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**NATIONAL
TRANSPORTATION
SAFETY
BOARD**

WASHINGTON, D.C. 20594

HIGHWAY ACCIDENT REPORT

LOPD COURIER PICKUP TRUCK
FIXED OBJECT COLLISION
PATUXENT ROAD
NEAR CROFTON, MARYLAND
APRIL 23 1979

NTSB CASE NO. 79-10

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16. Abstract About 9:15 p.m. on April 23, 1979, a compact pickup truck with 12 teenaged occupants was traveling between 64 and 78 mph along a winding country road near Crofton, Maryland, when it failed to negotiate a curve to the left. The truck ran off the right side of the road and struck three trees located about 7 feet from the edge of the pavement. Ten passengers were killed and one passenger was seriously injured; the driver was injured slightly. The National Transportation Safety Board determines that the probable cause of this accident was high speed, reckless driving of a vehicle by a driver who was under the influence of alcohol and marijuana. Contributing to the severe consequences of the accident was the presence of passengers in the open bed of the pickup truck, an area that offered no crash protection.					
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Adopted September 6, 1979

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FIXED-OBJECT COLLISION
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SYNOPSIS

About 9:15 p.m. on April 23, 1979, a compact pickup truck with 12 teenaged occupants was traveling between 64 and 78 mph along a winding country road near Crofton, Maryland, when it failed to negotiate a curve to the left. The truck ran off the right side of the road and struck three trees located about 7 feet from the edge of the pavement. Ten passengers were killed and one passenger was seriously injured; the driver was injured slightly.

The National Transportation Safety Board determines that the probable cause of this accident was high speed, reckless driving of a vehicle by a driver who was under the influence of alcohol and marijuana. Contributing to the severe consequences of the accident was the presence of passengers in the open bed of the pickup truck, an area that offered no crash protection.

INVESTIGATION

The Accident

About 9:15 p.m., e.s.t., on April 23, 1979, a compact pickup truck with 12 teenaged occupants was traveling south on Patuxent Road, a winding country road near Crofton, Maryland. The truck was en route from a bowling alley on the Ft. Meade military base to Patuxent River Park, a county park located about 7 miles from the bowling alley and just outside the military base. The driver reported that he had been traveling along the road at 30 to 35 mph and had swerved to his right when an oncoming vehicle came toward him on a curve to his left. He ran off the road and struck three trees located about 7 feet from the edge of the pavement. Side-scuff marks were left on the pavement by the truck tires as the truck attempted to negotiate the curve. (See Figure 1.) These marks indicated that the tires on the left side of the truck were on the centerline of the road as the truck entered the curve and that the truck was in a continuous left steering maneuver until it traveled off the right side of the road. The truck began to rotate counterclockwise while on the pavement and began to roll to the right as it left the pavement. After striking the trees, the truck was redirected back onto the pavement, where it came to rest upside-down and perpendicular to the road centerline. Seven passengers were killed instantly, and three were critically injured and later died. One passenger survived but was injured seriously; the driver received minor injuries.

The surviving passenger at first supported the driver's statement but later admitted that the driver was operating "way in excess" of the 25 to 35 mph posted speed limit along Patuxent Road and that no other vehicle was involved in the accident. He also admitted that the truck had been sliding and skidding and was across the road and on two wheels even before it reached the curve. Passengers had been yelling to the driver to slow down. Another passenger, who later died, estimated that the truck was traveling between 80 to 85 mph just before the accident. A witness, who was standing alongside the road about 1 mile before the accident scene, estimated that the truck was traveling 40 to 50 mph when it passed him and entered a small town; the posted speed limit there was 25 mph.

Injuries to Persons

<u>Injuries</u>	<u>Driver</u>	<u>Passengers</u>	<u>Other</u>
Fatal	0	10	0
Serious	0	1	0
Minor/None	1	0	0

The ages of the occupants ranged from 14 to 19 years. The driver and three passengers were in the cab of the truck and eight passengers were in the bed of the truck. The driver and a passenger who was sitting in the bed of the truck with his back to and directly behind the driver survived the collision.

Vehicle Information

The 1978 Ford Courier pickup truck, VIN SGTATD-96004, was purchased new by the driver. It was equipped with a 4-cylinder, gasoline engine, a 5-speed transmission, and Bridgestone 6.00 - 14 LT (light truck) bias ply tires. The standard suspension system was designed to accommodate a recommended maximum truck and cargo weight (GVWR) of 4,075 pounds. The truck cab was equipped with a bench seat, a floor-mounted gear shift, and two combination shoulder/lapbelts. The belts appeared to have been intentionally lodged between the seat cushions and were, therefore, not in use at the time of the accident. The odometer had registered 11,017 miles.

The tires were those on the truck when it was purchased. The front tires had 4/32-inch or more tread depth (2/32-inch or more is acceptable for driving on wet pavement), and there was no tread wear to indicate misalignment. Although the rear tires had little or no visible tread, this would not have adversely affected tire-to-pavement traction on dry pavement—the condition of the road at the time of the accident.

When the truck was being removed from the accident scene, the tow truck driver noted that air was leaking from the right rear tire after he returned the truck to the upright position. When the tires were examined the day after the accident, the right rear tire had 10 psi air pressure. Two small leaks were found in the tire that were produced by dirt, small stones, and grass that had become lodged between the tire bead and rim. The sidewalls of the right front and right rear tires were dirt-covered to the rims. Since there was about 37 psi of air pressure in the three remaining tires on the truck, the Safety Board assumed that the right rear tire was also at 37 psi and that the leaks developed after the truck ran off the pavement or when the truck was being prepared for towing after the accident.

The truck owner's manual contained information on vehicle loading and tire pressures for various loads and a placard was also attached to the body of the truck with this information. Weight distributions and tire pressures were established for an unloaded truck, a truck loaded to recommended maximum capacity, and a truck loaded in the same manner as the accident vehicle. (See Table 1.) Additionally, the recommended load capacities for this type of tire at various inflation pressures were obtained from the manufacturer. (See Table 2.)

No deficiencies or unusual conditions were noted for any other mechanical system on the truck.

Vehicle Damage

Most direct impact damage was located along the right front and right side of the truck. (See figure 2.) The cab roof and GT1/ bar were deformed to the rear and down, with most of the damage on the right side. The damage to the truck was matched to impact marks on the trees, which indicated that the truck was rolling over to its right when it struck the trees. The engine was forced rearward and off the right engine mount; the right cab door was jammed. Neither the frame or suspension was damaged, and the track width and wheel base dimensions had not been altered.

1/ A GT bar is a "cosmetic" metallic bar similar in configuration to a "roll" bar but nonfunctional as a "roll" bar.

Table 1. Weight Distributions and Tire Pressures for Various Truck Loads

	<u>Total Weight (lbs)</u>	<u>Weight Distribution</u>		<u>Cold Tire Pressures</u>	
		<u>Front Axle (lbs)</u>	<u>Rear Axle (lbs)</u>	<u>Front Axle (psi)</u>	<u>Rear Axle (psi)</u>
Unloaded Vehicle (curb weight)	2670	1460 (54.8%)	1210 (45.2%)	26	36 ^{1/}
Vehicle at Recommended Maximum Load (GVWR)	4075	1550 (38%)	2525 (62%)	26	45
Accident Vehicle	4430	1770 (40%)	2660 (60%)	37	37

^{1/} Rear tire pressures of 36 psi are acceptable only when the load over the rear axle is less than 2050 pounds

Table 2. Recommended Tire Load Capacities for Various Tire Pressures

<u>Load (lbs)</u>	<u>Tire Pressures (psi)</u>
1179	34
1234	37
1289	40
1345	43
1410	45

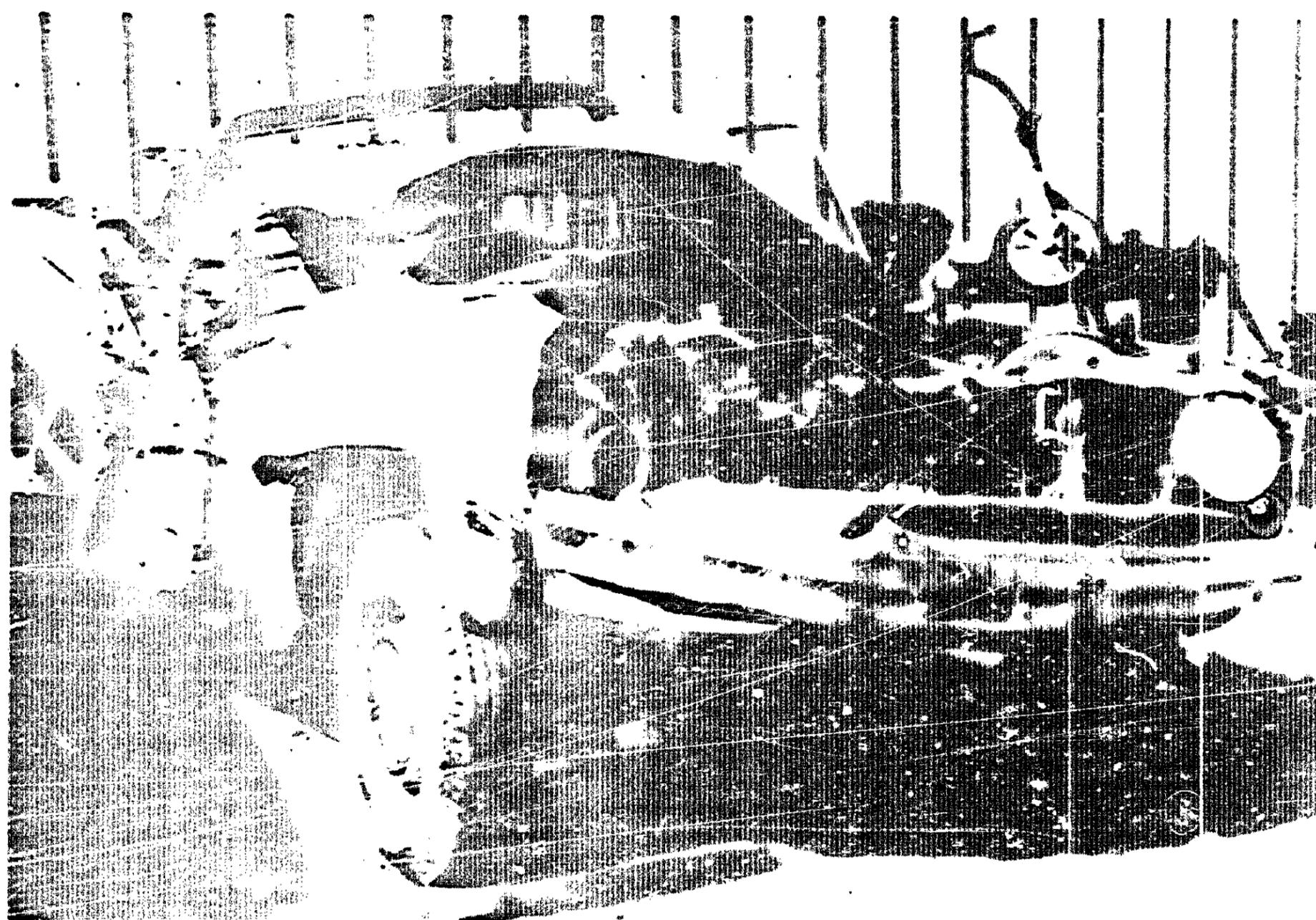


Figure 2. The Damaged Truck.

Driver Information

The 18-year-old, 192-pound driver was employed as a carpet cutter. He had held a valid Maryland driver's license with no operating restrictions for 2 years 3 months. In 1977, he had taken driver education at Fort Meade High School and had attended the minimum number of course hours required; his final grade was a D. He bought the truck on September 16, 1978, and was the owner and principal driver. Although the truck was insured at the time of sale, the insurance was dropped shortly after the truck was involved in an accident on December 4, 1978. The person who had driven the truck when it was involved in the December accident reported that he and a group of eight friends, including the owner of the truck, had been driving around and drinking. He had swerved to avoid a car that had stopped suddenly in front of him and he hit a telephone pole. The owner of the truck then purposely drove the truck into a pole at another location. The owner reported to police that he had struck the second pole. However, after being confronted with witness testimony disputing his account, he changed his story to report that a vehicle struck him, forced him into some other pole, and drove away. He told police that he tried to stage the second accident because he was afraid his insurance company would not pay for damages incurred on a dirt, country road.

On April 2, 1978, the driver/owner had received a traffic citation for exceeding the speed limit by 10 mph. According to some witnesses, he frequently drove haphazardly and exceeded the speed limit. He also frequently drove after drinking alcohol and had told persons that the truck was not insured. Section 7-103 of the Maryland Vehicle Law prohibits operating a vehicle not covered by insurance.^{2/} He told Safety Board and Anne Arundel County Police Department investigators that he had dropped out of high school, had been having "family problems", and periodically stayed away from home for several days. He said he had used such drugs as marijuana, PCP,^{3/} and cocaine, but not on the day of this accident. On the night before the accident, he said that he had been drinking alcohol and smoking marijuana; he went to bed about 2 a.m. and awoke about 9 or 10 a.m. During the day of the accident, he picked up his last paycheck from his previous job, stopped by the high school, where he was asked to leave because he was no longer a student, bought a sandwich for lunch and two 6-packs of beer later that afternoon, and for the most part, loitered about the Ft. Meade bowling alley. The driver stated that he drank two beers around lunchtime and two later that afternoon.

According to a teenaged witness, the driver and a group of persons had bought and consumed beer, chips, and a quart of 60-proof premixed cocktail drink that afternoon. Later in the day, other teenaged witnesses reported seeing the driver drink tequila and beer and 5 teenaged witnesses saw the driver smoke marijuana at various times and in varying amounts outside the bowling alley.

Witnesses reported a continuous long-term pattern of drinking by the driver and some thought that he was "drunk" at the bowling alley. When the group decided to go to Patuxent River Park for a party, the driver said that he at first refused to go because he was tired, but then changed his mind. At least two members of the group did not go because of home curfews. En route to the park, a two-vehicle caravan, which included the truck, stopped at a carryout restaurant,

^{2/} Article 66 1/2, Section 7-103, Motor Vehicle Laws of Maryland, 1974.

^{3/} PCP or Phencyclidine, a hallucinogenic drug when used by humans.

a gas station, and a liquor store where they bought a bottle of bourbon and two 6-packs of beer. The bourbon was not carried in the truck. The two vehicles separated en route to Patuxent Road, a road the driver had traveled on a number of occasions and with which he was familiar.

Highway Information

Patuxent Road is a 2-lane north-south, county-maintained roadway. The roadway is not a Federal-aid roadway and is classified as a collector road by the county and as a minor collector by the State. It is about 5 1/2 miles long and winds and rolls through a primarily rural, wooded area. Average daily traffic is about 1,000 vehicles. After the truck had left the small roadside town of Woodwardville, it traveled through a shallow curve to the left and a straight section of highway before reaching the accident site. (See Figure 3.) The grade was downhill over this distance and was about 3 percent at the accident site.

The curve on which the accident occurred has a radius of 350 feet and an average superelevation of about 0.035 feet/foot where the truck left the scuff marks. In 1977, the road had been resurfaced with asphalt. The pavement was 22 feet wide and the highway right-of-way was 39 feet wide, leaving a 4-foot-wide area on each side of the road for highway use. A dirt shoulder/drainage ditch was located in this area and trees and utility poles bordered the right-of-way; there were no street lights. The reflectorized white edgelines were in good condition and located 1 foot from the edge of the pavement, thereby providing 10-foot-wide lanes. The double yellow centerline was in poor condition throughout the curve. (See Figure 4.)

About a week before the accident, the Anne Arundel County highway department had reduced the maximum speed limit on Patuxent Road from 45 mph to 35 mph. The speed limit was reduced after a speed study indicated that 85 percent of the traffic was traveling 40 mph or less even on a straight section of the road. Two 25 mph speed limit signs were posted at the beginning and middle of the town, the first of which was about 1 mile before the accident site. The speed limit for the truck's direction of travel was not increased to 35 mph until 0.3 mile after the accident site. An advance curve warning sign with an advisory speed sign of 30 mph was located about 190 feet before the shallow left curve that preceded the accident curve. (See Figure 3.) Since both curves could be comfortably negotiated at the maximum speed limit of 25 mph, this sign was unnecessary.^{4/}

In the past 5 years, a relatively low number of accidents have occurred at or near the accident site. Since 1974, four highway accidents have occurred at or close to the accident site. Only one of these accidents involved a southbound vehicle that left the road and struck a utility pole. From 1975 to 1978, 14 accidents occurred within the 2-mile segment of the road that begins 1 mile north of the accident site and ends 1 mile south. Half of these accidents involved striking fixed objects such as trees and poles. Police accident reports with age data were available for 11 of the 14 accidents. The average age of the drivers in

^{4/}"Manual on Uniform Traffic Control Devices," U.S. Department of Transportation, Federal Highway Administration, 1978.

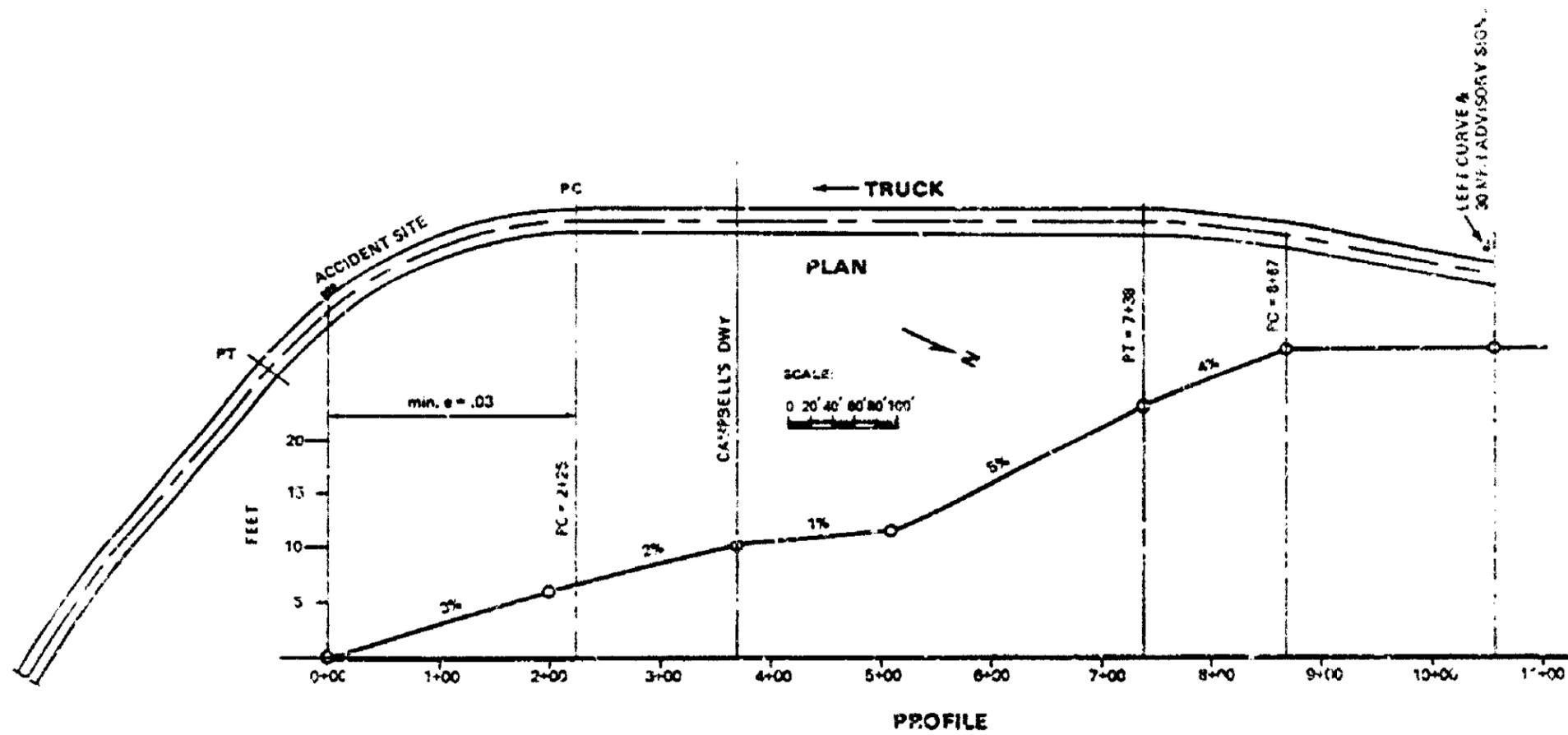


Figure 3. Plan and Profile of Accident Site.

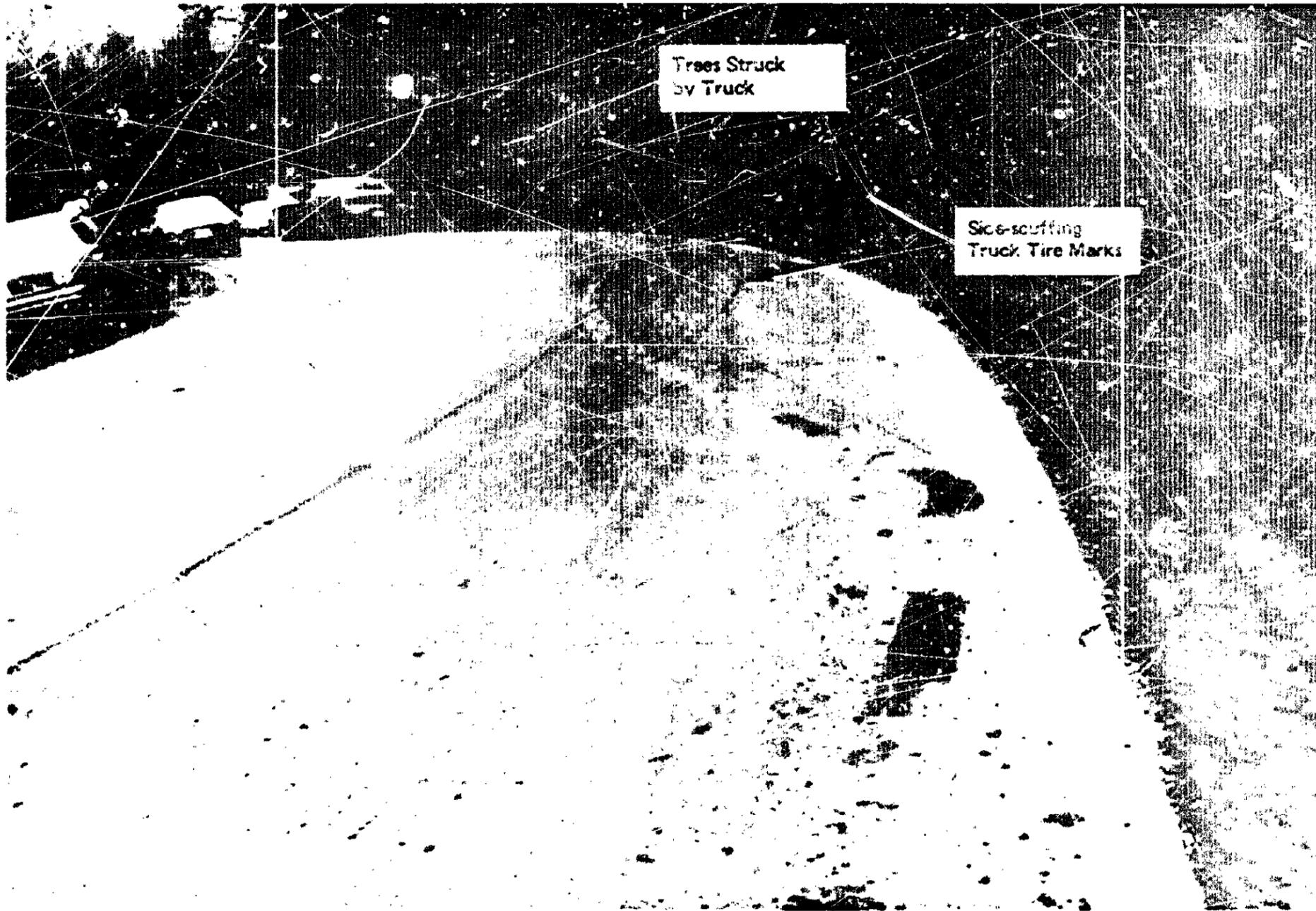


Figure 4. Accident Curve. Note condition of pavement lines, tire marks from truck, and trees struck by truck.

these reports was 24 years and the median age was 19 years. From 1974 to 1978, there was one other fatal accident on Patuxent Road; a motorcyclist lost control on another curve.

The Anne Arundel County Police Department has a selective enforcement program under Federal sponsorship whereby high accident locations and areas are given special and increased enforcement attention to reduce the type of traffic law violations that lead to accidents. Patuxent Road was not among the 20 highest locations or areas that could be funded for increased enforcement attention.

Meteorological Information

There was no precipitation, the sky was cloudy with southwesterly winds of 5 to 10 mph, and the temperature was about 65°F.

Tests and Research

The driver consented to a blood test about 5 hours after the accident. His blood alcohol level was 0.06 gram-percent. Research indicates that alcohol is eliminated from the blood at a constant rate of 0.015 gram-percent per hour for all persons regardless of their body weight or food consumed. ^{5/} With no opportunity to drink after the accident and with a continuous long-term pattern of drinking before leaving the bowling alley, the level of alcohol in the driver's blood could have been as high as 0.135 percent at the time of the accident (0.06 gram-percent at time of testing + (5 hours x 0.015 gram-percent loss of alcohol per hour) = 0.135 percent at time of accident).

The National Highway Traffic Safety Administration's Highway Safety Program Standard No. 8, Alcohol in Relation to Highway Safety, defines a driver as "intoxicated" or "under the influence of alcohol" when he exhibits blood alcohol concentrations at or higher than 0.10 percent by weight. ^{6/} Section 10-307 of the Maryland Vehicle Law states that if there is 0.10 percent by weight of alcohol at the time of testing, it shall be prima facie evidence that the defendant's driving ability was "impaired" by the consumption of alcohol. Maryland and New Jersey are the only remaining States where a blood alcohol level of 0.15 percent must be attained at the time of testing for a defendant to be considered "intoxicated." ^{7/} This information concerning the effects of alcohol and the witness statements concerning the driver's condition at the bowling alley indicate that the driver probably did have a level of alcohol at or near 0.135 gram-percent, as projected from the blood test results. In order to achieve a blood alcohol level of 0.135 percent, the driver had to consume at least seven 12-ounce bottles of beer or seven 1 oz shots of 80-proof alcohol within a time period of about 1 hour. ^{8/} Since he had been drinking over a longer time period, even more alcohol would have been consumed to achieve that level.

^{5/} "What the Body Does With Alcohol" by Leon L. Greenberg, Rutgers Center of Alcohol Studies.

^{6/} "Highway Safety Program Standard No. 8, Alcohol in Relation to Highway Safety," U.S. Department of Transportation, National Highway Traffic Safety Administration, October 1, 1973.

^{7/} "Traffic Laws Annotated," National Committee on Uniform Traffic Laws and Ordinances, 1977.

^{8/} "Drugs, Society and Human Behavior" by R. Oakley, C. V. Mosby Co., 1978.

No blood tests were conducted for marijuana. However, the witnesses' statements were considered sufficient proof that the driver was smoking an appreciable amount of marijuana on the day of the accident.

At the Safety Board's request, the Maryland Department of Transportation performed locked-wheel skid trailer and ball bank indicator tests at the accident site. Additional ball bank tests were performed by Safety Board investigators.

The skid trailer measures the sliding frictional coefficient developed between the pavement and a standard test tire that is sliding in the direction of travel of the trailer. Frictional coefficients of 0.10 to 0.15 are typical for ice-covered surfaces while values of 0.80 to 1.00 are typical for clear, dry, rough-textured surfaces, optimum operating conditions. Frictional coefficients ranging from 0.79 to 0.96 were obtained on the dry pavement for the seven tests conducted on the outside wheel path of southbound traffic at the accident site; these figures indicate that the road surface had appropriate dry frictional qualities.

Ball bank tests indicate the amount of side force on a vehicle and driver as the vehicle is maneuvered around a turn or curve in the road. As the speed of a particular turning maneuver increases, the amount of side force increases; therefore, drivers usually conduct maneuvers at speeds that will not produce uncomfortable side forces. The ball bank display allows the tester to know if the maneuver he is performing is at a speed that is considered comfortable to most drivers. According to the ball bank tests taken at the accident site, about 30 mph would be an appropriate speed for negotiating the curve.

ANALYSIS

The Driver's Statement and Truck Speed Estimate

The scuff marks left by the truck tires started near the beginning of the accident curve and indicated that the truck was in a continuous left-turning maneuver until it traveled off the right side of the road. There was no physical evidence on the road to indicate that the driver had swerved to the right to avoid another vehicle. Such a swerving maneuver would have to have been made before the tire marks began for the left-turning maneuver. And, since the left-turning tire marks began with the left wheels of the truck on the road centerline, the truck would have to have been on the wrong side of the road to maneuver first to the right to avoid an oncoming vehicle as the driver claimed. The driver of the truck then would have been at least a contributor to the accident even by his own story. However, given the witness statement and the tire marks that only indicated that the truck was attempting to negotiate the curve, it is highly unlikely that another vehicle was involved in the accident.

The type of scuff marks left by the truck tires can be produced in two ways. One, a driver can attempt a turning maneuver at a speed higher than that at which the maneuver can be made by a normally loaded and properly maintained vehicle. During this type of turning maneuver, the maximum available lateral frictional force between the tires and the pavement is exceeded by the centrifugal force exerted on the vehicle, which causes the vehicle to slide sideways and scuff the pavement. Two, a driver can attempt a turning maneuver and produce the

marks at a lower speed if the vehicle is severely overloaded, improperly loaded, has excessively low tire pressure(s), or has a "soft"^{9/} suspension system. However, there was no indication that the truck involved in this accident had any significant loading, tire pressure, or suspension problems.

Although the truck was overloaded by 355 pounds, the overload was only 8.8 percent over recommended capacity and was relatively well balanced over the front and rear axles. (See Table 1.) In fact, the front/rear weight distribution for the truck (40%/60%) was better for handling purposes than the weight distribution recommended for the truck loaded to capacity. The rear tires had underinflated cold tire pressures for the rear axle loading. ($2,660/2 = 1,330$ pounds versus 1,234 pounds at 37 psi). However, the tires were not considered to be underinflated enough to permit the lower speed generation of side-scuff marks as described above [$(1,330 - 1,234) / 1,330 = 7.2$ percent]. The truck was relatively new, it was equipped with a standard suspension system designed to accommodate maximum cargo capacity, and it had no mechanical problems in the suspension system. Therefore, the suspension probably did not affect the sequence of events leading to the accident.

In light pickups, cornering stability is usually maintained by varying the inflation pressures between the front and rear tires as the amount of cargo weight varies. (See Table 1.) The tire pressures on the accident vehicle were not varied as recommended for the loads on the front and rear axles. However, the scuff marks left by the truck tires were not the type that would have been made by a vehicle that was experiencing significant handling problems from improperly varied tire pressures. Therefore, the Safety Board concludes that the truck did not experience any significant loading, tire pressure, or suspension problems and that the scuff marks were produced when the driver attempted a turning maneuver at a higher speed than that at which the maneuver normally could be made.

Using data on the path of the scuff marks and the maximum available friction between the tires and the pavement, the speed of the truck was calculated. The skid trailer tests established the maximum available friction between a standard test tire and the pavement, and tests performed during previous research^{10/} were used to translate these frictional values to values for the truck tire. Frictional values at the accident site ranged from 0.79 to 0.96 on dry pavement. The research tests were conducted on a surface that produced a test tire-to-pavement frictional value of 0.81, which was similar to the lowest value measured at the accident site. The lowest frictional value for any of the 14-inch tires tested during research was 0.63. Using this value for the maximum available friction between the truck tires and the pavement, the speed of the truck was calculated to be 64 mph. Using a frictional value of 0.96, the speed of the truck was calculated to be 78 mph. Truck passenger statements support these high speed calculations which further reinforce the Safety Board's conclusion that the scuff marks were produced when the driver attempted the turning maneuver at too high a speed.

^{9/} A "soft" suspension system is one designed for minimum load capacity.

^{10/} "Tire - Pavement Interface Variability, Volume II - Technical Report," 1977, DOT HS-802 554.

The Driver

During his short driving experience, the pickup driver had demonstrated a lack of adherence to safe driving principles. He was described by some witnesses as a reckless driver who drove at high speeds and while under the influence of alcohol and drugs. On the night before and the day of the accident, he had been drinking alcohol and smoking marijuana. Blood tests and witnesses' statements indicated that the driver was under the influence of alcohol at the time of the accident. Although the Safety Board did not determine what level of usage and what effect the marijuana had on his behavior, it is known that high risk-taking behavior is frequently associated with both alcohol and marijuana intake.^{11/} The driver also demonstrated a lack of adherence to safe driving principles by permitting the cab area of the truck to be overcrowded and the truck to carry more persons than could be protected in the event of a crash. Additionally, since he had no insurance, his truck should not have been operating on the highway.

Witnesses' statements indicate that the driver had been traveling at high, reckless speeds even before reaching the curve and even though he was familiar with the winding character and low speed limits on the road. The driver approached the curve at more than twice the normal appropriate speed for negotiating the curve and at more than twice the posted speed limit. The driver was driving on the edge of controllability while taking very high risk, and these actions caused the accident.

National statistics indicate that young drivers are overrepresented in traffic accidents, traffic violations, and motor-vehicle related deaths. For example, although drivers under age 20 constitute only 10.2 percent of the driving population, they are involved in 16.4 percent of all fatal accidents and 17.8 percent of all accidents. Over the last 20 years, the higher death and accident rates for these young drivers have been steadily increasing. Traffic safety experts generally attribute the problems of young drivers to "driving inexperience and lack of adequate driving skills; excessive driving during high-risk and alcohol-prone night hours; risk-taking, dare-devil, and immature personalities; and poor driving judgment and decision-making."^{12/}

More than 3,500 persons died last year in highway accidents involving a drinking teenaged driver.^{13/} According to a profile established by the U.S. Department of Transportation ^{14/} the typical accident happens on a Friday or Saturday night, involves a vehicle carrying three or more persons, involves a combination of speed and alcohol, happens within an hour after the participants

^{11/} "Drugs, Society and Human Behavior" by R. Oakley, C. V. Mosby Co. 1978.

^{12/} "Model for Provisional (Graduated) Licensing of Young Novice Drivers," 1977, by Teknekron Inc. for the National Highway Traffic Safety Administration, DOT HS-802 313.

^{13/} Data from the National Highway Traffic Safety Administration's Fatal Accident Reporting System for 1978.

^{14/} "Safety Statistics" Arizona Governor's Office of Highway Safety, Volume 5, Number 1, Spring, 1979.

have been drinking heavily or moderately, and happens within 10 miles of the driver's home. This accident and other recent accidents investigated by the Safety Board ^{15/} and involving multiple fatalities and teenaged drivers display many of the characteristics described by this profile.^{16/} The U.S. Department of Transportation and U.S. Department of Health, Education and Welfare, along with the many State and local Government agencies, have on-going programs that are trying to combat the general drinking driver problem.

Two new major efforts are underway to combat the teenage accident problem in general and the drinking teenaged driver problem in particular. Several States that had recently lowered drinking age limits began to experience higher teenaged driver accident rates. As a result, these States and other States with lower drinking age limits are now considering adoption or have adopted legislation to raise these limits.^{17/} Attempts have been made to introduce bills to raise the drinking age in Maryland, but these bills have been tabled in committee.

Another current effort involves the use of probationary licenses for newly licensed, young drivers. In 1971 and 1976,^{18/} the Safety Board recommended that the National Highway Traffic Safety Administration (NHTSA) establish model guidelines for a probationary license system; the NHTSA published these guidelines in 1977.^{19/} Maryland was the first state to adopt a probationary license system after these guidelines were published, and the system was implemented in 1979. Under the probationary license concept, potential problem drivers are identified, counseled, given additional training, and issued restricted driving privileges until they demonstrate a period of violation- and accident-free driving. Because of his earlier speeding violation and possibly the earlier accident he was involved in, the driver involved in this accident would have been identified as a potential problem driver under the probationary license system. In spite of his record, the probationary licensing system may have had some chance of altering this driver's attitudes and behavior. Unfortunately, the driver was already licensed and therefore exempt from the system.

^{15/} "Automobile Run-Off-Roadway and Submergence, Lock Mills, Maine, June 2, 1979." (IAD79PH015.)

^{16/} "Multiple Vehicle Median Barrier Crossover and Collision, Grand Central Parkway, New York City, New York, June 8, 1979." (DCA 79AH004.)

^{17/} States that have recently raised the drinking age include Iowa, Minnesota, Montana, Tennessee, Maine, Massachusetts, New Hampshire and Michigan. Thirteen states have proposals pending in the state legislature.

^{18/} National Transportation Safety Board Special Study, "Youth and Traffic Safety Education," July 1, 1971 (NTSB-STS-71-3); "Railroad/Highway Accident Report -- Southern Pacific Transportation Company Freight Train/Automobile Grade Crossing Collision, Tracy, California, March 9, 1975" (NTSB-RHR-76-1).

^{19/} "Model for Provisional (Graduated) Licensing of Young Novice Drivers," 1977, by Teknekron Inc. for the National Highway Traffic Safety Administration, DOT HS-802 313.

Accident Severity Reduction

In order to permit some reasonable chance for surviving a collision, impact speeds and striking attitudes must be limited, the object struck must be made as forgiving as possible, and occupants must be properly seated and must wear seat and shoulder belts. The U.S., State and County Departments of Transportation have programs to make the roadside environment as forgiving as possible by clearing the roadside of trees, poles, and other hazards or by installing guardrail or similar devices that prevent direct contact with these fixed objects. However, since the truck was already beginning to overturn before it hit the trees and its speed was so great, a clear roadside area or conventional guardrail system probably would not have guaranteed a less severe accident.

Impact speed was so great that even if occupants had been wearing lap and shoulder belts, they would have had little or no chance of surviving the collision. The driver probably survived the collision because (1) he was laterally farther away from direct contact with the trees; (2) he was not ejected from the cab; and (3) other passengers cushioned him from the interior of the vehicle. Passengers in the bed or rear of the truck had even less of a chance of surviving any type of high-speed collision because they had no belts available to use and had little or no protective shell to prevent passenger ejection or outside object intrusion. Data obtained from the NHTSA Fatal Accident Reporting System indicated that from 1975 to 1978, an average of about 4,200 persons per year were killed annually in pickup trucks.^{20/} Of these, about 250 persons per year were riding in the bed of the pickup. After excluding fatal accidents in which only a driver was involved, 34 percent of the passengers riding in the beds of pickups were killed, while 28 percent of the drivers and passengers in the cab were killed. This accident reinforced these statistics. Those States with more than 25 fatalities in the bed of pickup trucks over this 4-year period included:

<u>State</u>	<u>Fatalities</u>
Arizona	49
California	131
Florida	63
Michigan	23
New Mexico	37
North Carolina	18
Texas	112

No State is known to have laws that prohibit riding in the bed of a pickup truck. The National Committee on Uniform Traffic Laws and Ordinances (NCUTLO), whose function is to establish uniform traffic laws for the States and local communities, considered but did not adopt a model law that would have prohibited riding in any area of any vehicle where passenger seats and belts were not provided. The law was not adopted primarily because passengers could not occupy a standard seat in some work-related vehicles and the law could not be readily enforced for vans, campers, and other enclosed vehicles. However, the Safety Board believes that at least a law should be drafted specifically to open-cargo area vehicles being used for nonwork-related purposes.

^{20/} Includes all pickup trucks including those with campers, stake, and small dump bodies.

CONCLUSIONS

Findings

1. Witnesses reported seeing the driver drink alcoholic beverages and smoke marijuana on the day of the accident and up to the time the truck left for the accident scene.
2. The teenaged driver had a reputation for high-speed reckless driving and driving while under the influence of alcohol and drugs.
3. According to blood tests, the driver could have had a blood alcohol level as high as 0.135 percent by weight, which is equivalent to drinking at least seven 12 oz bottles of beer and which is above the nationally recommended limit of 0.10 percent by weight, at which a person is considered to be intoxicated.
4. Locked-wheel skid trailer tests indicated that the pavement surface had dry-road frictional coefficient values of 0.79 to 0.96, indicating that the pavement had appropriate dry frictional qualities.
5. According to ball bank indicator tests, about 30 mph was an appropriate, comfortable speed for negotiating the curve where the accident occurred.
6. Calculations based on the truck's tire marks before it left the road indicated that the truck was traveling between 64 to 78 mph as it attempted to negotiate the curve where the accident occurred.
7. Witnesses' statements and physical evidence indicated that it was highly unlikely that another vehicle was involved in the accident.
8. The pickup truck's right rear tire had 10 psi of air pressure on the day after the accident, but this low pressure probably was caused after the truck ran off the pavement. All tires on the truck probably had 37 psi of air pressure just before the accident.
9. The truck was overloaded and did not have recommended tire pressures for the load it was carrying. The truck did not experience any significant loading, tire pressure, or suspension problems that would have affected the driver's ability to maneuver the vehicle through the curve.
10. The driver was driving on the edge of controllability while taking very high risks.
11. The truck's shoulder/lapbelts appeared to have been purposely lodged behind the seat cushions and were, therefore, not in use at the time of the accident.
12. The driver permitted the cab area of the truck to be overcrowded and the truck to carry more persons than could be protected in a crash.

13. The driver probably survived the collision because: (1) He was laterally farther away from direct contact with the trees; (2) he was not ejected from the cab; and (3) other passengers cushioned him from the interior of the vehicle.
14. Laws to raise the drinking age and probationary licenses for new young drivers are the two new major efforts underway to combat the drinking teenaged driver accident problem.
15. Laws specifically directed to prohibiting passengers from riding in open-cargo areas of vehicles that are not being used for work-related purposes can potentially reduce fatalities in accidents involving these vehicles.

Probable Cause

The National Transportation Safety Board determines that the probable cause of this accident was high speed, reckless driving of a vehicle by a driver who was under the influence of alcohol and marijuana. Contributing to the severe consequences of the accident was the presence of passengers in the open bed of the pickup truck, an area that offered no crash protection.

RECOMMENDATIONS

As a result of its investigation of this accident, the National Transportation Safety Board recommended:

— to the National Committee on Uniform Traffic Laws and Ordinances:

"Establish model guidelines for prohibiting passengers from riding in open-cargo areas of vehicles that are not being used for work-related purposes." (Class II, Priority Action) (H-79-40.)

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

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September 6, 1979