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Safety Study: Case Summaries of 189 Heavy Truck Accident Investigations

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16. Abstract: This study presents summaries of 189 heavy truck accident investigations conducted by the National Transportation Safety Board. Among the driver-related issues discussed are duty hours/fatigue, training/experience, alcohol/drugs, and driving records. The report also discusses motor carrier oversight of the operational safety of the truck or driver. Other factors discussed in some case summaries include hazardous materials, double trailers, grade crossings, the environment, and crashworthiness.

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NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C. 20594

SAFETY STUDY

Adopted: October 12, 1988

CASE SUMMARIES OF 189 HEAVY TRUCK ACCIDENT INVESTIGATIONS

INTRODUCTION

Over the past several years, interest in the safety issues surrounding heavy trucks has been increasing. Groups from both the government and private sector have voiced their concern about the trucking industry. As part of its safety studies program, the Safety Board began a heavy truck safety study project in 1985. The first report prepared under this project (training, licensing, and qualifications of truck drivers) recommended a wide variety of improvements needed in those areas.[1/] Several of these recommendations have since been included in the Commercial Motor Vehicle Safety Act of 1986.

In the fall of 1985, the Safety Board launched a special program of accident investigations involving heavy trucks. The criteria for this study included crashes involving trucks of 10,000 pounds gross vehicle weight rating (GVWR) or greater with tow-away damage. Field investigators from eight of the Safety Board's field offices participated in this series of investigations with assistance from the Washington, D.C. headquarters. The objectives of this project were to identify some of the safety problems associated with the trucking industry.

Using the selection criteria, more than 190 investigations of accidents involving heavy trucks were initiated. In addition, several field-level investigations that were initiated before the beginning of the study but which met the study's selection criteria were included in the project. The trucks involved include 2-axle straight trucks, 3-axle straight trucks, tractor-only (bobtail), tractor/semitrailer, and tractors in combination with two trailers (doubles). Many of the cases involved several medium and heavy vehicles (one, Case No. 127, involved seven trucks). A few of the investigations initiated were later closed because sufficient documentation for an in-depth investigation could not be developed. In addition, two investigations were closed when it was found that the accident-involved truck had not actually received tow-away damage.

Summaries of 189 investigations are presented in this volume. At a later date, the Board plans to issue appropriate recommendations from the investigations.

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1 / Safety Study--"National Transportation Safety Board, Training, Licensing, and Qualifications Standards for Drivers of Heavy Trucks, April 17, 1986" (NTSB/SS/-86/02).

Since it was not possible to relate all of the factual information contained in the docket in these short summaries, the complete documented case histories are in the docket. The docket for each of the summarized cases is available for public review if additional information is required. These dockets are maintained in the Safety Board's Public Inquiries office, 800 Independence Avenue, S.W., Washington, D.C. 20594.

The case files (dockets) which form the basis for these summaries contain extensive documentation of the motor carrier(s), the truck driver(s), the truck(s), and the roadway. In each investigation, the Safety Board developed a a minimal profile of the motor carrier responsible for the driver and truck, including its type of operation, size of operation, truck maintenance practices, and safety-related procedures and practices. The activities of the driver were reconstructed, to the extent possible, by a review of daily logs, fuel receipts or other available documents, and through interviews of persons such as the driver, motor carrier personnel, shipper personnel, family members, and personal acquaintances. Where possible, the employment background of the truck driver, including experience and training, was researched, in addition to a search of past traffic violations and accidents. The involved vehicles underwent varying degrees of mechanical inspections, the extent of the inspections based largely on other facts developed in the course of the on-scene investigation. Pre- and postaccident defects were noted as were relevant truck specifications such as wheelbase, overall length, and both laden and unladen weight. In addition, truck crashworthiness and hazardous material involvement are addressed, if appropriate. Restraint use, where sufficient evidence was available for determination, is included for the involved vehicles. Photographs are included for all relevant aspects of the investigation.

The table on page 11 lists the cases and the issues. Many of the cases involved several issues of interest. For example, Case No. 26 involved a truck driver in hazardous material transportation who admitted to smoking marijuana just prior to the accident, and Case No. 6 involved a doubles combination with 7 of 10 brakes out of adjustment or inoperative which resulted in the vehicle striking a freight train.

While this table is not limited to the "probable cause" of the accidents, it does list issues of interest that developed in the course of the investigations. For example, many of the deficiencies found in trucks may not have caused or contributed to the accident, but are, nonetheless, important issues to consider when discussing truck safety.

These investigations do not constitute a statistical sample of heavy truck accidents. The Board's objective was to investigate only those accidents meeting the selection criteria. Another aspect of the case selection process that would nullify a statistical study was that the limited number of field investigators could not conduct an in-depth investigation of all the accidents of which the Safety Board received notification. Therefore, the limited resources were directed toward the cases meeting the selection criteria.

The Safety Board decided to undertake a second phase of heavy truck accident investigations. This second phase study, initiated on October 1, 1987, will concentrate for 1 year on accidents fatal to the drivers of heavy trucks. Investigations now being conducted in eight target States will represent approximately 30 percent of the annual nationwide occurrences for this type accident. As with the first phase investigations, the Safety Board is conducting an in-depth investigation of each accident with thorough documentation of all aspects. The investigations will be sufficiently in-depth to determine the probable cause of the accidents and will focus on factors related to the driver (alcohol or drug involvement and the relationship of stressful working conditions to driver error) and the employing motor carriers (their oversight responsibilities to ensure safe operations).

The Safety Board's sample of cases for the second phase will not be representative of all truck accidents for two reasons: (1) the study is focusing on only one type of accident, those fatal to the driver; and (2) it is not a random sample of all those. Nevertheless, the Board believes that by obtaining a 30 percent sample of fatal-to-truck driver accidents, study results will provide reliable data on the extent of alcohol and drug use by truck drivers fatally injured in accidents and the operating environment that may have been a contributing factor.

INVESTIGATION HIGHLIGHTS - PHASE I

As with any event as complex as most traffic accidents, the Board found a multitude of safety-related issues in the accidents investigated that caused or contributed to an accident occurrence. While it is not the purpose of this document to address each safety topic found in these investigations, the Board believes that illustrative examples of selected issues may clarify why specific topics are considered important in heavy truck safety. The date, time, location, and Safety Board Field Office number of the cases cited as examples can be found in appendix B.

DRIVER ISSUES:

The actions of the vehicle driver probably have a greater influence on an accident occurrence than any other factor. In addition to the driver's actions during the accident sequence, it is important to consider the history of the driver. The investigations conducted by the Safety Board found truck drivers who had falsified daily log records, drove or remained on duty longer than allowed by Federal Motor Carrier Safety Regulations (FMCSR), had little or inadequate training for the type of vehicle operated, or had accumulated an extremely poor driving record.

Duty Hours/Fatigue--In the accidents investigated, the Safety Board repeatedly found violations of Federal Hours of Service regulations.[2/] In addition, many of the drivers investigated participated in off-duty activity that may have left them fatigued even before reaching the limits of duty time allowed. It was not uncommon to find multiple log books--one maintaining an accurate

2 / Federal Motor Carrier Safety Regulation 49 CFR 395.3

record of duty hours for payroll purposes and another maintaining a record of hours falsely indicating compliance with regulations for presenting at port-of-entry or roadside inspections.

In Case No. 4, a fully loaded tractor/semi-trailer travelling over 55 miles per hour ran into the rear of a schoolbus. The truck driver received only minor injuries while 4 of the schoolbus passengers were fatally injured, 4 received serious injuries, and 15 received minor injuries. The Safety Board found that the truck driver had been on duty for the 26 hours preceding the accident. He had falsified his daily log book to indicate 7 hours of off-duty time. In addition, it was found that he had violated hours-of-service regulations at least four times in the 3 days before the accident.

Case No. 93 involved an overturn and subsequent collision with a intercity bus in mountainous terrain. The truckdriver, operating with a known braking problem, had continued his assigned trip through the Colorado mountains. Four of the bus passengers were killed, 12 were injured; the truck driver escaped unharmed. The Safety Board investigation revealed that the truckdriver had accumulated fewer than 7 hours of sleep in the 51 hours preceding the accident. At the time of the collision, he had been without sleep for more than 21 hours. A codriver, his wife, who was supposed to share driving duties, was not onboard the unit. However, the daily logs of the codriver were found in the tractor cab, signed for the dates of the accident trip.

Training/Experience--Federal regulations establish no training prerequisite for interstate service. Regulations indicate that a person is qualified if the driver can "safely operate the type of motor vehicle he drives ...and [c]an... determine whether the cargo he transports ...has been properly located, distributed, and secured in or on the motor vehicle he drives." But in both cases, those abilities can be acquired "by reason of experience, training, or both."

As the Safety Board observed in its 1986 safety study, "Training, Licensing, and Qualification Standards for Drivers of Heavy Trucks" (NTSB/SS-86-02), "Truck driving ...is a specialized skill -- distinct in many ways, and more demanding than operating a smaller vehicle, such as a car." The Safety Board, noting that "far too many people are able to enter the field without having first acquired that skill," concluded that formal training is the most reliable way to ensure that truck drivers have learned what is necessary for safe operation of their vehicles. With encouragement and direction from the Safety Board, the Professional Truck Driver Institute of America is developing programs to increase the proportion of truck drivers with formal training and also to ensure adherence to high instructional standards at truck driver training schools. Furthermore, in keeping with the Board's recommendations, the Commercial Motor Vehicle Safety Act of 1986 called for reforms in the State licensing of truck drivers. The Department of Transportation has responded with rulemaking that will lead, it is hoped, to a uniform, nationwide system that is capable of screening out unqualified drivers.

In Case No. 176, a slow moving heavy truck was struck in the rear by a second heavy truck. The slow moving truck was being operated by a driving team who were neither trained nor licensed for heavy vehicles. One driver held only a schoolbus chauffeur's license and the other driver held an instruction permit that required a properly licensed truckdriver to be in the vehicle with him.

Alcohol/Drugs--Drivers impaired by alcohol, drugs, or a combination of the two unfailingly demonstrate poor driving judgement. When that poor judgement is combined with a heavily loaded 18-wheel truck, the potential for accident is obvious. The Safety Board investigated 26 accidents for this study which involved toxicological evidence of impairment, a police investigator's opinion of impairment, or other evidence of drug or alcohol abuse. Other cases suggested the involvement of alcohol or drug impairment but information was either not sufficient or was not available for the Safety Board to determine impairment.

In Case No. 52, a heavy truck was travelling at a driver-reported speed of 60 to 65 mph when it struck the rear of a queue of four other heavy trucks stopped due to a previous traffic accident. The Safety Board found that this driver had not slept in the past 44 hours. In addition, he had consumed a large quantity of beer and had taken unknown quantities of amphetamines and cocaine. Postcrash toxicological testing revealed a blood alcohol level of 0.14 percent. The driver related that he used the combination of alcohol and drugs in an attempt to stay awake on long trips.

In Case No. 110, a tractor travelling at a Safety Board-estimated speed of 78 to 87 mph struck the rear of a slow-moving tractor/semi-trailer loaded with steel. The Safety Board determined that the driver of the striking vehicle had been awake and active for the 16 hours preceding the accident and was in the initial stage of a 450-mile trip which he intended to complete before stopping. Postcrash toxicological tests revealed 0.11 milligrams per liter of methamphetamines in this driver's blood.

Driver History--In many of the cases investigated for this study, the Board found instances of very poor driving records, suspended or revoked operators' licenses, or multiple licenses. Some of the motor carriers were aware of the driver's past records; some of the drivers failed to report disqualifying past history to their employer.

In Case No. 133, a heavy truck operated by an intoxicated driver (blood alcohol concentration (BAC) of 0.26 percent) struck two passenger vehicles at the scene of a previous accident. The scene was protected by two marked police vehicles with warning devices activated. The subsequent Safety Board investigation found that the interstate truckdriver was licensed in seven states; five of the licenses were

suspended, one was expired, and one was classified in State records as "probably cancelled." The truckdriver's wife (also his codriver, who was not on this trip due to illness) stated to investigating officers that her husband is an alcoholic, and because of his drinking problem, she usually drives the first part of any trip while he sleeps.

MOTOR CARRIER:

The Safety Board found that practices of the motor carrier contributed, either directly or indirectly, to the occurrence of many of the accidents investigated for this project. In some, the carrier's oversight procedures were inadequate for ensuring the operational safety of the truck or the driver, and in other cases, the carriers were not complying with mandated safety regulations. Some of the carriers investigated knowingly employed drivers with disqualifying violation histories, knowingly tolerated falsification of daily log records, or showed generally poor oversight of the driver and/or the truck.

In Case No. 25, a heavily loaded truck overturned in the early morning hours. The Safety Board found that the driver had traveled more than 2,100 miles in the 3 1/2 days preceding the accident, but he had falsified his daily log books to reflect compliance with FMCSR hours of service requirements. A Bureau of Motor Carrier Safety (now the Office of Motor Carriers) audit of the motor carrier for 82 full-time drivers and 10 part-time drivers over a 12-month period found 150 instances of this carrier requiring or permitting their drivers to make false entries in their duty status logs. In addition, the audit found 13 violations of the 70-hour rule, 32 counts of requiring or permitting a driver to drive more than 10 hours, and 9 counts of requiring or permitting a driver to drive after having been on duty for 15 hours.

In Case No. 10, a heavily loaded truck struck the rear of a schoolbus that was stopped to load passengers. The truck was operated by an alcohol-impaired driver (BAC of 0.18 percent), who stated that he had not slept for 22 to 24 hours before the accident. The Safety Board found that the motor carrier did not have the minimum levels of financial responsibility required, had no proof of financial responsibility, used a disqualified driver (the license of the driver involved in this accident was suspended due to a prior Driving Under the Influence conviction but he continued to drive), had no driver qualification files, failed to report accidents, permitted drivers to violate the 10-hour driving rule, did not require drivers to maintain daily log books, and did not keep vehicle inspection and maintenance records.

Six of eight brakes on the truck in Case No. 14 were found to be out of adjustment, an accident which involved a runaway in mountainous terrain. The remaining brakes could not be checked due to damage to the truck. Also noted was inadequate tread depth for the majority of tires of the combination. The motor carrier told the Safety Board that brake adjustment was the responsibility of the driver. However, the investigation found that the carrier neither furnished training nor

required experience in brake adjustment. A surviving unauthorized passenger told investigators that the driver had checked his brake adjustments less than 1 1/2 hours before the accident.

In Case No. 78, a heavy truck ran away on a mountain downgrade. The vehicle was travelling at a witness-estimated speed of 70 to 80 mph before it overturned, slid through a guardrail, and continued for more than 550 feet before coming to a stop. An examination of the vehicle revealed that 8 of the combination's 10 brakes were out of adjustment. The Safety Board also found that the driver's daily log books were 13 days behind, and that the driver had traveled approximately 1,725 miles in the 39 hours preceding the accident (an average of over 44 mph if the driver had made no stops). At the time of the accident, the truck was 4 hours behind schedule and about 15 miles from its destination.

In Case No. 54, a heavy truck transporting 3,907 gallons of combustible and flammable liquids overturned on an Interstate cloverleaf in a densely populated area. The investigation revealed that eight portable tanks loaded within the trailer had not been secured against lateral shift. This loading procedure was in accordance with established carrier policy. The Safety Board found that the truck overturned when the rearmost tanks shifted toward the left, altering the trailer's lateral center of gravity and effectively reducing the rollover threshold of the entire unit. Forty-nine firemen on 16 fire and rescue units, about 15 enforcement officers, and personnel from both State and Federal environmental agencies responded to the spill that resulted. The roadway was closed for 12 1/2 hours while cleanup operations were completed.

OTHER ISSUES:

Hazardous Materials--While the Safety Board believes that the drivers responsible for the transportation of hazardous material should be the elite of their class and that the carrier's operation should be a model of compliance with all safety regulations, the investigations conducted for this study found drivers of hazardous cargos who were impaired by alcohol or drugs (or both), fatigued drivers, poorly maintained equipment, and carriers of hazardous material in almost total noncompliance with safety regulations.

In Case No. 102, a fully loaded gasoline tanker left the roadway in the early morning hours, overturned, and exploded. The Safety Board found that the driver was probably fatigued. Coworkers reported that the driver had lived in the sleeper cab of his truck, which was parked on the motor carrier's property, and spent the majority of his off-duty time maintaining several tractors and trailers that he leased to the carrier. The coworkers also related that the driver was in a constant state of fatigue due to irregular work hours and the self-maintenance of his vehicle fleet.

In Case No. 152, a gasoline tanker left the roadway and, in this case, struck a truck that was parked on the shoulder. The Safety Board found that the driver of the gasoline tanker had been on duty for approximately 89 hours in the past 8 days and, at the time of the accident, he had been driving for about 12 1/4 hours. The driver had modified his daily log book entries to reflect fewer duty hours than he actually worked.

Double Trailers—The alleged "inherent instability" of double trailer combination units has been debated for as long as this type of vehicle has been in operation. There have been many reports about rear trailers of doubles combinations suddenly becoming detached and overturning. The Safety Board investigated 41 cases involving double trailers for this study, many of which involved overturn of one or more components as the first accident event. The Board did not find a single case in which the rear trailer separated from the combination except during the overturn itself. Many of the overturns themselves resulted directly from steering maneuvers which might have been safe in a tractor/single-semitrailer combination. The Board also found cases where training or experience was probably inadequate for these operations.

In Case No. 68, a doubles combination was entering a left curve when the driver reportedly steered to the right to avoid an encroaching passenger car. The rearmost trailer began to swerve and eventually overturned. The Safety Board found that the driver had more than 15 years of experience in the operation of heavy trucks, but only 3 days of experience with double trailers. The only training regarding operation of double trailers provided by the motor carrier was a 30-minute orientation.

In Case No. 94, the doubles combination was traveling at a driver-estimated speed of 40 to 45 mph negotiating a curve to the left. The driver reported that the rearmost trailer began to sway and that after approximately 1,500 feet, it overturned. The Safety Board found that this driver had about 10 years of experience with heavy trucks, but had only 2 weeks of experience with double trailers. The motor carrier had furnished about one hour of training concerning the inspection, coupling, and uncoupling of double trailers. There was no behind-the-wheel training and no mention of different handling characteristics was made. The driver's road test was given in a tractor/single-semitrailer (in violation of the FMCSR which requires a road test in the same type vehicle that is to be regularly operated), and the carrier's employee who administered the test revealed that he had never tested a prospective driver in a doubles combination.

Grade Crossings—The Safety Board investigated 17 accidents during this study that involved a heavy truck at a grade crossing. Many of the accidents involved some type of low-profile trailer becoming high-centered at the crossing; others involved crossings that might not have been compatible with the performance of a heavy truck. Decibel meter readings at some of the crossings revealed that the truckdriver, due to his cab environment, might not have been able to hear the warning whistle of the approaching train.

In Case No. 105, a low-profile trailer became hung-up on a high-profile grade crossing. The combination unit was struck by a freight train travelling at approximately 50 mph. The Safety Board determined that the clearance allowable at the lowest point of the trailer was insufficient to allow the trailer to clear the crossing. Subsequent investigation revealed that the crossing profile had been elevated by the railroad, but the State DOT had not been made aware of the change.

In Case No. 184, a heavy truck was crossing a single track grade crossing when it was struck by an Amtrak passenger train travelling at 79 mph. The Safety Board determined that, although there were flashing warning lights present, the truckdriver's view of the approaching train was probably obstructed by a combination of the cab configuration and the crossing angle. In addition, field tests revealed that the interior noise level of the tractor cab probably was too great for the truck driver to have heard the train whistle in time to avoid the train.

The Environment--While the role of the environment must be considered as a factor in any accident, there are some accidents that will occur regardless of environmental surroundings. The Safety Board found that some of the accidents investigated were directly contributed to by the roadway or its condition, the weather (i.e., snow, ice, fog, rain, etc.), or other environmental factors.

A heavy truck lost control, jackknifed, and struck a dirt embankment in Case No. 91. The road surface, wet from an earlier rainfall, was highly polished asphalt with well-worn ruts in the tire travel paths of each lane. Within minutes of this accident, a second truck accident (Case No. 114) occurred several hundred feet down the road, also involving a loss of control. The Safety Board found evidence of at least 13 other vehicles having left the travel surface of the road in the immediate area, all within the past several days.

In Case No. 2, a twin trailer combination was traversing a downgrade on a U.S. highway. The travel surface of the roadway was polished concrete, with a very low friction value. The truckdriver was operating the unit with a three-stage engine retarder in its maximum efficiency position. As the driver relieved accelerator pressure, the tractor began an immediate rotation into a severe jackknife. The Safety Board found that although the engine retarder was being used improperly, the low friction value of the roadway contributed to the accident. Had adequate friction been available, the retarder could not have created the instability.

Crashworthiness--The Safety Board investigated many accidents where the structural design of the tractor cab did not provide adequate protection for the driver. Many of those accidents involved an overturn at legal highway speed in which the top of the tractor cab was crushed to the level of the instrument panel, resulting in little or no survivable space for the driver. Other investigations documented the complete disintegration of tractor cab structures in frontal collisions. Sufficient information (i.e., loading marks on the belt webbing, medical records documenting nature and location of

injuries, or contact areas within the cab structure) was not available for independent verification of restraint use by the truckdrivers for the Board to evaluate the effects of restraint use by drivers of heavy trucks.

In Case No. 28, a fully loaded tractor/semitrailer overturned after striking a second vehicle. As the tractor rolled onto its left side, the vehicle slid into a W-beam guardrail. The top left portion of the truck cab was collapsed inboard and downward, intruding into the driver's compartment. The driver was found crushed within the compressed area. The investigation found no structure above the drivers compartment sufficient for prevention of this type of collapse.

In Case No. 43, a tractor/semitrailer combination drifted off the travel surface and eventually rolled 270 degrees. The cab roof was crushed downward to the level of the instrument panel, and the truck driver was fatally injured. As in Case No. 28, there was no structure above the driver for prevention of the roof collapse.

In Case No. 122, a doubles combination went out of control, left the roadway, and struck a dirt embankment. The cab of the tractor hinged forward crushing the cab and the restrained driver. The Safety Board found that the cab latching mechanism had failed. If the tractor had been constructed with a reinforced cab, the crush may have been minimized and there might have been survivable space.

SUMMARY

The accidents discussed in this study highlight issues important to heavy truck safety: (1) duty hours/fatigue; (2) training/experience; (3) use of alcohol/drugs; (4) driver history; (5) carrier oversight of drivers; (6) carrier oversight of equipment; (7) hazardous material transportation; (8) double trailer operations; (9) grade crossings; (10) environmental issues; and (11) crashworthiness. While this is not a complete list of issues found during the investigation of the 189 accidents, it is representative of many safety related concerns in the trucking industry.

In the second phase of this project, the Safety Board will continue to examine the issues found during the initial 2 years of the heavy truck safety study. Recommendations, where appropriate, will be issued to public and private concerns to improve the safety aspects of heavy truck transportation.

TABLE - SUMMARY OF CASE ISSUES OF INTEREST

CASE NUMBER	OF INTEREST IN THE INVESTIGATION										
	DRIVER					CARRIER		OTHER			
	FATIGUE/DUTY HOURS	TRAINING/EXPERIENCE	ALCOHOL/DRUGS	DRIVING HISTORY	OVERSIGHT OF DRIVER	OVERSIGHT OF EQUIPMENT	HAZARDOUS MATERIAL	DOUBLE TRAILERS	GRADE CROSSING	ENVIRONMENT	CRASHWORTHINESS
1		X						X			
2		X						X		X	
3					X		X				
4	X			X	X						
5	X	X			X						
6						X		X	X		
7		X					X				
8	X					X					
9						X				X	
10	X		X	X	X	X					
11	X			X		X					
12		X						X			
13	X				X		X			X	X
14		X				X				X	
15	X		X	X	X	X					
16	X										
17	X					X		X		X	
18							X				
19		X				X		X		X	
20				X	X	X					
21				X	X		X				
22			X		X		X				
23		X					X			X	
24	X				X					X	
25	X				X						
26	X		X		X		X				
27	X	X	X	X	X			X			
28				X	X						X
29				X						X	X
30				X	X		X	X			
31		X			X					X	
32			X	X	X						

TABLE - SUMMARY OF CASE ISSUES OF INTEREST (cont.)

CASE NUMBER	OF INTEREST IN THE INVESTIGATION										
	DRIVER					CARRIER		OTHER			
	FATIGUE/DUTY HOURS	TRAINING/EXPERIENCE	ALCOHOL/DRUGS	DRIVING HISTORY	OVERSIGHT OF DRIVER	OVERSIGHT OF EQUIPMENT	HAZARDOUS MATERIAL	DOUBLE TRAILERS	GRADE CROSSING	ENVIRONMENT	CRASHWORTHINE...
33		X								X	
34	X				X						X
35	X			X	X						
36							X				
37									X		
38	X	X			X	X					
39	X	X			X	X		X			X
40	X				X						X
41	X				X						X
42	X		X		X	X					
43	X		X		X						X
44				X	X						
45		X		X	X						
46		X			X					X	
47	X			X	X					X	X
48						X		X			
49		X		X	X	X		X		X	
50	X			X						X	
51			X	X		X		X			
52	X		X		X						
53		X						X			
54						X	X				
55		X						X		X	
56				X	X		X		X	X	
57					X					X	
58											
59				X	X	X				X	X
60		X						X			
61	X						X		X		
62								X			
63						X					
64								X		X	

TABLE - SUMMARY OF CASE ISSUES OF INTEREST (cont.)

CASE NUMBER	OF INTEREST IN THE INVESTIGATION										
	DRIVER					CARRIER			OTHER		
	FATIGUE/DUTY HOURS	TRAINING/EXPERIENCE	ALCOHOL/DRUGS	DRIVING HISTORY	OVERSIGHT OF DRIVER	OVERSIGHT OF EQUIPMENT	HAZARDOUS MATERIAL	DOUBLE TRAILERS	GRADE CROSSING	ENVIRONMENT	CRASHWORTHINESS
65	X			X	X						X
66		X	X			X					
67		X						X			
68		X						X			
69		X			X	X					
70				X	X	X					
71	X				X					X	
72	X				X						
73			X							X	
74	X				X						X
75									X	X	
76			X	X	X			X			
77	X				X						X
78	X			X	X	X					
79										X	
80	X	X		X	X	X	X	X			
81							X				
82		X								X	
83		X			X	X			X	X	
84						X					
85				X	X		X	X		X	
86							X				X
87					X				X	X	
88	X				X						
89		X				X					
90						X	X				
91		X				X				X	
92				X	X	X	X				
93	X			X	X	X					
94		X		X	X			X			
95									X		
96						X		X			

TABLE - SUMMARY OF CASE ISSUES OF INTEREST (cont.)

CASE NUMBER	OF INTEREST IN THE INVESTIGATION										
	DRIVER					CARRIER		OTHER			
	FATIGUE/DUTY HOURS	TRAINING/EXPERIENCE	ALCOHOL/DRUGS	DRIVING HISTORY	OVERSIGHT OF DRIVER	OVERSIGHT OF EQUIPMENT	HAZARDOUS MATERIAL	DOUBLE TRAILERS	GRADE CROSSING	ENVIRONMENT	CRASHWORTHINESS
97								X		X	
98									X	X	
99											
100							X				X
101	X				X					X	
102	X				X		X				
103				X	X	X					
104				X					X	X	
105									X	X	
106	X			X	X			X		X	
107	X				X	X					
108								X			
109											
110	X		X		X	X					
111							X				
112		X			X	X				X	
113	X				X						
114		X				X		X		X	
115						X					
116		X	X	X	X					X	
117			X	X	X						
118						X					
119	X			X	X						
120							X	X		X	
121						X				X	X
122	X	X						X		X	X
123				X	X						
124				X				X		X	
125	X				X					X	
126					X						
127	X				X					X	
128						X					

TABLE - SUMMARY OF CASE ISSUES OF INTEREST (cont.)

CASE NUMBER	OF INTEREST IN THE INVESTIGATION										
	DRIVER					CARRIER		OTHER			
	FATIGUE/DUTY HOURS	TRAINING/EXPERIENCE	ALCOHOL/DRUGS	DRIVING HISTORY	OVERSIGHT OF DRIVER	OVERSIGHT OF EQUIPMENT	HAZARDOUS MATERIAL	DOUBLE TRAILERS	GRADE CROSSING	ENVIRONMENT	CRASHWORTHINESS
129	X		X	X	X						
130			X				X				
131								X		X	
132		X			X						
133			X	X	X					X	
134	X			X	X	X					
135									X	X	
136											
137		X			X						
138				X	X					X	
139	X				X					X	X
140	X			X		X					
141				X							
142			X	X	X	X					
143	X						X			X	
144						X					
145				X	X				X		
146	X					X	X				
147					X		X				
148										X	
149										X	
150	X									X	
151	X			X	X						
152	X				X		X				
153	X				X						
154				X				X			
155				X	X	X					
156	X		X	X	X	X	X				
157		X		X				X			
158		X			X			X		X	
159								X			
160					X	X	X				

TABLE - SUMMARY OF CASE ISSUES OF INTEREST (cont.)

CASE NUMBER	OF INTEREST IN THE INVESTIGATION										
	DRIVER					CARRIER		OTHER			
	DUTY HOURS/FATIGUE	TRAINING/EXPERIENCE	ALCOHOL/DRUGS	DRIVING HISTORY	OVERSIGHT OF DRIVER	OVERSIGHT OF EQUIPMENT	HAZARDOUS MATERIAL	DOUBLE TRAILERS	GRADE CROSSING	ENVIRONMENT	CRASHWORTHINESS
161							X				
162	X				X		X				
163											
164			X	X	X	X					
165			X								
166				X	X						
167						X			X	X	
168								X			
169						X	X			X	
170	X				X			X			
171							X			X	
172				X	X	X	X				
173	X			X	X						
174			X	X	X						
175			X	X			X				
176	X	X			X			X			
177		X		X			X				
178		X				X	X		X		
179				X			X				
180								X			
181	X			X	X	X				X	
182		X		X	X	X					
183			X		X				X		
184									X	X	
185		X									X
186									X	X	
187				X	X	X	X	X			
188	X	X			X						
189	X	X			X					X	X

CASE NO.: 1

Investigation No.: ATL-86-H-TR02
Accident Location: Interstate 26, Hendersonville, North Carolina
Lanes: 4
Shoulders: Asphalt, 3 feet inside, 10 feet outside
Median: 44-foot earthen
Features: Rolling, occasional curve, at grade
Date and Time: October 20, 1985, 7:00 p.m.
Ambient Conditions: Clear, dark, dry
Heavy Truck Involved: 1983 Freightliner COE power unit in combination with 2 loaded 28-foot van trailers
Motor Carrier: Ryder/PIE Nationwide
Type of Operation: Common Carrier
Size of Operation: 4905 power units
Total Weight of Truck(s): 78,530 pounds
Total Length of Truck(s): 68 feet 11 inches
Other Vehicle Involved: Passenger car
Truck Fatalities: 0 **Truck Injuries:** 0
Other Fatalities: 0 **Other Injuries:** 0

SUMMARY:

The combination unit was traveling uphill on a slight curve to the right at a driver-estimated speed of 54 mph. Witnesses related that as the combination unit began to overtake a slower moving passenger car, the truckdriver steered sharply from the right to left lane in a passing maneuver. The steering input resulted in an instability of both the front and rear trailers and both began swerving laterally. The driver stated that he "let off the gas" but that the instability increased to the point where both trailers were swerving outside of the travel lane of the tractor. The forward trailer made slight contact with a passenger car traveling in the right lane. The rearmost trailer, attached to the unit by a converter dolly, eventually swerved off the left shoulder where its rear duals entered the earthen median. From that point, the trailer overturned on its left side, breaking loose from its pintle coupling to the front trailer. The power unit and front trailer remained upright. The driver regained control and safely stopped it on the right shoulder without further conflict.

This accident resulted in no injuries to the unrestrained driver of the combination unit, nor to the occupants of the passenger car. The power unit of the combination vehicle was undamaged. The semitrailer received damage only at the pintle hook assembly while the converter dolly and rear trailer sustained moderate damage consistent with an overturn. One of the safety chain connections between the converter dolly and the semitrailer was found broken.

The investigation revealed this driver's operating license to be unrestricted, yet his DOT medical certificate noted him to be "qualified only when wearing corrective lenses." The driver was not wearing corrective lenses at the time of this accident. The driver had about 7 years of heavy truck operating experience, 2 of those with doubles units, but he had received no specialized training in the operational characteristics unique to pulling doubles.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the excessive steering input by the driver of the doubles combination. Contributing to the cause of the accident was a lack of specialized training in the operational characteristics unique to pulling doubles.

OF INTEREST IN THIS INVESTIGATION:

1. Driver Training/Experience
2. Double Trailers

CASE NO.: 2

Investigation No.: FTW-85-H-TR38
Accident Location: U.S. Highway 81, 6 miles south of Decatur, Texas
Lanes: 4-lanes, divided
Shoulders: 10-foot wide, asphalt
Median: Earthen, varying widths
Features: Vertical curve
Date and Time: August 13, 1985, 4:15 p.m.
Ambient Conditions: Raining
Heavy Truck Involved: 1981 G.M.C. Astro tractor in combination with 2 empty 27-foot van trailers
Motor Carrier: Whitfield Tank Lines, Inc.
Type of Operation: Common Carrier
Size of Operation: 175 power units
Total Weight of Truck(s): 27,100 pounds
Total Length of Truck(s): 65 feet 6 inches
Other Vehicle Involved: None
Truck Fatalities: 0 **Truck Injuries:** 1
Other Fatalities: 0 **Other Injuries:** 0

SUMMARY:

The combination unit was traveling southbound, traversing an approximate 3 percent downgrade on a straight section of roadway, approaching the tangent point of a vertical curve, when the driver relieved pressure on the accelerator. The tractor, being operated with a three-stage engine retarder set at its maximum efficiency position, began an immediate clockwise rotation. This rotation of the tractor continued through approximately 120° as the entire unit left the roadway from the right shoulder, skidded across the gravel and grass roadside material, and dropped into a depressed concrete drainage structure. From the drainage structure, the tractor continued for 160 feet, ascending about 20 feet up a dirt embankment, before coming to rest facing north. The semitrailer, directly behind and attached to the tractor by the fifth wheel, remained upright throughout the sequence. The full trailer, attached to the semitrailer by a converter dolly, tracked along the side-slope of the embankment and overturned onto its left side. This overturn partially separated the structural crossmember from the rear of the semitrailer and allowed the pintle connection to break free.

This accident resulted in serious injuries to the unrestrained truckdriver. The tractor received substantial damage while moderate damage was noted at the rear and right side of the semitrailer. The converter dolly was twisted due to the overturn, and the rear trailer moderately damaged.

This driver had been operating twin trailer combination units for the past 4 1/2 years, 4 of the years with his current employer. He had made the transition from three-axle tractors to the short wheelbase two-axle tractors about 2 1/2 years before the accident. The driver told Safety Board investigators that he had not experienced problems with similar instabilities before this accident.

The investigation revealed that this driver regularly operated the power unit with its engine retarder set for maximum efficiency. He stated that in 30 to 35 years of heavy truck operations he had never had access to an operator's manual for engine retarder operation, nor had instructions in proper retarder operation been received--there was no retarder operations manual in the power unit. The only instructions regarding twin trailer operations given by his employer concentrated on proper connection procedures.

Pavement testing results furnished by the Texas Department of Highways and Public Transportation revealed that the polished concrete travel surface had an average skid number of 20, with differential friction coefficients in the tire paths. At the time of this accident, a light rain had just begun to fall; the first rainfall reflected by local records in over 40 days. The Safety Board found that the low surface friction value, in combination with the rainfall, probably reduced the effective coefficient of friction to a value similar to that of an icy surface. With the reduced friction, the engine retarder was capable of stopping the rotation of the tractor's drive axle tires, resulting in the rapid rotation of the short wheelbase unit.

PROBABLE CAUSE:

The National Transportation Safety Board determined that the probable cause of this accident was the truckdriver's improper use of the engine retarder. This improper use, in combination with the polished travel surface, resulted in the initial instability of the tractor.

OF INTEREST IN THIS INVESTIGATION:

1. Driver Experience/Training
2. Double Trailers
3. Environment

CASE NO.: 3

Investigation No.: FTW-86-H-FR13
Accident Location: Interstate 40, within Albuquerque, New Mexico
Lanes: 6-lanes, divided
Shoulders: Median shoulder 4 feet of asphalt surface, no outside shoulder at impact area
Median: Concrete drainage structure bordered by New Jersey barriers
Features: Straight and level, at interchange
Date and Time: May 20, 1986, 7:50 p.m.
Ambient Conditions: Clear, dry, 78°F, artificial lighting
Heavy Truck Involved: 1980 Freightliner COE tractor in combination with a loaded 45-foot flatbed trailer
Motor Carrier: National Electric, Inc.
Type of Operation: Contract Carrier
Size of Operation: 35 power units
Total Weight of Truck(s): 72,300 pounds
Total Length of Truck(s): 58 feet
Other Vehicle Involved: 1970 Datsun stakebed pickup
Truck Fatalities: 0 **Truck Injuries:** 0
Other Fatalities: 0 **Other Injuries:** 1

SUMMARY:

The combination unit was travelling westbound in the center of three lanes at a driver estimated speed of 50 mph. The trailer was loaded with 16 electrical transformers containing varying levels of polychlorinated biphenyl (PCBs). As the truck passed through an interchange with a local street, a small pickup veered from a spiral onramp into the westbound lanes, striking the right front corner of the tractor. As the tractor continued forward, the small pickup rotated into contact with the right side fuel tank and the right side drive axles before departing the impact area toward the northwest. In all, the small pickup slid over 80 feet to its final resting point. The impact resulted in a loss of control by the truckdriver, and the combination unit began veering toward the northwest. The left front tire of the tractor began leaving visible scuffmarks at a point 6 feet west of the initial impact area. This scuff continued for a total distance of 192 feet, following an arc with a measured radius of 506 feet. The trailer rolled over onto its left side 152 feet west of the initial impact area. The tractor followed the trailer into the rollover approximately 8 to 10 feet further toward the northwest. From the area of rollover, the combination unit continued to the northwest for a distance of 140 feet, sliding on its left side to final rest. Diesel fuel from the ruptured right side tank was found sprayed on the roadway surface from the area of impact up to the point of overturn. According to the truckdriver, an engine fire began immediately after the combination unit came to rest. That fire eventually consumed a substantial portion of the tractor, but it was brought under control by firefighters before the fire reached the trailer and its toxic load.

This accident resulted in no injuries to the lapbelt restrained driver of the combination unit. The driver of the small pickup sustained serious injuries. The tractor of the combination unit was destroyed by fire and the trailer received minor damage consistent with an overturn. The small pickup was also destroyed.

The police report of the traffic accident indicated that the driver of the small pickup "stated that he had drank two beers." Although no alcohol tests were performed, the official report found that the driver "had been drinking - was not impaired."

Police investigators reported that the tractor came to rest off the improved roadway, lying on its left side in the dirt roadside material. The trailer was located on the travel lane and right side shoulder, also lying on its left side. The chains and fabric strap binding that had secured the load of transformers failed to prevent the left side of the load from contacting the pavement surface, and many of the transformers were found damaged and/or leaking their hazardous contents. At least one of the transformers was found totally detached from the trailer, resting on the travel surface of I-40 at an undocumented location several feet west of the trailer.

Following the accident, officials found varying levels of the toxic material spilled on the travel lanes, the asphalt shoulder, and in the dirt roadside material. With the fire and the smoke cloud, the roadway was closed to all but emergency traffic. Approximately 500 to 1,500 persons located northeast of the scene were evacuated. This evacuation was called off after the fire was extinguished, but the highway remained closed for 14 1/2 hours. Extensive testing later revealed that very little toxic material was actually spilled, and the environmental management officials determined that this was not a "reportable spill."

The truckdriver had accumulated approximately 11 years experience with heavy trucks. He had been employed by the motor carrier for about 1 1/2 months and was still under the supervision of a senior driver for 6 weeks of on-the-job training required by the motor carrier. Extensive training had been furnished by the motor carrier, dealing primarily with the transportation of hazardous material. A search of this driver's history revealed two moving violations and one accident for the 4 years eceding the accident.

A BMCS review of the carrier's operation, conducted on September 8, 1986, found no substantial violations of the FMCSR. It was noted, however, that nine of the carrier's drivers had blood pressure limits that might interfere with safe operation of vehicles assigned to them. The truckdriver in this accident was among those with the questionable blood pressures. The BMCS noted that, on notification of this deficiency, the motor carrier took steps for correction.

Albuquerque, New Mexico
Case No. 3

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the pickup driver to maintain a safe and reasonable speed for negotiating the spiral onramp. Contributing to the loss of property was the postimpact fire which was fueled by the tractor's ruptured diesel tank.

OF INTEREST IN THIS INVESTIGATION:

1. Hazardous Material
2. Motor Carrier Oversight of Driver

CASE NO.: 4

Investigation No.: CHI-86-H-TR03
Accident Location: Interstate 94 Texas Township, Michigan
Lanes: 4
Median: 70-foot earthen, snow covered
Features: Straight, at grade, underpass
Date and Time: December 5, 1985, 3:50 p.m.
Ambient Conditions: Cloudy, snowing, roadway wet with snow and ice
Heavy Truck Involved: 1986 COE Peterbilt in combination with a loaded 42-foot flatbed trailer
Motor Carrier: William Timblin Transit, Inc.
Type of Operation: Common Carrier
Size of Operation: 48 tractors
Total Weight of Truck(s): 73,420 pounds
Total Length of Truck(s): 55 feet
Other Vehicle Involved: Schoolbus
Truck Fatalities: 0 **Truck Injuries:** 1
Other Fatalities: 4 **Other Injuries:** 20

<u>SUMMARY:</u>

The combination unit was traveling east on a straight portion of road, at a witness-estimated speed of greater than 55 mph when it collided into the rear of a school bus which was traveling at approximately 40 mph. Following the initial impact, the schoolbus was pushed into the concrete bridge support structures of an overpass. The combination unit crossed the eastbound lanes of Interstate 94 and came to rest in the median on its left side with the cab partially detached from the tractor.

The collision resulted in extensive damage to both vehicles. The truckdriver and bus driver received minor injuries. Of the 23 bus passengers, 4 were killed, 4 received serious injuries, and 15 received minor injuries.

Information furnished by the employing motor carrier indicated that this driver had approximately 26 years experience in the operation of heavy trucks. He had been employed by the motor carrier for 16 years. A search of driving history records revealed that the driver had received four speeding citations in the past 5 years, and had been involved in two accidents in the past 2 years. The motor carrier had been notified of the violations and accidents by the truckdriver.

The investigation determined that the truckdriver had been on duty for approximately 26 hours immediately before the accident. During this period, the driver had approximately 16 hours of driving time. However, the driver had falsely entered into his official logs that he was off duty for 7 hours during this period. An examination of the driver's records by an investigator of the BMCS found at least four violations of Hours-of-Service regulations for the 3 days preceding the accident.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the truckdriver to observe and avoid the slower moving schoolbus due to fatigue which resulted from excessive hours on duty. Contributing to this accident was the failure of the motor carrier to monitor its driver and prevent excessive hours of service.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours
2. Driving History
3. Motor Carrier Oversight of Driver

CASE NO.: 5

Investigation No.: MKC-86-H-TR02
Accident Location: U.S. Highway 50, 3 miles east of Strong City, Kansas
Lanes: 2 lanes undivided
Shoulders: Undefined
Median: None
Features: Straight and level
Date and Time: January 8, 1986, 5:40 a.m.
Ambient Conditions: Clear, dry, and dark
Heavy Truck Involved: (1) 1984 Peterbilt COE tractor in combination with a loaded 48-foot van trailer
Motor Carrier: Julian Martin, Inc.
Type of Operation: Common Carrier
Size of Operation: Not determined
Heavy Truck Involved: (2) 1984 GMC conventional tractor in combination with 2 loaded 28-foot van trailers
Motor Carrier: Yellow Freight Systems, Inc.
Type of Operation: Common Carrier
Size of Operation: Not Determined
Total Weight of Truck(s): (1) Estimated at 72,000 pounds
(2) Estimated at 68,700 pounds
Total Length of Truck(s): (1) Not determined
(2) Not determined
Other Vehicle Involved: None
Truck Fatalities: (1) 2 (2) 1 **Truck Injuries:** (1) 0 (2) 0
Other Fatalities: 0 **Other Injuries:** 0

SUMMARY:

The combination units were traveling toward each other on a relatively straight and level section of a two-direction roadway. A section of road surface, about 850 feet from a bridge in the direction of approach for the Peterbilt, had been resurfaced and had no centerline or fogline markings painted on the roadway. As the Peterbilt was approaching the bridge, it drifted into the oncoming lane of traffic and struck the power unit of the GMC doubles combination headon. A fire of undetermined origin started which in combination with the impact forces destroyed both power units and the semitrailer behind the GMC. The trailer behind the Peterbilt and the second trailer of the doubles combination were substantially damaged.

This accident resulted in the ejection of the Peterbilt driver and passenger, both of whom were unrestrained at the time of impact. Both were found fatally injured away from the final rest area of their vehicle. The driver of the GMC, also unrestrained, was found fatally injured and pinned within the wreckage of his vehicle.

The investigation revealed that the driver of the Peterbilt had accumulated 9 months and 14 days experience in the operation of heavy trucks. Although his current log book was destroyed in the accident, research into past driving practices indicated a pattern of duty-hours violations, both daily hours of service and 7 day rules. It was also noted that the motor carrier failed to heed negative recommendations by former employers before hiring the driver. At the time of the accident, an unauthorized passenger was onboard the Peterbilt, which violated both company policy and Federal regulations.

Records submitted by the employer of the GMC's driver reflected 26 years experience in the operation of heavy trucks. He had been employed by the current motor carrier for approximately 17 years.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the Peterbilt driver's lack of vigilance which resulted in his failure to perceive that his vehicle was entering the opposing traffic lane. The Safety Board could not determine the reason for that lack of vigilance.

OF INTEREST IN THIS CASE:

1. Driver Training/Experience
2. Fatigue/Duty Hours
3. Motor Carrier Oversight of Driver

CASE NO.: 6

Investigation No.: SEA-86-H-TR07
Accident Location: South Texas Road at intersection with Burlington Northern railroad tracks, Anacortes, Washington
Lanes: 2
Median: None
Features: Grade crossing protected by advance warning and crossbucks. 764-foot radius left curve.
Date and Time: March 4, 1986, 1:44 p.m.
Ambient Conditions: Overcast and dry
Heavy Truck Involved: 1968 Peterbilt COE tractor in combination with 2 loaded 20-foot bottom dump trailers
Motor Carrier: American Plant Services
Type of Operation: Common Carrier
Size of Operation: 8 power units
Total Weight of Truck(s): 79,800 pounds
Total Length of Truck(s): 60 feet estimated
Other Vehicle Involved: Burlington Northern freight train
Truck Fatalities: 0 **Truck Injuries:** 1
Other Fatalities: 0 **Other Injuries:** 0

SUMMARY:

The combination unit was traversing a -7 percent grade approaching a railroad grade crossing as a freight train was nearing the crossing at a recorded speed of 20 mph. As the train crossed the roadway, the front of the tractor struck the right side of the engine. The impact peeled open the front of the cab and rotated the tractor approximately 70° clockwise.

This collision resulted in minor damage to the freight train's lead engine and no injuries to the train crew. The power unit of the doubles combination received major damage. The unrestrained driver was ejected and sustained serious injuries.

The investigation revealed that there was adequate sight distance for the truckdriver to see the train, perceive the problem, apply his brakes, and stop before reaching the track. An examination of the combination unit's braking system revealed that on the power unit, one brake was inoperative and one was out of recommended adjustment. Five of the six brakes installed on the converter dolly and trailers were out of adjustment. The remaining brake was at its maximum stroke allowable before adjustment is required. While the motor carrier related that each driver is responsible for the brake adjustments on both the tractor and trailers, no records of such adjustments were kept. Records supplied by the carrier revealed that the last preventative maintenance performed on the involved trailers was 9 months before the accident.

Anacortes, Washington
Case No. 6

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the inability of the truckdriver to stop the truck due to maladjustment of the brakes.

OF INTEREST IN THIS CASE:

1. Motor Carrier Oversight of Equipment
2. Grade Crossing
3. Double Trailers

CASE NO.: 7

Investigation No.: ATL-86-H-TR08
Accident Location: Interstate 75, Atlanta, Georgia
Lanes: 8
Shoulders: 3 feet wide each side
Median: Raised 6 inch curb with metal guardrail
Features: At grade, straight
Date and Time: February 26, 1986, 2:20 p.m.
Ambient Conditions: Clear, daylight, dry
Heavy Truck Involved: 1978 International 2-axle truck with partially loaded liquid cargo tank
Motor Carrier: Gas, Inc.
Type of Operation: Private Carrier
Size of Operation: 27 power units
Total Weight of Truck(s): 22,777 pounds
Total Length of Truck(s): Not determined
Other Vehicle Involved: None
Truck Fatalities: 0 **Truck Injuries:** 1
Other Fatalities: 0 **Other Injuries:** 0

SUMMARY:

The 2500-gallon capacity straight tank truck, loaded with 1,472 gallons of liquefied petroleum gas, was traversing a straight section of road at a driver estimated speed of 50 mph. The driver was changing lanes to the right when the preceding traffic began to slow. As the driver braked to avoid conflict with the preceding traffic, the drive axle brakes locked up, resulting in a rapid counterclockwise rotation of the vehicle. The truck's rear tires skidded about 60 feet as it rotated about 90° before overturning on its right side and coming to rest. There was no leakage of propane from the cargo tank, and there was no fire.

The accident resulted in substantial damage to the right side of the truck. The lapbelt-restrained driver sustained a minor abdominal contusion which was consistent with the restraint webbing location. He reported some difficulty in release of the restraint.

The investigation found no deficiencies in the mechanical components of the truck. The driver had 3 months experience in the operation of two-axle propane trucks. Training furnished by his employer consisted of 2 weeks over the road supervised by an experienced driver. In addition, he was given printed materials which related primarily to the transportation of hazardous materials.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the truckdriver's abrupt braking while changing lanes.

Atlanta, Georgia
Case No. 7

OF INTEREST IN THIS INVESTIGATION:

1. Driver Training/Experience

2. Hazardous Material

CASE NO.: 8

Investigation No.: FTW-85-H-TR36
Accident Location: State Highway 114 at MacArthur Blvd., Irving, Texas
Lanes: 10-lanes, divided
Shoulders: Unknown
Median: 29 feet wide, grass
Features: Signal controlled intersection
Date and Time: June 5, 1985, 1:44 p.m.
Ambient Conditions: Daylight, clear, dry
Heavy Truck Involved: 1974 Kenworth COE tractor in combination with a loaded 1966 Fruehauf gravel trailer
Motor Carrier: J. D. Strickland
Type of Operation: Contract carrier
Size of Operation: Not determined
Total Weight of Truck(s): Approximately 71,000 pounds
Total Length of Truck(s): 55 feet
Other Vehicles Involved: 9 passenger vehicles
Truck Fatalities: 0 **Truck Injuries:** 0
Other Fatalities: 3 **Other Injuries:** 13

SUMMARY:

The combination unit was traveling east at a witness-reported speed of 60 to 75 mph in a 45 mph speed zone, when the truck failed to stop for traffic stopped at a signal controlled intersection. The truck struck the rear of a queue of three vehicles, deflecting them into four other vehicles. The truck then entered the intersection and struck additional vehicles. The truck veered to the right following the latter impacts and came to rest atop one vehicle and against another. Two of the involved passenger cars sustained ruptured fuel tanks and subsequently burned.

This accident resulted in the deaths of two persons due to thermal injuries, and the death of a third person due to blunt force trauma. At least 13 additional occupants of the passenger cars sustained some degree of injury. The truckdriver was not injured. The power unit of the combination unit sustained major damage while five of the passenger vehicles were destroyed by fires or impact damage. The remaining vehicles received minor to substantial damage.

The driver of the combination unit related that he thought he had fallen asleep, further stating that he commonly began work at around 2:30 a.m. and worked until late at night. Subsequent investigation revealed that the driver had been driving for 11 hours at the time of the accident. It was also noted that the braking system of the heavy truck was out of adjustment, the brake drums were badly grooved, and the air tank for the braking system had been contaminated with approximately 2 gallons of water.

This driver had been employed by the motor carrier for approximately 2 years. He was taught to drive the combination unit by its owner, then placed under the direction of an experienced driver for about 1 month. The owner of the combination unit performed all required maintenance.

Irving, Texas
Case No. 8

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the truckdriver's fatigued condition which affected his ability to perceive and react to the stopped traffic.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours

2. Motor Carrier Oversight of Equipment

CASE NO.: 9

Investigation No.: CHI-86-H-TR04
Accident Location: U.S. Highway 80, 1/4 mile east of Morrison, Illinois
Lanes: 2
Shoulders: 17-inch wide gutter
Median: None
Features: Straight, at-grade
Date and Time: January 24, 1986, 6:45 p.m.
Ambient Conditions: Snowing, approximately 1/2 inch of slush on roadway
Heavy Truck Involved: 1976 Freightliner COE in combination with a loaded 40-foot flatbed trailer.
Motor Carrier: Jones Motor Company, Inc.
Type of Operation: Common carrier
Size of Operation: 1296 power units
Total Weight of Truck(s): 68,800 pounds
Total Length of Truck(s): 52.5 feet
Other Vehicle Involved: 1979 GMC van
Truck Fatalities: 0 **Truck Injuries:** 1
Other Fatalities: 1 **Other Injuries:** 0

SUMMARY:

The combination unit was traversing a straight section of roadway, on an approximate 4 percent upgrade, when the tractor began to jackknife. As the power unit rotated clockwise, it left the roadway to the right and traveled several feet before the driver corrected the jackknife. The unit was redirected toward the travel lanes, however, before it re-entered the roadway, it rotated counterclockwise, and the driver lost control. The power unit crossed into the eastbound lane where it was struck in the right side by an eastbound van. Although a saddle tank on the power unit ruptured, there was no fire.

This accident resulted in substantial damage to the power unit of the combination unit and minor damage to the trailer. The left side fuel tank of the power unit was displaced and ruptured at some point during the jackknife dynamics, and the right side fuel tank ruptured as a result of the passenger vehicle impact. The passenger vehicle was destroyed by the impact. The unrestrained driver of the heavy truck sustained only minor injuries. The van driver, restrained by a lap/shoulder belt, was crushed within the collapsed front structure of his vehicle and later died.

The driver of the combination unit had 25 years experience operating heavy trucks. He had been employed by the motor carrier only 2 weeks at the time of the accident. Daily log records reflected that, up to the accident, the driver had been on duty for 11 1/2 hours. The investigation also revealed that the truck had averaged approximately 60 mph for the 75 miles immediately preceding the collision. This speed had been maintained despite the snow and slush upon the roadway surface.

The investigation revealed two of the power unit's four brakes to be out of adjustment, and two of the trailer's brakes were either inoperative or out of adjustment. In addition, suspension component defects were noted on both the right and left sides of the trailer. Records furnished by the carrier indicated that both the power unit and trailer had been fully inspected by the director of safety for the company who trip leased the vehicle. That inspection, conducted only 9 hours before the accident, certified that no deficiencies with either unit were found.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the truckdriver's failure to control his speed on surface conditions of snow and slush.

OF INTEREST IN THIS INVESTIGATION:

1. Motor Carrier Oversight of Equipment
2. Environment

CASE NO.: 10

Investigation No.: ATL-86-H-TR05
Accident Location: U.S. Highway 84, Brunswick, Georgia
Lanes: 4
Shoulders: 10 feet both sides, grass
Median: 40-foot earthen
Features: Straight and level
Date and Time: January 14, 1986, 7:33 a.m.
Ambient Conditions: Clear, sun glare
Heavy Truck Involved: 1984 conventional Peterbilt power unit in combination with a loaded 40-foot flatbed trailer
Motor Carrier: Johnny Brown's Stumping Company, Inc.
Type of Operation: Contract Carrier
Size of Operation: 2 power units
Total Weight of Truck(s): Approximately 80,000 pounds
Total Length of Truck(s): 55 feet
Other Vehicle Involved: 66-passenger schoolbus
Truck Fatalities: 0 **Truck Injuries:** 1
Other Fatalities: 0 **Other Injuries:** 11

SUMMARY:

The schoolbus was stopped, facing east to pick up a passenger. The driver of the combination unit, traveling at a driver-estimated speed of 55 mph, crashed into the rear of the bus. The power unit remained engaged with the rear of the bus as they traveled approximately 100 feet on the highway. The bus then disengaged from the combination unit, left the travel surface, and overturned on the south roadside, coming to rest on its left side about 200 feet from the impact area. The power unit separated from the semitrailer and came to rest in the median, approximately 175 feet from the impact area. The semitrailer overturned onto its right side and came to rest in the eastbound lanes approximately 160 feet from the impact area.

Both vehicles were substantially damaged. Both drivers received minor injuries. Two schoolbus passengers were seriously injuried; nine received minor to moderate injuries.

This truckdriver had 30 years experience driving commercial vehicles--the last 15 years of which were in combination units. He had been employed by the current motor carrier for 10 of the last 13 years. In the week preceding the accident, the driver completed five round trips of 700 miles each--each requiring from 14 to 16 hours of driving time. He stated that he had not slept for 22 to 24 hours before the accident.

The truckdriver admitted that he had consumed a portion of a 1/2-pint bottle of rum in the 7 1/2 hours of driving time preceding the accident. A subsequent blood-alcohol test showed that the driver's BAC was .18 percent.

The investigation revealed that the truckdriver had been convicted of driving while under the influence of alcohol (DWI) on two previous occasions. His most recent conviction was on September 17, 1985, for a DWI offense that he committed on August 23, 1985, while driving the accident vehicle. The State of Florida suspended his driver's license as a result of the conviction, effective on January 27, 1986, 13 days after this collision. The investigation revealed that the driver's employer was aware of the DWI conviction and allowed him to continue driving their trucks.

As a result of this accident, the OMCS conducted a safety audit of the motor carrier. The audit showed that the carrier was in noncompliance with the FMCSR. Specifically, the carrier did not have the required minimum levels of financial responsibility, had no proof of financial responsibility, used a disqualified driver (the driver involved in this accident), had no driver qualification files, failed to report an accident, permitted drivers to violate the 10 hour driving rule, did not require the drivers to make a record of duty status, and did not keep vehicle inspection and maintenance records.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the truckdriver to avoid the stopped schoolbus due to a combination of alcohol and fatigue impairment. Contributing to this accident was the failure of the motor carrier to properly supervise the activities of its drivers.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours
2. Alcohol/Drugs
3. Driving History
4. Motor Carrier Oversight of Driver
5. Motor Carrier Oversight of Equipment

CASE NO.: 11

Investigation No.: CHI-86-H-TR05
Accident Location: Interstate 70 in the Township of Mound, Illinois
Lanes: 4-lane divided
Median: Grass
Features: Straight and level
Date and Time: January 27, 1986, 6:00 a.m.
Ambient Conditions: Clear, dry, cold
Heavy Truck Involved: 1975 Freightliner COE 3-axle tractor in combination with an empty 43-foot livestock trailer
Motor Carrier: Delbert G. Neidigh
Type of Operation: Independent Owner/Operator
Size of Operation: 1 power unit
Total Weight of Truck(s): 26,400 pounds
Total Length of Truck(s): Not determined
Other Vehicle Involved: 1968 Volkswagen van
Truck Fatalities: 0 **Truck Injuries:** 0
Other Fatalities: 2 **Other Injuries:** 5

SUMMARY:

The tractor trailer unit was proceeding eastbound on Interstate 70 at a driver-estimated speed of 60 to 65 mph. The truck approached a slow moving van which was reported to be traveling 30 to 35 mph without rear lights. The truckdriver stated he "dozed off" and impacted the rear of the van. The passenger van began to burn immediately after the initial impact, as it traveled 541 feet to a resting position in the south road ditch. Following the impact, the truck went off the right road edge across the south roadside ditch, climbed the embankment, and struck and overrode two fences and a tree. The truck came to rest approximately 252 feet south of the roadway. The tractor trailer traveled a total of approximately 528 feet from the initial impact area.

Neither the unrestrained driver of the combination unit nor the codriver resting in the sleeper berth were injured. Two of the rear seat passengers of the Volkswagen van were killed. The five remaining passengers in the van escaped with minor injuries.

The driver stated he had 30 years of experience in medium to heavy truck operations, and often makes 2 to 3 delivery trips per week. It was found that the truckdriver routinely works full time on his farm driving the combination unit in addition to his farming. The investigation revealed that the truckdriver had been awake and active since 8 a.m. on the day preceding this collision, a period of 22 hours. This driver stated that he must have dozed off, as he remembered passing mile post 82 but nothing else up to the collision area at mile post 83. There were no log books being maintained in the truck. On the date of this accident, log books were not required for an intrastate trip within Illinois.

A search of driving history files showed this driver had accumulated two traffic violation in the past 5 years. The records also revealed this driver had been involved in three accidents in the past 2 years.

An inspection of this tractor trailer revealed several deficiencies with the braking system, principally air leaks. A wornout right front tractor tire and several worn tires on the trailer were also found, however, the trailer brakes were within recommended adjustments.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was a lack of vigilance on the part of the truckdriver due to working excessive hours. Contributing to the cause was the absence of rear lights on the slow-moving van.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours
2. Driving History
3. Motor Carrier Oversight of Equipment

CASE NO.: 12

Safety Board Investigation No.: ATL-86-H-TR06
Accident Location: Interstate 40, Clyde, North Carolina
Lanes: 4
Shoulders: Asphalt, 3 feet inside and 10 feet outside
Median: Earthen, variable width
Features: Winding, downgrade
Date and Time: February 4, 1986, 11:40 a.m.
Ambient Conditions: Clear, dry, and daylight
Heavy Truck Involved: 1984 Freightliner COE power unit in combination with 2 loaded 28-foot van trailers
Motor Carrier: Consolidated Freightways, Inc.
Type of Operation: Common Carrier
Size of Operation: 6358 power units, 185 straight trucks
Total Weight of Truck(s): 67,170 pounds
Total Length of Truck(s): 67 feet 10 inches
Other Vehicle Involved: None
Truck Fatalities: 0 **Truck Injuries:** 0
Other Fatalities: 0 **Other Injuries:** 0

SUMMARY:

The combination unit had just traversed a 2-mile-long 3-percent downgrade and was exiting a curve to the left about to enter a curve to the right. According to the driver's statement, he was traveling in the left lane at a speed of about 50 to 55 mph in the posted 45 mph area. The driver stated that as the vehicle entered the curve to the right, he felt a "nudge" toward the rear of the unit. He looked into his mirror and saw that the rear trailer had broken traction, and was sliding to the left. It hit the guardrail, separated from the lead trailer as it rolled over the guardrail, and came to rest upright. At rest, the lead trailer was still coupled to the tractor.

The power unit was not damaged; however, the rear trailer was destroyed and the converter dolly frame was twisted. The only damage to the front trailer was at the pintle hook. A postcrash examination of the pintle hook revealed that all damage was a result of forces transmitted from the overturning rear trailer. The lapbelt-restrained truckdriver was not injured.

The driver had been operating heavy trucks for 12 years and doubles combinations part-time for 3 years. During this time, he had 4 hours of instruction relating to doubles operation. The driver had not received training on the handling characteristics unique to doubles.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the driver to reduce his speed while traversing a series of curves. Contributing to the accident was the failure of the motor carrier to provide specialized training for the driver in the operational characteristics unique to doubles operation.

OF INTEREST IN THIS INVESTIGATION:

1. Driver Training/Experience

2. Double Trailers

CASE NO.: 13

Investigation No.: CHI-86-H-TR06
Accident Location: U.S. Route 52, Shorewood, Illinois
Lanes: 2 lanes
Shoulders: Gravel surfaced 7 feet 10 inches wide on right shoulder; gravel surfaced 9 feet 2 inches wide on left shoulder
Median: None
Features: Banked curve
Date and Time: February 6, 1986, 5:40 a.m.
Ambient Conditions: Snowing and sleeting with 20 to 30 mph gusting winds, darkness
Heavy Truck Involved: 1982 COE International in combination with a loaded 45-foot Fruehauf tanker trailer
Motor Carrier: Dahlen Transport, Inc.
Type of Operation: Common Carrier
Size of Operation: 125 power units
Total Weight of Truck(s): Approximately 90,000 pounds
Total Length of Truck(s): Approximately 58 feet
Other Vehicle Involved: Passenger car
Truck Fatalities: 0 **Truck Injuries:** 2
Other Fatalities: 0 **Other Injuries:** 1

SUMMARY:

The combination unit was westbound on a snow- and ice-covered road approaching a left curve at a tachograph recorded speed of 50 mph, when the driver tapped his brakes to check how slippery the road surface was. The combination unit rotated clockwise and, as the unit crossed over into the eastbound lanes, the left side of the tractor's tandem wheels struck an eastbound passenger car. A witness reported that the combination unit began to overturn at the initial collision. The combination unit rolled over the passenger car and came to rest on its right side. At some point in the rollover sequence, the tractor separated from the tanker semitrailer at the fifth wheel position and came to rest in an upright position about 35 feet from the tanker.

The tractor cab was crushed downward 38 inches on the right side and 7 inches on the left side. The tanker semitrailer, loaded with 7,500 gallons of methyl ethyl ketone, sustained seam splits on the right front and rear. Approximately 1,200 gallons of the liquid cargo leaked out of the damaged tanker. There were no injuries resulting from the hazardous material release. The lapbelt-restrained truckdriver received serious injuries and the codriver, asleep in the sleeper berth, received minor injuries. Although the passenger car received substantial damage, its driver sustained only minor injuries.

With 34 years of experience in the operation of heavy trucks, this driver had been operating liquid cargo tankers for the past 29 years.

The investigation revealed no apparent mechanical deficiencies which might have contributed to this accident. A check of the driver's log books revealed a 1/2-hour violation of driving time 4 days before the accident and that, when miles driven were compared to driving times indicated, the average speeds did not agree with the tachograph charts. The log books reflected an average speed of 48 to 50 mph while the tachograph revealed a recorded average speed of 55 to 60 mph.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the driver to reduce his speed to a level consistent with the existing poor road conditions.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours
2. Motor Carrier Oversight of Driver
3. Hazardous Material
4. Crashworthiness
5. Environment

CASE NO.: 14

Investigation No.: LAX-86-H-TR05
Accident Location: Interstate 5, 3.5 miles north of Fort Tejon, California
Lanes: 8 lanes, divided
Shoulders: Median shoulder undetermined width of asphalt, outside shoulder undetermined width of dirt
Median: New Jersey concrete barrier and varying earthen divider
Features: 6 percent downgrade, curves, and mountainous
Date and Time: February 7, 1986, 3:20 a.m.
Ambient Conditions: Dark, 40°F, clear, and dry
Heavy Truck Involved: 1975 Mack COE tractor in combination with a loaded 42-foot flatbed trailer
Motor Carrier: Albina Transfer Company, Inc.
Type of Operation: Common Carrier
Size of Operation: Not determined
Total Weight of Truck(s): 79,000 pounds
Total Length of Truck(s): 56 feet 4 inches
Other Vehicle Involved: None
Truck Fatalities: 2 **Truck Injuries:** 1
Other Fatalities: 0 **Other Injuries:** 0

SUMMARY:

The combination unit was traversing a 5-mile, 6-percent downgrade when the driver noticed a loss of brakes. Approximately 3 miles from the crest of the downgrade, the vehicle entered a 765-foot truck escape ramp which had a maximum grade of a +5 percent. The combination unit then traversed the entire length of the arrester bed, vaulted approximately 60 feet from the elevated end of the ramp, and fell about 30 feet onto some boulders. The load on the flatbed trailer came forward and crushed the cab. A fire ensued which destroyed the passenger compartment of the power unit.

The tractor was destroyed from the collision with the ground and the fire, and the trailer received substantial damage. The unrestrained driver and the right front passenger were fatally injured, while the passenger in the sleeper survived with serious injuries. Both passengers were unauthorized and were carried in violation of both carrier policy and Federal regulations.

The investigation revealed that six of the combination unit's eight brakes were out of adjustment, the push-rod travel of each backed up to its maximum travel. The remaining two brakes could not be inspected due to damage. The surviving passenger stated that the truckdriver had checked his brake adjustments less than 1 1/2 hours before the accident. While the carrier related that brake adjustment was indeed the driver's responsibility, his employer neither furnished nor required training relating to this requirement. Also noted was inadequate tread depths for the majority of tires on the combination unit.

The driver of the combination unit had been employed by the motor carrier for approximately 6 weeks. While no record of previous heavy truck operating experience was documented, he had maintained a commercial operator's license for about 4 years. The carrier had furnished no in-house training.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the driver's failure to maintain his vehicle's speed on the mountain downgrade either due to improperly adjusted brakes. Contributing to the cause was the failure of the motor carrier to train the driver in proper brake system adjustment.

OF INTEREST IN THIS INVESTIGATION:

1. Driver Training/Experience
2. Motor Carrier Oversight of Equipment
3. Environment

CASE NO.: 15

Investigation No.: SEA-86-H-TR05
Accident Location: Interstate 5 near the Myrtle Creek Interchange, Myrtle Creek, Oregon
Lanes: 4 lanes, divided
Shoulders: 9.5-foot asphalt shoulders
Median: 7-foot asphalt with concrete redirecting barrier
Features: mountainous, curved roadway
Date and Time: February 8, 1986, 12:25 a.m.
Ambient Conditions: Clear, dry, and dark
Heavy Truck Involved: 1980 Peterbilt conventional tractor in combination with a loaded 44-foot flatbed trailer
Motor Carrier: L & S Trucking
Type of Operation: Common Carrier
Size of Operation: 18 power units
Total Weight of Truck(s): 63,965 pounds
Total Length of Truck(s): 60 feet
Other Vehicle Involved: None
Truck Fatalities: 0 **Truck Injuries:** 2
Other Fatalities: 0 **Other Injuries:** 0

SUMMARY:

The combination unit, loaded with 46,000 pounds of flat cardboard, entered a 614-foot radius curve to the right, at a calculated speed of 67 mph. The curve was posted with a 45 mph advisory speed. The driver stated he felt the load shift, and then the combination unit overturned. The vehicle slid approximately 160 feet before coming to final rest laying upon its left side. The driver was cited by the investigating police official for driving under the influence of intoxicants, consuming intoxicating beverages within 4 hours of going on duty, and for failing to maintain a driver's log book. The alcohol-related charges were based on the driver's actions and field sobriety tests--the truckdriver refused to be tested.

This accident resulted in substantial damage to the power unit and relatively minor damage to the trailer. Both the driver and passenger received minor injuries, however, medical treatment was not required. It was noted that no restraint belts were present in the power unit, and further investigation revealed that the driver had removed the lapbelts

Inspection of the vehicle revealed an inoperable speedometer. In the course of the investigation, it was found that both the speedometer and odometer had been defective for about 1 week. These items had been noted on the driver's daily inspection reports, but had not been repaired due to unavailability of the required parts. Also noted were inoperative instrument panel lights. Inspection of the combination unit's braking system revealed only one marginally out-of-adjustment brake. It was learned that the carrier required their drivers to perform brake adjustments occasionally and that instruction relating to this service was furnished.

This driver had been employed by the motor carrier intermittently for the past 3 years. No record of prior heavy truck operating experience was furnished by the driver or carrier. The carrier did note, however, that the driver was considered to be one of their better drivers, and, therefore, had assigned one of their better trucks to him. A search of driving history records revealed five moving violations and one accident over the past 5 years. Two of those violations along with the driver's failure to answer the citations resulted in his operating privileges being suspended for that State. The driver had a valid license from another state. Nevertheless, because of the suspension, the driver was considered disqualified by FMCSRs.

The investigation revealed that this truckdriver had not completed the required log book records in the 4 days preceding this accident. It was later reported that he had been driving for 8 hours at the time of the accident and had been on duty a total of 9 hours since his last consecutive 8 hours off duty.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the driver to reduce his speed for a tight radius turn. Contributing to this failure was the driver's impairment due to alcohol ingestion.

OF INTEREST IN THIS CASE:

1. Fatigue/Duty Hours
2. Alcohol/Drugs
3. Driving History
4. Motor Carrier Oversight of Driver
5. Motor Carrier Oversight of Equipment

CASE NO.: 16

Investigation No.: MKC-86-H-TR04
Accident Location: Interstate 435, Kansas City, Missouri
Lanes: 4 lanes, divided
Shoulders: 10-foot-wide asphalt surfaced median shoulder, 12-foot-wide asphalt surfaced outside shoulder
Median: Grass covered, earthen material
Features: Flat with occasional curves
Date and Time: February 11, 1986, 6:20 a.m.
Ambient Conditions: Cloudy and cold
Heavy Truck Involved: (1) 1973 COE International tractor in combination with a loaded 40-foot trailer
Motor Carrier: (1) Eugene E. Boos
Type of Operation: Common Carrier
Size of Operation: 1 power unit
Heavy Truck Involved: (2) 1972 3-axle, 2-ton International straight truck
Motor Carrier: (2) Strathman Feeds
Type of Operation: Private Carrier
Size of Operation: Not determined
Total Weight of Truck(s): (1) Not determined
(2) Not determined
Total Length of Truck(s): (1) Not determined
(2) Not determined
Other Vehicle Involved: None
Truck Fatalities: (1) 0 (2) 0 **Truck Injuries:** (1) 1 (2) 0
Other Fatalities: 0 **Other Injuries:** 0

SUMMARY:

The combination unit, traveling west on a straight area of road, veered to the right, ran off the travel lane, and collided into the rear of a 2-ton straight truck that was parked without any warning devices on the road shoulder. From the impact area, the combination unit traveled approximately 144 feet. The tractor came to rest facing south on the north road shoulder and the trailer came to rest facing west on the north roadside. The 2-ton truck traveled approximately 144 feet after impact, coming to rest south in the outside westbound lane of Interstate 435. The grain bin on the straight truck was displaced from the frame, and the cab on the International truck tractor was displaced from its frame.

The unrestrained driver of the combination unit was ejected from the vehicle and received serious injuries. On his admission to a local hospital, it was found that he had an occlusion of both the right and left brachial arteries. Double bypass surgery was subsequently performed. The driver of the 3-axle grain truck, asleep in his vehicle at the time of impact, was not injured.

Although operating in interstate commerce, the driver of the combination unit was not in conformity with FMCSRs. He was not maintaining driver log records at the time of this accident, and the investigation revealed that he had not done so in the past. Also absent at the time of the accident was a valid medical certificate for this driver. A request for information through the BMCS found that the BMCS had contacted the driver in 1983 and informed him of the applicability of the FMCSRs to his operation.

The investigation revealed that the combination unit driver departed Colorado 3 days before the accident. Following a delivery in Missouri, he had traveled to an unknown location for loading. At the time of the collision, he was en route back to Colorado. Hours on duty could not be reconstructed due to his noncompliance with log book regulations. However, the distances traveled indicate that he was most likely operating in excess of legal service hours.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the truckdriver's failure to maintain his vehicle within the travel lanes of the roadway. The reason(s) for this failure could not be determined.

OF INTEREST IN THIS CASE:

1. Fatigue/Duty Hours

CASE NO.: 17

Investigation No.: LAX 86-H-TR03
Accident Location: Transition from southbound I-15 to eastbound I-10 in Ontario, California
Lanes: 2
Shoulders: None-elevated road
Median: None
Features: Elevated transition road with left turn
Date and Time: January 1, 1986, 4:05 a.m.
Ambient Conditions: Dry, dark, extremely high crosswinds
Heavy Truck Involved: 1979 Ford COE tractor in combination with two loaded 27-foot trailers
Motor Carrier: PBI Freight Service
Type of Operation: Common Carrier
Size of Operation: Not determined
Total Weight of Truck(s): Not determined
Total Length of Truck(s): Not determined
Other Vehicle Involved: None
Truck Fatalities: 1 **Truck Injuries:** 0
Other Fatalities: 0 **Other Injuries:** 0

SUMMARY:

The combination unit was transitioning from the base of a 10-mile downgrade to an elevated interchange when the truck flipped onto the right bridge rail, overrode the rail, and fell to the ground 60 feet below. At the time of this occurrence, 40- to 100-mph winds were gusting in the area. These winds reportedly transitioned from a tailwind for the truck to a direct crosswind immediately before the accident.

The ground impact completely destroyed the power unit of the truck. The unrestrained truckdriver was ejected and sustained fatal injuries.

The investigation revealed that the braking system of the combination unit was seriously out of adjustment. The three brakes which could be checked on the power unit were well past adjustment limits, neither brake on the converter dolly was operational, and most of the remaining brakes were badly worn. In all, it was found that seven of the unit's ten brakes were improperly adjusted, two additional brakes were inoperative, and the remaining brake was not of the proper size.

Further investigation revealed that the truckdriver was apparently in violation of Hours-of-Service regulations, in that he could not have taken a required 8-hour rest period and still reached the accident location from his departure point. Log book entries from records furnished by the motor carrier indicated that the driver had probably not met the minimum for off-duty hours during the 48 hours preceding the accident.

Ontario, California
Case No. 17

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the wind conditions existing as the truck transitioned from a 40- to 100-mph tailwind to a crosswind of the same velocity. Contributing to the accident was the lack of effective warnings pertaining to the venturi winds.

OF INTEREST IN THIS CASE:

1. Fatigue/Duty Hours
2. Motor Carrier Oversight of Equipment
3. Environment
4. Double Trailers

CASE NO.: 18

Investigation No.: CHI-86-H-TR08
Accident Location: Interstate 70 in Englewood, Ohio
Lanes: 4 lanes, divided
Shoulders: Median shoulder 4 feet wide, asphalt; outside shoulder 10 feet wide, asphalt
Median: 15 feet 6 inches wide, grass
Features: Straight
Date and Time: February 17, 1986, 3:30 a.m.
Ambient Conditions: 42°F, moderate rain, fog, and dark
Heavy Truck Involved: 1985 Freightliner conventional tractor in combination with a loaded tanker trailer
Motor Carrier: D.S.I. Transport, Inc.
Type of Operation: Common Carrier
Size of Operation: Not determined
Total Weight of Truck(s): 77,380 pounds
Total Length of Truck(s): Not determined
Other Vehicle Involved: None
Truck Fatalities: 0 **Truck Injuries:** 2
Other Fatalities: 0 **Other Injuries:** 0

SUMMARY:

The combination unit was traveling at a driver reported speed of 55 to 60 mph, down a 4-percent downgrade when it drifted off the right side of the roadway. The tractor-trailer appeared to travel parallel to the road until it struck the guardrail about 314 feet past where it first left the asphalt pavement. After striking the guardrail, the vehicle rotated counterclockwise about 90° and rolled over before sliding down a 30-foot, 60-percent embankment. The tractor, still attached to the trailer, came to rest on its left side in the river. The trailer's load, containing diphenylmethane diisocyanate diluted to 0.02 percent by volume, began venting in the river.

The tractor and trailer received substantial damage from the impact with the guardrail and the rollover that followed. Approximately 1200 gallons of the liquid cargo spilled into the waterway. Both the restrained driver and unrestrained codriver who was resting in the sleeper compartment received only minor injuries.

Neither the truck nor trailer had placards displayed, the shipping papers were in the river, and the driver and codriver were unsure of the contents of their load. After discussion with the carrier, the load was identified. It was later determined that, due to the hazardous material content per volume, that the load was not required to be placarded.

The truckdriver, with a total of 15 years experience in heavy combination units, had been employed by the motor carrier intermittently for the past 10 years. During that time, he had received extensive training concerning the shipment and transportation of hazardous materials.

The investigation revealed that the combination unit departed its home terminal in the early morning hours of February 16, 1986, after 2 days off-duty time for the drivers. From the time of departure, up to the time of the accident on the following morning, the two drivers had alternated driving responsibilities. Each driver, when not behind the wheel, was required by company policy to be resting in the sleeper berth. Records submitted by the motor carrier revealed that the driver who was in control at the time of the accident had driven a total of at least 12 hours since departing on the trip. In the time period that he was not driving, he related that he was in and out of the sleeper berth.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the truckdriver's lack of vigilance which resulted in his failure to perceive that his vehicle was leaving the roadway. The reason for that lack of vigilance was not determined.

OF INTEREST IN THIS INVESTIGATION:

1. Hazardous Material

CASE NO.: 19

Investigation No.: SEA-86-H-TR06
Accident Location: State Route 35, Hood River, Oregon
Lanes: 2
Median: None
Features: 3.2-mile downgrade with a maximum slope of -5.2 percent and a curved bridge (240 ft. radius) at the bottom of the hill
Date and Time: February 24, 1986, 8:50 a.m.
Ambient Conditions: Clear and dry
Heavy Truck Involved: 1980 COE Ford tractor in combination with a 35-foot van trailer and a 28-foot van trailer, both loaded
Motor Carrier: Leonardo Truck Lines, Inc.
Type of Operation: Common Carrier
Size of Operation: 60 power units
Total Weight of Truck(s): Approximately 80,000 pounds
Total Length of Truck(s): 77 feet
Other Vehicle Involved: None
Truck Fatalities: 0 **Truck Injuries:** 1
Other Fatalities: 0 **Other Injuries:** 0

SUMMARY:

The combination unit was traversing a 3.2-mile winding downgrade. The driver reported that he lost his brakes at a point approximately 1/2 mile from the bottom of the hill. The unit continued down hill, out of control, at a witness-estimated speed of 40 to 50 mph. As the combination unit began crossing the curved bridge, all three units overturned. The tractor and semitrailer came to rest on their left side facing northeast, in the southbound lane. The full trailer separated from the semitrailer, went over a 32-inch high concrete barrier, fell approximately 35 feet, and landed on top of three 20,000-gallon fuel storage tanks. The metal structure of the first fuel storage tank was ruptured and the structures of the other two tanks were dented. There was no leakage from the damaged fuel storage tanks.

This accident resulted in extensive damage to the combination unit. The unrestrained driver received moderate injuries.

The vehicle examination disclosed that all of the brakes on the truck tractor and semitrailer were improperly adjusted, and that the brake drums were grooved from excessive wear. The motor carrier stated that brake adjustment was the driver's responsibility, but the driver related that he was unfamiliar with brake adjustment procedures. The motor carrier neither furnished nor required pre-employment training in the proper methods of brake adjustment.

The investigation found that no warning signs regarding the long downgrade were posted on the roadway, nor were there any speed restrictions for the grade. Just before a vehicle's entry onto the bridge, a 25 mph curve advisory speed sign was in place.

The driver reported that he was unsure of what gear the truck was in when traversing the downgrade. The investigation disclosed that the accident driver had been employed by this motor carrier for 1 month. Although the driver related 6 years of experience in the operation of heavy trucks, he had no experience in twin trailer operation before his current employment.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the improper adjustment and maintenance of the combination unit's brakes. Contributing to the cause was the motor carrier's failure to train the driver in proper brake adjustment procedures and the lack of adequate warning signs preceding the downgrade and curve.

OF INTEREST IN THIS CASE:

1. Motor Carrier Oversight of Equipment
2. Environment
3. Double Trailers
4. Driver Training/Experience

CASE NO.: 20

Investigation No.: FTW-86-H-TR04
Accident Location: Texas State Highway 21 at Farm Road 2818, Bryan, Texas
Lanes: 4 lanes
Shoulders: 10 feet wide, asphalt
Median: Solid yellow centerline
Features: At grade, straight, level
Date and Time: March 9, 1986, 4:25 p.m.
Ambient Conditions: Clear, daylight, dry
Heavy Truck Involved: 1977 Mack conventional 3-axle tractor in combination with a loaded 42-foot flatbed trailer
Motor Carrier: Pool Petroleum Services Company
Type of Operation: Private Carrier
Size of Operation: 200 power units
Total Weight of Truck: 43,500 pounds
Total Length of Truck: 65 feet
Other Vehicle Involved: Oldsmobile 4-door sedan
Truck Fatalities: 0 **Truck Injuries:** 0
Other Fatalities: 4 **Other Injuries:** 2

SUMMARY:

The combination unit was eastbound at a driver-estimated speed of 45 to 50 mph, when a 4-door sedan carrying six people initiated a U-turn across the path of the truck. The truck left 90 feet of skidmarks before striking the Oldsmobile in the left side. From the impact area, the passenger car rotated approximately 180° and skidded 140 feet before coming to rest. The combination veered across the travel lanes, skidding over 140 feet before coming to rest in the north road ditch. Witnesses' statements in combination with computer analysis of the sun's position, indicated that the passenger car driver's vision might have been affected by the glare.

This accident resulted in only moderate damage to the combination unit and the truckdriver was not injured. The passenger car was destroyed, and four of its six occupants were fatally injured.

The investigation revealed that the truckdriver had been on duty for 8 1/2 hours before the accident. He had driven about 250 miles during that period and was only 5 miles from his destination when the collision occurred. A search of this driver's license history found eight traffic violations committed in the 5-year period preceding the accident. Also noted were multiple violations of promises to appear in court, a prior criminal driving under the influence conviction, and a possession of dangerous drugs conviction. The motor carrier denied knowledge of their driver's history. The motor carrier refused to furnish employment records of the driver, and other information was not available for determination of the driver's accumulated experience in heavy truck operations.

An examination of the combination unit revealed that the factory installed front axle brakes for the power unit had been disconnected. In addition, it was found that three of the unit's remaining brakes were outside of proper adjustment. Officials of the motor carrier refused to discuss maintenance policies with Safety Board investigators, therefore, it was not determined who was responsible for brake adjustments.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was passenger car driver's failure to yield to conflicting traffic before initiating a U-turn. Contributing to the cause was the car driver's visibility limitation due to the angle of the sun. Contributing to the severity of the collision was the reduced braking efficiency of the truck.

OF INTEREST IN THIS INVESTIGATION:

1. Driving History
2. Motor Carrier Oversight of Driver
3. Motor Carrier Oversight of Equipment

CASE NO.: 21

Investigation No.: ATL-86-H-TR09
Accident Location: Interstate 59, Springville, Alabama
Lanes: 4
Shoulders: Asphalt, 4 feet inside and 10 feet outside
Median: Earthen, undetermined width
Features: Straight and downgrade
Date and Time: March 9, 1986, 11:30 p.m.
Ambient Conditions: Clear, windy, and dark
Heavy Truck Involved: 1985 Mack COE power unit in combination with a loaded 40-foot cargo tank trailer
Motor Carrier: Chemical Leaman Tank Lines, Inc.
Type of Operation: Common Carrier
Size of Operation: 1409 power units
Total Weight of Truck(s): 73,340 pounds
Total Length of Truck(s): 55 feet 8 inches
Other Vehicle Involved: None
Truck Fatalities: 0 **Truck Injuries:** 2
Other Fatalities: 0 **Other Injuries:** 0

SUMMARY:

The combination unit was traversing a 2-percent downgrade, at a driver-estimated speed of 50 to 55 mph when the right steering axle tire failed. The truck began pulling to the right across a grass shoulder where its right wheels entered a concrete drainage flume that paralleled the roadway. The truck overturned to its right against an earthen bank, skidded to the end of the flume, and entered a wooded area before it came to rest. Because two pipes on top of the cargo tank were broken off from contact with trees, over half the load of 4,130 gallons of toluene diisocyanate, a Class B poison liquid discharged. The spill required a 12-hour evacuation of about 2,000 residents and a 30-hour road closure while cleanup operations were being completed.

This accident resulted in minor injuries to the unrestrained truckdriver. The codriver, resting in the sleeper berth at the time of the rollover, sustained moderate injuries. About 14 enforcement and emergency personnel received minor skin burns and eye irritations resulting from the spill. The power unit received substantial damage and the trailer was destroyed. The tire which failed had been installed on the power unit 9 days before the accident and had been run 5,000 miles. Private laboratory testing determined that the tire failure resulted from sidewall cord separation that was initiated by a prior impact.

The driver of the combination unit had approximately 6 1/2 to 7 years experience in the operation of heavy trucks. He had been employed by the motor carrier for approximately 5 months. The truckdriver said he attended a commercial truckdriver's training course, "several years ago", but could not recall the dates or the course content. The truckdriver possessed operator's licenses from at least three States. Of that confirmed number, one license had been suspended. The motor carrier was aware of the number of licenses and of the suspension, but chose to retain the driver because of his "good attitude." The motor carrier was also aware of the driver's record which reflected 11 traffic violation convictions in the preceding 3 year period. At least seven of thosa violations were related to the safe or proper operation of a heavy truck. The carrier's written policy was that a driver must not have had a license suspended within the past 3 years, or have a driving record which would indicate disregard for public safety.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the catastrophic failure of the right tire on the steering axle. Contributing to the severity of the accident was the spilling of the Class B poison resulting from the broken piping on the trailer.

OF INTEREST IN THIS INVESTIGATION:

1. Driving History
2. Motor Carrier Oversight of Driver
3. Hazardous Material

CASE NO.: 22

Investigation No.: FTW-86-H-TR05
Accident Location: U.S. Highway 81 (Traffic routed by detour onto frontage road), 4 miles north of Decatur, Texas
Lanes: One 15-foot wide asphalt surface; frontage road
Shoulders: Gravel surface of varying widths
Median: 12-foot wide earthen median
Features: Construction zone
Date and Time: March 12, 1986, 12:40 a.m.
Ambient Conditions: Cloudy and dark with dry road surface
Heavy Truck Involved: 1984 COE International tractor in combination with a loaded 43-foot van trailer
Motor Carrier: Patterson Solvents
Type of Operation: Private Carrier
Size of Operation: 5 power units
Total Weight of Truck(s): Not determined
Total Length of Truck(s): Approximately 52 feet
Other Vehicle Involved: None
Truck Fatalities: 0 **Truck Injuries:** 1
Other Fatalities: 0 **Other Injuries:** 0

SUMMARY:

The combination unit was traveling south on the frontage road to U.S. Highway 81 at a driver-estimated speed of 45 to 50 mph within a posted 40-mph road construction zone. The unit had traversed approximately 4 miles of the zone when it veered to the left and departed the travel surface. The unit collided with and overrode a guardrail then traveled up a dirt embankment that separated the frontage road from the construction work on U.S. Highway 81. From this point, the combination unit traveled down the embankment, back across the frontage road, and came to rest on the gravel road shoulder. Overall, the combination unit traveled approximately 975 feet from the area of its initial collision to the point of final rest.

This accident resulted in moderate damage to the power unit of the combination unit, however, the trailer was not damaged and its load remained secure. The truckdriver received minor injuries.

The investigating troopers arrested the driver for DWI, and analysis of the driver's blood, taken 2 hours and 20 minutes after the accident, showed that the driver's BAC was a 0.05 percent. When questioned by the investigators, the driver stated that he had consumed two beers before departing from his residence on the 400-mile trip. He further stated that he must have driven too close to the edge of the roadway.

The combination unit was transporting a mixed load of solid corrosive solvents and solid flammable solvents. The van trailer was properly placarded for the shipment, but the shipping papers on the mixed load failed to specify which of the solvents was corrosive and which was flammable.

In the course of the investigation, it was learned that the policy of the motor carrier was to not hire drivers that had more than three moving violations on their driving record. It was also revealed that the leasing company from whom the combination unit was leased prohibited the use of drivers with more than three moving violations on their driving record. A search of this driver's State history files found six speeding violations and two previous accidents in the 5 years preceding this occurrence, however, no violations were found for the immediate past 2-year period. The driver had reportedly accumulated over 30 years experience in the operation of heavy trucks.

While examining the company records, investigators found that the motor carrier did not maintain qualification files for their drivers, and it was their understanding that they were not subject to the FMCSRs. The Region 6 office of the Bureau of Motor Carrier Safety in Fort Worth, Texas, was consulted and stated that although this shipment originated in and was scheduled to terminate in Texas, the carrier's entire operation was subject to the FMSCR because it transported hazardous materials and made occasional trips across State lines.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the driver's failure to maintain his vehicle within the travel lanes due to inattention or alcohol impairment or a combination of the two.

OF INTEREST IN THIS INVESTIGATION:

1. Alcohol/Drugs
2. Motor Carrier Oversight of Driver
3. Hazardous Material

CASE NO.: 23

Investigation No.: NYC-86-H-TR06
Accident Location: Gettysburg Road, Lower Allen Township, Pennsylvania
Lanes: 1 lane
Shoulders: Both shoulders undetermined width of rough asphalt
Median: None
Features: Entrance ramp, curving, level
Date and Time: March 3, 1986, 12:51 a.m.
Ambient Conditions: Clear, dark, and dry
Heavy Truck Involved: 1985 Mack conventional tractor in combination with a loaded tank trailer
Motor Carrier: Chemical Leaman Tank Lines, Inc.
Type of Operation: Common Carrier
Size of Operation: 1409 power units
Total Weight of Truck(s): Not determined
Total Length of Truck(s): Not determined
Other Vehicle Involved: None
Truck Fatalities: 1 **Truck Injuries:** 0
Other Fatalities: 0 **Other Injuries:** 0

SUMMARY:

The tractor-tank semitrailer was entering a 135-foot radius right curving entrance ramp, which the driver had used earlier in the evening. As the driver was about halfway through the curve, he lost control of the vehicle. The tractor-tank semitrailer traveled off of the left side of the roadway, rolling 270° before coming to rest on its right side in the northbound lanes of Pennsylvania Route 15. A fire ensued which destroyed the tractor and damaged the tank semitrailer. After the overturn, the driver was trapped in the tractor and was killed. The tanker was hauling 8,400 gallons of gasoline of which 4,909 gallons were lost in the fire.

The speed limit for this ramp was 40 mph; however, a 20 mph advisory speed sign was supposed to be in place on the ramp. The investigation revealed that the advisory sign was not in place at the time of the accident. Calculations revealed that the critical speed for this curve was between 30 and 40 mph, and that the truck's rollover threshold was about 31 mph.

The investigation found that the truckdriver had 3 1/2 years of experience in heavy vehicle operation and 2 months of that time had been with tank trailers. This 2-month period with tank trailers was with his current employer, who had given the driver 3 days of training on hazardous materials and tank trailer operations. The driver reportedly traveled this same route each duty day during the 2-month period.

Lower Allen Twp., Pennsylvania
Case No. 23

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the truckdriver losing control of the truck on a curve because the truck's speed exceeded the estimated 31-mph truck rollover threshold. Contributing to the severity of the accident was the fire.

OF INTEREST IN THIS INVESTIGATION:

1. Driver Training/Experience
2. Hazardous Material
3. Environment

CASE NO.: 24

Investigation No.: DEN-86-H-TR07
Accident Location: U.S. Highway 6, Greeley, Colorado
Lanes: 2-lane, 2 direction asphalt surfaced
Shoulders: 9-foot asphalt surfaced shoulder on north side
Median: None
Features: Construction zone - bridge
Date and Time: March 14, 1986, 9:09 p.m.
Ambient Conditions: Light snow falling with ice and slush on roadway
Heavy Truck Involved: 1985 Kenworth conventional tractor in combination with a partially loaded 43-foot van trailer
Motor Carrier: Monfort Transportation Company
Type of Operation: Common Carrier
Size of Operation: 400 power units
Total Weight of Truck(s): Not determined
Total Length of Truck(s): Not determined
Other Vehicle Involved: (2) 1971 Ford Bronco
(3) 1985 Toyota station wagon
(4) 1981 Toyota 2-door coupe
Truck Fatalities: 0 **Truck Injuries:** 1
Other Fatalities: 0 **Other Injuries:** 6

SUMMARY:

The combination unit was eastbound on State Highway 6, negotiating a left curve on an ice-covered bridge, when it went out of control, skidded into the westbound traffic lane, and struck a Ford Bronco head-on. From the impact area, the Bronco was forced backwards about 25 feet to where it departed the highway and rolled down a 75-foot gorge before coming to rest in creek bottom. After striking the Ford Bronco, the truck continued east in the westbound lane for approximately 117 feet and struck a Toyota station wagon. From this impact, the combination unit remained in contact with the small passenger vehicle, pushing it eastbound until both collided with a second passenger vehicle. All three vehicles then continued eastbound an additional 45 feet before coming to rest. At final rest, the power unit of the heavy truck was atop the first passenger car struck.

This accident resulted in substantial damage to the heavy truck's power unit and minor injuries to its driver. The three passenger vehicles were destroyed and their occupants received minor to moderate injuries.

During the investigation, the truckdriver stated to investigators that he was traveling at 30 mph when he lost control of his vehicle. Witnesses stated, however, that the truck was traveling at about 45 mph over the ice-covered bridge when it went out of control. The posted speed limit at the accident location was 25 mph.

The driver of the combination unit had accumulated 29 years experience in the operation of heavy trucks. His length of employment with the motor carrier was not determined.

The driver stated that his employer expects the Los Angeles to Denver run to be completed in 28 hours, stating, "This cannot be done legally, but everyone fudges a little bit. If a guy wants to make a living he has to be a little dishonest because of the laws and company regulations."

When relating the details of his trip, the truckdriver stated he departed Mesquite, Nevada, at 9 a.m. on the day of the accident, and drove the approximately 682-mile trip to Greeley, Colorado, with only a few rest stops. The accident occurred at 9:09 p.m., but the driver's log stops at 8 p.m. on that day. The log also reflects that he had 1 1/2 hours off that day. This would indicate that he completed the 682-mile trip in 11 hours of driving and averaged 62 mph through this mountainous terrain.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the truckdriver to reduce his speed and maintain his vehicle within its proper lane while negotiating a curve on an ice-covered bridge due to fatigue resulting from employer pressure to complete the trip within established guidelines.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours
2. Motor Carrier Oversight of Driver
3. Environment

CASE NO.: 25

Investigation No.: SEA-86-H-TR09
Accident Location: U.S. Highway 97, mile post 3.5, 4 miles south of Biggs Junction, Oregon
Lanes: 2-lanes
Shoulders: 9-foot asphalt, downwards slope
Median: None
Features: Winding, -3 percent grade, 955-foot radius curve
Date and Time: March 15, 1985, 3:15 a.m.
Ambient Conditions: Dark, clear, dry
Heavy Truck Involved: 1984 Freightliner conventional tractor in combination with a loaded refrigerated van trailer
Motor Carrier: Leonardo Truck Lines, Inc.
Type of Operation: Common Carrier
Size of Operation: 60 power units
Total Weight of Truck(s): 78,720 pounds
Total Length of Truck(s): 65 feet
Other Vehicle Involved: None
Truck Fatalities: 0 **Truck Injuries:** 1
Other Fatalities: 0 **Other Injuries:** 0

SUMMARY:

The combination unit was en route to Washington from California and was decending a winding section of mountainous roadway. The driver related that, while attempting to negotiate a right-hand curve in the roadway, he was distracted by a rattling noise somewhere in the sleeper berth. He further stated that when he turned around to see what the noise was, the vehicle drifted off the right edge of the roadway. He stated that, as he felt the truck leave the road, he applied the brakes but the loaded van trailer turned over. From the area of overturn, the combination unit slid for only 12 feet before coming to rest on the unpaved shoulder, lying on its right side.

This accident resulted in relatively minor damage to the combination unit, and the unrestrained driver sustained moderate injuries. The driver reported that he had been wearing a lapbelt immediately before the collision but unlocked it just before the truck rolled.

An audit of the motor carrier, conducted by the BMCS, indicated that log book violations were common for this company's drivers. For a 12-month period involving 82 full-time drivers and 10 part-time drivers, a BMCS search revealed 150 instances of this motor carrier requiring or permitting their drivers to make false entries on a record of duty status (log books). In addition, the audit discovered 13 violations of the 70-hour rule, 32 counts of requiring or permitting a driver to drive more than 10 hours, and 9 counts of requiring or permitting a driver to drive after having been on duty for 15 hours.

Biggs Junction, Oregon
Case No. 25

This driver left his carrier's terminal located Selah, Washington at noon on March 11 and completed over 2,100 miles of travel, going as far south as Irvine, California, in the 3 1/2 days preceding the accident. The investigation revealed that the driver had falsifed his daily log books to reflect compliance with hours of service requirement.

The investigation revealed that the truckdriver had not been eating regularly and had been suffering from depression along with mental and physical fatigue. Although he stated to investigators that he did not fall asleep, he related that he was mentally "down," had not eaten for over 24 hours, and was out of money. His assigned travel route was Interstate Route 5, a roadway without extreme mountainous grades; however, he was taking Highway 97 to get some money from his residence, which was accessible via Highway 97.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the driver's diminished alertness due to mental depression and the fatigue from excessive working hours. Contributing to the probable cause was the motor carrier's failure to properly monitor the driver's duty hours.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours

2. Motor Carrier Oversight of Driver

CASE NO.: 26

Investigation No.: FTW-86-H-TR06
Accident Location: Interstate 20, 0.6 miles west of Kilgore, Texas
Lanes: 4-lanes, divided
Shoulders: Median shoulder 4 feet of asphalt
outside shoulder 10 feet of asphalt
Median: 36-foot wide earthen median
Features: Straight, +4 percent grade
Date and Time: March 20, 1986, 4:30 a.m.
Ambient Conditions: Clear, dry, 65°F and dark
Heavy Truck Involved: 1985 Peterbilt conventional tractor in combination with an empty tanker trailer
Motor Carrier: Arnold Distributing Company
Type of Operation: Private Carrier
Size of Operation: 12 power units
Total Weight of Truck(s): Not determined
Total Length of Truck(s): Not determined
Other Vehicle Involved: None
Truck Fatalities: 0 **Truck Injuries:** 1
Other Fatalities: 0 **Other Injuries:** 0

SUMMARY:

The combination unit was traveling on a straight section of roadway, ascending a 4 percent up-grade, when the vehicle drifted off the right shoulder. From the area of departure from the improved shoulder, the vehicle continued for about 180 feet on the grass roadside before it collided with a concrete drainage inlet and overturned. The vehicle came to rest lying on its right side, approximately 20 feet from the inlet impact.

This accident resulted in minor abrasions and contusions to the unrestrained driver. The tractor and the empty gasoline tank trailer received minor damage.

The truckdriver stated that he felt tired, even though he was in compliance with hours of service requirements. He normally pulled over for a nap around that time but kept on driving because he had a lot of work to do that day. He added that no matter how well he rested, he always felt sleepy in the early morning hours. This driver was involved in a prior accident of similar circumstances in the early morning hours of May 1985. It was also discovered that the driver was seen fueling his personal vehicle at the carrier's fuel pumps at approximately 10:30 p.m. on the evening before the crash. This was approximately 3 hours before the driver reported for work.

A hand-rolled, partially burnt cigarette was found in the cab of the tractor. This cigarette was tested and proved to be marijuana. The driver freely admitted that the cigarette belonged to him and that he had smoked it on the trip just before the accident.

The truckdriver stated that he had been driving heavy trucks for 12 years, and he had been driving for 2 years with this motor carrier. Officials of the motor carrier related that this driver had been a model employee, and even after the previous accident, his performance had been impressive enough that the company chose to retain him. The carrier's transportation manager revealed that the driver's performance had been declining over the past 6 months, however, he was kept on the payroll in anticipation of improved performance.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the driver's failure to maintain his vehicle on the paved surface of the roadway due to diminished alertness and impaired efficiency of judgement and performance that developed from sleep cycle disruption and the use of marijuana.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours
2. Alcohol/Drugs
3. Hazardous Material
4. Motor Carrier Oversight of Driver

CASE NO.: 27

Investigation No.: FTW-86-H-TR07
Accident Location: Interstate 20, 14 miles south of Mineral Wells, Texas
Lanes: 4-lanes, divided
Shoulders: 11-foot wide asphalt
Median: 70-foot wide earthen
Features: Straight level
Date and Time: March 20, 1986, 4:45 a.m.
Ambient Conditions: Clear, dry, dark
Heavy Truck Involved: 1984 Kenworth conventional 3-axle tractor combined with 2 fully loaded 28-foot van trailers
Motor Carrier: ARA Trailblazers, Inc.
Type of Operation: Common Carrier
Size of Operation: 12 power units
Total Weight of Truck(s): 57,656 pounds
Total Length of Truck(s): 80 feet
Other Vehicle Involved: 1973 Mack tractor in combination with loaded flatbed trailer
Truck Fatalities: 0 **Truck Injuries:** 0
Other Fatalities: 0 **Other Injuries:** 0

SUMMARY:

The Kenworth combination unit was eastbound traveling on the shoulder of the Interstate highway when tire marks indicate the driver steered sharply to the left to avoid a slower moving truck which was also traveling on the shoulder. The Kenworth impacted the left rear of the preceding truck with the right side of the tractor and trailers. The unit then arced to the left across both lanes and then arced to the right as the rear trailer entered the median, rotated counterclockwise about its longitudinal axis, and overturned onto its left side. The overturned trailer was dragged back onto the right shoulder. During the accident dynamics, the pintle hook separated from the rear of the front trailer, but the safety chains remained intact.

This accident resulted in very minor damage to the power unit of the doubles combination, substantial damage to both of its trailers, and moderate damage to the converter dolly. Damage was reported as minor to the second tractor/trailer combination and its load. There were no injuries reported in this accident.

At the accident scene, witnesses reported that the interior of the doubles combination power unit smelled strongly of alcohol. Investigating police officials, after administering field sobriety tests, arrested this driver for DWI. Following his arrest, the driver refused chemical testing for determination of BAC. A safety officer for the motor carrier related that upon his release from police custody only a few hours after the accident, the driver could not recall what violation he had been arrested for. The driver, when questioned by his employer, admitted only to consuming "some beer" at a location 500 miles west of the accident site.

The long term lease under which the doubles power unit was being operated required a team of drivers to operate the unit. The required codriver was not onboard at the time of the accident, and nothing was heard from him until the morning following the accident when he called company officials, reportedly unaware that the vehicle had been wrecked. The investigation revealed that due to the absence of the codriver, the accident-involved driver was probably over the legal hours-on-duty permitted under Federal regulations. The last entry in the driver's daily log showed him in New Mexico at 7 p.m. evening before the accident--a distance of approximately 575 miles in the 10 hours preceding the collision. He had driven for 4 hours before the log entry in New Mexico.

The investigation determined that the driver had a total of 16 years experience in the operation of heavy trucks. It was found, however, that he had operated double trailer combination units for only the past 5 months. The driver was qualified by written test and road test for the motor carrier by the owner of the truck, and the initial employment application reflected no previous traffic violation for the immediate past 3-year period. A record check revealed at least four moving violations in his home State in that period.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the driver's failure to maintain his vehicle within the travel lanes due to a combination of fatigue and alcohol impairment.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours
2. Driver Training/Experience
3. Alcohol/Drugs
4. Driving History
5. Motor Carrier Oversight of Driver
6. Double Trailers

CASE NO.: 28

Investigation No.: FTW-86-H-TR08
Accident Location: U.S. Highway 287 within Bellevue, Texas
Lanes: 5 lanes
Shoulders: Varying widths of asphalt surface on both sides
Median: None
Features: +2 percent grade, straight, and center left-turn lane
Date and Time: March 22, 1986, 9:07 p.m.
Ambient Conditions: Dark, lighted with street lights, clear, and dry
Heavy Truck Involved: 1977 White Freightliner COE tractor in combination with a loaded 42-foot flatbed trailer
Motor Carrier: A.L. MacAlister Trucking Company
Type of Operation: Common Carrier
Size of Operation: 144 power units
Total Weight of Truck(s): Estimated at 71,700 pounds
Total Length of Truck(s): Estimated at 50 feet 6 inches
Other Vehicle Involved: Passenger vehicle with small trailer
Truck Fatalities: 1 **Truck Injuries:** 0
Other Fatalities: 0 **Other Injuries:** 0

SUMMARY:

As the combination unit was traveling at a witness-estimated speed of 60 mph, a passenger vehicle pulling a small trailer entered the traffic from the right directly into the path of the truck. As the truck changed from the right lane to the left lane, a minor collision resulted, with the right front tire of the tractor striking the extreme left rear of the small trailer being pulled by the passenger vehicle. This contact resulted in a penetration of the truck tire with subsequent loss of air pressure. As the tire lost air, the tractor began a clockwise rotation, veering back into the right-hand lanes of travel from the center lane. After the combination unit traveled about 150 more feet, the trailer began overturning to its left, coming to rest on top of its load. The tractor rolled onto its left side, and the top came in contact with a W-beam guardrail, resulting in substantial damage to the driver's compartment.

The top left portion of the tractor cab was destroyed, and the fatally injured driver was found pinned in the compressed area of his compartment. An examination of the tractor revealed no substantial structural support in the collapsed area. The trailer received only minor damage. The passenger vehicle and small trailer sustained only minor damage.

The driver's employment application to the motor carrier reflected only one violation in the preceding 3 years. The information given on the application had not been verified. A check with the State driver's records revealed five violations, along with two motor vehicle accidents in that 3-year period. In addition, a 5-year search revealed a total of four traffic accidents and a total of seven traffic violations, including one probated DWI charge. This driver was characterized by company safety officials as an exemplary driver.

Bellevue, Texas
Case No. 28

PROBABLE CAUSE:

The National Transportation Safety Board determines the probable cause of this accident to be the passenger car driver's movement of his vehicle into the path of the truck. Contributing to the severity of the accident was the rapid loss of air pressure on the right steering axle tire and the absence of any substantial structural framework on the cab portion of the tractor.

OF INTEREST IN THIS INVESTIGATION:

1. Driving History
2. Motor Carrier Oversight of Driver
3. Crashworthiness

CASE NO.: 29

Investigation No.: DEN-86-H-TR08
Accident Location: Interstate 70 interchange with Interstate 25, Denver, Colorado
Lanes: One 32-foot wide lane
Shoulders: Right side 6-foot wide asphalt bound by 32-inch high unsecured concrete redirecting barrier
Median: None
Features: Freeway transition road with less than a 200-foot radius curve to left
Date and Time: March 26, 1986, 6:10 a.m.
Ambient Conditions: Clear, dry, dark
Heavy Truck Involved: 1983 International Harvester COE tractor in combination with a loaded 48-foot van trailer
Motor Carrier: Save-A-Stop, Inc.
Type of Operation: Private Carrier
Size of Operation: Unknown
Total Weight of Truck(s): 55,000 pounds
Total Length of Truck(s): Approximately 60 feet
Other Vehicle Involved: None
Truck Fatalities: 0 **Truck Injuries:** 1
Other Fatalities: 0 **Other Injuries:** 0

SUMMARY:

The tractor/trailer combination was attempting to negotiate a left curve exit ramp with a posted advisory speed of 25 mph, but overturned onto its right side. As it overturned, it fell onto a barrier system of unanchored New Jersey-type barriers. The impact displaced several of these concrete structures, allowing the vehicle to override the barrier system and strike the concrete support columns of an overpass.

This accident resulted in substantial damage to both the power unit and the trailer of the combination unit. While the unrestrained driver reported no injury, the truck's codriver, reportedly resting in the sleeper berth, sustained serious injuries which included the traumatic amputation of his foot.

The speed limit for the approach to the accident area was posted at 40 mph. Within 150 feet of the left turn transition ramp was a left turn sign mounted in combination with the 25 mph advisory ramp speed sign. The left turn and advisory ramp speed signs were mounted on the right side of the roadway.

The investigation found that the cab sustained major crush to the right side which intruded into the sleeper berth. The principal damage from the contact with the displaced concrete barriers. The power unit inspection found no substantial structural support built into the cab which might prevent intrusion of this type.

The truckdriver had approximately 6 years of experience in the operation of heavy trucks, 2 of those years were with the subject motor carrier. A search of violation history for the truckdriver revealed that his operating privileges had been suspended in at least one State for the past 3 years. Communication with the State of Oklahoma found that this driver had surrendered his operator's license in lieu of posting bond for an "operating without proper authority" citation, and then failed to comply with payment of fines or court appearances. Oklahoma records reflect that they still have possession of the surrendered license even though the driver presented a valid license to investigating police officers in this accident. The driver's home State officials stated that the driver must have applied for and obtained a renewed, valid license. The driver's home State records reflect no suspension, therefore, the motor carrier was not advised in the course of their yearly driver record checks. The failure of Oklahoma to notify the driver's home State of the suspension allowed the driver to continue driving while he was disqualified under Federal regulations.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the driver to reduce his speed to a prudent rate for the ramp configuration. Contributing to the severity of the crash was the collapse of the concrete redirecting barrier.

OF INTEREST IN THIS INVESTIGATION:

1. Driving History
2. Crashworthiness
3. Environment

CASE NO.: 30

Investigation No.: MKC-86-H-TR06
Accident Location: U.S. Highway 63, 2.6 miles south of Mammoth Spring, Arkansas
Lanes: 3-lane, 2-direction, asphalt surface
Median: None
Features: Winding curves, hilly terrain
Date and Time: March 31, 1986, 3:35 a.m.
Ambient Conditions: Clear and dry
Heavy Truck Involved: (1) 1982 International tractor in combination with 2 loaded 28-foot trailers
Motor Carrier: Jones Truck Lines, Inc.
Type of Operation: Common carrier
Size of Operation: 410 power units
Heavy Truck Involved: (2) 1984 Kenworth tractor in combination with a loaded 48-foot trailer
Motor Carrier: Freight Savers, Inc.
Type of Operation: Common carrier
Size of Operation: 65 power units
Total Weight of Truck(s): (1) Unknown
(2) Unknown
Total Length of Truck(s): (1) Unknown
(2) Unknown
Other Vehicle Involved: None
Truck Fatalities: 2 **Truck Injuries:** 0
Other Fatalities: 0 **Other Injuries:** 0

SUMMARY:

The Kenworth truck and trailer combination was traveling southbound, negotiating a descending right curve, when the driver lost control and traveled into the northbound travel lane. The Kenworth combination overturned onto its left side, slid approximately 116 feet down the grade and further into the northbound lane, and collided head-on with the northbound International truck and double trailer combination. At impact, the semitrailer broke loose from the Kenworth truck and came to rest approximately 67 feet from the road surface on the east side of the road. Both power units, along with the set of doubles, came to rest in the northbound lane. A fire of undetermined origin ensued, which substantially consumed both power units and the first trailer of the doubles set. Both drivers were found burned in their vehicles. The double trailer combination was transporting wet storage batteries, a hazardous material, but the burning of this product did not result in injuries to emergency response personnel or passersby.

Records furnished by the doubles unit driver's employer revealed that this driver had approximately 11 1/2 years experience in the operation of heavy trucks. He had reportedly attended a commercial driving school. Although he certified on his initial employment application that no traffic violations had been committed in the past year, a records search revealed two moving violations on his record in that period. This driver's medical certificate had expired approximately 1 1/2 months before the accident.

Records furnished by the Kenworth driver's employer indicated that the driver began working for them approximately 3 1/2 months before the accident. He reportedly had 5 years experience in the operation of heavy trucks and had attended a 5-week commercial driving school. Subsequent investigation revealed that this motor carrier had issued eight warning letters to the driver of the Kenworth during the 21 days preceding this accident. The warning letters were for violating the company's speed policy which prohibits their drivers from averaging more than 49 mph (this is a time via distance computation and is not based on mechanical devices in the truck). This repeated violation of company policy by the accident driver did not result in any disciplinary action other than the warning letters.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the Kenworth driver's failure to reduce his speed and maintain his vehicle within the proper travel lane. The reason(s) for that failure was not determined.

OF INTEREST IN THIS INVESTIGATION:

1. Driving History
2. Motor Carrier Oversight of Driver
3. Hazardous Material
4. Double Trailers

CASE NO.: 31

Investigation No.: DEN-86-H-TR09
Accident Location: Interstate 76, on the 2 westbound lanes that terminate and intersect into the southbound lanes of Interstate 25, Denver, Colorado
Lanes: 4 lanes, divided
Shoulders: Median shoulder 3-foot asphalt surface, outside shoulder 10-foot asphalt surface
Median: None
Features: Entrance ramp, curve to the left, W-beam guardrail on outside shoulder

Date and Time: March 31, 1986, 5:30 a.m.
Ambient Conditions: Clear, dry, and 60°F
Heavy Truck Involved: 1977 Peterbilt COE tractor in combination with a loaded 50-foot livestock trailer
Motor Carrier: Western Sierra Enterprises, Inc.
Type of Operation: Common and contract carrier
Size of Operation: 5 power units
Total Weight of Truck(s): 80,000 pounds
Total Length of Truck(s): Approximately 60 feet
Other Vehicle Involved: None
Truck Fatalities: 0 **Truck Injuries:** 0
Other Fatalities: 0 **Other Injuries:** 0

SUMMARY:

The tractor-trailer combination was negotiating the left turning transition ramp. As the combination vehicle traveled through the curve, it veered to the right side of the ramp and hit the W-beam guardrail that paralleled the roadway. The vehicle traveled along the guardrail for about 42 feet before overriding the barrier. The vehicle then continued down a dirt embankment and overturned. The combination vehicle eventually came to rest lying on its right side approximately 210 feet from the initial guardrail contact. Police investigators, using preimpact tiremarks documented at the scene, estimated the combination unit's speed to have been approximately 79 mph on the approach to the ramp.

This accident resulted in substantial damage to the power unit and trailer. There were no injuries reported to the unrestrained driver. Approximately 300 of the trailer load of 460 sheep were killed.

Although the driver stated that his steering locked up, a postcrash examination of the steering components found them to be in satisfactory working order. Further examination of the power unit revealed that the factory-installed restraint system had been removed, and therefore, was not available to the driver.

This driver had no specialized training in the operation of heavy trucks. His experience had been gained over the past 2 years of employment with the current employer. Carrier officials confirmed that none of their drivers currently employed had prior driving experience in heavy trucks, nor do they require previous experience.

The driver reported that he had plenty of rest on the night before the accident. He related that he was in bed by 9 p.m. and was up at 3 a.m. After the 6 hours of sleep, he reported to work and began loading sheep at 3:30 a.m. At the time of the Safety Board interview at the accident scene, the driver could not produce the required daily log books. Carrier officials revealed that they were not knowledgeable of, nor were they enforcing, the Federal regulations applicable to their operation.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the driver's failure to slow his vehicle to safely traverse the highway ramp. The reason(s) for that failure was not determined.

OF INTEREST IN THIS INVESTIGATION:

1. Driver Training/Experience
2. Motor Carrier Oversight of Driver
3. Environment

CASE NO.: 32

Investigation No.: MKC-86-H-TR07
Accident Location: U.S. 65 at Pickens Lane, Dumas, Arkansas
Lanes: 2 lanes
Median: None
Features: Straight, flat
Date and Time: April 1, 1986, 7:10 p.m.
Ambient Conditions: Clear, dry, and dark
Heavy Truck Involved: 1985 Freightliner COE 3-axle tractor in combination with a loaded 40-foot flatbed trailer
Motor Carrier: C & H Transportation Company, Inc.
Type of Operation: Common carrier
Size of Operation: 1,000 power units
Total Weight of Truck(s): 67,700 pounds
Total Length of Truck(s): 60 feet
Other Vehicle Involved: Passenger car
Truck Fatalities: 0 **Truck Injuries:** 0
Other Fatalities: 5 **Other Injuries:** 0

SUMMARY:

A combination unit was traveling north on a rural highway when a passenger car carrying five occupants stopped in the northbound lane to make a left turn onto a side road. The truckdriver related that he did not see the vehicle stopped in his lane until it was too late to initiate any evasive maneuver. The truck impacted and overrode the rear of the car at a driver-stated speed of 55 mph. The truck and car moved in tandem off the right road edge and continued for approximately 195 feet before separation occurred. The truck continued on for an additional 455 feet, spewing fuel from a rupture in its left-side diesel tank. A fire of undetermined origin ensued which substantially consumed the cab portion of the power unit. Laboratory analysis of the tail lights of the car indicate that they were not on at the time of the accident.

This accident resulted in substantial damage to the power unit of the combination vehicle. The lapbelt-restrained truckdriver was uninjured. The passenger vehicle was destroyed, and its 5 occupants were fatally injured.

The truckdriver admitted to the consumption of "one beer" with his dinner about 45 minutes before the accident and was arrested by the investigating police officials for driving while intoxicated. Subsequent tests by two independent laboratories revealed a blood alcohol level of 0.084 and 0.109 percent. No reason for the inconsistent test results were given.

The investigation revealed that this driver had been arrested for DWI approximately 2 1/2 years before the accident. However, the State records revealed no disposition of the charge and, consequently, the arrest information was not made available to the driver's employer by either the State or the driver.

The truckdriver had approximately 24 years experience in the operation of heavy trucks. Records furnished by his employer did not reveal any type of formal training received in that period. The driver related to the investigating police officials that he had been driving trucks since he was 15 years old or for the past 48 years. The carrier was unable to furnish daily log book information for the driver's activity in the 5 days preceding this accident. The last available log entry reflected the driver off-duty in Westboro, Maine, at 3:30 p.m. on March 26. Further investigation, however, did not reveal excessive hours of duty.

A witness who passed the accident-involved passenger vehicle reported that, while the vehicle's headlights were on, no recollection of observing rear lights was claimed. Subsequent laboratory examination of rear lamps from the passenger car were inconclusive as to whether the lamps were illuminated at the time of impact.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this collision was the truckdriver's failure to perceive and avoid the stopped passenger vehicle due to alcohol impairment.

OF INTEREST IN THIS INVESTIGATION:

1. Alcohol/Drugs
2. Driving History
3. Motor Carrier Oversight of Driver

CASE NO.: 33

Investigation No.: FTW-86-H-TR09
Accident Location: Interstate 20, 20 miles west of Mineral Wells, Texas
Lanes: 4 lanes, divided
Shoulders: Asphalt - 11 feet right side, 3 feet left side
Median: Earthen
Features: Upgrade
Date and Time: April 3, 1986, 2:00 p.m.
Ambient Conditions: Heavy rain
Heavy Truck Involved: 1981 Freightliner COE tractor in combination with a loaded 40-foot flatbed trailer
Motor Carrier: Jones Motor Company, Inc.
Type of Operation: Common carrier
Size of Operation: 1296 power units (12/31/85)
Total Weight of Truck(s): 54,750 pounds
Total Length of Truck(s): 55 feet
Other Vehicle Involved: None
Truck Fatalities: 0 **Truck Injuries:** 2
Other Fatalities: 0 **Other Injuries:** 0

SUMMARY:

The combination unit was ascending a slight upgrade in an area of irregular pavement surface when it jackknifed in a counterclockwise motion. From this point, the unit traveled approximately 344 feet, entered the earthen median, and began a clockwise rotation. From the area of median entry, the unit traveled approximately 140 feet, reached approximately 15 to 20° from longitudinal orientation with the I-20 travel lanes, and overturned on its left side. On its left side, the combination unit slid for an additional 108 feet before coming to rest. As the unit slid on its left side, the fuel tank attachment structure was pushed rearward and penetrated the left side fuel tank. The driver stated that he was driving along in 12th or 13th gear at about 1600-1700 rpm (55 mph), when he suddenly lost steering control. He reported that it was raining heavily when he lost control of his truck. When questioned, the driver related he was using his 3-stage Jacobs engine retarder in its maximum efficiency setting.

The tractor received substantial damage to the left front and left side of the cab, along with a twisted frame. The accident resulted in moderate injuries to the unrestrained driver, while the passenger (the driver's wife), also unrestrained, was seriously injured.

By questioning the driver and examining the unit, it was learned that the front part of the semitrailer had only a 3,750-pound load, while the rear of the trailer had a 25,000-pound load. Information supplied by the motor carrier revealed that the driver had not been authorized to carry the front portion of the load. The driver, although leased long term to the motor carrier, had obtained the additional load independently and, consequently, was responsible for the improper weight distribution.

The original travel surface of the westbound lanes of I-20 was concrete with asphalt material placed on the shoulders. Information supplied by the Texas Department of Highways and Public Transportation indicates that a level-up asphalt surface was applied over the concrete surface in July 1985. At the time of this accident, only the right hand lane was asphalt surfaced. The left hand lane had a very smooth concrete surface. The tire travel paths of the asphalt overlay in the right hand lane were smooth and polished. The center area between the wheel paths had a very deep texture with large aggregate exposed. An irregular surface began 112 feet west of the asphalt overlay. This uneven surface was 4 feet in length and extended across the entire 12-foot lane width of the combination unit's travel path.

The truckdriver related that he had about 5 1/2 years experience in the operation of heavy trucks. He estimated approximately 70,000 to 75,000 miles of travel in each of those years.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the driver's operation of the Freightliner truck at a speed greater than what was safe for the existing weather and road conditions. Contributing to the accident was the road surface irregularity and the improper weight distribution of the load. Contributing to the severity of injuries sustained by the vehicle passenger was her failure to use the available restraint.

OF INTEREST IN THIS INVESTIGATION:

1. Environment

CASE NO.: 34

Investigation No.: MKC-86-H-TR08
Accident Location: Eastbound Interstate 70 at Delaware Street, Kansas City, Missouri
Lanes: 6 lanes, divided
Median: 32-inch concrete redirecting barrier with 8-inch top rail
Features: Depressed, slight downgrade
Date and Time: April 4, 1986, 10:05 a.m.
Ambient Conditions: Clear, dry, daylight
Heavy Truck Involved: (1) 1986 Kenworth conventional 3-axle tractor in combination with an empty 48-foot van trailer
Motor Carrier: John Oldner Trucking Company
Type of Operation: Common carrier
Size of Operations: 22 power units
Heavy Truck Involved: (2) 1979 GMC conventional 3-axle tractor in combination with a loaded 45-foot flatbed trailer
Motor Carrier: Steel Haulers, Inc.
Type of Operation: Common carrier
Size of Operation: 55 power units
Total Weight of Truck(s): (1) 36,000 pounds
(2) 75,880 pounds
Total Length of Truck(s): (1) 63 feet
(2) 65 feet
Other Vehicle Involved: None
Truck Fatalities: 0 **Truck Injuries:** 2
Other Fatalities: 0 **Other Injuries:** 0

SUMMARY:

A GMC combination unit carrying steel rail-car wheels was stalled in the center of three eastbound lanes. The driver had been trying unsuccessfully for 45 minutes to get the company to respond to remove the truck. The driver had activated his emergency flashers and had placed triangular reflectors behind the vehicle. Traffic was heavy in the area where the truck had stalled. The driver of the other empty combination unit, the Kenworth, was looking in the rearview mirror attempting to change lanes. The codriver of the Kenworth stated that she observed the truck ahead and called out to the driver. The Kenworth driver braked, producing approximately 30 feet of skidmarks before the Kenworth struck the center rear of the stalled, unoccupied GMC combination unit.

The impact drove the trailer of the stalled GMC up and over the fifth wheel, shearing the fifth wheel frame mountings, and into the rear of the cab. This allowed the trailer to extensively penetrate the cab. The structure of the cab was reduced, rear to front, by approximately 50 percent.

The Kenworth power unit sustained major frontal damage. The steering column and left side instrument panel were displaced rearward approximately 20 inches, into contact with the driver's seatback, and the left side door was rendered inoperable. The fuel tank ruptured when the front spring hangar separated from the frame. The steering axle displaced rearward and the front wheel contacted the tank. The unrestrained driver sustained a fracture in his left hand. The unrestrained right front passenger sustained a jaw fracture.

The Kenworth combination unit was assigned to a husband and wife driving team who had been employed by the carrier for approximately 4 months. Records submitted by the carrier reflected 4 years of experience in the operation of heavy trucks for the Kenworth driver and just over 3 years of experience for the Kenworth codriver. The Safety Board investigator found numerous discrepancies when comparing the daily logs of the two drivers. Trips are logged from Florida to Washington State without stops for fuel or meals, and the codriver logged one trip of 525 miles completed in 5 hours.

The investigation revealed that the GMC tractor stalled due to fuel starvation when the fuel would not crossfeed from the auxiliary tank. The truck had a manual shut off valve to keep the fuel from flowing between tanks. After the vehicle stalled, the driver attempted to open the valve but the injector system was empty. Without a primer pump system, the vehicle could not be restarted. Two telephone calls were made to the company before the collision, but no tow truck had arrived.

The GMC driver had been employed by his carrier for approximately 5 months. His employment application reflected about 3 years of heavy truck operating experience, primarily driving farm trucks on a when-needed basis. The driver submitted that he had accumulated 200,000 miles in that 3-year period. Safety Board investigators found that this driver had committed at least nine violations of the 15-hour rule in the past 30-day period. Daily violations of procedures for completing daily log books were found. The carrier's safety officer stated, "The company has found it very difficult to discipline drivers for violations due to strong union representation."

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the Kenworth's driver's failure to recognize the impending hazard of the stalled combination unit. The reason(s) for that failure was not determined.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours
2. Motor Carrier Oversight of Driver
3. Crashworthiness

CASE NO.: 35

Investigation No.: SEA-86-H-TR10
Accident Location: Interstate 5, 4/10 mile south of 93rd Street
Tumwater, Washington
Lanes: 4 lanes, divided
Shoulders: 10-foot asphalt shoulder
Median: 50 feet wide, grass
Features: Straight/flat
Date and Time: April 15, 1986, 4:40 a.m.
Ambient Conditions: Dark, overcast, dry
Heavy Truck Involved: 1985 Freightliner conventional 3-axle tractor in combination with a loaded 48-foot reefer trailer
Motor Carrier: Western Carriers, Inc.
Type of Operation: Common carrier
Size of Operation: 200 power units
Total Weight of Truck(s): Not determined
Total Length of Truck(s): Not determined
Other Vehicle Involved: None
Truck Fatalities: 0 **Truck Injuries:** 1
Other Fatalities: 0 **Other Injuries:** 0

SUMMARY:

The combination unit was northbound when it traveled off the roadway shoulder and onto the soft roadside material The driver reported that he fell asleep, stating that when he felt the right wheels drift off the right road edge, he attempted to steer to the left to return to the travel lane, but he overcorrected. The power unit re-entered the roadway, but the trailer tires remained on the soft roadside. At an area over 390 feet north of the point where the combination unit left the roadway, it rolled over onto its right side.

This accident resulted in moderate damage to both the power unit and the trailer. The unrestrained driver sustained minor injuries. A passenger, reportedly resting in the sleeper berth, was not injured.

The investigation revealed that the truckdriver was not maintaining daily logbooks as required by Federal regulations. Time accounts later reconstructed and furnished to the motor carrier by the driver indicated that the driver had probably been awake and active for the 16 1/4 hours preceding the accident and had been driving for 9 hours at the time of the accident; his destination was 2 hours from the accident site. The motor carrier also indicated to investigators that the passenger was being used by the driver as a codriver. This practice was a violation of both company policy and Federal regulations as the passenger was unauthorized.

The truckdriver related a total of 5 years experience in the operation of heavy trucks. A search of driver history files revealed that this driver had accumulated 11 violations while operating a commercial vehicle in the past 3 years.

While the power unit was owned by its driver and leased to the motor carrier, the trailer was owned by a leasing company. The lease agreements for both units stipulated that all maintenance was the responsibility of the power unit owner. Inspection of the combination unit revealed that two of the trailer's four brakes were at the limits of acceptable adjustment, and the remaining two were out of adjustment. The driver indicated that he performed brake adjustments once or twice a month.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the driver's failure to maintain his vehicle on the roadway due to the fatigue that resulted from lack of adequate rest.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours
2. Driving History
3. Motor Carrier Oversight of Driver
4. Motor Carrier Oversight of Equipment

CASE NO.: 36

Investigation No.: MKC-86-H-TR09
Accident Location: Interstate 44, within Tulsa, Oklahoma
Lanes: 4-lanes, divided
Median: 22 feet grass median
Features: Straight, at grade
Date and Time: April 15, 1986, 8:30 a.m.
Ambient Conditions: Clear, daylight, and dry
Heavy Truck Involved: 1984 White conventional tractor in combination with a loaded tanker trailer
Motor Carrier: Air Products & Chemicals, Inc.
Type of Operation: Private carrier
Size of Operation: Not determined
Total Weight of Truck(s): Unknown
Total Length of Truck(s): Unknown
Other Vehicle Involved: (1) Light-duty truck pulling a small trailer
(2) 1984 Chevrolet/Wayne Schoolbus
Truck Fatalities: 0 **Truck Injuries:** 0
Other Fatalities: 0 **Other Injuries:** 18

SUMMARY:

A light-duty truck pulling a small trailer was traveling on a straight section of highway when the small trailer came loose, crossed the median, and entered the lanes of traffic approaching from the opposite direction. When the small trailer was in the left lane of travel, it was struck by a schoolbus carrying 27 passengers. The combination unit was following the schoolbus in the left lane, as both had moved over to allow merging traffic to enter the highway. After the schoolbus hit the small trailer, the bus slowed and was struck in the rear by the following tractor-trailer. The schoolbus continued forward, crossed the center median and the two lanes of opposing traffic, and came to rest on the roadway shoulder. The tractor-trailer came to rest on the right shoulder.

The power unit of the combination received minor damage to the front end, but the trailer containing 7,000 pounds of liquid nitrogen was not damaged. The lapbelt-restrained truckdriver was not injured. Moderate damage was observed on the schoolbus, and 18 of the student passengers sustained minor injuries.

The truckdriver had approximately 14 years experience in the operation of heavy trucks. He had accumulated over 650,000 miles of travel over the past 7 years without reported safety violations. The investigation found the motor carrier to be in compliance with all applicable Federal regulations.

Tulsa, Oklahoma
Case No. 36

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the connection between the light duty truck and its trailer.

OF INTEREST IN THIS INVESTIGATION:

1. Hazardous Material

CASE NO.: 37

Investigation No.: ATL-86-H-TR10
Accident Location: Chestnut Street and NS railroad, Anniston, Alabama
Lanes: 2
Shoulders: Varying width, dirt surface
Median: None
Features: Railroad/highway grade crossing
Date and Time: April 15, 1986; 2:55 a.m.
Ambient Conditions: Clear and dark with street lights
Heavy Truck Involved: 1978 International tractor in combination with a loaded 36-foot flatbed trailer
Motor Carrier: United States Pipe and Foundry Company
Type of Operation: Private carrier
Size of Operation: 1 power unit
Total Weight of Truck(s): 76,500 pounds
Total Length of Truck(s): 48 feet
Other Vehicle Involved: Freight train
Truck Fatalities: 0 **Truck Injuries:** 1
Other Fatalities: 0 **Other Injuries:** 0

SUMMARY:

The combination unit traveled along city streets a few blocks and approached a grade crossing of Norfolk Southern Railway System (NS) reportedly at a slow speed. The vehicle continued northbound and entered the crossing without stopping. A NS freight train 991, westbound at a recorded 43 mph, struck the right side of the semitrailer. From the area of impact, the combination unit was pushed about 390 feet to where it struck a bridge guardrail and came to rest in a creek. The train consisted of four locomotives and 23 freight cars. As a result of the collision, four locomotives and eight freight cars derailed. The derailed units came to rest in an area that extended about 325 feet north of the crossing.

This accident resulted in extensive damage to the combination unit, train, and tracks. The lapbelted truckdriver received serious injuries. None of the four train crewmembers were injured.

A witness stated that the flashing light signals started flashing about 15 minutes before the train arrived, and that at the time of the accident the signals were flashing, the bell was ringing, and the train was sounding its whistle. Subsequent investigation revealed that a module of the electronic control equipment was defective due to a shorted diode, which could have caused the signals to operate in the fail-safe mode either intermittently or continuously.

The truckdriver stated that he had used this crossing twice each workday for the past 20 years. On the accident date, he did not hear the warning bell or see the flashing lights. He stated that once his vehicle was on the tracks, he saw the train coming and attempted to make it across. The driver did relate that his windows were rolled up.

Anniston, Alabama
Case No. 37

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the truckdriver's failure to observe the flashing light signals at the grade crossing and to stop clear of the track.

OF INTEREST IN THIS INVESTIGATION:

1. Grade Crossing

CASE NO.: 38

Investigation No.: DEN-86-H-TR10
Accident Location: Interstate 25, 1 mile north of Denver, Colorado
Lanes: 10-lanes, divided
Shoulders: Median shoulder 3 feet asphalt, outside shoulder 12 feet asphalt
Median: New Jersey type concrete barrier
Features: Straight, level
Date and Time: April 21, 1986, 12:15 p.m.
Ambient Conditions: Clear, dry, 68°F, and sunny
Heavy Truck Involved: 1980 Mack conventional tractor in combination with with a loaded 40-foot flatbed trailer
Motor Carrier: Leavitt Lumber Company
Type of Operation: Private carrier
Size of Operation: 2 power units
Total Weight of Truck(s): 67,760 pounds
Total Length of Truck(s): Unknown
Other Vehicle Involved: Four passenger vehicles, 1 straight truck, and 1 other tractor-trailer
Truck Fatalities: 0 **Truck Injuries:** 0
Other Fatalities: 0 **Other Injuries:** 2

SUMMARY:

The driver of the combination unit arrived in Denver at 5 a.m. after a 10-hour trip. He then slept in the cab of the tractor for about 2 hours before having his truck unloaded. Next, he proceeded to pick up his new load of ten flattened automobiles and began his return trip to Utah. Just outside Denver, the driver crested a small hill and noted that traffic was stopped due to a minor accident. The tractor-trailer driver claimed that he was unable to stop by applying his brakes, so he swerved to his left to avoid other vehicles. His evasive attempts were not successful, however, and several vehicles were hit which started a chain reaction collision that involved four passenger vehicles, a straight truck, and another tractor-trailer.

This accident resulted in substantial damage to the Mack power unit but no injuries were reported by the unrestrained driver. Only one of the passenger vehicles received greater than moderate damage. Two of the passenger vehicle occupants sustained minor injuries.

An inspection of the combination unit revealed that the airbrake supply lines between the power unit and the trailer were taped with electrical tape at frayed areas. In addition, one air line was spliced with heater-hose and the rear service air valve on the trailer leaked air. On the power unit, it was found that the internal braking components for each side of the steering axle brakes had been removed. The oil seals on two of the power unit's rear brakes were leaking, and the brake shoes were oil soaked. The motor carrier related that service had been performed on the combination vehicle just 5 days before the accident. The driver reported that he had performed a pretrip inspection of the vehicle, but made no record of his inspection.

The truckdriver reported that he had approximately 5 years of experience in the operation of heavy trucks. Only three to four long-haul trips had been made each year, and the rest of his time was spent driving log trucks and in local delivery operations. No formal training was claimed.

From statements made by the driver, it was determined that he had slept approximately 3 hours in the 26 hours preceding the accident. The driver also revealed that he was not properly maintaining his driver log books and had no current medical certificate. Also, at the accident scene the driver acknowledged that he brought his log book up-to-date, showing him to be in compliance with hours-of-service rules, while the police officers were busy with the other accident victims. Copies of the driver's log books furnished later by the motor carrier conflicted with the logs taken from the truckdriver at the accident scene. Additionally, the motor carrier did not maintain driver qualification files as required by Federal regulations.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the drivers fatigued condition which affected his ability to perceive and react to the existing hazard. Contributing to the accident was the poor mechanical condition of the combination unit.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours
2. Driver Training/Experience
3. Motor Carrier Oversight of Driver
4. Motor Carrier Oversight of Equipment

CASE NO.: 39

Investigation No.: LAX-86-H-TR07
Accident Location: Interstate 5, 2 miles north of Tejon, California
Lanes: 8 lanes, divided
Shoulders: 8-foot asphalt
Median: Varying width dirt with -5 percent grade bound by a 24-inch high W-beam guardrail
Features: -6 percent grade, curving roadway
Date and Time: April 23, 1986, 5:37 p.m.
Ambient Conditions: Clear, daylight, and dry
Heavy Truck Involved: 1967 Freightliner COE in combination with 2 loaded flatbed trailers
Motor Carrier: Bettencourt and Sons
Type of Operation: Common carrier
Size of Operation: 4 power units
Total Weight of Truck(s): Approximately 80,000 pounds
Total Length of Truck(s): Not determined
Other Vehicle Involved: Not documented
Truck Fatalities: 2 **Truck Injuries:** 0
Other Fatalities: 0 **Other Injuries:** 0

SUMMARY:

The combination unit was proceeding northbound on the highway as it entered a 5-mile long, -6 percent grade, serpentine highway. Witnesses reported that the truck was moving slower than the other truck traffic and that his brakes were smoking. The truck was reported to have attempted to move to the shoulder but quickly returned to the traffic lane and started accelerating. Approximately 2 miles below the crest of the grade, another truckdriver saw the accelerating truck approaching in his rearview mirror. As the second truckdriver attempted to move to the shoulder to let the speeding truck pass by, he observed a California Highway Patrol traffic-stop ahead. The other truck then attempted to move to the left to give the truck lane over to the accelerating truck. As he did so, the case vehicle also moved to the left to go around. The combination unit struck the right rear of the preceding trailer with the left front of the tractor and severed the steering axle. The unit then veered across three lanes and impacted a median barrier. During the accident sequence, the rear trailer separated from the unit and overturned in the roadway. The first trailer and tractor partially surmounted and partially penetrated a median barrier, rotated 360° while traveling 55 feet down the median, and came to rest upright facing southwest.

As a result of the collision sequences, the power unit of the doubles combination was destroyed. Both unrestrained occupants, the driver and an unauthorized passenger, were ejected from the cab and fatally injured. The vehicle examination revealed that, during the collisions, the load of flat steel on the front trailer shifted forward and deformed the cab structure. There was no barrier present between the load on the trailer and the rear of the power unit.

Postcrash examination of the truck revealed that the service and emergency air lines had been crossed and there was no braking air supplied to either trailer. The company declared that the brakes were properly hooked up when the trailer left the yard but had apperently been rehooked by the driver. In addition to the crossed air lines, it was noted that the brake linings or both sides of the drive axle were oil soaked, there were excessive contaminants in the wet tank, and the spring brake on the right side of the drive axle was broken.

The investigation revealed that the driver had very limited experience in the operation of heavy trucks. A coworker reported that the job with his current employer was his first truck-driving experience. He had been employed by this carrier a month earlier, but was fired 6 days before the accident because of driving on two flats for several miles, thus destroying the wheels and hubs. The carrier had recalled the driver on the day before the subject accident because they were short one driver. In the 3 weeks of actual driving experience, the driver had been responsible for local delivery only and had not driven over the mountainous highway known as "the Grapevine."

The investigation also found that this driver had been on duty for 17 hours at the time of the accident--12 1/2 of which were spent driving. This on-duty activity was not in accordance with pretrip instructions given him by the carrier.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this collision was the lack of braking ability due to improperly connected air lines and inadequate brake system maintenance. Contributing to the accident was the driver's inexperience in heavy truck operations. Contributing to the severity of the collision was the poor crashworthiness of the power unit and the absence of a suitable barrier between the trailer and the power unit.

OF INTEREST IN THIS INVESTIGATION:

1. Driver Training/Experience
2. Fatigue/Duty Hours
3. Motor Carrier Oversight of Driver
4. Motor Carrier Oversight of Equipment
5. Double Trailers
6. Crashworthiness

CASE NO.: 40

Investigation No.: CHI-86-H-TR09
Accident Location: Interstate 70 in Vandalia, Illinois
Lanes: 4 lanes, divided
Shoulders: 4-foot asphalt median shoulder and 10-foot outside shoulder
Median: Grass covered, earthen
Features: Straight
Date and Time: April 24, 1986, 11:00 p.m.
Ambient Conditions: Clear and dark
Heavy Truck Involved: 1978 (COE) International tractor in combination with a loaded 45-foot flatbed trailer
Motor Carrier: Moon Freight Lines
Type of Operation: Contract carrier
Size of Operation: 100 power units
Total Weight of Truck(s): 71,320 pounds
Total Length of Truck(s): 58 feet
Other Vehicle Involved: None
Truck Fatalities: 1 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The combination unit was eastbound on Interstate 70 on a straight section of roadway when it gradually veered to the right and departed the travel surface onto the south roadside. The combination unit traveled on the soft roadside for approximately 200 feet before the driver attempted to steer left back toward the travel surface. At this time, the semitrailer began to overturn on the 29 percent sidelope. The semitrailer pulled the tractor over and the entire combination unit flipped once, coming to rest in an upright position, approximately 45 feet south of the paved surface. The distance traveled from the point the unit departed the travel surface to where it came to rest was approximately 340 feet.

The 360° rollover resulted in extensive damage to the combination unit with 32 inches of downward crush on the tractor cab. The driver received fatal injuries.

Records furnished by the motor carrier indicated that this truckdriver had been employed by the carrier for less than 1 month. His employment application reflected on and off experience with heavy trucks for about 5 years. About 25 months of experience in combination units was reflected.

An examination of the driver's daily log books, the onboard tachograph's charts, and fuel receipts revealed that the driver had been driving for approximately 18 hours of the 20 hours preceding this accident. He had driven a total of 550 miles since the last stop reflected on records.

Vandalia, Illinois
Case No. 40

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the truckdriver's diminished alertness due to the fatigue from excessive duty hours.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours

2. Motor Carrier Oversight of Driver

3. Crashworthiness

CASE NO.: 41

Investigation No.: MKC-86-H-TR10
Accident Location: U.S. 77 at Butler County Road 87S, near Eldorado, Kansas
Lanes: 2 lanes, undivided
Median: None
Features: 1146 foot radius curve to the left, with a -30 percent slope on right shoulder
Date and Time: April 24, 1986, 4:45 p.m.
Ambient Conditions: Clear, windy, dry, daylight
Heavy Truck Involved: 1979 International COE power unit in combination with a loaded 45-foot cattle trailer
Motor Carrier: Prouty Truck Lines, Inc.
Type of Operation: Contract carrier
Size of Operation: 5 power units
Total Weight of Truck(s): Not determined
Total Length of Truck(s): Not determined
Other Vehicle Involved: None
Truck Fatalities: 1 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

A combination unit carrying 93 head of cattle was attempting to catch up to the lead truck of a two-truck convoy when the following unit entered a left hand curve. The truck failed to negotiate the curve and went off the right road edge. Witnesses reported that the driver tried to return his vehicle to the roadway but due to the soft dirt surface and the -30 percent slope, he was unable to recover before the trailer overturned. The overturned trailer struck a concrete culvert and pulled the tractor over, initiating a 450°-rollover of the tractor and a 540°-rollover of the trailer. The power unit came to rest lying on its left side and the trailer resting upside down.

This accident resulted in substantial damage to both the power unit and trailer of the combination unit. Severe downward distortion was noted to the roof structure of the cab. The unrestrained truckdriver was found pinned in the wreckage with fatal injuries.

The investigation revealed that the driver's log books were incomplete for the accident date. However, time/location information provided by the lead driver indicates that 450 miles were covered before the accident. After subtracting time for stops related by the lead driver, the driver would have had to average approximately 81 mph over the travel distance. Log books for previous days along with statements by the lead driver indicated that the driver had been off duty only 14 hours in the 3-day period preceding this accident.

The motor carrier did not maintain employee records. Consequently, there was no information developed regarding the accumulated experience in heavy trucks for this driver. It was established that he had been properly licensed to operate heavy trucks for about 10 years.

The investigation also revealed that while the power unit appeared to be well maintained, three of the four trailer brakes were out of adjustment.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the driver's operation of the combination at an excessive speed for the roadway curvature. Contributing to the driver's excessive speed was fatigue which resulted from inadequate rest.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours
2. Motor Carrier Oversight of Driver
3. Crashworthiness

CASE NO.: 42

Investigation No.: LAX-86-F-H009
Accident Location: State Route 71 in Chino, California
Lanes: 3 lanes, undivided
Shoulders: Outside shoulder 8-foot asphalt surface
Left shoulder 10-foot asphalt surface
Median: None
Features: Intersection, left turn lane, straight, level
Date and Time: April 28, 1986, 6:45 p.m.
Ambient Conditions: Clear, 75°F, dry, and daylight
Heavy Truck Involved: 1985 Freightliner COE tractor in combination with a loaded 48-foot van trailer
Motor Carrier: Jay Lines, Inc.
Type of Operation: Common carrier
Size of Operation: Not determined
Total Weight of Truck(s): Estimated at 73,000 pounds
Total Length of Truck(s): Unknown
Other Vehicle Involved: Two passenger vehicles
Truck Fatalities: 0 Truck Injuries: 1
Other Fatalities: 1 Other Injuries: 0

SUMMARY:

The combination unit was approaching a signal controlled intersection when the light turned red. According to witnesses, a motorcyle had already passed through the intersection before a passenger car entered the intersection from the truck's left. The truckdriver related that he attempted to brake. However, the unauthorized passenger in the truck stated that he told the driver to hit his brakes, but the driver said, "I'm not going to brake for anybody"--there were no preimpact skidmarks from the combination unit. The passenger further related that the driver did not try to avoid hitting the passenger car, however, another witness stated that he had heard the truckdriver activate the truck's horn. The tractor-trailer struck the right side of the passenger vehicle, and also caught the left front corner of another passenger vehicle which was in the intersection.

The collisions resulted in moderate damage to the power unit of the combination vehicle, but no injuries to the unrestrained truckdriver. Police reported an undefined injury to the passenger of the truck. The first passenger vehicle struck by the combination vehicle was destroyed, and its driver fatally injured. The second passenger vehicle struck received only minor damage and no occupant injuries resulted.

A strong odor of alcohol was noted by the investigating police officer, and the driver of the combination unit later submitted to a blood analysis which revealed a 0.21 BAC. A water pipe, commonly used for smoking drugs, was also found in the tractor cab. This driver later related to investigators that he had been consuming alcoholic beverages along with some type of cough medicine. A statement given later by the passenger indicated that the driver had consumed a 12 pint of vodka earlier in the day.

Employment records furnished by the motor carrier indicated that this driver had been employed by them for less than 2 weeks. Although the driver indicated on the application that he had accumulated approximately 27 years experience in the operation of medium and heavy trucks, only 4 years of this time was verified. A search of prior driving history revealed one violation, for improperly adjusted brakes, which occurred during the month before this accident.

An examination of the braking system on the tractor and trailer revealed that six out of ten brakes were out of adjustment. The four trailer brakes were backed off past the proper limits of adjustment, and one of the brake shoes failed to contact the brake drum by approximately 1/8 inch. The passenger of the truck revealed that the driver had stopped at least twice and adjusted the trailer brakes as it was felt that the trailer was slowing him down. The carrier stated that the power unit had been serviced less than 3 weeks before the accident and that the brakes were properly adjusted at that time. A service sticker attached to the trailer indicated that the trailer had been serviced about 4 weeks before the accident.

The investigation failed to find daily log books for the truckdriver. Consequently, no hours of service determinations were made. Witnesses to the accident related that, immediately postcrash, an occupant of the truck destroyed the log books that were being carried in the power unit.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the truckdriver's failure to stop his vehicle for a red light before entering an intersection due to a combination of alcohol impairment and improperly adjusted brakes.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours
2. Alcohol/Drugs
3. Motor Carrier Oversight of Driver
4. Motor Carrier Oversight of Equipment

CASE NO.: 43

Investigation No.: MKC-86-H-TR11
Accident Location: Interstate 70, six miles west of Wakeeney, Kansas
Lanes: 4 lanes, divided
Median: Grass covered, earthen
Features: Straight and flat
Date and Time: April 30, 1986, 2:30 a.m.
Ambient Conditions: Clear, dark, and dry
Heavy Truck Involved: 1984 COE International tractor in combination with a loaded 45-foot flatbed trailer
Motor Carrier: Sooner Transport Corporation
Type of Operation: Common carrier
Size of Operation: 180 power units
Total Weight of Truck(s): 76,990 pounds
Total Length of Truck(s): 58 feet
Other Vehicle Involved: None
Truck Fatalities: 1 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The combination unit was traveling east on a straight and level section of Interstate 70 when it drifted to the right and departed the travel surface. The unit then traveled approximately 392 feet with its right wheels on the soft roadside and its left wheels on the paved surface. Tiremarks indicated that the vehicle began veering back toward the improved travel surface but overturned before re-entry could be accomplished. The unit overturned 270° before coming to rest lying on its left side in the right roadside ditch. The unrestrained driver was found within the collapsed cab of the power unit.

The tractor cab sustained extensive damage with downward crush reaching a point even with the bottom of the windshield frame, and the driver was fatally injured. An inspection of the cab revealed no structural framework which could prevent the top from collapsing. The top of the cab was constructed of light sheet metal with a thin layer of foam rubber molded to the metal.

An examination of the power unit revealed three bottles containing various prescription drugs. One bottle was prescribed to the driver and the other two were prescribed to the driver's wife. Autopsy results show that the driver had barbiturates present in his blood, however, no quantity was given.

This driver had been employed by the motor carrier for approximately 3 months. The pre-employment application furnished by the carrier indicated that the driver had accumulated 5 years experience in the operation of heavy vehicles. It was also noted that the driver had held seven different jobs over the past 6-year period, the periods of employment varying from 6 weeks to 3 years.

Wakeeney, Kansas
Case No. 43

The investigation revealed that this driver had left Kansas at mid-day on April 27, traveled to New Mexico, and continued to separate locations in Colorado. The last log entry was made at 7 a.m. on the day preceding this accident. Time records found during the investigation revealed that he probably had no sleep or rest periods from that time up to the accident occurrence, a period of 19 1/2 hours. These times also reflect that he was over legal hours of service defined by Federal regulations.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the driver to maintain his vehicle on the travel surface as a result of drug usage or fatigue, or a combination of the two. Contributing to the severity of the accident was the absence of a substantial structural framework of the upper cab portion of the tractor.

OF INTEREST IN THIS INVESTIGATION:

1. Alcohol/Drugs

2. Fatigue/Duty Hours

3. Motor Carrier Oversight of Driver

4. Crashworthiness

CASE NO.: 44

Investigation No.: LAX-86-F-H012
Accident Location: Interstate 5 at Rosecrans Avenue offramp, Santa Fe Springs, California
Lanes: One
Shoulders: 10-foot wide asphalt on inside of curve, 8-inch concrete curb, and soft dirt shoulder
Median: None--paved gore point to left
Features: -2 percent, 145° foot radius right curve, elevated freeway offramp
Date and Time: April 30, 1986, 6:05 a.m.
Ambient Conditions: Clear, dry, and daylight
Heavy Truck Involved: 1980 Freightliner COE, 3-axle tractor in combination with a loaded 45-foot van trailer
Motor Carrier: Mammoth Freight Lines, Inc.
Type of Operation: Common carrier
Size of Operation: 43 power units
Total Weight of Truck(s): 54,850 pounds
Total Length of Truck(s): 65 feet
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 2
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The combination unit was exiting the southbound I-5 freeway at a driver-reported speed of 30 mph, traveling on a straight section of the ramp with a 2 percent downgrade. A 20 mph advisory speed sign for the ramp was in place. As the vehicle approached the tangent point of a 145-foot radius right curve, it veered to the left and out of the travel lane. The tractor tires hit and surmounted a raised curb, and the left front tractor wheel entered the dirt shoulder at the outside road edge. The combination vehicle then tipped over onto its left side and slid to rest.

This rollover resulted in substantial damage to both the power unit and the loaded van trailer. The unrestrained driver sustained moderate injuries while his passenger, a trainee who was also unrestrained, received minor injuries.

Records furnished by the motor carrier indicated that the truckdriver had approximately 6 years of experience in the operation of heavy trucks. A 6-month commercial training course had been completed at some time in the past 6 years. The driver related that he was familiar with the off-ramp where the accident occurred and that, although he was exceeding the posted advisory speed, he felt that the vehicle was under complete control. A search of driver history revealed that this driver had accumulated eight traffic violations in the past 3-year period, all of which were received while operating a commercial vehicle. It was found that the driver had not reported any of the violations to his employer. However, the carrier's files included a record transcript from the State revealing the accumulated violations.

Santa Fe Springs, California
Case No. 44

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the driver's failure to slow his vehicle to an appropriate speed for the configuration of the ramp.

OF INTEREST IN THIS INVESTIGATION:

1. Driving History

2. Motor Carrier Oversight of Driver

CASE NO.: 45

Investigation No.: LAX-86-H-TR10
Accident Location: Interstate 10 on-ramp, Ontario, California
Lanes: 2 lanes, undivided
Shoulders: Asphalt, unknown widths
Median: None
Features: Straight, 1.5 percent downgrade
Date and Time: May 5, 1986, 7:05 a.m.
Ambient Conditions: Clear, 65°F, daylight and dry
Heavy Truck Involved: 1980 Peterbilt, conventional tractor in combination with a loaded 28-foot open dump trailer
Motor Carrier: Belbeck Trucking
Type of Operation: Common carrier
Size of Operation: 2 power units
Total Weight of Truck(s): 77,000 pounds
Total Length of Truck(s): 50 feet 4 inches
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The combination unit was traveling northbound attempting to negotiate a tight radius, left-turning ramp onto a connector road. This was the driver's first of six scheduled loads for the day. He had traveled this route twice during the previous week. As the driver made the left turn, the rollover threshold of the vehicle was exceeded and the tractor and trailer overturned onto its right side. The short distance traveled from the point of overturn to final rest suggests a relatively low speed for the combination, however, no speed estimates were given.

This rollover resulted in substantial damage to the power unit. Moderate damage was noted along the right side of the trailer and the trailer's suspension system. The unrestrained truckdriver was not injured.

The investigation revealed that the truckdriver was the son of the combination vehicle's owner. He had accumulated approximately 1 year of on-the-job experience in the operation of heavy trucks. The carrier related that his son had been involved in several minor accidents over that 1-year period and was on probation at the time of this accident.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the driver to reduce his speed to conform to the geometry of the turn. Contributing to the cause of this accident was the driver's lack of training and/or experience.

Ontario, California
Case No. 45

OF INTEREST IN THIS INVESTIGATION:

1. Driver Training/Experience
2. Motor Carrier Oversight of Driver
3. Driving History

CASE NO.: 46

Investigation No.: DEN-86-H-TR12
Accident Location: Colorado State Highway 119, five miles west of Boulder, Colorado
Lanes: 2 lanes
Shoulders: Dirt shoulders of varying widths
Median: None
Features: Winding 6 percent downgrade
Date and Time: May 5, 1986, 2:10 p.m.
Ambient Conditions: Cloudy skies, dry pavement
Heavy Truck Involved: 1976 Kenworth conventional tractor in combination with a loaded 40-foot tanker trailer
Motor Carrier: McDonald Farms/Liquid Waste Services, Inc.
Type of Operation: Contract carrier
Size of Operation: 9 power units
Total Weight of Truck(s): 76,000 pounds
Total Length of Truck(s): Not determined
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The eastbound combination unit began traversing an approximate 6 percent downgrade on State Highway 119. The driver stated he was traveling at 30-35 mph in fifth gear before beginning the descent. At some point in the descent, the driver failed an attempted downshift, stalling the engine, and leaving the transmission in neutral. The driver stated to investigators that he attempted to shift to a lower gear without using the clutch. He stated this allowed the micro-switch to engage the engine retarder when he released pressure on the accelerator pedal, thereby stalling the engine. He went on to say that his supervisor had instructed him to downshift without using the clutch. This was verified by the carrier's general manager, who related that the shifting procedure is required of all employees. This official felt that the braking efficiency of the vehicles is increased substantially by this shifting method, but admitted that if the driver's foot is released from the accelerator, the engine will be killed by the engine retarder. The truck gained speed and the unit went out of control, eventually sliding into a guardrail as the driver attempted to negotiate a left-turning curve. From its initial contact with the W-beam guardrail, the combination vehicle traveled approximately 54 feet before overriding the barrier. From that point, the vehicle went over an embankment, falling about 35 feet into the boulder strewn creek bottom below.

Both the power unit and the trailer of the combination vehicle were destroyed. The fuel tanks of the power unit were ruptured, allowing approximately 200 gallons of diesel to spill, however, there was no fire. The tanker trailer, broken in half at impact with the creek bottom, spilled its entire 7,000 gallon load of sewage sludge into the water. The unrestrained driver of the truck sustained moderate injuries.

This driver had about 15 months of experience in the operation of heavy trucks. In addition, he had several years experience with straight dump trucks. He had successfully completed a commercial vehicle driving course approximately 1 year before the accident. He had been employed by the carrier for about 9 months, but had not traveled over the accident route before.

The motor carrier had been in operation for approximately 3 years. Although the State of the carrier's operation has adopted and does enforce the Federal regulations regarding motor carriers, the truckdriver's employer stated that he had no knowledge of those rules. The driver's employment records, vehicle maintenance records, and driver log books were not in compliance with regulations.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the driver's improper shifting procedure which resulted in loss of vehicle control. Contributing to the accident was the motor carrier's policy of requiring their drivers to follow the improper shifting procedure.

OF INTEREST IN THIS INVESTIGATION:

1. Driver Training/Experience
2. Motor Carrier Oversight of Driver
3. Environment

CASE NO.: 47

Investigation No.: ATL-86-H-TR11
Accident Location: Interstate 285, 3 miles east of Atlanta, Georgia
Lanes: 8
Shoulders: Asphalt, 3 feet inside and 10 feet outside
Median: New Jersey-type concrete barrier
Features: Straight, 1.77 percent downgrade
Date and Time: May 7, 1986, 1:45 a.m.
Ambient Conditions: Clear, dark, and dry
Heavy Truck Involved: 1982 Peterbilt COE tractor in combination with a loaded 44-foot van trailer
Motor Carrier: Schultz Transit, Inc.
Type of Operation: Common carrier
Size of Operation: 174 power units
Total Weight of Truck(s): 75,210 pounds
Total Length of Truck(s): 56 feet 2 inches
Other Vehicle Involved: One unoccupied passenger vehicle
Truck Fatalities: 1 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

A passenger car was having problems with the engine overheating, and the driver was unable to drive the car off the roadway before it stalled in the second lane from the outside. The driver stated that she could not get the car started, so she exited her vehicle and went to the outside shoulder. An approaching motorist observed the stalled vehicle, pulled off the road, and offered assistance. The combination unit approached in the outside lane, moved over into the second lane from the outside, and struck the stalled passenger car directly in the rearend. Tiremarks on the roadway indicated the truckdriver applied his brakes a short distance before impact. From impact, the passenger car moved over 400 feet forward and the combination unit veered right and then rolled onto its left side. The combination unit continued across the outside shoulder, and the tractor crashed through a blocked out W-beam guardrail, sliding over 100 feet before coming to rest. An examination of the passenger vehicle's tail light filaments by the investigating police agency indicated that the tail lights were on at impact, however, no determination was made regarding the status of the emergency flashers.

Both the unoccupied passenger car and the power unit of the combination unit were destroyed in the collision. The driver's compartment of the tractor was penetrated by the guardrail. The trailer, substantially damaged in the accident, was destroyed during the recovery operations. Rescue personnel found the unrestrained truckdriver fatally injured inside the crushed cab of the power unit. Blood analysis on the truckdriver was negative for alcohol or drugs.

The investigation revealed that the truckdriver was maintaining two separate daily log books. The most recent entry in either was made 3 days before the accident. Examination indicated that one book was used to document hours of service consistent with regulations and the other was used for preparation and submission to the motor carrier. A reconstruction of actual hours of service revealed that the driver had been on duty for 93.6 hours in the past 8 days--approximately 86 of which were spent driving. It was also noted that the carrier compensated its drivers based on actual miles driven.

It was found that this driver had approximately 9 years experience in the operation of straight trucks, but had no experience with heavy trucks prior to his employment with this carrier. He was originally employed as a driver by this motor carrier in August 1984, but was terminated because the company felt he was too great a risk because of inexperience and driving practices. The motor carrier re-employed him in July of 1985. Records furnished by the carrier reflected that the driver had reported only one of five violations committed in the 3 years before his most recent employment. Further research revealed that the driver's regular operator license had been revoked in his home State. However, the revocation period had passed and he was eligible to re-apply for the license.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the truckdriver's failure to avoid the disabled passenger car due to his fatigue which resulted from excessive on-duty hours and inadequate rest. Contributing to the occurrence was the motor carrier's failure to adhere to and enforce the FMCSR hours-of-service rules.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours
2. Driving History
3. Motor Carrier Oversight of Driver
4. Crashworthiness
5. Environment

CASE NO.: 48

Investigation No.: MKC-86-H-TR12
Accident Location: Interstate 35 near Mission Road, Kansas City, Kansas
Lanes: 6 lanes, divided
Median: Guardrail
Features: Level, curve right
Date and Time: May 9, 1986, 4:14 p.m.
Ambient Conditions: Daylight, dry, clear
Heavy Truck Involved: 1982 Freightliner 2-axle COE, in combination with 2 loaded 27-foot van trailers
Motor Carrier: Consolidated Freightways, Inc.
Type of Operation: Common carrier
Size of Operation: Approximately 6,550 power units
Total Weight of Truck(s): Not determined
Total Length of Truck(s): 75 feet
Other Vehicle Involved: Passenger vehicle
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The combination unit was eastbound in the inside lane when the driver initiated a lane change to the right. As he did, the right front of his vehicle struck the left rear of a 1980 Honda. The impact deflected the Honda into the inside lane across the path of the combination unit. The unit began tracking to the left toward the median. At some point during the maneuvers, the converter dolly drawbar eye broke the pintle coupling at the latch pin and tore the left safety chain bracket from the rear of the first trailer. The second trailer then separated from the first trailer and struck the median guardrail. From the initial contact, the trailer rode along the guardrail for approximately 70 feet before it struck a sign standard, overturned, and broke open. Following the rear trailer's separation, the power unit and its remaining trailer continued to the east for several hundred feet, remaining in contact with the passenger car, before coming to a stop in the travel lanes. The power unit traveled approximately 500 feet from the area of its initial contact with the passenger car to the area where it came to rest.

This accident resulted in minor damage to the power unit and first trailer of the combination unit. The rear trailer was destroyed and the converter dolly substantially damaged. The passenger car also received substantial damage. Neither the unrestrained truckdriver nor the restrained Honda driver was injured.

The investigation revealed that one of the safety chains attached to the converter dolly was missing a spring-loaded safety latch. There was no documentation made of this defective safety chain being connected at the time of the accident.

The truckdriver had been employed by the motor carrier since May 1967, approximately 19 years. Just before his employment, he successfully completed a 6-week commercial vehicle driving school. Records submitted by the carrier revealed that the driver had been operating doubles combinations for about 10 years. No prior accidents were documented.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the driver's failure to ensure a clear right-of-way before changing lanes.

OF INTEREST IN THIS INVESTIGATION:

1. Motor Carrier Oversight of Equipment
2. Double Trailers

CASE NO.: 49

Investigation No.: MKC-86-H-TR13
Accident Location: Interstate 70, outside Alma, Kansas
Lanes: 4 lanes, divided
Shoulder: Outside shoulder 10-foot asphalt surface
Median: Grass median of undetermined width
Features: Straight, 3 percent downgrade
Date and Time: May 10, 1986, 7:30 a.m.
Ambient Conditions: Raining, daylight
Heavy Truck Involved: 1986 Freightliner COE tractor in combination with 2 loaded 27-foot van trailers
Motor Carrier: Edson Express, Inc.
Type of Operation: Common carrier
Size of Operation: 131 power units
Total Weight of Truck(s): 56,330 pounds
Total Length of Truck(s): 66 feet 4 inches
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The loaded double trailer combination unit was traveling down a 3 percent grade in the left lane on a wet, grooved-asphalt road surface when the driver noticed his rear trailer moving to the left. As the driver attempted to correct the situation with steering input, the second trailer went off the roadway into the median, and then came back into the lanes of travel. This caused the entire unit to cross both lanes and travel off the right shoulder. The rear trailer broke away from the pintle connection as it rolled over. It then continued off the shoulder past the tractor and first trailer, where it came to rest on its left side. The tractor and front trailer came to rest upright in a jackknifed position.

The power unit and first trailer of the combination unit received only minor damage while the rear trailer was substantially damaged. Neither the lapbelted driver nor the codriver, reportedly resting in the sleeper, were injured.

An inspection of the vehicle's components found that the two-axle power unit had at least 10/32 inch of tread on the steering axle tires. The drive-axle tires, however, had only 2/32 inch tread remaining on the right side tires and 5/32 inch of tread on the left side tires. The tread depths of tires on the trailers and converter dolly were all above 10/32 inch.

The investigation revealed that this driver had been employed by the carrier for approximately 16 1/2 months. His employment application reflected only 100 miles of experience in the operation of combination vehicles, none of which was accumulated in doubles operation. About 2 weeks before his employment, he was given a 40-mile road test with a doubles combination. That road test was the only experience noted with doubles before beginning long-haul operations with a codriver.

A search of violation history for this driver found nine entries for the past 5 years. In addition, two suspensions and one DWI were noted. The motor carrier was made aware of this record before employing the driver. The most recent suspension, a one-year suspension for excessive points, was lifted about 2 months before his employment with the carrier. His commercial operating license was issued 6 days after that suspension was lifted. Three violations were found for the immediate 6-month period preceding the accident, one committed the day before the accident.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the driver's failure to maintain control of his vehicle due to the wet roadway, minimal tread depths on the drive axle, and the driver's inexperience.

OF INTEREST IN THIS INVESTIGATION:

1. Driver Training/Experience
2. Driving History
3. Motor Carrier Oversight of Equipment
4. Motor Carrier Oversight of Driver
5. Double Trailers
6. Environment

CASE NO.: 50

Investigation No.: FTW-86-H-TR15
Accident Location: Interstate 30 in Dallas, Texas
Lanes: 6 lanes, divided
Shoulders: Median shoulder 2 feet wide, asphalt; outside shoulder 8 feet wide, asphalt
Median: 25-foot wide earthen median with guardrail in center of median
Features: Bridge
Date and Time: May 12, 1986, 7:10 a.m.
Ambient Conditions: Clear, daylight
Heavy Truck Involved: 1982 conventional Freightliner tractor in combination with a loaded refrigerated van trailer
Motor Carrier: Preston M. Harmon
Type of Operation: Exempt carrier
Size of Operation: 1 power unit
Total Weight of Truck(s): Approximately 73,900 pounds
Total Length of Truck(s): Approximately 58 feet
Other Vehicle Involved: None
Truck Fatalities: 1 **Truck Injuries:** 0
Other Fatalities: 0 **Other Injuries:** 0

SUMMARY:

The combination unit was eastbound on Interstate 30 at a witness-estimated speed of 60 mph, when it veered to the left and departed the surface. The combination unit then collided with and overrode the median guardrail for approximately 105 feet, struck the bridge railing of a railroad overpass, and fell approximately 40 feet before coming to rest upside down on the Atchison, Topeka, & Santa Fe Railroad tracks below the bridge. Witnesses later stated that they had been behind the combination unit for about 12 miles and that the truck had been weaving erratically in the traffic lanes.

Both the power unit and the trailer of the combination unit were destroyed by the multiple impacts. The unrestrained truckdriver was found fatally injured, crushed within the cab structure of the power unit.

Log books and other duty status records were lost in the wreckage. However, investigators found that the driver had departed from Okanagan, British Columbia, Canada, on May 9, 1986, at about midnight. He had, therefore, driven the approximate 2,300 miles from his departure point to the accident site in about 55 hours. The manager of the brokerage company that obtained the load for this driver related that many produce haulers often attempt to make this trip straight through, without required rest stops, because of competition.

Several black capsules were recovered with the body of the truckdriver. Analysis disclosed these capsules contained caffeine, and the autopsy showed that the driver's blood contained trace amounts of caffeine.

Dallas, Texas
Case No. 50

The investigation found that the truckdriver had approximately 5 years of experience in the operation of heavy vehicles. He had traveled the route from Texas to Canada and back, monthly, for the past 2 years. The investigation also disclosed that the driver had been involved in three other accidents and had been convicted of five speeding charges in the preceding 5 years.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was that the driver fell asleep due to fatigue from excessive hours of duty.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours
2. Driving history
3. Environment

CASE NO.: 51

Investigation No.: LAX-86-H-TR13
Accident Location: Forrester Road at Johnson Road near Brawley, California
Lanes: 2 lanes
Shoulders: Level dirt shoulders of varying widths
Median: None
Features: Level, flat, straight
Date and Time: May 16, 1986, 1:30 p.m.
Ambient Conditions: Clear, daylight, dry
Heavy Truck Involved: (1) 1965 White Freightliner 2-axle COE in combination with 2 loaded 24-foot trailers
Motor Carrier: Joe S. Alvarez
Type of Operation: Contract carrier, exempt
Size of Operation: 1 power unit
Heavy Truck Involved: (2) 1969 Freightliner 2-axle COE and 2 empty 24-foot trailers
Motor Carrier: Carlos G. Settle
Type of Operation: Contract carrier, exempt
Size of Operation: 1 power unit
Total Weight of Truck(s): Undeterminable due to fire
Total Length of Truck(s): (1) 65 feet
(2) 65 feet
Other Vehicle Involved: Pick-up truck
Truck Fatalities: 2 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The 1965 Freightliner was southbound on a rural 2-lane highway in the process of transporting produce from the fields to a nearby processing plant. As the vehicle approached an intersection with a private dirt road, a preceding pickup truck slowed to make a right turn. As the truck attempted to overtake the turning vehicle on the left, it struck the pickup in the rear and left side. The combination unit then continued south, entered the northbound lane, and traveled into the path of a northbound doubles combination unit. The two heavy trucks collided head-on. Investigators found 70 feet of pre impact skid from two tires of the northbound vehicle.

From the head-on impact, the power unit and first trailer of the southbound combination overturned before coming to rest approximately 100 feet south of the area of impact. The northbound combination unit was redirected northeast traveling approximately 130 feet from the area of impact before coming to rest upright. Fire began immediately in the power units.

The initial collision between the southbound combination unit and the pickup truck resulted in only minor damage to the lighter vehicle and no injuries to its driver. The collision between the heavy trucks, along with the postcrash fire, completely destroyed the power units of both vehicles. The four trailers involved received minor damage. Both truckdrivers were fatally injured.

Investigators found narcotics paraphernalia in the power unit of the southbound vehicle. A post mortem toxicology report for this driver was positive for morphine, diazepam, and nordiazepam. Although the diazepam and nordiazepam were found to be within therapeutic levels, the Safety Board could not find records of the driver being under legal drug therapy. It was determined that this driver was undergoing an alcohol abuse treatment program at the time of the accident. Additionally, the driver was operating under a "work purposes only" restriction on his license which was suspended due to a second offense drunk driving conviction.

The driver of the southbound vehicle was reportedly experienced in heavy truck operations. His family related that he had began driving the accident involved truck when he was only 16 years old, which would indicate about 8 years of experience. While it was not determined who was responsible for maintenance of the vehicle, the investigation revealed multiple defficiencies with the vehicle's tires, brakes, and mechanical components.

No record of previous heavy truck experience was documented for the driver of the northbound combination vehicle. It was found through driver history files that this driver had four moving violations in the 2 years preceding the accident. At least two of those violations involved the unsafe operation of a commercial vehicle. The investigation documented several deficiencies in the vehicle's brakes, tires, and suspension components.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this collision was the 1965 Freightliner driver's failure to see and avoid the hazard of the preceding truck. Contributing to the inability of the driver to react was impairment due to morphine and diazapam.

OF INTEREST IN THIS INVESTIGATION:

1. Alcohol/Drugs
2. Driving History
3. Motor Carrier Oversight of Equipment
4. Double Trailers

CASE NO.: 52

Investigation No.: LAX-86-H-TR11
Accident Location: Northbound Interstate 5 near Lebec, California
Lanes: 8 lanes, divided
Shoulders: 10 feet wide, asphalt
Median: 60 feet wide, dirt
Features: At grade, +2 percent grade, straight, unlighted
Date and Time: May 16, 1986, 2:00 a.m.
Ambient Conditions: Dark, clear, dry
Heavy Truck Involved: 1985 White Volvo conventional 3-axle tractor in combination with a loaded 48-foot van trailer
Motor Carrier: Fisher Trucking
Type of Operation: Common carrier
Size of Operation: 150 power units
Total Weight of Truck(s): Not determined
Total Length of Truck(s): Not determined
Other Vehicle Involved: Four large truck combinations stopped for previous accident
Truck Fatalities: 1 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 3

SUMMARY:

The combination unit was traveling in the slow lane at a driver-reported speed of 60 to 65 mph. As the result of a previous accident, all traffic ahead of the case vehicle had been stopped by the California Highway Patrol. As the truck approached the queue of trucks, the driver failed to detect that the vehicles were stopped until immediately before the collision. There was no evidence of pre-impact evasive maneuvers, and the driver stated that he took none. The case vehicle struck the rear of a queue of four trucks and created a chain-reaction collision.

The case vehicle tractor was destroyed and the fiberglass cab unit separated from the frame. The unrestrained driver, who had assumed a prone position across the front seats, sustained only minor injuries. The unrestrained, unauthorized passenger in the sleeper sustained fatal injuries.

The four impacted trucks sustained major to minor damage, and three of the drivers sustained minor injuries.

The truckdriver related to investigators that he had approximately 7 years experience with heavy trucks. He had been employed by the motor carrier for only 2 months, although he had driven as an owner/operator for the preceding 7 years. The investigation did not document a driver call-in policy for the motor carrier, which could be used for monitoring a driver's activities, nor were dispatch policies determined. A search of the driver's violation history revealed one prior moving violation and one suspension.

The investigation revealed that the driver had not had any sleep for 44 hours. In addition, he had been on duty for 8 to 10 hours for each of the 7 days preceding the collision. He began drinking approximately 6 hours pre-crash and had consumed 2 1/2 pitchers of beer and 60 ounces of beer that he carried in the truck. In addition, he admitted to taking unknown quantities of amphetamines and to "snorting some coke" shortly before the accident. The driver related that he utilized this combination to stay awake on long trips. While there were no test results available for drug abuse, a postcrash BAC test revealed a 0.14 percent reading. The passenger in the truck had not been authorized by the company. Toxicological testing of the passenger's blood revealed positive results for opiates.

At the time of the collision, the driver had deviated approximately 60 miles from his assigned travel route. He had elected to do so for delivery of the passenger to her desired destination, and to visit relatives in the area. The unauthorized passenger had been picked up at a truck stop about 10 hours before the accident.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the truckdriver's failure to take evasive action due to a combination of fatigue and alcohol impairment.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours
2. Alcohol/Drugs
3. Motor Carrier Oversight of Driver

CASE NO.: 53

Investigation No.: ATL-86-H-TR15
Accident Location: Interstate 40, 1.6 miles west of Asheville, North Carolina
Lanes: 4 lanes, divided
Shoulders: Asphalt, 3 feet inside and 10 feet outside
Median: 44-foot earthen median
Features: Occasional curves
Date and Time: May 17, 1986, 2 a.m.
Ambient Conditions: Clear and dark
Heavy Truck Involved: 1985 COE International truck tractor in combination with 2 loaded 28-foot trailers
Motor Carrier: Carolina Freight Carriers Corporation
Type of Operation: Common carrier
Size of Operation: 2300 power units
Total Weight of Truck(s): Approximately 62,955 pounds
Total Length of Truck(s): Approximately 68 feet
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The twin trailer combination was westbound on Interstate 40 negotiating a 2.5° right curve when it departed the travel surface to the right and entered a ditch on the adjacent roadside. The right-side tires of the converter dolly struck a 1-foot high concrete drainage cover in the bottom of the ditch. From this point, the driver regained control and drove back onto the roadway, but the rear trailer overturned to the left. As the rear trailer overturned it broke free of the pintle coupling and the safety chain failed. During the accident sequence, the rear trailer slid back onto the travel surface of the roadway and came to rest on its left side. The driver was able to drive the power unit and remaining trailer to a safe stop. The driver reported that he heard a strange noise and the trailers pulled to the right, causing his tractor to go off the road.

This accident resulted in minor damage to the front trailer and converter dolly. The rear trailer received substantial damage. No damage was reported for the power unit, and the truckdriver was not injured.

The investigation found no evidence of preexisting defects or deficiencies of the combination unit. Tire prints at the accident scene indicated that the combination unit was tracking normally and straight when it departed the paved surface. An inspection of the pintle coupling revealed that the flap and locking pawl were undamaged, yet the lower hook portion of the assembly and the drawbar eye of the converter dolly both showed rotational distortion.

The truckdriver had accumulated approximately 27 years experience in the operation of heavy trucks. He had been employed by the carrier for 17 years, and records reflected no prior history of traffic violations or accidents. When the carrier received operating authority for doubles in 1983, this driver was assigned part-time to that operation. At the time of the accident, the driver operated doubles units approximately 50 percent of the time. No specialized hands-on training in doubles' operation was documented other than hookup and inspection guidelines. A set of hand-out instructions and cautions for doubles operation was furnished by the motor carrier in the form of interoffice communications and safety alerts.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the truckdriver's lack of vigilance which resulted in his failure to perceive that his vehicle was leaving the roadway. The reason(s) for that lack of vigilance was not determined.

OF INTEREST IN THIS INVESTIGATION:

1. Driver Training/Experience
2. Double Trailers

CASE NO.: 54

Investigation No.: ATL-86-H-TR12
Accident Location: Interstate 285 transition ramp, 1/2 mile south of Doraville, Georgia
Lanes: 1 lane, asphalt paved
Shoulders: Undetermined width of dirt shoulders, both sides
Median: None
Features: Construction zone, at grade
Date and Time: May 20, 1986, 7:20 a.m.
Ambient Conditions: Clear, daylight, and dry
Heavy Truck Involved: 1980 Mack conventional tractor in combination with a loaded 40-foot van trailer
Motor Carrier: Ashland Oil, Inc.
Type of Operation: Private carrier
Size of Operation: Not documented
Total Weight of Truck(s): 64,380 pounds
Total Length of Truck(s): 52 feet 6 inches
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The tractor-trailer unit was traveling through a sharp right turn on a cloverleaf ramp connecting two interstate highways. The truck was transporting 3,907 gallons of combustible and flammable liquids in eight portable cargo tanks. The driver advised that while negotiating the ramp, he looked into his mirror and observed the right trailer wheels lifting from the pavement surface. At the same time he heard a "rumbling" sound from the trailer. Both the tractor and trailer rolled onto its left side, slid a short distance, and stopped on the shoulder just off the pavement. The driver stated that he was traveling in fourth gear at a speed between 25 and 30 mph. That speed agreed with rollover speed calculations and the tractor's fourth gear speed range. The curve was posted with a 25-mph speed advisory sign.

The accident resulted in substantial crush damage to the tractor cab. The trailer was destroyed by the overturn and subsequent recovery operations. The lapbelted truckdriver sustained only minor injuries.

Forty-nine firemen on 16 fire and rescue units, about 15 enforcement officers, and personnel from both State and Federal environmental agencies responded to the accident. Approximately 365 gallons of the liquid cargo escaped; however, there was no fire, explosion, or evacuation. The roadway was closed for 12 1/2 hours while cleanup operations were being completed.

The 4-foot-wide liquid cargo tanks were loaded in the center of the trailer from the front rearward to the forward tandem axle. A strap around the last tank secured the load against longitudinal shifting. No securement was in place to protect the tanks against lateral shifting. This securement procedure was in accordance with carrier-established policies.

The truckdriver had about 12 years experience driving tractor semitrailer units; the last 2 years was for his current employer transporting hazardous materials. The carrier had furnished the driver hazardous materials training by requiring his attendance at monthly safety meetings. The driver stated that he had traveled the same ramp at a similar speed and had transported portable tank shipments, almost weekly for about 1 year. The only difference between the previous trips and the accident trip was that he normally hauled only 4 to 6 of the cargo tanks.

The trailer was placarded with flammable placards as required. However, the commodity identification numbers for the hazardous liquids being transported were not displayed on the placards as required by the Federal hazardous material regulations.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the lateral shifting of the portable cargo tanks within the trailer as a result of the carrier's failure to secure the portable tanks against lateral shifting.

OF INTEREST IN THIS INVESTIGATION:

1. Hazardous Material

2. Motor Carrier Oversight of Equipment (loading)

CASE NO.: 55

Investigation No.: ATL-86-H-TR14
Accident Location: Interstate 75, in Atlanta, Georgia
Lanes: 4, one-way
Shoulders: Asphalt, 4 feet wide
Median: Concrete barrier, some guardrails
Features: Elevated, several curves
Date and Time: May 24, 1986, 7:40 a.m.
Ambient Conditions: Clear, daylight, and dry
Heavy Truck Involved: 1984 Freightliner tractor in combination with 2 loaded 28-foot van trailers
Motor Carrier: Ryder/PIE Nationwide, Inc.
Type of Operation: Common carrier
Size of Operation: 4175 power units
Total Weight of Truck(s): 69,780 pounds
Total Length of Truck(s): 66 feet
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The combination unit carrying dry freight traveled south on Interstate 75 in Atlanta, Georgia, in a construction zone where traffic was routed through several small radius curves posted with 40-mph advisory speed signs. In a 315-foot radius right curve, the second leg of a small radius S-curve, the drawbar eye of the converter dolly rotated leftward, bent the upper portion of the pintle coupling, and broke free as the rear trailer overturned onto its left side. The tractor and lead trailer remained upright and were not damaged, except for the coupling. The truckdriver stated that he was traveling 45 to 50 mph and had perceived no problem with the combination before overturn of the rear trailer.

This accident resulted in moderate damage to the overturned rear trailer and converter dolly. The power unit was not damaged; however, the pintle assembly of the lead trailer was damaged. There were no injuries reported by the unrestrained driver.

The investigation revealed that the vehicle was in good mechanical condition and there were no contributing driver debilitations. In addition, postcrash examination revealed that the upper portion of the pintle hook was rotated to the left by the drawbar eye of the converter dolly. When the rear unit overturned, the converter dolly broke free of the pintle hook.

At the time of the accident, the driver had been on duty for about 5 1/2 hours. He had been off duty the 2 days preceding the accident and had accumulated 37 1/4 hours on duty in the 8 preceding days.

Atlanta, Georgia
Case No. 55

The driver had been employed by the motor carrier for about 14 years. He began operating twin trailer units in August 1983 when the carrier received authority to operate doubles in the eastern states. He was given no prior behind-the-wheel training, only a brief orientation which consisted primarily of coupling/uncoupling instructions. The driver stated that his best advice about driving doubles came from a small percent of his peers who had some prior experience driving doubles.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this collision was the driver's failure to reduce his speed to the posted advisory speed, thus exceeding the critical speed for the curve. Contributing to the accident was the rearward amplification of the lateral forces generated by the steering actions.

OF INTEREST IN THIS INVESTIGATION:

1. Driver Training/Experience
2. Double Trailers
3. Environment

CASE NO.: 56

Investigation No.: FTW-86-H-TR14
Accident Location: Intersection of Belmont Drive and Austin at railroad crossing 763396M, Allen, Texas
Lanes: 2 lanes
Shoulders: Variable width, dirt
Median: None
Features: Straight, slight upgrade, non-signalized grade crossing
Date and Time: May 28, 1986, 11:18 a.m.
Ambient Conditions: Clear, dry, and hot
Heavy Truck Involved: 1982 Freightliner conventional in combination with a loaded tanker trailer
Motor Carrier: Commercial Lubricants Corporation
Type of Operation: Private carrier
Size of Operation: 7 power units
Total Weight of Truck(s): Not determined
Total Length of Truck(s): 58 feet
Other Vehicle Involved: Southern Pacific train engine
Truck Fatalities: 0 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 3

SUMMARY:

A combination unit carrying 2,500 gallons of diesel fuel and 6,750 gallons of gasoline turned left onto a grade crossing, across the path of an oncoming freight train. The freight train, traveling at an estimated 17 mph with whistle sounding and front lights illuminated, began braking and slowed to about 6 mph before the impact occurred. The lead engine struck the rearmost 6 feet of the trailer's left side, separating the combination unit at its fifth wheel connection. The trailer rotated counterclockwise about 45° as it overturned on its top. The 2,500 gallons of diesel fuel cargo spilled from an impact-induced hole in the trailer. There was no fire. From the area of separation the power unit of the combination vehicle traveled clear of the crossing coming to rest upright. The freight train stopped on the tracks, traveling only 53 feet from the area of impact.

This accident resulted in substantial damage to both the power unit and the trailer of the combination vehicle. The lead locomotive of the train received damage which necessitated placing it out of service. The unrestrained truckdriver reported minor injuries, as did the train engineer and two of his crewmen. Approximately 120 feet of rail required replacement due to contamination of the trackbed.

The investigation revealed that the combination unit had been rerouted away from a signalized crossing due to construction work. At the accident crossing only 61 feet of travel surface was furnished between the curbline of the street from which the 58-foot-long truck turned and the first rail of the mainline track. The combination vehicle could not complete a 90° turn in the distance available.

Immediately before the collision the driver had been attending to a right-of-way discussion with an adjacent motorist and monitoring his rearview mirror because of a marked police vehicle that was following him. The driver told investigators that his air conditioning was on and the truck windows were rolled up. The investigation found that in order for the driver to check for oncoming train traffic, he would have had to stop his truck in mid-turn and turn his head to the left approximately 130° to look down the tracks.

Carrier records and information supplied by the driver indicated that he had accumulated 16 years of experience in heavy truck operation. In 1973, he reportedly attended a 6-month commercial driving school. He had been employed by the carrier for approximately 6 years. A records check found that the truckdriver's license had previously been suspended for multiple offenses which included a prior DWI. The period of suspension was within his employment with the carrier; however, it was not reported to them. The carrier had not checked his record between his 1980 hire date and 1984 and did not check it until the record was requested by an insurance carrier in 1985. This exceeded the retention time in State files of his suspension record.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this collision was the driver's failure to detect the approaching train due to a combination of the crossing design, his preoccupation with other motorists, and his inability to hear the train whistle because of environmental noise.

OF INTEREST IN THIS INVESTIGATION:

1. Driving History
2. Motor Carrier Oversight of Driver
3. Hazardous Materials
4. Grade Crossing
5. Environment

CASE NO.: 57

Investigation No.: DEN-86-H-TR13
Accident Location: Interstate 25 in Denver, Colorado
Lanes: 6 lanes, divided
Shoulders: 8-foot wide concrete shoulders
Median: Concrete barrier
Features: Upgrade, straight
Date and Time: May 29, 1986, 11:20 a.m.
Ambient Conditions: Cloudy 60°F
Heavy Truck Involved: (1) 1972 COF Kenworth truck tractor
Motor Carrier: Howard Electrical & Mechanical, Inc.
(2) 1986 conventional Freightliner in combination with a van trailer
(3) 1983 Kenworth truck-tractor in combination with a 30-foot dry bulk trailer
Type of Operation: (1) Private
Size of Operation: (1) One power unit
Total Weight of Truck(s): (1) 15,300 pounds
(2) Not determined
(3) 82,520 pounds
Total Length of Truck(s): (1) Approximately 21 feet
(2) Not determined
(3) Not determined
Other Vehicle Involved: None

Truck Fatalities:		Truck Injuries:	
	(1) 0		(1) 1
	(2) 0		(2) 0
	(3) 0		(3) 2
Other Fatalities: 0		Other Injuries: 0	

SUMMARY:

The 1972 Kenworth truck tractor was traversing a straight section highway within a construction zone, at a driver-estimated speed of 50 mph when the driver failed to react in time for slowing traffic. The Kenworth truck skidded approximately 188 feet and collided into the rear of a 1986 conventional Freightliner truck which was pulling a van-type trailer. From the initial impact the Kenworth departed to the left and collided with a concrete dividing barrier. From the barrier impact the Kenworth bounced back into the left side of the Freightliner, and then collided into the rear of the 1983 Kenworth truck that was towing a 30-foot, dry bulk, tanker trailer. The investigation revealed that the right front tire of the 1972 Kenworth was deflated by the initial impact.

The collision resulted in extensive damage to the 1972 Kenworth truck. The cab structure of the power unit was destroyed, and the driver received serious injuries. The Freightliner combination unit received moderate damage; however, neither occupant was injured. Both occupants of the 1983 Kenworth combination unit received minor injuries and the semitrailer received minor damage.

The driver of the 1972 Kenworth had been employed by the carrier for 3 years. He reported 13 years of experience with heavy trucks. He reportedly had accumulated about 10,000 miles of travel in each of those years. The investigation found that although the motor carrier was subject to the FMCSR due to the State's adoption of same, the carrier followed none of the applicable regulations, and no driver qualification files were maintained.

The Safety Board was unable to document information on the two other carriers involved.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the 1972 Kenworth driver's failure to react in time to the traffic slowing ahead.

OF INTEREST IN THIS INVESTIGATION:

1. Environment

2. Motor carrier oversight of driver

CASE NO.: 58

Investigation No.: LAX-85-H-TR16
Accident Location: Interstate 680, Fremont, California
Lanes: 6 lanes, divided
Shoulders: Median shoulder undetermined width of asphalt surface; outside shoulder 10-foot asphalt surface
Median: Undetermined width of grass
Features: Upgrade, straight
Date and Time: June 7, 1985, 10:20 a.m.
Ambient Conditions: Clear, 80°F, daylight and dry
Heavy Truck Involved: 1981 White Freightliner COE tractor in combination with a loaded 40-foot van trailer
Motor Carrier: Knudsen Corporation
Type of Operation: Not documented
Size of Operation: Not documented
Total Weight of Truck(s): 76,740 pounds
Total Length of Truck(s): 54 feet 9 inches
Other Vehicle Involved: Schoolbus
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 1 Other Injuries: 74

SUMMARY:

The loaded tractor trailer experienced engine problems, stalled, and the driver steered the vehicle onto the shoulder. Not being able to restart the tractor, the driver phoned for assistance. A mechanic arrived, checked the vehicle, sprayed ether into the air intake, and the engine started. The driver pulled back into traffic with the mechanic following in a van. When the engine stalled again, the driver was unable to get the combination unit out of the traffic lanes. The mechanic was unable to restart the engine and had returned to his van to find some chains so he could tow the tractor and trailer onto the shoulder. A schoolbus being operated by a driver using the hand throttle as a cruise control unit approached from the rear. The schoolbus struck the rear of the stalled tractor trailer. An inspection by the police revealed that the engine disablement resulted from a faulty electrical wire.

The tractor was not damaged, but the rear of the trailer sustained moderate damage. There were no occupants in the tractor at the time of the collision. The front of the transit-type schoolbus was damaged extensively. One of the bus passengers seated at a row one aisle position was fatally injured. The remaining 73 passengers, along with the busdriver, received varying levels of injuries

There was no information developed in this investigation regarding the truckdriver's experience and training, nor was the motor carrier's operation examined.

The investigation found that the busdriver had completed 19 hours of the 40 hours required of training for recertification as a schoolbus driver. Upon expiration of the then current certificate, he would not have been qualified to drive a schoolbus.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the schoolbus driver's failure to avoid the stalled tractor trailer. Contributing to the cause of this accident was the electrical short in the tractor and the improper use of the hand throttle by the schoolbus driver.

CASE NO.: 59

Investigation No.: SEA-86-H-TR11
Accident Location: Eastbound Interstate 84 at Mile Post 292.4, 10 miles west of Baker, Oregon
Lanes: 4 lanes, divided
Shoulders: 4-foot asphalt bound by -23 percent gravel grade at left down a 17-foot slope into median area
Median: 60 to 100-foot wide dirt median
Features: +2 percent grade, gentle curve to right
Date and Time: June 6, 1986, 12:50 a.m.
Ambient Conditions: Clear, dark and dry
Heavy Truck Involved: 1980 Kenworth conventional 3-axle tractor in combination with a loaded 45-foot flatbed trailer
Motor Carrier: Yaleway Transportation, Inc.
Type of Operation: Common carrier
Size of Operation: 3 power units
Total Weight of Truck(s): 74,000 pounds estimated
Total Length of Truck(s): Approximately 60 feet
Other Vehicle Involved: None
Truck Fatalities: 1 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The eastbound combination unit fully loaded with lumber approached a construction zone on Interstate 84, 10 miles north of Baker, Oregon. Both eastbound lanes were directed into the left-hand lane by a lighted directional sign, traffic cones, and a concrete barrier. After the vehicle traveled in the left lane for 3/4 of a mile it drifted off the paved roadway and shoulder and onto a -23 percent side sloping, soft gravel shoulder. The unit continued along the shoulder for about 440 feet until the driver attempted to steer the vehicle back onto the roadway. The wheels of the steering axle dug into the gravel and the unit turned over on its top.

The vehicle sustained major damage and both occupants were trapped inside the cab. The unrestrained driver was dead at the scene. The passenger in the sleeper berth sustained hip abrasions. Although evidence of alcohol and drug use was found in the cab, none was detected toxicologically.

The investigation revealed that the driver of the truck was not employed by the company, had little or no experience in the unit, and was operating the vehicle with a license which had been suspended due to alcohol-related violations.

The driver assigned to the truck, the right front passenger in this case, was also operating with a suspended license, his suspension was due to violation of financial responsibility laws. The investigation further revealed that the company was aware of the assigned driver's license problems but continued to allow him to drive.

A search of BMCS files revealed an ongoing investigation of violations by the carrier. The most recent audit of the carrier's operation revealed a total of 473 violations of Federal regulations for a 6-month period during 1983. A previous audit for a 6-month period of 1982 discovered 35 maintenance record violations.

A vehicle inspection revealed that even though mechanical defects were not pertinent in this case, the truck was in poor mechanical condition.

The severe (-23 percent) gravel slope at the left shoulder which created a "soft" surface hindered the driver's effort to return his vehicle to the roadway and contributed to the tripping action which precipitated the rollover.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the inexperienced driver's failure to maintain his vehicle within the single lane created by the construction zone. Contributing to the severity of the accident was the hindrance to control created by the severe slope of the shoulder and the lack of crush resistance of the cab.

OF INTEREST IN THIS INVESTIGATION:

1. Driving History
2. Motor Carrier Oversight of Driver
3. Motor Carrier Oversight of Equipment
4. Crashworthiness
5. Environment

CASE NO.: 60

Investigation No.: ATL-86-H-TR17
Accident Location: Interstate 77, 5.4 miles north of Elkin, North Carolina
Lanes: 4 lanes, divided
Shoulders: Median shoulder 4 feet of asphalt surface; outside shoulder 12 feet of asphalt
Median: 30-foot wide grass median
Features: Occasional curves, 1 percent downgrade
Date and Time: June 6, 1986, 1:35 p.m.
Ambient Conditions: Clear, daylight, and dry
Heavy Truck Involved: 1984 Freightliner COE tractor in combination with 2 loaded 28-foot van trailers
Motor Carrier: Consolidated Freightways, Inc.
Type of Operation: Common carrier
Size of Operation: 6358 power units
Total Weight of Truck(s): 70,846 pounds
Total Length of Truck(s): 67 feet 10 inches
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The combination unit was traveling in the right lane when the driver reportedly saw a passenger car stopped on the right shoulder. The truckdriver stated that when he was about 135 feet from the rear of the car, it pulled out onto the right traffic lane. He immediately steered left to avoid the car. Tire marks indicated that the rear trailer swerved forcefully from the right lane into the left lane, swerved right near the left pavement edge, then broke away while overturning. The overturned trailer came to rest on its left side on the grassy median shoulder. The driver stopped the tractor and the still coupled front trailer on the right shoulder a short distance ahead of the rear trailer. The car that reportedly entered the roadway continued on.

The truckdriver was not injured. There was no damage to the tractor. The front trailer's damage was confined to its pintle hook and a safety chain bracket. The rear trailer and converter dolly sustained moderate damage.

The truckdriver had about 25 years experience driving tractor trailer units--3 years were driving double trailer units. Four hours of double trailer training and a road test were provided by the carrier. Motor carrier records indicated that the driver had been involved in one "preventable" and one "non-preventable" accident in the previous 5-year period. He had no traffic violation history during the previous 3 years. As a result of this accident, the carrier attempted to terminate the driver. However, due to the national union contract, an arbitrator's decision was to reduce the punitive action to a 9-day suspension. This decision resulted from the union's contention that the driver had not been involved in a similar accident within a time period necessary for termination to be considered.

Elkin, North Carolina
Case No. 60

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the rapid lane change maneuver by the truckdriver which resulted in rearward amplification of lateral forces to the rear trailer.

OF INTEREST IN THIS INVESTIGATION:

1. Driver Training/Experience

2. Double Trailers

CASE NO.: 61

Investigation No.: DEN-87-H-TR02
Accident Location: Kansas Highway 4 near Valley Falls, Kansas
Lanes: 4 lanes, undivided
Shoulders: 8 feet of gravel at each edge
Median: None
Features: Grade crossing, slight downgrade
Date and Time: July 1, 1986, 5:37 p.m.
Ambient Conditions: Clear, daylight, dry, hot
Heavy Truck Involved: 1982 Ford 3-axle conventional tractor in combination with a loaded 40-foot MC-331 tank trailer
Motor Carrier: Holton Transport, Inc.
Type of Operation: Common carrier
Size of Operation: 35 power units
Total Weight of Truck(s): 51,960 pounds
Total Length of Truck(s): 61 feet
Other Vehicle Involved: Train
Truck Fatalities: 1 Truck Injuries: 0
Other Fatalities: 2 Other Injuries: 2

SUMMARY:

The combination unit, carrying 9,631 gallons of liquefied petroleum gas, was northbound on Kansas Highway 4 when the truckdriver approached a Santa Fe railroad grade crossing with operational grade crossing signals. With no apparent braking or other evasive maneuver, the truck drove in front of a three-engine freight train. The collision resulted in punctures to the front and rear heads of the cargo tank. The propane escaped and ignited, resulting in a massive explosion that engulfed the immediate area of the crossing in flames.

The truck was destroyed, and the fire resulted in fatal injuries to the truckdriver and two of the train's crew. Two other train crewmembers received serious injuries.

The investigation revealed no mechanical or environmental contributions to this accident. In addition, there was no evidence of preaccident incapacitation.

Records furnished by the motor carrier reflected that this driver had 17 years experience in the operation of heavy trucks. He had been employed by the carrier for the past 15 years. The carrier had not provided training other than what the driver received on-the-job. Time records revealed that the driver reported to work at 7 a.m. on the day before the accident and remained on-duty driving until 7 p.m. Although no log books were furnished for the accident date, the MCS 50-T report completed by the carrier indicated that the driver had been driving at least 10 hours up to the time of the collision. An examination of past log records revealed that it was common for this driver to report in at 6 to 7 a.m. and log off-duty around 7 p.m.

Valley Falls, Kansas
Case No. 61

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this collision was the driver's failure to heed active grade crossing warning devices and to stop before entering a grade crossing.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours

2. Hazardous Material

3. Grade Crossing

CASE NO.: 62

Investigation No.: ATL-86-H-TR19
Accident Location: North Carolina 152, 5 miles west of China Grove, North Carolina
Lanes: 2
Shoulders: Grass, both 4 to 6 feet wide
Median: None
Features: Occasional curves, at grade
Date and Time: July 8, 1986, 8:45 a.m.
Ambient Conditions: Clear, daylight, and dry
Heavy Truck Involved: 1985 International COE tractor in combination with 2 28-foot cargo vans
Motor Carrier: Carolina Freight Carriers Corporation
Type of Operation: Common carrier
Size of Operation: 2300 power units
Total Weight of Truck(s): Undetermined
Total Length of Truck(s): Undetermined
Other Vehicle Involved: Passenger car
Truck Fatalities: 0 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 1

SUMMARY:

The doubles combination was traveling a straight section of highway when the driver noticed a small passenger car crossing the centerline and heading toward him. The truckdriver applied his brakes, steered to his right, and began sliding off the right side of the roadway. As the combination unit was attempting to stop, the passenger car struck the left fuel tank and left front tire of the drive axles. The passenger car continued forward, hit the left tires of the lead trailer, and went underneath the left side of the rear trailer before striking the left duals. This final impact redirected the passenger car back across the roadway where it came to rest on the grassy shoulder. The truckdriver was able to maintain some control and steer back toward the roadway. He stopped the vehicle with the tractor and lead trailer on the road surface and the rear trailer on the grass shoulder. As the vehicle was stopping, the right side of the lead trailer struck a utility pole which the driver credited with preventing an overturn.

The small passenger car was destroyed and its driver was seriously injured. The investigating police officer stated that physical evidence indicated the driver of the passenger car had been drinking, but since no toxicology tests were performed, he was not able to determine impairment. The tractor and lead trailer received minor damage while the rear trailer sustained moderate damage. The lapbelted truckdriver received minor injuries.

China Grove, North Carolina
Case No. 62

The investigation found that this truckdriver had accumulated 34 years experience in the operation of heavy trucks. He had been employed by the subject motor carrier for the past 17 years and had been driving twin trailer units for 5 years. No formal training had been received by the driver other than yearly video tapes, printed material, and safety bulletins. He had not been convicted of a traffic violation nor had he been involved in an accident in over 8 years.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was that the operator of the passenger car drove his vehicle into the opposing traffic lane.

OF INTEREST IN THIS INVESTIGATION:

1. Double Trailers

CASE NO.: 63

Investigation No.: SEA-86-H-TR13
Accident Location: Idaho State Route 3, Cataldo, Idaho
Lanes: 2 lanes, undivided
Shoulders: 2-foot wide asphalt surfaced shoulders
Median: None
Features: Occasional curves
Date and Time: July 9, 1986, 4:51 p.m.
Ambient Conditions: Cloudy, daylight
Heavy Truck Involved: 1980 conventional White Western Star truck tractor in combination with an empty flatbed tilt-trailer
Motor Carrier: David R. Weingart
Type of Operation: Private owner/operator (exempt)
Size of Operations: 2 power units
Total Weight of Truck(s): 37,020 pounds
Total Length of Truck(s): 60 feet
Other Vehicle Involved: 1976 Fiat
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 1 Other Injuries: 0

SUMMARY:

The combination unit had just pulled out from a private drive and was traveling north on State Route 3 when a coworker who was standing nearby notified the driver, by CB radio, that his trailer brakes were locked. At this time, the combination unit was travelling about 5 mph and a northbound passenger car, according to witnesses, started to pass the combination unit. The northbound car then pulled back into the northbound lane because of oncoming traffic and skidded 114 feet before striking the rear of the tilt-trailer. The passenger car underrode the 34-inch high loading ramps on the rear of the tilt-trailer, and the driver was fatally injured.

The investigation found that the passenger vehicle was traveling at approximately 50 to 55 mph when the driver braked to avoid the collision, and was traveling at about 15 to 20 mph when it struck the rear of the combination unit.

The truck examination revealed that the dust covers had been removed from the trailer brakes, thus allowing contaminents to collect on the drum and shoes. This may have resulted in the trailer brakes not releasing when the unit first started out on the highway.

Further examination by the Idaho State Police disclosed that the height of the rear load ramps on the tilt-trailer was in violation of State law. The State law is consistent with the FMCSR 393.86 which provides that the rear must not have a ground clearance in excess of 30 inches and that the rear of the trailer must have rearend protection. The ramps on the rear of the tilt-trailer had a ground clearance of 34 inches and there was no rearend protection. The hood level of the passenger car was only 31.5 inches above the ground. Consequently, the hood and windshield absorbed all of the collision forces.

Cataldo, Idaho
Case No. 63

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the passenger car driver to avoid the slow moving truck. Contributing to the severity of this collision was the absence of rearend underride protection on the combination unit.

OF INTEREST IN THIS INVESTIGATION:

1. Motor Carrier Oversight of Equipment

CASE NO.: 64

Investigation No.: ATL-86-H-TR21
Accident Location: Interstate 85 at overpass of NC 2124, near Spencer, North Carolina
Lanes: 4
Shoulders: Asphalt, 4 feet on left and 10 feet on right, W-beam guardrail to bridge, concrete railing over bridge
Median: Grass, variable width
Features: +3 percent grade, elevated
Date and Time: July 22, 1986, 6:30 a.m.
Ambient Conditions: Clear, daylight, dry
Heavy Truck Involved: 1979 Mack COE tractor in combination with 2 loaded 28-foot trailers
Motor Carrier: United Parcel Service
Type of Operation: Common carrier
Size of Operations: 8000 truck tractors, 45,000 trucks
Total Weight of Truck(s): Not determined due to fire
Total Length of Truck(s): 61 feet
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

A combination unit was southbound on Interstate 85 when it drifted onto the right shoulder toward a metal guardrail placed at the approach to an overpass. The right front wheel and tire of the power unit struck the W-beam guardrail at an area where the barrier transitioned inward for connection to the overpass structure. The truck moved along the barrier for the length of the overpass and, beyond the end of the elevated structure, it penetrated the guardrail. The unit then traveled down a steep 20-foot embankment and came to rest in a jackknifed configuration. The lead trailer overturned onto its right side and the rear trailer came free at the pintle coupling. The left fuel tank of the unit ruptured, fuel spilled, and an intense fire ensued which destroyed the power unit and a substantial portion of the lead trailer. The lapbelted driver sustained minor injuries.

Records furnished by the motor carrier indicated that the driver had no pre-existing medical problems and was within hours of service limitations. He had been on-duty for 8 1/2 hours at the time of the accident. The driver told investigators that he had adequate rest for several days before the accident and that he was alert. He stated that the accident resulted from a mechanical defect within the steering system which caused the power unit to pull toward and impact the guardrail. The investigation revealed that the truck was in good mechanical condition and did not contribute to the accident. There were no apparent contributing environmental factors.

The truckdriver had accumulated approximately 7 years experience in the operation of heavy trucks, all with the subject motor carrier. He had been driving twin trailer combinations about 50 percent of the time for the past 2 years. The motor carrier, which operates over 53,000 vehicles in its parcel delivery service, requires the completion of an extensive 2-week training program before a driver is assigned to twin trailer operations. This training includes 11 hours of classroom instruction, 10 hours of general field operations, and approximately 60 hours of behind-the-wheel and over-the-road instruction.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the driver's failure to give his full time and attention to maintaining his vehicle within the traffic lanes.

OF INTEREST IN THIS INVESTIGATION:

1. Double Trailers
2. Environment

CASE NO.: 65

Investigation No.: FTW-86-H-TR16
Accident Location: Interstate 45 near Fairfield, Texas
Lanes: 4 lanes, divided
Shoulders: Median shoulder 5.5 feet of asphalt surface; Outside shoulder 9.5 feet of asphalt surface
Median: 350 feet of grass median
Features: Straight, level, elevated
Date and Time: August 12, 1986, 4:45 a.m.
Ambient Conditions: Clear, 80°F, dark, and dry
Heavy Truck Involved: 1982 International conventional tractor in combination with a partially loaded 45-foot tanker trailer
Motor Carrier: Wright Oil Company
Type of Operation: Private carrier
Size of Operations: 3 power units
Total Weight of Truck(s): Estimated 64,250 pounds
Total Length of Truck(s): 60 feet 8 inches
Other Vehicle Involved: None
Truck Fatalities: 1 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

A witness reported observing the combination unit traveling at an estimated speed of 65 to 70 mph, weaving out of its traffic lane, and almost side-swiping a bridge railing. On a straight section of highway, the combination unit drifted to the right and off the travel surface. The unit then traveled about 280 feet on the roadside before tracking back to the left where it began to re-enter the paved surface. At this point, the tractor-trailer unit began to overturn. The tractor was sliding on its right side on the paved shoulder and the trailer was sliding on its right side on the roadside. The trailer separated and continued sliding until rolled over and came to rest on its left side. After sliding on its right side and roof, the tractor then flipped over and came to rest in an upright position.

The power unit of the combination was destroyed while the trailer received moderate damage. Because the cab was crushed during the overturn, there was no survivable occupant space where the fatally injured, lapbelted driver was found.

Investigation revealed that the driver was concerned about making the trip within the time scheduled by the carrier. When he departed on the 510-mile accident trip, the driver had already been on duty 21 of the preceding 24 hours. The motor carrier's delivery schedule required that the trip be completed and the load delivered in 12 hours from his time of departure. Before the accident, the driver had been awake for about 31 hours and was on duty for 26 hours. In that period, witnesses observed the driver dozing and related that he complained of not having had any sleep. There were no toxicological tests performed.

This driver had reportedly accumulated 11 years of experience in the operation of heavy trucks. He had been driving liquid cargo tankers for only the past year, since his employment with the motor carrier. Although subject to all applicable Federal regulations, the motor carrier permitted the driver to exceed the maximum hours of service.

The investigation revealed that the truckdriver possessed two valid driver's licenses, with one moving violation on one and two moving violations on the other. In addition, he had been involved in one accident during the preceding year which was not reported to the carrier.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the truckdriver's acute fatigue which resulted from excessive duty hours. Contributing to the cause was the motor carrier's failure to properly schedule the driver's activities to prevent excessive hours of service.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours
2. Driving History
3. Motor Carrier Oversight of Driver
4. Crashworthiness

CASE NO.: 66

Safety Board Investigation No.: SEA-86-H-TR14
Accident Location: North 3rd Street at Sunset Blvd., Renton, Washington
Lanes: 5 lanes
Shoulders: None--6-inch high concrete curb
Median: None
Features: 7 to 12 percent downgrade
Date and Time: August 18, 1986, 4:13 p.m.
Ambient Conditions: Clear and daylight with dry asphalt
Heavy Truck Involved: 1981 conventional White tractor carrying a logging trailer piggyback
Motor Carrier: Delbert Carr
Type of Operation: Private carrier
Size of Operations: 1 power unit
Total Weight of Truck(s): Unknown
Total Length of Truck(s): 21 feet
Other Vehicles Involved: 1 tow truck and 7 passenger vehicles
Truck Fatalities: 0 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 7

SUMMARY:

The White tractor carrying a log trailer piggyback started down a 7 to 12 percent downgrade in fourth gear. At some point in the descent, the driver applied his brakes but discovered that the brakes would not control the truck's speed. At the bottom of the hill, the White tractor collided into a line of eight vehicles stopped for a red traffic signal.

The collision resulted in moderate damage to the power unit and moderate to substantial damage to the other eight vehicles involved. The unrestrained driver of the truck received minor injuries. Of the other vehicle occupants, eight were uninjured, five sustained minor injuries, and two received moderate to serious injuries.

The vehicle examination determined that of the three axles on the power unit, the front axle had no brakes, the second axle was not adjusted within tolerance, and the third axle was at the upper limit of proper adjustment. Both the driver and owner related that the brake adjustments are examined regularly. The owner stated that he had properly adjusted the power unit brakes only 4 days before the accident. Trip records furnished by the carrier indicated that the truck would have accumulated only about 630 miles since that maintenance. In the course of the investigation, the stopping capability of the tractor was tested at a local garage. This was accomplished by towing the accident tractor with a forklift while its brakes were applied. In this configuration, the brake wheels rolled freely. However, when the brakes were adjusted properly for the second test, the wheels locked.

This driver had 2 weeks of experience in the accident type vehicle and had received no training before his employment with the carrier. He was a long-time friend of the owner and was not subjected to a pre-employment check, a driving knowledge test, or a driving skills test. During the driver interview it was learned that the truckdriver had consumed "a beer" while dining with a relative of the truck's owner just before the accident. Witness interviews revealed that moments before the accident, the White truck ran onto a curb when it could not stop for traffic at another intersection.

The driver had began his day at 3:30 a.m. on the accident date, completing two round trips of about 180 miles up to the time of the collision, approximately 13 hours later. As the motor carrier failed to provide the requested daily time records, the driver's working hours for the past 2 weeks could not be established.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the inadequate braking capability of the truck which resulted from improperly adjusted rear brakes and the absence of front wheel brakes.

OF INTEREST IN THIS INVESTIGATION:

1. Driver Training/Experience
2. Alcohol/Drugs
3. Motor Carrier Oversight of Equipment

CASE NO.: 67

Investigation No.: LAX-86-F-H014
Accident Location: Eastbound Interstate 210, near Van Nuys Blvd., Los Angeles, California
Lanes: 8 lanes, divided
Shoulders: 10 feet wide, asphalt
Median: 15-foot asphalt with integral 32-inch concrete barrier
Features: At grade, straight, +1 percent grade
Date and Time: August 20, 1986, 4:45 a.m.
Ambient Conditions: Clear, dark, dry
Heavy Truck Involved: 1986 Peterbilt conventional 2-axle tractor in combination with 2 loaded 20-foot tank trailers
Motor Carrier: Valencia Trucking
Type of Operation: Common carrier
Size of Operations: 17 power units
Total Weight of Truck(s): 79,885 pounds
Total Length of Truck(s): 71 feet
Other Vehicle Involved: 2 unoccupied passenger cars
Truck Fatalities: 0 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The combination unit was traveling eastbound in the third lane of a straight, unlit section of an urban freeway when the driver suddenly encountered an abandoned vehicle. In an attempt to avoid striking the vehicle, the driver initiated an evasive action by inputting a severe right and then left turn, at a driver-reported speed of 55 mph. The driver stated he felt the load shift and the combination unit started to overturn. As the rear trailer rolled, it impacted and crushed a small passenger car which was unoccupied and parked on the shoulder. The entire unit landed on its right side and slid to a stop facing westbound across the outside shoulder and the third and fourth lanes.

This accident resulted in substantial damage to the power unit, and moderate damage was noted at the front and right side of both trailers. The unrestrained driver of the combination unit received minor injuries. Neither of the passenger vehicles was occupied.

The driver of the combination unit had been employed in the trucking industry for 20 years--9 of those years had been in the operation of units similiar to the accident vehicle. He had not received formal training as a driver or formal instructions relative to the operation of twin trailers.

The investigation found that the left turn maneuver made by the driver created a circular path with a critical speed of 34 mph and a rollover threshold of 31 mph, causing the vehicle to overturn rather than skid. This was facilitated by the probable load shift and the amplification of the lateral forces acting at the rear trailer.

The investigation found no pre-existent vehicle environmental deficiencies or driver debilitations which contributed to this accident.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the driver's intentional evasive maneuver which resulted in rearward amplification of lateral forces to the rear trailer. Contributing to the accident was the presence of the abandoned, unlit vehicle.

OF INTEREST IN THIS INVESTIGATION:

1. Driver Training/Experience
2. Double Trailers

CASE NO.: 68

Investigation No.: ATL-86-H-TR22
Accident Location: NC 150, 0.7 mile east of Terrell, North Carolina
Lanes: 2
Shoulders: Grass, 4 to 6 feet wide
Median: None
Features: 1 percent upgrade, occasional curves
Date and Time: August 30, 1986, 3:10 a.m.
Ambient Conditions: Clear, dark, and dry
Heavy Truck Involved: 1985 Ford tractor in combination with 2 loaded 28-foot cargo van semitrailers
Motor Carrier: Carolina Freight Carriers Corporation
Type of Operation: Common carrier
Size of Operations: 2,450 power units
Total Weight of Truck(s): Undetermined
Total Length of Truck(s): 66 feet
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The combination unit entered a left curve on the 2-lane highway. The driver stated that he steered to the right to avoid a passenger car approaching from the opposite direction which had crossed the centerline. As the combination unit continued with its right tires on the grassy shoulder, the driver turned it back toward the roadway. As the tractor came back onto its lane of travel, the rear trailer began to weave laterally. The rear trailer overturned onto its left side in the roadway and broke free of the pintle coupling. As the tractor and first trailer were slowing to stop, the rear trailer was dragged by the safety chains.

The tractor and lead trailer remained upright and were not damaged except for the pintle coupling. The converter dolly and rear trailer sustained minor damage. There were no injuries to the lapbelted driver. The driver had about 15 years experience in operating heavy trucks, but only 3 days experience in the operation of doubles combinations. His only training in doubles was a 30-minute orientation provided by the carrier which related to the proper coupling and uncoupling of the trailers.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the steering input by the driver which resulted in the amplification of lateral forces at the rear trailer. Contributing to the accident was the failure of the motor carrier to provide adequate training in the operation and handling characteristics of twin trailers.

Terrell, North Carolina
Case No. 68

OF INTEREST IN THIS INVESTIGATION:

1. Driver Training/Experience

2. Double Trailers

CASE NO.: 69

Investigation No.: DEN-86-H-TR15
Accident Location: Colorado State Highway #6 ramp to eastbound Interstate 70, Silverthorne, Colorado
Lanes: 1-lane ramp
Shoulders: 4-foot paved shoulder
Median: None
Features: Transition from straight, level roadway to elevated freeway overcrossing
Date and Time: August 31, 1986, 9:46 a.m.
Ambient Conditions: Clear, warm, and daylight
Heavy Truck Involved: 1977 Peterbilt conventional 3-axle tractor in combination with a partially loaded tanker trailer
Motor Carrier: Liquid Waste Management, Inc.
Type of Operation: Common carrier
Size of Operation: 8 power units
Total Weight of Truck(s): 70,850 pounds
Total Length of Truck(s): Not determined
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The combination unit carrying a partial load of liquid sludge attempted to make a 65-foot radius right turn to transition from a 4-lane highway onto a 1-lane ramp to the interstate. Witnesses reported his speed to be approximately 10 mph. As the vehicle initiated the turn, the unit rolled over onto its left side. Due to rust around the manhole cover seals and the fact that the center cover was missing, waste escaped onto the roadway.

The vehicle sustained moderate damage to the left side. The unrestrained driver was uninjured.

Examination of the tractor and trailer revealed a broken stabilizer bar on the third axle and a cracked stabilizer brace on the fourth axle, both on the left side. Further examination of the trailer revealed that the longitudinal baffles in the tank had been altered by cutting large holes in the top and bottom to allow a free flow of liquid from one side of the tank to the other.

The investigation revealed that the driver's logbooks were not filled out for the 4 days before the collision. Although he stated that he had 1 year of truck driving experience, he had only 2 months experience in the unit. In addition, he stated that he had no formal training in either this type of unit or any other truck. The investigation also revealed that he did not have and was never asked by the carrier to obtain a medical certificate.

Silverthorne, Colorado
Case No. 69

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was a combination of the driver's excessive steering input for the partially loaded liquid cargo trailer and the carrier's alteration of the longitudinal baffles which allowed the liquid to surge in the direction of the lateral forces of the turning manuver. Contributing to the cause were the damaged stabilizer bars.

OF INTEREST IN THIS INVESTIGATION:

1. Driver Training/Experience

2. Motor Carrier Oversight of Driver

3. Motor Carrier Oversight of Equipment

CASE NO.: 70

Investigation No.: FTW-87-H-TR17
Accident Location: U.S. Highway 59, Cleveland, Texas
Lanes: 4 lanes, divided
Shoulders: Asphalt surface, 4 feet wide on median side and 10-foot outside shoulder
Median: Earthen of varying widths
Features: Occasional curves
Date and Time: September 19, 1986, 6:01 a.m.
Ambient Conditions: Cloudy, damp pavement, dark with street lights
Heavy Truck Involved: (1) 1979 Kenworth tractor in combination with a loaded 40-foot flatbed trailer
Motor Carrier: Delta Southern Transportation Company, Inc.
Type of Operation: (1) Private carrier
Size of Operation: (1) 3 power units
Heavy Truck Involved: (2) 1974 Ford F-600 straight truck, loaded
Motor Carrier: Freddie L. Bingham
Type of Operation: (2) Private carrier
Size of Operation: (2) 1 straight truck
Total Weight of Truck(s): (1) 76,000 pounds
(2) Not determined
Total Length of Truck(s): (1) Approximately 55 feet
(2) Not determined
Other Vehicle Involved: 1972 AMC Jeep
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 2 Other Injuries: 0

SUMMARY:

A 1972 AMC military jeep and the combination unit were southbound on the travel surface of southbound U.S. Highway 59 as a 1974 Ford straight truck loaded with three junked cars was traveling on the shoulder. The Ford pulled onto the travel surface and was struck in the rear-end by the jeep. Before the events of this collision stabilized, the combination unit collided into the rear of the jeep, pushing the jeep and Ford approximately 85 feet. When this impact occurred, a gas can mounted on the rear of the jeep ruptured and ignited. Both occupants of the jeep were fatally injured in the ensuing fire. According to a witness, the jeep was traveling at approximately 35 to 40 mph when it collided with the rear of the straight truck. The witness also stated that the combination unit was following the jeep too closely and could not stop when the initial impact occurred.

The jeep's main fuel tank did not rupture. The fire was fueled by the spare gas can on the jeep along with gasoline from the fuel tank from one of the junk cars loaded on the Ford straight truck. The load of junked cars on the straight truck extended illegally to the rear and that the rear of the straight truck was not illuminated.

During the on-scene inspection, it was noted that there were no preimpact skidmarks. An inspection of the combination unit disclosed that the brake adjustment on the third axle of the Kenworth truck tractor was improper. It was determined that brake adjustments were the driver's responsibility.

The driver of the Kenworth related 4 years of experience in the operation of heavy trucks. In that time he had received no formal training. A search of his driving history revealed four moving violations and one accident for the 2 years preceding the accident.

The investigation revealed an extensive driving history for the operator of the Ford straight truck. Included in that record were several suspensions and multiple equipment violations. At least one suspension was the result of a DWI conviction.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the Ford driver's failure to yield the right-of-way when he pulled from the road shoulder onto the travel surface. The Safety Board determines that the second collision between the Kenworth combination unit and the jeep resulted from the truckdriver's failure to maintain a proper separation between his vehicle and the vehicle ahead.

OF INTEREST IN THIS INVESTIGATION:

1. Driving History
2. Motor Carrier Oversight of Driver
3. Motor Carrier Oversight of Equipment

CASE NO.: 71

Investigation No.: DEN-86-H-TR14
Accident Location: U. S. Highway 6, near Keystone, Colorado
Lanes: 2 lanes, undivided
Shoulders: Varying width, dirt
Median: None
Features: 6 percent winding downgrade
Date and Time: August 21, 1986, 11:25 a.m.
Ambient Conditions: Clear, daylight, 45 to 50°F, with dry pavement
Heavy Truck Involved: 1984 International conventional tractor in combination with a loaded 40-foot tanker trailer
Motor Carrier: Western Tank Lines, Inc.
Type of Operation: Common carrier
Size of Operation: 20 power units
Total Weight of Truck(s): 81,000 pounds
Total Length of Truck(s): 62 feet
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The combination vehicle was descending a -6 percent grade on an 8-mile section of curving, mountainous highway. One and one-half miles from the bottom of the grade, the truck rounded a curve to the right and came upon road repairs being conducted in its lane of travel. Road repair warning signs were out on the road, and the flagman had three passenger cars stopped in the truck's lane. According to the driver, he came upon the repair area too quickly to stop and steered into the uphill lane. As he started around the stopped vehicles, he observed an oncoming car. He steered off the roadway, crossed a dirt pull-off shoulder area, went over an embankment, and overturned. The impact ripped the tractor cab from the frame and ruptured the tanker semitrailer in several places, allowing approximately 2,000 gallons of flotation oil to spill into the river.

The power unit of the combination vehicle was destroyed and the trailer received substantial damage. The unrestrained driver received serious injuries.

There were multiple signs warning heavy trucks to reduce speed and remain in low gear on the descent to the accident area. In addition, signs were in place warning traffic of their approach to a construction area. The driver stated that he was using his engine retarder while in the high side of sixth or seventh gear and that he never needed to shift down to lower gears as the highway signs advised. Both the flagman and a witness reported smelling burning brakes. The driver also told a highway maintenance supervisor that he applied his brakes with no noticeable results.

Time accounts given by the truckdriver were substantially different from the service hours recorded on log book records supplied by the motor carrier. The investigation found that the driver had been awake and active for 43 hours on the 2 days preceding the accident. On the accident date, his day begin at 5:30 a.m.--he began work at 7 a.m. and began driving at 7:30 a.m. He stated that he rested for 8 hours the night before the accident. A witness reported that the driver was napping while his trailer was being loaded. Another witness reported that the driver looked like he had been up for a couple of days. The carrier required their drivers to log certain portions of on-duty time as off-duty time due to the time required for particular trips. It was noted that the driver had been suspended for 8 hours several days before the accident because he had pulled off the road and taken a nap while on his way to work, resulting in late arrival for work.

The driver had been employed by the motor carrier for just over 3 months. He related that he had been raised around heavy trucks, was licensed for the operation of heavy trucks when he reached 16 years of age, and owned his own truck when he was 18. He had never received formal training in heavy truck operation. A search of driving history files found three moving violations in the past 2 years.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the driver's failure to select a lower gear which would have allowed a proper speed for descent of the mountainous terrain.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours
2. Motor Carrier Oversight of Driver
3. Environment

CASE NO.: 72

Investigation No.: DEN-87-H-TR01
Accident Location: Westbound Interstate 70 near Dillon, Colorado
Lanes: 4 lanes, divided
Shoulders: 10-foot paved shoulder on left side and 15-foot gravel shoulder on right side
Median: Varying width earthen median
Features: -6 to -7 percent grade, runaway ramp, low gear and 25 mph truck speed advisory signs
Date and Time: October 4, 1986, 1:50 p.m.
Ambient Conditions: Clear, dry, daylight
Heavy Truck Involved: 1979 Freightliner COE tractor in combination with a fully loaded 48-foot refrigerated van
Motor Carrier: FFE Transportation Services, Inc.
Type of Operation: Common carrier
Size of Operation: 614 power units
Total Weight of Truck(s): 69,000 pounds
Total Length of Truck(s): 67 feet
Other Vehicle Involved: None
Truck Fatalities: 1 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

A combination unit was traversing -6 to -7 percent grade in mountainous terrain when the truck drifted off the right edge of the paved shoulder and onto the adjacent gravel roadside. The vehicle traveled for a distance of 616 feet, impacted the mountainside, and uprooted two small boulders. These boulders caused damaged to the brake system and rendered it inoperable. The vehicle then impacted the mountainside a second time, remaining in contact with the mountainside for about 440 feet at which time the power unit began an angular ascent up the mountain slope. The truck continued a gradual ascent, rotating into a jackknifed orientation before it rolled over onto its left side.

Although the power unit and trailer received substantial damage, the driver's compartment remained intact. The driver, who jumped from the power unit immediately before it overturned, was found fatally injured beneath the trailer.

Witness statements indicated that the driver appeared to be intentionally impacting the mountainside in order to slow his vehicle. There was no evidence of skidmarks and none of the witnesses reported seeing any smoke emitting from the truck's brakes. The precrash condition of the brake system could not be determined due to crash-induced damage. The engine retarder was found in the high position.

Information furnished by the motor carrier indicated that the truckdriver had accumulated about 2 1/2 years of experience in the accident type combination vehicle. His previous experience with mountainous driving operations could not be determined. He had been employed by the motor carrier for just under 3 months and had received no company training which could be documented. An inspection of the driver's daily log indicated that the driver had been on duty 101.5 hours in the last 8 days and had driven as much as 16 hours 2 days before this accident. Approximately 2900 miles of travel had been completed in the 8 days preceding the accident.

A search of driver history files revealed that the truckdriver had been cited for five violations in the past 5 years. Only two of those were reported to his employer.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the driver's failure to maintain a proper speed for the mountainous descent. The reason for that failure was not determined. Contributing to the severity of the accident was the driver's decision to jump from the power unit cab rather than remain with it.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours
2. Motor Carrier Oversight of Driver

CASE NO.: 73

Investigation No.: FTW 87-H-TR01
Accident Location: U.S. Highway 82, 2 miles east of Wichita Falls, Texas
Lanes: 4 lanes, divided
Shoulders: Asphalt surfaced - median shoulder 4 feet wide, outside shoulder 10 feet wide
Median: Grass covered, earthen
Features: Construction zone
Date and Time: October 5, 1986, 8 p.m.
Ambient Conditions: Cloudy and raining heavily
Heavy Truck Involved: 1979 COE International tractor in combination with a loaded 42-foot flatbed trailer
Motor Carrier: Blaschke Trucking Company
Type of Operation: Common carrier
Size of Operations: 16 power units
Total Weight of Truck(s): 71,000 pounds
Total Length of Truck(s): 55 feet
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The combination unit, traveling west on a straight section of roadway in a construction zone, veered to the right and departed the travel surface. The unit struck several traffic barrels, a flashing light barrier, and collided into a concrete bridge. The unit traveled approximately 203 feet from where it departed the travel surface to where it collided with the concrete barrier. From this point, the unit slid along the concrete bridge rail for about 42 feet and then fell 16 feet, coming to rest in the creek below. The initial impact displaced the steering axle and ruptured the left side saddle fuel tank, allowing diesel fuel to spray and ignite.

The combination unit sustained extensive impact damage and the wreckage burned in the intense postimpact fire. The unrestrained driver was ejected during the collision sequence and sustained serious injuries.

Witnesses to the collision stated that the truck was traveling in an erratic manner before the collision. They described the truck as speeding up and slowing down and weaving out of its lane. Those witnesses also related that the combination vehicle "just drifted off of the paved surface and hit the bridge." Investigating police officials and emergency medical personnel related that the truckdriver smelled of alcohol. A blood test performed at the request of law enforcement officers revealed a BAC of 0.22 percent--over two times the level normally considered as evidence of intoxication. When questioned by investigators, the driver admitted the consumption of "a few beers" during the evening hours of the day before the accident, but denied drinking alcohol in the 24 hours preceding the accident.

The driver of the combination unit had 32 years experience in the operation of heavy trucks--at least 30 of those were in the accident type vehicle. He had been driving the accident involved power unit for 7 years and related extensive experience in driving over similar terrain in the existing weather conditions. A search of driving history files for his home State revealed no violation or accident occurrences in the past 5 years.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the truckdriver's inability to maintain his vehicle on the roadway because of alcohol impairment.

OF INTEREST IN THIS INVESTIGATION:

1. Alcohol/Drugs
2. Environment

CASE NO.: 74

Investigation No.: CHI-87-H-TR01
Accident Location: U.S. Route 36, 3.2 miles west of Chrisman, Illinois
Lanes: 2 lanes, undivided
Median: None
Features: At grade, straight
Date and Time: October 6, 1986, 7:50 a.m.
Ambient Conditions: Clear, 50°F, early morning sun, and dry
Heavy Truck Involved: 1978 Chevrolet conventional tractor in combination with an empty 40-foot flatbed trailer
Motor Carrier: Schulz Trucking
Type of Operation: Common carrier
Size of Operation: 5 power units
Total Weight of Truck(s): 26,000 pounds
Total Length of Truck(s): 56 feet
Other Vehicle Involved: Schoolbus
Truck Fatalities: 0 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 23

SUMMARY:

The combination unit was traveling westbound on the straight 2-lane road, at a stated speed of 45 to 50 mph when the driver reportedly experienced glare from the sun in his eyes. He stated that the low, early morning sun was reflecting from the left outside mirror, temporarily blinding him. He moved the truck's sunvisor to the left and held up his left hand to shade his eyes, at which time the driver stated that he observed the schoolbus and saw that a collision was unavoidable. The busdriver stated that she was in the process of stopping the bus to load passengers and that the yellow warning flashers of the bus had been activated. The combination unit left about 259 feet of tire marks before the tractor struck the rear of the schoolbus. The bus was pushed forward for about 130 feet as both vehicles rotated clockwise and moved to the right side of the roadway. The schoolbus rolled over onto its left side with the rear of the bus on top of the tractor frame at final rest. The cab of the tractor was forced off the frame and found on its left side, laying next to the tractor chassis with the restrained driver trapped inside. During the collision, the right saddle tank on the tractor was ruptured, but no fire resulted. The trailer received only minor damage. There was severe damage to the rear of the schoolbus with 43 inches of maximum crush measured.

The lapbelted driver of the combination unit received moderate injuries while the restrained driver of the schoolbus was not injured. Of the 35 passengers in the bus, 3 received serious injuries, 20 sustained minor injuries, and 12 were reportedly uninjured.

The operator of the combination unit had 3 1/2 years experience operating heavy trucks--the last 2 years with the subject motor carrier. He had received no formal training but had ridden along with other drivers for a 5-month period. In the 2 years preceding the accident, he had been told to obtain a medical certificate, but he had not complied. In spite of the fact that this driver met the Federal Hours of Service requirements, he had not used the off-duty time for rest--he had been awake and active for 33 hours out of the 45 hours before the accident. At the time of the accident, he had been driving for approximately 8 hours.

The investigation found that this motor carrier had begun operations less than 2 years before the accident. The operations were seasonal, hauling only during vegetable-harvesting time. A check with the BMCS revealed that the regulatory agency had no knowledge of the carrier's operation. An interview with the motor carrier revealed that there was a lack of knowledge and compliance concerning the Federal requirements for driver's qualifications and the records that should be maintained.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was a combination of the driver's fatigued condition due to inadequate rest and the reduced visibility due to the glare from the sun.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours
2. Motor Carrier Oversight of Driver
3. Crashworthiness

CASE NO.: 75

Investigation No.: LAX-87-H-TR01
Accident Location: County Road 103 at Union Pacific railroad crossing #4K-43.1 near Westwood, California
Lanes: 2 lanes
Shoulders: Gravel, varying width
Median: None
Features: Railroad crossing
Date and Time: October 13, 1986, 9:20 a.m.
Ambient Conditions: Clear, and daylight
Heavy Truck Involved: 1977 conventional Kenworth truck tractor in combination with a loaded log trailer
Motor Carrier: Sierra Pacific Industries
Type of Operation: Private carrier
Size of Operation: 24 power units
Total Weight of Truck(s): 52,500 pounds
Total Length of Truck(s): Not determined
Other Vehicle Involved: Union Pacific freight train #STBR-12-2432
Truck Fatalities: 1 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 2

SUMMARY:

The combination unit was southbound on County Road 103 negotiating a 400-foot radius left curve on an approach to the Union Pacific highway/railroad grade crossing. Witnesses reported that the combination unit was traveling at about 20 mph when it approached and began to cross the railroad tracks. The witnesses indicated that the combination unit driver took no evasive action and apparently never saw or heard the approaching train.

The northbound 3-locomotive, 31-car Union Pacific freight train, traveling at a recorded speed of 40 mph, collided into the right rear of the truck tractor and separated the truck and trailer combination. From the crossing, the truck tractor was pushed approximately 325 feet. The three locomotives and first five cars of the freight train derailed, and came to a stop approximately 450 feet from the crossing.

The collision resulted in extensive damage to both the power unit and the trailer of the combination unit. The unrestrained truckdriver was ejected and received fatal injuries. The freight train sustained moderate damage, and two train crewmembers received minor injuries.

Subsequent investigation disclosed that at a distance of 130 feet from the crossing, the truckdriver would have had an unobstructed view of only 360 feet. This sight distance was found to be insufficient based upon Table IX-21 of the AASHTO - Geometric Design of Highways and Streets Manual.

The driver of the combination unit had accumulated approximately 30 years experience in the operation of heavy trucks. He was familiar with the accident crossing, having made at least 10 trips over the route in the past week. He had been employed by the subject carrier for the past 12 years, and records reflected no previous reportable accidents. At the time of the accident, the driver had been on-duty for less than 3 hours. The 2 days preceding the accident were spent off-duty.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the truckdriver's failure to observe and stop for the approaching freight train. Contributing to the accident was the insufficient sight distance available at the grade crossing.

OF INTEREST IN THIS INVESTIGATION:

1. Grade Crossing
2. Environment

CASE NO.: 76

Investigation No.: CHI-87-H-TR03
Accident Location: Interstate 70 westbound just west of Interstate 75 on-ramp, near Dayton, Ohio
Lanes: 6 lanes, divided
Median: 30-foot grass median
Features: +4.3 percent grade
Date and Time: October 26, 1986, 7:44 a.m.
Ambient Conditions: Dark (lighted with overhead street lamps), raining, wet roadway
Heavy Truck Involved: 1979 Mack conventional tractor in combination with 2 partially loaded 28-foot van trailers
Motor Carrier: Transcon Lines
Type of Operation: Common carrier
Size of Operation: 35 power units
Total Weight of Truck(s): 61,698 pounds
Total Length of Truck(s): 68 feet
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

A combination unit was westbound on Interstate 70 in the right traffic lane, at a driver-estimated speed of 20 to 25 mph. As the driver passed the on-ramp from Interstate 75 the unit began to veer to the right. It crossed the median separating the roadway from the ramp, then traversed the ramp surface the asphalt shoulder, and entered the soft grassy roadside adjacent to the right road edge. It rode along the grassy median for 85 feet and contacted a concrete gutter. The unit rode along the gutter until the rear trailer rolled onto its right side and the vehicle slid to a stop.

The rear trailer of the combination unit received minor damage from the load shift and overturn; the power unit and semitrailer escaped without damage. The unrestrained driver was not injured. After submitting to sobriety tests requested by the investigating police officials, the driver was arrested for DWI. A subsequent breath test revealed a BAC of .18 percent.

The driver had a DWI arrest about 6 months before this accident. On April 23, 1986, he was arrested at 2:30 p.m. with a BAC of .11 percent. That arrest was plea bargained to a reckless driving violation and the driver's operating privileges were suspended for 1 month. Although the conviction was reported to the motor carrier, the driver failed to relate that it resulted from a DWI arrest or that his operating privileges had been suspended. Consequently, the carrier took no action against the driver.

Inspection of the vehicle revealed that there was an exhaust leak which could have allowed fumes to escape into the engine compartment.

The truckdriver stated he had 7 to 8 years of experience with heavy trucks. Only the last 2 years had been spent driving a vehicle similiar to the accider' truck. He had been employed by the motor carrier for about 2 years. Although the driver's employment application indicates his attendance at a commercial driving school, the driver denied this schooling when interviewed by Safety Board investigators. A search of driving history records found that at least four moving violations and three traffic accidents had accumulated over the past 5 years.

The investigation found that the motor carrier had been assigned a "conditional" compliance rating by the BMCS in 1984. No record of a subsequent audit by the regulatory agency was found. An inspection of the driver's logbooks and company policy regarding alloted time for trip completions found that they were not consistent with realistic driving, fueling, pretrip inspection, and hook-up time requirements.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the truckdriver's inability to maintain his vehicle on the roadway due to alcohol impairment.

OF INTEREST IN THIS INVESTIGATION:

1. Alcohol/Drugs
2. Driving History
3. Motor Carrier Oversight of Driver
4. Double Trailers

CASE NO.: 77

Investigation No.: SEA-87-H-TR01
Accident Location: Interstate 5, 7 miles north of Vancouver, Washington
Lanes: 6 lanes, divided
Shoulders: 6 feet of asphalt on left, 10 feet of asphalt on right
Median: 35 feet of grass
Features: +3 percent grade
Date and Time: November 11, 1986, 10:02 a.m.
Ambient Conditions: Raining, daylight
Heavy Truck Involved (1): 1986 Freightliner 3-axle COE tractor in combination with loaded 42-foot pressurized tanker trailer
Motor Carrier: Cardox Division of Liquid Air Corporation
Type of Operation (1): Private carrier
Size of Operation (1): 192 power units
Heavy Truck Involved (2): 1958 GMC 2-axle flatbed truck carrying 18,070 pounds of lumber
Motor Carrier: Kellogg Lumber Company
Type of Operation (2): Private carrier
Size of Operation (2): 1 power unit
Total Weight of Truck (1): 80,060 pounds
Total Weight of Truck (2): 26,770 pounds
Total Length of Truck (1): 54 feet
Total Length of Truck (2): 26 feet 5 inches
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 2
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

A combination unit was southbound in the third lane of an interstate highway at a calculated speed of 60 mph. The driver stated that as he crested a small hill he observed traffic ahead changing lanes to go around a slow moving lumber truck. The lumber truck had reportedly just entered the traffic lanes from the right shoulder. Witnesses reported that as the combination unit closed on the lumber truck the Freightliner driver steered abruptly toward the left. The Freightliner driver stated that as he swerved to the left to avoid the other truck he felt the trailer "break loose and come around." The front of the tank trailer struck the rear of the lumber truck, creasing the pressurized tank and pushing the lumber loaded on the straight truck forward. The lumber penetrated a plywood headerboard and intruded 26 inches into the cab.

As the combination unit swerved to the left, the steering input created a small radius turn which exceeded the vehicle's rollover threshold. The unit overturned, rotated counterclockwise, and came to rest inverted and straddling the median, the left shoulder, and lanes 1 and 2. The lumber truck was pushed forward off the right road edge and down a grassy slope.

The combination unit sustained severe cab crush downward to the level of the instrument panel. The lap/shoulder belt-restrained driver sustained minor injuries. The lumber truck cab sustained severe intrusion from the load and the unrestrained driver sustained moderate injuries including multiple rib fractures which required 8 days of hospitalization.

With 12 years of experience in the operation of heavy trucks, the Freightliner driver had been operating vehicles similar to the accident-involved combination for about 8 years. He had been employed by the motor carrier for just over 3 years.

The driver of the combination unit was maintaining 3 sets of daily logs. Two sets of log books were found in the power unit following the accident and an additional set was furnished by the motor carrier at the request of the Safety Board. This driver stated to investigators that he was using multiple logs to see if he could make the trip required by the motor carrier in the legal amount of time. A compilation of logs and interviews indicated that he had been on duty for at least 72 hours in the previous 7 days. On the day of this accident he had been driving for 9.25 hours after beginning at 12:45 a.m.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the combination unit driver's failure to take appropriate evasive maneuvers to avoid slower moving traffic.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours
2. Motor Carrier Oversight of Driver
3. Crashworthiness

CASE NO.: 78

Investigation No.: DEN-87-H-TR04
Accident Location: Interstate 80, near Salt Lake City, Utah
Lanes: 6 lanes, divided
Shoulders: Median shoulder undetermined width of asphalt surface; outside shoulder 4 feet of asphalt surface
Median: Undetermined width of earthen median
Features: 6 percent winding downgrade
Date and Time: November 25, 1986, 9:40 a.m.
Ambient Conditions: Clear, daylight, dry, 35°F
Heavy Truck Involved: 1984 International COE tractor in combination with a 45-foot, fully loaded refrigerated van trailer
Motor Carrier: Treasure Valley Transportation, Inc.
Type of Operation: Common carrier
Size of Operation: 10 power units
Total Weight of Truck(s): Not determined
Total Length of Truck(s): 58 feet 4 inches
Other Vehicle Involved: None
Truck Fatalities: 1 **Truck Injuries:** 1
Other Fatalities: 0 **Other Injuries:** 0

SUMMARY:

The combination unit was traversing a mountainous downgrade traveling in the median lane of three available travel lanes. A witness reported that the vehicle was traveling at high speed and that there was smoke coming from the tractor wheels. Approximately 8 miles from the crest of the downgrade, several hundred feet after passing a runaway truck escape ramp, the combination unit overturned onto its right side, slid into a section of blocked out W-beam guardrail, and left the travel surface of the roadway. After departing the travel lanes the vehicle descended an embankment before coming to rest. From the area of overturn the combination unit traveled over 550 feet before coming to a stop. Twelve warning signs were placed between the crest of the downgrade and the accident location. In addition, a brake test area was located at the hillcrest. The downgrade was posted with a 40 mph speed limit for heavy trucks.

This accident resulted in substantial damage to both the power unit and trailer of the combination vehicle. The unrestrained driver of the truck was ejected from the cab and was later found fatally injured beneath the overturned vehicle. An authorized passenger, also riding unrestrained, sustained serious injuries. Inspection of the power unit revealed that the factory-installed restraint belt had been removed from the unit.

Although the passenger stated that the driver had used the brake check area and had manually checked the adjustment of the vehicle's brakes, a witness who was pulling onto the highway from the brake check area stated that the combination unit passed him at about 35 mph. Other witnesses reported the tractor-trailer traveling at 35 to 40 mph toward the top of the hill and then 70 to 80 mph farther down.

An examination of the combination vehicle revealed that eight of the ten brakes installed on the power unit and trailer were out of adjustment. Only the steering axle brakes were within adjustment tolerances recommended by the manufacturer. Records supplied by the motor carrier reflected that the unit's brakes had been serviced only 2 days before the accident.

This driver's daily log books were 13 days behind at the time of the accident. Reconstruction of the driver's activities, accomplished through information furnished from the motor carrier, handwritten records on a small notepad found in the power unit, and information given by the passenger, revealed that the driver had traveled approximately 1,725 miles in the 39-hour period preceding the accident. At the time of the accident the driver was 4 hours behind for a scheduled delivery and was approximately 15 miles from his destination.

This driver had reportedly accumulated 6 years of experience in the operation of heavy trucks. He had been operating the accident vehicle for the entire 2-month period of employment with the motor carrier. A search of driving history files found that he had been cited for five traffic violations in the past 3 years, however, only one of those had been reported to the carrier.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was a combination of the improperly adjusted brakes, the driver's failure to inspect the brakes at the brake check area, and the failure of the driver to use the escape ramp provided.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours
2. Driving History
3. Motor Carrier Oversight of Driver
4. Motor Carrier Oversight of Equipment

CASE NO.: 79

Investigation No.: SEA-87-H-TR02
Accident Location: Interstate 90 7 miles east of Mullan, Idaho
Lanes: 4 lanes, divided
Shoulders: N/A--covered with ice
Median: 3 foot concrete barrier--covered with ice
Features: 5 percent downgrade on Curve
Date and Time: November 30, 1986, 9 a.m.
Ambient Conditions: Cold, cloudy, with icy roads
Heavy Truck Involved: 1985 conventional Peterbilt tractor in combination with a loaded 45-foot van trailer
Motor Carrier: V.K. Putman, Inc.
Type of Operation: Common carrier
Size of Operation: 50 power units
Total Weight of Truck(s): 70,300 pounds
Total Length of Truck(s): 55 feet
Other Vehicle Involved: Passenger Vehicle
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 1

SUMMARY:

The combination unit was westbound on an ice-covered road entering a right curve when a westbound pickup collided with the left rear of the semitrailer. The truckdriver stated he was traveling at approximately 25 mph when the collision occurred. The pickup driver stated he was driving at about 45 mph.

The collision resulted in extensive damage to the pickup truck and moderate damage to the trailer axle of the combination unit. The pickup truckdriver received minor injuries and the unrestrained truckdriver was not injured.

The distance from the outside edge of the trailer to the rear end protection device was 26.5 inches. CFR Part 393.86 (c) states that this distance shall not exceed 18 inches. The Utility Trailer Manufacturing Company was unaware that they were not in compliance with the CFR.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the pickup driver to reduce his speed for the existing road conditions. Contributing to the severity of the accident was the narrow trailer rear end underride protection device.

OF INTEREST IN THIS INVESTIGATION:

1. Environment

CASE NO.: 80

Investigation No.: LAX-87-H-TR02
Accident Location: Interstate 15 near Barstow, California
Lanes: 4 lanes, divided
Shoulders: Median shoulder 3-foot asphalt surface, outside shoulder 8-foot asphalt surface
Median: 40-foot earthen median
Features: Straight, at grade
Date and Time: December 3, 1986, 1:40 a.m.
Ambient Conditions: Clear, dark, and dry
Heavy Truck Involved: 1971 White Freightliner COE tractor in combination with 2 loaded tank trailers
Motor Carrier: Hilgo Transport, Inc.
Type of Operation: Contract carrier
Size of Operation: Not determined
Total Weight of Truck(s): 77,880 pounds
Total Length of Truck(s): Not determined
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The doubles combination, hauling 8,400 gallons of molten sulfur, struck a berm at the right road edge with the rear trailer. The tractor and trailers veered across the outside lane into the median lane where the rear trailer overturned and ruptured upon impact. The driver stated that he brought the vehicle to a stop, exited the vehicle, and noticed a blue flame emitting from the area of the spill. The sulfur had ignited, causing a toxic cloud to spread from the scene across the open desert. The highway was closed in both directions for nearly 10 hours, but evacuation was not necessary because of the rural, unpopulated area.

The unrestrained driver was not injured, nor were there any injuries to the emergency response personnel. The rear trailer was destroyed in the fire and the first trailer was severely damaged. Minor fire damage was noted to the tractor. There was severe damage to the roadway resulting from the intense fire, requiring extensive resurfacing before the traffic lanes could be reopened.

The investigation revealed several defects with the mechanical components of the power unit and semitrailer. These defects included out-of-adjustment brakes, deteriorated and leaking air service lines for the brakes, excessive contaminants in the air tanks for the brake system, broken suspension parts, and multiple deficiencies with the vehicle's lighting system.

While the total experience for the 21-year-old truckdriver was not determined, it was found that in the past 3 years he had received 13 citations while operating a commercial vehicle and had one accident. The driver related that he had no formal training in heavy truck operations or in the transportation of hazardous material. While the driver stated to investigators that he did not maintain a daily log, a driver's log book was found in the power unit cab. That log book was 30 days behind. The driver reported to the California Highway Patrol that he had been on duty for 12 hours before the accident. Investigators at the accident site observed that the driver appeared to be in "a sleepy/fatigued" condition.

OTHER INFORMATION:

Molten sulfur is not regulated as a hazardous material according to the CFR, in spite of the fact that it is transported at 290°F. in order to maintain the liquid state. As a result of this investigation and two investigations of similar accidents, a Safety Board recommendation was issued to regulate the transportation of molten sulfur as a hazardous material.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the driver's failure to perceive that his vehicle was leaving the roadway as a result of fatigue.

OF INTEREST IN THIS INVESTIGATION:

1. Driver Training/Experience
2. Fatigue/Duty Hours
3. Driving History
4. Motor Carrier Oversight of Driver
5. Motor Carrier Oversight of Equipment
6. Hazardous Material
7. Double Trailers

CASE NO.: 81

Investigation No.: MKC-87-H-TR02
Accident location: County Road #3, near Winfield, Kansas
Lanes: 2 lanes
Median: None
Features: Straight
Date and Time: December 4, 1986, 10:04 a.m.
Ambient Conditions: Clear, daylight, dry pavement
Heavy Truck Involved: 1980 COE Freightliner tractor in combination with a loaded 26-foot van trailer
Motor Carrier: Mistletoe Express Service
Type of Operation: Common carrier
Size of Operation: 406 power units
Total Weight of Truck(s): 29,006 pounds
Total Length of Truck(s): 40 feet
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The combination unit was southbound on County Road #3 transporting a mixed load of the following hazardous materials: 455 pounds of nitro methane, 205 pounds of Class C detonators, and 1,125 pounds of ammonium nitrate. At a point approximately 1/2 mile north of U.S. Highway 160 the unit veered to the right and departed the paved surface. The combination unit's right side traveled about 166 feet on the soft roadside before the driver steered left to regain control. At this point, the unit rotated counterclockwise approximately 270° over a 96-foot area and overturned on the opposite side of the highway, coming to rest on its left side. The truckdriver reported to police that the accident resulted from an oncoming passenger car forcing him off the road. A witness who was following the combination vehicle related that no other vehicle was involved. The witness indicated that the truck wandered onto the shoulder, its right side tires dropped off the edge, and then the driver overcorrected. The combination unit then crossed back over the roadway onto the left roadside and overturned.

The overturn resulted in extensive damage to both the power unit and trailer of the combination vehicle. The unrestrained driver received minor injuries.

The investigation determined that the combination unit was not placarded as required by Federal regulations to show what materials were being transported. Additionally, the shipper was unaware that he was required to provide placards to the transporter. The hazardous materials came out of the semitrailer during the collision sequence, but they were retained in their shipping containers. No environmental contamination occurred, and no difficulties were reported by the responding emergency personnel.

The truckdriver related 10 years experience in the operation of heavy trucks--6 of those in the accident type vehicle. He had been employed by the motor carrier for about 3 1/2 years. His only training was that acquired on the job. A search of driving history records revealed that he had accumulated four violations and had been involved in one accident over the past 5 years.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the excessive steering input by the truckdriver as he attempted to drive back onto the roadway.

OF INTEREST IN THIS INVESTIGATION:

1. Hazardous Material

CASE NO.: 82

Investigation No.: DEN-87-H-TR05
Accident Location: U.S. Highway 49 at FM (Farm to Market) Road 441 overpass, Hillje, Texas
Lanes: 2 lanes
Shoulders: 3-foot paved shoulder
Median: None
Features: Straight, level
Date and Time: December 21, 1986, 11:50 p.m.
Ambient Conditions: Raining, dark
Heavy Truck Involved: 1986 International COE 3-axle tractor in combination a loaded 42-foot van trailer
Motor Carrier: Mery Brothers Produce
Type of Operation: Private carrier
Size of Operation: 1 power unit
Total Weight of Truck(s): Not determined
Total Length of Truck(s): Not determined
Other Vehicle Involved: 1985 Chevrolet Caprice station wagon
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 9 Other Injuries: 1

SUMMARY:

The combination unit was illegally parked on the shoulder with its lights on while the driver checked the mechanical condition of his truck. A station wagon, loaded with ten occupants, drifted off the right roadedge and struck the rear of the truck. The impact separated the underride structure at the rear of the trailer and the station wagon underrode the trailer. The frontal deformation on the station wagon was approximately 44 inches with an additional 19 inches of underride.

The combination unit sustained moderate damage to the rear of the trailer. The unrestrained driver was not hurt. The Chevrolet sustained total frontal damage and nine of the ten unrestrained occupants were fatally injured.

The truckdriver was inexperienced and apparently unaware of the illegality of parking on the interstate. The conspicuity of the truck was poor due to the lack of flashing lights or warning devices, dirty taillight lenses, and limited visibility due to inclement weather.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the passenger car driver's lack of vigilance due to fatigue. Contributing to this accident was the inconspicuity of the truck due to the absence of warning devices, the dirty taillight lenses, and the inclement weather.

Hillje, Texas
Case No. 82

OF INTEREST IN THIS INVESTIGATION:

1. Driver Training/Experience
2. Environment

CASE NO.: 83

Investigation No.: SEA-87-H-TR03
Accident Location: Walnut Street crossing of Burlington Northern railroad track at mile post 71.43, Winlock, Washington, DOT # 0924935
Lanes: 2 lanes
Shoulders: Unimproved dirt
Median: None
Features: +14 percent grade to tracks
Date and Time: December 22, 1986, 1:36 p.m.
Ambient Conditions: Raining, daylight, wet
Heavy Truck Involved: 1982 Freightliner COE 3-axle tractor in combination with a fully loaded 48-foot 3-axle trailer
Motor Carrier: M & M Transport, Inc.
Type of Operation: Common carrier
Size of Operation: 11 power units
Total Weight of Truck(s): 78,400 pounds
Total Length of Truck(s): 58 feet
Other Vehicle Involved: Amtrak passenger train
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 3

SUMMARY:

A combination unit loaded with wood chips in a low-clearance trailer approached a high-profile railroad grade crossing. The driver reported that as he attempted to cross the tracks the truck stopped abruptly and he was unable to move either forward or backward. The driver had been unable to free the vehicle when the grade crossing protection gates came down. He radioed his company and exited the truck. Within 2 1/2 minutes from the time the driver stopped on the tracks, the tractor and trailer were impacted near the fifth wheel by a passenger train. The train was powered by two engines and pulling 11 cars. A speed tape recovered from the lead engine indicated an impact speed of 51 mph. There were 14 crewmembers and 457 passengers on the train. The impact pushed the tractor 168 feet down the tracks and the detached trailer 50 feet.

The truck was destroyed by the impact. Both engines and four cars of the train were derailed. Two passengers and one crewmember sustained minor injuries.

The investigation revealed that the clearance allowable at the lowest point on the trailer (12 inches) was insufficient to allow the trailer to clear the high profile grade crossing at the angle of approach elected by the driver. Although the driver had taken this route before, it is probable that this approach was made from a different angle. He had made approximately 100 previous crossings of the railroad tracks before the accident date--about 10 to 12 of those crossings made in the accident type vehicle.

The truckdriver reported 4 years experience in the operation of heavy trucks. Although he had been employed by the motor carrier for about 8 months, he had only 3 weeks of experience in the accident involved combination unit. The driver's record indicated a total of four violations in the past 5 years, including a recent negligent driving and a citation for 52 mph in a 35 mph zone. None of the violations were reported to the motor carrier.

The investigation also found that four of the combination unit's ten brakes were out of adjustment at the time of the accident. Maintenance of the vehicle's components was the responsibility of the motor carrier, who related that each vehicle is inspected and maintained every 5,000 miles.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the truckdriver's failure to negotiate the high-profile crossing at the proper angle to clear the low-clearance trailer.

OF INTEREST IN THIS INVESTIGATION:

1. Driver Training/Experience
2. Motor Carrier Oversight of Driver
3. Motor Carrier Oversight of Equipment
4. Grade Crossing
5. Environment

CASE NO.: 84

Investigation No.: CHI-86-H-TR11
Accident Location: West Main at Chipman St., Owosso, Michigan
Lanes: 4 lanes, undivided
Median: None
Features: Intersection
Date and Time: May 10, 1986, 10:24 a.m.
Ambient Conditions: Clear, daylight with dry pavement
Heavy Truck Involved: 1975 conventional Brockway tractor in combination with a loaded 3-axle dump trailer
Motor Carrier: Chippawa Redimix Concrete & Construction Company
Type of Operation: Private carrier
Size of Operation: 1 operating tractor trailer, 3 three-axle cement mixer trucks
Total Weight of Truck(s): 79,300 pounds
Total Length of Truck(s): Approximately 40 feet
Other Vehicle Involved: Passenger car
Truck Fatalities: 0 Truck Injuries: 1
Other Fatalities: 1 Other Injuries: 0

SUMMARY:

The combination vehicle was eastbound approaching a signalized intersection. The driver stated that he had a green light for his lane as he traveled over a grade crossing 477 feet west of the intersection at approximately 25 mph. The truckdriver estimated his speed at 30 mph as he reached the intersection and a westbound passenger car turned left (south) in front of the truck. The truck tractor collided into the right side of the passenger car. The truck pushed the passenger car approximately 47 feet into a wooden utility pole, severing the pole before coming to rest. The tractor of the combination vehicle came to rest partially on top of the passenger car at the southeast corner of the intersection.

The collision resulted in substantial damage to the right front of the tractor but only minor injuries were reported by the truckdriver. The passenger car was destroyed and its driver sustained fatal injuries.

The driver stated that he observed the passenger vehicle turning across his path approximately 100 feet before the impact. A postaccident examination of the combination vehicle revealed multiple defects with including inoperative brakes on the tractor-trailer. A hand valve on the airbrake system supply hose of the trailer, used for a second trailer (pup trailer, when present), was found open. This open valve allowed air brake system pressure to escape. Several of the tires on this vehicle were unsafe. The owner of this combination vehicle stated there was no maintenance program in effect for the vehicle. All maintenance was performed on an as-needed basis either by the owner or by a person employed by the owner. The trailer had not been in service for the 6 months preceding the accident.

The truckdriver claimed to have approximately 10 years of occasional experience with heavy truck operations. He was not a full-time truckdriver--he worked as a heavy equipment operator. For the past several years his only truck driving duties had involved moving heavy equipment from one local job site to another.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the passenger car driver to yield to oncoming traffic when making a left turn. Contributing to the severity of the accident was the reduced braking efficiency of the combination vehicle.

OF INTEREST IN THIS INVESTIGATION:

1. Motor Carrier Oversight of Equipment

CASE NO.: 85

Investigation No.: ATL-87-H-TR04
Accident Location: Interstate 85, 4 miles west of Lawrenceville, Georgia
Lanes: 4 lanes, divided
Shoulders: 16-foot wide graded earthen on right,
30-foot wide graded earthen on left
Median: Variable width earthen
Features: At grade, construction zone
Date and Time: November 18, 1986, 2:30 p.m.
Ambient Conditions: Daylight, clear, dry
Heavy Truck Involved: 1986 Ford COE 2-axle tractor in combination with 2 fully loaded 28-foot van trailers
Motor Carrier: Consolidated Freightways, Inc.
Type of Operation: Common carrier
Size of Operation: 6,358 power units
Total Weight of Truck(s): 75,986 pounds
Total Length of Truck(s): 69 feet
Other Vehicle Involved: Passenger car and parked truck
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 1

SUMMARY:

A twin trailer combination unit traveling in the right lane at a witness-estimated speed of 70 mph entered a 1,455-foot-long left curve transitional roadway in a construction zone. The two-lane section of roadway was reduced to one lane by barricades, and traffic cones were in place directing all traffic into the left lane. On-scene evidence indicated that the driver veered to the right lane and onto the right shoulder. He continued on the shoulder, striking a pedestrian, an adjacent bridge pillar, and a parked truck. At the bridge pillar collision, the rear trailer broke away and overturned onto the roadway. The tractor and front trailer remained coupled and came to rest on the left shoulder.

The tractor was not damaged and its driver was not injured. Both of the van trailers and the parked truck were destroyed. The freight, including bulk hazardous materials, was strewn about the construction site. The pedestrian sustained serious injuries.

Reopening of the roadway was delayed until the on-scene fire chief was assured that the proposed hazardous material cleanup operation was completed. Delays in opening the road resulted when he failed to get adequate assurances from on-scene personnel (EPA, Georgia DOT, etc.) that his plan for cleanup was safe. The confusion resulted in a 22-hour interstate highway closure.

There were no mechanical or roadway deficiencies, or any pre-existing driver conditions which may have been factors.

The truckdriver had been employed by the motor carrier for about 14 years. He had driven tractor semitrailer units for the first 11 years and double trailer units for the past 3 years. While no formal training had been received, he had attended regular safety meetings as required by the carrier. Company records indicated that the driver had been involved in ten prior accidents while driving the motor carrier's equipment. Seven of those were classified as preventable. In 1984, he was involved in a similar accident. He was found by the company to have been negligent and was discharged. The existing master contract between the union and the company allowed the union to hold a hearing on the disciplinary action. Following the hearing he was given a 30-day suspension and resumed his driving duties until this accident. Again, the company found him negligent and discharged him. This time, however, the driver was terminated. (A similar situation existed in Case No. 60 (ATL 86-H-TR17).)

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the truckdriver's failure to maintain his vehicle within the designated lane and at a speed that was safe for conditions.

OF INTEREST IN THIS INVESTIGATION:

1. Driving History
2. Motor Carrier Oversight of Driver
3. Hazardous Material
4. Double Trailers
5. Environment

CASE NO.: 86

Investigation No.: NYC-86-H-TR03
Accident Location: Route 495 entrance ramp, Holtsville, New York
Lanes: 1 lane
Shoulders: Both shoulders undetermined width of asphalt surface to curbs
Median: None
Features: Upgrade, 140-foot radius curve
Date and Time: February 3, 1986, 12:15 p.m.
Ambient Conditions: Clear, daylight with dry pavement
Heavy Truck Involved: 1981 Mack conventional tractor in combination with a tanker trailer loaded with fuel oil and kerosene
Motor Carrier: County Tank Lines, Inc.
Type of Operation: Contract carrier
Size of Operation: 11 power units
Total Weight of Truck(s): Not determined
Total Length of Truck(s): Not determined
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The tractor and semitrailer had turned onto an entrance ramp that curved to the right. The driver had been traveling on this ramp with similar loads for about 8 years. As the combination unit got part way into the curve, both the tractor and trailer rolled to the left and came to rest upside down in a grassy area bordering the ramp. The driver stated he was traveling at about 35 to 40 mph, and that he normally drives the ramp at 15 to 20 mph. The critical speed range for the curve was calculated at 32 to 36 mph. The two-gravity activated vent/check valves on top the tank trailer were damaged during the rollover and failed to close. This allowed most of the fuel oil and kerosene to spill from the trailer.

The restrained driver received minor injuries. Damage to the power unit consisted of inward deformation on the upper left cab with the roof being pushed down to the instrument panel.

The driver related approximately 8 years of experience with heavy trucks--all of which were spent in vehicles similar to the accident type combination. He had been employed by the subject motor carrier for the past 6 years. Over that 6-year period he had received approximately 1 1/2 hours of training each month. The driver related to investigators that he had traveled the accident route about three times a week for the past 8 years. A search of driver history files indicated his involvement in two accidents in the past 2 years. No violation record was found.

Holtsville, New York
Case No. 86

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the truckdriver's attempt to negotiate the curve at a speed greater than the curve geometry and rollover threshold of the combination unit would allow.

OF INTEREST IN THIS INVESTIGATION:

1. Hazardous Material
2. Crashworthiness

CASE NO.: 87

Investigation No.: ATL-87-H-TR02
Accident Location: Fellwood Road, 5 miles south of College Park, Georgia
Lanes: 2 lanes, undivided
Shoulders: Grass, varying width
Median: None
Features: Straight, grade crossing
Date and Time: November 12, 1986, 7:22 a.m.
Ambient Conditions: Drizzling rain
Heavy Truck Involved: 1985 Conventional Kenworth tractor in combination with a loaded, low profile, auto-transport semitrailer
Motor Carrier: Penscola Auto Auction
Type of Operation: Common carrier
Size of Operation: 1 power unit
Total Weight of Truck(s): 54,100 pounds
Total Length of Truck(s): Approximately 60 feet
Other Vehicle Involved: CSX Freight Train #M-615
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The driver of the combination unit was attempting to locate a local auto auction lot for a delivery. As the driver turned onto an unfamiliar local street, he failed to notice a sign that prohibited truck traffic. As he attempted to cross a railroad track the bottom of the semitrailer became lodged on the track. The driver remained inside the truck for about 20 minutes while attempting to summon help on his CB radio. A northbound CSX freight train with five locomotives and 73 cars approached the crossing and the driver exited his truck. The train began an emergency stop about 900 feet from the crossing; however, it was unable to stop and struck the right side of the combination unit.

The collision resulted in extensive damage to the combination unit and its load. The CSX freight train sustained moderate damage. Neither the truckdriver nor the train crewmembers were injured.

The vertical curve of the railroad/highway grade crossing was not in compliance with guidelines set forth in Section 1.2 of the Manual for Railway Engineering. An agreement between CSX Transportation and Fulton County, Georgia, called for the county to perform surface maintenance on the roadway approaches to the crossing. CSX had resurfaced the approaches 4 months before the accident but it had not notified the county of the grade crossing modification.

The truckdriver had about 8 years experience driving heavy trucks--6 1/2 years of that time was driving combination units. He had been employed by the motor carrier for 9 months. He had completed a 5-week commercial driver's course about 4 years before the accident.

A postcrash investigation by the BMCS revealed that the carrier was in noncompliance with the FMCSR. Specifically, they had no driver qualification files, the driver was not recording his duty status, and the driver had an expired medical certificate.

OTHER INFORMATION:

Special Note: The problem of large trucks becoming lodged on railroad/highway grade crossings has been previously addressed by the Safety Board in its Safety Recommendations H-84-69, R-84-35, and R-84-36 to the AASHTO and the AAR.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the truckdriver driving the combination unit onto a railroad/highway grade crossing that did not provide adequate trailer/ground clearance.

OF INTEREST IN THIS INVESTIGATION:

1. Motor Carrier Oversight of Driver
2. Grade Crossing
3. Environment

CASE NO.: 88

Investigation No.: CHI-86-H-TR10
Accident Location: Interstate 24, near Vienna, Illinois
Lanes: 4 lanes, divided
Median: Undetermined width of grass median
Features: Straight, at grade, 4 percent upgrade
Date and Time: May 11, 1986, 4:39 a.m.
Ambient Conditions: Clear, 74°F, dark and dry
Heavy Truck Involved: 1979 International conventional tractor in combination with an empty 41-foot tank trailer
Motor Carrier: William F. Braun Milk Houling, Inc.
Type of Operation: Common motor carrier
Size of Operations: 26 power units
Total Weight of Truck(s): 28,900 pounds
Total Length of Truck(s): 56 feet 9 inches
Other Vehicle Involved: Passenger car
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 1 Other Injuries: 0

SUMMARY:

The combination unit was traveling on a straight section of a 4 percent upgrade when it struck and overrode the back of a slow moving passenger car. The right front tractor tire impacted the center of the rear of the small vehicle, riding up into the trunk and passenger area of the car. As the car rotated its right rear fender was overridden by the tractor's right framerail and was struck by the right duals on the tractor's forward drive axle. The two vehicles separated with the passenger vehicle coming to rest just off the outside shoulder and the tractor-trailer going off the roadway through a wooded area for about 300 feet.

The tractor received moderate damage to the front and the trailer sustained minor damage. No injuries were reported by the unrestrained truckdriver. The driver of the passenger car was fatally injured, and a blood sample revealed he had a 0.21 percent BAC. Police records showed that the driver of the passenger vehicle was driving with a suspended license.

The truckdriver told rescue personnel that he may have fallen asleep and that he did not see the car until he was right behind it. Examination of the truckdriver's log book, which was filled out after the accident, showed that he was in violation of the 10-hour driving, the 15-hour on duty, and the 70-hour on duty 8-day regulations. He also kept a personal diary which contained additional on duty time violations. When the motor carrier official was interviewed he stated that he was not aware of either the log book violations or the driver's lack of a valid medical certificate. The motor carrier official did not report this accident to the BMCS in the prescribed time.

With 3 years of experience in the operation of heavy trucks, the driver had received no training other than on the job. He had been employed by the motor carrier for about 14 months.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the truckdriver's failure to perceive the slower moving passenger car due to fatigue from excessive hours on duty. Contributing to this driver's excessive duty hours was the failure of the motor carrier to properly monitor the driver's activities.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours
2. Motor Carrier Oversight of Driver

CASE NO.: 89

Investigation No.: CHI-86-H-TR12
Accident Location: Interstate 57, near Chicago, Illinois
Lanes: 6 lanes, divided
Median: Undetermined width grass median
Features: Depressed, curve to left
Date and Time: May 19, 1986, 2:20 p.m.
Ambient Conditions: Clear, 60°F, daylight and dry
Heavy Truck Involved: 1982 International conventional tractor in combination with a loaded 40-foot tanker trailer
Motor Carrier: Justak Brothers, Inc.
Type of Operation: Common carrier
Size of Operations: 25 power units
Total Weight of Truck(s): 76,060 pounds
Total Length of Truck(s): 49 feet 6 inches
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The combination was traveling at a driver-estimated speed of 53 to 54 mph in the right lane on a curve to the left. The driver said that he observed the nonbaffled trailer in his left rear view mirror leaning to the right with its left side tires in the air. Both the tractor and the trailer rolled over on their right sides when the driver corrected by steering to the left. The tanker trailer was loaded to 84 percent of its capacity with crude oil. As it rolled it impacted a concrete drainage ditch and damaged the top hatch and right side gate valve, allowing the oil to leak from the tank.

This accident resulted in substantial damage to both the power unit and the trailer of the combination unit. The driver, restrained by a lapbelt, sustained minor injuries.

This driver related 12 years experience in the operation of heavy trucks, the last 6 of which had been with vehicles similar to the accident vehicle. He had been employed by the motor carrier for only 10 days and, consequently, he had driven the accident-involved combination unit only a few times.

The investigation revealed that of the eight brakes on the combination unit which could be inspected, six were out of adjustment. Two of the tractor brakes had been backed off for towing. Only the steering axle brakes of the power unit were found properly maintained. In addition, defective suspension components were noted at the left side of the trailer. The top leaf spring on the number 4 axle was broken at the U-bolt and the entire rear portion of the left side number 5 assembly was broken at the U-bolts and missing.

Chicago, Illinois
Case No. 89

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the truckdriver's operation at a speed too great for the roadway curvature and the trailer's rollover threshold. Contributing to the accident was the improper steering input by the driver as he attempted to correct the initial instability.

OF INTEREST IN THIS INVESTIGATION:

1. Driver Training/Experience

2. Motor Carrier Oversight of Equipment

CASE NO.: 90

Investigation No.: NYC-86-H-TR05
Accident Location: Sunrise Highway,(NY State Route 27), at Fuller Avenue exit ramp, Islip, New York
Lanes: 6 lanes, divided
Shoulders: Asphalt surface of varying width
Median: 15-foot wide asphalt surface
Features: Off-ramp
Date and Time: February 24, 1986, 8:20 p.m.
Ambient Conditions: Clear and dark
Heavy Truck Involved: A partially loaded 1974 GMC straight body tank truck
Motor Carrier: Marlin Trucking
Type of Operation: Private carrier
Size of Operation: 5 straight body tank trucks
Total Weight of Truck(s): 35,280 pounds
Total Length of Truck(s): Unknown
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The 2,000-gallon capacity straight body tank truck was eastbound on Sunrise Highway, carrying a 1,197-gallon load of fuel oil at a driver-estimated speed of 55 mph. As the driver approached the Fuller Avenue exit he abruptly turned right onto the exit ramp and lost control of the truck. The truck overturned 90° onto its right side and slid about 100 feet. During the overturn the tank's rear compartment vent cap detached and about 215 gallons of fuel oil spilled onto the highway. The fuel oil and gasoline from the truck's fuel tank ignited while the truck was sliding on its side, causing extensive scorching to the exterior of the truck.

This accident resulted in substantial damage to the tanker truck, both from the rollover and from the subsequent fire. The unrestrained driver sustained minor injuries.

The driver had 12 years of experience in the operation of medium to heavy trucks and had been operating trucks similar to the accident truck for about 1 year. He stated that he had only driven the case vehicle four times before the accident trip. At the time of the accident the driver had been on duty since about 7:44 a.m.--a total of over 12 1/2 hours. In addition, he had worked 11 1/2 hours per day on the 2 days preceding the accident.

Three of the six locking bolts on the tank's rear compartment vent cap were loosely adjusted and the locking hook was missing from one of the other bolts. The overhead exit sign for Fuller Avenue on Sunrise Highway was blank and there was no overhead street lighting.

Islip, New York
Case No. 90

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the lack of proper exit signing and the driver's sudden steering input which resulted in lateral forces that exceeded the partially loaded tanker truck's rollover threshold. Contributing to the extent of the hazardous material spill was the vent cap that detached from the rear tank compartment.

OF INTEREST IN THIS INVESTIGATION:

1. Motor Carrier Oversight of Equipment
2. Hazardous Material

CASE NO.: 91

Investigation No.: FTW-86-H-TR11
Accident Location: U. S. 69, Near Dennison, Texas
Lanes: 4 lanes, divided
Shoulders: Both shoulders 10 feet of gravel-sealed asphalt surface
Median: Grass median - varying width
Features: Winding, upgrade, depressed
Date and Time: May 10, 1986, 7:15 a.m.
Ambient Conditions: Cloudy, daylight, wet
Heavy Truck Involved: 1976 International COE tractor in combination with an empty 45-foot van trailer
Motor Carrier: Mid-Continent Van Service, Inc.
Type of Operation: Contract carrier
Size of Operation: Undetermined
Total Weight of Truck(s): Undetermined
Total Length of Truck(s): 55 foot 8 inches
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The tractor and empty semitrailer was traveling at a driver-estimated speed of 45 to 50 mph on the wet asphalt pavement. The driver was negotiating a curve to the right from the left travel lane. Traffic ahead of the combination unit began to slow down due to a passenger vehicle entering from a side road. On application of the service brakes the trailer reportedly began to swing to the driver's left. As the driver let off the brakes and accelerated in an attempt to regain control, the entire unit left the roadway toward the outside shoulder. When it crossed the shoulder, the tractor struck and traveled up a dirt embankment, and its left front tire and wheel plowed progressively deeper into the soft dirt. A clockwise rotation of the tractor occurred and the entire unit finally came to rest on the outside road ditch in a jackknifed position.

The trailer was found broken in half at the junction of the rear-most edge of the fifth wheel plate and the trailer floor structure. The tractor sustained substantial damage; the lapbelted driver was uninjured.

The driver had 1 year of experience operating heavy trucks, all with his current employer, but had received no formal training. He related to investigators that the power unit involved had a history of jackknife type accidents, with at least three occurring in just the past year. He further stated that the previous driver assigned to the truck had eventually refused to drive the vehicle because of its tendency to jackknife. Inspection of the power unit found no apparent deficiencies other than a tire worn smooth on the drive axle. The power unit was not equipped with an engine retarder.

An inspection of the involved trailer revealed severe corrosion present at a substantial number of the framework joints. These corroded areas, found where the steel crossmembers connected to the aluminum side rails, were visible along the entire length of the trailer's lower outside aluminum trim where the corrosion had eaten through. Further inspection of the internal framework joints revealed that the corrosion had reduced the cross sectional area at the aluminum members by up to 50 percent in some of the joints.

The road surface was wet, highly polished asphalt with bleeding asphalt in the rutted wheel paths of both lanes. Resurfacing last took place in July or August 1983. Within 0.2 mile in either direction of the accident site there had been a minimum of 13 vehicles which left the road surface in the past several days. Within minutes of the case accident another heavy truck accident occurred due to the roadway conditions within a few hundred feet south of this accident site (See Case No. 114).

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the driver's failure to maintain proper control of his vehicle due to a combination of inexperience, the reduced surface friction, and the tire path rutting.

OF INTEREST IN THIS INVESTIGATION:

1. Driver Training/Experience
2. Motor Carrier Oversight of Equipment
3. Environment

CASE NO.: 92

Investigation No.: LAX-86-H-TR15
Accident Location: Northbound Interstate 405, Culver City, California
Lanes: 10 lanes, divided
Shoulders: 10-foot asphalt
Median: 6 foot asphalt with integral concrete barrier
Features: 1 percent grade, elevated freeway
Date and Time: September 2, 1986, 4:09 a.m.
Ambient Conditions: Dark, clear, dry
Heavy Truck Involved: 1976 White Freightliner COE, 3-axle tractor in combination with a custom made 3-compartment 40-foot trailer loaded in the center compartment
Motor Carrier: Shaen Magan Trucking
Type of Operation: Contract carrier
Size of Operation: 7 power units
Total Weight of Truck(s): Approximately 78,000 pounds
Total Length of Truck(s): 55 feet
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

A combination unit laden with 52,000 pounds of 290° molten sulfur was northbound on an interstate highway through a densely populated urban area, when the rear compartment of the 3-section tanker separated from the vehicle. The center portion of the tank dropped to the road, the tank breached, and the load spilled onto the roadway. The rear section and its axle went off the right edge of the roadway. A fire ensued due to the high temperature of the product, causing the hardened sulfur to create sulfur dioxide fumes, and the surrounding residential areas were evacuated.

The accident resulted in only minor damage to the power unit. The trailer, however, was destroyed. No injuries were reported by the lapbelted driver.

The on-scene personnel had difficulty positively identifying the product involved. They were not "convinced" that the driver was familiar with the product--the shipping papers listed a UN number but no placards were present on the tank. The Safety Board later determined that the molten sulfur cargo was not required to be placarded.

The investigation revealed that the 40-foot tanker was constructed with three independent 13-foot compartments. The motor carrier routinely used the front and rear compartments for transport of crude oil but dedicated the center tank to their molten sulfur contracts. It was found that due to the very high density of the sulfur the center compartment loading almost met the GVWR of the entire trailer. An engineering analysis determined that the tanker structure failed at the junction of the second and third compartments. Multiple failures of the fillet welds used for construction were noted in the failure area.

The truckdriver reported a total of 21 years experience with heavy trucks but had been employed by the motor carrier for only 10 days. Although the driver insisted that he maintained a daily log in accordance with regulations, the only log found in the power unit was 5 days behind. In addition, the driver possessed two licenses, one of which was revoked.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the fatigue failure of the tank. Contributing to that failure was the loading procedures which used only the center compartment of the tanker for a maximum rated weight load.

OF INTEREST IN THIS INVESTIGATION:

1. Driving History
2. Motor Carrier Oversight of Driver
3. Motor Carrier Oversight of Equipment
4. Hazardous Material

CASE NO.: 93

Investigation No.: DEN-86-H-TR16
Accident Location: U.S. Highway 550, 1/2 mile south of Silverton, Colorado
Lanes: 2 lanes
Shoulders: 18-inch wide asphalt shoulder
Median: None - Double yellow center stripe
Features: Downgrade with winding curves
Date and Time: September 12, 1986, 12:20 p.m.
Ambient Conditions: Clear, daylight with dry pavement
Heavy Truck Involved: 1984 Conventional Peterbilt tractor in combination with a loaded 45-foot trailer
Motor Carrier: R & D Harris Transportation, Inc.
Type of Operation: Common carrier
Size of Operation: 14 power units
Total Weight of Truck(s): 81,660 pounds
Total Length of Truck(s): 65 feet
Other Vehicle Involved: 1966 MCI 47 passenger bus
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 4 Other Injuries: 12

SUMMARY:

The combination unit, 1660 pounds overweight, was northbound, traversing a mountainous area on U.S. Highway 550 near Silverton, Colorado, when the brakes began to overheat. It should be noted that the highway had numerous warning signs concerning curves, steep grades and reduced speed limits. The driver had just descended Coal Bank Hill Pass and stopped for 20 minutes to allow his brakes to cool. He then began to descend Molas Pass, an 8-mile, 7-percent winding downgrade. At a point about halfway down the pass the unit's brakes began smoking, and the driver stopped for another 30 minutes to allow his brakes to cool and to re-adjust them. He then began to descend the remainder of the pass in third or fourth gear. Near the bottom of the pass he lost all braking capability and began accelerating out of control. The unit entered a 114-foot radius curve to the right, and overturned, taking up both lanes. The unit then slid 110 feet on its left side and collided with a southbound passenger bus that was in the right lane. The impact forces pushed the coach bus backwards approximately 26 feet from the initial contact area.

The combination unit and bus sustained substantial damage, and four bus occupants received fatal injuries. Twelve additional bus passengers received minor to serious injuries. The truckdriver was uninjured.

An examination the combination unit's brakes disclosed that the left brake on the second axle was inoperative, the left brake on the fourth axle was inoperative, and both brakes on the fifth axle were improperly adjusted. These deficiencies left only six of the available ten brakes in proper working order. During the National Transportation Safety Board interview, the driver admitted that he was having brake problems, but when he had informed his supervisor about the problem, his supervisor said not to worry about it, that they would be fixed when the unit returned from Colorado.

When interviewed, the supervisor denied receiving any report of brake problems before the driver left the carrier's yard. The state of disrepair of the brake system indicated a longstanding problem, not one that could have occurred on this trip.

With 15 total years of experience in the operation of heavy trucks, the Peterbilt driver's only training had been acquired on the job. He had been employed by the carrier for about 3 weeks, and was making his third trip when the accident occurred. The driver stated he had mountainous driving experience, but this was the first time he had driven this route. A search of this driver's record revealed that he had been cited for at least ten moving violations in the 4-year period preceding the accident. On the driver's undated employment application furnished by the motor carrier, the driver certified only one violation had been committed for the past 3 year period. (Seven of the ten violations were committed in this 3-year period)

The Safety Board investigation revealed that the truckdriver had accumulated less than 7 hours of sleep in the 51 hours preceding the collision. He had started his activities on Wednesday, the 10th of September, at 8 a.m., working at the carrier's yard until 4 p.m. He began driving at 5 p.m. on that date, traveling all night and covering more than 450 miles in approximately 13 hours, before stopping because of mechanical problems. The necessary repairs took 7 hours; however, the driver was unable to sleep uninterrupted because of noise and cab movement during the repairs. After leaving the repair facility, he drove for 4 hours, went off duty for 3 hours, and then drove an additional 200 miles in approximately 3 hours before stopping for 1 1/2 hours. Unable to sleep, he began driving again, continuing until the accident occurred at 12:20 a.m. Approximately 100 miles remained before he would have reached his destination, and he was 3 1/2 hours late for his scheduled delivery. At the time of the accident, he had been without sleep for over 20 1/2 hours. A codriver, his wife, who was supposed to share driving duties was not onboard the unit for any part of the trip. However, the daily logs of the codriver were found in the power unit, signed, but driving and off duty history were not filled out for the dates of the accident trip.

Further investigation found that this driver was unfamiliar with the mountainous route where the accident occurred. The driver had, however, passed several advisory signs prior to the collision which indicated the hazardous nature of the roadway.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the fatigued truckdriver's decision to continue a descent on a very steep mountain roadway, knowing that his truck brakes were not properly maintained. This resulted in a loss of speed control, the overturn, and subsequent collision with the bus. Contributing to the accident was the carrier's failure to maintain the truck's brakes.

Silverton, Colorado
Case No. 93

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours
2. Driving History
3. Motor Carrier Oversight of Driver
4. Motor Carrier Oversight of Equipment

CASE NO.: 94

Investigation No.: ATL-86-H-TR25
Accident Location: Interstate 40 at MP 9.5, near Clyde, North Carolina
Lanes: 4
Shoulders: Asphalt, 3 feet inside and 10 feet outside
Median: 32-inch high concrete barrier
Features: -3 percent grade westbound
Date and Time: September 20, 1986, 8:45 p.m.
Ambient Conditions: Cloudy, dark, windy, and dry
Heavy Truck Involved: 1986 White 3-axle conventional tractor in combination with 2 fully loaded 28-foot cargo van trailers
Motor Carrier: TNT Transall, Inc.
Type of Operation: Common carrier
Size of Operations: 100 power units
Total Weight of Truck(s): 74,798 pounds
Total Length of Truck(s): 76 feet
Other Vehicle involved: None
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The combination unit was traveling westbound at a driver reported speed of 40 to 45 mph when the driver approached a 996-foot radius curve to the left. Witnesses reported that the brake lights were on as the truck entered the transitional spiral before the curve. The driver reported that the rear trailer began to sway and, after approximately 1,500 feet of lateral movement, it overturned. The rotation of the rear trailer around the pintle coupling caused the pin on the locking pawl to shear and jam partially open. The rear trailer broke free and overturned off the right side of the roadway. There were heavy braking tiremarks on the roadway before the point of overturn.

The rollover resulted in substantial damage to the rear trailer--the power unit was undamaged and the lead trailer received damage to the pintle coupling. No injuries were reported by the lapbelted driver, nor was the codriver who was resting in the sleeper berth injured.

The driver had approximately 10 years experience in the operation of heavy trucks. He had been employed by the carrier for only 2 weeks--that 2-week period was his only experience with twin trailer operations. The carrier had furnished 3 days of training primarily covering company regulations and policies. The driver related that about 1 hour of the training concerned the inspection, coupling, and uncoupling of doubles. There was no behind-the-wheel training and no information was presented regarding the handling characteristics of twin trailers. The driver's road test, required by Federal regulation to be given in the type of vehicle that the carrier intends to assign, was performed in a tractor/single trailer combination unit. The company employee who administered the test related that he had never tested a driver in a doubles combination.

Investigation of the driver's record revealed that although he held a valid license at the time of the accident, he had received 15 speeding tickets in the last 13 years (three of them listed as "to elude arrest"), one drunk driving arrest, one reckless driving, six other moving violations, two revocations, and three license suspensions. On the driver's application he had listed two speeding tickets.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the driver's failure to maintain control as the truck negotiated a curve, resulting in the amplified reaction by the rear trailer and an eventual rollover. Contributing to this collision was the driver's inexperience with twin trailers and the failure of the company to provide training in the handling characteristics of twin trailer units.

OF INTEREST IN THIS INVESTIGATION:

1. Driver Training/Experience
2. Driving History
3. Motor Carrier Oversight of Driver
4. Double Trailers

CASE NO.: 95

Investigation No.: MKC-87-H-TR03
Accident Location: Brick Yard Road, Buffalo, Kansas
Crossing Number: 449548U
Lanes: 2 lanes, 2 direction
Median: None
Features: Straight, at grade, railroad crossing
Date and Time: December 18, 1986, 10:20 a.m.
Ambient Conditions: Clear, 40°F, daylight, dry
Heavy Truck Involved: 1979 Freightliner COE tractor in combination with a loaded 45-foot van trailer
Motor Carrier: Consolidated Transfer and Warehouse Company, Inc.
Type of Operation: Common carrier
Size of Operation: 44 power units
Total Weight of Truck(s): 49,000 pounds
Total Length of Truck(s): 60 feet (estimated)
Other Vehicle Involved: Freight train
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 1

SUMMARY:

The combination unit was approaching a grade crossing marked with an advance warning railroad sign and crossbucks. Both the driver and a witness stated that the tractor and trailer stopped before the crossing and that the train blew its whistle as the truck pulled onto the crossing. The visibility from the point where the truck stopped toward the direction of the train's approach was 1 to 1 1/2 miles. The whistle board for this crossing is located 0.25 mile from the crossing. As the combination unit was on the crossing it was struck by a freight train with 8 locomotive units and 69 cars approaching from the left of the truck. The train struck the trailer 31 feet back from the front bulkhead and completely severed the rear portion of the trailer from the front.

The trailer of the combination unit was destroyed. The tractor received moderate damage and the train sustained only minor damage to the snow plow and front railing. The restrained truckdriver was not injured, while one train crewmember suffered minor injuries.

The pulse locomotive recording system indicated that the train was traveling at 50 mph when its brakes were applied in emergency. There was no derailment, and the 5,020-foot train stopped about 0.4 mile past the crossing. Calculations determined the train's whistle was not sounded until it had passed the whistle board, and that if it had been sounded at the whistle board, the driver of the tractor-trailer could have stopped before he got to the tracks.

This truckdriver had accumulated 14 years of experience in the operation of heavy trucks. He had been employed by the motor carrier for approximately 3 months but had driven the accident involved power unit for 3 years.

Buffalo, Kansas
Case No. 95

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the truckdriver's failure to observe the approaching train and yield to it. Contributing to the accident was the late activation of the train whistle.

OF INTEREST IN THIS INVESTIGATION:

1. Grade Crossing

CASE NO.: 96

Investigation No.: LAX-86-F-H008
Accident Location: Eastbound Interstate 10, near Colton, California
Lanes: 8 lanes, divided
Shoulders: 6-foot asphalt on right, 10-foot asphalt on left
Median: W-beam barrier
Features: At grade, straight, level
Date and Time: April 13, 1986, 3:04 p.m.
Ambient Conditions: Clear, dry, daylight
Heavy Truck Involved: 1981 White Freightliner COE 2-axle tractor in combination with 2 fully loaded tank trailers
Motor Carrier: Farmdale Creamery
Type of Operation: Exempt carrier
Size of Operation: 3 power units
Total Weight of Truck(s): 79,000 pounds
Total Length of Truck(s): Not determined
Other Vehicle Involved: Four passenger cars
Truck Fatalities: 0 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 3

SUMMARY:

A combination unit was eastbound in the slow lane of an interstate highway at a witness-estimated speed of approximately 50 mph. The driver related that he observed traffic slowing ahead and applied his brakes approximately 200 feet back but that his vehicle failed to slow sufficiently to avoid impacting the vehicles ahead. Witnesses reported that before the impact, the truck had moved into the second and third lanes. The unit struck four vehicles and then overturned in the roadway.

The truck sustained major damage. The unrestrained driver sustained minor injuries. The four passenger vehicles also sustained major damage resulting in three minor injuries.

The driver stated that he had not noticed the loss of braking ability until he attempted an emergency stop. He further stated that he had completed a brief pretrip examination but had not noticed any problems. The investigation revealed that the brake shoes on axle No. 5 had been improperly installed when the roller cam was reinstalled below the S-cam, precluding any contact between the brake shoe and the drum. Records furnished by the motor carrier indicated that the brakes on the No. 5 axle had been replaced 4 days before the accident and that the combination unit's brakes had been adjusted on the day before this accident. The motor carrier also revealed that all vehicle maintenance is performed by the carrier at their facilities.

The State highway patrol conducted an audit of the carrier approximately 5 months before this accident. Two power units and four trailers were inspected. The examination found four brake violations, two suspension violations, two steering violations, and two tire violations. That audit had resulted in an unsatisfactory compliance rating, however, approximately 3 weeks before this accident the carrier's rating was upgraded to satisfactory.

The driver reported 15 years of experience with heavy trucks. He had been employed by the carrier for 4 years and had been driving the accident involved vehicle for the past 3 years. At the time of the accident he had been on duty for approximately 10 1/2 hours.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the inability of the truckdriver to stop his vehicle for traffic congestion due to a delayed response and defective brakes.

OF INTEREST IN THIS INVESTIGATION:

1. Motor Carrier Oversight of Equipment
2. Double Trailers

CASE NO.: 97

Investigation No.: DEN-87-H-TR06
Accident Location: Interstate 25, Denver, Colorado
Lanes: 6 lanes, divided
Shoulders: Median shoulder 8 feet of concrete surface, outside shoulder 10 feet of concrete surface
Median: Undetermined width of earthen median
Features: Elevated overpass, downgrade
Date and Time: January 7, 1987, 6:05 a.m.
Ambient Conditions: Snowing, 25°f, daylight, packed snow and ice on the road
Heavy Truck Involved: 1985 Ford conventional tractor in combination with 2 loaded 27-foot van trailers
Motor Carrier: ABF Freight System, Inc.
Type of Operation: Common carrier
Size of Operations: 2,400 power units
Total Weight of Truck(s): Undetermined
Total Length of Truck(s): Undetermined
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The doubles combination unit was traveling in the centerlane of an ice and snow-covered overpass at a driver-estimated speed of 45 mph. The driver stated that a small vehicle to his left pulled in front of him. As he lightly applied his brakes, the rear trailer began to slide. The tractor struck the New Jersey concrete barrier off the right shoulder. There was a noise barrier attached to the top of the New Jersey barrier constructed of 5-foot-high panels. The tractor went up on the concrete barrier and slid for 159 feet. It came to rest still on the barrier facing off the shoulder with both trailers still attached and upright.

This accident resulted in substantial damage to the tractor while the trailers received only minor damage. Both fuel tanks were displaced from the tractor and ruptured but there was no fire. The lapbelt-restrained driver was not injured.

The truckdriver reported 24 years of experience with heavy trucks, 18 of which have been spent in the operation of double trailer units. He had been employed by the motor carrier for the past 28 years. The driver stated that he does not like to drive double trailer units in adverse weather because an operator has very little control over the second trailer when the brakes are applied.

Denver, Colorado
Case No. 97

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the driver's operation at a speed greater than that safe in conjunction with his braking input on the low-friction road surface.

OF INTEREST IN THIS INVESTIGATION:

1. Double Trailers
2. Environment

CASE NO.: 98

Investigation No.: SEA-87-H-TR04
Accident Location: East Territorial Road, 2 miles north of Canby, Oregon
Lanes: 2 lanes, 2 direction
Shoulders: Gravel, varying width
Median: None
Features: Grade crossing
Date and Time: January 15, 1987, 1 p.m.
Ambient Conditions: 40^{0} F, clear, dry, and daylight
Heavy Truck Involved: 1969 Mack COE Tractor in combination with a loaded 35-foot low-profile trailer
Motor Carrier: Grey's International of Oregon, Inc.
Type of Operation: Private carrier
Size of Operation: 1 power units
Total Weight of Truck(s): 66,000 pounds
Total Length of Truck(s): 51 feet 4 inches
Other Vehicle Involved: Amtrak Passenger Train # 14
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 1

SUMMARY:

The eastbound combination unit was traversing the Southern Pacific highway/railroad grade crossing on Territorial Road near Canby, Oregon, when the low-profile semitrailer lodged on the tracks. The driver dismounted the vehicle and attempted to get help. Approximately 2 minutes later an Amtrak passenger train carrying 13 crewmembers and 207 passengers approached the crossing at approximately 65 to 70 mph. The engineer applied the emergency brakes, but could not stop in time. The train, which had slowed to approximately 35 mph, struck the semitrailer, pushing the entire combination unit approximately 422 feet. The lead engine stopped approximately 595 feet north of the crossing.

The collision resulted in substantial damage to the lead locomotive and the combination unit. The train crewmembers and truckdriver were not injured. One train passenger received minor injuries.

The investigation disclosed that the low-profile semitrailer's ground clearance was only 7 3/4 inches. The truckdriver was not concerned about being lodged on the track because he had carried the same load across the grade 3 days earlier. An examination of the scrapes on the bottom side of the semitrailer showed that the right side had lodged on the track.

Further investigation revealed that on this particular trip, the trailer was loaded with an object that moved the trailer's center of mass farther to the right causing that side to lodge on the track.

The truckdriver had been operating heavy trucks for 30 years, the last 20 of which were in vehicles similar to the accident combination. He had been employed by the motor carrier for 20 years and had driven the accident-involved combination vehicle for 17 years.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the truckdriver's failure to adequately monitor the clearance of his trailer above the crossing. The low clearance and long wheel base of the lowboy semitrailer, the high profile of the crossing, and the uncentered arrangement of the load resulted in the semitrailer becoming high-centered on the tracks.

OF INTEREST IN THIS INVESTIGATION:

1. Grade Crossing

2. Environment

CASE NO.: 99

Investigation No.: SEA-87-H-TR06
Accident Location: Interstate 5 at MP 6, near Vancouver, Washington
Lanes: 4 lanes, divided
Shoulders: 10-foot asphalt
Median: 15-foot asphalt with 32-inch concrete barrier
Features: +4 percent grade, straight, at grade
Date and Time: March 2, 1987, 9:32 p.m.
Ambient Conditions: Dark, raining, wet roadway
Heavy Truck Involved: 1975 White Freightliner, 3-axle, COE Tractor in combination with a fully loaded 40-foot flatbed trailer
Motor Carrier: Carroll Mill Company, Inc.
Type of Operation: Common carrier
Size of Operation: 19 power units
Total Weight of Truck(s): 76,200 pounds
Total Length of Truck(s): Not determined
Other Vehicle Involved: 2 Passenger Cars
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 1 Other Injuries: 0

SUMMARY:

A combination unit was in the right lane of a rural interstate highway when the truck began a transition from a downgrade to a 4 percent grade. Visibility was poor due to darkness and inclement weather and the roadway was wet. A State patrol officer had made a traffic stop on the right shoulder and his vehicle was behind the violator's vehicle with his emergency lights operating. The truckdriver stated and witnesses confirmed that he signaled a lane change in an attempt to give wide clearance to the traffic stop. However, a vehicle traveling to the left of the unit precluded a lane change. The combination driver related that as he approached the patrol car the vehicle to his left moved to the right, forcing him approximately 2 feet to the right of the right road edge line. The unit sideswiped both the patrol vehicle and the traffic violator's vehicle, and the right front of the tractor struck and fatally injured the trooper.

The driver of the combination unit had accumulated approximately 7 years of experience in the operation of heavy trucks. In addition, he had completed a 6-week driving course sponsored by the local teamsters union. He had been employed by the motor carrier for the past 18 months.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the truckdriver's operation of his vehicle to the right of the travel lane's delineation line. This improper operation resulted from the encroachment of a second, unknown vehicle.

CASE NO.: 100

Investigation No.: FTW-87-H-TR04
Accident Location: Interstate 55, near Tillatoba, Mississippi
Lanes: 4 lanes, divided
Shoulders: Undetermined width of oil-sealed gravel for both shoulders
Median: Undetermined width of grass and trees
Features: Occasional curves, 4 percent downgrade
Date and Time: March 6, 1987, 5:45 a.m.
Ambient Conditions: Clear 60°F, dark & dry
Heavy Truck Involved: 1986 Kenworth conventional tractor in combination with a loaded tanker trailer
Motor Carrier: Vista Chemical Company
Type of Operation: Private carrier
Size of Operation: 25 power units
Total Weight of Truck(s): 79,879 pounds
Total Length of Truck(s): 56 feet 2 inches
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 2
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The tractor-tanker trailer was hauling approximately 7,000 gallons of LPA solvent down a 4-percent grade at a tachograph-indicated speed of 53 mph when the vehicle traveled to the left off the paved surface. The unit traveled straight on the soft earthen roadside for approximately 330 feet and then began to turn right, back in the direction of the roadway. At this point the tractor began to rotate as it traveled onto the paved surface. As the tank trailer began to roll it also caused the tractor to roll. The combination unit slid on its left side for about 32 feet, rolled 360°, and slid another 75 feet to where it fell into a drainage ditch. Approximately 3,000 gallons of the liquid solvent leaked into a drainage ditch due to damage to the valves on the upper dome of the tanker.

The accident resulted in substantial damage to the roof structure and sleeper of the tractor. The outer shell of the tanker semitrailer sustained substantial damage. The restrained driver and the codriver who was in the sleeper both received moderate injuries.

During the interview the truckdriver related that a passenger car pulled from the shoulder into his lane, forcing him to run off the road. This vehicle could not be located and there was no physical evidence to support the statement.

The tractor-cab contained a material safety data sheet describing the load, emergency response procedures, and telephone numbers of the company emergency response team. The carrier was notified and arrived within hours with a response crew to handle the spill.

The driver had been taking an anti-inflamatory drug naprosyn to reduce swelling in his knee. This medication can cause drowsiness in 3 to 4 percent of persons using it, but the company doctor stated that this side effect normally wears off after about 1 week of use--the driver had been taking the medication for about 3 weeks.

The motor carrier appeared to be very well managed and supervised with respect to safety. The company has a director of transport and three terminal managers who supervise the transport safety program. Each of the terminal managers acts as a safety coordinator for the other terminals.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the driver's lack of attention which resulted in his failure to perceive that his vehicle was leaving the traffic lanes. The reason(s) for this inattention was not determined.

OF INTEREST IN THIS INVESTIGATION:

1. Hazardous Material
2. Crashworthiness

CASE NO.: 101

Investigation No.: ATL-87-H-TR14
Accident Location: Interstate 20, 1.3 miles west of Atlanta, Georgia
Lanes: 8 lanes - (median divided)
Shoulders: 10 feet asphalt on right
Median: Concrete median barrier
Features: Interstate highway bridge
Date and Time: April 2, 1987, 3:20 p.m.
Ambient Conditions: Cloudy, light overcast
Heavy Truck Involved: 1985 Freightliner tractor/cargo van semitrailer laden with furniture parts
Motor Carrier: North American Van Lines, Inc.
Type of Operation: Common carrier
Size of Operation: 12,900 tractor/semitrailer units
Total Weight of Truck(s): 42,300 pounds
Total Length of Truck(s): 62 feet
Other Vehicle Involved: Georgia Department of Transportation 1974 International dump truck

Truck Fatalities:	0	Truck Injuries:	1
Other Fatalities:	1	Other Injuries:	1

SUMMARY:

A westbound combination unit laden with furniture parts crashed into the rear of a stopped Georgia Department of Transportation (GADOT) 1974 International truck in the third lane of the 4-lane westbound roadway of Interstate 20. The impact occurred on the asphalt roadway of a concrete structure railroad overpass. After being struck the GADOT truck traveled forward to the left and struck a concrete median barrier. The combination unit skidded straight ahead and came to rest in the third traffic lane. The driver of the GADOT truck died from injuries sustained in the accident. The lapbelted driver of the combination unit sustained serious injuries.

The GADOT highway maintenance truck was engaged in a "cold patch" operation along the westbound roadway and was occupied by its driver. A flashing arrow panel, 4 feet by 8 feet, was attached to the rear of the vehicle. The operation included one other vehicle, a small pickup that contained some "Silvex" for patching small holes in the roadway. One GADOT employee operated the pickup and patched pot holes.

According to the driver of the pickup, he stopped near the east end of the concrete overpass in the third traffic lane of the westbound roadway and dismounted and placed material in a small hole. As the worker started to drive forward about 1 minute later, he observed the collision in the rearview mirror of his vehicle. A GADOT enforcement vehicle with its emergency lights (blue lights) activated was stopped on the shoulder some 500 feet rearward of the truck with the flashing arrow panel. It was established that the flashing arrow panel lights were activated during the entire period of maintenance and

at the time of the collision. A witness driving westbound stated that the combination unit was traveling about 60 mph in the third traffic lane before the accident. No other vehicle or object was in a position to obscure the truckdriver's vision of the flashing arrow.

About 100 feet of skidmarks, identified as belonging to the combination unit before its impact with the GADOT "buffer" vehicle, were located in the roadway. The weather was cloudy and the roadway surface was dry at the time of the accident.

The Georgia State Patrol arrived on scene shortly after the accident. Each driver remained within his respective vehicle. During his assessment of the emergency situation the investigating trooper asked the truckdriver about his physical/medical condition and nothing more. The trooper stated that the driver responded, "I must have gone to sleep, I worked all night."

The truckdriver's daily log was current to 8:30 a.m. on the day of the accident--7.25 hours driving (395) miles since 12:15 a.m. After 8:30 a.m., reconstruction of hours of service from available sources resulted in a reasonable estimate of 6.75 hours on duty, 2.5 hours driving about 100 miles within metropolitan Atlanta. This reconstruction, along with completed daily logs for previous days, reveals 70 hours on duty, 62.25 hours driving during the 8 days before the accident. Consequently, the driver was about to become in violation of hours-of-service regulations at the approximate time of this accident. Evidence documented in the supplemental reports and docket demonstrates that the motor carrier monitored and recorded some negative performances of the truckdriver during his 2-year employment.

A check of all States determined that the truckdriver was licensed only in Indiana. Several months earlier a Wisconsin drivers license had been voluntarily surrendered out-of-State and returned to Wisconsin. Records revealed that the truckdriver had been involved in one minor property damaged accident and had two convictions for minor traffic violations in the last 5 years.

A postaccident mechanical inspection of the Freightliner tractor/semitrailer combination unit was conducted by the OMCS. No defects of the vehicle were noted.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of the accident was the failure of the truckdriver to observe the flashing arrow and to avoid the highway maintenance truck due to fatigue from working excessive hours.

Atanta, Georgia
Case No. 101

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours

2. Motor Carrier Oversight of Driver

3. Environment

CASE NO.: 102

Investigation No.: FTW 87-H-TR06
Accident Location: U. S. Highway 281, 5 miles south of I-20, in Palo Pinto County, Texas
Lanes: 2 lanes, 2 direction
Shoulders: 6-foot wide asphalt surface
Median: None
Features: At grade
Date and Time: March 26, 1987, 5:40 a.m.
Ambient Conditions: Rainy, dark
Heavy Truck Involved: 1969 COE Peterbilt tractor in combination with a loaded tanker trailer
Motor Carrier: Petro-Chemical Transport, Inc.
Type of Operation: Common carrier
Size of Operations: 58 power units
Total Weight of Truck(s): Undetermined
Total Length of Truck(s): Undetermined
Other Vehicle Involved: None
Truck Fatalities: 1 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The southbound combination unit veered to the left, crossed the northbound travel lane, and departed the paved surface at an approximate 6° angle. From the asphalt shoulder the unit traveled approximately 160 feet before striking the concrete abutment walls of a drainage culvert located 16 feet east of the shoulder edge line. The entire combination unit traveled over the depressed drainage ditch, displacing the tractor's front axle assembly and damaging the trailer's axles, then continued an additional 140 feet before the tanker trailer overturned. The fifth wheel separated from the tractor at overturn, remaining attached to the trailer as it rolled forward and crushed the tractor cab. The tanker trailer ruptured and a fire ensued which eventually consumed the 8,975 gallons of gasoline onboard.

The fire and a resultant series of explosions destroyed both the power unit and the tanker trailer. The driver was fatally injured by either the impact forces or the postcrash fire.

On the day before the accident, the driver worked for at least 6 hours and spent the remainder of the day performing maintenance on his truck. He went back on duty at sometime before 10:56 p.m. and worked until the accident occurred at 5:40 a.m. the following morning.

The driver lived in the sleeper cab of his truck that was parked on the carrier's property. Coworkers reported that the driver was in a continual state of fatigue due to his irregular work hours and self-maintenance of his trucks. It was reportedly common for this driver to stop on the roadside and sleep for periods of 15 to 20 minutes.

Information furnished by coworkers and the motor carrier indicated that the driver had accumulated approximately 16 years of experience in the operation of heavy trucks. He had been employed by the motor carrier for the 3 years preceding the accident. The carrier reported that the driver had been involved in a previous run-off-road accident about 2 1/2 years before the subject accident.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the truckdriver's fatigued condition which resulted from inadequate rest. Contributing to the accident was the motor carrier's failure to adequately monitor the activities of this driver.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours
2. Motor Carrier Oversight of Driver
3. Hazardous Material

CASE NO.: 103

Investigation No.: DEN-87-H-TR03
Accident Location: Eastbound Interstate 70 interchange to northbound Interstate 25, Denver, Colorado
Lanes: 30-foot transition ramp
Shoulders: Right shoulder 5 feet asphalt leading to 40-inch concrete barrier. Left shoulder was 6 inches asphalt
Median: None
Features: At grade, 200-foot radius turn to the left
Date and Time: November 20, 1986, 5:15 a.m.
Ambient Conditions: Cloudy, dry, dawn
Heavy Truck Involved: 1975 White conventional tractor in combination with a fully loaded 40-foot tank trailer
Motor Carrier: Liquid Waste Management
Type of Operation: Contract carrier
Size of Operation: 8 power units
Total Weight of Truck(s): 74,360 pounds
Total Length of Truck(s): 57 feet
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The tractor and tanker trailer carrying sludge was traveling at a witness-estimated 30 mph traversing a 200-foot radius left turning transition ramp. The posted speed limit was 25 mph. The driver was unable to estimate his speed because the speedometer was not working. As the combination vehicle traveled through the curve, it rolled onto its right side. The truck slid on the right side for approximately 50 feet before coming to rest on its right side against the outside concrete redirecting barrier.

The accident resulted in a spill of the sludge. The sludge escaped from accident-induced vessel cracks and pre-existent deficiencies in the tank, i.e., missing manhole covers.

The truck sustained minor right side deformation to the tractor and denting and scraping of the trailer. The unrestrained driver received moderate injuries.

The vehicle was found to have had low tire pressure on six of the nine right side tires--four of them were below 40 psi. Although the brake adjustments were within range, all the drums were deeply grooved and heat cracked.

Inspection of the tank revealed that additional holes had been cut in the lateral baffles. However, the thick consistency of the product probably precluded rapid surging.

A check of the driver's record indicated ten moving violations in the last 6 years--5 of which were for speeding. He had no specialized training. His experience was obtained on-the-job by driving similar rigs for the last 12 years. His employer required no specialized training. The driver had been driving for the carrier for 1 month and was assigned to the night shift. During that time he drove from 6 p.m. to 6 a.m., 12 hours per day, 5 days per week.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was a combination of the driver's operation at an excessive speed for the ramp's curvature and the low air pressure of the combination unit's right side tires as a result of improper maintenance by the motor carrier.

OF INTEREST IN THIS INVESTIGATION:

1. Driving History
2. Motor Carrier Oversight of Driver
3. Motor Carrier Oversight of Equipment

CASE NO.: 104

Investigation No.: ATL 87-H-TR01
Accident Location: Montgomery County Road 42 and CSX Railroad Tracks, 1/2 mile south of Montgomery, Alabama
Lanes: 2
Shoulders: Grass, 4 to 6 feet wide
Median: None
Features: Highway/railroad grade crossing
Date and Time: October 30, 1986, 7:05 a.m.
Ambient Conditions: Clear, bright sunlight
Heavy Truck Involved: 1979 International 2-axle delivery truck, loaded with soft drink products
Motor Carrier: Coca-Cola Bottling Company
Type of Operation: Private carrier
Size of Operations: 60 power units
Total Weight of Truck(s): Undetermined
Total Length of Truck(s): Undetermined
Other Vehicle Involved: CSX Freight Train J-745
Truck Fatalities: 0 Truck Injuries: 2
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The 2-axle International truck was traveling east on Montgomery County Road No. 42, approaching the Seaboard System Railroad crossing. About 85 feet west of the tracks, the truckdriver braked and swerved to the right off the pavement surface. The truck continued east-southeast on the soft roadside to where it impacted into the right side of the CSX freight train. The impact occurred on the first freight car of the train, which was positioned behind three locomotives. The first car, three trailing cars, and the caboose derailed following the impact.

The collision resulted in substantial damage to the freight train and extensive damage to the International truck. None of the traincrew was injured, but the truckdriver and his passenger sustained serious injuries.

Witnesses reported that the flashing lights and warning bells at the crossing were operating properly and that the freight train was sounding its warning whistle. The witnesses also reported that the bright sunlight was directly in the truckdriver's eyes. The driver could not recall any details of the accident. The driver's coworker, seated in the right front of the truck, was pre-occupied with a label maker when the accident occurred. He did state, however, that the sun was very bright and positioned behind the crossing warning lights.

The driver had accumulated approximately 1 year of experience in the operation of heavy trucks. He had been working for the company for 7 months. Before being assigned to regular route driving, the carrier provided 2 weeks of on-the-job training by an experienced driver.

The truckdriver had been involved in three accidents in the 5-year period preceding the subject accident. In addition, he had accumulated three moving violations over the same period. While he had reported all moving violations to his employer, only one of the accidents was found on his employment application.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the truckdriver's failure to observe and stop for the approaching CSX freight train. Contributing to this failure was the position of the early morning sun respective to the driver's view of the activated flashing lights.

OF INTEREST IN THIS INVESTIGATION:

1. Driving History
2. Grade Crossing
3. Environment

CASE NO.: 105

Investigation No.: ATL 87-H-TR03
Accident Location: Grade crossing (DOT 629659J) of NC 125 and CSX, Halifax, North Carolina
Lanes: 2
Shoulders: Grass, narrow
Median: None
Features: Highway/railroad grade crossing
Date and Time: November 12, 1986, 1:50 p.m.
Ambient Conditions: Daylight, raining
Heavy Truck Involved: 1984 Mack conventional tractor in combination with with a loaded low profile trailer
Motor Carrier: Daniels Transfer Company, Inc.
Type of Operation: Common carrier
Size of Operation: 11 power units
Total Weight of Truck(s): 74,140 pounds
Total Length of Truck(s): Not determined
Other Vehicle Involved: CSX Freight Train R460
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The combination unit was eastbound on North Carolina Highway 125, traversing the Seaboard System Railroad crossing in Halifax, North Carolina, when the low-profile semitrailer lodged on the railroad tracks.

The driver exited the truck and talked with another truckdriver about pulling his truck off the tracks. Northbound CSX freight train #R460, configured with three locomotives and 134 cars, approached the crossing at approximately 50 mph, was unable to stop, and struck the right side of the semitrailer.

The train pushed the combination unit into the northeast quadrant of the crossing and continued approximately 1,300 feet before coming to a stop. The impact caused the lead locomotive and eight cars to derail.

The collision resulted in extensive damage to the combination unit, the freight train, and the railroad tracks. There were no injuries to the truckdriver or the traincrew.

The 54-year-old truckdriver had 29 years of over-the-road truck driving experience, a considerable amount of which was in low-profile type semitrailers.

Subsequent investigation revealed that the tracks at this location had been elevated by CSX in 1983 and that this maintenance project had never been evaluated by the North Carolina Department of Transportation.

Further evaluation of the crossing profile showed that it had a vertical curve radius of 106.8 feet. The low-profile (lowboy) semitrailer had an 8-inch frame height and could not negotiate a vertical curve with a radius smaller than 199.3 feet.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the truckdriver's failure to adequately monitor the clearance available for the low-profile trailer at the high-profile crossing. Contributing to the accident was the lack of warning signs.

OF INTEREST IN THIS INVESTIGATION:

1. Grade Crossing
2. Environment

CASE NO.: 106

Investigation No.: ATL 86-H-TR23
Accident Location: U.S. Hwy 70, 5 miles south of Hot Springs, North Carolina
Lanes: 2 lanes, 2 direction
Shoulders: South side - grass covered, 1 1/2 ft wide with W-beam guardrail; North side - none
Median: None
Features: Downhill curve, winding mountain highway
Date and Time: September 3, 1986, 3:45 p.m.
Ambient Conditions: Cloudy, daylight with dry asphalt road surface
Heavy Truck Involved: 1986 COE International tractor in combination with 2 partially loaded 28-foot trailers
Motor Carrier: Pacific Inland Transport, Inc.
Type of Operation: Common carrier
Size of Operations: 55 power units
Total Weight of Truck(s): 55,933 pounds
Total Length of Truck(s): 68 feet
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The twin trailer combination unit was eastbound on U.S. Highway 70 traversing a winding mountainous highway. Approximately halfway down a 2-mile-long, 4-percent downgrade, the driver lost control of the truck and overturned in a sharp left curve. The rear trailer began overturning right, broke away at its pintle hook coupling, slid 31 feet on its right side, overrode the guardrail, then came to rest against some trees and brush on the side of the embankment. The tractor and front trailer came to rest on their right sides on the south roadside.

This accident resulted in substantial damage to the power unit and both trailers. The driver reportedly sustained minor injuries.

The driver departed Whittier, California, on August 29, 1986. However, his remaining trip history is not known. He was not completing daily logs for the trip, and reported that he had been lost several times. He stated that he was not sure what State he was in or what highway he was on at the time of the accident. A witness that observed the driver about 2 hours before the accident, plus the investigating trooper that saw him at the site, said that he was disoriented and looked tired. When interviewed 2 days later, he was still disoriented. Tests of the driver's blood drawn 4 days after the accident was negative for drugs and alcohol.

The driver was hired by the carrier on August 26, 1986. Even though the motor carrier's policy required that new drivers drive 30 days with a senior driver, this driver was driving alone only 9 days after he was hired. The carrier gave no explanation as to why the driver was driving alone.

The carrier conducted a more thorough background investigation following the accident. According to the safety director one of the references cited was unsatisfactory. The safety director had documents detailing the driver's first background check showing that he checked with three of four previous employers. The most recent past employer related that the driver could not take orders, that he got lost on one trip, and that he had caused a spill. The motor carrier reported that the driver was going through a divorce and was apparently under stress.

Utah had suspended the truckdriver's license in June 1986 for failure to answer a summons. The carrier had run a check on the drivers license but were not informed of the suspension in as much as it did not result from a moving traffic violation. Consequently, the carrier did not obtain a complete record from Utah. However, a question on the driver's application to the motor carrier, asking if he had ever had his license suspended, was not answered.

The twin trailer combination unit should not have been traveling on U.S. 70 at the accident site. North Carolina prohibits twin trailer operation on that highway section.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the failure to maintain a safe speed for descent of mountainous grade. Contributing to that failure was the driver's inexperience with the handling characteristics of twin trailer combinations and the failure of the motor carrier to properly train the driver for twin trailer operations.

OF INTEREST IN THIS CASE:

1. Fatigue/Duty Hours
2. Motor Carrier Oversight of Driver
3. Double Trailers
4. Driving History
5. Environment

CASE NO.: 107

Investigation No.: MKC 86-H-TR15
Accident Location: Interstate 70, 1 mile east of Goodland, Kansas
Lanes: 4 lanes, divided, grooved concrete
Median: 44-foot wide earthen median
Features: Straight, level, at grade
Date and Time: September 9, 1986, 2:00 a.m.
Ambient Conditions: Clear and dry, dark without artificial lighting
Heavy Truck Involved: (1) 1976 International COE in combination with a 1981 45-foot flatbed trailer
Motor Carrier: (1) Independent Freightways, Inc.
Type of Operation: (1) Common carrier
Size of Operation: (1) 21 power units
Heavy Truck Involved: (2) 1986 Peterbilt conventional in combination with a 48-foot refrigerated van trailer
Motor Carrier: (2) Carretta Trucking, Inc.
Type of operation: (2) Common carrier
Size of operation: (2) 300 power units
Total Weight of Truck(s): (1) Not determined
(2) Not determined
Total Length of Truck(s): (1) Not determined
(2) Not determined
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 2
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The International combination was traveling on a straight and level section of roadway when it overtook a slower moving 1986 Peterbilt combination. The driver of the International braked and attempted to turn left to avoid the collision, but struck the preceding truck in the left rear. Thirty-seven feet of preimpact skidmarks were found. The International pulled to the left from impact and came to rest on the right shoulder. The Peterbilt combination continued for approximately 160 feet and stopped, also on the right shoulder.

The International combination sustained major damage to the front of the tractor. The unrestrained driver received minor injuries. The Peterbilt combination sustained minor damage to the left rear of the trailer. The lapbelt-restrained driver of the Peterbilt was uninjured--the codriver, located in the sleeper berth, sustained minor injuries.

The investigation revealed that the driver of the International had not had adequate rest in the 36 hours preceding the accident. This was reflected by his daily log books and verified by his statements. The driver's record-of-duty status did not correspond with the hours of service declared on the trip lease being operated under at the time of the accident.

The motor carrier responsible for the International maintained a fleet of 21 power units and 28 trailers. These vehicles were involved in a total of 13 accidents in an 8-month period during the year preceding the subject accident. It was also found that from July 1985 to July 1986, the carrier's vehicles had been checked at roadside inspection stations 21 times. Those inspections noted 140 violations, 45 of which were out-of-service citations. There were only five vehicles checked that were not placed out of service.

Inspection of the truck revealed that the lights on the instrument panel were not operational; therefore, the driver could not determine the speedometer reading.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the International driver's failure to avoid slower moving traffic in his lane as a result of fatigue.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours
2. Motor Carrier Oversight of Driver
3. Motor Carrier Oversight of Equipment

CASE NO.: 108

Investigation No.: ATL-86-H-TR20
Accident Location: North Carolina 150, Mooresville, North Carolina
Lanes: 2
Shoulders: Grass, 4 to 6 feet wide
Median: None
Features: Occasional curves, at grade
Date and Time: July 10, 1986, 6:30 a.m.
Ambient Conditions: Clear, daylight, and dry
Heavy Truck Involved: 1985 Ford 3-axle tractor in combination with 2 partially loaded 28-foot cargo van trailers
Motor Carrier: Carolina Freight Carriers Corporation
Type of Operation: Common carrier
Size of Operation: 2,450 power units
Total Weight of Truck(s): 71,000 pounds estimated
Total Length of Truck(s): 66 feet
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The combination unit traveled westbound on a straight section of 2-lane roadway approaching a 486-foot radius curve to the right. The truckdriver had driven the route weekly for the last 14 years and many times in the past 3 years with double trailers. The driver stated that he heard a loud noise part way through the curve. He looked in his mirror and saw the rear trailer on its left side being dragged by the safety chains. The rear trailer broke free of the pintle hook, overturned across the centerline, and was dragged along the opposite lane and back across to the right shoulder where the driver stopped the upright tractor and lead trailer. The driver stated that he had reduced his speed to about 35 mph (the speed that he usually drove the curve) when he entered the curve.

This accident resulted in extensive damage to the overturned rear trailer. The only damage to the lead trailer was the bent pintle hook connection. The power unit was not damaged. The lapbelted truckdriver was not injured.

The lead trailer was about 85 percent filled with various packages of general commodities freight. Due to the nature of the packages and loading, there was no need to secure the load. The rear trailer was loaded with 10 beams of yarn, each individually supported within an open rack and each weighing 1,769 pounds. There were eight racks on the floor of the trailer, and the other two racks were stacked (interlocked in lower racks) toward the rear. The racks on the floor were not chocked, yet there was over 1 foot of clearance on each side within the cargo van.

Although the speed of the vehicle was not determined it is apparent that the speed at overturn of the rear trailer was in excess the speed which the vehicle could safely negotiate the curve under the existing conditions, particularly the load of the rear trailer. The racks on the trailer floor shifted within the curve and contributed to the overturn of the trailer. The beams were normally transported in smaller quantities and secured by other types of freight.

The driver of the combination unit had 15 years experience operating heavy trucks and 3 years experience with double trailers. His only training was a brief orientation on double trailers. A check of his driving record revealed no chargeable accidents or violations in the last 8 years.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of the accident was the lateral shifting of the rear trailer's unsecured cargo as a result of improper loading.

OF INTEREST IN THIS INVESTIGATION:

1. Double trailers

CASE NO.: 109

Investigation No.: CHI 85-H-FR25
Accident Location: Interstate 70, 3.2 miles north of Knightstown, Indiana
Lanes: 4 lanes, divided
Median: Grass-covered earthen median
Features: Straight
Date and Time: July 18, 1985, 4:30 a.m.
Ambient Conditions: Clear, dark, no street lights
Heavy Truck Involved: 1977 COE International tractor in combination with a loaded flatbed trailer
Motor Carrier: Waggoner's Trucking
Type of Operation: Common carrier
Size of Operation: Undetermined
Total Weight of Truck(s): 69,010 pounds
Total Length of Truck(s): Undetermined
Other Vehicle Involved: 1982 Eagle coach bus
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 2 Other Injuries: 28

SUMMARY:

A Trailways Coach Bus was traveling east on a straight section of Interstate 70 near Knightstown, Indiana, at a driver-estimated speed of 60 mph. The busdriver, preoccupied with an air conditioning control adjustment, drove into the rear of the combination unit that was traveling eastbound in the right lane at a slower speed.

The collision resulted in approximately 18 feet of the coach's right side being ripped open and three passengers being ejected onto the roadway. Two of the ejected passengers sustained fatal injuries while the third sustained serious injuries. Of the remaining 26 passengers, 25 sustained minor to moderate injuries and one was uninjured. The driver of the bus received minor injuries. No injuries were reported by the truckdriver.

The truckdriver stated that he had pulled from a stopped position on the shoulder onto the travel lane about 1 mile before the accident. He stated that he had accelerated to about 45 to 50 mph before the impact occurred. The evidence at the scene suggested that the combination unit was traveling much slower than 50 mph when the collision occurred.

The truckdriver had been working for his present employer for only 1 month when the accident occurred. The available documents indicated that the driver had 1 year of truck driving experience before his employment with the current motor carrier.

Knightstown, Indiana
Case No. 109

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the busdriver's failure to perceive the slow moving tractor semitrailer and move to the other available lane. Contributing to the busdriver's lack of hazard perception was his preoccupation with the air conditioner control adjustment and the absence of hazard warning lamps on the slow moving combination unit.

CASE NO.: 110

Investigation No.: FTW 86-H-TR10
Accident Location: Interstate 10, near Junction, Texas
Lanes: 6 lanes divided, 4 westbound and 2 eastbound
Shoulders: Median shoulder 4-foot, outside shoulder 8-foot wide; both asphalt surfaced
Median: Earthen
Features: At grade
Date and Time: April 3, 1986, 9:55 p.m.
Ambient Conditions: Clear, dark, no street lights
Heavy Truck Involved: (1) 1980 Conventional Freightliner truck tractor
Motor Carrier: (1) Bennie Greenwood Trucking
Type of Operation: (1) Contract carrier
Size of Operation: (1) 1 power unit
Heavy Truck Involved: (2) 1979 conventional Kenworth in combination with a loaded flatbed trailer
Motor Carrier: (2) S & R Metals
Type of Operation: (2) Private carrier
Size of Operation: (2) 3 power units
Total Weight of Truck(s): (1) 17,000 pounds
(2) 68,220 pounds
Total Length of Truck(s): (1) 27 feet
(2) Approximately 60 feet
Other Vehicle Involved: None
Truck Fatalities: 1 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The Kenworth combination unit had just entered the travel lanes of a controlled access freeway from a parked position on the right shoulder. As this unit crossed the second lane of the three-lane roadway, it was struck in the rear by a Freightliner tractor. Witnesses who observed the Freightliner before the collision described its speed as very fast, and investigating police officials estimated the impact speed to have been in excess of 90 mph. From impact the Kenworth combination unit was pushed approximately 90 feet, coming to rest partially in the median. The Freightliner truck tractor was impaled into the rear of the semitrailer.

The collision resulted in extensive damage to the Freightliner with rearward crush reaching near 14 feet. The double sleeper cab, engine and transmission were displaced. The transmission was found approximately 105 feet from the impact area. The rear of the Kenworth's trailer was crushed inward approximately 32 inches on the right side. The semitrailer was displaced from the Kenworth tractor at the fifth wheel position. It overrode the headerboard (barrier located between the trailer and the rear of the cab structure), crushed the sleeper cab, and penetrated approximately 1 foot into the driver's area of the cab. The Freightliner driver received fatal injuries and the Kenworth combination driver received serious injuries.

The Kenworth combination unit had pulled from the shoulder across two acceleration lanes and into the travel lanes over a distance of 262 feet. The Safety Board calculated that the combination unit was traveling at a maximum of 12.5 mph and the Freightliner was traveling at 78 to 87 mph when the impact occurred.

Laboratory analysis showed that the taillights and turn signal lights on the left rear of the semitrailer were not on when the impact occurred. A blood test indicated that the Freightliner driver had .11 milligrams per liter of methamphetamine. It was later determined that this driver had been awake for 16 hours at the time of the accident.

Safety Board investigators were unable to verify whether either driver was medically qualified to drive, and no log books were available to verify the combination driver's hours of service.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the Kenworth combination driver's illegal and unsafe movement into the traffic lanes from a parked position and the Freightliner driver's failure to maintain a prudent and lawful speed. Contributing to this collision were the defective taillamps and turn signal lamps on the Kenworth unit.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours
2. Alcohol/Drugs
3. Motor Carrier Oversight of Driver
4. Motor Carrier Oversight of Equipment

CASE NO.: 111

Investigation No.: ATL-87-H-TR24
Accident Location: US 70-A and US 301, in Selma, North Carolina
Lanes: U.S. 70A - 4 lanes. US 301 - 2 lanes
Shoulders: Curb and gutter within junction; various shoulders otherwise
Median: None
Features: Intersection of 2 U.S. highways with traffic control signals
Date and Time: September 14, 1987, 5:41 a.m.
Ambient Conditions: Clear, darkness with some street lights
Heavy Truck Involved: 1980 Mack tractor/tank semitrailer loaded with gasoline
Motor Carrier: Coastal Transport, Inc.
Type of Operation: Common carrier
Size of Operation: 28 tractors, 42 tank semitrailers
Total Weight of Truck(s): Not determined
Total Length of Truck(s): Not determined
Other Vehicle(s) Involved: Passenger car and small van
Truck Fatalities: 1 Truck Injuries: 0
Other Fatalities: 1 Other Injuries: 3

SUMMARY:

The tractor/tank semitrailer combination unit traveled east on U.S. 70A loaded with 9,015 net gallons of gasoline. At the intersection of U.S. 70A and U.S. 301, a northbound 1975 Mercury entered the intersection and started a left turn to proceed west on U.S. 70A. The through eastbound combination unit entered the intersection and struck the left side of the Mercury. In the accident sequence, the tractor engaged the left side of the Mercury and the vehicles moved in a northeasterly direction. The combination unit overturned onto its right side. The Mercury struck the right front of a 1982 Chevrolet van that had stopped in the left turn lane of westbound U.S. 70A. All three vehicles came to rest generally in the east-northeast area of the junction. Fueled by gasoline from the tank semitrailer, the area was immediately engulfed in flames. Both the truckdriver and the driver of the Mercury remained within their respective vehicles and were killed. The Chevrolet van sustained minor crash damage on the right front. Its occupants received minor injuries and were able to escape the fire.

In the area of the accident intersection, U.S. 301 has four-lane roadway. A marked left turn lane extends along the center of the roadway. US 70A has generally a two-lane roadway. Both approaches to the intersection have left and right turn lanes. The intersection was equipped with traffic control signals, including a left turn signal for each of the four approaches to the intersection. The system was operated by an eight-phase solid-state microprocessor controller. Although the equipment was mostly destroyed in the accident and fire, there was no evidence to suggest a malfunction.

A witness, who was located southwest of the intersection at the time of the accident, stated that the traffic control signals facing south were red for several seconds before the accident. He clearly observed the Mercury proceed through the red traffic signals into the intersection and watched it being struck by the eastbound truck. The driver of the westbound van stated she had stopped for a red left turn light and was waiting for a green light for a left turn onto southbound U.S. 301. She stated that the traffic signal was green for through traffic, and through traffic had moved ahead on her right.

Postaccident examination of the vehicles revealed 42 inches crush to the left side of the Mercury, the major portion of which extended from rearward of the left front wheel to the center pillar post. The front bumper/frame rails of the tractor had collision damage. All three vehicles were destroyed by the fire; their respective conditions precluded postcrash mechanical inspections.

At the time of the accident, the experienced truckdriver had been on duty less than 2 hours. He had loaded the tank semitrailer a short distance from the accident for his first trip of the day. No evidence was found of any physical impairment or fatigue of the truckdriver. Nor was any evidence found of lack of skill due to inadequate training or experience. The motor carrier maintained all records required by regulation and law.

According to the medical examiner, the blood of both the truckdriver and the Mercury driver tested negative for alcohol.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of the accident was the failure of the driver of the Mercury to obey a traffic control signal (red light) and yield to through traffic.

OF INTEREST IN THIS INVESTIGATION:

1. Hazardous Material

CASE NO.: 112

Investigation No.: LAX-85-F-H017
Accident Location: Interstate 17, 7 miles north of Camp Verde, Arizona
Lanes: 4-lane divided highway
Shoulders: 10-foot wide asphalt surfaced
Median: Lanes were separated by mountain
Features: Construction zone, winding downgrade
Date and Time: July 24, 1985, 11:04 a.m.
Ambient Conditions: Clear, daylight, and dry road surface
Heavy Truck Involved: (1) 1976 COE International tractor in combination with a loaded flatbed trailer
Motor Carrier: (1) Flower Transportation, Inc.
Type of Operation: (1) Contract carrier
Size of Operation: (1) 2 power units
Heavy Truck Involved: (2) 1984 COE International tractor in combination with a van trailer
Type of Operation: (2) not determined
Size of Operation: (2) not determined
Total Weight of Truck(s): (1) Not determined, (2) not determined
Total Length of Truck(s): Not determined
Other Vehicle Involved: 1985 Pontiac 4-door
Truck Fatalities: 0 Truck Injuries: 2
Other Fatalities: 6 Other Injuries: 0

SUMMARY:

The 1976 International combination unit was southbound on Interstate Highway 17 in the left travel lane traversing a 12-mile descent when the driver lost speed control. He was unable to shift into a lower gear and accelerated to approximately 80 mph on the 6 percent downgrade. Near the bottom of the downgrade, the unit swerved into the right travel lane to avoid a pavement milling machine and collided into the rear of a Pontiac 4-door sedan. The Pontiac was pushed into the rear of a 1984 International truck and semitrailer combination unit. The 1976 International combination unit continued southbound pushing the Pontiac to the right into the guardrail on the west road shoulder. From this impact area, the truck pushed the Pontiac across the roadway and they collided with and overrode the east guardrail before coming to rest in a dirt area on the edge of a mountain slope. The combination unit and car were then destroyed in an intense postcrash fire.

The collision resulted in fatal injuries to the six occupants of the Pontiac. The 1976 International truckdriver and his 10-year-old son received minor injuries. The 1984 International combination unit sustained substantial damage. The driver was not injured.

The truckdriver stated to the Arizona State Highway Patrol that he was traveling at about 45 mph when his brakes faded and he was unable to shift into a lower gear. The driver also explained that although the left lane was blocked off by traffic cones, he elected to use it so he could avoid other traffic.

During the postaccident vehicle examination, it was noted that the left side third axle brake drum was cracked.

The truckdriver had only been employed for 49 days as a driver before this accident. He was unfamiliar with the operation of a 13-speed transmission, and he was inexperienced in mountain driving.

In a subsequent audit, the BMCS gave the motor carrier an unsatisfactory rating due to violations discovered in its driver qualification files.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the truckdriver's failure to use a lower gear when beginning his initial descent on the 6 percent downgrade. This resulted in a loss of speed control and subsequent brake fade. Contributing to this loss of control was the driver's inexperience in operating a vehicle with a 13-speed transmission.

OF INTEREST IN THIS INVESTIGATION:

1. Driver Training/Experience
2. Motor Carrier Oversight of Driver
3. Motor Carrier Oversight of Equipment
4. Environment

CASE NO.: 113

Investigation No.: CHI-86-H-TR13
Accident Location: Interstate 80, near New Lenox, Illinois
Lanes: 4 lanes, divided
Median: 30-foot wide earthen median
Features: Depressed roadway
Date and Time: September 26, 1986, 1:35 a.m.
Ambient Conditions: Clear, dark, no street lights
Heavy Truck Involved: (1) 1977 International conventional tractor in combination with a loaded flatbed trailer
Motor Carrier: Jones Motor Company, Inc.
Type of Operation: (1) Contract carrier
Size of Operation: (1) 900 power units
Heavy Truck Involved: (2) 1981 COE Freightliner Tractor in combination with a loaded flatbed trailer
Motor Carrier: (2) J Lines, Inc.
Type of Operation: (2) Contract carrier
Size of Operation: (2) 30 power units
Total Weight of Truck(s): (1) 79,080 pounds
(2) 80,000 pounds
Total Length of Truck(s): (1) 65 feet
(2) 58 feet
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The driver of a Freightliner combination unit parked on the shoulder of eastbound Interstate 80, turned on his parking lights, and went to sleep at approximately 11:30 p.m. on September 25, 1986. At about 1:35 a.m. on September 26, 1986, the eastbound International combination unit veered to the right and collided into the left rear of the parked Freightliner combination unit. The right front fender of the International contacted the left rear corner of the parked semitrailer. The International tractor's steering axle was displaced rearward to where it ruptured and displaced the right side saddle fuel tank, allowing approximately 33 gallons of diesel to spill. The diesel ignited and the burning saddle tank came to rest underneath the parked Freightliner tractor. The burning International combination unit continued eastbound on I-80 for approximately 165 feet before it came to rest.

Both combination units burned but their drivers escaped.

The International driver had been on duty for 18 1/2 hours at the time of the accident. The driver stated to the Illinois State Police that he had fallen asleep. The Freightliner driver had pulled over to sleep because he had only two hours of rest in the preceding 28 1/2 hours.

During the investigation it was learned that the 22-year-old International driver had been involved in three accidents and received five tickets in the preceding six years. The Freightliner driver had been involved in two accidents and received six tickets in the preceding six years.

Although not contributing to the accident, it was noted that the right side fifth axle brake of the International combination had a push rod travel of 2 3/4 inches--the pad did not contact the drum when tested.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the International combination unit driver to maintain his vehicle within the travel lanes due to acute fatigue as a result of excessive hours of service. Contributing to the collision was the decision of the fatigued Freightliner driver to illegally park his unit on the road shoulder.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours

2. Motor Carrier Oversight of Driver

CASE NO.: 114

Investigation No.: FTW 86-H-1R12
Accident Location: U. S. Highway 69, 1.5 miles north of Dennison, Texas
Lanes: 4 lanes, divided
Shoulders: 10-foot wide asphalt shoulders
Median: Earthen median of varying width
Features: Elevated, winding curves
Date and Time: May 10, 1986, 7:45 a.m.
Ambient Conditions: Raining
Heavy Truck Involved: 1984 COE Freightliner in combination with 2 loaded 28-foot trailers
Motor Carrier: TML, Inc.
Type of Operation: Common carrier
Size of Operation: 50 power units
Total Weight of Truck(s): 75,940 pounds
Total Length of Truck(s): Unknown
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The twin trailer combination was northbound on U.S. Highway 69, entering a left curve at a driver-estimated speed of 45 mph when the driver began changing lanes from right to left to avoid the wreckage of an accident that had occurred shortly before. During the lane change maneuver an instability occurred and the rear trailer began swinging to the right, then left, and eventually overturned, breaking loose from its pintle and hook connection on the rear of the semitrailer. The rear trailer slid approximately 109 feet on its left side before coming to rest in the median. There were tire marks up to 212 feet long preceding the overturned rear trailer. The semitrailer and tractor remained upright and were driven to the right hand shoulder and stopped.

The collision resulted in moderate damage to the rear trailer. The semitrailer and truck tractor were not damaged. The lapbelt-restrained driver was not injured.

On-site inspection of the roadway revealed that the wheel paths were highly polished. A light rain had fallen before the accident, further reducing the traction available on the polished surface. Tire marks indicated that the rear trailer rotated 22° from longitudinal alignment with the traffic lane in approximately 1.27 seconds.

Approximately 1/3 of the original diameter of the lower circumference of the eye hook at the pintle connection had worn away. The absence of wear marks on the safety chain loop indicated that the safety chain was not in use.

The truckdriver had accumulated a total of 10 years experience in the operation of heavy trucks; however, he had operated twin trailer combinations for only the past 2 years. He had been employed by the motor carrier for 6 months and had received limited training in the inspection of doubles units.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the driver's failure to slow his vehicle within the space available to him to a speed at which his lane change maneuver could have been safely performed. Contributing to the occurrence was the reduced friction coefficient of the northbound lane's travel surfaces.

OF INTEREST IN THIS INVESTIGATION:

1. Driver Training/Experience
2. Motor Carrier Oversight of Equipment
3. Double Trailers
4. Environment

CASE NO.: 115

Investigation No.: CHI 87-H-TR05
Accident Location: Interstate 70, East St. Louis, Illinois
Lanes: 3 lanes
Median: None
Features: Elevated
Date and Time: December 4, 1986, 2:54 p.m.
Ambient Conditions: Clear, dry, daylight
Heavy Truck Involved: (1) 1977 COE International tractor in combination with a loaded dump trailer
Motor Carrier: J.C. Hauling Company
Type of Operation: (1) Contract carrier
Size of Operation: (1) 50 power units
Heavy Truck Involved: (2) 1977 COE International tractor in combination combination with an empty flatbed trailer
Motor Carrier: ABC Trucking
Type of Operation: (2) Common carrier
Size of Operation: (2) 200 power units
Total Weight of Truck(s): (1) 70,680 pounds
(2) 27,070 pounds
Total Length of Truck(s): (1) Not determined
(2) 54 feet
Other Vehicle(s) Involved: 2 Passenger cars
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 1 Other Injuries: 1

SUMMARY:

The loaded International dump trailer combination was eastbound on Interstate Highway 70 in the left of three lanes at a witness-estimated speed of 55 mph when a passenger car reportedly made an abrupt lane change maneuver and then slowed down, causing the International driver to steer into the center lane. Traffic in the center and right lanes slowed, and the International dump trailer combination failed to stop, colliding into the rear of a 1977 Chevrolet.

The Chevrolet was pushed about 38 feet from the initial impact area to where it was forced into the rear of the International flatbed combination unit. These units continued being pushed forward until the flatbed combination struck the rear of a 1986 Pontiac.

The collision resulted in minor damage to both combination units while the Chevrolet was crushed extensively. The unrestrained Chevrolet driver received fatal injuries, and the unrestrained right front seat passenger received serious injuries. The Pontiac sustained substantial damage. The Pontiac driver and both truckdrivers reported no injuries.

The International dump trailer combination unit's right side fifth axle began leaving skidmarks in the left lane 494 feet from where the unit came to rest.

A subsequent examination of the brakes of this combination unit disclosed only 2 of 10 brakes were in working order. The following brake system defects were noted.

> The brake pads on the steering axles were contaminated with oil, and the air hoses were dry rotted and cracked, allowing air to leak from the system. The left chamber of the second axle leaked air and the right side brake pads on the second axle failed to contact the drum during a full air application test. The brakes on the third axle, both sides, were inoperative--the pads failed to move during a full air application.
>
> There was no brake lining on the left side of the fourth axle, and the push rod travel on the type 24 brakes was 2 3/4 inches. During a full air test, it was noted that the system lost 13 psi per minute and could not maintain 30 psi at engine idle speed.

BMCS files reflected that this carrier had a satisfactory rating even though it had never been audited by inspectors. Moreover, the files showed that this carrier's trucks had been inspected in the field on 50 occasions, resulting in 474 violations in 6 months. An examination of the motor carrier by the Safety Board revealed that the carrier neither inspects nor requires its drivers to inspect the owner-operated vehicles of the fleet for equipment deficiencies.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the improperly maintained brakes on the International combination which were the result of the motor carrier's inadequate maintenance practices.

OF INTEREST IN THIS INVESTIGATION:

1. Motor Carrier Oversight of Equipment

CASE NO.: 116

Investigation No.: LAX 86-H-TR06
Accident Location: Interstate 5, near Fort Tejon, California
Lanes: 8 lanes, divided
Shoulders: 10-foot wide concrete
Median: New Jersey Barrier
Features: Steep, winding downgrade
Date and Time: March 22, 1986, 8 a.m.
Ambient Conditions: Clear, daylight, dry
Heavy Truck Involved: 1972 Peterbilt conventional tractor in combination with 2 loaded 24-foot flatbed trailers
Motor Carrier: Prouty Trucking Company
Type of Operation: Private carrier
Size of Operation: 10 power units
Total Weight of Truck(s): 71,000 pounds
Total Length of Truck(s): Not determined
Other Vehicle Involved: None
Truck Fatalities: 1 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The northbound combination unit was traversing a 5-mile 6-percent downgrade when the driver lost braking ability and the truck began accelerating out of control. At a point about 3 miles into the descent, the driver steered onto a runaway truck escape ramp. Witnesses reported that the truck was traveling in excess of 100 mph when it entered the escape ramp. The combination unit travelled through the 765-foot long soft gravel arrester bed, penetrated a 4-foot high mound at its end, and vaulted 160 feet before crashing into the side of a granite mountain.

The combination unit was destroyed on impact, and the driver received fatal injuries. A subsequent toxicological examination revealed that the driver had methamphetamine, amphetamine, and cocaine metabolites in his blood.

The Safety Board believes that the driver may have ridden his brakes, depleting the air in the system during the steep descent. Immediately after the accident, the combination unit's brakes were only warm--not hot as would be expected. Witnesses stated that the driver had stated on the CB radio that he had killed his engine and was unable to shift into a lower gear. The owner of the truck stated, "If you began traveling too fast on a downgrade and tried to down-shift, you could get stuck in netrual." The engine retarder might then kill the engine. The power unit's engine was not running at the time of the impact.

The truckdriver had reportedly accumulated 15 years of experience in the operation of heavy trucks. He was familiar with the route being traveled; however, this was his second trip in the accident involved combination vehicle. Documents from the California licensing authorities showed that the combination unit driver had been convicted of 13 violations in the preceding 3 years.

Fort Tejon, California
Case No. 116

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the driver's failure to control the speed of his vehicle during the steep 5-mile descent as a result of impairment due to usage of methamphetamines and amphetamines.

OF INTEREST IN THIS INVESTIGATION:

1. Driver Training/Experience
2. Alcohol/Drugs
3. Driving History
4. Motor Carrier Oversight of Driver
5. Environment

CASE NO.: 117

Investigation No.: MKC-87-H-TR01
Accident Location: Interstate 80 in Stockton, Iowa
Lanes: 4-lane divided
Median: 60-foot wide earthen median
Features: At grade
Date and Time: November 16, 1986 7:35 p.m.
Ambient Conditions: Clear, dry, and dark
Heavy Truck Involved: 1978 COE Peterbuilt tractor in combination with a loaded 48-foot van trailer
Motor Carrier: Rebel Express, Inc.
Type of Operation: Common carrier
Size of Operation: 11 power units
Total Weight of Truck(s): Not determined
Total Length of Truck(s): Not determined
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The eastbound combination unit veered to the right from the travel lanes of a controlled access highway, crossed a deceleration lane preceding an off-ramp, and entered the grassy median. From the area of median entry, the combination unit continued for approximately 280 feet before overturning onto its left side in the dirt gore area between the travel lanes and the exit ramp.

This collision resulted in substantial damage to the combination unit. The unrestrained driver received minor injuries.

The driver was arrested for driving with a revoked license. A subsequent breath test, given by the Iowa State Police, showed that the driver's BAC equivalent was 0.16 percent. The truckdriver admitted to having consumed "around five beers" in his truck before the accident.

The truckdriver had accumulated a total of 1 1/2 years experience in the operation of heavy trucks, all of which was with his current employer and in the accident-involved vehicle. He had received no formal training; he had been promoted within the company from a "grease monkey" position.

It was found that the driver possessed two operator's licenses--one from Iowa and one from Arkansas. The driver's Iowa license had been suspended once and revoked once before for DWI violations. He had also been involved in four accidents in the 4 years preceding the accident. It was determined that the driver had numerous false entries in his driver log books for the 2 weeks preceding this accident.

An examination of a BMCS audit record revealed 73 violations in the motor carrier's driver qualification files during four separate audits between 1980 and 1983. In 1984, the BMCS gave the carrier a satisfactory rating in spite of this violation record.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the truckdriver to maintain his vehicle within the traffic lanes due to alcohol impairment.

OF INTEREST IN THIS INVESTIGATION:

1. Alcohol/Drugs
2. Driving History
3. Motor Carrier Oversight of Driver

CASE NO.: 118

Investigation No.: SEA-86-H-TR12
Accident Location: Interstate 84, 11 miles north of Huntington, Oregon
Lanes: 4 lanes, divided
Shoulders: 10 feet of asphalt shoulder on inside, 15 feet of asphalt plus 3 feet of gravel on outside
Median: Concrete redirecting barrier
Features: Elevated, +1.8 percent, 818 feet radius curve to the left, W-beam guardrail on outside road edge
Date and Time: June 30, 1986, 3:45 p.m.
Ambient Conditions: Clear, daylight, dry, 85°F
Heavy Truck Involved: 1979 Kenworth COE tractor in combination with a fully loaded 45-foot flatbed trailer
Motor carrier: SM Transport, Inc.
Type of Operation: Common carrier
Size of Operation: 90 power units
Total Weight of Truck(s): 73,270 pounds
Total Length of Truck(s): 55 feet
Other Vehicle Involved: None
Truck Fatalities: 1 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The tractor-trailer combination was traveling at a calculated speed of 70 mph, negotiating a left turning curve in the roadway. The posted advisory speed for the turn was 50 mph. As the combination vehicle traveled into the curve, the trailer began sideslipping, leaving approximately 262 feet of yaw marks, and rolled onto its top. The vehicle slid along the guardrail for approximately 330 feet. The tractor came to rest inverted atop the guardrail. The trailer came to rest still attached behind the tractor. The vehicle began leaking diesel fuel and a fire ensued approximately 5 minutes postcrash. Approximately 10 minutes after the fire, explosions began around the vehicle structure.

The accident resulted in the destruction of the tractor. The unrestrained truckdriver was ejected from the power unit and found fatally injured beneath the front portion of the trailer.

The driver had no formal training and had only been driving for 6 years. He had only 1 year of experience with flatbed trailers. Neither the truck owner nor the motor carrier provided training.

The driver had plenty of rest and had only been driving for approximately 3 hours at the time of the accident. He had been delayed 2 days by truck repairs over the 2 days preceding the accident.

An examination of the wreckage led to the conclusion that the tank which initially ruptured was properly vented, but the tank which exploded was not vented adequately. The Safety Board subsequently inspected 150 trucks chosen at random at various points in the United States and found that approximately 12 percent of those examined were lacking a proper safety venting system for their fuel tanks.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the driver's operation of his vehicle at a speed which precluded the successful negotiation of the roadway curvature.

OF INTEREST IN THIS INVESTIGATION:

1. Motor Carrier Oversight of Equipment

CASE NO.: 119

Investigation No.: MKC-87-H-TR05
Accident Location: Interstate 80, 3 miles west of Coraville, Iowa
Lanes: 4 lanes, divided
Median: Undetermined width of grass median
Features: Straight, at grade, slight upgrade
Date and Time: January 12, 1987, 5:45 a.m.
Ambient Conditions: Clear, 25° F, dark, and dry
Heavy Truck Involved: (1) 1977 Peterbilt COE 3-axle tractor in combination with a loaded 42-foot flatbed trailer
Motor Carrier: Northern Hills Transport, Inc.
Type of Operation: Common carrier
Size of Operation: 14 power units
Heavy Truck Involved: (2) 1984 International COE 3-axle tractor in combination with loaded 48-foot van trailer
Motor Carrier: Centennial Warehousing Corporation
Type of Operation: (2) Common carrier
Size of Operation: (2) 17 power units
Total Weight of Truck(s): (1) Undetermined, (2) 69,800 pounds
Total Length of Truck(s): (1) 58 feet estimated, (2) 63 feet estimated
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 2
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The Peterbilt tractor and flatbed trailer was traveling at a driver-stated speed of 52 to 53 mph on a straight section of highway up a very slight grade. An International tractor pulling a loaded van trailer in the same lanes struck the rear of Peterbilt's trailer. The operator of the Peterbilt applied his brakes, steered the vehicle to the shoulder, and stopped. After the impact, the International combination unit veered to the right, went through a guardrail, and came to rest with the trailer and power unit frame on their left side. The cab separated from the power unit and remained upright. Yaw marks 100 feet long, attributed to the International tractor, were found from the point of impact to the point where it left the road. Calculations based on these marks produced a postimpact speed estimate of 59 mph for the International tractor and its trailer.

The collision resulted in moderate damage to both the Peterbilt tractor and the flatbed trailer. The unrestrained operator of the Peterbilt and his codriver, who was in the sleeper, received minor injures. The International tractor and the van trailer were both damaged extensively. No injuries were received by the lapbelted driver of the International.

The Peterbilt driver had been operating heavy trucks for 48 years and had never received formal training. Over the last 3 years, his driving record showed no accidents or violations.

The operator of the International had been driving heavy trucks for 2.6 years. He had completed a commercial vehicle driving course involving 25 hours of correspondence and 100 hours of driving. A check for other State driver's licenses revealed one in Missouri for combination vehicles and one in Iowa for straight trucks. In the last 5 years, both States indicated three accidents and five violations.

A check of the logbooks for the operator of the International revealed that he was in violation of driving more than 10 hours without 8 consecutive hours off duty. His logbooks also showed that he averaged 74 to 101 mph on 5 of the last 8 days--casting doubt on the accuracy of the logbook entries. The carrier stated that logbooks were checked for accuracy, but it appears that no action was taken when a violation was discovered.

Before the accident, the operator of the International had been off duty for 36 hours; yet, he had no sleep or rest for 18 hours immediately preceding the accident. He stated that he had been involved with family activities all day and into the evening, then he drove across town to the terminal and began driving.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the International driver's fatigue which adversely affected his ability to avoid the preceding combination unit.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours
2. Motor Carrier Oversight of Driver
3. Driving History

CASE NO.: 120

Investigation No.: DEN-86-H-TR06
Accident Location: Interstate 25, 1 mile south of Arapahoe Road, near Greenwood Village, Colorado
Lanes: 6 lanes, divided
Shoulders: 8 feet 9 inch asphalt shoulder on outside of curve bordered by concrete redirecting barrier with 4 feet of asphalt shoulder
Median: Redirecting concrete barrier
Features: At grade, construction zone with angled detour of traffic
Date and Time: March 10, 1986, 5:40 a.m.
Ambient Conditions: Daylight, cloudy, dry, 42°F
Heavy Truck Involved: 1984 GMC Conventional 2-axle tractor in combination with 2 partially loaded 27-foot trailers
Motor Carrier: Yellow Freight Systems, Inc.
Type of Operation: Common carrier
Size of Operation: Not determined
Total Weight of Truck(s): 61,693 pounds
Total Length of Truck(s): 62 feet
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

A tractor pulling two trailers was approaching a construction zone. Signing and physical barriers redirected traffic to the left while work was done on the extension of the road. Signs and flashing lights advising of the detour preceded the construction zone by 1,500 feet. The driver failed to make the curve created by the temporary barriers, and the combination unit impacted and rode against the right barrier for 165 feet. As the driver attempted to correct the instability, the rear trailer overturned. The rear trailer left 84 feet of scrape marks before the tractor and first trailer also overturned. The entire unit then slid for an additional 213 feet before coming to rest on its right side perpendicular to the traffic lanes.

The vehicle sustained moderate right side damage. The lapbelted driver sustained minor injuries.

The driver had been employed for 6 months as a truckdriver and had only recently moved to this area to drive out of a new terminal. He did not indicate any formal training. The company does background checks and testing but offers no formal training.

The driver had obtained enough rest the night before and had been driving for approximately 10 hours at the time of the accident.

Approximately 821 pounds of hazardous material were being transported in the first trailer. During the rollover sequence, one 5-gallon can breeched and 2 gallons of cleaning liquid was lost. There was no hazard presented as a result of this spill.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the driver's failure to obey clear redirectional signs and maintain his vehicle within the traffic lanes created by the detour.

OF INTEREST IN THIS INVESTIGATION:

1. Hazardous Material
2. Double Trailers
3. Environment

CASE NO.: 121

Investigation No.: LAX-86-H-TR16
Accident Location: Interstate 110, inside Los Angeles, California
Lanes: 8 lanes, divided
Shoulders: Median shoulder 10 feet of asphalt, outside shoulder 6 feet of asphalt
Median: 10-foot asphalt surface with New Jersey type concrete barrier in center
Features: Straight, 2 percent downgrade
Date and Time: August 30, 1986, 3:20 p.m.
Ambient Conditions: Clear, daylight, and dry
Heavy Truck Involved: 1981 Kenworth conventional 3-axle tank truck in combination with a loaded tanker pull trailer
Motor Carrier: Don Keith Trucking
Type of Operation: Common carrier
Size of Operations: 99 power units
Total Weight of Truck(s): Undetermined
Total Length of Truck(s): Undetermined
Other Vehicle(s) Involved: 2 passenger vehicles
Truck Fatalities: 1 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 1

SUMMARY:

The combination unit was traveling at a witness-reported speed of 50 to 52 mph on a slight curve to the right when the left front tire failed. The trailer began to whip back and forth, and then both the tractor and trailer veered to the left across two lanes at an angle of about 10° for 294 feet. When the left side of the tractor struck the concrete barrier, the trailer climbed up and over the wall into the oncoming lanes of traffic. The tractor overturned and continued along the barrier partially resting on the barrier and ejecting the driver. As the tractor was sliding to rest still pulling the trailer across the barrier, a passenger vehicle struck the trailer and glanced off another passenger car. Because of the abrasive action of the concrete barrier rubbing on the attachment points, the tank came off the chassis of the tractor as the combination unit slid about 350 feet along the barrier.

Both the tractor and trailer were extensively damaged. The cab was crushed on the top left and side with much of the outside structure torn away. There was no survivable space around the driver's seating position. The unrestrained driver was ejected and crushed between the tractor and the concrete barrier.

The restrained driver of the passenger car that struck the trailer was seriously injured, and his car received moderate damage. The other involved passenger vehicle also received moderate damage. None of five restrained occupants were injured.

An examination of the left front tire revealed that the tire failure occurred before impact. Records at the carrier showed that the tire had about 90,000 miles, and measurements showed 10/32 inch of tread. An examination of the vehicle found 3 of the 4 tractor brakes out of adjustment. The trailer brakes were not checked because they had been backed off to remove the trailer from the accident scene. On the third axle of the tractor, three of the eight spring hanger bolts were loose.

The operator of the combination unit had no accidents and only one violation in the past 3 years. No other information concerning the driver's experience and training was available because of the carrier's lack of cooperation.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the explosive failure of the truck's steering axle tire. Contributing to the severity of the accident was the failure of the median barrier to keep the combination unit on its own side of the roadway.

OF INTEREST IN THIS INVESTIGATION:

1. Motor Carrier Oversight of Equipment
2. Crashworthiness
3. Environment

CASE NO.: 122

Investigation No.: SEA-86-H-TR08
Accident Location: Interstate 84, MP 144.9, near Arlington, Washington
Lanes: 4 lanes, divided
Shoulders: Median shoulder 4-foot paved bordered by a 19-foot unpaved berm sloping -5 percent, outside shoulder was paved, 10 feet wide
Median: Approximately 300 feet wide and sloping; eastbound lanes approximately 50 feet higher than westbound
Features: At grade, straight, flat, ruts in right lane
Date and Time: March 8, 1986, 7:20 p.m.
Ambient Conditions: Raining, dark, 40°F (approximate), slippery road
Heavy Truck Involved: 1981 International COE in combination with 1 unloaded 27-foot trailer and 1 lightly loaded 35-foot trailer
Motor Carrier: Leaseway Transportation, Inc.
Type of Operation: Common carrier
Size of Operation: 55 power units
Total Weight of Truck(s): 32,785 pounds
Total Length of Truck(s): 73 feet 10 inches
Other Vehicle Involved: None
Truck Fatalities: 1 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The tractor-double trailer combination was traveling westbound in the right (outside) lane while it was raining. There were ruts worn in the travel paths of the right lane and water was puddled in them. The combination unit went off the south edge of the roadway and struck a dirt embankment. The unit then went up the 25-percent sloped embankment. The tractor and first trailer remained upright, but the cab hinged forward and crushed the cab roof while knuckling under the tractor. The tractor and first trailer came to rest in an upright position with the front of the tractor 225 feet from where it first left the roadway. During this occurrence, the second trailer broke loose from the converter dolly and came to rest on its right side. Postcrash examination revealed that the second trailer separated when a piece of the locking lip broke away from the pintle connection.

This accident destroyed the power unit and caused moderate damage to both trailers. The driver, restrained by a lapbelt, sustained fatal injuries.

It was determined that the loss of control was probably due to a combination of the slippery roadway, ruts in the roadway, and water laying in the ruts. Testing by Oregon in July 1986 recorded skid numbers of 26 (0.26 coefficient of friction), which would be considered slippery pavement. Research indicates that the hydroplaning of empty trailers can occur at speeds of 55 to 58 mph. There was no known interference from other traffic.

Although the driver had 12 years of truckdriving experience, he had no known formal training. Company training was limited to prehire evaluation trips and training as needed since they hired only drivers with a minimum of 2 years experience with double trailers. The driver had not recently driven this route, and it is unknown if he was aware of the road conditions. He had been employed by this carrier on a part-time basis for 3 years, although this was his first trip in more than 2 months.

An examination of the cab locking mechanism revealed that the top of the right rotating lock had long term wear marks that matched the marks on the U-bolt, thus indicating the right side of the cab had not been secured for a long time. In this instance, the U-bolt would be on top of the rotating lock rather than being grasped by it. In addition, the cab lock control lever pivots on a mount that was secured to the left fuel tank. The fuel tank broke lose during the collision, thus causing the locking mechanism to lose its integrity.

As the locking mechanism failed to contain the cab, it hinged forward crushing the cab roof and the restrained driver. A subsequent examination of 20 randomly selected tractors of the same make and model revealed 12 of them to have defects which prevented the cabs from being properly locked.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the driver's operation of his vehicle on a flooded section of pavement at a speed too great for existing weather conditions. Contributing to the severity of the accident was the failure of the cab locking mechanism to secure the cab to the chassis, thus allowing the cab to hinge forward and the cab roof to crush the driver.

OF INTEREST IN THIS INVESTIGATION:

1. Driver Training/Experience
2. Fatigue/Duty Hours
3. Double Trailers
4. Crashworthiness
5. Environment

CASE NO.: 123

Investigation No.: MKC-87-H-TR06
Accident Location: State Highway 22, 2.6 miles west of Kalona, Iowa
Lanes: 2 lanes
Median: None
Features: At grade on curve
Date and Time: February 18, 1987, 3:25 p.m.
Ambient Conditions: Clear, daylight, dry asphalt
Heavy Truck Involved: 1973 COE Kenworth tractor in combination with a loaded 44-foot livestock trailer
Motor Carrier: Dan Thompson Brighton
Type of Operation: Common carrier
Size of Operation: 1 power unit
Total Weight of Truck(s): Approximately 72,000 pounds
Total Length of Truck(s): 55 feet
Other Vehicle Involved: Schoolbus
Truck Fatalities: 1 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 38

SUMMARY:

The eastbound Kenworth combination unit swerved into the westbound lane of State Highway 22 to avoid a slow moving eastbound passenger car and collided head-on into a westbound schoolbus. The left front of the Kenworth struck the left front of the schoolbus in the westbound lane of traffic. From impact, the schoolbus rotated approximately 40° to the right before coming to rest on the road shoulder. The Kenworth combination unit continued east approximately 94 feet and came to rest in the eastbound lane.

The unrestrained Kenworth driver was ejected at impact and received fatal injuries. The unrestrained right front seat passenger in the Kenworth received moderate injuries. The combination unit sustained extensive damage on its left front.

The schoolbus sustained extensive damage with the rearward collapse reaching a maximum of 92 inches at the top left corner of the bus. The schoolbus driver received serious injuries, and the 37 student passengers received minor injuries.

The surviving occupant of the Kenworth truck stated that the driver was unable to stop for the slower moving eastbound car and swerved into the opposing traffic lane. The driver of the eastbound passenger car stated she tapped her brakes to disengage her cruise control which was set at 55 mph and gradually slowed to about 35 mph without braking before the truck swerved to pass her.

Records furnished by the Kenworth driver's employer indicated that the Kenworth driver had 3 years of experience as a heavy truckdriver, but he had never att nded formal driver training courses. The driver record files from Iowa showed that the truckdriver had been convicted of two speeding violations and had been involved in one other accident since 1984.

In an employment application obtained from the Kenworth driver's previous employer, the driver indicated that his license had once been suspended for being a habitual violator of the State traffic laws. Additionally, the Kenworth driver had been terminated from his previous driving job for involvement in an accident.

An employment application and driver qualification file from the Kenworth driver's present employer was not available.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the truckdriver's decision to swerve into the opposing traffic lane without checking for oncoming traffic.

OF INTEREST IN THIS INVESTIGATION:

1. Driving History

2. Motor Carrier Oversight of Driver

CASE NO.: 124

Investigation No.: NYC-86-H-TR08
Accident Location: New Jersey Turnpike in Mercer County, New Jersey
Lanes: 6 lanes, divided
Shoulders: 16-foot, asphalt surface
Median: 12 feet of grass surface
Features: Straight, at grade, level
Date and Time: April 9, 1986, 4:20 a.m.
Ambient Conditions: Clear, 50°F, dark, and dry
Heavy Truck Involved: 1981 Ford conventional 3-axle tractor in combination with 2 loaded 28-foot trailers
Motor Carrier: Pilot Freight
Type of Operation: Contract carrier
Size of Operation: Unknown
Total Weight of Truck(s): Undetermined
Total Length of Truck(s): Undetermined
Other Vehicle Involved: 3 other tractors with loaded single trailers
Truck Fatalities: 1 Truck Injuries: 2
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The Ford doubles combination was traveling at a driver-stated speed of 55 mph in the right southbound lane of the highway. In the vicinity of mile marker 65.3 the Ford tractor collided with the rear of a southbound 1979 International COE 3-axle tractor semitrailer. Both vehicles veered left, crashed into and over the blocked-out W-beam median guardrail, and went into the northbound lanes. The International crossed all three northbound lanes and came to rest in a field about 75 feet from the road. The Ford combination, however, collided with a northbound 1984 Peterbilt COE 3-axle tractor semitrailer which was then struck by a northbound 1985 Mack 3-axle tractor car-carrier. During the collision sequence, the Ford's second trailer separated from the combination and came to rest in the northbound lanes adjacent to the median, while the Ford tractor and the first trailer ran off the roadway and overturned onto their left sides. The Peterbilt tractor, which had struck the right side of the first trailer attached to the Ford, sustained extensive damage to the cab. It separated from its semitrailer and came to rest facing north with its left side on the median. The Peterbilt's semitrailer was in front of the tractor, also facing north. The Mack and car-carrier came to rest in the right lane facing north.

The Ford driver stated that before the crash, he heard a loud noise toward the rear of his vehicle. He looked in his rear view mirrors and was checking the truck for damage when he collided with the International.

The Ford tractor received extensive damage to the front and the top left of the cab. The first trailer of the doubles combination was also damaged extensively on the right side, from the middle to the rear, and the top was split open. The front of the second trailer received substantial damage. The restrained driver of the Ford received minor injuries.

The International tractor and its semitrailer received moderate damage. The International's restrained driver was not injured. The Peterbilt tractor was destroyed, and the front of its semitrailer was severely damaged. The restrained Peterbilt driver received fatal injuries. The Mack tractor and car-carrier received minor damage, and the restrained Mack driver received minor injuries.

The right outside and left inside tires of the Ford's front drive axle were flat. This damage apparently occured when the tractor traveled over the median guardrail. The blocked-out W-beam median guardrail did not deflect either truck from crossing into the opposing traffic lanes. The New Jersey Turnpike Authority began a major project in February 1984 to replace this type of guardrail with MB-5 type concrete median barrier.

The operator of the Peterbilt had been driving heavy trucks for about 7 years. A check on his driving record revealed that he was driving with a license which was suspended due to excessive point accumulation. The Ford driver had 9 years experience operating heavy trucks at an annual mileage of 125,000 miles. He had received no formal training, and no violations or accidents were found in a check of his driving record. The International driver had 16 years experience operating heavy trucks. His driving record showed two traffic violations and three accidents in the last 3 years. The operator of the Mack tractor had been driving heavy trucks for 7 years with no record of violations or accidents.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was that the Ford truck driver was distracted from his driving duties and failed to perceive the slower moving vehicle preceding him. Contributing to the severity of the accident was the failure of the blocked-out W-beam medium guardrail to deflect the tractor and trailers.

OF INTEREST IN THIS INVESTIGATION:

1. Double Trailers
2. Environment
3. Driving History

CASE NO.: 125

Investigation No.: SEA-87-H-TR07
Accident Location: Interstate 84, 5 miles east of Durkee, Oregon
Lanes: 4 lanes divided
Shoulders: Median shoulder 6-foot wide asphalt surface, outside shoulder 7-foot wide asphalt and 3-foot wide gravel
Median: 14-foot asphalt with concrete barriers
Features: At grade
Date and Time: March 19, 1987, 4:30 p.m.
Ambient Conditions: Clear, daylight, dry asphalt
Heavy Truck Involved: 1979 COE International tractor in combination with a loaded 48-foot flatbed trailer
Motor Carrier: Pre-Fab Transit Company
Type of Operation: Common carrier
Size of Operation: 592 power units
Total Weight of Truck(s): 72,940 pounds
Total Length of Truck(s): 57 feet
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The International combination unit was eastbound on Interstate Highway 84 at a calculated speed of 76 mph when it tipped or rolled over to the left in a 6°-right curve. There were 50 mph advisory signs in the area for truck traffic. The unit collided into the concrete median barrier, bounced back into the travel lanes, and rotated counterclockwise approximately 45° before coming to rest across both lanes of traffic.

A witness who admitted to driving at 70 mph stated that the truck passed her traveling at approximately 80 mph. Subsequent calculations revealed that the combination unit would overturn at approximately 76 mph at this location.

The collision resulted in substantial damage to the combination unit and the lapbelt restrained driver received moderate injuries.

The design features of the accident curve were compared to recommendations found in A Policy on Geometric Design of Highways and Streets, 1984 and were found to be adequate. However, accident statistics showed this location had a high accident rate.

Records furnished by the International driver's employer revealed that he had approximately 30 years of experience in the operation of heavy trucks. The driver had never attended a formal truck driving school; however, he had received training from his employer during semi-annual safety meetings.

The truckdriver was maintaining two sets of daily log books. Numerous descrepancies were noted between the log book entries, and neither log matched times and dates indicated on fuel receipts found in the power unit.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the truckdriver's operation of his vehicle at a speed which precluded the successful negotiation of the roadway curvature.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours
2. Motor Carrier Oversight of Driver
3. Environment

CASE NO.: 126

Investigation No.: DEN-87-H-TR11
Accident Location: Northbound on-ramp from Parker Road to Interstate 225, Aurora, Colorado
Lanes: 1 lane
Shoulders: Undefined gravel shoulder on each side
Median: None
Features: At grade, slight curve to right, +2 percent grade
Date and Time: March 24, 1987, 5:33 p.m.
Ambient Conditions: Cloudy, dusk, dry, 22°F
Heavy Truck Involved: 1971 GMC COE tractor in combination with 1 fully loaded 27-foot van trailer
Motor Carrier: Edson Express, Inc.
Type of Operation: Common carrier
Size of Operation: 236 power units
Total Weight of Truck(s): 34,050 pounds
Total Length of Truck(s): 36 feet
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

A tractor-trailer combination was making a right turn from a city street to merge with an on-ramp to an interstate highway at a driver-estimated speed of 10 to 15 mph when the vehicle rolled onto its left side. The vehicle sustained minor left side damage. The unrestrained driver was uninjured.

The trailer was improperly loaded because the heaviest loading was unevenly distributed to the left rear. The driver had picked up the sealed, loaded trailer and had not checked the load distribution. Loading had been supervised by the shipper's stock clerk who was untrained in the proper loading of a trailer to insure equal distribution of the weight. The carrier had no load check requirements and they did not warn drivers about the dangers of improper weight distribution.

The truckdriver had accumulated 13 years of commercial vehicle operating experience--5 had been acquired in the accident-type vehicle. He had been employed by the carrier for approximately 2 1/2 years. The driver had received no formal driver training, and this carrier did not provide training. A search of driving records revealed the driver's involvement in two previous accidents in the 3 years preceding the subject accident.

Aurora, Colorado
Case No. 126

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the improper weight distribution of the trailer's cargo.

OF INTEREST IN THIS INVESTIGATION:

1. Motor Carrier Oversight of Driver

CASE NO.: 127

Investigation No.: FTW-87-H-TR02
Accident Location: Interstate 10 on Lost and Old River Bridge, 15 miles east of Anahuac, Texas
Lanes: 4 lanes divided
Shoulders: 18-inch metal walkway
Median: 33-inch high concrete barrier with glare screen
Features: Elevated bridge approximately 20 feet above the water
Date and Time: January 28, 1987, 8:55 a.m.
Ambient Conditions: Dense fog, 57°F, daylight, dry
Other Vehicle Involved: 18 assorted passenger vehicles
Truck Fatalities: 0 Truck Injuries: 1
Other Fatalities: 5 Other Injuries: 6

Heavy Truck Involved: (1) 1980 Mercedes 2-axle tank truck, partial load
Motor Carrier: Aztron Chemical Services
Type of Operation: Private carrier
Size of Operation: 2 trucks
Total Weight of Truck(s): Not determined
Total Length of Truck(s): Not determined
Injuries: Minor
Damage: Substantial damage to front
Heavy Truck Involved: (2) 1984 Mack tractor in combination with a loaded 45-foot flatbed trailer
Motor Carrier: Apache Products, Inc.
Type of Operation: Private carrier
Size of Operation: 7 power units
Total Weight of Truck(s): Not determined
Total Length of Truck(s): Not determined
Injuries: None
Damage: Minor damage to rear of trailer
Heavy Truck Involved: (3) 1982 Mack tractor in combination with a loaded tank trailer
Motor Carrier: Martin Gas, Inc.
Type of Operation: Not determined
Size of Operation: Not determined
Total Weight of Truck(s): Not determined
Total Length of Truck(s): Not determined
Injuries: None
Damage: Moderate damage to right front
Heavy Truck Involved: (4) 1982 International tank truck, empty
Motor Carrier: Dowell Schlumberger, Inc.
Type of Operation: Private carrier
Size of Operations: 11 power units
Total Weight of Truck(s): 18,200 pounds
Total Length of Truck(s): Not determined
Injuries: None
Damage: Moderate to front

Anahuac, Texas
Case No. 127

Heavy Truck Involved: (5) 1981 White Freightliner conventional tractor in combination with an empty 45-foot flatbed trailer
Motor Carrier: Apache Products, Inc.
Type of Operation: Private carrier
Size of Operation: 7 power units
Total Weight of Truck(s): Not determined
Total Length of Truck(s): Not determined
Injuries: None
Damage: Substantial damage to front
Heavy Truck Involved: (6) 1980 White Freightliner COE tractor in combination with an empty 40-foot flatbed trailer
Motor Carrier: Sullivan Transfer Company
Type of Operation: Common carrier
Size of Operation: 6 power units
Total Weight of Truck(s): 55,100 pounds
Total Length of Truck(s): 53 feet
Injuries: None
Damage: Substantial to tractor
Heavy Truck Involved: (7) 1977 White Freightliner conventional tractor in combination with a loaded beverage trailer
Motor Carrier: Thomas Garrison
Type of Operation: Not determined
Size of Operation: Not determined
Total Weight of Truck(s): Not determined
Total Length of Truck(s): Not determined
Injuries: None
Damage: Substantial to right side of tractor

SUMMARY:

Eastbound traffic on Interstate 10 encountered an area of dense fog on an elevated bridge, and visibility was reduced to a reported 30 to 50 feet. In the left eastbound lane of the four-lane divided road, a light pickup truck was attempting to push a disabled car off the structure. A collision between the pickup truck and an eastbound passenger car set off a series of chain-reaction collisions that involved 25 vehicles; 7 of these were medium-to-heavy trucks. Five passenger car occupants were killed. One truckdriver and six other occupants were injured.

Many of the passenger vehicles were able to slow and/or stop before striking wreckage, only to be struck from behind by heavy trucks traveling at what was described by other commercial drivers as "at high speed." At least one of the heavy truck operators described his travel speed through the dense fog as about 45 to 50 mph.

One heavy truck passed a slower moving tractor trailer which had its emergency flashers activated and its driver waving from the driver's window in an attempt to slow other vehicles down. The passing truck driver reportedly gave the "thumbs up" to the passed driver just before striking the standing line of wrecked or stopped vehicles. Drivers' statements indicated that the "high speed" passage through the dense fog was, in some cases, the result of several miles of travel through variable density fog on I-10 preceding the accident location. These drivers had apparently become conditioned to operating in the fog with no expectations of traffic obstructions. Given the fact that several of the vehicles involved had time to reduce their speed before impacting other vehicles, it is apparent that the density of the fog on the bridge was variable. Therefore, some of the drivers probably anticipated that adequate sight distance would be available farther down the road and maintained their travel speed.

Vehicle condition, greater braking distances, and lack of maneuverability were not factors for the medium to heavy trucks involved in these collisions. The Mercedes tanker truck, considering its postcrash dynamics, was traveling at a speed beyond its ability to see and avoid conflicting traffic. While many of the passenger vehicles and three of the heavy trucks were able to stop or slow before striking other vehicles, at least two of the heavy trucks involved in the later stages of the collisions, Nos. 4 and 6, struck other vehicles at relatively high speeds. These two trucks, along with truck No. 1, were responsible for the greatest collision damage, injuries, and fatalities. The driver of vehicle No. 6 related that he was traveling through the dense fog at approximately 55 mph in an attempt to avoid being struck from the rear. Considering the actions of the truckdrivers, most of whom had prior warning of the traffic obstructions, in relation to the passenger vehicles' operations, there was a clear lack of responsible actions on the part of at least three of the truck drivers.

Of the five medium to heavy trucks documented, involving four carriers, only one considered itself as being regulated by the FMCSR. Only one other carrier was registered with Texas as an intrastate operation. All operated in at least Texas and Louisiana, and normal operating distances exceeded a 100-mile radius from three of the carriers' business operations.

Only the carrier considering itself an interstate operation (vehicle No. 4) maintained driver employment and qualification files. Although the carrier reported that log books were maintained and checked to prevent violations of driver hours of service regulations, it was later determined that their driver had been on duty for 78 hours of the 8 days immediately preceding this accident. Before the day of the accident was over, this driver had logged 89 hours for the 8-day period. Also reflected in the information submitted by the carrier was that their driver was on duty for 17 hours 2 days before the accident and 11 hours on the day immediately preceding the accident. He had been driving for 2 hours on the morning of the accident after a 14-hour off-duty period.

The carrier responsible for vehicle No. 6 submitted statements indicating that it was not engaged in motor carrier operations and that the company was not regulated by either interstate or intrastate commerce regulations. This company does not maintain driver qualification files, nor does it require drivers to keep logs reflecting hours of service. At the time of the subject accident, their driver had accumulated 76 on-duty hours in the immediate past 8 days. Assuming that he was working a normal work-day, he would have had a minimum of over 30 hours of service by the end of the accident date.

The operator of vehicle No. 5 had recorded 78 hours in the immediate 8 days preceding this accident with a 14 1/2 hour on-duty day logged 2 days before the accident. The on-duty hours for the morning of this accident could not be determined; however, the driver was on an empty return trip to the carrier's operations over 100 miles away. Records submitted by the carrier revealed that it was not uncommon for their drivers to begin work at 4:30 a.m.

Vehicles Nos. 4, 5, and 6 entered the collision area at speeds substantially greater than what could be considered safe for the restricted visibility conditions. Considering the on-duty hours revealed for these drivers, it is very possible that each was suffering from some degree of fatigue and that fatigue played some role in the improper judgment displayed by each.

The driver of vehicle No. 7 had recorded a total of 79.5 hours on duty in the immediate 8-day period preceding the accident. While this driver did not contribute to as great a degree as the drivers of vehicles Nos. 4, 5, and 6, it is probable that his excessive duty hours affected his awareness and perception abilities to some extent.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this multiple vehicle accident was the failure of many of the drivers involved to reduce their speed as necessary for maintaining control of their vehicles with the limited visibility available. Contributing to the initial collision was the absence of a shoulder on the bridge structure which would have allowed the initially disabled vehicle to be removed from the bridge.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours
2. Motor Carrier Oversight of Driver
3. Environment

CASE NO.: 128

Investigation No.: FTW-87-H-TR05
Accident Location: FM 60 at East Frontage Road to State Highway 6 in College Station, Texas
Lanes: 2 lane, 2 direction
Shoulders: West shoulder 4-foot wide asphalt, east side, no shoulder
Median: None
Features: At intersection
Date and Time: March 17, 1987, 3:35 p.m.
Ambient Conditions: Clear, daylight, dry asphalt
Heavy Truck Involved: 1973 COE Kenworth tractor in combination with an empty 40-foot flatbed trailer
Motor Carrier: Bilbo Freightlines, Inc.
Type of Operation: Common carrier
Size of Operation: 150 power units
Total Weight of Truck(s): 24,000 pounds
Total Length of Truck(s): Not determined
Other Vehicle Involved: 1980 Oldsmobile Cutlass
Truck Fatalities: 0 Truck Injuries: 1
Other Fatalities: 2 Other Injuries: 0

SUMMARY:

The Kenworth combination unit was traveling north on the frontage road to State Highway 6 at approximately 35 to 40 mph when it passed a passenger vehicle in a no-passing zone, ran the red light at FM 60, and collided into the right side of a 1980 Oldsmobile that was eastbound on FM 60. From the initial impact area, the Kenworth combination unit pushed the Oldsmobile approximately 55 feet to where the left side of the Oldsmobile struck a traffic signal pole. The combination unit then overrode and came to rest on top of the Oldsmobile.

The collision resulted in substantial damage to the combination unit and the Oldsmobile was destroyed. The lapbelt-restrained Kenworth driver received a minor head injury. Both the lap/shoulder belt restrained driver and the right front seat passenger of the Oldsmobile received fatal injuries.

This motor carrier's safety inspectors checked all vehicles of the fleet monthly to ensure that all trucks had proper brake adjustments. The records showed that this vehicle had missed its last required inspection and was approximately 1 month overdue for its brake inspection. During the examination of the Kenworth truck, it was found that the brakes were not adjusted properly on the second and third axles--the push rod stroke on the second axle was 2 5/8 inches on both sides and 2 1/2 inches on both sides of the Third axle. The front steering axle was not equipped with brakes.

The driver had 5 years experience in operating heavy trucks. The driver had never attended a formal driver training school; however, he did receive training during annual safety meetings required by the motor carrier.

College Station, Texas
Case No. 128

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the driver to stop for a red traffic signal as a result of inattention, degraded brake performance, or an intentional attempt to enter and cross the intersection before the light changed from yellow to red.

OF INTEREST IN THIS INVESTIGATION:

1. Motor Carrier Oversight of Equipment

CASE NO.: 129

Investigation No.: SEA-86-H-TR15
Accident Location: Interstate 5, 4.5 miles north of Tacoma, Washington
Lanes: 8 lanes, divided
Shoulders: All shoulders 10.5 feet wide with asphalt surface
Median: 27 feet of grass and gravel
Features: At grade, curve, and flat
Date and Time: September 5, 1986, 10:59 a.m.
Ambient Conditions: Clear, 70°F, daylight, and dry
Heavy Truck Involved: 1979 Freightliner COE 3-axle tractor in combination with an empty 45-foot van trailer
Motor Carrier: Brewster Heights Packing, Inc.
Type of Operation: Contract carrier
Size of Operation: 2 power units
Total Weight of Truck(s): 31,600 pounds
Total Length of Truck(s): 53 feet estimated
Other Vehicle Involved: 1 passenger vehicle
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 1 Other Injuries: 0

SUMMARY:

The combination unit was traveling in the median lane about to enter a slight curve to the right. As it was rounding the curve, it left the roadway, crossed the grass median, and the tractor and trailer began traveling against the traffic in the opposite lanes of travel. According to a witness, the operator of the passenger car attempted to avoid the collision by steering to the outside lane, but due to other traffic there was no room to do so. The left rear of the trailer impacted the left side of the passenger car, spinning it 360° counterclockwise before it came to rest on the outside shoulder. The driver of the combination unit steered over to the median shoulder where he drove for about 0.25 mile before crossing back over the grass median into his own lanes of travel. He continued on the road for about 2 more miles before turning off and driving another 0.25 mile to a truck stop.

There was no damage to the tractor and only minor damage to the left rear of the trailer. The unrestrained driver was not injured. The passenger vehicle was extensively damaged along the entire left side. The only occupant in the car was the restrained driver who received fatal injuries.

A witness following the tractor and trailer reported the truck weaving, slowing and then speeding up, and driving on the shoulder. The operator of the truck admitted to drinking two pitchers of beer, smoking some marijuana, and snorting cocaine the night before the accident. Blood and urine tests showed evidence of marijuana, cocaine, and alcohol in his system. His BAC was 0.06 percent. Drug paraphernalia were found in the cab of the truck.

The driver of the combination unit stated that he got to bed at 2 a.m. the night before the accident and was driving by 8:30 a.m. He also said that he had very little sleep the 3 days before the accident. There were no logs filled out for the day of the accident or the day before, and the logs that were written up proved to be inaccurate after checking fuel receipts. During an interview, the driver of the tractor and trailer admitted to falling asleep.

When the owner of the company was interviewed he related that other employees had suspected this driver of using marijuana but, since he could not prove it, there was nothing he could do. The driver had been employed by this carrier for the last 10 years. During a discussion with the carrier concerning driver qualifications, it became apparent that the carrier was lacking in his knowledge of the FMCSR.

The operator of the combination unit had 4 years experience operating heavy trucks and no formal training. He estimated his annual mileage to be about 25,000 miles. There were no accidents listed on his driving record over the past 7 years. He was convicted of DWI in both 1979 and 1982, with the second conviction resulting in a license suspension. His license was later reinstated and was valid at the time of the accident.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the driver of the combination unit to keep his vehicle in its own lanes of travel as a result of fatigue and impairment resulting from his use of marijuana, cocaine, and alcohol the night before the accident.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours
2. Alcohol/Drugs
3. Driving History
4. Motor Carrier Oversight of Driver

CASE NO.: 130

Investigation No.: SEA-87-H-TR08
Accident Location: Interstate 5, 3 miles north of Rogue River, Oregon
Lanes: 4 lanes divided
Shoulders: Left shoulder was 4.5 feet of asphalt +2 feet of gravel to W-beam, right shoulder was 10 feet of asphalt and 11 feet of gravel
Median: 30 percent grass slope, approximately 60 feet wide
Features: +2 percent grade, straight, at grade
Date and Time: May 19, 1987, 3:45 p.m.
Ambient Conditions: Clear, daylight, 70°F, dry
Heavy Truck Involved: 1974 Freightliner COE 3-axle straight truck in combination with a 24-foot pull trailer, both units were loaded
Motor Carrier: T.A.P.S. Trucking
Type of Operation: Common carrier
Size of Operation: 21 power units
Total Weight of Truck(s): 74,500 pounds
Total Length of Truck(s): 65 feet
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The combination unit loaded with bagged ammonium nitrate fertilizer was traveling at a calculated speed of 59 mph when the vehicle drifted off the right road edge into the gravel. As the driver attempted to correct his path of travel, the vehicle rolled onto its right side and spilled part of the load.

The vehicle sustained minor damage. The unrestrained driver was uninjured. The Oregon State Police cited the driver for DWI (0.11 percent BAC) and for consuming an alcoholic beverage within 4 hours of going on duty.

The investigation revealed that the driver was 20 miles from his home where he had cleaned up, eaten, and consumed a "couple of drinks." The driver was familiar with the vehicle and the route. He related that he felt the recent meal, the alcohol, and the afternoon sun contributed to the fact that he fell asleep and allowed the vehicle to drift off the right road edge.

The driver had no history of excessive traffic violations during the last 13 years. He had no formal training and the company did not provide any.

No extreme hazard was presented by the hazardous materials spill; however, 100 bags of fertilizer broke and emptied into a drainage ditch leading to the river.

A reconstruction of the accident dynamics indicated that the driver would have been able to maintain the vehicle's stability had he not induced a corrective steering angle which created a radius too tight for its center of gravity. This turning maneuver caused the vehicle to overturn.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was that the truckdriver, whose judgement and driving ability were affected by alcohol, fell asleep and allowed his vehicle to leave the roadway.

OF INTEREST IN THIS INVESTIGATION:

1. Alcohol/Drugs
2. Hazardous Material

CASE NO.: 131

Investigation No.: DEN-87-H-TR14
Accident Location: Eastbound lanes of Interstate 80, 20 miles west of Cheyenne, Wyoming
Lanes: 4-lanes, divided
Shoulders: Right 8-foot asphalt, Left 1.5 foot of asphalt
Median: Earthen, varying widths; accident area 34 feet 6 inches wide
Features: Straight, level, right lane deeply rutted
Date and Time: May 1, 1987, 4:55 p.m.
Ambient Conditions: Raining
Heavy Truck Involved: 1987 Freightliner tractor pulling 2 loaded 27-foot dry van trailers
Motor Carrier: Transport USA, Inc.
Type of Operation: Common carrier
Size of Operation: 49 power units
Total Weight of Truck(s): 47,100 pounds
Total Length of Truck(s): 65 feet 6 inches
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The truck was eastbound on the interstate, traveling in the left traffic lane during a heavy rain storm. The truck had moved to the left lane and slowed to pass a car accident on the right shoulder of the eastbound lanes that had occurred earlier. About 5 miles past the car accident, the truck was still traveling in the left lane because the right lane had 3-inch-deep traffic-worn ruts and the ruts were full of rain water. The second trailer on the combination suddenly began whipping back and forth. The driver was unable to control the truck. The truck jackknifed, rotated 180°, went off the right side of the road, rolled over onto its left side, and came to rest facing in a westerly direction in a dirt area between the traffic lanes and an off-ramp lane. The first trailer remained attached to the tractor via the fifth-wheel. During the accident, the pintle hook at the back of the first trailer broke allowing the converter dolly and second trailer to separate from the truck. These two units remained connected and were 35 feet east of the tractor and first trailer. The driver had driven 337 miles from the last Port of Entry (POE) to the accident location in 5 hours and 10 minutes--an average speed of 65 mph on a posted 55-mph highway.

Neither the driver nor the codriver was injured in the accident. The tractor received minor damage to the right rear corner of the cab and a dented right saddle fuel tank. Both trailers had minor dents and scrapes on their left sides. The converter dolly's drawbar doughnut was cracked and the top part of the pintle hook on the first trailer was broken off.

The driver had been operating twin trailer combination units for the past 10 years--all with his current employer. No prior experience with vehicle instability was claimed.

The cargo weight in the second trailer was 7,114 pounds and was packed into large, 4- by 6-foot cardboard boxes. Four of these boxes and a generator motor, weighing 3,600 pounds, were loaded just inside the rear door at the far end of the truck unit. With over half the cargo weight at the extreme rear of the second trailer, the weight distribution at the front of the trailer was light.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was a combination of the driver's operation at a speed too great for the road condition and the improper loading of the rearmost trailer. The unequal weight distribution adversely affected the stability of the rear trailer as it traveled over the roadway's rutted surface.

OF INTEREST IN THIS INVESTIGATION:

1. Double Trailers

2. Environment

CASE NO.: 132

Investigation No.: MKC-87-H-TR12
Accident Location: Interstate 35, milepost 205.9, Gardner, Kansas
Lanes: 4 divided
Shoulders: Inside shoulder 7-foot, outside shoulder 10-foot
Median: Undetermined width of earthen median
Features: Straight with rolling hills
Date and Time: May 2, 1987, 9:45 a.m.
Ambient Conditions: Clear, dry and daylight
Heavy Truck Involved: 1978 Ford conventional tractor in combination with a loaded Trailmobile flatbed trailer
Type of Operation: Common carrier
Size of Operation: 45 power units
Total Weight of Truck(s): 73,400 pounds
Total Length of Truck(s): 51 feet
Other Vehicle Involved: Chevrolet Van
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 6 Other Injuries: 4

SUMMARY:

The combination unit was northeast bound in the outside lane when it was struck in the rear by a Chevrolet van. The van left 28 feet 10 inches of one wheel skid before impact and 3 feet 8 inches after impact. The van then separated from the semitrailer and slid 29 feet 4 inches before stopping. After impact, the combination unit came to a stop in 114 feet. The driver of the combination unit stated that he was experiencing trouble with the power unit and was traveling between 35 and 40 mph. The driver also stated that he did not know if the hazard warning flashers were on at the time of the accident because he had been turning them on and off to keep them from over heating.

At approximately 8 a.m. on the morning of the accident, the truckdriver contacted his company dispatcher and reported that he was experiencing trouble with the power unit not having enough power to pull his load faster than 40 mph. The company official told him to keep on going because he had to be at Lenexa, Kansas, before noon to unload.

This accident resulted in no damage to the power unit and only minor damage to the trailer. The passenger vehicle was destroyed by the impact. The unrestrained driver of the combination unit sustained no injuries. The unrestrained driver of the van and five passengers died; four other passengers in the van sustained serious injuries.

The driver of the combination unit related a total of 24 days experience operating heavy trucks, not including the truck driving school he had attended. He had been employed by the motor carrier only 4 days at the time of the accident. Daily log records reflected no entries for the last 2 days. Investigation also revealed that the truck had averaged approximately 29 mph for the 51 miles immediately preceding the collision.

The bottom brakeshoe of the third axle was not in contact with the brakedrum when the brake was applied and the third axle wheel rim was cracked. On the semitrailer, there was no front end structure to prevent shifting of the load to the front.

PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of this accident was the inattention of the driver of the Chevrolet van. Contributing to the accident was the requirement by the company for the truckdriver to continue his trip even though the power unit could not maintain the minimum speed limit.

OF INTEREST IN THIS INVESTIGATION

1. Driver Training/Experience
2. Motor Carrier Oversight of Driver

CASE NO: 133

Investigation No.: CHI-87-H-TR08
Accident Location: U. S. Route 50, Salem, Illinois
Lanes: 2 11-foot wide traffic lanes delineated by a painted space line
Median: None
Features: Straight roadway with a 2 percent downgrade.
Date and Time: January 10, 1987, 10:50 p.m.
Ambient Conditions: Darkness strong winds, drifting snow, 17°F
Heavy Truck Involved: 1984 International Harvester Cabover tractor in combination with a loaded van trailer
Motor Carrier: Ohio Pacific Express, Inc.
Type of Operation: Common carrier
Size of Operation: 58 units
Total Weight of Truck(s): 74,270 pounds
Total Length of Truck(s): 59 feet 7 inches
Other Vehicles Involved: 1 passenger car (rolling) 1 police car (parked)
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 3

SUMMARY:

The combination was following a 1976 Ford passenger vehicle westbound traveling a 2 percent downgrade on a relatively straight section of roadway. The two units approached an accident site, located on the eastbound traffic lane/shoulder and protected by two marked police cars with activated warning lights, at a witness-estimated speed of 50 mph. The passenger car slowed down to 35 to 40 mph as it neared the police cars and was subsequently struck in the rear by the combination unit. The collision ruptured the Ford's fuel tank at the filler pipe and joint seams. The truck tractor overrode the rear of the passenger car forcing the bottom of the car down against the pavement, grinding a hole in the gas tank and igniting the spilled gasoline. The burning passenger car separated from the tractor, veered to the left, sideswiped a parked police car, then rotated about 270° counterclockwise and stopped in the ditch on the south side of the roadway. The three occupants were pulled from the blazing vehicle by the on-scene police officers.

Following the collision, the combination unit veered to the right, departed the roadway, and traveled about 218 feet on the roadside down an 11-foot 9-inch wide, -4.6 percent sloped embankment and laid over on its right side. At final rest, the truck tractor was located about 289 feet west of the departure point. The unit's left outside tire on axle #2 (the drive axle) was resting against a tree trunk. The truck tractor's engine was running at high speed (rpm) with the transmission engaged and the drive axle spinning. The friction of the tire rubbing against the tree generated enough heat to melt the tread, causing large amounts of smoke and an explosive failure of the tire. The smoke from the tire and noise from the rupture was initially reported as the vehicle's fuel tanks burning and exploding.

Both fires were extinguished by responding fire/rescue personnel. The truck's engine continued running until it seized due to lack of lubricating oil. The truckdriver was found standing upright inside the truck tractor on the passenger side door attempting to locate the controls to shut off the truck's engine. He was removed from the vehicle by police officers at the accident site. He was arrested for DWI after visual observations by the officers indicated the driver was intoxicated. The truckdriver was taken to a local hospital where blood was drawn for toxicology tests, then transported to the area police station for a breath alcohol test which registered 0.26 percent BAC equivalent.

Investigating officers found a 200 ml bottle of Vodka in the sleeper compartment of the truck tractor. The seal on the bottle was broken and only 1.25 inches of liquid were found in it.

The truckdriver's wife (his codriver, who was not on this trip due to illness) stated to investigating troopers that her husband was an alcoholic and that because of his drinking problem she usually drove the first part of any trip while he slept.

A request for driver's license checks through all States was submitted for the truckdriver. The response to this request indicated the driver had the following licenses:

1. Ohio driver's license - expired;
2. Missouri driver's license - possibly cancelled (invalid license, but no suspension or revocation indicated);
3. Illinois driver's license - suspended;
4. Oklahoma driver's license - suspended;
5. Arizona driver's license - suspended;
6. California driver's license - suspended; and
7. Virginia driver's license - suspended.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the truckdriver's failure to reduce his speed and avoid the preceding passenger car due to alcohol impairment.

OF INTEREST IN THIS INVESTIGATION:

1. Alcohol/Drugs

2. Driving History

3. Motor Carrier Oversight of Driver

4. Environment

CASE NUMBER: 134

Investigation No.: CHI-87-H-TR09
Accident Location: Illinois Route 53 at Army Trail Road in Addison, Illinois
Lanes: 2 lanes, 2 direction
Median: None
Features: Straight roadway with a slight downgrade
Date and Time: January 24, 1987, 1:10 p.m.
Ambient Conditions: Clear, dry, daylight, about 20°F
Heavy Truck Involved: 1976 Peterbilt cabover tractor in combination with a 1973 Obrecht flatbed trailer
Motor Carrier: Area Interstate Trucking, Inc.
Type of Operation: Common carrier
Size of Operation: Between 20 and 200 tractors (The driver was working for 3 carriers.)
Total Weight of Truck(s): 82,430 pounds
Total Length of Truck(s): 34 feet 3 inches (approximate)
Other Vehicles Involved: None
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The combination unit was southbound on Illinois Route 53, a four-lane divided highway that terminates at Army Trail Road in Addison, Illinois. The combination was in the right lane of the two-lane exit ramp for Army Trail Road traveling at a driver-stated speed of 35 to 40 mph. The driver stated that as he approached traffic stopped at the intersection, he applied the truck's brakes and discovered they would not activate. He then steered the unit off the roadway to the right to avoid the stopped traffic. The combination departed the right side of the roadway over a cement curb and onto the snow covered roadside, traveling about 103 feet before impacting a storm water drainage pipe. The power unit and trailer remained upright, but the power unit cab broke away from the frame and laid over on its left side. The trailer's load of steel, secured with chains and binders, broke away, rolled forward, and struck the trailer's bulkhead. The bulkhead fractured at the trailer base and laid forward onto the truck frame. Investigation of the accident scene disclosed that the combination unit's tires were rolling, not skidding.

The combination unit and its load of metal products were destroyed in the accident. The unrestrained driver of the combination stated he was not injured in the accident.

A subsequent examination of the combination unit disclosed numerous defects throughout the mechanical system, including several defects in the brake system. The driver, who was also the owner, maintained and serviced his equipment. He stated that he repairs and adjusts the brakes on his trucks, usually backing off the trailer brakes a little to prevent control problems while hauling in a double bottom configuration. The carriers employing the driver and his unit are also required on trip leases to pretrip inspect the tractor and trailer. Copies of the inspections supplied by the carriers indicate the unit was inspected and no defects were found.

The driver of the overweight combination unit was operating the truck with a suspended Indiana chauffeur's license. His current license suspension is one of three incurred from 1981 through 1987. His Indiana driving record includes the following offenses:

1. A conviction for leaving the scene of an accident;
2. A conviction for reckless driving;
3. A conviction for driving with a suspended license; and
4. Four unpaid speeding citations.

The driver had about 7 years of experience operating heavy trucks, and was trip-leased by one of three motor carriers at the time of the accident. Log book entries obtained from all three carriers indicate the driver was on duty between 33.5 and 36.5 hours in a 72-hour period prior to initiating the accident trip lease--a violation of the 15-hour on-duty regulation.

Information obtained from the three motor carriers the driver leased or trip leased to show he was operating on short term leases of 29 days or less. None of the three carriers had done a background or license check on the driver.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the driver's failure to adjust and maintain the vehicle's braking system.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours
2. Driving History
3. Motor Carrier Oversight of Driver
4. Motor Carrier Oversight of Equipment

CASE NO.: 135

Investigation No.: CHI-86-H-TR10
Accident Location: County Road 150, near Rensselaer, Indiana
Lanes: 2-lanes, undivided
Shoulders: Earthen, varying widths
Features: Straight, level roadway at grade crossing with 2 tracks
Date and Time: February 19, 1987, 9:32 a.m.
Ambient Conditions: Clear with dry pavement
Heavy Truck Involved: 1972 International 2000D straight truck
Motor Carrier: Grow Feed Company
Type of Operation: Private
Size of Operation: 1 tractor/trailer, 3 trucks
Total Weight of Truck(s): Estimated 17,000 pounds
Total Length of Truck(s): Unknown-vehicle altered from original, and destroyed in this accident
Other Vehicle Involved: Amtrak locomotive pulling 8 cars
Truck Fatalities: 1 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The International straight truck was traveling north on County Road 150. The Amtrak train was traveling west at approximately 70 mph. According to witnesses, the crossing signals were operating as the truck slowed or stopped and then entered the crossing at a low speed. The train engineer stated that he was sounding the train horn when the truck pulled onto the tracks in front of the train and was struck by the train. He also stated the train headlight was operating and the train bell was ringing. Witnesses stated the truck entered the crossing "carefully" and at a low speed.

The impact of the train destroyed the truck. The truckdriver was ejected from the truck cab and found approximately 76 feet west of the point of impact. Parts of the truck were thrown west of the crossing and parts were carried by the train to a point approximately 3/4 of a mile east of the crossing where the train stopped. The train was not derailed by the collision.

The line of sight from the crossing toward the approaching train was obstructed by rail freight cars parked on the siding track southeast of the crossing.

This accident resulted in fatal injuries to the truckdriver. A chemical test for alcohol impairment was not performed. No one aboard the train was injured in this accident.

This driver was employed as a farmhand and drove straight trucks and various farm equipment incidental to his normal duties. He had been with his current employer for approximately 12 years.

A 50-State license check for this driver discovered only one operator's license--a valid Indiana chauffeur's license with no restrictions, convictions, or violations listed. The employer stated this driver had been driving for approximately 19 years. The only driver training he received was during his service in the U.S. Army over 12 years ago. This driver was familiar with the truck involved in this accident, the route where the accident occurred which he travelled weekly at a minimum, and the grade crossing.

This driver and his family lived in the same house with his employer. According to his employer, he regularly worked Monday through Friday from 0700-1200 and 0100 to 1800. The driver had been working this schedule for the 72 hours proceeding this accident.

At the time of this accident, light conditions were listed on the police report as daylight, the weather was clear, and the roadway was dry.

The employer stated the driver may have thought the crossing signals were operating due to the presence of a railroad service vehicle and parked freight cars and not due to an approaching train. According to the driver's employer, railroad maintenance equipment had been present in the area for some time, and often caused spurious activations of grade crossing signals.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the truckdriver to heed the signals in operation at the grade crossing. Contributing to that failure was the configuration of the grade crossing intersection and the cars parked on the siding which obstructed the truckdriver's view of the approaching train.

OF INTEREST IN THIS INVESTIGATION:

1. Grade Crossing

2. Environment

CASE NO.: 136

Investigation No.: MKC-87-H-TR16
Accident Location: Interstate 94 and 27th Street overpass Minneapolis, Minnesota
Lanes: 6 lanes, divided
Median: New Jersey type concrete barrier
Features: Curve, at grade
Date and Time: July 9, 1987, 1:00 a.m.
Ambient Conditions: Raining, dark with street lights
Heavy Truck Involved: 1987 White conventional power unit in combination with a loaded 42-foot van trailer
Motor Carrier: Kraft, Inc.
Type of Operation: Private carrier
Size of Operation: 18 power units
Total Weight of Truck: 42,133 pounds
Total Length of Truck(s): 63 feet
Other Vehicle Involved: Honda Accord
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 1 Other Injuries: 0

SUMMARY:

The combination unit was westbound in the center lane when the driver saw a Volkswagen spin out of control. The driver of the combination unit started braking to avoid a collision with the Volkswagan and was either coming to a stop or had stopped when a Honda passenger car ran under the rear of the trailer.

This collision resulted in no damage to the power unit and minor damage to the trailer. The driver of the combination unit was not injured. The Honda car received substantial damage, and its driver was fatally injured.

The driver of the combination unit began driving a livestock truck in 1962 without any driving experience and had been driving for his present employer for 19 years. Blood was submitted from both drivers for a chemical test for the purpose of determining the alcohol content. The analysis revealed no ethyl alcohol concentration in the blood of the driver of the combination unit. The analysis revealed a BAC of 0.11 for the driver of the Honda.

PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of this accident was that the Honda driver, whose judgement and driving ability were impaired by alcohol, failed to perceive the slowing combination unit and take evasive action.

CASE NO.: 137

Investigation No.: MKC-87-H-TR17
Accident Location: Interstate 80, 12 miles west of Rawlins, Wyoming
Lanes: 2-lane, 2-direction, asphalt surface
Median: N/A
Features: Straight and at grade; eastbound lanes closed for construction, eastbound traffic routed into westbound lanes
Date and Time: July 10, 1987, 3:40 p.m.
Ambient Conditions: Clear and dry
Heavy Truck Involved: 1984 International tractor in combination with an empty 1987 Fruehauf 48-foot trailer
Motor Carrier: Schneider National Carriers, Inc.
Type of Operation: Common carrier
Size of Operation: 2042 power units
Total Weight of Truck(s): 30,000 pounds
Total Length of Truck(s): 59 feet 7 inches
Other Vehicle Involved: (2) 1968 Ford Mustang (3) 1985 Oldsmobile Cutlass
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 5 Other Injuries: 1

SUMMARY:

The combination unit was westbound on I-80 traveling a straight and level section of road when the semitrailer separated from the tractor. The trailer traveled into the oncoming lane and struck a 1968 Ford Mustang head-on. The trailer then traveled over the Mustang and struck an oncoming 1985 Oldsmobile Cutlass head-on before coming to rest off the south side of the highway on top of the Oldsmobile.

The accident resulted in fatal injuries to both occupants of the Ford Mustang and to three of the four occupants of the Oldsmobile. The semitrailer sustained minor damage while both the Ford and the Oldsmobile sustained substantial damage.

The driver of the International truck had about 2 1/2 years experience driving commercial vehicles and had been with this company for 8 months. He graduated from a commercial driving school before being employed by this company. This driver's record indicates that he had received one moving violation and had been involved in one minor accident before being employed by the carrier. A urine test of this driver administered shortly after the accident was negative for narcotics and alcohol.

This driver picked up the loaded trailer at Lodi, California, pulled it to Denver, Colorado, unloaded and drove to Cheyenne, Wyoming, where he fueled and checked the truck. The driver then drove for approximately 2 1/2 hours before the trailer separated from the tractor.

After the accident, the locking jaws on the fifth wheel were found to be in the closed and locked position. Also, because of the marks and scars on the top of the jaw's locking ring, it was obvious that the trailer had been pulled a considerable distance with the king pin sitting on top of the jaws. The lock guard was bent and the lock guard spring would not keep the lock guard in proper position. However, a visual inspection would have detected the improper connection.

On April 8, 1987, the carrier issued service bulletin #329 which advised all of their service facilities to check and repair the jawlock guards on all Holland fifth wheels to prevent improper hookups to high trailers.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the truckdriver to properly secure the trailer to the tractor. Contributing to the improper connection was the damaged jaw lock guard.

OF INTEREST IN THIS INVESTIGATION:

1. Driver Training/Experience

2. Motor Carrier Oversight of Driver

CASE NO.: 138

Investigation No.: ATL-87-H-TR08
Accident Location: Interstate 10, LaPlace, Louisiana
Lanes: 4-lane divided, on 2 separate elevated bridges over water
Shoulders: Left shoulder 6-foot concrete, right shoulder 10-foot concrete
Median: None
Features: Straight and level
Date and Time: January 28, 1987, 11:25 a.m.
Ambient Conditions: Daylight, foggy, fog-dampened pavement
Heavy Truck Involved: 1985 conventional/sleeper cab, 3-axle Freightliner tractor towing a 48-foot van semitrailer
Motor Carrier: Carroll Truck Lines
Type of Operation: Common carrier
Size of Operation: 250 power units and 275 semitrailers
Total Weight of Truck(s): 74,380 pounds
Total length of Truck(s): 68 feet 2 inches
Other Vehicle(s) involved: 2 tractor semitrailer units, 2 pick-up trucks, 2 van trucks, and 9 autos.
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 4 Other Injuries: 5

SUMMARY:

Shortly before noon on January 28, 1987, heavy fog suddenly covered the 12-mile-long twin bridge segment of east-west I-10 that spans Lake Pontchartrain just west of New Orleans, Louisiana. Nine separate accidents involving 46 vehicles occurred on the westbound bridge during the limited visibility condition. One of the accidents that occurred near the middle of the bridge involving the subject tractor semitrailer unit, 15 other vehicles, and 21 vehicle occupants, is reported herein.

Initially, 6 of the 15 westbound vehicles were forced to stop on the bridge by wrecked vehicles involved in an earlier accident blocking the roadway just west of the site. An approaching work van failed to stop and crashed into the rear of one of the standing automobiles. The collision initiated a series of rear-end and sideswipe-type impacts that ultimately involved the other five stopped vehicles. As the respective vehicles came to rest, several of the occupants exited their vehicle and stood on the fog-covered roadway. There was no fire or serious injury at this time.

As eight additional westbound vehicles had stopped or were moving slowly toward the seven wrecked vehicles, the tractor semitrailer unit (truck) was driven into the area. The truck passed between two stopped autmobiles, sideswiping each, then crashed into the rear of a third automobile. Pushing the auto out of its path, the truck continued forward and

overrode the left rear of a Buick automobile occupied by four people. The Buick's fuel tank ruptured, gasoline was spilled, and fire erupted immediately at the front of the truck and rear of the Buick. Engaged with the Buick, the truck continued forward forcing the Buick into two other automobiles. One of the two was an auto involved in the first accident. The truck came to rest with its front still engaged with the left side of the Buick. Both vehicles were on fire which quickly spread throughout the area of the spilled gasoline and engulfed six vehicles. Those vehicles included four automobiles, one pickup truck, and one work van.

Blockage on the bridge caused by other accidents, plus miscommunication between local jurisdictions, delayed emergency response. Fire and rescue personnel arrived at the site about 1 hour 15 minutes after the accident, and they immediately extinguished the vehicle fires. The truck's tractor, the Buick, and the six other vehicles were destroyed by postcrash fire. The four Buick occupants were trapped and incinerated inside their vehicle; the occupants in the other burned vehicles did not sustain burn injuries. The remaining eight vehicles received varying degrees of crush damage. Five vehicle occupants sustained minor injuries. The truckdriver was not injured.

The truckdriver stated that he first encountered fog when he entered the bridge roadway. Continuing through the fog, he received two CB radio transmissions from eastbound truckdrivers warning that there were accidents ahead with vehicles stopped on the bridge. He reported that the fog became more dense and visibility was reduced to 4 or 5 feet ahead of his truck at the the accident site. He approached the accident with his tractor in seventh gear, traveling an estimated speed of 50 mph and struck the first vehicle at the same moment he sighted it. His speed estimate is consistent with the tractor's seventh gear speed range. There was no evidence to indicate that the driver was fatigued or the truck experienced a mechanical defect. The investigating trooper cited the truckdriver for "reckless homicide"; that charge was dropped when a grand jury failed to return an indictment.

The accident tractor was owned by a fleet operator and was being operated by the motor carrier under a long term lease agreement. The truckdriver had about 17 years tractor trailer driving experience. The motor carrier maintained a Driver Qualification File on the truckdriver as required by the FMCSR and had approved him as an interstate driver in their fleet; however, he was on the fleet operators payroll. He had driven leased vehicles for the motor carrier in November 1983 and June 1984; his current employment began in October 1986. He had drivers license from Mississippi and Michigan. At the time of the accident, his Mississippi license was under suspension. Therefore, he was disqualified from interstate driving by requirements of the FMCSR until the license suspension was lifted. His Mississippi driving record revealed a history of five traffic violations and no accidents during the preceding 3 years. The original license would have been valid through August

1987 had it not been suspended in September 1985 for "failure to appear." A check of his Michigan license revealed no traffic violations or accident history since it was issued in November 1984. The driver stated that he obtained the Michigan license because he understood that Michigan did not charge "points" against their license. The motor carrier had not initiated a check on the truckdriver's license when he was last employed in October 1986. They stated that they were unaware that the driver's license was under suspension. They also stated that they were unaware that he was holding licenses from two States.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the truckdriver's operation of his vehicle at a speed which precluded evasive action after he observed the vehicles stopped on the fog covered bridge. Contributing to the severity of the injuries was the postcrash fire fueled by gas from the ruptured fuel tank of one of the passenger cars.

OF INTEREST IN THIS INVESTIGATION:

1. Driving History
2. Motor Carrier Oversight of Driver
3. Environment

CASE NO.: 139

Investigation No.: ATL-87-H-TR12
Accident Location: Interstate 10, New Orleans, Louisiana
Lanes: 4-lane divided, on 2 separate elevated bridges over water
Shoulders: Left shoulder 6-foot concrete, right shoulder 10-foot concrete
Median: None
Features: Straight and level
Date and Time: March 21, 1987, 7:30 a.m.
Ambient Conditions: Daylight, foggy, fog-dampened pavement
Heavy Truck Involved: 1983 conventional cab, 3-axle Mack tractor towing a empty dump-type semitrailer
Motor Carrier: MCSC, dba, Bridge Terminal Transport
Type of Operation: Contract carrier
Size of Operation: 7 power units and 7 semitrailers
Total Weight of Truck(s): 25,400 pounds
Total length of Truck(s): 41 feet 9 inches
Other Vehicles(s) Involved: 1 automobile and 1 station wagon
Truck Fatalities: 1 Truck Injuries: 0
Other Fatalities: 3 Other Injuries: 1

SUMMARY:

Just before dawn, patchy fog covered the 5.3-mile-long twin bridge segment of east-west I-10 that spans Lake Pontchartrain at the east side of New Orleans, Louisiana. Ten separate accidents involving 39 vehicles occurred on the two-lane eastbound bridge during the limited visibility condition. The one accident that is reported here occurred about 1/2 mile onto the bridge. It involved a tractor semitrailer unit and two other vehicles.

About 7:30 a.m., an eastbound station wagon was moving slowly through dense fog when the driver observed a slow moving or stopped Volkswagen automobile ahead. The Volkswagen was in the right lane with its flashers activated. The station wagon driver steered right to the emergency shoulder and was passing the Volkswagen when a tractor semitrailer unit (truck) came from behind and crashed into the rear of the Volkswagen. The Volkswagen was propelled forward about 150 feet, sideswiped the station wagon, and stopped upright astride the right edgeline. After impact, the truck veered left, crossed the left lane, and crashed into the bridge rail. It continued forward against the rail for a short distance, and then the truck veered right and crossed the roadway. The truck impacted and crossed over the right bridge rail, falling into the lake. The combination unit remained coupled and came to rest on its top at the bottom of the lake. The truckdriver was its only occupant--he remained inside the tractor cab. There was no fire or explosion.

The tractor and the Volkswagen were destroyed. The semitrailer sustained moderate crush damage. The station wagon sustained minor damage and was driven from the site. The truckdriver was drowned. The Volkswagen driver and front seated passenger were restrained; the driver was killed and the passenger sustained moderate injuries. The two unrestrained rear seated passengers in the Volkswagen were ejected and killed. The four station wagon occupants were not injured.

The truckdriver and another carrier driver on a second truck had driven together during the morning hours before the accident. The carrier driver stated that both trucks had driven through the foggy weather for about 3 hours before the accident; he was traveling ahead of the accident truck and did not witness the accident. The station wagon driver stated that dense fog had reduced visibility at the accident site to no more than 15 feet. Tire markings on the pavement and scrape marks on the left bridge rail marked the 240-foot-long path the truck followed from the Volkswagen impact to the location where it crossed the right bridge rail. Speed calculations indicated that the truck was traveling at a speed of between 55 and 60 mph when it struck the Volkswagen; the top speed of the truck was about 61 mph. There was no evidence that the truck experienced a mechanical defect.

The accident truck was being operated by a privately owned motor carrier who operated seven combination units. The units transported rock aggregate products in southeastern Louisiana. The driver had about 20 years heavy truck driving experience. He was regularly employed by another Metairie, Louisiana (New Orleans) motor carrier, where he drove combination units 5 days each week. He was driving as an extra driver when the accident occurred. The accident carrier had not qualified the driver; however, the motor carrier where he was regularly employed maintained a driver qualification file. The file included a valid medical examiner's certificate that qualified him both as an interstate and Louisiana intrastate truckdriver.

The driver held a valid, nonrestricted, Louisiana drivers license that authorized him to drive the truck. His driving record for the prior 6 years revealed no traffic violation or accident history. However, between 1975 and 1981 he had one accident plus seven speeding and one DWI convictions. His failure to file proof of insurance following the 1981 DWI conviction resulted in the revocation of his drivers license between 1983 and 1985. His drivers license was restored in May 1986 following the payment of assessed fines and a restoration fee.

Postcrash toxicological tests conducted on blood and urine samples taken from the truckdriver showed negative for alcohol and drugs. The investigation revealed that during the 27-hour-period preceding the accident he had been on duty 19 hours with only a few hours sleep. On the day before the accident, he was on duty driving for the Metairie motor carrier for 12 hours from 4:30 a.m. to 4:30 p.m. He was off duty for the next 8 hours during which time he

reportedly slept only 3 1/2 hours. Immediately thereafter, he began driving the accident truck at 12:30 a.m. and remained on duty for the following 7 hours until the accident occurred.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the truckdriver's operation of his vehicle at a speed which precluded evasive action after observing the Volkswagen in the dense fog. Contributing to the truckdriver's actions was fatigue which resulted from inadequate rest and excessive duty time.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours
2. Motor Carrier Oversight of Driver
3. Environment
4. Crashworthiness

CASE NO.: 140

Investigation No.: ATL-87-H-TR15
Accident Location: US 1 and Kings Mill Drive, in Fredericksburg, Virginia
Lanes: 4
Shoulders: None inside, 6 feet gravel outside
Median: Grass, depressed, 21 feet wide
Features: Tangent roadway, long vertical sag through a T-intersection
Date and Time: April 8, 1987; 3:20 p.m.
Ambient Conditions: Clear, sunny, and dry
Heavy Truck Involved: 1978 Chevrolet power unit and semitrailer (car-hauler) with cargo of 8 automobiles
Motor Carrier: Anchor Motor Frieght, Inc.
Type of Operation: Common carrier
Size of Operation: 3,000 power units
Total Weight of Truck(s): 65,000 pounds
Total Length of Truck(s): 55 feet
Other Vehicle Involved: 1975 Thomas 66-passenger schoolbus with 35 students aboard
Truck Fatalities: 0 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 36

SUMMARY:

A southbound combination unit crashed into the rear of a public schoolbus. The bus was stopped in the right traffic lane of the southbound two-lane roadway to off-load one of the 35 student passengers aboard; its emergency lights and brake lights were activated. The back of the schoolbus driver's seat collapsed and the lapbelted driver was thrown rearward several feet. As the schoolbus moved forward out of control, the seriously injured driver returned to the front and managed to stop the bus. The bus came to rest on the right shoulder of the roadway about 300 feet from the area of impact. Extensive damage was sustained by the bus--maximum deformation in the rear measured 44 inches. Four students seated in the rear of the schoolbus were seriously injured, the remaining 31 passengers sustained minor injuries.

The power unit continued southward to a final rest position partially in the right traffic lane and on the shoulder. The front of the power unit and an automobile being transported on its top were damaged. In the accident sequence, the lower fifth wheel plate was torn from the tractor frame causing the front of the semitrailer to impact the rear of the power unit. The rear of the power unit cab and two automobiles on the front of the trailer were damaged. The lapbelted truckdriver sustained minor injuries.

The roadway on the approach to the accident site is tangent with a vertical curve. A moderate descending grade begins about 1/2 mile away with the sag of the vertical curve located about 1/10 mile from the accident site. Sight distance between the beginning of the grade and the accident site was unobstructed.

Some skidmarks that were identified as belonging to the combination were found at the accident site. Skidmarks of the rear tires of the power unit measured about 111 feet for the left side and 81.5 feet for the right side. About 20 feet of the left skidmarks were preimpact; no other preimpact skidmarks were found. The only skidmarks of the trailer measured about 10.5 feet to final rest position of the left rear tires.

A postcrash inspection of the combination unit included a finding that the brake chamber push rod measurements at all wheels of the semitrailer exceeded readjustment limits. The brake chamber diaphragm at the right front was ruptured with oil and grease present in the chamber--signs of little friction between brake pads and drum. Also, records of the motor carrier documented several instances where the combination unit driver had reported brake system defects and subsequent repairs at the company shop.

At the time of the accident, the truckdriver reportedly had traveled about 415 miles in 8 3/4 hours. This computed to an average speed of over 47 mph traveling over some mountainous and heavy traffic volume highways.

At the time of the accident, the truckdriver was licensed in both Maryland and Virginia. The motor carrier formally discharged the truckdriver on May 6, 1987. Upon appeal in accordance with union contract, the discharge was reduced to a 6-week suspension, and the truckdriver returned to work on May 26, 1987. In Fredericksburg General District Court on July 17, 1987, the truckdriver was found guilty of reckless driving as a result of the accident. The sentence included a 6-month suspension of his driver's license. The suspension was subsequently documented in his Virginia driver license record. In late November 1987, the Virginia license submitted by the Court was being held in State files. No record of the conviction or suspension was found in his Maryland driver's license record. The driver qualification file as maintained by the motor carrier documented the truckdriver's Maryland license only both for periods of employment before the accident and after his license suspension by Virginia. In early December 1987, a management representative of the motor carrier responded to a Safety Board inquiry on the truckdriver's status by stating that he was working regularly as an over-the-road driver and that his driver qualification file documented a Maryland driver license. The representative was specifically advised by the Safety Board of the suspension by Virginia, to which the representative expressed a lack of prior knowledge and an assurance that corrective action would be taken. The foregoing information was referred to the OMCS.

The schoolbus, owned and operated by Fredericksburg City Public Schools, was transporting 35 students of the Walker-Grant Intermediate School. The busdriver had several years of experience and was a certified schoolbus driver and trainer. Postcrash inspection of the schoolbus revealed that its emergency lights and brake lights were activated at the time of the accident. No preaccident defects were found.

Fredericksburg, Virginia
Case No. 140

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of the accident was the failure of the truckdriver to observe and avoid the stopped schoolbus. The reason(s) for that failure could not be determined. Contributing to the severity of the accident was the defective brakes of the combination unit due to inadequate maintenance by the motor carrier and separation of the semitrailer from the tractor in the accident sequence.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours
2. Driving History
3. Motor Carrier Oversight of Equipment

CASE NO.: 141

Investigation No.: LAX-87-H-TR04
Accident Location: Northbound Interstate 605 at Foster Road, Norwalk, California
Lanes: 10
Shoulders: 8-foot asphalt paved shoulders
Median: Concrete reinforced barrier
Features: Elevated, flat, convergence
Date and Time: February 13, 1987, 12:30 p.m.
Ambient Conditions: Daylight, raining, cloudy
Heavy Truck Involved: 1981 International Model S1800 2-axle van truck, fully loaded
Motor Carrier: DAI HOA Trading
Type of Operation: Private carrier
Size of Operation: One vehicle
Weight of Truck(s): Not determined
Total Length of Truck(s): 25 feet
Other Vehicle(s) Involved: 1969 Ford 3-axle COE tractor in combination with unidentified trailer, 1984 Chevrolet Luv pickup truck

Truck Fatalities:	0	Truck Injuries:	0
Other Fatalities:	0	Other Injuries:	1

SUMMARY:

The combination unit was approaching traffic stopped for congestion when a pickup truck made an abrupt lane change and entered the S-4 lane. The pickup truckdriver applied his brakes in order to avoid the International truck stopped ahead but was unable to stop before striking and underriding the rear of the International. The Ford combination unit, traveling at a reported speed of 40 mph, struck the rear of the pick-up truck and increased the underride condition.

The collision resulted in minor damage to the International from the lift gate mechanism at the rear of the truck forward to the lift gate battery unit. The vehicle was driven from the scene. The unrestrained driver was uninjured. The Chevrolet pick-up truck sustained a reduction in overall length of 38 inches. The restrained pick-up driver was trapped in the vehicle for approximately 2.5 hours before extrication was completed. He was unconsciousness for an undetermined amount of time and sustained moderate face and upper torso injuries. The Ford sustained minor frontal damage and was driven from the scene. The unrestrained driver was uninjured.

The underride damage extended back beyond the A-pillars of the pickup truck resulting in significant intrusion into the occupant space.

Little information was available regarding the Ford driver as the company fired him immediately postcrash and refused to cooperate with the investigation. However, a review of his driving record indicates four speeding violations and two accidents in the 3 years before this collision.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the pick-up truckdriver to assure sufficient space existed to safely merge between two other vehicles. Contributing to the severity of the collision was the underride configuration.

OF INTEREST IN THIS INVESTIGATION:

1. Driving History

CASE NO.: 142

Investigation No.: LAX 87-H-TR05
Accident Location: Eastbound SR 60 near Brea Canyon Road, Diamond Bar, California
Lanes: 8
Shoulders: 5-foot asphalt paved shoulder
Median: 10-foot wide asphalt with integral concrete redirecting barrier
Features: At grade, 6,000 foot radius curve to right, 0.2 percent upgrade
Date and Time: March 7, 1987, 8:55 a.m.
Ambient Conditions: Daylight, cloudy, dry
Heavy Truck Involved: 1970 Peterbilt conventional tractor in combination with a partially loaded 46-foot trailer
Motor Carrier: Banovac Transportation, Inc.
Type of Operation: Common carrier
Size of Operation: 3 power units
Total Weight of Truck(s): Not determined
Total Length of Truck(s): 67 feet
Other Vehicle(s) Involved: 6 passenger vehicles
Truck Fatalities: 0 **Truck Injuries:** 2
Other Fatalities: 2 **Other Injuries:** 13

SUMMARY:

The combination unit was eastbound in the third lane when traffic ahead began to slow and stop for a prior collision. The combination unit driver reported his speed to be 50 to 60 mph when, in an attempt to avoid a stopped vehicle ahead, the driver turned to the right. As he did, he impacted and overrode the rear of a passenger vehicle, severely damaging the right rear of the passenger vehicle. The truck then clipped the left front fender of a pickup truck. As it continued eastbound and began to arc into the center divider, it impacted and overrode the left rear of another passenger vehicle, killing the two occupants. At this point, evidence indicates that the combination unit began to overturn onto its right side. As it did so, it impacted and severely intruded into the left rear of a small station wagon, causing serious injuries to the left side passengers. The unit then slightly impacted the vehicle which had precipitated the original slow down. The station wagon then struck the center median and rolled over into the traffic lanes. The vehicle was unoccupied at this time because the occupants had fled after the initial accident. The combination unit continued on its side and impacted the rear of a sixth passenger vehicle causing major damage to the rear of the vehicle.

The collision resulted in moderate damage to the left front and right side of the combination vehicle. The unrestrained occupants complained of back and neck strain. Five of the passenger vehicles were destroyed. Two of the occupants were fatally injured, 2 sustained serious injuries, and 11 sustained minor injuries.

Two of the four service brakes on the tractor were out of adjustment and that all drums exhibited minor heat checking on the surfaces. The inspection of the trailer revealed that three of the four service brakes were out of adjustment. An inspection of the scene failed to discover any evidence of precrash braking.

Toxicological examination of the combination unit driver revealed a 0.10 percent BAC level. Extrapolating back to the time of the accident renders a probable at-crash BAC level of 15-17 percent. During an interview, the passenger in the combination unit revealed that he had been with the driver since approximately 10 p.m. on the night before the accident. He had noticed that the driver was in an "angry" mood and observed him drinking from a bottle in the vehicle. As they continued on their delivery route, the driver reportedly drove in an erratic manner. When the passenger called the dispatcher for the company to report the driver's behavior, he was told to "mind his own business" and to continue with the route. The driver's record indicated that he had been arrested approximately 6 months before this collision and convicted of drunk driving. He was on probation for this offense at the time of this accident.

During the course of the examination by the Drug Recognition Expert (DRE), the officer noticed track marks on the driver's arms and constricted (1.5 mm diameter) pupils. In addition, the driver stated that he was a daily heroin user. Research indicates that the normal injection rate requirement is between 4 and 6 times per day. The passenger remained in the driver's presence for approximately 11 hours and did not observe the driver take any injections. A syringe containing a yellow substance was located near the driver as he was apprehended by police. Any delay in injection can create withdrawal symptoms consistent with the angry, irritable, aggressive behavior described by the passenger. The normal symptoms of heroin or opioid withdrawal can be partially masked by the depressant action of alcohol however, they cannot be totally camouflaged.

Although the probability of opiate presence was detected by the DRE, the only toxicological test sample taken for examination was blood. Heroin converts back to morphine in the body and can be detected in the urine and blood. The time period for discovery in a blood sample is significantly less than that in urine samples and is, therefore, less reliable. No urine was taken in this case and the blood test made from a sample was extracted 3.5 hours postcrash. The best method of detection for opiates is a urine test performed as soon as possible after the incident. Without these results, it is not possible to reliably determine the time of the driver's last injection of heroin.

Diamond Bar, California
Case No. 142

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was that the truckdriver, whose judgement and driving ability were impaired by a combination of probable opioid withdrawal and alcohol, failed to perceive and react to the slowing vehicles in time to avoid the collision. Contributing to the accident was the motor carrier's failure to take positive action to remove the driver from the truck after being notified of the driver's condition.

OF INTEREST IN THIS INVESTIGATION:

1. Alcohol/Drugs
2. Driving History
3. Motor Carrier Oversight of Driver
4. Motor Carrier Oversight of Equipment

CASE NO.: 143

Investigation No.: CHI-87-H-TR06
Accident Location: SR 23 northbound lanes, 1/10 mile south of
Black Oak Ridge Road connector, Wayne, New Jersey
Lanes: 6-lanes, divided
Median: Concrete, New Jersey style median barrier
Features: Straight section with positive grade followed by
reversing curve with negative grade
Date and Time: December 7, 1986, 12:09 a.m.
Ambient Conditions: Clear, dry, artificial light
Heavy Truck Involved: 1986 Mack conventional tractor in combination with
a loaded tanker trailer
Motor Carrier: Island Transportation Corporation
Type of Operation: Common carrier
Size of Operation: 100 power units
Total Weight of Truck(s): 80,560 pounds
Total Length of Truck(s): 55 feet 7 inches
Other Vehicle Involved: None
Truck Fatalities: 1 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The combination unit was traveling north on State Route 23 in the farthest right of three travel lanes along a straight section of roadway. Witnesses estimated the speed of the combination unit from 55 to 70 mph. Approximately 1/10 mile south of the Black Oak Ridge Road connector, the combination vehicle was negotiating a left curve when it swerved to the left, rolled onto its left side, and slid across the pavement until the rear of the trailer struck the median barrier.

The tanker trailer of the combination unit was ruptured as the vehicle slid to rest and the gasoline cargo was ignited. The driver of the combination unit was killed by the fire. The tractor and trailer were completely destroyed by the gasoline fire.

The burning gasoline flowed into the storm drains along SR 23 and then into the Pompton River. The burning gasoline in the river damaged a bridge located north of the accident scene, the pavement of SR 23, and destroyed or damaged 32 vehicles parked in the lot of a car dealer on the east side of SR 23.

This driver had been employed by the carrier on August 13, 1985. According to his employment application, he had 6 years experience with van and flatbed tractor-trailers and approximately 1 year of experience with straight trucks. The company stated the driver had been operating this specific vehicle since September 1986 and had traveled this route before. The driver's home was in Effort, Pennsylvania. He frequently commuted from his home to Carteret, New Jersey, where the combination vehicle was stationed, a one-way distance of approximately 90 miles. This driver commonly worked approximately 10 hours per day. This driver had been on duty since 5:30 p.m. on the date of the accident (6.5 hours).

The pavement of this roadway was new construction completed on August 8, 1986, and had replaced a traffic circle intersection. The combination unit passed a 55 mph sign 2.3 miles south of the accident scene. The only other traffic or advisory sign for north bound traffic, was located 0.7 mile south of the accident scene, which read "REDUCED SPEED AHEAD."

Approaching the scene, the combination unit traveled up a 3.4 percent grade and then negotiated a left curve in the roadway with a decreasing radius from 1,200 to 600 feet. This curve required a change in heading from approximately 339° to 315°. After negotiating this curve, the combination vehicle began to descend a straight section of roadway approximately 340 feet long, with a grade of -3.38 percent. An entrance ramp enters the east side of SR 23 at this point providing four northbound lanes. As the combination vehicle descended this slope, the tractor rotated clockwise and moved toward the east road edge. The trailer also rotated clockwise, rolled over, and slid broadside along the northbound lanes as it pulled the tractor with it. The combination vehicle came to rest at an approximate heading of 026° in a section of roadway with an approximate heading of 018°.

Tire marks left by the combination vehicle were present on the roadway. These marks began in the eastern lane and angled to the east across the entrance ramp which joins the eastern side of SR 23 in the descending straight section following the left curve. Tire marks from the left rear trailer tires and gouges in the pavement from the wheels were also located on the pavement in this area. Eleven parallel, striated, aluminum scrape marks were present on the pavement from north of these tire marks to the position of final rest. These scrape marks on the pavement were measured to be the same length and have the spacing interval as the internal bulkheads of an undamaged Heil tanker trailer.

A memorandum written by an employee of the Wayne Township, Department of Public Works dated September 24, 1986, stated:

> ...I questioned Mr. Spoerl [the Resident Engineer of New Jersey Department of Transportation] relative to the design speed of the new highway with particular reference to the portion between Ratzer Road and the Black Oak Ridge Road connector traffic signal....I expressed my safety concerns to Mr. Spoerl because I have not been able to stay in lane through the section in question at speeds of 50 mph....In response to the question as to the signing of the new sections, specifically referring to speed and advisory signs, Mr. Spoerl indicates that these will be installed within the next two weeks.

Wayne, New Jersey
Case No. 143

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the lack of warning signs to alert motorists to the roadway configuration and the reduced level of alertness of the driver due to long hours of on-duty status combined with long distance driving while commuting from his home to the truck terminal.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours

2. Environment

3. Hazardous Material

CASE NO.: 144

Investigation No.: ATL-87-H-TR10
Accident Location: State Highway 50, 14 miles east of Orlando, Florida
Lanes: 4
Shoulders: 6 feet outside, none inside
Median: Grass covered, 20 feet wide
Features: Through-highway, at grade
Date and Time: March 19, 1987, 8:55 a.m.
Ambient Conditions: Cloudy, light overcast
Heavy Truck Involved: (1) 1984 International tractor with partially loaded 28-foot trailer
Motor Carrier: (1) ABF Freight Systems, Inc.
Type of Operation: (1) Common carrier
Size of Operation: (1) 3,500 power units
Heavy Truck Involved: (2) 1984 Mack dump truck, empty
Motor Carrier: (2) Kanawha Valley Trucking Company, Inc.
Type of Operation: (2) Interstate, nonregulated
Size of Operation: (2) 3 dump trucks
Total Weight of Truck(s): (1) 28,317 pounds
(2) 21,640 pounds
Total Length of Truck(s): (1) 32.9 feet
(2) 24 feet
Other Vehicle Involved: 1982 Bluebird 66-passenger public schoolbus with 54 passengers aboard
Truck Fatalities: 0 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 33

SUMMARY:

The combination unit and the dump truck traveled east on State Highway 50 with the combination unit in the left traffic lane and the dump truck in the right traffic lane. On the approach to the intersection of Tanner Road, the combination unit overtook the dump truck and moved into the right traffic lane. It slowed down in front of the dump truck and began to turn right onto Tanner Road. The driver of the dump truck braked and subsequently steered evasively leftward. The right front corner of the metal bed of the dump truck struck the left rear corner of the semitrailer of the combination unit.

The combination unit stopped several feet south on Tanner Road. The semitrailer sustained very minor damage at the left rear corner where there were some paint transfers. The dump truck moved through the intersection and across the left traffic lane. It rotated counterclockwise as it crossed the center median and entered the westbound roadway. In the westbound roadway, the dump truck was struck in the right side by a skidding westbound schoolbus. The schoolbus skidded about 138 feet before it impacted the dump truck. The dump truck sustained minor damage at the right front of its metal dump bed in collision with the semitrailer, and it sustained extensive damage on the right side in its collision with the schoolbus. The schoolbus was extensively damaged.

The driver of the combination unit was not injured. The driver of the dump truck reported minor injuries. The lapbelted schoolbus driver was seriously injured. The investigating police documented 54 students on the schoolbus--32 reported injuries. None of the students were admitted to a hospital.

The roadway at the accident site is practically level with a very slight eastbound right curve. The roadway was not a factor in the accident, nor was there any vision obstruction. The weather was cloudy and the roadway surface was dry at the time of the accident.

Statements of the truckdrivers conflicted regarding the lane change and turning maneuver of the combination unit. The driver of the combination unit stated that he moved to the right traffic lane after he was about 1 1/2 truck lengths past the dump truck. He also stated that he gave a right turn signal before he slowed and began to turn right onto Tanner Road. The driver of the dump truck stated that the combination unit turned abruptly into the right traffic lane directly in front of him and that the combination unit suddenly braked before turning onto Tanner Road. A witness traveling eastbound a few hundred feet to the rear of the dump truck stated that he observed the dump truck brake and veer sharply to the left. The witness said that he did not observe the combination unit overtake the dump truck in the immediate area of the intersection. He said that any such overtaking maneuver could only have been a considerable distance from the intersection. Another witness stated to the investigating police that the combination unit turned into the right traffic lane rather close to the dump truck and braked abruptly before the right turn onto Tanner Road.

Skidmarks of the combination unit extended eastbound along the right traffic lane for about 90 feet before the initial point of impact. Dual wheel tire marks of the dump truck extended eastbound along the same area for about 70 feet before the initial point of impact. Therefore, it can be reasonably assumed that both vehicles were in the right traffic lane and traveling in a straight direction before the combination began to decrease speed. The investigating police charged the driver of the combination unit with improper lane change. In a trial on the charge, the case was dismissed by the Orange County Traffic Court.

A postcrash inspection and road test of the combination unit revealed no preaccident mechanical defects. In a postcrash inspection of the dump truck, the rear brake drums were found to be severely scored and "worn beyond safe limits," yet the brakes had recently been relined. Also, it was determined that the dump truck had excessive steering play from a loose left tie rod end in the steering arm.

No evidence was found of excessive hours of service of either truckdriver. At the time of the accident, both drivers had been on duty and driving only a short time. Otherwise, no evidence was found of any physical impairment of either truckdriver.

Both truckdrivers possessed valid Florida driver licenses with no restrictions. Neither truckdriver had an exceptional driving record, although the driver of the combination unit had some recorded convictions during the last several years. In a check of all States, no other record was found on either truckdriver.

Both truckdrivers had several years of experience. However, the driver of the combination unit had been employed by the motor carrier (1) just less than 3 months (length of probationary period). In accordance with company policy, the motor carrier terminated the probationary truckdriver.

The schoolbus, owned and operated by Orange County Public Schools, was transporting 54 students of Liberty Junior High School. The adult busdriver had several years of experience and was licensed and certified in accordance with Florida law. Postaccident inspection of the schoolbus revealed no defects.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of the accident was a combination of the abrupt deceleration of the combination unit and the failure of the dump truck driver to maintain a safe following distance. Contributing to the accident were the defective brakes and steering on the dump truck.

OF INTEREST IN THIS INVESTIGATION:

1. Motor Carrier Oversight of Equipment

CASE NO.: 145

Investigation No.: ATL-87-H-TR05
Accident Location: U.S. 278 and CSX railroad, Allendale, South Carolina
Lanes: 4
Shoulders: Grass, varying width
Median: None
Features: Highway/railroad grade crossing
Date and Time: January 8, 1987, 7:45 p.m.
Ambient Conditions: Clear, dark, and dry
Heavy Truck Involved: 1984 White conventional F-300 tractor in combination with an empty container trailer
Motor Carrier: G & P Trucking Company, Inc.
Type of Operation: Common carrier
Size of Operation: 109 power units
Total Weight of Truck(s): 32,620 pounds
Total Length of Truck(s): 51 feet
Other Vehicle Involved: Seaboard System Railroad (CSX) freight train S-151
Truck Fatalities: 0 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 2

SUMMARY:

The westbound combination unit had turned right and was crossing the Seaboard System Railroad (CSX) highway grade crossing on U.S. 278 when a westbound CSX freight train, configured with 2 locomotives and 18 trailing cars, struck the right side of the combination unit's semitrailer at approximately 32 mph.

Before the collision, the combination unit had been traveling parallel to the (CSX) single railroad track behind two other trucks of his company. A police officer witness stated that both the second truck of the three-truck group and the accident truck failed to stop for the flashing signal lights at the crossing and that the train was sounding its warning whistle on its approach to the crossing.

Records furnished by the driver's employers showed that he had 5 years of experience as a heavy truckdriver, but he had only been employed with his present carrier for 3 months. Additionally, the records showed that the truckdriver had successfully completed a 4-week commercial truck driving school. The administrator of the commercial driving school reported that if the motor carrier had requested an evaluation of the driver's performance, the administrator would have recommended that they not hire him because he had an attitude problem.

The collision resulted in extensive damage to the combination unit and substantial damage to the train. The truckdriver, train engineer, and train brakeman received minor injuries.

Allendale, South Carolina
Case No. 145

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the truckdriver's failure to obey the flashing light signals and stop clear of the train crossing.

OF INTEREST IN THIS CASE:

1. Grade Crossing
2. Motor Carrier Oversight of Driver
3. Driver History

CASE NO.: 146

Investigation No.: DEN-87-H-TR07
Accident Location: Interstate 70, inside Vail, Colorado
Lanes: 4 lanes, divided
Shoulders: Outside shoulder 6 feet of asphalt surface, median shoulder undetermined width of asphalt surface
Median: 100-foot wide earthen median with small aspen trees
Features: Winding, -7 percent grade, mountainous
Date and Time: January 16, 1987, 8:20 a.m.
Ambient Conditions: Cloudy, 5°F, daylight, and dry
Heavy Truck Involved: 1982 GMC COE 3-axle tractor in combination with a loaded tank trailer
Motor Carrier: Groendyke Transport, Inc.
Type of Operation: Common carrier
Size of Operation: 700 power units
Total Weight of Truck(s): 76,040 pounds
Total Length of Truck(s): Undetermined
Other Vehicle Involved: No
Truck Fatalities: 1 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The combination unit was traveling over a mountain pass and began descending a 7 percent winding grade. According to the driver's statement, he was in fifth gear, low side of the transmission, when he passed the summit. As the truck began to gain speed, he tried to shift back down to fourth gear and was unable to do so. He continued to apply his brakes, which did not slow him appreciably. He reported his speedometer pegged out at 85 mph. He passed the first runaway truck ramp that he claimed came up too quickly. The driver reportedly shifted out of fifth gear again, but still could not get it into fourth, and then could not get the transmission back into fifth gear--leaving the truck freewheeling down the grade. As the combination unit continued down the road, the driver applied the trailer parking brakes, which did not slow the vehicle. He also passed a second escape ramp which he stated he did not see. While the driver was attempting to go around a curve to the left, the truck went off the right side of the roadway. The truck's right side tires dropped off into a culvert opening, causing the unit to roll over onto its right side. The truck traveled for 446 feet along the ditch before it struck the cut bank. After impact, the truck continued sliding for another 146 feet.

Both the tractor and trailer were destroyed in the accident. The cab was torn from the chassis and both ends of the tank were ruptured, spilling the contents. Both the driver and his unauthorized passenger were unrestrained and ejected. The driver was knocked unconscious and received additional minor injuries; the passenger was fatally injured.

An examination of the vehicle revealed that six out of the nine brakes which could be checked were out of adjustment. Most of the drums showed signs of heat cracks and discoloration. Four and one-half quarts of liquid were drained from the first air tank reservoir. Chipped gear teeth were also found on the low range gears in the transmission. According to the driver's statement, the low-air warning light had come on and a witness reported seeing smoke coming from the trailer wheels.

When the driver's statement of his activities for 72 hours before the accident was checked with his fuel receipts and other documents, many places and times did not match. His total hours on duty for the previous 8 days was 69.5 hours. In the 53 hours preceding the accident, the operator of the truck had only 10 hours of sleep. On January 6, 1987, he logged 11.75 hours of driving and on January 10, 14.75 hours of driving.

The tanker contained 5,057 gallons of crude petroleum treating compound, all of which spilled on impact. The load was placarded properly, but the driver was unaware of the exact contents of his load. The shipping company had not provided papers detailing the exact contents of the load. A safety official with the carrier stated that often the shipper would not disclose the chemical contents of the product because certain contents would provoke higher shipping charges. As a result, it took 4 hours to properly identify the cargo and the hazards presented.

The operator of the combination unit had 12 years experience driving heavy trucks and no formal training. He stated that he had been fearful of driving over mountain passes because a relative had been killed in a runaway truck accident. In the last 5 years, he had one speeding violation. No accidents were recorded on his record for the past 10 years.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was a combination of the improperly maintained brake system and the driver's inexperience with driving over mountainous terrain.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours
2. Motor Carrier Oversight of Equipment
3. Hazardous Material

CASE NO.: 147

Investigation No.: FTW-87-H-TR03
Accident Location: Interstate 20, 7 miles west of Longview, Texas
Lanes: 4 lanes, divided
Shoulders: Median shoulder 4-foot wide asphalt, outside shoulder 9-foot wide asphalt
Median: 40-foot earthen median
Features: On 1°-curve approaching bridge
Date and Time: April 28, 1987, 4:50 a.m.
Ambient Conditions: Clear, dark, dry asphalt
Heavy Truck Involved: 1982 COE Freightliner tractor in combination with a loaded tanker trailer
Motor Carrier: Ashland Oil, Inc
Type of Operation: Private motor carrier
Size of Operation: 7 power units
Total Weight of Truck(s): 72,900 pounds
Total Length of Truck(s): Not determined
Other Vehicle Involved: None
Truck Fatalities: 1 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The westbound combination unit departed the travel surface tangent to a 1° right curve, traveled 138 feet in the soft earthen median, collided with and overrode a metal guardrail for about 150 feet, and fell down a concrete covered embankment. On impact with the embankment, a fire ignited that consumed the combination unit and its 7,500-gallon cargo of Naptha.

The combination unit was destroyed and the driver received fatal injuries.

The driver had been diagnosed as a diabetic in 1976 and had been using injectable insulin to control the illness up until 1984. During this time, he had worked continuously as an interstate truck driver for several different motor carriers. In 1982, he began working for his present employer. His DOT medical examination form showed that he answered "Yes" to a question about being treated for diabetes mellitus and indicated that he was taking 30 units of insulin a day. In spite of this, the doctor certified the driver as qualified to drive in interstate commerce.

In 1984, the motor carrier began using a different doctor, and this physician disqualified the driver on his initial exam. However, the driver sought treatment from an endocrinologist that placed the driver on a diet, prescribed oral medication, and discontinued his use of insulin. This permitted the motor carrier's company doctor to certify the driver as medically qualified. However, the endocrinologist stated to investigators that the driver had problems maintaining his weight and blood-sugar level. He indicated that the driver's elevated blood-sugar level could result in his being fatigued more easily. This collision occurred after the driver had been on duty for 10 hours.

The motor carrier's present safety management personnel were unaware that this driver had once been required to take insulin to control his diabetes or the problems he was having controlling his blood-sugar level.

Records furnished by the driver's employer showed that he had about 22 years experience operating heavy trucks. The driver had not attended a commercial driving school.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the truckdriver's lack of vigilance which resulted in his failure to perceive that his vehicle was leaving the roadway. Contributing to his lack of vigilance were his medical condition and long nighttime duty hours.

OF INTEREST IN THIS INVESTIGATION:

1. Motor Carrier Oversight of Driver
2. Hazardous Material

CASE NO.: 148

Investigation No.: LAX-87-F-H007
Accident Location: Westbound Interstate 10 transition road to southbound Interstate 111 within Los Angeles, California
Lanes: 2
Shoulders: Both 8 feet wide, concrete
Median: None
Features: Elevated S-curve
Date and Time: March 15, 1987, 8:50 p.m.
Ambient Conditions: Cloudy, dry, street lights
Heavy Truck Involved: 1983 Kenworth straight tanker in combination with a tanker pull trailer, both units loaded
Motor Carrier: Pan Pacific Petroleum Company
Type of Operation: Common carrier
Size of Operation: 30 power units
Total Weight of Truck(s): 79,840 pounds
Total Length of Truck(s): Not determined
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The combination unit was traversing an S-curve on an elevated transition road at a tachograph-recorded speed of approximately 50 mph. The posted advisory speed was 25 mph. As the vehicle attempted to negotiate the second segment of the curve the trailing 2-axle pull trailer overturned to its left side. As the trailer overturned, it collided with the 3-foot high guardrail to its left. This collision ruptured the tank vessel and allowed approximately 2,000 gallons of the heavy grade fuel oil cargo to escape onto the roadway. There was no fire; however, the spill required a 17-hour cleanup effort.

This accident resulted in substantial damage to the overturned trailer. The towing unit, a three-axle straight tanker, was not damaged. No injuries were reported by the restrained driver.

The driver had been operating heavy truck combinations for about 11 years with 5 years of in-type experience. He had been employed by the carrier for 8 months and related that he had traveled over the transition road only 6 or 7 times before the date of the accident. A check of this driver's record revealed four moving violations in the 2 1/2 years preceding the accident. Two of the violations were committed in a commercial vehicle. There were no prior accidents listed for the reporting period.

On the date of the accident, the driver was working an evening shift. He had been on duty since 5 p.m. He had driven about 103 miles in the 2.6 hours preceding the accident. Records revealed that he had been on duty 67 hours in the last 8 days, 42 3/4 of which were spent driving.

The investigation revealed that this segment of highway experienced at least eight accidents involving heavy truck combinations in a 5-year period. All eight accidents were attributed to excessive speed. A reverse curve warning sign was posted along with the 25-mph advisory sign approximately 380 feet before entry into the S-curve.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the truckdriver to reduce his speed sufficiently to safely negotiate the second curve of the S-curve transition road.

OF INTEREST IN THIS INVESTIGATION:

1. Environment

CASE NO.: 149

Investigation No.: MKC-87-H-TR14
Accident Location: County Road 4 miles south of Polk, Nebraska
Lanes: 2-lane, 2-direction gravel road
Median: None
Features: At grade
Date and Time: May 11, 1987, 4 p.m.
Ambient Conditions: Clear, daylight, dry surface
Heavy Truck Involved: 1980 COE Kenworth tractor in combination with an empty hopper-bottom trailer
Motor Carrier: Hirschfeld & Sons
Type of Operation: Private carrier
Size of Operation: 1 power unit
Total Weight of Truck(s): Not determined
Total Length of Truck(s): Not determined
Other Vehicle Involved: 47-passenger schoolbus
Truck Fatalities: 0 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 12

SUMMARY:

The eastbound Kenworth combination unit collided broadside into the left side of a 47-passenger schoolbus that was traveling northbound through an uncontrolled intersection on a gravel surfaced county road. From the initial impact, the bus traveled approximately 60 feet before coming to rest in the northeast corner of the intersection. The Kenworth combination unit traveled about 48 feet after impact before coming to rest in the northeast corner of the intersection.

The collision resulted in substantial damage to the front of the Kenworth tractor and extensive damage to the left side of the schoolbus. Both drivers received moderate injuries and, of the 11 schoolbus passengers, 2 received serious injuries, 2 received moderate injuries, and 7 received minor injuries.

Records furnished by the truckdriver's employer showed that the driver had 3 years of heavy truck driving experience. He had not attended a formal truck driving school.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the Kenworth driver to yield the right-of-way to the schoolbus that was approaching from the truck's right within the uncontrolled intersection.

OF INTEREST IN THIS INVESTIGATION:

1. Environment

CASE NO.: 150

Investigation No.: NYC-87-H-TR11
Accident Location: New Jersey Turnpike in Cherry Hill, New Jersey
Lanes: 4 lanes, divided
Shoulders: Right side shoulder 10-foot asphalt
Left side shoulder 12-foot asphalt
Median: 56-inch high MB-5 concrete median barrier
Features: Straight, 2 percent descending northbound grade
Date and Time: August 27, 1987, 2:45 p.m.
Ambient Conditions: Clear, 80°F, daylight, and dry
Heavy Truck Involved: 1986 Freightliner tractor and loaded semitrailer
Motor Carrier: Rich Food, Inc.
Type of Operation: Common carrier
Size of Operation: 120 power units
Total Weight of Truck(s): Estimated 72,000 pounds
Total Length of Truck(s): 56 feet
Other Vehicle Involved: 7 passenger cars and 1 other tractor semitrailer
Truck Fatalities: 0 Truck Injuries: 2
Other Fatalities: 6 Other Injuries: 11

SUMMARY:

The tractor and loaded semitrailer was northbound on the New Jersey Turnpike, traveling from Mechanicsville, Virginia, en route to Ridgefield, New Jersey. In the vicinity of milepost 31.1, where northbound traffic was merging into the right lane at a construction zone, the Freightliner truck ran into the rear of a Ford Tempo, initiating a chain collision involving six additional passenger cars and another tractor semitrailer. A fire ensued and three passenger cars and the Freightliner truck were destroyed. Six passenger car occupants were killed and 11 were injured. Both truckdrivers were also injured.

There were no indications that the Freightliner truck was braking or that the driver initiated any evasive maneuvers before the collision. A witness estimated the truck's speed at 65 mph. The Freightliner driver stated that he was traveling at 60 to 65 mph and that he was keying in mileage on his on board computer when the crash occurred. Apparently, the truckdriver was also talking on his citizens band radio at the time of the collision.

The construction zone was marked with advisory signs on both sides of the highway, a reduced speed limit of 45 mph, and an illuminated overhead warning sign before the accident site. The Freightliner driver had driven through this same construction zone on the day before the accident.

The driver had at least 7 years of experience in the operation of heavy trucks. On the day preceding the accident, the driver had operated his vehicle for at least 17.75 hours and had only had 6 hours off duty before beginning the accident trip. On the day of the accident, he had operated the truck for 5.75 hours before the crash occurred.

Vehicle examinations revealed that two separate fires began during the crash. The vehicles that were involved in the fires received catastrophic damage to their fuel tanks, and it appears that gasoline that spilled from these damaged fuel tanks ignited.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the Freightliner driver, while traveling at an excessive speed, to slow due to a delay in perceiving the slowed and stopped vehicles at the construction zone in front of him.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours
2. Environment

CASE NO.: 151

Investigation No.: DEN-87-H-TR08
Accident Location: Interstate 80, 1 mile west of Wamsutter, Wyoming
Lanes: 4 lanes, divided
Shoulders: 10-foot asphalt
Median: 53 feet wide, earthen
Features: Straight, level, at grade, snow/ice covered
Date and Time: March 19, 1987, 8 p.m.
Ambient Conditions: Snow, strong winds, dark, -15°F
Heavy Truck Involved: 1981 Kenworth COE tractor in combination with a 45-foot refrigerator van
Motor Carrier: A & D Transportation, Inc.
Type of Operation: Common carrier
Size of Operation: 28 power units
Total Weight of Truck(s): 62,063 pounds
Total Length of Truck(s): Not determined
Other Vehicle Involved: 1974 Ford Pinto stationwagon
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 1

SUMMARY:

A combination unit was traveling eastbound in the left lane of an interstate highway at a witness-reported speed of 50 mph. The road surface was covered with snow and ice and other truck traffic was traveling approximately 35 mph. As the combination unit passed another truck unit, a car in front of that truck pulled out to pass another car, striking the back of that car and causing both cars to spin out of control. The combination unit was unable to take evasive maneuvers and struck one of the out-of-control vehicles, a Pinto. The Pinto stayed upright and went off into the median. The combination unit rotated 180° and overturned onto its right side before coming to rest in the median. The truck being passed was not involved in the accident.

The truck sustained minor right side damage. The passenger car struck by the truck sustained major left side damage. An unrestrained occupant of the Pinto was slightly injured. The drivers of the passenger cars were uninjured. The unrestrained truckdriver and his two unauthorized passengers were also uninjured.

Following truckdrivers who witnessed the accident related that they had advised this truckdriver to slow down but he had failed to respond on the CB and had showed no evidence of slowing.

The investigation further revealed that the driver was in possession of two driver licenses--one from Texas and one from Mississippi. The driver related that as he acquired "too many" speeding tickets on his Texas license, he quickly acquired a Mississippi permit. Texas eventually suspended his license for 4 years for excessive violations, reinstating it 6 months before the accident. The Texas driving record revealed four speeding tickets in the last 3 years, while the Mississippi record was clear.

An investigation into the truckdriver's employment history revealed that he had been a truckdriver for 30 years and had received both military and private training. He had been employed by this firm for 5 months. His previous employer had fired him after 9 months for a continued record of excessive speed. Company trip computers reported that the driver consistently (62 percent of the time) drove in excess of 70 mph. Although he was warned verbally and in writing, he continued his excessive speeding.

A check of the driver's logs indicated that they were 3 days behind. Examination of additional records revealed that he had been on duty and/or driving for 20 hours on the day before the accident. On the day of the accident, the driver's duty/driving time totaled 11 hours.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the truckdriver to travel at a speed appropriate for the icy road conditions.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours
2. Driving History
3. Motor Carrier Oversight of Driver

CASE NO.: 152

Investigation No.: ATL-87-H-TR06
Accident Location: Interstate 10 near MP 344, 1 mile south of Baldwin, Florida
Lanes: 4 lanes, divided
Shoulders: 10-foot asphalt right, 4-foot asphalt left
Median: 57-foot wide grass
Features: Straight, at grade, level
Date and Time: January 13, 1987, 2:55 a.m.
Ambient Conditions: Dark, clear dry
Heavy Truck Involved: (1) 1981 Mack conventional 3-axle tractor in combination with a fully loaded cargo tank semitrailer
Motor Carrier: Direct Transport Company
Type of Operation: Common carrier
Size of Operation: 46 power units
Total Weight of Truck(s): 80,370 pounds
Total Length of Truck(s): Approximately 60 feet
Heavy Truck Involved: (2) 1985 Freightliner conventional tractor in combination with a fully loaded flatbed trailer
Motor Carrier: Cook Transports, Inc.
Type of Operation: Common carrier
Size of Operation: 284 power units
Total Weight of Truck(s): 62,903 pounds
Total Length of Truck(s): Approximately 60 feet
Truck Fatalities: 1 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

A combination cargo tank unit loaded with 8,521 gallons of gasoline was traveling in the right lane of an interstate highway when the vehicle drifted off to the right and struck a lighted combination flatbed unit that was illegally parked. The parked flatbed trailer was loaded with three 30-foot-long, 4-foot-diameter steel pipes. At impact, the pipe contacted and ripped open the right side of the cargo tank, spilling the load of gasoline onto the roadway. Fire erupted immediately and both vehicles were consumed by flames. There was no evidence of precrash evasive maneuvers. The tanker driver sustained burns over 40 percent of his body. The driver of the parked unit, in the sleeper berth at the time of the collision, died in the fire.

The tanker driver was probably fatigued. Driver's logs and company records indicate that he had been on duty for approximately 89 hours during the previous 8 days--19 hours over the maximum permitted by the FMCSR. At the time of the accident, he had been driving about 12 1/4 hours. The driver had modified his log book entries to reflect fewer duty hours than he actually worked. The company terminal manager constructed the driver's actual on-duty hours by assembling all the bills of lading with their time and date stamps. The motor carrier did not routinely compare these documents. A trailing motorist advised that the tank truck had run onto the right shoulder a short distance before the accident and that the truck was not braking when it drifted off the road a second time.

Baldwin, Florida
Case No. 152

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the Mack driver's failure to perceive that his vehicle was leaving the travel lanes due to fatigue from excessive duty hours. Contributing to the accident was the Freightliner driver's decision to park his vehicle illegally on the shoulder of the roadway.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours
2. Motor Carrier Oversight of Driver
3. Hazardous Material

CASE NO.: 153

Investigation No.: NYC-87-H-TR08
Accident Location: Whaleyville Road, inside Suffolk, Virginia
Lanes: 2 lanes, undivided
Shoulders: Both grass shoulders were 5 feet wide
Median: None
Features: Straight, at grade, and level
Date and Time: May 11, 1987, 3 p.m.
Ambient Conditions: Clear, 80°F, daylight, and dry
Heavy Truck Involved: 1980 GMC COE 3-axle tractor in combination with an empty semitrailer
Motor Carrier: Port City Transportation
Type of Operation: Contract carrier
Size of Operation: 7 tractors
Total Weight of Truck(s): 28,000 pounds
Total Length of Truck(s): Undetermined
Other Vehicle Involved: 1 passenger vehicle and 1 64-passenger schoolbus
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 2 Other Injuries: 14

SUMMARY:

The combination unit was approaching the rear of a 64-passenger schoolbus that had stopped to discharge students. The schoolbus operator had activated the red flashing lights and the swing-out stop sign from the left side of the bus. A passenger car with two occupants had stopped about 150 feet behind the bus. The tractor crashed into and overrode the rear of the passenger car, and then both vehicles collided with the rear of the schoolbus. A fire ensued as the passenger car's gas tank ruptured and the fuel was ignited. Evidence on the roadway and calculations indicated that the operator of the truck did not begin braking until the collision with the passenger car. After the accident, the student passengers were assisted from the bus by the schoolbus driver and the truckdriver.

The front of the tractor was moderately damaged in the collision, but the tractor cab was destroyed in the fire. The front portion of the trailer was damaged by fire. The passenger vehicle was destroyed with crush on both the front and rear, and both passenger car occupants were fatally injured. The rear of the bus was pushed inward; 1 student passenger sustained serious injuries and 13 of the remaining students received minor injuries. Neither the schoolbus driver nor the truckdriver, both of whom were restrained, received injuries.

The fire began as sparks from the sliding passenger cars undercarriage ignited gasoline that had spilled from the car's ruptured fuel tank. The fuel tanks on the tractor did not rupture, nor did the tanks ignite in the fire. The thermal vents on the tank caps opened and the fuel was vented. The Virginia State Police checked the brake adjustments on both the tractor and trailer and found that the brakes were adjusted to provide the truck with full braking capability.

A check of the truckdriver's log books revealed that he was within driving time limitations for his current trip. On May 9, 1987, he had exceeded the 10-hour driving rule by 5 hours, and in April, he violated the 10-hour driving rule on five separate occasions. The carrier stated that he checked log books for accuracy, but apparently there was no enforcement action taken against offending drivers.

The truckdriver had 30 years of experience operating heavy trucks. He also had attended two commercial vehicle training classes. His State driving records showed five traffic violations and two accidents in the last 8 years.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the truckdriver's failure to perceive the stopped passenger car ahead of him. The reason(s) for that failure was not determined.

INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours

2. Motor Carrier Oversight of Driver

CASE NO.: 154

Investigation No.: MKC-87-H-TR04
Accident Location: Interstate 8 miles east of Evanston, Wyoming
Lanes: 4-lane divided roadway
Median: 17-foot wide earthen median
Features: 6 percent downgrade
Date and Time: December 27, 1986, 6 p.m.
Ambient Conditions: Snowing, darkness, wet road surface
Heavy Truck Involved: 1984 COE Peterbilt tractor in combination with a loaded twin bulk-hopper tanker trailer combination
Motor Carrier: Matlock, Inc.
Type of Operation: Common carrier
Size of Operation: 47 power units
Total Weight of Truck(s): Not determined
Total Length of Truck(s): Not determined
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The Peterbilt truck and twin trailer combination westbound, descending a 6 percent downgrade on a wet roadway when the rear trailer began rotating to the left. This trailer broke loose from the pintle connection, crossed the median of the roadway, and came to rest in the eastbound lanes. The swinging action of the rear trailer pushed the front trailer forward and the Peterbilt tractor jackknifed on the slippery surface. The first trailer separated from the tractor at the fifth wheel position, overturned, crossed the median, and came to rest in the eastbound lanes. The tractor crossed the median and both eastbound lanes before coming to rest.

The collision resulted in substantial damage to the combination unit and the driver received minor injuries.

A broken ratio relay valve was found on the rear trailer. Metallurgical analysis showed that the failure may have resulted from improper attachment of the flange to the main device. It appeared that the flexible O-ring was not completely seated in the groove at the time the flange was screwed down. Consequently, when the cap screws were tightened, a bending and twisting force was developed in the flange probably resulting in a crack and, later, the complete failure.

The driver stated that he heard a "bump" before the instability. When the relay valve failed, the spring brakes locked on the rear trailer causing it to swing to the left on the slippery surface.

It was also noted that one bolt on the Heil semitrailer fifth wheel plate was missing its self-locking nut. The remaining nine bolts were pulled through the fifth wheel plate during the collision sequence.

Records furnished by the driver's employer showed that the driver had been convicted of one traffic violation and had not been involved in any accidents. This information was furnished by the driver. However, a check of the State driver records showed that the driver had been involved in two accidents and convicted of three traffic violations during the past 3 years.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the rapid air loss caused by a failure of the ratio relay valve on the second trailer of the combination unit which resulted in the lockup of the rear trailer brakes and the subsequent trailer instability.

OF INTEREST IN THIS INVESTIGATION:

1. Double Trailers
2. Driver History

CASE NO.: 155

Investigation No.: ATL-87-H-TR11
Accident Location: Georgia Highway 26 at MP 163, 2 miles east of Montezuma, Georgia
Lanes: 2 lanes, undivided
Shoulders: Variable width grass
Median: None
Features: Straight, level, at grade
Date and Time: March 19, 1987, 11:30 a.m.
Ambient Conditions: Clear, daylight, dry
Heavy Truck Involved: 1978 International conventional tractor in combination with a loaded 41-foot trailer
Motor Carrier: W.A. Sargent
Type of Operation: Private carrier
Size of Operation: 2 power units
Total Weight of Truck(s): about 77,000 pounds
Total Length of Truck(s): 50 feet
Other Vehicle Involved: 1981 GMC 48-passenger church bus
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 31

SUMMARY:

A combination unit was traveling eastbound at a driver-reported speed of 50 mph when a westbound 48-passenger bus initiated a left turn into a commercial driveway. The truck moved into the west lane and the service brakes were applied. There was a westbound truck traveling behind the bus. As the combination unit driver observed the westbound truck, he steered back into the eastbound lane and impacted the right rear of the bus. The truck continued for 190 feet and came to rest upright in a ditch at the right road edge. The bus traveled an additional 10 feet after impact.

This accident resulted in substantial damage to both the power unit of the combination unit and to the right rear side of the bus. The unrestrained truckdriver was uninjured. No injuries resulted to the unrestrained busdriver. Thirty-one of the 34 bus passengers sustained minor to moderate injuries; 6 were hospitalized.

Postcrash inspection revealed that the service brakes on the truck were defficient--three wheels of the tractor were not braking. The motor carrier had no maintenance program and no company repair facility. The owner stated that he made daily visual inspections of his two trucks. The truckdriver reported that he had not inspected the combination unit. Georgia exempts agricultural trucks, including log trucks, from State safety requirements, e.g., vehicle inspections.

The truckdriver stated that he assumed that the busdriver had observed his oncoming truck and was going to wait to initiate his turn until he had passed by. The busdriver stated he did not see the truck.

The truckdriver had reportedly accumulated about 8 years of experience driving combination vehicles. A check made of the driver's violation history revealed three traffic violations--two for speeding and one for DWI. In addition, his driver's license had been suspended following the DWI conviction. The driver related to investigators that he had been convicted of an additional speeding violation about 10 days before the accident.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was failure of the busdriver to yield the right of way to oncoming traffic before initiating a left turn. Contributing to the severity of the crash was the inability of the truck to reduce its speed significantly due to inoperative brakes.

OF INTEREST IN THIS INVESTIGATION:

1. Driving History
2. Motor Carrier Oversight of Driver
3. Motor Carrier Oversight of Equipment

CASE NO.: 156

Investigation No.: DEN-87-H-TR13
Accident Location: Interstate 15 outside Beaver, Utah
Lanes: 4 lanes, divided
Shoulders: Median shoulder 10-foot asphalt, outside shoulder 4-foot asphalt
Median: Undetermined width of grass
Features: Straight, at grade, +1 percent upgrade
Date and Time: April 29, 1987, 7:15 a.m.
Ambient Conditions: Clear, 49°F, daylight, and dry
Heavy Truck Involved: (1) 1976 Peterbilt conventional 3-axle tractor in combination with a loaded 47-foot van trailer
Motor Carrier: MST Truckline
Type of Operation: Unknown
Size of Operation: Unknown
Heavy Truck Involved: (2) 1984 Kenworth conventional 3-axle tractor in combination with a loaded 47-foot van trailer
Motor Carrier: Belkins Van Lines Company
Type of Operation: Contract carrier
Size of Operation: 10 power units
Total Weight of Truck(s): (1)-Undetermined; (2)-Undetermined
Total Length of Truck(s): (1)-Undetermined; (2)-Undetermined
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The driver of the Peterbilt had pulled off on the outside shoulder and activated his emergency flashers to check the air pressure in his tires. As he was pulling back into traffic using his left blinker, the driver noticed another tractor and trailer coming up behind him in the outside lane. The Peterbilt driver continued to gain to an estimated speed of 40 mph and looked in his mirror once more just as the Kenworth struck him in the rear of his trailer. The trailer doors were torn off and a small part of the load of hazardous materials was spilled on the highway. The Kenworth continued forward, veered left into the median, and came to rest with the tractor in the opposite lanes of travel and the trailer still partially in the median. The operator of the Peterbilt was able to get his vehicle stopped on the outside shoulder.

The Peterbilt tractor was not damaged; however, the rear portion of the trailer sustained substantial damage. Neither the driver nor the codriver of the Peterbilt was restrained or injured. Extensive damage to the front of the Kenworth tractor was noted and there was minor damage to the front of the trailer. The Kenworth driver received serious injuries.

An examination of the Kenworth tractor and its trailer revealed that 4 out of 10 of its brakes were in need of adjustment. The driver's log books were 3 days behind. It was determined that he had been driving or on duty for 30 hours without rest or sleep.

Drug paraphernalia and a bottle of bourbon were found in the cab of the Kenworth, along with three small bottles of a white powder. The Utah State Crime Laboratory identified the white powder as cocaine. Blood drawn from the Kenworth driver more than 3 hours after the accident was analyzed and was found to contain 0.05 micrograms per milliliter of cocaine and 1.2 micrograms per milliliter of benzoylecgonine. He was placed under arrest by the Utah State Patrol. Sixty days after the accident, the carrier had not initiated any disciplinary action against the driver of the Kenworth.

The trailer being pulled by the Peterbilt was loaded with various chemical products. A partial carton of chlorine trifluoride pellets was spilled on the highway. Emergency response personnel covered the pellets with plastic to contain them and to protect them from moisture. The driver of the Peterbilt provided the investigating officers with adequate information concerning his load of hazardous materials.

The operator of the Peterbilt had 2 years of experience operating heavy trucks with an annual estimated mileage of 15,000 miles. He stated that he had never received any formal training for driving commercial vehicles. In the last 3 years, his driving record showed no violations or accidents. The driver of the Kenworth combination had been operating heavy trucks for 7 years, with an estimated average of 135,000 miles each year and had never received any formal training in the operation of heavy trucks. His driving record showed seven violations in the last 3 years and two accidents in the past 5 years, none of which were reported to the carrier.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the Kenworth driver's failure to perceive the preceding Peterbilt due to his impairment from a combination of acute fatigue and the ingestion of cocaine. Contributing to the accident was the slower speed of the Peterbilt combination.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours
2. Alcohol/Drugs
3. Driving History
4. Motor Carrier Oversight of Driver
5. Motor Carrier Oversight of Equipment
6. Hazardous Material

CASE NO.: 157

Investigation No.: ATL-87-H-TR20
Accident Location: Interstate 40, 20.5 miles west of Clyde, North Carolina
Lanes: 4
Shoulders: Asphalt, 3 feet inside and 10 feet outside
Median: Concrete barrier
Features: Winding downgrade
Date and Time: May 22, 1987, 7:45 a.m.
Ambient Conditions: Clear, daylight, and dry
Heavy Truck Involved: 1984 Freightliner conventional tractor in combination with 2 loaded 28-foot cargo van trailers
Motor Carrier: Ryder/PIE Nationwide, Inc.
Type of Operation: Common carrier
Size of Operation: 4,175 power units
Total Weight of Truck(s): 71,500 pounds
Total Length of Truck(s): 66 feet
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The twin trailer combination unit was negotiating a 6° right curve on a 5 percent downgrade when the rear trailer began weaving back and forth in the road. According to witnesses, this whipping action continued for about 1 mile before the rear trailer began overturning to the right. The trailer broke free from the pintle coupling as it overturned, skidding on its right side into a guardrail. Witnesses indicated that the combination unit was traveling at about 45 mph when the driver lost control.

The collision resulted in substantial damage to the overturned rear trailer. The power unit was undamaged, and the lead trailer received damage only at the pintle assembly. The driver was not injured.

The driver stated that he had about 3 years of experience operating twin trailer combination, but he had never received hands-on training in the operation of double trailer units. The only training furnished by the motor carrier to drivers of twin trailer combination units consisted of a brief orientation relating to instructions on coupling and uncoupling equipment. Records furnished by the driver's employer showed that he had been convicted of two traffic violations in the preceding 7 years and had been involved in 11 accidents in the past 20 years.

The driver was taking oral medication to control diabetes, but he was qualified medically under the FMCSR since he was not injecting insulin.

Clyde, North Carolina
Case No. 157

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the driver's failure to control the lateral movement of the rear trailer during the steep descent. Contributing to this failure was the driver's inadequate training on the exceptional handling characteristics of twin trailer combinations.

OF INTEREST IN THIS INVESTIGATION:

1. Driver Training/Experience

2. Driver History

3. Double Trailers

CASE NO.: 158

Investigation No.: ATL-87-H-TR07
Accident Location: Interstate 85, 4.6 miles south of Kings Mountain, North Carolina
Lanes: 4
Shoulders: Asphalt, 4 feet inside and 10 feet outside
Median: Grass, depressed
Features: Downgrade
Date and Time: January 25, 1987, 10:30 p.m.
Ambient Conditions: Dark, ice-covered asphalt
Heavy Truck Involved: 1978 Peterbilt COE in combination with 2 loaded cargo van trailers
Motor Carrier: Transus, Inc.
Type of Operation: Common carrier
Size of Operation: 400 power units
Total Weight of Truck(s): Not determined
Total Length of Truck(s): 66 feet
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The northbound twin trailer combination unit was traversing a 4 percent downgrade on an ice-covered section of roadway when the rear trailer skidded left, overturned, and separated from the front trailer at its pintle coupling. The rear trailer collided with a metal guardrail and slid on its side for approximately 130 feet. The power unit and lead trailer remained upright and were stopped by the driver without further instability.

The rear trailer sustained moderate damage, as did its cargo. The power unit was undamaged, and the only damage found to the lead trailer was at the pintle coupling. The lapbelt-restrained truckdriver reported no injury.

The driver had accumulated about 2 years of heavy vehicle operating experience, but he had only 7 months part-time experience in the operation of double trailer combinations. While he had completed a 40-hour commercial vehicle driving course, the driver indicated that he had received only 2 hours of specialized training on double trailer operations. Records furnished by the driver's employer showed that the driver reported that he had not been involved in any accidents and had only received two traffic tickets. However, a check with Georgia showed that the driver had been involved in one accident and had been convicted of four traffic violations in the preceding 5 years.

Kings Mountain, North Carolina
Case No. 158

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was a combination of the driver's inadequate training, his inexperience, and his decision to continue the trip during hazardous weather conditions.

OF INTEREST IN THIS INVESTIGATION:

1. Driver Training/Experience
2. Motor Carrier Oversight of Driver
3. Double Trailers
4. Environment

CASE NO.: 159

Investigation No.: SEA-87-H-TR09
Accident Location: Interstate 5 outside Woodburn, Oregon
Lanes: 6 lanes, divided
Shoulders: Median shoulders 15-foot asphalt and outside shoulders 10-foot asphalt surface
Median: 40-foot grass median with 6-foot tall rose bushes
Features: Straight, at grade
Date and Time: May 28, 1987, 9:20 a.m.
Ambient Conditions: Cloudy, daylight, 60°F and dry
Heavy Truck Involved: 1984 Freightliner conventional tractor in combination with 2 empty 27-foot van trailers
Motor Carrier: Milne Truck Lines, Inc.
Type of Operation: Common carrier
Size of Operation: 198 power units
Total Weight of Truck: 29,818 pounds
Total Length of Truck: 68 feet 11 inches
Other Vehicles Involved 2 passenger vehicles
Truck Fatalities: 0 Truck Injuries: 1
Other Fatalities: 1 Other Injuries: 4

SUMMARY:

The doubles combination was traveling at a reported speed of 55 to 60 mph on a straight and flat section of the highway in the outside lane, when a Chevrolet crossed the median and proceeded across the path of the combination unit. Witnesses reported this vehicle was traveling at high speed in the outside lane, passing cars, and then suddenly veering right and into the median. The tractor struck the right front fender of the Chevrolet, causing it to rotate over 720° counterclockwise while traveling about 130 feet before it came to rest on the median shoulder. The tractor and both trailers continued forward and to the left, where they turned into the median about 300 feet from the point of impact. After crossing the median, the doubles combination proceeded across the oncoming lanes of traffic. Another passenger vehicle, traveling in the lane next to the median, struck the first trailer at the position of the landing gear, continued under the trailer and out the other side, coming to rest in the center lane about 55 feet from where it impacted the trailer. The tractor came to rest off the paved shoulder with the first trailer partially on the paved shoulder and the rear trailer blocking the center and outside lanes.

This accident resulted in moderate damage to the front end of the tractor and minor damage to the first trailer. The lapbelted tractor driver received only minor injuries. The first collision destroyed the Chevrolet and two unrestrained occupants were ejected. The driver received serious injuries and the right front occupant was fatally injured. The unrestrained rear seat occupant remained in the vehicle and received only minor injuries. The second passenger car, which passed under the trailer, received substantial damage, having the roof torn off. Both restrained front seat occupants received moderate injuries.

An examination of the tractor revealed that bolts attaching the steering gear box to the frame had been sheared off and that the front motor mount had been broken off. The broken motor mount allowed the engine to drop which cut an air hose supplying air to the front brakes. Torn sheet metal from the Chevrolet cut the tractor's left front tire causing a complete loss of air. The operator stated he noticed a strong pulling to the left and ineffective brakes. He tried to correct the situation by steering to the right and applying the trailer brake hand valve. The front bumper on the tractor lacked 21 inches on both sides of extending the full width of the tractor. Had the bumper been full width, it still might not have been strong enough to protect the tire from damage.

The second passenger car went under the trailer where the frame was about 49 inches above the ground. A higher vehicle would have presented even more serious hazards to the occupants.

The driver of the doubles combination had 44 years of experience driving heavy vehicles and 17 years driving doubles combinations. He estimated his average annual mileage to be 80,000 miles, and he reported that he had received no formal training. In the last 4 years, he had a record of six violations, four of which were for speeding.

PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of this accident was that the driver of the Chevrolet passenger car drove his vehicle across the median and into the path of the combination unit.

OF INTEREST IN THIS INVESTIGATION:

1. Double Trailers

CASE NO.: 160

Investigation No.: DEN-87-H-TR18
Accident Location: Entrance ramp to Interstate 80 at Elk Street, Rock Springs, Wyoming
Lanes: 2 lanes
Shoulders: 2-foot wide concrete surfaced
Median: 4-foot wide concrete divider
Features: Up-grade
Date and Time: June 23, 1987, 5:30 a.m.
Ambient Conditions: Clear, dry concrete
Heavy Truck Involved: 1982 Kenworth conventional in combination with a loaded tanker trailer
Motor Carrier: Desert Oil Company
Type of Operation: Common carrier
Size of Operation: 5 power units
Total Weight of Truck(s): 68,110 pounds
Total Length of Truck(s): 55 feet
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The Kenworth tractor was eastbound on the entrance ramp to Interstate Highway 80 pulling a Timpte semitrailer loaded with 7,500 gallons of Naptha when the semitrailer slid loose from the tractor's fifth wheel. The semitrailer dropped to the pavement landing on its landing gear. The gear punctured the underside of the tanker allowing Naptha to leak onto the pavement. The landing gear collapsed allowing the king pin to strike the pavement, and sparks ignited the liquid cargo. The ensuing fire destroyed the tanker semitrailer.

During the inspection of the tractor and the Holland, Type "A," fifth wheel mechanism, it was found that the release handle had been heated with a welding torch and bent at a different angle than the manufacturer's specification. The modification allowed the release handle end to rest on the side of the tractor frame when the handle was pulled out and turned down. The company's mechanic stated he made the modification on June 5, 1987. He said the modification was made because the drivers complained that the release did not work, and the drivers had to rely on a second person to pull and hold out the release handle in order to disconnect it from a semitrailer. Also, he made the modification because he felt the handle stuck out in the tires path, and he was afraid during the winter months a snow chain would catch on it. He advised he did not have any Holland Service Manuals on the fifth wheel involved. He felt he was doing the right thing by making the modification.

Tests were conducted by coupling the accident tractor to a semitrailer similar to the one destroyed in the accident. During the first test, when the accident tractor was backed under the semitrailer and the fifth wheel release handle was in the normal position above and not touching the frame. There was no problem when the fifth wheel king pin coupled together. The king pin slid into the fifth wheel opening, the lock yoke slammed into place around the back of the king pin, and the safety lock plunger fully engaged behind the lock yoke. When the driver tried to release from the semitrailer by pulling the release handle, backing, and then pulling forward, the fifth wheel remained fully coupled to the king pin. The release mechanism would not release under these normal procedures. The driver could use two methods to make the release mechanism work so the tractor could be separated from the semitrailer. The first method involved a second person who would pull out and hold the release handle at the maximum release position, while the driver drove the tractor forward separating it from the semitrailer. The second method was for the driver to pull out the release handle and position the handle end on the side of the tractor frame. This kept the release mechanism at the maximum release position and allowed the driver to separate the tractor from the semitrailer without any help. However, as the semitrailer slid off the fifth wheel, it caused the release handle to rotate upward and inward about 1/4 inch, and the end of the handle would become lodged in a groove above the frame. The groove was where the fifth wheel cog-rack was welded to the top of the tractor frame.

A second test was conducted with the fifth wheel release handle end positioned in the groove between the tractor frame and cog-rack. The accident tractor was backed under the same semitrailer used in the first test. The king pin slid into the fifth wheel opening, the lock yoke slammed in place around the back of the king pin, the safety lock plunger came out and barely engaged behind the back of the lock yoke. Because of the grease and darkness in the lock area, a person could not determine if the safety lock plunger was fully engaged without the use of a strong flashlight. Under this coupling, the tractor was driven forward and backwards and the semitrailer followed without separating from the tractor. However, when the tractor was jolted forward several times, the safety plunger gave away and allowed the fifth wheel mechanism to release. This test was conducted 12 different times and each time the results were the same. The tests revealed that the modified release handle caused the release mechanism to be in an unsafe partially locked position.

The truckdriver reported 12 years experience in the operation of heavy trucks, the same period of time he had been with his current employer. He had received no formal nor specialized training.

Rock Springs, Wyoming
Case No. 160

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the driver to ensure that the semitrailer king pin was completely locked into the tractor fifth wheel assembly. Contributing to this failure was the improper modification made to the release assembly by the company mechanic.

OF INTEREST IN THIS INVESTIGATION:

1. Motor Carrier Oversight of Driver
2. Motor Carrier Oversight of Equipment
3. Hazardous Material

CASE NO.: 161

Investigation No.: MKC-87-H-TR09
Accident Location: U.S. 71 and S.H. 69, at Mansfield, Arkansas
Lanes: 2-lanes, 2 direction, asphalt surfaced
Median: N/A
Features: Straight with a major intersection
Date and Time: April 20, 1987, 8:55 a.m.
Ambient Conditions: Clear and dry
Heavy Truck Involved: 1985 International tractor in combination with a 1980 Trailmobile MC# 306 Al. tank trailer
Motor Carrier: Arkansas Transport Company
Type of Operation: Common Carrier
Size of Operation: 46 power units
Total Weight of Truck(s): 78,420 pounds
Total Length of Truck(s): 58 feet
Other Vehicle Involved: 1986 Dodge Colt station wagon, 1982 Cadillac, 1982 Buick Regal, 1982 Datsun 2-door
Truck Fatalities: 0 Truck Injuries: 1
Other Fatalities: 3 Other Injuries: 2

SUMMARY:

The International truck and trailer was southbound on U.S. 71 approaching the intersection of SH-69 when a 1986 Dodge station wagon pulled onto U.S. 71 in front of the southbound truck. The truck struck the 1986 Dodge in the left rear, traveled across the northbound lane, and struck a parked northbound 1982 Cadillac. At that time, a northbound 1982 Buick struck the truck in the right side. The truck rolled 270°, came to rest on top of the 1982 Buick, and started to burn. A 1983 Datsun that was also northbound struck the truck but was able to roll backwards without catching on fire.

The 1986 Dodge station wagon, the 1985 International truck, the 1982 Cadillac, and the 1982 Buick were all destroyed by the postaccident fire. The driver of the 1986 Dodge station wagon and a passenger who was restrained in a child safety seat received minor injuries. The lapbelt-restrained driver of the 1985 International received serious burns. The driver and two passengers of the 1982 Buick were fatally injured.

The driver of the 1985 International, according to his application, had been driving for 37 years. The last 20 years he had been driving large articulating vehicles. He had been with this company for 9 years. The records provided by the company indicates that he had one accident and one violation in the last 20 years.

This company requires 3 years of verifiable driving experience to be hired as a driver. They also require anyone that is going to haul hazardous material to attend a 1-week training session provided by the company.

Mansfield, Arkansas
Case No. 161

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the driver of the 1986 Dodge Colt station wagon to yield the right-of-way to the 1986 International Truck.

OF INTEREST IN THIS INVESTIGATION:

1. Hazardous Material

CASE NO.: 162

Investigation No.: ATL-87-H-TR13
Accident Location: State Highway 18 near Forsyth, Georgia
Lanes: 2 lane, 2 direction
Shoulders: Grass, variable width
Median: None
Features: 4° left curve, 4.3 percent downgrade
Date and Time: April 2, 1987, 10:16 a.m.
Ambient Conditions: Clear, dry, daylight
Heavy Truck Involved: 1979 conventional International tractor in combination with a loaded MC 331 cargo tank semitrailer
Motor Carrier: Green's Propane Gas Corporation
Type of Operation: Private carrier
Size of Operation: 2 tractors, 26 trucks
Total Weight of Truck(s): Approximately 76,470 pounds
Total Length of Truck(s): Approximately 60 feet
Other Vehicle Involved: None
Truck Fatalities: 1 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The eastbound combination unit was traveling downgrade near the end of a long left curve when it ran off the right pavement edge onto the abutting grassed shoulder. The unit was steered left from the shoulder and immediately began angling left on the pavement. The unit crossed the centerline, traveled over 381 feet before it overturned onto its left side in the westbound traffic lane, and then skidded northeasterly along the north side of the roadway. Beyond the roadway, it traveled through a stand of small trees while descending an embankment. The vehicle stopped at the foot of the embankment, resting on its left side with the tractor facing east. There was no fire or explosion.

The unrestrained truckdriver was ejected and killed. The tractor was destroyed. The 11,400-gallon capacity trailer, loaded with 9,000 gallons of liquefied petroleum gas (LPG), received minor crush damage. Minor spillage of LPG resulted from a damaged vapor line on the trailer.

This driver had been operating LPG tractor semitrailer units for about 10 years and had been employed by the carrier for about 7 months. He held a valid operator's license, restricted to wearing corrective lenses, and an expired medical examiner's certificate that had qualified him as an interstate truckdriver before its expiration. His driving record for the prior 9 years revealed nine traffic violations and one accident; eight of the traffic violations were speeding. He had received no formal truckdriver training.

The driver had been on duty approximately 24 3/4 hours during the preceding 7 days, and at the time of the accident, he had been driving for about 10 1/2 hours since his last consecutive 8 hours off duty. He had arrived at home about 1:30 a.m. on the morning of the accident after working 13 3/4 hours and then was off duty only 7 1/4 hours before starting the accident trip. He had driven about 1 hour, loaded the truck, and traveled about 32 miles after leaving his home on the accident trip. He had also driven about 15 minutes after having been on duty for 15 hours.

Tire markings on the roadway and the fact that the cargo was liquid loaded to only 78.9 percent of the tanker's capacity suggest that transverse loadings resulted from liquid surge began when the combination unit ran onto the sloping shoulder. When the trailer returned to the pavement and crossed the roadway, those surging forces were amplified to a point where the driver ultimately lost control and the vehicle overturned.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the fatigued truckdriver to maintain his lateral lane position on the roadway combined with the lateral surge of liquid in the partially loaded tanker trailer.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours
2. Motor Carrier Oversight of Driver
3. Hazardous Material

CASE NO.: 163

Investigation No.: MKC-87-H-TR13
Accident Location: K-156, 2.3 Miles west of Jetmore, Kansas
Lanes: 2 lanes, 2 direction, asphalt surfaced
Median: N/A
Features: At grade, grassy open rolling country
Date and Time: May 4, 1987 3:25 pm
Ambient Conditions: Cloudy, daylight and dry
Heavy Truck Involved: 1984 Kenworth tractor in combination with a 1986 Merritt livestock trailer
Motor Carrier: Speedway Transportation, Inc.
Type of Operation: Common carrier
Size of Operation: 149 power units
Total Weight of Truck(s): Not determined
Total Length of Truck(s): Not determined
Other Vehicle Involved: 1981 Chevrolet station wagon
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 5 Other Injuries: 2

SUMMARY:

The Kenworth combination unit was eastbound on K-156 descending a slight grade to an intersection where a county road crossed K-156. A 1981 Chevrolet station wagon, being used as a schoolbus, pulled onto K-156 in front of the combination unit and was struck broadside. From impact, the Chevrolet station wagon was carried a short distance by the truck before the vehicles separated. Both traveled off the northeast corner of the intersection and came to rest.

This accident resulted in only minor damage to the power unit of the combination unit. However, the passenger car was destroyed, with crush depths reaching up to 17 inches over a 144-inch wide area of the left side. The lapbelt-restrained truckdriver was not injured. Five of the seven occupants of the station wagon sustained fatal injuries, one received serious injuries, and one received minor injuries.

Records furnished by the truckdriver's employer revealed that he had accumulated about 2 years of experience with heavy trucks. He had been employed by the carrier for 4 months. His record indicates that he has had one accident and no traffic convictions in the past 3 years.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the driver of the 1981 Chevrolet station wagon to yield the right-of-way to the combination vehicle.

CASE NO.: 161

Safety Board Investigation No.: CHI-87-H-TR02
Accident Location: State Route 131, Lake County, Illinois
Lanes: 4 lanes, undivided
Shoulders: Gravel, varying width
Median: None
Features: Signalized intersection
Date and Time: October 17, 1986, 12:18 p.m.
Ambient Conditions: Clear, dry, daylight
Heavy Truck Involved: (1) 1976 conventional Peterbilt in combination with a loaded 24-foot gravel-dump trailer
Motor Carrier: (1) Kirschhoffer Truck Service, Inc.
Type of Operation: (1) Common carrier
Size of Operation: (1) 15 power units
Heavy Truck Involved: (2) 1985 COE Kenworth tractor in combination with a loaded 45-foot flatbed trailer
Motor Carrier: (2) The Mickow Corporation
Type of Operation: (2) Common carrier
Size of Operation: (2) 330 power units
Total Weight of Truck(s): (1) Not determined (2) 38,365 pounds
Total Length of Truck(s): (1) Not determined (2) Not determined
Other Vehicles Involved: 6 passenger vehicles
Truck Fatalities: 1 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The Peterbilt combination unit was traveling south when it entered a signalized intersection. Witnesses stated that the signal light was red for southbound traffic. An eastbound Kenworth preceding through the intersection at the same time was struck in the left side of the tractor cab by the front of the southbound tractor. Investigators recorded 26 feet of preimpact skidmarks from the southbound combination unit. From the area of impact, the two combination vehicles remained together as they traveled southeasterly for over 130 feet to a position of final rest in a restaurant parking lot. At final rest the gravel-dump trailer of the Peterbilt was partially overturned. Six passenger vehicles received damage from either the combination units or portions of the trailers' loads.

The driver of the Kenworth was ejected and fatally injured during the collision sequence. The Peterbilt driver received serious injuries which required hospitalization. Neither driver was restrained. Both tractors were destroyed, and the trailers received substantial damage.

The driver of the Peterbilt refused to furnish training and experience information, and his employer did not maintain employment records. A search of driving history revealed that he had received four convictions and five warnings of unsafe vehicle violations in the 2 years preceding this accident. He had been involved in 4 accidents in the 10 months preceding this accident, including three in the accident-involved tractor. Toxicology tests performed as a result of this accident revealed the presence of cocaine, phenylpropanlamine, and ephedrine in the driver's system.

A postcrash inspection of the Peterbilt combination unit resulted in the vehicle being placed out of service due to multiple safety violations. The violations noted included a missing brake drum on one axle, tire cord exposed on at least two tires, and broken suspension components. The carrier had been in operation for approximately 2 1/2 years, yet had not complied with Federal or State recordkeeping requirements, vehicle inspections, or driver history checks. The motor carrier stated to investigators that had they known of the driver's drug use, driving record, or the condition of his truck, he would not have been employed. At the request of the Safety Board, an audit of the carrier was conducted by the BMCS. The BMCS cited the carrier for multiple violations regarding driver qualification files, vehicle inspections, records of duty status, and maintenance records. An "unsatisfactory" rating was assigned to the carrier.

The Kenworth driver had been operating heavy trucks for 19 years and had been contracted to his carrier for 5 months. A search of his driver history records revealed five traffic violations in the past 5 years. No record of accident involvement in that 5-year period was found.

PROBABLE CAUSE:

The National Transportation Safety Board determined that the probable cause of this accident was the failure of the Peterbilt driver to obey the traffic signal at the intersection. It is not known to what extent the driver's use of cocaine was a factor in the accident.

OF INTEREST IN THIS INVESTIGATION:

1. Alcohol/Drugs
2. Driving History
3. Motor Carrier Oversight of Driver
4. Motor Carrier Oversight of Equipment

CASE NO.: 165

Investigation No.: MKC-87-H-TR15
Accident Location: State Highway 6, at Green Castle, Missouri
Lanes: 2 lanes, 2 direction
Median: None
Features: Urban highway
Date and Time: June 4, 1987, 10:45 p.m.
Ambient Conditions: Clear, dry, and dark
Heavy Truck Involved: 1985 Mack COE in combination with a 40-foot van trailer
Motor Carrier: North Arkansas Wholesale Company, Inc.
Type of Operation: Private carrier
Size of Operation: 839 power units
Total Weight of Truck(s): 58,034 pounds
Total Length of Truck(s): 59 feet 6 inches
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The Mack tractor and semitrailer combination was traveling eastbound on SH-6 in the town of Green Castle, Missouri, when the driver lost control. The vehicle traveled off the right shoulder into a ditch along the road and rolled onto its right side. There was minor damage to the truck. There were no other vehicles involved.

Records furnished by this driver's employer indicated that he had been driving large articulating vehicles for 16 years. He had received three violations for exceeding the posted speed limit since May 26, 1981. This driver had a short suspension in October 1982 for failure to pay a fine on a citation.

This driver was cited for DWI. His BAC was 0.19 percent approximately 2 hours after the accident.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the driver's failure to maintain his vehicle within the travel lane due to alcohol impairment.

OF INTEREST IN THIS INVESTIGATION:

1. Alcohol/Drugs

CASE NO.: 166

Investigation No.: MKC-87-H-TR08
Accident Location: U.S. Highway 167, 2 miles south of East End, Arkansas
Lanes: 2 lanes undivided
Median: none
Features: Rolling hills with occasional curves
Date and Time: April 7, 1987, 11:05 a.m.
Ambient Conditions: Clear, dry, daylight
Heavy Truck Involved: Kenworth COE tractor in combination with a partially loaded 40-foot flatbed trailer
Motor Carrier: A.K.T. Trucking, Inc.
Type of Operation: Common carrier
Size of Operation: 11 Power units
Total Weight of Truck(s): Not determined
Total Length of Truck(s): 65 feet
Other Vehicle Involved: Buick passenger car
Truck Fatalities: 0 Truck Injuries: 1
Other Fatalities: 1 Other Injuries: 0

SUMMARY:

The combination unit was traveling southwest on a straight area of road when a Buick passenger car, traveling northeast, veered to the left from the opposing lane and collided into the front of the tractor. From the impact area, the combination unit crossed the eastbound travel lane and entered the southside road ditch, traveling approximately 175 feet before coming to rest upright. The Buick traveled approximately 33 feet and came to a stop in the north ditch.

This accident resulted in substantial damage to the power unit and no damage to the trailer of the combination unit. The passenger car also received substantial damage. The truckdriver, restrained by a lapbelt, sustained minor injuries. The driver of the Buick was fatally injured.

The investigation revealed that the driver of the combination unit had accumulated only 8 months experience in the operation of heavy trucks. Part of that time period had been spent as a codriver. He had been employed by the motor carrier for about 10 months. Although the driver's application did not reflect prior violation history, it was found that the driver's Oklahoma operators license had been revoked in 1983 due to a DWI violation.

An examination of the truckdriver's daily logs revealed that dates reflected on the documents had been altered.

East End, Arkansas
Case No. 166

PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of this accident was that the driver of the Buick permitted her vehicle to drift into the opposite traffic lane.

OF INTEREST IN THIS CASE

1. Driving History

2. Motor Carrier Oversight of Driver

CASE NO.: 167

Investigation No.: CHI-87-H-TR04
Accident Location: Clay Street at rail crossing # 870-879-M, Gary, Indiana
Lanes: 2 lanes, 2 direction
Shoulders: Gravel, varying width
Median: None
Features: Grade crossing, protected with lights and gates
Date and Time: October 30, 1986, 6:40 p.m.
Ambient Conditions: Clear, dry, artificial light
Heavy Truck Involved: 1977 GMC conventional tractor in combination with a loaded 40-foot pallet trailer
Type of Operation: Common carrier
Size of Operation: 21 power units
Total Weight of Truck(s): 77,790 pounds
Total Length of Truck(s): Approximately 55 feet
Other Vehicle Involved: Passenger train
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 32

SUMMARY:

The combination unit was northbound, traversing a grade crossing, when its low-profile pallet trailer became stuck. The driver stated that as he had attempted to accelerate from a stop, the tractor drive shaft failed. He then exited the cab. A westbound passenger train struck the left side of the trailer at a speed estimated by the engineer to be 45 mph. The speed of passenger trains approaching the crossing was limited by the railroad to 35 mph. At impact, an unsecured coil of sheet steel weighing 38,190 pounds was dislodged from the trailer's pallet and entered the front of the train's leading passenger car. The coil continued rearward through the passenger car destroying seats and striking passengers. The train traveled approximately 641 feet from impact before coming to rest with the front end of the leading passenger car derailed. The impact separated the tractor from the trailer at the fifth-wheel connection. The tractor came to rest on the north side of the crossing while the trailer was pushed westward for more than 230 feet.

Of the 32 passengers and traincrew who were injured, 3 passengers and the train's conductor were hospitalized. The truckdriver was not injured.

The truckdriver had been operating heavy vehicles for 15 years. He had been employed by the motor carrier operating the accident type combination vehicle for 2 1/2 years. A search of his driving history revealed two violations in the past 3 years and two automobile accidents in the past 5 years.

The drive shaft of the tractor was found fractured. The differential of the GMC tractor had been rebuilt approximately 1 1/2 months before the accident with a combination of used parts. Metallurgical analysis indicated that the presence of these used parts might have caused a misalignment of the drive shaft which could have contributed to the fracture.

As a result of previous trailer "hang-ups" at this crossing, the motor carrier had agreed to provide emergency notifications of a blocked crossing to the railroad. The investigation revealed that although a two-way radio was present in the tractor, the driver made no attempt to use the established procedure. Additionally, the transmitter was found to be inoperative.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the differential drive shaft yoke on the tractor.

OF INTEREST IN THIS INVESTIGATION:

1. Motor Carrier Oversight of Equipment
2. Grade Crossing
3. Environment

CASE NO.: 168

Investigation No.: SEA-87-H-TR11
Accident Location: State Highway 35, near Polson, Montana
Lanes: 2 lane, 2 direction
Shoulders: South: 2-foot dirt, north: 26-foot asphalt
Median: None
Features: Straight, level, near intersection
Date and Time: August 3, 1987, 6:55 p.m.
Ambient Conditions: Dry roadway, daylight
Heavy Truck Involved: 1978 Peterbilt COE tractor in combination with one empty 45-foot van trailer and one empty 27-foot van trailer
Type of Operation: Contract carrier
Size of Operation: 73 power units, 4 trucks
Total Weight of Truck(s): 36,000 pounds
Total Length of Truck(s): 94 feet 4 inches
Other Vehicle Involved: 1978 Ford pickup
Truck Fatalities: 0 Truck Injuries: 1
Other Fatalities: 1 Other Injuries: 0

SUMMARY:

The combination unit was traveling eastbound at a tachograph-recorded speed of 55 mph when preceding traffic began slowing. As the operator of the combination unit applied brakes, the tractor drive axle tires and trailer tires began to slide. The tractor began a counterclockwise rotation and crossed into the westbound lane of traffic where it was struck on the right side by a westbound pickup truck. Approximately 300 feet of skidmarks from the combination vehicle preceded the impact. The tractor came diagonally across the roadway, facing northeast, and the rear trailer came to rest in the eastbound lane facing east. The pickup came to rest on the north shoulder facing west.

This accident resulted in minor injuries to the unrestrained driver of the combination unit. The tractor received moderate damage. Minor damage was noted at the left front of the first trailer while the convertor dolly and rear trailer were undamaged. The pickup truck was destroyed and its unrestrained driver fatally injured. Toxicology tests were negative for both drivers.

The combination unit driver had 17 years experience with heavy vehicles. He had been employed by the carrier for 8 years, averaging approximately 100,000 miles per year, and had driven twin trailer combination units for the past year. He stated that his father had taught him to drive trucks and that he had never received formal training. The motor carrier had provided limited training. A search of his driving history revealed no violations or accidents for the past 5-year period.

The tractor was not equipped with front axle brakes. No observable defects were noted to the remainder of the vehicle's brakes. Maintenance records revealed that the tractor's, lead trailer's, and rear trailer's brakes had been adjusted 4 days (535 miles) before the accident.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the truckdriver to pay attention to the preceding traffic, thereby causing a delay in brake application. Contributing to the accident was the absence of steering axle brakes which resulted in the jackknife of the tractor.

OF INTEREST IN THIS INVESTIGATION:

1. Double Trailers

CASE NO.: 169

Investigation No.: DEN-87-H-TR16
Accident Location: State Highway 9, 6 miles north of Silverthorn, Colorado
Lanes: 2 lane, 2 direction
Shoulders: 1 foot asphalt, both sides
Median: None
Features: Level, winding, low shoulder
Date and Time: June 2, 1987, 1:45 p.m.
Ambient Conditions: Clear, dry, daylight
Heavy Truck Involved: 1969 Kenworth conventional tractor in combination with a 42-foot loaded tanker trailer
Type of Operation: Contract carrier
Size of Operation: 34 power units
Total Weight of Truck(s): 78,500 pounds
Total Length of Truck(s): Not determined
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The combination unit was traveling northbound at a driver-estimated 40 mph when the vehicle left the right side of the travel lane. In the area, the right side shoulder terminated in a 7- to 8-inch drop-off. The vehicle continued with its right side tires tracking off the shoulder for over 273 feet before the driver regained the roadway. Upon regaining the travel lane, it traveled only 48 feet before again departing from the right shoulder. The vehicle then traveled approximately 154 feet down an embankment, rolled over 270°, and came to rest with the tractor lying on its roof and facing west. Approximately 4,800 gallons of the tanker's load of jet fuel was spilled due to ruptures in the cargo tank. There was no fire.

The tractor was destroyed and the tanker received substantial damage. The unrestrained truckdriver, who was ejected through the windshield during the accident sequence, sustained serious injuries.

This driver had been operating heavy trucks for 17 years. He had been driving vehicles similar to the accident-involved combination for 2 years. He had not been formally trained as a truckdriver, and the company to which he was leased did not provide training. A search of his driving history record revealed four violations in the past 4 years. No record of accident involvement was found for the 5 years preceding this occurrence.

An inspection of the vehicle noted several cracks on both the left and right side fifth wheel ramp supports. Also noted was a loose right side steering kingpin which resulted in a slight wobble in the right front wheel.

Silverthorn, Colorado
Case No. 169

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the truckdriver to maintain his vehicle on the traveled portion of the roadway. Contributing to the accident was the abrupt shoulder drop-off.

OF INTEREST IN THIS INVESTIGATION:

1. Motor Carrier Oversight of Equipment

2. Hazardous Material

3. Environment

CASE NO.: 170

Investigation No.: DEN-87-H-TR15
Accident Location: U.S. Interstate 70, 2 miles east of downtown Denver, Colorado
Lanes: 6-lanes, divided
Shoulders: All shoulders 2-foot wide asphalt with paralleling 24-inch high metal W-beam guardrails
Median: Earthen, 6-foot wide with 6-inch high concrete curbs
Features: Elevated, straight, and level
Date and Time: May 26, 1987, 3:50 a.m.
Ambient Conditions: Clear, dry, dark
Heavy Truck Involved: 1979 Freightliner tractor pulling 2 loaded 27-foot dry van trailers
Motor Carrier: ANR Freight System, Inc.
Type of Operation: Common carrier
Size of Operation: 2,606 power units
Total Weight of Truck(s): 60,440 pounds
Total Length of Truck(s): 69 feet 5 inches
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The combination unit was westbound on the interstate in the left traffic lane. The truck drifted into and along the median's concrete curb for 27 feet before striking a protruding section of the curb at an overpass. The driver lost control when the semitrailers began whipping back and forth. The truck overrode the guardrail, rolled over onto its right side, and began riding on top of both median guardrails for a distance of 325 feet 9 inches. The tractor and first semitrailer remained attached via the fifth wheel and came to rest in the eastbound traffic lanes facing west. The second semitrailer broke loose from the truck unit, rolled over onto its right side, slid up against the guardrail, and came to rest in the westbound left traffic lane facing west. A fire started around the engine but was quickly extinguished.

Both the power unit and semitrailers were destroyed. The converter dolly's left wheel rims were bent and the frame twisted. The unrestrained driver of the truck sustained minor injuries.

This driver stated that he encountered a 4-inch by 4-inch board or post, 2 to 3 feet long that was lying crosswise in his traffic lane. He swerved to the left to miss the board, struck the guardrail, and lost control. Witnesses driving behind the truck and in the same lane, stated that they did not encounter, observe, or find a board. An eastbound witness stated that the accident truck never swerved, but gradually coasted into the guardrail before overturning.

The truckdriver reported 31 years of experience in the operation of heavy trucks with 19 years experience pulling double trailer combinations. No specialized training or formal instruction was recorded for that period. He had been driving this particular tractor for 3 months and was familiar with the road as he has driven the route 20 times per month for the last 2 years. Driver license records showed only one speeding citation in the last 3 years with no suspensions or revocations.

The motor carrier was formed in 1986 from a consolidation of three long standing trucking firms. The company's certification files met DOT requirements.

The driver was on his scheduled days off but had accepted an offer for overtime when the company called with the overtime trip. The truckdriver had been awake and active for 21 hours preceding the accident. At the time of the accident, he had been on duty or driving for 10 1/2 hours. This driver normally worked during the late night and early morning hours.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the fatigued truckdriver's failure to maintain control of his vehicle.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours
2. Motor Carrier Oversight of Driver
3. Double Trailers

CASE NO: 171

Investigation No.: FTW-87-H-TR07
Accident Location: Interstate 75 in Frenchtown, Michigan
Lanes: 6-lane divided, concrete surface
Shoulders: 2-foot wide concrete median shoulder
11-foot wide concrete outside shoulder
Median: 36-foot wide earthen median with a 2-foot wide double blocked-out W-beam guardrail positioned in the center
Features: 3,819-foot radius curve to the right
Date and Time: April 9, 1987, 3:55 a.m.
Ambient Conditions: Clear and dry, dark with no street lights
Heavy Truck Involved: 1984 Mack conventional tractor pulling a partially loaded tanker trailer
Motor Carrier: Ray Molder Carrier Corporation-Refiners Transport & Terminal Corporation
Type of Operation: Common carrier
Size of Operation: 571 power units
Total Weight of Truck(s): 76,660 pounds
Total Length of Truck(s): Approximately 55 feet
Other Vehicle Involved: None
Truck Fatalities: 0 **Truck Injuries:** 1
Other Fatalities: 0 **Other Injuries:** 0

SUMMARY:

At approximately 2 a.m., the driver began loading his truck at the Coulton Chemical plant near Toledo, Ohio. He departed there at about 3:15 a.m. loaded to about 66 percent capacity with 99.7 percent pure sulfuric acid. The 4,950-gallon capacity tanker was filled to about 28 inches from the top of the semitrailer.

The driver was traveling north on I-75 at a tachograph-recorded speed of 61 mph when the combination unit struck a truck tire lying in the center lane of the three northbound lanes. The impact disabled the left front tie-rod on the steering axle of the tractor. The combination unit veered to the left, traveled approximately 222 feet, and collided into the median guardrail. The unit then overrode the guardrail for about 50 feet, overturned 270°, and slid on its right side to where it came to rest in the southbound lanes of I-75. The impact with the guardrail and pavement displaced the screw caps on top of the tanker which allowed approximately 1,850 gallons of acid to spill. The acid flowed into the center median storm drain and then flowed east under the highway into a drainage ditch.

The collision resulted in substantial damage to the combination unit and the unrestrained driver received moderate injuries. The collision also resulted in a release of hazardous materials. The acid reacted with the water in the drainage ditch forming a toxic cloud over the accident area.

After the driver was removed from the scene, the Frenchtown Township fire department implemented the Monroe County, Michigan, disaster plan. In accordance with this plan, the Frenchtown Township fire chief took command and the following agencies were contacted to provide assistance:

1. Michigan State Police
2. Michigan State Police Fire Marshall Division
3. Monroe County Office of Civil Preparedness (OCP)
4. Monroe County Sheriff's Office
5. Monroe County Health Department
6. Toledo, Ohio, Fire Department, Hazardous Materials Response Team
7. Michigan Department of Natural Resources
8. Cousins Waste Control Corp.
9. The Motor Carrier - Leaseway Refinery Corp. of Ohio.
10. U.S. Environmental Protection Agency

At 5 a.m., an evacuation of a 1-square mile area was ordered and the Enrico Fermi II nuclear power plant was requested to monitor wind conditions. A command post was set up on Hurd Road about 2/10 mile from the accident scene. Interstate 75 had been closed since the accident occurred and traffic was detoured onto Dixie Highway. By 6:30 a.m., 100 families had been evacuated and a temporary shelter was established at one of the local schools. At 11 a.m., several tons of soda ash began arriving and the acid was neutralized. By 4 p.m., all of the residents were allowed to return home, but the interstate remained closed until about 11 p.m. On the following day, the interstate was closed again in order to neutralize the residual amounts of acid that remained in the storm drain under the road surface. It required approximately 30 tons of soda ash to neutralize the entire spill. The acid remaining in the damaged tanker was pumped into a waste disposal truck and dumped at a toxic waste site.

In a subsequent interview, the driver stated that he could not respond in time to avoid the tire in the roadway because he was distracted by a pedestrian on the road shoulder that was waving at him in an attempt to warn him about the tire. A witness to the accident stated that the tire had fallen off of a flatbed semitrailer.

The truckdriver had been operating tanker trucks for 15 years and had received driver training and hazardous materials handling training every 3 months during this time period. During the 15-year period, the driver had been involved in six other accidents. However, only one of those accidents was chargeable to the driver.

Frenchtown, Michigan
Case No. 171

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the driver's distraction and the sudden loss of control that resulted from the disablement of the power unit's steering axle.

OF INTEREST IN THIS INVESTIGATION:

1. Hazardous Material

2. Environment

CASE NO.: 172

Investigation No.: SEA-87-H-TR10
Accident Location: Interstate 84, 6 miles south of Durkee, Oregon
Lanes: 4 lanes, divided
Shoulders: Median shoulder 7 feet of asphalt surface, outside shoulder 10 feet of asphalt surface
Median: 17 feet of asphalt surface with concrete barrier
Features: Winding, -2 percent grade
Date and Time: June 5, 1987, 4:30 p.m.
Ambient Conditions: Clear, 80°F, daylight, and dry
Heavy Truck Involved: 1966 White Freightliner straight truck configured with a loaded flatbed
Motor Carrier: Nyssa Co-op Supply
Type of Operation: Private carrier
Size of Operation: 7 power units
Total Weight of Truck(s): 36,900 pounds
Total Length of Truck(s): 26 feet 7 inches
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The loaded straight flatbed truck was traveling down a 2 percent grade at a witness-estimated speed of 55 to 60 mph when a steering axle tire failed. The witness following the truck reported smelling burning rubber. He had begun to slow down in order to inspect his tires when he heard a loud bang. From the point where the tire exploded, a distance of 164 feet was covered before the truck crossed the outside fogline. It then went across the drainage ditch, traversed part of the rocky hillside, came back down, and rolled onto its left side. From where the truck crossed the fogline, it traveled 252 feet before coming to rest. The driver reported that a fire began immediately after the truck came to rest and that he kicked out the front window to exit the vehicle. Emergency response crews fought the fire for 1 hour 15 minutes before they were informed that two 30-gallon drums of 2,4-Dechlorophenoxyactic acid (2,4-D weed killer) were on the truck.

This accident resulted in the destruction of the flatbed truck and its load. Neither the unrestrained driver nor anyone else was injured as a result of the accident.

The driver of the truck stated that after the explosion, the truck kept pulling hard to the right. Due to the fire damage, neither the braking nor the steering systems could be thoroughly examined in order to consider possible contributing factors.

When the vehicle was new, it was equipped with two 23-inch diameter fuel tanks. With these tanks and the 10.00R20 size tires that were on the truck at the time of the accident, the tanks would have been 14.6 inches above the ground. However, the truck had been configured with only one tank sometime before the present owners purchased it. Since that tank was

destroyed in the fire, the actual ground clearance was not determined. A drain type pipe plug was found in the right side wheel tracks on the hillside about 120 feet back of the final resting position.

The shipping papers for the 2,4-D were not in conformance with the FMCSR as they only contained the brand name, Cenex 40A. The instructions on the use of the product stated that it was not to be transported with feed, but the flatbed also contained 15,760 pounds of animal feed.

When the carrier was interviewed it was revealed that he had very little knowledge of the FMCSR and had no driver's qualification files. In spite of the fact that the carrier operated in three States and transported hazardous materials on occasion, the drivers were not required to keep driver's logbooks.

The driver of the flatbed had 15 years experience in the operation of heavy trucks and 2.5 years experience with the accident vehicle. He estimated an annual mileage of 57,500 miles and reported he had received only 4 hours of formal training on safe driving practices. During the past 10 years, his driving record showed two violations for DUI. The second conviction resulted in a 1-year suspension of his driver's license.

PROPOSED PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the driver's loss of control due to the explosive failure of the steering axle tire. Contributing to the severity of the accident was the ruptured fuel tank and resulting fire.

OF INTEREST IN THIS INVESTIGATION:

1. Driving History
2. Motor Carrier Oversight of Driver
3. Motor Carrier Oversight of Equipment
4. Hazardous Material

CASE NO.: 173

Investigation No.: MKC-87-H-TR10
Accident Location: Interstate 40, 8 miles west of Brinkley, Arkansas
Lanes: 4 lanes, divided
Median: 10-foot wide asphalt surfaced outside shoulder
Features: Grass covered, earthen material
Date and Time: April 22, 1987, 2:30 a.m.
Ambient Conditions: Clear, dry, and dark
Heavy Truck Involved: (1) 1987 International conventional tractor in combination with a 48-foot van trailer
Motor Carrier: (1) Conalco Carriers, Inc.
Type of Operation: (1) Common carrier
Size of Operation: (1) 200 power units
Heavy Truck Involved: (2) 1985 Ford conventional tractor in combination with a loaded 48-foot van trailer
Motor Carrier: (2) Pat Salmon & Son
Type of Operation: (2) Common carrier
Size of Operation: (2) 137 power units
Total Weight of Truck(s): (1)Not determined
(2)Not determined
Total Length of Truck(s): (1)Not determined
(2)Not determined
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The Ford combination unit was eastbound in the outside lane when the driver saw an International tractor with a semitrailer parked in his traffic lane due to a prior accident. The Ford could not stop before striking the rear of the International's semitrailer. At some point during the impact sequence the Ford's semitrailer broke loose and struck the power unit in the rear.

The accident resulted in minor damage to the International and semitrailer but no injury to the driver. The Ford received substantial damage to the front and rear of the cab, and its driver received moderate injuries.

The driver of the International had about 9 years of experience with heavy trucks. He had been employed by the carrier for 3 months. A search of driver history records revealed that he had accumulated five traffic violations over the past 2 years and had been involved in four traffic accidents in the past 9 years. None of the traffic violations were reported to the motor carrier on the driver's employment application. Research into the past month of his driving practices indicated violations of daily duty hours and violations of the 7-day rules.

The driver of the Ford had accumulated approximately 10 years of heavy vehicle operating experience. He had been employed by the motor carrier for 2 years. Employment records submitted by the motor carrier revealed that three moving violations committed by the driver had not been reported to the carrier as required.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the Ford driver's failure to perceive the stopped combination unit in time to take appropriate evasive action.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours
2. Driving History
3. Motor Carrier Oversight of Driver

CASE NO.: 174

Investigation No.: MKC-87-H-TR11
Accident Location: US-60, 8.5 miles west of Sikeston, Missouri
Lanes: 2 lane, 2 direction, concrete surface
Median: N/A
Features: Straight road
Date and Time: April 29, 1987, 4:05 a.m.
Ambient Conditions: Clear and dry
Heavy Truck Involved: (1) 1978 International tractor in combination with a 1983 Timpte 40-foot hopper bottom trailer
Motor Carrier: (1) Allen G. Hampton
Type of Operation: (1) Exempt carrier
Size of Operation: (1) 1 Power unit, 3 straight trucks
Heavy Truck Involved: (2) 1985 Kenworth tractor in combination with a 1984 Timpte 45-foot refrigerated trailer
Motor Carrier: (2) Gam-Bel, Inc.
Type of Operation: (2) Common carrier
Size of Operation: (2) 30 power units
Total Weight of Truck(s): (1) 78,000 pounds
(2) 74,000 pounds
Total Length of Truck(s): (1) 54 feet
(2) 65 feet
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The Kenworth truck and trailer was westbound on a straight section of road when the driver lost control. The combination unit traveled into the eastbound lane and struck an eastbound International combination unit head-on. The International traveled 452 after impact and came to rest 65 feet north of the north edge of the roadway. The Kenworth traveled 488 feet after impact and came to rest 27 feet south of the south edge of the roadway.

This accident resulted in substantial damage to both combination vehicles. The driver of the International was uninjured while the Kenworth driver sustained minor injuries. Neither driver was restrained. An unauthorized female passenger, riding in the sleeper berth of the Kenworth, was reportedly uninjured.

The driver of the International had about 5 years experience in the operation of heavy vehicles. He had been employed by the motor carrier for 8 years, but he had received no training. A driver records check revealed two violations and one accident over the past 4 years--all of which had been properly reported to the motor carrier.

The driver of the Kenworth had reportedly accumulated 15 years of experience with heavy vehicles. He had been employed by the motor carrier for about 4 months. Records furnished by the Kenworth driver's employer indicates that this driver has been driving large commercial vehicles for 15 years. Records also indicate that he graduated from a commercial vehicle driving school. This driver's application for employment shows that he received only two violations in the last 3 years. However, a check of his motor vehicle record indicates that he received nine violations from 1983 to 1987 and that his driving privileges had been suspended from December 9, 1984 until April 27, 1987, just 2 days before this accident occurred.

Toxicology tests indicated that the Kenworth's driver had the following drugs in his system; nicotine, amphetamines, methamphetamine, menthol metabolite, and some other drug which the facility was unable to identify. The amounts of drugs were not quantified. The driver related to investigators that he was taking Ionamin without a prescription. Ionamin is related chemically and pharmacologically to amphetamines and other stimulant drugs. The Physicians Desk Reference warns that the abrupt cessation of this drug, following high dosage, may result in extreme fatigue and mental depression, therefore, it should not be used by anyone operating heavy or dangerous equipment.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the Kenworth driver's failure to maintain his vehicle within the proper lane. It is not known to what extent the driver's use of drugs was a factor in the accident.

OF INTEREST IN THIS INVESTIGATION:

1. Alcohol/Drugs

2. Driving History

3. Motor Carrier Oversight of Driver

CASE NO.: 175

Investigation No.: LAX-87-H-TR13
Accident Location: Eastbound Interstate 80, near Truckee, California
Lanes: 4-lanes, divided
Shoulders: 12-foot wide asphalt
Median: Earthen, approximately 25 feet wide
Features: 1,400-foot curve left, -5.4 percent grade
Date and Time: May 30, 1987, 2:15 p.m.
Ambient Conditions: Dry
Heavy Truck Involved: 1974 White tractor in combination with one loaded 43-foot tank trailer
Motor Carrier: Frederickson Tank Lines, Inc.
Type of Operation: Common carrier
Size of Operation: 25 power units
Total Weight of Truck(s): 78,000 pounds
Total Length of Truck(s): 59 feet
Other Vehicle Involved: None
Truck Fatalities: 1 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The combination unit was traversing an approximate 5.4 percent downgrade on a 1,400-foot radius curve to the left at a calculated minimum speed of 81 mph, when the driver failed to negotiate the curve. The unit left the right road edge. Evidence indicated that the driver initiated a left turn in an attempt to return to the road. However, the truck overturned onto its right side. The tank breached and the load of 8,000 gallons of diesel fuel and gasoline leaked onto the roadway. The vehicle slid on its right side for approximately 653 feet before coming to rest.

A fire ensued and the vehicle was destroyed. A critically burned unauthorized passenger in the truck succumbed to complications from his burns within 18 hours of the crash. The driver was found approximately 5 hours postcrash wandering in a train depot in Sparks, Nevada. He had apparently escaped the burning vehicle with second and third-degree burns over approximately 20 percent of his body. He related that he jumped over the right road edge fence and down a 150-foot embankment to the river below. He doused the flames on his clothing and "jumped" a passing freight train, riding it into the next train yard.

The driver had 16 years of heavy truck operating experience and had been employed by the motor carrier for approximately 3 years. The investigation revealed that the driver had not received formal training, nor did the company provide any.

A blood sample drawn from the driver 5 hours postcrash revealed a BAC of 0.11 percent. The driver was familiar with the route but not the truck, as he was in the process of purchasing the vehicle at the time of the collision. Driver records indicate that the driver had a California license that had been suspended since 1973. However, he was in possession of a current Nevada license.

Medical records indicate that the driver had bypass surgery in 1986 and had been returned for duty shortly thereafter. At the time of this incident, medical personnel concurred in the opinion that he was asymptomatic.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was that the truckdriver, whose judgement and driving ability were impaired by alcohol, failed to maintain control of his vehicle's speed on the mountainous descent.

OF INTEREST IN THIS INVESTIGATION:

1. Alcohol/Drugs
2. Driving History
3. Hazardous Material

CASE NO.: 176

Investigation No.: DEN-87-H-TR10
Accident Location: Interstate 25, 29 miles north of Cheyenne, Wyoming
Lanes: 4-lanes, divided
Shoulders: Right side 12-foot wide asphalt, separated from traffic lane by solid white line; left side 2-foot wide asphalt, separated by from traffic lane by solid yellow line.
Median: Earthen, varying widths of 25 to 30 feet
Features: Straight, level, and near an exit off-ramp
Date and Time: March 24, 1987, 1 a.m.
Ambient Conditions: Cold, light blowing snow, and dark
Heavy Truck Involved: (1) 1986 Freightliner tractor in combination with 2 loaded 26-foot dry van trailers
Motor Carrier: (1) Edson Express, Inc.
Type of Operation: (1) Common carrier
Size of Operation: (1) 152 power units
Heavy Truck Involved: (2) 1974 GMC Auto Transport truck loaded with 8 passenger cars
Motor Carrier: (2) Rebuildable Auto Salvage
Type of Operation: (2) Common carrier
Size of Operation: (2) 1 power unit
Total Weight of Truck(s): (1) 57,325 pounds (2) 71,560 pounds
Total Length of Truck(s): (1) 67 feet (2) 65 feet
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The Freightliner combination was northbound in the righthand traffic lane when it struck the left rear corner of a GMC combination. At the time of the accident the GMC was also northbound and was either stopped or traveling at a speed of below 5 mph and moving into the right traffic lane from the shoulder lane. The impact pushed the GMC forward and towards the right and into a nearby off-ramp exit. The first trailer and tractor of the Freightliner combination remained connected via the fifth wheel and rolled onto their left side, rotated 180°, and came to rest on the exit ramp in front of and facing the GMC combination. The second trailer and converter dolly of the Freightliner unit separated from the first trailer when the converter dolly twisted loose from the pintle hook. This unit rolled over onto its left side and came to rest in the northbound traffic lanes facing north.

The accident resulted in minor injuries to the unrestrained driver of Freightliner. Neither the driver nor the codriver of the GMC was injured. The Freightliner unit received substantial damage to the tractor and moderate damage to both trailers. The GMC unit received moderate damage. There was no noticeable damage to the vehicles being transported on the trailer of the GMC.

Cheyenne, Wyoming
Case No. 176

The driver of the Freightliner had been operating twin trailer combination units for the past 2 1/2 years--all with his current employer. He had no formal truck driving training. No prior experience with vehicle instability was claimed. The driver stated that he had the flu the week before the accident and had kept late hours during the weekend preceding the accident. He reported to work the night of the accident with a headache and was physically fatigued. He saw the truck lights appear in front of him and realized that he was going to collide with the back of the truck. He stated that he did not feel he went to sleep at the wheel, but that he was day dreaming and inattentive to his driving duties.

The driver and codriver of the GMC told investigators several different versions of the accident. The first version was they had just changed positions at the 39 mile marker at 0100 hours and were in the process of pulling back into the right traffic lane from the shoulder when struck in the rear by the Freightliner. Later they stated that they changed positions at the 37 mile marker at about 0030 hours, but refused to answer why it took them 1/2 hour to go 2 miles. Because of the different versions of the accident the Safety Board was not able to positively identify the driver of the GMC. The person claiming to be the driver stated that he had a schoolbus chauffeur's license, had never driven a large truck before, and was doing his friend, the owner of the truck, a favor by being a codriver on the trip. The codriver had an "Instruction Permit" that required a licensed truckdriver to accompany him when driving a truck. The carrier that owned and operated the GMC combination knew of the status of each driver and allowed them to operate the truck anyway. Additionally, carrier officials revealed they were not familiar with or applying DOT regulations to their operations.

Other truckdrivers that were northbound on I-25 between 2200 hours and the time of the accident stated that the GMC combination was traveling extremely slow or stopped along the highway when they passed it. Several of these truckdrivers claimed they nearly collided with the GMC's trailer when they came on it as it was partially in the right lane and partially on the right shoulder.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the fatigued Freightliner driver's lack of vigilance. Contributing to the accident was the slow speed and lane position of the GMC combination.

OF INTEREST IN THIS INVESTIGATION:

1. Driver Experience/Training
2. Fatigue/Duty Hours
3. Motor Carrier Oversight of Driver
4. Double Trailers

CASE NO.: 177

Investigation No.: ATL-87-H-TR18
Accident Location: U.S. 258 and RP 1923, 10.9 miles south of Kinston, North Carolina.
Lanes: 2 lanes (each highway)
Shoulders: 4 to 6 feet wide on U.S. 258
Median: None
Features: T-intersection
Date and Time: May 19, 1987, 8:45 a.m.
Ambient Conditions: Clear, daylight, and dry
Heavy Truck Involved: 1986 Peterbilt tractor in combination with a loaded 42-foot tank semitrailer
Motor Carrier: A.G. Lee Oil Company, Inc.
Type of Operation: Private carrier
Size of Operation: 1 tractor/semitrailer unit (accident vehicle)
Total Weight of Truck(s): Not determined
Total Length of Truck(s): Not determined
Other Vehicle Involved: Passenger automobile
Truck Fatalities: 1 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 1

SUMMARY:

Both the 1964 Plymouth Valiant and the 1986 Peterbilt tractor/tank semitrailer combination were traveling south on rural U.S. 258. Each vehicle was occupied by only the driver. The 9,200-gallon tank semitrailer was loaded with 9,167 net gallons of gasoline. The southbound Plymouth slowed for a left turn onto RP 1923 as the trailing southbound combination unit approached its rear. The right front bumper of the tractor struck the left rear bumper of the Plymouth. Thereafter, the right side of the combination unit sideswiped the left side of the Plymouth. The combination unit swerved across the centerline into the oncoming traffic lane then yawed rightward in clockwise rotation and overturned leftward. It came to rest across the roadway and concrete bridge over the Trent River. The combination unit became engulfed in flames and burned; the driver was fatally injured. The Plymouth came to rest in the roadway of U.S. 258 a short distance south of the RP 1923 intersection and before the bridge. The Plymouth driver reported minor injuries.

The Trent River bridge was about 182 feet south the intersection. Skidmarks of the southbound combination unit began in the right (southbound) traffic lane of U.S. 258 about 87 feet before the intersection of RP 1923. A separate tire mark as well as a pavement groove was located about 20 feet before the intersection and near the center of the same southbound traffic lane.

In the area of the accident, southbound U.S. 258 had a very slight right curve, and the approach to the accident intersection had a very slight downgrade. The roadway had recently been resurfaced and was in excellent condition.

The private motor carrier owned no other similar vehicles. The vehicle was engaged in the transportation of gasoline to one of several service station/convenience store facilities owned by the motor carrier. According to the North Carolina DOT the private motor carrier was subject to State safety regulations. The DOT had no record of the motor carrier in their files.

The truckdriver was one of two drivers employed by the motor carrier to operate the accident vehicle primarily in the transportation of gasoline to the various locations. He had been so employed for about 10 months. Training was estimated to be about 1 week "coach-pupil" with the senior driver. Previously, he had about 9 years experience driving tractor/semitrailer combination units, but he had none transporting gasoline or other hazardous materials. The truckdriver was not "logging." The motor carrier surveyed other records and information to determine certain activities of the truckdriver before the accident. Accordingly, the truckdriver worked about 57.3 hours during the 7 days before the accident. The truckdriver's wife stated that he had worked at no other job during the week. Additionally, she stated that her husband was rested when he left home just before 7 a.m. on the morning of the accident and that he was in excellent health with no known physical or psychological impairment.

By a check of all States, it was determined that the truckdriver was licensed in North Carolina. He had previously been licensed in Florida (expired May 31, 1986). However, the records indicate that the truckdriver had possessed the two licenses concurrently. A record provided by New York documented three suspensions for failure to answer summons in 1982 and 1983 that were not shown on North Carolina record.

A postcrash inspection revealed that the Plymouth had a defective brake light/turn signal system.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of the accident was the failure of the truckdriver to avoid the slower preceding automobile. Contributing to the accident was the defective stop light/turn signal system of the automobile.

OF INTEREST IN THIS INVESTIGATION:

1. Driver Training/Experience
2. Driving History
3. Hazardous Material

CASE NO.: 178

Investigation No.: DEN-87-H-TR20
Accident Location: Larimer County Road 70, Wellington, Colorado
Lanes: 2 lanes, undivided
Shoulders: 5 feet wide, gravel
Median: None
Features: -3 percent grade, grade crossing
Date and Time: June 30, 1987, 6:20 a.m.
Ambient Conditions: Clear
Heavy Truck Involved: 1987 Kenworth tractor in combination with a loaded 40-foot tank trailer
Motor Carrier: Wofford Trucking Company
Type of Operation: Common carrier
Size of Operation: No information
Total Weight of Truck(s): 79,500 pounds
Total Length of Truck(s): Not determined
Other Vehicle Involved: Train
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The combination unit loaded with 6,972 gallons of crude oil was traversing a 3 percent downgrade on a straight section of roadway and was approaching a Burlington Northern grade crossing. The driver indicated that he applied the brakes when he first saw the train. Realizing he could not stop in time, he released the brakes and accelerated in an attempt to beat the train to the crossing. The combination unit left 116.7 feet of skidmarks with the left rear trailer tire and 59.8 feet of skidmarks with the right rear trailer tires.

The lead locomotive struck the center portion of the trailer. The impact resulted in the destruction of the trailer and a resulting oil spill. Colorado State Law 42-4-608, in part, requires vehicles carrying hazardous material to stop at grade crossing not more then 50 feet from or less then 15 feet from the nearest rail.

Inspection of the trailer brakes revealed that all brakes were out of adjustment. The tractor was not available for inspection. The lead locomotive and tractor received minor damage.

Information from the driver showed he had 6 years experience operating articulated vehicles. In this time, he had not received any formal training in the operation of the equipment or safety training. The motor carrier did not respond to requests for information on the company or the driver.

There was a grade crossing information sign 1/5 mile west of the crossing. The road and grade crossing were properly marked by passive warning devices. There is unobstructed visibility in either direction for 3/4 mile for eastbound traffic.

Wellington, Colorado
Case No. 178

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the driver's operation of the truck at a speed which precluded a successful stop for the crossing. Contributing to the accident was the misadjusted trailer brakes.

OF INTEREST IN THIS INVESTIGATION:

1. Driver Training/Experience

2. Motor Carrier Oversight of Equipment

3. Hazardous Material

4. Grade Crossing

CASE NO.: 179

Investigation No.: ATL-87-H-TR19
Accident Location: Interstate 20, Jacksonville, Alabama
Lanes: 4-lane divided
Shoulders: Median Shoulder 4-foot wide asphalt, outside shoulder 10-foot wide asphalt.
Median: 46-foot wide swaled grass median
Features: Straight and level
Date and Time: May 20, 1987, 10:55 p.m.
Ambient Conditions: Clear, dark, and dry
Heavy Truck Involved: 1985 conventional cab, 3-axl , Ford tractor towing a loaded 45-foot van semitrailer
Motor Carrier: McGill Specialized Carriers
Type of Operation: Common carrier
Size of Operation: 33 trucks and 496 truck tractors
Total Weight of Truck(s): Approximately 76,000 pounds
Total length of Truck(s): 65 feet 6 inches
Other Vehicle Involved: 1969 one ton, winch-bed Ford truck towing a lowboy utility trailer; a 8000 series Ford dumptruck was being transported on the trailer
Truck Fatalities: 0 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 2

SUMMARY:

The lowboy trailer unit (hereafter called truck 1) came onto I-20 from a rural interchange and began traveling east in the right lane of the 2-mile-long tangent and level eastbound roadway section. About 1 mile from the interchange, truck 1 was traveling at a driver-estimated speed of between 40 and 45 mph when the driver looked in his rearview mirror and saw the headlights from a semitrailer unit (hereafter called truck 2) which was rapidly approaching from the rear. Seconds later, truck 2 closed on the rear of truck 1 and cut to the left to move around and pass truck 1. The right front of truck 2's tractor crashed into the left rear of truck 1 and its loaded dump truck. The initial impact forces caused truck 1's trailer and boarded dump truck to break away from its coupling to the small truck; that truck continued forward on the pavement and was not further involved. Truck 2 continued moving forward with its right side raking the left rear of truck 1's trailer and the dump truck. The right fuel tank of truck 2's tractor was breached and the right side of its van trailer was ripped open. Diesel fuel from the breached tank and mortar projectiles from the cargo of truck 2 were spilled onto the roadway along a 423-foot-long path as the unit traveled from the impact to the grassed median where it came to rest. Fire erupted immediately and spread throughout the area of the spilled fuel, truck 2, truck 1's trailer, and the dump truck. The fire eventually ignited the projectiles on the trailer and those scattered on the roadway.

Several local fire departments, including the Anniston Army Depot fire department, responded to the scene. They were unable to extinguish the vehicle fires because of the discharging mortar rounds. Several small brush fires that were ignited by the projectiles were secured, and the area was closed off until the fires burned themselves out. The roadway was closed to traffic for about 17 hours until Army EOD personnel declared the area safe.

The driver of truck 2 received minor injuries; the codriver was uninjured. The driver and passenger on truck 1 received minor injuries. Truck 2 was destroyed. The other truck received minor crush damage when the lowboy trailer of truck 1 broke away; the lowboy trailer and dump truck were destroyed. No persons in the area were injured by the postcrash fire or discharging mortar rounds.

The tractor of truck 2 was owned by its driver. It was being operated as a man-wife team under a long-term lease with the motor carrier. Except for 3 days of instruction from the carrier, the truckdriver had received no truckdriver training. He had been driving tractor trailer units for about 10 years, of which less than 2 months were with this carrier. His drivers record in Georgia revealed no traffic violation or accident history since 1981. For the 11-year-period before 1982, the record noted 16 speeding convictions and no accidents. The speeding convictions resulted in three drivers licence suspensions. He was qualified by the motor carrier as an interstate driver in compliance with the FMCSR requirements.

Postcrash inspection revealed that the four tail lamps on the truck 1's trailer were illuminated at impact. Although the postcrash condition of truck 2 prohibited an inspection to determine precrash defects, the driver reported there were none. It was equipped with a 6-cylinder engine, governed at 2,100 rpm, and a 13-speed transmission; its top speed was about 94 mph. The driver of truck 2 advised that he was traveling in the left lane when his vehicle approached truck 1 without braking. He was not sure of his vehicle's speed, transmission gearing, or engine speed when the accident occurred. He believed that truck 2 was in either 11th or 12th gear with the engine turning about 1,900 rpm (a resulting 67.75 mph 12th-gear speed). Speed calculations indicated that the vehicle was traveling about 73 mph when the crash occurred; the posted speed limit was 55 mph.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of the accident was the failure of the driver of the semitrailer combination unit to perceive the vehicle ahead and take evasive action in a timely manner. Contributing to that failure was excessive speed of the semitrailer combination unit. Contributing to the severity of damage to all the vehicles was the postcrash fire.

OF INTEREST IN THIS INVESTIGATION:

1. Driving History

2. Hazardous Material

CASE NO.: 180

Investigation No.: MKC-87-H-TR07
Accident Location: Interstate 70, Kansas City, Missouri
Lanes: 6 lanes
Shoulders: 10-foot outside and 7-foot inside
Median: Barrier
Features: Straight 2 percent downgrade
Date and Time: March 22, 1987 4:39 p.m.
Ambient Conditions: Clear, dry, and daylight
Heavy Truck Involved: 1983 Freightliner COE tractor in combination with 2 loaded 28-foot van trailers
Motor Carrier: Consolidated Freightways, Inc.
Type of Operation: Common carrier
Size of Operation: 2,717 power units
Total Weight of Truck(s): Not determined
Total Length of Truck(s): Not determined
Other Vehicle Involved: Camaro

Truck Fatalities:	0	Truck Injuries:	1
Other Fatalities:	0	Other Injuries:	0

SUMMARY:

The doubles combination unit was traveling west in the outside lane when a Camaro came alongside on the right shoulder. The car tried to change from the shoulder into the outside lane of traffic, but it struck the tractor on the right side. The driver of the combination cut his wheels to the left and applied his brakes. The combination then went across the center and inside lane of traffic, traveling 219 feet before striking the median barriers, knocking over two of them and partially destroying another one. The doubles combination then traveled another 371 feet before coming to a stop. Both trailers came to rest in the east bound traffic lane and the tractor came to rest on top of a median barrier. The Camaro went into the north ditch before driving away.

This accident resulted in substantial damage to both the power unit and the trailers of the combination unit. The passenger car received minor damage. The restrained truckdriver received moderate to serious injuries, and the passenger car driver was not injured.

The investigation revealed that the second trailer of the combination unit was 2 months past due for inspection and service.

PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the operator of the Camaro to ensure a clear right-of-way before changing lanes.

OF INTEREST IN THIS INVESTIGATION:

1. Double Trailers

CASE NO.: 181

Investigation No.: FTW-87-H-TR13
Accident Location: Interstate 20, 16 miles West of Monroe, Louisiana
Lanes: 2 lanes, 2 directions
Shoulders: 10-foot wide, asphalt
Median: N/A
Features: Construction zone
Date and Time: August 16, 1987, 7:07 p.m.
Ambient Conditions: Clear and dry
Heavy Truck Involved: Conventional 1980 Ford tractor in combination with loaded 45-foot flatbed trailer
Motor Carrier: Thrasher Trucking Company, Inc.
Type of Operation: Common carrier
Size of Operation: 91 power units
Total Weight of Truck(s): 85,346 pounds
Total Length of Truck(s): Not determined
Other Vehicle Involved: 1973 COE Peterbilt tractor in combination with a loaded van trailer
A 1981 Honda and a 1985 Chevrolet
Truck Fatalities: 1 Truck Injuries: 1
Other Fatalities: 2 Other Injuries: 1

SUMMARY:

At about 7:07 p.m. on August 16, 1987, a four-vehicle collision occurred on I-20 in a 6.5-mile area of road construction approximately 16 miles west of Monroe, Louisiana. The original westbound lanes of I-20 were closed and two-way traffic was being routed in the eastbound lanes of I-20. The detour had been implemented in November 1986 to allow the contractor to resurface the westbound lanes in this area. There were concrete positive control barriers placed for lane separation at the beginning of each end of the detour, but the lanes of the 6.5-mile area in between were divided only by 3-foot-tall rubber reflector posts spaced at 100-foot intervals.

Initially, an eastbound pickup truck stopped in the eastbound lane to execute a U-turn. This maneuver resulted in a long line of traffic coming to a stop in the eastbound lane. After the pick-up truck executed the U-turn, the traffic started eastbound at slow speed. Approximately 45 seconds later, an eastbound 1980 conventional Ford 3-axle truck tractor pulling a loaded 45-foot Fruehauf semitrailer collided into the rear of a 1981 Honda Prelude. The Honda was then pushed into the rear of a 1985 Chevrolet Cavalier which departed the south roadside and overturned. The Honda skidded across the westbound lane and came to rest in the center median approximately 275 feet from where the initial impact occurred. The Ford combination unit continued eastbound, then crossed the westbound lane and collided head-on with a 1973 COE style Peterbilt truck tractor that was pulling a loaded van semitrailer. Scrapes and skidmarks in the westbound lane showed that the Peterbilt combination unit was approximately 4 feet onto the shoulder of the road when this impact occurred.

At initial impact, the front of the Peterbilt tractor contacted the right side of the Ford tractor and then the Fruehauf semitrailer separated from its fifth wheel attachment and collided into the Timpte van semitrailer. Both tractors came to rest in the center median and burned. The Timpte van semitrailer came to rest on the road surface, and the Fruehauf semitrailer came to rest in the median and received moderate fire damage. There were no preimpact skidmarks in the eastbound traffic lane by the Ford combination unit.

Witnesses located behind the Ford combination unit stated that it was traveling at 50 to 65 mph when the initial impact occurred. Witnesses located behind the Peterbilt combination unit stated that it was traveling at approximately 45 mph in the posted 45-mph construction zone when it swerved to the right in an attempt to avoid the Ford combination unit. The Honda Prelude, which had caught fire after the initial impact, was destroyed by the collision forces and fire; the driver was killed. The Chevrolet Cavalier received extensive damage and the right front passenger was ejected and killed. The Chevrolet driver received serious injuries. Both combination units were destroyed by the collision forces and postcrash fire. The Peterbilt driver was killed, and the Ford driver received serious injuries.

The Louisiana State Police removed a glass vial from the Ford truckdriver's clothing which contained a schedule II stimulant. The Safety Board obtained a sample of the Ford driver's blood which was forwarded to the Center for Human Toxicology in Utah for analysis. The drug screen showed that there were no drugs in the Ford driver's blood.

During a postcrash inspection of the Ford combination unit, it was found that the pushrod travel on the left front steering axle brake was 2 1/4 inches. The right front steering axle and both sides on the 2nd and 3rd axle brakes could not be measured due to damage. On the forward axle brake of the semitrailer the pushrod travel was measured to be 2 1/2 inches on both sides, and the left side rear trailer axle brake had 2 3/8 inches of pushrod travel. The right rear axle trailer brake had 2 1/4 inches of pushrod travel. These measurements were not taken from a functional test, but were derived from wear marks on the cam shaft of the S-cam brakes. However, the driver stated in a telephone interview that was conducted on October 6, 1987, that he noticed his trailer brakes were not adjusted properly on the afternoon of August 16, about 2:30 p.m. when he was adjusting his sliding axles at a weigh station in Shreveport, Louisiana. He stated that he adjusted them by tightening them all the way down and then backing them off about 3 clicks or 1/2 a turn. The combination unit was then driven approximately 79 miles from where the brakes were adjusted to the accident area. Consequently, the wear marks noted at the time of the brake inspection are not conclusive.

Additionally, when questioned about his log books, the driver stated that he had not kept current entries and his normal practice was to fill out his logs every 3 days or so. The last entry noted in his log was on August 9, 1987. Moreover, one false entry was found in the log. The record showed that he went off duty at 6 p.m. until midnight in Chicago, Illinois, on August 3, and then slept in his sleeper berth until 8 a.m. on August 4. However, in fact he was stopped and arrested at a weigh station in Caruthersville, Missouri, at 2:01 a.m. on August 4, 1987, for an overweight violation. This was approximately 450 miles from where he stated he was asleep in his truck. This information was verified by comparing his `og books to an arrest ticket issued by the Missouri State Police at the weigh station.

When the logs of the Peterbilt combination driver were inspected, several violations were found. The record showed that during the 8-day duty period from August 7 to August 14, 1987, the driver exceeded the 70-hour duty rule by working 74 hours. On August 7 and August 12, 1987, he exceeded the 10-hour drivir rule by driving 12 hours and 13 hours respectively on those days. Additionally, the driver's logs were not up to date at the time of accident. The record showed that he departed Florida on the morning of August 15, 1987, at 8:37 a.m., and there were no other entries on his log during the next 1 1/2 days before the accident occurred. During the postcrash examination of the Peterbilt combination unit, it was noted that the steering axle of the tractor was not equipped with brakes. The other axles of the tractor were not examined due to damage. The rear axle brake on the right side of the van semitrailer did not have any brake pads and the left rear brake drum was cracked.

Employment records showed that the Ford combination driver had 8 years of commercial driving experience, but had only been working for his present employer for 3 months. During the past 5 years, he had been convicted of two traffic law violations. Records showed that the Peterbilt driver had 21 years of commercial driving experience, but he had only been working for his present employer for 9 months. He had been convicted of seven traffic law violations in the past 5 years.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the Ford truckdriver to reduce his speed in response to the slower moving traffic because of inattention due to a momentary lapse of alertness or fatigue.

OF INTEREST IN THIS INVESTIGATION:

1. Fatigue/Duty Hours
2. Driving History
3. Motor Carrier Oversight of Driver
4. Motor Carrier Oversight of Equipment
5. Environment

CASE NO.: 182

Investigation No.: CHI-87-H-TR07
Accident Location: Interstate 90, at the Belvidere toll barrier
Lanes: Transition area from 4-lane divided highway to toll barrier plaza with 6 traffic lanes each direction
Median: None present at point of toll plaza
Features: Toll plaza with barrier
Date and Time: December 21, 1986, 12:38 p.m.
Ambient Conditions: Daylight, clear, dry
Heavy Truck Involved: 1980 Mack COE tractor in combination with a loaded van trailer
Motor Carrier: Severson Transport, Inc.
Type of Operation: Common carrier
Size of Operation: 12 power units
Total Weight of Truck(s): 75,000 pounds
Total Length of Truck(s): 55 feet
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 1
Other Fatalities: 1 Other Injuries: 0

SUMMARY:

The tractor trailer loaded with 45,345 pounds of canned vegetables was traveling east on the Illinois Tollway designated as Interstate 90, approaching the Belvidere Toll Plaza at mile post 55.5. The driver stated initially he was traveling 52 to 55 mph, but later stated his speed was about 40 to 45 mph toward the toll plaza, when the accelerator pedal went to the floor. The tractor trailer struck the toll barrier at lane 10, which was closed to traffic at the time of the accident. The tractor trailer struck and overrode the concrete divider between lanes 9 and 10, the toll lane 10 toll booth, rolled onto its left side into lane 9, and began to burn.

The truckdriver suffered a ruptured spleen in this collision. The driver denied any history of medical problems, hospitalization, or any family history of seizure disorders. A toll collector was walking behind the lane 10 toll booth when the truck struck it. The toll collector was pinned beneath the trailer and the scattered load of the truck. The collector was fatally injured in the collision and/or resulting fire. The tractor, trailer, and trailer cargo were destroyed by the postcollision fire. The toll barrier sustained between $75,000 and $90,000 damage.

The truckdriver claimed the accelerator pedal went to the floor because the spring on the foot pedal/throttle linkage broke. The driver stated this occurred as he crossed the second set of three "rumble strips" located approximately 1,081 feet from the toll plaza. The driver claimed he bent over to pull the accelerator pedal up with his hand, and when he looked out the windshield again, the truck had reached the toll plaza. He stated he then pulled the kill switch, hit the brakes, and "jerked" the steering wheel. Approximately 43 feet of skidmarks were observed leading to the struck concrete divider.

The driver claimed the accelerator pedal had malfunctioned with a broken spring once before in this tractor. On that occasion, he stated he pulled the pedal up and steered the truck over to the roadside. According to records at the motor carrier company, the "throttle return spring" had most recently been replaced in this tractor on October 27, 1986.

The driver of this combination vehicle was hired by the motor carrier during January 1984. The motor carrier provided no training to this driver. This driver had no commercial driver training. This driver had received a speeding violation conviction in August of 1983. Records at the motor carrier listed three previous accidents for this driver: September 27, 1984, at 1100 hours, when this driver backed into a car; November 22, 1984 at 1000 hours, when this driver struck a stop light; October 20, 1985, when this driver hit a viaduct.

A witness in toll booth 12 estimated the speed of the truck approaching the toll barrier at 30 to 35 mph and stated the truck stayed "in-line" as it approached. This witness stated the fire started near the ground, approximately 1 to 2 minutes after the truck came to rest between the tractor and the trailer. The flames then spread to the rest of the truck. This witness stated the first time he saw the truckdriver was after the truck came to rest, and the driver walked around the end of the overturned truck.

In a postcollision inspection of the Mack tractor, the throttle linkage and the fuel injector were examined. No springs or fragments of springs were found on the spring mounting points on the linkage or in the tractor wreckage. The front axle of the tractor was separated from the chassis at impact with the concrete lane divider. The engine was also detached from the chassis engine mounts during the collision sequence. A postcollison test was conducted on the tractor fuel injector pump. The governor/throttle shutdown mechanism of the injector was found to have been operational. This fuel injector had been repaired and calibrated to specifications during May 1986.

According to the technician examining the injector, if the spring(s) on the throttle linkage broke, the throttle would revert to idle at once. He stated pressure must be maintained on the throttle lever for the injector to operate. If the gas (throttle) pedal went to the floor with the throttle spring(s) broken, the pressure would be removed from the lever and the engine speed would fall. Pulling up on the foot pedal would have no effect on the engine speed. A test was conducted on a 1980 Mack COE tractor with a similar throttle linkage. The springs were removed from the throttle linkage of this tractor. When the throttle pedal was depressed, the speed of the engine was found to remain high (and not return to idle) with no springs on the linkage. According to the Mack mechanic present during this test, the failure of the throttle to return to idle on the tested (1980) tractor, could have been due to binding of the throttle/gas pedal linkage of this tractor. According to this mechanic, some truckdrivers remove one of the springs on the throttle linkage to relieve the pressure which must be used to depress and hold down the gas pedal.

Belvidere, Illinois
Case No. 182

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the malfunction of the accelerator mechanism which resulted in the driver's distraction and failure to reduce the vehicle's speed and stop at the toll barrier.

OF INTEREST IN THIS INVESTIGATION

1. Driver Training/Experience
2. Driving History
3. Motor Carrier Oversight of Driver
4. Motor Carrier Oversight of Equipment

CASE NO.: 183

Investigation No.: CHI-87-H-TR17
Accident Location: Sweitzer Road at grade crossing near Joliet, Illinois
Lanes: 2 lanes, undivided
Median: None
Features: Straight
Date and Time: June 26, 1987, at 9:22 a.m.
Ambient Conditions: Clear, dry, daylight, about 80°F
Heavy Truck Involved: 1986 Ford 9000 Chassis fitted with a roll-off dumpster assembly
Motor Carrier: Spee Dee Disposal
Type of Operation: Disposal service, licensed special waste hauler
Size of Operation: 6 trucks
Total Weight of Truck(s): Unknown
Total Length of Truck(s): 27 feet
Other Vehicle Involved: Passenger train
Truck Fatalities: 1 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 28

SUMMARY:

The Ford truck was westbound on Sweitzer Road, a relatively straight two-lane road, at what the train engineer described as high speed. The truck continued westbound crossing the path of a southbound (pusher operation) passenger train traveling at a documented speed of 79 mph with the front lights illuminated and air horns sounding. The train engineer observed the truck was not going to stop before the grade crossing and placed the train into emergency stop braking. He then evacuated the control cab of the lead car. The lead car of the passenger train impacted the right side of the truck's cab, separating the unit's cab, engine transmission, steering axle, and roll-off box from the truck frame. The truck rotated about 220° counter clockwise and came to rest about 222 feet south and about 21 feet east of the impact area.

The lead car of the train derailed off the right (west) side of the tracks into a field. The lead car jackknifed at the second car coupling, breaking the coupling and derailing the front of the second car off the left side of the tracks. The rear of the second car, the third car, and the pusher engine derailed off the right (west) side of the tracks. After jackknifing and separating from the second car, the lead car rotated clockwise 170° and came to rest on its left side. The other cars and the engine were tilted at various angles but remained on their wheels.

The accident resulted in the destruction of the truck and substantial damage to the passenger train and rail bed. The unrestrained truckdriver was ejected from his unit and fatally injured. The engineer and 27 occupants (passengers and crew) of the passenger train were injured.

The truckdriver met with his supervisor at about 7 a.m. at the company garage. They spoke for a short time during which the supervisor pointed out a broken rear fender support and instructed the driver to have it repaired at the Harris residence on Sweitzer Road if he had the time during his next run. The driver's next run consisted of picking up a full dumpster at Owen Chemical facility on Patterson Road in Joliet and emptying it at a nearby landfill. On returning to the Owen facility, the driver detoured to the Harris residence for the welding repair. He arrived about 8:45-9:00 a.m., waited while the truck was repaired, and departed westbound on Sweitzer Road about 9:20-9:22 a.m. He traveled about 1/4 mile to the grade crossing where his unit was struck by a southbound passenger train.

The coroner's examinations and tests indicate the driver's BAC was 0.229 at the time of his death. Vitreous alcohol test had a level of 0.259. Both tests indicate the driver's BAC was over two times the limit of 0.10 BAC at which point a driver is considered under the influence in Illinois.

During interviews with persons (including the driver's immediate supervisor) who had contact with the driver on the morning of the accident, both subjects were questioned regarding the driver's appearance, demeanor, actions, speech, and breath odors. Both subjects stated they noted nothing unusual about the driver on the day of the accident.

The investigation at the accident scene showed the truckdriver and train engineer would be able to see each other as the truck left the Harris residence about 1/4 mile from the crossing and the train passed the whistle post about 1,500 feet north of the crossing.

Decibel sound levels of an approaching Amtrak passenger train in a pusher configuration were measured at the grade crossing. At the whistle post approximately 1,500 feet north of the crossing, the lead car's audible signal (air horn) registered at 72 decibels. At the crossing it registered at 104 decibels. The truck's sound levels were measured using an identical truck from the carrier. A Safety Board investigator sitting in the cab of the running truck measured levels between 80 to 103 decibels depending on radio(s) usage, volume levels, and the vehicle's speed (engine RPM's).

The driver of the truck had approximately 31 years experience in this type of unit and 6 months experience in the accident unit. The carrier's records and the driver's license abstract from Illinois indicate the driver was not involved in an accident or issued a driving violation citation within the past 5 years. The driver's license was checked through all 50 States; the check showed the driver possessed only an Illinois license.

Joliet, Illinois
Case No. 183

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was that the alcohol impaired truckdriver failed to react to the train's warnings and drove onto the crossing.

OF INTEREST IN THIS INVESTIGATION:

1. Alcohol/Drugs
2. Motor Carrier Oversight of Driver
3. Grade Crossing

Tests were conducted by coupling the accident tractor to a semitrailer similar to the one destroyed in the accident. During the first test, when the accident tractor was backed under the semitrailer and the fifth wheel release handle was in the normal position above and not touching the frame. There was no problem when the fifth wheel king pin coupled together. The king pin slid into the fifth wheel opening, the lock yoke slammed into place around the back of the king pin, and the safety lock plunger fully engaged behind the lock yoke. When the driver tried to release from the semitrailer by pulling the release handle, backing, and then pulling forward, the fifth wheel remained fully coupled to the king pin. The release mechanism would not release under these normal procedures. The driver could use two methods to make the release mechanism work so the tractor could be separated from the semitrailer. The first method involved a second person who would pull out and hold the release handle at the maximum release position, while the driver drove the tractor forward separating it from the semitrailer. The second method was for the driver to pull out the release handle and position the handle end on the side of the tractor frame. This kept the release mechanism at the maximum release position and allowed the driver to separate the tractor from the semitrailer without any help. However, as the semitrailer slid off the fifth wheel, it caused the release handle to rotate upward and inward about 1/4 inch, and the end of the handle would become lodged in a groove above the frame. The groove was where the fifth wheel cog-rack was welded to the top of the tractor frame.

A second test was conducted with the fifth wheel release handle end positioned in the groove between the tractor frame and cog-rack. The accident tractor was backed under the same semitrailer used in the first test. The king pin slid into the fifth wheel opening, the lock yoke slammed in place around the back of the king pin, the safety lock plunger came out and barely engaged behind the back of the lock yoke. Because of the grease and darkness in the lock area, a person could not determine if the safety lock plunger was fully engaged without the use of a strong flashlight. Under this coupling, the tractor was driven forward and backwards and the semitrailer followed without separating from the tractor. However, when the tractor was jolted forward several times, the safety plunger gave away and allowed the fifth wheel mechanism to release. This test was conducted 12 different times and each time the results were the same. The tests revealed that the modified release handle caused the release mechanism to be in an unsafe partially locked position.

The truckdriver reported 12 years experience in the operation of heavy trucks, the same period of time he had been with his current employer. He had received no formal nor specialized training.

CASE NO.: 184

Investigation No.: CHI-87-H-TR14
Accident Location: Livingston County Highway 8 about 10 miles south of Pontiac, Illinois
Lanes: 2 lanes delineated by painted lines
Median: None
Features: Straight, positive 6 percent grade, traffic rutted and rippled to a single track, signalized (no gates) grade crossing
Date and Time: April 28, 1987, 8:19 a.m.
Ambient Conditions: Clear, dry, daylight, about 80°F
Heavy Truck Involved: 1979 Ford LT 9000 power unit in combination with an empty 1979 Veto dump trailer
Motor Carrier: Jeff L. Wilson & Sons
Type of Operation: Common carrier
Size of Operation: 4 tractors and 4 dump trailers
Total Weight of Truck(s): Not determined
Total Length of Truck(s): Not determined
Other Vehicle Involved: Passenger train
Truck Fatalities: 1 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The combination unit completed a right turn from northbound Old U.S. Route 66 onto eastbound County Highway 8. It traveled about 125 feet east on Highway 8 to a signalized single track grade crossing which dissected County 8 at a 64° angle. The unit's operator failed to stop for the flashing railroad signal lights and crossed the tracks into the path of the northbound passenger train traveling at a recorded 79 mph with its forward lights and horns activated.

The right side of the tractor was struck by the engine of the train. The tractor's cab, hood, engine, and steering axle separated from the frame. The tractor cab, impaled on the front of the train engine, was carried about 2,795 feet from the impact location. The trailer's right front corner was struck by the train's engine causing minor damage. The trailer with the truck drive axles and frame attached rotated counterclockwise out of the train's path.

The accident resulted in the destruction of the Ford tractor, minor damage to the trailer, and substantial damage to the passenger train locomotive.

The investigation noted a vision obstruction caused by the conventional power unit's B-pillar as the unit approached the grade crossing at a 64° angle. This was confirmed in conversation with other drivers of conventional tractors at the crossing and photographs. To see an oncoming train (from right), the driver would have to lean forward over the wheel to look out of the passenger door window or lean back over the seat back to look out the rear window (units not equipped with sleepers).

Field tests were conducted at the grade crossing using a Precision Sound Level Meter type 2232 to measure sound levels of an Amtrak train's 5 trumpet air horn as it approached the crossing at a speed of 79 to 83 mph. Tested sound levels ranged from 73 decibels at the whistle post to 112 decibels as the train crossed over the roadway. Similar tests were conducted on sound levels inside a conventional combination vehicle as it approached the grade crossing. Tested sound levels ranged from 81 decibels to 88 decibels (exclusive of commercial or business radio noise level). The tests indicate the truckdriver would be warned of the train's approach by an optimum of 24 decibels of sound above the tractor's 88 decibels when the train was at the crossing.

Carrier records and interviews indicate the driver had received no formal truckdriver training, but was part of a small family-owned trucking operation and had worked/trained with his father on the trucks since childhood. A records check found the driver possessed a valid Illinois chauffeur's license with two traffic citations recorded. The carrier was aware of the violations, neither of which occurred while operating a commercial vehicle.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the truckdriver's failure to perceive and react to the warning signals or flashing lights of the approaching train or grade crossing.

OF INTEREST IN THIS INVESTIGATION:

1. Grade Crossing

2. Environment

CASE NO.: 185

Investigation No.: CHI-87-H-TR11
Accident Location: Illinois Route 3 southbound exit ramp for eastbound Interstate 270 near Granite City, Illinois
Lanes: 1 lane
Roadside: Sight graded at -21 to -32 percent
Features: Grade +3 percent; Cross slope +6 percent; Posted speed limit 25 mph
Date and Time: March 2, 1987, at 1 p.m.
Ambient Conditions: Clear, dry, daylight, about 52°F
Heavy Truck Involved: 1987 Cabover Freightliner tractor in combination with a 1983 Hobbs Fruehauf van trailer
Motor carrier: Midwestern Distribution, Inc.
Type of Operation: Common carrier
Size of Operation: 620 power units
Total Weight of Truck(s): 71,076 pounds
Total Length of Truck(s): 63 feet 6 inches
Other Vehicle Involved: None.
Truck Fatalities: 1 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The combination unit was exiting Illinois Route 3 onto a right curved (transition spiral) entrance ramp for I-270 at a witness/codriver-stated speed of 35 mph. The combination unit failed to negotiate the right curve and departed the left side of the roadway onto the earthen roadside where it overturned onto its left side and roof.

The tractor and semitrailer were destroyed in the rollover and subsequent ejection of the trailer's load of four cribbed metal coils. The unrestrained driver was fatally injured when he was crushed between the collapsed roof of the tractor and his seat. The restrained codriver received minor injuries.

The driver of the combination had been employed by the carrier for about 6 months. He obtained his commercial vehicle operator's license in Illinois on August 4, 1986, after completing a certificated truckdrivers' training course in St. Louis, Missouri. The carrier's training consisted of 3 days of classroom and on-road instructions followed by daily safety meetings available at their Fort Scott, Kansas facility.

Further investigation revealed the unit's load of metal products consisted of three cribbed rolls of copper weighing 33,478 pounds, one cribbed roll of brass weighing 8,988 pounds, and two empty shipping boxes weighing 150 pounds. The cribs of rolled metal were improperly secured within the trailer using 2- by 4-inch wood material nailed to the trailer's wood floor boards for bracing. One cribbed coil of metal placed on a 6- by 8-foot metal deck at the trailer's forward bulk head was secured by nailing three 2- by 4-inch stringers to the trailer's wood deck with a 2- by 4-inch beam across the front of the stringers, wedging the crib against the trailer's front bulk head. No

evidence of lateral blocking of the coil in the trailer's nose was found. This lack of evidence was corroborated by the codriver's statement that the load shifted to the left while the driver attempted to negotiate the right curve, causing loss of vehicle control.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the lateral shift of the unsecured cargo in the trailer.

OF INTEREST IN THIS INVESTIGATION:

1. Driver Training/Experience
2. Crashworthiness

CASE NO: 186

Investigation Number: CHI-87-H-TR16
Accident Location: On County Road at the Todd Switch crossing near Vinita, Oklahoma
Lanes: Undelineated 15 feet 6 inches
Shoulders: None
Median: None
Features: Straight 7 percent up grade, nonsignaled 2 track grade crossing protected by railroad crossing (cross bucks) signs.
Date and Time: June 8, 1987, 9:40 a.m.
Ambient Conditions: Clear, dry, 75°F
Heavy Truck Involved: 1980 Mack R600ST dump truck
Motor Carrier: Joe I. Epperson
Type of Operation: Contract carrier
Size of Operation: Varies between 1 to 10 units
Total Weight of Truck(s): Undetermined
Total Length of Truck(s): About 26 feet
Other Vehicles Involved: Freight train
Truck Fatalities: 1 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The Mack dump truck was traveling south on a straight section of roadway with a 7 percent positive grade approaching a two-track grade crossing protected only with cross bucks. One cross buck was located on each side of the crossing facing its traffic lane. The truck was traveling at a witness-stated speed of 25 to 30 mph as it drove onto the tracks into the path of the westbound freight train traveling at a recorded speed of 50 mph with the forward lights and horn activated.

The lead engine of the freight train struck the left side (center) of the dump truck, carrying it 246 feet down the tracks to a point where the truck's frame split and the cab/engine compartment separated from the dump box, coming to rest on the south side of the main track. The train continued another 1,500 feet down the tracks carrying the rear frame and dump box. The train engines derailed in an upright position with approximately 13 cars derailed in an accordion fashion behind the engine.

The Mack dump truck was destroyed in the collision. The unrestrained driver was ejected during the collision and was fatally injured. A combination of diesel fuel and hydraulic oil was released from the truck's ruptured tanks. A small fire was observed around the right front corner of the lead locomotive and left side of the dump truck at final rest. The fire was extinguished with a handheld fire extinguisher.

The investigation determined the accident truck and other vehicles from a nearby quarry use the crossing five to six times a day. Also, the driver was familiar with the area and crossing because he had traveled over the road to the quarry daily for the past 7 years.

The interview of the traincrew revealed that the driver never turned his head or looked in the direction of the train before crossing the tracks and the impact by the train locomotive.

Field tests were conducted using a Precision Sound Level Meter type 2232 to measure sound levels inside a similar Mack convention cab truck and sound levels produced by an approaching freight train. The sound levels inside the truck were measured between 83 to 88 decibels (idle to 30 mph) without the use of the air conditioner blower, AM/FM radio, or CB radio. The sound levels produced by the approaching freight train measured between 98 to 102 decibels (whistle post to crossing). The tests indicate the truckdriver would be warned of the train's approach by an optimum of 14 decibels of sound above the truck's 88 decibels of sound.

Carrier records and interviews indicate the driver had 8 years of truck driving experience. Over the past 7 years, he had driven his own truck under an as-needed contract with the carrier. The driver had never received formal truckdriver training. A driver's license check found the driver possessed a valid Oklahoma chauffeur's license with no restrictions or convictions noted.

The Oklahoma Medical Examiner's Office listed the truckdriver's cause of death as the result of massive trauma from the collision. No preaccident incapacitations were noted in the report. Blood was drawn for alcohol screening and tested negative for a BAC.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the truckdriver to perceive the approaching train and react accordingly by stopping his unit before crossing the railroad tracks.

OF INTEREST IN THIS INVESTIGATION:

1. Grade Crossing
2. Environment

CASE NO.: 187

Investigation No.: LAX-87-H-TR09
Accident Location: Dublin Blvd., within Dublin, California
Lanes: 4-lanes, divided
Shoulders: None
Median: Traffic island
Features: Intersection
Date and Time: April 15, 1987, 1:04 a.m.
Ambient Conditions: Clear, dry, artificial light
Heavy Truck Involved: 1980 Freightliner COE in combination with 2 partially loaded tanker trailers
Motor Carrier: Arrow Transportation
Type of Operation: Common carrier
Size of Operation: 97 power units, 200 trucks
Total Weight of Truck(s): 67,440 pounds
Total Length of Truck(s): Not determined
Other Vehicle Involved: None
Truck Fatalities: 0 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 15

SUMMARY:

The doubles combination, both trailers partially loaded with a mixture of vinyl acetate and butyl acrylate, was attempting to make a U-turn on a city street. The driver stated that as he rolled through the intersection he felt one of the trailers "slide out." He then looked into his rearview mirror and saw the rear trailer overturning. After exiting the tractor, the driver observed the contents of the overturned trailer spilling from the filler dome of the trailer and running to the curb where it flowed into a storm drain.

Fifteen persons, including 4 firefighters who responded to the chemical spill, were treated and released because of their exposure to the hazardous material. The lapbelt-restrained truckdriver was not injured.

The investigation found that the tanker trailer has originally been designed for transporting hot products such as asphalt. The filler dome seal was designed to vent if static pressure exceeded 3 psi, and any product within would continue to vent until the tank's interior pressure dropped below that pressure. It was also determined that the synthetic rubber material of the dome seal becomes defective if exposed to hazardous material such as vinyl acetate. A representative of the motor carrier inspected the dome seal at the accident scene and found a .032-inch gap between the gasket and the dome lid. The gasket was also found to be broken in numerous places about its circumference.

The driver of the combination had about 9 years of experience in the operation of heavy trucks and about 8 years in similar type vehicles. He had been employed by the motor carrier for 3 years and had attended a 240-hour commercial vehicle training course.

A search of this truckdriver's State history revealed three violations committed and the occurrence of one property damage accident in the past 6 years. A check of his record with the motor carrier found 11 violations of carrier regulations committed in the 2 years preceding this accident; including one Hours of Service charge, and eight speeding infractions.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the excessive speed of the combination vehicle as the driver attempted to make the U-turn. Contributing to the severity of the incident was the defective dome lid gasket which allowed approximately 1,500 gallons of vinyl acetate mixture to spill into the city storm drain.

OF INTEREST IN THIS INVESTIGATION:

1. Motor Carrier Oversight of Driver
2. Motor Carrier Oversight of Equipment
3. Hazardous Material
4. Double Trailers
5. Driver History

CASE NO.: 188

Investigation No.: CHI-87-H-TR13
Accident Location: Interstate 90 eastbound lanes, in the County of McHenry, Illinois
Lanes: 4 lanes, divided highway
Median: Grass covered
Features: Straight, at grade roadway
Date and Time: April 21, 1987, 4:35 a.m. and 4:45 a.m.
Ambient Conditions: Dark, clear, dry
Heavy Truck Involved: (1) 1976 Freightliner tractor in combination with a 1978 Freuhauf van trailer
Motor Carrier: D. L. Browning Company
Type of Operation: Unknown
Size of Operation: Unknown
Heavy Truck Involved: (2) 1979 International tractor in combination with a 1978 Great Dane van trailer
Motor Carrier: Whitehead Specialities
Type of Operation: Common Carrier
Size of Operation: 67 power units
Heavy Truck Involved: (3) 1977 Peterbilt tractor in combination with a 1978 Trailmobile semitrailer
Motor Carrier: (3) W.T.B., Inc.
Type of Operation: Common Carrier
Size of Operation: 97 power units
Total Weight of Truck(s): (1) Unknown
(2) Unknown
(3) Vehicle 32,380 pounds, cargo unknown
Total Length of Truck(s): (1) Approximately 55 feet
(2) Approximately 55 feet 6 inches
(3) Approximately 56 feet 8 inches
Other Vehicle Involved: None
Truck Fatalities: 1 Truck Injuries: 1
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

On April 21, 1987, at approximately 0435 hours a 1976 Freightliner was eastbound on I-90 in the right lane with a flat tire at the left rear of the semitrailer he was pulling. At approximately mile post 43.75, in McHenry County, Illinois, a 1979 International combination traveling eastbound on I-90 struck the rear of the Freightliner's trailer. Following the collision, the driver of Freightliner drove his vehicle approximately 150 yards farther east on I-90, before parking it on the south shoulder. The International was disabled by the collision and remained in the right lane of the roadway.

The driver of Freightliner checked the damage to the rear of that vehicle, placed three emergency reflectors on the roadway, and then walked west toward the International. Following the collision, the driver of the International activated the warning flashers of that vehicle and set out three safety reflectors west of the stalled vehicle. At approximately 0445 hours, a 1977 Peterbilt was traveling eastbound on I-90 in the right lane. A witness, traveling east beside the Peterbilt stated that he slowed down and tried to

signal the driver of the Peterbilt about the stalled vehicle. The witness stated that the Peterbilt struck the rear of the stalled, unoccupied International at approximately 55 mph. A fire ignited that destroyed both tractors and damaged both trailers.

The driver and two passengers of the Freightliner were not injured. The driver of the International received minor injuries. The driver of the Peterbilt was ejected during the collision with the International and was fatally injured. Toxicological analysis on specimens from the driver of the Peterbilt detected no drugs or alcohol.

According to information obtained by the Illinois State Police, the driver of the Freightliner was inexperienced in operating that vehicle. This driver had just been employed by the motor carrier company which owned vehicle 1, and this was the first load he had transported. This driver was a recent graduate of a truck driving school in Wisconsin. He stated to police he went to bed on April 20, 1987, at about 2030 hours and woke up on April 21 at 0130 hours. This driver stated he and his girlfriend and her son had departed Mather, Wisconsin, at about 0200 hours on April 21, 1987. The driver stated a tire on the trailer he was pulling went flat at about 0415 hours, and he decided to drive on to the next truck stop to have it repaired.

This driver stated his travel speed was about 25 to 30 mph, and that he had activated the emergency flashers after the tire went flat. According to this driver, he had driven approximately 3 miles before being struck by the International.

The driver of the International stated he had gone to bed on April 20, 1987, at approximately 2100 hours and woke up at approximately 0130 hours on April 21, 1987. He stated his son drove him from his home to the motor carrier's garage in Monroe, Wisconsin, where he had 2 cups of coffee, checked the unit for the trip, and departed at approximately 0300 hours on April 21, 1987, en route to Chicago, Illinois.

The driver of the Peterbilt had left Powderville, Montana, on April 19, 1987, at approximately 1200 hours en route to Grand Rapids, Michigan. Fuel stops were made in Rapid City, South Dakota, on April 20, and Jackson, Minnesota, on April 20. The times of these stops are unknown. The distance from Jackson, Minnesota, to the scene of the accident is approximately 453 miles.

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of the first accident was the failure of the International driver to perceive and react to the slow moving Freightliner combination. Contributing to that accident was the Freightliner driver's decision to proceed, at low speed, in the travel lane of the Interstate.

The National Transportation Safety Board determines that the probable cause of the second accident was the diminished alertness of the Peterbilt driver, due to excessive hours on duty, which resulted in his failure to perceive and react to the combination unit disabled in his traffic lane.

OF INTEREST IN THIS INVESTIGATION:

1. Driver Training/Experience
2. Fatigue/Duty Hours
3. Motor Carrier Oversight of Drivers

CASE NO.: 189

Investigation No.: CHI-87-H-TR15
Accident Location: Interstate 57 northbound lanes, Effingham County, Illinois
Lanes: 2 northbound lanes of a 4-lane divided highway
Median: Grass median
Features: Roadside slope on east roadside protected by blocked out W-beam guardrail
Date and Time: June 27, 1987, 10:20 a.m.
Ambient Conditions: Daylight, clear, dry
Heavy Truck Involved: 1983 Freightliner tractor in combination with a Hobbs van trailer
Motor Carrier: Midwestern Distribution, Inc.
Type of Operation: Common carrier
Size of Operation: 613 tractors
Total Weight of Truck(s): Estimated 75,570 pounds
Total Length of Truck(s): Estimated 58 feet
Other Vehicle Involved: None
Truck Fatalities: 2 Truck Injuries: 0
Other Fatalities: 0 Other Injuries: 0

SUMMARY:

The Freightliner combination was northbound on I-57. The trailer was loaded with a cargo of boxed laundry detergent. The 27-year-old codriver was operating the combination vehicle and the 36-year-old lead driver was in the sleeper cab of the tractor. At MP 156.36, the vehicle exited the right (east) side of the roadway striking and penetrating the blocked-out W-beam guardrail. The combination unit overrode the guardrail and descended a steep roadside slope into a valley area. As the tractor overrode the guardrail, the fuel tank on the right side was ruptured and torn from the frame. No fire occurred. The truck traveled diagonally down the slope and then rolled onto its right side. The combination vehicle came to rest approximately 45 feet below the level of the roadway and 300 feet north of where it left the roadway at the bottom of the roadside slope.

The tractor cab was crushed during the rollover and the two occupants of the tractor were fatally injured.

The codriver was a graduate of an 8-week course at the Chauffeur's Training School of Chicago, Illinois, in December 1986. He had also taken a 1 1/4-day "Codriver Indoctrination Class" and been qualified by Midwestern Distribution, Inc., on June 5, 1987. At the time of the accident, this driver had 23 days of experience as a heavy truckdriver.

"Driver's Daily Log Books" for the codriver and lead driver were found in the tractor wreckage during the vehicle inspection. These log books were recovered from the crushed sheet metal components of the tractor cab. Two log books signed by the codriver were found. One of these two log books contained two sets of pages completed for June 24 and 25, 1987.

According to the first set of log book, pages completed for June 24 and 25, 1987, indicated: on June 24 the codriver was in the sleeper berth from 0000 to 0200, on duty for 1/2 hour to 0230, off duty to 1030, and then in the sleeper berth from 1030 to 1400, then off duty to 2100, and in the sleeper berth until 2400. On June 25; the codriver spent from 0000 to 0030 on duty, then in the sleeper berth to 0130. He was off duty from 0130 to 1030, then in the sleeper berth from 1030 to 1330, then off duty from 1330 to 2130. From 2130 to 2400, no entries were made on this page of the log book.

According to the second set of pages for June 24 and 25 found in the codriver's log books: on June 24, the codriver was in the sleeper berth from 0000 to 0200, on duty for 1/2 hour to 0230, then off duty from 0230 to 1000, in the sleeper berth from 1000 to 2000. He was logged as being off duty to 2100, and then back in the sleeper berth to 2400. On June 25, the codriver was on duty from 0000 to 0030, then off duty from 0030 to 0130, then driving from 0130 to 0530, and then off duty from 0530 to 1030, then in the sleeper berth until 1330, and then off duty until 2130, in the sleeper berth for 1/2 hour to 2200, off duty for 1 hour to 2300, and then back in the sleeper until 2400.

On June 26 the codriver was in the sleeper berth from 0000 to 0600, off duty from 0600 to 1330, driving from 1330 to 1630, with a 30-minute period of on-duty time, and driving from 1700 to 1900, and then in the sleeper berth from 1900 to 2400.

After the 5 hours in the sleeper berth on June 26, the codriver's log book shows him driving on June 27 from 0000 to 0830, which is the last entry before the accident at 1020 hours. The codriver was found behind the wheel following the accident, and the lead driver was found in the sleeper area.

The lead driver's log book entries for June 24 show he drove for 11 hours and covered a distance (total for the day) of 539 miles. On June 25, the lead driver's log shows him driving for 4.5 hours and covering 203 miles. On June 26, the lead driver drove 408 miles in 8.5 hours. On June 27, the lead driver's log book shows him in the sleeper berth from 0000 to 0830 hours, which is the last entry in this log before the accident at 1020 hours.

The driver's log book entries of miles driven for each driver were totaled for 7 and 8 days, from June 19, 1987 to June 26, 1987. The lead driver accumulated 59 hours of on-duty and driving time for both 7- and 8-day totals in that period. The codriver accumulated 33 hours of on-duty and driving time for both 7- and 8-day totals in the same period. The total mileage driven for the lead driver during these dates was 2,595 miles. The total mileage driven for the codriver was 1,382 during this period.

No alcohol or drugs were found in the tractor cab following this collision. No traces of these substances were found in the blood sample taken from the codriver and submitted for toxicological analysis by the Effingham County Coroner.

Effingham County, Illinois
Case No. 189

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the fatigued truckdriver to maintain the vehicle on the roadway as a result of excessive hours on duty and the lack of adequate rest. Contributing to the accident was the failure of the motor carrier to properly monitor the driver's activities and prevent excessive hours of service.

OF INTEREST IN THIS INVESTIGATION:

1. Driver Training/Experience
2. Fatigue/Duty Hours
3. Motor Carrier Oversight of Driver
4. Crashworthiness
5. Environment

APPENDIX A

GLOSSARY OF TERMS AND ABBREVIATIONS

This glossary briefly describes certain terms, as they are used throughout the case summaries, that may be unfamiliar to the reader. Many of the definitions are transcribed directly from the Federal Motor Carrier Safety Regulations, others are taken from industry publications.

AASHTO--American Association of State Highway and Transportation Officials

BAC--blood alcohol content

BAL--blood alcohol level

BMCS--Bureau of Motor Carrier Safety. (Now the Office of Motor Carriers)

COE--cab-over-engine; A tractor with the cab positioned over the engine.

Combination--a highway vehicle composed of two or more detachable units, such as a tractor and semitrailer or a tractor, a semitrailer, and a full trailer.

Common carrier--a for-hire trucking company that offers its transportation services to the general public on an equal basis.

Contract carrier--a for-hire trucking company that provides a specialized transportation service under contract with one, or a limited number of, shipper(s).

Conventional cab--a tractor with the cab positioned behind the engine.

Converter dolly--a device used as an auxiliary axle for conversion of a semitrailer to a full trailer. Used to couple the trailers of a multiple trailer combination.

DOT--Department of Transportation

Doubles combination. A tractor in combination with a semitrailer and a full trailer.

EPA--Environmental Protection Agency

Exempt carrier--common or contract carriers of property which is exempt from economic regulation.

Fifth wheel--matching plates mounted above the rear frame of a tractor and below the front end of a semitrailer, with a vertical connecting pin, that bears the weight of the front end of a semitrailer and is the pivot point between the two vehicles.

FMCSR--Federal Motor Carrier Safety Regulations

Full trailer--any motor vehicle, with or without motive power, other than a "pole trailer," designed to be drawn by another motor vehicle and so constructed that no part of its weight except the towing device rests on the towing vehicle. A semitrailer equipped with an auxiliary front axle (dolly) shall be deemed a "full trailer."

GADOT--Georgia Department of Transportation

ICC--Interstate Commerce Commission

Motor carrier--except as otherwise specifically provided, the term "motor carrier" includes a common carrier by motor vehicle, a contract carrier by motor vehicle, and a private carrier of property by motor vehicle.

NTSB--National Transportation Safety Board

OMC--Office of Motor Carriers

Owner-Operator--an individual who owns and operates his own truck as a business.

Pintle hook--an attachment unit, consisting of a latching hook at the rear of a vehicle coupled to a drawbar eyehook extending from a full trailer in tow.

Pole trailer--the term "pole trailer" means any vehicle without motive power, possibly of variable wheelbase, designed to be drawn by another motor vehicle, and attached to the towing vehicle by means of a "reach," or "pole," or by being "boomed" or otherwise secured to the towing vehicle, and ordinarily used for transporting long or irregular-shaped loads such as poles, pipes, or structural members capable generally of sustaining themselves as beams between the supporting connections.

Power unit--see "truck tractor"

Private carrier--any person or entity, who or which transports property by motor vehicle which it owns, leases, is bailee of, or is in the furtherance of that person's commercial enterprise.

Semitrailer--any motor vehicle other than a "pole trailer," with or without motive power, designed to be drawn by another motor vehicle and so constructed that some part of its weight rests upon the towing vehicle.

Straight truck--a truck with the engine, cab, and freight compartment all on the same frame.

Trailer--the cargo-carrying unit in a combination truck.

Truck--any self-propelled motor vehicle except a truck tractor, designed and used, or exclusively used whether or not so designed, for the transportation of property.

Truck tractor--a self-propelled motor vehicle designed and used primarily for drawing other vehicles and not so constructed as to carry a load other than a part of the weight of the vehicle and load so drawn. Also referred to as "power unit."

Twin trailer combination--see "doubles combination"

Vehicle--any conveyance of any type whatsoever operated upon the highways.

APPENDIX B
PHASE I HEAVY TRUCK INVESTIGATIONS

CASE NUMBER	FIELD OFFICE NUMBER	DATE	TIME	LOCATION
001	ATL-86-H-TR02	10/20/85	7:00 PM	HENDERSONVILLE, NORTH CAROLINA
002	FTW-85-H-TR38	08/13/85	4:15 PM	DECATUR, TEXAS
003	FTW-86-H-FR13	05/20/86	7:50 PM	ALBUQUERQUE, NEW MEXICO
004	CHI-86-H-TR03	12/05/85	3:50 PM	KALAMAZOO, MICHIGAN
005	MKC-86-H-TR02	01/08/86	5:40 AM	STRONG CITY, KANSAS
006	SEA-86-H-TR07	03/04/86	1:44 PM	ANACORTES, WASHINGTON
007	ATL-86-H-TR08	02/26/86	2:20 PM	ATLANTA, GEORGIA
008	FTW-85-H-TR36	06/05/85	1:44 PM	IRVING, TEXAS
009	CHI-86-H-TR04	01/24/86	6:45 PM	MORRISON, ILLINOIS
010	ATL-86-H-TR05	01/14/86	7:33 AM	BRUNSWICK, GEORGIA
011	CHI-86-H-TR05	01/27/86	6:00 AM	MOUND, ILLINOIS
012	ATL-86-H-TR06	02/04/86	11:40 AM	CLYDE, NORTH CAROLINA
013	CHI-86-H-TR06	02/06/86	5:40 AM	SHOREWOOD, ILLINOIS
014	LAX-86-H-TR05	02/07/86	3:20 AM	FORT TEJON, CALIFORNIA
015	SEA-86-H-TR05	02/08/86	12:25 AM	MYRTLE CREEK, OREGON
016	MKC-86-H-TR04	02/11/86	6:20 AM	KANSAS CITY, MISSOURI
017	LAX-86-H-TR03	01/07/86	4:05 AM	ONTARIO, CALIFORNIA
018	CHI-86-H-TR08	02/17/86	3:30 AM	ENGLEWOOD, OHIO
019	SEA-86-H-TR06	02/24/86	8:50 AM	HOOD RIVER, OREGON
020	FTW-86-H-TR04	03/09/86	4:25 PM	BYRAN, TEXAS
021	ATL-86-H-TR09	03/09/86	11:30 PM	SPRINGVILLE, ALABAMA
022	FTW-86-H-TR05	03/12/86	12:40 AM	DECATUR, TEXAS
023	NYC-86-H-TR06	03/12/86	12:51 AM	LOWER ALLEN TWP., PENNSYLVANIA
024	DEN-86-H-TR07	03/14/86	9:09 PM	GREELEY, COLORADO
025	SEA-86-H-TR09	03/15/86	3:15 AM	BIGGS JUNCTION, OREGON
026	FTW-86-H-TR06	03/20/86	4:30 AM	KILGORE, TEXAS
027	FTW-86-H-TR07	03/20/86	4:45 AM	MINERAL WELLS, TEXAS
028	FTW-86-H-TR08	03/20/86	9:07 PM	BELLEVUE, TEXAS
029	DEN-86-H-TR08	03/26/86	6:10 AM	DENVER, COLORADO
030	MKC-86-H-TR06	03/31/86	3:35 AM	MAMMOTH SPRING, ARKANSAS
031	DEN-86-H-TR09	03/31/86	5:30 AM	DENVER, COLORADO
032	MKC-86-H-TR07	04/01/86	7:10 PM	DUMAS, ARKANSAS
033	FTW-86-H-TR09	04/03/86	2:00 PM	MINERAL WELLS, TEXAS
034	MKC-86-H-TR08	04/04/86	10:05 AM	KANSAS CITY, KANSAS
035	SEA-86-H-TR10	04/15/86	4:40 AM	TUMWATER, WASHINGTON
036	MKC-86-H-TR09	04/15/86	8:30 AM	TULSA, OKLAHOMA
037	ATL-86-H-TR10	04/15/86	2:55 AM	ANNISTON, ALABAMA

APPENDIX B (cont.)

038	DEN-86-H-TR10	04/21/86	12:15 PM	DENVER, COLORADO
039	LAX-86-H-TR07	04/23/86	5:37 PM	TEJON, CALIFORNIA
040	CHI-86-H-TR09	04/24/86	11:00 PM	VANDALIA, ILLINOIS
041	MKC-86-H-TR10	04/24/86	4:45 PM	ELDORADO, KANSAS
042	LAX-86-F-H009	04/28/86	6:45 PM	CHINO, CALIFORNIA
043	MKC-86-H-TR11	04/30/86	2:30 AM	WAKEENEY, KANSAS
044	LAX-86-F-H012	04/30/86	6:05 AM	SANTA FE SPRINGS, CALIFORNIA
045	LAX-86-F-H010	05/05/86	7:05 AM	ONTARIO, CALIFORNIA
046	DEN-86-H-TR12	05/05/86	2:10 PM	BOULDER, COLORADO
04.	ATL-86-H-TR11	05/07/86	1:45 AM	ALANTA, GEORGIA
048	MKC-86-H-TR12	05/09/86	4:14 PM	KANSAS CITY, KANSAS
049	MKC-86-H-TR13	05/10/86	7:30 AM	ALMA, KANSAS
050	FTW-86-H-TR15	05/12/86	7:10 AM	DALLAS, TEXAS
051	LAX-86-H-TR13	05/16/86	1:30 PM	BRAWLEY, CALIFORNIA
052	LAX-86-H-TR11	05/16/86	2:00 AM	LEBEC, CALIFORNIA
053	ATL-86-H-TR15	05/17/86	2:00 AM	ASHEVILLE, NORTH CAROLINA
054	ATL-86-H-TR12	05/20/86	7:20 AM	DORAVILLE, GEORGIA
055	ATL-86-H-TR14	05/24/86	7:40 AM	ALANTA, GEORGIA
056	FTW-86-H-TR14	05/28/86	11:18 AM	ALLEN, TEXAS
057	DEN-86-H-TR13	05/29/86	11:20 AM	DENVER, COLORADO
058	LAX-85-F-H016	06/07/85	10:20 AM	FREMONT, CALIFORNIA
059	SEA-86-H-TR11	06/06/86	12:50 AM	BAKER, OREGON
060	ATL-86-H-TR17	06/06/86	1:35 PM	ELKIN, NORTH CAROLINA
061	DEN-87-H-TR02	07/01/86	5:37 AM	VALLEY FALLS, KANSAS
062	ATL-86-H-TR19	07/08/86	8:45 AM	CHINA GROVE, NORTH CAROLINA
063	SEA-86-H-TR13	07/09/86	4:51 PM	CATALDO, IDAHO
064	ATL-86-H-TR21	07/22/86	6:30 AM	SPENCER, NORTH CAROLINA
065	FTW-86-H-TR16	08/12/86	4:45 AM	FAIRFIELD, TEXAS
066	SEA-86-H-TR14	08/18/86	4:13 PM	RENTON, WASHINGTON
067	LAX-86-F-H014	08/20/86	4:45 AM	LOS ANGELES, CALIFORNIA
068	ATL-86-H-TR22	08/30/86	3:10 AM	TERRELL, NORTH CAROLINA
069	DEN-86-H-TR15	08/31/86	9:46 AM	SILVERTHORNE, COLORADO
070	FTW-86-H-TR17	09/19/86	6:01 AM	CLEVELAND, TEXAS
071	DEN-86-H-TR14	09/21/86	11:25 AM	KEYSTONE, COLORADO
072	DEN-87-H-TR01	10/04/86	1:50 PM	DILLON, COLORADO
073	FTW-87-H-TR01	10/05/86	8:00 PM	WICHITA FALLS, TEXAS
074	CHI-87-H-TR01	10/06/86	7:50 AM	CHRISMAN, ILLINOIS
075	LAX-87-H-TR01	10/13/86	9:20 AM	WESTWOOD, CALIFORNIA
076	CHI-87-H-TR03	10/27/86	7:44 AM	DAYTON, OHIO

APPENDIX B (cont.)

077	SEA-87-H-TR01	11/11/86	10:02 AM	VANCOUVER, WASHINGTON
078	DEN-87-H-TR04	11/25/86	9:40 AM	SALT LAKE CITY, UTAH
079	SEA-87-H-TR02	11/30/86	9:00 AM	MULLAN, IDAHO
080	LAX-87-H-TR02	12/03/86	1:40 AM	BARSTOW, CALIFORNIA
081	MKC-87-H-TR02	12/04/86	10:04 AM	WINFIELD, KANSAS
082	DEN-87-H-TR05	12/21/86	11:50 PM	HILLJE, TEXAS
083	SEA-87-H-TR03	12/22/86	1:36 PM	WINLOCK, WASHINGTON
084	CHI-86-H-TR11	05/10/86	10:24 AM	OWOSSO, MICHIGAN
085	ATL-87-H-TR04	11/18/86	2:30 PM	LAWRENCEVILLE, GEORGIA
086	NYC-86-H-TR03	02/03/86	12:15 PM	HOUTSVILLE, NEW YORK
087	ATL-87-H-TR02	11/12/86	7:22 AM	COLLEGE PARK, GEORGIA
088	CHI-86-H-TR10	05/11/86	4:39 AM	VIENNA, ILLINOIS
089	CHI-86-H-TR12	05/19/86	2:20 PM	CHICAGO, ILLINOIS
090	NYC-86-H-TR05	02/24/86	8:20 PM	ISLIP, NEW YORK
091	FTW-86-H-TR11	05/10/86	7:15 AM	DENNISON, TEXAS
092	LAX-86-H-TR15	09/02/86	4:09 AM	CULVER CITY, CALIFORNIA
093	DEN-86-H-TR16	09/12/86	12:20 PM	SILVERTON, COLORADO
094	ATL-86-H-TR25	09/20/86	8:45 PM	CLYDE, NORTH CAROLINA
095	MKC-87-H-TR03	12/18/86	10:20 AM	BUFFALO, KANSAS
096	LAX-86-F-H008	04/13/86	3:04 AM	COLTON, CALIFORNIA
097	DEN-87-H-TR06	01/07/87	6:05 AM	DENVER, COLORADO
098	SEA-87-H-TR04	01/15/87	1:00 PM	CANBY, OREGON
099	SEA-87-H-TR06	03/02/87	9:32 PM	VANCOUVER, WASHINGTON
100	FTW-87-H-TR04	03/06/87	5:45 AM	TILLATOBA, MISSISSIPPI
101	ATL-87-H-TR14	04/02/87	3:20 PM	ALANTA, GEORGIA
102	FTW-87-H-TR06	03/26/87	5:40 AM	PALO PINTO COUNTY, TEXAS
103	DEN-87-H-TR03	11/20/86	5:15 AM	DENVER, COLORADO
104	ATL-87-H-TR01	10/30/86	7:05 AM	MONTGOMERY, ALABAMA
105	ATL-87-H-TR03	11/12/86	1:50 PM	HALIFAX, NORTH CAROLINA
106	ATL-86-H-TR23	09/03/86	3:45 PM	HOT SPRINGS, NORTH, CAROLINA
107	MKC-86-H-TR15	09/09/86	2:00 AM	GOODLAND, KANSAS
108	ATL-86-H-TR20	07/10/86	6:30 AM	MOORESVILLE, NORTH CAROLINA
109	CHI-85-H-FR25	07/18/85	4:30 AM	KNIGHTSTOWN, INDIANA
110	FTW-86-H-TR10	04/03/86	9:55 PM	JUNCTION, TEXAS
111	ATL-87-H-TR24	09/14/87	5:41 AM	SELMA, NORTH CAROLINA
112	LAX-85-F-H017	07/24/85	11:04 AM	CAMP VERDE, ARIZONA
113	CHI-86-H-TR13	09/26/86	1:35 AM	NEW LENOX, ILLINOIS
114	FTW-86-H-TR12	05/10/86	7:45 AM	DENNISON, TEXAS
115	CHI-87-H-TR05	12/04/86	2:54 PM	EAST ST. LOUIS, ILLINOIS

APPENDIX B (cont.)

116	LAX-86-H-TR06	03/22/86	8:00 AM	FORT TEJON, CALIFORNIA
117	MKC-87-H-TR01	11/16/86	7:35 PM	STOCKTON, IOWA
118	SEA-86-H-TR12	06/30/86	3:45 PM	HUNTINGTON, OREGON
119	MKC-87-H-TR05	01/12/87	5:45 AM	CORAVILLE, IOWA
120	DEN-86-H-TR06	03/10/86	5:40 AM	GREENWOOD VILLAGE, COLORADO
121	LAX-86-H-TR16	08/30/86	3:20 PM	LOS ANGELES, CALIFORNIA
122	SEA-86-H-TR08	03/06/86	7:20 PM	ARLINGTON, WASHINGTON
123	MKC-87-H-TR06	02/18/87	3:35 PM	KALONA, IOWA
124	NYC-86-H-TR08	04/09/86	4:20 AM	MERCER COUNTY, NEW JERSEY
125	SEA-87-H-TR07	03/19/87	4:30 PM	DURKEE, OREGON
126	DEN-87-H-TR11	03/24/87	5:33 PM	AURORA, COLORADO
127	FTW-87-H-TR02	01/28/87	8:55 AM	ANAHUAC, TEXAS
128	FTW-87-H-TR05	03/17/87	3:35 PM	COLLEGE STATION, TEXAS
129	SEA-86-H-TR16	09/05/87	10:59 AM	TACOMA, WASHINGTON
130	SEA-87-H-TR08	05/19/87	3:45 PM	ROGUE RIVER, OREGON
131	DEN-87-H-TR14	05/01/87	4:55 PM	CHEYENNE, WYOMING
132	MKC-87-H-TR12	05/22/87	9:45 AM	GARDNER, KANSAS
133	CHI-87-H-TR08	01/10/87	10:50 PM	SALEM. ILLINOIS
134	CHI-87-H-TR09	01/24/87	1:10 PM	ADDISON, ILLINOIS
135	CHI-87-H-TR10	02/19/87	9:32 AM	RENSSELAER, INDIANA
136	MKC-87-H-TR16	07/09/87	1:00 AM	MINNEAPOLIS, MINNESOTA
137	MKC-87-H-TR17	07/10/87	3:40 PM	RAWLINS, WYOMING
138	ATL-87-H-TR08	01/28/87	11:25 AM	LAPLACE, LOUISIANA
139	ATL-87-H-TR12	03/21/87	7:30 AM	NEW ORLEANS, LOUISIANA
140	ATL-87-H-TR15	04/08/87	3:20 PM	FREDERICKSBURG, VIRGINIA
141	LAX-87-H-TR04	02/13/87	12:30 PM	NORWALK, CALIFORNIA
142	LAX-87-H-TR05	03/07/87	8:55 AM	DIAMOND BAR, CALIFORNIA
143	CHI-87-H-TR06	12/07/86	12:09 AM	WAYNE, NEW JERSEY
144	ATL-87-H-TR10	03/19/87	8:55 AM	ORLANDO, FLORDIA
145	ATL-87-H-TR05	01/08/87	7:45 AM	ALLENDALE, SOUTH CAROLINA
146	DEN-87-H-TR07	01/16/87	8:20 AM	VAIL, COLORADO
147	FTW-87-H-TR08	04/28/87	4:50 AM	LONGVIEW, TEXAS
148	DEN-87-H-TR12	04/21/87	8:50 PM	LOS ANGELES, CALIFORNIA
149	MKC-87-H-TR14	05/11/87	4:00 PM	POLK, NEBRASKA
150	NYC-87-H-TR11	08/27/87	2:45 PM	CHERRY HILL, NEW JERSEY
151	DEN-87-H-TR08	03/19/87	8:00 PM	WAMSUTTER, WYOMING
152	ATL-87-H-TR06	01/13/87	2:55 AM	BALDWIN, FLORIDA
153	NYC-87-H-TR08	05/11/87	3:00 PM	SUFFOLK, VIRGINIA
154	MKC-87-H-TR04	12/27/86	6:00 PM	EVANSTON, WYOMING

APPENDIX B (cont.)

155	ATL-87-H-TR11	03/19/87	11:30 AM	MONTEZUMA, GEORGIA
156	DEN-87-H-TR13	04/29/87	7:15 AM	BEAVER, UTAH
157	ATL-87-H-TR20	05/22/87	7:45 AM	CLYDE, NORTH CAROLINA
158	ATL-87-H-TR07	01/25/87	10:30 PM	KINGS MOUNTAIN, NORTH CAROLINA
159	SEA-87-H-TR09	05/28/87	9:20 AM	WOODBURN, OREGON
160	DEN-87-H-TR18	06/23/87	5:30 AM	ROCK SPRINGS, WYOMING
161	MKC-87-H-TR09	04/20/87	8:55 AM	MANSFIELD, ARKANSAS
162	ATL-87-H-TR13	04/02/87	10:16 AM	FORSYTH, GEORGIA
163	MKC-87-H-TR13	05/04/87	3:25 PM	JETMORE, KANSAS
164	CHI-87-H-TR02	10/17/87	12:18 PM	LAKE COUNTY, ILLINOIS
165	MKC-87-H-TR15	06/04/87	10:45 PM	GREEN CASTLE, MISSOURI
166	MKC-87-H-TR08	04/07/87	11:05 AM	EAST END, ARKANSAS
167	CHI-87-H-TR04	10/30/86	6:40 PM	GARY, INDIANA
168	SEA-87-H-TR11	08/03/87	6:55 PM	POLSON, MONTANA
169	DEN-87-H-TR16	06/02/87	1:45 PM	SILVERTHORNE, COLORADO
170	DEN-87-H-TR15	05/26/87	3:50 AM	DENVER, COLORADO
171	FTW-87-H-TR07	04/09/87	3:55 AM	FRENCHTOWN, MICHIGAN
172	SEA-87-H-TR10	06/05/87	4:30 PM	DURKEE, OREGON
173	MKC-87-H-TR10	04/22/87	2:30 AM	BRINKLEY, ARKANSAS
174	MKC-87-H-TR11	04/29/87	4:05 AM	SIKESTON, MISSOURI
175	LAX-87-H-TR13	05/30/87	2:15 PM	TRUCKEE, CALIFORNIA
176	DEN-87-H-TR10	03/24/87	1:00 AM	CHEYENNE, WYOMING
177	ATL-87-H-TR18	05/19/87	8:45 AM	KINSTON, NORTH CAROLINA
178	DEN-87-H-TR20	06/30/87	6:20 AM	WELLINGTON, COLORADO
179	ATL-87-H-TR19	05/20/87	10:55 PM	JACKSONVILLE, ALABAMA
180	MKC-87-H-TR07	03/22/87	4:39 PM	KANSAS CITY, MISSOURI
181	FTW-87-H-TR13	08/16/87	7:07 PM	MONROE, LOUISIANA
182	CHI-87-H-TR07	12/21/86	12:38 AM	BELVIDERE, ILLINOIS
183	CHI-87-H-TR17	06/26/87	9:22 AM	JOLIET, ILLINOIS
184	CHI-87-H-TR14	04/28/87	8:19 AM	PONTIAC, ILLINOIS
185	CHI-87-H-TR11	03/02/87	1:00 PM	GRANITE CITY, ILLINOIS
186	CHI-87-H-TR16	06/08/87	9:40 AM	VINITA, OKLAHOMA
187	LAX-87-H-TR09	04/15/87	12:20 AM	DUBLIN, CALIFORNIA
188	CHI-87-H-TR13	04/21/87	4:35 AM	MCHENRY COUNTY, ILLINOIS
189	CHI-87-H-TR15	06/27/87	10:20 AM	EFFINGHAM COUNTY, ILLINOIS

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