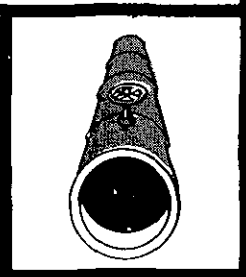
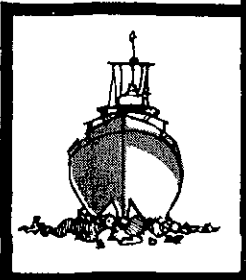
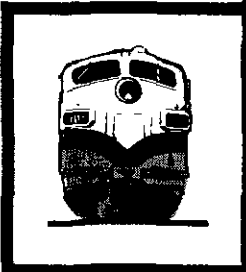
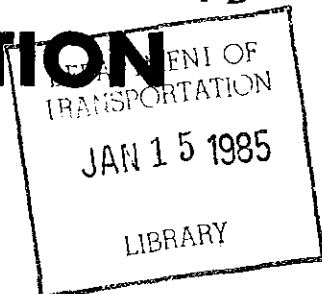


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# NATIONAL TRANSPORTATION SAFETY BOARD



WASHINGTON, D.C. 20594

## RAILROAD ACCIDENT REPORT

**TRAIN ACCIDENT INVOLVING  
AMTRAK PASSENGER TRAIN NO. 225  
AND AMTRAK WORK EXTRA NO. 4934  
LINDEN, NEW JERSEY  
JULY 9, 1980**

**NTSB-RAR-80-12**

**UNITED STATES GOVERNMENT**

## CONTENTS

<b>SYNOPSIS</b> . . . . .	1
<b>INVESTIGATION</b> . . . . .	1
The Accident . . . . .	1
Injuries to Persons . . . . .	5
Damage . . . . .	5
Crewmember Information . . . . .	9
Train Information . . . . .	9
Method of Operation . . . . .	11
Meteorological Information . . . . .	12
Survival Aspects . . . . .	12
Postaccident Inspection of Track and Equipment . . . . .	13
<b>ANALYSIS</b> . . . . .	13
The Accident . . . . .	13
CWR Unloading Procedures . . . . .	15
Operations . . . . .	16
<b>CONCLUSIONS</b> . . . . .	17
Findings . . . . .	17
Probable Cause . . . . .	18
<b>RECOMMENDATIONS</b> . . . . .	18
<b>APPENDIXES</b> . . . . .	21
Appendix A--Investigation and Deposition Proceedings . . . . .	21
Appendix B--Crew Information . . . . .	22
Appendix C--National Railroad Passenger Corporation Memo . . . . .	24
Appendix D--Excerpts from Amtrak and Conrail Operating Rules and Instructions . . . . .	25

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

**RAILROAD ACCIDENT REPORT**

**Adopted: December 23, 1980**

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**TRAIN ACCIDENT INVOLVING  
AMTRAK PASSENGER TRAIN NO. 225  
AND AMTRAK WORK EXTRA NO. 4934  
LINDEN, NEW JERSEY  
JULY 9, 1980**

**SYNOPSIS**

About 6:30 p.m., on July 9, 1980, westbound Amtrak passenger train No. 225 was struck by a 15-foot section of rail that had been protruding from the side of a railcar on Work Extra No. 4934, an eastbound continuous welded rail train, at Linden, New Jersey. The rail penetrated the first car of passenger train No. 225, struck and killed one passenger, and injured 17 others.

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the track supervisor to instruct the maintenance crew and the failure of the crewmembers of Work Extra No. 4934 to remove and secure loose buffer rails when the train was being prepared for movement. Contributing to the accident were the failure of Amtrak to provide comprehensive instructions for unloading rails and the failure of Amtrak to provide qualified personnel to direct the unloading of continuous welded rail.

**INVESTIGATION**

**The Accident**

On July 8 and 9, 1980, continuous welded rail (CWR) <sup>1/</sup> was unloaded from a National Railroad Passenger Corporation (Amtrak) work train between Grundy and Morris, Pennsylvania. On July 9, 1980, the train was designated as Work Extra No. 4934 and consisted of 2 electric locomotive units, 1 coach, 3 threader cars, 3 gondola cars, and 28 flatcars (railcars) which were specially equipped with one rack on each end to transport the CWR.

Normally, during the unloading of the CWR, a track engineer, an officer in the engineering department, was present to insure that the rail was unloaded properly. However, since he was on vacation, the Trenton subdivision track supervisor who had not previously worked a CWR train of this type and a track maintenance crew were ordered to unload the 48 pieces of CWR and prepare the train for movement to Hudson Yard. On July 8, the track supervisor discussed with the assistant track supervisor the method he employed to unload a CWR train.

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<sup>1/</sup> Rail welded together to a continuous length of 1,437 feet.

Relying on that conversation and on previous observations he had made when he had assisted in unloading CWR, the track supervisor placed track employees at various locations on the train and began the unloading process.

He assigned a foreman who had previous knowledge of the operation to the first threader car, which is used to pull the rails from the train. (See figure 1.) At the third threader car, which is used in a step down operation to lower the rails to the ground level, he assigned a foreman and four trackmen who had not previously worked on a CWR train. Their job was to attach the ends of each successive rail together during the unloading process. He assigned an assistant track foreman, who had previously worked on CWR trains, and two trackmen to the anchor car, the flat car near the middle of the train to which the rail is secured against longitudinal movement while the train is in transit. Their job was to remove the anchors that secured the rails to the car. At the rear railcar of the train, he assigned the track foreman and a truckdriver to remove the buffer rails <sup>2/</sup> from the ends of the CWR. (See figure 2.) Buffer rails are attached to CWR with standard joint bars. <sup>3/</sup> The track foreman had not worked a CWR train of this type, and as he and the other employees removed the joint bars, they allowed the buffer rails to drop to the next level of rails and eventually to the car floor. During the 2 days of unloading, the track supervisor was located in the area of the threader step down car and did not go to the rear flatcar where the buffer rails were being removed.

After the CWR was unloaded, the track supervisor turned over the operation of the train to the conductor for the movement of the train to Hudson Yard, 60 miles east of the job site. Since no mechanical crew was present, the train crewmembers performed an inspection and airbrake test of the train. The train crewmembers and the track maintenance crew stated that they took no exception to the loose buffer rails or other material lying on the floor of the railcars.

After the CWR was unloaded, the engineer of Work Extra No. 4934 changed positions from the second locomotive unit, which had been used during the unloading operation, to the first unit, which would be the leading unit during movement to Hudson Yard. The radio installed in the lead locomotive unit was defective and it could only be used for transmission, and it received only intermittently. After the conductor reported that all tests and inspections were completed, the engineer started the train for Hudson Yard. All of the train crewmembers were riding in the lead locomotive unit or in the coach car which was used as a crew rider car and was located immediately behind the locomotive.

As Work Extra No. 4934 proceeded east, it passed Amtrak Metroliner No. 119 at approximately 4:05 p.m. in the vicinity of County interlocking. The engineer of train No. 119 saw dust and dirt flying from one of the cars near the rear of the rail train, and when he passed that car, some of the debris struck his locomotive. Train No. 119 did not sustain any damage; however, the engineer

<sup>2/</sup> Short pieces of rail bolted to the ends of CWR to give sufficient length to the rails to prevent their falling from the end rack when negotiating curves.

<sup>3/</sup> Steel bars used in pairs for the purpose of joining rail ends together.

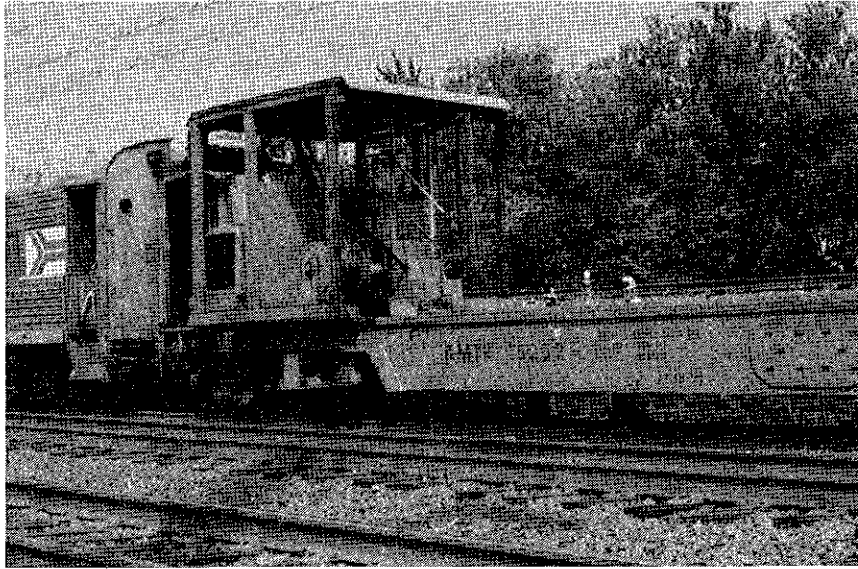


Figure 1.—View of threader car.

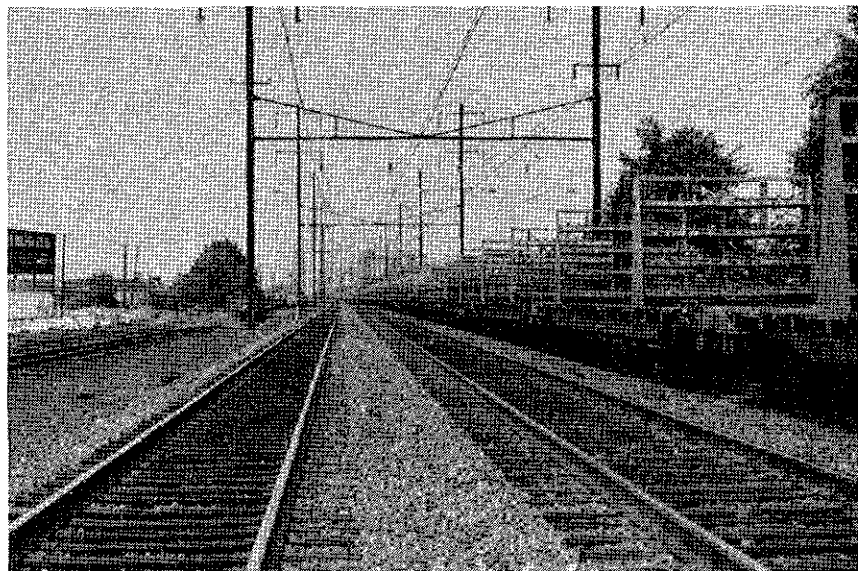


Figure 2.—Arrangement of railcars in CWR train.

immediately attempted to contact the engineer on Work Extra No. 4934 by radio, but did not get a response. He then tried to contact the operator at County, but he was unsuccessful. He finally contacted and advised the operator at Midway, who in turn relayed the information to the operator at County over the block line telephone. In addition to the Midway operator's information, the County operator received an indication on his model board of the track layout that Work Extra No. 4934 had activated the dragging equipment detector 4/ at County interlocking. The operator caused the signal for Work Extra No. 4934 to indicate stop and then radioed the crewmembers that the train had activated the dragging equipment detector and that debris flying from the rear of the train had struck train No. 119. The conductor of Work Extra No. 4934 stated that he did not hear the message about activating the dragging equipment detector device but he had heard some of the message regarding the debris flying from the rear of his train. After the train stopped, the conductor inspected the train and found several rail joint bars hanging over the side of a railcar near the rear of the train. Since a storage facility was not provided on the railcars for joint bars, he pushed the bar back onto the car and dropped bolts through a hole in the joint bars into a hole in the car floor. The conductor stated that he did not observe any loose rails lying on the railcars; however he did state that, he had seen three pieces of rail lying against the rail rack on one of the railcars and thought that they were secured. He then notified the operator that his train was ready to proceed. During this conversation, nothing was said about activating the dragging equipment detector and, when the signal changed to proceed, the engineer started the train for Hudson Yard.

Passenger Train No. 225 departed Sunnyside Yard, New York, at 4:30 p.m., for Penn Station with six self-propelled cars. Before departing, the engineer advised a car inspector that the radio was not working, and the car inspector relayed the information to the tower operator. However, the tower operator instructed the engineer to depart. The train departed Penn Station westbound at 5:30 p.m., bound for Washington, D.C., with the engineer operating the train from the control compartment in the front of and on the north side of the lead unit and the conductor standing on the opposite side of the control compartment.

About 6:30 p.m., Work Extra No. 4934 was moving eastward at 30 mph on track No. 2 at Linden, New Jersey. At the same time, train No. 225 was moving westward at 60 mph on track No. 3. As the two trains began to pass, the engineer of train No. 225 thought that he saw something protruding over the side of a railcar near the rear of the rail train, but he lost sight of it and dismissed it as a shadow or an optical illusion. However, as his train came closer to the rear of the rail train, he realized that something was protruding over the side of one of the railcars. He shouted a warning to the conductor and released the controller handle which caused the train brakes to apply in emergency. However, before the speed of the train was reduced, a 15-foot section of buffer rail, protruding 51 inches over

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4/ Mounted on both sides and between the track, detector loops are positioned at a level just below the normal standard clearance for railroad equipment. When defective equipment or other parts hanging from passing cars or locomotives strike and break one or more of the detector loops, an electrical relay is released and a signal is activated on the operator's model board of the track layout.

the side of the next to the last railcar, struck and penetrated the first car of passenger train No. 225. (See figure 3.)

The crewmembers of Work Extra No. 4934 were not aware that an accident had occurred and continued eastward. Radio messages sent to them could not be received, and the train continued on until it arrived at Lane Tower, east of Elizabeth, New Jersey, where it was stopped by a signal indication.

**Injuries to Persons**

	<u>Passengers</u>	<u>Extra No. 4934 Crewmembers</u>	<u>Train No. 225 Crewmembers</u>	<u>Total</u>
Fatal	1	0	0	1
Nonfatal	17	0	0	17
Minor/None	780	3	6*	789
TOTAL	<u>798</u>	<u>3</u>	<u>6</u>	<u>807</u>

\*Includes a crewmember who appeared to be in physical distress while assisting in the evacuation and was hospitalized when it was determined that he had an existing heart problem.

**Damage**

The protruding buffer rail struck the left side (opposite the engineer's station) of the first car of passenger train No. 225 at the steps immediately below the floor. The steps were destroyed. (See figure 4.) The rail then penetrated the side of the car, 26 feet behind the front end of the car, immediately above the floor level and under the fourth window. (See figures 5a and b.) Seat Nos. 7, 8, 9, 10, 11, and 12, and a partition, which was located behind the seats and contained electrical equipment, were extensively damaged.

One brake beam on the 33d car and one brake beam on the 34th car of Work Extra No.4934 were broken and destroyed. One stake pocket on the 32d car was destroyed, and one rail-carrying rack was bent and torn.

The mechanical committee of the Safety Board's investigation team estimated the damage to the trains as:

First passenger car of of Train No. 225	\$100,000
Work Extra No. 4934	<u>2,000</u>
TOTAL	\$ 102,00

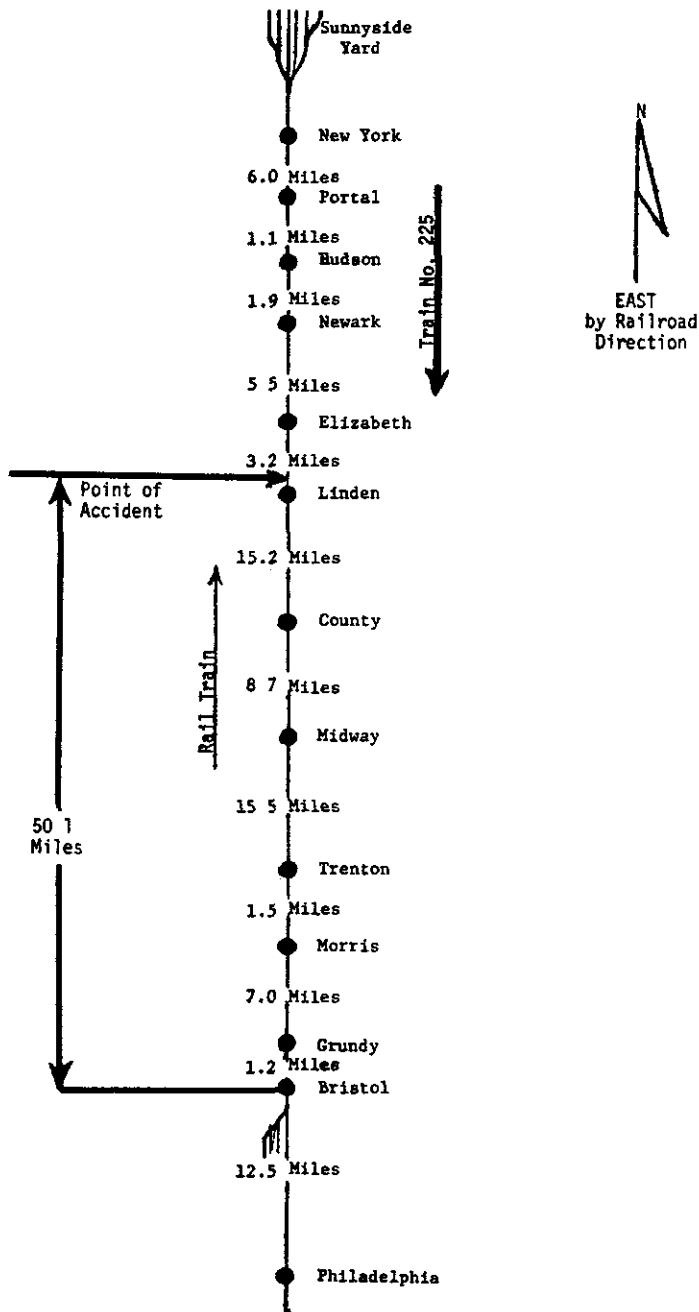


Figure 3.-- Plan of locations and distances.



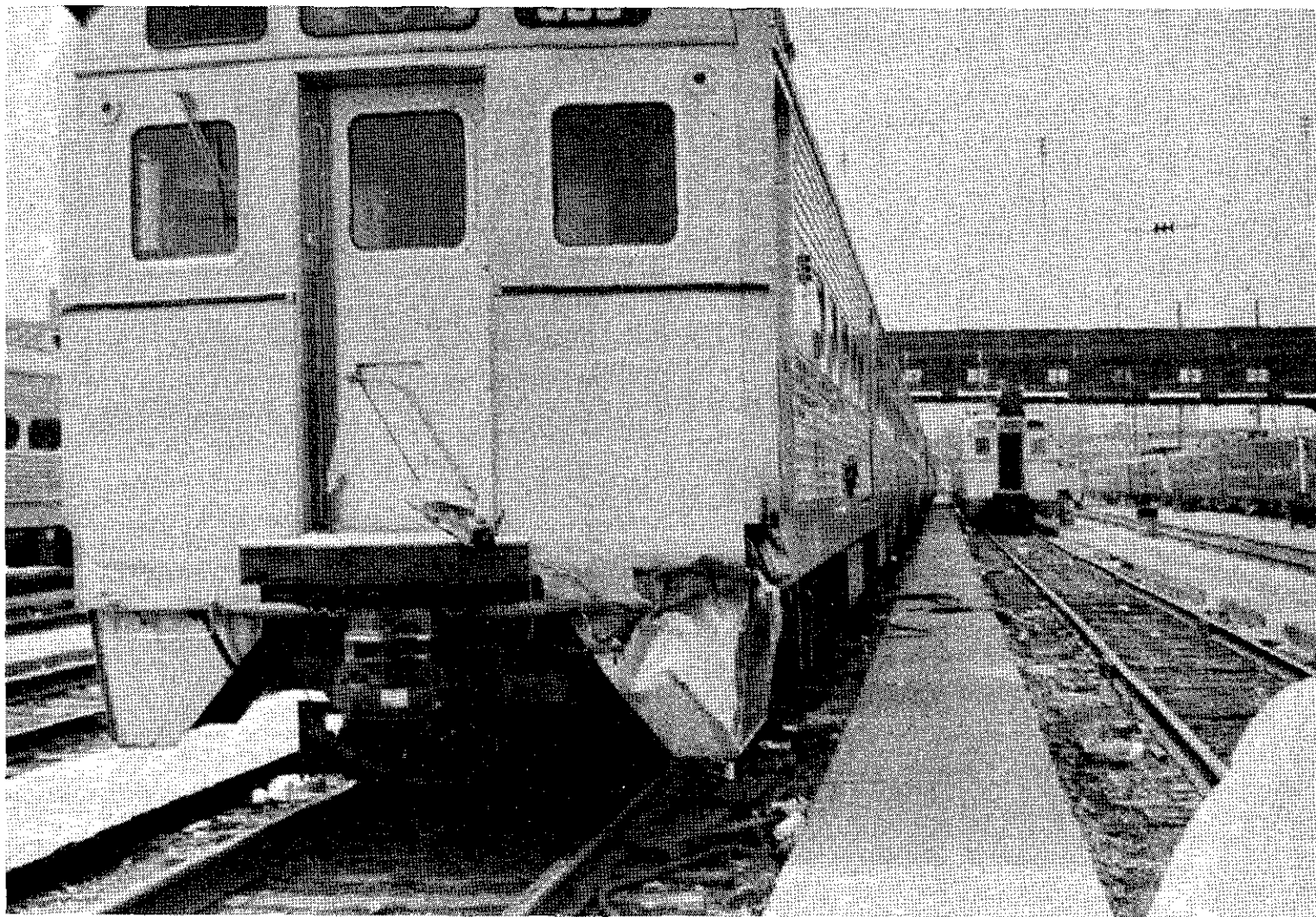


Figure 4.—Front end of the first passenger car of train No. 225.

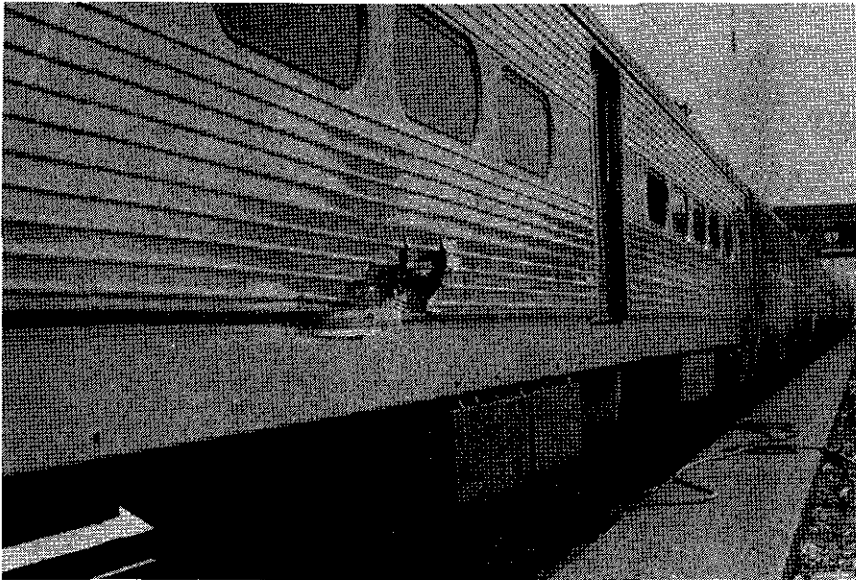


Figure 5a.--Exterior entry of rail of first passenger car of train No. 225.

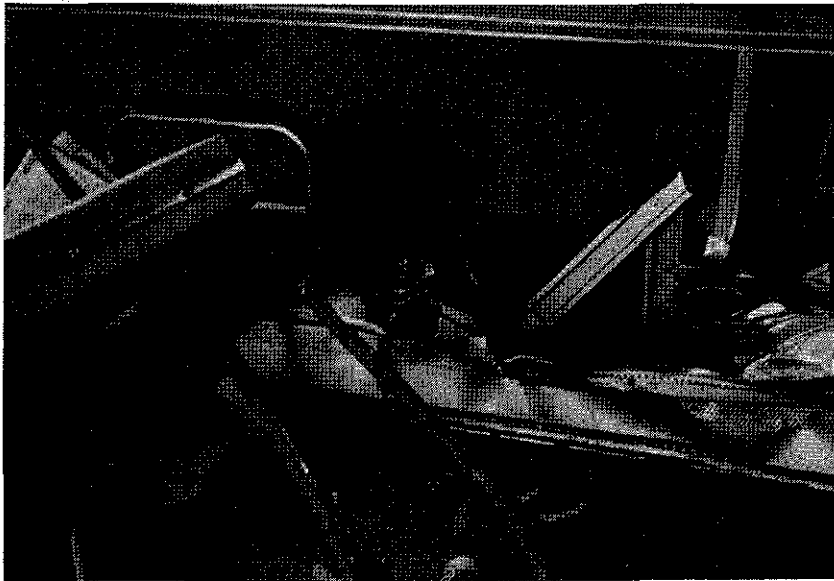


Figure 5b.--Interior entry of rail.

### Crewmember Information

The crewmembers of train No. 225 included a conductor, an engineer, and four trainmen. All had reported for duty on July 9, 1980, at 9:35 a.m. at Philadelphia, Pennsylvania, and had operated train No. 204 to New York, arriving there at 11:00 a.m. They were off duty until 5:30 p.m., when they reported for duty aboard passenger train No. 225 at Penn Station, except the engineer who reported for duty at 4:30 p.m., at Sunnyside Yard and had operated the train into the Penn station in preparation for the westbound trip. At the time of the accident, the engineer had been on duty 2 hours and the other crewmembers had been on duty 1 hour. Each crewmember was qualified in the operating rules and air brake rules and had passed a company approved physical examination.

The crewmembers of Work Extra No. 4934 included a conductor, an engineer, and a brakeman. They had reported for duty at 7:00 a.m. at Morrisville Yard. At the time of the accident, they had been on duty 11 hours and 30 minutes. Each crewmember was qualified on the operating rules and air brake rules and had passed a company approved physical examination.

The crewmembers of both trains were employed by Conrail. (See appendix B.)

The track supervisor, who was in charge of unloading the CWR, had been employed by Amtrak for 4 years.

The track foreman had been employed in the track department of Amtrak and the predecessor company for 16 years and, for the past 11 years, had been assigned as a track foreman.

### Train Information

#### Amtrak Work Extra No. 4934

Work Extra No. 4934 consisted of two electrically propelled GG-1 type electric locomotive units. Electric power for traction was collected from an overhead catenary system by pantographs. One all-steel passenger coach car, was used as a rider car for crewmembers. An all-steel gondola car, 52 feet 6 inches long, was located at each end of the railcars for protection in the event the rail shifted, and another similar gondola car was used for debris. One CWR threader car, a 60-foot flatcar, was equipped with a winch and cables for pulling the CWR from the car and positioning it alongside the track. Two other CWR threader cars, 53-foot 6-inch long flatcars, were equipped to lower the rail to the track surface as it was pulled from the railcars. Each of the 28 railcars was a standard 53-foot 6-inch flatcar and was equipped with a rack on each end of the car. Each rack was 9 feet 8 inches wide and 7 feet 3 3/4 inches high, and was provided with 4 horizontal tiers with rollers to accommodate 12 rails. The base of each rail rested on a 7 1/4-inch roller. A railcar near the middle of the train was equipped with two additional roller racks, plus a rack to which rail could be secured to prevent it

from shifting while the train was en route. It was also equipped with storage for anchors, tiedown blocks, and bolts. The roller racks were manufactured by the Marmon Transmotive Company. The J. J. Finngan Company installed the racks to the standard flatcars in 1977, and the train was placed in service in 1977.

Work Extra No. 4934 was designed to transport 1,437-foot welded rail. The rails, when evenly spaced on the 28 railcars, provided a clearance of 10 feet 1 1/2 inches from the rail end to the roller rack at each end. This clearance was necessary to provide for proper clearance during movement of the train on curves. However, for some applications, Amtrak uses CWR welded together from used rail, which is not consistently 1,437 feet long. When the shorter rail is loaded on the railcars, proper clearance from the end of the CWR to the rail roller rack is not always available. When this occurs, a short piece of rail, known as a buffer rail, is attached to the CWR to provide the proper length. Of the 48 pieces of CWR unloaded on July 8 and 9, 1980, buffer rails had been attached to 26 pieces of rails. No provision for storage of buffer rails and joint bars was provided on the railcars.

#### Passenger Train No. 225

Train No. 225 consisted of six self-propelled, electrically-driven commuter cars. Each all-steel car was 85 feet long and was equipped with 2 two-axle, motor-driven trucks. The cars were semipermanently coupled into pairs and were designed to operate in pairs. Each opposite end contained an operator's compartment, and the couplers on these ends were fully automatic. Each car was equipped with a pneumatic braking system manufactured by the Westinghouse Air Brake Company.

All cars were controlled from the operator's compartment at the leading end of the train. A radio installed in each operating compartment enabled crewmembers to communicate with crewmembers of other trains and with tower operators. However, the radio in the engineer's compartment of train No. 225 was not working properly. When the train stopped at Newark, New Jersey, the crewmembers discovered that when a coach door key was inserted in the door control panel to operate the door, the radio came on. After the accident, the engineer had to remove a coach door key from his equipment bag and insert it in the door control panel so that he could use the radio to notify the operator of the accident. An intercom system enabled him to make announcements throughout the train.

The cars, constructed by the General Electric Company for the New Jersey Department of Transportation, were of two types. The "A" cars had a capacity for 100 passengers, seated 4 abreast in 25 rows. The "B" cars had a capacity for 96 passengers, seated 4 abreast in 24 rows. Two emergency-escape windows were located on each side of the cars. Emergency exit through these windows was possible when the window stripping was peeled away and the pane of glass was pulled inward. Each car had an end door which opened into a vestibule, and passengers could exit from doors on either side of the vestibule. Doors at the middle on each side were used at stations having high platforms. The side doors could be used as emergency exits.

Each passenger car on train No. 225 and each railcars on Work Extra No. 4934 was 10 feet 6 inches wide. The distance between the track centers of track Nos. 2 and 3 at Linden was 12 feet. The clearance between passenger train No. 225 and Work Extra No. 4934 at the Linden accident site was 1 foot 6 inches.

### Method of Operation

Trains are operated on six main tracks in the Linden area by a position light type of automatic block signal system. The tracks are designated from south to north as track A, tracks Nos. 1, 2, 3, and 4, and track B. The maximum authorized speed for a passenger train on track No. 3 is 110 mph, and work trains were restricted to a maximum speed of 40 mph.

The officers and supervisors in the track department, including the track engineer, indicated that they had only received verbal information about handling CWR trains. Amtrak had not issued instructions to the track forces for unloading CWR or preparing the empty CWR train for movement back to the rail plant.

On March 30, 1980, an empty Amtrak CWR train derailed while en route to the rail plant. A piece of buffer rail fell from one of the railcars; one end of the rail embedded in the ground, and the other end wedged into the side of the car and caused it to derail. The track engineer was not present during the unloading of the rails nor in preparing the train for movement. As a result of the derailment, on March 31, 1980, the track engineer issued a memo to all division engineers which stated:

"Please advise everyone on your division that will be or have been connected with unloading CWR from Amtrak's Rail Train that when removing the buffer rails from the rail strings at the rear end of the train, they must be dropped off the rail cars and not left sitting on them." (See appendix C.)

The assistant track supervisor testified that the track supervisor of the Trenton subdivision read the memo and threw it away without disseminating the information to the track personnel assigned to him.

Although the unloading of the CWR was the responsibility of the division personnel at the unloading site, the track engineer was normally present at the site to provide instructions and give advice to the employees involved in the unloading. The track engineer would also provide a qualified threader car operator. The track engineer was not present during the unloading of the rails nor in preparing the train for movement.

There are no Federal regulations that requires material to be secured on a car. Rule 5(G)(4) of the Association of American Railroads (AAR) manual, General Rules Governing the Loading of Commodities on Open Top Cars and Trailers, states, "Detached parts, boxed materials, etc., must be loaded as far from car sides and ends as practicable and secured substantially to prevent displacement vertically, laterally and longitudinally." However, because maintenance of way work trains are not interchanged with other carriers, the AAR rule does not apply, except as a guideline or reference.

Conrail Transportation Department Rule No. 77 identifies insecure lading as a dangerous condition and states that trains are not to be operated with insecure lading. However, when trains are operated on the Northeast Corridor of Amtrak, train crewmembers are working under Amtrak Rules and Instructions, and these rules did not specify insecure lading as a dangerous condition. (See appendix D.)

Amtrak Rules and Instructions, Rule No. 76(a), provides that "All crewmembers must observe the engine(s) and cars of their train when moving or standing as frequently as opportunity permits, to detect any unsafe condition." (See appendix D.)

Amtrak Rules and Instructions, Rule No. 77, states that trains must be stopped when observed with a condition endangering the movement, or for defects, one of which is shifted lading over side or end of car. (See appendix D.)

In 1976, Amtrak became the owner of the Northeast Corridor and, thus, became responsible for maintaining the track. However, since Amtrak did not own any track laying or maintenance equipment, the Department of Transportation, Federal Railroad Administration (FRA), funded the project for upgrading the track structure within the Northeast Corridor and purchased the necessary track laying and maintenance equipment.

The CWR train is a part of the Northeast Corridor Project, which is funded by the Department of Transportation. The train is operated by Amtrak; however, it is owned by the FRA.

Amtrak Operating Rules and Instructions, Rule No. 712, states, "Failure of radio or interference from another radio station must be reported to the train dispatcher or yardmaster promptly with information as to location, time, and identity of station, if possible."

Amtrak does not have a rule that requires trains to be equipped with an operable radio.

### **Meteorological Information**

The nearest reporting National Weather Service (NWS) station is at Newark, New Jersey, 8 miles north of the accident site. On the day of the accident, the NWS reported the weather at 6:53 p.m., e.d.t., as temperature - 82° F; daylight, with a thin overcast; southeast wind at 5.1 mph; and visibility - 10 miles.

### **Survival Aspects**

The rail entered the car of train No. 225 without any warning to the 135 passengers, 35 of whom were standing in the aisle. Some of the passengers in the forward section of the first car heard a series of three bumps, followed immediately by a much louder noise as the 15-foot section of rail tore through the side of the car, entering it above the floor. As the rail took an upward trajectory,

it struck and killed one passenger. It continued toward the rear of the car, striking other passengers, and severely damaging the seats. The rail came to rest on the floor in the aisle of the rear section of the car. Passengers said that the events of the rail striking the car and penetrating it and the velocity of the projected rail was such that they were not aware that a rail had entered the car but thought instead that a bomb had exploded inside the car.

One passenger, a nurse, immediately began to give aid to the injured. Police and emergency medical teams arrived 6 minutes after the accident and began to give aid and to transport the injured to three area hospitals.

### **Postaccident Inspection of Track and Equipment**

An inspection of the track disclosed that five sections of buffer rail and seven joint bars, which had fallen from Work Extra No. 4934, were found lying along track No. 3 between Bristol Yard and the accident site. An inspection of the railcars of Work Extra No. 4934 after the accident revealed 5 sections of buffer rail and 13 joint bars lying loosely on two of the last three railcars, and two tie plates, one pin, and 100 rail anchors lying loosely on the anchor car. (See figures 6 and 7.)

## **ANALYSIS**

### **The Accident**

Because of a lack of instructions regarding loose material on CWR cars, and their failure to inquire of the track supervisor what should be done with the loose material, the track employees allowed the buffer rails, rail joint bars, and rail anchors to drop to the car floor while they unloaded the CWR on July 8 and 9, 1980. Further, the material was allowed to remain on the floor of the railcars after the rail was unloaded and made ready for movement. Even though the assistant track foreman had worked previously on CWR trains, he allowed 100 rail anchors to lie loosely on the floor of the car. Apparently, his previous experience and on-the-job training had not prepared him adequately to know each necessary task for properly unloading and preparing the train for movement. After the track supervisor read the track engineer's memo of March 31, 1980, he threw away the memo regarding the removal of the buffer rails, before moving the train. However, he did not disseminate the instructions vital to the safe operation of the train to the track personnel under his supervision. Although the track foreman, had not worked on a CWR train of this type previously and had not been given the information contained in the memo concerning the buffer railcars, his 16 years of experience in the track department should have made him aware that material should not have been allowed to lie loosely on flatcars because of the danger of the material shifting over the side of a car.

His lack of experience in the unloading of CWR may explain why the track supervisor busied himself at the threader car end of the train and did not walk along the train to observe how the work was progressing at the various locations. His questioning of the assistant track supervisor on July 8, 1980, on the method he employed when unloading a CWR train, would indicate an uneasiness about the inefficiency of his knowledge to properly supervise the unloading of the rail.

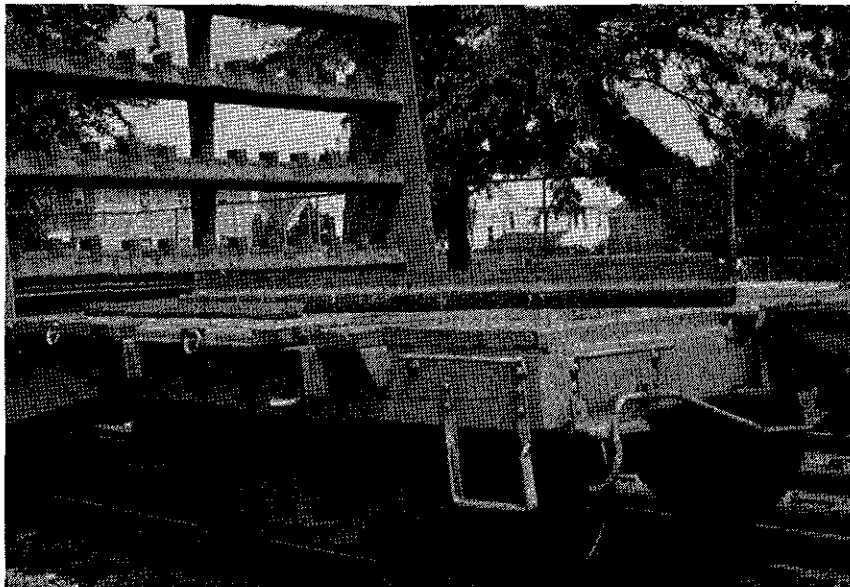


Figure 6.--Loose rails lying on the 31st car of Work Extra No. 4934.

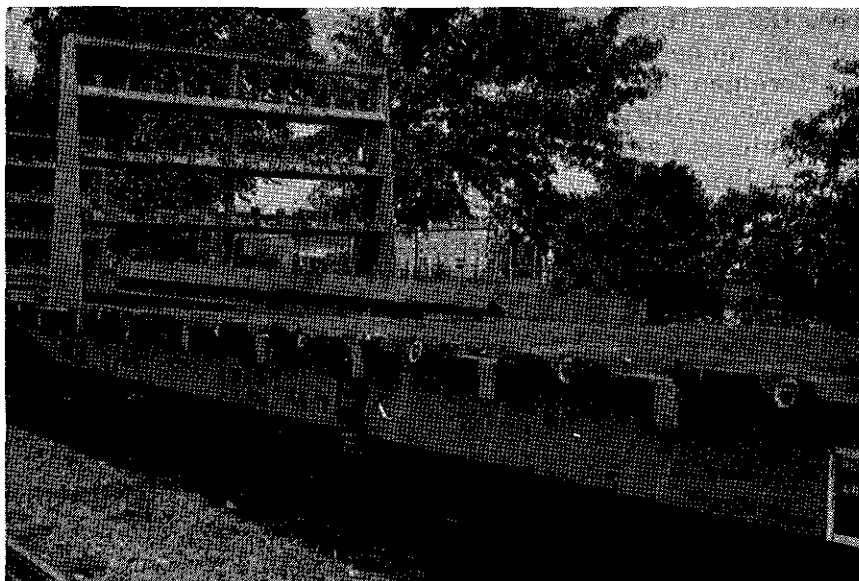


Figure 7.--Loose rail lying on the 32d car of Work Extra No. 4934.



Having received and read the memo on removing buffer rails from the cars, and had he observed the procedures being used by his crew, he would have noticed the buffer rails lying on the cars and had them removed, thus, preventing the accident. Even though the track supervisor did not observe the unloading process along the train, if he had made a proper inspection of the train after the CWR was unloaded, he would have seen the loose material on the cars and had it removed.

Since no mechanical personnel were present after the rail train was unloaded, the train's crewmembers were responsible for performing the inspection and airbrake test of the rail train. The crewmembers were Conrail employees, operating an Amtrak train and working under Amtrak operating rules and instructions; however, they should have been familiar with the Conrail's Transportation Department Rule No. 77 which identified insecure lading as a dangerous condition. They should have seen the loose material on the cars during the preparation of the train for movement, reported it as an unsafe and dangerous condition, and had the loose material removed or secured. If this action had been taken, the accident would have been prevented.

As a train moves over the rails, vibration of the car floors would cause the dangerous condition of loose material, buffer rails, and rail joint bars moving to the edge of the car floors and falling from the car to the ground. As the buffer rails fell from the railcar, one rolled under the last railcar and damaged a brake beam of that car and a brake beam on the following gondola car. It was probably these damaged brake beams that struck and activated the dragging equipment detector at County.

When Work Extra No. 4934 was stopped at County to inspect the cars on the rear of the train, the conductor could have observed the loose material on the floors of the railcars. When he dropped bolts through holes in the rail joint bars and the car floor, he would have been standing high enough to have seen onto the car floor and he should have seen the loose rails. But, even if he could not see onto the car floor, it was his responsibility to ensure that the train was safe to move. (See appendix D.) However, he allowed the train to continue eastward, and again buffer rails and rail joint bars moved to the side of the car and fell. At Linden, a 15-foot section of rail was protruding over the side of the railcar, and when it was struck by passenger train No. 225, it apparently rotated, struck a roller rack on the railcar, and penetrated into the side of the passenger car.

### **CWR Unloading Procedures**

Since Amtrak had placed the CWR rail train in service without issuing any written instructions for unloading it and preparing the empty train for movement, it was essential that it provide trained supervision or comprehensive directions to the workmen at the work site. The 3 years it had been operating this train should have afforded Amtrak ample opportunity to train numerous track department employees on the Northeast Corridor on the proper procedures when working with a CWR train. However, Amtrak elected to rely on the availability of a single track engineer to direct the unloading operations, and no other person had

been assigned to this task. In neither incident where the CWR train was involved in accidents from loose buffer rails falling from the cars had the track engineer been present during the unloading process. When he was present during other occasions of unloading CWR, no accidents resulted. Since Amtrak had selected this method to insure the proper unloading of the CWR, a sufficient number of people should have been assigned to this duty so that oversight and instructions would have been available everytime the CWR train was unloaded. If as in this incident, Amtrak intended that the track maintenance crew on the subdivision was to unload the CWR, even when the track engineer was not present, then the crew should have been sufficiently trained in the tasks necessary for unloading the CWR and the safe movement of an empty train.

### Operations

Since no provision had been made for crewmembers to ride on the rear of the CWR rail train, they were either riding in the locomotive or in the rider car on the front end as it was moving from the worksite to Hudson Yard. From their positions, they could not comply with Amtrak Rules and Instructions, Rule No. 77, because they could not see far enough to the rear to detect a rail protruding from the side of a car. Also, they were not in a position to receive hand signals from crewmembers of trains traveling in the opposite direction who may have seen material falling from or protruding over the side of cars in their train. If the rider car had been placed on the rear of the train, a crewmember riding at that position would have only been three or four cars away from the railcars. From that position, he would have been able to detect the rails as they protruded over the side, taken action to stop the train, and corrected the condition.

Amtrak and Conrail rules state that the conductor and engineer must know that their train has been inspected, and if during that inspection, unsafe conditions are found they must be reported to the proper authority to have the unsafe condition corrected. (See appendix D.) If Work Extra No. 4934 had been properly inspected it would not have been moved with the loose rails and other material lying on the cars, and this accident would have been prevented.

Since Amtrak Operating Rules and Instructions do not require that radios be operational on locomotive units and trains, both train No. 225 and Work Extra No. 4934 were permitted to operate with defective radio units. The rule requiring that defective radios be reported did not prevent train No. 225 from being dispatched. However, after the accident, a delay in notification occurred because the engineer had to remove a coach door key from his equipment bag and insert it in the door lock before the radio would function. Since the radio installed in the lead locomotive unit of Work Extra No. 4934 could not be used to transmit and received only intermittently, the crewmembers did not receive all pertinent messages, such as the activation of the dragging detector and that an accident had occurred involving their train. Work Extra No. 4934 continued eastward for approximately 4 miles after the accident had occurred with the unsafe condition before it was stopped by signal indication.

The Safety Board discussed the problems experienced in operating trains with inoperative radios on the Northeast Corridor in its report of an Amtrak train accident at Edison, New Jersey, on April 20, 1979. 1/ Amtrak responded on April 15, 1980, that all locomotives have been equipped with radios and that a maintenance and repair program for radios had been established. The Federal Railroad Administration responded that "FRA does not have data which will support promulgation of a recommendation requiring all trains operating on a main track to be equipped with an operable radio."

The Safety Board reemphasizes the importance of the following recommendations which were made to Amtrak and the Federal Railroad Administration as a result of the previous accident on the Northeast Corridor:

--to the National Railroad Passenger Corporation (Amtrak):

Require that all trains operating on a main track be equipped with an operable radio. (R-79-71)

--to the Federal Railroad Administration:

Establish regulations that would require all trains operating on a main track to be equipped with an operable radio. (R-79-73)

## CONCLUSIONS

### Findings

1. Work Extra No. 4934 was dispatched with short pieces of buffer rails lying loosely on the floor of several railcars and with no provision to keep the rails on the cars.
2. Amtrak did not design the railcars with a storage facility for buffer rails, nor did the cars have side rails to retain buffer rails, or other loose material on the car.
3. Although Amtrak did not issue formal instructions for unloading the CWR and preparing the train for movement, it did provide a track engineer to be present during the unloading of CWR; however, it made no provision for backup in the event he was not available.
4. The track supervisor had not assisted previously in unloading CWR, but he had received an inter-office memo directing that buffer rails were to be removed from railcars. However, he did not relay the instructions to the track foreman.

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1/ Railroad Accident Report--"National Railroad Passenger Corporation (Amtrak) Head-End Collision of Train No. 111 and Plasser Track Machine Equipment, Edison, New Jersey, April 20, 1979" (NTSB-RAR-79-10).

5. The track foreman did not remove the buffer rails from the railcars, nor did he inquire what was to be done with the buffer rails.
6. Because the buffer rails and other loose material were unsecured on the car floors, they were susceptible to falling from the cars as the train traveled.
7. The crewmembers of Work Extra No. 4934 rode near the front end of the train and, therefore, could not see the rails protruding or falling from the cars.
8. There are no Federal regulations for the securement of material on cars.

### Probable Cause

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the track supervisor to instruct the maintenance crew and the failure of the crewmembers of Work Extra No. 4934 to remove and secure loose buffer rails when the train was being prepared for movement. Contributing to the accident was the failure of Amtrak to provide comprehensive instructions for unloading rails and the failure of Amtrak to provide qualified personnel to direct the unloading of continuous welded rail.

### **RECOMMENDATIONS**

During its investigation of this accident, on September 15, 1980, the National Transportation Safety Board recommended that the National Railroad Passenger Corporation:

Immediately establish procedures for the securement of all material carried on flatcars of a continuous welded rail train and maintenance of way work trains. (Class I, Urgent Action)  
(R-80-37)

After the accident, Amtrak issued an instruction for continuous welded rail that stated:

All buffer rails, splice bars, track bolts and anchors used in securement of the CWR strings must be immediately removed from the train and placed in a secure location on the ground concurrently with the unloading of the CWR strings.

At the same time, Amtrak also issued the following instructions to the rail plant, located in New Haven, Connecticut:

No more short pieces of rail will be secured to ends of strings of rail to get proper overhang. Where strings do not overhang the required distance, they will be torch cut to proper length with one hole cut in web for handling purposes.

**BY THE NATIONAL TRANSPORTATION SAFETY BOARD**

/s/ JAMES B. KING  
Chairman

/s/ FRANCIS H. McADAMS  
Member

/s/ PATRICIA A. GOLDMAN  
Member

/s/ G. H. PATRICK BURSLEY  
Member

ELWOOD T. DRIVER, Vice Chairman, did not participate.

December 23, 1980

**APPENDIXES**

**APPENDIX A**

**INVESTIGATION AND DEPOSITION PROCEEDING**

**Investigation**

The National Transportation Safety Board was notified of the accident about 8 p.m., on July 9, 1980. The Safety Board immediately dispatched an investigator from its New York City field office to the scene. An investigator from Washington, D.C., also went to the scene and arrived 4 hours after the accident. Investigation of operations, vehicle factors, and human factors was conducted.

**Deposition**

A deposition proceeding was held on August 21, 1980, at Trenton, New Jersey. Parties represented at the deposition proceedings were the National Railroad Passenger Corporation, Federal Railroad Administration, and the Brotherhood of Locomotive Engineers. Statements were taken from 11 witnesses.

**APPENDIX B**  
**CREW INFORMATION**

**Work Extra No 4934**

Conductor Michael F. Sherlock

Conductor Sherlock, 31, was employed as a brakeman by the Penn Central Railroad on June 16, 1969. He has worked as a brakeman and a conductor on the Penn Central Railroad and its successor, Conrail. He passed the Amtrak Operating Rules Examination and an examination on the air brake rules in March 1979. He passed a company physical examination in February 1979.

Engineer William J. Clausen

Engineer Clausen, 32, was employed as a fireman on the Penn Central Railroad in June 1971. He worked as a fireman and an engineer on the Penn Central Railroad and its successor, Conrail. He passed the Amtrak Operating Rules Examination in March 1979 and an examination on the air brake rules in January 1980. He passed a company physical examination in December 1979.

Trainman V. Latronica

Trainman Latronica, 58, was employed as a brakeman by the Pennsylvania Railroad in February 1942. He had worked as a brakeman on the Pennsylvania Railroad and its successor, Conrail. He passed the Amtrak Operating Rules Examination and an examination on air brake rules in March 1979. He passed a company physical examination in February 1979.

**Passenger Train No. 225**

Conductor John O. Erickson

Conductor Erickson, 61, was employed as a brakeman by the Pennsylvania Railroad on March 25, 1942, and had worked for the Pennsylvania Railroad and its successor, Conrail, as a brakeman and a conductor. He passed the Amtrak Operating Rules Examination in March 1979 and an examination on the air brakes rules in October 1978. He passed a company physical examination in March 1979.

Engineer Wesley C. Branch

Engineer Branch, 38, was employed as a fireman by the Penn Central Railroad on April 30, 1974, and had worked for the Penn Central Railroad and its successor Conrail as a fireman and an engineer. He passed the Amtrak Operating Rules Examination in April 1979 and an examination on the air brake rules in May 1978. He passed a company physical examination in January 1979.

Trainman Edwin G. Ebbert

Trainman Ebbert, 41, was employed as a brakeman by the Pennsylvania Railroad on April 10, 1964, and was promoted to conductor on February 22, 1966. He had worked as a brakeman and conductor on the Pennsylvania Railroad and its successor, Conrail. He passed the Amtrak Operating Rules Examination in April 1979 and an examination on the air brake rules in November 1978. He passed a company physical examination in July 1978.

Trainman Michael J. DelNero

Trainman DelNero, 58, was employed as a brakeman by the Pennsylvania Railroad on March 12, 1946. He had worked as a brakeman on the Pennsylvania Railroad and its successor, Conrail. He passed the Amtrak Operating Rules Examination in March 1979 and an examination on the air brake rules in February 1979. He passed a company physical examination in February 1979.

Trainman Edward M. Domanoski

Trainman Domanoski, 48, was employed as a station baggageman by the Pennsylvania Railroad on November 14, 1955. On December 27, 1955, he transferred to a brakeman position. He was promoted to conductor on February 16, 1968. He had worked as a brakeman and a conductor on the Pennsylvania Railroad and its successor, Conrail. He passed the Amtrak Operating Rules Examination in March 1979 and an examination on the air brake rules in January 1977. He passed a company physical examination in March 1978.

Trainman James P. Grace

Trainman Grace, 47, was employed as a brakeman by the Pennsylvania Railroad on January 13, 1956. He was promoted to conductor in 1961. He had worked as a brakeman and as a conductor on the Pennsylvania Railroad and Conrail. He passed the Amtrak Operating Rules Examination in February 1980 and an examination on the air brake rules in November 1977. He passed a company physical examination in May 1978.



APPENDIX C

NATIONAL RAILROAD PASSENGER MEMO

INTEROFFICE MEMO

EXHIBIT #1

DATE: March 31, 1980

TO: ALL DIVISION ENGINEERS

FROM: J.S. COLLINS (s/s J.S.C.)

SUBJECT: UNLOADING OF RAIL TRAIN

Please advise everyone on your division that will be or have been connected with unloading CWR from Amtrak's Rail Train that when removing the buffer rails from the rail strings at the rear end of the train, they must be dropped off the rail cars and not left sitting on them.

We recently had an incident where the buffer rails were left sitting on the cars after the train was unloaded and during movement of the empty train back to New Haven Welding Plant, a 10' piece of rail fell off the rail car and derailed the rear buffer car.

This MUST NOT and WILL NOT happen again!

In the future, the Amtrak Car Department will be notified at least two to three hours in advance of making any moves with the Rail Train over the Corridor in order for them to make arrangements to inspect the train.

Your cooperation in these matters will be greatly appreciated.

cc: G.E. Ellis  
J.F. Siravo  
B.F. Overbey  
R.J. Rudy  
A.E. Shaw  
J. McKenna

APPENDIX D

EXCERPTS FROM AMTRAK AND CONRAIL OPERATING RULES AND INSTRUCTIONS

AMTRAK

INSPECTING TRAINS FOR DEFECTS

76 Conductor and Engineman must know that cars and engines have been inspected for movement in their train Car(s) or engine(s) that have been derailed must be inspected for defects before moving If during inspection unsafe conditions are found, Conductor or Engineman must report to proper authority for instructions

- (a) All crew members must observe the engine(s) and cars of their train when moving or standing as frequently as opportunity permits, to detect any unsafe condition They must be observant for signals from employees on other trains or while passing block stations from Operators and at locations where Trackmen and other employees are working Crew members must exchange hand signals with these employees
- (b) When a train has been stopped because of brakes sticking or sliding wheels, an examination of the car wheels must be made If a wheel shows signs of being overheated, the air brakes on that car must be cut out If cracks are found in any wheel, that car must be set out Attention must be given to flat spot indications and be governed by Rule 917
- (c) Defective parts of equipment, when possible, must be loaded on engines or cars from which removed, otherwise they must be placed a safe distance from the track Train Dispatcher must be notified as to disposition

77 Trains must be stopped when observed with a condition endangering the movement or any of the following defects

- Hot Journal
- Sliding Wheel
- Broken Wheel
- Brakes Sticking
- Open Door or Freight Cars or Trailers
- Open Drop Bottom Doors
- Defective Truck
- Equipment Dragging
- Shifted Lading over side of End of Car

C 2

CONRAIL

OBSERVATION OF TRAINS FOR DEFECTS

76 Conductors and engineers must know that cars and engines in their train have been inspected If equipment is found unsafe for movement, instructions must be received from train dispatcher or yardmaster

77. Employees must observe passing trains closely and if hot journal, brakes sticking, wheel sliding, dragging equipment, insecure lading, defective truck, swinging car door or any other dangerous condition is detected, they must give Stop Signal to trainmen and engineers on passing trains If nothing irregular is noted, they will give proceed signal as rear of train passes

Trainmen and engineers must be on lookout for signals from employees When equipped with radio, the engineer will be responsible for prompt notification to crew members on the rear of the train that employees adjacent to the tracks are observing their train If Stop Signal is received or attention is called to a dangerous condition, train must be promptly stopped, consistent with good train handling techniques, inspection made and train dispatcher notified

Any material used to replace defective parts must be reported on prescribed form

If defects cannot be corrected, cars unsafe for movement must be set out and report made to train dispatcher or operator, including location where waybill is to be left

Trainmen and engineers must frequently observe both sides of their train while moving, looking for signals and indication of defects in train and track, especially at curves and passing stations Additional observations must be made of both sides of the train sufficiently in advance of the first switch at interlockings, but not less than two miles, so that if defect is detected, train can be promptly stopped consistent with good train handling techniques prior to reaching switch Rear trainman must observe indications of hot box and dragging equipment detectors and must also make observations behind train, particularly at grade crossings, looking at track and structures for evidence of defective or derailed cars Results of these observations must be communicated by radio, if practicable, between crew members on rear end and head end of train, and with each other If indication of defect is observed, train must be promptly stopped for inspection

Trainmen and engineers must observe the condition of passing trains for defects When their train is moving, trainmen must be in position to make inspection of passing trains, to observe signals given and to give signals to other trains

When train is stopped for any reason after leaving initial station and prior to arrival at terminating station, inspection must immediately be made of as much of train as time permits