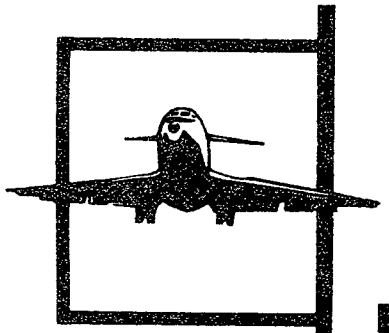

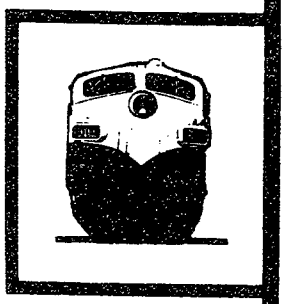

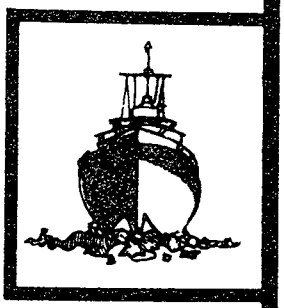

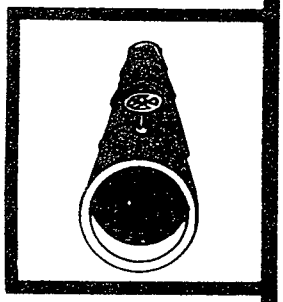

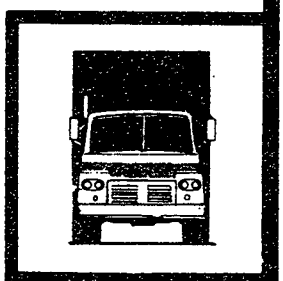

NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D.C. 20594

SPECIAL STUDY

RAILROAD/HIGHWAY GRADE CROSSING ACCIDENTS INVOLVING TRUCKS TRANSPORTING BULK HAZARDOUS MATERIALS

NTSB-HZM-81-2

UNITED STATES GOVERNMENT

TECHNICAL REPORT DOCUMENTATION PAGE

1. Report No. NTSB-HZM-81-2	2. Government Accession No. PB82-113432	3. Recipient's Catalog No.
4. Title and Subtitle Special Study: Railroad/Highway Grade Crossing Accidents Involving Trucks Transporting Bulk Hazardous Materials		5. Report Date September 24, 1981
		6. Performing Organization Code
7. Author(s)		8. Performing Organization Report No.
9. Performing Organization Name and Address National Transportation Safety Board Bureau of Technology Washington, D.C. 20594		10. Work Unit No. 3098A
		11. Contract or Grant No.
12. Sponsoring Agency Name and Address NATIONAL TRANSPORTATION SAFETY BOARD Washington, D. C. 20594		13. Type of Report and Period Covered Special Study Report on the Safe Transportation of Hazardous Materials
		14. Sponsoring Agency Code

15. Supplementary Notes
The subject report was distributed to NTSB mailing lists: 8A, 8E, 14A, 15, 16, 20A and 20D.

16. Abstract The National Transportation Safety Board has studied accident data collected by four other Federal agencies, has investigated 14 accidents involving train collisions with trucks transporting hazardous materials, and as a result has determined certain characteristics of such collisions.

An average of 62 accidents of this type occur annually, resulting in an average of more than $1.6 million in property damage, 41 injuries, and 7 fatalities. Some recent individual accidents have involved fatalities and property damage in excess of previous yearly averages. One railroad's data when extrapolated suggest that there may be as many as 750 near-collisions between trains and trucks transporting bulk hazardous materials each year. The accidents tend to involve trucks transporting petroleum products and to occur close to distribution/storage terminals.

A uniform effort, as an extension of Operation Lifesaver, which includes engineering, education, enforcement, and legislation, is needed to reduce these types of accidents. Additionally, changes in data systems are needed.

17. Key Words	18. Distribution Statement
hazardous materials; trucks; railroad/highway grade crossing accidents; Operation Lifesaver; Southern Railway System; Bureau of Motor Carrier Safety; Materials Transportation Bureau; Federal Railroad Administration; National Highway Traffic Safety Administration; accident data	This document is available to the public through the National Technical Information Service-Springfield, Virginia 22161 *(Always refer to number listed-in item 2)*

19. Security Classification (of this report)	20. Security Classification (of this page)	21. No. of Pages	22. Price
UNCLASSIFIED	UNCLASSIFIED	49	

NTSB Form 1765.2 (Rev. 9/74)

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NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C. 20594

SPECIAL STUDY

Adopted: September 24, 1981

RAILROAD/HIGHWAY GRADE CROSSING ACCIDENTS INVOLVING TRUCKS TRANSPORTING BULK HAZARDOUS MATERIALS

INTRODUCTION

This study is directed toward preventing collisions between trains and trucks transporting hazardous materials in bulk 1/ at railroad/highway grade crossings. 2/ During a 1-month period in the fall of 1979, the National Transportation Safety Board (NTSB) investigated four accidents involving a train collision with a truck transporting petroleum products. Three of these accidents resulted in gasoline fires which engulfed the truck trailers and the train locomotives. While the truckdrivers were uninjured in the three accidents involving fire, five railroad employees were killed, four were injured, and the total property damage for the three accidents was estimated to be more than $923,000. These four accidents and five similar accidents, previously investigated by the NTSB, all involved factors that have been found to be common in accidents at crossings which involved trucks transporting bulk hazardous materials. Because of this accident experience, the NTSB initiated this special study to determine the magnitude of the problem and the characteristics of these truck accidents. The NTSB's concern was heightened by the fact that railroad personnel, truckdrivers, other motorists, bystanders, and nearby occupied buildings have been affected, most often by burning petroleum products and occasionally by toxic substances. Moreover, some of these truck accidents have occurred immediately adjacent to petroleum terminals and posed the risk of substantial escalation of their consequences.

The NTSB examined data from its accident investigations involving truck accidents and reviewed accident data on this type of accident collected by four agencies in the U.S. Department of Transportation (DOT):

- Federal Railroad Administration (FRA) crossing accident/incident reports, coded as involving a truck transporting a hazardous material; supplementary railroad injury and illness summaries; rail equipment accident/incident reports; and crossing inventory forms.
- Federal Highway Administration (FHWA)/Bureau of Motor Carrier Safety (BMCS) motor carrier accident reports coded as a train/truck collision in which the truck was transporting hazardous materials.

1/ Throughout the report, this type of accident will be referred to as "truck accident."
2/ This report will refer to railroad/highway grade crossings as "crossings." Crossings with warning systems such as signs and manually operated devices that are not automatically activated by an approaching train will be referred to as "passive crossings." Crossings with warning systems such as gates, flashing lights, highway signals, wigwags, and bells that are automatically activated by an approaching train will be referred to as "active crossings."

- o Research and Special Programs Administration (RSPA)/Materials Transportation Bureau (MTB) reports of accidents involving hazardous materials reported to have occurred at crossings.

- o National Highway Traffic Safety Administration (NHTSA)/Fatal Accident Reporting System (FARS) reports of fatal accidents involving trains, trucks, and a fire or explosion.

When a relevant accident was found in one agency's data system, the other agencies' data were examined to determine if the same accident information was contained in another agency's files. In those cases where the data found in one agency's files conflicted with that in another's or were inconsistent, the information was verified with the State or the railroad involved. The data for 1975 through 1979 (see table 1) revealed a yearly average of 62 accidents, 7 fatalities, 41 injuries, and $1,670,000 in property damage involving the truck accidents.

Table 1.--Reported accidents involving trucks carrying hazardous materials in bulk colliding with trains, 1975-1979.

	Accidents	Fatalities	Injuries	Property damage
1975	53	5	28	$1,140,678
1976	46	7	36	1,671,265
1977	65	7	30	735,870
1978	74	9	80	3,135,955
1979	72	7	32	1,688,262
Total	310	35	206	$8,372,030

1/ Based on a compilation of data from the FHWA, FRA, NHTSA, MTB, NTSB, and other sources.

Shortly after the NTSB initiated the accident investigation phase of this study in November 1980, four truck accidents occurred within a 10-day period that resulted in 9 fatalities, 9 injuries, and $718,000 in property damage. In this 10-day period, the total fatalities exceeded the yearly average, and the property damage was 43 percent of what might be expected for an entire year. Another truck accident investigated in 1981 resulted in the derailment of 5 locomotive units and 24 cars, 1 fatality, and $2,748,000 in property damage--1.6 times the average annual property damage in recent years.

This study analyzes these data and discusses strategies for reducing collisions between trains and trucks transporting hazardous materials in bulk. The study also discusses deficiencies in the data-gathering systems of the DOT.

ACCIDENT DATA

NTSB Data

The NTSB investigates selected crossing accidents which involve multiple fatalities or a high amount of property damage. This sample of accidents is not necessarily representative of all crossing accidents but is sufficient to identify significant safety issues. In the past 15 years, the NTSB has investigated 14 accidents and 1 near-collision in which trains collided or were involved with trucks transporting hazardous materials in bulk. Forty-three percent of the fatalities in these truck accidents occurred in

accidents investigated by the NTSB during 1975 through 1979. Each investigation has been assigned a case letter that will be referred to throughout this report. The following is a brief description of each accident investigated:

Case A--Everett, Massachusetts--12-28-66

A single-car passenger train struck a tractor/cargo-tank semitrailer loaded with 8,300 gallons of fuel oil. The truck was stopped on the tracks at an active crossing when it lost air pressure which caused its brakes to set automatically. Fire engulfed the train, killing 11 of the 28 passengers and 2 of the 3 train crewmembers. There were other injuries to passengers. The truckdriver, who had exited the cab and tried to warn the train engineer, was uninjured. 3/

Case B--Loda, Illinois--1-24-70

A passenger train struck a cargo tank truck loaded with 1,400 gallons of gasoline. The truckdriver did not stop for the activated wigwag device. 4/ An inspection of the warning device the day after the accident disclosed that the light between the red lenses in the center of the banner was so dim that a person had to look closely during daylight to determine whether the light was illuminated. Fire engulfed the truck killing three train crewmembers and the truckdriver. 5/

Case C--Tazewell, Virginia--7-9-76

A train consisting of only three locomotive units struck a tractor/cargo-tank semitrailer loaded with 8,000 gallons of gasoline. The truckdriver did not stop for the activated wigwag device. Fire engulfed the area, killing two pedestrians and the truckdriver. The train engineer and two motorists received burn injuries. The total property damage was estimated to be $430,000. 6/

Case D--Marland, Oklahoma--12-15-76

A high-speed passenger train struck a tractor/cargo-tank semitrailer loaded with 9,600 gallons of crude oil. Visibility was severely restricted by fog at the passive crossing which had a single crossbuck. 7/ The truckdriver had stopped before the crossing. Even with optimum weather conditions, the truckdriver may have had insufficient time to clear the track from a stopped position before the train's arrival. Fire

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3/ Highway Accident Report—"Boston and Maine Corporation, Single Diesel-Powered Passenger Car 563 Collision with Oxbow Transport Company Tank Truck at Second Street Railroad-Highway Grade Crossing, Everett, Massachusetts, December 28, 1966," adopted December 28, 1967.

4/ A round red light mounted in the center of a round white and black banner which swings in an arc when activated by a train.

5/ Highway Accident Report--"Illinois Central Railroad Company Train No. 1 Collision with Gasoline Tank Truck at South Second Street Grade Crossing, Loda, Illinois, January 24, 1970" (NTSB-RHR-71-1).

6/ NTSB Docket Number 76-135.

7/ A white reflectorized sign forming an "X" shape and containing the message "RAILROAD CROSSING" in black letters.

engulfed the locomotive. The truckdriver and two train crewmembers were killed and two train crewmembers and nine passengers on the train were injured. 8/

Case E--Beattyville, Kentucky--9-24-77

At a crossing with activated flashers, a tractor/cargo-tank semitrailer loaded with 8,255 gallons of gasoline sped in front of a freight train, clearing it by about 78 feet, but failed to negotiate the remaining portion of the curving roadway because the truck was being driven too fast. The vehicle struck a building, overturned, and burst into flames. Seven persons were trapped in buildings and died as a result of the fire. The truckdriver received minor injuries. 9/

Case F--Boutte, Louisiana--12-15-78

A tractor/cargo-tank semitrailer loaded with 7,500 gallons of liquefied anhydrous ammonia was driven around lowered railroad gates and was struck by a freight train. The ammonia was released and formed a fog throughout the area. Three persons in nearby vehicles died, and 4 train crewmembers, the truckdriver, and 28 persons in the area received injuries, mostly from released ammonia. (See figure 1.) 10/

Case G--Russellville, Alabama--10-4-79

A freight train struck a tractor/cargo-tank semitrailer loaded with 9,000 gallons of gasoline at a passive crossing. The truck's destination was a tank farm located next to the tracks. A traffic count indicated that 67 hazardous materials trucks and 12 schoolbuses used this three-track crossing daily. One train crewmember was killed and two crewmembers were injured in the ensuing fire. The truckdriver was not injured and property damage was estimated to be $586,000. 11/

Case H--Pantego, North Carolina--10-12-79

A freight train struck a tractor/cargo-tank semitrailer loaded with 8,457 gallons of gasoline at a passive crossing. The truckdriver had not intended to stop at the crossing, as required by State law, and approached the crossing at an estimated speed of 50 mph. Two train crewmembers received severe burn injuries, and a year later one died as a result of the injuries. The truckdriver was not injured and property damage was estimated to be $217,819. 12/

8/ Railroad/Highway Accident Report--"Collision of an Amtrak/Atchison, Topeka and Santa Fe Railway Train and a Tractor-Cargo Tank Semitrailer, Marland, Oklahoma, December 15, 1976" (NTSB-RHR-77-3).

9/ Highway Accident Report—"Usher Transport, Inc., Tractor-Cargo-Tank-Semitrailer Overturn and Fire, State Route 11, Beattyville, Kentucky, September 24, 1977" (NTSB-HAR-78-4).

10/ Hazardous Materials Accident Spill Map NTSB-HZM-MAP-79-1 and NTSB Docket Number 78-78.

11/ NTSB Docket Number 80-003.

12/ NTSB Docket Number 80-012.

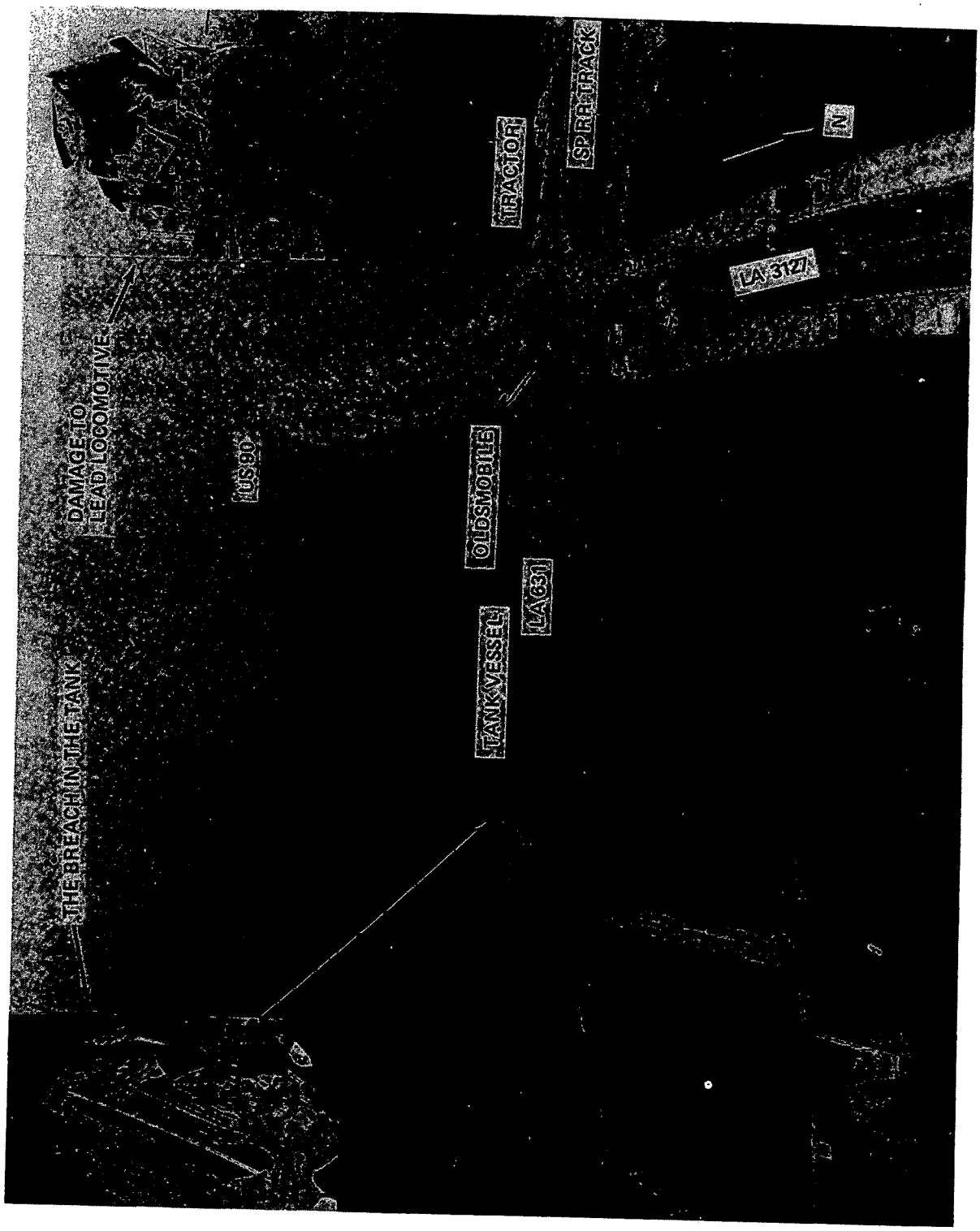

Figure 1.—The accident scene at Boutte, Louisiana (Case F).

Case I--Evanston, Wyoming--10-17-79

A freight train struck a railroad service truck carrying a cargo of diesel fuel and gasoline which was on a private crossing. The truckdriver was preoccupied with backing across the track which had passive warning devices. Although fuel and gasoline spilled, there was no fire. The truckdriver died from impact injuries. The train crewmembers were not injured and property damage was estimated to be $8,000. 13/

Case J--Spokane, Washington--11-2-79

A freight train struck the trailer of a tank truck/full trailer at a passive crossing. The trailer was loaded with 5,500 gallons of gasoline and had been stored overnight in the oil company's yard adjacent to the crossing. The truckdriver's view of the train was impaired by a building and by a boxcar on a siding. Fire engulfed the locomotive, injuring one railroad crewmember and killing three others. The truckdriver was not injured and property damage was estimated to be $119,500. 14/

Case K--Houston, Texas--11-20-80

A freight train struck a tractor/cargo-tank semitrailer loaded with about 7,900 gallons of jet fuel at a passive crossing. The fire engulfed the truck and the train. The truckdriver was killed. One train crewmember received a minor injury, and property damage was estimated to be $173,000. 15/

Case L--Stilwell, Kansas--11-25-80

A freight train struck a cargo tank truck loaded with 1,600 gallons of gasoline at a passive crossing. The storage tank farm was 300 feet from the crossing. This was the only crossing available to the truck farm. About 1,400 gallons spilled onto the ground, but there was no fire. No one was injured or killed, and property damage was estimated to be $17,000. 16/

Case M--Kenner, Louisiana--11-25-80

A freight train struck a tractor/cargo-tank semitrailer after it had been driven around lowered railroad gates at an active crossing. Most of the 8,600 gallons of gasoline in the semitrailer's tank escaped or burned. (See figure 2.) Because the doors and windows of the locomotive were closed, no flame came into the cab. One person in a nearby vehicle and six persons in a nearby building died in the fire.

13/ NTSB Docket Number 81-268.
14/ NTSB Docket Number 80-032.
15/ NTSB Investigation Number MKC81-D-H022.
16/ NTSB Investigation Number MKC81-F-H004.

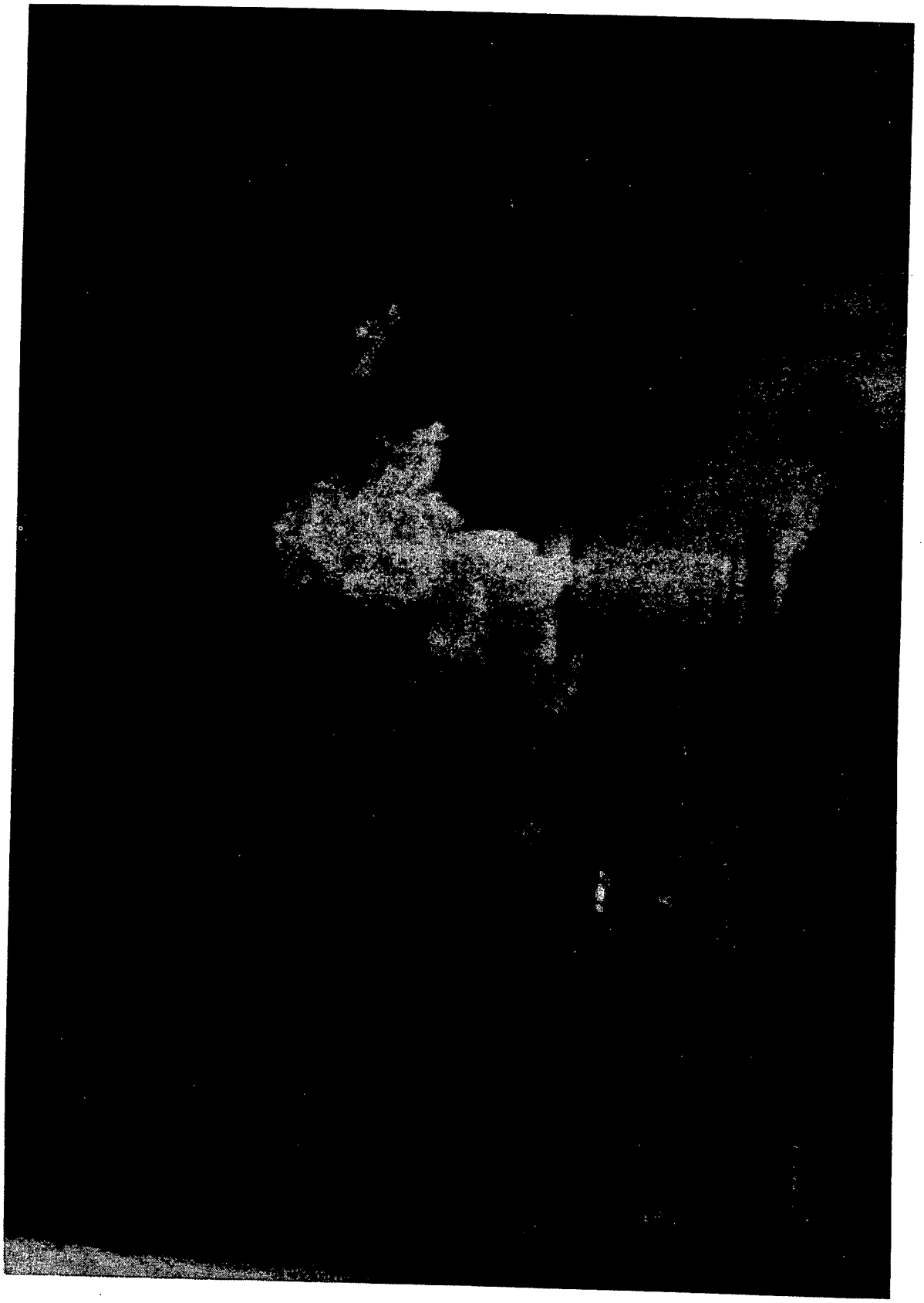

Figure 2.--Burning trailer at Kenner, Louisiana (Case M).

The truckdriver, two train crewmembers, and three other persons were injured. The train crewmembers and the truckdriver were not injured. Property damage was estimated to be $425,000. 17/

Case N--Charlotte, North Carolina--11-29-80

A freight train struck a tractor/cargo-tank semitrailer loaded with 8,800 gallons of gasoline at a passive crossing. The truckdriver did not stop before the crossing. There were 16 bulk petroleum shippers within a 1-mile radius of the accident site. Sixty tank trucks and 8 trains used this crossing daily, although there were other crossings with flashers and gates nearby. In the last 8 years, the driver had 14 motor vehicle convictions, 2 suspensions, and 5 additional accidents. One passenger in the truck was killed, and the truckdriver and two train crewmembers were burned in the ensuing fire. The estimated property damage was $103,000. 18/

Case O--Cooks Point, Texas--4-7-81

A tractor/cargo-tank semitrailer loaded with 8,820 gallons of crude oil struck near the side of the first locomotive unit of a freight train at a passive crossing. The truckdriver did not slow his vehicle noticeably as it approached the crossing. The semitrailer was engulfed in flames, and 5 locomotive units and 24 cars of the train derailed. The truckdriver was killed, but the train crewmembers were not injured. The estimated property damage was $2,748,000. 19/

Two of the early truck accidents investigated (cases B and C) involved wigwag signals. Because these devices do not always command a driver's attention, wigwags are being replaced as crossings are upgraded. As a result, their involvement in crossing accidents is being reduced.

In more recent truck accidents, two common factors have been observed. The first factor observed was that these accidents tend to occur near terminals. In those cases where accidents occurred at passive crossings, a petroleum products terminal, depot, distribution center, etc., was either within a few miles of, or immediately adjacent to, the tracks. Nine accidents (cases D, G, H, I, J, K, L, N, and O) occurred at passive crossings. In seven of these accidents, the petroleum distribution center was within 4 miles of the crossing, with five storage facilities (cases D, G, J, L, and N) within several thousand feet of the accident crossing. The two accidents within several miles of the depots (cases H and O) were on the most direct routes to the terminals. The six accidents at active crossings (cases A, B, C, E, F, and M) generally occurred farther from the terminals, with the two closest (cases A and M) being 1.5 and 2 miles away.

The second factor observed was that truckdrivers involved in these accidents appeared to demonstrate an irresponsible or careless attitude at the crossings. Two drivers made conscious efforts to drive around gates (cases F and M); one driver disregarded flashers that were visible for 720 feet (case E); two drivers approached

17/ Railroad/Highway Accident Report--"Illinois Central Gulf Railroad Freight Train/Mobil Oil Company Tractor/Cargo-Tank Semitrailer Collision and Fire, Kenner, Louisiana, November 25, 1981" (NTSB-RHR-81-1).
18/ NTSB Investigation Number ATL-81-F-H007.
19/ NTSB Docket Number 81-268 and HY-354-81.

passive crossings with no apparent intention of stopping (cases H and O); and one driver did not stop at the passive crossing even though he had been involved in an accident at the same crossing the day before (case L). Some of these and other of the drivers had driving convictions 20/ (reckless driving or a number of speeding violations) (cases C, K, N, and O), suspensions (cases F and N), or accident histories (cases K, M and N) in their State driver license records which suggest a serious lack of safety consciousness among drivers of trucks loaded with bulk hazardous materials.

FRA Data

The FRA's Office of Safety maintains the Railroad Accident/Incident Reporting System (RAIRS) and the National Rail-Highway Crossing Inventory. The RAIRS contains the accident/incident reports filed monthly by all railroads with the FRA Office of Safety in accordance with 49 CFR 225. The National Rail-Highway Crossing Inventory form (see appendix A, form 1) contains information on the characteristics of crossings in the United States. Title 49 CFR 225.19(b) states that:

> Each rail-highway grade crossing accident/incident must be reported to the FRA on Form FRA F 6180.57 [see appendix A, form 2], regardless of the extent of damages or whether a casualty occurred.

In addition, whenever a crossing accident/incident results in more than $2,900 in damage to railroad on-track equipment, signals, track, track structures, or roadbed, that accident/incident must be reported to the FRA on Form FRA F 6180.54 [see appendix A, form 3]. Title 49 CFR 225.19(c) states:

> For reporting purposes, damages include labor costs and all other costs to repair or replace in kind damaged on-track equipment, signals, track, track structures, or roadbed, but do not include the cost of clearing a wreck.

Title 49 CFR 225.19(d) states:

> Each accident/incident, arising from the operation of a railroad, must be reported on Form FRA F 6180.55a [see appendix A, form 4] if it results in: (1) The death of any person from an injury within 365 days of the accident/incident;. . . (3) injury to any person other than a railroad employee that requires medical treatment; (4) injury to a railroad employee that requires medical treatment or results in restriction of work or motions for one or more work days, one or more lost work days, termination of employment, transfer to another job, or loss of consciousness.

FRA accident reports from 1975 through 1979 were examined individually by NTSB personnel. After careful selection, 288 accidents contained in the FRA accident/incident report files were used in this study. Additional research produced data corresponding to each accident from 45 rail equipment reports, 89 injury summaries, and 235 crossing inventory forms.

20/ Records often did not indicate if violations or accidents occurred while driving in private or commercial vehicles.

The FRA data (see tables 2 and 3) showed that about 40 percent of the truck accidents occurred at active crossings. Nationwide data for 1978 21/ indicated that 47 percent of all highway vehicle accidents occurred at active crossings. The FRA data supported NTSB findings that many of the accidents at active crossings involved motorists who did not stop (53.3 percent), drove around gates (8.3 percent), and even passed other stopped motorists (10.0 percent). The FRA data showed that, at passive crossings, most motorists did not stop (72.6 percent).

The data for the 288 accidents indicate that train speeds were in the estimated range of 0-10 mph in 46.4 percent of the cases, while truck speeds were in this range 68.1 percent of the time. Most of the train speed estimates were based on train speed recorders or on the estimates of railroad personnel. Most frequently, the train struck the truck (81.4 percent); second, the truck struck the first car of the train (12.3 percent). In about 9.7 percent of the accidents, visibility was limited by permanent structures, standing rail equipment, or other items.

The truck accidents tended to occur at single-track crossings (57.3 percent) where highway traffic volume was either very low (less than 500 vehicles per day--35.4 percent) or very high (5,000 vehicles or more per day--26.2 percent). These accidents typically occurred on two-lane (82.0 percent), non-Federal-aid (53.6 percent), paved streets (85.8 percent) where the crossing intersected at 60 to 90 degrees to the highway (78.1 percent).

FRA data combined with NTSB data for 1975 through 1979 indicated that occupants on the train, especially those in the locomotive, accounted for about 25 percent of all injuries and fatalities in collisions with trucks transporting bulk hazardous materials. The accidents resulted in 8 fatalities and 50 injuries (burn injuries in 8 cases) to the train occupants. For comparison, in 1978, 4 train occupants were killed and 201 train occupants were injured in all the collisions at crossings. 22/

FHWA/BMCS Data

According to 49 CFR 394.3, reportable accidents, defined as an occurrence involving a motor vehicle engaged in the interstate, foreign, or intrastate operations of a motor carrier resulting in: (1) the death of a human being; (2) bodily injury to a person who, as a result, receives medical treatment away from the scene of the accident; or (3) total damage to all property aggregating $2,000 or more based on actual costs or reliable estimates, are, except under limited conditions, to be reported to the BMCS on Form MCS 50-T (see appendix A, form 5) within 30 days or less. Many accidents that otherwise meet these criteria are not reported because the DOT does not require intrastate carriers to report them.

After individual review of BMCS accident reports and comparison to the other agencies' reports, 104 accidents were selected, 85 of which were common to the FRA's reports. The BMCS data (see table 4) showed that petroleum products were the most commonly involved hazardous materials product (31 or more out of 104 identified). Fourteen carriers were involved in two or more accidents, and one company was involved in seven accidents (empty tankers in two out of the seven accidents). Most drivers had worked for carriers less than 2 years (53 percent). Many of the accidents occurred within the first hour of the trip (25 percent).

21/ Rail-Highway Accident/Incident and Inventory Bulletin, Calendar Year 1978, U.S. DOT-FRA.
22/ Ibid.

Table 2.--Miscellaneous, FRA-corrected data from FRA accident/incident reports, 1975-1979.

Traffic Control Device at Crossing

	Number of Accidents	Percent
Crossbuck	118	41.0
Flashers	87	30.2
Gates	23	8.0
Wigwag	5	1.7
Traffic signal or stop sign	27	9.4
Flagged, none, other	23	8.0
Unknown	5	1.7
Total	288	100.0

Driver Action

Active Device Crossings (gates, flashers, wig wags)

	Number of Accidents	Percent
Drove around gates	10	8.3
Did not stop	64	53.3
Stopped and proceeded	9	7.5
Stopped on crossing	12	10.0
Stalled	6	5.0
Passed stopped motorist	3	2.5
Unknown	16	13.3
Total	120	100.0

Passive Device Crossings (crossbuck, stop sign, none, other)

	Number of Accidents	Percent
Did not stop	119	72.6
Stopped and proceeded	17	10.4
Stalled	7	4.3
Stopped on crossing	10	6.1
Passed stopped motorist	0	0
Other	1	.6
Unknown	10	6.1
Total	164	100.0

Estimated Train Speed

	Cases	Percent
0-5 mph	79	28.0
6-10 mph	52	18.4
11-15 mph	18	6.4
16-20 mph	24	8.5
21-25 mph	23	8.2
26-30 mph	23	8.2
31-35 mph	18	6.4
36 mph and more	45	16.0
Total	282	100.0

Estimated Truck Speed

0-5 mph	117	46.1
6-10 mph	56	22.0
11-20 mph	40	15.7
21-30 mph	21	8.3
31 and up	20	7.9
Total	254	100.0

Striking Vehicle

Train struck truck	232	81.4
Truck struck car No. 1	35	12.3
Truck struck car No. 2-4	9	3.2
Truck struck other car	9	3.2
Total	285	100.1

Vision Obscured By

Permanent structure	10	3.5
Standing rail equipment	5	1.7
Topography	3	1.0
Rain/fog	3	1.0
Vegetation	2	.7
Standing highway vehicle	1	.3
Passing train	1	.3
Other	3	1.0
Unknown or nothing	260	90.3
TOTAL	288	100.0

Number of Tracks

1	121	57.3
2	52	24.6

Table 3.--FRA-corrected data of factors most common to truck accidents, from FRA crossing inventory forms, 1975-1979.

	Cases	Percent
Crossing Angle		
0° - 29°	12	5.7
30 - 59°	34	16.2
60° - 90°	164	78.1
Number of Traffic Lanes		
2	173	82.0
4	18	8.5
Highway System		
Non-Federal-aid	113	53.6
Federal-aid secondary	48	22.7
Federal-aid primary	39	18.5
Federal-aid urban	11	5.2
Functional Classification		
Rural = Local	53	23.9
Rural = Minor Collector	27	12.2
Rural = Major Collector	23	10.4
Urban = Local	33	14.9
Urban = Minor Arterial	36	16.2
Urban = Other Principal Arterial	25	11.3
Highway Paved		
Yes	182	85.8
No	30	14.2
Truck Pullout Lane		
Yes	6	2.8
No	205	97.2
Does Track Run Down a Street		
Yes	5	2.4
No	206	97.6
Daily Highway Traffic		
0-500	73	35.4
5,001 and up	54	26.2
501-1,000	24	11.7
Type of Development		
Open space	68	31.9
Commercial	64	30.0
Industrial	46	21.6
Residential	35	16.4
Percent Trucks at Crossing		
6-10	82	39.6
0-5	77	37.2
11-15	23	11.1

Table 4.--BMCS data from form MCS 50-T, 1975-1979.

Driver	Cases	Percent
Years with Company		
0-2	55	52.9
3-5	20	19.2
6-11	17	16.3
12 or more	12	11.5
Hours on duty before accident		
1	25	24.0
2	14	13.5
3	16	15.4
4	16	15.4
5 - 8	22	21.2
9 or more	6	5.8
Type of Carrier		
Private carriers	33	31.7
ICC-authorized carriers	58	55.8
Other carriers - exempt	2	1.9
Type of Trip		
Over the road	73	70.2
Local pickup and delivery	20	19.2

Hazardous Material Involved (as coded)

	Cases	Percent	Fatalities	Injuries
Flammable Liquids	15	14.4		
Gasoline	14	13.5	8	9
Liquids in bulk	8	7.7		
Flammable	6	5.8		3
LPG	6	5.8		
Compressed gases in bulk	6	5.8		
Fuel oil	6	5.8		
Empty tankers	5	4.8		
Combustible liquids	5	4.8		
Corrosive liquids	4	3.8		
Diesel fuel	3	2.9	2	3
Flammable gases	3	2.9		2
Flammable liquids (NOS)	3	2.9		
Crude oil	2	1.9	3	11
Paint, enamel, lacquers, stain	2	1.9		
Miscellaneous 1/	20	19.2	3	41
Total			16	69

1/ One each of liquid NOS, nonflammable gases, flammable P cylinders, Class C explosives, corrosive, comp cleaning liquid, No. 2 fuel, dinitrophenel, flammable resin solution, oxidizer, phosphorus acid, nitric acid, batteries, poison B cp agris, poison B methyl, sodium H, acetic corrosive, anhydrous ammonia, methyl alcohol, butane.

NHTSA/FARS Data

NHTSA's National Center for Statistics and Analysis maintains the computer file for the Fatal Accident Reporting System (FARS). The FARS report was authorized by the Highway Safety Act of 1966, P.L. 89-564. While this law does not require a response, States are obligated under the terms of a grant of funds to defray the expense of reporting this information to cooperate in the FARS survey or to make its results comprehensive, accurate, and timely. FARS accident reports are usually filed only for accidents occurring on public roads. (See appendix A, forms 6, 7, and 8.)

The FARS does not code the type of cargo or whether hazardous materials were involved in an accident. An accident may be coded as involving a fire/explosion or gas inhalation as a first harmful event or a most harmful event. Additionally, fire could be coded in another segment of the report as occurring in a vehicle during the accident (explosion could be indicated on forms prior to 1980).

Only 21 accidents, 6 of which were among the NTSB investigations, were available from the FARS system. Records of five of the truckdrivers, other than those in the NTSB investigations, involved in truck accidents were as follows:

Accident date	Accident State	Driver record	Time period
8-16-75	Oregon	2 accidents, 2 speeding convictions, 2 other "harmful" motor vehicle convictions	12-68 to 9-73
6-10-77	Texas	1 accident, 2 speeding convictions	2-75 to 1-77
6-22-78	Texas	1 accident, 4 speeding convictions	9-75 to 3-78
7-24-78	Mississippi	3 previous driving-while-intoxicated convictions	4-75 to 7-78
11-21-79	Georgia	1 accident, 2 previous suspensions/ revocations, 2 driving-while-intoxicated, 1 other "harmful" motor vehicle conviction	6-77 to 9-78

RSPA/MTB Data

The regulations requiring reporting of hazardous materials transportation incidents are contained in 49 CFR 171.15-17, which covers the transport of hazardous materials by rail, air, water, and highway. This reporting system has two facets in that (1) an immediate telephone notice is required under certain conditions, and (2) a detailed written report is required whenever there is any unintentional release of a hazardous material during transportation or temporary storage related to transportation. The same reporting system applies to any quantity of hazardous waste and "reportable quantities" of hazardous substances discharged during transportation.

Accidents are to be reported when, as a direct result of hazardous materials:

(1) A person is killed;
(2) A person receives injuries requiring hospitalization;
(3) Estimated carrier or other property damage exceeds $50,000;

(4) A situation exists such that a continuing danger to life exists at the scene of the incident.

The carrier must submit a report on Form DOT F 5800.1 (see appendix A, form 9) within 15 days from the date of the incident. While carriers are required to report, any interested party may report these incidents to the MTB.

When the incident report is coded by the MTB, a miscellaneous information code is available to identify a grade crossing incident (train/truck collision code number 16). This information is encoded from the "remarks" section of the report (section H). When the NTSB accessed the MTB data, only nine accidents had been coded as train/truck collisions from 1975 through 1979. Six of these nine accidents were found in the FRA or the BMCS accident data.

A second computer search of MTB data files was made to identify each accident that had been reported by the FRA or BMCS as a collision between a train and a truck transporting hazardous materials. Seventeen additional accidents were found in the MTB data.

Data Summary

The compilation of FRA, FHWA/BMCS, NHTSA/FARS, RSPA/MTB, NTSB, and some State and railroad company data for specific accidents indicates that 310 train accidents were reported from 1975 through 1979 to have involved trucks transporting bulk hazardous materials. (See table 5.) These data revealed that there is a belt of States in the south along the Gulf of Mexico and another belt in the midwest, including Illinois, Indiana, and Ohio, where these truck accidents occur most often. (See figure 3.) Texas, which has the most crossings, had more accidents than any other State, with 30 in the 5-year period.

The truck accidents occurred most frequently on a Monday (22.6 percent). The number of accidents increased during the morning until 10 a.m. to noon and then decreased during the afternoon. These accidents occurred during the late fall and winter months when demand was greatest for fuel oil for heating and the summer months when gasoline is in the greatest demand.

Accident data were available from more than one agency in 33.2 percent of the cases. Between the FRA (92.9 percent of all the reports) and the FHWA/BMCS (33.5 percent of all the reports), data were available for 99 percent of the cases in this study. Accident data were available from 3 or more agencies for 9.4 percent of the cases.

The average of 62 accidents reported to the DOT administrations annually are probably the minimum number of accidents that occurred. Based on the total number of reported accidents identified in this study, the FRA received all but 7 percent of the reported accidents. However, based on a small sample of accidents from BMCS files (84 accidents, but a 27 percent sample), the FRA received only 78 percent of the cases (19 were missing). Additionally, this small sample indicated that in 27 percent of the FRA cases, hazardous materials involvement was not coded when hazardous materials were involved according to the BMCS. In fact, based on the BMCS sample and reported FRA data, it can be estimated that trucks transporting a hazardous material in bulk collide with trains in about 100 accidents annually.

Table 5.--Compilation of accident data from all sources, 1975-1979.

Source of accident data	Cases	Percent
FRA	186	60.0
FRA, BMCS	58	18.7
FRA, NHTSA	11	3.5
FRA, NTSB	2	0.6
FRA, MTB	2	0.6
FRA, BMCS, MTB	19	6.1
FRA, BMCS, NHTSA	5	1.6
FRA, NTSB, NHTSA	2	0.6
FRA, BMCS, NHTSA, NTSB	2	0.6
FRA, BMCS, NHTSA, NTSB, MTB	1	0.3
BMCS	18	5.8
BMCS, MTB	1	0.3
MTB	3	1.0
TOTAL	310	99.7

Number of accident reports from each agency		
FRA	288	92.9
BMCS	104	33.5
NHTSA	21	6.8
MTB	26	8.4
NTSB	7	2.3

Accidents by Month	Cases	Percent
October	36	11.6
August	30	9.7
December	30	9.7
January	29	9.4
February	28	9.0
July	27	8.7
April	25	8.1
March	24	7.7
November	24	7.7
May	22	7.1
September	19	6.1
June	16	5.2

Accidents by day of week		
Sunday	6	1.9
Monday	70	22.6
Tuesday	46	14.8
Wednesday	58	18.7
Thursday	60	19.4
Friday	47	15.2
Saturday	23	7.4

Accident by time of day	Cases	Percent
0000-0159	7	2.3
0200-0359	11	3.5
0400-0559	22	7.1
0600-0759	27	8.7
0800-0959	32	10.3
1000-1159	60	19.4
1200-1359	39	12.6
1400-1559	37	11.9
1600-1759	25	8.1
1800-1959	23	7.4
2000-2159	6	1.9
2200-2359	7	2.3
Unknown	14	4.5

Accidents by driver age		
31-35	26	8.4
36-40	18	5.8
41-45	18	5.8
51-55	20	6.5
21-25	17	5.5
46-50	14	4.5
56-60	13	4.2
26-30	12	3.9
61-65	5	1.6
15-20	4	1.3
66 and up	4	1.3
Unknown	159	51.3

Accidents Involving Release of Hazardous Materials	
Number of accidents	49
Total fatalities	17
Total injuries	88
Fatalities possibly attributed to the release of hazardous materials	16
Injuries possibly attributed to the release of hazardous materials	69

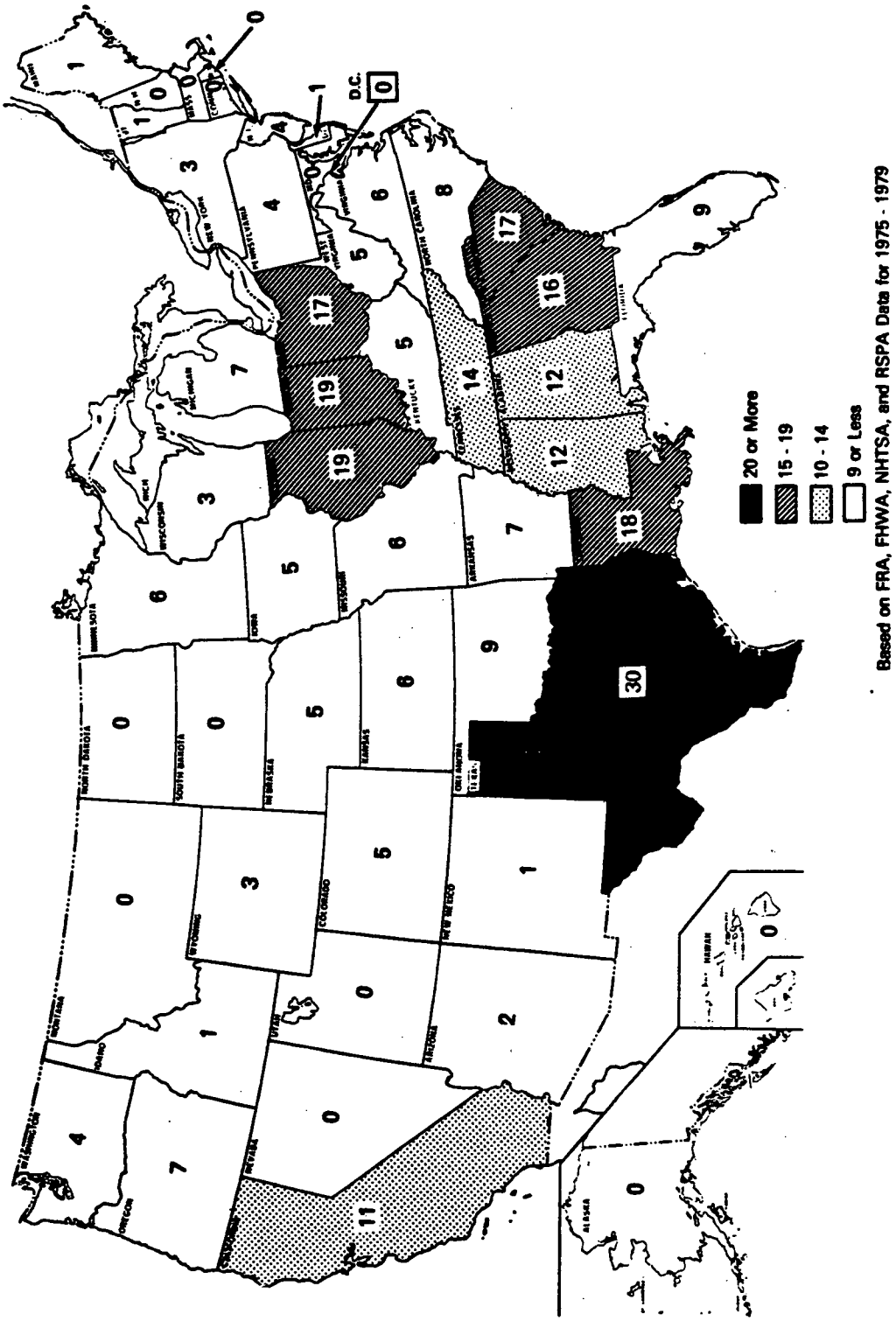

Figure 3.--Accidents involving collision between trains and trucks transporting bulk hazardous materials.

When accident data are available from two or more DOT agencies, case studies can be developed. For example, case K was reported in the FHWA/BMCS, NHTSA/FARS, and FRA files. A researcher could examine the characteristics of the train and the crossing using FRA data; the material involved, driver hours on duty, and years with the company from BMCS files; and the driver record from NHTSA data. All these data helped to indicate the extent of property damage and other factors involved. Since each agency is interested in different facets of an accident, a uniform data system would not be practical. However, more comprehensive case studies could be developed if data could be combined quickly and easily using various files.

In the 14 crossing accidents investigated by the NTSB, none of the truckdrivers was found to be under the influence of alcohol. The FHWA/BMCS and NHTSA/FARS accident reports did not indicate the involvement of alcohol in any accidents. The FRA does not code these data on the crossing accident/incident report. The NTSB believes that this information would aid researchers involved in studying the human factors aspect of crossing accidents.

DISCUSSION

Operation Lifesaver

"Operation Lifesaver" is a nationwide, cooperative effort of many organizations, coordinated by the National Safety Council, to increase public awareness of the danger at crossings and to develop proper driver behavioral patterns for approaching and moving over crossings. About 30 States have adopted this coordinated program which involves State and local governing bodies (especially public service commissions and transportation, education, enforcement, and motor vehicle administrators), civic groups, safety organizations, railroads operating in the State, labor groups, public information media, and citizens. In locations where this type of program has been implemented, the results have been impressive and encouraging in terms of reduced accidents, fatalities, and injuries at crossings. 23/

The three aspects of Operation Lifesaver (engineering, enforcement, and education) summarize most of the techniques available to reduce the number of collisions between trains and trucks transporting bulk hazardous materials. The engineering aspect of Operation Lifesaver promotes the permanent installation of and improvements to existing traffic control devices at crossings. The enforcement aspect is an ongoing program aimed at specific problem locations that can be determined by analyzing accident rates and observing driver actions at the site. The education aspect involves a highly visible and concentrated public relations program aimed at reaching a significant portion of the target population.

In the past, Operation Lifesaver has not specifically addressed the issue of bulk hazardous materials trucks at crossings. The NTSB believes that, as part of Operation Lifesaver, the problem of reducing train collisions with trucks transporting bulk hazardous materials should receive special emphasis. At least one railroad company already has extended the Operation Lifesaver program to specifically address this problem.

23/ Railroad/Highway Accident Report--"Collision of Chicago, Rock Island and Pacific Railroad Company Freight Train with an Automobile, Des Moines, Iowa, July 1, 1976" (NTSB-RHR-77-2); and "Operation Lifesaver--a Program to Reduce Accidents and Deaths at Railroad-Highway Crossings," Traffic Safety, Vol. 79, No. 8, August 1979.

In May 1980, the Southern Railway System (SR) implemented a pilot program in Alabama which was aimed directly at the trucking industry as well as the State and local law enforcement groups. The SR program, which will be extended soon to North Carolina, involves six aspects:

(1) Identifying all the hazardous materials bulk loading facilities near SR trackage, which enables the SR to pinpoint those companies where truckdriver information programs should be concentrated, and identifies those crossings where a high density of tank truck traffic is likely. Once these locations are identified, enforcement can be concentrated or improvements in grade crossing traffic control devices can be scheduled.

(2) Holding educational meetings with the truckdrivers, traffic managers, and other employees at bulk loading facilities. These in-plant meetings include a short introduction, a movie ("Lucky You"), a question-and-answer session, and distribution of informational reminders.

(3) Holding personal meetings with truckdrivers and distribution of information at nonbulk loading plants or at truckstops, accompanied by a local law officer.

(4) Encouraging State and local law enforcement officials to enforce laws that require hazardous materials trucks to stop at crossings, through meetings held to discuss the problem and the program. The SR has developed a form that allows a police officer who is on his/her way to answer another call and who witnesses a truck not stopping at a crossing to record the pertinent information. The complete form is sent to the SR which notifies the trucking company, either by phone or by personal contact, to inform it of the truckdriver's violation and of the associated hazards.

(5) Encouraging field enforcement officers with the truck law enforcement division of the State's Public Service Commission to stop truckdrivers who are seen using crossings dangerously and to discuss the hazards with the truckdrivers. These officers explain the Operation Lifesaver program when they talk with truckdrivers at truck stops and weighing stations.

(6) Notifying trucking companies when the SR receives a locomotive engineer's near-collision report or a report from a law official. The companies can then take the appropriate steps internally to correct unsafe driver behavior.

The collective DOT data show that SR trains experienced 17 crossing accidents with trucks transporting bulk hazardous materials over a 5-year period (3.4 accidents/year). In a 14-month period, during most of 1980 and the early part of 1981, 48 near-collisions between SR trains and tank trucks were reported. If SR experience is representative, it could be estimated that for every reported accident there are at least 12 near-collisions. Nationwide, this would indicate as many as 750 near-collisions annually that jeopardize the lives of railroad personnel in locomotives, as well as nearby motorists, residents, and bystanders.

Engineering

Since 1967 (case A), the NTSB has encouraged drivers of vehicles carrying bulk hazardous materials to use crossings that offer minimum accident risks. Ideally, the safest way to cross a track is by using a grade separation (bridge or tunnel), but the cost for constructing the required separations is prohibitive ($1.5 million each according to a recent General Accounting Office audit) when one considers the number of crossings in the country. Since grade separations are not available at most locations, crossings used frequently by trucks transporting bulk hazardous materials should have active traffic control devices, which ranked in the order of effectiveness are: gates and flashers, flashers, and wigwags. 24/ Passive control devices are the least effective.

The need for active devices at crossings where exposure of trucks transporting bulk hazardous materials is a problem was commented upon by the NTSB and six other organizations in responses to an FHWA Advance Notice of Proposed Rulemaking (ANPRM), "Railroad-Highway Projects" (FHWA Docket No. 78-13), which requested of interested persons, "What specific factors and conditions should be considered for the several types of warning devices used at grade crossings?" A second ANPRM, "National Standards for Traffic Control Devices; Manual on Uniform Traffic Control Devices; Railroad--Highway Projects" (FHWA Docket No. 80-11), proposed that:

> (c) Automatic gates and flashing light signals be installed when one or more of the following conditions exist: . . . .
>
> 6. Either a high volume of vehicular traffic, high number of train movements, substantial numbers of school buses or trucks carrying hazardous materials, unusually restricted sight distance, continuing accident occurrences, or any combination of these conditions.

The comments on this rulemaking have been unfavorable and it will probably not be promulgated as proposed.

Accidents involving bulk hazardous materials trucks at active crossings occurred less often than expected (40 percent) when compared to nationwide accident statistics for all types of highway vehicles at crossings (47 percent). Active devices have been shown in many studies to reduce the number of accidents that occur at the same crossing, given the same traffic. Active devices negate restrictions to visibility, both natural (dense fog, Case D) and man-made (buildings and fences, case H), and alert drivers to approaching trains when sufficient visibility is not available for a truck to stop and to proceed across the track in low gear (20-30 seconds clearance needed) as required by most States. As indicated by the NTSB investigations, a majority of the reported truck accidents occurred at passive crossings which often were near hazardous materials storage or distribution terminals. These passive crossings are the most likely candidates for improvement, especially at locations with high volumes of hazardous materials truck traffic.

Before passive crossings are scheduled to be improved with active devices, they should be evaluated thoroughly for all operating problems. As an example, at the location where case N occurred, sufficient "storage room" was not provided for trucks between the stop sign and the tracks. (See figure 4.) In the tank farm complex where case N occurred, there was another passive crossing which did not have sufficient storage room for trucks; however, there were also four other active crossings. Crossings similar to that in case N

24/ Based on studies highlighted in National Cooperative Highway Research Program Report No. 50, "Factors Influencing Safety at Highway-Rail Grade Crossings," 1968.

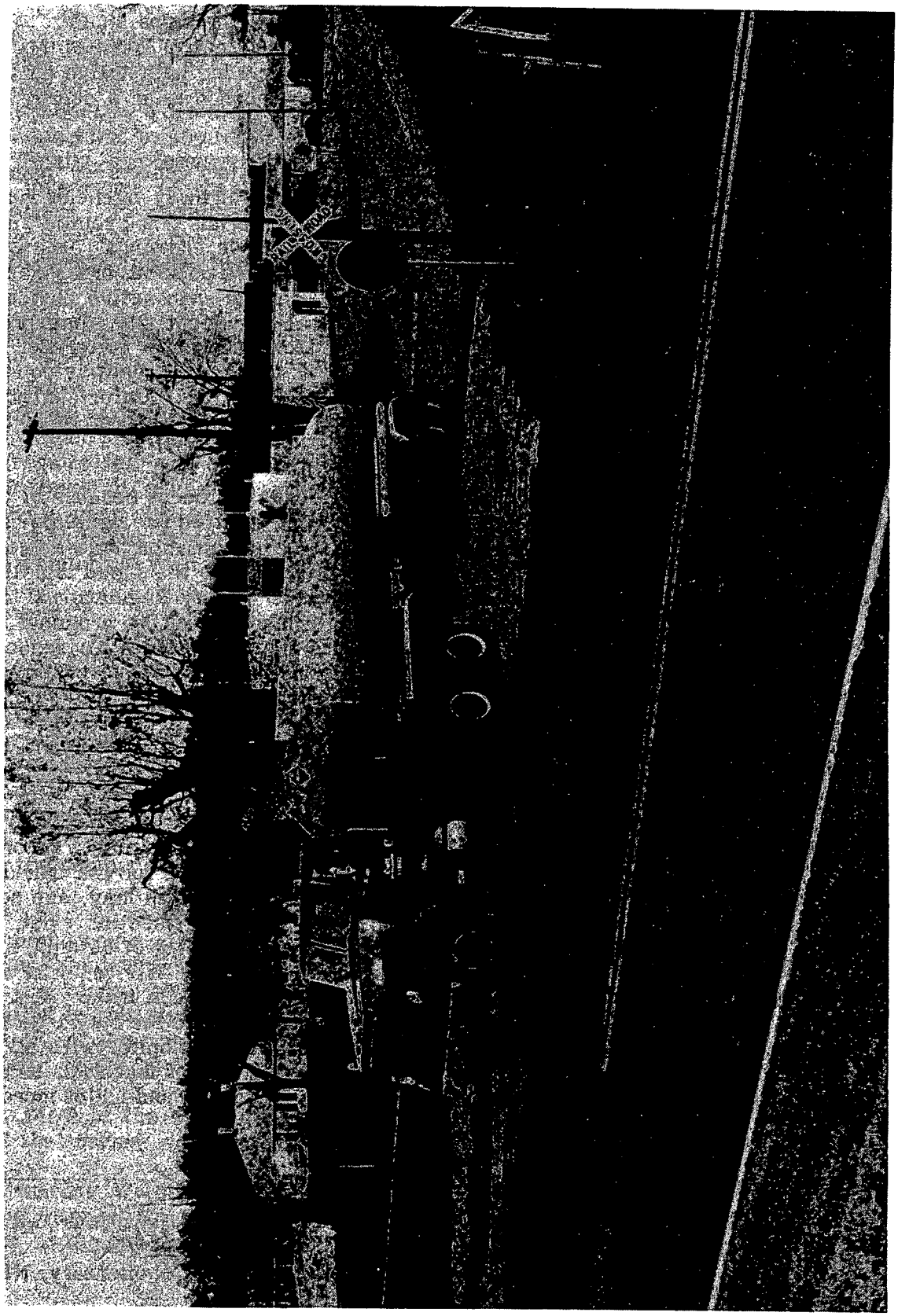

Figure 4.--Truck stopped at site without adequate "storage room" between tracks.

should not be used by trucks, especially trucks carrying bulk hazardous materials. Trucks may be excluded from using certain streets by posting warning signs similar to those discussed in Section 2B-28 of the Manual on Uniform Traffic Control Devices (MUTCD). At the case J accident site, the crossing could have been upgraded with active devices or closed, or a hazardous materials route could have been established using a nearby active crossing.

Where railroads are near petroleum product distribution centers or hazardous materials depots, carriers should notify the local and State highway agencies and the railroads and work with them to establish safe hazardous materials truck routes. Routes established should maximize use of grade separations and active crossings. If a passive crossing must be used, or long routes are mandated through more populous areas or on less desirable roads, efforts should be made to upgrade the crossing with active devices. In May 1980, the FHWA published a useful informational document 25/ that provides guidelines to be considered when designating routes for hazardous materials. The document suggests many variable roadway factors such as traffic and roadway conditions that should be considered in designating hazardous materials routes. Unfortunately, the document does not specifically address crossings unless they are considered as street or roadway intersections.

Even when crossings do have active devices, accidents can occur because of design deficiencies in the signal systems. For example, if the time allotted for signal devices to flash prior to the arrival of a train is too short, some longer combination highway vehicles may not have time to clear the crossing if they start across just as the signal is activated by a train. Most State laws 26/ and Federal Motor Carrier Safety Regulation (FMCSR) 392.10 require trucks transporting bulk hazardous materials to stop at crossings, even those controlled by gates or flashing lights which are not activated. To reduce the potential for stalling on the tracks, the truckdriver is not allowed to shift gears after starting to cross. In low gears, most trucks would be capable of reaching a speed of only 3 to 8 mph. In cases D and J, calculations showed that a minimum 23 to 24 seconds were necessary for the trucks to clear one to two tracks at right angles to the crossing. If a track were at a right angle to the road and a 55-foot-long truck stopped 15 feet before the crossing, the truck would have to travel about 80 feet to clear an approaching train. At an average speed of 3 mph for the truck, it would take the truck 18 seconds to clear the crossing. If there were two adjacent tracks it would take at least 21.5 seconds to clear the second track. This does not account for the additional time for the truckdriver to look in both directions and to shift into gear and accelerate, which may take several more seconds. When more than two tracks or sharp angles of intersection exist, up to 30 seconds or more would be required to clear the crossing. Traveling at 60 mph, a train would travel 1/2 mile of track in that same 30 seconds. The MUTCD requires that a signal flash for a minimum of only 20 seconds before the arrival of a train. If it takes 30 seconds for a truck to clear the crossing, but a warning is provided for only 20 seconds, the trailer will be struck by the train, even if the truckdriver complies with all laws. Until States and the BMCS delete the requirement for bulk hazardous materials trucks to stop at active crossings when the signals are not flashing, railroads should allot more time for clearance of tracks by loaded trucks on new systems.

25/ Development of Criteria to Designate Routes for Transporting Hazardous Materials, Report No. FHWA/RD-80-105, May 1980.

26/ "Drivers' Duties at Railroad Grade Crossings," Traffic Laws Commentary, NHTSA, Vol. 8, No. 1, January 1979, p. 51.

If signals flash too long in advance of a train's arrival, frequent users of crossings may come to believe they can "beat" the train. This seems to have happened in case M. In cases E, F, and M, the flashing lights were activated for more than 50 seconds prior to the arrival of the train. Also, when tracks are known to be blocked often by trains for 15 to 45 minutes in some locations, as in case G and apparently in case M, drivers are more apt to try beating a train. Crossing closure times must be kept to an adequate minimum (as recommended by the NTSB in case M), so as to not encourage drivers to try to beat the train. Finally, at crossings which have mixed low- and high-speed train traffic, flash of signals in advance of the train's arrival should be uniform, so as not to confuse driver expectations. Constant warning times can be provided with various motion detector systems; however, a recent FRA study 27/ indicates that the most promising devices need "a great deal of further testing and development" before they can be incorporated into a working system.

Further study must be given to how to upgrade crossings with a low volume of highway traffic which service isolated fuel tanks, farms, or small companies, perhaps on private roads. As in case D, a crossing may be used by a hazardous materials truck only once a week, or farms may be serviced with fuel oil or chemicals only a few times each year. At such crossings, the MUTCD currently allows only active devices such as flashers, which require fail-safe backup power at such crossings. These devices cost at least $25,000 to install, even if power is immediately available, and maintenance may be $1,000 to $2,000 a year. To accommodate these situations, less sophisticated devices, such as detectors in trucks or verbal communication systems including telephones or citizen band radios, which have been experimented with on a limited basis, could be used.

Enforcement

Even with the best active devices, accidents will occur when truckdrivers do not respect or understand the message being conveyed by the signals. The FRA data indicate that 30 percent of all the truck accidents occurred because the drivers did not obey flashing lights or gates. In another 41 percent of the truck accidents, the drivers failed to stop at a passive crossing and did not perceive the approaching train. The other truck accidents included vehicles that stopped or stalled on the crossings. Federal, State, and local enforcement officials must improve driver compliance with existing regulations that govern the crossing of railroad tracks by trucks loaded with bulk hazardous materials to reduce the number of these accidents.

As part of an Operation Lifesaver program, the implementation of an enforcement aspect could begin with a widespread publicity campaign. The BMCS periodically issues "On Guard" bulletins that reach many truckdrivers. This sort of medium could be used by States, railroads, 28/ and trucking companies to disseminate the accident histories highlighted in this study, as they relate to driver responsibility, and to inform drivers of increased enforcement activity at crossings for trucks transporting bulk hazardous materials. This type of activity should gain voluntary compliance from some truckdrivers.

In most of the NTSB investigations at crossings, evidence could be developed that showed that drivers were generally not being cited for noncompliance with laws pertaining

27/ "Constant Warning Time Concept Development for Motorist Warning at Grade Crossing," Report No. FRA/ORD-81/07, May 1981.
28/ Such as the one by the SR, discussed on page 19.

to crossings. A recent DOT letter 29/ stated that "Section 392.10 Federal Motor Carrier Safety Regulations [49 CFR 392.10] has been in existence many years with little enforcement action taken because of the difficulty in developing proper evidence . . . ." This regulation deals with the responsibility of drivers of bulk hazardous materials trucks at crossings. Support must be obtained so that drivers will ultimately respect the intersection of the highway with the railroad to the extent that they do where two highways intersect. Increased enforcement efforts are essential to gaining driver respect for crossing traffic controls. The NTSB discussed this need as early as 1970 (case B).

In 1963, the International Association of Chiefs of Police (IACP), recognizing the need for public education and the continued vigorous enforcement of crossing laws, called upon all its member State, county, and municipal police agencies to "continue giving vigorous attention to the enforcement of traffic laws governing the movement of motor vehicles and trains at railroad grade crossings, and that insofar as possible the educational facilities of these agencies be used to remind motor vehicle operators of the hazards existing at highway-railroad grade crossings." 30/ The IACP also held a workshop on this topic at its 1969 conference. In 1973, in response to an NTSB recommendation for the IACP to use its influence and resources to enhance law enforcement at crossings, 31/ the IACP brought the 1963 position statement to the attention of its membership in its annual report. However, law enforcement in this area remained mixed.

In 1977, the NTSB recommended that the IACP:

> Provide support and cooperate with the National Safety Council in its efforts to develop and implement a nationwide "Operation Lifesaver" railroad/highway grade crossing safety program by encouraging its members to allocate additional police resources for this effort. (Class II, Priority Action) (H-77-30) 32/

The IACP adopted a resolution in 1979 that encouraged police officials at the State, county, and local levels to participate in Operation Lifesaver activities. The IACP should encourage participation in local programs that enforce bulk hazardous materials truck regulations at crossings.

Education

Drivers of bulk hazardous materials trucks must be made aware of train stopping dynamics. For example, in case J, a train with a locomotive and 13 cars traveling at 10 mph was unable to stop until it was 125 feet through the crossing and was past the point of impact. In case H, a train with a locomotive and 10 cars traveling at 28 mph began emergency braking 200 feet before impact. After it was derailed at impact, the

29/ Letter from Associate Regional Administrator, Office of Motor Carrier Safety, Kansas City, Missouri, field office, February 18, 1981, contained in "Railroad-Highway Crossing Safety Program - Progress Report," DOT, FRA, Midwest Region, July 1, 1981.
30/ "Highway Safety Policies for Police Executives," Highway Safety Division, International Association of Chiefs of Police, as revised in 1975.
31/ NTSB Safety Recommendation H-73-15 issued to the IACP on June 21, 1973, as a result of Railroad/Highway Accident Report--"Penn Central Freight Train/Schoolbus Collision, Congers, New York, March 24, 1972" (NTSB-RHR-73-1).
32/ Issued to the IACP on November 16, 1977, as a result of Railroad/Highway Accident Report--"Collision of a Chicago Rock Island and Pacific Railroad Company Freight Train with an Automobile, Des Moines, Iowa, July 1, 1976" (NTSB-RHR-77-2).

locomotive turned around 180 degrees and came to rest 200 feet past the point of impact. In case D, a passenger train going 90 mph did not stop until it was 4,900 feet past the point of impact. Because a train needs such long stopping distance, the driver of a bulk hazardous materials truck must anticipate a train at every crossing and be prepared to stop short of the tracks.

Truckdrivers also must be taught proper interpretations of signal devices. Installation of the most advanced devices currently available merely provides a warning message to the driver that a train is approaching the crossing. The active devices do not "protect" the driver. Therefore, such devices are only effective when they are understood, adhered to, and enforced. Usually these devices indicate a train will approach within the next 20 to 60 seconds; however, occasionally a train may not arrive at the crossing for 4 or 5 minutes. Sometimes the devices are activated by a switching train or by a short in the circuit, and no train actually reaches the crossings.

As explained previously, a truck transporting bulk hazardous materials that stops for a crossing and then proceeds will require 20 seconds or more to clear a single track. Thus, if a train were approaching at 60 mph, a truckdriver would have to detect the train when it is about 1/3 mile away in order to clear the track before the train arrives. Some States require a driver to take advantage of every clue available to determine that a train is approaching, such as opening the windows to listen for train whistles and by stopping and looking for train headlights.

Drivers of bulk hazardous materials trucks must be made aware of the meanings of railroad traffic control devices, responsibilities at crossings, time-distance relationships, increased emphasis on law enforcement, and the hazards should an accident occur. This training can be accomplished through BMCS material such as the "On Guard" bulletin or through meetings conducted with drivers similar to those outlined in the SR program.

The Transportation Safety Institute (TSI) of the RSPA offers several courses relating to the enforcement of safety regulations governing the transportation of hazardous materials on highways. Since there are special regulations which govern driver actions at crossings when vehicles are carrying bulk hazardous materials, and since these types of accidents can be severe, crossing regulations should be emphasized in these courses.

Licensing

The threat of financial penalties and points imposed on State driver licenses for violation of existing laws appears to be an insufficient incentive to encourage voluntary compliance with existing laws as evidenced by the case histories developed by the NTSB. Additional methods are needed to prevent truckdrivers who exhibit risky behavior from transporting bulk hazardous materials. As cited in NTSB cases C, F, K, M, and O and in some of the NHTSA accident data, drivers had driving histories that should have disqualified them from driving trucks carrying bulk hazardous materials. However, strict criteria for disqualification have not been established. Certainly the driver's record in case N--14 motor vehicle convictions, 2 suspensions, and 5 accidents--should have been grounds for not hiring the person to work for a company transporting bulk hazardous materials. One bulk hazardous materials carrier requires its drivers to have at least 2 years of accident-free driving on semitrailer units before being hired to operate tanker rigs. If a driver's license has been suspended in the last 3 years, or if the driver has had a major chargeable offense such as driving while intoxicated, the carrier will not consider the driver for employment. The BMCS data show that most drivers involved in these truck accident (52.9 percent) had worked for the carrier for less than 2 years. If employee driving records are reviewed more carefully prior to employment, the number of risky drivers that are likely to be involved in truck accidents can be decreased.

Conceptually, the National Driver Register (NDR), if completely functional, would provide a mechanism for preventing some problem drivers from operating trucks carrying bulk hazardous materials. During the NTSB study of the NDR, 33/ two other accidents were cited (Lynchburg, Virginia and Winthrop, Iowa) in which the operator of a truck transporting bulk hazardous materials had exhibited risky driver behavior as evidenced by motor vehicle records. Unfortunately, the future of the NDR program is uncertain due to decreased Federal funding.

Criteria for a license to operate a truck carrying bulk hazardous materials should be more stringent than a typical commercial license which permits a driver to operate a truck. This requirement could reduce the number of railroad and other types of accidents that involve hazardous materials. States could require drivers of trucks transporting bulk hazardous materials to have a special class of license or an endorsement on their license to transport bulk hazardous materials. For authority to transport bulk hazardous materials, drivers should have to have a driving history essentially devoid of convictions for serious violations. Drivers also should have to demonstrate, through examinations, a knowledge of (1) rules of the road pertaining to transportation of hazardous materials such as those applicable at railroad/highway grade crossings, (2) emergency response information and operating proficiency, and (3) loading and unloading procedures. At least two States currently require permits which certify that drivers know how to load and unload petroleum products.

A BMCS project scheduled for completion in 1981 is the development of a training curriculum for commercial drivers. This curriculum is to be tested and evaluated prior to final rulemaking in 1986. This course is fairly basic and includes such pointers as not to change gears when crossing tracks and other appropriate precautions. The findings of the BMCS study will be used by the MTB to develop proposed rulemaking for a curriculum for training drivers of trucks carrying cryogenic liquids and radioactive materials. This rulemaking addresses handling of hazardous materials and emergency procedures. An additional study is needed to define what specific criteria are necessary for licensing drivers of trucks transporting bulk hazardous materials to assure more safety consciousness. Such a study should determine traffic accident and violation conviction experience limits that should be used to disqualify unsafe drivers from operating a truck transporting bulk hazardous materials.

Licenses might best be coordinated at the national level to prevent a driver from having several licenses or endorsements from different States which allow the driver to operate a truck transporting bulk hazardous materials. The Uniform Vehicle Code (UVC) and Model Traffic Ordinance (Section 6.104--Classes of licenses) allows for various classes of licenses and states: "(b) The (responsible) departments shall establish such qualifications as it believes reasonably necessary for the safe operation of the various types, sizes or combinations of vehicles and shall appropriately examine each applicant to determine his qualifications according to the type or general class of license applied for." States should consider collecting and analyzing accident data to determine whether a special license should be required for drivers of bulk hazardous materials trucks.

33/ "Safety Effectiveness Evaluation of Detection and Control of Unsafe Interstate Commercial Drivers Through The National Driver Register, State Driver Licensing Policies, The Federal Motor Carrier Safety Regulations," February 15, 1980 (NTSB-SEE-80-1). Conceptually, the NDR would not allow drivers to operate a vehicle until a thorough search of their past records was made.

Legislation and Regulations

Current rules of the road for bulk hazardous materials trucks at crossings are not uniform from State to State or at the Federal level. Differences exist in rules governing both active and passive crossings. These differences should be resolved to eliminate possible driver confusion--especially for drivers engaged in interstate transportation or those who may change residence frequently from one State to another.

The UVC states that "situations similar in nature should be treated similarly" and thus emphasizes the need for uniformity in laws. In 1971, the UVC was revised in the area which deals with bulk hazardous materials vehicles at crossings. Previously, only vehicles carrying explosive substances or flammable liquids as cargo were required to stop before every crossing--even those "protected" by crossing gates or flashing light signals. The revised UVC (11.703(b)(3)) states that the section which pertains to requiring hazardous materials trucks to stop does not apply at "(3) Any railroad grade crossing protected by crossing gates or an alternately flashing light signal intended to give warning of the approach of a railroad train." (See appendix B.) The BMCS has not adopted this UVC exception. According to an NHTSA study, 34/ 10 States have the UVC version, 2 States do not require stops where there are open gates, and 36 States require stops at all crossings, even those with gates which are open.

As cited earlier, flashing light devices may not provide sufficient time for a truck to clear the crossing when it begins from a stopped position. In 27 of the 120 accidents at crossings with active devices, drivers stopped and proceeded, stopped on the crossing, or stalled on the tracks. Perhaps accidents of this type could be avoided if trucks were not required to stop for active devices unless they are flashing or gates are down. Additionally, some "rear-end" motor vehicle accidents would be avoided. In only 3 of the 120 cases at active crossings did accidents occur where active devices were not functioning properly. These active devices are designed to be "failsafe" and are more reliable than earlier systems. If trucks were not required to stop before active crossings that are not flashing, times at crossings could be reduced to 20 seconds or less. A uniform minimum delay of about 20 seconds could result in more compliance by all drivers at crossings with active devices.

Four States do not require bulk hazardous materials trucks to stop always at a passive crossing. Texas allows a truck transporting bulk hazardous materials to cross the track at a rural crossing at 20 mph. Where active devices are not installed, bulk hazardous materials trucks should be required to stop. Stopping at a passive crossing will provide the best opportunity for a truckdriver to detect an approaching train from either direction. Stopping does increase exposure time and therefore passive crossings should be given priority for installation of active devices if there is substantial bulk hazardous materials traffic. In contrast, Maryland, Virginia, and Rhode Island do not require stops in developed areas. Similar lack of uniformity was noted in the NHTSA study 35/ in the following areas:

- o The vehicles required to stop based on cargo
- o The requirement to look and listen
- o The requirement to not shift gears

34/ "Drivers' Duties at Railroad Grade Crossings," Traffic Laws Commentary, NHTSA, Vol. 8, No. 1, January 1979.
35/ Ibid.

Regulations that govern trucks transporting bulk hazardous materials at crossings need to be standardized to eliminate possible driver confusion. If laws are changed, the drivers must be educated about the changes.

A Uniform Effort

To reduce the number of accidents involving train collisions with trucks transporting bulk hazardous materials, a uniform, coordinated effort is needed. The engineering, enforcement, education, and legislative effort that is required involves interaction among agencies that may ordinarily not become involved in each other's activities. The trucking associations, State and local departments of transportation, railroads, labor groups, enforcement agencies, legislatures, carriers, and shippers should participate in this effort. Many of these agencies are already working together on Operation Lifesaver, which is being promoted by the National Safety Council. It may be appropriate for the National Safety Council to again act as a national focal point to develop programs specifically aimed at reducing accidents with bulk hazardous materials trucks, perhaps as an extension of Operation Lifesaver.

The organizer of this program should provide a forum for railroads, States, trucking associations, labor, carriers, and shippers to identify those crossings in need of upgrading. This would assure the most effective program. Persons with technical expertise should be brought together to decide what can be done about the isolated crossings which are used only infrequently by trucks carrying bulk hazardous materials. This coordinated effort also must have the cooperation and interest of local and State enforcement officials if it is to be successful. Truckdrivers must be given better training, must be made aware of increased enforcement, and must receive notice of changes in the rules of the road that govern bulk hazardous materials traffic at crossings. Finally, legislatures must be made aware of the need for changes in rules to provide nationwide uniformity and to reduce the potential number of accidents.

THE NEED FOR IMPROVED DATA SYSTEMS

The discrepancies in DOT agency data found during the preparation of this study indicate that the existing data systems need improvement. The initial data provided by the FRA indicated that 127 (32 percent) of the 398 cases provided to the NTSB involved vehicles other than trucks. A further analysis of these data found that these accidents typically involved automobiles, and there was no indication that hazardous materials, other than the vehicle's gas tank, were involved in the accident. An automobile accident should not be coded as hazardous materials-related unless the vehicle was carrying explosives, large tanks filled with gases (other than the one used to store fuel for the vehicle's engine), or several loose containers of hazardous materials. Otherwise, all railroad/highway accidents would be coded as involving a hazardous material.

Several accidents were found in which vans or pickup trucks were coded as "trucks." The word "truck" should be reserved for larger vehicles. Additionally, it would be helpful to differentiate between small propane tanks normally found in vans and 2,000-gallon tank trucks. The FRA has two extra coding characters (0 and 9) available that could be used to code pickup trucks and vans (recreational vehicles).

As indicated by the conflict with BMCS data in 43 cases, and other cases found in the SR data, the FRA form question on whether hazardous materials were involved does not request sufficient information to assess reliably the accident circumstances. More information is needed when there is a potential for bulk hazardous materials to be released as the result of an accident. Also, the current highway vehicle/train report does not collect information on driver impairment due to alcohol or drugs.

In several cases in the BMCS data, spillage of hazardous cargo was coded, yet the cargo was not coded as a hazardous material. Such discrepancies should be avoided. In other cases, the cargo was coded as "other" and specified as "batteri" and "fuel oi." Computer permutations of the spelling of hazardous materials perhaps could flag these accidents for further clarification. Those accident reports involving companies that frequently transport bulk hazardous materials in which the material is coded as liquids in tanks or empty tanks should be flagged for further followup to determine whether bulk hazardous materials were involved.

As evidenced by the absence in the RSPA/MTB files of six accidents which were investigated by the NTSB, of which five resulted in the release of large quantities of hazardous materials, fatalities, and substantial property damage, the MTB file is incomplete. Depending on which MTB reporting criteria are involved in the specific accidents, the small sample of BMCS and NTSB accidents with hazardous spills (49 cases) indicates that the MTB may be missing as many as 32 to 47 percent of the accidents which should have been reported to the MTB.

The FRA was missing at least 7 percent and, based on a small sample (84 cases), perhaps as many as 22 percent of the accidents that should have been reported to it. Even if the report is sent to the FRA, the hazardous materials category may be inaccurate as often as 27 percent of the time, based on the related BMCS reports.

The BMCS did not receive an accident report for NTSB's case H. Additionally, BMCS data conflicted with that of the FRA in 20 cases. The BMCS data were probably in error in at least five of these cases. Based on the sample size (105 cases), the BMCS data may have errors in reporting of at least 5 percent and perhaps as many as 20 percent of the cases. The BMCS form does provide more information than the FRA form on hazardous materials, but there is still need for improvement.

The NHTSA's current accident data do not highlight accidents involving bulk hazardous materials. NTSB's case F is an example of a case where coding limitations on NHTSA forms did not allow the release of ammonia gas to be included.

To assess the validity of the agencies' accident files periodically and to increase the completeness of the data base, accident reports should be cross-referenced from one agency's system to the other and added into the other systems if they have not been reported to them. The potential exists to validate annually 200 to 2,000 or more accidents of all types. For example, the FRA could validate those crossing accidents that involve fatalities with the NHTSA and those that involve interstate trucks with the BMCS. The NHTSA could validate fatal truck accidents with the BMCS. The MTB could correlate the data from the BMCS, the NHTSA, and the FRA as appropriate.

These cross-checks might be accomplished through a common case number developed for the accident based on date, time, and location of the accident, with an abbreviated system to identify a carrier. If all of the accidents relating to a particular safety problem were available from all the systems, the information would allow a more thorough evaluation of the safety problem and its solution. For example, those interested in truckdriver records and qualifications and their involvement in accidents could obtain NHTSA information on driver history (such as previous accidents, motor vehicle convictions, etc.) and driver education; BMCS information on hours-on-duty and years with the company; and FRA information on driver actions at crossings. This information might lead to strategies to reduce truck accidents at crossings. The MTB could use its own data and BMCS and NHTSA data to determine desirable driver qualifications.

As demonstrated by the FRA file, the existing form does not request sufficient information to report the involvement of bulk hazardous materials and the performance of containers in accidents. A short supplement to the existing form which requests slightly more information than that requested by the BMCS would provide the necessary information. Perhaps the FRA form could be modified to be similar to the BMCS form, and the NHTSA could adopt a similar supplement for its FARS data. If sufficient information is obtained, the MTB form may not be necessary in these modes of transportation.

The new supplemental form developed by the four DOT administrations should have the carrier's name and address, origin and destination of the material, the type of container, the quantity and type of material, and other information about spillage. Since empty tanks may be hazardous and are subject to some Federal regulations, information also should be collected on empty tank vehicles used to transport bulk hazardous materials. Data on origin and destination, when obtained on an FRA or a FARS report, if not found in the BMCS file, could alert the BMCS to companies which are not reporting accidents.

Other information provided would allow for cross-checks and followup inquiry. These reports should be required only for those vehicles in which the hazardous material was directly involved in the accident. For example, if a train were to strike a truck, information would not be required for the train's tank cars loaded with hazardous materials unless the truck strikes hazardous materials rail cars or these cars are derailed. Currently, the RSPA is developing a Hazardous Materials Information System (HMIS). This system is to integrate the data systems of the FHWA, the FRA, the DOT's National Response Center, and the MTB. Conceptually, this system when completed will allow cross-checking of critical items of information. The centralized accident information should aid in analyzing the effectiveness of regulatory and enforcement programs and should identify common causal factors in accidents while detecting recurring problems in response. Since the NHTSA is not involved in enforcement of hazardous materials regulations and has not collected hazardous materials information on the FARS form, the HMIS does not include the NHTSA. Based on the findings in this study, the NTSB believes that the NHTSA should be included in the HMIS and that the FRA, the FHWA/BMCS, and the NHTSA/FARS should collect similar data for accidents involving bulk hazardous materials to assure completeness of files and accuracy of data.

CONCLUSIONS

1. From 1975 through 1979 there were an average of 62 accidents annually that involved collisions between trains and trucks transporting bulk hazardous materials. These 62 accidents resulted in an annual average of 7 fatalities, 41 injuries, and $1.6 million in property damage. Recent single accidents of this type have involved even higher losses than the historical averages for a whole year.

2. There may be as many as 750 near-collisions annually involving trucks carrying bulk hazardous materials and trains that jeopardize the lives of truckdrivers, railroad personnel in locomotives, motorists, and bystanders.

3. Based on NTSB experience, most accidents involving trucks carrying bulk hazardous materials which occur at passive crossings are near bulk hazardous materials storage, depot, or terminal facilities, especially those used for petroleum distribution.

4. Trucks carrying bulk hazardous materials should use routes that have grade separations or active traffic control devices. Where routes that have passive crossings are near terminals, the crossings should be upgraded.

5. Existing documents that describe procedures for the selection of hazardous materials routes do not specifically address the hazards of crossings.

6. Some existing active devices may not provide sufficient warning time to a truck that is required to stop before entering a crossing.

7. Many of the truckdrivers involved in these accidents ignored active warning devices or did not stop at passive warning devices as required by law.

8. Some of the drivers involved in these accidents had a history of irresponsible attitudes as reflected in their past driving records.

9. Existing laws which govern bulk hazardous materials trucks at crossings are not uniform among the States, and some Federal laws are in conflict with State laws. These conflicts can create confusion as to driver responsibility and can increase the potential for accidents.

10. Uniform laws governing operation of trucks carrying bulk hazardous materials at crossings and increased enforcement are needed.

11. A coordinated effort of engineering, enforcement, educational, and legislative officials, such as an extension of Operation Lifesaver, is needed to reduce the number of truck accidents.

12. FRA, BMCS, MTB, and NHTSA accident data are not complete, have miscoded data, and are in need of improvement.

13. DOT agencies should exchange common accident reports so that the agencies can analyze data on a sampling basis to determine the validity and completeness of files.

14. There is a need for a uniform supplemental reporting form for the FRA, the FHWA/BMCS, and the NHTSA/FARS to collect information on bulk hazardous materials involvement in an accident.

RECOMMENDATIONS

As a result of this special study, the National Transportation Safety Board made these recommendations:

—to the Federal Highway Administration:

Encourage States to identify crossings with passive warning devices used by trucks transporting bulk hazardous materials and to designate specific routes, which have grade separations or crossings with active warning devices, for trucks carrying bulk hazardous materials to use near hazardous materials terminals and depots. (Class II, Priority Action) (H-81-72)

Establish a method which, through a cooperative effort of hazardous materials carriers and the railroads, will identify to the States crossings that are frequently used by bulk hazardous materials trucks and that need improved warning devices. (Class II, Priority Action) (H-81-73)

Issue an "On Guard" Bulletin to shippers and carriers of bulk hazardous materials alerting drivers of trucks carrying bulk hazardous materials to the dangers of crossings. The bulletin should encourage drivers to use routes with grade separations or crossings with active warning devices and to report to their supervisors the locations of crossings with passive warning devices that must be used. (Class II, Priority Action) (H-81-74)

Modify the informational document "Criteria to Designate Routes for Transporting Hazardous Materials" to specifically address the hazards of crossings. (Class III, Longer-Term Action) (H-81-75)

Study the feasibility of requiring drivers to have an additional national or State license or endorsement to drive trucks used to transport bulk hazardous materials. The study should establish criteria for prior driving record and training in handling hazardous materials and in emergency procedures. (Class III, Longer-Term Action) (H-81-76)

Amend 49 CFR 392.10 to require trucks carrying bulk hazardous materials to stop at crossings with active warning devices only when the devices are activated to warn drivers of an approaching train, so that it will be consistent with the Uniform Vehicle Code. (Class II, Priority Action) (H-81-77)

—to the Secretary of Transportation:

Include the National Highway Traffic Safety Administration as a member of the task force for the Hazardous Materials Information System which will determine hazardous materials data needs for accident reports. (Class II, Priority Action) (I-81-8)

Consider the development of uniform short supplemental accident data forms to supplement existing Federal Highway Administration, Federal Railroad Administration, and National Highway Traffic Safety Administration accident report forms. (Class III, Longer-Term Action) (I-81-9)

Put into effect methodology to cross-reference accidents compiled by Department of Transportation administrations to periodically assess the validity of the data and the completeness of the data files, and to prepare detailed case analyses. (Class III, Longer-Term Action) (I-81-10)

—to the Research and Special Programs Administration:

Include in the hazardous materials enforcement courses offered through the Transportation Safety Institute instructions concerning driver responsibilities at crossings when transporting bulk hazardous materials. (Class III, Longer-Term Action) (H-81-78)

—to the National Safety Council:

Expand the existing Operation Lifesaver program to include a specific program which addresses the problems with trucks carrying bulk hazardous materials, especially petroleum products, over crossings. (Class II, Priority Action) (H-81-79)

—to the International Association of Chiefs of Police; American Trucking Associations, Inc.; National Tank Truck Carriers Association; the American Petroleum Institute; Brotherhood of Locomotive Engineers; United Transportation Union; Association of American Railroads; and Governors of all States:

> Assist the National Safety Council in its program to reduce accidents involving trucks carrying bulk hazardous materials across crossings. (Class II, Priority Action) (H-81-80)

--to the Association of American Railroads:

> Encourage railroads to develop programs for train crewmembers to report: (1) truck carriers identified as transporters of bulk hazardous materials, (2) crossings with passive warning devices which are used frequently by bulk hazardous materials trucks, and (3) bulk hazardous materials trucks which are involved in near-collisions. (Class II, Priority Action) (R-81-96)

—to all States:

> Review State laws and regulations regarding the transportation of bulk hazardous materials by trucks across crossings and modify them to conform with the Uniform Vehicle Code. (Class III, Longer-Term Action) (H-81-81)

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

/s/ JAMES B. KING
Chairman

/s/ PATRICIA A. GOLDMAN
Member

/s/ G. H. PATRICK BURSLEY
Member

ELWOOD T. DRIVER, Vice Chairman, and FRANCIS H. McADAMS, Member, did not participate.

September 24, 1981

APPENDIXES

APPENDIX A

PERTINENT U.S. DOT ACCIDENT REPORT FORMS

FORM 1

OMB-004-R4039

U.S. DOT — AAR CROSSING INVENTORY FORM

A. INITIATING AGENCY ☐ RAILROAD ☐ STATE

B. CROSSING NUMBER ⌊⌋⌊⌋⌊⌋⌊⌋⌊⌋

C. REASON FOR UPDATE:
☐ CHANGES IN EXISTING CROSSING DATA
☐ NEW CROSSING
☐ CLOSED CROSSING

D. EFFECTIVE DATE ⌊⌋⌊⌋⌊⌋ (M D Y)

Part I Location and Classification of All Crossings (Must Be Completed)

1. Railroad Operating Company
2. Railroad Division or Region
3. Railroad Subdivision or District
4. State
5. County
6. County Map. Ref. No.
7. City
8. Nearest City
9. Highway Type and No.
10. Street or Road Name
11. RR I. D. No.
12. Nearest RR Timetable Station
13. Branch or Line Name
14. Railroad Mile Post

DO NOT WRITE IN THIS SPACE
State | County | City | Nearest City | RR Code | Timetable Station

15. Pedestrian Crossing
☐ 1. at grade
☐ 2. RR under
☐ 3. RR over

16. Private Vehicle Crossing
A. ☐ 1. Farm ☐ 2. Residential ☐ 3. Recreational ☐ 4. Industrial
B. ☐ 5. at grade ☐ 6. RR under ☐ 7. RR over
C. ☐ 8. signs-specify ☐ 9. signals-specify ☐ 0. none

17. Public Vehicle Crossing
☐ 1. at grade
☐ 2. RR under
☐ 3. RR over

COMPLETE REMAINDER OF FORM ONLY FOR PUBLIC VEHICLE CROSSINGS AT GRADE

Part II Detailed Information for Public Vehicular at Grade Crossing

1A. Typical Number of Daily Train Movements

Daylight (6 AM to 6 PM)		Night (6 PM to 6 AM)	
thru trains	switching	thru trains	switching
⌊⌋1	⌊⌋2	⌊⌋3	⌊⌋4

1B. Check if Less Than One Movement Per Day ☐5

2. Speed of Train at Crossing
A. Maximum time table speed ⌊⌋1
B. Typical Speed Range Over Crossing from ⌊⌋2 to ⌊⌋3 mph

3. Type and Number of Tracks
main ⌊⌋1 other ⌊⌋2 If other specify ⌊⌋3

4. Does Another RR Operate a Separate Track at Crossing?
☐ Yes 1 ☐ No Specify: RR ⌊⌋2

5. Does Another RR Operate Over Your Track at Crossing?
☐ Yes 1 ☐ No Specify: RR ⌊⌋2

6. Type of Warning Device at Crossing
A. Signs

Crossbucks		Standard Highway Stop Sign	Other Stop Signs	Other Signs: Specify
reflectorized	non-reflectorized			
⌊⌋01 Number	⌊⌋02 Number	⌊⌋03 Number	⌊⌋04 Number	⌊⌋05 Number ⌊⌋06; ⌊⌋07 Number ⌊⌋08

B. Train Activated Devices

Gates		Cantilever Flashing Lights		Mast Mounted Flashing Lights	Other Flashing Lights	Highway Traffic Signals	Wigwags	Bells
red & white reflectorized	other colored	over traffic lane	not over traffic lane		Specify			
⌊⌋09 Number	⌊⌋10 Number	⌊⌋11 Number	⌊⌋12 Number	⌊⌋13 Number	⌊⌋14 Number ⌊⌋15	⌊⌋16 Number	⌊⌋17 Number	⌊⌋18 Number

C. Specify Special Warning Device not Train Activated ⌊⌋19
D. No Signs or Signals ☐ 20

7. Is Commercial Power Available? ☐ Yes ☐ No
8. Does Crossing Signal Provide Speed Selection for Trains? ☐ Yes ☐ No ☐ N/A
9. Method of Signalling for Train Operation: Is Track Equipped with Signals? ☐ Yes ☐ No

Part III. Physical Data

1. Type of Development ☐ 1. Open Sp. ☐ 2. Res ☐ 3. Comm. ☐ 4. Ind. ☐ 5. Inst.
2. Smallest Crossing Angle ☐ 0°-29° ☐ 30°-59° ☐ 60°-90°
3. Number of Traffic Lanes Crossing Railroad ⌊⌋ Number
4. Are Truck Pullout Lanes P[illegible]nt? ☐ Yes ☐ No
5. Is Highway Paved ☐ Yes ☐ No
6. Pavement Markings ☐ Stoplines ☐ RR Xing Sym. ☐ None
7. Are RR Advance Warning Signs Present? ☐ Yes ☐ No
8. Crossing Surface ☐ 1. Sec. Timber ☐ 2 Full Wd. Plank ☐ 3. Asphalt ☐ 4. Concrete Slab ☐ 5 Concrete Pave. ☐ 6. Rubber ☐ 7. Metal Sections ☐ 8. Other Metal ☐ 9. Unconsolidated ☐ 0. Other Specify
9. Does Track Run Down A Street? ☐ Yes ☐ No
10. Nearby Intersecting Highway? ☐ Yes ☐ No

Part IV Highway Department Information

1. Highway System ⌊⌋
2. Is Crossing on State Highway System? ☐ Yes ☐ No.
3. Functional Classification of Road over Crossing ⌊⌋
4. Estimate AADT ⌊⌋⌊⌋⌊⌋⌊⌋⌊⌋
5. Estimate Percent Trucks ⌊⌋

I. D. Number

FORM 2

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION

RAIL-HIGHWAY GRADE CROSSING ACCIDENT/INCIDENT REPORT

FORM APPROVED
OMB NO. 04R4033

1 NAME OF REPORTING RAILROAD — Amtrak / Autotrain | 1a Alphabetic Code | 1b Railroad Accident/Incident No

2. NAME OF OTHER RAILROAD INVOLVED IN TRAIN ACCIDENT/INCIDENT | 2a. Alphabetic Code | 2b Railroad Accident/Incident No

3. NAME OF RAILROAD RESPONSIBLE FOR TRACK MAINTENANCE *(single entry)* | 3a. Alphabetic Code | 3b Railroad Accident/Incident No

4. U.S. DOT-AAR GRADE CROSSING IDENTIFICATION NUMBER | 5. DATE OF ACCIDENT/INCIDENT month / day / year | 6. TIME OF ACCIDENT/INCIDENT am ☐ pm ☐

LOCATION

7. NEAREST RAILROAD STATION | 8. COUNTY | 9 STATE *(two letter code)* | CODE

10. CITY *(if in a city)* | 11. HIGHWAY NAME OR NUMBER *(if private crossing, so state)*

ACCIDENT/INCIDENT SITUATION

HIGHWAY USER INVOLVED

12 TYPE — 1. Auto 2. Truck 3. Truck-Trailer 4. Bus 5. School Bus 6. Motorcycle 7. Pedestrian 8. Other *(specify)* | CODE

13. SPEED *(estimated mph at impact)* | 14 DIRECTION *(geographical)* 1. North 2. South 3. East 4. West | CODE

15. POSITION — 1. Stalled on crossing 2. Stopped on crossing 3. Moving over crossing | CODE

RAILROAD EQUIPMENT INVOLVED

16 EQUIPMENT — 1. Train *(units pulling)* 2. Train *(units pushing)* 3. Train *(standing)* 4. Car(s) *(moving)* 5 Car(s) *(standing)* 6. Light loco(s) *(moving)* 7. Light loco(s) *(standing)* 8. Other *(specify)* | CODE

17. POSITION OF CAR/UNIT IN TRAIN | CODE

18. CIRCUMSTANCE — 1. Train struck highway user 2. Train struck by highway user | CODE

19 Was the highway user and/or rail equipment involved in the impact transporting hazardous materials? 1. Highway user 2. Rail equipment 3. Both 4. Neither | CODE

ENVIRONMENT

20. TEMPERATURE *(specify, if metric)* °F

21. VISIBILITY *(single entry)* — 1. Dawn 2. Day 3. Dusk 4. Dark | CODE

22 WEATHER *(single entry)* — 1. Clear 2. Cloudy 3. Rain 4. Fog 5. Sleet 6. Snow | CODE

TRAIN AND TRACK

23. TYPE OF TRAIN — 1. Freight 2. Passenger 3. Mixed 4. Work 5. Yard/Switching 6. Light Locomotive(s) | CODE

24 TRACK TYPE USED BY TRAIN INVOLVED — 1. Main 2. Yard 3. Siding 4. Industry | CODE

25 TRACK NUMBER OR NAME

26. FRA TRACK CLASSIFICATION

27 NUMBER OF LOCOMOTIVE UNITS

28. NUMBER OF CARS

29 TRAIN SPEED *(recorded speed, if available)* Est ☐ MPH Recorded ☐

30 TIME TABLE DIRECTION — 1. North 2. South 3. East 4. West | CODE

CROSSING WARNING

31. TYPE *(place X in appropriate box(es))*
1 ☐ Gates 2 ☐ Cantilever FLS 3 ☐ Standard FLS 4 ☐ Wig Wags 5 ☐ Hwy. Traffic Signals 6 ☐ Audible 7 ☐ Crossbucks 8 ☐ Stop Signs 9 ☐ Watchman 10 ☐ Flagged by crew 11 ☐ Other *(specify)* 12 ☐ None

32. SIGNALED CROSSING WARNING — Was the signaled crossing warning identified in item 31 operating? 1. Yes 2. No | CODE

33. LOCATION OF WARNING — 1. Both sides 2. Side of vehicle approach 3. Opposite side of vehicle approach | CODE

34 CROSSING WARNING INTERCONNECTED WITH HIGHWAY SIGNALS — 1. Yes 2 No 3. Unknown | CODE

35 CROSSING ILLUMINATED BY STREET LIGHTS OR SPECIAL LIGHTS — 1. Yes 2. No 3. Unknown | CODE

MOTORIST ACTION

36. MOTORIST PASSED STANDING HIGHWAY VEHICLE — 1. Yes 2. No 3. Unknown | CODE

37. MOTORIST DROVE BEHIND OR IN FRONT OF TRAIN AND STRUCK OR WAS STRUCK BY SECOND TRAIN — 1. Yes 2. No 3. Unknown | CODE

38 MOTORIST — 1. Drove around or thru the gate 2. Stopped and then proceeded 3. Did not stop 4. Other *(specify)* 5. Unknown | CODE

39. VIEW OF TRACK OBSCURED BY *(primary obstruction)* — 1. Permanent structure 2. Standing railroad equipment 3. Passing train 4. Topography 5. Vegetation 6. Highway vehicles 7. Other *(specify)* 8. Not obstructed | CODE

HIGHWAY VEHICLE PROPERTY DAMAGE/CASUALTIES

40. HIGHWAY VEHICLE PROPERTY DAMAGE *(est. dollar damage)*

41. DRIVER WAS — 1. Killed 2. Injured 3. Uninjured | CODE

42. WAS DRIVER IN THE VEHICLE? — 1. Yes 2. No | CODE

43 TOTAL NUMBER OF OCCUPANTS KILLED

44 TOTAL NUMBER OF OCCUPANTS INJURED

45 TOTAL NUMBER OF OCCUPANTS *(include driver)*

46 IS A RAIL EQUIPMENT ACCIDENT/INCIDENT REPORT BEING FILED? 1. Yes 2. No | CODE

47. TYPED NAME AND TITLE | 48. SIGNATURE | 49. DATE

FORM FRA F 6180-57 (12-74) REPLACES FORM FRA F 6180-13 (10-67) WHICH IS OBSOLETE

APPENDIX A

FORM 3

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION

RAIL EQUIPMENT ACCIDENT/INCIDENT REPORT

FORM APPROVED
OMB NO. 04R4008

1. NAME OF REPORTING RAILROAD — Amtrak / Autotrain — 1a. Alphabetic Code — 1b. Railroad Accident/Incident No.

2. NAME OF OTHER RAILROAD INVOLVED IN TRAIN ACCIDENT/INCIDENT — 2a. Alphabetic Code — 2b. Railroad Accident/Incident No.

3. NAME OF RAILROAD RESPONSIBLE FOR TRACK MAINTENANCE (single entry) — 3a. Alphabetic Code — 3b. Railroad Accident/Incident No.

4. U. S. DOT-AAR GRADE CROSSING IDENTIFICATION NUMBER — 5. DATE OF ACCIDENT/INCIDENT (month / day / year) — 6. TIME OF ACCIDENT/INCIDENT (am / pm)

7. TYPE OF ACCIDENT/INCIDENT (enter number in code box; single entry) — CODE

1. Derailment 3. Rear end collision 5. Raking collision 7. Rail-Highway crossing 9. Obstruction 11. Fire or violent rupture 12. Other (specify)
2. Head on collision 4. Side collision 6. Broken train collision 8. RR grade crossing 10. Explosion-Detonation

HAZARDOUS MATERIALS (number of)

8. CARS CARRYING | 9. CARS DAMAGED OR DERAILED | 10. CARS WHICH RELEASED HAZ. MAT. | 11. PEOPLE EVACUATED (est.)

LOCATION

12. DIVISION | 13. NEAREST STATION | 14. MILEPOST (to nearest tenth) | 15. STATE (two letter code) — CODE

ENVIRONMENTAL CONDITIONS

16. TEMPERATURE (specify °F or °C) °F

17. VISIBILITY (single entry) — CODE
1. Dawn 3. Dusk
2. Day 4. Dark

18. WEATHER (single entry) — CODE
1. Clear 2. Cloudy 3. Rain 4. Fog 5. Sleet 6. Snow

OPERATIONAL DATA

19. METHOD (place X in appropriate box(es))
1 ☐ Manual block 4 ☐ Automatic block 7 ☐ Yard rules 10 ☐ Auto train control 13 ☐ Other (specify)
2 ☐ Interlocking 5 ☐ Traffic control 8 ☐ Time table 11 ☐ Verbal permission
3 ☐ Cab signal 6 ☐ Auto. train stop 9 ☐ Radio 12 ☐ Train orders

20. SPEED (recorded speed if available) Est. / MPH Recorded — 21. TRAIN NUMBER — 22. TIME TABLE DIRECTION (1. North 2. South 3. East 4. West) — CODE

EQUIPMENT

23. TRAILING TONS (gross tonnage, excluding power units) — 24. TYPE OF EQUIPMENT CONSIST (single entry) — CODE
1 Freight train 3. Mixed train 5 Single car 7 Yard/switching
2 Passenger train 4 Work train 6 Cut of cars 8 Light loco(s)

25. WAS TRAIN OR EQUIPMENT IDENTIFIED AS UNATTENDED? — CODE
1. Yes 2. No

26. TRACK NUMBER OR NAME — 27. FRA TRACK CLASSIFICATION — 28. ANNUAL TRACK DENSITY (gross tons in millions) — 29. TYPE OF TRACK (1. Main 3. Siding 2. Yard 4. Industry) — CODE

	30. PRINCIPLE CAR/UNIT	30a. Initial and Number	30b. Position in Train	30c. Loaded (yes or no)
(1)	First Involved (derailed, struck, striking, etc.)			
(2)	Causing (mechanical failures)			

31. LOCOMOTIVE UNITS (no. of)	a. Head End	Mid Train b. Manned	Mid Train c. Remote	Rear End d. Manned	Rear End e. Remote	32. CARS (no. of)	Loaded a. Freight	Loaded b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Train						(1) Total in Equipment Consist					
(2) Total Derailed						(2) Total Derailed					

PROPERTY DAMAGE (estimated cost, including labor, to repair or replace)

33. EQUIPMENT DAMAGE (to be reported for this equipment consist only) — $

34. TRACK, SIGNAL, WAY AND STRUCTURES DAMAGE (to be reported by railroad in item 3 only) — $

ACCIDENT/INCIDENT CAUSE CODE

35. PRIMARY CAUSE — CODE — 36. CONTRIBUTING CAUSE — CODE — 37. If no code available, explain cause

CASUALTIES

38. NUMBER OF PERSONS INJURED — 39. ESTIMATED TOTAL DAYS DISABILITY — 40. NUMBER OF FATALITIES

CREW (no. of)

41. ENGINEERS — 42. FIREMEN — 43. CONDUCTORS — 44. BRAKEMEN

HOURS ON DUTY

45. ENGINEER (Hrs: / Mins:) — 46. CONDUCTOR (Hrs: / Mins:)

47. TYPED NAME AND TITLE — 48. SIGNATURE — 49. DATE

50. NARRATIVE DESCRIPTION — Describe the cause, nature and circumstances of accident/incident

FORM FRA F 6180-54 (12-74) REPLACES FORM FRA F 6180-15 (11-72) WHICH IS OBSOLETE

FORM 4 (front)

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION

RAILROAD INJURY AND ILLNESS SUMMARY

Form Approved OMB No. 04-R4009

1. NAME OF REPORTING RAILROAD	2. ALPHABETIC CODE	3. REPORT MONTH & YEAR	4. STATE ALPHABETIC CODE	5. COUNTY

NAME OF REPORTING OFFICER	OFFICIAL TITLE

ADDRESS	TELEPHONE (Area Code) (Number)

6.

I, _____, being first duly sworn, do say upon my oath that I
(Name of Affiant)

am _____, of the railroad aforesaid and as such officer of the said railroad it is my duty to have supervision
(Title of Office held by affiant)

over the record of reportable incidents arising from the operation of the said railroad, and that I have caused to be compiled from the said record and to be carefully examined the annexed report of such incidents occurring during the month named at the head of this sheet; and that the said report is true and complete to the best of my knowledge and belief.

Subscribed and sworn to before me, a notary public in and for the State and County aforesaid, this _____ day of _____, 19 _____.

(Use an impression seal) [L.S.] _____ _____
(Notary Public) *(Signature of affiant)*

7. MILES RUN DURING MONTH

A. LOCOMOTIVE TRAIN MILES	B. MOTOR TRAIN MILES	C. YARD SWITCHING MILES	D. TOTAL

8.

A. EMPLOYEE MANHOURS WORKED	B. PASSENGER MILES OPERATED	C. NUMBER OF PASSENGERS TRANSPORTED

TOTAL TRAIN ACCIDENTS	TOTAL FRA FORMS 6180-55A	TOTAL FRA FORMS 6180-56	TOTAL FRA FORMS 6180-57

SECTION A—RECAPITULATION OF ALL CASUALTIES *INCLUDING* HIGHWAY GRADE CROSSING ACCIDENT/INCIDENT CASUALTIES

CLASS OF PERSON FOR SECTIONS A AND B	TRAIN ACCIDENTS		TRAIN INCIDENTS		NONTRAIN INCIDENTS		TOTAL	
	KIL	INJ	KIL	INJ	KIL	INJ	KIL	INJ
1. Employees on duty								
2. Employees not on duty								
3. Passengers on trains								
4. Other nontrespassers								
5. Trespassers (all classes)								
6. Contractor Employees								
7. GRAND TOTAL								

SECTION B—RECAPITULATION OF ALL HIGHWAY GRADE CROSSING ACCIDENT/INCIDENT CASUALTIES

TRAIN ACCIDENTS		TRAIN INCIDENTS		NONTRAIN INCIDENTS		TOTAL	
KIL	INJ	KIL	INJ	KIL	INJ	KIL	INJ

SECTION C—MEMORANDUM—SUBSEQUENT FATALITIES DEVELOPED FROM REPORTED CASUALTIES

LINE NO.	ACCIDENT/INCIDENT NUMBER	TYPE PERSON OR JOB CODE	DATE OF INJURY	DATE OF DEATH	STATE
1					
2					
3					
4					

FORM FRA F 6180-55 (8-76) REPLACES FORM FRA F 6180-55 (12-74) WHICH IS OBSOLETE.

This report is required by law (45 USC 40). Failure to report can result in the imposition of civil penalties.

FORM 4 (back)

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION

RAILROAD INJURY AND ILLNESS SUMMARY
(CONTINUATION SHEET)

FORM APPROVED
OMB NO. [illegible]

SHEET____ OF____

1. NAME OF REPORTING RAILROAD	2. ALPHABETIC CODE	3. REPORT MONTH

9.

CASUALTIES (Cont.)

a. INCIDENT NUMBER	b. TYPE PERSON OR JOB CODE	c. INJURY OR ILLNESS CODE	d. OCCURRENCE CODE	e. AGE	f. NUMBER OF DAYS AWAY FROM WORK	g. NUMBER OF DAYS OF RESTRICTED ACTIVITY	h. CASES WITH-OUT LOST WORK DAYS	i. STATE ALPHABETIC CODE

FORM FRA F 6180-55a (8-74)

GPO [illegible]

FORM 5 (front)

Form Approved
OMB No. 004–R2394

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
BUREAU OF MOTOR CARRIER SAFETY

MOTOR CARRIER ACCIDENT REPORT

Original and two copies of MCS 50-T shall be filed with the Director, Regional Motor Carrier Safety Office, FHWA, as required by 394.9. Copy shall be retained in carrier's file. Circle or (×) appropriate boxes below.

1. Name of carrier *(Corporate business name)* (7–21)

2. Principal Address *(Street and no., City, State, ZIP Code.)* (22–50)

3. Type of carrier (51–66) [A] Private, Employer ID No. (IRS)_____ [B] ICC authorized, MC _____ [C] Other *(Specify)* _____ Employer ID No. (IRS)_____

4. Type of trip (67) [A] Over-the-road [B] Local pick-up and delivery operation

5. Place accident occurred *(Nearest Town or City, State)* (68–78)

5A. Type of district (79) [A] Residential [B] Rural [C] Primarily business

6. Street or highway *(Route or Name)* (7–16)

6A. Location if off highway (17–26)

7. Day of week (27) [A] M [B] T [C] W [D] TH [E] F [F] S [G] S

8. Date accident occurred (28–33) ----------/----------/----------

9. Time accident occurred *(Military time to nearest hour)* (34–35)

10. ACCIDENT TYPE *(Primary Event)*

10A. Collision *(Check appropriate box)* (36) [A] Not applicable [B] Collision with moving object [C] Collision with fixed or parked object

10B. Collision *(Check other object involved)* (37–45) [A] Not applicable [B] Commercial truck [C] Fixed object [D] Automobile [E] Pedestrian [F] Bus [G] Train [H] Bicyclist [I] Animal [J] Motorcycle [K] Other *(Specify)*_____

10C. Collision with another vehicle—Accident Classification *(Check appropriate box)* zzz ☐ not applicable

(46–48)	VEHICLES 1	2	3	ACTION	(46–48)	VEHICLES 1	2	3	ACTION
A				Slowing—Stopping	L				Intersection
B				Stopped	M				Passing
C				Parked	N				Changing Lanes
D				Rear-end	O				Sideswipe—Opposite Direction
E				Backing	P				Head-On—Crossed into Opposing Lane
F				Making Right Turn	Q				Skidding
G				Making Left Turn	R				Vehicle Out-Of-Control
H				Making U-Turn	S				Roll-Away
I				Proceeding Straight	T				Controlled Railroad Crossing
J				Merging	U				Uncontrolled Railroad Crossing
K				Entering Traffic From Shoulder, Median, Parking Strip or Private Drive	V				Other *(Specify)*_____

10D. Non-collision *(Check primary event)* (49–57) [A] Not applicable [B] Ran off road [C] Jackknife [D] Overturn [E] Separation of units [F] Fire [G] Loss or spillage of cargo [H] Cargo shift [I] Other *(Specify)* _____

10E. If not primary event, did accident result in (58) [A] Not applicable [B] Spillage of hazardous cargo [C] Fire [D] Spillage of non-hazardous cargo [E] Explosion

11. DRIVER INFORMATION

11A. Name of your driver (59–72)

11B. Age (73–74)

11C. Social Security No. (7–15) ...../...../.....

11D. How long employed as your driver *(To nearest year)* (16–17)

11E. Hours actually driving since last period of 8 consecutive hours off duty (18) [A] 1 hr. [B] 2 hrs. [C] 3 hrs. [D] 4 hrs. [E] 5 hrs. [F] 6 hrs. [G] 7 hrs. [H] 8 hrs. [I] 9 hrs. [J] 10 hrs. [K] 11–12 hrs. [L] Not applicable

11F. Estimated hours of driving for entire trip or portion of trip, since last period of 8 consecutive hours off duty (19) [A] 1 hr. [B] 2 hrs. [C] 3 hrs. [D] 4 hrs. [E] 5 hrs. [F] 6 hrs. [G] 7 hrs. [H] 8 hrs. [I] 9 hrs. [J] 10 hrs. [K] 11–12 hrs. [L] Not applicable

11G. Condition of driver (20–28) [A] Apparently normal [B] Sick [C] Had been drinking [D] Dozed at wheel [E] Medical waiver [F] Other *(Specify)* _____

11H. Date of last medical certificate (29–34) ------/------/------

Form MCS 50–T (Property-Carrying) (Rev. 8–72) Previous editions of this form are obsolete

(over)

FORM 5 (back)

12. CARRIER'S VEHICLE(S)

	Type (35–39)	Year (40–41)	No. of Axles (42–43)	Make (44–53)	Model No. (54–63)	Company No. (64–69)	TYPE OF BODY (70–74) Van	Flat	Tank	Auto Carrier	Other (Specify)
A	Truck										
B	Tractor										
C	Semi-trailer										
D	Full trailer										
E	Full trailer (2nd)										
F	Other (Specify)_____										

13. Total length of vehicle/comb. (7–9) Ft. | 13A. Total width of vehicle or cargo (10–11) Ft. | 13B. Weight (cargo) (12–17) Lbs. | 13C. Weight (gross) (18–23) Lbs.

14. Type of fuel [A] Gasoline [B] Diesel [C] L.P.G. [D] Other (Specify)_____ (24–29)

15. Cargo at time of accident (Your vehicle) (30–38)
[A] Hazardous materials in cargo (Specify classification)_____ [B] Non-hazardous materials in cargo

16. Check one of the following as principal type of cargo
[A] General freight [B] Household goods or uncrated furniture/fixtures [C] Metal: Coils, sheets, rods, plates, etc. [D] Heavy machinery or other large objects [E] Motor vehicles [F] Driveaway-towaway [G] Gases in bulk [H] Solids in bulk [I] Liquids in bulk [J] Explosives [K] Logs, poles, lumber [L] Empty [M] Refrigerated foods [N] Mobile home (39–44) [O] Farm products [P] Other (Specify)_____

17. Was your driver killed? (45) [A] Yes [B] No | 17A. Was driver injured? (46) [A] Yes [B] No | 17B. Was your relief driver killed? (47) [A] Yes [B] No [C] N/A | 17C. Was relief driver injured? (48) [A] Yes [B] No [C] N/A

18. Number of other authorized persons in your vehicle Killed_____ Injured_____ (49–50) | 18A. Number of unauthorized persons in your vehicle Killed_____ Injured_____ (51–52)

19. Total number of other persons killed____ injured____ (53–56) | 19A. Amount of total property damage in dollars $_____ (57–61)

20. Were mechanical defects or failures apparent on your vehicle at time of accident? [A] Yes [B] No (62)

21. Check appropriate boxes (Mechanical defects or failures) (63–69)
[A] Not applicable [B] Fuel system [C] Wheels and tires [D] Steering system [E] Suspension [F] Transmission [G] Driveline [H] Engine [I] Brakes [J] Lights [K] Coupling [L] Other (Specify)_____

22. Was your vehicle equipped with seat belts? [A] Yes [B] No (70)

23. Were seat belts in use by your driver(s) at time of accident? [A] Yes [B] No (71)

24. OTHER VEHICLES INVOLVED

24A. Company name or operator (Vehicle #2) | 24B. Address | 24C. Type of vehicle

24D. Company name or operator (Vehicle #3) | 24E. Address | 24F. Type of vehicle

25. Weather (7–12)
[A] Rain [B] Clear [C] Snow [D] Fog/Smog [E] Cloudy/overcast [F] Sleet [G] Other (Specify)_____

25A. Light (13–18)
[A] Day [B] Artificial lights [C] Dawn [D] Other (Specify)_____ [E] Dusk [F] Dark

26. Road surface (19–23)
[A] Dry [B] Wet [C] Snowy [D] Icy [E] Other (Specify)_____

26A. Total number of lanes (24)
[A] One lane [B] Two lanes [C] Three lanes [D] Four or more lanes

26B. Type of highway (25)
[A] Divided [B] Undivided

26C. Check appropriate box [A] Entrance ramp (Expressway) [B] Exit ramp (Expressway) [C] Not applicable (26)

27. Account of accident by carrier official

28. Name and title of person signing report | 29. Signature

30. Telephone Number Area Code | 31. Date report submitted (27–32) ____/____/____

Form MCS 50–T (8–72)

For sale by the Superintendent of Documents, U.S. Government Printing Office Washington, D.C. 20402 - Price $1.25 per pad STOCK NO. 5004-00007

GPO 948—19—62124-1 470 646

FORM 6

STATE CASE NO. _____

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

Form Approved
O.M.B. No. 004R-5634

FATAL ACCIDENT REPORTING SYSTEM (1981)
—ACCIDENT LEVEL—

This report is authorized by the Highway Safety Act of 1966, P.L. 89-564. While the law does not require you to respond, the State is obligated under the terms of a grant of funds to defray the expense of reporting this information to cooperate in or to make the results of this survey comprehensive, accurate and timely.

CASE NUMBER STATE (GSA CODES) [1][2] | CONSECUTIVE NUMBER [3][4][5][6] | TRANSACTION CODE [7] = 1 (11—Original Submission, 12—Update or Change) [8] | CARD NO. [9] = 1

CITY [14][15][16][17] | COUNTY [18][19][20] | DATE: MONTH [21][22], DAY [23][24], YEAR [25][26] = 8 1 | TIME (Military Time, 9999—Unknown) [27][28][29][30]

Number of Vehicle Forms Submitted [31][32] | Number of Person Forms Submitted [33][34] | Number of Vehicles Involved in Accident [35][36] | LAND USE [37] (1—Urban, 2—Rural, 9—Unknown)

ROADWAY FUNCTION CLASS [38]
1—Principal Arterial - Interstate
2—Principal Arterial - Other Urban Freeways and Expressways
3—Principal Arterial - Other
4—Minor Arterial
5—Urban Collector
6—Major Rural Collector
7—Minor Rural Collector
8—Local Road or Street
9—Unknown

TA-1 CLASS [39]
1—Interstate
2—Other Federal Aid Primary
3—Federal Aid Secondary
4—Federal Aid Urban Arterials
5—Federal Aid Urban Collectors
6—Non-Federal Aid Arterials
7—Non-Federal Aid Collectors
8—Non-Federal Aid Local
9—Unknown

SPECIAL JURISDICTION [40]
0—No Special Jurisdiction
1—National Park Service
2—Military
3—Indian Reservation
4—College/University Campus
5—Other Federal Properties
8—Other
9—Unknown

FIRST HARMFUL EVENT [41][42]

NON-COLLISION
01—Overturn
02—Fire/Explosion
03—Immersion
04—Gas Inhalation
05—Fell from Vehicle
06—Injured in Vehicle
07—Other Non-Collision

COLLISION WITH
08—Pedestrian
09—Pedalcycle
10—Railway Train
11—Animal
12—Motor Vehicle in Transport
13—Motor Vehicle in Other Roadway
14—Parked Motor Vehicle
15—Other Type Non-Motorist
16—Other Object (Not Fixed)

COLLISION WITH FIXED OBJECT
18—Building
19—Culvert/Ditch
20—Curb or Wall
21—Divider
22—Embankment
23—Fence
24—Guard Rail
25—Light Support
26—Sign Post
27—Tree/Shrubbery
28—Utility Pole
29—Other Poles/Support
30—Impact Attenuator
31—Other Fixed Object
32—Bridge or Overpass (Passing Under)
33—Bridge or Overpass (Passing Over)
99—Unknown

MANNER OF COLLISION [43]
0—Not Collision with Vehicle in Transport
1—Rear-End
2—Head-On
3—Rear-to-Rear
4—Angle
5—Sideswipe, Same Direction
6—Sideswipe, Opposite Direction
9—Unknown

RELATION TO JUNCTION [44]
1—Non-Junction
2—Intersection
3—Intersection Related
4—Interchange Area
5—Driveway, Alley, Access, etc.
6—Entrance/Exit Ramp
7—Rail Grade Crossing
8—In Crossover
9—Unknown

RELATION TO ROADWAY [45]
1—On Roadway
2—Shoulder
3—Median
4—Roadside
5—Outside Right-of-Way
6—Off Roadway—Location Unknown
7—In Parking Lane
9—Unknown

ROADWAY FLOW [46]
1—Divided Highway, Median Strip
2—Divided Highway, Guardrail
3—Divided Highway, Other Barrier or Barrier Type Unknown
4—Not Physically Divided
5—One Way Trafficway
9—Unknown

NUMBER OF TRAVEL LANES [47]
Actual Value Except:
7—Seven or more lanes
9—Unknown

SPEED LIMIT [48][49]
Actual Miles Per Hour Except:
99—Unknown

ROADWAY ALIGNMENT [50]
1—Straight
2—Curve
9—Unknown

ROADWAY PROFILE [51]
1—Level
2—Grade
9—Unknown

ROADWAY SURFACE TYPE [52]
1—Concrete
2—Blacktop (Bituminous)
3—Brick or Block
4—Slag, Gravel or Stone
5—Dirt
8—Other
9—Unknown

ROADWAY SURFACE CONDITION [53]
1—Dry
2—Wet
3—Snow or Slush
4—Ice
5—Sand, Dirt, Oil
8—Other
9—Unknown

TRAFFIC CONTROLS [54][55]
00—No Controls
01—Flashing Traffic Signal
02—On Colors Traffic Signal
03—Stop Sign
04—Yield Sign
05—Physically Controlled RR Crossing
06—Stop Sign for RR Crossing
07—Other RR Crossing
08—School Zone Sign
09—Traffic Controls Not Functioning
10—Pedestrian Signal
98—Other
99—Unknown

LIGHT CONDITION [56]
1—Daylight
2—Dark
3—Dark but lighted
4—Dawn
5—Dusk
9—Unknown

ATMOSPHERIC CONDITIONS [57]
1—Normal
2—Rain
3—Sleet
4—Snow
5—Fog
8—Other: Smog, Smoke, Blowing Sand or Dust
9—Unknown

HIT AND RUN [58]
0—No Hit and Run
1—Hit Motor Vehicle
2—Hit Non-Motorist
3—Left Scene

CONSTRUCTION/MAINTENANCE ZONE [59]
0—None
1—Construction
2—Maintenance
3—Construction or Maintenance

NOTIFICATION TIME EMS [60][61][62][63]
Military Time Except:
0000—Not Notified
9999—Unknown

ARRIVAL TIME EMS [64][65][66][67]
Military Time Except:
0000—Not Notified
9999—Unknown

SCHOOL BUS RELATED [68]
0—No
1—Yes

RELATED FACTORS [69][70][71][72][73][74]
See Instruction Manual "Related Factors—ACCIDENT LEVEL"

RAIL GRADE CROSSING IDENTIFIER [75][76][77][78][79][80][81]
(See Instruction Manual)

CARD NO. [9] = 2 | ADDITIONAL STATE INFORMATION (See Instruction Manual) [14][15][16][17][18][19][20][21][22][23][24][25][26][27][28][29][30][31][32][33]

HS Form 214 (Rev. 9/80)

*U. S. GOVERNMENT PRINTING OFFICE: 1980—330-498

FORM 7

STATE CASE NO._____

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

Form Approved
O.M.B. No. 004R-5634

FATAL ACCIDENT REPORTING SYSTEM (1981) —VEHICLE-DRIVER LEVEL—

This report is authorized by the Highway Safety Act of 1966, P.L. 89-564. While the law does not require you to respond, the State is obligated under the terms of a grant of funds to defray the expense of reporting this information to cooperate in or to make the results of this survey comprehensive, accurate and timely.

CASE NUMBER STATE (GSA CODES) 1 2 | **CONSECUTIVE NUMBER** 3 4 5 6 | **TRANSACTION CODE** 21—Original Submission 22—Update or Change 7 8 = 2 | **CARD NO.** 9 = 1 | **VEHICLE NUMBER (Assigned by Analyst)** 10 11

VEHICLE MAKE (See Instruction Manual) 14 15 | **VEHICLE MODEL (See Instruction Manual)** 16 17 | **BODY TYPE (See Instruction Manual)** 18 19 | **MODEL YEAR** Actual Value except 99—Unknown 20 21

VEHICLE IDENTIFICATION NO. Actual Value except: Zero Fill if no VIN Nine Fill if Unknown 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38

REGISTRATION STATE 39 40
GSA CODES Except:
00—No Registration
Not Applicable
93—Multiple State Reg., in State
94—Multiple State Reg., Out-of-State
95—U.S. Government Tags
96—Military Vehicle
97—Foreign Countries
99—Unknown

ROLLOVER 41
0—No Rollover
1—First Event
2—Subsequent Event

JACK KNIFE 42
0—Not an Articulated Vehicle
1—No
2—Yes

TOWED TRAILING UNIT 43
0—No
1—Yes

SPECIAL USE 44
0—No Special Use
1—Taxi
2—Vehicle Used as School Bus
3—Vehicle Used as other Bus
4—Military
5—Police
6—Ambulance
9—Unknown

EMERGENCY USE 45
0—No
1—Yes

IMPACT POINT—INITIAL 46 47
00—Non-Collision
01-12—Clock Points
13—Top
14—Undercarriage
15—Under Ride
99—Unknown

IMPACT POINT—PRINCIPAL 48 49
00—Non-Collision
01-12—Clock Points
13—Top
14—Undercarriage
15—Under Ride
99—Unknown

EXTENT OF DEFORMATION 50
0—None
2—Other (Minor)
4—Functional (Moderate)
6—Disabling (Severe)
9—Unknown

VEHICLE ROLE 51
0—Non-Collision
1—Striking
2—Struck
3—Both
9—Unknown

MANNER OF LEAVING SCENE 52
1—Driven
2—Towed Away
3—Abandoned
9—Unknown

FIRE OCCURRENCE 53
0—No Fire
1—Fire Occurred in Vehicle During Accident

NUMBER OF OCCUPANTS 54 55
Actual Value if Total Known
97—Unknown—Only Injured Reported
99—Unknown

RELATED FACTORS 56 57 58 59
See Instruction Manual "Related Factors—VEHICLE LEVEL"

MOST HARMFUL EVENT 60 61

NON-COLLISION
01—Overturn
02—Fire/Explosion
03—Immersion
04—Gas Inhalation
05—Fell from Vehicle
06—Injured in Vehicle
07—Other Non-Collision

COLLISION WITH
08—Pedestrian
09—Pedalcycle
10—Railway Train
11—Animal
12—Motor Vehicle in Transport
13—Motor Vehicle in Other Roadway
14—Parked Motor Vehicle
15—Other Type Non-Motorist
16—Other Object (Not Fixed)

COLLISION WITH FIXED OBJECT
18—Building
19—Culvert/Ditch
20—Curb or Wall
21—Divider
22—Embankment
23—Fence
24—Guard Rail
25—Light Support
26—Sign Post
27—Tree/Shrubbery
28—Utility Pole
29—Other Poles/Support
30—Impact Attenuator
31—Other Fixed Object
32—Bridge or Overpass (Passing Under)
33—Bridge or Overpass (Passing Over)
99—Unknown

Card No. 9 = 2

DRIVER PRESENCE 14
1—Driver Operated Vehicle
2—Driverless
3—Driver Left Scene
9—Unknown

LICENSE STATE GSA CODES 15 16
Except:
94—Military
95—Canada
96—Mexico
97—Other Foreign Countries
99—Unknown

LICENSE STATUS 17
0—No License Required
1—No License, License Required
2—Licensed, but not for this type of vehicle
3—Valid License for this type of vehicle
4—Suspended License
5—Revoked License
6—Expired License
7—Learner's Permit
9—Unknown

COMPLIANCE WITH LICENSE RESTRICTIONS 18
0—No Restrictions
1—Restrictions Complied With
2—Restrictions Not Complied With
3—Restrictions, Compliance Unknown
9—Unknown

DRIVER TRAINING 19
0—None
1—High School
2—Commercial
3—School Bus
4—Traffic School
5—Two or more Types
6—Training, Type Unknown
9—Unknown

VIOLATIONS CHARGED 20
0—No
1—Yes
2—Pending
9—Unknown

PREVIOUS RECORDED ACCIDENTS 21 22
Actual Value Except:
00—None
99—Unknown

PREVIOUS RECORDED SUSPENSIONS AND REVOCATIONS 23 24
Actual Value Except:
00—None
99—Unknown

PREVIOUS DWI CONVICTIONS 25 26
Actual Value Except:
00—None
99—Unknown

PREVIOUS SPEEDING CONVICTIONS 27 28
Actual Value Except:
00—None
99—Unknown

PREVIOUS OTHER HARMFUL MV CONVICTIONS 29 30
Actual Value Except:
00—None
99—Unknown

DATE OF LAST ACCIDENT, SUSPENSION, OR CONVICTION 31 32 33 34
Mo. Yr.
00—No Record
99—Unknown

DATE OF FIRST ACCIDENT SUSPENSION, OR CONVICTION 35 36 37 38
Mo. Yr.
00—No Record
99—Unknown

RELATED FACTORS 39 40 41 42 43 44
See Instruction Manual, "Related Factors—DRIVER LEVEL"

HS Form 214A (Rev. 9/80)

FORM 8

STATE CASE NO. _____

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

Form Approved
O.M.B. No. 004R-5634

FATAL ACCIDENT REPORTING SYSTEM (1981) —PERSON LEVEL—

This report is authorized by the Highway Safety Act of 1966, P.L. 89-564. While the law does not require you to respond, the State is obligated under the terms of a grant of funds to defray the expense of reporting this information to cooperate in or to make the results of this survey comprehensive, accurate and timely.

CASE NUMBER STATE (GSA CODES) [1][2]

CONSECUTIVE NUMBER [3][4][5][6]

TRANSACTION CODE [7][8] = 3
31—Original Submission
32—Update or Change

CARD NO. [9] = 1

VEHICLE NUMBER (Assigned by Analyst) [10][11]
00—Non-Motorist

PERSON NUMBER (Assigned by Analyst) [12][13]

AGE [14][15]
Actual Value
00—Up to One Year
97—Ninety-Seven Years or Older
99—Unknown

SEX [16]
1—Male
2—Female
9—Unknown

PERSON TYPE [17]
1—Driver
2—Passenger
3—Non-Motorist: Pedestrian
4—Non-Motorist: Pedalcyclist
5—Non-Motorist: Occupant of Non Traffic Unit Vehicle
8—Non-Motorist: Other or Unknown
9—Occupant: Unknown Type

SEATING POSITION [18][19]
00—Non-Motorist
01—Front Seat - Left Side (Driver's Side)
02—Front Seat - Middle
03—Front Seat - Right Side
04—Second Seat - Left Side
05—Second Seat - Middle
06—Second Seat - Right Side
07—Third Seat - Left Side
08—Third Seat - Middle
09—Third Seat - Right Side
10—Front Seat - Other
11—Second Seat - Other
12—Third Seat - Other
13—Other Passengers
14—Sleeper Section of Cab (Truck)
15—Riding on Vehicle Exterior
99—Unknown

MANUAL (ACTIVE) RESTRAINT SYSTEM — USE [20]
0—None Used - Vehicle Occupant/Not Applicable - Non-Motorist
1—Shoulder Belt
2—Lap Belt
3—Lap and Shoulder Belt
4—Child Safety Seat
5—Motorcycle Helmet
8—Restraint Used — Type Unknown or Other including Other Helmet
9—Unknown

AUTOMATIC (PASSIVE) RESTRAINT SYSTEM — FUNCTION [21]
0—Not Equipped or Non-Motorist
1—Automatic Belt In Use
2—Automatic Belt Not In Use
3—Deployed Air Bag
4—Non-deployed Air Bag
9—Unknown

NON-MOTORIST LOCATION [22][23]
00—Not Applicable - Vehicle Occupant
99—Unknown
01—Intersection - In Crosswalk
02—Intersection - Sidewalk, Median, Island, Shoulder, Other
03—Intersection - On Roadway
04—Intersection - Unknown
05—Non-Intersection - In Crosswalk
06—Non-Intersection - Sidewalk, Median, Island, Other
07—Non-Intersection - Bike Path
08—Non-Intersection - On Road Shoulder
09—Non-Intersection - Outside Trafficway
10—Non-Intersection - On Roadway
11—Non-Intersection - In Parking Lane
12—Non-Intersection - Unknown

EJECTION [24]
0—Not Ejected
1—Totally Ejected
2—Partially Ejected
9—Unknown

EXTRICATION [25]
0—Not Extricated
1—Extricated
9—Unknown

ALCOHOL INVOLVEMENT [26]
0—No
1—Yes

ALCOHOL TEST RESULT [27][28]
Actual Value (Decimal Implied before First Digit) (0.xx)
95—Test Refused
96—None Given
97—AC Test Performed, Results Unknown
99—Unknown

INJURY SEVERITY [29]
0—O
1—C
2—B
3—A
4—K
5—Injured, Severity Unknown
6—Died Prior to Accident
9—Unknown

TAKEN TO HOSPITAL OR TREATMENT FACILITY [30]
0—No
1—Yes
9—Unknown

DEATH DATE [31] [32][33][34][35][36]
000000—Not Applicable
999999—Unknown
MONTH DAY YEAR

RELATED FACTORS [37][38] [39][40] [41][42]
See Instruction Manual
"Related Factors—PERSON LEVEL"

HS Form 214B (Rev. 9/80)

GPO : 1980 O - 330-570

FORM 9 (front)

DEPARTMENT OF TRANSPORTATION

Form Approved OMB No. 04-S613

HAZARDOUS MATERIALS INCIDENT REPORT

INSTRUCTIONS: Submit this report in duplicate to the Director, Office of Program Support, Materials Transportation Bureau, Department of Transportation, Washington, D.C. 20590, (ATTN: DMT-412). If space provided for any item is inadequate, complete that item under Section H, "Remarks", keying to the entry number being completed. Copies of this form, in limited quantities, may be obtained from the Director, Office of Program Support. Additional copies in this prescribed format may be reproduced and used, if on the same size and kind of paper.

A INCIDENT

1. TYPE OF OPERATION
1 ☐ AIR 2 ☐ HIGHWAY 3 ☐ RAIL 4 ☐ WATER 5 ☐ FREIGHT FORWARDER 6 ☐ OTHER *(Identify)* _____

2. DATE AND TIME OF INCIDENT *(Month - Day - Year)*
_____ a.m.
_____ p.m.

3. LOCATION OF INCIDENT

B REPORTING CARRIER, COMPANY OR INDIVIDUAL

4. FULL NAME

5. ADDRESS *(Number, Street, City, State and Zip Code)*

6. TYPE OF VEHICLE OR FACILITY

C SHIPMENT INFORMATION

7. NAME AND ADDRESS OF SHIPPER *(Origin address)*

8. NAME AND ADDRESS OF CONSIGNEE *(Destination address)*

9. SHIPPING PAPER IDENTIFICATION NO.

10. SHIPPING PAPERS ISSUED BY
☐ CARRIER ☐ SHIPPER
☐ OTHER *(Identify)* _____

D DEATHS, INJURIES, LOSS AND DAMAGE

DUE TO HAZARDOUS MATERIALS INVOLVED

11. NUMBER PERSONS INJURED

12. NUMBER PERSONS KILLED

13. ESTIMATED AMOUNT OF LOSS AND/OR PROPERTY DAMAGE INCLUDING COST OF DECONTAMINATION *(Round off to dollars)*
$

14. ESTIMATED TOTAL QUANTITY OF HAZARDOUS MATERIALS RELEASED

E HAZARDOUS MATERIALS INVOLVED

15. HAZARD CLASS (*Sec. 172.101, Col. 3)	16. SHIPPING NAME (*Sec. 172.101, Col. 2)	17. TRADE NAME

F NATURE OF PACKAGING FAILURE

18. *(Check all applicable boxes)*

☐ (1) DROPPED IN HANDLING	☐ (2) EXTERNAL PUNCTURE	☐ (3) DAMAGE BY OTHER FREIGHT
☐ (4) WATER DAMAGE	☐ (5) DAMAGE FROM OTHER LIQUID	☐ (6) FREEZING
☐ (7) EXTERNAL HEAT	☐ (8) INTERNAL PRESSURE	☐ (9) CORROSION OR RUST
☐ (10) DEFECTIVE FITTINGS, VALVES, OR CLOSURES	☐ (11) LOOSE FITTINGS, VALVES OR CLOSURES	☐ (12) FAILURE OF INNER RECEPTACLES
☐ (13) BOTTOM FAILURE	☐ (14) BODY OR SIDE FAILURE	☐ (15) WELD FAILURE
☐ (16) CHIME FAILURE	☐ (17) OTHER CONDITIONS *(Identify)* _____	19. *SPACE FOR DOT USE ONLY*

Form DOT F 5800.1 (10-70) (9/1/76)
*-Editorial change to incorporate redesignation per HM-112.

FORM 9 (back)

G **PACKAGING INFORMATION** - *If more than one size or type packaging is involved in loss of material show packaging information separately for each. If more space is needed, use Section H "Remarks" below keying to the item number.*

ITEM				#1	#2	#3
20	TYPE OF PACKAGING INCLUDING INNER RECEPTACLES *(Steel drums, wooden box, cylinder, etc.)*					
21	CAPACITY OR WEIGHT PER UNIT *(55 gallons, 65 lbs., etc.)*					
22	NUMBER OF PACKAGES FROM WHICH MATERIAL ESCAPED					
23	NUMBER OF PACKAGES OF SAME TYPE IN SHIPMENT					
24	DOT SPECIFICATION NUMBER(S) ON PACKAGES *(21P, 17E, 3AA, etc., or none)*					
25	SHOW ALL OTHER DOT PACKAGING MARKINGS *(Part 178)*					
26	NAME, SYMBOL, OR REGISTRATION NUMBER OF PACKAGING MANUFACTURER					
27	SHOW SERIAL NUMBER OF CYLINDERS, CARGO TANKS, TANK CARS, PORTABLE TANKS					
28	TYPE DOT LABEL(S) APPLIED					
29	IF RECONDITIONED OR REQUALIFIED, SHOW	A	REGISTRATION NO. OR SYMBOL			
		B	DATE OF LAST TEST OF INSPECTION			
30	IF SHIPMENT IS UNDER DOT OR USCG SPECIAL PERMIT, ENTER PERMIT NO.					

H **REMARKS** - Describe essential facts of incident including but not limited to defects, damage, probable cause, stowage, action taken at the time discovered, and action taken to prevent future incidents. Include any recommendations to improve packaging, handling, or transportation of hazardous materials. Photographs and diagrams should be submitted when necessary for clarification.

31. NAME OF PERSON PREPARING REPORT *(Type or print)*	32. SIGNATURE
33. TELEPHONE NO. *(Include Area Code)*	34. DATE REPORT PREPARED

Reverse of Form DOT F 5800.1 (10-70)

APPENDIX B

PERTINENT UNIFORM VEHICLE CODE AND BUREAU OF MOTOR CARRIER SAFETY REGULATIONS

Uniform Vehicle Code

§11.703--Certain vehicles must stop at all railroad grade crossings

(a) Except as provided in subsection (b), the driver of any vehicle described in regulations issued pursuant to subsection (c), before crossing at grade any track or tracks of a railroad, shall stop such vehicle within 50 feet from the nearest rail of such railroad and while so stopped shall listen and look in both directions along such track for any approaching train, and for signals indicating the approach of a train and shall not proceed until he can do so safely. After stopping as required herein and upon proceeding when it is safe to do so the driver of any said vehicle shall cross only in such gear of the vehicle that there will be no necessity for manually changing gears while traversing such crossing and the driver shall not manually shift gears while crossing the track or tracks.

(b) This section shall not apply at

1. Any railroad grade crossing at which traffic is controlled by a police officer or human flagman;

2. Any railroad grade crossing at which traffic is regulated by a traffic-control signal;

3. Any railroad grade crossing protected by crossing gates or an alternately flashing light signal intended to give warning of the approach of a railroad train;

4. Any railroad grade crossing at which an official traffic control device gives notice that the stopping requirement imposed by this section does not apply.

(c) The (commissioner or other appropriate State official or agency) shall adopt such regulations as may be necessary describing the vehicles which must comply with the stopping requirements of this section. In formulating such regulations the (commissioner or other appropriate State official or agency) shall give consideration to the number of passengers carried by the vehicle and the hazardous nature of any substance carried by the vehicle in determining whether such vehicle shall be required to stop. Such regulations shall correlate with and so far as possible conform to the most recent regulation of the United States Department of Transportation.

BMCS Regulation 49 CFR 392.10:

§392.10 Railroad grade crossings; stopping required.

(a) Except as provided in paragraph (b) of this section, the driver of a motor vehicle specified in paragraphs (a) (1) through (6) of this section shall not cross a railroad track or tracks at grade unless he first: Stops the vehicle within 50 feet of, and not closer than 15 feet to, the tracks; thereafter listens and looks in each direction along the tracks for an approaching train; and ascertains that no train is approaching. When it is safe to do so, the driver may drive the vehicle across the tracks in a gear that permits the vehicle to complete the crossing without a change of gears. The driver must not shift gears while crossing the tracks.

(1) Every bus transporting passengers,

(2) Every motor vehicle transporting any quantity of chlorine,

(3) Every motor vehicle which, in accordance with the regulations of the Department of Transportation, is required to be marked or placarded with one of the following markings:

(i)	Explosives A	(x)	Poison
(ii)	Explosives B	(xi)	Oxygen
(iii)	Poison Gas	(xii)	Flammable Gas
(iv)	Flammable Solid W	(xiii)	Combustible
(v)	Radioactive	(xiv)	Flammable Solid
(vi)	Flammable	(xv)	Oxidizer
(vii)	Blasting Agent	(xvi)	Organic Peroxide
(viii)	Nonflammable Gas	(xvii)	Corrosive
(ix)	Chlorine	(xviii)	Dangerous

(4) Every cargo tank motor vehicle, whether loaded or empty, used for the transportation of any hazardous material as defined in the Hazardous Materials Regulations of the Department of Transportation, Parts 170-189 of this title.

(5) Every cargo tank motor vehicle transporting a commodity which at the time of loading has a temperature above its flash point as determined by §173.115 of this title.

(6) Every cargo tank motor vehicle, whether loaded or empty, transporting any commodity under special permit in accordance with the provisions of §170.13 of this title.

(b) A stop need not be made at:

(1) A streetcar crossing, or railroad tracks used exclusively for industrial switching purposes, within a business district as defined in §390.12 of this chapter,

(2) A railroad grade crossing when a police officer or crossing flagman directs traffic to proceed,

(3) A railroad grade crossing controlled by a functioning highway traffic signal transmitting a green indication which, under local law, permits the vehicle to proceed across the railroad tracks without slowing or stopping.

(4) An abandoned railroad grade crossing which is marked with a sign indicating that the rail line is abandoned,

(5) An industrial or spur line railroad grade crossing marked with a sign reading "Exempt." Such "Exempt" signs shall be erected only by or with the consent of the appropriate State or local authority.

*U.S. GOVERNMENT PRINTING OFFICE : 1981 0-361-828/69