NATIONAL TRANSPORTATION SAFETY BOARD

RAILROAD/HIGHWAY ACCIDENT REPORT

ILLINOIS CENTRAL RAILROAD COMPANY

Train No. 1 Collision With Gasoline Tank Truck At South Second Street Grade Crossing Loda, Illinois

January 24, 1970

NATIONAL TRANSPORTATION SAFETY BOARD
Washington, D. C. 20591

Report Number: NTSB-RHR-71-1

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16 Abstract

About 9:55 a.m., on January 24, 1970, Illinois Central Railroad southbound passenger train No. 1, moving at a speed of 79 miles per hour on track No. 1, struck a motortruck loaded with gasoline on the South Second street crossing in Loda, Illinois. The tank of the truck was split open, spilling the gasoline which exploded and caught fire. The burning gasoline covered the exterior of the locomotive unit and entered the control compartment through the nose door, damaged nose, and other openings.

Three employees of the railroad, who were occupying the control compartment of the lead locomotive unit at the time of the accident, and the driver of the motortruck received fatal injuries from the burning gasoline.

The National Transportation Safety Board determines that the probable cause of this accident was that the operator drove the gasoline-laden truck, without stopping, onto the tracks immediately in front of the approaching train, while the crossing warning device was indicating the train's approach.

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FOREWORD

This report of facts and circumstances and determination of probable cause by the National Transportation Safety Board is based on facts developed in the field investigation by the Bureau of Railroad Safety of the Federal Railroad Administration. In developing its recommendations, the Safety Board has considered the suggestions the Federal Railroad Administration made in forwarding the investigatory data The recommendations made herein, however, are recommendations of the Safety Board

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C 20591
RAILROAD/HIGHWAY ACCIDENT REPORT

ADOPTED: July 8, 1971

ILLINOIS CENTRAL RAILROAD COMPANY TRAIN NO 1 COLLISION WITH GASOLINE TANK TRUCK AT SOUTH SECOND STREET GRADE CROSSING LODA, ILLINOIS JANUARY 24, 1970

I. SYNOPSIS

About 9:55 a m , on January 24, 1970, Illinois Central Railroad (ICRR) southbound passenger train No 1, moving at a speed of 79 miles per hour on track No 1, struck a motor-truck loaded with gasoline on the South Second Street crossing in Loda, Illinois. The tank of the truck was split open, spilling the gasoline which exploded and caught fire The burning gasoline covered the exterior of the locomotive unit and entered the control compartment through the nose door, damaged nose, and other openings

Three employees of the railroad, who were occupying the control compartment of the lead locomotive unit at the time of the accident, and the driver of the motortruck received fatal injuries from the burning gasoline

PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of this accident was that the operator drove the gasoline-laden truck, without stopping, onto the tracks immediately in front of the approaching train, while the crossing warning device was indicating the train's approach

The cause of the fatalities to engine crewmembers and the official was the entrance of burning gasoline into the control compartment and engine compartments which burned the occupants of the control compartment, made escape into the engine compartment useless, and forced the occupants to jump from the control compartment while the train was still moving at a speed too high to insure survival

II. FACTS

A Location and Method of Operation

The accident occurred at Loda, Illinois, 92 3 miles south of Chicago Central Station, where the railroad is crossed at grade by South Second Street Loda is located on that part of the Chicago Division which extends 126 4 miles between Chicago Central Station and Champaign, Illinois

1. The Railroad

A double-track main line extends northward and southward through Loda The tracks are designated from west to east as No 1 for southbound trains and No 2 for northbound trains Trains are operated with the current of

traffic on the main tracks by signals of an automatic-block signal system In the vicinity of the South Second Street crossing, a siding 3,218 feet in length, designated as the business track, parallels No 1 track on the west In the accident area, the tracks are straight, and the average grade for southbound trains is 0.48 percent descending.

The maximum authorized speed for passenger and express trains with passenger locomotives is 79 miles per hour

2. Highway and Grade Crossing

U S Route 45 is a two-lane road paved with concrete extending approximately north and south through Loda The highway parallels the railroad and is about 82 feet east of the tracks

South Second Street in Loda (also known as Bayles Lake Road) is a two-lane public highway, 20 feet wide, paved with Amicrete The street crosses U.S. 45 and the three tracks of the Illinois Central Railroad at grade at a 90° angle [1] It is one of several crossings in Loda. The average grade from the east is 5 0 percent ascending for 80 feet to the crossing, practically level over the crossing, and 5.8 percent descending for 53 feet westward The railroad crossing is 32 feet wide, with wood planking between the rails of the three tracks and along the outside of each rail The remaining surface of the crossing area is surfaced with bituminous material to the tops of the planking and the rails. (See Figure 1) The blacktop surface of the crossing at the time of the accident had a number of chuckholes and there was some slush on the roadway

3 Crossing Protection

The crossing was equipped with an automatic, wig-wag, crossing-warning for the purpose of warning operators of motor vehicles of approaching trains The signal had a 5-inch diameter mast, 14 feet 6 inches in height, with a crossarm, and it was located in the northeast quadrant of the crossing, 11 feet north of the paved surface of the roadway A warning bell was mounted on top of the mast A multiple-track sign and a crossbuck warning sign were attached to the mast, 6 feet 11 inches, and 9 feet 11 inches, respectively, above the ground A wig-wag banner, 20 inches in diameter, was suspended from the crossarm The banner, a white, circular, metal disc with a black cross and border, was located 10 feet 11 inches above the ground and swung in an arc 30 inches in length parallel with the tracks A light contained between two red lenses, 6-3/8 inches in diameter, was mounted in the center of the banner. This light illuminated the red lenses and could be seen on each side of the crossing. (See Figure No 2) The signal was installed April 9, 1927.

The circuit of the automatic crossing-warning signal was so arranged that when a southbound train reached a point 4,170 feet north of the crossing on Track No 1, the red light was illuminated, the banner began to swing and the bell began to ring This device continued to function until the train moved entirely over the crossing. Only one automatic warning signal was located at the crossing, and this device was depended upon to warn traffic approaching the crossing in both directions. The west approach to the crossing was also protected with a railroad crossbuck sign

B. Description of Accident

1 The Train and Crew

Train No 1, designated as the City of New Orleans, was a scheduled passenger train running between Chicago Central Station and New Orleans, Louisiana. On the day of the accident, the train consisted of three car-body type, diesel-electric units, Nos 4019, 4003, and 4028, two baggage cars, four coaches, one diner, and eight coaches, in that order.

On the morning of January 24, 1970, the engineer and fireman for passenger train No. 1 reported for work at 7 a m. at 27th Street in

[1] Appendix No 1 — Photograph and Sketch of the Accident Area

FIGURE 1

FIGURE 2

Chicago, Illinois After inspecting the locomotive, the crew moved it to Chicago Central Station where it was coupled to the train Brake tests were performed after the train was assembled, and they indicated that the brakes functioned properly The fireman was informed by a transportation engineer (road foreman of engines) that he and an executive assistant to the president of the railroad would accompany the engine crew on the trip The transportation engineer assumed the fireman's duties in the cab of the locomotive and instructed the fireman to ride in the second unit of the locomotive The fireman then proceeded to the cab of the second unit Shortly after the arrival of the executive assistant to the president, the train departed at 8:10 a m , 10 minutes late

At Kankakee, Illinois, 42 8 miles north of Loda, the train made the last of several scheduled stops before the accident There were about 225 passengers on the train when it departed from Kankakee The train passed Gilman, 17 6 miles north of Loda, at 9:42 a m , 26 minutes late

Shortly after the departure of the train from Chicago Central Station, the first of a series of ground-relay actuations occurred on the first unit of the locomotive The ground relay is an electrical protection device that is actuated when a ground occurs in the high-voltage electrical system of the locomotive unit Operation of the device cuts off electricity to the traction motors. To reset the ground relay requires that the diesel engine be isolated by positioning a switch, and manually resetting the relay This maneuver can be performed without stopping the train After the train passed Gilman, the ground relay actuated for the fourth time Each time that the relay functioned, the transportation engineer left the control compartment and went into the engineroom where he was joined by the fireman from the second unit, and jointly they reset the device. After the relay was reset following the last actuation as the train was approaching Loda, the transportation engineer instructed the fireman to remain in the engineroom of the first unit and, if the ground relay functioned again, to isolate the engine The transportation engineer then returned to the control compartment When the fireman last observed the employees in the control compartment, the engineer was operating the locomotive, the executive assistant to the president was seated in the fireman's place, and the transportation engineer was seated on a portable seat in the center of the compartment

2 The Truck and Its Operation Prior to the Accident

a *Motortruck and Tank*

The motortruck consisted of a 1,400-gallon cargo tank mounted on a 1968 Chevrolet chassis, Model CS51403 The truck was equipped with a CS 50-592, six-cylinder gasoline engine, power steering, hydraulic brakes with a vacuum booster, and a two-speed rear axle with dual wheels Its serial number was CS538J 144185, and the license number was 1969-70 Illinois, 19349G Large exterior rearview mirrors about 20 inches in length and 6 inches in width were mounted on each side of the cab of the motortruck in line with the operator's range of side vision in both directions The cab had a nominal capacity for two people and was equipped with a radio and heater The cab and chassis were owned by the driver

The cargo tank was approximately 20 feet 11 inches in length, and was divided into five compartments with capacities of 400, 300, 300, 200, and 200 gallons The vehicle was painted yellow and stenciled in accordance with the specifications of the Shell Oil Company Decals measuring 6 inches high by 24 inches long, indicating "Flammable," were applied on both sides and on the rear of the tank The tank was built in August 1955, and was mounted previously on another motortruck by the Progress Manufacturing Company In November 1968, the company remounted the cargo tank on the motortruck involved in the accident The tank was owned by Farmer's Oil and Supply Company, Colfax, Illinois

b. *Movement of the Motortruck*

On the morning of January 24, 1970, the driver of the motortruck left his home in Loda at approximately 6:30 a m. He proceeded to Paxton, 4 miles south of Loda, where he loaded the tank truck with gasoline from a bulk plant Two deliveries were made before the tank was reloaded with 1,400 gallons of gasoline for Gibson City, located about 20 miles west of Loda

The driver made stops at the local post office and at his residence At approximately 9:52 a m , he resumed his journey and drove the truck to U S. 45, turned right and moved northward The driver made a left turn onto South Second Street and proceeded westward toward the railroad (See sketch, Appendix No 1)

3 The Accident

As train No 1 was approaching the South Second Street grade crossing at an estimated speed of 79 miles per hour, a resident of Loda, who was working in a grocery store at the corner of South Second and Chestnut Streets on the west side of the tracks, reported that she heard the crossing warning bell ringing on the crossing protection signal, saw the wig-wag signal operating, and saw the lighted red light in the center of the disk. About the same time, she saw the Shell Oil truck move northward on U S 45 and turn left on South Second Street toward the track She heard the horn of the locomotive being sounded as it approached the crossing

A second witness, who was standing in the doorway of a feed mill southwest of the crossing, also saw the Shell Oil truck move northward on U.S 45, turn left on South Second Street, and move westward toward the crossing One of the witnesses estimated the speed of the motortruck to be 5 to 10 miles per hour as it moved up the incline toward the tracks Both witnesses stated that the motortruck did not slow down or stop before it moved onto the track immediately in front of the approaching passenger train. The locomotive struck the motortruck near the center of the tank on the right side; The cargo tank was ruptured on impact causing an explosion and ignition of the spilled gasoline. The impact and the explosion damaged the front of the locomotive, broke the nose door from its securement and forced it back into the compartment, and broke the glass covers of the number boxes Burning gasoline entered the control compartment of the locomotive and flowed over the right side of the first unit.

The three men in the control compartment of the locomotive survived the initial impact but fled from the cab due to the intense fire which developed almost immediately after the collision. The three employees exited by the door and ladder on the left or east side of the first unit They were found along the east side of track No. 1 at the following distances south of the crossing: the executive assistant to the president, 2,137 feet, the transportation engineer, 2,212 feet, and the engineer, 3,012 feet. The train stopped with its front end 4,930 feet south of the point of impact

The driver of the motortruck was killed in the collision. His body was burned and was thrown out of the cab of the truck It was found on the west side of the siding near the damaged front portion of the truck, about 85 feet south of the point of collision.

At the time of collision, the fireman, who was standing in the engine room, heard the explosion and witnessed fire coming through the side doors and through the floor of the engine-room. He immediately retreated from the flames through the rear units of the locomotive. He did not make an effort to stop the train because he was aware that the train was stopping By the time the fireman had reached the third unit, the train was stopped He alighted, joined the conductor and baggageman, and the three men proceeded to the front of the first unit where they found the control compartment engulfed in flames, the nose door collapsed, and the left side control-compartment door open They found no one in the control compartment

The baggageman, who was seated on the east side of the first coach of the train at the moment of impact, felt the slack run in when the collision occurred He saw the flames and

felt the heat through the windows of the car when it passed the collision point He responded to the flagman's radio message to the engineer and advised the flagman that the head end of the train was on fire When the train stopped, he joined the conductor and fireman, and went to the lead locomotive unit

The conductor, who was seated in the center of the train, felt the brakes apply, noted that the time on his watch was 9:55, and instructed the passengers to remain seated in each car as he made his way toward the front of the train Due to the presence of smoke, the conductor evacuated the passengers from the first coach, the third car in the train. He joined the baggageman and the fireman, proceeded to the head end of the locomotive, and found the control compartment filled with flames He climbed the ladder on the left side, determined that the cab was empty, and then notified the train dispatcher of the accident

The flagman had talked with the engineer by radio-telephone several times during the trip At the time of impact, the flagman was seated in the rear coach When the brakes applied, the flagman tried to reach the engineer by radio-telephone He was answered by the baggageman, who told him that the head end was on fire The flagman saw the fire as the train passed South Second Street After the train stopped, the flagman alighted from the rear car and found the engineer lying between the two main tracks with his clothing afire He carried him to the west side of the tracks and extinguished the fire with snow He recalled that there was an extremely strong odor of gasoline on the engineer's clothing He used his portable radio to call for an ambulance

C Results of the Accident

1 Casualties

The transportation engineer was killed and his body was extensively burned He was pronounced dead at the scene of the accident The driver of the motortruck was pronounced dead at the scene of the accident The executive assistant died at approximately 2:45 p m , on January 24, 1970, at Paxton Community Hospital, as a result of injuries received The locomotive engineer died 3 days after the accident, at Cook County Hospital, Chicago, Illinois

2. Damages to the Train

The lead unit of the locomotive was heavily damaged The windshield was broken The control compartment was gutted by fire The outer shell of the locomotive was badly damaged by fire The outside sheeting of the second and third units of the locomotive and of the first three cars of the train was damaged by the fire None of the passenger cars was damaged on the inside by fire The engineroom and equipment of the first unit were damaged by fire The nose door above the coupler was severed from its hinges and was found in the nose compartment, the number boxes were broken, and the front sheeting below the number boxes and to the right of the coupler was heavily indented and was torn by the impact The pilot was torn along the right side and bent downwards Estimated cost of damages to the train was $158,400

3 Damages to the Truck

The locomotive struck the right side (north side) of the truck at about the center of the tank The motortruck cab and part of the chassis were either carried, or hurled by the forces of the impact, to a point 85 feet south of the point of the collision They came to rest along the west side of the business track The motortruck rear wheels and cargo tank were separated from the chassis and were carried, or propelled by the force of the explosion and impact, south of the crossing and stopped along the west side of the business track The rear wheels and axle and the cargo tank stopped 245 feet and 265 feet, respectively, south of the collision point The motortruck and tank were completely demolished (See Figure No 3)

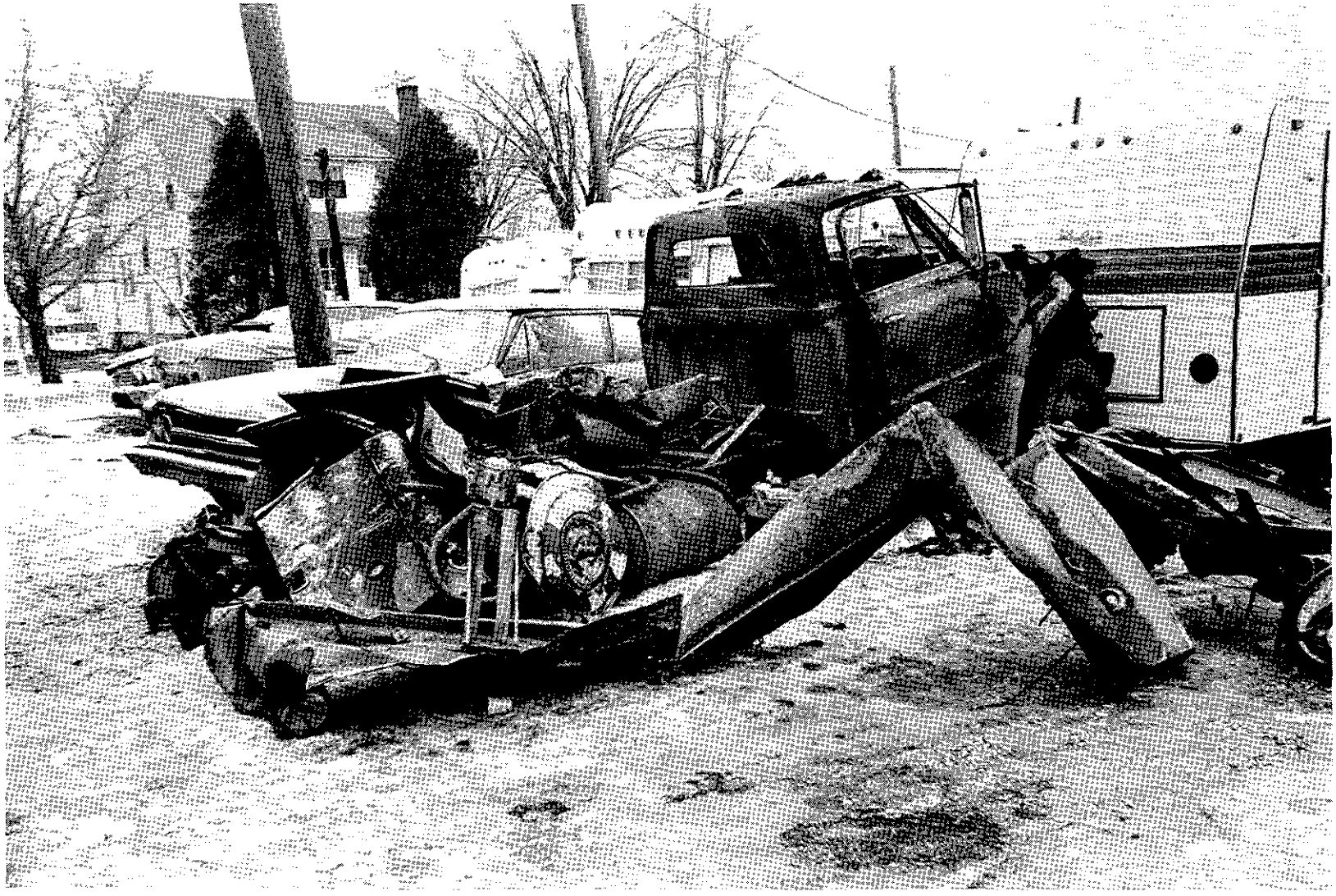


FIGURE 3
Photo showing right side of motortruck after it had been moved from accident point.

4 Damages to the Surrounding Area

Immediately following the collision, the spilled gasoline ignited and set fire to a large area surrounding the crossing, however, there was little damage from the fire

D The Driver of the Truck

The driver resided in Loda, one block east of the Illinois Central tracks and approximately three blocks south of the Second Street crossing He was 52 years old, and a licensed driver of the State of Illinois He had no record of convictions or accidents He had operated trucks delivering gasoline and oil products in the area for about 6 years. The driver, whose weight was in excess of 300 pounds, was known to be suffering from an overweight condition and from high blood pressure Until a few weeks before the accident, he had been taking medication for excessive weight According to the information available, the driver had sufficient rest before he began working, and had been on duty for 3 hours and 25 minutes at the time of the accident

The driver was self-employed and had purchased the motortruck chassis on which the tank and its equipment were mounted He delivered gasoline, fuel oil, and other petroleum products from bulk plants located in Paxton and Gibson City, to service stations and farmers in the area All of his business operations were within the State of Illinois so that the operation of the vehicle was not subjected to the motor carrier safety regulations of the Federal Highway Administration

Prior to the date of the accident when the driver made deliveries in Gibson City, he drove the truck empty to the bulk plant at that point, filled it, and made his deliveries On the day of the accident, the filling pump at the Gibson City bulk plant was out of service, which necessitated his filling the tank at the Paxton bulk plant.

The motortruck driver's assistant, who often accompanied him in the deliveries of gasoline, did not see the driver on the morning of the accident The assistant stated that the driver had often crossed railroad crossings with the loaded truck without stopping when the warning signals were not operating He said at other times the driver was careful

E Applicable Laws and Regulations

The State of Illinois, in its "Laws Relating to Motor Vehicles," requires the following for vehicles transporting certain commodities or school children over railroad crossings

> "Sec 84 - Certain Vehicles Must Stop at all Railroad Crossings (a) The driver of any motor vehicle carrying passengers for hire, or of any school bus carrying any school child, or any vehicle carrying liquid petroleum and liquid petroleum products, explosives, flammable or oxidizing liquids and solids, flammable or poisonous fumes, corrosive liquids, and radioactive materials as cargo or part of a cargo, before crossing at grade any track or tracks of a railroad, shall stop such vehicle within 50 feet but not less than 10 feet from the nearest rail of such railroad and while so stopped shall listen and look in both directions along such track for any approaching train, and for signals indicating the approach of a train, except as hereinafter provided, and shall not proceed until he can do so safely "

The Uniform Traffic Act requires the following:

> "180 - Obedience to signal indicating approach of train
> (a) Whenever any person driving a vehicle approaches a railroad grade crossing and a clearly visible electric or mechanical signal device gives warning of the immediate approach of a train, the driver of such vehicle shall stop within fifty feet but not less than ten feet from the nearest track of such railroad and shall not proceed until he can do so safely "

The State of Illinois requires that an applicant for a driver's license be 18 years old, pass a written examination and driving test, and comply with visual requirements On complying with the requirements, a license is issued for a period of 3 years and is renewed on application A reexamination is required at the expiration of 9 years. No special license is required for a self-employed truck driver except that which entitles him to operate a vehicle over a certain weight When a licensed driver reaches the age of 69, he is required to be examined annually. The State Driving Manual and the written examination for a license contain information and questions on the proper manner of operating a vehicle on the approach to and over a rail-highway grade crossing

F Visibility at the Grade Crossing

As a motor vehicle approaches the railroad from the east on South Second Street, the operator's view of a southbound train is obstructed by several items in the area between U S Route No. 45 and the railroad, north of South Second Street

A line of poles parallels U S 45, about 11 feet west of the highway, and several evergreen trees are located between the tracks and U S 45 A gasoline service station is located about 337 feet north of South Second Street and 41 feet east of Track No 1. A railroad signal relay case is located on the north side of South Second Street, 30 feet east of Track No 1 As a northbound vehicle on U S. 45 approaches South Second Street, the driver's view of Track No. 1 northward is partially obstructed As the vehicle turns left on South Second Street and approaches the crossing, the driver's view northward is obstructed intermittently From points 100, 70, 50, and 33 feet east of Track No. 1, the driver has a view northward of 600, 800, 1,300 and 300 feet, respectively When the vehicle has approached to within 30 feet of Track No 1, the driver has an unobstructed view of southbound trains for a distance of 2,600 feet

G. Observations of the Condition and Effectiveness of the Automatic Crossing Warning Device

An inspection made of the automatic warning device the day following the accident disclosed that the light between the red lenses in the center of the banner was so dim that one had to look closely during daylight hours to determine whether the light was lighted. It was observed that the paint on the banner was worn and faded. When operating, the movement of the banner through its 30-inch swing appeared short and was above the normal line of sight of the driver The alarm bell was not loud and if there had been any distracting noise such as a running engine it would have been difficult to hear in an enclosed motor vehicle

H. Traffic Count at the Grade Crossing

During the 24-hour period preceding the accident, 12 passenger and 16 freight trains moved over the crossing A traffic count beginning at 5 p m , February 9, 1970, revealed that 34 pedestrians, 611 automobiles, 123 trucks, and four buses moved over the crossing in a 24-hour period

I. Incidence of Accidents at the Grade Crossing

Illinois Commerce Commission records indicated that the following crossing accidents occurred at South Second Street in Loda:

Year	*Cause*	*Result*
1955	A pedestrian struck by train	A Fatality
1967	Train hit auto	A Fatality
1969	Auto ran into side of train	No Fatality

J Weather

Chanute Air Force Base, which is located near Loda, reported that the temperature at the time

of the accident was 23° F, visibility 6 miles with haze, and the wind was blowing at a speed of 22 knots, gusting to 26 knots, from the south-southwest

There was an accumulation of snow on the ground and some slush on the crossing The strong wind was accompanied with occasional snow flurries According to witnesses, visibility was good in the crossing area at the time of the accident

K. Description of the Locomotive

Diesel-electric unit No 4019, the first unit of train No 1 on the day of the accident, was a 2,250-horsepower, type E-8, passenger, A Unit, manufactured by the General Motors Corporation in 1950 (See Figure No 4) It was provided with two six-wheeled trucks equipped with traction motors, two diesel engines—each driving electric generators which provided power to the traction motors, a steam generator, and the necessary electrical and mechanical controls for the operation of this and the other units of the locomotive To aid in describing the unit, the superstructure can be divided into three areas: the nose, the control compartment, and the engineroom which housed the diesel engines, the electric generators, and other associated equipment

The nose section is about two-thirds of the height of the locomotive and is rounded on the front A door, 45 inches high by 28 inches wide provided with a circular window, is located in the front center of the nose section The door opened inward and was secured with two manually operated sliding-bolt locks at its top and bottom in addition to a latching device Two steel boxes, provided with electric lights and glass fronts to display the unit's members, are mounted on the nose section, one on each side of the door Screened vents are installed along each side of the nose door just above the floor to provide ventilation for the nose section No means is provided to blank these vents Airbrake and other equipment are housed in the nose section Removable sections are provided to close off the tunnel-like area between the nose section and the engineroom under the control compartment floor, but the sections are not airtight when in place.

The control compartment is located near the front of the unit The compartment occupies the full width of the locomotive and extends from the nose about 8 feet to the bulkhead of the engineroom Access doors, 54 inches high by 21 inches wide, are located in the rear quarter of each side of the compartment Doors leading into the engineroom are located on each side of the rear wall of the compartment Access to the nose section is through a 21-inch-wide door in the center of the front wall below the windshield The divided windshield is made of safety glass Safety glass is provided in the windows on each side ahead of the doors and in each side door The floor of the cab is 7 feet 3 inches above the top of the rail and about 30 inches above the floors of the nose section and of the engineroom, with steps to compensate for the difference in elevation Access from the ground to the compartment is by ladders and handholds attached to the outside of the locomotive unit

The engineer operates the locomotive from a bolted-down adjustable seat on the right side of the cab The manual controls for the locomotive are to the engineer's immediate front and left There is a safety control foot pedal ("dead man") which the engineer is required to keep depressed while he is operating the locomotive When the locomotive is being operated, the brakes on the train are applied and the engines are reduced to idle position when the "dead man" control is released

A fire extinguishing system was not installed in these units Portable fire extinguishers are provided, but they do not have the capacity to control a fire such as the one that developed in this accident. One Ansul dry powder extinguisher is located in the control compartment and two CO_2 extinguishers are located in the engineroom

The locomotive unit has two headlights One is a sealed beam, 250-watt, fixed headlight mounted above the nose compartment door

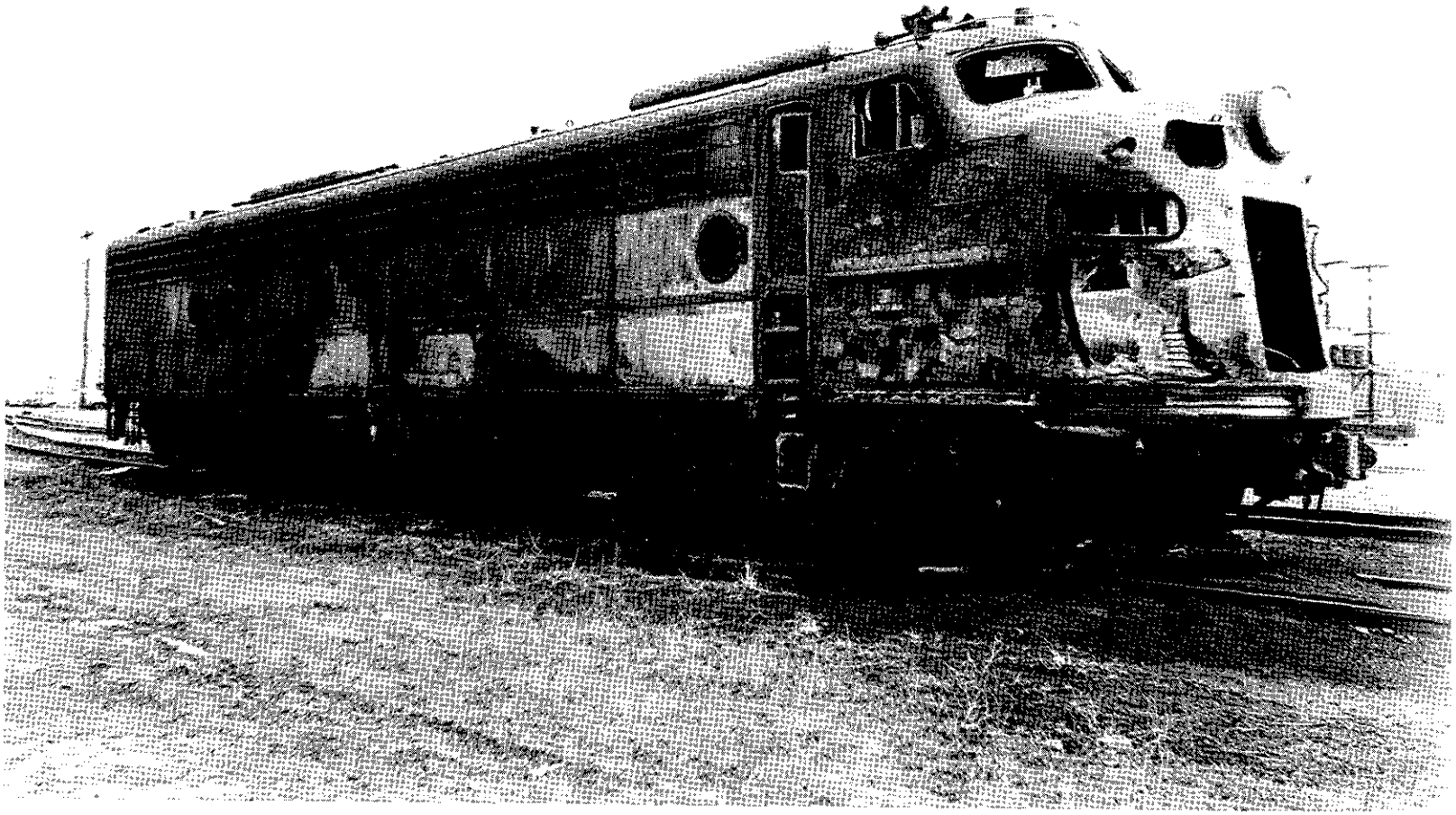


FIGURE 4

about 7 feet 10 inches above the top of the rail The other headlight has rotating red and white lights, and it is located about 10 feet 10 inches above the top of the rail The carrier's operating rules[2] require that the fixed headlight must be displayed to the front of trains by day and night; the white oscillating light must be displayed at night and during the day when weather conditions seriously impair visibility, and the red oscillating light must be displayed both day and night when a train is disabled or stopped suddenly by an emergency application of brakes, or when the engineer or conductor finds it necessary to stop trains under conditions whereby adjacent tracks may be fouled.

The horn installed on this unit consists of five air horns, with three facing forward and two facing rearward The horn is located on the right side of the roof over the control compartment about 14 feet 5 inches above the top of the rail The carrier's operating rules require that the locomotive horn be given two long, a short, and a long blast on approaches to public crossings at grade In addition, special instructions were issued in Illinois Central Railroad, Chicago Division, Through Train, Time Table No 15, which required the engineer to sound the horns for at least 20 seconds before passing over grade crossings The sound of the horn is to be distinct, with intensity in proportion to the distance the signal is to be conveyed, and is to provide adequate warning The warning of at least 20 seconds must be strictly adhered to and, in every case, the final sound must be prolonged until the grade crossing is reached

Air vents and filters are located in the sides of the locomotive units to provide air to the engineroom

III ANALYSIS

A How the Crossing Environment Contributed to the Accident

The uneven condition of the pavement of the approaches and the crossing made it unlikely that the loaded truck approached the tracks at a speed greater than the 5 to 10 miles per hour as estimated by the witnesses Because of the 5 percent ascending grade from U S 45 to the tracks, the driver probably shifted into a lower gear before turning left and continued up onto the tracks at a constant speed

The design and worn condition of the automatic warning device was such that when the signal was operating during daylight hours it would not effectively attract the attention of an approaching motorist Typical modern warning signals, used at other grade crossings and having bright alternately flashing red lights positioned at the level of the motorist's line of vision, are much more effective in providing attention-getting warning than the device described in this accident

If a crossing signal is to be effective, it must first attract the motorist's attention to the fact that the signal is actuated, and then convey to the operator of the vehicle the action necessary to avoid the danger Most State laws, including those in Illinois, are so written that when a railroad crossing signal, other than gates, is actuated, the motorist is required to stop short of the crossing, and if in his opinion he can cross over safely in front of the approaching train, he may do so Therefore, if the motorist stops at the actuated signal and moves over the crossing in front of a train and is not struck by the train, law enforcement officers consider the requirements of the law fulfilled There have been many suggestions that drivers do not regard grade-crossing warning devices with the same respect that they give to highway traffic signals It has been inferred that in most cases, drivers obey the indications of standard highway traffic signals even though no conflicting traffic is approaching If this driver had stopped the truck, as required by Illinois law, the train would have occupied the crossing before the truck arrived at the track, thus avoiding the accident

The various obstructions located in the area north of the crossing between Highway 45 and the railroad could have obstructed the motor truck driver's view of the train As he did not

[2] Appendix No 2 Rule 17, Illinois Central Rules and Regulations of the Transportation Department, Effective July 1, 1958

have an unobstructed view of the track until the truck was within 30 feet of the tracks it must be assumed that this would have been the only point where he could have clearly seen the train approaching from the north

B. How the Design of the Cab and the Right Side Rearview Mirror Could Have Contributed to the Accident

It was first considered that, in addition to the obstructions located in the surrounding area, the design of the truck cab and the location of the rearview mirror mounted on the right side may have further obstructed the driver's view of the train It would require 10 seconds for the truck, moving at an average speed of 8 miles per hour, to traverse the distance of 116 feet from the point where the truck first entered South Second Street from U S Route 45 When the truck first entered South Second Street, the train was at a point 1,158 feet north of the crossing. With the truck and train on a collision course in these relative positions, the bearing of each as viewed from the other does not change This collision, however, did not quite meet this condition, as immediately prior to the impact the truck moved onto the crossing in front of the train and the truck was struck rearward of the operator's cab However, as each vehicle approached the crossing, until the time that the truck entered the crossing, the bearing between the two vehicles would be constant. It was not practical in this case to obtain the physical evidence and to reproduce the driver's range of visibility

Using a similar vehicle to the one involved in the accident, it was found that with the driver seated in a normal operating position, his line of sight through the right side door window and the right side of the windshield is obstructed by the rearview mirror mounted on the right side and by the cornerpost of the cab Computations made of the speed of the vehicles and of the angle of this obstruction disclosed that the train was north of the area of the track which was obstructed to the view of the operator and that with these two vehicles approaching each other on a collision course, the view of the train to the operator of the truck was not obstructed by the rearview mirror mounted on the right side nor by the cornerpost of the cab

If there had been an obstruction to the driver's view, it would have required him to move his head or body forward sufficiently to change the angle of sight to assure himself that nothing was approaching on the railroad. This would have required a certain amount of concentration to have thoroughly accomplished this task, which would have detracted from his other activities The road crossing, however, due to the unevenness of the roadway and the slush on the road, required direct surveillance on the part of the operator to steer the vehicle towards a better route over the crossing

C. How the Condition of the Truck Affected the Accident

The truck was demolished as a result of the accident, and it was not possible to determine its mechanical condition at the time of the collision Apparently, the truck functioned in reasonably good order prior to the accident, as it was being used regularly by the driver in carrying out his business Several deliveries had been made on the day of the accident If there had been a brake failure as the truck moved on the ascending grade of the approach, the driver could have stopped the truck simply by disengaging the engine. If there had been any other type of mechanical failure, it would have tended to further reduce the speed, or to have caused the truck to stop on the approach or on the crossing Witnesses stated that this did not occur, as the speed of the truck was maintained on the approach and the crossing until struck by the train.

The investigation disclosed nothing that would support the contention that the driver's view was obstructed as a result of ice, snow, or frost on the windshield.

The operation of the truck in a lower gear to move it slowly up the grade of the approach to the crossing would produce more noise from the engine and transmission than is normally produced when operating in high gear. It can be

assumed from the weather conditions on the day of the accident that the windows in the cab of the truck were closed and probably that the cab heater fan was operating Observations made following the accident disclosed that the occupant of a fairly well-sealed compartment of a motor vehicle with all windows closed would have difficulty in hearing the warning bell of the automatic warning device and the horn of an approaching train If other audible distractions were present within the vehicle, such as a louder engine noise than usual, radio playing, or heater fan operating, the aforementioned audible warning devices probably would not attract the vehicle occupant's attention If the vehicle, however, had been stopped short of the crossing, as required by Illinois State law, much of the interfering noise produced by the operation of the truck would have been reduced and the driver probably would have been able to hear the warning devices

The design of the vehicle did contribute to the severity of the injuries to the driver and to the occupants of the locomotive The tank ruptured on impact and separated from the vehicle Large quantities of fuel were propelled through the rupture and sprayed over the truck cab and the locomotive The tank was not provided with material to limit the flow of a commodity in the event of a container rupture Such techniques as filling tanks with special reticulated foam are technically effective in preventing the rapid discharge of liquid from a ruptured tank The locomotive struck the truck at about the center of the tank which completely destroyed the tank and the rear portion of the vehicle The force of the impact caused the front of the truck to turn northward and strike the locomotive The structural integrity of the cab, however, was not violated by the collision (See Figure No 3)

D The Possibility of Physical or Mental Impairment of the Driver

Because the driver failed to see a locomotive which was less than 500 feet from the crossing, the possibility of some physical impairment must be considered The driver's obesity and high blood pressure are the only conditions which can be considered factors, however, a physical failure cannot be verified because an autopsy could not be performed

It could be assumed that the driver's overweight condition (reported to be over 300 pounds) impaired his moving about the inside of the vehicle in an easy manner This condition could also have deterred his moving forward, or into some other position to compensate for the obstructed sight area caused by the mirror mounted on the right side door, to look for the automatic warning device at the crossing

The driver talked to several people prior to the accident, and he appeared to these people to be normal and did not complain of any physical or mental discomfort

The statement by a witness who regularly assisted in the delivery of fuel that the driver often drove the loaded truck across railroad tracks without stopping may indicate that the driver may have failed to see or hear the crossing warning device and continued onto the crossing in front of the train

E How the Locomotive Contributed to the Severity of the Accident

Because all those riding in the cab of the locomotive at the time of the accident were injured fatally, the sequence of events leading to the impact is not known Because of the partially obstructed view of the truck until it was within 30 feet of the track, and the fact that motor vehicles are expected to stop at crossings, no one in the locomotive would realize that the truck would move onto the track until about 3 seconds or less before impact Realization that the truck was not going to stop would occur when the locomotive was within about 230 to 250 feet of the crossing This gave the engineer about 2 seconds to take action The fact that none of those in the locomotive cab escaped into the engineroom before impact indicates that they were not aware of the impending collision until

shortly before it occurred. Locomotive crews are fearful of collisions with gasoline tank trucks and, had they realized the collision was imminent, at least some of them would have attempted to escape into the engineroom

As the collision occurred, the engineer moved the throttle forward to the engine shutdown position and left his position at the controls to evacuate the control compartment. When the engineer left the controls, he released the safety control pedal "dead man" which applied the brakes on the train. The brake application was not effective in slowing the speed of the train before the impact, due to the short period of time between the application of the brakes and the impact.

A general foreman of the Illinois Central Railroad inspected the controls of the lead unit of the locomotive about 1 hour and 15 minutes after the accident, and found that the controls were set in the following positions:

Automatic brake valve	– Running position
Independent brake valve	– Release position
Reverse lever	– In center position
Throttle lever	– In engine shutdown position

The brakes were applied on the train, and the engines on the locomotive were stopped From the position of the controls, it was evident that the brakes were applied on the train by the actuation of the safety control "dead-man," and that the reverse lever was moved to the center position when the engineer evacuated the control compartment

The train's momentum carried the entire train through the blazing gasoline thus preventing fire damage to the passengers If the pilot on the front of the unit had been completely severed from the locomotive, allowing the truck to strike the front truck of the locomotive, the train probably would have derailed If the train had derailed, there is a significant probability that some of the passenger cars might have been engulfed in burning gasoline

In normal operation, when a possible conflicting automotive movement takes place on the left side of the train, the fireman observes and cautions the engineer It is not known whether the regular fireman's absence from the control compartment left the engineer unprotected on that side. With other than a crewmember in the compartment, there is always a possibility that conversation with the engineer may occupy his attention momentarily, causing the engineer not to see the approaching truck.

When the locomotive struck the tank truck, flaming gasoline was forced into the nose section through the opened nose door, torn sheeting, broken glass of the number boxes, and end vents Due to the tunnel-like arrangement under the control compartment's floor, and the inability to seal off this area, the fuel flowed under the compartment's floor and into the engineroom behind the control compartment Air being pulled into the engine room through the filters located in the car body also would have drawn burning gasoline into the engineroom. The fireman, who was in the engineroom on the first unit, witnessed this phenomenon, when he observed that the fire was coming "through the doors and out of the floor " As a result of the entrance of the fuel into the engineroom, both doors and passageways into the engineroom from the control compartment became engulfed in flames of such intensity that the three occupants of the compartment were unable to use these doors as an escape route. An inspection of the leading locomotive unit, following the accident, disclosed that the right side of the unit was extensively damaged by fire, which indicated that burning fuel from the tank truck flowed along the outside right side of the locomotive in quantities that would have completely blocked the door on the right side of the cab as an escape route

Large quantities of broken window glass were found in the control compartment after the accident, indicating that the windshields and probably several windows were broken inward as a result of the impact or of the explosion This also provided access to the control compartment for the burning fuel

The nose door of the locomotive failed to withstand the force of the impact when the hinges and locks broke and the door collapsed inwardly The torn sheeting of the nose end of the locomotive and broken glasses in the number boxes provided additional means of entrance for the fuel into the nose area The nose section of the locomotive unit was designed with vents on each side of the nose door to provide ventilation for the area Since these vents could not be closed, there was ready access for flammable liquids or vapors to enter the nose area

The occupants of the control compartment probably realized immediately the impossibility of escape through the engineer's door on the right side of the locomotive or through the doors in the rear wall leading to the engine compartment, and were forced to evacuate the control compartment by the left side door which opened onto Track No 1 Some time was consumed by the occupants of the control compartment in making their escape after the collision If it is assumed that the brakes on the train were actuated just prior to the collision and became fully applied at the collision point, then it would have required 84 seconds for the train to stop From the distance from the collision point to the points where their bodies were found, it can be estimated that the following time was consumed by the individuals in evacuating the control compartment:

Executive Assistant to the President	36 4 seconds
Transportation Engineer	37 7 seconds
Engineer	51 3 seconds

Some of their burns resulted from the delay in escaping from the compartment

The side and rear doors to the locomotive are too narrow to permit the passage of a man in an erect, forward position In order to pass through these doors, a man must turn sideways and stoop A rapid emergency escape through one of these doors is not easy to accomplish The speed of the train would have been reduced by the application of the brakes when the employees were able to evacuate the control compartment, but it would still have been moving at a speed too great for them to get off without serious injury

IV. CONCLUSIONS

1. The surface of the crossing was not well maintained, and the rough surface affected the safe speed at which a vehicle could cross the tracks
2. The automatic wig-wag crossing warning device indicated the approach of the train
3. The train was being operated in compliance with all applicable rules and regulations at the time of the accident
4. It could not be determined whether the mechanical condition of the truck was a contributing factor in the accident
5. The truck was driven without stopping onto the main track, immediately in front of the oncoming train This action violated Section 84 of the State of Illinois "Laws Relating to Motor Vehicles " If the driver had stopped the truck as required by law, the train would have occupied the crossing before the truck, thus, probably avoiding the accident
6. The engine crew had insufficient time to take effective preventive action or to escape from the locomotive control compartment after they became aware of the truck
7. The collision ruptured the tank of the truck, splashing burning gasoline against and into the forward portion of the locomotive, burning the crew and forcing them to evacuate the control compartment while the locomotive was moving at a high rate of speed.
8. The design of the locomotive allowed the entry of burning gasoline into the control compartment and nose of the locomotive, and retarded the emergency evacuation of the crew from the compartment
9. Physical obstruction to the line of sight between the truck driver and the engineer of the approaching train prevented an early determination that a collision was imminent

V PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of this accident was that the operator drove the gasoline-laden truck, without stopping onto the tracks immediately in front of the approaching train, while the crossing warning device was indicating the train's approach.

The cause of fatalities to engine crewmembers and the official was the entrance of burning gasoline into the control compartment and engine compartments which burned the occupants of the control compartment, made escape into the engine compartment useless, and forced the occupants to jump from the control compartment while the train was still moving at a speed too high to insure survival

VI RECOMMENDATIONS

The National Transportation Safety Board recommends that:

1 The Department of Transportation, in the grade-crossing study required by the Federal Railroad Safety Act of 1970, consider the problems of existing ineffective warning devices and poorly maintained grade crossings and take corrective action.

2. Law enforcement officers of Loda and the State of Illinois enforce more vigorously the requirement that trucks carrying hazardous materials stop at railroad crossings and not proceed until they can do so safely as required by "State of Illinois Laws Relating to Motor Vehicles – 1967, Section 84."

3 The Federal Railroad Administration consider possible changes in the design of locomotive control compartments, such as the shielding of the compartment against direct penetration of fire, the use of fire resistent materials, protection of air inlets and vents, and the strengthening of doors, that would provide greater protection to the occupants of the locomotive when a tank truck carrying flammable material is struck by the train Such studies should include the development of escape plans and the assurance of their performance by tests Until such regulatory changes can be implemented, the Association of American Railroads and the Federal Railroad Administration should consider interim changes to locomotives exposed to truck traffic at grade crossings that would improve the chances of fire survival of the occupants of the locomotive.

4 The Illinois Central Railroad and the town of Loda, Illinois, improve the grade crossing involved in this accident Improvements should include an effective warning device capable of drawing the attention of highway drivers and conveying a warning of the approaching train, improved condition of crossing surface, and improved vision of track to approaching drivers

The Safety Board reiterates and emphasizes the following recommendations made in previous accident reports:

Railroad Accident Report, Southern Pacific Railroad Company, Fruitridge Road Grade Crossing, Sacramento, California, February 22, 1967,

"3. The Board recommends that agencies for law enforcement at grade crossings consider adequate enforcement at grade crossings to be as important as enforcement at signals governing highway intersections; "

"5 The Board recommends that the Department of Transportation proceed apace to prepare broadly acceptable grade crossing hazard ratings or other objective criteria of grade crossing protection needs so as to formalize comparisons of grade crossing values on a broader basis than local judgements and local surveys The existence of such broadly recognized criteria would speed the consideration of optimum use of funds on a statewide or nationwide basis "

"6 The Board recommends that the Congress and the Department of Transportation consider the minimal use of

Federal funds for grade crossing safety protection by the States Investigation should determine the degree to which these funds are not being employed because they are limited to the Federal Highway System; and also the degree to which these funds are not being employed because States prefer to use the funds for general highway expansion or improvements Since these funds are intended to reduce grade crossing fatalities as a safety benefit to all motorists, it would therefore be appropriate to consider whether legislation should extend the use of these funds beyond the Federal Highway System "

Highway-Railroad Accident Report, Waterloo, Nebraska Public School Bus, Union Pacific Railroad Company Freight Train Accident, Waterloo, Nebraska, October 2, 1967

"10 The Safety Board recommends that the Federal Railroad Administration study the visual effectiveness of the white, fixed, sealed-beam headlights on locomotives in contrast with the bright daylight as compared with an oscillating or gyrating headlight unit, a flashing strobe light or other high-intensity type light, possibly of a more contrasting color "

BY THE NATIONAL TRANSPORTATION SAFETY BOARD:

/s/ JOHN H REED
Chairman

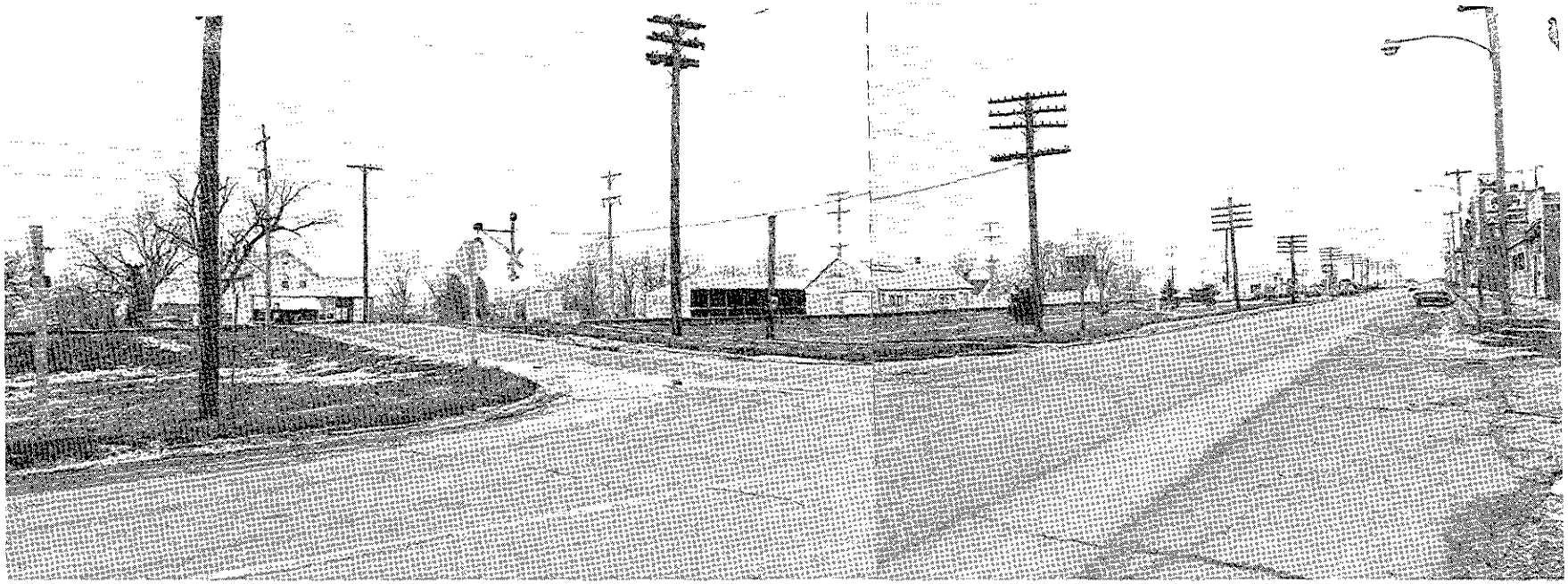
/s/ OSCAR M LAUREL
Member

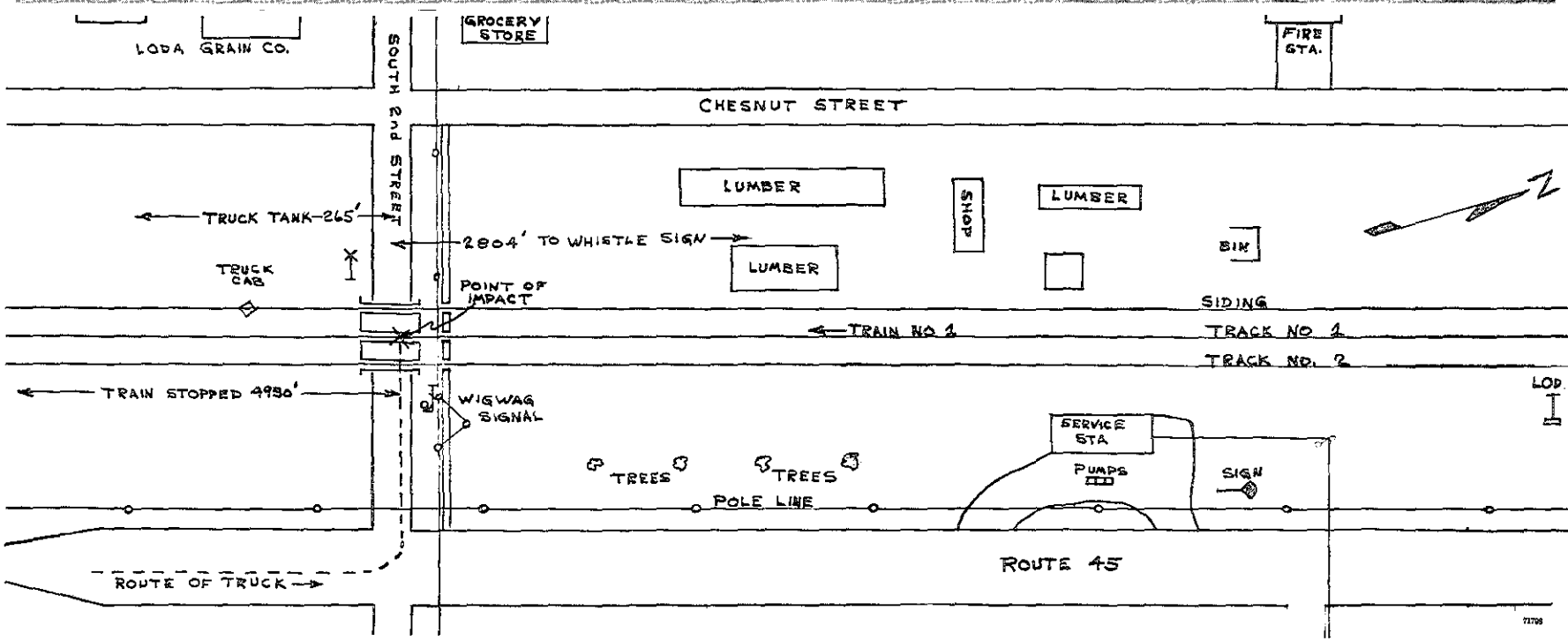
/s/ FRANCIS H McADAMS
Member

/s/ LOUIS M. THAYER
Member

/s/ ISABEL A. BURGESS
Member

APPENDICES




LODA GRAIN CO.
GROCERY STORE
FIRE STA.
SOUTH 2nd STREET
CHESNUT STREET
LUMBER
SHOP
LUMBER
BIN
TRUCK TANK-265'
2804' TO WHISTLE SIGN
LUMBER
TRUCK CAB
POINT OF IMPACT
SIDING
TRACK NO. 1
TRACK NO. 2
TRAIN NO. 1
TRAIN STOPPED 4950'
WIGWAG SIGNAL
SERVICE STA
PUMPS
SIGN
TREES
TREES
POLE LINE
ROUTE 45
ROUTE OF TRUCK

APPENDIX NO. 2

Excerpts from

the

ILLINOIS CENTRAL

RULES

AND

REGULATIONS

OF THE

TRANSPORTATION

DEPARTMENT

EFFECTIVE JULY 1, 1958

14. Engine Whistle Signals.

NOTE —The signals prescribed are illustrated by "o" for short sounds; "—" for longer sounds The sound of the whistle should be distinct, with intensity and duration proportionate to the distance signal is to be conveyed

Sound.	Indication.
(a) o	Apply brakes Stop
(b) — —	Release brakes. Proceed.
(c) — o o o	Flagman protect rear of train.
(c-a) o o o —	Forward trainman or fireman protect ahead.
(d) — — — —	Flagman may return from west or south, as prescribed by Rule 99
(e) — — — — —	Flagman may return from east or north, as prescribed by Rule 99.
(f) — — —	Train parted.
(g) o o	Answer to 14 (k) or any signal not otherwise provided for.
(h) o o o	When standing, back Answer to 12 (d) and 16 (c) When running, answer to 16 (d).
(j) o o o o	Call for signals
(k) — o o	(Single Track) To call attention of engine and train crews of trains of the same class, inferior trains and yard engines, and of trains at train order meeting points, to signals displayed for a following section. If not answered by a train, the train displaying signals must stop and ascertain the cause. (Two or More Tracks) To call attention of engine and train crews of trains of the same class, inferior trains moving in the same direction and yard engines, to signals displayed for a following section
(l) — — o —	Approaching public crossings at grade. To be prolonged or repeated until crossing is reached
(m) ————	Approaching stations, junctions, railroad crossings at grade, and mail cranes located between stations
(n) — — o	Approaching meeting or waiting points See Rule S-90.
(o) o —	Inspect train line for leak or for brakes sticking.
(p) Succession of short sounds.	Alarm for persons or livestock on the track
(q) — o o —	Answer to signal displayed as prescribed by Rule 10 (g).
(r) — o	When running against the current of traffic; (1) Approaching stations, curves, or other points where view may be obscured. (2) Approaching passenger or freight trains and when passing freight trains. (3) Preceding the signals prescribed by Rules (d) and (e)
(s) o o —	Engineer in charge of second engine operate air brakes.

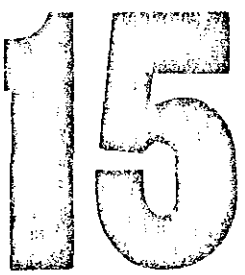
17 (c) Where engines are equipped with white oscillating light, it must be displayed at night and during the day when weather conditions seriously impair visibility It must be extinguished when the headlight is dimmed or extinguished

17 (d) Where engines are equipped with red oscillating light, it must be displayed both day and night when a train is disabled or stopped suddenly by emergency application of brakes, or when the engineer or the conductor finds it necessary to stop train under conditions whereby adjacent tracks may be fouled Engineer on train approaching on adjacent track must stop immediately and will not proceed until it is determined that track is unobstructed The use of the red oscillating light does not relieve train and engine crews from complying with Rules 99 and 102

Illinois Central Railroad

CHICAGO DIVISION

THROUGH TRAIN TIME TABLE No.



Taking Effect at 12:01 a.m.

SUNDAY, JUNE 1, 1969

Superseding
Chicago Division Time Table
No. 14
Dated July 14, 1968
and
Illinois Division Time Table
No. 14
Dated July 14, 1968

FOR THE GOVERNMENT OF EMPLOYEES ONLY

W H THOMPSON,
Vice-President and General Manager

H L WILLIAMS,
Asst Vice-President—Transportation

R K OSTERDOCK,
General Superintendent

A M DICKERSON,
General Manager—Transportation

I. B HALL,
Superintendent

PRINTED IN U S A BY RAND MCNALLY

CHICAGO DISTRICT—Southward

Siding, Standing Room, Cars with Engine	Mile Posts	TIME TABLE NO. 15 Taking Effect June 1 1969 STATIONS		FIRST CLASS 1 City of New Orleans Daily	21 Governor's Special Daily	53 City of Miami Daily		7 Illini Daily	33 P C 304 James Whitcomb Riley Daily	5 Panama Limited Daily	9 Seminole Daily	51 Piggy Back Daily
	9	CONGRESS ST (CHGO)										L 6 00PM
	11	CENTRAL STA (CHGO)		L 8 00AM	L 8 15AM	L 8 40AM		L 3 00PM	L 3 50PM	L 5 00PM	L 5 10PM	
		6.5										
	7 9	C WELDON 63 STREET		s 8 10	s 8 25	s 8 50		s 3 10	s 4 00	s 5 10	s 5 20	
		6.6										
	11 5	KENSINGTON										
		5.5										
	20 0	HARVEY										
		3.5										
	23 5	HOMEWOOD		s 8 30	s 8 10	s 9 05		s 3 30	4 17	s 5 30	s 5 10	PU 6 55
		1.7										
	28 2	MATTESON										
		1.1										
	29 3	RICHTON										
		2.3										
	31 6	STUENKEL		8 37	8 50	9 18		3 37	4 26	5 34	5 50	7 05
		2.6										
	34 2	MONEE										
		6.3										
	40 5	PEOTONE										
		6.2										
	46 7	MANTENO										
		1.1										
	50 8	INDIAN OAKS										
		3.4										
	54 2	BRADLEY										
		1.1										
	55 3	D KANKAKEE JCT							A 4 48PM			
		.6										
	55 9	KANKAKEE		s 8 58	s 9 08	j 9 39		s 3 58		b 5 58	s 6 10	7 27
		4.4										
119	60 3	OTTO										
		4.0										
	64 3	CHEBANSE										
		4.8										
	69 1	CLIFTON										
		4.0										
104	73 1	ASHKUM										
		1.3										
	77 4	DANFORTH										
		3.7										
224	81 1	C GILMAN		9 16	As 9 31AM	9 59		f 4 16		6 16	6 30	f 50
		3.6										
	84 7	ONARGA										
		2.9										
	87 6	DEL REY										
		5.5										
86	93 1	BUCKLEY										
		5.6										
	98 7	LODA										
		4.1										
128	102 8	PAXTON		9 33		10 16		f 4 33		6 33	6 47	
		5.5										
	108 3	LUDLOW										
		5.5										
	113 8	D RANTOUL		s 9 42		10 25		s 4 42		6 42	s 7 00	8 19
		4.9										
	118 7	THOMASBORO										
		3.9										
	122 6	LEVERETT										
		1.5										
	124 1	LEVERETT JCT		A 9 51AM		A 10 37AM		A 4 51PM		A 6 51PM	A 7 10PM	A 8 28PM
		3.7										
		ILLINOIS DIVISION										
	127 8	C CHAMPAIGN		A 9 57AM		A 10 45AM		A 4 57PM		A 6 57PM	A 7 20PM	A 8 40PM

VIA GILMAN LINE

VIA PENN CENTRAL

b—Stop on flag to receive revenue passengers for Cairo and scheduled stops beyond

PU—Regular stop to pick up Piggy-Back Traffic

j—Stop on flag to receive revenue passengers for Jackson, Lena and scheduled stops beyond

14(I) Engineers must sound their whistles for at least twenty seconds before passing over grade crossings. The sound of the whistle should be distinct with intensity in proportion to the distance the signal is to be conveyed, and should provide adequate warning The warning of at least twenty seconds must be strictly adhered to, and in every case the final sound must be prolonged until the grade crossing is reached

17(c) The use of white oscillating light on the Chicago District between Central Station and Stuenkel, and on the Broadview District, should be restricted to emergencies only

101 Speed Restrictions: Speeds shown are maximum authorized between points named but do not modify any rule or special instruction which may require lower speed

Territory or Location	Passenger and Express Trains: Passenger Engines	Passenger and Express Trains: GP Type Engines	Freight Trains Passenger or GP Type Engines	All Trains: Switcher or Transfer Engines
	MILES PER HOUR			
Between Chicago and 67th Street				
Tracks 1, 2, 3, 4	40	40	35	35
Tracks 5, 6	75	65	50	45
Between 67th Street and Kensington				
Tracks 1, 2, 3, 4	40	40	35	35
Tracks 5, 6	75	65	50	45
Tracks 7, 8	45	45	45	45
Between Kensington and Richton				
Tracks 1, 2	40	40	35	35
Tracks 3, 4	79	65	50	45
Tracks 5, 6	30	30	30	30
Between Richton and Stuenkel				
Tracks 1, 2	79	65	50	45
Tracks 3, 4	30	30	30	30
Between Stuenkel and Champaign	79	65	60	45
Between Gilman and Clinton	79	65	60	45
Between Otto and Normal Junction	30	30	30	25
Between Saxony and Minonk Junction	30	30	30	25
Rantoul District	20	20	20	15
Between 67th Street and South Chicago			35	35
Between Kensington and Blue Island			35	35
Between Chicago and Ash Street	40	40	40	40
Between Ash Street and Broadview	60	60	45	45
Diverging Routes, through crossovers, junction and siding switches:				
Through turnouts at spring switches unless otherwise authorized	25	25	25	25
On straight track at spring switches when springing points	40	40	40	40
Homewood Interlocking	30	30	30	30
Except track 1 to 2, 2 to 1, 6 to 5, 6 to 7, 6 to 8	15	15	15	15
Richton Interlocking	30	30	30	30
Except track 2 to 1, 4 to 5, 5 to 4, 6 to 5	15	15	15	15
Kensington, track 2 to 4	25	25	25	25
Other interlocking—all crossovers and turnouts	15	15	15	15
Stuenkel—*Crossovers between main tracks* and turnouts to No 3 and No 4 track				
Peotone—Crossovers between No 1 and No 2 tracks				
Indian Oaks—Turnout No 3 track to No 2 track				
Otto—Crossovers between No 1 and No 2 tracks and turnout from No 2 to No 3 track	*No 20* and No 18 Cross-			
Gilman—First crossover north of station No 2 to No 1 track	overs and Turnouts	30	30	30
Manteno—Crossovers between tracks 1 and 2				
Kankakee Jct —First crossovers north of K & S railroad crossing, tracks 2 to 1, and 2 to 3				
Otto—Crossover No 2 to No 3 track and north siding switch				
Askum—Crossovers, except Crossover south end west siding				
Gilman—Crossover south of T P & W RR crossing No 2 to No 1 track				
Otto—South end siding				
Askum—North end west siding	No 15 Cross-			
Gilman—South end west lead to No 1 track Crossover No 2 track to east siding, and north end east and west sidings	overs and Turnouts	25	25	25
Leverett Jct —Crossover and turnouts				
Gibson City—South siding switch				
Farmer City—Siding Switches				
Through crossovers and turnouts other locations		15	15	15

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