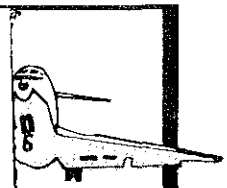

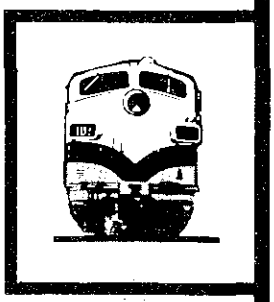

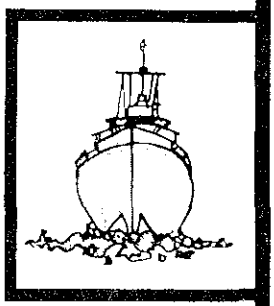

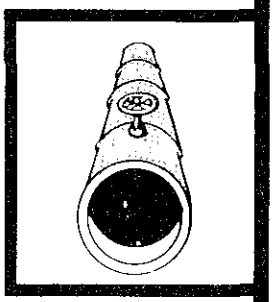

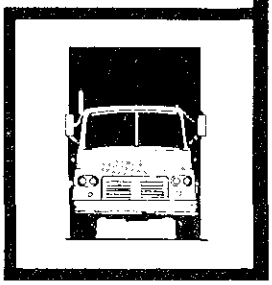

NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D.C. 20594

RAILROAD/HIGHWAY ACCIDENT REPORT

COLLISION OF A CHICAGO, ROCK ISLAND AND PACIFIC RAILROAD COMPANY FREIGHT TRAIN WITH AN AUTOMOBILE

DES MOINES, IOWA

JULY 1, 1976

REPORT NUMBER: NTSB-RHR-77-2

UNITED STATES GOVERNMENT

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16 Abstract

At 5:05 p m. on July 1, 1976, near Des Moines, Iowa, a westbound Chicago, Rock Island and Pacific Railroad Company freight train struck an automobile that had slowed but did not stop for the flashing signal lights at a grade crossing. All five persons in the automobile were killed.

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the automobile driver to stop short of the railroad track in response to the flashing signal lights and her failure to determine if it was safe to cross the track.

The Board made recommendations to the National Safety Council, the National Highway Traffic Safety Administration, the Federal Highway Administration, the Federal Railroad Administration, the International Association of Chiefs of Police, and the Chicago, Rock Island and Pacific Railroad Company.

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RAILROAD/HIGHWAY ACCIDENT REPORT

Adopted: November 3, 1977

COLLISION OF A CHICAGO, ROCK ISLAND AND PACIFIC RAILROAD COMPANY FREIGHT TRAIN WITH AN AUTOMOBILE, DES MOINES, IOWA JULY 1, 1976

SYNOPSIS

At 5:05 p.m. on July 1, 1976, near Des Moines, Iowa, a westbound Chicago, Rock Island and Pacific Railroad Company freight train struck an automobile that had slowed but did not stop for the flashing signal lights at a grade crossing. All five persons in the automobile were killed.

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INVESTIGATION

The Accident

At 5:05 p.m. on July 1, 1976, a 54-car freight train, en route from Altoona, Iowa, to Des Moines, Iowa, was traveling westbound along a main track of the Chicago, Rock Island and Pacific Railroad Company near Des Moines. The train had traveled about 1 1/2 miles from its last stop when it approached the East 56th Street grade crossing near the city limits. Train crewmembers estimated the train's speed to be from 25 to 30 mph. Railroad crossing signals at the single-track crossing were activated as the train passed the beginning of the approach track circuit about 3,000 feet east of the crossing. The engineer reported that he began to sound the train's horn before he made a minimum brake application for the grade and before he saw any vehicles near the crossing. Other crewmembers could not recall if the horn had been sounded.

Highway vehicles continued through the crossing after the signals began to flash. A southbound driver of one of these vehicles approached the crossing, slowed to about 5 to 10 mph, and continued southbound when she saw that the train was about one-fourth mile from the crossing. She crossed the track, and passed by a northbound automobile. She did not recall passing by a second northbound automobile, although she did. Looking into her rearview mirror, she saw a car's taillights illuminate about 10 seconds after she crossed the tracks.

Another southbound driver slowed to about 10 mph as he approached the crossing. He estimated that the train was traveling at 40 mph and was 150 yards from the crossing. He decided not to cross in front of the train at the speed he was traveling. As this vehicle and two other southbound following vehicles were stopping, the first of two northbound automobiles crossed the track.

Witnesses in the other southbound vehicles reported that the first northbound automobile was traveling about the same relative speed as the train (25 to 30 mph) and that it crossed the track when the train was about 100 feet from the crossing. The driver and passenger of this northbound automobile said they slowed to about 5 to 10 mph before they crossed the track. The driver said that she looked in both directions before crossing, nothing caught her attention, so she accelerated and crossed the track. A witness in one of the southbound vehicles said that this first northbound driver was looking straight ahead as she crossed the track and gave no indication that she was aware of the approaching train.

The first northbound driver said she heard a train horn for the first time when she was on the track and was startled by the sound but continued to accelerate. She said that she could not believe that the train had approached so close to the crossing when she crossed. Witnesses in the southbound vehicles also reported hearing the train horn then for the first time; one witness did not recall hearing the train horn at any time.

A second northbound automobile, about 100 feet behind the first northbound car and traveling at an estimated speed of 25 to 30 mph, also attempted to cross the track. The train brakeman reported that when this second car was about 60 feet from the crossing, its front end dipped as though the brakes had been applied, but the car continued forward without reducing its speed.

The engineer was seated on the right side of the locomotive unit cab and his view to the left was restricted. The northbound cars were approaching the crossing from his left. The brakeman was seated on the left side of the cab near an emergency brake control; however, he had a

limited view of the cars at the crossing and only had time to shout a warning to the engineer. Even if the brakeman had applied the brakes, the speed of the train would not have reduced significantly. The engineer applied the brakes in emergency when the locomotive struck the second northbound automobile.

The coupler of the lead locomotive unit struck the center of the front passenger door of the automobile. The car traveled with the locomotive 671 feet from the crossing until the train stopped. The driver and her four children were killed in the collision.

The collision occurred in daylight during clear weather. The pavement was dry. The sun was to the northbound driver's left and there was no reflective glare.

Injuries to Persons

Injuries	Driver	Passengers	Traincrew
Fatal	1	4	0
Nonfatal	0	0	0
None	0	0	4

Driver Information

The driver of the automobile struck by the train was a 42-year-old woman with a valid Iowa State driver's license. Records show no convictions for traffic law violations and one traffic accident on July 22, 1970. She was en route from a recreation club to her home when her car was struck. She had visited the club often and apparently was traveling her usual route home. Blood tests revealed nothing that would have significantly affected driver performance.

The engineer had 30 years of railroad experience. He was promoted to locomotive engineer in 1953.

Vehicle Information

The automobile was a 1970 four-door Chevrolet. The passenger compartment was severely damaged in the collision. The roof and floor pan were crushed inward about one-third the width of the passenger compartment with deformation of these areas extending into the driver's area. (See figure 1.) The fan was on low, the radio was on at low volume, and the windows on the driver's side were almost fully lowered. The windows on the right side were closed.

The train was being pulled by two General Motors Class 0-4-4-0 diesel locomotive units. Damage was limited to the right front pilot and steps. The lights, bell, horn, brakes, and radio were tested and found to be operative.

Highway Information

East 56th Street is a 22-foot-wide, two-lane, two-way, asphalt-paved county road located about 1 1/2 miles outside the Des Moines city limits. It is the first primary north-south route east of Des Moines. For northbound traffic approaching the crossing, the road grade changes from relatively level to a 500-foot-long, 3.5 percent average downgrade, then levels out across a small bridge, and changes to a 400-foot-long, 2.5 percent average upgrade before it levels out again to cross the railroad track. The road continues to follow the rolling terrain north of the crossing. There are no curves along this section of highway. The change in grade does not affect visibility of the crossing and signals; the driver of the first northbound automobile reported she first saw the signals in operation when she was about 1,500 feet from the crossing.

The posted highway speed limit was 45 mph. The presence of the crossing was indicated by an advance warning sign 750 feet before the crossing and an "RxR" symbol painted on the pavement 400 feet before the crossing. Two standard railroad crossing signals -- two horizontal red lights flashing alternately for each signal -- faced each direction of traffic. (See figure 2.)

For westbound trains, the track grade was a 0.73 percent downgrade for 2,000 feet east of the crossing and for 350 feet west of the crossing. The approach track circuits for the crossing signal lights began 3,000 feet east and 2,500 feet west of the crossing. When the track circuit was installed, the track speed limit was 60 mph. Since 1974, however, a "slow order" that restricts train speeds to 30 mph or less has been in effect because of track conditions. It is not uncommon for train speeds to be as low as 10 mph at this crossing.

An eastbound train that is within 280 feet of the crossing can be seen by a northbound driver when that driver is at a point 150 feet from the crossing. A westbound train can be seen from this point if it is within 85 feet of the crossing. (See figure 3.) The distance within which approaching westbound trains can be seen gradually increases to about 170 feet at a point 90 feet before the crossing. From this point, the distance within which approaching westbound trains can be seen increases rapidly until there is unlimited visibility when northbound traffic is 50 feet before the crossing. Up to this point, a driver's view of westbound trains is limited by a line of trees on private property next to the highway. The trees are just beyond the 50-foot rights-of-way of the highway and railroad.

For southbound highway traffic, a driver's view of eastbound trains is initially limited by a hill. At a point 200 feet before the crossing, an approaching eastbound train can be seen if it is within 100 feet of the crossing. Southbound motorists have unlimited visibility of westbound trains.

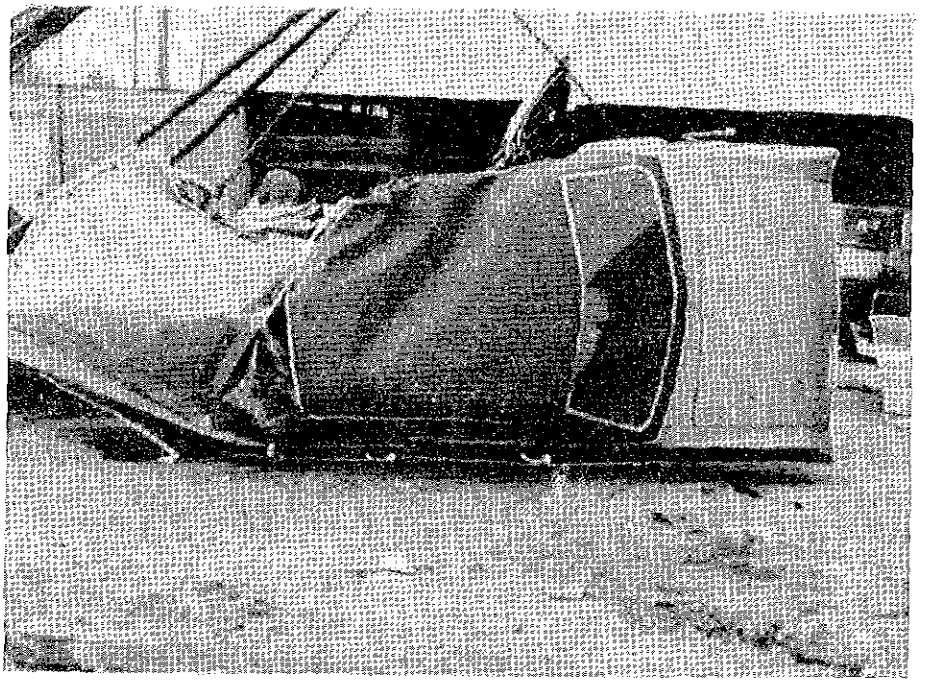


Figure 1. Damage to automobile.

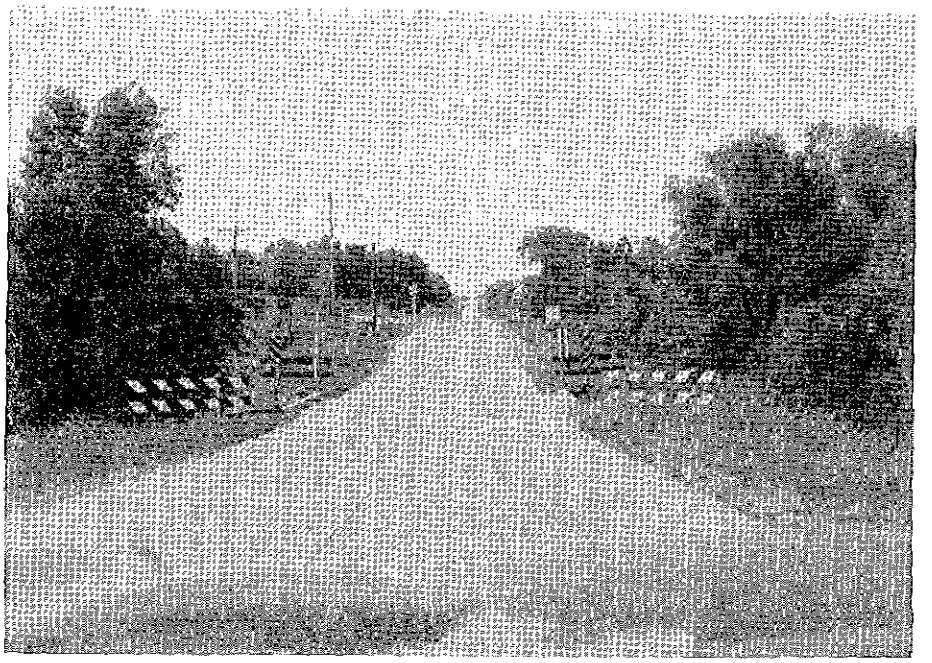
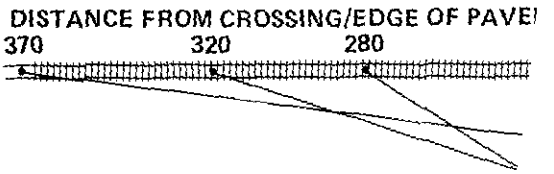


Figure 2. View of East 56th Street and Chicago, Rock Island, and Pacific railroad/highway grade crossing as seen by approaching northbound traffic. Advance railroad warning sign is not shown in this photograph.


DISTANCE FROM CROSSING/EDGE OF PAVE
370
320
280

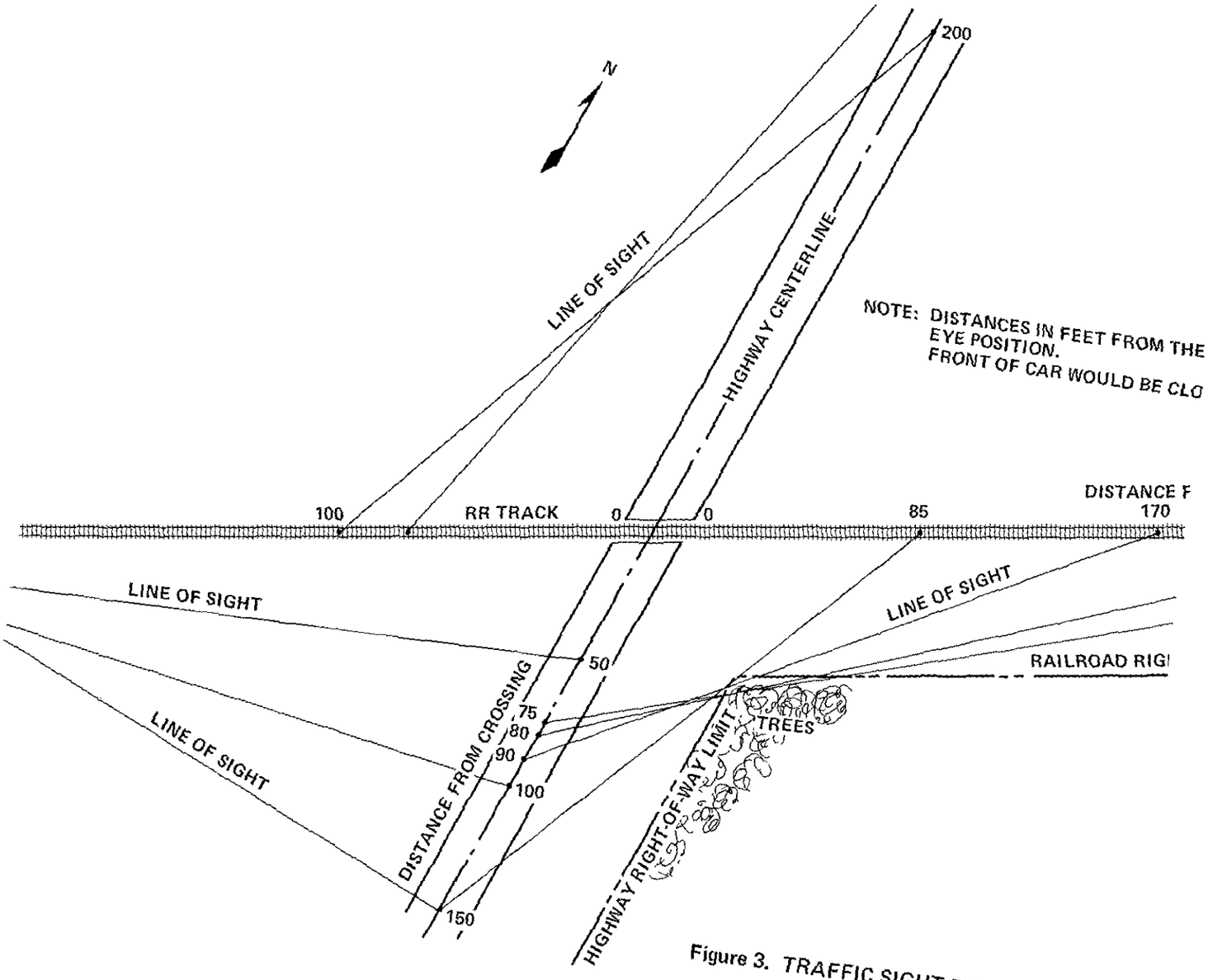


Figure 3. TRAFFIC SIGHT DISTANCE FOR O

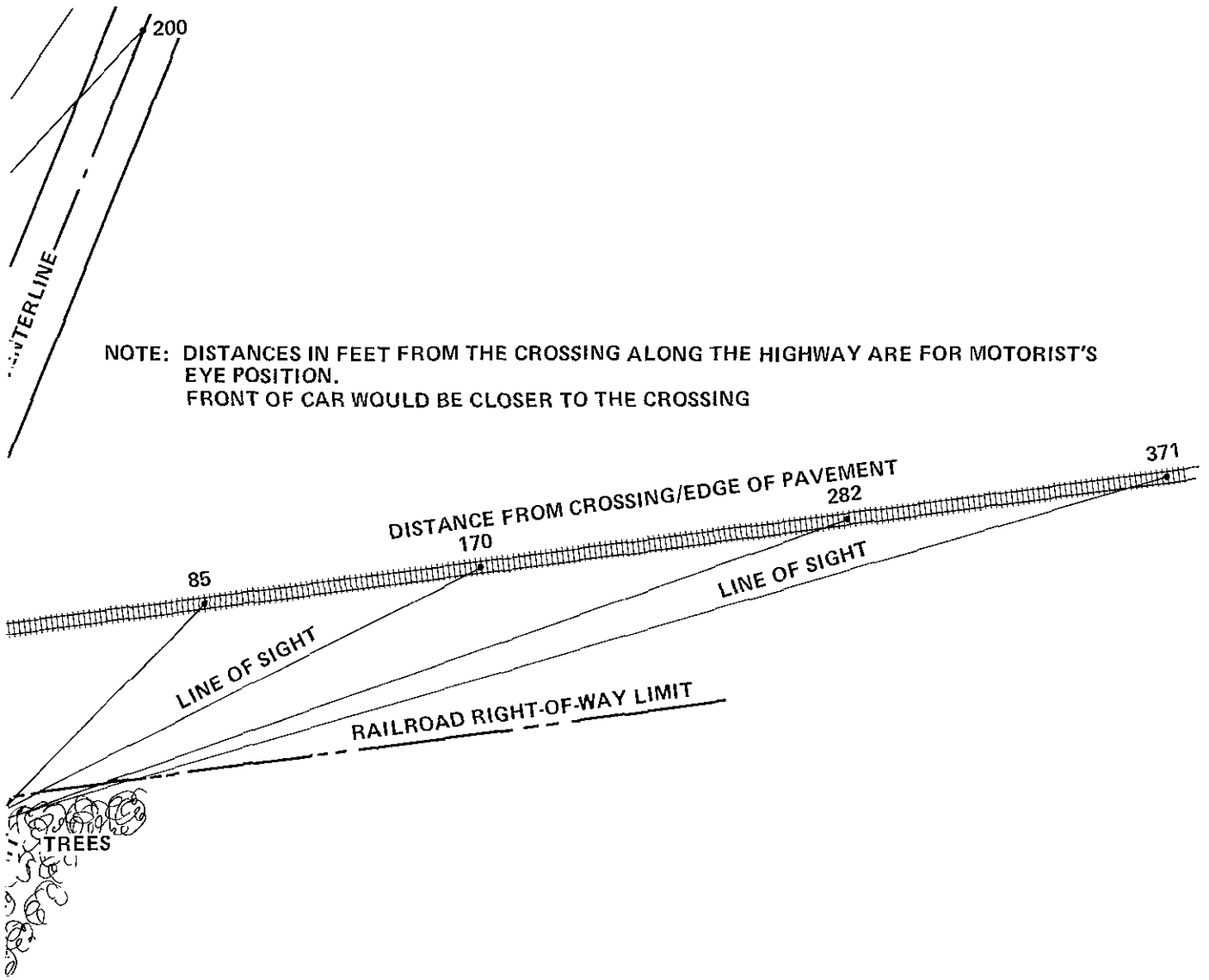


Figure 3. TRAFFIC SIGHT DISTANCE FOR OBSERVING TRAINS

Two other accidents have occurred at this crossing within the past 10 years. In 1972, one person received minor injuries when a southbound automobile was struck by an eastbound train. In 1973, no injuries were reported when a northbound truck struck the side of a train, whose direction of travel was not recorded.

Other Information

The driver of the northbound automobile that crossed the track just ahead of the accident vehicle was a middle-aged woman en route from work to home. This was her usual route home. She reported that she knew she was supposed to stop at the crossing and proceed only if safe to do so. 1/ She saw the southbound vehicle cross the track as she was approaching and said that she may have assumed that since the other driver had a better view of her "blind side" to the east and had crossed, then it was all right for her to cross. She also said that since the signal lights went on shortly before she crossed, she believed that she had plenty of time to get across the track.

She reported that she planned her route to and from work to avoid being stopped by trains. For example, on the way to work, the route she took permitted her to see trains for a considerable distance from a crossing. She said that there were "so many tracks" between where she worked and her home, and that "sometimes the lights flash for hours and hours and hours, so naturally I slow down to not a halt, but just kind of a running stop." However, she also said that there were only two crossings along her route to and from work and that she had seen only one or two trains at each crossing in 4 years of driving this route.

ANALYSIS

Even though the sight distance for observing approaching trains was limited on one side for each direction of travel and even though the crossing signals were operating and visible, none of the drivers who approached the crossing without a vehicle immediately preceding them intended to stop in response to the signals alone. These drivers significantly reduced their speed from the posted 45-mph speed limit, but they also were searching for an approaching train while they were moving and distant from the crossing. They decided either to cross the track or to stop as they were approaching the crossing and based their decision on whether they thought a train presented an immediate hazard.

If the drivers of either the northbound accident vehicle or the northbound car that preceded it across the track had decided to stop in response to the crossing signals, as State law required, the accident

1/ Iowa State law requires vehicles to stop when railroad crossing signals are in operation.

would not have occurred. The train would have occupied the crossing before either automobile had stopped completely. Since vehicles were approaching in the southbound lane, the driver of the accident vehicle would not have had an opportunity to pass the vehicle ahead if its driver had slowed for a complete stop. The actions of the first northbound driver provided significant insight as to the behavior of drivers at grade crossings. Therefore, Board investigators considered the actions of both northbound drivers in reconstructing the accident sequence.

Reconstruction of the accident sequence (see figure 4) indicates that when the first northbound automobile was about 80 feet from the track, the driver could have seen about 170 feet down the track to the east; the train would have been just out of sight at this point. Since the driver was traveling at 25 to 30 mph when she arrived at this point, she had already lost any opportunity to make a normal stop at the crossing, and she also was beyond the point from which it would have been possible to detect the train and skid to a stop short of the crossing from a speed of 30 mph. Therefore, the driver had little or no opportunity to see the train before she had to commit to a decision to cross the track, and she would not have been able to stop once she did see the train.

She could have been encouraged to commit to a decision to cross the track because she was traveling through a zone where sight distance down the track was improving, she could see farther down the track than she was in distance from the track, and the southbound vehicle had crossed the track as she was approaching. However, even if a train is not in sight when a motorist begins to travel through a zone where visibility is improving but is not yet unlimited, the motorist approaching at low speed or stopping must continue to make an approach that will permit a normal stop at the crossing and must resist committing to a decision to cross the track. This need to continue stopping while sight distance continues to improve and no train is in sight is not understood by many drivers, particularly those who use a low speed or "rolling stop" approach. When hastily considered, this requirement to stop seems totally opposite to what these drivers believe is appropriate. If the train involved in this accident had been traveling at 50 mph, which would have been possible without the speed restriction, the first northbound automobile would have collided with the train.

It also was not appropriate for the first northbound driver to base her decision in part on the actions of the southbound vehicle that had crossed the track as she was approaching the crossing. If the train had been at the same speed as it was in this accident but 3 seconds closer to the crossing when the southbound driver decided to cross the track, the southbound driver would have had sufficient time and distance to cross the track, clearing it with at least 7 seconds rather than 10 seconds to spare. However, the first northbound driver would have been in a position similar to that of the second northbound driver and probably would have collided with the train.

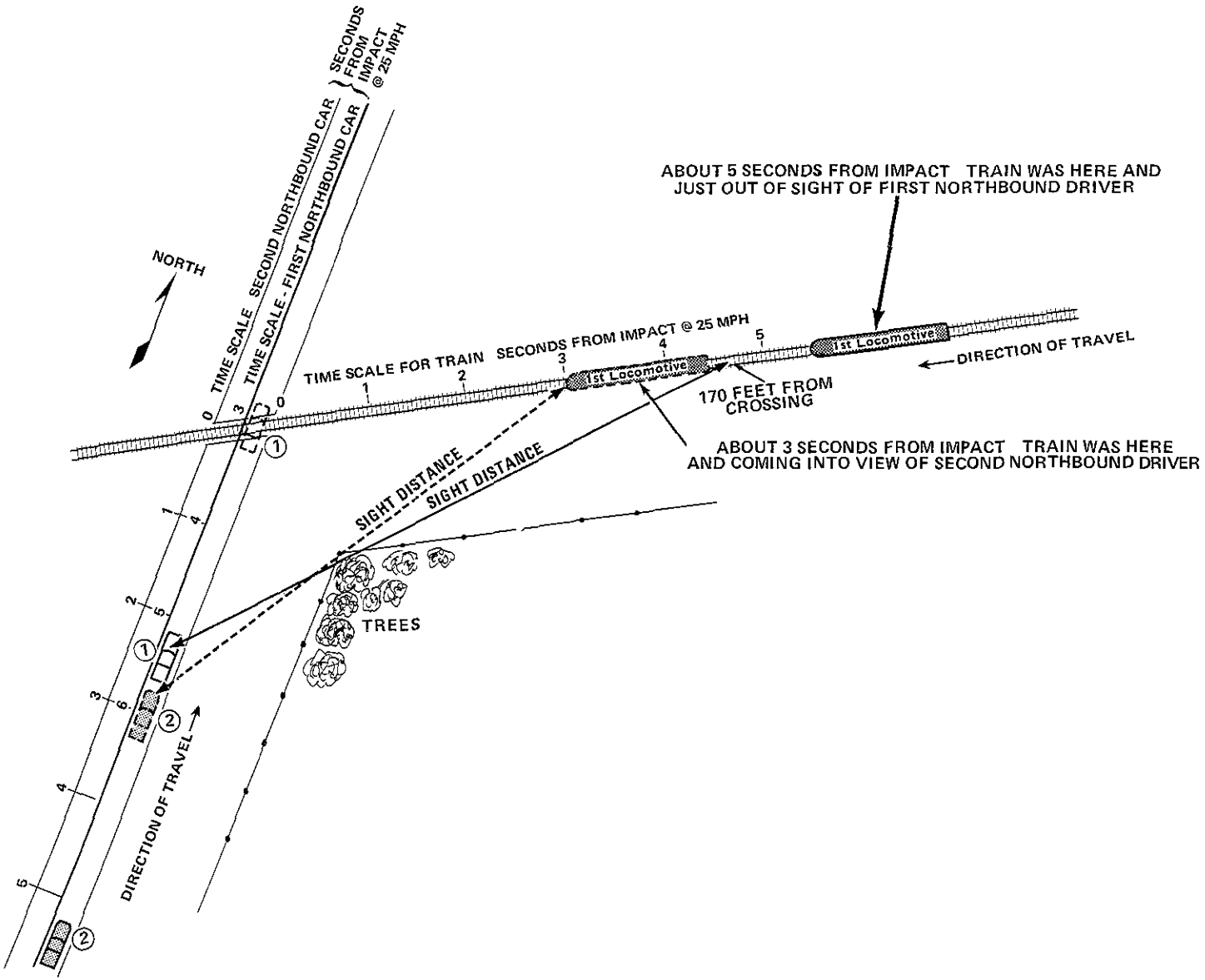


Figure 4. Reconstruction of relative positions of train and two northbound automobiles as they approached the crossing at equal approach speeds.

It was especially inappropriate for the first northbound driver to decide to use a "rolling stop" approach at this crossing. Sight distance was limited and the signal lights were flashing. She was not familiar with the operation of the signals or trains at this crossing because she said that she had seen only one or two trains there during 4 years of driving this route. While she claimed that long signal times led to her use of a "rolling stop" approach, she did not gain her experience regarding long signal times at this or other crossings along her daily route.

A recommended practice for automatic crossing signals is that: "On tracks where trains operate at a speed of 20 miles per hour or higher, the signals shall operate for not less than 20 seconds before (the) arrival of any train...." 2/ For a westbound train approaching the East 56th Street crossing at 30 mph, the signal lights flash for about 68 seconds before the train arrives at the crossing. For a train speed of 10 mph, which is not uncommon at this crossing, the lights flash for about 3 1/3 minutes. Compared to the recommended minimum of 20 seconds, these warning times would seem to be a relatively long period and could contribute to driver disregard of the full intent of the signals. Currently, there are no firm guidelines regarding maximum flashing signal warning times. However, there is a guideline to provide for uniformity of warning time; a recommended practice is that "where the speeds of different trains on a given track vary considerably under normal operation, special devices or circuits should be installed to provide reasonably uniform notice in advance of all movements over the crossing." 3/

Modification of the approach track circuitry at the East 56th Street crossing to reduce warning time and make these times more uniform would seem to be appropriate. However, the modification should not be made without consideration of driver expectations resulting from past experience with signal times at this and nearby locations. Also, drivers should be alerted to the fact that a modification has been made. This is supported, in part, by the first northbound driver's statement that since the signals went on shortly before she crossed, she believed she had plenty of time to get across the track. Since she was 1,500 feet from the crossing when she first saw the signals in operation, it is unlikely that she saw the signals begin to operate. In order for her to see the signals begin operation, she would have had to travel 1,500 feet at 12 to 15 mph while the train was traveling 3,000 feet at 25 to 30 mph, or if she was traveling at the 45-mph speed limit, the train

2/ "Recommended Practices for Railroad-Highway Grade Crossing Warning Systems," Bulletin No. 7, published by the Communication and Signal Section, Association of American Railroads, 1974.

3/ Ibid.

would have to be traveling at 90 mph. Assuming she was traveling near the speed limit, she would not have seen the signals begin to operate, but she would have seen the signals working for at least 25 seconds. The significant point is not whether she saw the signals begin working. It is that she thought she saw them begin working and she thought she had sufficient time to cross the tracks even though she had seen the signals operate for at least 25 seconds. Therefore, any modification should consider driver expectations of this type.

About 3 seconds before impact, the train had approached to within about 110 feet of the crossing and was just in position to be seen by the second northbound driver. (See figure 4.) The second northbound driver may have detected and reacted to the presence of the train as evidenced by the dipping motion of her car. If, as the train brakeman estimated, she was 60 feet from the track when this dipping motion occurred and the dipping motion resulted from a brake application, she had detected and reacted to the train about 1.1 to 1.3 seconds after the train was visible, and she could have skidded to a stop, but just short of the track. Even though she may have detected the train, reacted about as quickly as could be expected, and began to stop, she may have considered her chances of avoiding a collision through braking to be very marginal and stopped braking.

According to the time-space reconstruction of the accident sequence, witnesses first heard the train horn about the same time that the train was first in a position to be seen by the second northbound driver. Since no one totally observed her behavior before the collision, investigators could not determine if the train horn influenced her actions. Except for the engineer's statement, it could not be established whether the train horn had been sounded earlier. Since tests have shown that train horns have a limited range [4/], it is possible that the train horn was sounded earlier but was not heard by witnesses at the crossing. It was not possible to determine what effect, if any, earlier recognition of the train horn would have had on the accident. Some drivers might consider the train horn to be a more positive indication that a train is operating in an area, but a train horn is not always heard and does not reliably indicate the distance a train is from a crossing. Also, in this accident, the fact that southbound and northbound vehicles continued to cross the track may have eliminated any positive influence the train horn would have had on the northbound motorists.

Research in grade crossing safety indicates that 41 percent of injury-producing accidents at grade crossings occur at crossings with active warning systems such as flashing signals and bells, gates, and

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4/ "The Visibility and Audibility of Trains Approaching Rail-Highway Grade Crossings," prepared by Systems Consultants, Inc., for the Federal Railroad Administration, May 1971.

watchmen, even though these devices are installed at only 22 percent of the grade crossings nationwide. Some researchers theorize that the high accident rates at these crossings result from heavier train and traffic volumes. In addition, crossings with a history of accidents are more likely to be equipped with active traffic control devices as a result of that history. 5/ Other researchers conclude that, although factors such as train and traffic volumes are involved, it appears that the effectiveness of current active protective devices is less than desired. Also, while conditions differ at individual crossings, driver disregard for warning devices at railroad/highway grade crossings is common nationwide. 6/

One study revealed only a 46 percent driver compliance rate in response to flashing signals. 7/ Another study found that of vehicles that stopped at signalized locations with limited visibility: (1) their appreciable deceleration did not begin until the vehicles were within 190 feet of the tracks; (2) their average speeds were about 25 mph when the vehicles were within 100 feet of the tracks; and (3) their average deceleration rates were highest when the vehicles were 50 feet or less from the tracks (17 percent higher than a normal stopping rate). 8/ These observations indicate that even the average driver may be attempting to shorten the time required to stop at these crossings in order to maximize his opportunity to cross in front of a train. The actions of the drivers associated with the accident at the East 56th Street crossing demonstrated the common disregard of these types of signals.

Partly in recognition of this disregard for flashing signals, some States have decided to install both flashing signals and gates at new installations. However, except for high-speed train corridors or locations with a high accident history, the States cannot afford to add gates at all existing crossings with only flashing lights. Also, the cost of providing both gates and flashers reduces the number of locations that can be equipped with some form of active protection device. Therefore, the Safety Board concudes that a nationwide effort to achieve a higher degree of respect for flashing signals at grade crossings is necessary.

5/ "Human Factors Countermeasures to Improve Highway-Railway Intersection Safety" by J. H. Sanders, et. al.; prepared for the U.S. Department of Transportation, July 1973 (DOT HS-800 888).

6/ "Analysis of Driver Reaction to Warning Devices at a High-Accident Rural Grade Crossing" by E. R. Russell; prepared for the Indiana State Highway Commission and the Federal Highway Administration; August 1974. "Statistical and Economic Aspects of Rail-Highway Grade Crossing Safety Improvement Programs in Texas" by H. T. Richards and J. T. Lamkin. Research Report 111-2, Texas Transportation Institute, 1970.

7/ "Evaluation of Safety at Railroad-Highway Grade Crossings," Technical Report, Joint Highway Research Project, Purdue University, August 1967.

8/ "Human Factors Countermeasures to Improve Highway-Railway Intersection Safety" by J.H. Sanders, et. al.; prepared for the U.S. Department of Transportation, July 1973 (DOT HS-800 888).

In March 1972, the Federal Railroad Administration and the National Highway Traffic Safety Administration (NHTSA) began a joint effort to determine driver performance and related human factors that contributed to motor vehicle/train accidents and to develop and demonstrate the effectiveness of countermeasures for these factors. 9/ A significant effort was made to understand driver behavior at railroad crossings, to develop nonaccident measures of behavior (such as driver "looking behavior" and driver attitudes) for evaluating countermeasures, and to predict which countermeasures would increase behavioral safety.

Driver-oriented countermeasures included: (1) driver education to eliminate intolerant attitudes about delays at railroad crossings; (2) enforcement of laws that stipulate grade crossing behavior; and (3) efforts to increase appropriate "looking behavior." As part of the study, drivers were asked to suggest ways to reduce crossing accidents. After increased use of gates and better warning signs and signals, drivers thought improved driver education, stricter law enforcement, and public safety campaigns were useful methods to improve crossing safety.

These countermeasures may have prevented inappropriate behavior by the first northbound driver involved in this accident. Intolerance of delay was exhibited by her route plan that permitted her to see trains for a considerable distance from a crossing so that she could avoid being stopped by trains. Enforcement action may have prevented her consistent use of a rolling stop approach pattern. Providing public information regarding the inappropriatness of using rolling stop techniques may have had a positive influence.

The Safety Board has issued several recommendations to improve railroad/highway grade crossing safety. The Safety Board has advocated further development of improved train and crossing equipment, better methods for upgrading crossing protection, and improved driver education and law enforcement. In a 1972 report, the Safety Board recommended that the U.S. Department of Transportation "include in its railroad-highway grade crossing program the development of methods, and a system for their implementation, to improve driver understanding of hazards involved, and the crucial precautions needed for safe passage across railroad-highway intersections." 10/ In a 1973 report, the Safety Board

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9/ "Human Factors Countermeasures to Improve Highway-Railway Intersection Safety" by J. H. Sanders, et. al.; prepared for the U.S. Department of Transportation, July 1973 (DOT HS-800 888).

10/ "Atchison, Topeka and Santa Fe Passenger Train No. 212 Collision With Stillwater Milling Company Motortruck at 116th Street North Grade Crossing Near Collinsville, Oklahoma, April 5, 1971" (NTSB-RHR-72-1).

recommended that the International Association of Chiefs of Police (IACP), "use its influence and resources to redirect the attention of law enforcement agencies to the need for uniform enforcement of traffic laws pertaining to railroad/highway grade crossings (1963 IACP Resolution F-18, Highway Safety Policies for Police Executives)..." 11/

Congress has mandated that the Federal Highway Administration pursue an aggressive program to develop better crossing equipment and upgrade crossing protection and has provided some specific funds to achieve that objective. However, there is no apparent Federal effort to vigorously pursue a program that would upgrade driver education and law enforcement activity or to devise, implement, or generate interest in public safety campaigns related to crossing safety. NHTSA is responsible for administering such programs. NHTSA has acted to incorporate elements related to crossing safety into broad program areas such as driver education. However, NHTSA's ability to focus on the specific problem of crossing safety apparently has been hampered by a need to use limited resources on programs of higher priority in terms of accidents affected -- alcohol, passive restraints, seat belt use, and the 55-mph speed limit law. These programs have reduced, or have the potential to reduce a larger percentage of the 46,000 deaths that occur annually on our Nation's highways.

Crossing fatalities had been steadily decreasing for many years and reached a low of about 910 fatalities in 1975. Highway fatalities decreased in a number of problem areas after 1973. But, while fatalities have remained low in other problem areas, the number of crossing accident deaths increased to about 1,130 in 1976. With projections of increased and faster rail traffic to transport passengers, coal, and other resources, the number of deaths at grade crossings could increase further.

In 1963, IACP, recognizing the need for public education and the continued vigorous enforcement of crossing laws, called upon all State, county, and municipal police agencies in its membership to "continue giving vigorous attention to the enforcement of traffic laws governing the movement of motor vehicles and trains at railroad grade crossings, and that insofar as possible the educational facilities of these agencies be used to remind motor vehicle operators of the hazards existing at highway-railroad grade crossings." 12/ The IACP also held a workshop on this topic at its 1969 conference. In 1973, the IACP brought the 1963 position statement to the attention of its membership in its annual report. However, the national pattern of law enforcement in this area remains mixed, ranging from excellent to virtual inattention.

11/ "Penn Central Freight Train/Schoolbus Collision, Congers, New York, March 24, 1972 (NTSB-RHR-73-1).

12/ "Highway Safety Policies for Police Executives," Highway Safety Division, International Association of Chiefs of Police, as revised in 1975.

Currently, while there is no nationwide effort to implement driver-oriented countermeasures, several States 13/ and major railroads, with the assistance of the National Safety Council, have implemented crossing safety programs titled "Operation Lifesaver." Full-scale programs are directed toward combining and enhancing existing education, enforcement, and engineering efforts with respect to crossing safety and toward maintaining interest in this area after an initial concentrated effort. The first program began in Idaho in 1972, and there was a 39 percent reduction in grade crossing fatalities the first year. Other States which introduced the program obtained similar first-year results; in Nebraska, fatalities declined 46 percent, and in Kansas, 47 percent. Georgia had a 63-percent reduction in 1974, the beginning of their "Operation Lifesaver" program, and the number of fatalities has remained at this reduced level through 1977. Continuous vigorous support of the program may have been responsible for this success. Available program evaluation data does not permit a more precise judgment. In areas where the program was dropped after the first year, fatalities returned to their former levels. In areas where the program was not completely developed, a significant reduction in fatalities was not achieved. These results indicate that the programs have achieved some success, but there is a need to provide additional resources to insure complete development, implementation, and evaluation of this effort.

CONCLUSIONS

Findings

1. Even though the sight distance for observing approaching trains was limited on one side for each direction of travel and even though the crossing signals were operating and visible, none of the drivers who approached the crossing without a vehicle immediately preceding them intended to stop in response to the signals alone.

2. If either the driver of the northbound accident vehicle or the northbound car that preceded it across the track had decided to stop for the signals, as State law required, the accident would not have occurred.

3. Although the 25- to 30-mph approach speed of the first northbound driver was appreciably below the speed limit of 45 mph, the approach speed, available sight distance, and position and speed of the train were such that she had no opportunity to see the train before she had to commit to a decision to cross the track, and she would not have been able to stop once she did see the train.

13/ Alabama, Colorado, Florida, Georgia, Idaho, Illinois, Kansas, Missouri, Nebraska, Oregon, and Utah.

4. The first northbound driver could have been encouraged to commit to a decision to cross the track because she was traveling through a zone where sight distance down the track was improving, she could see farther down the track than she was in distance from the crossing, and a southbound vehicle had crossed the track as she was approaching.

5. Even if a train is not in sight when a motorist begins to travel through a zone where visibility is improving but is not yet unlimited, a motorist approaching at low speed or stopping must continue to make an approach that will permit a normal stop at the crossing and must resist committing to a decision to cross the track or he may be struck by a high-speed train.

6. If the train had been moving at the same speed as it was in the accident but had been 3 seconds closer to the crossing when the southbound driver had decided to cross the track, the southbound driver would have had more than sufficient time to cross the track but the first northbound automobile probably would have collided with the train.

7. Even though the second northbound driver may have detected the train, reacted about as quickly as could be expected, began braking, and could have skidded to a stop but just short of the track, she may have considered her chances of avoiding a collision to be very marginal and stopped braking.

8. Except for the engineer's statement, it could not be established whether the train horn had been sounded before the train was about 110 feet from the crossing and was in a position to be seen by the second northbound driver.

9. It was not possible to determine if the train horn influenced the second northbound driver's actions or what effect, if any, earlier recognition of the train horn would have had on the accident.

10. There is no apparent Federal effort to vigorously pursue a program that would upgrade driver education and law enforcement activity or to devise, implement, or generate interest in public safety campaigns related to crossing safety.

11. Although the long flashing signal warning period did not prove to be a factor in this accident, modification of track circuitry to reduce warning times and make these times more uniform would be appropriate.

Probable Cause

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the automobile driver to stop short of the railroad track in response to the flashing signal lights, and her failure to determine if it was safe to cross the track.

RECOMMENDATIONS

As a result of its investigation of this accident, the National Transportation Safety Board made the following recommendations:

-- to the National Safety Council:

"Serve as a national focal point and coordinator for the total development, implementation, and evaluation of a nationwide 'Operation Lifesaver' railroad/highway grade crossing safety program. This program should be undertaken with the full support and cooperation of all interested groups and agencies, especially the Association of American Railroads, the International Association of Chiefs of Police, the National Highway Traffic Safety Administration, the Federal Highway Administration, the Federal Railroad Administration, and the States. (Class II, Priority Action) (H-77-25)"

-- to the Association of American Railroads:

"Provide support and cooperate with the National Safety Council in its efforts to develop and implement a nationwide 'Operation Lifesaver' railroad/highway grade crossing safety program by encouraging its members to allocate additional railroad resources for this effort. (Class II, Priority Action) (H-77-26)"

-- to the National Highway Traffic Safety Administration:

"Seek additional resources and actively participate and support the National Safety Council in the development, implementation, and evaluation of a nationwide 'Operation Lifesaver' railroad/highway grade crossing safety program. (Class II, Priority Action) (H-77-27)"

-- to the Federal Highway Administration:

"Actively participate and support the National Safety Council in the development, implementation, and evaluation of a nationwide 'Operation Lifesaver' railroad/highway grade crossing safety program. (Class II, Priority Action) (H-77-28)"

-- to the Federal Railroad Administration:

"Actively participate and support the National Safety Council in the development, implementation, and evaluation of a nationwide 'Operation Lifesaver' railroad/highway grade crossing safety program. (Class II, Priority Action) (H-77-29)"

-- to the International Association of Chiefs of Police:

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

-- to the Chicago, Rock Island and Pacific Railroad:

"Modify the approach track circuit at the East 56th Street crossing to reduce crossing warning times and make these warning times more uniform and consistent with current train operating speeds and current driver expectations regarding warning times at this and nearby locations. (Class II, Priority Action) (H-77-31)"

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

/s/ FRANCIS H. McADAMS
Member

/s/ PHILIP A. HOGUE
Member

/s/ JAMES B. KING
Member

KAY BAILEY, Acting Chairman, did not participate.

November 3, 1977