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Safety Study - Passenger/Commuter Train and Motor Vehicle Collisions at Grade Crossings (1985)

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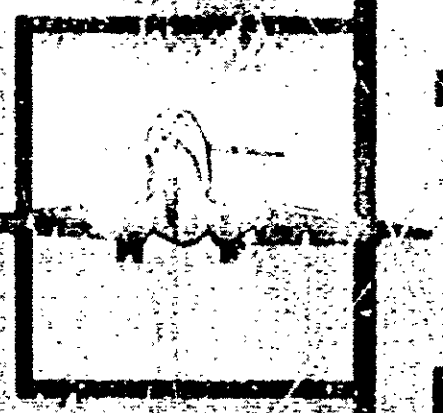

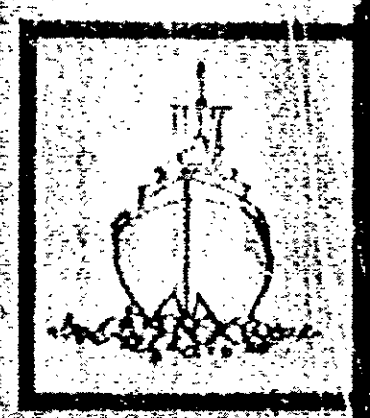

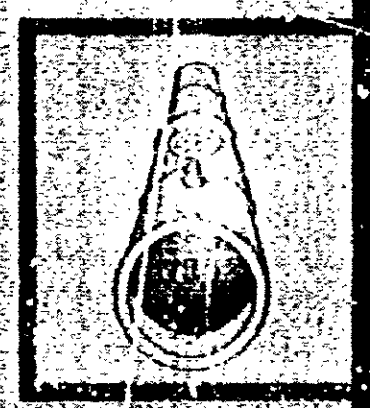

# NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D.C. 20594

## SAFETY STUDY

## PASSENGER/COMMUTER TRAIN AND MOTOR VEHICLE COLLISIONS AT GRADE CROSSINGS (1985)

NTSB/SS-86/04

UNITED STATES GOVERNMENT

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16. Abstract

The National Transportation Safety Board has had a longstanding objective to improve safety at railroad/highway grade crossings. In calendar year 1985, the Safety Board investigated 75 accidents involving passenger/commuter trains to determine safety issues that could be successfully addressed by Federal agencies, States, and other organizations responsible for the public's safety. As a result of a safety study based on these 75 accidents, the Safety Board remains concerned that the public (motor vehicle occupants and passengers on trains) and railroad employees are placed in life-threatening situations on a daily basis at grade crossing locations, where the Safety Board believes safety improvements can be accomplished.

| | | | |
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## EXECUTIVE SUMMARY

In 1984, several major grade crossing accidents involving schoolbuses, heavy trucks, and hazardous materials trucks with passenger trains led the National Transportation Safety Board to undertake an accident investigation program to provide some direction for further safety gains. Railroad data reported to the FRA for calendar years 1978 through 1985 indicated that progress made by Federal, State, and local agencies, by railroads, and by public and private safety organizations had substantially reduced the loss of life by 44 percent and injuries by 38 percent from these accidents. Accidents also were reduced by 44 percent during this period. Unfortunately, in 1984, the absolute number of accidents, fatalities, and injuries occurring at grade crossings increased by 2.1 percent, by 12.3 percent, and by 10.0 percent respectively over calendar year 1983, prompting concern among the safety community.

The rise of accidents, fatalities, and injuries in calendar year 1984, focused attention on the grade crossing safety issue. The Safety Board undertook a special accident investigation program in calendar year 1985, to look at passenger/commuter train and motor vehicle collisions at grade crossings. This study addresses the results of the Safety Board's investigations into 75 passenger/commuter train and motor vehicle collisions at grade crossings.

The safety issues discussed in this report are listed below:

- Grade crossings characteristics, including roadway approach design, angle of intersection, multiple tracks, elevated surface profile, and masked flashing lights and sunglare.
- Drivers' behavior, including disregard for warning devices, inattentiveness or distraction, and failure to understand train characteristics, especially speed.
- Obstructions, both movable and immovable, limiting the driver's sight distance.
- Ineffectiveness of a train's audible warning system.
- Alcohol use by motor vehicle drivers.
- Routing of vehicles, particularly heavy trucks, away from grade crossings that do not have active warning devices to crossings that do have such devices or to crossings with better crossing characteristics.
- Inadequacy of warning time for multiple-trailer units.
- Signal controls unprotected from damage by vehicular traffic.
- Additional warning signs at identified hazardous crossings awaiting the installation of active warning device(s).

Recommendations were issued to the Federal Railroad Administration, the Federal Highway Administration, Operation Lifesaver, Incorporated, and the Governors of States with rail passenger/commuter service.

The recommendations focused on the following safety concerns:

- The need to maintain sight distances at grade crossings.
- The need to reexamine the Federal standards applicable to trains' audible warning systems.
- The possible adoption of highway traffic signals as primary warning devices.
- The need for roadside barrier protection of grade crossing signal control systems.
- The need to develop and require a public toll-free system in each State to report problems of active warning devices operating in the absence of a train nearing the crossing.
- The need for advance warning signs that warn of limited sight distance, high hump profile surface, and hazardous crossings.
- The need for additional safety bulletins to motor carriers on the ineffectiveness of trains' audible warning systems and for multiple trailing units to use routes with grade separations.
- The need to include grade crossing safety in the truck size and weight national network guidelines.
- The need to expand the voluntary "Operation Lifesaver" program to include projects that reduce obstructions to sight distance and that warn the public that train's audible warning systems cannot be relied on to warn of an approaching train.
- The need for States' grade crossing safety programs to give a high priority for installation of active warning devices to public crossings used by passenger or commuter trains.

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C. 20594

SAFETY STUDY

Adopted: December 12, 1986

# PASSENGER/COMMUTER TRAIN AND MOTOR VEHICLE COLLISIONS AT GRADE CROSSINGS (1985)

## INTRODUCTION

During the last five years, the number of collisions between trains and motor vehicles at grade crossings has averaged 7,350 annually. These collisions produce the largest single group of fatalities and injuries from railroad operations -- an average of 580 fatalities and 2,700 injuries a year. (See table 1.)

From 1976 to 1984, the Safety Board investigated, on the average, about 18 grade crossing accidents annually. Generally, accidents investigated were catastrophic, often involving the collision of trains with schoolbuses, heavy trucks, or specialty trucks, such as those carrying hazardous materials. (See figure 1.) As a result of these accident investigations, the Board issued more than 100 safety recommendations to Federal and State agencies, railroads, and safety-related organizations, urging both general and site-specific grade crossing safety improvements. Although most of the improvements outlined in the Safety Board's safety recommendations have been implemented by the various recipients of the recommendations, a number of these issues have yet to be adequately addressed. (See appendix A.)

By the end of calendar year 1984, several major grade crossing accidents reported in an earlier Safety Board Review, 1/ involving schoolbuses, heavy trucks, and hazardous materials trucks with passenger trains, led the Safety Board to undertake an accident investigation program specifically tailored to grade crossing collisions that could provide some direction for further safety gains. Railroad data reported to the FRA for calendar years 1978 through 1985 (see table 1) indicated that progress made by Federal, State, and local agencies, by railroads, and by public and private safety organizations had substantially reduced the loss of life by 44 percent and injuries by 38 percent from these accidents. Accidents also were reduced 44 percent during this period. Unfortunately, in 1984, the absolute number of accidents, fatalities, and injuries occurring at grade crossings increased by 2.1 percent, by 12.3 percent, and by 10.0 percent over calendar year 1983 respectively, prompting concern among the safety community. (See appendix B for a brief summary of National Grade Crossing Safety Programs and information provided by the National Railroad Passenger Corporation (Amtrak) on its program.)

1/ See NTSB Safety Study—"Railroad/Highway Grade Crossing Review-Calendar Years 1983 and 1984" (NTSB/SS-85/05), September 30 1985.

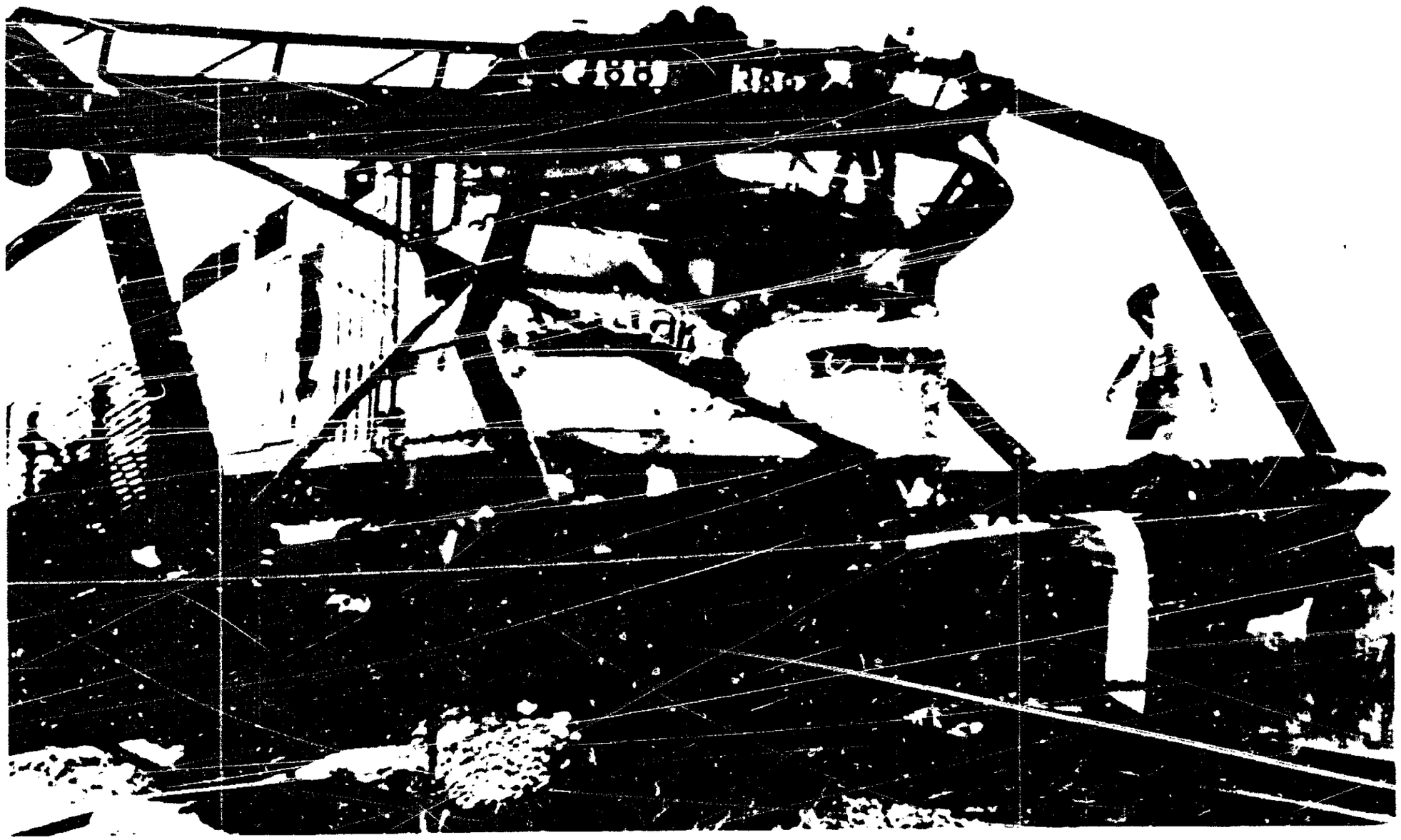

Figure 1.—Photograph of typical train/vehicle collision.
Location: Plant City, Florida.

Table 1.—Railroad/highway grade crossing accidents involving a motor vehicle 2/

| Year | Accidents | Fatalities | Injuries |
|---|---|---|---|
| 1978 | 11,999 | 929 | 4,120 |
| 1979 | 11,108 | 727 | 4,019 |
| 1980 | 9,422 | 708 | 3,534 |
| 1981 | 8,936 | 650 | 3,187 |
| 1982 | 7,427 | 645 | 2,534 |
| 1983 | 6,834 | 512 | 2,518 |
| 1984 | 6,975 | 575 | 2,771 |
| 1985 | 6,616 | 515 | 2,557 |

The rise of accidents, fatalities, and injuries in calendar year 1984, focused attention on the grade crossing safety issue. The Safety Board undertook a special accident investigation program in calendar year 1985, to look at passenger/commuter train and motor vehicle collisions at grade crossings. 3/ Passenger/commuter train and motor vehicle collisions were selected by the Board for this special accident investigation program primarily because the passenger loads on these trains elevated the risk exposure to the traveling public at these locations. The passenger/commuter railroads reported 161 accidents to the Safety Board in calendar year 1985, and the Board investigated 75 of the reported accidents. (Appendix C summarizes these 75 accidents.) With the assistance of Amtrak and the commuter railroads, a notification system was developed to allow the Safety Board's accident investigators to reach the site as soon after the collision as possible. Since the Safety Board did not have sufficient resources to investigate all 161 accidents reported, the Safety Board decided to select primarily those accidents which involved fatalities and/or serious injuries. Furthermore, the Board chose not to investigate any accident in which suicide or insurance fraud was suspected by local law enforcement officials or accidents in very remote locations which did not permit timely response to the accident site. Eventually, the Safety Board investigated a total of 75 accidents which included 42 of 45 fatalities and 75 of 83 injuries reported. Fortunately, in 1985, of the 75 accidents investigated by the Safety Board and reported in this study, only a few train passengers were injured, most in one accident (13 minor injuries to passengers) and one other had one serious injury and 10 minor injuries to passengers. The investigation highlights (appendix D) include some general information about these accidents.

In all of the accidents the Board determined those factors which either caused the accident or which contributed to the accidents. Table 2 summarizes the probable cause and contributing factors to the accidents. Appendix C provides the complete probable cause statements.

2/ Source: Federal Railroad Administration, "Rail-Highway Grade Crossing Accident/Incident and Inventory Bulletins, Nos. 1-7, Calendar Years 1978 through 1984," and FRA release of 1985 data at the Association of American Railroads Grade Crossing Workshop, April 7, 1986, Nashville, Tennessee.

3/ The Safety Board investigated selected grade crossing accidents that involved fatalities, injuries, or property damage. These samples of accidents do not necessarily represent all crossing accidents but are sufficient to identify major safety issues.

**Table 2.—Summary of probable causes and contributing factors of 75 grade crossing accidents.**

| Case Number | Probable Cause | | | | | | | Contributing Factors | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Driver Behavior | Visibility (Sight Distance) | Audibility (Train Warning System) | Crossing Characteristics | Alcohol Involvement (BAC) | Routing | Other | Driver Behavior | Visibility (Sight Distance) | Audibility (Train Warning System) | Crossing Characteristics | Alcohol Involvement | Routing | Other |
| 1 | ✓ | | | | | | | | | ✓ | | | | |
| 2 | | | | | | | Snow | | | | | | | [illegible] |
| 3 | | | ✓ | | | | Fog | | | | | | | |
| 4 | ✓ | | | ✓ | | | | | | | | | | |
| 5 | ✓ | ✓ | ✓ | ✓ | | | | | | | | | | |
| 6 | ✓ | | | | | | | | ✓ | ✓ | | | | [illegible] |
| 7 | ✓ | | | | | | | | | | | | | |
| 8 | ✓ | | ✓ | ✓ | | | | | | | | | | [illegible] |
| 9 | ✓ | ✓ | ✓ | ✓ | | | | | | | | | | |
| 10 | | | | | 0.175% | | | | | | | | | |
| 11 | | | | | | | Snow | | | ✓ | | | | |
| 12 | ✓ | | | | | | | | | ✓ | | | | |
| 13 | ✓ | | | | | | | | | | | | | [illegible] |
| 14 | ✓ | | | | | | | | ✓ | | | | | |
| 15 | ✓ | | | | | | | | | | | | | |
| 16 | ✓ | | | | | | | | | | | | | |
| 17 | ✓ | | | | | | | | | ✓ | | | | |
| 18 | ✓ | | | | | | | | ✓ | ✓ | ✓ | | | |
| 19 | ✓ | | | | | | | | ✓ | ✓ | ✓ | | | |
| 20 | ✓ | | | | | | | | ✓ | ✓ | | | | |
| 21 | | | | ✓ | | | | | | ✓ | | | | |
| 22 | ✓ | | | | | | | | | | | | | |
| 23 | ✓ | | | | | | | | | ✓ | | | | |
| 24 | ✓ | | | | | | | | | ✓ | | | ✓ | |
| 25 | | | | ✓ | 0.195% | | | ✓ | | | | | | |
| 26 | | | | | 0.17% | | | ✓ | | | ✓ | | | |
| 27 | | | | | 0.17% | | | | | | | | | |
| 28 | | ✓ | ✓ | ✓ | | | | | | | | | | |
| 29 | | | | | 0.04% | | | | | | | | | |
| 30 | ✓ | | | | | | | | | ✓ | | | | |
| 31 | ✓ | | | ✓ | | | | | | | | | | |
| 32 | ✓ | ✓ | ✓ | ✓ | | | | | | | | | | |
| 33 | ✓ | | | | | | | | | ✓ | | | | |
| 34 | | ✓ | | | | | Rules | | | | | | | [illegible] |
| 35 | ✓ | | | ✓ | | | | | | | | | | |
| 36 | | | | | | | [illegible] | | | | ✓ | | | [illegible] |
| 37 | ✓ | ✓ | ✓ | | | | | | | | | | | |
| 38 | ✓ | | | | | | | | | | | | | |

(Continued)

Table 2.—(continued)

| Case Number | Probable Cause: Driver Behavior | Visibility (Sight Distance) | Audibility (Train Warning System) | Crossing Characteristics | Alcohol Involvement (BAC) | Routing | Other | Contributing Factors: Driver Behavior | Visibility (Sight Distance) | Audibility (Train Warning System) | Crossing Characteristics | Alcohol Involvement | Routing | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 39 | ✓ | | | | | | | | | | | | | |
| 40 | | ✓ | | ✓ | 0.25% | | | | | | | | | |
| 41 | ✓ | ✓ | | | | | | | | | | | | |
| 42 | | | | | | | | | | | | | | |
| 43 | ✓ | | | | | | | | ✓ | | | | | |
| 44 | ✓ | | | | | | | | | | | | | |
| 45 | ✓ | | | | | | | | ✓ | | | | | |
| 46 | ✓ | ✓ | | | | | | | | | | | | |
| 47 | | ✓ | | ✓ | | | | | | | | | | |
| 48 | | | | | 0.25% | | | | | | | | | |
| 49 | ✓ | | | | | | | | | | | | | |
| 50 | ✓ | ✓ | ✓ | | | | | | | | | | | |
| 51 | | ✓ | ✓ | | | | | | | | | | | |
| 52 | ✓ | | | ✓ | | ✓ | | | | | | | | |
| 53 | ✓ | | | | | | | | | | | | | |
| 54 | | | | | 0.34% | | | | | | | | | |
| 55 | ✓ | | | | | | | | | | ✓ | | | |
| 56 | ✓ | | | | | | | | | | ✓ | | | |
| 57 | ✓ | | | | | | | | | ✓ | | | | |
| 58 | ✓ | | ✓ | ✓ | | | | | | | | | | |
| 59 | ✓ | ✓ | ✓ | ✓ | | ✓ | | | | | | | | |
| 60 | ✓ | | | | | | | | | | | | | |
| 61 | ✓ | | | | | | | | | | ✓ | | ✓ | |
| 62 | ✓ | | | | | | | | | | | | | |
| 63 | ✓ | | | | | | | | | | ✓ | | ✓ | |
| 64 | ✓ | ✓ | | | | | | | | | | | | |
| 65 | ✓ | | | | | | | | | | | | | |
| 66 | ✓ | ✓ | | | | | | | | | | | | |
| 67 | | ✓ | | | 0.11% | | | | | | | | | |
| 68 | ✓ | | | | | | | | | | | | | |
| 69 | | | | | 0.07% | | | | | | | | | |
| 70 | | | | | | | | | | | ✓ | | | |
| 71 | | | | | 0.11% | | | | | | | | | |
| 72 | ✓ | | | | | | | | | ✓ | | | ✓ | |
| 73 | ✓ | | | | | | | | ✓ | | ✓ | | | |
| 74 | ✓ | | | | | | | | | ✓ | | | | |
| 75 | | | | | | | | | | | | | | |
| Totals: | 52 | 16 | 11 | 15 | 11 | 2 | 8 | 2 | 8 | 16 | 10 | – | , | 9 |

The safety issues to be addressed in the study are as follows:

- o Drivers' Behavior--In many accidents, the motor vehicle drivers disregarded warning devices, were inattentive, or took other improper actions that led to their driving over crossings in front of trains; in some cases drivers were influenced by their lack of understanding of train characteristics or they were inattentive to safety warnings. (Alcohol involvement cases are listed separately.)

- o Alcohol/Drug Involvement--In 11 of the accidents investigated, the use of alcohol by motor vehicle operators was confirmed by toxicological tests.

- o Grade Crossing Characteristics--Design characteristics were factors in a number of accidents. The Safety Board focused on roadway approach design, angle of intersection, multiple tracks, elevated surface profile, and masked flashing lights and sunglare.

- o Visibility--In a number of cases, it was determined that motor vehicle drivers had difficulty crossing safely because obstructions (vegetation, fixed structures, standing/stored railroad cars, terrain, or track curvature) limited the driver's sight distance and, therefore, limited the visibility of the train.

- o Audible Warning Systems--In many cases, the train's audible warning system was ineffective because of high ambient noise levels within the motor vehicle caused by the use of heaters, air conditioners, or sound systems such as radios or tape decks, or because of noise levels caused by motor vehicle engines.

- o Routing--Six accidents were investigated in which the safe routing of heavy trucks was a factor. The routing of motor vehicles, particularly heavy trucks, over grade crossings that do not have active warning devices continues to be a major safety problem. Accidents with high speed passenger trains compound the number of people who may be involved in collisions at these grade crossing locations.

- o Priority Crossings--In 12 of the accidents investigated, the grade crossings were identified as hazardous crossings by the States. These crossings were awaiting an upgrade to an active warning devices(s); however, no additional actions were taken to warn motorists of the hazards at these crossings while the crossing awaited the upgrade to an active warning device(s).

- o Flashing Red Lights or Steady Red Lights--Twenty-four accidents investigated in this study occurred at grade crossings with flashing red lights.

- o Adequacy of Warning Time for "Double Bottom" or Multiple Trailer Units--This safety concern addresses the adequacy of the warning time at grade crossings for the long heavy trucks now with multiple trailing units.

- Signal Controls Unprotected from Damage by Vehicular Traffic--This safety concern addresses grade crossing locations where grade crossing signal control systems can be severely damaged by motor vehicle intrusion.

## DRIVERS' BEHAVIOR

In the accidents investigated for this study, 85 percent of the motor vehicle drivers were familiar with the grade crossing. Weather was not a factor in most of the accidents; approximately 72 percent of the accidents occurred in clear or only cloudy weather. Most of the accidents (92 percent) occurred when persons were traveling to or from work, shopping, or school. Only 12 percent of the accidents occurred at night.

In many of the 75 accidents, 4/ the driver of the motor vehicle disregarded active warning devices, was inattentive or distracted, or took other improper actions that led to driving over a crossing in front of a train or in some cases striking the side of the train.

Several cases illustrate the Safety Board's concern about driving behavior. For example, on January 27, 1985, at 10:18 a.m., a pickup truck with a driver and one passenger struck the side of the lead locomotive unit of southbound Amtrak passenger train No. 59 at County Road No. 407, Winona, Mississippi (Case 12). The train was traveling about 40 mph (59 ft/sec); the pickup driver said he was traveling about 40 to 45 mph (59 to 66 ft/sec). The driver and passenger were not injured. The train did not derail and none of the train crew or passengers were injured. There were an advance warning sign 458 feet before the grade crossing, painted pavement markings 300 feet before the crossing, and a painted crossbar on the pavement 20 feet before the crossing. At trackside there were flashing warning lights, audible signals, and crossbucks. The flashing light circuitry was set to give a motorist 30 seconds of warning time. Witnesses said the signal system was working. The driver said he did not see or hear the northbound train until very near the crossing, at which time he applied the brakes and took evasive action by turning sharply to the south parallel to and in the same direction as the train was traveling. This action may have saved the driver and his passenger from serious injury; the motor vehicle struck the train at an angle, and it was shoved away from the train after initial impact.

On February 6, 1985, a motorist drove around two stopped automobiles and the already lowered gate arms at the Canal Road grade crossing in Lansing, Michigan (case 15). Westbound Amtrak train No. 365, moving at 55 mph (81 ft/sec), struck the automobile. The automobile was propelled, airborne, and landed on its roof about 62 feet from the point of impact. The driver, who was wearing his lap/shoulder belt, remained restrained throughout the accident and sustained only minor injuries. The driver indicated that she heard the train but assumed it was a slow train and, therefore, that she had time to drive around the gates.

On March 4, 1985, southbound Amtrak passenger train No. 381 struck a tractor-semitrailer-tank truck at Kennedy Road grade crossing in Peotone, Illinois (Case 24). The grade crossing had passive warning devices. The train was traveling at 77 mph (113 ft/sec.) when the truck turned right from Highway 50, stopped, and proceeded onto the

7/ See cases 1, 4, 5, 6, 7, 8, 9, 12, 13, 14, 15, 16, 17, 18, 19, 20, 22, 23, 24, 30, 31, 32, 33, 35, 37, 38, 39, 41, 43, 44, 45, 46, 49, 50, 52, 53, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 68, 72, 73, and 75.
NOTE: Alcohol-related cases are listed separately under the section entitled "Alcohol Involvement."

grade crossing. The collision derailed the train and destroyed the tanker. One Amtrak employee, three passengers, and the engineer of the train were taken to nearby hospitals, treated, and released. The truckdriver said he saw the train coming from what appeared to be a mile away. He proceeded across the two main tracks in first gear and shifted to second gear after clearing the first main track. He said he never heard the train's whistle but noticed the train's headlight just before the collision. He attempted to accelerate to clear the crossing.

Motor vehicle drivers disregard warning signs and devices and cross in front of approaching trains for many reasons. Many drivers do not understand that, under most circumstances, trains are unable to stop short of the crossing. Furthermore, many drivers do not expect passenger trains traveling faster than 40 mph, since they usually observe trains in local freight or switching movements, conducted at much lower speeds. 5/ These facts, coupled with poor line of sight at many crossings and the difficulty of hearing trains' warning systems inside a car or truck, make it difficult to improve drivers' recognition of danger at these locations.

There is no easy way to improve drivers' awareness of the extreme hazards of grade crossings. One program that the Safety Board has long supported, the national voluntary "Operation Lifesaver" program, if sustained, might be able to educate the public about the need for careful driving at grade crossings. The Operation Lifesaver program began in 1972 under the auspices of the Union Pacific Railroad. The first State to embrace the program was Idaho and, at the end of its first year, the number of grade crossing fatalities in the state dropped 39 percent. This result led to a program in Nebraska, which tallied a fatality reduction of 46 percent in its first year. Between 1972 and 1977, Operation Lifesaver programs were started in Alabama, Georgia, Kansas, Missouri, and Utah. The first year, fatality reductions ranged from 28 to 64 percent.

The Safety Board, as the result of a tragic grade crossing accident in July 1976 near Des Moines, Iowa, recommended that the National Safety Council serve as the coordinator for the "total development, implementation and evaluation of a nationwide, Operation Lifesaver' railroad/highway grade crossing program. . . ." (Safety Board Safety Recommendation H-77-25). From 1977 until 1986, the program expanded to include voluntary programs in 49 States and the District of Columbia.

In June 1986, however, the National Safety Council withdrew its support because of apparent financial limitations. Fortunately, the program has been successful in developing many safety professionals and leaders who believe in the importance of continuing a vigorous and effective national program. On August 19, 1986, a new nonprofit organization, known as Operation Lifesaver, Inc., 6/ was formed with the following purposes:

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5/ These facts are discussed in other Safety Board reports, notably "Railroad/Highway Grade Crossing Accidents Involving Trucks Transporting Bulk Hazardous Materials" (NTSB/HZM-81/2) and "Railroad/Highway Grade Crossing Review — Calendar Years 1983 and 1984" (NTSB/SS-85/05).

6/ On October 27, 1986, the President of Operation Lifesaver, Inc., provided a formal notification to Operation Lifesaver coordinators, State and local committees, volunteers, and supporters of the new organization.

- Develop and conduct a nationwide program to assist in the education of the public and transportation industry on grade crossing safety.

- Develop, produce, and distribute grade crossing safety educational materials.

- Provide assistance and coordination to State and local grade crossing safety education and public information programs.

The Safety Board looks forward to working with the new Operation Lifesaver, Inc., and as the result of this study has made recommendations to this new organization.

Despite its considerable successes, the program clearly has not reached all drivers in its 16-year history; only one of the drivers involved in these accidents was familiar with the program. A more concerted and expanded "Operation Lifesaver" program needs to be undertaken, particularly in communities along tracks providing high speed passenger/commuter train service.

Even though driver behavior is the most prominent cause of grade crossing accidents, other safety factors and issues seriously impact the driver's decision to proceed across a grade crossing. These safety factors and issues are addressed in this study and offer areas for fruitful corrective actions. The Safety Board believes that any changes in driver behavior will be accomplished by educational and public media initiatives such as Operation Lifesaver, by providing improved information on the hazards that are found at grade crossings, and by improving and correcting physical problems that exist at the Nation's grade crossings.

## ALCOHOL INVOLVEMENT

Although the Safety Board requested that toxicological tests be performed for vehicle operators involved in grade crossing accidents, tests were performed on relatively few motor vehicle operators in the 75 crossing accidents. However, in 19 cases, testing was performed. The results indicated that in 11 cases 7/ the motor vehicle operators were alcohol involved. The blood alcohol concentrations 8/ of these 11 drivers ranged from 0.04 percent to 0.34 percent. (See table 3.) These cases accounted for 17 of the fatalities (40.5 percent) and 23 of the injuries (30.7 percent) in the 75 accidents investigated by the Safety Board. Most of the alcohol-related accidents occurred in the evening after work hours or during the night (8 of 11 cases). Drug use was not determined to be a factor in any of the accidents, although two cases had some physical evidence of drugs (Cases 16 and 29). No tests were made for drug use.

There were no indications of alcohol or drug use by the train crews involved in the 75 accidents; only two tests were known to have been performed on train engineers to confirm this observation (Cases 50 and 54). The Federal regulations issued by the FRA, 49 CFR 219 "Control of Alcohol and Drug Use," exclude the testing of train crews involved in grade crossing collisions.

7/ See Cases 10, 25, 26, 27, 29, 40, 48, 54, 67, 69, and 71.
8/ Blood alcohol concentration (BAC) is expressed as a percent W/V (g/100 ml) where W = weight, V = volume, g = grams, and ml = milliliters.

Table 3.—Blood alcohol concentrations of motor vehicle drivers involved in crossing collisions

| Blood alcohol concentration (percent) | Number of Accidents |
|---|---|
| 0.00 to 0.04 | 1 |
| 0.041 to 0.10 | 1 |
| 0.101 to 0.15 | 2 |
| 0.151 to 0.20 | 4 |
| 0.201 to 0.25 | 2 |
| 0.251 to 0.30 | 0 |
| 0.301 or greater | 1 |
| TOTAL: | 11 |

Two cases illustrate the role of alcohol as a factor in grade crossing accidents. On September 8, 1985, at 6:37 p.m., westbound Amtrak passenger train No. 13, traveling at about 72 mph, struck an automobile at a private grade crossing with stop signs on Emado Avenue in Coyote, California (Case 54). The driver and six family members were killed.

The fireman, a qualified engineer, was operating the train when he noticed an automobile approaching from the left; he applied emergency braking almost immediately. The train hit the automobile broadside and shoved it more than a half mile before the train and automobile came to a stop. Both the engineer and fireman stated that the automobile did not stop at the stop sign before entering the crossing.

The entire family had just left the home of relatives, where they had had dinner. The blood alcohol level of the driver was tested by the local coroner's officer at 0.34 percent. (See figure 2.)

On March 5, 1985, at 5:45 p.m., Amtrak train No. 709 struck a pickup truck at the intersection of the Atchison, Topeka and Santa Fe's main line and the Golden State Frontage Road near Fresno, California (Case 25.) The northbound train was moving at about 45 mph when the crew observed a westbound pickup truck drive around the lowered gate arms and into the path of the train. The pickup truck was substantially damaged in the ensuing collision. Fortunately, no one was injured.

The driver's view of the tracks was not obstructed. Following the collision, the California Highway Patrol (CHP) conducted two breath tests on the pickup driver; the first test showed 0.20 percent blood alcohol level and the second, 0.19 percent. The CHP report of the incident indicates that the driver was "staggering drunk." The driver was not aware following the accident that the pickup had been struck by a train.

The Safety Board continues to believe that train crews should undergo toxicological testing for substance abuse when they have been involved in a collision with a motor vehicle involving a fatality or injury. In its comments on the FRA's substance abuse regulatory proposal, the Safety Board urged that the rule's post-accident toxicological testing provisions should be extended to include accidents at grade crossings if they result in injury or death. 9/

9/ Letter from Chairman, NTSB, to FRA Docket No. RSOR-6, Notice No. 4, August 15, 1984.

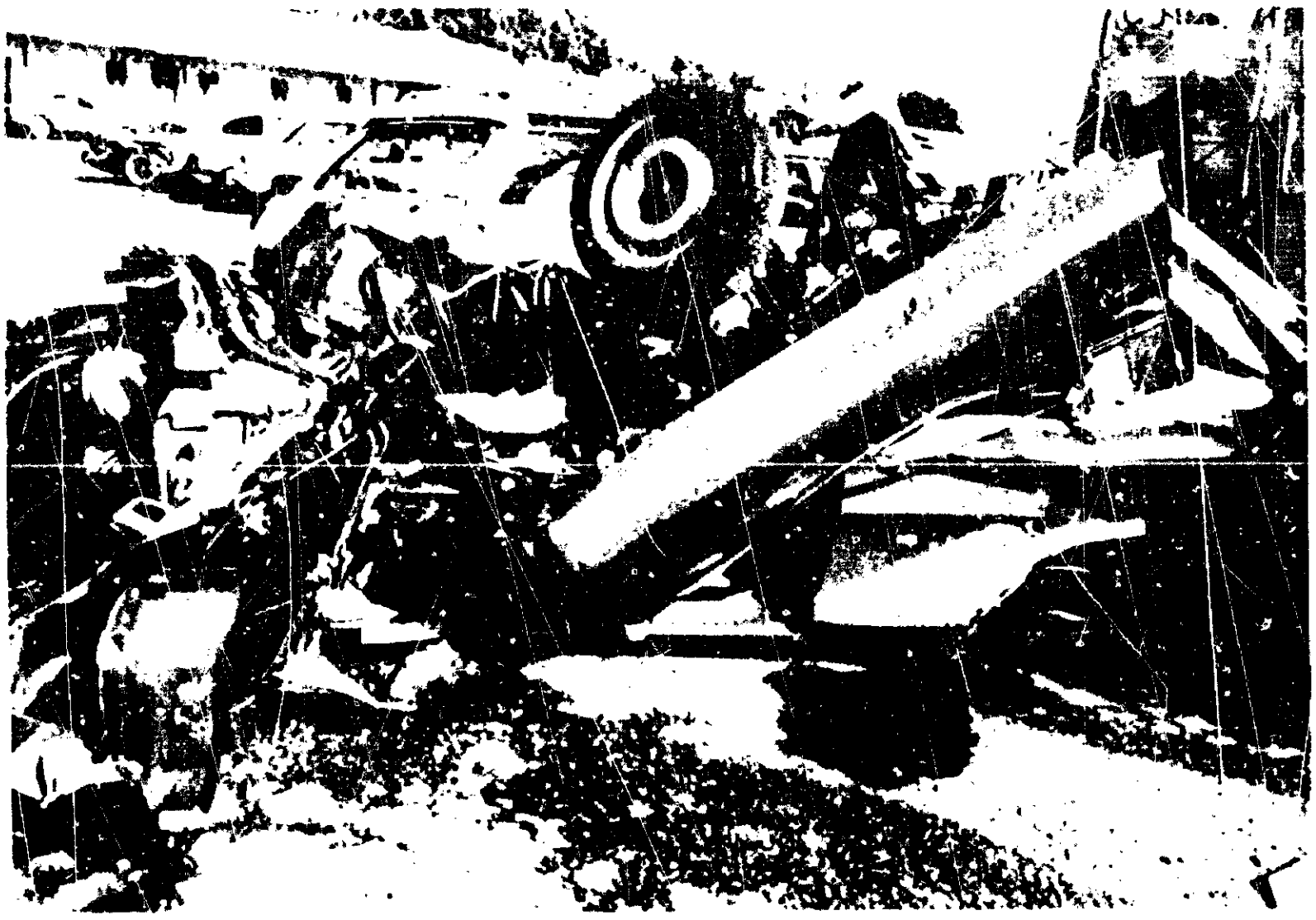


Figure 2.--Grade Crossing Collision at Coyote, California--
September 8, 1985: Driver had blood alcohol level of 0.34 percent.

## GRADE CROSSING CHARACTERISTICS

The characteristics of grade crossings or their approaches were factors in many of the 75 accidents. (See appendix E for a listing of these accidents.) Multiple tracks, roadway approach design, and elevated surface profile were among the most prevalent problems that the Safety Board found during its accident investigations.

### Multiple Tracks

On February 19, 1985, northbound Amtrak train No. 392 struck an eastbound automobile at the Jaycee Avenue grade crossing in Effingham, Illinois. (See Case 21.) The driver, the sole occupant of the automobile, was fatally injured. The train was traveling at approximately 60 mph (88 ft/sec). At the time of the accident, the motor vehicle operator, a young woman, was en route to a part-time job at a fast food restaurant located 1 1/2 miles east of the accident site. She had been working 3 nights a week at the restaurant for about 4 months. In addition to this job, she was working full time at a factory in nearby Altamount, Illinois.

This grade crossing has seven tracks: five are yard tracks and two are main line tracks (one southbound and one northbound). A driver must travel approximately 100 feet before safely clearing the crossing. The crossing has no active warning devices; train traffic is mixed, including both high speed passenger trains and slow speed freight trains. Since there are no active warning devices at this crossing, local drivers proceed onto the crossing based on their past experience as to the track on which train traffic may be traveling. Generally, vehicular traffic will proceed and stop before the track being occupied. However, it is difficult even for local drivers familiar with multiple track locations to estimate train speeds and to judge whether it is safe to proceed across the crossing, particularly when there is a mixture of trains traveling at high and slow speeds.

The Safety Board is particularly concerned about grade crossings with multiple tracks with no active warning devices to alert motor vehicle drivers of the approach of a high speed passenger train. (See Case 21.) The use of the crossbucks is not adequate at these crossings. Few drivers can accurately assess the closing rate of a high speed passenger train or the distance it takes such a train to stop. Indeed, recent data presented by the FRA 10/ indicated that the average motor vehicle driver would perceive a train traveling 60 mph directly toward the driver as moving at 12 mph. If the multiple track crossing is lengthy, some motor vehicle drivers will disregard passive warning signs and venture onto the crossing, thinking they can tell which track the train is on and stop before reaching that track. In the Effingham, Illinois, case, the Safety Board believes the young driver took the chance that she could select the track that the train was using—she selected wrong.

The crossbuck sign, the primary warning device found at the 122,959 locations throughout the nation, is inadequate to warn drivers of the dangers they face at multiple track intersections. The Safety Board addressed this related concern as early as 1976 in Safety Recommendations R-76-13 and -14 to the U.S. Department of Transportation (DOT) suggesting that (1) the DOT require flashing lights and gates as minimum protection at all grade crossings used by commuter trains and (2) that DOT contemplate a grade separation program. Issued ten years ago, these recommendations have not been fully addressed by the DOT. The DOT's most recent response, prepared by the Federal Railroad Administration on August 5, 1986, requests that these recommendations be closed based on its efforts in conjunction with the Federal Highway Administration to provide States with an automated procedure for developing an initial listing of grade crossing projects in order of their potential benefit-to-cost ratio.

The Board is cognizant that in certain sections of the country many grade crossings with low traffic activity do not meet "potential benefit-to-cost ratio" criteria. However, the risk of a passenger train and motor vehicle collision poses a constant and serious condition that can cost many lives. The Safety Board believes that grade separations or crossing closures are the most advantageous ways to eliminate grade crossing collisions. However, the high cost of separations often precludes action. Crossing closure, on the other hand, can be cost effective in some situations; however, the public quite often reacts adversely to this suggestion. Recognizing that neither of these two means are extensively used, the Safety Board, therefore, believes that a minimum standard must be set for all locations where high speed passenger/commuter train operations involve a large number of individuals and intersect with motor vehicle operations. This was the Safety Board's intent in Safety Recommendations R-76-13 and -14.

10/ Mr. Phil Oleksyzk, Deputy Associate Administrator for Safety, FRA, "Train Speed Issues," presented at the 4th National Operation Lifesaver Symposium, St. Louis, Missouri, June 18, 1986.

However, since the States are now responsible for grade crossing improvements at these locations, the Safety Board believes that the States should determine the priorities for grade crossing safety improvements and should act to ensure that public grade crossings used by passenger or commuter trains are given high priority for installation of active warning devices. Consequently, the Safety Board's Safety Recommendations R-76-13 and -14 to the DOT are now "Closed--Reconsidered." A new recommendation to those States that have passenger and commuter operations is being issued with this report.

Two other accidents (Cases 25 and 40) that occurred at multiple track locations (see figure 3) involved active warning devices. In Fresno, California (Case 25), there were three tracks; it was reported in the investigation that the active warning devices often activated without a train nearing the crossing. In Mansfield, Ohio (Case 40), there were six tracks; often, drivers at that crossing were delayed for various periods of time by train yard switching operations some distance from the crossing.

This is an extremely dangerous condition at multiple track locations — the activation of active warning devices (flashing lights and/or gates) that halt motor vehicle traffic although no train appears. This situation most commonly occurs where railroad yard switching operations some distance from the grade crossing activate the warning devices. If railroad management and State highway departments allow such conditions to continue unabated, motor vehicle drivers become conditioned to believe that warning devices at grade crossings do not necessarily indicate that a train is approaching. This leads motorists to disobey the signals, thus establishing a pattern for collisions between trains and motor vehicles.

One promising approach to this problem has been implemented by the State of Texas, whose legislature directed the Texas Department of Public Safety (DPS) to establish a toll-free telephone service to receive calls reporting grade crossing signal malfunctions. The State Department of Highways and Public Transportation (SDHPT) was required to attach a sign with the toll-free telephone number and DOT-AAR grade crossing inventory number to each train-activated warning device on the State-maintained highway and road system. Members of the public can report problems at these grade crossings to the DPS; the DPS then contacts the appropriate railroad to correct the reported condition. The railroads, according to those persons involved in implementing this system, have responded favorably to the system and have in a timely manner dispatched signal maintainers and others to correct the deficiencies reported.

So far, 3,400 such signs have been installed at 1,700 crossings in Texas. The system has generated 5,100 calls from the public in a 28-month period, or approximately 6 to 7 calls per day. The major malfunctions reported were "Signal Operating—No Train Visible" (84 percent), "Signal Not Operating Properly" (4.3 percent), "Vandalism" (2.7 percent), and "Other" (9 percent). Problems reported in the "Other" category included a truck stalled on the tracks, brush obstructing the view of the crossing, and a train blocking the intersection. 11/

Legislation has been introduced in New York State that proposes a program comparable to the Texas program. However, New York's proposed legislation places more responsibility on the railroads operating in the State, requiring the carriers to:

11/ Jack T. Lamkin, and Hoy A. Richards, "Perceived Signal Malfunctions," presented at the 4th National Operation Lifesaver Symposium, St. Louis, Missouri, June 18, 1986.

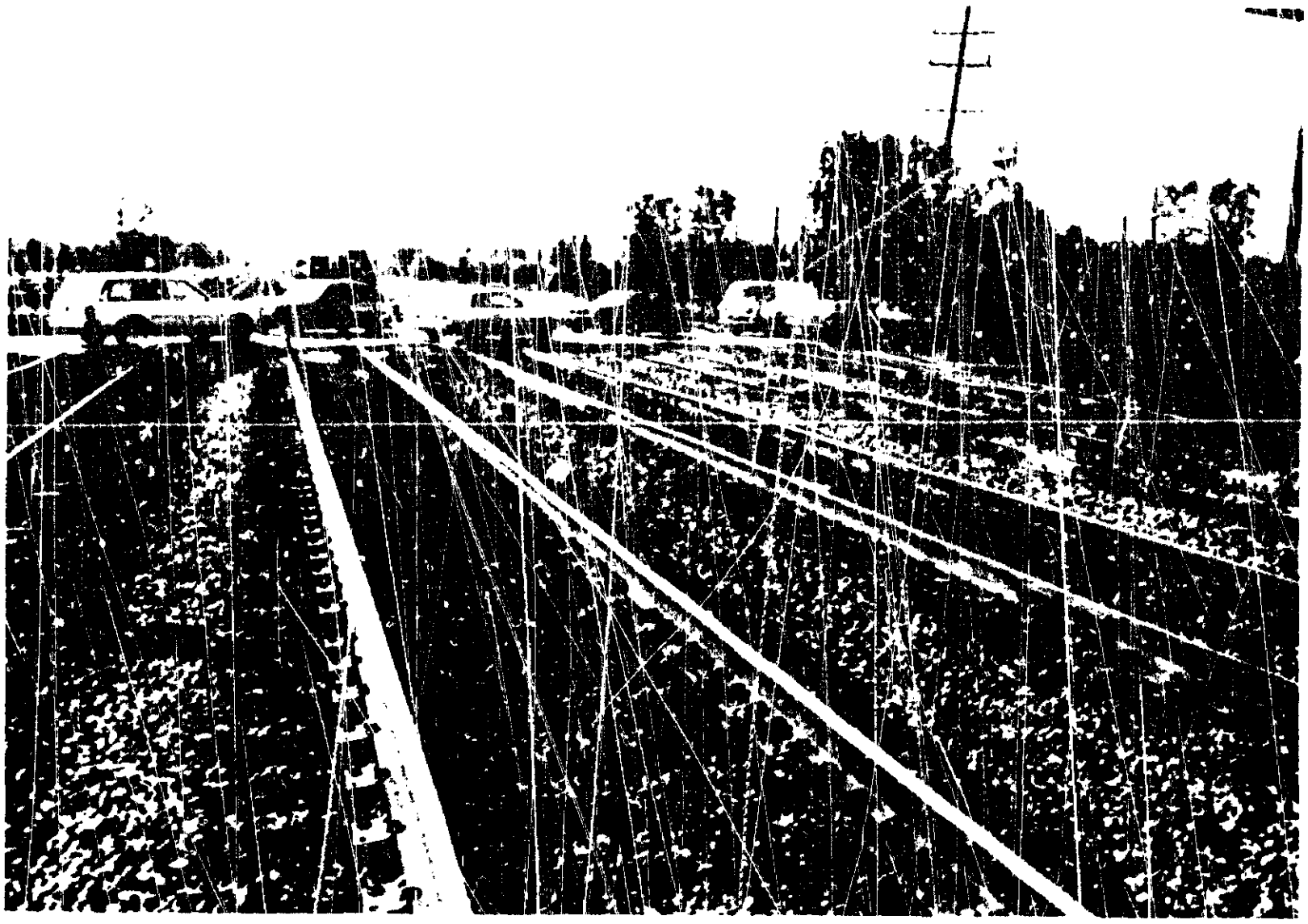


Figure 3.—Example of multiple track location accident site (Mansfield, Ohio).

- Conduct regularly scheduled inspections of safety equipment (grade crossing).
- Post at rail crossings the penalties for motorists who ignore warning lights or crossing gates.
- File biannual reports to the State Department of Transportation outlining details of corrective action taken in response to reported incidents of malfunctioning equipment.
- Keep records of equipment inspections and repairs on file for inspection by the Department.

The Safety Board believes that the Texas and proposed New York programs warrant serious consideration by the FRA and the FHWA as a partial solution to the problem of active warning devices operating in the absence of a train near the crossing. The FRA is

currently evaluating the Texas system. The FRA and the FHWA should complete evaluations of the Texas system and the proposed New York system and develop an appropriate strategy to implement the concept in all States.

Roadway Approach Design

In eight of the accidents investigated (Cases 31, 32, 35, 55, 58, 59, 61, and 63), design of the roadway approach to the grade crossing was a factor. Several examples follow.

On October 24, 1985, northbound Amtrak passenger train No. 25, traveling at 70 mph (103 ft/sec), struck a tractor-semitrailer combination on the Ross Road grade crossing near the town of Wix, Idaho (case 61). (See figure 4.) The tractor-semitrailer had made a right turn off U.S. 95, which is parallel to the tracks at this point, onto Ross Road and had begun to travel the 65 feet up to the Ross Road crossing, which is perpendicular to the track. The tractor-semitrailer (52 feet in length) became stuck in loose dirt on the side of the roadway with the cab partially lodged on the tracks. (See figure 5.) The truckdriver fled before the collision. If the truck had stopped at the trackside stop sign, the semitrailer (approximately 12 feet) would still have been on U.S. 95, posing a danger to other motor vehicles. Likewise, at this location it is conceivable that a tractor-semitrailer combination could be stopped waiting to enter U.S. 95 and be struck in the trailer by a train.

On October 15, 1985, westbound Amtrak passenger train No. 371, traveling at about 85 mph (95 ft/sec) at Coloma Road near Coloma, Michigan (Case 58) collided with a van. The van driver said that she was on her way to town over a familiar route and approached the crossing at about 30 mph. The road runs parallel to the track, then curves sharply towards the track at an almost 90° angle. This allows motorists only a short time to discern the flashing signals. Additionally, as the driver rounded the approach curve, she was momentarily blinded by the sun, which was behind the flashing light mast. Though seriously injured, the driver and her two young children, the van's only occupants, survived.

On September 11, 1985, northbound Amtrak passenger train No. 304 struck a 1984 Pontiac Fiero at the Third and Jackson Streets grade crossing in Springfield, Illinois (Case 55). The train was traveling at approximately 20 mph (30 ft/sec) when the northbound automobile turned right onto Jackson Street and the crossing from Third Street without stopping. The driver, the sole occupant of the automobile, was killed in the collision.

Although the flashing light at the crossing was angled properly to give eastbound Jackson Street motorists a clear indication of an approaching train, this was not so for Third Street motorists. There was neither an advance warning nor any flashing lights focused to warn Third Street traffic properly. Because of the road's proximity to the tracks, the motor vehicle driver was probably looking for motor vehicle traffic to his left on Jackson Street as he turned right onto Jackson Street (and immediately thereafter onto the crossing), instead of checking for flashing lights and train traffic.

The Safety Board believes this kind of problem can be addressed by additional highway traffic signals or signs. If a road runs parallel to the railroad tracks, intersects another roadway, and requires a right or left turn for the driver to cross the tracks, the driver traveling parallel to the tracks must look over his/her right or left shoulder to see a

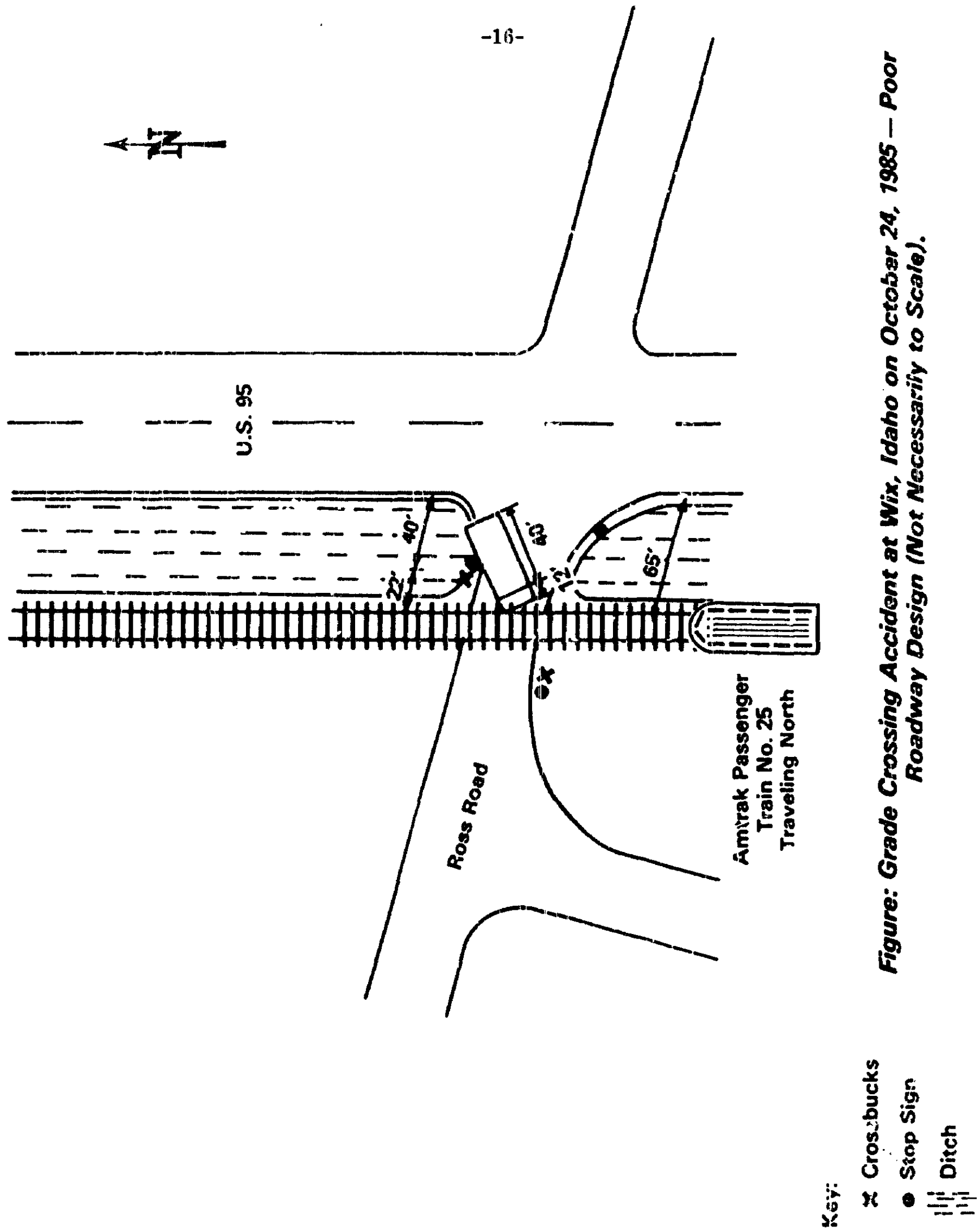



*Figure: Grade Crossing Accident at Wix, Idaho on October 24, 1985 — Poor Roadway Design (Not Necessarily to Scale).*

Figure 4.—Grade crossing with roadway design problems.
Wix, Idaho — October 24, 1985.

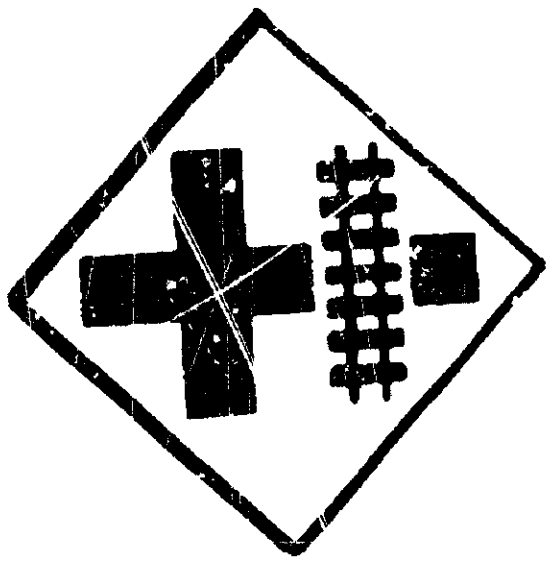
Figure 5.--Photograph of Wix, Idaho grade crossing.

train. If at the same time the driver must also look for traffic on the intersecting road before turning across the crossing, the driver may be distracted from looking for a train. At these extremely hazardous grade crossings where multiple roads compound the driver's decisionmaking tasks, the Safety Board believes an advance highway traffic warning signal or signs, indicating a dangerous grade crossing approach, is necessary.

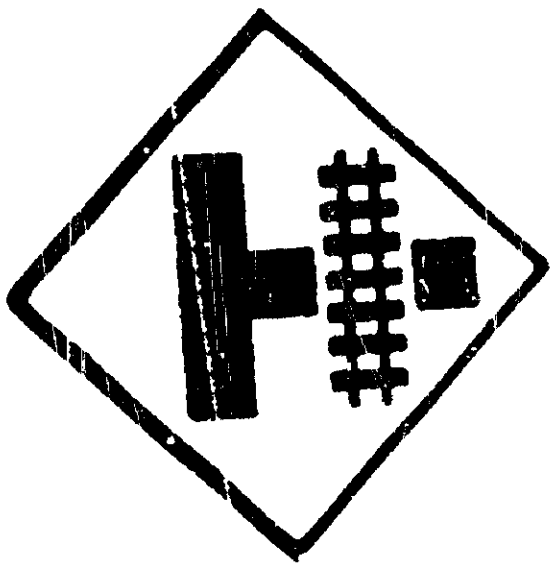
A variety of new signs have been available for the States to use since December 1983, and are found in the Manual of Uniform Traffic Control Devices (MUTCD). These highway advance warning signs, denoted as W10-2, 3, 4, have been designed for intersections where one roadway runs parallel to the tracks; however, the signs to date have not been universally used. (See figure 6.)

## Masked Flashing Lights and Sunglare

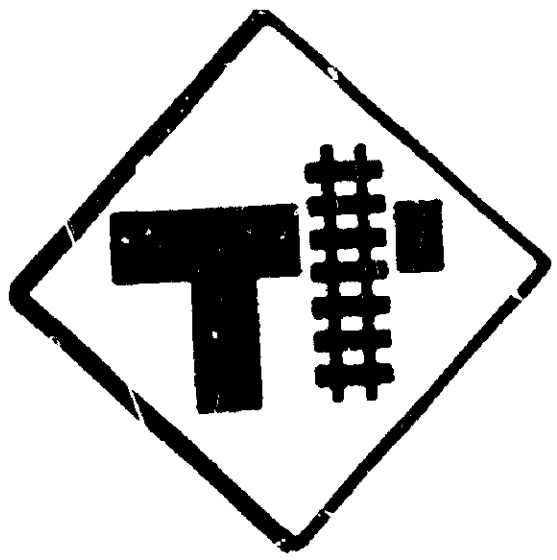
The problem of sunglare masking flashing lights on approach to a grade crossing, as previously referenced in Case 59, appeared in several other cases (Cases 4, 5, 56, and 73).



W10-2
30" × 30"



W10-3
30" × 30"



W10-4
30" × 30"

Figure 6.--Railroad Advance Warning Signs for Use at Dangerous Intersections (W10-2, 3, and 4), Manual for Uniform Traffic Control Devices.

In Case 4, Centertown, Missouri, an eastbound Amtrak passenger train traveling at a speed of 55 mph struck a 1979 Ford pickup truck at County Road Z grade crossing. The occupant of the pickup truck was killed in the collision.

Although the grade crossing's flashing light system was focused properly to give motorists a clear warning of an approaching train, the investigation revealed that sunlight may have interferred with the driver's view of the flashing light signal. The motor vehicle driver was familiar with the crossing.

In another case at Winter Haven, Florida (Case 5), an Amrak train moving at 60 mph collided with a 1979 Datsun 280Z at the intersection of Coleman Road and the Seaboard System Railroad's main track. There was no derailment or fire; the automobile was destroyed. The driver, the sole occupant of the motor vehicle, was fatally injured.

The investigation revealed that there was the possibility that the motor vehicle operator's vision was affected by sunglare as he approached the grade crossing intersection and that the sun diminished the conspicuity of the flashing warning lights.

The Safety Board previously has addressed the problem of sunglare in at least one accident. On July 31, 1978, an automobile with six occupants entered the grade crossing on Washington State Road No. 706 near Elbe, Washington. 12/ The westbound automobile was struck by southbound Milwaukee Road freight train No. 965. As a result of this accident, the Safety Board recommended that the Washington State Department of Transportation (WADOT):

> Improve the flashing light warning system masked by sunglare by some alternative such as installation of supplemental flashing lights, installation of 12" diameter roundels or installation of a large black background plate. (H-79-3)
>
> Survey all east-west rail-highway grade crossings. . .to determine if glare from sunlight reduces the visibility of warning devices at the crossing(s) and take necessary corrective action. (H-79-4)

In its July 2, 1979, response to the Board's recommendations, the WADOT indicated that (1) it does not keep accident records for the rail/highway grade crossings in the state; (2) rail crossing improvements are selected from a priority listing that considers a number of parameters; (3) the crossing in question did not appear on the then-present program; (4) it might be eligible for the next biennium program; and (5) all current available funds for rail crossing improvement had been committed. For H-79-4, the WADOT indicated that evaluating and correcting visibility problems from glare at all east-west rail-highway crossings was ongoing in the State of Washington, and that this factor was reviewed as each crossing improvement project was developed.

The Safety Board noted these efforts in its letter of August 14, 1979, and requested a copy of WADOT's most recent crossing inventory and improvement listing and the number of crossings identified in the ongoing inventory that have a problem similar to that of the accident crossing.

12/ Safety Recommendation letter addressed to the Washington State Department of Transportation on March 1, 1979.

The Board sent a further followup letter on August 14, 1986, to the WADOT. On September 12, 1986, WADOT replied favorably to the Board's recommendations and indicated that WADOT had improved the specific crossing and had identified two other crossings with a similar sunglare hazard. These two crossings were also corrected. The status of these two Safety Board recommendations is now "Closed—Acceptable Action."

The Safety Board believes that the problem of sunglare masking flashing light signals on approach to grade crossings is a safety concern that may need further research and documentation by the Federal agency responsible for railroad safety, the FRA.

## Influence of Crossing Angle

Ideally, grade crossings should be 90° intersections of the track and roadway. According to the FRA, 4 percent (8,262) of the 200,730 public grade crossings in use in 1984 had angles of intersection of 0 to 29°, 16 percent (32,777 crossings) had angles of 30° to 59°, and 80 percent (159,671 crossings) had angles of 60° to 90°. Since the FRA does not separately identify the number of public grade crossings whose angle of intersection is the ideal 90°, the Safety Board can only estimate that at least 40,000 public crossings have crossing angle intersections that may significantly affect the driver's view of an approaching train. No figures are available for the approximately 130,256 private grade crossings. The FHWA's 1978 Railroad-Highway Grade Crossing Handbook, which provides guidelines for crossing improvements, states that ". . . the crossing angle has significant effect on the motorist's field of view, and the amount of skew from the ideal of 90 degrees should be minimized." 13/

In three accidents investigated by the Safety Board (Cases 9, 18, and 59), approach angles of less than 90° were probable factors. The crossing angles involved in these accidents were 66°, 48°, and 72°, respectively. In these accidents, the crossing angle factor was often compounded by other factors, such as inadequate sight distance and audibility problems, thus making these crossings dangerous for motor vehicle drivers to traverse safely.

In case number 59, Coaling, Alabama, the influence of the crossing angle, added to other safety factors, made for an extremely hazardous grade crossing intersection. In this accident, a southbound Amtrak passenger train traveling at 60 mph struck an eastbound 1985 Mack tractor semitrailer cargo tank combination at a grade crossing on County Road 59 in Coaling, Alabama. The train did not derail. There were no injuries to the crew or passengers. The truckdriver was seriously injured, but survived.

The locomotive engineer stated he began the whistle warning about 1,000 feet away (approximately 11 1/2 seconds) from the crossing. At this point, the engineer could not see the crossing due to brush, trees, and the curvature of the track. When the tractor semitrailer cargo tank came into view (approximately 5 to 6 seconds from the grade crossing), the engineer placed the train in emergency braking, but the braking action was too late to be effective. Sight distance at the crossing is very restricted due to the trees, brush, and curvature of the track. The roadway is narrow (17 feet wide), and the last 50 feet of the approach has a 5.2 percent ascending grade. The roadway approach angle to the track is 72,° which further limited the truckdriver's ability to see the train.

13/ Federal Highway Administration, Railroad-Highway Grade Crossing Handbook, FHWA-TS-78-214, August 1978.

It is not easy to categorize most accidents in which roadway approach design, including the influence of crossing angle, is a factor; therefore, specific engineering improvements must be made case-by-case by State highway traffic departments with the assistance of the railroads. The FHWA has actively promoted the use of diagnostic teams to solve individual grade crossing design problems. This approach offers the most practical way to solve many of the roadway approach design problems found on State, county, and locally maintained roads.

## Elevated Surface Profile Crossings

Sometimes, heavily loaded trucks, particularly those transporting heavy equipment, are unable to clear the tracks at a crossing with an elevated surface profile. Case 52 highlighted the Safety Board's concern over elevated surface profiles. In this accident, westbound Amtrak train No. 1, operating at 40 mph (59 ft/sec), struck a tractor-"lowboy" semitrailer lodged on the track at the Deadwood Road grade crossing in Schriever, Louisiana on September 4, 1985. (See figure 7.) When the collision occurred, the truckdriver had already detached the tractor and had off-loaded a bulldozer with which he was attempting to free the hung-up trailer. The force of the collision propelled the semitrailer about 150 feet and it collided with a parked, unoccupied pickup truck. The train did not derail, and fortunately no injuries resulted from this collision. The engineer began an emergency application of the brakes when he saw the situation at the crossing and had reduced the train's speed from 70 mph to about 40 mph at the time of impact.

The Safety Board believes that the removal of the bulldozer from the lowboy was extremely fortuitous. If Amtrak train No. 1 had collided with the lowboy and the bulldozer, the results may have indeed been more catastrophic.

The Safety Board investigated two similar accidents in 1983. On August 25, 1983, an Amtrak passenger train struck a tractor-lowboy-semitrailer combination that had become lodged on a grade crossing in Rowland, North Carolina. In this accident, two locomotive units and two passenger cars derailed; 29 people were injured. A similar accident occurred at Citra, Florida, on November 11, 1983. This accident resulted in minor injuries to 47 passengers and 11 traincrew members.

Based on the North Carolina accident, the Safety Board issued Safety Recommendation H-84-066 to the FHWA:

> Issue an On-Guard Bulletin alerting motor carriers of the hazards of railroad/highway grade crossings with high surface hump profiles.

In June 1985, the FHWA did issue three On-Guard Bulletins describing the circumstances of these accidents, and the Safety Board classified this recommendation as "Closed--Acceptable Action."

Additionally, the Safety Board issued Safety Recommendation H-84-69 to the American Association of State Highway and Transportation Officials (AASHTO):

> Review the State safety program dealing with hazardous grade crossing profile conditions now underway in Florida, and promote the adoption within each State of this program or a comparable program developed by an appropriate AASHTO committee.

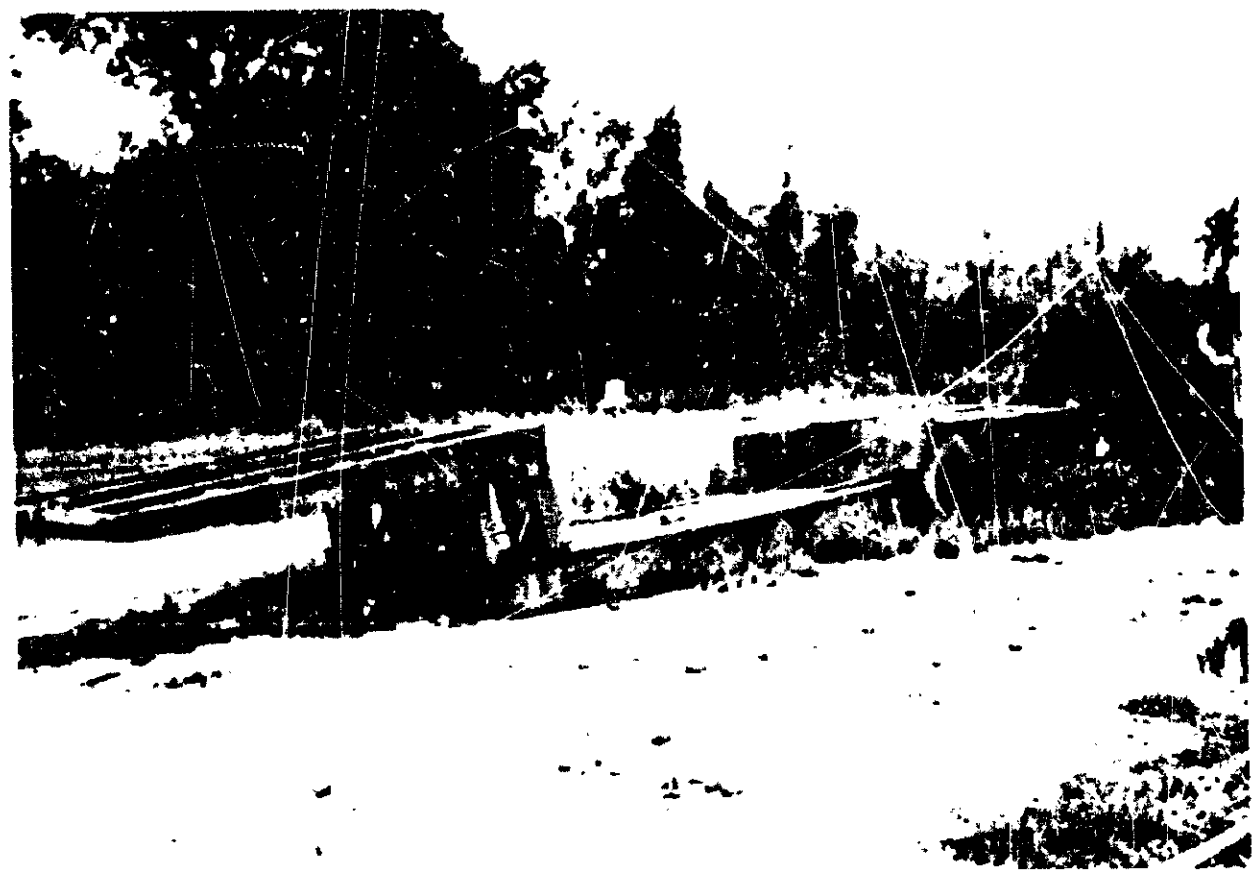


Figure 7.—42' lowboy trailer (top photograph) which lodged on Schriever, Louisiana crossing (bottom photograph) September 4, 1985.

The State of Florida has actually developed and begun to place elevated surface profile advance warning signs at grade crossings. (See figure 8.) Two AASHTO committees are now reviewing this recommendation. Pending action by the AASHTO committees, the recommendation is being held in an "Open—Acceptable" status.

The Safety Board also issued safety recommendations to the AAR on this safety concern:

> Establish the specifications stated in 1.2, "Profile and Alignment of Crossings and Approaches," of the "Manual for Railway Engineering" of the American Railway Engineering Association as the minimum acceptable specifications for railroad/highway grade crossings. (R-84-35)
>
> Encourage all member railroads to coordinate activity related to track maintenance with local and State government to preserve the integrity of the profiles at railroad/highway grade crossings. (R-84-36)

The AAR responded that it fully supports the intent of these recommendations but that it has no role in the development of minimum specifications for grade crossings. The Safety Board replied to AAR on June 19, 1985, that the AAR should take an active role in issues involving grade crossing designs. Recommendation R-84-35 is in an "Open—Acceptable" status, and R-84-36 has been "Closed--Acceptable Action." The AAR encouraged its members in November 1984, to coordinate track maintenance activities with appropriate governmental agencies to preserve the integrity of railroad crossings profiles.

In April and May 1986, the AAR held four regional workshops on the railroad/highway grade crossing program, which were attended by Federal, State, and railroad officials responsible for grade crossing design, construction, and safety. A major topic of the workshops was high profile grade crossings. It was evident from the discussion at these workshops that better coordination of both track and roadway maintenance to reduce the problem of the elevated profile on grade crossings is necessary.

In an annual review of research needs prepared for the Federal Highway Administration on September 3, 1985, entitled "Annual Review of Federally Coordinated Program (FCP), Project 10: Railroad Highway Grade Crossing Safety" (DTFH61-85-C-00054), the problem of elevated surface profile (hump crossings) was recommended as a "most important" priority. The report recommended an objective "to identify design criteria to determine what geometric conditions on approaches to grade crossings would create a hazard to low clearance vehicles and to develop geometric design criteria and traffic control systems for mitigating hazards."

Grade crossings with an elevated surface profile are easily identifiable and can be provided with additional highway traffic signs to warn heavily loaded trucks, particularly those transporting heavy equipment, of the inherent danger. Additionally, the Safety Board looks forward to the AASHTO committees' responses to its recommendations and to further action from the AAR, based on the results of its recently completed regional workshops on grade crossing safety.

Figure 8.--Elevated surface profile advance warning sign--State of Florida.

## VISIBILITY PROBLEMS
(Sight Distance)

The passenger/commuter train and motor vehicle accidents investigated by the Safety Board in 1985, confirmed that visibility (sight distance) is a continuing and troublesome concern. Indeed, in 24 of the accidents investigated by the Safety Board, visibility was cited as a cause.

The driver's view of the train's approach to the grade crossing was obscured in most cases by vegetation (16 cases), followed by fixed structures (9 cases), standing/stored railroad cars (4 cases), curvature of track (4 cases), and terrain (3 cases). In some cases, the driver's view was obscured by more than one of these conditions. (See appendix F for a listing of these accidents.)

Several accidents illustrate the Safety Board's continuing concern about obstructions limiting the motorist's ability to see the train. On February 13, 1985, southbound Amtrak passenger train No. 313 (Case 18), operating at 78 mph (114 feet per second), struck the trailer of a westbound tractor-trailer traveling across the Main Street grade crossing in Lexington, Illinois. (See figure 9.) Fortunately, no injuries or deaths resulted from this accident. The Main Street grade crossing has automatic flashing lights, bells, and crossbucks. The visibility of the railroad approach from the north for westbound Main Street motorists was obstructed by silos and other structures of a grain elevator complex located only 25 feet from the main track and 260 feet from the crossing. Standing railroad cars on a siding were another sight obstruction. Moreover, the road intersects the track at a 48° angle. The driver's view of the track to his right (approach of train) was hampered by the right front corner of his trailer and to some extent by the design of the truck cab's right side window. More significantly, however, his view was hampered by the grain storage structure and standing railroad cars. The driver was thus heavily dependent on the automatic warning devices. In this instance, the driver said he did not see the flashing warning lights or hear the warning bells or the train's whistle until he had already traveled past the first grade crossing signal and onto the tracks. The active warning devices were working.

Figure 9.--Fixed obstructions to sight distance (Lexington, Illinois -- February 13, 1985).

On February 17, 1985, eastbound Amtrak train No. 2 (Case 19), traveling at 70 mph (103 ft/sec), struck the right rear of a southbound pickup truck at a grade crossing located on Parish Road near Jennings, Louisiana. The driver of the pickup truck was seriously injured and his passenger was killed. The train did not derail and there were no injuries to the train crew or passengers. The pickup driver said that as he approached the crossing he could not see the train because trees and brush, located between 75 and 120 feet west of the road, substantially blocked his view of the eastbound train. Crossbucks are located at trackside. There were no advance warning signs, pavement markings, or audible warning devices. The driver said he did not hear the train's whistle warning.

On October 26, 1985, a car with five occupants (the driver and four children) was moving south across the single track at Desonier Road grade crossing in Sorrell, Louisiana (Case 64), when it was struck broadside on the driver's side by Amtrak passenger train No. 1, traveling westbound at 70 mph (103 ft/sec). All the occupants of the motor vehicle were fatally injured. There were no injuries to the train crew or the 146 passengers on the train. The crossing had passive warning signs. A sugar cane field, as well as brush and weeds on the railroad's right-of-way, blocked the view from the road to the track.

Sight obstructions render many grade crossings unsafe for motorists. Even at crossings with active warning systems, sight obstructions increase the opportunity for collisions; at crossings with no warning systems or only passive systems, such obstructions are especially dangerous. However, no Federal standards prohibit these obstructions, require their removal, or require additional, strongly worded warning signs for motorists approaching a sight-obstructed crossing. In 1978, the FHWA did publish some guidance to State, municipal, and railroad authorities concerning recommended sight distances at grade crossings. 14/ However, this guidance is not mandatory and is frequently and widely ignored.

Federal standards should be promulgated for the two main categories of sight obstructions found at grade crossings: movable (vegetation, standing railroad cars) and non-movable (buildings or the terrain itself). For movable obstructions such as vegetation, the standards should require the railroad to maintain, at each grade crossing, that portion of the "sight triangle" that is within the railroad right-of-way. In most cases this would entail the periodic removal of vegetation or keeping it to some defined

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14/ FHWA, Railroad-Highway Grade Crossing Handbook. Table 6 in this report, reproduced from the handbook, is the source for calculating the dimensions of the so-called "sight triangle," the relatively obstruction-free area recommended by the FHWA. The dimensions are determined by (1) selecting from the table the posted speed of the highway, (2) selecting from the table the highest speed at which any train traverses the crossing, (3) finding in the table the corresponding distance down the track and distance down the roadway, and (4) connecting these two points on the track and highway. By connecting these two points with the point at which the highway and track intersect, a triangle is formed — one side consisting of the track up to the grade crossing, another consisting of the highway up to the grade crossing, and the third consisting of the calculated line described above. See figure 10 for an example of a "sight triangle," based on a maximum train speed of 50 mph and a posted highway speed of 50 mph. (The FHWA table does not provide figures for a posted highway speed of 55 mph.) Figure 10 provides a "sight triangle" that will allow a motor vehicle operator to stop only short of the grade crossing. These recommended distances do not allow a motor vehicle to safely proceed across the grade crossing. NOTE: The FHWA currently is preparing to issue a new Railroad-Highway Grade Crossing Handbook, which may have even greater "sight triangle" distances than the distances reflected in this study.

Table 6--Information for use in determining dimensions of minimum "sight triangle" for motorists at grade crossings.

## *Information for Use in Determining Dimensions of Minimum "Sight Triangle" for Motorists at Grade Crossings*

| | Posted Highway Speed in MPH | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 |
| Train Speed | Distance Along Railroad From Crossing | | | | | | | |
| 10 | 162 | 126 | 94 | 94 | 99 | 107 | 118 | 129 |
| 20 | 323 | 252 | 188 | 188 | 197 | 214 | 235 | 258 |
| 30 | 484 | 378 | 281 | 281 | 295 | 321 | 352 | 387 |
| 40 | 645 | 504 | 376 | 376 | 394 | 428 | 470 | 516 |
| 50 | 807 | 630 | 470 | 470 | 492 | 534 | 586 | 644 |
| 60 | 967 | 756 | 562 | 562 | 590 | 642 | 704 | 774 |
| 70 | 1129 | 882 | 656 | 656 | 684 | 750 | 822 | 904 |
| 80 | 1290 | 1008 | 752 | 752 | 788 | 856 | 940 | 1032 |
| 90 | 1450 | 1134 | 844 | 844 | 884 | 964 | 1056 | 1160 |
| | Distance Along Highway From Crossing | | | | | | | |
| | 20 | 65 | 125 | 215 | 330 | 470 | 640 | 840 |

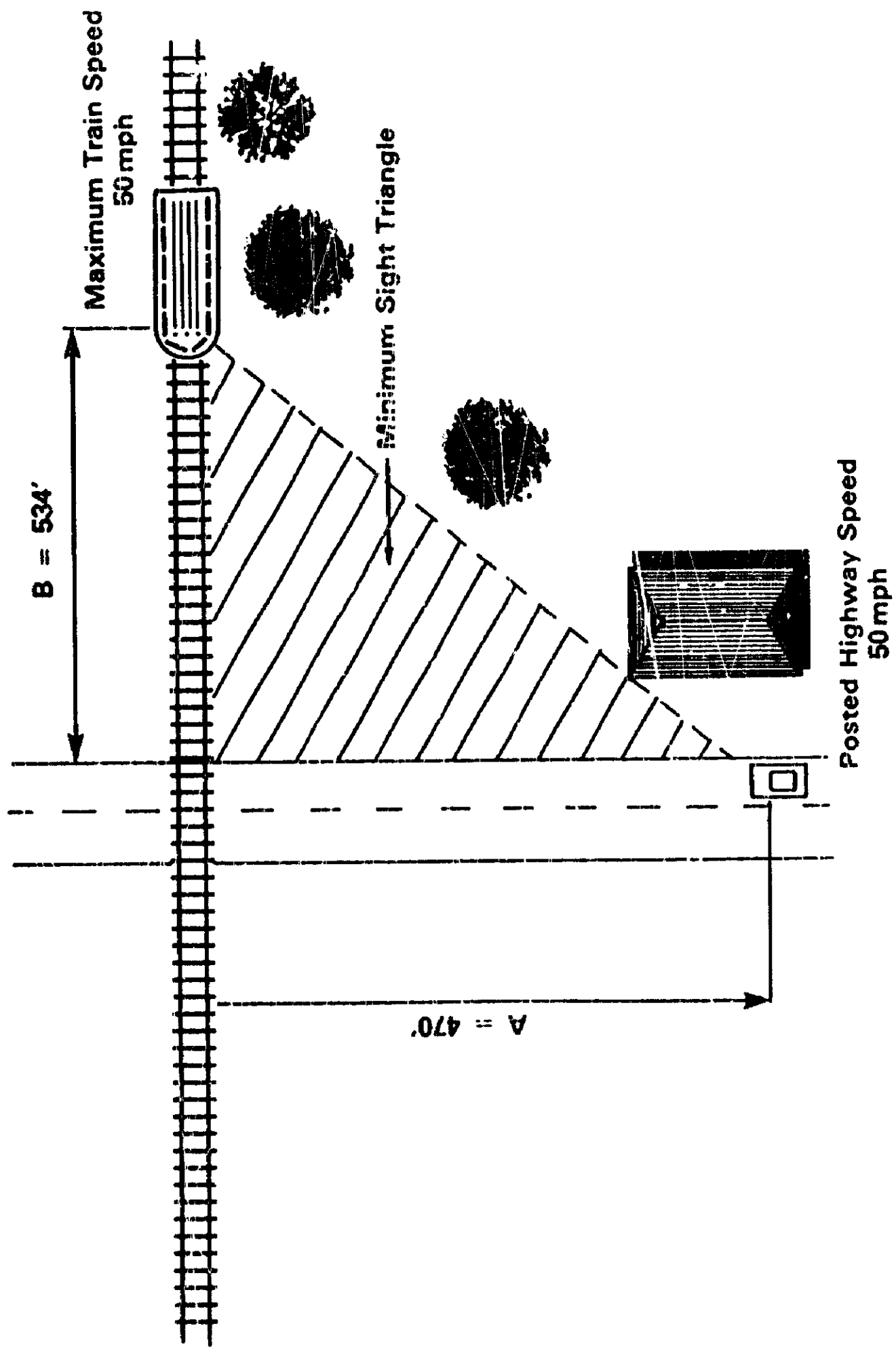


Figure 10.--Minimum sight triangle.
Source: FHWA Railroad-Highway Grade Crossing Handbook, Report No. FHWA-TS-78-214, August 1978.

maximum height within "the sight triangle." The State should be responsible for maintaining the portion of the "sight triangle" not on railroad right-of-way. For such movable obstructions as standing rail cars, Federal standards should simply prohibit them within the appropriate sight triangle.

Non-movable obstructions obviously require a different approach. Since they cannot be moved, it is important that approaching motorists receive adequate warning that they may be unable to see an approaching train in time to stop and that special caution is therefore required. Such warning is particularly necessary at crossings used by high-speed trains. Roadway advance signing, with messages such as "HAZARD/OBSTRUCTED VIEW/HIGH SPEED TRAIN" or "DANGEROUS TRAIN CROSSING/OBSTRUCTED VIEW" should be placed at all crossings with non-movable obstructions within the minimum "sight triangle." First priority should be given to signing crossings with high speed trains.

Another action that could be taken by local or State highway officials would be to review the possible use of rumble strips in advance of a grade crossing that is particularly hazardous because, for example, it has severe visibility problems. This would alert a motor vehicle driver to a potentially hazardous situation.

"Indented" rumble strips are in use in a number of States. (See figure 11.) These strips are pressed directly into the roadway. This design may be appropriate for use prior to grade crossings. The cost for installation of "indented" rumble strips of the type illustrated in figure 11 is approximately $.05 per foot. Reportedly, the rumble strips do not cause deterioration of the roadway or additional maintenance costs.

In its study of controlled sections of roadway one year before and one year after the installation of rumble strips, the State of California found that, overall, accidents were reduced by 19 percent and "run-off" road accidents by 49 percent. 15/

## INEFFECTIVENESS OF AUDIBLE WARNING SYSTEMS

In 27 cases 16/ the ineffectiveness of the train's audible warning system was cited as a factor in the collision between motor vehicles and passenger/commuter trains.

For example, on January 4, 1985, at 6:40 a.m., westbound Amtrak passenger train No. 11, traveling at about 30 mph (44 ft/sec), struck a southbound three-axle dump truck at a grade crossing on 20th Street in Sacramento, California (Case 3). The driver was not injured. The train did not derail and passengers and train crew were not injured. The crossing had crossbucks and a stop sign.

The truckdriver said that he stopped at the 20th Street crossing and waited as a westbound freight train cleared. Once the freight train cleared, he looked for additional trains; seeing and hearing none, he proceeded onto the three-track crossing. About midway across the grade crossing, he saw the headlight and heard the whistle of the approaching westbound Amtrak train. He accelerated, but the dump trailer was struck on the left rear. At the time of this accident, the truck windows were up, the heater fan was on high, the windshield wipers were on, and the citizens band radio was on. The train's audible warning system was critical because fog had reduced visibility to about 200 feet.

15/ State of California Department of Transportation's Report Number: CALTRANS 08-85-1 entitled "Insterstate Route 15 and 40 Shoulder Rumble Strips" dated August 1985.
16/ See Cases 1, 3, 5, 6, 8, 9, 11, 12, 17, 18, 19, 20, 21, 23, 24, 28, 30, 32, 33, 37, 50, 51, 57, 58, 59, 72, 74.

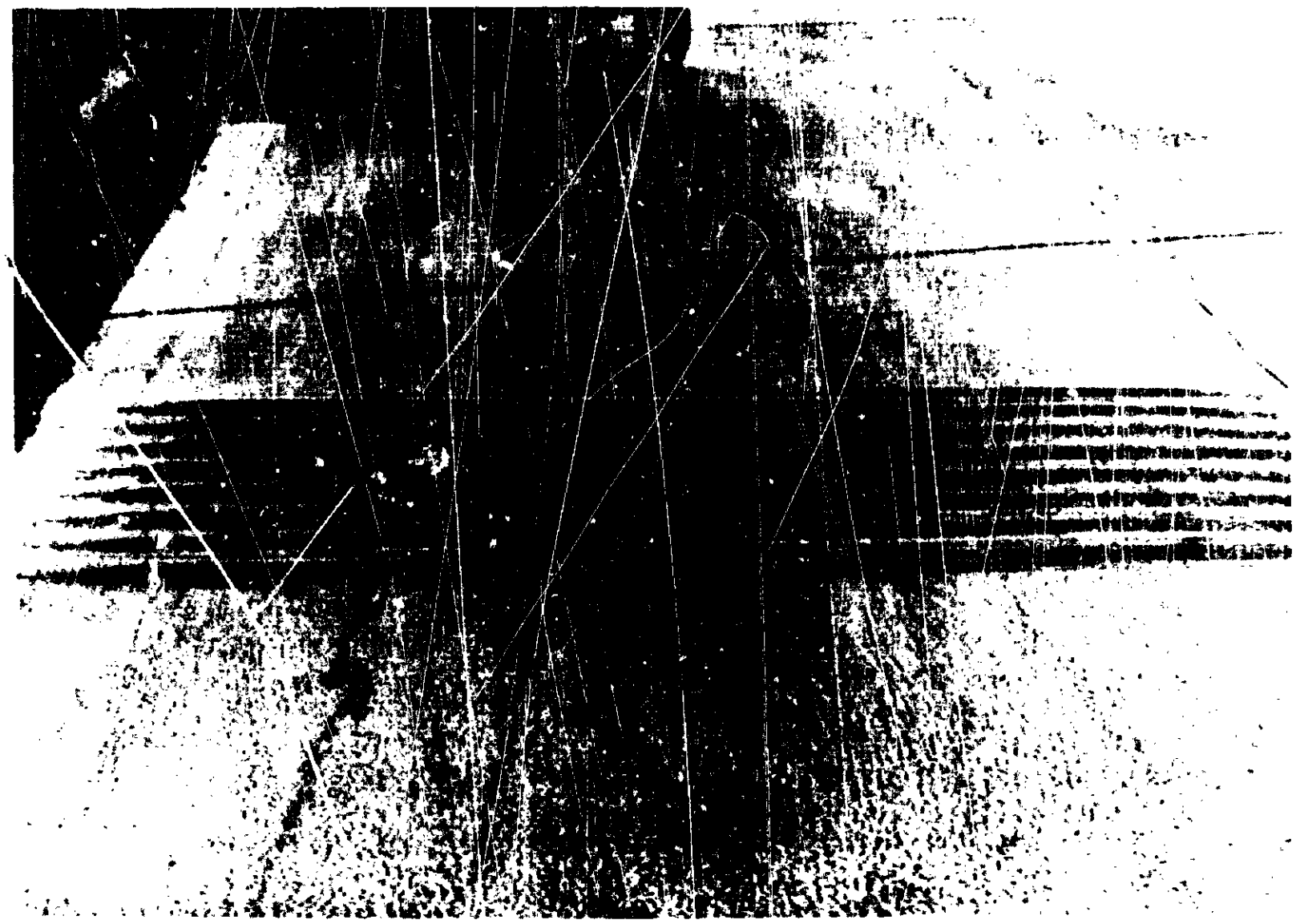

Figure 11.—Indented rumble strips.

On February 19, 1985, at 5:05 p.m., northbound Amtrak train No. 88, traveling at 70 mph (103 ft/sec), collided with an eastbound tractor-semitrailer-dump truck combination at Capitol Concrete Drive in Jacksonville, Florida (Case 20). The tractor was destroyed and the semitrailer was substantially damaged. The truckdriver was seriously injured and could not be interviewed due to his medical condition.

Visibility for motor vehicle traffic at this accident location was restricted by trees and standing railroad hopper cars, making the train's audible warning system even more important for preventing collisions. The grade crossing had crossbucks and a stop sign as warning devices. A series of tests using a similar tractor-semitrailer combination was conducted to test the audibility of the locomotive's whistle to a truck occupant. With the heater fan on and windows closed, it was determined that the whistle was not significantly above the ambient noise level in the tractor cab until the locomotive was 20 feet from the tractor. This means the truckdriver had less than one second in which to react.

On October 15, 1985, at 12:10 p.m., southbound Amtrak passenger train No. 19, traveling at 60 mph (88 ft/sec), struck an eastbound tractor-semitrailer-cargo tank combination at a grade crossing on County Road 59 in Coaling, Alabama (Case 59). The train did not derail and the crew and passengers were not injured. The truckdriver was seriously injured but survived. The locomotive engineer said he began the whistle warning for the crossing about 1,000 feet (11 to 12 seconds) from the crossing. At this point, the engineer could not see the crossing, due to trees and the curvature of the tracks. When the tractor-semitrailer-cargo tank came into the engineer's view (approximately 5 to 6 seconds from the grade crossing), the engineer applied the train's emergency braking, but it was too late, and the train struck the left side of the tractor. A witness said that the truck had stopped on the crossing, had moved slightly backward, and was then struck by the train. The grade crossing had crossbucks and a stop sign as warning devices. The noise of the truck's radio and air conditioner, which were in the on position, and the truck's engine probably reduced the ability of the driver to hear the train's whistle.

In the early days of automobile and train transportation, the steam whistle from a slow moving, approaching train easily alerted the slow moving motorist approaching a crossing; often, the motor vehicle was an open or cloth-covered vehicle. In fact, the whistle may have been the primary alerting device, with no active warning or watchman, and only limited bells and wigwags. Today, the train's warning horn has become an ineffective warning device. Trains move at speeds up to 79 mph and motor vehicles approach crossings at speeds up to 55 mph. With the windows up, air conditioning or heater fan on, wipers on, and/or radio equipment blaring, the motor vehicle operator does not hear the train until it is too late to take evasive action, as seen in repeated accident investigations. The Safety Board's audibility tests have repeatedly indicated that, in a truck, the engine noise alone will usually mask an Amtrak or freight train horn until 1 or 2 seconds before impact, if the motor vehicle's windows are up. To hear a train's horn, a truckdriver must stop, let the engine idle, turn off fans, wipers, and radios, and roll the window down. At passive crossings, truckdrivers must be especially cautious. Cases 3, 20, and 24 highlight and reinforce similar observations made in three previous cases (Bainville, Montana; Avondale, Colorado; and McBee, South Carolina), discussed in the Safety Board's 1983-84 grade crossing study. At active crossings, sun glare or other obstructions to the active devices can reduce their effectiveness, thus making the train's horn a more critical part of the overall warning system than it can adequately fulfill.

A number of cases highlighted numerous factors that argue for improved audibility warning. In Case 1 and perhaps two other cases, elderly drivers had hearing impairments. In several cases, audio equipment (such as a 200-watt tape deck in Case 23, a dispatcher talking on a citizens band radio in Case 3, or a radio turned on as loud as 87 decibels in Case 9) may have completely masked the trains' warning horns. In some cases, air conditioning, heater fans, or even wipers created loud noises (70 to 85 decibels) that masked the train's warning horns. It is not unusual to find radios turned on volumes slightly above the ambient levels of the air conditioner, heater fans, or wipers. Further, some cabs are "sound proofed" to reduce outside noise, thus reducing the train horn's ability to penetrate the "closed" vehicle and provide any degree of audible warning.

One of the first Safety Board accident investigations to include audibility tests of train horns was in 1967. 17/ The accident occurred on October 2, 1967, when a

17/ For further information, see Highway-Railroad Accident Report—"Public School Bus-Union Pacific Railroad Company Freight Train Accident, Waterloo, Nebraska," issued September 2, 1968 (NTSB/RHR-1).

schoolbus carrying 13 children was driven across a highway grade crossing with passive warning devices and was struck by a train. Four of the children on the bus were killed and the other nine injured. The Safety Board's report of this accident stated that

> The data collected and [their] analysis strongly support the proposition that the bus driver, with the bus door closed, could hear the train whistle for...approximately 6 seconds or 510 feet prior to the locomotive's arrival at the crossing. With the front door of the bus open, the whistle could be heard for...approximately 13.5 seconds or 1,150 feet away....The analysis of horn and other sounds reported in this report establishes that the train was too far away for the driver to hear the horn while the bus was stopped even if the door was open, and that once the door was closed and the bus was moving toward the tracks in low gear, the horn could not be heard inside the bus until it was too late for the bus to stop short of the crossing.

In response to the Safety Board's safety recommendation from this accident (H-68-008), 18/ the FRA sponsored an audibility study 19/ that described adequate audible warnings as a function of three factors:

- Sound level at the vehicle.--For a motorist in a vehicle moving less than 35 mph, a sound level of at least 101 decibels is needed; for those moving at 36 to 50 mph, the required level is 105 decibels; for those at 51 to 65 mph, 109 decibels.

- Required distance.--The required decibel level must be perceived by the motorist before he or she has passed the threshold of the stopping distance needed for the speed at which he or she is traveling.

- Sound attenuation.--Power in a sound dissipates as it moves away from its source (as light does); the power varies from the level at the source by the inverse square of the distance (between 1 and 4 feet from the source, the sound has spread out over an area 16 times larger than the area affected at the source, and the power is 1/16 as great).

Amtrak's Nathan K5LA air horns (five forward-facing horns) produced 113 to 114 decibels of sound at 100 feet directly in front of the train. However, if the train were moving at 50 mph, it would traverse approximately 100 feet in little more than 1 second--hardly sufficient warning. When measured at a 45° angle from head-on, the sound was 112.5 decibels at 100 feet, and from a 90° angle and 100 feet, it was 109.5 decibels--an even lower level of warning effectiveness.

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18/ The Safety Board's Safety Recommendation (H-68-008) reads: "FHWA and FRA study the questionable audibility of external sound signals within motor vehicles and work toward creating a unified system of warnings and reliable reception, to be made effective through Federal regulations or State laws." The status of this recommendation is Closed--Acceptable Action.

19/ John P. Aurelius and Norman Korolow, The Visibility and Audibility of Trains Approaching Rail-Highway Grade Crossings, FRA-RP-71-2, May 1971.

Locomotive train horns (freight or passenger) are required to meet Federal standards of only "96 [decibels] at 100 feet forward of the locomotive in its direction of travel. . ." The Federal standard also permits a measurement variation of 4 decibels. 20/ The Safety Board believes that the Federal standard should at least meet the decibel warning levels produced by the Amtrak train air horns. This would give motorists who approach railroad/highway grade crossings a much improved safety warning from the train's audible warning systems. The present FRA standard is inadequate.

The 1971 FRA study concluded that "railroad horns [as designed now] cannot reliably warn motorists when either the train or motor vehicle is going [faster than] 50 mph." As the author put it:

> To "warn" a motorist, the sound must penetrate into his [or her] vehicle and override ambient noise. . .while the vehicle is far enough away from the crossing to still be able to stop. It is not suggested that horns are seldom heard by motorists, but rather that they fail to reach some motorists and are thus questionable as [a] primary warning device.

The authors recommended the following:

- Use a high output horn, such as the five-chime type, because of its alerting qualities, its ability to override masking sounds, and its lesser nuisance value.
- Mount horn high and on the front to reduce the nuisance to the crew and improve performance.
- Mount a horn on each end of bi-directional locomotives.
- Lower the highway speed limits at the approaches to crossings where audible warnings must have a primary role (poor visibility, no active control devices).

During the Safety Board's investigations, investigators did note in several cases, when stopped at the crossing and listening specifically for the train's horn, that the tone became audible prior to any change in recorded decibels on the sound meters. This phenomenon is similar to a person listening for a specific instrument in a loud orchestra. The horn can be an early alerting device, but only if it is listened for specifically with no noise distractions and only if the motorist's window is down.

The Safety Board believes that the Federal Railroad Administration should reexamine the standard applicable to trains' audible warning systems and act to improve the audible warning systems' ability to alert motor vehicle drivers to approaching trains. The Federal Highway Administration should make every effort to inform truckdrivers that the audible warning systems currently used by passenger trains and high speed freight trains cannot be relied on to warn of a train's approach and that drivers should roll down their windows, turn off radios and CB units, and listen carefully for a train before proceeding across any grade crossing location with passive warning devices. Additionally, the Board believes that the "Operation Lifesaver" program should develop educational materials to warn motorists that a train's audible warning system cannot be relied on to adequately warn of its approach and that motorists should treat grade crossings with passive warning devices as extremely hazardous locations.

20/ 49 CFR 229.129, "Audible Warning Devices," Railroad Locomotive Safety Standards.

## COMMERCIAL VEHICLE ROUTING

In the study of 1985 accidents, the Safety Board has identified six cases in which heavy truck routing over grade crossings without active warning devices was an issue. (See table 7.) In these cases, alternate routes with active warning devices were available near the accident location, or the crossing should not have been used by heavy trucks because of poor crossing characteristics and another crossing should have been selected.

Table 7.--1985 accidents involving heavy trucks in which the truck's routing was a factor

| Case No. | Date | Location | Motor Vehicle Involved | Warning Device |
|---|---|---|---|---|
| 24 | 3/4/85 | Peotone, Illinois | Tractor-semitrailer | Crossbucks |
| 52 | 9/4/85 | Schriever, Louisiana | Tractor-"lowboy"-semitrailer | Crossbucks |
| 59 | 10/15/85 | Coaling, Alabama | Tractor-semitrailer | Crossbucks |
| 61 | 10/24/85 | Wix, Idaho | Tractor-semitrailer | Crossbucks and stop signs |
| 63 | 10/25/85 | Kenner, Louisiana | Tractor-semitrailer | Crossbucks |
| 72 | 12/18/85 | Youngsville, North Carolina | Tractor-semitrailer | Crossbucks |

Two examples may illustrate why the Safety Board continues to believe that, wherever possible, heavy trucks should be routed to avoid grade crossings with passive warning devices.

On March 4, 1985, at 6:50 p.m., southbound Amtrak passenger train No. 381 struck a tractor-semitrailer-tank combination at Kennedy Road grade crossing in Peotone, Illinois. The tank truck had turned right off Highway 50, stopped, and proceeded onto the grade crossing (Case 24). The train was traveling at 77 mph (113 ft/sec), and the ensuing collision derailed the train and destroyed the tank truck. An Amtrak employee, three passengers, and the engineer of the train were taken to nearby hospitals, treated for injuries, and released.

The truckdriver said he saw the train coming, but it appeared to be about a mile away. He proceeded onto the crossing, traversing the first main tracks in first gear; he shifted to second gear after clearing that track and before continuing onto the second track. He noticed the train's headlight just before the collision and attempted to accelerate to clear the crossing. He said he never heard the train's whistle.

This accident occurred at a crossing with passive signs (crossbucks), which are inadequate warning devices to assist a truckdriver in making a reasonable decision to cross the tracks. The truckdriver could have selected an alternate route over a grade crossing equipped with active warning devices that would have given him adequate notice of the train's approach to the grade crossing. However, the truckdriver's company had instructed him to cross at the route with passive warning devices, even though the safer route was available.

On December 18, 1985, at 12:24 p.m., northbound Amtrak train No. 271 struck a tractor-semitrailer combination at the Winston Street grade crossing in Youngsville, North Carolina (Case 72). The truck, transporting a bulldozer, had been driven across the tracks in front of the train. The engineer and fireman saw it, and the engineer applied the train's brakes and reduced its speed from 70 to 67 mph (98 ft/sec). Nevertheless, the semitrailer was struck by the train. No one was injured, however, and the train was not derailed.

Again, this crossing had only a crossbuck to "control" the intersection of railroad and highway. The train whistle was not sufficient to attract this truckdriver's attention, so he was not aware of the approaching train as he began to drive his truck onto the track at an estimated speed of 2 mph. (The truck was moving 2.9 feet per second across the crossing.) A safer crossing with active warning devices was located 945 feet south of this crossing. The driver selected the crossing with the passive warning devices because it was closer to a local diner at which he planned to eat.

The Safety Board's 1983-84 grade crossing study and the Board's 1981 special study (specifically for bulk hazardous materials trucks), cited previously in this report, both addressed the hazards posed by unnecessarily routing heavy trucks over grade crossings with only passive warning systems.

As a result of the findings in the 1981 study, the Safety Board recommended that the National Safety Council (NSC) expand the "Operation Lifesaver" program to address the problem of trucks carrying bulk hazardous materials, especially petroleum products, over such crossings. (This recommendation, H-81-79, was in an "Open—Acceptable Action" status, pending the NSC's attempts to obtain additional financial support to implement new programs.) NSC announced in June 1986, that it no longer will coordinate the "Operation Lifesaver" program; therefore, we have classified H-81-79 as "Closed—Unacceptable Action." However, the Safety Board believes that the issue of routing of trucks carrying bulk hazardous materials, especially petroleum products, over grade crossings is an appropriate educational initiative for Operation Lifesaver, Inc. Therefore, a recommendation has been made to that organization addressing this concern.

Additionally, the Safety Board recommended that 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." (R-81-96). The AAR indicated in a letter of December 22, 1982, that it would meet with the FHWA to discuss these issues.

On August 11, 1986, the AAR further responded to the Safety Board that the AAR supported the FHWA project conducted in the State of Virginia to address grade crossing safety involving trucks carrying bulk hazardous materials. This pilot project led the FHWA administrator to direct FHWA Division Offices to initiate efforts to establish multidisciplinary advisory groups in each State to address the problem of grade crossing safety involving hazardous materials truck carriers. The AAR in support of the FHWA effort contacted its member railroads urging their support and participation in such State advisory groups. Based on the AAR's response, the Safety Board has classified Safety Recommendation R-81-96 as "Closed—Acceptable Alternate Action."

## FLASHING RED LIGHTS OR STEADY RED LIGHTS

In 24 (32.0 percent) of the 75 collisions investigated for this study, a red flashing light was involved. Apparently, these devices do not clearly convey an effective "STOP" message to many motorists. To some extent, this may be the result of motorists experiencing a "false positive" signal (warning device on, but no train appearing), so that they learn to disregard the signal. Perhaps, for many motorists a flashing red light is not as clear and strong a "STOP" signal as is a steady red light. (Some motorists of course, may attempt to "beat" the train, regardless of the warning signal used.) While the Uniform Vehicle Code (UVC) clearly states that "No person shall drive any vehicle through, around or under any crossing gate or barrier at a railroad crossing while such gate or barrier is closed or is being opened or closed . . .," there is no such guidance or prohibition for red flashing lights. Indeed, the red flashing light only means stop and proceed when safe to do so. There is no language that prohibits a person from driving through the flashing red signal. The UVC is very clear that at a steady red indication a motorist ". . . shall remain standing until an indication to proceed is shown . . ." This is basically the same intent as a gate.

Most States (40) tend to conform to the UVC that a driver can stop and then proceed when safe to do so at flashing red lights. 21/ Eight States conform to the UVC but use different words, such as "Drivers must ascertain that no train is coming."

The Safety Board believes the safety community should seriously consider highway traffic control signals at grade crossings. Motorists are more familiar with, and conditioned to obey, highway traffic control signals; if these fail to function properly, motorists may be more likely to report the failure, so that incorrect warning messages are not conveyed to motorists over a long period. The use of the flashing red light should be questioned if the intent is for a motorist to make an absolute stop at a grade crossing and wait for a train to pass. It would seem more appropriate to require a steady red indication so that motorists would remain standing until the signal indicates that they can proceed.

Recent research by the University of Tennessee's Transportation Center for the Federal Highway Administration supports the use of traffic signals at grade crossings. In an FHWA sponsored study soon to be released, entitled "Innovative Railroad-Highway Crossing Active Warning Devices," the use of traffic signals resulted in significant reductions of motor vehicle crossings during signal activation. The reported average number of vehicle crossings per activation of the flashing red lights was 12.6 vehicles; after the installation of the highway traffic signals, the number of vehicle crossings per activation was reduced to 0.6 vehicles. The researchers reported that "most signal cycles have no violators."

This enhanced signal system normally rests in green. When the train approaches the grade crossing, the signal goes to yellow for four seconds and then to red until the train has passed. The average daily traffic count at this crossing is almost 15,000. Sight distance along the track is critical in three of four quadrants. Train volumes are moderate with five through and ten switching operations per day.

21/ National Highway Traffic Safety Administration, Traffic Laws Commentary," Driver's Duties at Railroad Grade Crossing," January 1979.

The full results of this research, including the test and evaluation results of four-quadrant gates with skirts and four-quadrant flashing lights with overhead strobes, should be released for the public's review soon. 22/

Another report released in 1985, entitled "Driver Behavior and Risk of Accident at Flashing Lights: Railway-Highway Crossings," authored by L. Aaberg of Uppsalas University in Sweden, concluded that flashing lights are an unreliable source of information to drivers.

## INSTALLATION OF ADDITIONAL WARNING SIGNS AT IDENTIFIED HAZARDOUS CROSSINGS

A number of accidents occur at grade crossings that State officials have previously identified as hazardous crossings based on a hazard index formula. These grade crossings are targeted for active warning devices(s) installation because the crossings are known to be hazardous based on, but not limited to, such factors as expected number of accidents, average traffic volume, average train volume, angle of crossing factor, protection factor, type and speed of train factor, and others.

In a number of cases investigated by the Safety Board, 23/ the crossings had been placed on a States' list of hazardous crossings or had otherwise been identified as a location for active warning device(s) installation or for upgrading to a higher active warning device level (for example, from flashing lights to gates and flashing lights). The installation either had not occurred or was accelerated only after the fatal accident at the crossing location.

The Safety Board believes that grade crossings clearly identified by the States as hazardous and crossings that have been placed on an official list for installation of upgraded warning device(s) need to be provided with additional interim warning signs indicating the hazardous crossing location. The interim warning sign should indicate that the crossing is considered a dangerous location and that upgraded warning devices will be placed at the crossing location as soon as possible. Once the upgraded warning devices are in place, the interim warning signs could be removed.

An example of a grade crossing that needs additional warning signs until active warning device(s) are installed is illustrated in figure 12. This grade crossing (Case 9) has been the subject of negotiation and correspondence between the city of McComb, Mississippi, and the Mississippi Highway Department and the Illinois Gulf Railroad since 1977. The Safety Board's investigation revealed that three additional accidents had occurred at this location since 1981. If additional hazardous warning signs had been installed in 1977, perhaps these accidents could have been avoided.

In this case, southbound Amtrak passenger train No. 59 struck an eastbound 1977 Chrysler LeBaron. No one was injured. The driver stated that she stopped for the stop sign, but did not observe the train. She then moved forward and again stopped when she saw the train approaching from her left side. The grade crossing is very dangerous because of sight distance problems. Vegetation growing within 30 to 40 feet of the crossing makes it difficult for a motorist to see a train's approach. A motorist is actually past the stop sign before getting a good view of train traffic.

22/ The University of Tennessee Transportation Center," Innovative Railroad-Highway Crossing Active Warning Devices: Status Report on Installation and Field Testing," May 1986.
23/ See Cases 3, 5, 9, 11, 14, 18, 33, 41, 44, 55, 57, and 65.

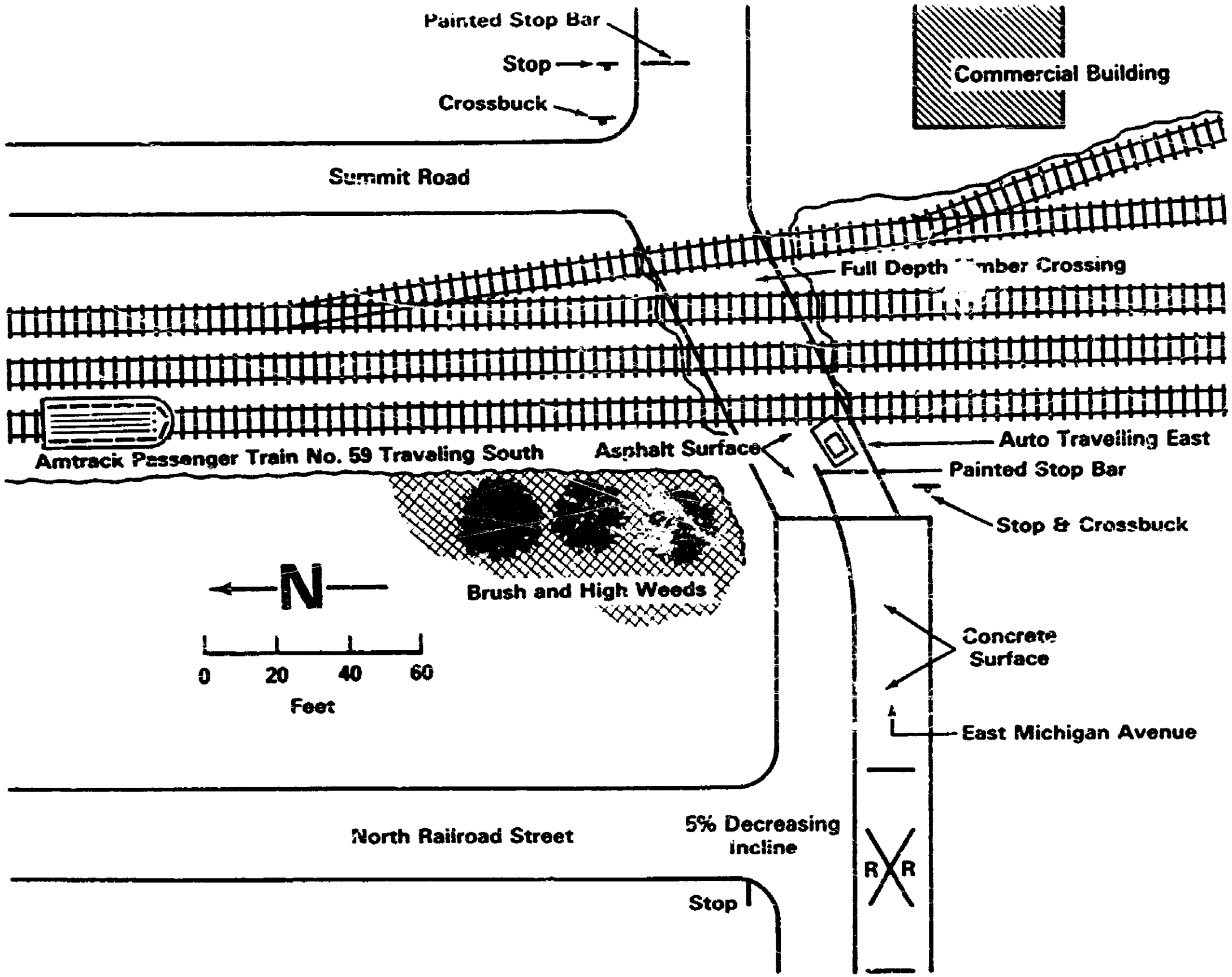


Figure 12.—Grade crossing accident at McComb, Mississippi on January 17, 1985.

The Safety Board believes that two other important safety issues warrant examination by the Federal Railroad Administration and the Federal Highway Administration. These issues are the adequacy of warning time for "double bottom" units and signal controls unprotected from damage by vehicular traffic.

## ADEQUACY OF WARNING TIME FOR "DOUBLE BOTTOM" UNITS

On June 24, 1985, at 12:55 p.m., southbound Amtrak passenger train No. 1011, operating at 65 mph (95 feet per second) over Burlington Northern Railroad track, struck the second trailer of a two-trailer semi/dump truck combination traveling west on Big Hanaford Road (a county road) in Centralia, Washington (Case 47).

The gate arm at this crossing was actuated by a southbound train 2,500 feet north of the grade crossing. This caused the gate arm to drop approximately 25 seconds before the train reached the crossing. For southbound trains, there was a 2° left hand curve about 500 feet north of the crossing, which limited motor vehicle drivers' view of an approaching southbound train.

In this case, the truckdriver said he had slowed entering the crossing and was changing gears when the gate arm came down between the first and second trailers of his unit. At his speed -- estimated at 3 mph, or 4.4 feet per second -- he did not have time to clear the crossing. The length of the truck combination was 75 feet. If the truckdriver had slowed at the stop line for the crossing and continued across, it would have taken the truck approximately 27 seconds to clear the crossing.

As a result of this accident, the Safety Board's investigator requested that the Burlington Northern Railroad increase the gate arm drop time from 25 to 30 seconds so that longer vehicles would have time to clear the track. The railroad rejected this request, claiming that this would cause too much delay for other motor vehicles.

Under Washington State statute, all Federal-aid primary routes and U.S. and State numbered routes are available for multiple-trailing units. Further, the State has designated that counties must take action to keep such units from using county roads. According to the State of Washington office that issues permits for multiple trailing units, no county has taken action to keep such units off county roads.

The Safety Board believes that the FHWA must review the length of grade crossing warning times for "double bottom" or other multiple-trailing units and act to correct conditions that place passenger trains and long, heavy trucks on a collision course.

The Federal Highway Administration has issued "Truck Size and Weight National Network Guidelines" under 23 CFR 658, which designated the U.S. interstate, primary, and arterial road network for use by multiple trailing units. Grade crossing safety considerations, such as the adequacy of clearance time, was not considered a specific factor in the final guidelines. The Safety Board believes that the adequacy of clearance time for multiple trailing units is a serious safety problem and believes that the FHWA should review those sections of the designated road network that include grade crossings and determine if the clearance times of grade crossings in this network have been determined safe for such units. As one interim measure, the FHWA should issue an "On Guard" Bulletin, warning companies and drivers of multiple-trailing units that grade crossings with active warning devices may not be safely traversed if the warning time before the train's approach is no more than 20 to 25 seconds. Companies and truckdrivers of these units should take steps to verify with the railroads the crossing clearance times

for grade crossings on routes they travel. This action would at least alert truckdrivers to the potential hazard of inadequate warning clearance times at grade crossings. The 20-second minimum found in the MUTCD (Section 8C-5), which railroads and States have adopted as a voluntary standard, should now be carefully reviewed in light of the proliferation of longer heavy truck units.

A recent study completed for the FHWA, entitled "Consequences of Mandatory Stops at Railroad-Highway Crossings," Report No. FHWA/RD-86/014, reports that "the increased use of double and triple bottom truck trailers results in the minimum MUCTD advance warning of 20 seconds being insufficient at many railroad grade crossings."

## SIGNAL CONTROLS, UNPROTECTED FROM DAMAGE BY VEHICULAR TRAFFIC

The second safety issue is that of railroad signal control boxes unprotected from damage by errant motor vehicles, particularly if the system is not integrated with the highway traffic light system for roadways adjacent to or leading across the crossing.

On April 21, 1985, at 5:05 p.m., Amtrak train No. 710 was struck broadside by an automobile at the Cutting Boulevard grade crossing in Richmond, California (Case 26). The train was traveling at approximately 60 mph (88 ft/sec) at the time of the collision. The car driver, the sole occupant, was ejected; she was transported to a local hospital where she was treated and released.

The grade crossing signal control system had been damaged in an apparent hit-and-run automobile accident sometime before this accident, so the grade crossing warning system was not operating. The highway traffic signals at this crossing continued to function for highway traffic and showed a green light for this driver.

The roadway now carries 19,200 vehicles per day. California Public Utilities Commission records showed that 45 accidents had occurred at this location since 1928, resulting in 7 fatalities and 25 reportable injuries. In 159 documented incidents, the signal equipment was damaged. The crossing has been recommended by the California Public Utilities Commission for grade separation five times.

The Safety Board believes that signal control boxes that govern active warning systems must not remain unprotected from highway traffic incursions at major thoroughfares. The Federal Railroad Administration, the Federal Highway Administration, and State highway departments need to review the damage protection provided for roadside signal control boxes. A number of innovative barriers that are available and in use by State highway departments could be used to protect grade crossing signal control boxes at such locations. If such protection, which does not increase the risk to motorists, cannot be provided because interpretation of local, county, or State laws and regulations is inconsistent, then uniform Federal standards will be necessary.

## CONCLUSIONS AND FINDINGS

1. From 1981 through 1985, there was an annual average of 7,350 grade crossing accidents involving collisions between trains and motor vehicles, resulting in an annual average of 580 fatalities and 2,700 injuries.

2. From 1981 through 1985, Amtrak was involved in an annual average of 150 grade crossing accidents with motor vehicles. Amtrak trains were involved in 70 of the 75 accidents investigated by the Safety Board as part of this study.

3. Of the 75 passenger/commuter train collisions with motor vehicles in 1985 that the Safety Board reported in this study, two resulted in most injuries to passengers on the train -- one accident had 13 injuries and one other had one serious injury and 10 minor injuries.

4. Of the 75 passenger/commuter train grade crossing accidents selected by the Safety Board for investigation in this study, more than 50 percent occurred at grade crossings with active warning devices, about 33 percent were at locations with passive warning devices, about 13 percent were at locations with stop signs, and the remainder were at locations with other devices.

5. Relatively few (19) motor vehicle drivers were tested for alcohol involvement; however, motor vehicle drivers in 11 of the 75 accidents were known to have been drinking. In 9 of the 11 cases, the driver's blood alcohol level exceeded 0.10 percent. Two known tests were performed on train engineers and the results were negative.

6. The motor vehicle drivers in 54 of the 75 accidents disregarded warning devices, were inattentive, or took other improper actions that led to their driving across crossings in front of trains.

7. In 24 of the 75 accidents, the motor vehicle drivers had difficulty crossing safely because obstructions (fixed and/or movable) limited his or her sight distance. Vegetation was the most common obstruction to sight in the 24 cases (16 cases).

8. There are no Federal standards for minimum required sight distance at grade crossings; there are no standards for preserving sight distances at grade crossings by ensuring maintenance (such as removing obstructing vegetation).

9. There are no Federal or State standards that require flashing lights and automatic gates as the minimum warning level for all public grade crossings used by passenger/commuter trains.

10. In 25 of the 75 accidents, the characteristics of the grade crossing or its approach were causal in the accidents.

11. The most predominant passive warning device, a crossbuck, at crossings with multiple tracks where passenger trains travel at high speeds is inadequate for warning motorists.

12. In 27 of the 75 accidents, the audible warning system of the train could not be heard by the occupants of the automobiles, pickup trucks, heavy trucks, and other vehicles indicating that the train's audible warning system is inadequate as a primary warning system.

13. Earlier research conducted for the FRA recommended that train horns be improved to better address the inaudibility concern; the research also suggested a new high output horn or reduction of highway traffic speeds at crossings where the audible warning system must be the primary warning system, i.e., crossings with poor visibility or no active warning devices.

14. Heavy and/or unusually long trucks should avoid routes that include highway/railroad intersections, unless these routes have grade separations or active traffic control devices that have adequate warning times.

15. Improved advance warning signs could be developed to indicate a variety of hazardous grade crossing situations, particularly limited sight distance, difficult crossing approaches (such as high hump surface profile), and high speed train operations.

16. Additional interim advance warning signs should be installed at grade crossing locations identified by States as hazardous at locations awaiting upgraded warning device(s) installation.

17. At least one reporting system has been developed that assists the public in notifying railroad companies about active warning devices that are operating when no train is nearing the crossing or other problems or malfunctions.

18. Some critical grade crossing signal control systems located adjacent to the roadway may require sasfe protection to keep highway traffic from damaging the signal control system. Any system installed should not impose a risk to errant vehicles that strike them.

19. The message conveyed by a flashing red light is confusing to some motorists. Flashing red lights at grade crossings in most States do not prohibit a motor vehicle operator from proceeding through the signal, as do gates and the standard red traffic signal. In 24 of 75 accidents, a red flashing light was involved.

## RECOMMENDATIONS

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

—to the Federal Railroad Administration:

Require railroads to maintain sight distances at grade crossings, by ensuring that the railroad right-of-way is free of obstructing vegetation or other sight obstructions such as standing or stored railroad cars. (Class II, Priority Action) (R-86-44)

Reexamine the standard applicable to trains' audible warning systems and require improvements in the audible warning systems ability to alert motor vehicle drivers to approaching trains. (Class II, Priority Action) (R-86-45)

In conjunction with the Federal Highway Administration, study, report, and undertake further demonstrations on the feasibility of adopting highway traffic signals as primary warning devices at grade crossings. (Class II, Priority Action) (R-86-46)

In conjunction with the Federal Highway Administration, assist in developing requirements for roadside barrier protection of grade crossing signal control systems located adjacent to the roadway. (Class II, Priority Action) (R-86-47)

In conjunction with the Federal Highway Administration, develop and require a system in each State similar in concept to the State of Texas public toll-free system to report active warning devices that are operating when no train is nearing the crossing, or other problems or malfunctions. (Class II, Priority Action) (R-86-48)

—to the Federal Highway Administration:

Require State highway departments to maintain sight distances at grade crossings by ensuring the roadside is free of obstructing vegetation or other sight obstructions. (Class II, Priority Action) (R-86-49)

Develop and require the use of advance warning signs that clearly inform motor vehicle drivers of particular dangers at grade crossings, including the warning of limited sight distance and high hump profile surface. (Class II, Priority Action) (R-86-50)

Develop and require installation of a specific advance warning sign for grade crossing locations identified by States as hazardous at locations awaiting upgrade to an active warning device(s). (Class II, Priority Action) (R-86-51)

Issue an "ON GUARD" bulletin to all motor carriers, advising that the audible warning systems currently used by passenger trains and high speed freight trains cannot be relied on to warn of a train's approach and that it is imperative that drivers approach any grade crossing with passive warning devices as an extremely hazardous location. (Class II, Priority Action) (R-86-52)

Issue an "ON GUARD" bulletin to all motor carriers, encouraging drivers of "double bottom" trucks or with three trailing units to use routes with grade separations whenever feasible. (Class II, Priority Action) (R-86-53)

In the truck size and weight national network guidelines, include the adequacy of clearance times for multiple truck units at grade crossings. Review those sections of the designated U.S. primary and arterial road network that include railroad/highway grade crossings and determine if the warning device clearance times of crossings in this network have been determined safe for such units. (Class II, Priority Action) (R-86-54)

In conjunction with the Federal Railroad Administration, assist in the development and requirements for a system in each State similar in concept to the State of Texas public toll-free system to report active warning devices that are operating when no train is nearing the crossing, or other problems or malfunctions. (Class II, Priority Action) (R-86-55)

In conjunction with the Federal Railroad Administration, require roadside barrier protection of grade crossing signal control systems located adjacent to the roadway. (Class II, Priority Action) (R-86-56)

In conjunction with the Federal Railroad Administration, study, report, and undertake further demonstrations on the feasibility of adopting highway traffic signals as primary warning devices at grade crossings. (Class II, Priority Action) (R-86-57)

--to Operation Lifesaver, Inc.

Expand the "Operation Lifesaver" program to include projects to identify obstructions to sight distances at grade crossing locations. Motorists should be encouraged to provide information to the railroads and appropriate State or local government officials concerning poor visibility conditions. (Class II, Priority Action) (R-86-58)

Expand the "Operation Lifesaver" program to include projects to warn motorists that train audible warning systems cannot be relied on to warn of an approaching train and that motorists should consider grade crossings with passive signing as extremely hazardous locations. (Class II, Priority Action) (R-86-59)

Expand the "Operation Lifesaver" program to deal specifically with the problems of trucks carrying bulk hazardous materials, especially petroleum products, over grade crossings. (Class II, Priority Action) (R-86-60)

—to the Governors of the States with passenger/commuter train operations:

In determining the priorities of your State's program for grade crossing safety improvements, ensure that public crossings used by passenger or commuter trains are given high priority for installation of active warning devices. (Class II, Priority Action) (R-86-61)

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

/s/ JIM BURNETT
Chairman

/s/ PATRICIA A. GOLDMAN
Vice Chairman

/s/ JOHN K. LAUBER
Member

/s/ JOSEPH T. NALL
Member

December 12, 1986

# APPENDIXES

## APPENDIX A

## SELECTED SAFETY RECOMMENDATIONS ISSUED BY THE NATIONAL TRANSPORTATION SAFETY BOARD THAT ADDRESS GRADE CROSSING SAFETY IMPROVEMENTS

GENERAL RECOMMENDATIONS TO FEDERAL OR NATIONAL/INTERNATIONAL TRANSPORTATION ORGANIZATIONS:

1. R-76-013, issued April 20, 1976 to the Department of Transportation (DOT): Require flashing lights and gates as minimum protection at all grade crossings used by commuter trains. (Status: Based on FRA's letter of August 5, 1986, this recommendation has been "Closed--Reconsidered.")

2. R-76-014, issued April 20, 1976 to the DOT: Develop a program directed at the improvement of all grade crossings used by commuter trains. This program should contemplate the separation of grades of all these crossings in the forseeable future. (Status: Based on FRA's letter of August 5, 1986, this recommendation has been "Closed—Reconsidered.")

3. H-81-077, issued October 6, 1981 to the Federal Highway Administration (FHWA): 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. (Status: "Open--Acceptable Action.")

4. H-81-079, issued October 6, 1981 to the National Safety Council (NSC): 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. (Status: Based on NSC's announcement that it would no longer coordinate the Operation Lifesaver Program, this recommendation is "Closed—Unacceptable Action.")

5. H-81-080, issued October 6, 1981 to the International Association of Chiefs of Police; American Trucking Association, Inc.; National Tank Truck Carriers Association; 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. (Status: "Open—Acceptable Action.")

6. H-81-081, issued October 6, 1981, to each State (multiple addressees): 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. (Status: "Open--Acceptable Action.")

7. R-81-096, issued October 6, 1981, 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. (Status: Based on AAR's letter of August 11, 1985, this recommendation has been "Closed—Acceptable Alternate Action.")

8. H-85-004, issued March 22, 1985, to the State Directors of Pupil Transportation of the 50 States and the District of Columbia (multiple addressees): Encourage local school jurisdictions to establish and enforce procedures to systematically monitor schoolbus driver compliance with railroad crossing stop requirements and routing requirements which include on scene observations of driver performance. (Status: "Open--Acceptable Action.")

9. H-85-005, issued March 22, 1985, to the State Directors of Pupil Transportation of the 50 States and the District of Columbia (multiple addressees): Encourage local school jurisdictions to issue an announcement to parents and students at or near the start of each school year which (1) states the jurisdiction's rules regarding schoolbuses stopping at railroad crossings, (2) requests that schoolbus drivers who fail to comply be reported to a designated school official, and (3) provide the name and telephone number of the official. (Status: "Open--Acceptable Action.")

## APPENDIX B

## NATIONAL GRADE CROSSING SAFETY PROGRAMS

Several national safety programs are directed at reducing losses from grade crossing collisions. A major Federal grade crossing safety funding program was provided by Congress under Sections 203 and 230 of the Highway Safety Act of 1973. 1/ Including fiscal year 1986 funds, this program has authorized $1.945 billion for crossing improvements to date. The funds are apportioned annually to the States based on a formula that considers area, population, rural road mileage, and number of crossings. In general, States pay 10 percent for projects financed through this program.

Under this program, active warning devices have been installed at 20,000 grade crossings. From 1982 through 1985, a concentrated effort was made to use Section 203 funds, and approximately $716 million was obligated. Forty-two percent of the funds were used for installing flashing lights and gates at 5,000 crossings; another 18 percent were used for installing flashing lights at 4,286 crossings. The remaining funds have been obligated for grade crossing surfaces, crossbucks, approach signs and markings, track circuitry improvements, and other crossing improvements.

The Federal Highway Administration's 1986 Annual Report on Highway Safety Improvement Programs indicated that the rail-highway crossing program has the largest percent reduction in accident rates after improvements. For example, fatal accidents occurring at grade crossings have been reduced by 88 percent by grade crossing improvements while the closest highway safety program has decreased fatal accidents by only 60 percent. Likewise, injury accident rate reductions are 65 percent for the grade crossing program as compared to a high of 31 percent by a highway safety program.

The Federal Railroad Administration (FRA) maintains a grade crossing inventory (DOT-AAR Grade Crossing Inventory) that can be used by State and local governments, the railroads, and others to assist in providing factual data on individual crossings or to rank crossings for safety improvements based on accident data reported by the railroads or by the States. This inventory maintains records on approximately 371,911 grade crossings -- 200,730 public grade crossings, 130,256 private grade crossings, and 40,925 other grade crossings (public grade separations and pedestrian crossings), according to the FRA's "Rail-Highway Crossing Accident/Incident and Inventory Bulletin No. 7" issued in June 1985.

Additionally, both the FRA and the Federal Highway Administration (FHWA) have undertaken considerable research to determine where grade crossing safety improvements can be made. These two agencies have supported and funded a number of major national conferences addressing grade crossing safety concerns. However, no Federal Safety requirements specifically address safety features at grade crossing locations such as sight distance requirements, mandatory clearance of vegetation, placement of flashing lights to obviate masking by sunglare, and other concerns.

1/ Note: Originally, Section 203 provided funding for Federal-aid roads and Sections 230 provided funding for non-Federal aid roads. Section 230 was later combined with Section 203 funds, hereafter known as Section 203 funds.

The largest voluntary safety program that addresses grade crossing safety is the "Operation Lifesaver" program coordinated by the National Safety Council (NSC). This program has coordinated State development and implementation of programs to improve grade crossing safety through education, law enforcement, and engineering improvements. When the Safety Board recommended that NSC coordinate this program in 1977, only 11 States implemented the idea; in 1986, the number of States has grown to 49. This national program operated on a budget of approximately $162,000 in 1985; voluntary funding was most notably provided by the National Railroad Passenger Corporation (Amtrak), the Association of American Railroads (AAR), and the Railway Progress Institute. In June 1986, the NSC announced that it would no longer coordinate this highly successful grade crossing safety program because of unresolved funding/budget problems.

## AMTRAK SUPPORTS GRADE CROSSING SAFETY EFFORTS

(The following information was provided by Amtrak)

With limited manpower and financial resources, Amtrak does all it can to support Operation Lifesaver and other efforts that strive to reduce or eliminate injuries and fatalities due to trespasser or vehicle accidents on the railroad. Amtrak's efforts include participation with the other railroads in Operation Lifesaver trains, Operation Lifesaver State council activities in some States, distribution of literature at public events, speaking engagements in schools, camps, and other public forums, and through locomotive engineer's reports of "near misses."

**Operation Lifesaver Trains** --

1982-84 -- For three years Amtrak and the freight railroads in the Massachusetts-Rhode Island-Connecticut tri-state area operated a special train between Boston, Springfield, New Haven, and return to attract public attention to Operation Lifesaver. The governors of those States issued proclamations and sometimes participated in news conferences at stations or on board the trains. The news media was invited to ride for all or a portion of the trip, and media coverage was generally good.

1984 -- Amtrak participated in a trip by the Illinois Association of Chiefs of Police from Chicago to Carbondale aboard a special car attached to a regular Amtrak train. In the car was a video monitor on which police could see the engineer's view of the tracks ahead.

1984 — Amtrak participated in other special Operation Lifesaver trains in South Carolina and Vermont. Amtrak provided some of the passenger cars to carry the officials and news media who were invited to ride the train.

1985 - Amtrak worked with the Seaboard System and other Operation Lifesaver participants to run an "Operation Lifesaver Express" train from New York City to Tampa, Florida. The train carried Amtrak passenger cars and stopped in cities along the route to promote the goals of the Operation Lifesaver program. Local officials made speeches in track-side ceremonies, and the news media covered the speeches and in some cases rode the train. On the train, guests were able to watch safety films and watch the tracks ahead on a video monitor connected to a camera mounted in the locomotive.

1985 -- Amtrak also participated in Operation Lifesaver trains in Wisconsin, Missouri, and Nevada.

**State Councils** —

Amtrak employees in several different departments participate in State Operation Lifesaver activities as time permits. For example, Amtrak's public affairs director in San Francisco serves on the executive council of the California Operation Lifesaver committee. The public affairs director in Chicago participates with the other railroads each year in the Operation Lifesaver booth at the Illinois Press Association meeting in September, and served on a committee to plan the Operation Lifesaver Symposium held in St. Louis in June 1986.

About six Amtrak safety officers around the country regularly participate in Operation Lifesaver activities. This constitutes about 5 percent of each officer's time. States where they are active include Indiana, Illinois, Louisiana, New York, and Maryland.

Amtrak's police department is also very active in Operation Lifesaver activities, primarily in the Northeast. Amtrak's police superintendant in Boston is chairperson of the State Operation Lifesaver councils in Rhode Island, Connecticut, and Massachusetts.

**Other Activities** —

Amtrak's police officers engage in other activities that help educate the public about the dangers of trespassing on railroad property as pedestrians or motorists. Approximately nine people in the police department spend about 15 percent of their time in this type of activity. Focusing on grade crossing safety, vandalism, trespassing and other safety issues, these officers made presentations to more than 345,000 students in 1985 and more than 400,000 in 1984. Most of these presentations were made in the Northeast.

The Amtrak police also patrol crossings in Amtrak's Boston Division and issue tickets to motorists who violate the driving rules there. They are also training Federal Railroad Administration inspectors who accompany them to various groups to discuss Operation Lifesaver.

Both safety and police officers at Amtrak have generated and reproduced various brochures, bookmarks, posters, bumper stickers, and other items for local and national distribution.

Division engineers, locomotive engineers, division operation personnel, and others participate in speakers' bureaus that promote Operation Lifesaver to various civic, business, and professional groups.

The police officers who make presentations use numerous films, slide shows, and an "Officer-Choo Choo" puppet to promote Operation Lifesaver in schools. They have video footage of two Amtrak triangle grade crossing accidents in the Midwest that is a formal part of their presentation. They are also working with Michigan fire departments and schoolbus drivers to promote grade crossing safety, using a slide show entitled "Precious Cargo."

When Amtrak promotes its various services through public equipment displays, a display on Operation Lifesaver is usually included. Representatives of Operation Lifesaver or Amtrak employees had handed out literature and answered questions at equipment displays in Detroit, New Orleans, Los Angeles, San Diego, and Washington, D. C., to name a few.

Amtrak's locomotive engineers have special forms on which they report "near misses." The forms are forwarded to the police for follow-up with motorists.

Until FY 86, Amtrak contributed $95,000 each year to the National Safety Council for the Operation Lifesaver program. Due to budget constraints, Amtrak's contribution was cut to $45,000 in FY 86. This contribution covers development and printing of literature and administrative costs of coordinating the program.

## APPENDIX C

## SEVENTY-FIVE PASSENGER/COMMUTER TRAIN AND MOTOR VEHICLE COLLISION GRADE CROSSING ACCIDENTS INVESTIGATED BY THE NATIONAL TRANSPORTATION SAFETY BOARD DURING CALENDAR YEAR 1985

The format for the summaries in this appendix is as follows: (Heading information to identify the accident is provided.

Safety Board Investigation No.
Accident Location
Date and Time
Motor Vehicle Involved
Train(s) Involved
Railroad(s) Involved
U.S. DOT-AAR Crossing Number
Train Activated Warning Devices
Fatalities Injuries)

**Summary:** A brief write-up of the accident scenario is provided.

**Probable Cause:** The Safety Board's determination of actions, omissions, events, conditions or a combination thereof that led to an accident is provided.

**Issues:** Safety issues that played a role in the accidents are provided. Generally, these issues are linked to the probable cause. In the summaries, the definitions of the issue categories are as follows:

1. Audibility: Conditions that led to the ineffectiveness of the train's audible warning system.
2. Visibility: Obstructions that limit a motor vehicle driver's view of an approaching train.
3. Driver's Action: An action or lack of action by a motor vehicle driver that led to a grade crossing collision or increased the severity of the accident.
4. Crossing Characteristics: Conditions of the crossing approach or the crossing location itself that played a substantive role in an accident, such as roadway approach design, angle of intersection, multiple tracks, elevated surface profile, and masked flashing lights and sunglare.
5. Alcohol/Drug Involvement: Use of alcohol and/or drugs that led the motor vehicle driver to make an incorrect decision.
6. Other Factors: Unusual conditions that may have affected an accident.
7. Weather: Conditions that may have affected an accident.

**Other Information:** Additional information on the motor vehicle driver's familiarity with the grade crossing and the national Operation Lifesaver Program, as well as the past accident history of the crossing:

**Postaccident Information:** Additional information on the crossing location, such as changes suggested in warning device levels, i.e., passive to active warning devices or other information provided by Safety Board accident investigators.

## CASE NO.: 01

**Safety Board Investigation No.:** CHI-85-F-X005
**Accident Location:** 17th Avenue, Gary, Indiana
**Date and Time:** January 2, 1985, 7:10 a.m.
**Motor Vehicle Involved:** 1971 Ford pickup truck
**Train(s) Involved:** Amtrak Train No. 323
**Railroad(s) Involved:** Amtrak/Consolidated Rail Corporation
**U.S. DOT-AAR Crossing Number:** 522903D
**Train Activated Warning Devices:** Standard flashing lights, automatic gates, audible signals
**Fatalities:** 0 **Injuries:** 1

**Summary:**

Amtrak Train No. 323, operating westbound at a speed of 38 mph, struck a 1971 Ford pickup truck at the intersection of Conrail's main track and 17th Avenue in Gary, Indiana. The pickup truck was being driven by its sole occupant, a man a few days short of his 79th birthday. He stated that he did not see or hear the train and that the crossing gates were not down. The train did not derail nor was any person aboard the train injured. The truckdriver was taken to a local hospital, treated, and released.

The driver wore thick-rimmed glasses, but the quality of his vision, although questionable, could not be documented by public record since he did not possess a valid State of Indiana driver's license. The driver routinely traversed the crossing and was thoroughly familiar with it. Due to the weather conditions, the windows were closed and the heater was operating. Postaccident tests conducted in a similar pickup truck indicated that the locomotive whistle was not audible.

The highway crosses the tracks at about a 30° angle measured in the southwest quadrant. The engineer was operating the push-pull train from the right side of the cab car. He stated he observed the pickup truck approaching from the south but lost sight of it due to the configuration of the cab car. The next time he saw the pickup truck it was immediately in front of his train. Just before impact, the engineer applied the train's brakes.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was the failure of the driver of the pickup truck to stop at the crossing because he ignored the visual active warning devices.

Contributing to the cause of the accident was the inaudibility of the train whistle and bell in the pickup truck cab.

**Issues:**

1. Audibility: Postaccident sound testing indicated the sound of the locomotive's whistle could not overcome the ambient sound level in the cab of the pickup truck.

2. Visibility: Not an issue.

Gary, Indiana

3. Driver's Action: The driver probably operated his vehicle into the path of an approaching train after negotiating his vehicle around the lowered gate. The driver was issued a traffic citation for failure to yield the right-of-way.

4. Crossing Characteristics: Not an issue.

5. Alcohol/Drug Involvement: Not an issue.

6. Other Factors: The driver's visual acuity is questionable; he wore extremely thick corrective lenses and indicated in his statement that he did not see the train.

7. Weather: Not an issue; it was dawn, clear, and 19° F.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: Four previous accidents have been reported in the DOT/AAR Grade Crossing Inventory maintained by the Federal Railroad Administration. It is interesting to note that with the exception of this case, the drivers had evacuated their vehicles prior to collision with trains.

## CASE NO.: 02

**Safety Board Investigation No.:** CHI-85-F-X006
**Accident Location:** Dundee Road, Northbrook, Illinois
**Date and Time:** January 2, 1985, 3:21 p.m.
**Motor Vehicle Involved:** 1981 Freightliner tractor semitrailer combination
**Train(s) Involved:** Amtrak Train No. 7
**Railroad(s) Involved:** Amtrak/Chicago, Milwaukee, St. Paul and Pacific Railroad
**U.S. DOT-AAR Crossing Number:** 388037N
**Train Activated Warning Devices:** Automatic gates, standard flashing lights, and audible signals
**Fatalities:** 0 **Injuries:** 0

**Summary:**

Northbound Amtrak train No. 7 struck the rear of a tractor semitrailer combination that had become stuck on a snow covered grade crossing. The tractor semitrailer combination became stuck on the grade crossing when the driver took evasive measures to avoid a collision with an automobile that had attempted to pass an oncoming snowplow. For approximately 15 minutes the driver and codriver of the tractor semitrailer combination tried to "rock" the combination out of the snow. However, they could not clear the combination from the crossing before the grade crossing warning system began to operate.

The engineer of the train said his operating speed was 60 to 70 mph when the train rounded a curve and he saw the truck standing on the track. He then initiated the emergency system at a distance of 1,200 feet in an attempt to reduce the impact force. The reduced impact speed was estimated at 30 to 40 mph. This accident might have been avoided if the two drivers had taken some action to warn approaching trains of the hazard that existed on the crossing.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was that the tractor trailer driver swerved to avoid an automobile and became stuck in the snow with the trailer fouling the grade crossing and that the driver of the tractor trailer failed to warn approaching trains.

Contributing to the cause of the accident was the ineffectiveness of snow removal operations to maintain clear roadways.

**Issues:**

1. Audibility: Not an issue.

2. Visibility: The train had limited sight distance, which prevented the engineer from seeing the tractor semitrailer combination in time to stop the train.

3. Crossing Characteristics: Not an issue.

4. Roadway Characteristics: Snow removal operations had not effectively maintained clear road conditions over the grade crossing after an 18" snowfall.

Northbrook, Illinois

5. Alcohol/Drug Involvement: Not an issue.

6. Driver's Actions: Although the motor vehicle driver had successfully avoided one collision, he neglected to take immediate actions to warn approaching trains of the hazard presented by the blocked crossing.

7. Other Factors: Municipal ordinance prohibited the sounding of a train whistle in this area.

8. Weather: Daytime, cloudy, snow and ice with approximately 3" to 5" on roadway, temperature estimated at 30° F.

**Other Information:**

1. Driver familiar with crossing: No.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: One previous accident reported in U.S. DOT-AAR Crossing Inventory since 1975.

**CASE NO.: 03**

**Safety Board Investigation No.:** LAX-85-F-X004
**Accident Location:** 20th Street, Sacramento, California
**Date and Time:** January 4, 1985, 6:40 a.m.
**Motor Vehicle Involved:** 1969 White 3-axle dump truck
**Train(s) Involved:** Amtrak Train No. 11
**Railroad(s) Involved:** Amtrak/Southern Pacific Transportation Company
**U.S. DOT-AAR Crossing Number:** 762347M
**Train Activated Warning Devices:** None, crossbucks and stop sign; an additional advance warning sign with yellow flashing lights was located 200 feet from the crossing.

**Fatalities:** 0 **Injuries:** 0

**Summary:**

Westbound Amtrak passenger train No. 11, traveling at about 30 mph, struck a southbound three-axle dump truck operated by Sac Val at a grade crossing on 20th Street in Sacramento, California. The driver of the truck was not injured. The train did not derail and there were no injuries to passengers or the traincrew.

The truckdriver stated that he stopped at the 20th Street crossing and waited for a westbound freight train to clear the crossing. Once the freight train cleared, he looked for additional trains; seeing and hearing none, he proceeded onto the three-track crossing. About midway across the grade crossing, he saw the headlight and heard the whistle of the approaching westbound Amtrak train. It is estimated that he saw or heard the train about 2 seconds before impact (about 100 feet). He accelerated his truck, but was struck on the left rear portion of the dump trailer.

At the time of the accident, the windows of the dump truck were up, the heater fan was on the maximum setting, the windshield wipers were on, and the truck company's dispatcher was talking on the citizens band (CB) radio in the truck.

Fog was reported to be heavy in the area. Sacramento Metropolitan Airport, located 7 miles northwest of the accident site was closed due to low visibility. The temperature was 34° F.

The locomotive engineer stated that visibility was about 200 feet. Fog and condensation had been freezing on the windshield and at one point the fireman had gone out and scraped ice from the windshield. The engineer and fireman said the whistle was sounded prior to sighting the truck.

This crossing has been on the State's list of crossings that are eligible for gate installation since February 9, 1981, but priority has been give to other crossings with more train and vehicular traffic. Under normal weather conditions, this crossing is not statistically dangerous. There are crossbucks and a standard traffic sign at trackside. The roadway intersects the track at nearly a 90° angle. In addition, there is an advance warning sign with a yellow flashing light located about 200 feet from the crossing.

Sacramento, California

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was extremely dense fog and the absence of train-activated crossing warning lights, which affected the driver's ability to detect an oncoming train, and ambient noise in the truck, which affected the driver's ability to hear the train whistle.

**Issues:**

1. Audibility: The truckdriver stated he did not hear the whistle warning. The driver stated that the truck windows were up, the heater fan was on, the windshield wipers were on and a company two-way radio was on (he was listening, but not talking).

2. Visibility: Not an issue.

3. Driver's Action: Not an issue.

4. Crossing Characteristics: Not an issue.

5. Alcohol/Drug Involvement: Not an issue.

6. Other Factors: (1) This crossing was placed on a list with about 1,601 others in the State eligible for upgrading of warning devices. Part of the installation cost, 10 percent, must be supplied by the city in which the crossing is located. The city of Sacramento, and others, must then prioritize the crossings within their jurisdictions. The 20th Street crossing has been eligible since February 9, 1981 for an upgrade.

   (2) The Board's investigator observed 13 trains (six Amtrak, seven freight) pass the 20th Street crossing and none of the trains sounded the whistle at the whistle board. Two of the trains did not sound any whistle at all.

7. Weather: Heavy fog severely reduced sight distance.

**Other Information:**

1. Driver familiar with crossing: Yes.
2. Driver familiar with Operation Lifesaver: No.
3. Past accident history at crossing: No previous accidents reported in the DOT-AAR Grade Crossing Inventory.

**Postaccident Information:**

The Safety Board's investigation of this accident accomplished the following postaccident actions:

A. The General Manager of the trucking firm (Sac Val) has issued instructions to all drivers using this and other crossings to lower the windows all the way and to leave them down while traversing a grade crossing.

Sacramento, California

B. The management of the Southern Pacific Transportation Company has agreed to intensify efficiency testing for signal compliance as a result of this investigation.

## CASE NO.: 04

**Safety Board Investigation No.:** DEN-85-F-X012
**Accident Location:** County Road Z, Centertown, Missouri
**Date and Time:** January 5, 1985, 11:42 a.m.
**Motor Vehicle Involved:** 1979 Ford pickup truck
**Train(s) Involved:** Amtrak Train No. 3
**Railroad(s) Involved:** Amtrak/Missouri Pacific Railroad Company
**U.S. DOT-AAR Crossing Number:** 442250H
**Train Activated Warning Devices:** Standard flashing lights
**Fatalities:** 1 **Injuries:** 0

**Summary:**

Eastbound Amtrak passenger train No. 3, traveling at a speed of 55 mph, struck a 1979 Ford pickup truck at the County Road Z grade crossing. The occupant of the pickup truck was killed in the collision.

Although the grade crossing's flashing light system was focused properly to give motorists a clear warning of an approaching train, the investigation revealed that sunlight may have interfered with the driver's view of the flashing light signal in the southeast quadrant of the intersection. This was the quadrant to which a driver would have looked for a crossing occupancy indication.

Post-accident examination of the crossing warning devices was performed by the Missouri Pacific Railroad Company and the crossing warning functioned as intended.

The motor vehicle operator was very familiar with this crossing, having used it many times prior to this accident.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was that the driver of the pickup truck was inattentive to his driving duties and drove by the flashing warning lights and into the path of the train.

Contributing to the accident was that the sun may have diminished the intensity of the flashing warning lights and that there were no warning bells.

**Issues:**

1. Audibility: Not an issue.

2. Visibility: Not an issue.

3. Driver's Action: The driver was not attentive to driving duties.

4. Crossing Characteristics: Sunlight may have diminished the intensity of the flashing warning lights and thus reduced their ability to warn the driver of an impending train. The placement of the flashing warning lights should be reviewed to minimize possible concealment by the sun's glare.

Centertown, Missouri

5. Alcohol/Drug Involvement: Not an issue.

6. Other Factors: None.

7. Weather: Not a factor; daytime, clear, 3[illegible]° F with one inch of snow on the ground.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: No previous accidents reported in the DOT-AAR Grade Crossing Inventory.

**Postaccident Information:**

The Missouri Pacific Railroad Company is considering the possibility of cutting down a dirt embankment west of the crossing that parallels the Missouri Pacific track structure, thus providing a better view of the track by northbound motorists.

## CASE NO.: 05

**Safety Board Investigation No.:** ATL-85-F-X005
**Accident Location:** Coleman Road, Winter Haven, Florida
**Date and Time:** January 7, 1985, 2:30 p.m.
**Motor Vehicle Involved:** 1979 Datsun 280Z
**Train(s) Involved:** Amtrak Train No. 97
**Railroad(s) Involved:** Amtrak/Seaboard System Railroad
**U.S. DOT-AAR Crossing Number:** 625397R
**Train Activated Warning Devices:** Standard Flashing Lights and Audible Signals
**Fatalities:** 1 **Injuries:** 0

**Summary:**

Eastbound Amtrak train, moving at a speed of 60 mph, collided with a 1979 Datsun 280Z at the intersection of Coleman Road and the Seaboard System Railroad's main track near Winter Haven, Florida. There was no derailment or fire; the automobile was destroyed. The driver, the sole occupant of the motor vehicle, was fatally injured.

Visibility of the railroad from the highway is obstructed in the northeast and northwest quadrants by buildings. Further, there is the possibility that the motor vehicle operator's vision was affected by sunglare as he approached the railroad/highway intersection. The driver of the vehicle immediately behind the accident vehicle observed the Datsun proceed across the intersection, veer to the left and accelerate immediately before being struck by the train. A similar vehicle with the radio turned on and the windows closed was used to conduct sound tests. The results indicated that the sound of the whistle did not overcome the ambient sound level in the automobile until the train was approximately 20 feet from the crossing.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was that the sun diminished the intensity of the flashing warning lights, buildings adjacent to the track obstructed the automobile driver's view of the approaching train, the driver was inattentive to his driving duties, and he did not hear the train's audible warning system because of high ambient noise levels inside the automobile.

**Issues:**

1. Audibility: Postaccident testing indicated that the sound level of the locomotive's whistle was ineffective until approximately 20 feet from the crossing because of high ambient noise levels in the automobile's interior.

2. Visibility: Sight distance was obstructed by buildings, thereby limiting the motor vehicle operator's ability to see the approaching train.

3. Driver's Action: The driver did not respond to flashing lights at the grade crossing but was seen accelerating and attempting an evasive move immediately prior to impact.

4. Crossing Characteristics: Sunglare possibly obscured the flashing lights.

Winter Haven, Florida

5. Alcohol/Drug Involvement: Not an issue.

6. Other Factors: None.

7. Weather: Not a factor; daytime, clear, dry, and 68° F.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: Unknown.

3. Past accident history at crossing: One previous accident reported in the DOT-AAR Grade Crossing Inventory.

**Post Accident Information:**

The Florida Department of Transportation has informed the Safety Board that the Coleman Road grade crossing is under review for application of gates. The gates were to be installed in the near future.

## CASE NO.: 06

**Safety Board Investigation No.:** CHI-85-F-X007
**Accident Location:** Vernon Road, Durand, Michigan
**Date and Time:** January 10, 1985, 3:30 p.m.
**Motor Vehicle Involved:** 1972 Ford pickup truck
**Train(s) Involved:** Amtrak Train No. 364
**Railroad(s) Involved:** Amtrak/Grand Trunk Western Railroad
**U.S. DOT-AAR Crossing Number:** 283711A
**Train Activated Warning Devices:** None, crossbucks
**Fatalities:** 0 **Injuries:** 4

**Summary:**

Eastbound Amtrak train No. 364, operating on the Grand Trunk Western Railroad, collided with a 1972 Ford pickup truck at a grade crossing near Durand, Michigan. The engineer of the train indicated that as he approached the crossing at approximately 55 mph he saw the pickup truck moving down the road. He lost sight of the pickup truck when it passed behind a barn and then a farm house. The motor vehicle operator neither remembers seeing the railroad advance warning signs and crossbucks nor seeing and hearing the train until he had entered the crossing. The motor vehicle operator also stated he could not clearly see the train because of fixed obstructions.

The engineer of the train indicated that he was blowing the whistle, his train's engine light was on and the bell was functioning. He also noted that the motor vehicle operator appeared to be leaning over talking to someone in the passenger seat. The pickup truck (three-person maximum in the front seat) had four people in the seat, which may have caused an overcrowding condition, further limiting visibility and distracting the driver.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was that the pickup driver was distracted by conversation with persons in the front seat of the pickup truck. Contributing to the cause of the accident was limited sight distance due to terrain and fixed objects (farm house and outbuildings) and the inaudibility of the train whistle due to the ambient noise level in the pickup.

**Issues:**

1. Audibility: The windows of the pickup were closed, and the heater and fan were on. Audibility tests indicate that the occupants may not have heard the train.

2. Visibility: The terrain and fixed structures blocked the motor vehicle operator's clear view to the track occupied by the train.

3. Driver's Action: The motor vehicle operator was not paying attention to his duties; the motor vehicle should not have been operated with an overcrowded front seat.

4. Crossing Characteristics: Not an issue.

Durand, Michigan

5. Alcohol/Drug Involvement: Not an issue.

6. Other Factors: None.

7. Weather: Not a factor; daytime, partially cloudy, snow on road, and temperature 10° F.

**Other Information:**

1. Driver familiar with crossing: Yes.
2. Driver familiar with Operation Lifesaver: No.
3. Past accident history at crossing: In the past 5 years, no accidents had occurred at this crossing according to the county sheriff.

## CASE NO.: 07

**Safety Board Investigation No.:** ATL-85-F-X007
**Accident Location:** 20th Street, Pell City, Alabama
**Date and Time:** January 12, 1985, 3:15 p.m.
**Motor Vehicle Involved:** 1980 Chevrolet Citation
**Train(s) Involved:** Amtrak Train No. 20
**Railroad(s) Involved:** Amtrak/Southern Railway System
**U.S. DOT-AAR Crossing Number:** 726850
**Train Activated Warning Devices:** None, crossbucks
**Fatalities:** 0 **Injuries:** 0

**Summary:**

Eastbound Amtrak train No. 20, operating on the Southern Railway System, collided with a 1980 Chevrolet Citation automobile at the 20th Street grade crossing in the downtown area of Pell City, Alabama. The southbound automobile accelerated approximately 700 feet from the crossing and stalled close to the north rail of the track. The automobile had had a past history of stalling. The driver of the automobile, facing an impending disaster, fled his vehicle before the collision occurred.

The train's speed was reported as 38 mph. The engineer applied his train's airbrakes after impact. The grade crossing had crossbucks, but there was no advance warning sign in place on the north side of the crossing.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was the decision of the automobile driver to drive across the grade crossing 700 feet in front of the train in a vehicle with known mechanical problems (stalling).

**Issues:**

1. Audibility: Not an issue.

2. Visibility: Not an issue.

3. Driver's Action: The driver made an unwise decision to cross in front of the train with an automobile with a known history of stalling. The driver stated he saw the train coming and he thought he could proceed across the crossing before the train arrived.

4. Crossing Characteristics: Not an issue.

5. Alcohol/Drug Involvement: Not an issue.

6. Other Factors: None.

7. Weather: Not a factor; daytime, clear, dry, and 46° F.

Pell City, Alabama

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: Not reported.

3. Past accident history at crossing: No previous accidents listed in the U.S. DOT-AAR Grade Crossing Inventory.

**Postaccident Information:**

The mayor of Pell City, Alabama, was contacted by the Safety Board and provided a list of deficiencies at the city's grade crossings.

Nineteenth Street

South side: Advance railroad pavement marking and stop bar faded, need repainting.

North side: No type of railroad advance warning signs posted; no stop bar on roadway.

Twentieth Street

South side: Railroad advance warning sign rusted, needs replacement; no stop bar on roadway.

North side: No type of railroad advance warning signs posted; no stop bar on roadway.

Twenty-Second Street

South and North side: No type of railroad advance signs posted; no stop bar on roadway.

## CASE NO.: 08

**Safety Board Investigation No.:** ATL-85-F-X008
**Accident Location:** U.S. Route 98, Lorida, Florida
**Date and Time:** January 17, 1985, 9:25 a.m.
**Motor Vehicle Involved:** 1977 Lincoln Town Car trailering a boat
**Train(s) Involved:** Amtrak Train No. 91
**Railroad(s) Involved:** Amtrak/Seaboard System Railroad
**U.S. DOT-AAR Crossing Number:** 628045V
**Train Activated Warning Devices:** Standard flashing lights and audible signals
**Fatalities:** 0 **Injuries:** 0

**Summary:**

Amtrak train No. 91, operating southbound at a reported speed of 79 mph, collided with a boat and trailer being towed by an automobile. The collision occurred at the intersection of U.S. Route 98 outside the corporate limits of Lorida, Florida. The boat and trailer were destroyed; there were no personal injuries, fire, or derailment.

The U.S Route 98 grade crossing is equipped with the following warning systems: flashing lights, bell, and crossbucks. It intersects with the railroad at an angle of 20,° measured in the northwest quadrant. Cowhouse Road and Bluff Hampton Road meet in the general vicinity of the intersection of U.S. Route 98 and the track. The eastbound automobile was crossing the track prepared to make an immediate lefthand turn onto Bluff Hampton Road. A tractor cargo tank semitrailer combination that stopped at the crossing, possibly because it was hauling hazardous materials, was moving slowly across the crossing in the opposite direction. As a result, the automobile driver stopped and waited for the truck to clear the crossing before making the left turn. The stopped automobile and boat trailer were east of the warning lights, which were reportedly not operating as the automobile entered the crossing. As the westbound truck cleared, the automobile proceeded across the track and was struck by the train. Fortunately, the only damages were to the boat and trailer.

The driver stated that he did not hear the sound of the locomotive's whistle until the train was about 150 feet from the road crossing. The automobile's windows were closed, but the radio and air conditioning were not operating.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was the obstruction of the driver's view by a nearby truck and the construction/design of the crossing, which allowed highway vehicles to become trapped. Further contributing to the accident was the inaudibility of the train whistle due to the sound dampening characteristics of the automobile.

**Issues:**

1. Audibility: The driver did not hear the train's whistle until it was 150 feet from his location because the vehicle's windows were closed. Additionally, the acceleration of the tractor cargo tank semitrailer increased the noise level of that engine, masking the train's whistle.

Lorida, Florida

2. Visibility: Vision of the oncoming train was blocked by the oncoming truck clearing the crossing and the automobile driver's line-of-sight to clearly view the approaching train was reduced.3.Driver's Action: Not an issue.

4. Crossing Characteristics: When the automobile driver stopped to wait for the truck to clear, he was in a position from which he could not see the flashing lights activate prior to his moving across the crossing; this crossing's design allows vehicles to be trapped in some circumstances on the crossing.

5. Alcohol/Drug Involvement: Not an issue.

6. Other Factors: None.

7. Weather: Not an issue; daylight, clear, and an ambient temperature of 62° F.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: Three accidents have been reported in the DOT-AAR Grade Crossing Inventory.

**CASE NO.: 09**

**Safety Board Investigation No.:** FTW-85-F-X005
**Accident Location:** Michigan Avenue, McComb, Mississippi
**Date and Time:** January 17, 1985, 10:21 a.m.
**Motor Vehicle Involved:** 1977 Chrysler LeBaron
**Train(s) Involved:** Amtrak Train No. 59
**Railroad(s) Involved:** Amtrak/Illinois Central Gulf Railroad Company
**U.S. DOT-AAR Crossing Number:** 300106Y
**Train Activated Warning Devices:** None, crossbucks and stop signs
**Fatalities:** 0 **Injuries:** 0

**Summary:**

Southbound Amtrak passenger train No. 59 struck an eastbound 1977 Chrysler LeBaron at a grade crossing on Michigan Avenue in McComb, Mississippi. Neither the traincrew and passengers nor the driver of the automobile were injured. The train was moving at 28 mph at the time of impact.

The driver stated that she stopped at the stop sign, but did not observe the train. She then moved forward and again stopped when she saw the train approaching from her left side. At this point she was on the southbound track by about 8 inches. She remained stopped and the train struck the automobile, spinning it around clear of the tracks. At this point the driver exited the automobile.

The engineer stated that he saw the automobile as it stopped on the track and thought his train would be clear of the automobile. When he got about 150 feet from the crossing, he saw that the automobile was on the track and he applied the train's emergency brakes.

This crossing is dangerous due to design and sight distance. The vegetation growing within 30 to 40 feet of the crossing makes it difficult for a motorist to see a train's approach. A motorist is actually past the stop sign before having a good view of southbound train traffic. This is the fourth accident at this grade crossing location since May 1981.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was the inability of the driver to hear the train's whistle due to high ambient noise level in the automobile, limited sight distance due to terrain, vegetation, and track curvature, and placement of the passive warning signs.

**Issues:**

1. Audibility: The driver could not hear the train's warning whistle because of the high ambient noise levels inside the automobile caused by the heater and radio, which were both on maximum settings.

2. Visibility: Sight distance for motor vehicle operators looking for southbound trains is seriously hampered by crossing design, track curvature, terrain, and vegetation.

McComb, Mississippi

3. Driver's Action: The driver failed to perceive the location of the motor vehicle relative to track and failed to back up her automobile.

4. Crossing Characteristics: The crossing is designed so that a motorist must move past the stop sign to see any southbound trains. The crossing angle of intersection is 66,° which also hinders the visibility at this crossing.

5. Alcohol/Drug Involvement: Not an issue.

6. Other Factors: None.

7. Weather: Not a factor; daytime, cloudy, and 52° F.

**Other Information:**

1. Driver familiar with crossing: Yes.
2. Driver familiar with Operation Lifesaver: No.
3. Past accident history at crossing: Seven accidents have been reported in the DOT-AAR Grade Crossing Inventory.

**Postaccident Information:**

The crossing has been the subject of much correspondence between the city of McComb, the Mississippi State Highway Department, and the Illinois Central Gulf Railroad. The plan to install flashing lights and automatic gates has been approved, but no action had been taken. Negotiations and correspondence date from 1977 to January 1985. The projected tentative starting date for installation was set as spring 1986.

## CASE NO.: 10

**Safety Board Investigation No.:** ATL-85-F-X009
**Accident Location:** State Route 667, Mount Holly, South Carolina
**Date and Time:** January 18, 1985, 10:16 p.m.
**Motor Vehicle Involved:** 1983 Ford pickup truck
**Train(s) Involved:** Amtrak Train No. 38
**Railroad(s) Involved:** Amtrak/Seaboard System Railroad
**U.S. DOT-AAR Crossing Number:** 631968W
**Train Activated Warning Devices:** None, crossbucks, and stop sign
**Fatalities:** 1 **Injuries:** 0

**Summary:**

Northbound Amtrak train No. 88, operating over the track of the Seaboard System Railroad, collided with a 1983 Ford pickup truck. The train was traveling at a recorded speed of 75 mph. The truck had been moving north on U.S. Route 52 and turned right onto State Route 667 past the highway stop sign mounted on the crossbuck mast and into the path of the train. The driver of the pickup, the sole occupant, was fatally injured. The truck was destroyed. There was no derailment, fire, or injury to persons aboard the train.

Post accident toxicological tests of the driver's blood indicated a 0.175 percent blood alcohol concentration.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was that the pickup truck driver, due to the use of alcohol, ignored the stop sign and drove into the path of the approaching train. Contributing to the cause of the accident was the absence of train activated warning devices at the crossing.

**Issues:**

1. Audibility: Not an issue.
2. Visibility: Not an issue.
3. Driver's Action: The driver failed to stop at a highway stop sign and moved into the path of the train.
4. Crossing Characteristics: Not an issue.
5. Alcohol/Drug Involvement: A blood alcohol concentration of 0.175 percent indicated that the motor vehicle operator's ability to drive was impaired.
6. Other Factors: Lack of active warning equipment at crossing.
7. Weather: Not an issue; nighttime, clear, dry, and 35° F.

Mount Holly, South Carolina

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: Unknown.

3. Past accident history at crossing: Two previous accidents have been reported in the DOT-AAR Grade Crossing Inventory.

**Postaccident Information:**

The crossing has been the subject of an improvement project between the Seaboad System Railroad Company and the South Carolina Department of Highways and Public Transportation. Permission was granted on February 2, 1984, to install automatic light signals and gates. Installation actually began after the accident.

## CASE NO.: 11

**Safety Board Investigation No.:** CHI-85-F-X008
**Accident Location:** Basswood Road, Three Oaks, Michigan
**Date and Time:** January 19, 1985, 6:40 p.m.
**Motor Vehicle Involved:** 1972 Mercedes Benz
**Train(s) Involved:** Amtrak Train No. 365
**Railroad(s) Involved:** Amtrak/Consolidated Rail Corporation
**U.S. DOT-AAR Crossing Number:** 545586R
**Train Activated Warning Devices:** None, crossbucks
**Fatalities:** 2 **Injuries:** 0

**Summary:**

Westbound Amtrak passenger train No. 365 struck a 1972 Mercedes Benz at Basswood Road grade crossing in Three Oaks, Michigan. The train was traveling at approximately 79 mph when the collision occurred. The two occupants of the automobile were killed.

The locomotive crewmembers said they noticed a car stalled or stuck in the 12 to 14 inches of snow on the crossing. The fireman, a qualified locomotive engineer, who was operating the train, applied emergency braking at 79 mph (116 feet per second) when he saw the automobile on the tracks. The crewmembers said the occupants of the vehicle gave no indication of ever seeing the train.

This accident occurred during adverse weather conditions, with heavy blowing snow and subzero temperatures. The occupants of the vehicle were in their mid-seventies. A local resident reported that vehicular traffic had been having trouble all day in the crossing area because of heavy snow and slippery conditions. Interstate and State roads had been closed and traveler advisories against all travel had been issued during the day because of the extremely hazardous road conditions.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was the driver's loss of control of the automobile, which became stuck in more than foot-deep snow on the grade crossing.

Contributing to the accident was the inability of the driver to hear the train's whistle.

**Issues:**

1. Audibility: The enclosed vehicle prevented the driver from hearing the train's whistle.

2. Visibility: Not an issue.

3. Driver's Action: The driver used poor judgment in attempting to travel in severe weather conditions. Travel advisories to the public against all travel had been issued during the day.

Three Oaks, Michigan

4. Crossing Characteristics: Not a factor

5. Alcohol/Drug Involvement: Not a factor

6. Other Factors: None

7. Weather: Darkness, -17° F., and northwest winds 25-35 mph; heavy, blowing and drifting snow (12 to 14 inches on the crossing) reduced visibility to about 400 feet.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: One previous accident had been reported in the DOT-AAR Grade Crossing Inventory.

**Postaccident Information:**

On September 2, 1983, the Michigan Department of Transportation recommended to the Berrien County Road Commission that flashing lights and gates should be installed or the crossing closed. No action has been taken to date.

## CASE NO.: 12

**Safety Board Investigation No.:** FTW-85-F-X007
**Accident Location:** County Road No. 407, Winona, Mississippi
**Date and Time:** January 27, 1985, 10:18 a.m.
**Motor Vehicle Involved:** 1985 Toyota pickup truck
**Train(s) Involved:** Amtrak Train No. 59
**Railroad(s) Involved:** Amtrak/Illinois Central Gulf Railroad
**U.S. DOT-AAR Crossing Number:** 299653E
**Train Activated Warning Devices:** Standard flashing lights and audible signals
**Fatalities** 0 **Injuries:** 0

**Summary:**

A 1985 Toyota pickup truck with driver and one passenger struck the side of the lead locomotive unit of southbound Amtrak passenger train No. 59. The train was traveling abut 40 mph at the time of the accident. Even though the driver and passenger of the pickup truck were not wearing seatbelts, they were not injured. The train did not derail and traincrew and passengers suffered no injuries.

There are an advance warning sign 458 feet from the crossing, painted pavement markings 300 feet from the crossing, and a painted cross bar on the pavement 20 feet from the crossing. At trackside are flashing lights, audible signals, and crossbucks. The flashing light circuitry is set to give a motorist 30 seconds of warning time.

The driver stated he was traveling east at about 40 to 45 mph. The driver indicated he was distracted by a birdhouse at the roadside, which momentarily caused him to look away from the approaching crossing. He did not see or hear the train until very near the crossing, when he applied the brakes and took evasive action by turning sharply to the south. This action may have saved the driver and his passenger from serious injury as the motor vehicle struck the train at an angle and was shoved away from the train after initial impact.

A witness stated the signal system was working and observed the accident vehicle as it approached the crossing. The witness said the motor vehicle driver applied the brakes at the last second and turned south. The vehicle then hit the train.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was the pickup truckdriver's distraction by a birdhouse at the roadside, which caused him to drive by the flashing warning lights and audible warning bells into the path of the train.

Contributing to the cause of the accident was the inability of the driver to hear the train's whistle due to the ambient noise level in the truck.

**Issues:**

1. Audibility: The pickup truck's windows were up and heater and stereo tape player were on medium. The driver stated he did not hear the train whistle. The

locomotive engineer stated he began the whistle warning about 1,000 feet from the crossing.

2. Visibility: Not an issue.

3. Driver's Action: The driver diverted his attention at a critical time to look at a birdhouse beside the roadway - a time when he should have been concentrating on the crossing. By the time he looked back at the roadway, it was too late to stop. He then turned sharply to the right and struck the lead locomotive at an angle. This action probably saved his life and that of his passenger.

4. Crossing Characteristics: Not an issue.

5. Alcohol/Drug Involvement: Not an issue.

6. Other Factors: None.

7. Weather: Not an issue; cloudy, daytime, and 35° F.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: Four previous accidents have been reported in the DOT-AAR Grade Crossing Inventory.

## CASE NO.: 13

**Safety Board Investigation No.:** NYC-85-F-X009
**Accident Location:** 7th Street, Charlottesville, Virginia
**Date and Time:** February 1, 1985, 1:09 p.m.
**Motor Vehicle Involved:** 1982 Volkswagen
**Train(s) Involved:** Amtrak No. 51
**Railroad(s) Involved:** Amtrak/Chesapeake and Ohio Railway Company
**U.S. DOT-AAR Crossing Number:** 224672B
**Train Activated Warning Devices:** Cantilevered flashing lights and audible signals
**Fatalities:** 0 **Injuries:** 0

**Summary:**

Westbound Amtrak passenger train No. 51 struck a 1982 Volkswagen at the 7th Street grade crossing in Charlottesville, Virginia. The train was traveling at approximately 8 mph when the car attempted to cross in front of the train. The driver of the car was not injured.

The grade crossing had the following warning systems: advance warning signs, flashing lights, and bells. City ordinance prohibits trains passing through Charlottesville from sounding the whistle.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was that the automobile driver ignored the flashing grade crossing warning lights and drove by them into the path of the oncoming train.

Contributing to the cause of the accident was a city ordinance that prohibits blowing train whistles.

**Issues:**

1. Audibility: Not an issue.
2. Visibility: Not an issue.
3. Driver's Action: The driver failed to stop when automatic flashing warning lights and bells were activated.
4. Crossing Characteristics: Not an issue.
5. Alcohol/Drug Involvement: Not an issue.
6. Other Factors: The train whistle was not sounding because of a city ordinance.
7. Weather: Not an issue; daytime, intermittent showers and sky overcast.

Charlottesville, Virginia

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: Unknown.

3. Past accident history at crossing: There has been one previous accident reported in the DOT-AAR Grade Crossing Inventory.

## CASE NO.: 14

**Safety Board Investigation No.:** DEN-85-F-X015
**Accident Location:** Ranson Road, Greenwood, Missouri
**Date and Time:** February 4, 1985, 9:45 a.m.
**Motor Vehicle Involved:** 1966 Chevrolet Model 60, flatbed truck
**Train(s) Involved:** Amtrak Train No. 30
**Railroad(s) Involved:** Amtrak/Missouri Pacific Railroad Company
**U.S. DOT-AAR Crossing Number:** 441975G
**Train Activated Warning Devices:** Standard flashing lights and audible signals
**Fatalities:** 0 **Injuries:** 0

**Summary:**

Eastbound Amtrak passenger train No. 30, operating at 70 mph, struck a flatbed truck traveling on Ranson Road in Greenwood, Missouri. There were no injuries or deaths.

A growth of trees and brush along Ranson Road restricts the view of a northbound driver until 40 feet south of the grade crossing. Because of the limited visibility at the crossing, motor vehicle drivers depend heavily upon automatic crossing warning signals. The driver indicated he had been over the crossing three times on the day of the accident and had used the crossing numerous times in the weeks preceding the accident.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was the misjudgment of the truck driver to proceed into the crossing past the flashing lights and audible signals and into the path of the train.

Contributing to the cause of the accident was the limited sight distance available to a motorist because of vegetation adjacent to the track and the lack of train activated gates.

**Issues:**

1. Audibility: Not a factor.

2. Visibility: The motor vehicle operator's sight distance was reduced by trees and brush along the roadway.

3. Driver's Action: The driver misjudged the closing rate of the truck and the train. He attempted to brake and then accelerated when he thought he could not stop in time to avoid a collision with the train.

4. Crossing Characteristics: Not an issue.

5. Alcohol/Drug Involvement: Not an issue.

6. Other Factors: None.

7. Weather: Ranson Road was covered with snow and ice, cloudy, and 20° F.

Greenwood, Missouri

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: No previous accidents had been reported in the U.S. DOT-AAR Grade Crossing Inventory.

**Postaccident Information:**

On March 4, 1985, officials of the Missouri Pacific Railroad, Missouri State Highway Department, Missouri Public Service Commission, and the Chief of Police of Greenwood met. The group formulated plans to install gates, extend the grade crossing signal circuits, and widen the roadway.

## CASE NO.: 15

**Safety Board Investigation No.:** CHI-85-F-X010
**Accident Location:** Canal Road, Lansing, Michigan
**Date and Time:** February 6, 1985, 3:10 p.m.
**Motor Vehicle Involved:** 1983 Subaru GL
**Train(s) Involved:** Amtrak No. 365
**Railroad(s) Involved:** Amtrak/Grand Trunk Western Railroad Company
**U.S. DOT-AAR Crossing Number:** 283629F
**Train Activated Warning Devices:** Standard flashing lights, automatic gates and audible signals.
**Fatalities:** 0 **Injuries:** 1

**Summary:**

A motor vehicle operator in a 1983 Subaru GL drove around two stopped automobiles and the already lowered gate arms onto the grade crossing. Amtrak train No. 365, moving at 55 mph in a westbound direction, struck the automobile. The driver, the sole occupant of the automobile, was wearing shoulder and lapbelts at the time. The automobile was propelled about 62 feet from the point of impact, landing on its roof. The driver remained restrained throughout the incident and only sustained minor injuries. Damage was estimated at $10,000.

Canal Road is a north-south two lane highway and intersects the three tracks of the railroad at an angle of 125,° measured in the northwest quadrant. During a postaccident interview, the driver indicated that she was en route to visit her boy friend, who was incarcerated in a local jail, and it was necessary for her to be there before 4:30 p.m.

The ambient temperature was 10 °F. and the driver had her auto windows closed. She indicated that she heard the train but assumed it was a slow train and she had time to go around the gates.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was the intentional act of the automobile driver in driving past two stopped automobiles, around lowered crossing gates, and into the path of the train.

**Issues:**

1. Audibility: Not an issue.

2. Visibility: Not an issue.

3. Driver's Action: The driver chose to operate her vehicle around two stopped automobiles, past the flashing red lights and lowered gate arms.

4. Crossing Characteristics: Not an issue.

5. Alcohol/Drug Involvement: Not an issue.

Lansing, Michigan

6. Other Factors: The driver was in the habit of visiting her incarcerated boy friend on Wednesday. The visiting hours ended at 4:30 p.m. She was trying to hurry to the local jail.

7. Weather: Not an issue; daytime, cloudy, and 10° F with no precipitation.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: There had been one previous accident reported in the DOT-AAR Grade Crossing Inventory.

## CASE NO.: 16

**Safety Board Investigation No.:** NYC-85-F-X011
**Accident Location:** New County Road, Secaucus, New Jersey
**Date and Time:** Pebruary 8, 1985, 6:05 p.m.
**Motor Vehicle Involved:** 1975 Mack tractor semitrailer combination
**Train(s) Involved:** New Jersey Transit No. 1207 and New Jersey Transit No. 1114
**Railroad(s) Involved:** New Jersey Transit
**U.S. DOT-AAR Crossing Number:** 263276R
**Train Activated Warning Devices:** Automatic gates and standard flashing lights
**Fatalities:** 1 **Injuries:** 0

**Summary:**

Westbound New Jersey Transit train No. 1207, operating at 50 mph, struck a tractor semitrailer traveling over the New County Road grade crossing in Secaucus, New Jersey. The initial collision with No. 1207 pushed the tractor onto an adjacent track, where the tractor was struck by New Jersey Transit Train No. 1114. The truckdriver was fatally injured in the accident.

The grade crossing had the following warning system: automatic crossing gates and flashing lights. A witness observed the tractor semitrailer traveling southbound, proceeding around the lowered gate and then being struck by the westbound train.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was the intentional act of the truckdriver in driving around a lowered crossing gate and into the path of two oncoming trains.

**Issues:**

1. Audibility: Not an issue.
2. Visibility: Not an issue.
3. Driver's Action: The driver failed to stop for the lowered crossing gates.
4. Crossing Characteristics: Not an issue.
5. Alcohol/Drug Involvement: Not identified as a factor; however, marijuana and anti-sleep pills (Nodoz) were found among driver's personal effects.
6. Other Factors: None.
7. Weather: Not an issue; temperature in the teens, windy, with blowing snow.

**Other Information:**

1. Driver familiar with crossing: Unknown.
2. Driver familiar with Operation Lifesaver: No.
3. Past accident history at crossing: There had been two previous accidents reported in the U.S. DOT-ARR Grade Crossing Inventory.

## CASE NO.: 17

**Safety Board Investigation No.:** CHI-85-F-X011
**Accident Location:** County Road 38, Abington, Illinois
**Date and Time:** February 11, 1985, 7:37 a.m.
**Motor Vehicle Involved:** County truck/snowplow
**Train(s) Involved:** Amtrak Train No. 348
**Railroad(s) Involved:** Amtrak/Burlington Northern Railroad Company
**U.S. DOT-AAR Crossing Number:** 063726H
**Train Activated Warning Devices:** None, crossbucks
**Fatalities:** 0 **Injuries:** 1

**Summary:**

Eastbound Amtrak train No. 348 struck a county truck/snowplow at County Road 38 grade crossing near Abington, Illinois. The train was traveling at approximately 79 mph when the truck/snowplow entered the grade crossing. The occupant of the truck/snowplow was slightly injured in the ensuing collision.

The engineer and fireman reported that the snowplow operator came onto the crossing without stopping. The truck/snowplow was operating slowly or was nearly stopped at the time of the collision and was struck in the rear. The truck/snowplow operator had not buckled his seatbelt and was thrown out of the truck's cab in the collision.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the the accident was the failure of the snowplow driver to stop at the grade crossing or to detect the approaching train due to distraction of the snow plowing operations and snow blowing over the truck.

Contributing to the cause of the accident was the inability of the driver to hear the train's whistle due to the high ambient noise level of the truck/snowplow.

**Issues:**

1. Audibility: The train whistle was muted by the truck's engine noise and operation of the snowplow.

2. Visibility: The snow plowing operation caused restricted visibility for the snowplow operator.

3. Driver's Action: The driver was not attentive to conditions while approaching and entering the grade crossing.

4. Crossing Characteristics: Not an issue.

5. Alcohol/Drug Involvement: Not an issue.

Abington, Illinois

6. Other Factors: The snowplow operator had been on duty eight hours when he began plowing County Road 38.

7. Weather: An issue; 12° F, light blowing snow, winds gusting to 30 mph.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: There had been one previous accident reported in the DOT-AAR Grade Crossing Inventory.

## CASE NO.: 18

**Safety Board Investigation No.:** CHI-85-F-X012
**Accident Location:** Main Street, Lexington, Illinois
**Date and Time:** February 13, 1985, 2:50 p.m.
**Motor Vehicle Involved:** Paymaster Seed Company truck/trailer combination
**Train(s) Involved:** Amtrak No. 303
**Railroad(s) Involved:** Amtrak/Illinois Central Gulf Railroad
**U.S. DOT-AAR Crossing Number:** 290792U
**Train Activated Warning Devices:** Standard flashing lights. Cantilevered flashing lights not over traffic lane and audible signals.
**Fatalities:** 0 **Injuries:** 0

**Summary:**

Southbound Amtrak passenger train No. 303, operating at 78 mph, struck the trailer of a westbound Paymaster Seed Company truck/trailer combination traveling across the Main Street grade crossing in Lexington, Illinois. The trailer was destroyed. There were no injuries or deaths.

The Main Street grade crossing is equipped with automatic flashing lights, bells, and crossbucks. The view of the railroad approach from the north while traveling westbound on Main Street is obstructed by silos, by the structures of a grain elevator complex located 25 feet from the main track and 260 feet from the crossing, and by standing railroad cars on a siding. Moreover, the road intersects the track at a 48° acute angle. Therefore, the driver's view of the track was hampered when looking to his right by the configuration of the truck's side window. There was no view to the rear because the trailer combination completely blocked the driver's view. Because of the limited visibility at the crossing, motor vehicle drivers are heavily dependent upon automatic warning devices. The driver indicated he did not see the flashing warning lights or hear the audible warning bells or the train's whistle until he had already traveled past the first grade crossing signal location. He became aware of the cantilevered crossing signal operating on the other side of the crossing and attempted to accelerate to clear the crossing upon realizing his dangerous position. Witnesses indicated that the signals were working and the train was sounding its whistle.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the the accident was that the truckdriver misjudged the capability of his vehicle to clear the crossing and drove by the flashing lights and audible warning bells into the path of the train.

Contributing to the cause of the accident were industrial buildings and standing railroad cars obstructing the driver's view of the train, the configuration of the crossing, and the inability of the driver to hear the train's whistle due to the high ambient noise level in the truck.

Lexington, Illinois

**Issues:**

1. Audibility: The high ambient sound level in truck's cab caused by the engine masked the train's warning whistle. The pitch of the whistle could have been heard if the truckdriver had listened carefully.

2. Visibility: The driver's vision was blocked by a grain elevator and standing railroad cars.

3. Driver's Action: The driver failured to stop when automatic flashing warning lights and bells were activated.

4. Crossing Characteristics: An acute angle at this railroad/highway intersection added to the driver's difficulty in safely negotiating this crossing.

5. Alcohol/Drug Involvement: Not an issue.

6. Other Factors: None.

7. Weather: Not an issue; daytime, cloudy and 25° F, 6 inches of snow with slushy road surface.

**Other Information:**

1. Driver familiar with crossing: Yes.
2. Driver familiar with Operation Lifesaver: No.
3. Past accident history at crossing: Three previous accidents had been reported in the DOT-AAR Grade Crossing Inventory.

**Postaccident Information:**

The Illinois Central Gulf Railroad, the Illinois Commerce Commission, the City of Lexington, the County of McLean, and the State of Illinois Department of Transportion agreed on March 13, 1985, to install crossing gate arms, predictor circuits, and a rubber surface at this crossing. Their work was to be completed by March 13, 1986.

## CASE NO.: 19

**Safety Board Investigation No.:** FTW-85-F-X008
**Accident Location:** Parish Road, Jennings, Louisiana
**Date and Time:** February 17, 1985, 2:43 p.m.
**Motor Vehicle Involved:** 1980 Chevrolet pickup truck
**Train(s) Involved:** Amtrak Train No. 2
**Railroad(s) Involved:** Amtrak/Southern Pacific Transportation Company
**U.S. DOT-AAR Crossing Number:** 767932S
**Train Activated Warning Devices:** None, crossbucks
**Fatalities:** 1 **Injuries:** 1

**Summary:**

Eastbound Amtrak train No. 2, traveling at 70 mph (102.6 feet per second), struck the right rear of a 1980 Chevrolet Luv pickup truck at a grade crossing located on Parish Road near the town of Jennings, Louisiana. The driver of the pickup truck was seriously injured, and his passenger, a 15-year-old girl, was killed. They were not wearing seatbelts, and both were ejected from the vehicle. The train did not derail and neither the train crew nor the passengers were injured.

The locomotive engineer stated that the pickup truck appeared to stop, then moved forward onto the crossing. The train's whistle warning was sounded beginning about 2,000 feet from the crossing.

The driver of the pickup truck stated that as he approached the crossing he could not see the train. Trees and brush located between 75 and 120 feet northwest of the road substantially blocked the driver's view of the eastbound train. He also did not hear the train's whistle warnings. He put his truck in first gear and then in second; he then looked left and saw nothing. He looked right and left and saw the train rapidly closing. He stepped on the gas, but the train struck the rear portion of his truck. He said the radio was off and the right window was up, while the left window (driver's side) was halfway up.

A blood sample was taken from the driver, analyzed for alcohol content, and found negative.

A recent detour had increased traffic over Parish Road. The roadway is 21 feet wide, gravel covered, with an 8.3 percent ascending grade to the crossing area. Crossbucks are located at trackside. There are no advance warning signs, pavement markings, or audible warning device. The posted speed limit for Parish Road is 30 mph.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was the failure of the pickup truck driver to stop and stay at the grade crossing due to an error in judgment.

Contributing to the cause of the accident was vegetation that obscured the driver's view of the train, and the inability of the driver to hear the train's whistle due to the high ambient noise level in the truck. Further contributing was the routing of traffic because

Jennings, Louisiana

of a detour over a roadway and grade crossing, neither of which were designed for heavy traffic conditions nor adequately provided with advance warning signs to inform automobile drivers of the hazardous crossing.

**Issues:**

1. Audibility: The pickup truckdriver did not hear the train's whistle warnings. Since obstructions blocked his view of the train, the train's whistle was a critical issue in this accident.

2. Visibility: Vegetation blocked the view of the driver, allowing him an estimated 1 to 2 seconds to decide to stop his vehicle.

3. Driver's Action: It is probable that the driver approached without intending to stop, panicked when he saw the train, and momentarily hit the brakes before he attempted to clear the crossing.

4. Crossing Characteristics: An issue; a recent detour had increased traffic over this road. Advance warning signs should have been installed.

5. Alcohol/Drug Involvement: A possible issue; the driver told the investigator that he had one beer that morning to relax. His companion was tested and found to be negative for alcohol. The investigating police officer ordered toxicological testing for the driver, but for unknown reasons the test was not completed.

6. Other Factors: Seatbelts may have kept both occupants in their vehicle.

7. Weather: Not an issue; daytime, dry, clear, and 68° F.

**Other Information:**

1. Driver familiar with crossing: Yes.
2. Driver familiar with Operation Lifesaver: No.
3. Past accident history at crossing: No previous accidents had been reported in the DOT-AAR Grade Crossing Inventory.

## CASE NO.: 20

**Safety Board Investigation No.:** ATL-85-F-X010
**Accident Location:** Capitol Concrete Drive, Jacksonville, Florida
**Date and Time:** February 19, 1985, 5:07 p.m.
**Motor Vehicle Involved:** 1979 Kenworth tractor semitrailer dump truck combination
**Train(s) Involved:** Amtrak Train No. 88
**Railroad(s) Involved:** Amtrak/Seaboard System Railroad
**U.S. DOT-AAR Crossing Number:** 620897W
**Train Activated Warning Devices:** None, crossbucks and stop sign
**Fatalities:** 0 **Injuries:** 1

**Summary:**

Northbound Amtrak train No. 88, traveling at 70 mph (a closing rate of 102.6 feet per second), collided with an eastbound empty tractor semitrailer dumptruck combination at Capitol Concrete Drive in Jacksonville, Florida. The tractor was destroyed and the semitrailer was substantially damaged. The driver, who was seriously injured, could not be interviewed due to his medical condition.

An eastbound motor vehicle driver's view of the railroad south of the grade crossing is obstructed by a row of pine trees (20 to 60 feet in height). This row of trees obstructs vision until the driver is approximately 17 feet from the nearest rail. Further, on the day of the accident, a group of railroad hopper cars were standing on a siding, which further reduced sight distance.

Audibility tests using a similar tractor semitrailer combination were conducted to test the sound level of the locomotive's whistle. With the heater fan in an "on" position and windows closed, the whistle was not significantly above the ambient noise level in the tractor cab until the locomotive was 20 feet from the tractor. The truckdriver had about 1 second to hear the train.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was that the truckdriver failed to stop at the grade crossing because nearby trees and standing railroad cars obscured the driver's view of the train, and the driver was unable to hear the train's whistle due to the high ambient noise level in the truck.

**Issues:**

1. Audibility: High ambient sound level in the cab of the tractor with the windows closed and the engine and heater fan operating reduced the driver's ability to hear the train's whistle and take action to avoid a collision.

2. Visibility: The driver's sight distance was obstructed by a row of trees and railroad cars standing on a siding.

3. Driver's Action: The accident may have been averted had the driver stopped, looked, and listened prior to moving across the rail crossing.

Jacksonville, Florida

4. Crossing Characteristics: Not an issue.

5. Alcohol/Drug Involvement: Not an issue.

6. Other Factors: None.

7. Weather: Not an issue; daytime, clear, dry, and 70° F.

**Other Information:**

1. Driver familiar with crossing: Yes

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: There had been no previous accidents reported in the U.S. DOT-AAR Grade Crossing Inventory.

## CASE NO.: 21

**Safety Board Investigation No.:** FTW-85-F-X009
**Accident Location:** Jaycee Avenue, Effingham, Illinois
**Date and Time:** February 19, 1985, 5:36 p.m.
**Motor Vehicle Involved:** 1980 Oldsmobile Calais
**Train(s) Involved:** Amtrak No. 392
**Railroad(s) Involved:** Amtrak/Illinois Central Gulf Railroad
**U.S. DOT-AAR Crossing Number:** 28919N
**Train Activated Warning Devices:** None, crossbucks
**Fatalities:** 1 **Injuries:** 0

**Summary:**

Northbound Amtrak train No. 392 struck an eastbound automobile at Jaycee Avenue grade crossing in Effingham, Illinois. The driver, the sole occupant of the automobile, was killed.

The train was operating within the city limits of Effingham, Illinois and had decreased its speed from 79 mph to 60 mph in preparation for a scheduled stop at Effingham. The train engineer sounded the train whistle and the engine's headlights were illuminated. He observed the car moving slowly toward the crossing and assumed it would stop short of the track on which his train was traveling. However, the automobile continued into the path of train No. 392. The impact occurred on the right front door of the automobile and the train shoved the car 272 feet before the automobile rotated 90° and deflected to the right of the train.

This particular grade crossing has seven tracks; five are yard tracks and two are main line tracks (one southbound, one northbound). The length of Jaycee Avenue grade crossing is approximately 100 feet. The approach to the crossing is on level ground and visibility is good for about 1 1/2 miles in either direction.

The roadway surface over the grade crossing is dirt and gravel. Each track is at a slightly different elevation and the crossing surface is considered rough, necessitating slow speeds for automobile traffic.

This crossing has no active warning devices; therefore, automobile traffic proceeds onto the crossing based on past experience as to which track trains may be using. Generally, traffic will proceed and stop before the track being occupied.

At the time of the accident, the motor vehicle operator was en route to a part-time job at a fast-food restaurant, located 1 1/2 miles east of the accident site. She had been working 3 nights a week at the restaurant for about 4 months. In addition to this part-time job, she worked full time at a factory in nearby Altamont, Illinois. She was familiar with the route she was driving and the grade crossing.

Examination of the totally destroyed 1985 Oldsmobile Calais revealed that the windows were all closed. It could not be determined if the heater blower or the radio/tape deck was in use at the time.

Effingham, Illinois

Three eyewitnesses approximately 200 feet west of the accident site reported that before impact the train's whistle was being sounded and from their position it appeared that the automobile stopped on the track. Examination of the automobile's tail lights indicated elongation of the bulb filament, indicating that the brakes were being applied at the time of the accident.

When multiple tracks are involved (seven for this crossing), the motor vehicle operators proceed onto the crossing attempting to forecast which of the tracks is in use. Particularly troublesome are multiple tracks where slow speed freight and yard operations take place with high speed train operations such as Amtrak.

This accident probably occurred because the automobile driver was familiar with the grade crossing, having traversed it four to six times per week. She probably moved across the grade crossing assuming the train was (1) on another track or (2) was a slow moving freight train and she misjudged the speed of the approaching Amtrak train.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was an inadequate warning system at an extremely hazardous seven-track grade crossing where high speed and low speed train operations occur daily.

Contributing to the cause of the accident was the inability of the driver to hear the train's whistle due to the high ambient noise level in the automobile.

**Issues:**

1. Audibility: Probably a factor, although the investigation could not clearly document the heater and radio/tape deck positions. The temperature was 45° F and the heater fan was probably on. The windows were all closed.

2. Visibility: Not an issue.

3. Driver's Action: The motor vehicle operator was unable to judge the speed of the approaching train.

4. Crossing Characteristics: The crossbuck gives no aid or assistance to an automobile driver as to the speed of an approaching train. The length of this grade crossing, with multiple tracks, multiple speed train operations (151 trains in a 7-day period), and the rough surface support the need for an active warning configuration at this site.

5. Alcohol/Drug Involvement: Not an issue.

6. Other Factors: The driver was working two jobs, one full-time and one part-time; in addition, she had a 1-year-old child to care for at home.

7. Weather: Not an issue; evening, clear, dry, and 45° F.

Effingham, Illinois

**Other Information:**

1. Driver familiar with crossing: Yes.
2. Driver familiar with Operation Lifesaver: No.
3. Past accident history at crossing: No previous accidents reported in the DOT-AAR Grade Crossing Inventory.

**Postaccident Information:**

As a result of this accident, the city of Effingham erected stop signs on each side of the crossing.

## CASE NO.: 22

**Safety Board Investigation No.:** DEN-85-F-X016
**Accident Location:** County Road No. 18, Hanna Junction, North Dakota
**Date and Time:** February 24, 1985, 12:12 a.m.
**Motor Vehicle Involved:** 1972 Ford Galaxy
**Train(s) Involved:** Amtrak Train No. 8
**Railroad(s) Involved:** Amtrak/Burlington Northern Railroad Company
**U.S. DOT-AAR Crossing Number:** 086881C
**Train Activated Warning Devices:** None, crossbucks
**Fatalities:** 0 **Injuries:** 2

**Summary:**

Eastbound Amtrak passenger train No. 8 struck a 1972 Ford Galaxy at a grade crossing with a passive crossbuck warning sign. The motor vehicle driver received minor injuries and the passenger in the automobile was critically injured.

Before the accident, the motor vehicle was parked on the railroad's access road. As the train moved toward the grade crossing, it began sounding its whistle signal. Additionally, the train's headlights and strobe lights were illuminated. The motor vehicle operator, apparently seeing the approaching train, panicked and moved forward on the access road and attempted to make a right hand turn at the crossing in front of the train. The motor vehicle stalled on the crossing and the train struck the automobile at an estimated speed of 65 mph.

This accident would not have occurred if the motor vehicle operator had remained stopped parallel to the tracks on an adjacent access road.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was the intentional act of the automobile driver to move his automobile from a stopped parallel position adjacent to the tracks into the path of an oncoming train.

**Issues:**

1. Audibility: Not an issue.

2. Visibility: Not an issue.

3. Driver's Action: The motor vehicle driver took the unnecessary action of moving from a stopped parallel position adjacent to the track into the path of an on-coming train.

4. Crossing Characteristics: Not an issue.

5. Alcohol/Drug Involvement: The motor vehicle operator's toxicological tests taken after the accident were negative for alcohol or drugs.

Hanna Junction, North Dakota

6. Other Factors: None.

7. Weather: Not an issue; dark, clear, calm, and 26° F.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: No previous accidents reported to the DOT-AAR Grade Crossing Inventory.

## CASE NO.: 23

**Safety Board Investigation No.:** ATL-85-F-X011
**Accident Location:** Stoffel Drive, Tallapoosa, Georgia
**Date and Time:** February 27, 1985, 9:45 a.m.
**Motor Vehicle Involved:** 1973 Plymouth Duster
**Train(s) Involved:** Amtrak Train No. 19
**Railroad(s) Involved:** Amtrak/Southern Railway System
**U.S. DOT-AAR Crossing Number:** 726704S
**Train Activated Warning Devices:** None, crossbucks
**Fatalities:** 0 **Injuries:** 1

**Summary:**

Amtrak Train No.19, operating over Southern Railway System (SRS) track, collided with an automobile at a grade crossing on Stoffel Drive and the Southern's main track. There was no derailment, fire, or personal injury aboard the train. The automobile was destroyed and the driver, the sole occupant, injured. It could not be determined if the driver was using his occupant restraint system.

The auto was being driven in the same direction as the westbound train, on a road that paralleled the track. The train had been slowed to 30 mph in compliance with a city speed ordinance. The engine crew stated that it appeared to them that the automobile was being brought to a stop prior to crossing in front of the train. The fireman, a qualified locomotive engineer, was operating the locomotive and was sounding the whistle in accordance with requirements. He immediately applied the train brakes in an emergency application upon seeing the automobile entering the crossing. The 17-year-old male driver had a total of 3 months driving experience at the time of the accident, and he may have been using a recently installed high powered tape deck. Just before the crossing, the tape on his high-powered tape deck had ended.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was the distraction of the driver with his tape deck at a critical time when his attention should have been focused on safely negotiating the grade crossing.

Contributing to the accident was the inability of the driver to hear the approaching train just before entering the crossing intersection because of the high ambient noise level within the automobile.

**Issues:**

1. Audibility: The possibly high sound level of the tape deck (200 watt) and the heater/fan motor operating inside the vehicle and the closed windows muted the audible warning of the locomotive's whistle.

2. Visibility: Not an issue.

3. Driver's Action: The driver failed to stop, look, and listen prior to proceeding across the grade crossing. The tape may have just ended, distracting the driver from his duties as a motor vehicle operator.

Tallapoosa, Georgia

4. Crossing Characteristics: Not an issue.

5. Alcohol/Drug Involvement: Not an issue.

6. Other Factors: The 17-year-old driver had been driving for 3 months and therefore did not have the benefit of experience.

7. Weather: Not an issue; daytime, clear, and 42° F.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: No previous accidents had been reported in the DOT-AAR Grade Crossing Inventory.

**CASE NO.: 24**

**Safety Board Investigation No.:** CHI-85-F-X-013
**Accident Location:** Kennedy Road, Peotone, Illinois
**Date and Time:** March 4, 1985; 6:50 p.m.
**Motor Vehicle Involved:** 1980 International Harvester tractor semitrailer tank combination
**Train(s) Involved:** Amtrak Train No. 381
**Railroad(s) Involved:** Amtrak/Illinois Central Gulf Railroad
**U.S. DOT-AAR Crossing Number:** 288917S
**Train Activated Warning Devices:** None, crossbucks
**Fatalities:** 0 **Injuries:** 5

**Summary:**

Southbound Amtrak passenger train No. 381 struck a DOT placarded tractor semitrailer cargo tank combination transporting used motor oil at Kennedy Road grade crossing at Peotone, Illinois. The train was traveling at 77 mph. The tank truck turned right off Highway 50, stopped, and proceeded onto the grade crossing. The ensuing collision derailed the train and destroyed the tank truck. One Amtrak employee was injured, three passengers and the engineer of the train were taken to nearby hospitals, treated, and released for minor injuries.

The truckdriver said he saw the train and judged it to be approximately a mile away. He started across the two main tracks in first gear and shifted to second gear after clearing the first. He said he never heard the train's whistle but noticed the train's headlight just before the collision. He attempted to accelerate to clear the crossing.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was the intentional act of the truck driver to proceed over the crossing when there was not adequate time to safely complete the maneuver.

Contributing to the accident was the high noise level in the truck cab and instructions to the truck driver from his company to use a route that involved a crossing with passive warning devices, even though a safer route with active warning devices was available.

**Issues:**

1. Audibility: The truckdriver did not hear the train's signal system at a distance because the ambient noise level in the cab was about 83 decibels. This level in the cab is not exceeded by the whistle until the train is at the crossing. The engineer stopped blowing the whistle about 500 feet before the crossing to seek protection from the impending collision.

2. Visibility: Not an issue.

Peotone, Illinois

3. Driver's Action: The driver stopped for grade crossing, misjudged the approaching train's distance, and proceeded into crossing. He failed to use an alternate route with gates and flashing lights. The driver shifted gears when he should not have taken such action because of stalling potential. Hazardous materials trucks that are stopped at a crossing should never start to cross even if they think they see a train.

4. Crossing Characteristics: Not an issue.

5. Alcohol/Drug Involvement: Not an issue.

6. Other Factors: The truck driver's company policy was not to use the grade crossing with active warning devices because the noise from the heavy trucks annoyed residents of the town.

7. Weather: Dark, 28° F, partly cloudy, occasional snow flurries, high winds 35 to 45 mph.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: No previous accidents reported in the DOT-AAR Grade Crossing Inventory.

## CASE NO.: 25

**Safety Board Investigation No.:** LAX-85-F-X008
**Accident Location:** Golden State Frontage Road, Fresno, California
**Date and Time:** March 5, 1985, 5:45 p.m.
**Motor Vehicle Involved:** 1981 Chevrolet pickup truck
**Train(s) Involved:** Amtrak Train No. 709
**Railroad(s) Involved:** Amtrak/Atchison, Topeka and Santa Fe Railroad Company
**U.S. DOT-AAR Crossing Number:** 028464L
**Train Activated Warning Devices:** Standard flashing lights, automatic gates, and audible signals.
**Fatalities:** 0 **Injuries:** 0

**Summary:**

Amtrak train No. 709 struck a pickup truck at the intersection of the Atchison, Topeka and Santa Fe (ATSF) Railroad's main track and the Golden State Frontage Road near Fresno, California. The northbound train was moving at about 45 mph when the crew observed a westbound pickup truck drive around the lowered gate arms and into the path of the train. The pickup truck was substantially damaged in the ensuing collision. Fortunately, no one was injured.

The driver's view of the tracks was not obstructed. However, the driver, who routinely crossed the railroad tracks at this intersection, stated that she often drove around the lowered gates because a train never neared the crossing. Following the collision, the California Highway Police (CHP) conducted two separate breath tests on the motor vehicle operator about 47 and 51 minutes after the collision. The results were 0.20% and 0.19% blood alcohol concentrations respectively. Tests for drugs were not performed. The driver told CHP and the Safety Board that she was also taking a "nerve" medication. The CHP report of the incident indicates that the driver was "staggering drunk." The driver was not aware that the pickup truck had been struck by a train following the accident.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was that the pickup truckdriver failed to detect the approaching train due to the use of alcohol and that warning signals of the crossing sometimes activated due to yard trains undertaking switching operations, even though a train did not enter the crossing.

**Issues:**

1. Audibility: Not an issue.

2. Visibility: Not an issue.

3. Driver's Action: The driver ignored activated flashing lights and lowered automatic half gate arms.

Fresno, California

4. Crossing Characteristics: The warning signals at this grade crossing with multiple tracks (3) would frequently activate without a train entering the crossing. This experience could lead motor vehicle drivers to disregard the value of the active warning device.

5. Alcohol/Drug Involvement: The driver was driving under the influence according to California State law. Her tested blood alcohol concentrations were .19% and .20%.

6. Other Factors: None.

7. Weather: Not an issue; dusk, cloudy, and 52° F.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: No previous accidents reported in the U.S. DOT-AAR Grade Crossing Inventory.

## CASE NO.: 26

**Safety Board Investigation No.:** LAX-85-F-X009
**Accident Location:** 6th Street, Oceanside, California
**Date and Time:** March 6, 1985, 8:43 p.m.
**Motor Vehicle Involved:** 1977 Oldsmobile Delta 88
**Train(s) Involved:** Amtrak Train No. 587
**Railroad(s) Involved:** Amtrak/Atchison, Topeka and Santa Fe Railway Company
**U.S. DOT-AAR Crossing Number:** 026813M
**Train Activated Warning Devices:** Automatic gates, standard flashing lights and audible signals

**Fatalities:** 0 **Injuries:** 1

**Summary:**

Westbound Amtrak passenger train No. 587, traveling at about 22 mph, struck a 1977 Oldsmobile Delta 88 at a grade crossing located on 6th Street in Oceanside, California. The driver of the automobile, the sole occupant, sustained minor injuries. The train did not derail and there were no injuries to the traincrew or the passengers.

A local police officer was stopped on the opposite side and served as an eyewitness. The officer stated that a freight train had cleared the crossing and a number of vehicles proceeded to traverse the tracks. The automatic crossing gates came down again as an Amtrak train approached. The gates trapped two automobiles already in the crossing, but they were in a safe location. The first car stopped to wait for the Amtrak passenger train, the second car backed up, drove around the first car and was struck by the train. If the second car had remained behind the first car, it would have been safe. The crossing consists of two tracks, one mainline and the other a yard track.

The driver of the vehicle would not answer specific questions about his actions at the crossing. A local police officer visually evaluated the driver as acting intoxicated and administered a sobriety test, which the driver failed. The driver was taken into custody, tested for alcohol, and found to have a blood alcohol concentration of 0.17 percent. The driver did not possess a valid operator's license.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was the failure of the automobile driver to avoid the approaching train due to the use of alcohol, and the design of the crossing, which allows drivers to become trapped between crossing gates.

**Issues:**

1. Audibility: Not an issue.

2. Visibility: Not an issue.

3. Driver's Action: The driver made the wrong decision, influenced by alcohol, to drive around the car in front and proceed onto the crossing. If he had remained in line, he would have been safe.

Oceanside, California

4. Crossing Characteristics: The distance across the roadway from gate to gate is about 75 feet. The fact that two cars could get trapped between the gates indicates that the design of the crossing warning system should be re-evaluated.

5. Alcohol/Drug Involvement: The driver tested at a blood alcohol concentration of 0.17 percent.

6. Other Factors: The driver was operating without a license. From October 30, 1983, to June 15, 1984, he had been involved in four traffic violations, three for speeding and one for operating without a license.

7. Weather: Not an issue; nighttime, clear, dry, and 55° F.

**Other Information:**

1. Driver familiar with crossing: Yes.
2. Driver familiar with Operation Lifesaver: No.
3. Past accident history at crossing: No previous accidents reported in the U.S. DOT-AAR Grade Crossing Inventory.

## CASE NO.: 27

**Safety Board Investigation No.:** ATL-85-F-X012
**Accident Location:** Wooten Road, Intercession City, Florida
**Date and Time:** March 16, 1985, 9:11 p.m.
**Motor Vehicle Involved:** 1973 Chev t Nova
**Train(s) Involved:** Amtrak Train No
**Railroad(s) Involved:** Amtrak/Seaboard System Railroad
**U.S. DOT-AAR Crossing Number:** 622954P
**Train Activated Warning Devices:** Standard flashing lights, automatic gates and audible signals.
**Fatalities:** 1 **Injuries:** 2

**Summary:**

Northbound Amtrak passenger train No. 82 struck a 1973 Chevrolet Nova at a grade crossing on Wooten Road in Intercession City, Florida. The accident resulted in one fatality and two serious injuries to occupants of the automobile. There was no fire or derailment; damage was estimated at $2,200.

Eyewitnesses in an automobile stopped at the grade crossing stated that they observed the accident vehicle ignore the flashing lights and go around the lowered gate arms. The driver stopped and stalled directly on the grade crossing. The backup lights of the automobile were seen to illuminate immediately prior to impact. One of the automobile's passengers had exited the car and was struck by the train as it impacted with the stalled automobile. The train was moving at 78 mph as it exited the curve 1,100 feet south of the grade crossing. The engineer applied the train brakes in an emergency application when the stalled automobile was illuminated by the locomotive's headlight.

The 21-year old male driver had been licensed in Florida for about 1 year prior to the accident. However, his driving violation record begins in December 1980 and includes counts of driving without a license and driving under the influence (DUI). Post mortem toxicological tests indicated that the driver had a blood alcohol concentration of 0.17 percent. Florida's legal DUI level is 0.10 percent. The two passengers in the automobile were also alcohol-involved. There were no injuries to persons on the train.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was that due to the use of alcohol the automobile driver, ignored lowered crossing gates and drove into the path of the oncoming train.

**Issues:**

1. Audibility: Not an issue.

2. Visibility: Not an issue.

3. Driver's Action: The driver drove his vehicle around the lowered gate arms.

Intercession City, Florida

4. Crossing Characteristics: Not an issue.

5. Alcohol/Drug Involvement: The driver's blood alcohol concentration of 0.17 percent exceeds Florida's driving under the influence statute.

6. Other Factors: None.

7. Weather: Not an issue; nighttime, cloudy, no temperature provided.

**Other Information:**

1. Driver familiar with crossing: Undetermined.

2. Driver familiar with Operation Lifesaver: Undetermined.

3. Past accident history at crossing: No previous accidents reported in the U.S. DOT-AAR Grade Crossing Inventory.

**CASE NO.: 28**

**Safety Board Investigation No.:** FTW-85-F-X010
**Accident Location:** Goodman Road, Lake Charles, Louisiana
**Date and Time:** April 5, 1985, 5:30 p.m.
**Motor Vehicle Involved:** 1976 Cadillac
**Train(s) Involved:** Amtrak Train No. 2
**Railroad(s) Involved:** Amtrak/Southern Pacific Transportation Company
**U.S. DOT-AAR Crossing Number:** 768018J
**Train Activated Warning Devices:** None, crossbucks
**Fatalities:** 0 **Injuries:** 4

**Summary:**

Eastbound Amtrak train No. 2, traveling at 68 mph, struck the right rear of a 1976 Cadillac at the grade crossing on Goodman Road in Lake Charles, Louisiana.

The automobile was southbound with a driver and three passengers. The driver was treated and released at a local hospital, but the three passengers were seriously injured. The train did not derail, and there were no injuries to the traincrew or passengers. The driver was familiar with the grade crossing and knew that it had a "hump"; therefore, he drove the automobile at a slight angle to the left to keep it from dragging on the high center.

The driver stated that he did not hear the train. The locomotive engineer stated that he began the whistle warning about 2,000 feet from the crossing. The windows of the automobile were up and the radio and air conditioner were on. The driver and passengers were having normal conversation. No seatbelts were in use.

The driver also said that he did not see the train. Trees and bushes on the railroad right-of-way obscured vision so that the driver did not have a clear view of the train until about 30 feet from the crossing. Although the driver did not complain of sun blinding his view it was noted that at that time of day the sun is low in the sky and laying over the tracks in a manner that could affect the operator's ability to see the train.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was the failure of the automobile driver to detect the approaching train due to limited sight distance because of vegetation adjacent to the track, the inaudibility of the train's audible warning system because of high ambient noise level in the automobile's interior, and a road with an elevated surface profile.

**Issues:**

1. Audibility: The motor vehicle operator stated he did not hear the train. This was due in large part to the windows being up and the air conditioner and radio being on medium.

2. Visibility: Vegetation on the railroad right-of-way had not been cleared.

Lake Charles, Louisiana

3. Driver's Action: The motor vehicle operator took no action to avoid the collision because his attention was focused on keeping his automobile from dragging its bottom while negotiating a road with a high center.
4. Crossing Characteristics: Not an issue.

5. Alcohol/Drug Involvement: Not an issue.

6. Other Factors: There was an elevated surface profile at the grade crossing.

7. Weather: Not a issue; dusk, clear, dry, and 78° F.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: No previous accidents reported in the U.S. DOT-AAR Grade Crossing Inventory.

## CASE NO.: 29

**Safety Board Investigation No.:** CHI-85-F-X015
**Accident Location:** County Road 200, Crawfordsville, Indiana
**Date and Time:** April 6, 1985, 8:53 a.m.
**Motor Vehicle Involved:** 1978 Oldsmobile Cutlass
**Train(s) Involved:** Amtrak Train No. 317
**Railroad(s) Involved:** Amtrak/Consolidated Railroad Corporation
**U.S. DOT-AAR Crossing Number:** 543071W
**Train Activated Warning Devices:** None, crossbucks
**Fatalities:** 1 **Injuries:** 0

**Summary:**

Westbound Amtrak train No. 317, operating at 58 mph, struck a southbound automobile traveling on County Road 200 near Crawfordsville, Indiana. The driver was killed and the vehicle was destroyed in the ensuing collision. Witnesses stated that the train's horn was sounding and the headlight was on. The driver, the sole occupant of the motor vehicle, was killed.

The road approaches the grade crossing from the north at an obtuse angle with a clear sight distance. The view to the west is obstructed by a line of trees and the acute angle of approach.

The locomotive engineer stated he had just made a service air reduction in anticipation of entering onto the Seaboard System railroad. As the train approached the crossing, the engineer saw the automobile approaching from the north. The automobile appeared to speed up, according to the engineer. The engineer put the train into emergency braking about 200 feet from the crossing and struck the automobile, carrying it 1,296 feet down the track.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was that the automobile driver, possibly due to the use of alcohol, accelerated in an attempt to beat the train over the crossing.

**Issues:**

1. Audibility: Not an issue.

2. Visibility: Not an issue.

3. Driver's Action: The driver failed to stop for an approaching train.

4. Crossing Characteristics: Not an issue.

5. Alcohol/Drug Involvement: Postaccident testing resulted in a 0.04 percent blood alcohol concentration. Marijuana was found among the driver's effects. No tests were taken for drugs. The driver's judgment may have been impaired by alcohol.

Crawfordsville, Indiana

6. Other Factors: None.

7. Weather: Not an issue; daytime, partly cloudy, and 42° F.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: Unknown.

3. Past accident history at crossing: There had been one previous accident reported in the DOT-AAR Grade Crossing Inventory since 1976.

## CASE NO.: 30

**Safety Board Investigation No.:** FTW-85-F-X011
**Accident Location:** Boyd Street, West Palm Beach, Florida
**Date and Time:** April 7, 1985, 10:32 a.m.
**Motor Vehicle Involved:** 1981 Ford Escort
**Train(s) Involved:** Amtrak train No. 91
**Railroad(s) Involved:** Amtrak/Seaboard System Railroad, Inc.
**U.S. DOT-AAR Crossing Number:** 628031S
**Train Activated Warning Devices:** Standard flashing lights
**Fatalities:** 0 **Injuries:** 2

**Summary:**

Amtrak train No. 91, operating southbound at 30 mph, struck an eastbound 1981 Ford Escort. There was no derailment or injury to persons aboard the train; the two occupants of the automobile were injured. The collision occurred at the intersection of the Seaboard System Railroad's main track and Boyd Street in West Palm Beach, Florida.

Boyd Street intersects the track at a 90° angle. The automobile was initially traveling southward in the same direction as the train on Wilkens Street, which runs parallel to the track. A highway stop sign required the automobile to stop before turning left onto Boyd Street. There is also a set of flashing lights focused for southbound traffic on Wilkins Street, to alert drivers to the approach of a train if their travel will take them over the track.

Witnesses stated that the locomotive's whistle was sounded, the headlight was illuminated and the crossing warning equipment was activated on approach of the train. The driver stated that she stopped for the stop sign before turning but did not see the flashing lights. Neither the driver nor the passenger heard or saw the train; they may have been conversing. Postaccident audibility tests indicated that with the windows closed and the air conditioning blower on medium as it was during the accident, the sound of the locomotive's whistle should have been heard 500 feet before the impact (11 seconds) if conversation within the automobile was not too loud. There were no skid marks as a result of braking.

The driver lived a short distance from the intersection and stated that she drove over the railroad crossing at least twice a day, five days a week. She was on her way to church at the time of the accident.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was that the automobile driver was distracted by conversation with a passenger and drove by the flashing warning lights into the path of the train.

Contributing to the accident was the inability of the driver to hear the train's whistle due to the high ambient noise level in the automobile.

West Palm Beach, Florida

**Issues:**

1. Audibility: A possible factor; testing indicated that the sound of the locomotive's whistle did not significantly increase above the ambient sound level in the automobile until the train was about 500 feet from the automobile.

2. Visibility: Not an issue.

3. Driver's Action: The driver operated her vehicle onto the track in front of the approaching train oblivious to the train activated warning lights.

4. Crossing Characteristics: The driver would have to look over her left shoulder at an oblique angle to observe an approaching train.

5. Alcohol/Drug Involvement: Not an issue.

6. Other Factors: The driver alluded to the possibility that she and her passenger were in conversation at the time they approached the rail/highway intersection.

7. Weather: Not an issue; clear, daytime, and 68° F.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: No previous accidents reported in the DOT-AAR Grade Crossing Inventory since 1976.

## CASE NO.: 31

**Safety Board Investigation No.:** CHI-85-F-X016
**Accident Location:** Private Crossing, Grand Rapids, Michigan
**Date and Time:** April 10, 1985, 7:47 a.m.
**Motor Vehicle Involved:** 1978 Ford pickup truck
**Train(s) Involved:** Amtrak Train No. 371
**Railroad(s) Involved:** Amtrak/Chesapeake and Ohio Railway Company
**U.S. DOT-AAR Crossing Number:** 234600A
**Train Activated Warning Devices:** None, stop sign privately installed
**Fatalities:** 0 **Injuries:** 0

**Summary:**

Westbound Amtrak passenger train 371 struck a pickup truck at a private crossing near Grand Rapids, Michigan. The train was traveling at approximately 60 mph when the truck entered the crossing without stopping. The occupant of the truck was not injured.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was the failure of the pickup driver to stop at a private grade crossing due to the driver's attention being focused on the steep approach to the crossing.

**Issues:**

1. Audibility: Not an issue.

2. Visibility: Not an issue.

3. Driver's Action: The driver did not stop before entering the grade crossing.

4. Crossing Characteristics: The approach to the grade crossing is on a sharp incline.

5. Alcohol/Drug Involvement: Not an issue.

6. Other Factors: None.

7. Weather: Not an issue; daylight, clear, and 35° F.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: Three previous accidents reported in the U.S. DOT-AAR Crossing Inventory.

## CASE NO.: 32

**Safety Board Investigation No.:** FTW-85-F-X012
**Accident Location:** Capace Street, Independence, Louisiana
**Date and Time:** April 10, 1985, 11:10 a.m.
**Motor Vehicle Involved:** 1977 Ford LTD station wagon
**Train(s) Involved:** Amtrak Train No. 59
**Railroad(s) Involved:** Amtrak, Illinois Central Gulf Railroad
**U.S. DOT-AAR Crossing Number:** 300176N
**Train Activated Warning Devices:** None, crossbucks
**Fatalities:** 0 **Injuries:** 0

**Summary:**

Southbound Amtrak train No. 59 traveling at 79 mph was struck by a 1977 Ford LTD station wagon on the left side of the lead locomotive unit as the train passed through a grade crossing at Capace Street in Independence, Louisiana. There were no injuries to the driver of the 1977 Ford or to the passengers and crew of the train. The train did not derail.

A motor vehicle driver's view of southbound trains is limited due to track curvature and vegetation. The roadway is a 12-foot-wide blacktop with about a 9 percent ascending grade. The road is very narrow and motor vehicle drivers must concentrate on oncoming traffic as well as the railroad grade crossing.

The driver had purchased the vehicle a few days before the accident and stated she was not completely familiar with its operational characteristics. She stated the hood on this vehicle was longer than that of the motor vehicle she previously owned. The driver stated she never heard the train and her attention was focused on the narrow roadway that only allowed one car at a time to traverse the road safely.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was that the automobile driver's attention was focused on negotiating the narrow one-lane roadway, vegetation obstructed the driver's view of the train, and the driver was unable to hear the train's approach.

**Issues:**

1. Audibility: The driver stated she did not hear the whistle. Tests conducted by the Safety Board indicated that the maximum warning time to the motor vehicle driver was 2.2 seconds before the train entered the crossing. The train engineer stated the whistle was sounding as he approached the crossing.

2. Visibility: The curvature of the track and brush along the roadway obstructs the view of southbound trains to westbound automobile traffic.

3. Driver's Action: The motor vehicle driver was focusing her attention on the narrow one-lane roadway and did not detect the approaching train.

Independence, Louisiana

4. Crossing Characteristics: The narrow, one-lane crossing requires the driver to first make sure there is no oncoming traffic, and virtually focus on train traffic at the same time.

5. Alcohol/Drug Involvement: Not an issue.

6. Other Factors: The driver stated she was not completely familiar with her automobile because it was recently purchased. The hood on the automobile was longer than her previous automobile and may have affected her judgment in where to stop in relation to the railroad tracks.

7. Weather: Not an issue; dry, cloudy, and 78° F.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: Two previous accidents had been reported in the U.S. DOT-AAR Crossing Inventory.

## CASE NO.: 33

**Safety Board Investigation No.:** LAX-85-F-X011
**Accident Location:** McKenzie Street, Fresno, California
**Date and Time:** April 11, 1985, 8:08 a.m.
**Motor Vehicle Involved:** 1979 Oldsmobile Delta 88
**Train(s) Involved:** Amtrak Train No. 711
**Railroad(s) Involved:** Amtrak/Atchison, Topeka and Santa Fe Railway Company
**U.S. DOT-AAR Crossing Number:** 028556Y
**Train Activated Warning Devices:** Standard flashing lights and audible signals
**Fatalities:** 0 **Injuries:** 0

**Summary:**

Westbound Amtrak passenger train No. 711, traveling at 20 mph, struck a 1979 Oldsmobile at a grade crossing located on McKenzie Street in Fresno, California. The driver (sole occupant) was not injured. The train did not derail. There were no injuries to the traincrew or passengers. The locomotive engineer stated that the automobile made no apparent effort to stop; in fact, immediately prior to the collision, the automobile increased speed. The driver of the auto stated that he saw the train and started to stop, but the brakes failed. When he saw a collision was imminent, he increased speed to try to beat the train. After the accident, an inspection of the braking system at a local garage revealed no defects. The reason for this accident was a deliberate attempt by the motorist to beat the train.

This crossing has been placed on the State list of 1,601 crossings eligible for automatic gate installation. In February 1966, the California Public Utility Commission recommended that the crossing be installed with train activated flashing lights and automatic crossing gates. The flashers were installed, but the gates were not. The city of Fresno, California, must supply 10 percent of the cost for the automatic crossing gates. The speed through Fresno, California, is limited to 20 mph due to the number of crossings. There are six crossings within 1,800 feet of this crossing.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was the intentional act of the automobile driver to try to beat the train over the crossing.

Contributing was the inaudibility of the train whistle due to the high ambient noise level of the automobile's radio.

**Factors:**

1. Audibility: Postaccident testing showed the automobile radio producing decibel levels of 94.5. At this level, the train whistle would not be heard until it was at the crossing.

2. Visibility: Not an issue.

Fresno, California

3. Driver's Action: The driver speeded up in an attempt to beat the train after an alleged brake failure that was not found during a vehicle tear down completed by the Safety Board.

4. Crossing Characteristics: Not an issue.

5. Alcohol/Drug Involvement: Not an issue.

6. Other Factors: None.

7. Weather: Not an issue; clear, dry, and 68° F.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: Seven accidents reported since April 27, 1963 according to he California Public Utilities Commission. Records maintained by the DOT-FAR Grade Crossing Inventory report two previous accidents since 1975. The Safety Board's investigator concluded that the State of California's records were more accurate.

## CASE NO.: 34

**Safety Board Investigation No.:** NYC-85-F-X014
**Accident Location:** Pierson Lane, Windsor, Connecticut
**Date and Time:** April 17,1985, 6:15 p.m.
**Motor Vehicle Involved:** 1982 Ford Mustang
**Train(s) Involved:** Amtrak Train No. 140
**Railroad(s) Involved:** Amtrak
**U.S. DOT-AAR Crossing Number:** 500734G
**Train Activated Warning Devices:** Standard flashing lights and audible signals
**Fatalities:** 1 **Injuries:** 2

**Summary:**

Northbound Amtrak train No. 140, moving about 20 mph, struck a westbound 1982 Ford Mustang at the Pierson Lane grade crossing in Windsor, Connecticut. The automobile's driver was fatally injured, and one passenger suffered minor injuries. A relative of the fatally injured driver in another automobile had to be treated for shock.

The driver's view of the oncoming train was restricted because of a commercial building and trucks parked in a lot close to the crossing. These obstructions limited sight distance to 220 feet. Pierson Lane intersects with Amtrak's double main track at an angle of 65° as measured in the southwest quadrant. On the day of the accident, Amtrak's maintenance crews were working on the northbound track, which required the use of the southbound track to move northbound trains. At the time of the accident, the train activated warning circuit on the track south of Pierson Lane was only 85 feet long. Amtrak's Timetable Special Instructions required the train to stop at the crossing and that flag protection be provided prior to operating through the crossing. Witnesses indicated that the train's whistle was being sounded as it approached the Pierson Lane crossing at about 20 mph. Daily train traffic over this crossing included 25 through-trains and 1 switching movement.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was that the train crew did not comply with Amtrak Special Instruction requiring a train to stop and provide flag protection at the crossing, Amtrak's lack of enforcement of the Special Instruction, the absence of flagmen at the crossing, and a building obstructing the driver's view of the approaching train.

**Issues:**

1. Audibility: Not an issue.
2. Visibility: A commercial building located in the southeast quadrant limited sight distance.
3. Driver's Action: Not an issue.
4. Crossing Characteristics: Not an issue.

Windsor, Connecticut

5. Alcohol/Drug Involvement: Not an issue.

6. Other Factors: The railroad management/supervision did not properly oversee the dangerous situation at this crossing. Amtrak's Special Instructions were not followed and proper flag protection was not provided.

7. Weather: Not an issue; daylight, clear, and about 60° F.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: There have been 3 previous accidents reported in the DOT-AAR Grade Crossing Inventory.

**Postaccident Information:**

On May 15, 1985, an approach circuit to activate the automatic crossing signal system was installed 2,150 feet south of the Pierson Lane crossing. This circuit provides 30 seconds of warning time for a train moving at 50 mph.

CASE NO.: 35

**Safety Board Investigation No.:** CHI-85-F-X017
**Accident Location:** Eastman Avenue, Springfield, Illinois
**Date and Time:** April 19, 1985, 7:01 a.m.
**Motor Vehicle Involved:** 1975 Chrysler Cordoba
**Train(s) Involved:** Amtrak Train No. 300
**Railroad(s) Involved:** Amtrak/Illinois Central Gulf Railroad Company
**U.S. DOT-AAR Crossing Number:** 294293S
**Train Activated Warning Devices:** Standard flashing lights, cantilevered flashing lights and audible signals
**Fatalities:** 0 **Injuries:** 1

**Summary:**

Northbound Amtrak train No. 300, operating on the Illinois Central Gulf Railroad, struck an eastbound 1975 Chrysler with one occupant at the Eastman Avenue grade crossing. The train was traveling at approximately 25 mph. The single occupant in the motor vehicle was injured. The engineer and fireman stated that the grade crossing's flashing lights were operating. The train was not using its whistle signal because the Illinois Commerce Commission exempts all railroads operating in the State from sounding whistle signals at grade crossings that are protected by gates and/or flashing lights. However, whistle signals are to be sounded in the case of an emergency, or if a special warning is required.

This crossing is actively protected by cantilevered flashing light signals. The railroad intersects the Eastman Avenue crossing at approximately a 45° acute angle. Sight distance is restricted by the 4.2 percent ascending slope of the road and by houses located parallel to the railroad. The crossing is complicated by another road, 8th Street, which also crosses the railroad and intersects with Eastman Avenue. A motor vehicle operator must pay attention not only to the grade crossing but also must stop for the roadway intersection on the east side of the crossing while looking for southbound traffic on 8th Street. This crossing needs to be redesigned.

The motor vehicle operator was unaware of the approaching train. The operator's attention may have been directed to the approaching highway stop sign and traffic on 8th Street.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was the distraction of the automobile driver due to other highway traffic and the absence of train activated warning gates at a complicated multiple roadway/track configuration.

**Issues:**

1. Audibility: Not an issue.

2. Visibility: Not an issue.

Springfield, Illinois

3. Driver's Action: The driver was inattentive to his driving duties and was distracted by other highway traffic.

4. Crossing Characteristics: This was a poorly designed grade crossing that requires lights coordinated with active crossing warning devices since there are two roadways involved.

5. Alcohol/Drug Involvement: Not an issue.

6. Other Factors: None.

7. Weather: Not an issue; daylight, clear, dry, and 70° F.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: The Illinois Commerce Commission records indicate that there have been a total of 14 accidents at this crossing since 1972: eight at the Eastman Avenue crossing and six at the adjoining crossing on 8th Street. The DOT-AAR Grade Crossing Inventory indicates that there have been seven previous accidents reported in the inventory.

**CASE NO.: 36**

**Safety Board Investigation No.:** LAX-85-F-X012
**Accident Location:** Cutting Boulevard, Richmond, California
**Date and Time:** April 21, 1985, 5:05 p.m.
**Motor Vehicle Involved:** 1975 Cadillac
**Train(s) Involved:** Amtrak Train No. 710
**Railroad(s) Involved:** Amtrak/Southern Pacific Transportation Company
**U.S. DOT-AAR Crossing Number:** 751678U
**Train Activated Warning Devices:** Automatic gates, cantilevered flashing lights, audible signals and highway traffic signals.
**Fatalities:** 0 **Injuries:** 1

**Summary:**

Amtrak train No. 710 was struck broadside by a 1975 Cadillac at the Cutting Boulevard grade crossing in Richmond, California. The train was traveling at approximately 60 mph at the time of the collision. The sole occupant was ejected from the automobile. She was transported to a local hospital where she was treated and released.

The grade crossing warning system was not operating for train traffic approaching from the west and traveling east. Its signal control system had been damaged by an apparent hit-and-run automobile sometime prior to this accident. The highway traffic signals were not preempted and continued to function for highway traffic. A witness waiting for a bus near the accident site verified that the crossing gates did not activate properly and that the train was sounding its warning whistle prior to the crossing. The highway traffic light system should be designed in concert with the crossing signal control system.

Records maintained for this crossing by the California Public Utilities Commission (CaPUC) indicated that 45 accidents had occurred at this location since 1928. There were a total of 7 fatalities and 25 reportable injuries in these accidents. This boulevard has a reported traffic count of 19,200 vehicles per day. There were 159 documented incidents in which the signal equipment was damaged. This particular crossing has been recommended by the CaPUC for grade separation twelve times.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was that the grade crossing signal was inoperative because an unknown automobile had previously damaged the signal control system located adjacent to the roadway.

Contributing to the accident was the lack of corrective action by responsible railroad, State, and local officials to correct a crossing location known to be dangerous and the absence of a protecting barrier for the railroad signal control system to preclude automobile intrusion.

Richmond, California

**Issues:**

1. Audibility: Not an issue.

2. Visibility: Not an issue.

3. Driver's Action: Not an issue.

4. Crossing Characteristics: The signal control system for this crossing is vulnerable to unnecessary damage from automobiles.

5. Alcohol/Drug Involvement: Not an issue.

6. Other Issues:
   (a) Grade Crossing Signals--the signal was inoperative for train traffic approaching from the west traveling east.
   (b) Actions by responsible officials--the dangerous conditions at this crossing are well known by both railroad and governmental officials. Responsible officials should have insured that any failure of the grade crossing signal system would trigger a red restrictive warning.

7. Weather: Not an issue; overcast, daytime, and 60° F.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: Forty-five accidents have occured at this crossing since 1928 according to CaPUC records. The DOT-AAR Grade Crossing Inventory indicates that there had been five accidents since 1975.

## CASE NO.: 37

**Safety Board Investigation No.:** FTW-85-F-X013
**Accident Location:** Quality Lane, Senatobia, Mississippi
**Date and Time:** April 23, 1985, 6:48 a.m.
**Motor Vehicle Involved:** 1983 Datsun sedan
**Train(s) Involved:** Amtrak Train No. 59
**Railroad(s) Involved:** Amtrak/Illinois Central Gulf Railroad
**U.S. DOT-AAR Crossing Number:** 297612T
**Train Activated Warning Devices:** Cantilevered flashing lights over traffic lanes and audible signals
**Fatalities:** 0 **Injuries:** 0

**Summary:**

On April 23, 1985, about 6:48 a.m., a westbound 1983 Datsun sedan struck the side of southbound Amtrak train No. 59. The accident occurred at the intersection of Quality Lane and the Illinois Central Gulf Railroad's main track in Senatobia, Mississippi. There were no personal injuries, fire, or derailment.

Visibility of the southbound train from the westbound auto was impeded by a chain link fence and vegetation. The driver indicated that he did not observe either the crossing's flashing lights or hear the train's whistle as he drove onto the grade crossing. Neither he nor his 2 1/2 year old daughter, who was restrained in an infant car seat, was injured.

The weather was light rain and overcast. His first clear view of the approaching train was about 25 feet from the nearest rail. He applied the automobile brakes and skidded into the lead locomotive unit; the auto was deflected away from the train. The engineer stated that he began sounding the locomotive's whistle at the whistle post 877 feet north of the crossing. The estimated train speed was 70 mph.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was that the automobile driver failed to stop at the crossing because he was distracted by a child in the car, that a fence and vegetation obstructed the driver's view of the approaching train, and that the driver did not hear the train's audible warning system because of the automobile's closed windows and operating windshield wipers.

Issues:

1. Audibility: The closed windows and operating windshield wipers reduced the driver's ability to hear the train's whistle to a maximum of about 5 or 6 seconds before impact.

2. Visibility: A chain link fence and vegetation limited the available sight distance from the automobile to the approaching train.

3. Driver's Action: The driver failed to stop when flashing lights and bells were activated. He was possibly distracted by the child in the car.

Senatobia, Mississippi

4. Crossing Characteristics: Not an issue.

5. Alcohol/Drug Involvement: Not an issue.

6. Other Factors: The driver was distracted by his 2 1/2-year-old child passenger.

7. Weather: Not an issue; overcast, light rain, wet, 62° F.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No

3. Past accident history at crossing: Two previous accidents reported in the DOT-AAR Grade Crossing Inventory.

## CASE NO.: 38

**Safety Board Investigation No.:** LAX-85-F-X014
**Accident Location:** Zeering Road, Denair, California
**Date and Time:** May 1, 1985, 7:15 p.m.
**Motor Vehicle Involved:** 1980 Datsun pickup truck
**Train(s) Involved:** Amtrak Train No. 709
**Railroad(s) Involved:** Amtrak/Atchison, Topeka, and Santa Fe Railway Company
**U.S. DOT-AAR Crossing Number:** 028726R
**Train Activated Warning Devices:** Automatic gates, standard flashing lights and audible signals

**Fatalities:** 1 **Injuries:** 0

**Summary:**

Westbound Amtrak passenger train No. 709, traveling at about 79 mph, struck a 1980 Datsun pickup truck at a grade crossing on Zeering Road in Denair, California. The driver of the pickup truck was killed. The train did not derail, and there were no other injuries.

The engineer and fireman on train No. 709 stated that the train was being operated at the maximum authorized speed of 79 mph when they approached Zeering Road. They stated the crossing gates were down, the headlight of the train was on bright, the whistle was sounding, and the engine bell was ringing. They observed the pickup truck drive around the lowered gates from the east before the impact with the train occurred. Another automobile in front of the pickup truck also drove around the lowered gates.

A conductor standing on the platform of his freight train's caboose was on an adjacent track east of the crossing and observed the pickup driver go around the gates. He shouted a warning to the driver, but to no avail. The conductor's train was not blocking the driver's view of the oncoming passenger train.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was the intentional act of the pickup truck driver to drive around lowered crossing gates into the path of the oncoming train.

**Issues:**

1. Audibility: Not an issue.

2. Visibility: Not an issue.

3. Driver's Action: The motor vehicle operator drove around lowered gates.

4. Crossing Characteristics: Not an issue.

5. Alcohol/Drug Involvement: Not an issue; toxicological tests for blood alcohol concentration for the pickup driver was negative.

Denair, California

6. Other Factors: None.

7. Weather: Not an issue; evening, clear, dry, and 83° F.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: No previous accidents reported in the DOT/AAR Grade Crossing Inventory.

## CASE NO.: 39

**Safety Board Investigation No.:** DEN-85-F-X018
**Accident Location:** Gravel Road (no identification) near Highway No. 2, Norwich, North Dakota
**Date and Time:** May 6, 1985, 8:12 a.m.
**Motor Vehicle Involved:** 1978 Dodge pickup truck
**Train(s) Involved:** Amtrak Train No. 7
**Railroad(s) Involved:** Amtrak/Burlington Northern Railroad Company
**U.S. DOT-AAR Crossing Number:** 093061W
**Train Activated Warning Devices:** None, crossbucks
**Fatalities:** 1 **Injuries:** 0

**Summary:**

Westbound Amtrak train No. 7, operating on the Burlington Northern Railroad Company track, struck a North Dakota State Highway Department pickup truck. The occupant of the pickup truck was fatally injured. The pickup truck driver was not familiar with the grade crossing and had been told to pick up gravel samples at a gravel pit located in proximity to the crossing. The engineer of the train indicated the driver did not look to see the train. The driver may have been preoccupied with his search for the gravel pit.

The train's speed was approximately 60 mph. The train's whistle was being sounded and the engineer placed the train brakes into emergency about 600 feet from the crossing. The train's speed was not reduced substantially to avoid the collision.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was that the pickup truck driver failed to stop at the crossing due to distraction as he looked for a gravel pit in the proximity of the crossing.

Issues:

1. Audibility: Not an issue.

2. Visibility: Not an issue.

3. Driver's Action: The motor vehicle operator failed to stop before entering a railroad grade crossing.

4. Crossing Characteristics: Not an issue; however, railroad advance warning signs would improve a motor vehicle driver's recognition of approach to the grade crossing.

5. Alcohol/Drug Involvement: Not an issue.

6. Other Factors: None.

7. Weather: Not an issue; daytime, clear, dry, and 50° F.

Norwich, North Dakota

**Other Information:**

1. Driver familiar with crossing: No.

2. Driver familiar with Operation Lifesaver: Operation Lifesaver programs are active in North Dakota under the guidance of the North Dakota Safety Council (NDSC). However, this accident highlighted that neither the supervisor of the ND State Highway Department facility nor the North Dakota State Highway Patrol were involved with the program.

3. Past accident history at crossing: No previous accident had been reported in the DOT-AAR Grade Crossing Inventory.

**Postaccident Information:**

The Safety Board's investigator of this accident obtained assurances from the program manager of the NDSC that both of the State agencies involved would be notified and actively solicited to become involved in Operation Lifesaver. Further, the Burlington Northern Division Supervisors agreed to further stress Operation Lifesaver in their accident prevention programs.

## CASE NO.: 40

**Safety Board Investigation No.:** CHI-85-F-X020
**Accident Location:** Illinois Avenue, Mansfield, Ohio
**Date and Time:** May 18, 1985, 4:50 a.m.
**Motor Vehicle Involved:** 1980 Chevrolet Chevette
**Train(s) Involved:** Amtrak Train No. 40
**Railroad(s) Involved:** Amtrak/Consolidated Rail Corporation
**U.S. DOT-AAR Crossing Number:** 502655C
**Train Activated Warning Devices:** Automatic gates with lights, standard flashing lights and audible signals
**Fatalities:** 1 **Injuries:** 0

**Summary:**

Westbound Amtrak train No. 40, operating on Conrail, collided with a 1980 Chevrolet Chevette traveling southbound. The driver, who was the only occupant of the motor vehicle, was fatally injured. The driver of the automobile drove around the lowered automatic gates where the automobile was struck by the train and dragged 3,168 feet. The train's speed at impact was approximately 70 mph.

The grade crossing warning system was functioning as intended and the train's headlight, strobe lights, and whistle were working. Postaccident toxicological tests indicated that the motor vehicle operator was legally intoxicated according to State law, as his blood was tested at a 0.22 percent blood alcohol concentration.

This grade crossing has had a history of accidents and the U.S. DOT-AAR Crossing Inventory provided 10 accidents that were reported at the crossing since 1977. The public has voiced its concern about this crossing because of the credibility of the crossing warning system. There are six tracks at this crossing and motorists are often delayed by switching movements away from the crossing that occur with varying time delays. It has been reported that the crossing warning system sometimes operates without a train ever traversing the tracks. Motorists then disregard the warning system and drive around the gate arms.

Additionally, a motor vehicle driver's visibility is limited by a fence with heavy vegetation that obstructs the view of a motor vehicle operator traveling southbound looking for a westbound train.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was the intentional act of the automobile driver, due to the use of alcohol, to drive around the lowered automobile crossing gates, and to cross warning signals that had a history of activating even though a train did not enter the crossing due to the yard trains' undertaking switching operations nearby. In addition, vegetation obscured the driver's view of the approaching train.

Mansfield, Ohio

**Issues:**

1. Audibility: Not an issue.

2. Visibility: The view of the approach of a westbound train is obstructed by the topography and vegetation growing on a fence along the railroad's right-of-way for motorists traveling southbound.

3. Driver's Action: The motor vehicle operator did not stop at the grade crossing due to impaired judgment from the use of intoxicants.

4. Crossing Characteristics: This crossing's credibility is constantly jeopardized because the warning time of the signal system is frequently excessive. This has continually caused motorists to disregard the grade crossing system and travel across the crossing unless a train is clearly in sight. For switching and low-speed trains operations, motor vehicle operators feel confident they can proceed around the lowered gate arms and cross safely.

5. Alcohol/Drug Involvement: The motor vehicle operator had a tested blood alcohol concentration of 0.22 percent.

6. Other Factors: None.

7. Weather: Possibly a factor; nighttime, some reports of patchy fog, and 42° F.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: Ten accidents have been reported in the U.S. DOT-AAR Grade Crossing Inventory.

CASE NO.: 41

**Safety Board Investigation No.:** CHI-85-F-X021
**Accident Location:** 135th Street, Chicago, Illinois
**Date and Time:** May 23, 1985, 11:02 a.m.
**Motor Vehicle Involved:** 1974 Pontiac LeMans
**Train(s) Involved:** Amtrak Train No. 317
**Railroad(s) Involved:** Amtrak/Consolidated Rail Corporation
**U.S. DOT-AAR Crossing Number:** 522458T
**Train Activated Warning Devices:** None, crossbucks
**Fatalities:** 1 **Injuries:** 0

**Summary:**

Eastbound Amtrak passenger train No. 317, operating at 40 mph, struck an automobile at the 135th Street grade crossing in Chicago, Illinois. The vehicle was destroyed and the driver was fatally injured. The locomotive engine of train No. 317 derailed in the accident.

The visibility of the railroad approach from the west while traveling northbound on 135th Street is severely obstructed by residential structures, fences, and vegetation.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was the failure of the automobile driver to stop at the crossing due to inattention and because residential structures, fences, and vegetation severely obstructed the driver's view of the train.

**Factors:**

1. Audibility: Not an issue.

2. Visibility: Sight distance blocked by residential structures, fences, and vegetation.

3. Driver's Action: The driver failed to stop for the grade crossing.

4. Crossing Characteristics: This grade crossing had severe obstruction problems that limited the driver's view of the train.

5. Alcohol/Drug Involvement: Not an issue.

6. Other Factors: None.

7. Weather: Not an issue; daytime, clear, and 68° F.

Chicago, Illinois

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: Ten previous accidents have been reported in the U.S. DOT-AAR Crossing Inventory.

**Postaccident Information:**

The Consolidated Rail Corporation accelerated the installment on June 16, 1985, of crossing gates and flashing lights at 135th Street crossing as the result of this accident.

## CASE NO.: 42

**Safety Board Investigation No.:** FTW-85-F-X017
**Accident Location:** State Highway 70, Denmark, South Carolina
**Date and Time:** June 7, 1985, 5:18 a.m.
**Motor Vehicle Involved:** 1973 Mack tractor semitrailer combination
**Train(s) Involved:** Amtrak Train No. 82
**Railroad(s) Involved:** Amtrak/Seaboard System Railroad
**U.S. DOT-AAR Crossing Number:** AAR 634777
**Train Activated Warning Devices:** Standard flashing lights and audible signals
**Fatalities:** 0 **Injuries:** 0

**Summary:**

Amtrak train No. 82 struck a tractor semitrailer combination that was stalled on the track. Minor damage was sustained by the tractor semitrailer combination and the train but there were no injuries.

The truckdriver indicated that as he attempted to drive over the track, the tractor's transmission disengaged, thus stalling the truck and causing the semitrailer to foul the main track. Moments later the flashing lights and audible signals were activated. The truckdriver, unable to engage the transmission, instructed his passenger to try and warn the train to stop. The engineer of Amtrak train No. 82 saw the stalled truck and a person approaching the train waving his arms and so applied the emergency brakes. The collision speed was estimated at 1 mph.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was that the truck's transmission broke apart, causing the truck to stall on the tracks.

**Issues:**

1. Audibility: Not an issue.
2. Visibility: Not an issue.
3. Driver's Action: Not an issue.
4. Crossing Characteristics: Not an issue.
5. Alcohol/Drug Involvement: Not an issue.
6. Other Factors: The transmission in the tractor disengaged, stalling the semitrailer on the track.
7. Weather: Not an issue; dawn, clear, and 76° F.

Denmark, South Carolina

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: No previous accidents reported in the DOT-AAR Grade Crossing Inventory.

## CASE NO.: 43

**Safety Board Investigation No.:** LAX-85-F-X017
**Accident Location:** Jefferson Street, LeGrand, California
**Date and Time:** June 9, 1985, 8:50 a.m.
**Motor Vehicle Involved:** 1983 Buick Regal
**Train(s) Involved:** Amtrak Train No. 711
**Railroad(s) Involved:** Amtrak/Atchison, Topeka and Santa Fe Railway Company
**U.S. DOT-AAR Crossing Number:** 028638F
**Train Activated Warning Devices:** Standard flashing lights, automatic gates and audible signals.
**Fatalities:** 0 **Injuries:** 0

**Summary:**

Amtrak train No. 711, traveling northbound at 20 mph, struck a 1983 Buick Regal automobile at the intersection of the Atchison, Topeka and Santa Fe railroad track and Jefferson Street, in Le Grand, California. The northbound passenger train had been diverted onto a passing track to allow a southbound freight train to pass. The engine crew of the passenger train observed the automobile standing east of the lowered gate arms and, as soon as the freight train cleared the crossing, the automobile was seen to drive around the gate arm and into the path of the northbound passenger train. There was no derailment or injury to persons aboard the train. The 90-year-old driver of the automobile was not injured. According to a statement by the driver, he tried to stop but hit the gas pedal instead of the brake pedal and accelerated into the path of the train.

Jefferson Street intersects the four-track crossing at an angle of 90°. It was noted during the investigation that the driver's view of the approaching passenger train was obscured by rail cars standing on the yard track approximately 100 feet south of the intersection. Postaccident tests were made of the locomotive's whistle and headlight, and of the crossing warning equipment; no exception was taken.

The driver stated that he did not hear the train's whistle. During the interview with the driver, the investigator noted that he was suffering from a hearing impairment, which may explain why he did not hear the whistle.

The windows of the automobile were closed; the radio air conditioning unit and fan were off. With these conditions, the driver should have been able to hear the train when it was 500 feet or more before the crossing.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was the unintentional act of the automobile driver, who inadvertently hit his gas pedal instead of the brake pedal, causing him to drive into the path of the oncoming train.

Contributing to the accident was a sight distance obstruction caused by standing rail cars on a siding.

LeGrand, California

**Factors:**

1. Audibility: The 90-year-old driver's impaired hearing may have been a factor in his decision to go around the lowered gate after the freight train passed. Although he may not have heard the approaching passenger train, the driver stated he inadvertently hit the gas pedal instead of the brake pedal.

2. Visibility: The standing rail cars on an adjacent yard track obscured the driver's view of the approaching train.

3. Driver's Action: The driver disregarded the lowered gate arm and flashing lights as he drove around them into the path of the passenger train. He was cited by the California Highway Patrol for driving around a closed railroad crossing gate.

4. Crossing Characteristics: Not an issue.

5. Alcohol/Drug Involvement: Not an issue.

6. Other Factors: None.

7. Weather: Not an issue; clear, daytime, and 59° F.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: One previous accident had been reported in the DOT-AAR Grade Crossing Inventory.

## CASE NO.: 44

**Safety Board Investigation No.:** NYC-85-F-X017
**Accident Location:** Crescent Street, Stamford, Connecticut
**Date and Time:** June 15, 1985, 3 p.m.
**Motor Vehicle Involved:** 1980 Chevrolet Monza
**Train(s) Involved:** Metro-North Train No. 6734
**Railroad(s) Involved:** Metro-North Commuter Railroad
**U.S. DOT-AAR Crossing Number:** 500532J
**Train Activated Warning Devices:** Standard flashing lights and audible signals
**Fatalities:** 0 **Injuries:** 0

**Summary:**

Traveling about 9 mph, four-car Metro-North Commuter Railroad train No. 6734 struck a 1980 Chevrolet Monza. Train speed is restricted to 10 mph on this section of track. The automobile's speed was estimated at approximately 4 mph. There were no injuries to either passengers, train crew, or the motor vehicle operator.

The motor vehicle operator stopped and looked for train traffic. He perceived that it was clear to proceed across the tracks. Believing that train No. 6734 was stopped further down the track, he proceeded to cross the tracks when train No. 6734 struck the front of his automobile, removing the automobile's bumper. Witnesses indicated that the flashing lights and audible signals were working. The driver traveled over this crossing daily going to and from work.

There is limited visibility on the four quadrants of this grade crossing. This is not uncommon in urban areas where buildings and parking lots are next to the railroad tracks. Thus, motor vehicle operators must rely on active warning signals.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was that the automobile driver drove by the flashing warning lights and audible warning bells into the path of the train due to an error in judgment.

**Issues:**

1. Audibility: Not an issue.

2. Visibility: Not directly an issue; in this accident, however, there is limited visibility at the four quadrants of this crossing from buildings, a stored boat, a vine covered chain link fence, and highway commuter parking lots.

3. Driver's Action: The driver chose to ignore the flashing lights and audible signal and proceeded to enter the crossing because of an error in judgment.

4. Crossing Characteristics: Not an issue.

5. Alcohol/Drug Involvement: Not an issue.

Stamford, Connecticut

6. Other Factors: None.

7. Weather: Not an issue; daylight, clear, dry, and 75° F.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: Five previous accidents have been reported in the U.S. DOT-AAR Grade Crossing Inventory.

**Postaccident Information:**

This crossing has been assigned a State Project Number 135138 for installation of automatic crossing gates. A date for installation of the gates had not been assigned as of the Board investigator's submittal of this report on July 26, 1985.

**CASE NO.: 45**

**Safety Board Investigation No.:** CHI-85-F-X022
**Accident Location:** High Street, Jamestown, Indiana
**Date and Time:** June 22, 1985, 8:09 a.m.
**Motor Vehicle Involved:** 1981 Chevrolet Chevette
**Train(s) Involved:** Amtrak Train No. 317
**Railroad(s) involved:** Amtrak/Consolidated Rail Corporation
**U.S. DOT-AAR Crossing Number:** 542991V
**Train Activated Warning Devices:** None, crossbucks
**Fatalities:** 0 **Injuries:** 1

**Summary:**

Westbound Amtrak Train No. 317, traveling at about 35 mph, collided with a 1981 Chevrolet Chevette at the intersection of the Conrail track and High Street in Jamestown, Indiana. The train did not derail and there were no injuries to persons aboard the train. The driver, and sole occupant of the automobile, was seriously injured.

High Street intersects the track at an angle of about 90°. It is a city street with commercial buildings on both sides of the 24-foot-wide roadway. The standard advance railroad warning sign was 246 feet from the crossing and was obscured by vegetation.

A similar vehicle, which was stopped at the crossing 15 feet from the south rail of the single track to the west, determined that sight distance was limited to about 175 feet, by buildings in that quadrant. An alternate route across the tracks is 300 feet from High Street and is equipped with train activated flashing lights.

The view of an approaching train is blocked by buildings in the northeast quadrant, which places direct responsibility on the driver to slow down and look for trains. The motor vehicle driver's task is made more difficult because buildings seriously restrict the driver's view.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was the failure of the automobile driver to stop at the crossing due to inattentiveness. Contributing to the accident were buildings that obstructed the driver's view of the approaching train and vegetation on the approach to the grade crossing that obscured an advance warning sign.

**Issues:**

1. Audibility: Not an issue.

2. Visibility: View of the approaching train was severely reduced by the buildings near the track in the southeast quadrant of the intersection.

3. Driver's Action: The driver did not take appropriate precaution when approaching the grade crossing.

Jamestown, Indiana

4. Crossing Characteristics: An advance warning sign obscured by vegetation was 246 feet from the crossing.

5. Alcohol/Drug Involvement: Not an issue.

6. Other Factors: None.

7. Weather: Not an issue; 60° F, cloudy and a dry pavement.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: No previous accidents have been reported in the DOT/AAR Grade Crossing Inventory.

## CASE NO.: 46

**Safety Board Investigation No.:** LAX-85-F-X019
**Accident Location:** Hobbs Road, Dayton, Idaho
**Date and Time:** June 24, 1985, 7:30 a.m.
**Motor Vehicle Involved:** 3-wheeled Honda ATC motorcycle
**Train(s) Involved:** Amtrak Train No. 26
**Railroad(s) Involved:** Amtrak/Union Pacific Railroad
**U.S. DOT-AAR Crossing Number:** 806090F
**Train Activated Warning Devices:** None, crossbucks
**Fatalities:** 1 **Injuries:** 0

**Summary:**

Southbound Amtrak train No. 26, traveling at 70 mph, was struck on the side of the second passenger coach by a 12-year-old boy on a three-wheeled Honda ATC motorcycle.

The locomotive engineer stated that he saw two Honda ATC motorcycles approaching from the east as train No. 26 closed on the Hobbs Road grade crossing near Dayton, Idaho. The train whistle was being sounded, but before entering the crossing, the engineer made a full service application of the brakes. As the train passed through the crossing, he looked back and saw one of the Honda ATC motorcycles strike the side of the second coach.

The 13-year-old companion stated that he was riding parallel to the other boy. He heard the train's whistle and began to stop. Neither of the motorcycle operators was wearing a helmet nor was licensed to operate such a vehicle on a public road. A relative stated that the deceased had been operating such a vehicle for about four years around the farm and on back roads. Vegetation and a fixed structure (corral) blocked the motorcycle operator's view of the approaching train.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was the three-wheel all-terrain motorcycle operator's inattention to his driving duties because of a motorcycle race with another youth and a sight distance obstruction caused by a fixed obstruction (a corral) and vegetation.

**Issues:**

1. Audibility: Not an issue.

2. Visibility: Sight distance was not available until relatively close to the crossing because of a corral and vegetation.

3. Driver's Action: The 12 and 13-year-olds were in racing each other back to the house and were not paying attention to the approaching train.

4. Crossing Characteristics: Not an issue.

Dayton, Idaho

5. Alcohol/Drug Involvement: Not an issue.

6. Other Factors: The driver was not licensed to operate a motor vehicle on a county road.

7. Weather: Not an issue; daytime, cloudy, and 75° F.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: No previous accidents had been reported in U.S. DOT-AAR Grade Crossing Inventory.

## CASE NO.: 47

**Safety Board Investigation No.:** LAX-85-F-X020
**Accident Location:** Big Hanaford Road, Centralia, Washington
**Date and Time:** June 24, 1985, 12:55 p.m.
**Motor Vehicle Involved:** 1977 White Freightliner tractor two-trailer semi/dump truck combination
**Train(s) Involved:** Amtrak Train No. 1011
**Railroad(s) Involved:** Amtrak/Burlington Northern Railroad
**U.S. DOT-AAR Crossing Number:** 092523G
**Train Activated Warning Devices:** Standard flashing lights and automatic gates.
**Fatalities:** 0 **Injuries:** 0

**Summary:**

Southbound Amtrak passenger train No. 1011, operating at 65 mph, struck the second trailer of a two-trailer semi/dump truck combination traveling west on Big Hanaford Road in Centralia, Washington. One of the trailers was heavily damaged. There were no injuries or deaths.

The automatic crossing equipment is actuated by a southbound train 2,500 feet north of the grade crossing. This allows the gate arm to drop 25 seconds before the train reaches the crossing. A southbound train emerges from a 2° left hand curve about 500 feet north of the crossing, and the curve limits the vehicle operator's view of approaching trains. Witnesses to the accident indicated the brake lights on the tandem trailer combination were lit an unusually long time approaching and entering the crossing.

The driver said he decelerated upon entering the crossing and was changing gears when the gate arm came down between the first and second trailers. At the speed he passed over the crossing, estimated at 3 mph (4.4 feet per second), he did not have time to clear the crossing.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was that the crossing warning signal time was insufficient to allow the long double trailer truck to clear the crossing for high-speed train operation and that the driver's view of the approaching train was obstructed by vegetation and curvature of the track.

**Issues:**

1. Audibility: Not an issue.

2. Visibility: Sight distance is limited at the crossing by the track's curvature, vegetation, and a high bank.

3. Driver's Action: The driver approached, changed gears, and entered crossing at too low a speed.

Centralia, Washington

4. Crossing Characteristics: The 25-second time allowed by the crossing warning system is not adequate for tractor trailer double combination units traveling at very low speeds at this crossing.

5. Alcohol/Drug Involvement: Not a factor; no tests taken.

6. Other Issues: None.

7. Weather: Not an issue; daytime, dry, clear, and 65° F.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: One previous accident had been reported in the U.S. DOT-AAR Grade Crossing Inventory.

**Postaccident Information:**

At an informal discussion with the local signal department of the Burlington Northern Railroad and the Safety Board investigator, it was suggested that the gate arm drop time be increased from 25 to 30 seconds so that heavy trucks like this unit could adequately clear the track. The local signal department rejected this request because in their view it would delay vehicular traffic too much.

## CASE NO.: 48

**Safety Board Investigation No.:** CHI-85-F-X023
**Accident Location:** Elliot Street, Jackson, Michigan
**Date and Time:** June 28, 1985, 7:15 p.m.
**Motor Vehicle Involved:** 1971 Chrysler New Yorker
**Train(s) Involved:** Amtrak Train No. 355
**Railroad(s) involved:** Amtrak/Consolidated Rail Corporation
**U.S. DOT-AAR Crossing Number:** 545282A
**Train Activated Warning Devices:** Standard flashing lights and audible signals
**Fatalities:** 1 **Injuries:** 4

**Summary:**

Westbound Amtrak train No. 355, traveling at 40 mph, struck a southbound 1971 Chrysler New Yorker at Elliot Street grade crossing in Jackson, Michigan. The auto contained a driver and seven passengers. Five of the occupants were children, three of whom were seriously injured. One adult passenger died fifteen days after the accident as a result of accident-related injuries.

Witnesses stated that after an eastbound freight train cleared the crossing the Amtrak train arrived. The signal warning system was working and there was no lapse or break in the warning. A passenger in the automobile stated that he heard the Amtrak train blowing its whistle warning, and told the driver to "cool it," but the driver continued across the grade crossing behind the clearing freight train. The passenger also stated that two or three cars in front of them had safely traveled across the track after the freight train passed.

The driver was tested and found to have a blood alcohol concentration of 0.25 percent. He did not possess a valid driver's license and had past convictions for speeding and for driving while under license suspension.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was the failure of the automobile driver, due to the use of alcohol, to heed the warning of a passenger in his automobile and to detect the approaching train.

**Issues:**

1. Audibility: Not an issue.

2. Visibility: Not an issue.

3. Driver's Action: The driver ignored the warning lights and a verbal warning from passenger.

4. Crossing Characteristics: Not an issue.

Jackson, Michigan

5. Alcohol/Drug Involvement: Toxicological test results indicated a blood alcohol concentration of 0.25 percent, well in excess of Michigan's driving under the influence limit of 0.10 percent.

6. Other Factors: The driver was operating without a license. Past violations and suspensions indicate disregard for traffic laws.

7. Weather: Not an issue; clear, evening, and 77° F.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: No accidents reported in the DOT-AAR Grade Crossing Inventory.

**Postaccident Information:**

The Michigan Department of Transportation held hearings concerning this crossing and ordered that crossing gates be installed, but the work has been held up due to challenges by the railroad, which wants the crossing closed.

## CASE NO.: 49

**Safety Board Investigation No.:** CHI-85-F-X024
**Accident Location:** Holmes Street, Lemont, Illinois
**Date and Time:** July 3, 1985; 1:05 p.m.
**Motor Vehicle Involved:** 1982 GMC tractor semitrailer cargo tank combination
**Train(s) Involved:** Amtrak Train No. 22
**Railroad(s) Involved:** Amtrak/Illinois Central Gulf
**U.S. DOT-AAR Crossing Number:** 289734C
**Train Activated Warning Devices:** Standard flashing lights, automatic gates and audible signals.
**Fatalities:** 0 **Injuries:** 1

**Summary:**

Northbound Amtrak train No. 22 struck a 1982 GMC tractor semitrailer cargo tank combination at the Holmes Street grade crossing in Lemont, Illinois. The train did not derail and there were no injuries to the truckdriver, passengers, or crewmembers on the train. However, the driver of an automobile that was behind the truck was injured when the cargo tank was redirected after impact and collided with the vehicle she was driving. Amtrak train No. 22 was operating at 70 mph at the time of the impact. The truck fouled the track due to the driver's attempt to negotiate a missed turn and became lodged near the grade crossing's active warning devices.

The train approached the Holmes Street crossing with its whistle sounding and the headlight illuminated. The maximum speed allowed for passenger trains in the vicinity is 79 mph. The engineer stated that due to an industrial crossing in the area he approached the vicinity with the train's brakes applied at a speed of 65 to 70 mph. He applied the train brakes immediately upon seeing the truck on the crossing.

The driver in the automobile directly behind the stopped truck heard the train's whistle and was aware of the train approaching but did not know its direction. She executed a left U-turn prior to the collision in an attempt to get into the clear, but the cargo tank struck the side of her automobile.

The truckdriver stated that he was not familiar with the grade crossing and that this was his first trip to this area. He had run past the turn he was expecting to make and was backing up to align his truck to drive onto the correct road. He drove the truck too close to the grade crossing active warning devices. He was also aware of the automobile that had closed in behind him forcing him, to delay his backup movement until he was sure the automobile was in the clear. As he became aware of the approaching train, he released his seatbelt and left the cab of the truck before impact.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was that the truckdriver was unfamiliar with the characteristics of the grade crossing and failed to negotiate a turn properly, resulting in the truck getting stuck on the track structure.

Lemont, Illinois

Contributing to the accident was the inability of the truckdriver to back up because a car was blocking his backward movement.

**Issues:**

1. Audibility: Not an issue.

2. Visibility: Not an issue.

3. Driver's Action: The driver's unfamiliarity with the location should have caused him to be more cautious when seeking a roadway.

4. Crossing Characteristics: Not an issue.

5. Alcohol/Drug Involvement: Not an issue.

6. Other Factors: The driver of the automobile should have perceived the truckdriver's difficulty and given him additional space instead of queuing immediately behind the truck.

7. Weather: Not an issue; sunny, clear and 78° F.

**Other Information:**

1. Driver familiar with crossing: No.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: One previous accident was reported in the DOT/AAR Grade Crossing Inventory. This accident occurred in January 1983, involving an Amtrak train that struck a truck.

**CASE NO.: 50**

**Safety Board Investigation No.:** CHI-85-F-X025
**Accident Location:** Pardee Road, Galien, Michigan
**Date and Time:** July 10, 1985, 11:55 p.m.
**Motor Vehicle Involved:** 1984 Subaru
**Train(s) Involved:** Amtrak train No. 350
**Railroad(s) Involved:** Amtrak
**U.S. DOT-AAR Crossing Number:** 545576K
**Train Activated Warning Devices:** None; crossbucks
**Fatalities:** 1 **Injuries:** 2

**Summary:**

A 1984 Subaru traveling northbound on Pardee Road in Galien, Michigan, struck the side of eastbound Amtrak train No. 350 that was travelling at 76 mph. There was neither a derailment nor injury to persons aboard the train. The 18-year-old driver of the Subaru was fatally injured and the two passengers were seriously injured.

Pardee Road intersects the Amtrak main track at 90° and the grade for northbound traffic slightly ascends. Visibility of an approaching train is obscured by a dense line of trees in both the southeast and southwest quandrants of the intersection on the railroad right-of-way. The speed limit for highway traffic is 55 mph.

Sound level tests made with a similar vehicle using the same partially open window configuration and radio sound on the same level indicated that the sound of the locomotive's whistle did not overcome the ambient noise in the automobile until the train was about 100 feet from the auto. Rubber tire skid marks began 95 feet south of the south rail and continued to that point. The auto's speed at the beginning of the skid marks was calculated to be 38 to 43 mph and at the impact, the velocity of the vehicle was less than 17 mph.

The fireman, a qualified locomotive engineer, was operating the train at the time of the accident. He stated that the locomotive's whistle was being sounded, and the headlight, strobes, and bell were operating as the train approached the highway grade crossing. He observed the automobile approaching the grade crossing but was not aware of a problem until he observed a flash in his rear view mirror and initiated an emergency application of the train's brakes immediately.

The visibility of an approaching train is blocked by a line of trees, therefore making the audibility of the train a very important factor. As indicated by the audibility test conducted following the accident, the driver may not have heard the train until it was too late to control the speed of the vehicle. This tends to be corroborated by the length of the skid marks. The lack of active warning devices at the intersection means that greater caution must be taken by the operator of a motor vehicle.

Galien, Michigan

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was the failure of the automobile driver to detect the approaching train due to inattentiveness to driving duties, the inability of the driver to hear the train's whistle, the inability of the driver to see the approaching train due to vegetation obstructing her view, and the absence of an active warning device at this grade crossing location.

**Issues:**

1. Audibility: The postaccident testing indicates the motor vechicle driver may not have heard the locomotive's whistle sound in time to stop his motor vehicle.

2. Visibility: The view of an approaching train was blocked by a line of trees growing on the railroad's right-of-way.

3. Driver's Action: The driver did not exercise sufficient caution when approaching a passive warning grade crossing; this condition is amplified because the grade crossing is located on a high speed passenger corridor.

4. Crossing Characteristics: Not an issue.

5. Alcohol/Drug Involvement: Not an issue.

6. Other Factors: None.

7. Weather: Not an issue; the weather was clear, with bright sunlight, and 78° F.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: No previous accidents had been reported in the DOT-AAR Grade Crossing Inventory.

4. Toxicological tests (traincrew): The engineer and fireman of this train were tested for alcohol and/or drug involvement. The tests were negative.

## CASE NO.: 51

**Safety Board Investigation No.:** FTW-85-F-X024
**Accident Location:** Elton Road, Jackson, Mississippi
**Date and Time:** August 27, 1985, 9:15 a.m.
**Motor Vehicle Involved:** 1978 Ford sedan
**Train(s) Involved:** Amtrak Train No. 59
**Railroad(s) Involved:** Amtrak/Illinois Central Gulf Railroad
**U.S. DOT-AAR Crossing Number:** 299804S
**Train Activated Warning Devices:** None, crossbuck.
**Fatalities:** 0 **Injuries:** 1

**Summary:**

Southbound Amtrak train No. 59, operating at 35 mph, collided with a 1978 Ford sedan at the intersection of the Illinois Central's main track and Elton Road in Jackson, Mississippi. The train did not derail and there were no injuries to persons aboard the train. The driver, the sole occupant of the automobile, received minor injuries.

The driver had crossed the four-track crossing, which was composed of two main tracks and four auxiliary tracks, only once. The driver was in search of a fishing pond he had been informed was in the area and was attempting to locate it. During his search for the pond, he crossed the track for the first time in an easterly direction and just minutes later he returned, headed west.

The track intersects with the roadway at a 90° angle. At the time of the accident, there were freight cars stored north of the road with the south end of the cars 180 feet from the road. The southbound main track was west of the track on which the cars were stored. Calculations predicated on the speed of the train and automobile indicated that the driver had approximately 3.5 seconds to see the train and react before impact. The driver also stated that he did not hear the train's whistle until seconds before impact. The automobile's windows were closed, the air conditioning fan was running, and the radio was playing at a medium volume.

Postaccident audibility tests indicated that the sound level of the locomotive's whistle did not overcome the high ambient sound level in the automobile until the train was about 100 feet from the crossing.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was the failure of the automobile driver to see the approaching train because standing cars on an adjacent track obstructed the view of the train and the inability of the driver to hear the train's whistle because of the high ambient sound level in the automobile.

**Issues:**

1. Audibility: Postaccident testing indicated the sound level of the locomtive's whistle did not overcome the ambient sound level in the automobile until there was a separation of about 100 feet.

2. Visibility: The standing rail cars on the track in approach to the southbound main track obscured the driver's view of the train until about 3.5 seconds before impact.

3. Driver's Action: Not an issue.

4. Crossing Characteristics: Not an issue.

5. Alcohol/Drug Involvement: Not an issue.

6. Other Factors: None.

7. Weather: Not an issue; clear and 81° F.

**Other Information:**

1. Driver familiar with crossing: No.

2. Driver familiar with Operation Lifesaver: Yes.

3. Past accident history at crossing: Four previous accidents had been reported in the U.S. DOT/AAR Grade Crossing Inventory.

## CASE NO.: 52

**Safety Board Investigation No.:** FTW-85-F-X025
**Accident Location:** Deadwood Road, Schriever, Louisiana
**Date and Time:** September 4, 1985, 4:15 p.m.
**Motor Vehicle Involved:** Lowboy semitrailer
**Train(s) Involved:** Amtrak train No. 1
**Railroad(s) Involved:** Amtrak/Southern Pacific Transportation Company
**U.S. DOT-AAR Crossing Number:** 758075V
**Train Activated Warning Devices:** None; crossbucks and stop sign
**Fatalities:** 0 **Injuries:** 0

**Summary:**

Westbound Amtrak train No. 1, operating at 70 mph, struck a lowboy semitrailer that was lodged on the track on Deadwood Road, in Schriever, Louisiana. The train did not derail and persons on the train were not injured. The truckdriver had already detached the tractor and off-loaded a bulldozer with which he was attempting to free the hungup semitrailer. The semitrailer was propelled about 150 feet and collided with a parked unoccupied pickup truck that was being used to follow the lowboy movement. The nearest telephone was located 4 miles from the accident scene.

The engineer initiated an emergency application of the brakes when he observed the situation at the crossing and slowed the train's speed to about 40 mph at impact.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was that the lowboy trailer got stuck on an elevated surface grade crossing due to an error in the truckdriver's judgment, the poorly designed grade crossing intersection, the lack of signs warning of a roadway profile that might present a hazard to vehicles with a low ground clearance, and the driver's improper selection of a truck route that could not be safely negotiated by his lowboy trailer unit.

**Issues:**

1. Audibility: Not an issue.

2. Visibility: Not an issue.

3. Driver's Action: The driver took no precaution to ensure that the lowboy trailer would not get hungup on the crossing. Also, the person accompanying the truck movement in the pickup truck could have been dispatched to a telephone in an attempt to warn local police/carrier officer of the situation.

4. Crossing Characteristics: The profile at this crossing should have been marked by a highway sign to indicate moderate clearance for lowboy semitrailer vehicles.

5. Alcohol/Drug Involvement: Not an issue.

Schriever, Louisiana

6. Other Factors: The engine crew's alertness is questionable due to the fact that the track is tangent and relatively level for a considerable distance in approach to the grade crossing; braking action by the traincrew could have occurred sooner.

7. Weather: Not an issue; cloudy, dry, and 82° F.

**Other Information:**

1. Driver familiar with crossing: No.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: No previous accidents recorded in the U.S. DOT/AAR Grade Crossing Inventory.

## CASE NO.: 53

**Safety Board Investigation No.:** FTW-85-F-X026
**Accident Location:** Collins Road, Orange Park, Florida
**Date and Time:** September 5, 1985, 8:20 a.m.
**Motor Vehicle Involved:** 1985 Ford pickup truck
**Train(s) Involved:** Amtrak Train No. 53
**Railroad(s) Involved:** Amtrak/Seaboard System Railroad
**U.S. DOT-AAR Crossing Number:** 620900C
**Train Activated Warning Devices:** Standard flashing lights and automatic gates
**Fatalities:** 1 **Injuries:** 2

**Summary:**

Southbound Amtrak train No. 53, operating at 62 mph, struck a westbound 1985 Ford pickup truck at the intersection of the Seaboard System Railroad's main track and Collins Road near Orange Park, Florida. The driver and one of the two school children she was transporting to school at the time of the accident were seriously injured; the other child, her son, was fatally injured. The train did not derail nor were any persons aboard the train injured.

The engineer observed the pickup truck on the crossing as the train was about 1,600 feet from the intersection. He observed that the pickup truck lurched forward and rolled backward. The engineer immediately initiated an emergency application of the train's brakes. The speed of the train was reduced to about 53 mph at impact. The driver had left the truck and was attempting to remove the children at the time of the impact.

A witness who lives near the intersection heard the pickup truck's starter motor grinding and the locomotive's whistle being sounded. She also observed the gates down in the horizontal position at the time.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was that, because the truck driver was in a hurry to get children to school, she failed to stop for the flashing warning lights and gates.

Contributing to the severity of the accident was the driver's attempt to restart the pickup truck, which stalled on the tracks, instead of evacuating the children.

**Issues:**

1. Audibility: Not an issue.

2. Visibility: Not an issue.

3. Driver's Action: The driver waited too long to evacuate the truck in her attempt to restart the engine.

4. Crossing Characteristics: Not an issue.

Orange Park, Florida

5. Alcohol/Drug Involvement: Not an issue.

6. Other Factors: Motor vehicle stalled on crossing.

7. Weather: Not an issue; clear, daytime, and 92° F.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver with Operation Lifesaver: No.

3. Past accident history at crossing: No previous accidents reporded in the DOT/AAR Grade Crossing inventory.

## CASE NO.: 54

**Safety Board Investigation No.:** LAX-85-F-X029
**Accident Location:** Emado Avenue, Coyote, California
**Date and Time:** September 8, 1985, 6:37 p.m.
**Motor Vehicle Involved:** 1967 Ford Galaxy
**Train(s) Involved:** Amtrak Train No. 13
**Railroad(s) Involved:** Amtrak/Southern Pacific Transportation Company
**U.S. DOT-AAR Crossing Number:** 755077Y
**Train Activated Warning Devices:** None, private crossing with stop sign and crossbucks
**Fatalities:** 7 **Injuries:** 0

**Summary:**

Westbound Amtrak passenger train No. 13, traveling at about 72 mph, struck a 1967 Ford Galaxy at a private grade crossing on Emado Avenue in Coyote, California. The driver and six family members were killed.

The fireman, a qualified engineer, was operating the train when he noticed an automobile approaching from the left. He placed the train into emergency braking almost immediately. The train impacted the automobile broadside and shoved it over 1/2 mile before train and automobile came to a stop. Both the engineer and the fireman stated that the automobile did not stop at the stop sign before entering the crossing. The maximum authorized operating speed is 70 mph for passenger trains.

The entire family had just left the home of relatives where they had had dinner. The blood alcohol concentration of the driver was tested by the local coroner's office and was found to be 0.34 percent.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was that the automobile driver, due to the use of alcohol, ignored the stop sign at the crossing.

**Issues:**

1. Audibility: Not an issue.

2. Visibility: Not an issue.

3. Driver's Action: The driver drove through a stop sign onto the crossing.

4. Crossing Characteristics: Not an issue.

5. Alcohol/Drug Involvement: The driver was found to have a blood alcohol concentration of 0.34 percent. This is a very high level and greatly impaired his ability to operate a motor vehicle safely.

6. Other Factors: None.

7. Weather: Not an issue; evening, cloudy, dry, and 62° F.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: No previous accidents had been reported in the DOT-AAR Grade Crossing Inventory.

4. Toxicological tests (train's fireman): As a result of this accident, the fireman, a qualified enginer, was arrested when he refused a city of San Jose police officer's request that he submit to a toxicological test. Subsequently, he was tested. The test was negative for alcohol or drugs.

## CASE NO.: 55

**Safety Board Investigation No.:** CHI-85-F-X030
**Accident Location:** Jackson Street, Springfield, Illinois
**Date and Time:** September 11, 1985, 4:53 p.m.
**Motor Vehicle Involved:** 1984 Pontiac Fiero
**Train(s) Involved:** Amtrak Train No. 304
**Railroad(s) Involved:** Amtrak/Illinois Central Gulf Railroad
**U.S. DOT-AAR Crossing Number:** 294312U
**Train Activated Warning Devices:** Cantilivered flashing lights over traffic lanes and audible signals.
**Fatalities:** 1 **Injuries:** 0

**Summary:**

Northbound Amtrak passenger train No. 304 struck a 1984 Pontiac Fiero at the Jackson Street grade crossing in Springfield, Illinois. The train was traveling at approximately 20 mph when the automobile traveling parallel to the train turned right onto the crossing from Third Street without stopping. The operator, sole occupant of the automobile, was seriously injured and two days later died as a result of his injuries.

Although the cantilivered flashing light system was angled properly to give motorists a clear indication for Jackson Street of the crossing's occupancy by a train, Third Street was an exception. There was neither an advance warning nor any flashing lights angled to give proper warning to Third Street traffic.

The train's whistle was not sounded because of a city of Springfield ordinance; thus, the motor vehicle operator had no audible warning from the approaching train.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was the automobile driver's failure to detect the approaching train due to distraction by other highway traffic.

Contributing to the accident were the facts that the flashing signals were focused for traffic on Jackson Street and that there were no advance warning signs and/or signals for motorists traveling southbound on Third Street.

**Issues:**

1. Audibility: Not an issue.

2. Visibility: Not an issue.

3. Driver's Action: The driver was not attentive to the flashing lights because of distraction due to highway traffic on Jackson Street.

4. Crossing Characteristics: The parallel road without any advance warning signs and/or signals of a grade crossing approach represented a major hazard.

Springfield, Illinois

5. Alcohol/Drug Involvement: Not an issue.

6. Other Issues: A stop sign was not placed at the intersection of Third Street and Jackson Street. A stop sign would normally require one to come to a complete stop; if the driver had stopped, he may have seen the flashing lights and/or the trains's headlights. Additionally, the train whistle was not sounding because of a city ordinance.

7. Weather: Not an issue; daytime, clear, dry, and 65° F.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: The U.S. DOT-AAR Grade Crossing Inventory indicated five previous accidents had occurred at this grade crossing and had resulted in three fatalities.

**Postaccident Information:**

The Illinois Central Gulf Railroad, the Illinois Commerce Commission (ICC), the City of Springfield, and the State of Illinois Department of Transportation had agreed on August 1, 1984, to put crossing gates at this location. The ICC officially "ordered" the work to be done on October 10, 1984. The order allows one year for completion. As a result of this accident work began on September 17, 1985, and was completed prior to the October 10, 1985 "order" expiration date.

**CASE NO.: 56**

**Safety Board Investigation No.:** LAX-85-F-X030
**Accident Location:** 45th South Frontage Road, Murray, Utah
**Date and Time:** September 30, 1985, 8:05 a.m.
**Motor Vehicle Involved:** 1980 GMC Blazer pickup truck
**Train(s) Involved:** Amtrak Train No. 6
**Railroad(s) Involved:** Amtrak/Denver and Rio Grande Western Railroad Company
**U.S. DOT-AAR Crossing Number:** 254774B
**Train Activated Warning Devices:** Standard flashing lights and audible signals
**Fatalities:** 0 **Injuries:** 1

**Summary:**

Eastbound Amtrak passenger train No. 6, travelling at about 68 mph, struck a 1980 GMC Blazer at a grade crossing on 45th South Frontage Road, in Murray, Utah. The driver sustained minor injuries. The train did not derail, and there were no onboard injuries.

The engineer stated that the locomotive headlight was on "bright," the strobe light was operating, and the whistle was being sounded. He further stated that the pickup truck approached the tracks, headed east slowly and drove onto the track.

The driver, sole occupant of the motor vehicle, stated that he did not recall hearing the audible signal or seeing the flashing lights before entering the crossing. As he entered the crossing, he heard the crossings' audible signal and saw the opposing flashing lights begin to operate. He then accelerated and almost simultaneously saw the train's headlight. The driver was ejected from the vehicle; he was not wearing a seatbelt.

The radio and heater fan in the vehicle were in the "on" position and the windows were closed. The investigator pointed out that the sun at the time of the accident was rising directly over and behind the signal mast and may have interfered with the driver's ability to perceive the flashing lights before entering the crossing.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was that the automobile driver drove by the flashing warning lights into the path of the train because he was inattentive to his driving duties.

Contributing to the accident was that the sun may have diminished the intensity of the flashing warning lights.

**Issues:**

1. Audibility: A possible issue; the driver stated that he did not hear a train whistle until just before the train struck his automobile.

2. Visibility: Not an issue.

Murray, Utah

3. Driver's Action: The driver failed to stop at the crossing indicated by the flashing lights.

4. Crossing Characteristics: The sun rising over the flashing signal lights may have reduced the driver's ability to perceive the flashing lights.

5. Alcohol/Drug Involvement: Not an issue.

6. Other Factors: None.

7. Weather: Not an issue; daylight, clear, dry, and 42° F.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: No previous accidents had been reported in the U.S. DOT-AAR Grade Crossing Inventory.

## CASE NO.: 57

**Safety Board Investigation No.:** FTW-86-F-X001
**Accident Location:** Turner Road, China, Texas
**Date and Time:** October 11, 1985, 12:28 p.m.
**Motor Vehicle Involved:** 1978 Pontiac
**Train(s) Involved:** Amtrak Train No. 2
**Railroad(s) Involved:** Amtrak/Southern Pacific Transportation Company
**U.S. DOT-AAR Crossing Number:** 762737A
**Train Activated Warning Devices:** None, crossbucks and stop sign
**Fatalities:** 0 **Injuries:** 1

**Summary:**

A northbound 1978 Pontiac struck the right side of Amtrak train No. 2 at Turner Road grade crossing on the Southern Pacific Railroad in China, Texas. Amtrak train No. 2 was travelling eastbound at approximately 70 mph. The collision did not result in any injuries to the traincrew or passengers; however, the occupant of the motor vehicle was injured although not seriously.

The motor vehicle operator may have stopped at the stop sign but then slid into the front of the approaching train. The train sheared off the front bumper and lights of the automobile. The train's whistle was not easily heard until the train was close to the crossing. More than likely, the driver disregarded the stop sign and did not look for the train and so failed to detect it.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was that the automobile driver, due to inattentivenes to his driving duties, failed to remain stopped at the crossing.

Contributing to the accident was the inability of the driver to hear the train's whistle.

**Issues:**

1. Audibility: The train's warning whistle was not heard by the automobile driver until the Amtrak train was close to the crossing.
2. Visibility: Not an issue.
3. Driver's Action: The motor vehicle operator failed to detect the train.
4. Crossing Characteristics: Not an issue.
5. Alcohol/Drug Involvement: Not an issue.
6. Other Factors: None.
7. Weather: Not an issue; daytime, clear, dry, and 74° F.

China, Texas

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: One previous accident had been reported in the DOT/AAR Grade Crossing Inventory.

**Postaccident Information:**

The Southern Pacific Transportation Company plans to install flashing lights at this crossing in 1986. The State and the Federal government will fund this project jointly.

**CASE NO.: 58**

**Safety Board Investigation No.:** CHI-86-F-X001
**Accident Location:** Coloma Road, Coloma, Michigan
**Date and Time:** October 15, 1985, 9:08 a.m.
**Motor Vehicle Involved:** 1984 Dodge Caravan
**Train(s) Involved:** Amtrak Train No. 371
**Railroad(s) Involved:** Amtrak/Conrail Chessie System
**U.S. DOT-AAR Crossing Number:** 234794H
**Train Activated Warning Devices:** Standard flashing lights and audible signals
**Fatalities:** 0 **Injuries:** 3

**Summary:**

Westbound Amtrak passenger train No. 371, traveling at about 65 mph (a closing rate of 95.3 feet per second), collided with a van at the Coloma Road grade crossing in Coloma, Michigan. The van contained a driver and two child passengers. All were wearing seatbelts and/or harness restraints. A 3-month-old baby in a child seat was thrown out of the seat and onto the roadway. They were taken to a local hospital and treated for serious, but not fatal, injuries.

The motor vehicle operator stated that she was on her way to town over a route she was very familiar with and approached the crossing at about 30 mph. She rounded the almost 90° turn and was momentarily blinded by the sun, which was right over the standard flashing light signal mast. She heard the train at the last moment, but it was too late to avoid a collision.

The sight distance at the crossing is adequate if one observes the flashing light signals. Some consideration should be given to the sunglare problem encountered by this motorist.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was that the van driver failed to detect an approaching train due to distraction caused by children inside the van, that the driver was unable to hear the train's whistle because the van windows were up, the radio was on, and the children were making noise, and that she was unable to see the flashing warning lights because the sun's glare masked the lights.

**Issues:.**

1. Audibility: The motor vehicle operator did not hear the whistle until it was too late. Audibility was hampered because the window was up, the radio was in the "on" position, and the children were probably talking.

2. Visibility: Not an issue.

3. Driver's Action: The driver was inattentive to her driving duties although other issues also affected her ability to safely traverse this grade crossing.

Coloma, Michigan

4. Crossing Characteristics: The road curves to the crossing from parallel to the track to an almost 90° angle crossing in a short time. Therefore, a motorist only has a short time to discern the flashing lights.

5. Alcohol/Drug Involvement: Not an issue.

6. Other Factors: The sun masked the flashing lights that indicated the train's approach.

7. Weather: Not an issue; clear, dry and 50° F.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: No previous accidents reported in U.S DOT/AAR Grade Crossing Inventory.

## CASE NO.: 59

**Safety Board Investigation No.:** ATL-86-F-X002
**Accident Location:** County Road 59, Coaling, Alabama
**Date and Time:** October 15, 1985, 12:10 p.m.
**Motor Vehicle Involved:** 1985 Mack Tractor Semitrailer Cargo Tank Combination
**Train(s) Involved:** Amtrak Train No. 19
**Railroad(s) Involved:** Amtrak/Southern Railway System
**U.S. DOT-AAR Crossing Number:** 725429V
**Train Activated Warning Devices:** None; crossbucks and stop sign
**Fatalities:** 0 **Injuries:** 1

**Summary:**

Southbound Amtrak passenger train No. 19, traveling at 60 mph, struck an eastbound 1985 Mack tractor semitrailer cargo tank combination at a grade crossing on County Road 59 in Coaling, Alabama. The train did not derail. There were no injuries to the crew or passengers. The truckdriver was seriously injured, but survived.

The locomotive engineer stated he began the whistle warning for the crossing about 1,000 feet away (11 1/2 seconds from the crossing). At this point, the engineer could not see the crossing due to brush, trees, and curvature of the track. When the tractor semitrailer cargo tank came into view (approximately 5 to 6 seconds from the grade crossing), the engineer placed the train into emergency braking, but the braking action was too late to be effective and the train struck the left side of the tractor. The engineer stated that the tractor semitrailer cargo tank was stopped on the crossing.

A witness stated that the truck had stopped on the crossing, had moved slightly backward, and was then struck by the train. The truckdriver was unable to remember anything about the accident. He did state that he was well rested and had traveled about 142 miles prior to the accident. He possessed a valid driver's license with no restrictions and had no accidents or convictions over the past 5 years.

Sight distance is very restricted at the crossing due to trees and track curvature in both directions. The roadway is narrow (17 feet wide) and the last 50 feet of the approach has a 5.2 percent ascending grade. The roadway approach angle to the track is 72°.

The radio was on low, the air conditioner was on, the passenger side window was up and the driver's window was up about halfway. If the truck was at idle, the driver may have heard the train because his window was partially down and he may have started to reverse or shift gears, which allowed the truck to roll backward as the witness observed.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was the truckdriver's failure to detect the approaching train because vegetation and track curvature obstructed the view of the train and because he was unable to hear the train's whistle because of high ambient noise levels in the tractor's cab. Further contributing to the accident was the crossing configuration of an ascending grade coupled with a 72° angle of intersection, which further limited the truckdriver's ability to detect the approaching train, and the driver's improper selection of a truck route.

Coaling, Alabama

**Issues:**

1. Audibility: The high ambient noise level in the tractor cab caused by radio, air conditioner, and tractor engine reduced the effectiveness of the train's whistle.

2. Visibility: The track curvature, brush, and trees seriously restrict vision. The tractor semitrailer cargo tank truck, did not have enough time to cross. It was estimated that it would take 10 to 11 seconds for a truck of that size to clear the crossing. At 60 mph, there is about 5 to 6 seconds of sight distance warning time. There is not sufficient sight distance for tractor semitrailer cargo tank to clear the crossing.

3. Driver's Action: Not an issue.

4. Crossing Characteristics: Sight distance is a problem, but additionally the roadway is narrow (17 feet) and the last 50 feet of approach to the grade crossing has a 5.2 percent ascending grade. Additionally, the crossing has an angle of intersection of 72°.

5. Alcohol/Drug Involvement: Not an issue.

6. Other Factors: The routing of this vehicle over this grade crossing was inappropriate. The characteristics of this crossing should have precluded a heavy truck driver from selecting this crossing for use.

7. Weather: Not a factor; daytime, cloudy, dry, and about 65° F.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: Yes.

3. Past accident history at crossing: One previous accident had been reported in the U.S. DOT-AAR Grade Crossing Inventory.

## CASE NO.: 60

**Safety Board Investigation No.:** CHI-86F-X002
**Accident Location:** Knox County Road 10, Galesburg, Illinois
**Date and Time:** October 22, 1985, 1:04 p.m.
**Motor Vehicle Involved:** 1979 Ford Pinto
**Train(s) Involved:** Amtrak Train No. 6
**Railroad(s) Involved:** Amtrak/Burlington Northern Railroad Company
**U.S. DOT-AAR Crossing Number:** 079209S
**Train Activated Warning Devices:** Standard flashing lights, automatic gates, and audible signals.

**Fatalities:** 1 **Injuries:** 0

**Summary:**

Eastbound Amtrak passenger train No. 6, traveling at approximately 79 mph, struck an automobile at Knox County Road 10, near Galesburg, Illinois, when the car went around the gates without stopping. The driver, sole occupant of the automobile, was killed in the collision.

A witness stated that the gates and lights at the crossing were functioning, the train's headlight was on, and the engineer was sounding the whistle. The witness observed the driver turn his head toward the approaching train before going around the gates.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was the intentional act of the automobile driver to ignore crossing gates because he was late for an appointment.

**Issues:**

1. Audibility: Not an issue.
2. Visibility: Not an issue.
3. Driver's Action: The driver failed to stop behind lowered crossing gates and drove around the gates.
4. Crossing Characteristics: Not an issue.
5. Alcohol/Drug Involvement: Not an issue.
6. Other Factors: Driver was late for a job interview.
7. Weather: Not an issue; daytime, cloudy, dry, and 60° F.

**Other Information:**

1. Driver familiar with crossing: Yes

Galesburg, Illinois

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: No previous accidents had been reported in the DOT/AAR Grade Crossing Inventory.

4. Driver's Previous Driving Record: 11 convictions, 5 suspensions, and driver's license revoked on September 12, 1985.

**CASE NO.: 61**

**Safety Board Investigation No.:** LAX-86-F-X001
**Accident Location:** Ross Road, Wix, Idaho
**Date and Time:** October 24, 1985, 8:55 a.m.
**Motor Vehicle Involved:** 1980 Kenworth tractor semitrailer combination
**Train(s) Involved:** Amtrak Train No. 25
**Railroad(s) Involved:** Amtrak/Union Pacific Railroad
**U.S. DOT-AAR Crossing Number:** 819405U
**Train Activated Warning Devices:** None, crossbucks and stop sign
**Fatalities:** 0 **Injuries:** 0

**Summary:**

Northbound Amtrak train No. 25, traveling at 70 mph, struck a tractor semitrailer combination on the Ross Road grade crossing near the town of Wix, Idaho. No injuries resulted from this accident.

The tractor semitrailer had made a right turn off U.S. Highway 95 onto Ross Road and began to travel the 65 feet to the crossing when the right rear trailer wheels went off the paved roadway and became stuck in the dirt. At this point, the tractor was on the railroad track and the driver stated he could not move the tractor semitrailer combination either forward or backward.

The driver stated that he heard the train whistle and evacuated the tractor. Ross Road is a mixture of asphalt and gravel, is maintained by Washington County, and has a 5 percent ascending grade over the 65 feet from Highway 95 to the tracks. The roadway is 23 feet wide and intersects the railroad tracks at an angle of approximately 110°.

After this accident and with the assistance of the Safety Board's investigator, Washington (Idaho) County Commissioners closed this crossing, citing that due to truck traffic the crossing was unsafe. If a tractor semitrailer stops at the trackside stop sign, the trailer portion is still on the highway. Traveling from Ross Road to Highway 95, it is conceivable that a tractor semitrailer combination could be stopped waiting to enter onto Highway 95 and be struck by a train in the trailer portion because that section would be on the tracks. Alternate routes in the immediate area are safer for heavy trucks to cross.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was that the truck driver failed to negotiate a turn and got the trailer stuck in a ditch with the truck tractor on the track.

Contributing to the accident was the narrow highway approach to the crossing. Further contributing was the improper selection of a truck route.

**Issues:**

1. Audibility: Not an issue.

2. Visibility: Not an issue.

Wix, Idaho

3. Driver's Action: The driver attempted to free his trailer from the dirt; being unable to do so, he evacuated the tractor after hearing the train whistle.

4. Crossing Characteristics: The short distance to the crossing from the main highway (65 feet), the 5% ascending grade, and the soft earth on the side of the roadway all contributed to this accident.

5. Alcohol/Drug Involvement: Not an issue.

6. Other Factors: The driver heard the train and evacuated the tractor, thereby preventing injury.

7. Weather: Not an issue; daytime, foggy, wet, and 50° F.

**Other Information:**

1. Driver familiar with crossing: No.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: Four previous accidents had been reported in the DOT/AAR Grade Crossing Inventory.

**Postaccident Information**

With the assistance of the Safety Board's investigator, the Washington (Idaho) County Commissioners met and closed this crossing.

**CASE NO.: 62**

**Safety Board Investigation No.:** CHI-86-F-X003
**Accident Location:** New River Road, Wilmington, Illinois
**Date and Time:** October 25, 1985, 9:10 a.m.
**Motor Vehicle Involved:** 1973 Oldsmobile Cutlass
**Train(s) Involved:** Amtrak Train No. 300
**Railroad(s) Involved:** Amtrak/Illinois Central Gulf Railroad
**U.S. DOT-AAR Crossing Number:** 290497P
**Train Activated Warning Devices:** Standard flashing lights and audible signals
**Fatalities:** 0 **Injuries:** 0

**Summary:**

Northbound Amtrak passenger train No. 300, traveling at 77 mph, was struck on the side of the last passenger coach by an automobile as it moved through the public grade crossing on New River Road near the town of Wilmington, Illinois. There were no injuries in this accident.

The engineer stated that he saw the automobile traveling toward the crossing at a high rate of speed. He saw the front of the automobile dip down as the train passed through the crossing. He looked in his mirror and saw the automobile was damaged and at an undetermined angle. At this point, the fireman said he believed that the automobile had struck the train.

The driver of the automobile stated he did not see or hear the train yet he attempted to beat the train to the crossing. When the motorist realized he could not safely traverse the grade crossing he applied the automobile's brakes. He misjudged his stopping distance. There were no rubber marks on the roadway because the automobile driver did not attempt a panic stop.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was the failure of the automobile driver to miss the rear car of the train due to an error in judgment in an attempt to beat the train.

**Issues:**

1. Audibility: Not an issue.

2. Visibility: Not an issue.

3. Driver's Action: The driver attempted to beat the train and realized at the last moment he could not beat the train and applied the brakes.

4. Crossing Characteristics: Not an issue.

5. Alcohol/Drug Involvement: Not an issue.

Wilmington, Illinois

6. Other Factors: None.

7. Weather: Not an issue; daytime, clear, dry, and 50° F.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: Two previous accidents had been reported in the U.S. DOT/AAR Grade Crossing Inventory.

## CASE NO.: 63

**Safety Board Investigation No.:** FTW-86-F-X002
**Accident Location:** Hollanday Street, Kenner, Louisiana
**Date and Time:** October 25, 1985, 11:57 a.m.
**Motor Vehicle Involved:** 1985 White Tractor semitrailer combination
**Train(s) Involved:** Amtrak Train No. 59
**Railroad(s) Involved:** Amtrak/Illinois Central Gulf Railroad
**U.S. DOT-AAR Crossing Number:** 300223U
**Train Activated Warning Devices:** None, crossbucks
**Fatal(s):** 0 **Injury(ies):** 0

**Summary:**

Southbound Amtrak train No. 59 struck a 1985 White tractor semitrailer combination at the Hollanday Street grade crossing in Kenner, Louisiana. The train did not derail and the truckdriver, traincrew, and passengers were not injured. The train was operating at approximately 25 mph. The train's headlights were on and the warning whistle was sounding.

As the train approached the Hollanday crossing, the engineer and brakeman observed a truck turning right onto Hollanday from Kenner Avenue. Kenner Avenue parallels the track on the south side. The truck approached the track and abruptly stopped with its front wheels fouling the track. The train struck the truck and the tractor pivoted approximately 135° and came to rest in a drainage ditch on the north side of Kenner Avenue. Estimated damage to the truck was $71,600.

According to the truckdriver, after departing the American Steel Corporation truck terminal, he drove about three blocks on Fenner Avenue to Hollanday Street. The truckdriver reported that as he made his right turn from Kenner Street onto Hollanday Street, he was watching the rear of the truck in his rear view mirror. As he glanced to his right, he saw the approaching train. He immediately stopped the truck and the engine stalled. He could not explain why the engine had died, unless he had failed to depress the clutch pedal when he made the emergency stop. Before he could restart the truck's engine, impact with the train occurred.

The driver was familiar with the grade crossing and simply failed to take proper precautions to detect the approaching train.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was the truckdriver's failure to detect the approaching train because he was preoccupied with turning on a narrow street at the crossing. Contributing was the stalling of the truck engine while on the crossing and the selection of an improper truck route.

**Factors:**

1. Audibility: Not an issue.

Kenner, Louisiana

2. Visibility: Not an issue.

3. Driver's Action: The driver should have been more concerned with crossing safely and should have looked more carefully for a train.

4. Crossing Characteristics: A narrow road makes turning a truck difficult, especially while watching for an approaching train.

5. Alcohol/Drug Involvement: Not an issue.

6. Other Factors: The routing of this truck over this crossing was an issue.

7. Weather: Not an issue; daytime, cloudy, wet, and 74° F.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: Three previous accidents had been reported in the U.S. DOT/AAR Grade Crossing Inventory.

## CASE NO.: 64

**Safety Board Investigation No.:** FTW-86-F-X003
**Accident Location:** Desonier Road, Sorrell, Louisiana
**Date and Time:** October 26, 1985, 5:15 p.m.
**Motor Vehicle Involved:** 1985 Buick Somerset
**Train(s) Involved:** Amtrak No. 1
**Railroad(s) Involved:** Amtrak/Southern Pacific Transportation Company
**U.S. DOT-AAR Crossing Number:** 767567A
**Train Activated Warning Devices:** None, crossbucks
**Fatalities:** 5 **Injuries:** 0

**Summary:**

A 1985 Buick Somerset with five occupants, the driver and four children, was moving across the single track of Southern Pacific's main line at Desonier Road grade crossing when it was struck broadside on the driver's side by Amtrak Train No. 1. The train was traveling westbound at 70 mph. All the occupants of the motor vehicle were fatally injured. There were no injuries to the traincrew or to the 146 passengers on the train.

Desonier Road is a 16-foot-wide asphalt roadway. The road approaches the track ascending at a 4.5 percent grade. A sugar cane field in the northeast quadrant as well as brush and weeds on the railroad right-of-way blocks the view from the road to the track.

The accident was not survivable for the five occupants of the motor vehicle. The automobile was impaled on the front of the lead Amtrak unit and carried 5/8 mile down the track.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was the failure of the automobile driver to detect the approaching train due to inattentiveness to his driving duties and because vegetation (sugar cane fields) obstructed his view of the approaching train.

**Issues:**

1. Audibility: Not an issue.

2. Visibility: Vegetation had been allowed to grow up along the railroad right-of-way, blocking the driver's view of the approaching train.

3. Driver's Action: The driver failed to slow down and look before proceeding across the track.

4. Crossing Characteristics: Not an issue.

5. Alcohol/Drug Involvement: Not an issue.

Sorrell, Louisiana

6. Other Factors: None.

7. Weather: Not an issue; daylight, cloudy, light-rain, wet, and 73° F.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: Unknown.

3. Past accident history at crossing: No previous accidents had been reported in the U.S. DOT/AAR Grade Crossing Inventory.

**CASE NO.: 65**

**Safety Board Investigation No.:** DEN-86-F-X002
**Accident Location:** Vine Street, Otterville, Missouri
**Date and Time:** October 28, 1985, 5:47 p.m.
**Motor Vehicle Involved:** 1978 GMC 2 1/2 ton truck
**Train(s) Involved:** Amtrak Train No. 359
**Railroad(s) Involved:** Amtrak/Missouri Pacific Railroad
**U.S. DOT-AAR Crossing Number:** 442166A
**Train Activated Warning Devices:** None, crossbucks
**Fatalities:** 1 **Injuries:** 2

**Summary:**

Eastbound Amtrak train No. 359, operating at 65 mph on the Missouri Pacific Railroad, collided with a 2 1/2-ton truck at the Vine Street grade crossing in Otterville, Missouri. The impact ruptured the fuel tanks on the truck, igniting the spilled f and engulfing the truck in flames. Two passengers on the train received minor injuri The damages to the truck and locomotive were estimated to be $25,000; the truckdriver was fatally injured.

The Vine Street grade crossing was equipped with crossbucks, but train activated warning devices (gates, bells, lights) were in the early installation phases. The driver could not have seen the train's headlight until he turned off County Road A onto Vine Street. Because of the limited distance between the Vine Street grade crossing and County Road A, the driver would have had 4.5 seconds to observe the approaching train's headlight, react, and apply the truck's brakes.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was the failure of the truck driver to detect the approaching train because he was distracted by turning from a side street onto the grade crossing and because of the absence of train activated warning devices.

**Issues:**

1. Audibility: Not an issue.
2. Visibility: Not an issue.
3. Driver's Action: The driver failed to stop before entering the grade crossing.
4. Crossing Characteristics: Not an issue.
5. Alcohol/Drug Involvement: Not an issue.
6. Other Factors: The truckdriver was in a hurry to get his load delivered to the grain elevator.

Otterville, Missouri

7. Weather: Not an issue; nighttime, overcast, dry, and 42° F.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: Unknown.

3. Past accident history at crossing: No previous accidents had been reported in the DOT/AAR Grade Crossing Inventory.

**Postaccident Information:**

The Missouri Pacific Railroad completed the installation of crossing gate arms, flashing lights, and bells at Vine and Cherry Street crossing less than one month after the Safety Board investigation.

**CASE NO.: 66**

**Safety Board Investigation No.:** CHI-86-F-X004
**Accident Location:** County Road 900 N, Lee, Indiana
**Date and Time:** November 3, 1985, 8:45 a.m.
**Motor Vehicle Involved:** 1978 Ford
**Train(s) Involved:** Amtrak Train No. 317
**Railroad(s) Involved:** Amtrak/Seaboard System Railroad
**U.S. DOT-AAR Crossing Number:** 341241E
**Train Activated Warning Devices:** None, crossbucks
**Fatalities:** 2 **Injuries:** 0

**Summary:**

Northbound Amtrak train No. 37, operating at 79 mph (a closing rate of 116 feet per second) on the Seaboard System Railroad, struck an eastbound 1978 Ford automobile with two occupants at County Road 900 N near rural Lee, Indiana. Both occupants of the automobile were fatally injured. No injuries were reported to passengers or crewmembers onboard the train.

The track intersects the road at a 144° obtuse angle. The railroad was elevated on a fill about 6 feet above the level of the road and the southwestern quadrant of the crossing contained a growth of trees and vegetation. The speed limit on the unimproved gravel road is an unposted 55 mph.

The fireman on the operating engine warned the engineer about the car when he saw it approaching at a speed he estimated at 45 mph. The engineer stated that he began sounding the warning whistle at the prescribed whistle post and sounded it continually until the accident. The train's headlight and strobe lights were also on. The fireman stated that the vehicle swerved, straightened out, and then skidded into the train.

The visibility of the approaching train is restricted by the trees and vegetation growing in the southwest quadrant of the crossing. This restriction blocks the view of an approaching train's headlights at sporadic intervals at various locations along the road, beginning at a point about 630 feet west of the crossing. These obstructions may have played some role in this accident.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was the automobile driver's failure to stop at the train crossing due to inattentivenes to his driving duties, and because vegetation obstructed his view of the approaching train.

**Issues:**

1. Audibility: Not an issue.

2. Visibility: Sight distance is restricted due to vegetation in the quadrant of the crossing critical for the driver to see the approaching train's headlight.

Lee, Indiana

3. Driver's Action: The automobile driver failed to slow down and look for a train.

4. Crossing Characteristics: Not an issue.

5. Alcohol/Drug Involvement: Not an issue.

6. Other Factors: None.

7. Weather: Not an issue; daytime, cloudy, wet, and 45° F.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: No previous accidents reported in the DOT/AAR Grade Crossing Inventory.

## CASE NO.: 67

**Safety Board Investigation No.:** CHI-86-F-X005
**Accident Location:** Clarke Road, Gary, Indiana
**Date and Time:** November 4, 1985, 6:40 a.m.
**Motor Vehicle Involved:** 1974 Ford dump truck
**Train(s) Involved:** Amtrak Train No. 321
**Railroad(s) Involved:** Amtrak/Consolidated Rail Corporation
**U.S. DOT-AAR Crossing Number:** 522915X
**Train Activated Warning Devices:** Standard flashing lights
**Fatalities:** 1 **Injuries:** 13

**Summary:**

Westbound Amtrak commuter train No. 321, operating at 65 mph, struck a dump truck on Clarke Road in Gary, Indiana, destroying the vehicle. The driver was fatally injured and there were 13 minor injuries to passengers aboard the train.

Clarke Road grade crossing is equipped with the following warning system: automatic flashing lights, advance warning signs, and crossbucks. The visibility of the railroad approach from the east for motorists traveling northbound on Clarke Road is obstructed by trees, brush, and an automobile salvage yard.

A witness who was driving a truck ahead of the accident vehicle said that when he crossed the grade crossing, the train headlight was visible but the lights at the crossing were not flashing. Police reported the flashing lights at the crossing were functioning when they arrived at the accident scene.

Postaccident toxicological testing of the truckdriver indicated a blood alcohol concentration of 0.11 percent.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was the truckdriver's failure to stop at the crossing due to the use of alcohol and because vegetation and an auto salvage yard obstructed his view of the approaching train.

**Issues:**

1. Audibility: Not an issue.

2. Visibility: Sight distance was restricted by trees, brush, and an auto salvage yard.

3. Driver's Action: The driver failed to stop at warning flashing lights.

4. Crossing Characteristics: Not an issue.

5. Alcohol/Drug Involvement: Toxicological tests indicated that the driver's blood alcohol concentration was 0.11 percent.

Gary, Indiana

6. Other Factors: None.

7. Weather: Not an issue; dawn, cloudy, dry, and 45° F.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: Eleven accidents had been reported to the U.S. DOT/AAR Grade Crossing Inventory.

## CASE NO.: 68

**Safety Board Investigation No.:** ATL-86-F-X004
**Accident Location:** Selma Street, Buford, Georgia
**Date and Time:** November 6, 1985, 7:05 a.m.
**Motor Vehicle Involved:** 1974 Ford LTD
**Train(s) Involved:** Amtrak Train No. 19
**Railroad(s) Involved:** Amtrak/Southern Railway System
**U.S. DOT-AAR Crossing Number:** 717823C
**Train Activated Warning Devices:** None, crossbucks and stop sign
**Fatalities:** 0 **Injuries:** 1

**Summary:**

Southbound Amtrak train No. 19 struck a westbound 1974 Ford LTD at a grade crossing located in Buford, Georgia. The train was traveling at approximately 60 mph. The train did not derail and there were no injuries to the passengers or traincrew, although the motor vehicle operator was seriously injured.

Sight distance afforded to motor vehicle operators of oncoming trains at this crossing is about 1,000 feet to the south and 500 feet to the north. Audibility tests conducted at the site indicated that the motor vehicle operator should have heard the train's whistle if he slowed or stopped near the crossing; however, he probably would not have heard the train's whistle if he approached the tracks at the road's posted speed limit (30 mph).

It is most likely that the motor vehicle operator neither heard the warning signal nor observed the train prior to entering the grade crossing. The operator's familiarity with this crossing should have made him alert to the stop sign. The sight distance was adequate to look for trains in both directions. It is reasonable to assume that the motor vehicle operator was preoccupied with reporting to work and therefore paid litle attention to the stop sign.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was the failure of the automobile driver to stop at the crossing due to inattentiveness to his driving duties caused by preoccupation with reporting to work.

**Issues:**

1. Audibility: A possible issue; the motor vehicle operator may not have heard the train's warning whistle with the windows of the vehicle up.

2. Visibility: Not an issue.

3. Driver's Action: The motor vehicle operator failed to stop and look for a train.

4. Crossing Characteristics: Not an issue.

Buford, Georgia

5. Alcohol/Drug Involvement: Not an issue.

6. Other Factors: None.

7. Weather: Not an issue; daylight, clear, and dry (temperature not recorded).

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: One previous accident had been reported to the U.S. DOT/AAR Grade Crossing Inventory.

## CASE NO.: 69

**Safety Board Investigation No.:** NYC-86-F-X003
**Accident Location:** Private grade crossing, Tivoli, New York
**Date and Time:** December 8, 1985, 2:37 p.m.
**Motor Vehicle Involved:** 1972 Dodge
**Train(s) Involved:** Amtrak Train No. 80
**Railroad(s) Involved:** Amtrak/Consonlidated Rail Corporation
**U.S. DOT-AAR Crossing Number:** None recorded
**Train Activated Warning Devices:** None
**Fatalities:** 3 **Injuries:** 0

**Summary:**

Southbound Amtrak train No. 80, operating on the Consonlidated Rail Corporation's track, collided with a 1972, two-door Dodge automobile at a private crossing near Tivoli, New York. The three occupants of the automobile were killed in the collision. The private grade crossing had a sign designating the tracks for high speed trains.

The train's speed prior to the collision was reported as approximately 90 mph (132 feet per second). The engineer applied his train's brakes prior to impact.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was the failure of the automobile driver to detect the approaching train due to the use of alcohol.

**Issues:**

1. Audibility: Not an issue.

2. Visibility: Not an issue.

3. Driver's Action: The driver turned the motor vehicle onto the crossing in front of the train.

4. Crossing Characteristics: Not an issue.

5. Alcohol/Drug Involvement: Tests conducted after the accident indicated a blood alcohol concentration (BAC) of 0.07 percent for the driver and one passenger, and a BAC of 0.02 percent for the second passenger.

6. Other Factors: None.

7. Weather: Not an issue; daytime, cloudy, and 36° F.

Tivoli, New York

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: Unknown

3. Past accident history at crossing: Recreational route to river front - no previous accident history reported in the U.S. DOT/AAR Grade Crossing Inventory.

## CASE NO.: 70

**Safety Board Investigation No.:** NYC-86-F-X002
**Accident Location:** Glenbrook Road, Stamford, Connecticut
**Date and Time:** December 7, 1985, 8:45 p.m.
**Motor Vehicle Involved:** 1977 Chevrolet
**Train(s) Involved:** Metro-North Commuter Train No. 6721
**Railroad(s) Involved:** Metro-North Commuter Railroad
**U.S. DOT-AAR Crossing Number:** 500533R
**Train Activated Warning Devices:** Standard flashing lights
**Fatalities:** 0 **Injuries:** 0

**Summary:**

Southbound Metro-North Commuter train No. 6721 struck a 1977 Chevrolet automobile at Glenbrook Road crossing in Stamford, Connecticut. The westbound automobile stopped with the front bumper on the crossing. The driver, unable to back her vehicle in time to clear the tracks, was struck by the slow moving train. The train's speed was estimated at 10 mph. There were no injuries.

The Glenbrook Road crossing is equipped with the following warning system: advance warning signs, staff mounted flashing lights, and crossbucks; highway traffic signals are pre-empted by the grade crossing signal system. Postaccident testing of the grade crossing signal circuits revealed that the pre-empting feature had been improperly wired. This incorrect wiring prohibited westbound vehicular traffic from safely clearing the grade crossing because the traffic signal turned red instead of green as the train approached.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was that an improperly wired crossing warning system (pre-emptive traffic control devices) displayed an incorrect signal indication, resulting in the automobile being trapped on the crossing as the train approached. In addition, the engineer failed to stop the slow moving train short of the collision.

**Issues:**

1. Audibility: Not an issue.

2. Visibility: Not an issue.

3. Driver's Action: The driver failed to stop clear of railroad tracks but was placed in this position by highway traffic signals.

4. Crossing Characteristics: An improperly wired traffic signal backed up traffic, which placed the motor vehicle in a dangerous position on the crossing.

5. Alcohol/Drug Involvement: Not an issue.

Stamford, Connecticut

6. Other Factors: The engineer failed to stop the slow moving train short of a collision.

7. Weather: Not an issue; nighttime, clear, dry, and 38° F.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: Three previous accidents had been reported in the U.S. DOT-AAR Grade Crossing Inventory.

## CASE NO.: 71

**Safety Board Investigation No.:** LAX-86-F-X004
**Accident Location:** Childs Avenue, Planada, California
**Date and Time:** December 16, 1985, 6:45 p.m.
**Motor Vehicle Involved:** 1985 Cadillac
**Train(s) Involved:** Amtrak Train No. 709
**Railroad(s) Involved:** Amtrak/Atchison, Topeka and Santa Fe Railway Company
**U.S. DOT-AAR Crossing Number:** 028647E
**Train Activated Warning Devices:** Automatic gates, standard flashing lights, and audible signals
**Fatalities:** 1 **Injuries:** 1

**Summary:**

Westbound Amtrak passenger train No. 709, traveling at about 79 mph, struck a 1985 Cadillac at the Childs Avenue grade crossing in Planda, California. The driver of the Cadillac was killed. A passenger managed to vacate the automobile before impact. The passenger stated that they were on their way to a dinner party scheduled for 7 p.m. They missed their turn and became stuck on the tracks while attempting to back up and turn around. The car stalled when the driver became stuck off the roadway and between the rails. The passenger got out and discovered they were hungup between rails, she then heard the train whistle warning. She did not hear the crossing bell or see the gates go down, located about 25 feet away. She tried to warn the driver, but to no avail. She was still standing near the passenger door as the automobile was struck by the train.

A witness on the other side of the crossing verified the gates, bell, whistle warnings and locomotive headlight were operating.

The driver was tested for alcohol and the blood alcohol concentration was found to be 0.11 percent. The weather was described as very poor with an estimated 60 to 100 feet of sight distance due to heavy fog. The locomotive engineer stated that he had seen the automobile for only about 1 to 2 seconds before striking it. He did not apply his train's brakes until after impact.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was that the automobile driver, due to the use of alcohol, drove off the road onto the track and got the car stuck on the tracks.

Contributing to the accident was restricted visibility due to heavy fog.

**Issues:**

1. Audibility: Not an issue.

2. Visibility: Not an issue.

3. Driver's Action: The driver missed a turn due to alcohol impairment and was unable to negotiate the automobile off the crossing.

Planada, California

4. Crossing Characteristics: Not an issue.

5. Alcohol/Drug Involvement: The 0.11 percent blood alcohol concentration impaired the driver's judgment and limited her ability to quickly exit the automobile.

6. Other Factors: None.

7. Weather: Heavy fog restricted the vision of both the automobile driver and the engineer. If the weather had been clear, the engineer may have been able to slow the train, if he perceived a disabled automobile.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: Five previous accidents had been reported to the DOT-AAR Grade Crossing Inventory.

**CASE NO.: 72**

**Safety Board Investigation No.:** ATL-86-F-X007
**Accident Location:** Winston Street, Youngsville, North Carolina
**Date and Time:** December 18, 1985, 12:24 p.m.
**Motor Vehicle Involved:** 1979 GMC tractor semitrailer combination
**Train(s) Involved:** Amtrak Train No. 271
**Railroad(s) Involved:** Amtrak/Seaboard System Railroad
**U.S. DOT-AAR Crossing Number:** 630529J
**Train Activated Warning Devices:** None, crossbucks
**Fatalities:** 0 **Injuries:** 0

**Summary:**

Northbound Amtrak train No. 271 was being operated by the Seaboard System Railroad to transport military personnel from Fort Jackson, South Carolina, to New York City, for the upcoming holidays. The train was moving through the municipality of Youngsville, North Carolina, when a tractor semitrailer combination was driven across the tracks ahead of the train. The semitrailer was struck by the train and became detached from the tractor. There was no derailment, fire, or personal injuries to persons aboard the train or in the cab of the truck. Estimated property damage was $52,000.

The engineer and fireman observed the eastbound tractor semitrailer combination being driven across the track ahead of them. The engineer applied the train brakes and reduced the train's speed based on the train's speed tape from 70 mph to 67 mph.

It appears that the truckdriver was not aware of the approaching train as he began to drive his truck onto the track at a speed of 3 to 5 mph. The noise level in the cab of the tractor initially masked the sound of the locomotive's whistle at other crossings as it moved through Youngsville even though the tractor's windows were open. The train's alerting whistle was not sufficient to attract the motor vehicle driver's attention prior to the whistle post for this crossing. Additionally, the driver was preoccuppied with maneuvering his truck to park parallel to the track after crossing over the track; thus, his concentration may have been directed to that task. A local diner was located on the other side of the track. Sight distance was not a factor since the train was visible to the truckdriver from the whistle post for approximately 1,580 feet down the track.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was the truckdriver's failure to detect the approaching train due to his preoccupation with an upcoming parking maneuver as he entered the grade crossing.

Contributing to the accident was the inability of the driver to hear the train's approach due to the ambient noise level in the truck cab. Further contributing was the failure of the driver to select a safer alternate route located 945 feet away.

**Issues:**

1. Audibility: Noise from the truck's engine masked the sound of the locomotive's whistle prior to the whistle post at this crossing. At that time the driver had insufficient time to clear the crossing.

Youngsville, North Carolina

2. Visibility: Not an issue.

3. Driver's Action: The driver should not have proceeded in advance of an oncoming train.

4. Crossing Characteristics: Not an issue.

5. Alcohol/Drug Involvement: Not an issue.

6. Other Factors: A safe route with active warning devices was available 945 feet south of this crossing.

7. Weather: Not an issue; daytime, clear, dry, and 45° F.

Other Information:

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: No previous accidents had been reported in the U.S. DOT/AAR Grade Crossing Inventory.

## CASE NO.: 73

**Safety Board Investigation No.:** NYC-86-F-X004
**Accident Location:** New Canaan Avenue, Norwalk, Connecticut
**Date and Time:** December 21, 1985, 8:27 a.m.
**Motor Vehicle Involved:** 1980 Datsun
**Train(s) Involved:** Metro-North Commuter Train No. 6813
**Railroad(s) Involved:** Metro-North Commuter Railroad
**U.S. DOT-AAR Crossing Number:** 500564P
**Train Activated Warning Devices:** Standard flashing lights and highway traffic signals
**Fatalities:** 0 **Injuries:** 1

**Summary:**

Metro-North Commuter Railroad Train No. 6813 struck a 1980 Datsun at New Canaan Avenue, in Norwalk, Connecticut. The single occupant of the automobile, who was on his way to work, was seriously injured.

The train approached the crossing with its horn sounding and traveling at 30 mph. The engineer of the train indicated the grade crossing's flashing lights were working. This was confirmed by other witnesses. According to witnesses, the highway traffic signal changed from red to green and then back to red. At the time of the accident, the road surface was wet from a recent 1" to 2" snowfall. A motor vehicle operator in a following automobile indicated that the Datsun's brakes were applied, but the automobile continued into the path of the train. The roadway approach descends at a 7 percent grade to the track. The witness also stated that it was very difficult to tell if the grade crossing's flashing lights were functioning because of sunlight masking the signal's lights. Furthermore, the sight distance for both train and vehicle drivers at the New Canaan Avenue grade crossing is very limited by terrain, buildings, and structures near the crossing.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was that the automobile driver drove by the flashing warning lights and into the path of the train because of his preoccupation to get to work.

Contributing to the accident may have been the diminished conspicuity of the flashing warning lights due to the position of the sun. Further contributing was obstruction of the automobile driver's view of the approaching train by buildings adjacent to the tracks.

**Issues:**

1. Audibility: Not an issue.

2. Visibility: The sight distance for both trains and vehicles at this grade crossing is obstructed due to terrain and fixed structures.

3. Driver's Action: Not an issue.

Norwalk, Connecticut

4. Crossing Characteristics: It was difficult for the motor vehicle operator to tell if the grade crossing's flashing lights were on because the lights were masked by sunlight.

5. Roadway Characteristics: In wet or otherwise inclement weather the descending 7 percent grade can exacerbate an already dangerous intersection.

6. Alcohol/Drug Involvement: Not an issue.

6. Other Factors: None

7. Weather: Clear, 35°, 1 to 2 inches of snow on the ground.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: Unknown.

3. Past accident history at crossing: Six previous accidents had been reported in the U.S. DOT/AAR Grade Crossing Inventory.

**CASE NO.: 74**

**Safety Board Investigation No.:** CHI-86-F-X008
**Accident Location:** Royal Road, Michigan City, Indiana
**Date and Time:** December 30, 1985, 12:33 p.m.
**Motor Vehicle Involved:** 1985 Dodge Aries sedan
**Train(s) Involved:** Chicago, South Shore and South Bend Commuter Train No. 16
**Railroad(s) Involved:** Chicago, South Shore and South Bend Railroad Company (CSS&SB)
**U.S. DOT-AAR Crossing Number:** 870438P
**Train Activated Warning Devices:** Standard flashing lights and audible signals
**Fatalities:** 1 **Injuries:** 0

**Summary:**

CSS&CB westbound train No. 16, consisting of two self-propelled electric passenger cars, struck a southbound 1985 Dodge Aries automobile at the Royal Road grade crossing in Michigan, City, Indiana. The driver, and the sole occupant of the vehicle, was fatally injured. Subsequent toxicological tests administered to the train's engineer and the motor vehicle driver indicated there was no drug or alcohol involvement. The crossing was protected with flashing lights and bells.

The road was tangent to the track with some restricted visibility due to topography, a short row of trees, and the curvature of the track. The ground was snow covered with some snow and ice on the road surface; however, no skid marks were documented. The train was traveling westward on a right hand curve. The grade crossing warning devices are set for a track speed of 65 mph, but the crossing is within the city limits and the timetable speed is listed as 25 mph. The train was not equipped with a speed recording device. The engineer stated the train's speed was approximately 25 mph, yet subsequent tests of the running time, based upon the engineer's statement, indicate the speed of the train would have been about 40 mph using the engineer's statement of the time past the last station. There was no documentation to indicate that the train's speed limit was enforced at this location. The signal system functioned properly.

The driver lived within a mile of the crossing and was a lifetime resident of the Michigan City area. She had borrowed the car she was driving from a friend whom she had just dropped off at work. She continued to run some errands. The windows of the vehicle were rolled up. The heater controls were too damaged to tell what setting they were on; however, the prevailing weather condition would suggest that the heater fan was in an "on" position. The light from the radio was examined and determined to have been on, but the radio's controls were too damaged to indicate what volume the radio was on. The brake lights were on at the time of the accident, indicating the driver was aware of the train and tried to stop.

The engineer stated that he saw the car approaching the crossing and began sounding the train's whistle in a normal manner. He lost sight of the car behind a wall of the train's operating compartment cab. The engineer thought the car was stopping when it reappeared in front of his window and was immediately struck by the train. He did not know if the driver was looking at the train.

Michigan City, Indiana

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was the failure of the automobile driver to detect the approaching train due to inattentiveness to her driving duties.

Contributing was the inability of the driver to hear the train's audible warning system because of high ambient noise level in the automobile and the failure of the engineer to comply with speed restrictions.

**Issues:**

1. Audibility: The windows of the vehicle were rolled up. The condition of the heater fan was undeterminable due to vehicle damage; however, weather conditions would suggest that the heater fan was on. Analysis of light bulbs indicated that the radio was on at the time of the accident. The sound of the train's whistle probably did not penetrate the automobile until the last second.

2. Visibility: The visibility of the approaching train was somewhat obstructed by the terrain, a row of trees, and track curvature. The snow covered landscape may have also contributed to the masking of the train against the white background.

3. Driver's Action: The driver operated the vehicle into the path of the approaching train. She tried to stop, as indicated by the analysis of the brake lights.

4. Crossing Characteristics: Not an issue.

5. Alcohol/Drug Involvement: Not an issue.

6. Other Factors: The train was operating in excess of the speed prescribed by the city (25 mph). The Board's investigation indicated the train's speed was most probably 40 mph.

7. Weather: Not an issue; daytime, cloudy, and 28° F; some snow and ice on the road's surface.

**Other Information:**

1. Driver familiar with crossing: Yes.

2. Driver familiar with Operation Lifesaver: No.

3. Past accident history at crossing: No previous accidents have been reported in the DOT/AAR Grade Crossing Inventory.

**CASE NO.: 75**

**Safety Board Investigation No.:** DCA-85-MH014
**Accident Location:** Private Road, Mansfield, Ohio
**Date and Time:** August, 26, 1985, 12:49 a.m.
**Motor Vehicle Involved:** 1971 International Tractor Semitrailer "Lowboy" Combination
**Train(s) Involved:** Amtrak Train No. 40
**Railroad(s) Involved:** Amtrak/Consolidated Rail Corporation
**U.S. DOT-AAR Crossing Number:** 502634B
**Train Activated Warning Devices:** Automatic gates and flashing lights
**Fatalities:** 0 **Injuries:** 11

**Summary:**

Eastbound Amtrak train No. 40, operating at approximately 57 mph, collided with a tractor semitrailer "lowboy" combination that had stalled on the track on a private road in Mansfield, Ohio. The train derailed and 11 passengers were injured — one seriously and 10 with minor injuries. Most of the injuries occurred during the evacuation of the train.

The truck stalled on the railroad tracks about two minutes before the collision occurred. The two members of the traincrew in the lead Amtrak locomotive saw the silhouette of the truck moments before impact and applied the emergency brakes.

The engine in the truck had been replaced with an old bus engine with 30-35% less pulling power than the previous engine. The truckdriver was unaware of this replacement and attempted to cross the tracks from a stopped position in second gear. Apparently, the replacement engine had to be started in first gear from a stop.

**Probable Cause:**

The National Transportation Safety Board determined that the probable cause of the accident was the disablement of a tractor semitrailer "lowboy" combination on the railroad tracks due to a stalled engine.

**Issues:**

1. Audibility: Not an issue.
2. Visibility: Not an issue.
3. Driver's Action: Not an issue.
4. Crossing Characteristics: Not an issue.
5. Alcohol/Drug Involvement: Not an issue.
6. Other Factors: Underrated engine stalled on the railroad tracks from a stopped position. Truckdriver unable to start engine and clear tracks before collision.
7. Weather: Not an issue; clear, and nighttime; temperature not reported.

Mansfield, Ohio

**Other Information:**

1. Driver familiar with crossing: Yes.
2. Driver familiar with Operation Lifesaver: No.
3. Past accident history at crossing: No data.

# APPENDIX D

## INVESTIGATION HIGHLIGHTS, 1985

Of the 161 accidents reported to the Safety Board during the program, 155 involved Amtrak trains. 1/ Of the 75 accidents discussed herein, Amtrak trains were involved in 70. The remaining five accidents involved commuter railroad operations.

The railroad track over which Amtrak and/or commuter railroads operated were:

| Railroad | Number of Accidents |
|---|---|
| Illinois Central Gulf Railroad | 13 |
| Consolidated Rail Corporation | 11 |
| Seaboard System Railroad | 10 |
| Southern Pacific Transportation Company | 8 |
| Atchison, Topeka and Sante Fe Railway | 6 |
| Burlington Northern Railroad | 5 |
| Southern Railway System | 4 |
| Chessie System (B & O, C & O) | 3 |
| Metro-North Commuter Railroad | 3 |
| Missouri Pacific Railroad | 3 |
| Amtrak | 2 |
| Union Pacific Railroad | 2 |
| Grand Trunk Western Railroad | 2 |
| New Jersey Transit | 1 |
| Denver, Rio Grande and Western Railroad | 1 |
| Chicago, South Shore and South Bend Railroad | 1 |
| TOTAL: | 75 |

A breakdown of the investigations by State indicated the following:

| State | Number of Accidents |
|---|---|
| Illinois | 11 |
| California | 9 |
| Michigan | 7 |
| Florida | 6 |
| Indiana | 6 |
| Louisiana | 6 |
| Mississippi | 4 |
| Connecticut | 4 |
| Missouri | 3 |
| Idaho | 2 |
| South Carolina | 2 |
| Alabama | 2 |
| North Dakota | 2 |
| Georgia | 2 |

1/ This is consistent with Amtrak accident experience in previous years. Amtrak accident reporting to the FRA for calendar years 1981 through 1984 was 147, 163, 121, and 164, respectively. The annual average number of accidents involving Amtrak trains for calendar years 1981 through 1985 was 150.

| State | Number of Accidents |
|---|---|
| Ohio | 2 |
| New Jersey | 1 |
| Washington | 1 |
| Utah | 1 |
| New York | 1 |
| Texas | 1 |
| North Carolina | 1 |
| Virginia | 1 |
| TOTAL: | 75 |

The following types of warning devices were in place at the grade crossings involved in the 161 notification accidents and the 75 investigated accidents:

| Types of Warning Device | Number among 161 notified accidents | Number among 75 investigated accidents |
|---|---|---|
| Active 2/ | 72(44.7%) | 40 (53.3%) |
| Passive 3/ | 59 (36.6%) | 24 (32.0%) |
| Stop Sign | 13 ( 8.1%) | 10 (13.3%) |
| Other | 17 (10.6%) | 1 ( 1.4%) |
| TOTAL | 161 | 75 |

Most of the accidents investigated occurred during daylight hours, as shown in the following breakdown of the accidents by time of day:

| Time of Day | No. of accidents |
|---|---|
| 6 - 7 a.m. | 3 |
| 7 - 8 a.m. | 6 |
| 8 - 9 a.m. | 10 |
| 9 - 10 a.m. | 6 |
| 10 - 11 a.m. | 4 |
| 11 - 12 (Noon) | 4 |
| 12 - 1 p.m. | 5 |
| 1 - 2 p.m. | 3 |
| 2 - 3 p.m. | 5 |
| 3 - 4 p.m. | 4 |
| 4 - 5 p.m. | 2 |
| 5 - 6 p.m. | 7 |

2/ Active Warning Devices - A warning system activated by an approaching train: gates, flashing lights, highway signals, wigwags, or bells.
3/ Passive warning devices - A warning system not automatically activated by an approaching train: generally signs (crossbucks) or occasionally special warning devices (manually operated gates, flood lights, etc). The standard highway sign, generally a stop sign, is listed separately.

| Time of Day | No. of accidents |
|---|---|
| 6 - 7 p.m. | 6 |
| 7 - 8 p.m. | 2 |
| 8 - 9 p.m. | 2 |
| 9 - 10 p.m. | 1 |
| 10 - 11 p.m. | 0 |
| 11 - 12 midnight | 1 |
| 12 - 1 a.m. | 2 |
| 1 - 2 a.m. | 0 |
| 2 - 3 a.m. | 0 |
| 3 - 4 a.m. | 0 |
| 4 - 5 a.m. | 1 |
| 5 - 6 a.m. | 1 |
| TOTAL: | 75 |

The most common weather condition in these accidents was reported as being "clear." A breakdown of weather conditions revealed the following:

| Weather Condition | No. of Accidents | |
|---|---|---|
| Clear (day or night) | 38 | (50.7%) |
| Cloudy (day or night) | 16 | (21.3%) |
| Rain | 5 | (6.7%) |
| Cloudy w/snow on the ground | 5 | (6.7 %) |
| Fog | 4 | (5.3%) |
| Snow | 3 | (4.0%) |
| Other | 4 | (5.3%) |
| TOTAL: | 75 | (100.0%) |

Passenger train operating speeds were generally high (more than two-thirds were moving faster than 40 mph at the time of impact):

| Train Speed (mph) | Number of Accidents | |
|---|---|---|
| 0 to 10 | 4 | (5.3%) |
| 11 to 20 | 4 | (5.3%) |
| 21 to 30 | 9 | (12.0%) |
| 31 to 40 | 8 | (10.7%) |
| 41 to 50 | 2 | (2.7%) |
| 51 to 60 | 13 | (17.3%) |
| 61 to 70 | 20 | (26.7%) |
| 71 to 80 | 14 | (18.7%) |
| 81 | 1 | (1.3%) |
| TOTAL: | 75 | |

At 26 of the 75 grade crossings, the Safety Board found that at least two previous collisions had been recorded in the DOT-AAR Grade Crossing Inventory maintained by the FRA since 1975; at 39 of them, there had been at least one previous accident. The number of previous accidents reported in the inventory was found to be as follows:

| Number of Previous Accidents | Number of Crossings |
|---|---|
| 5 or more | 10 |
| 2 to 4 | 16 |
| 1 | 13 |
| 0 | 36 |
| TOTAL: | 75 |

## APPENDIX B

## GRADE CROSSING ACCIDENTS WITH CROSSING CHARACTERISTICS AS ISSUES

| Case No. | Location/ Date | Vehicle | Fatalities/ Injuries | Characteristics |
|---|---|---|---|---|
| 4 | Centertown, Missouri 1/5/85 | Pickup truck | 1/0 | Sunglare masked flashing lights |
| 5 | Winter Haven, Florida 1/7/85 | Automobile | 1/0 | Sunglare may have masked flashing lights, multiple merging roadways |
| 8 | Lorida, Florida 1/17/85 | Automobile | 0/0 | Crossing design allowed vehicle to be trapped on crossing |
| 9 | McComb, Mississippi 1/17/85 | Automobile | 0/0 | Placement of passive warning devices, crossing intersection angle |
| 18 | Lexington, Illinois 2/13/85 | Truck/trailer | 0/0 | Acute angle of crossing |
| 19 | Jennings, Louisiana 2/17/85 | Pickup truck | 1/1 | Poor warning device design for traffic conditions |
| 21 | Effingham, Illinois 2/19/85 | Automobile | 1/0 | Multiple tracks (7), multiple trains, and speeds; no active warning devices |
| 25 | Fresno, California 3/5/85 | Pickup truck | 0/0 | Multiples tracks |
| 26 | Oceanside, California 3/6/85 | Automobile | 0/1 | Multiple tracks (2)/ crossing design allowed traffic to be trapped on crossing |
| 28 | Lake Charles, Louisiana 4/5/85 | Automobile | 0/4 | Elevated surface profile |

## GRADE CROSSING ACCIDENTS WITH CROSSING CHARACTERISTICS AS ISSUES

| Case No. | Location/ Date | Vehicle | Fatalities/ Injuries | Characteristics |
|---|---|---|---|---|
| 31 | Grand Rapids, Michigan 4/10/85 | Pickup truck | 0/0 | Steep incline on approach to crossing |
| 32 | Independence, Louisiana 4/10/85 | Automobile | 0/0 | Narrow roadway, driver focus on vehicular traffic before train traffic |
| 35 | Springfield, Illinois 4/19/85 | Automobile | 0/1 | Multiple roadways (2)/poor interface between highway/railroad warning devices |
| 36 | Richmond, California 4/21/85 | Automobile | 0/1 | Poor protective design for vital grade crossing relay boxes |
| 40 | Mansfield, Ohio 5/18/85 | Automobile | 1/0 | Multiple tracks (6), multiple trains, and speeds; poor warning device design for traffic conditions |
| 47 | Centralia, Washington 6/24/85 | Tractor/ dump truck | 0/0 | Poor warning device design for traffic conditions |
| 52 | Schriever, Louisiana 9/4/85 | Tractor-semitrailer | 0/0 | Crossing surface profile |
| 55 | Springfield, Illinois 9/11/85 | Automobile | 1/0 | Multiple roadways (2) and poor interface between highway/railroad warning devices; no advance warning signs placed on parallel road |
| 56 | Murray, Utah 9/30/85 | Pickup truck | 0/1 | Sunglare masked warning lights |
| 58 | Coloma, Michigan 10/15/85 | Van | 0/3 | Poor roadway approach, active warning device not effective |

## GRADE CROSSING ACCIDENTS WITH CROSSING CHARACTERISTICS AS ISSUES

| Case No. | Location/ Date | Vehicle | Fatalities/ Injuries | Characteristics |
|---|---|---|---|---|
| 59 | Coaling, Alabama 10/15/85 | Tractor-semitrailer | 0/1 | Narrow roadway, ascending grade, poor design, crossing intersection angle |
| 61 | Wix, Idaho 10/24/85 | Tractor-semitrailer | 0/0 | Ascending grade crossing, deep ditch on approach to crossing, too close to parallel highway |
| 63 | Kenner, Louisiana 10/25/85 | Tractor-semitrailer | 0/0 | Poor roadway design, narrow road for heavy trucks attempting to turn onto road |
| 70 | Stamford, Connecticut 12/7/85 | Automobile | 0/0 | Poor highway traffic signal design allowed automobiles to be trapped on crossing |
| 73 | Norwalk, Connecticut 12/21/85 | Automobile | 0/1 | Sunglare masked warning lights |

## APPENDIX F

## GRADE CROSSING ACCIDENTS WITH VISIBILITY AS AN ISSUE

| Case No./ Warning device level | Accident location | Date | Railroad responsible for crossing | Visibility obstruction |
|---|---|---|---|---|
| 5/active | Winter Haven, Florida | 1/7/85 | Seaboard System | Fixed structures |
| 6/passive | Durand, Michigan | 1/10/85 | Grand Trunk Western | Fixed structures, terrain |
| 9/passive | McComb, Mississippi | 1/17/85 | Illinois Central Gulf | Vegetation, curvature of track, terrain |
| 14/active | Greenwood, Missouri | 2/4/85 | Missouri Pacific | Vegetation |
| 18/active | Lexington, Illinois | 2/13/85 | Illinois Central Gulf | Fixed structures, standing railroad cars |
| 19/passive | Jennings, Louisiana | 2/17/85 | Southern Pacific | Vegetation |
| 20/passive | Jacksonville, Florida | 2/19/85 | Seaboard System | Vegetation, standing railroad cars |
| 28/passive | Lake Charles, Louisiana | 4/5/85 | Southern Pacific | Vegetation |
| 32/passive | Independence, Louisiana | 4/10/85 | Illinois Central Gulf | Vegetation, curvature of track |
| 34/active | Windsor, Connecticut | 4/17/85 | Amtrak | Fixed structure |
| 37/active | Senatobia, Mississippi | 4/23/85 | Illinois Central Gulf | Vegetation, fixed structure |
| 40/active | Mansfield, Ohio | 5/18/85 | Consolidated Rail | Vegetation, terrain |
| 41/passive | Chicago, Illinois | 5/23/85 | Consolidated Rail | Fixed structures |
| 43/active | DeGrand, California | 6/9/85 | Atchison, Topeka, and Sante Fe | Standing railroad cars |
| 45/passive | Jamestown, Indiana | 6/22/85 | Consolidated Rail | Fixed structures |

## GRADE CROSSING ACCIDENTS IN WHICH VISIBILITY WAS AN ISSUE

| Case No./ Warning device level | Accident location | Date | Railroad responsible for crossing | Visibility obstruction |
|---|---|---|---|---|
| 46/passive | Dayton, Idaho | 6/24/85 | Union Pacific | Vegetation, fixed structure (corral) |
| 47/active | Centralia, Washington | 6/24/85 | Burlington Northern | Vegetation, curvature of track |
| 50/passive | Galen, Michigan | 7/10/85 | Amtrak | Vegetation |
| 51/passive | Jackson, Mississippi | 8/27/85 | Illinois Central Gulf | Standing railroad cars |
| 59/passive | Coaling, Alabama | 10/15/85 | Southern Railway | Vegetation, curvature of tracks |
| 64/passive | Sorrell, Louisiana | 10/26/85 | Southern Pacific | Vegetation |
| 66/passive | Lee, Indiana | 11/3/85 | Seaboard System | Vegetation |
| 67/active | Gary, Indiana | 11/4/85 | Consolidated Rail | Vegetation, fixed structure |
| 73/active | Norwalk, Connecticut | 12/21/85 | Metro-North | Vegetation, fixed structures |

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