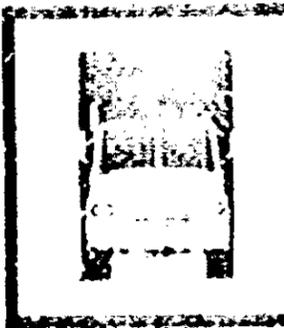
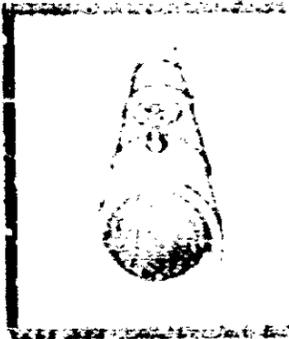


PB83-917001



# NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D.C. 20594

## RAILROAD/HIGHWAY ACCIDENT REPORT

AUTOMOBILE/MISSOURI PACIFIC RAILROAD  
FREIGHT TRAIN COLLISION  
WOODLAND DRIVE /  
LAKE VIEW, ARKANSAS

JULY 9, 1982

NTSB-TSR-RHR-83-1

UNITED STATES GOVERNMENT

REPRODUCED BY  
NATIONAL TECHNICAL  
INFORMATION SERVICE  
U.S. DEPARTMENT OF COMMERCE  
SPRINGFIELD, VA 22161

**TECHNICAL REPORT DOCUMENTATION PAGE**

1. Report No. NTSB-TSR-RHR-83-1		2. Government Accession No. PB83-917001		3. Recipient's Catalog No.	
4. Title and Subtitle Railroad/Highway Accident Report-- Automobile/Missouri Pacific Railroad Freight Train Collision, Woodland Drive, Lake View, Arkansas July 9, 1982				5. Report Date January 11, 1982	
				6. Performing Organization Code	
7. Author(s)				8. Performing Organization Report No.	
9. Performing Organization Name and Address  National Transportation Safety Board Bureau of Accident Investigation Washington, D.C. 20594				10. Work Unit No. 3661	
				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 July 9, 1982	
				14. Sponsoring Agency Code	
15. Supplementary Notes					
<p>15. Abstract On July 9, 1982, a 4-door Cadillac sedan, carrying nine occupants, was traveling westbound on Woodland Drive in Lake View, Arkansas, approaching a railroad/highway grade crossing. The passenger car was driven onto the crossing and was struck broadside by the lead locomotive of a Missouri Pacific freight train traveling southbound. Eight of the occupants in the Cadillac were killed and one was seriously injured. None of the train crewmembers or company officials aboard the train were injured as a result of the accident.</p> <p>The National Transportation Safety Board determines that the probable cause of this accident was the failure of the automobile driver to see or hear the approaching freight train and to stop short of the railroad tracks.</p>					
17. Key Words railroad/highway grade crossing, Operation Lifesaver, near miss accidents, passenger car, freight train, rural communities.				18. Distribution Statement This document is available to the public through the National Technical Information Service, Springfield, Virginia 22161	
19. Security Classification (of this report) UNCLASSIFIED		20. Security Classification (of this page) UNCLASSIFIED		21. No. of Pages 23	22. Price

## CONTENTS

<b>SYNOPSIS</b> . . . . .	1
<b>INVESTIGATION</b> . . . . .	1
The Accident . . . . .	1
Injuries to Persons . . . . .	3
Vehicle Information and Damage . . . . .	3
Train Information and Damage . . . . .	4
Driver Information . . . . .	8
Traincrew Information . . . . .	8
Highway Information . . . . .	8
Grade Crossing Information . . . . .	9
Railroad Information . . . . .	9
Physical Evidence . . . . .	11
Meteorological Information . . . . .	11
Survival Aspects . . . . .	11
Medical and Pathological Information . . . . .	11
Operation Lifesaver . . . . .	12
Near Miss Information . . . . .	13
Public Hearing on Grade Crossings . . . . .	13
<b>ANALYSIS</b> . . . . .	13
The Accident . . . . .	13
Survival Aspects . . . . .	16
The Highway . . . . .	16
Operation Lifesaver . . . . .	17
Near Miss Program . . . . .	17
<b>CONCLUSIONS</b> . . . . .	17
Findings . . . . .	17
Probable Cause . . . . .	18
<b>RECOMMENDATIONS</b> . . . . .	18
<b>APPENDIXES</b> . . . . .	21
Appendix A--Investigation and Hearing . . . . .	21
Appendix B--Traincrew Information . . . . .	27

**NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C. 20594**

**RAILROAD/HIGHWAY ACCIDENT REPORT**

**Adopted: January 11, 1982**

---

**AUTOMOBILE/MISSOURI PACIFIC RAILROAD  
FREIGHT TRAIN COLLISION  
WOODLAND DRIVE,  
LAKE VIEW, ARKANSAS  
JULY 9, 1982**

**SYNOPSIS**

On July 9, 1982, a 4-door Cadillac sedan, carrying nine occupants, was traveling westbound on Woodland Drive in Lake View, Arkansas, approaching a railroad/highway grade crossing. The passenger car was driven onto the crossing and was struck broadside by the lead locomotive of a Missouri Pacific freight train traveling southbound. Eight of the occupants in the Cadillac were killed and one was seriously injured. None of the train crewmembers or company officials aboard the train were injured as a result of the accident.

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the automobile driver to see or hear the approaching freight train and to stop short of the railroad tracks.

**INVESTIGATION**

**The Accident**

About 8:45 a.m., <sup>1/</sup> on July 9, 1982, a 52-year-old woman departed her residence in Lake View, Arkansas, in a 1973 Cadillac with several family members to transport a friend of the family to work. She drove to the neighboring town of Elaine, Arkansas, about 9 miles south of Lake View, dropped off the friend, and departed shortly afterward for the return trip home. At this time, the car was occupied by the driver and another adult in the front seat and seven children in the rear seat. The driver drove north on State Route 44, turned left onto Woodland Drive, and proceeded west about 0.2 miles until they reached a Missouri Pacific (MP) grade crossing. (See figure 1.) The grade crossing was not equipped with active warning signals to inform motorists of an approaching train. It was equipped with a crossbuck railroad crossing sign on the westbound approach. The driver of the Cadillac was familiar with the crossing and aware of its existence since it was located within 120 feet of her residence. The weather was clear and dry and there was no other vehicular traffic on Woodland Drive.

A MP freight train, No. DNO8, with a consist of 2 locomotive units, 21 freight cars, 3 company business cars, and a caboose was traveling southbound on the main track approaching the Woodland Drive crossing. Upon reaching the whistle post for southbound trains, located 1,440 feet north of the Woodland Drive crossing, the fireman began

<sup>1/</sup> All times herein are central daylight time.

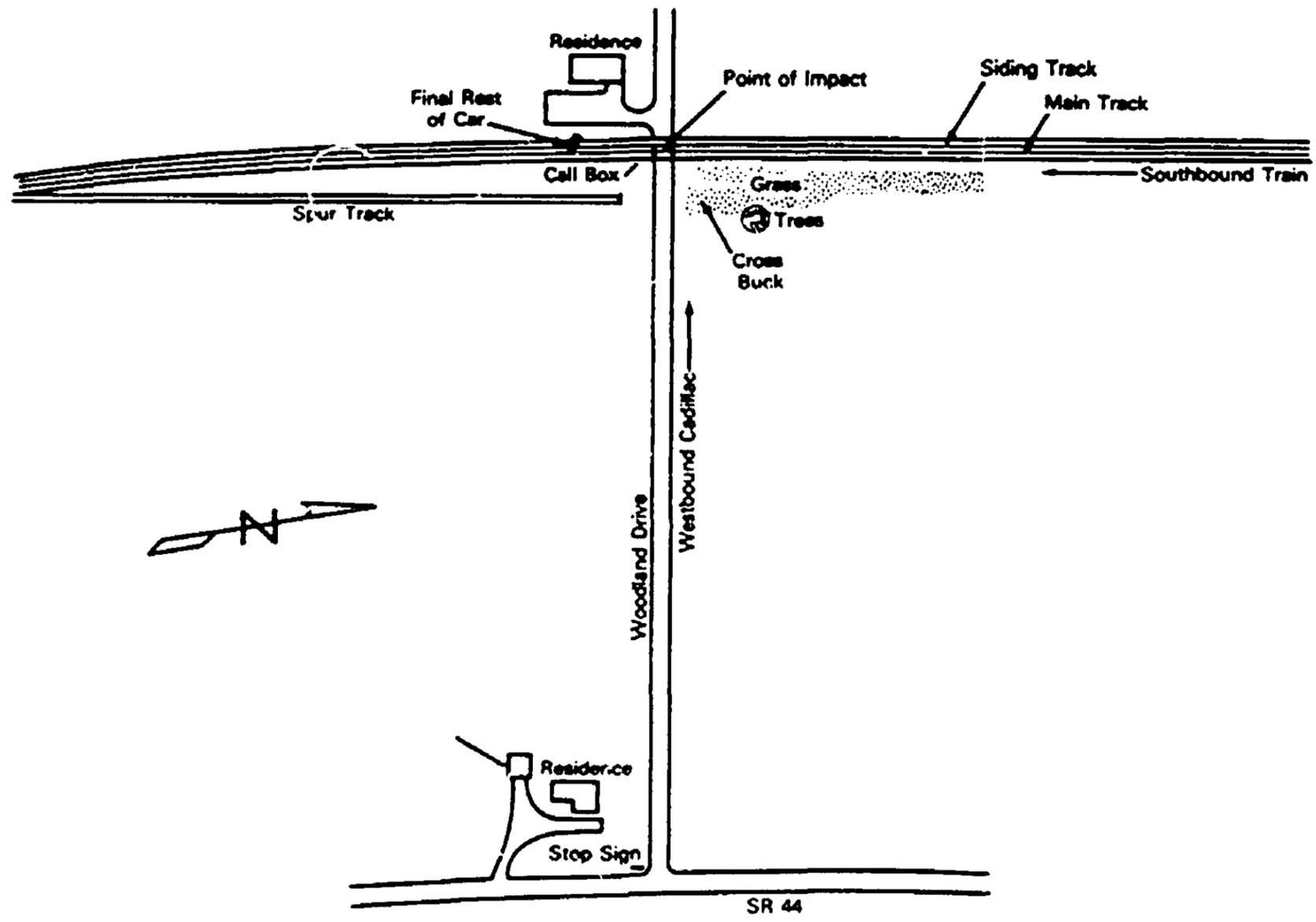


Figure 1.—Plan view of accident site.

sounding the standard whistle signal for public crossings. 2/ The front external headlights were illuminated. 3/ The fireman noticed the Cadillac approaching the track when the train was about 250 feet from the crossing. According to the fireman, none of the occupants in the car appeared to have seen or heard the southbound freight train. The Cadillac approached the crossing very slowly and pulled onto the track in front of the train. The fireman put the train into emergency braking about 100 feet before reaching the crossing. At 9:26 a.m., the train struck the Cadillac broadside near the right side passenger doors, spun the car clockwise, and pushed the car 123 feet down the track before the car separated from the train and came to rest on the siding track parallel to the main track. (See figure 2.) The train completed its emergency stop about 1,250 feet south of the grade crossing. According to the tape on the electronic speed recorder, the train was traveling about 48 mph when the accident occurred.

Three occupants in the Cadillac were ejected during impact. Eight occupants were fatally injured, and one occupant, a child, was seriously injured. None of the company officials or traincrew aboard the train were injured. Total property damage was estimated at \$7,500.

A witness who lived near the crossing was working outside in his yard the morning of the accident. When he heard the train whistle blowing, he looked up and saw the Cadillac approaching the crossing at the same time. He thought the car had cleared the crossing before the train since the car went out of his view. However, he knew something was wrong when the train suddenly began to slow down shortly after passing the crossing. The witness also stated that the train's front headlights were illuminated.

The investigating officer of the Arkansas State Police (ASP) indicated that when he arrived on the scene the tape player inside the Cadillac was operating at a high volume and the air conditioning blower was still operating. He also stated that none of the vehicle occupants appeared to have been wearing seatbelts when the accident occurred.

#### Injuries to Persons

<u>Injuries</u>	<u>Driver</u>	<u>Passengers</u>	<u>Traincrew</u>	<u>Total</u>
Fatal	1	7	0	8
Serious	0	1	0	1
Minor	0	0	0	0
None	0	0	5	5
<u>Total</u>	<u>1</u>	<u>8</u>	<u>5</u>	<u>14</u>

#### Vehicle Information and Damage

The accident vehicle was a 1978 Cadillac DeVille 4-door sedan. It was equipped with a 425 cubic inch, V-8 gasoline engine, 3-speed automatic transmission, power steering and brakes, air conditioning, and a stereo radio/tape player. At the time of the accident, all windows were in the closed position and the vehicle weight was approximately 4,989 pounds. (See figure 3 for weight and dimensions.)

2/ MP operating Rule 14(1) requires that two long, a short and a long blast of the whistle be blown as a train approaches a public crossing. When the whistle sign is displayed, the whistle signal must begin at least 20 seconds before the train reaches the crossing, and be prolonged or repeated until the train occupies the crossing.

3/ MP Rule 17. The standard white headlight must be displayed brightly to the front of every train and engine during the day and at night.

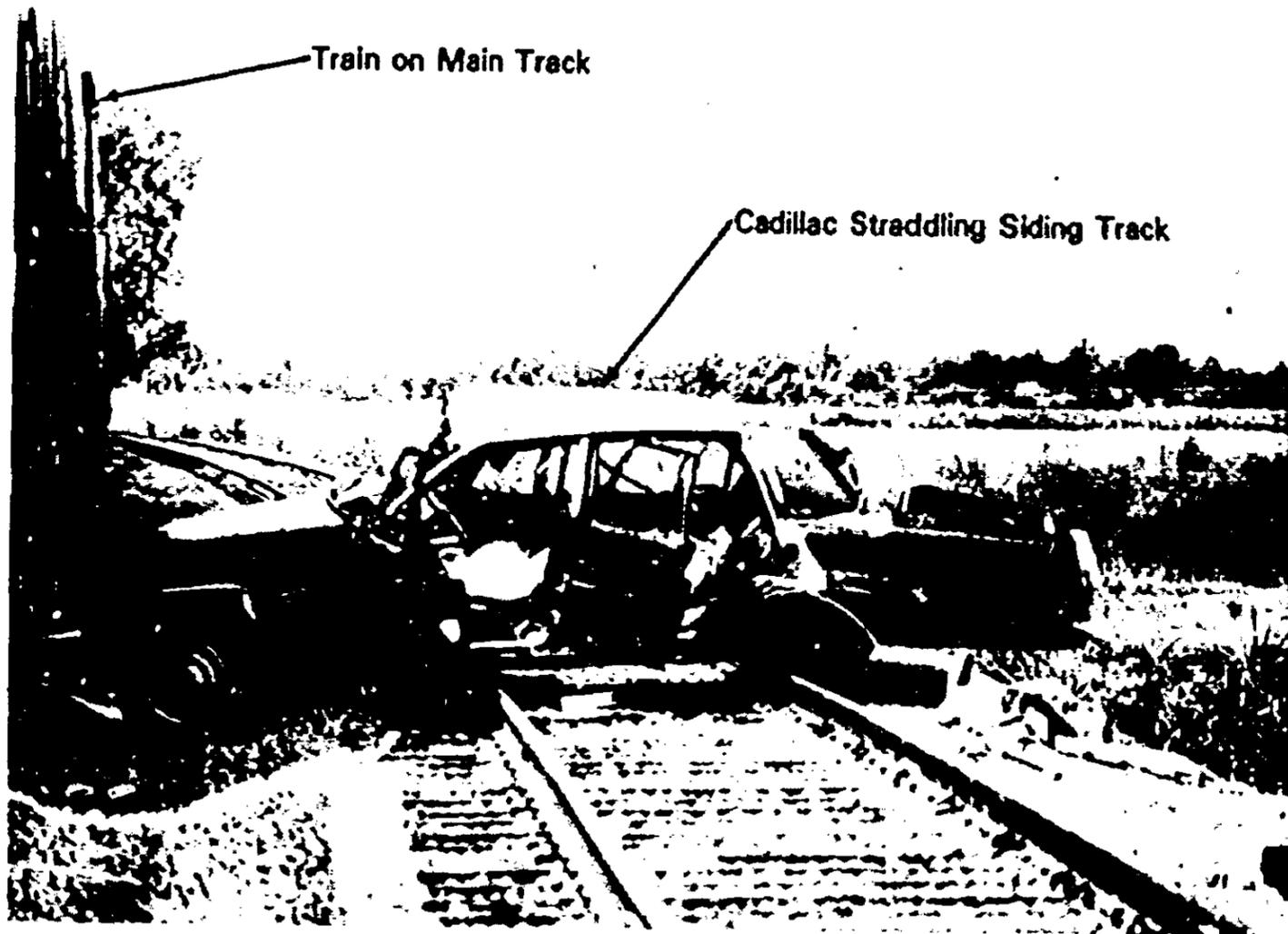


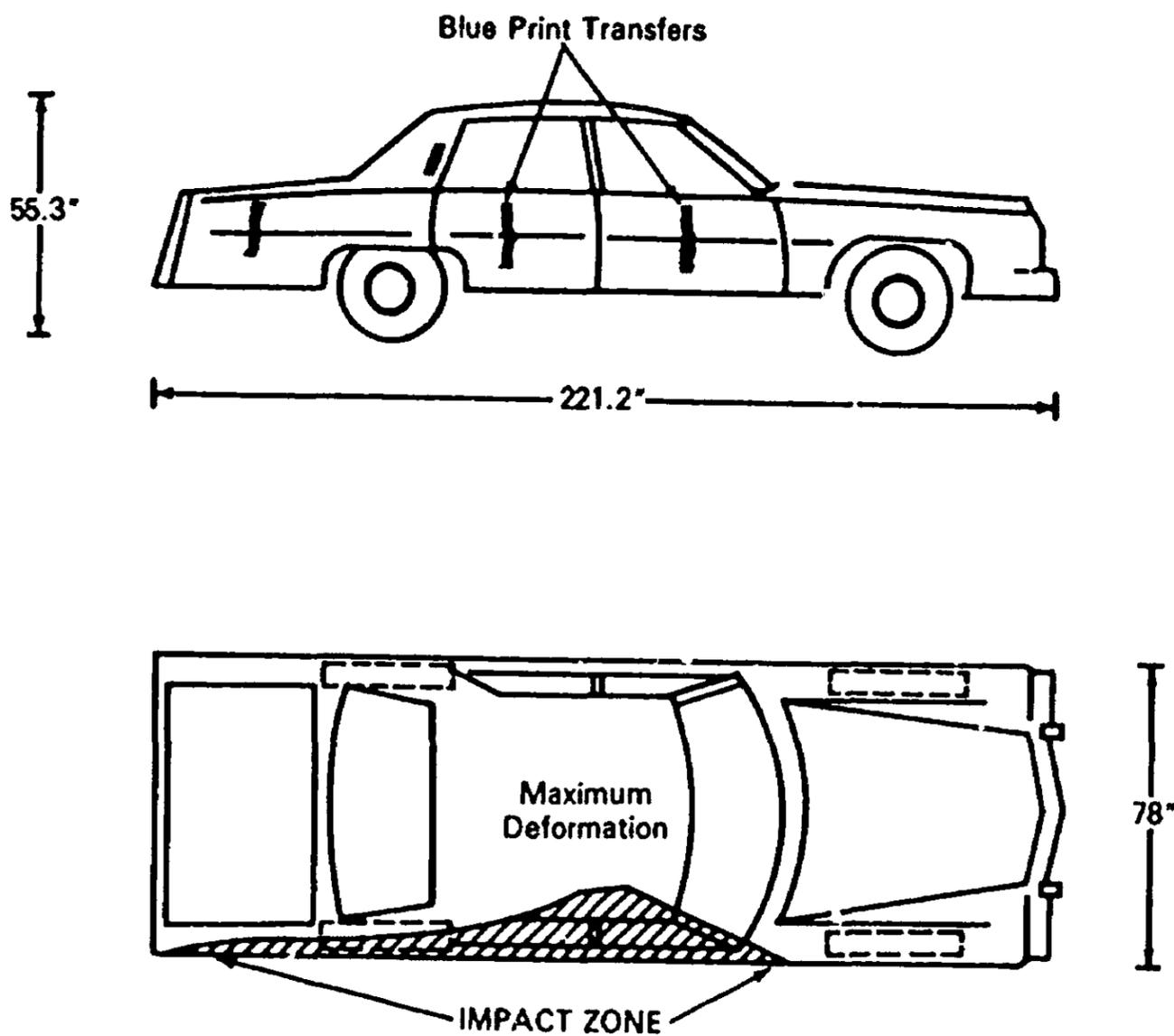
Figure 2.—Left side view of Cadillac in rest position.

Impact damage to the Cadillac was primarily confined to the right side, trunk, and roof. All windows and other glass components on the right side were missing. Both right doors were deformed inward crushing both the front and back seats into an "L" configuration. Maximum penetration of the passenger compartment occurred on the right side just forward of the "B" pillar and was measured to be about 2 feet. Blue paint transfers were observed along the right side in several locations. The trunk lid was severed from its mounting brackets and bent into a "V" shape configuration. The left side doors were buckled slightly, apparently during the rescue operation, and the left door windows were intact and found closed (in the rolled up position).

The Cadillac's front suspension was undamaged. The rear axle and all attaching components had separated from the frame. The drive shaft, rear springs, and the left rear wheel had separated from the rear axle during the collision sequence, and the right side frame rail adjacent to the right front door was pushed inward in alignment with the right side damage. Because the brake lines on the rear axle were severed during impact, the preimpact brake system integrity could not be determined. (See figure 4.)

#### Train Information and Damage

Train No. DNO8 was owned and operated by the MP Railroad and consisted of a 2-unit locomotive, 6 loaded freight cars, 3 business cars, 15 empty freight cars, and 1



ESTIMATED WEIGHT

Curb Weight	-	4359 lbs
Passenger Loading	-	<u>630 lbs</u>
Total		4989 lbs

Figure 3.—Schematic of 1978 Cadillac.



Figure 4.—Right side view of 1978 Cadillac Sedan.

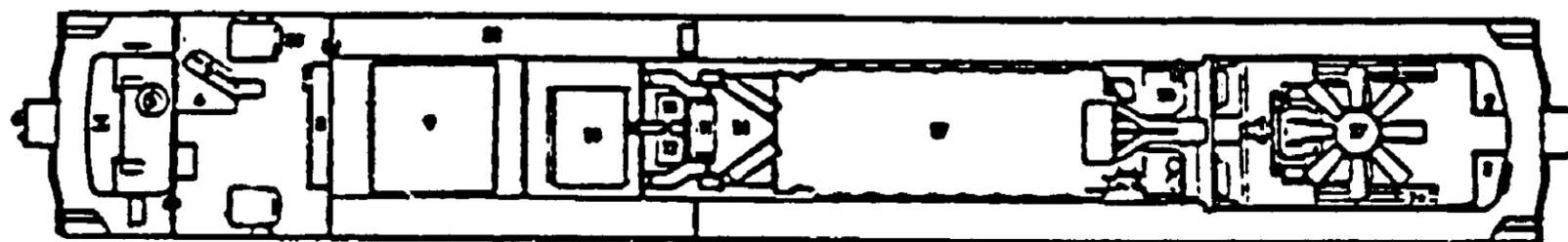
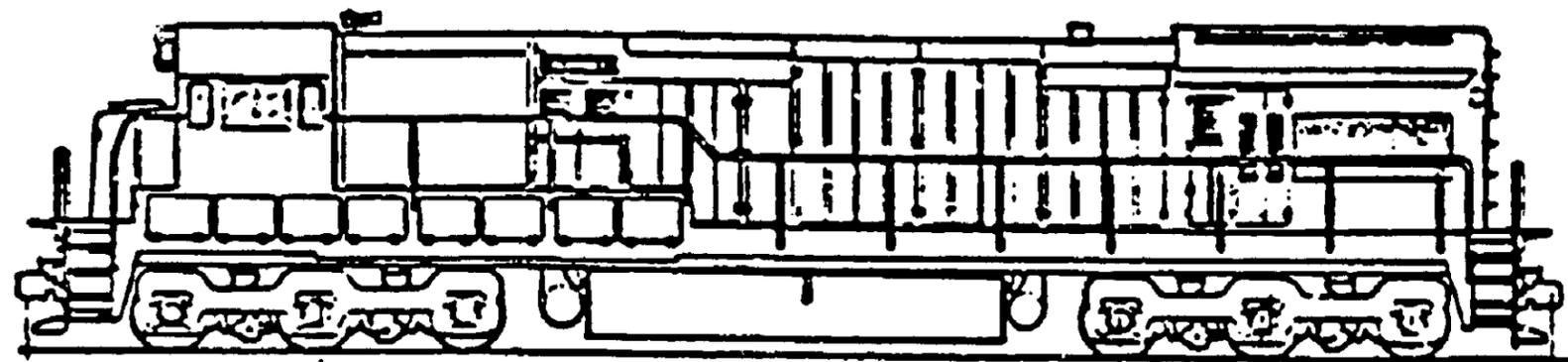
caboose. The MP business cars were located behind the caboose. The nominal length of the train was 1,452 feet and the total trailing tonnage was 1,187 tons.

The lead locomotive unit, MP 4832, was a General Electric power unit, model B30-7A, equipped with two fixed headlights, one forward facing external horn (whistle), <sup>4/</sup> and one external bell. The lead locomotive, which was painted blue, was placed in service on the MP Railroad on April 20, 1982. The last trip inspection was conducted on July 8, 1982, and the locomotive met all applicable Federal Railroad Administration (FRA) and MP company requirements. (See figure 5.)

On the day of the accident, the freight train had departed Paragould, Arkansas, about 4:28 a.m. and was en route to McGehee, Arkansas. About 7:30 a.m., the train was traveling through Forrest City in a restricted speed zone (25-mph maximum speed) when a passenger car pulled up and stopped on the tracks of a public crossing. Because the car appeared to be stalled, the fireman, who was operating the train, put the train into emergency braking. The driver managed to push the car off the track before the train reached the crossing. The traincrew reinspected the train's braking system before resuming the trip and found no defects.

The locomotive was equipped with an electronic recording device that recorded speed, direction of movement, elapsed time, automatic airbrake applications, throttle positions, and whistle applications. The electronic recorder printout indicated the "Power Control Switch" was activated at 7:26 a.m. when an emergency application of the airbrake was made at Forrest City. The printout indicated that the train, after clearing the crossings at Forrest City, departed at 7:41 a.m. The printout indicated that the "Power

<sup>4/</sup> The external horn was capable of delivering 116.5db of sound at a distance of 100 feet.



1. Load box fill
2. Sand box
3. Toler (when furnished)
4. Operating controls
5. Cab heater
6. Engine control panel
7. Ballast or steam generator (when

Location of Parts

- (furnished)
10. Equipment blower
11. Receiver
12. Auxiliary generator
13. Exciter
14. Traction generator

17. Diesel engine
18. Cooling water storage tank
19. Dynamic brake grids (when furnished)
20. Radiator fan
21. Battery (right side)
22. Air brake equipment (right side)

Figure 5.--General Electric Model B30-7A.

Control Switch" was again activated about 9:26 a.m. when the train was traveling at a speed of 42 m.p.h.

As a result of the collision, the right front grabiron, the right front ladder, and the right front pilot on the locomotive were bent. Repair damage was estimated at \$495.60; total cost was for labor, since no materials were needed to make the repairs.

#### Driver Information

The 52-year-old Cadillac driver lived less than 126 feet from the accident site. She held a valid Arkansas operator's permit with no restrictions. Her driving record indicated that she had not previously been involved in an accident, but that she had received one speeding citation in January 1980.

Interviews with neighbors and friends disclosed that the driver of the Cadillac vehicle was a quiet easy-going, responsible citizen. She had driven the accident vehicle regularly for at least 2 years and was familiar with the accident crossing. Her personal physician had examined her 2 months before the accident, and except for a minor high blood pressure problem, she was in good physical condition. She did not have a history of hearing problems. A blood sample taken from the deceased driver shortly after the accident was found to be negative for alcohol.

#### Traincrew Information

Freight train No. DNO8 arrived in Paragould, Arkansas, about 4:15 a.m. on July 9, 1987. The outbound train departed Paragould around 4:28 a.m. after a change of traincrews. All outbound train crewmembers were fully rested and were in compliance with the hours of service law.<sup>5/</sup> The train departed Paragould with the fireman operating the lead locomotive. The traincrew consisted of the locomotive engineer, the conductor, the fireman, the head brakeman, and the rear brakeman. (See appendix B.)

A road foreman and several other MP company officials were riding in the three business cars behind the cabooses when the accident occurred.

#### Highway Information

Woodland Drive is an east/west gravel road located inside the city limits of Lake View. The road is about 20 feet wide with drainage ditches on each side. The speed limit is 35 mph on the road, and the average daily traffic is estimated to be less than 50 vehicles. The city of Lake View is responsible for the construction, maintenance, and signing of the road and the approaches up to the railroad grade crossing; MP is responsible for the construction and maintenance of the grade crossing surface, track structures, right-of-way, signal devices, and signing at the crossing.

The westbound approach on Woodland Drive ascends a positive grade of about 6 percent, which begins about 100 feet before the crossing. The approach narrows from a roadway width of 20 feet to 16.75 feet at the crossing surface. The angle of intersection between the crossing and the railroad tracks is about 92° in the northeast quadrant.

In the southeast quadrant of the intersection, there were two patches of grass and a cluster of trees at the time of the accident. The first patch of high grass was 17 feet east of the crossing and 40 feet north of the road. The second patch of grass was 27 feet east of the crossing and 24 feet north of the road. The top of the grass was about 2 feet above the top of the railroad tracks and the patches of grass were located within the railroad's

<sup>5/</sup> 49 CFR 228-107 "Requirement of the Hours of Service Act."

right-of-way. The cluster of trees, 30 to 40 feet tall, was 44 feet east of the crossing and 100 to 133 feet north of the road. An inspection of the right-of-way east of the track revealed that the foliage was drying from a recent chemical weed control spraying by the railroad. The foliage on the west side did not appear to have been affected.

### Grade Crossing Information

The accident occurred at a public crossing known as C.S. Woodland Drive, located 292 feet south of MP 342 on the Missouri Pacific Louisiana division line between Paragould and McGehee, Arkansas. The accident crossing was equipped with only one traffic control device, a crossbuck sign on the westbound approach. There were no railroad advanced warning signs installed on either highway approach to the crossing. Safety Board investigators inspected four other grade crossings in the Lake View area. All four were passive grade crossings (see table 1, page 10 for definition of passive crossing) with gravel approaches and were protected with only crossbuck signs. The sight distance was marginal at two crossings because of foliage growth along the right-of-way.

The grade crossing surface between the tracks is asphalt. The crossing surface is approximately 24 feet long and 17 feet wide across both sets of tracks. The main and adjacent siding tracks are superelevated at the crossing. The tracks are banked to accommodate a curvature in the track alignment. The tracks begin to curve into a transition spiral about 400 feet north of the crossing which becomes a full 1° left curve about 516 feet south of the crossing. The difference in elevations of the rails in each set of tracks is about 2 inches. The curved track alignment has a descending grade toward the south that varies from 0.18 to 0.30 percent.

According to the Arkansas State Highway and Transportation Department (ASHTD), no other traffic accidents have been reported at this crossing in the last 15 years. The ASHTD disclosed that the crossing has a hazard rating of 1.03, and is number 3,071 out of the 3,992 public crossings rated in Arkansas. Under this rating system, the State has determined that there are 3,070 crossings with a higher priority for improvement throughout the State based on highway traffic, railroad traffic, crossing accidents, and local conditions.

With a hazard rating of 1.03, the recommended Arkansas protective device policy only requires that standard passive protection devices (i.e. railroad crossbuck signs, advance warning signs, and pavement markings when possible) which are in conformance with the Manual on Uniform Traffic Control Devices (MUTCD) Part 8B<sup>6/</sup> be used. However, the MUTCD states that the determination of need and selection of devices at public grade crossings is made by the public agency with jurisdictional authority - in this case the City of Lake View.

Safety Board investigators observed the crossing and noted that the road traffic generally traveled quite slowly over the crossing. It appeared that this slow speed was because of the roughness of the crossing. Many vehicles proceeded through the crossing without stopping at speeds estimated between 10 and 15 mph.

### Railroad Information

Trains operate daily over the single main track between Paragould and McGehee, Arkansas. The total length of this MP line is 188.2 miles. Since February 1982, train

<sup>6/</sup> The MUTCD is published by the Federal Highway Administration, U.S. Department of Transportation, 1979; and is the approved national standard for all highways open to public travel in accordance with Title 23, U.S. Code, Sections 109(b) and 402(c) and 23 CFR 1204.4.

traffic over the accident crossing has been about three trains in each direction daily. The trains do not pass over the accident crossing on any routine schedule, and the time between trains varies from 6 to 16 hours. The maximum operating speed for all trains on this line is limited by FRA regulations to 49 mph. 7/

The tracks crossing Woodland Drive generally run north/south. The entire line was recently renovated and was closed to regular traffic until the reconstruction was completed in February 1982. The reconstruction encompassed the installation of new ties, ballast, and continuous welded rail for the main track, and new ties and ballast for the siding track as needed. The carrier has upgraded the newly renovated track to FRA class 4 specifications. 8/ The hazard rating for the crossing was established before the renovation of this line.

A review of FRA statistics 9/ on rail-highway crossing accidents indicates that the number of grade crossing accidents/incidents in Arkansas decreased 14 percent from 1980 through 1981. However, the number of fatalities over the same period increased by 12.5 percent.

There are approximately 4,000 grade crossings in Arkansas, which represent about 1.8 percent of the total grade crossings nationwide. The following tables are a comparison breakdown of grade crossing accident/incidents and casualty rates for the 1980 and 1981 calendar years.

Table 1.--Grade Crossing Accidents/Incidents for 1980/1981. 10/

Geographical Area	Year	Accidents/Incidents, at Active Crossings <sup>+</sup>		Accidents/Incidents at Passive Crossings*		Totals	
		No.	%	No.	%	No.	%
Arkansas	1980	73	(37)	126	(63)	199	(100)
Nationwide	1980	4,986	(53)	4,436	(47)	9,422	(100)
Arkansas	1981	61	(36)	111	(64)	172	(100)
Nationwide	1981	4,428	(54)	3,804	(46)	8,232	(100)

<sup>+</sup> Active crossings have traffic control devices that inform motorists and pedestrians of the approach or presence of trains.

<sup>\*</sup> Passive crossings have traffic control devices which identify and direct attention to the location of grade crossings, but do not warn motorists of the approach of a train.

7/ FRA requires automatic block signals to be installed to operate freight trains in excess of 49 mph.

8/ The track is in conformance with FRA standards that would permit a maximum allowable operating speed of 60 mph for freight trains and 80 mph for passenger trains. Reference 49 CFR, Part 213.9.

9/ U.S. DOT (FRA) Publication "Rail-Highway Crossing Accident/Incident and Inventory" Bulletin Nos. 3 and 4 dated June 1981 and June 1982, respectively.

10/ The national statistics used for comparison in this report reflect both rural and urban data. The comparative data do not reflect the traffic exposure or the hazard conditions at the accident site. There are no data readily available that permit a comparison of the traffic conditions at the accident site with similar crossings in comparable states.

Table 2.--Grade Crossing Casualty Rates for 1980/1981. <sup>10/</sup>

<u>Geographical Area</u>	<u>Year</u>	<u>Accidents/Casualties per 10,000 Vehicles Registered</u>		
		<u>Accidents</u>	<u>Killed</u>	<u>Injured</u>
Arkansas	1980	1.29	0.09	0.60
Nationwide	1980	0.59	0.04	0.22
Arkansas	1981	1.07	0.09	0.52
Nationwide	1981	0.51	0.04	0.19

#### Physical Evidence

A set of scrape marks and a gouge were located on the south side of the crossing road surface. A tire skidmark was also observed on the asphalt surface between the rails of the main track. (See figure 6.)

#### Meteorological Information

On July 9, 1982, the weather at Helena, Arkansas, (approximately 15 miles from the accident site) was reported to be mostly sunny with scattered clouds and no precipitation. The temperature was approximately 84°F with visibility at 10 miles. At the time of the accident, the sun was in the east behind both vehicles and did not cause any unusual visibility problems.

#### Survival Aspects

The car was equipped with bench type front and rear seats which had occupant restraints for each of the six designated seating positions. None of the occupants were wearing seatbelts at the time of the accident. Two adults were seated in the front, and seven children, ages 4 to 6, were seated in the rear.

The locomotive struck the passenger car about midway on the right side and penetrated the passenger compartment. Three passengers were ejected during the impact sequence. The surviving passenger was seated in the rear of the vehicle, probably out of the immediate impact zone. (See figure 3.)

The Arkansas State Police was notified at 9:30 a.m., and it immediately dispatched a trooper to the scene of the accident. Upon arriving, the trooper assessed the situation and called for additional assistance from the appropriate emergency response units.

#### Medical and Pathological Information

A medical report released by the coroner of Phillips County, Arkansas, attributed the cause of death of the Cadillac driver to a fractured neck. The driver also sustained severe head and chest injuries during impact. There was no evidence of preexisting medical problems which could have caused incapacitation.

The coroner's report indicated that the causes of death for the remaining fatal victims were attributed to either fractured necks or massive head and chest injuries. The surviving passenger suffered a compound fracture of the jaw and severe internal injuries to the stomach.



Figure 6.--Physical evidence at grade crossing.

### Operation Lifesaver

Operation Lifesaver is a program coordinated nationwide by the National Safety Council which is designed to increase the public's awareness of grade crossing hazards. The program is directed toward combining and enhancing existing educational, enforcement, and engineering efforts to reduce grade crossing fatalities and injuries. The program is managed on a state-by-state basis by a state coordinator who seeks to encourage the participation of all railroads, state and local highway officials, police departments, and trucking industries that operate within each state. The Safety Board has supported the Operation Lifesaver program since its inception.

The Operation Lifesaver program in Arkansas is centrally coordinated by the Governor's Office of Public Safety. Much of the day to day contact with the public is done by representatives of railroad companies that operate within the State. The State, through its public affairs bureaus, provides speakers and films, and disseminates information on the program to the public when requested. The State is attempting to expand its efforts by spearheading a new program which encourages the discussion of the Operation Lifesaver program in the driver's education training courses being taught within the school systems throughout the State. The railroad companies have agreed to work with individual school districts within the State. The new program began this fall for the 1982/83 school year.

Before opening the newly reconditioned line involved in the accident after the line's recent renovation, MP conducted a series of meetings in January 1982, in the small urban communities along the line at Marianna, Jonesboro, Forrest City, Helena, Watson, and Elaine. The meetings were geared to reach the largest cross section of people along the line, primarily those living in the small urban areas. However, most trackage and passive grade crossings are located in the sparsely populated rural farming communities.

### Near Miss Information

Safety Board investigators interviewed the Road Foreman of Engines for MP. He indicated that it was not unusual to have five or six near misses on a normal trip on this line from Paragould to McGehee. He stated that on February 15, 1982, when the newly upgraded line was opened to traffic, he was aboard the first train over the line, and on that day, the traincrew experienced a near miss with a gasoline truck at the first crossing in Forrest City.

MP currently has an active program for reporting near misses in the Louisiana Division, which services Arkansas. Engine and traincrews are encouraged to be on the look out for hazardous material trucks and schoolbuses that violate grade crossing safety laws, and to report to the proper authorities any violation that they might encounter. Arkansas statute 75.638 requires that all hazardous material and public transportation vehicles (i.e. schoolbuses) stop for all grade crossings.

### Public Hearing on Grade Crossings

The Arkansas Transportation Commission (ATC) held a public hearing on September 3, 1982, in response to three petitions it received from cities along the MP line between Paragould and McGehee, Arkansas. The cities (Marianna, Lake View, and McGehee) requested an inspection of the trackage along the line, and 37 grade crossings were found hazardous, primarily because of foliage growth along the right-of-way. The ATC has statutory authority to order MP to correct problems concerning the maintenance of track and structures, maintenance of rights-of-way, and signal device installation if warranted. During the hearing, MP and the ASHTD verbally agreed to correct certain difficulties along the line. MP indicated that it will improve right-of-way foliage control and grade crossing surfaces at certain locations. The ASHTD indicated that it will fund the installation of a flashing signal device at a grade crossing near McGehee, Arkansas. The ATC is awaiting an official response from MP identifying those grade crossings that will be affected. Once this response is received, the ATC will issue a final order.

### **ANALYSIS**

The traincrew was properly certified and qualified in accordance with the existing MP regulations. The passenger car driver held a valid operator's permit and had no previous record of accidents. There was no evidence of preimpact mechanical deficiencies on either the passenger car or freight train which might have been a contributing factor. There was no evidence of medical or physiological problems which might have affected the preimpact performance of either operator. Weather was not a factor in this accident.

### The Accident

Based on witness statements and physical evidence at the scene, the Cadillac sedan was traveling westbound on Woodland Drive at a relatively low speed as it approached the grade crossing. The vehicle entered the crossing without stopping and drove directly into the path of the approaching freight train. Initial contact occurred between the right front door of the passenger car and the front coupler of the lead locomotive.

The Safety Board estimates that the passenger car was traveling at approximately 13 mph when impact occurred. If the driver had attempted to negotiate the crossing at a higher speed, the car's suspension would probably have bottomed out because of the heavy passenger load and the roughness of the crossing. The vehicle's speed was calculated to be

about 26 mph at 106 feet from the point of impact, assuming the vehicle was coasting to the crossing while climbing the 6-percent grade on the westbound approach. From a distance of 123 feet to 93 feet from the point of impact, the driver had an unobstructed view of the train. The view obstruction indicated in figure 7 was caused by a combination of high rolling terrain and vegetation. If the driver had been alert, during the initial 17 feet of unobstructed view, she would have had at least 3.7 seconds to react and stop short of the tracks at the crossing. 11/ It is likely that once the car reached the next point where the driver had an unobstructed view (75 feet from the point of impact), she could not have stopped the car in time to avoid the impending danger.

According to a witness at the scene, the train's headlights were illuminated and its whistle was blowing as the train approached the accident crossing. Under normal circumstances, the horn should have been audible to the driver and occupants inside the Cadillac within a range of 400 feet. 12/

Although the Safety Board could not determine precisely why the Cadillac driver did not respond to the train's warning signals, it is possible that the noise level inside the passenger compartment of the Cadillac may have prevented the driver from hearing the warning signal. The State trooper who responded indicated that when he arrived at the scene, the tape player in the passenger car was operating at a high volume, the air-conditioning blower was on, and all of the windows were in the closed position. In addition, the Cadillac was loaded with nine occupants, two adults in the front seats and seven small unrestrained children in the rear seat. The children could have caused enough commotion to distract the driver's attention.

The "too familiar crossing" sometimes creates an unusually dangerous situation for drivers. Initially, most drivers normally perceive a grade crossing as being potentially hazardous. However, they tend to disregard their better judgment after having repeatedly traveled over a grade crossing without observing the presence of a train. The empty track creates a false sense of security and lulls the driver into reducing the level of cautiousness normally exhibited when approaching a grade crossing.

Accident data have shown that the majority of those persons involved in grade crossing accidents are familiar with the crossing. 13/ In this accident, the driver lived within 120 feet of the crossing and should have been familiar with the train's irregular schedule and alternate directions of travel. However, the engine crew fireman, who observed the passenger car just before impact, stated that the occupants inside did not appear to have seen or heard the approaching train as the car entered the crossing. Any combination of the factors described above could have created a set of circumstances which could easily have diverted the Cadillac driver's attention and caused her to not be fully alert and cognizant of the conditions outside the car. There is no evidence to suggest that the Cadillac driver either recognized the impending danger or took evasive action before impact. The Safety Board concludes that the Cadillac driver was preoccupied at the time of the accident and drove her vehicle in an inattentive manner.

11/ The passenger car speed was not affected by grade for the initial 17 feet of unobstructed view. The analysis assumes a perception and reaction time of 1.5 seconds.

12/ Based on the FRA study, "The Visibility and Audibility of Trains Approaching Rail-Highway Grade Crossings," May 1971, the sound level required to alert a motorist going less than 35 mph is about 101 dB just outside the vehicle. The audibility of the accident train's external horn would have been reduced to 104 dB at 400 feet due to sound attenuation. However, the reduced sound level would still have been above the level normally required to alert a motorist.

13/ U.S. DOT (FRA) publication "Human Factors Countermeasures to Improve Highway-Railway Intersection Safety" July 1973 (DOT-HS-190-2-300).

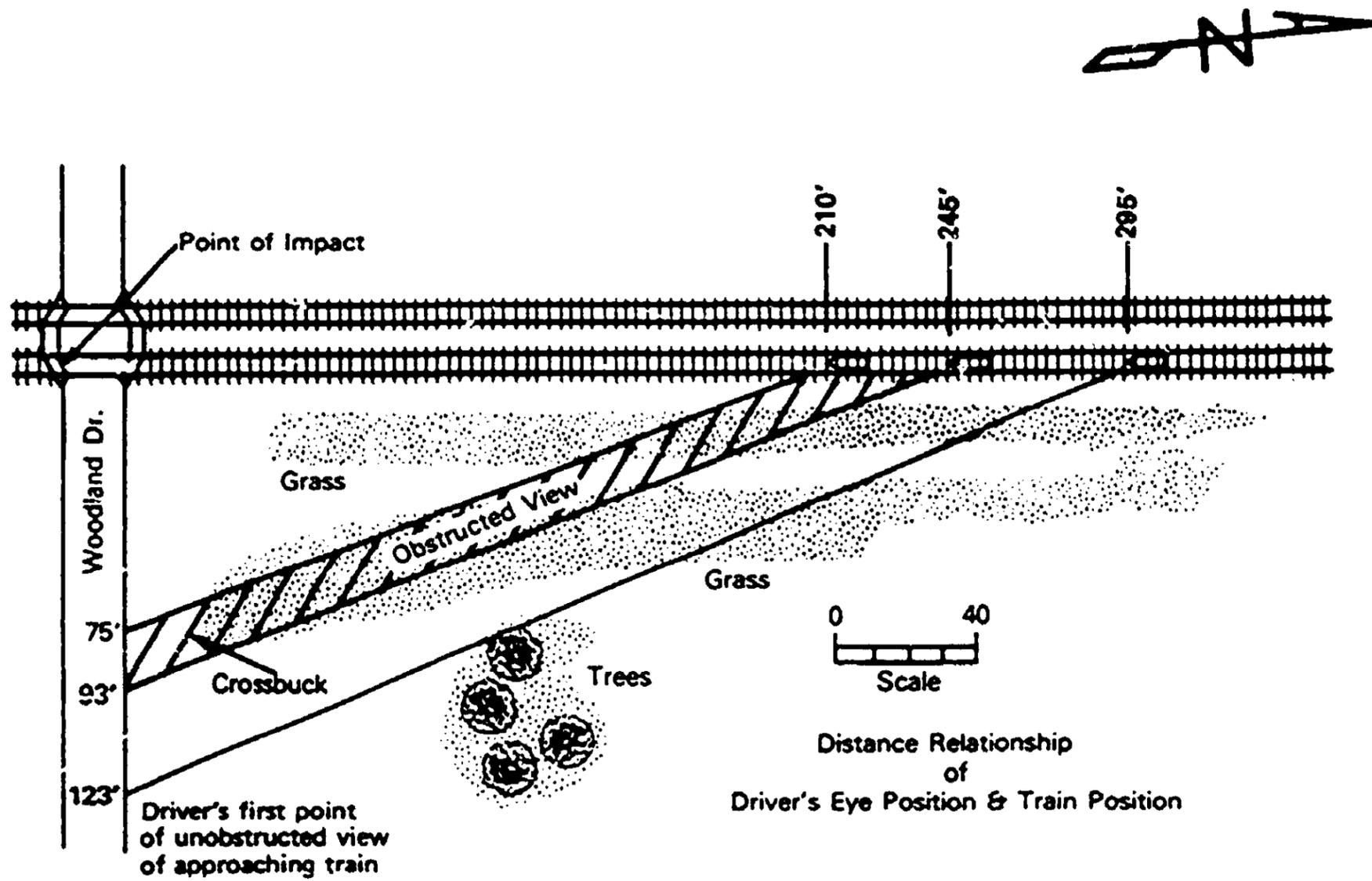


Figure 7.—Sight distance for the Cadillac driver.

### Survival Aspects

The impact forces were sufficient to stop the westbound momentum of the Cadillac and instantly accelerate the car to the velocity of the train. The coupler of the lead locomotive penetrated the passenger compartment by 2 feet. Eight occupants received fatal neck and head injuries and were pronounced dead at the scene. Penetration of the passenger compartment caused the left side doors to buckle and become ajar, thus permitting three occupants to be ejected. The use of the available occupant restraints probably would not have had any effect in this accident because of the severe impact forces. The kinetic energy and lateral acceleration transferred to the occupants during impact far exceeded the energy absorption capabilities of the restraint systems installed in the car. In addition, since there were only six occupant restraints installed in the car, even if such restraints had all been used, three of the nine occupants would have remained unrestrained during the accident.

### The Highway

The Woodland Drive crossing is a public crossing that is protected by a passive traffic control device--a crossbuck sign on the westbound approach. The crossing was constructed many years ago to provide vehicular passage over the railroad tracks as part of an access route between several farms and the main highway. The crossbuck sign on the eastbound approach was missing. Also, there were no advance railroad warning signs on either approach to the crossing. The MUTCD requires that crossbuck signs and advance railroad warning signs be installed on each roadway approach for passive crossings.

Although additional passive warning signs would have been desirable at this grade crossing, it is questionable whether the additional signs would have altered the outcome of this accident. Passive traffic control devices do not warn the motorist of an approaching train. The Cadillac driver in this accident was familiar with this crossing and was aware of its location. Active traffic control devices, such as flashing lights, gates, or bells, are designed to warn motorists of an approaching train. Because of the low hazard rating assigned to this crossing, which is determined by the accident rate and the highway and railroad traffic volume, the state only recommended that standard passive protection devices be used at this location.

FRA statistics on rail-highway grade crossings indicate that the total number of grade crossing accidents decreased in Arkansas from 1980 through 1981. However, the percentage of accidents/incidents at crossings protected by passive devices slightly increased over the same period and also were overrepresented when compared with nationwide statistics. In 1980, 63 percent of the rail-highway accidents/incidents in Arkansas occurred at passive crossings, versus 47 percent nationwide over the same period. In 1981, 64 percent of the rail-highway accidents/incidents in Arkansas occurred at passive crossings, versus 46 percent nationwide.

The fatality, injury, and accident rates for grade crossing accidents in Arkansas are also higher than the nationwide rates. In 1980 and 1981, the fatality, injury, and accident rates per 10,000 vehicles registered in the State were at least 100 percent above the national averages for the same time periods. The FRA data indicate that the majority of grade crossing accidents in Arkansas occur at passive crossings and that the injuries from such accidents tend to be more severe than those incurred in passive crossing accidents nationwide.

### Operation Lifesaver

MP conducted 10 "Operation Lifesaver" community meetings along the railroad line between Jonesboro and McGehee during the week of January 24, 1982. The purpose of the meetings was to discuss grade crossing safety with the residents before opening the newly reconditioned line and to make the residents aware that more trains, moving at faster speeds, would be running over the line. MP attempted to reach the people along the line primarily concentrated in the small towns (population 10,000 and below). At that time, the MP Operation Lifesaver program did not focus much attention on reaching the sparsely populated rural farming communities where the most trackage and passive grade crossings are located and where the typical rail-highway accident in Arkansas occurs. Grade crossing accident victims often live near the grade crossing involved. The state has recently initiated a program to reach a broader range of drivers, and is encouraging the railroad companies to work directly with individual school districts and make Operation Lifesaver presentations in the driver's education classes. This program hopefully will inform more youthful drivers about grade crossing safety. However, the program is not designed to reach drivers in the farming communities, such as Lake View, who probably would account for the majority of the exposure. The Safety Board believes that the State of Arkansas should also focus some attention on working directly with the key groups in the farming communities, such as farmer's cooperatives, Farm Bureau Associations, and local officials to inform farmers and farm equipment operators of the potential hazards at passive grade crossings in rural areas.

### Near Miss Program

MP does have an active near miss reporting program to identify hazardous material trucks and schoolbuses that violate grade crossing safety laws. The State of Arkansas should encourage MP and all of the other railroad companies operating within the State to expand their active near miss programs to include the reporting of all violations of grade crossing safety laws. The information compiled from the near miss program could be used by the State to warn violators and to identify other appropriate action as required. The reporting system could also identify hazardous grade crossings and provide insights on recurring problems at hazardous crossings which require attention.

The operating railroad personnel, such as engineers, trainmen, and conductors, that are actively involved in the near miss program should also be encouraged to participate in the Operation Lifesaver program. They are the people best able to relate their day to day experiences with respect to near misses and accidents. Hopefully, this will serve to further convince the local public of the importance of grade crossing safety. Information relating to near miss experiences should be shared with local officials so that they can study the crossing involved to determine what action is needed to prevent near misses and future accidents.

## CONCLUSIONS

### Findings

1. The train and traincrew were in compliance with all applicable Federal Railroad Administration and Missouri Pacific rules and regulations.
2. There was no evidence of preimpact mechanical deficiencies on either the Cadillac or train which might have been a contributing factor in this accident.
3. There was no evidence of medical or physiological disorders which might have affected the preimpact performance of the vehicle driver or train operator.

4. The Cadillac driver's view of the train was unobstructed from a point 123 feet south of the point of impact to a point 93 feet south of the point of impact.
5. Under normal circumstances, the horn on the lead locomotive should have been audible to the driver and occupants inside the Cadillac.
6. The interior noise level inside the Cadillac may have prevented the driver from hearing the train's warning signals.
7. The Cadillac driver and occupants were preoccupied at the time of the accident and did not see or hear the train's warning signals; the driver did not take evasive action.
8. The speed of the Cadillac at the time of impact was calculated to be about 13 mph. The speed of the train at impact was recorded to be 48 mph.
9. The geometry and conditions of the road, track, and crossing did not contribute to the accident. The foliage east of the tracks did not influence the outcome of the accident.
10. Although there was only one crossbuck sign at the crossing, and although there were no advance warning signs, the lack of such protection devices did not influence the outcome of the accident.
11. Although the occupant restraints in the Cadillac were not used, the impact forces produced during the accident far exceeded the energy absorption capabilities of the occupant restraints.
12. The Federal Railroad Administration statistics indicate that the majority of grade crossing accidents in Arkansas occur at passive crossings and the injuries from such accidents tend to be more severe than those incurred in such accidents nationwide.
13. The State of Arkansas should direct additional attention to promoting its Operation Lifesaver program within the rural farming communities where the majority of trackage and passive grade crossings are located.

#### Probable Cause

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the automobile driver to see or hear the approaching freight train and to stop short of the railroad tracks.

#### RECOMMENDATIONS

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

--to the State of Arkansas:

Develop a coordinated program with the railroad companies that operate within the State, to extend the Operation Lifesaver program to the rural communities where the majority of trackage and unprotected grade

crossings are located by working directly with local officials, farm bureaus, and farming cooperative associations to promote grade crossing safety within rural communities. (Class II, Priority Action) (H-83-1)

Encourage all railroad companies that operate within the State to develop a near miss data system that will permit them to promptly report to the State authorities all violators of grade crossing safety laws. (Class II, Priority Action) (H-83-2)

--to the Missouri-Pacific Railroad:

Expand the company's ongoing near miss reporting program in the Louisiana division to require that operating and engine crews also report vehicles other than hazardous material trucks and schoolbuses that violate grade crossing safety laws. (Class II, Priority Action) (H-83-3)

Encourage company operating employees in all districts to increase their participation in the Operation Lifesaver program in order to disseminate to a wider section of the public their experiences with near misses and accidents that occur along the train line over which they operate. (Class II, Priority Action) (H-83-4)

**BY THE NATIONAL TRANSPORTATION SAFETY BOARD**

/s/ JIM BURNETT  
Chairman

/s/ PATRICIA A. GOLDMAN  
Vice Chairman

/s/ FRANCIS H. McADAMS  
Member

/s/ G. H. PATRICK BURSLEY  
Member

/s/ DONALD D. ENGEN  
Member

January 11, 1983

**APPENDIXES**

**APPENDIX A**

**INVESTIGATION AND HEARING**

Investigation

The National Transportation Safety Board was notified of the accident at 1:30 p.m. on July 9, 1982. Investigators were dispatched from the Washington, D.C., Headquarters, Kansas City and Denver Field Offices on July 10, 1981. Safety Board investigators were assisted by representatives of the Arkansas State Police and the Missouri Pacific Railroad.

Depositions/Hearing

There were no depositions taken and a hearing was not held in conjunction with this investigation.

**Preceding page blank**

## APPENDIX B

### TRAINCREW INFORMATION

#### Engineer

The locomotive engineer, 42, was initially employed by MP as a fireman in December 1958. He was promoted to locomotive engineer in June 1968. He passed his last operating rules examination in January 1970. <sup>14/</sup> At the time of the accident, the engineer was seated in the rear auxiliary seat on the left side of the lead locomotive.

#### Conductor

The conductor, 32, was initially employed by MP as a brakeman in March 1968. He was promoted to conductor in June 1974. He passed his last operating rules examination in June 1982. At the time of the accident, the conductor was aboard the caboose.

#### Fireman

The fireman, 35, was initially employed by MP as a brakeman in March 1971. He transferred to engine service and was promoted to locomotive engineer in March 1979. He passed his last operating rules examination in March 1980. At the time of the accident, the fireman was operating the train and was seated on the right side of the lead locomotive.

#### Head Brakeman

The head brakeman, 35, was initially employed by MP as a brakeman in June 1969. He passed his last operating rules examination in April 1982. At the time of the accident, the head brakeman was seated in the second locomotive.

#### Rear Brakeman

The rear brakeman, 37, was initially employed by MP as a brakeman in April 1969. He passed his last operating rules examination in June 1978. At the time of accident, the rear brakeman was seated in the caboose.

<sup>14/</sup> 49 CFR 217 requires each railroad to periodically examine its employees on the operating rules. However, the regulation does not specify the time period required between examinations.