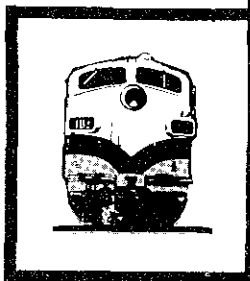


HE 1780
.A34
no.
NTSB-
RHR-
76-2

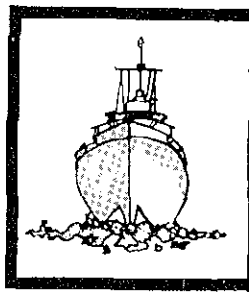


NATIONAL TRANSPORTATION SAFETY BOARD

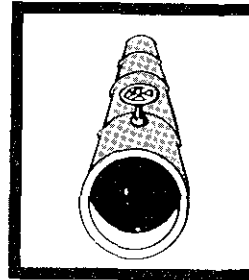


Dept. of Transportation
FEB 25 1977
Library

WASHINGTON, D.C. 20594



RAILROAD/HIGHWAY ACCIDENT REPORT



COLLISION OF A
CROWN-TRYGG CONSTRUCTION
COMPANY TRUCK WITH
AN AMTRAK PASSENGER TRAIN

ELWOOD, ILLINOIS

NOVEMBER 19, 1975



REPORT NUMBER: NTSB-RHR-76-2

UNITED STATES GOVERNMENT

TECHNICAL REPORT DOCUMENTATION PAGE

111
A 89
No.
NTSB
RHH-
76-2.

U.
111

1. Report No. NTSB-RHR-76-2.	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle Railroad/Highway Accident Report -- Collision of a Crown-Trygg Construction Company Truck with an Amtrak Passenger Train, Elwood, Illinois, November 19, 1975.		5. Report Date May 12, 1976	6. Performing Organization Code
7. Author(s)		8. Performing Organization Report No	
9. Performing Organization Name and Address National Transportation Safety Board, Bureau of Surface Transportation Safety Washington, D.C. 20594		10. Work Unit No. 1817	11. Contract or Grant No.
12. Sponsoring Agency Name and Address NATIONAL TRANSPORTATION SAFETY BOARD Washington, D. C. 20594		13. Type of Report and Period Covered Railroad/Highway Accident Report November 19, 1975	
15. Supplementary Notes		14. Sponsoring Agency Code	
<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> <p style="text-align: center;">FEB 25 1977</p> <p style="text-align: center;">Library</p> </div> <p>16. Abstract</p> <p>At 9 10 a m , c. s t , on November 19, 1975, Amtrak turboliner passenger train No. 301 was struck by a loaded dump truck on a grade crossing in Elwood, Illinois. The crossing was unprotected and had limited sight clearance between the road and the track. Four cars of the five-car train were derailed and 41 persons were injured. The train was owned by Amtrak and was operated by an Illinois Central Gulf Railroad (ICG) crew over the ICG track. The road was a county highway maintained by the Will County Highway Department</p> <p>The National Transportation Safety Board determines that the probable cause of the accident was the failure of the truckdriver to stop his vehicle short of the track until it was safe to proceed. Contributing to the accident was the inadequate sight clearance between the road and the track on the approach to the unprotected grade crossing.</p> <p>As a result of its investigation of this accident, the Safety Board made recommendations to the Federal Highway Administration and to the Federal Railroad Administration</p>			
17. Key Words Grade crossing safety, high-speed rail corridors, train couplers; grade crossing management; turboliners		18. Distribution Statement This document is available to the public through the National Technical Information Service, Springfield, Virginia 22151.	
19. Security Classification (of this report) UNCLASSIFIED	20. Security Classification (of this page) UNCLASSIFIED	21. No of Pages 24	22. Price

FOREWORD

This report is based upon an investigation by the National Transportation Safety Board under the authority of the Independent Safety Board Act of 1974.

TABLE OF CONTENTS

	Page
SYNOPSIS	1
FACTS	2
The Accident	2
Postaccident Activities.	5
Accident Site	6
Marks on the Roadway.	7
Vehicles.	8
Vehicle Damage.	10
Vehicle Occupants.	13
High-Speed Passenger Train Corridors	13
ANALYSIS	14
The Grade Crossing	14
High-Speed Passenger Train Corridors	16
European-Type Couplers	16
CONCLUSIONS	17
PROBABLE CAUSE	18
RECOMMENDATIONS	18
APPENDIX	
Phase I Recommendations--Illinois Department of Transportation Railroad Grade Crossing Task Force	21

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D. C. 20594

RAILROAD/HIGHWAY ACCIDENT REPORT

Adopted: May 12, 1976

COLLISION OF A CROWN-TRYGG CONSTRUCTION COMPANY TRUCK
WITH AN AMTRAK PASSENGER TRAIN, ELWOOD, ILLINOIS,
NOVEMBER 19, 1975

SYNOPSIS

At 9:10 a.m., c.s.t., on November 19, 1975, Amtrak turboliner passenger train No. 301 was struck by a loaded dump truck on a grade crossing in Elwood, Illinois. The crossing was unprotected and had limited sight clearance between the road and the track. Four cars of the five-car train were derailed and 41 persons were injured. The train was owned by Amtrak and was operated by an Illinois Central Gulf Railroad (ICG) crew over the ICG track. The road was a county highway maintained by the Will County Highway Department.

The National Transportation Safety Board determines that the probable cause of the accident was the failure of the truckdriver to stop his vehicle short of the track until it was safe to proceed. Contributing to the accident was the inadequate sight clearance between the road and the track on the approach to the unprotected grade crossing.

FACTS

The Accident

About 9 a.m., c.s.t., on November 19, 1975, Amtrak turbotrain No. 301 was traveling southward at 71.5 mph toward the Manhattan Road grade crossing in Elwood, Illinois. The crew on the train's power car consisted of a fireman and engineer. The four fixed headlights on the front of the leading power car and the audible warning devices were in use.

The fireman was operating the train from the west side of the power car's cab. The engineer was seated at the east side of the cab. His view of the westbound approach to the track was obstructed by two private residences until the train was about 200 feet from the crossing. (See Figure 1.) When the train reached that point, the engineer saw a dump truck approaching from the east.

The truckdriver had been traveling west on Manhattan Road at 45 to 50 mph en route to deliver a load of hot asphalt to a location west of the track. He applied the truck's brakes and downshifted to accommodate a vehicle immediately ahead as it turned off the road. When that vehicle cleared the road, the truckdriver stated that he probably shifted to fourth gear and continued forward, accelerating slightly.

The driver said that he looked to his right during these movements and he could see part of the track, but did not see a train. He stated that he next saw the track about 600 feet east of the crossing. He did not notice the advance railroad warning sign which was on the right shoulder 630 feet east of the crossing.

He again saw the track about 300 feet from the crossing, when he could see through a narrow space between two private residences. Again, he claimed that he neither saw nor heard the approaching train. The driver did notice a railroad crossing warning on the pavement at that location.

The driver stated that he first saw the approaching train about 200 feet from the crossing when his truck passed the southwest corner of the residence nearest to the track. (See Figure 2.) He said, "I saw the train loom up above the brush along the track. I did not hear a horn at any time." He stated that the windows of the truck's cab were up, that the heater was on, that the radio was off, and that the noise within the cab was at the high level commonly found in vehicles of this type. An occupant of the residence nearest to the track heard the train horn and saw the truck pass her house almost simultaneously. The truckdriver estimated the speed of his truck at that point to be between 35 and 40 mph.

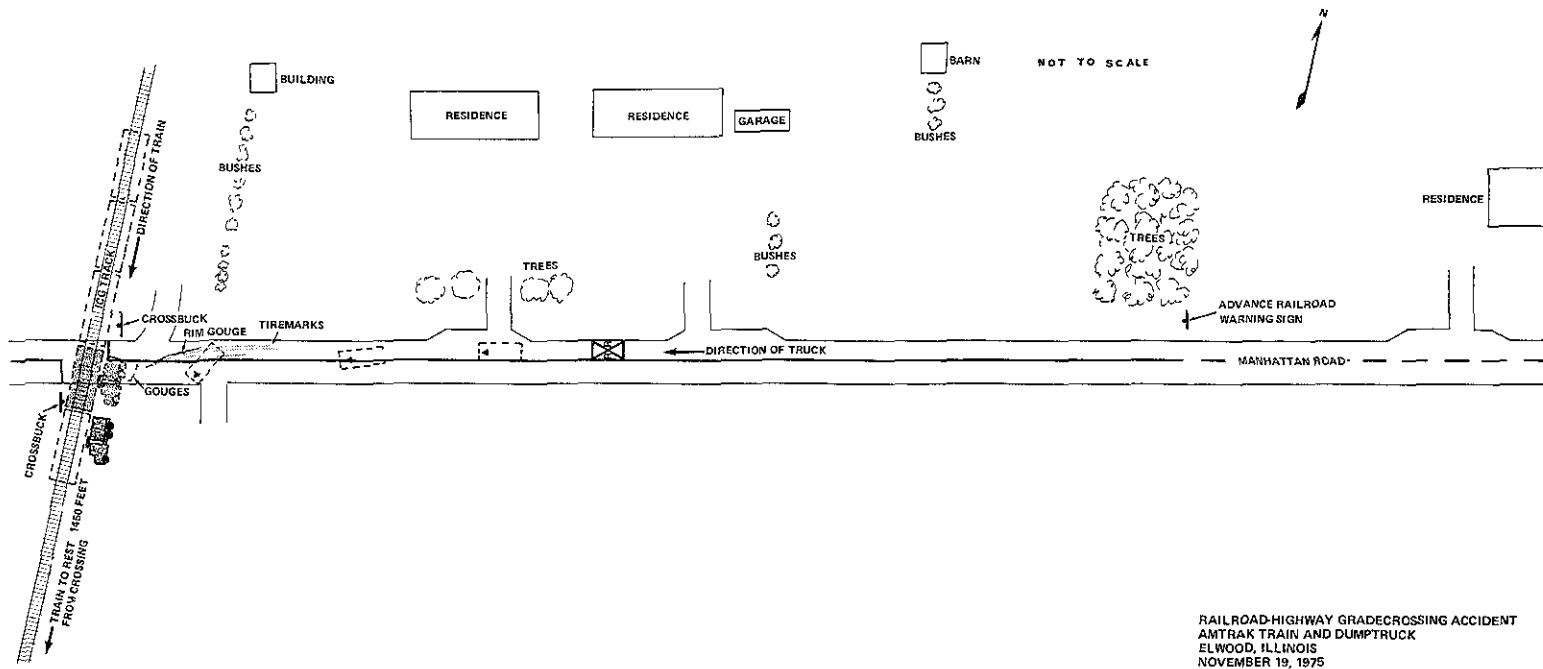


Figure 1. Accident site and crash sequence diagram.



Figure 2. Looking north along the track from Manhattan Road, 200 feet from the east rail. Note (arrow) lead power car of southbound passenger train.

The truckdriver said that before he saw the approaching train, he had decided to cross the track without stopping and without reducing his truck's speed. When he finally saw the train, he applied the brakes and steered hard to the left. Before the brakes could lock the wheels, the truckdriver released the brakes to allow himself full steering capability. According to the driver, he opted for the steering maneuver because he was certain that he could neither stop the vehicle before he reached the track nor accelerate and clear the track before the train reached the crossing.

When the engineer saw the truck approaching the crossing, he estimated its speed to be about 35 mph. As the train reached the crossing the engineer noted that the truck was swerving as if its driver had braked and that the vehicle had turned south in the direction of the train's travel. As the truck turned sharply to the left, it was both rotating counterclockwise and upsetting to the right as it moved toward the track in a west-southwesterly direction. The truck was still on the road and parallel to the train when it completed its overturn to the right. Its cargo of asphalt spilled onto the track area and against the second car of the train as the body of the truck struck the side of the car.

A combination of impact forces and mounds of asphalt on the east rail of the track caused the rear truck of the second car to derail. The overturned dump truck slid into the ditch bordering the track and the unbelted truckdriver was ejected through the windshield space before the truck came to rest. The third car moved forward and its lower left-front side panel contacted the dump truck. The second and third cars became uncoupled and the third, fourth, and fifth cars then derailed. The train brakes applied themselves in emergency as the air line connection between the cars was severed. The leading power car continued southward for about 1,450 feet and came to rest with its front and rear trucks on the rails. The front truck of the second car stopped on the ground at the base of the east rail and the left wheel of the rear truck was derailed and stopped just inside the west rail. The right wheels of the second car were on the edge of the track ballast. The three rear cars were tilted at a 20-degree angle and the first two cars stopped upright, about 36 feet ahead of the rear cars.

No fire ensued. Forty-one persons were injured in the collision.

Postaccident Activities

The Will County Sheriff's Department directed the evacuation of the injured persons. Will County and surrounding communities provided emergency and rescue equipment. Rescue units arrived within 10 minutes of the accident.

Most passengers evacuated the train without assistance, but some of the injured and elderly were helped from the train. The vertical inclination of some of the cars made evacuation difficult because it increased the distance between the exits and the ground. There were no reports of injuries sustained or aggravated during rescue operations.

Accident Site

Roadway -- Manhattan Road is a two-lane county road which, in the vicinity of the grade crossing, runs east and west. It traverses a rural area which is experiencing some residential growth. The road is straight and relatively level as it approaches the track from the east.

The pavement is 27 feet wide, asphalt-surfaced, and in excellent condition; it was reconstructed in mid-1975 and was reopened to traffic on October 31, 1975. Until its reconstruction the road was unpaved and was used infrequently.

A daily traffic count was not available. However, Board investigators noted that traffic volume on the newly opened road was moderate.

Two private residences, which are located on the north side of the westbound approach to the track, limit the visibility between the road and track until 200 feet before the grade crossing. From that point to the grade crossing, visibility is obstructed slightly by a fence, trees, and a freestanding building which are located on private property adjacent to the railroad right-of-way.

A standard railroad crossbuck warning sign is located on the shoulder of the road adjacent to and on both sides of the track. Advance railroad warning signs are located 630 feet east and 630 feet west of the track. Pavement markings which display the standard warning of a railroad crossing ahead are painted across both the east and west approaches about 300 feet from the track. In addition, a double yellow line separates the opposing lanes of traffic beginning 630 feet east of the track. No other signs or devices are present on either approach.

On September 15, 1975, 4 months after reconstruction of the road began, the Will County Highway Department contacted the Illinois Central Gulf Railroad (ICG) to initiate negotiations for the installation of active protection devices (flashing lights) at the Manhattan Road grade crossing; these devices had not been installed before the collision.

In Illinois when the speed limit is not posted, it is 55 mph. This was the case at the Manhattan Road grade crossing. An official of the Will County Highway Department stated, however, that procedures had been initiated to reduce the speed limit for Manhattan Road. In the interim, Will County has installed 35-mph speed advisory plates on each of the two advance railroad warning signs which are located on the approaches to the crossing. The 35-mph speed is advisory only and is not enforceable.

Local authorities had no official record of any previous train/motor vehicle collision at the crossing. The Illinois Commerce Commission, however, did have a notation of a train/automobile collision that occurred at the crossing in 1965.

At the time of the accident, the weather was clear and sunny. The sun would have been positioned directly behind the truckdriver and it would not have hindered him in sighting the crossing and the train.

The Railroad -- The single track is straight for more than 1 mile north of the grade crossing. It is relatively level, runs north and south, and intersects the road at an angle of 78 degrees. The track is owned and maintained by the Illinois Central Gulf Railroad (ICG). The timetable speed for the track is 79 mph. About four passenger and three freight trains move over the crossing daily.

This track is a segment of the high-speed, passenger rail corridor which runs for 284 miles between Chicago, Illinois, and St. Louis, Missouri. The corridor includes 259 public grade crossings; about 35 percent of the grade crossings have an average daily traffic count of 50 motor vehicles or less. Forty-two percent of the grade crossings are without active protection and many are intersected by narrow farm roads.

From September 1975 to January 1976 three major grade crossing accidents that involved passenger trains occurred within a 60-mile section of the corridor. The Manhattan Road grade crossing was in this 60-mile section. These accidents killed 10 persons and injured 41. All of them occurred at unprotected crossings.

Records indicate that, in a 56-month period immediately preceding September 1975, there were a total of 79 train/motor vehicle collisions on the corridor. Nineteen of those collisions killed 26 persons.

Marks on the Roadway

Three arc-shaped tiremarks were found along the path followed by the truck after it began to swerve. The marks were identified as side scuff marks caused by the tires on the right side of the truck as it moved toward the southwest in a counterclockwise rotation. The longest mark, which was caused by the right rear outside tires, measured 108 feet 8 inches.

A gouge, caused by the rim of the outside rear right wheel, was found parallel to the tiremark made by that wheel as it moved across the centerline of the roadway. The gouge had a radius of 121.875 feet.

Several other gouges, caused by the overturned truck as it slid toward the track, also were found on the road. (See Figure 1.)

Vehicles

Dump Truck -- The dump truck, a 1969 GMC Model 7500, was owned and operated by the Crown-Trygg Construction Company of Joliet, Illinois. It was equipped with a 9-cubic-yard Heil dump body and was 21 feet 8 inches long. The trucking operation of the company was intrastate; therefore, it was not subject to Federal Motor Carrier Safety Regulations.

The vehicle was carrying a 28,800-pound load of bituminous concrete (asphalt). Its gross vehicle weight at the time of the accident was 45,100 pounds -- 100 pounds over the weight limit allowed by Illinois law. The manufacturer's rated gross vehicle weight for the truck was 37,000 pounds.

The truck was a conventional, cab-behind-engine type with three axles. The tandem rear axles were equipped with dual tires and all three axles were equipped with hydraulic brakes with Hydrovac power-assist.

The cab of the vehicle was equipped with a radio and a heater. Rearview mirrors were mounted outside and were attached to a pillar on both sides of the cab forward of the door window.

Turbotrain -- The train was owned and operated by Amtrak and was manned by ICG crews over ICG track. The train's consist was a lead power car, two coach cars, one coach-grill car, and another power car. Both power cars had coach seating in their rear sections.

The lead power car had a gas-turbine engine, an operating range of 745 miles, a maximum speed capability of 125 mph, and an air-operated braking system. The engineer's console was in the right section of the cab and visibility from the cab was adequate.

The power car was equipped with three air horns and three bell chimes. Four white, sealed-beam headlights were attached to the front of the lead power car below the windshield and a red light, bordered by two white lights, was attached in the center above the windshield. The train was painted white, red, and blue and was designed and manufactured in France.

The coupler on the turbotrain was the standard type used on European and British railroad cars. (See Figure 3.) In the United States, this type of coupler is found only on the French turbotrains. The Federal Railroad Administration (FRA) had issued an exemption to Amtrak to allow the use of these couplers. Turbotrains currently under manufacture for use in the United States will be equipped with conventional H-type couplers.

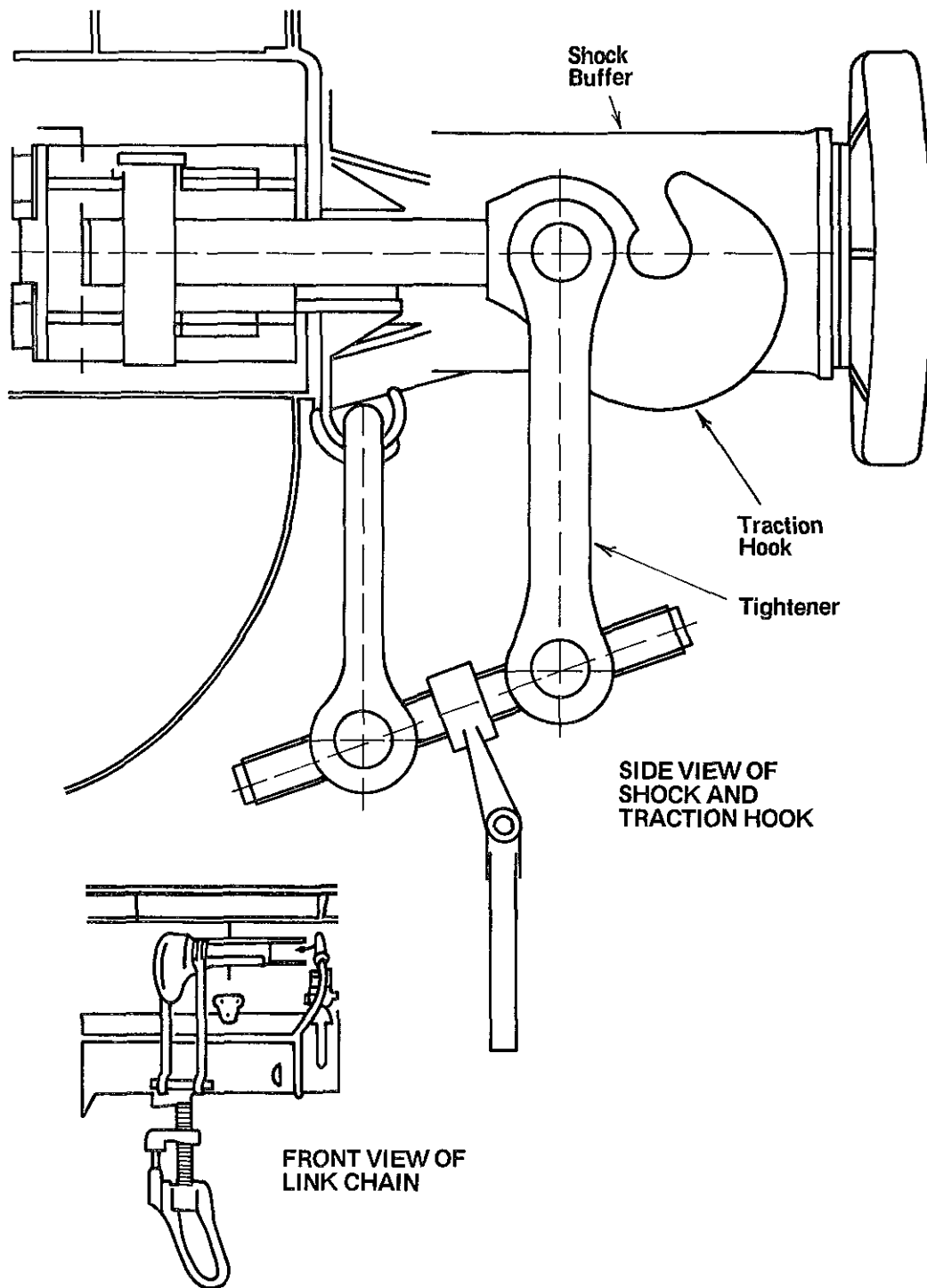


Figure 3. European-type coupler assembly.

The passenger compartments were equipped with airline-type seats. Trays were attached to the back of each seat to accommodate passenger needs. The seats were equipped with reclining backs, similar to those found in theaters, which automatically return to the upright position when the seats are not in use.

Stainless-steel baggage racks were attached to the bulkheads lengthwise above the windows. The windows consisted of two panes of "Thermopane" glass, separated by a narrow air space. The exterior pane was 5/16-inch thick and the interior 1/4-inch thick. There was one emergency window with a quick-action pull handle in each passenger compartment. Sliding doors, which opened and closed automatically, provided entry to the cars.

Vehicle Damage

Dumptruck -- A postcrash inspection of the truck on the day following the accident did not identify any safety-related defects which had occurred before the collision.

The primary damage incurred by the truck included deformation of the left side of the cab roof, deformation of the left side of the dump body, deformation of the right front fender and bumper, and displacement of the windshield. (See Figure 4.)

Turbotrain -- The leading power car was not damaged. Impact damage to the second car was restricted to the left rear side of the car. (See Figure 5.) The damaged area was 24 feet 6 inches long, about 6 feet high, and about 8 inches deep at its deepest point. Two double-pane windows were shattered completely and a third had only its outer pane shattered. In the area of impact, the floor was deformed slightly, a pair of seats had rotated partially, and a folding tray was deformed to the right. The floor and seats were littered with broken window glass. There were no signs of side or roof panel buckling or deformation of the overhead baggage racks.

The third car was damaged at its left front corner. At that point, the lower-outside paneling had been crinkled and had been marked with horizontal striations, and the window was broken. The left front corner of the car was crushed beginning about 8 feet above the top of rail and extending upward for 21 feet. Some additional deformation occurred just above that crushed area.

Both the second car and third were covered with asphalt in the areas which were struck by the truck. Air and electric lines which connected the second and third cars were broken.



Figure 4. Accident truck being removed from the track area.

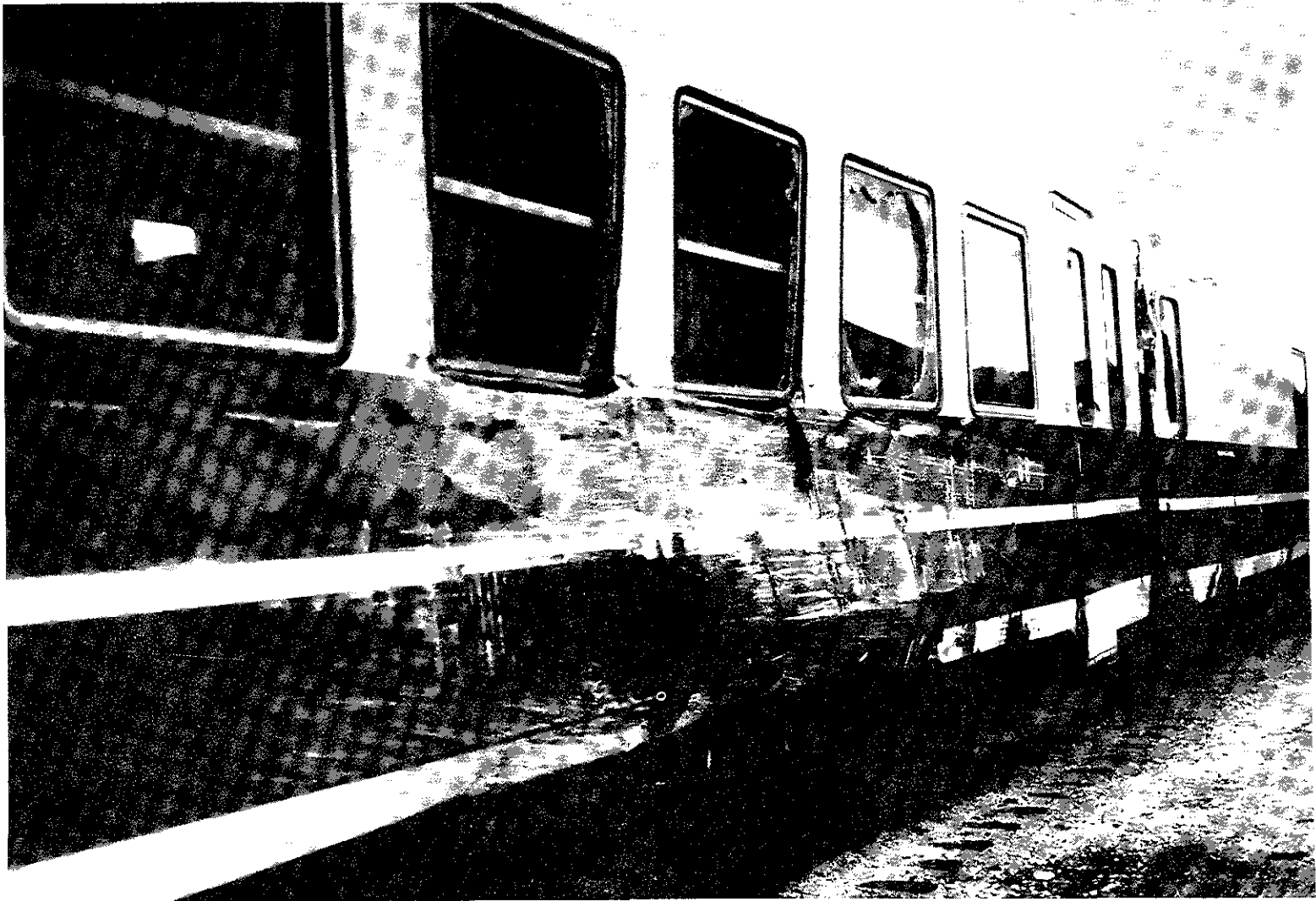


Figure 5. Crash damage to the second and third cars of the turboliner.

Vehicle Occupants

Truckdriver -- The driver was 48 years of age, wore corrective lenses, and was licensed to operate a truck in Illinois. His traffic record was without notation of any driving violation or accident except for a minor collision in 1973.

He had driven for 33 years and had driven the truck involved in the accident for 4 to 5 years. He was familiar with Manhattan Road, but had not traveled through the accident area for more than 2 months prior to the day of the accident. The driver stated that although he was familiar with the crossing, he had never encountered a train there.

The driver was ejected from the truck after the collision, but he was not injured. He was not wearing the available seatbelt.

The truckdriver was charged with "Failure to obey a signal 1/ indicating approach of a train," Section 11-1201 (3) of the Illinois Vehicle Code.

Traincrew -- The crew consisted of an engineer, a fireman, a conductor, and a flagman, who were employees of ICG and were subject to ICG operating rules. The food service attendant and other service personnel were employees of Amtrak and were subject to Amtrak operating rules.

The train was being operated in accordance with ICG rules and operating instructions. No members of the traincrew or service personnel were reported injured.

Train Passengers -- Of the 132 passengers on the train, 41 reported injuries. Five of these were admitted to local hospitals; the most serious injury incurred by these passengers was a ruptured spleen. The remaining 36 injured passengers were treated and released. Most of their injuries consisted of head, chest, shoulder, back, and leg pains. These injuries probably occurred as the passengers were propelled laterally from left to right as the train left the track. Two passengers were cut by glass which came from shattered windows.

Four of the hospitalized passengers were interviewed. Two stated that they struck the service trays which were attached to the seat backs. At the time of the accident, the passengers were eating breakfast and the trays were down. Two others stated that they saw baggage falling from the overhead rack and striking other passengers; however, no injuries caused by falling baggage could be documented.

High-Speed Passenger Train Corridors

In the advent of Amtrak, rail passenger service has been reemphasized and 13 actual or potential high-speed railroad corridors have been opened.

1/ Train's audible warning.

There are a substantial number of grade crossings along these corridors; the 13 corridors traverse 3,107 miles of track and contain about 2,869 grade crossings. About 60 percent of these crossings are estimated to be on public roads. 2/

After this accident, the Illinois Department of Transportation (IDOT) organized an intradepartmental task force to upgrade the safety of grade crossings first on the Chicago-to-St. Louis corridor and second on all the high-speed rail corridors in the State. The task force has completed a report on the first phase of its assignment. The report includes recommendations relating to improvements that "can be implemented within 6 months." (See Appendix.)

In addition to IDOT's efforts to improve safety at grade crossings, the Will County Highway Department and ICG Railroad soon will install flasher lights at the Manhattan Road crossing and Amtrak has initiated a grade crossing safety program. Amtrak has organized a unit within its organization which is responsible for projects to improve the safety at grade crossings.

ANALYSIS

The Grade Crossing

The truckdriver, operating his vehicle at a speed of about 40 mph, required a minimum of 275 feet to stop the truck safely before he reached the track; he required about 190 feet to decelerate the vehicle to a speed at which he could have steered hard to the left in order to avoid the track without turning his truck over. Trucks traveling at the 55-mph speed limit on Manhattan Road require a minimum of 490 feet of stopping sight distance. 3/ This intersection, in the critical portion of the westbound approach, only provided about 200 feet of unobstructed sight distance to the track. This sight distance warrants a reduction in speed limit to 30 or 35 mph or the installation of active grade crossing protection devices.

The type of protection installed at crossings which accommodate trains that operate at speeds significantly higher than other trains in the area -- for example, turboliner passenger trains versus freight trains -- is especially critical. At such locations, active protection devices are essential to insure that the motorist is made aware of an

2/ U.S. Department of Transportation Report to Congress, "Railroad-Highway Safety, Part II: Recommendations for Resolving The Problem," FRA/FHWA, August, 1972.

3/ The stopping sight distance is the distance traversed by a vehicle from the instant the driver sights an object for which he must stop to the instant that the vehicle is stopped completely.

approaching hazard clearly and sufficiently in advance to avoid the hazard. In this way, only minimal demands upon a motorist's perceptual and judgmental capabilities will be required. This was demonstrated by this accident, in which the truckdriver either ignored or failed to recognize the advance warning devices and the hazard of the approaching train until it was too late to make a successful evasive maneuver. If the crossing had been protected by active devices, the truckdriver might have noticed them and stopped before he reached the crossing.

The installation of conventional active protection alone is not foolproof; the value of such devices can be negated by human error. Nevertheless, they can reduce accidents and accident severity when they are installed at hazardous crossings. A survey 4/ conducted by the State of California showed that the upgrading of protection at grade crossings between 1965 and 1972 resulted in a 41-percent reduction of vehicle-train accidents and casualties.

Active protection (flashing lights) had been planned for this crossing but was not in place on the day of the accident. The administrative process required to obtain such an installation was not begun when the process to reconstruct the road was begun. Had the administrative process been initiated more expeditiously, the flashing lights might have been installed and operational on the morning of the accident.

Investigation into statewide safety practices suggested that this case of delay was unique; State officials did not recall any similar situations within the past few years. However, this does not mean that it has not occurred previously in Illinois or elsewhere or that it will not occur again. Therefore the need for organizational efficiency in the planning and implementation of active protection of grade crossings is a problem which must be solved.

In July 1975, the Federal Highway Administration (FHWA) contracted 5/ with the Texas Transportation Institute to solve a related problem -- the lack of a guidebook and training program which contains all the subjects related to grade crossing safety and which could be used by highway and railroad engineers. The guidebook now being developed includes a section entitled "Systems Administration." The improvement of grade crossings would be enhanced if this section included a standard administrative methodology for the planning and implementation of active protection at grade crossings.

4/ California Public Utilities Commission, "The Effectiveness of Automatic Warning Devices in Reducing Accidents at Gradecrossings in California," San Francisco, California, August 1, 1975.

5/ Federal Highway Administration. "The Railroad-Highway Gradecrossing Handbook Project," Washington, D. C., 1976.

High-Speed Passenger Train Corridors

With the reestablishment of high-speed, high-density rail passenger service over tracks formerly used by freight train traffic alone, the population at risk at grade crossings has increased to the point that the consequences of train-motor vehicle collisions could be as serious as those of a major air disaster. 6/ If the dump truck had crashed head-on into the side of the passenger car or if it had been a vehicle carrying a hazardous material cargo, this collision could have been a catastrophe of major scale.

The above safety problem was recognized by the Safety Board in a 1971 special study. 7/ The Board concluded in the study that "grade crossings are not compatible with rail rapid transit operations" and recommended that the FRA consider these incompatibilities when it establishes methods to protect grade crossings. The FRA responded to this recommendation in the Department of Transportation's 1972 report to Congress on railroad-highway safety. In the report, the DOT cited short term and long term projects which employed various methods to protect grade crossings, and also suggested that States begin a comprehensive field review of each of the high-speed rail corridors. The field review of the Chicago-to-St. Louis corridor was initiated by the IDOT after this accident occurred. Of the various projects cited by the DOT in its report, only one -- The National Crossing Inventory and Numbering Project -- had been initiated or implemented on the Chicago-to-St. Louis corridor before this accident.

Although turboliner trains have been taken out of service on the Chicago-to-St. Louis corridor, high-speed passenger rail service will continue. The need for action to improve grade crossing safety is, therefore, still present.

European-type Couplers

The forces generated during the crash dynamics caused the buffers which connected the end of the second car to the front of the third car to misalign and to bypass. Once the buffers were separated, the tension on the link coupler relaxed and the link was able to bounce off the hook. This permitted the cars to separate and contributed to the derailment of the third, fourth, and fifth cars.

6/ Federal Railroad Administration, "Gradecrossing Protection in High-Speed, High-Density, Passenger-Service Rail Corridors," Transportation Systems Center (DOT), Cambridge, Ma., 1973.

7/ National Transportation Safety Board, "Special Study of Rail Rapid Transit Safety," 1971, NTSB-RSS-71-1.

The ease with which the European-type coupler can uncouple increases the potential for each car to react independently in an accident situation. When cars are not attached to other equipment, they are more likely to derail and to roll over; this increases the risks of loss and injury. Practical methods exist to improve this type of coupler assembly in order to insure its integrity under crash conditions.

CONCLUSIONS

1. The train was being operated in accordance with ICG regulations and with accepted operating procedures.
2. There is no evidence to suggest mechanical difficulty of the truck or train before the collision.
3. The sight distance at the crossing was not adequate, given the legal speed limit of the road and the timetable speed of the track.
4. Additional advance warning devices and a reduced speed limit would decrease the likelihood of conflict at this crossing.
5. The familiarity of the truckdriver with this crossing, coupled with the advance railroad warning sign and pavement marks, should have caused him to approach the track with caution.
6. Active protection for the crossing should have been installed while the road was being reconstructed and before it was opened.
7. The impact by the truck, in combination with the dumping of large amounts of asphalt on and about the rails, caused the train to derail.
8. It is important to keep railroad cars coupled under crash conditions to increase the probability that they will not derail or roll over.
9. High priority should be afforded to improving the safety at grade crossing highway-railroad intersections on all high-speed passenger train corridors.
10. Active protection devices are the best means to alert drivers and to assure that they can stop before they reach an occupied grade crossing.

PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of the accident was the failure of the truckdriver to stop his vehicle short of the track until it was safe to proceed. Contributing to the accident was the inadequate sight clearance between the road and the track on the approach to the unprotected grade crossing.

RECOMMENDATIONS

As a result of its investigation of this accident, the National Transportation Safety Board submitted the following recommendations to the Federal Highway Administration:

"Include procedures in the FHWA guidebook and training course for highway/railroad engineers, concerning the design and safety of grade crossings, which will insure that proposed active grade crossing protection devices are operational when upgraded or newly constructed streets or highways are opened. (H-76-21)

"Urge and assist all States which have high-speed passenger train corridors to (1) initiate without delay a comprehensive field review of the corridors and (2) establish and implement a schedule of projects to insure that each grade crossing receives appropriate safety treatment." (H-76-22)

The National Transportation Safety Board also submitted the following recommendation to the Federal Railroad Administration:

"Require improvements to the coupler assembly on the French-manufactured turbo trains currently in service to minimize the possibility of uncoupling under crash conditions." (R-76-23)

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

/s/ WEBSTER B. TODD, JR.
Chairman

/s/ FRANCIS H. McADAMS
Member

/s/ PHILIP A. HOGUE
Member

/s/ ISABEL A. BURGESS
Member

/s/ WILLIAM R. HALEY
Member

May 12, 1976

APPENDIX

PHASE I RECOMMENDATIONS - ILLINOIS
DEPARTMENT OF TRANSPORTATION RAILROAD
GRADE CROSSING TASK FORCE 1/

Based on the analysis available information and data, the Task Force developed the following Phase I recommendations. Recommendations 1, 2, 3, and 5 make an innovative use of a red and yellow color coding. The coding is used throughout the series of advance warning signs, crossbucks, gates, and delineators in the situations in which they would be used. Such coding would help satisfy the human factors needs for quick, easy recognition of grade crossings.

1. Replace Crossbucks with New Red and Yellow Experimental Design
The Task Force recommends, subject to obtaining necessary clearances, red and yellow crossbucks be installed on an experimental basis at all crossings in the Chicago-St. Louis corridor.
2. Upgrade Existing Grade Crossing Gates to Reflectorized Red and Yellow with Red Warning Lights and Other Appurtenances
To increase both day and nighttime visibility and to reduce the potential for accidents caused by vehicles running through a crossing protected by gates, the Task Force recommends that existing gates be converted to reflectorized red and yellow with strips that hang vertically when the gates are in a horizontal position. If the approvals necessary to use the unique red and yellow color coding cannot be obtained in time to accomplish this work within the target time limit, the contingency recommendation is to upgrade all gates to the standard reflectorized red and white.
3. Advance Warning Signs
To provide motorists adequate advance notice that a railroad grade crossing is near on which high speed trains are operated, it is recommended reflectorized, red and yellow, high intensity, advance warning signs be installed at each grade crossing in the Chicago-St. Louis corridor.
4. Railroad Pavement Marking
To significantly increase motorists' awareness of approaching grade crossing, the Task Force recommends thermoplastic pavement markings be applied to all unmarked intersecting road approaches in the Chicago-St. Louis corridor.

1/ IDOT Railroad Grade Crossing Task Force, "Phase I Report," Springfield, Illinois, February 10, 1976. The language used in this Appendix is that of the Task Force.

5. Delineators

The Task Force recommends that red and yellow delineators be installed on all curved roadway approaches with a radius of 1,000 feet or less. Delineators help motorists negotiate a curve and, would avoid lowering motorists' awareness of the proximity of a crossing and the possibility of meeting a train. If approval to use red and yellow delineators cannot be obtained, the contingency recommendation is to use the colors specified in the MUTCD.

6. Sign Restriction and Distraction Removal

A concentrated effort should be made by the railroad companies and those responsible for maintenance of the roadway approaches to remove, or cause to be removed, sight obstructions such as weeds, brush, or debris along their respective rights-of-way. Additionally, extraneous items such as signs in the immediate vicinity of the crossing should be removed from the rights-of-way to avoid distracting or irrelevant appurtenances. The Task Force recommends the railroad company and appropriate local agencies accomplish this work with their own forces. No special funding of this effort is recommended since it should be a continual program.

7. Public Education

It is recommended information be released to the news media as the Phase I recommendations are implemented. This would serve not only to provide some public education regarding the measures being taken but also to remind motorists of the potential hazards at railroad-highway grade crossing. Increased awareness and understanding on the part of motorists would be a positive step in decreasing the potential for accidents. It is recommended the railroad industry's "Operation Lifesaver" be considered for implementation in Illinois. Similarly, we recommend that the Illinois Office of Education be requested to emphasize the hazards of railroad crossing in driver education and information programs, possibly preparing special informational material for distribution. It is further recommended the Illinois Information Service be requested to produce TV and radio spots to run during public service time slots on the subject of the hazards at railroad crossing.