RAILROAD ACCIDENT REPORT

DERAILMENT OF PENN CENTRAL FREIGHT TRAIN B-4 AND COLLISION OF SOUTHERN RAILWAY PASSENGER TRAIN No.6 WITH DERAILED CAR AT ARLINGTON, VIRGINIA APRIL 27, 1972

TRANSPORTATION SAFETY BOARD

NATIONAL TRANSPORTATION SAFETY BOARD
Washington, D. C. 20591
REPORT NUMBER : NTSB-RAR-73-2

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ADOPTED: FEBRUARY 28, 1973

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16. Abstract

At 10:17 p.m., on April 27, 1972, eight cars in Penn Central freight train B-4 derailed as the train was moving at about 8 m.p.h. into the Potomac Yard in Arlington, Va. One of the derailed cars fouled the adjacent No. 2 main track of the Richmond, Fredericksburg and Potomac Railroad Company and was struck by Southern Railway passenger train No. 6 about 6 to 8 minutes later. The four-unit diesel-electric locomotive of the passenger train and the three occupied passenger cars were derailed. There were no serious injuries.

The National Transportation Safety Board determines that the probable cause of the derailment of the freight cars was a defective rail, which broke while the train was passing over it. The probable cause of the collision between the passenger train on the adjacent main track and the derailed B-4 freight car was that the crewmembers of B-4 did not flag the passenger train as they were required to do by the operating rules.

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FOREWORD

The accident described in this report has been designated a major accident by the National Transportation Safety Board under the criteria established in the Safety Board's regulation.

This report is based on facts obtained from the Safety Board's investigation and from a joint hearing conducted by the Richmond, Fredericksburg and Potomac Railroad Company, the Penn Central Transportation Company, and the Southern Railway Company.

The conclusions, the determination of probable cause, and the recommendations herein are those of the Safety Board.

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DERAILMENT OF PENN CENTRAL FREIGHT TRAIN B-4 AND COLLISION OF SOUTHERN RAILWAY PASSENGER TRAIN NO 6 WITH DERAILED CAR AT ARLINGTON, VIRGINIA, APRIL 27, 1972

I. SYNOPSIS

Eight freight cars in Penn Central Transportation Company's freight train B-4 derailed as the train was moving south at about 8 m.p.h into the Potomac Yard near the Crystal City development in Arlington, Va , at 10:17 p.m , e d.t , on April 27, 1972. One of the derailed cars fouled the adjacent Richmond, Fredericksburg and Potomac Railroad Company's No. 2 main track and was struck by a Southern Railway Company passenger train about 5 to 8 minutes later. Southern Railway's four-unit diesel-electric locomotive and the three occupied passenger cars were derailed. There were no serious injuries

The National Transportation Safety Board determines that the probable cause of the derailment of the freight cars was a defective rail, which broke while the train was passing over it The probable cause of the collision between the passenger train on the adjacent main track and the derailed B-4 freight car was that the crewmembers of B-4 did not flag the passenger train as they were required to do by the operating rules

II. FACTS

Accident Site

Potomac Yard extends about 4 miles south from the Potomac River. The northern end of the yard lies between the George Washington Memorial Parkway and U S Route 1 in Arlington County, Va , adjacent to a complex of office and apartment buildings known as Crystal City. The southward receiving yard has 13 tracks. The No. 1 southward receiving track, the longest, is on the west side of the yard This track originates at a switch from the southbound freight running track, at a point about 1 2 miles south of the Penn Central bridge over the Potomac River The first derailment in this accident occurred on this track 635 feet south of the switch (See Figure 1.)

The two main tracks (designated No. 2 and No. 3) of the Richmond, Fredericksburg and Potomac Railroad Company (RF&P) run along the west side of the Potomac Yard from Alexandria, Va , to the Penn Central bridge The No 2 main track is adjacent to Potomac Yard and east of the No. 3 main track. At the point

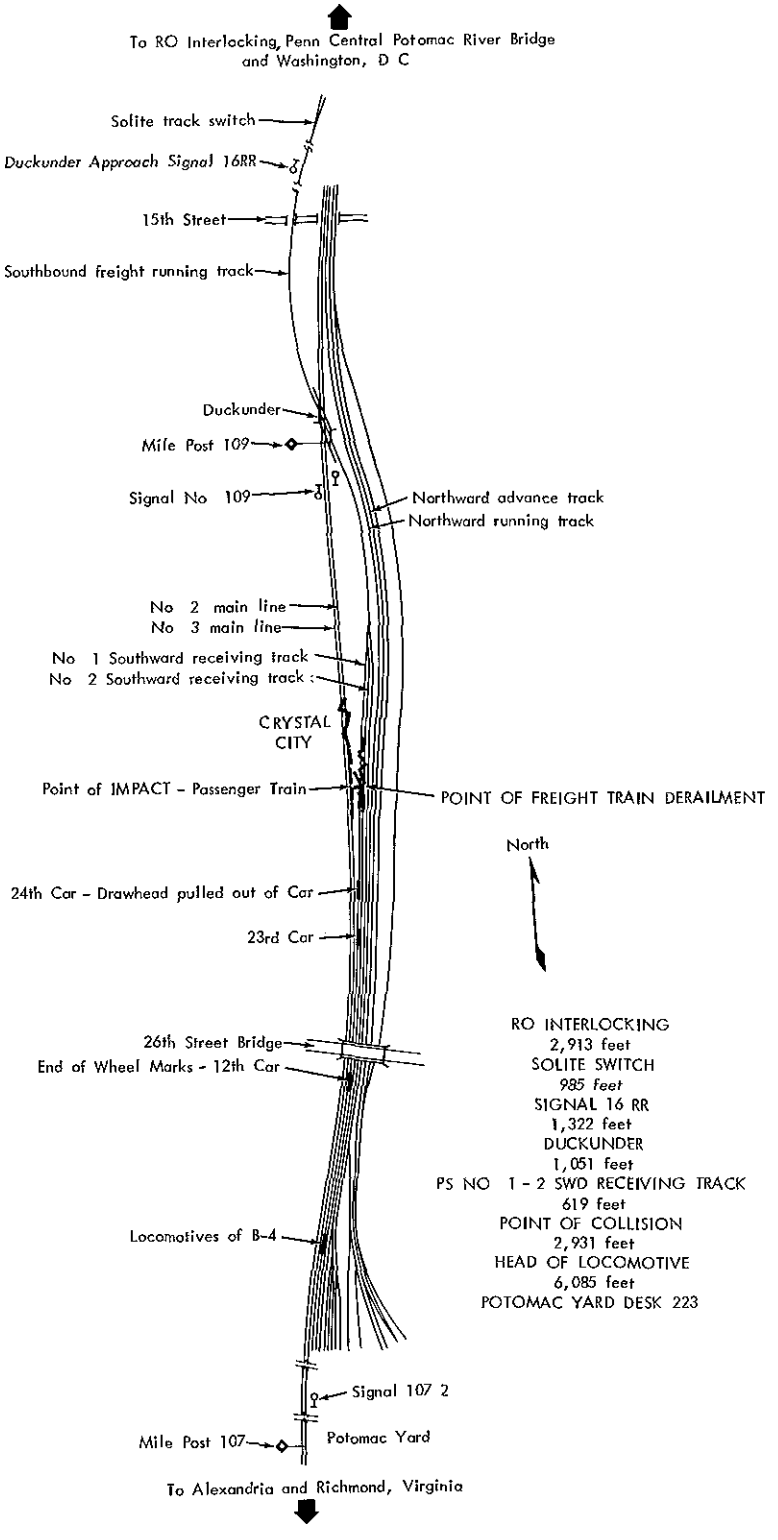

Figure 1 Plan of accident site.

of collision in this accident, the No. 2 main track is about 42 feet west of and 6.5 feet higher than the No. 1 southward receiving track. About 2,200 feet south of the collision point the centers of the two tracks are only about 15 feet apart A northbound train approaching the accident site on the No 2 main track traverses about 500 feet of straight track and 1,560 feet of track that curves slightly to the west

Method of Operation

The Potomac Yard is a classification yard owned and operated by the RF&P for its trains as well as for those of the Penn Central, the Baltimore and Ohio (B&O) Railroad, the Chesapeake and Ohio (C&O) Railroad, and Southern Railway. Tenant lines share operating costs

Southbound Penn Central freight trains enter Potomac Yard at RO Interlocking from the No. 3 main track via the southbound freight running track.

Potomac Yard Special Rules govern yard employees as well as employees of tenant lines when they are using yard facilities.[1] The Special Rules supersede operating rules and any special instructions of individual railroads in conflict therewith However, Potomac Yard Special Rules do not apply to the RF&P main tracks.

The two RF&P main tracks west of Potomac Yard are used by passenger trains of the RF&P, C&O, and Southern Railway. Train movements in both directions are governed by signal indications. C&O and Southern Railway crews are subject to RF&P rules while they are using RF&P tracks. The speed limit for Southern Railway passenger trains is 69 m p h in the area of the accident

[1]See Appendix A for excerpts from the *Potomac Yard Special Rules for the Government Employees* pertinent to this accident

Penn Central Freight Train B-4

Train B-4 had 93 freight cars and three E-44 electric locomotive units. It originated at Enola Yard in Harrisburg, Pa. The lead locomotive unit was equipped with an operable radio, but the caboose was not. The crew of B-4 consisted of an engineer, head brakeman, conductor, and flagman who were qualified in accordance with Penn Central Transportation Company rules Crewmembers had been off duty 10 hours prior to their assignment to train B-4 on the day of the accident

Derailment of Freight Cars

Train B-4 arrived at RO Interlocking at about 10:05 p m. on April 27, 1972. The train proceeded into Potomac Yard on the southbound freight running track in accordance with the restricting aspects displayed by the home signal at RO Interlocking and by Approach Signal 16RR, located about 3,900 feet south of RO Interlocking The track indicator board at RO displayed R/01, indicating that the train would go into the No. 1 southward receiving track The signal governing movements onto receiving tracks indicated that the train should proceed "at a speed that will permit stopping within one-half range of vision."[2] As the train entered the track, the engineer increased the speed to about 8 m p.h from what he described as "almost a standstill " The conductor noted that at 10:10 p m the caboose cleared the home signal at RO Interlocking.

After the locomotive traveled about 1,900 feet on the No. 1 southward receiving track, the 12th car in the train (SCL 23656) derailed 635 feet south of the No 1 southward receiving track switch. The 13th through the 28th cars remained on the rails, but the 29th through the 35th cars derailed at the same point as the

[2]Potomac Yard Special Rule 11(a), "Yard Speed "

Figure 2. Overview of accident site, showing derailed freight and passenger trains.

12th car. (See Figure 2.) Locomotive power still was being applied and the coupler was pulled out of the south end of the 24th car. This separation apparently initiated an emergency brake application at about 10:17 p.m.

The 12th car traveled 1,349 feet with the front wheels of both trucks derailed to the east. After the emergency brake application, at least three derailed boxcars (the 29th, 30th, and 31st cars) struck the caboose of B&O train No. 87, which was standing on the No. 2 southward receiving track adjacent to the point of derailment. (See Figure 3.) Then, the 30th car veered westward and fouled the No. 2 main track. (See Figure 4.)

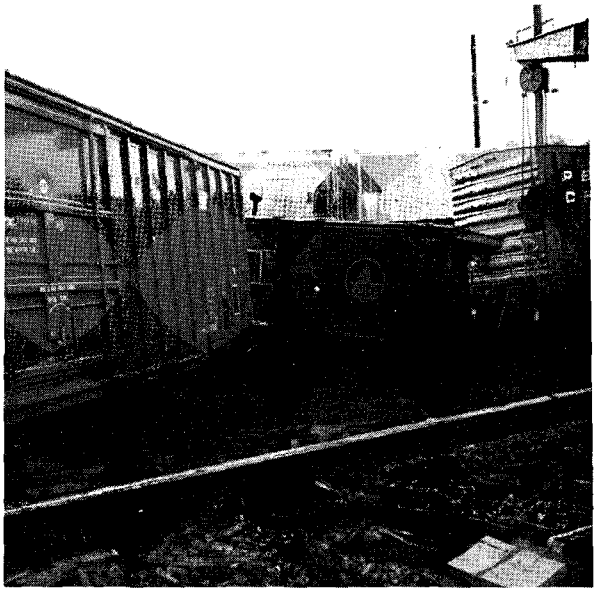

Figure 3. Derailed Penn Central boxcars in contact with B&O caboose.

When the engineer of train B-4 noted the emergency brake application, he released the locomotive brakes and continued to apply power until the locomotive stopped about 3,550 feet south of the track switch. At this point, the centers of the No. 1 receiving track and the No. 2 main track are 15 feet apart. The engineer attempted to advise the southbound hump control office and Desk 223[3] by radio of the emergency brake application. He still was unaware of the derailment.

While the engineer was radioing, the head brakeman took a wrench, an airhose, and his trainman's lantern and detrained to look for a broken airhose which he thought may have initiated the emergency brake application. He knew that trains on adjacent tracks should be protected under such circumstances, but he testified that he thought the engineer would protect them. The engineer testified that he assumed that the brakeman and the flagman would protect adjacent tracks. He did not instruct the brakeman to flag the No. 2 main track. The engineer stated that he thought his efforts to contact Desk 223 by radio fulfilled his responsibility.

When the conductor on the caboose noted the emergency brake application, he instructed the flagman to protect the tracks. The caboose had stopped near the Solite switch, and the conductor detrained and walked southward along the southbound freight running track. (See Figure 1.)

Meanwhile, two car inspectors were working on the adjacent No. 2 southward receiving track. One of the inspectors conferred with the brakeman after they had discovered the freight train's derailed 12th car. The other car inspector notified Radio Control 207[4] that B-4 was derailed. He estimated that the time of his transmission was 10:20 p.m., about 3 minutes after the emergency brake application. The two car inspectors had moved northward from the transmission point about three car lengths along

[3]Desk 223 is the central control point for the entire Potomac Yard operation. It is manned around the clock by an assistant to the trainmaster who represents the yard superintendent. Desk 223 is located near the center of the yard, along the main tracks.

[4]Radio Control 207 is the central control point for assignment and direction of all car inspectors working in the yard. The office is located in the car shop near the center of the yard.

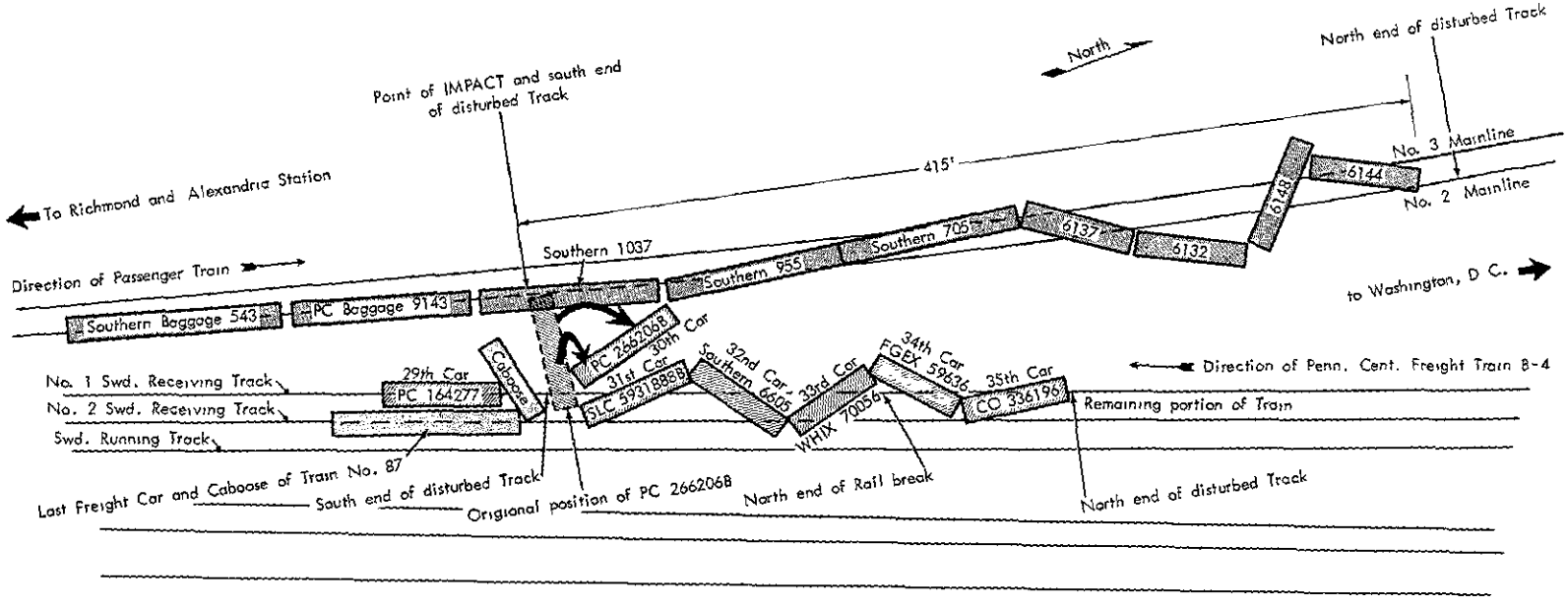

Figure 4. Position of derailed freight cars and passenger train.

the freight train when they overheard the radio message from a car inspector working in the southbound classification yard that a northbound passenger train was approaching on the No. 2 main track. One of the car inspectors made his way between the freight cars to the main track and signaled the oncoming passenger train to stop with his lantern, but he did not see the train until it was within three car lengths of him The engineer of the northbound train responded by blowing his horn but he did not reduce the train's speed The car inspector heard the impact when the passenger train struck the derailed 30th car of train B-4, and he went northward to help The other car inspector informed Radio Control 207 of the collision

The head brakeman of train B-4 said that he was walking between the freight train and the No. 2 main track when he first saw the northbound passenger train. He stated that he attempted to signal the train to stop The engineer of train B-4 made no attempt to flag the train as it passed him

Southern Railway Passenger Train No 6

The passenger train that struck the derailed 30th car of train B-4 was Southern Railway train No 6, which consisted of four FP-7 diesel-electric locomotive units, a combine (baggage-coach) car, two regular coaches, and two dead-head baggage cars, in that order. The train left Alexandria Station at 10:20 p m , with one passenger in the combine car, 20 passengers in the first coach, and seven in the second coach

The crew consisted of an engineer, fireman, conductor, flagman, baggagemaster, and dining-car attendant. They had complied with the Hours of Service Act and had operated trains on RF&P tracks for many years

Collision of Passenger Train No. 6 with Derailed Freight Car

As the passenger train left Alexandria Station, the engineer made a running test of the brakes, which performed satisfactorily. The weather was clear and visibility was good

Signal 1072, the last signal before the collision, displayed a clear aspect. The engineer saw the freight train's headlight and passed it at about 60 m.p.h without seeing any signal from the crew. Shortly thereafter he saw the car inspector's light, but he did not interpret the light as a stop signal because car inspectors often move around at night with their lanterns as they work on freight trains on the No 1 southward receiving track.

As the passenger train's locomotive rounded the curve, the engineer and fireman saw the derailed boxcar on the track about 10 car-lengths away The engineer immediately applied the brakes and positioned himself on the floor of the locomotive cab. He estimated that the time of the collision was 10:27 p m The locomotive units derailed and stopped in a jack-knifed position, as shown in Figure 5. The coaches also derailed and stopped approximately in line, leaning slightly (See Figure 6.)

The fireman was injured, but he immediately detrained and went northward to flag the adjacent main track The flagman promptly relieved him.

The conductor and the engineer of the passenger train tried several times to transmit emergency radio messages. Finally, the assistant to the trainmaster at Desk 223 and the Southern Railway dispatcher in Greensboro, N C , answered but the transmission was garbled. The conductor went to a public telephone and called the Southern Railway chief dispatcher in Greensboro, who advised him that ambulances and buses had been ordered to the scene

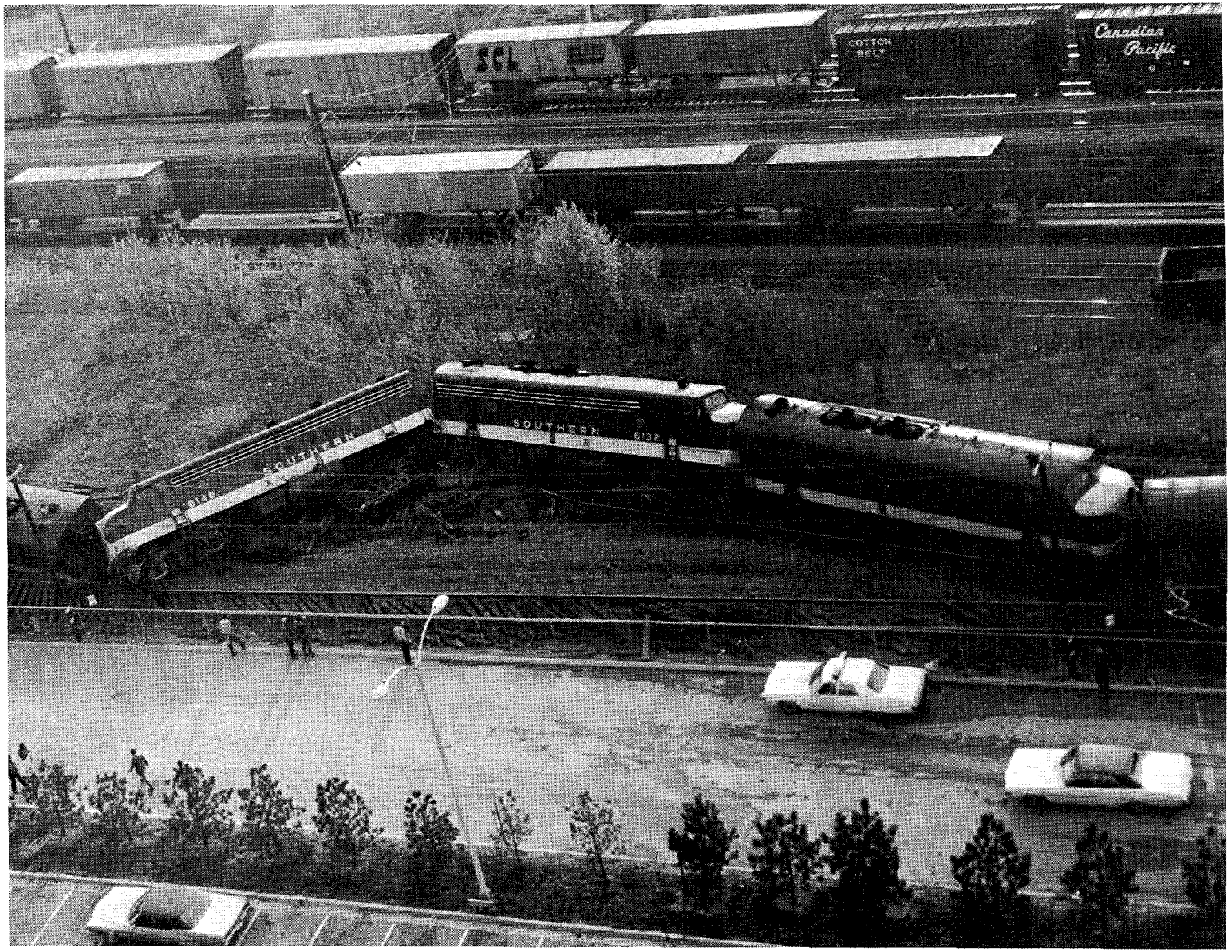

Figure 5. Derailed Southern Railway locomotives.

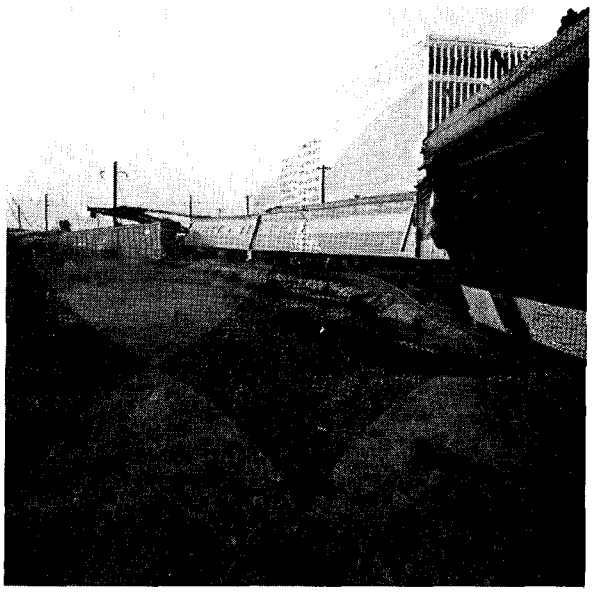

Figure 6. Derailed Southern Railway coaches.

and that all signals for adjacent tracks and approaches to the accident site were set at stop.

Crewmembers' injuries were not serious enough to require hospitalization. They assisted the passengers as required and protected adjacent tracks until they were relieved.

Activities at Desk 223

Desk 223 and hump yardmasters' offices have radio facilities to communicate with crews of RF&P, Penn Central, and Southern Railway trains. They also have 10 frequencies for Potomac Yard operations. Normally, radios of tenant lines are monitored constantly but only those Potomac Yard frequencies which immediately concern Desk 223 are used.

When the freight cars derailed, three supervisors—the off-going (3 to 11 p.m.) and the on-coming (11 p.m. to 7 a.m.) assistants to the trainmaster and the assistant trainmaster—were at Desk 223. Their testimony indicated that no Potomac Yard supervisor heard the engineer's radio transmission from the freight train after its cars derailed.

Desk 223 received its first notice of the derailment via a telephone call from Radio Control 207 at about 10:25 p.m. While the assistant to the trainmaster was talking on the phone to the foreman at 207, he overheard the radio message from the car inspector that the passenger train had struck one of the derailed freight cars. At the same time, Desk 223 received an emergency transmission from someone on the passenger train. The assistant trainmaster answered it and went to the scene of the accident immediately.

Just before Desk 223 received notice of the derailment from Radio Control 207, the assistant to the trainmaster had conversed by radio with the engineer of outbound Penn Central train MD116, which was near the derailed freight train. Moreover, radios on the Penn Central frequency on the southbound and northbound humps were determined to be operable after the derailment.

Sometime after the derailment and collision, the engineer of train B-4 made radio contact with the Penn Central operator at the Virginia Interlocking tower in Washington, D.C. The operator telephoned the assistant to the trainmaster at Desk 223 and told him that the engineer was trying to contact him. The assistant to the trainmaster then contacted B-4 by radio with no difficulty. The engineer of Penn Central MD116 testified later that he had overheard on his radio the engineer of B-4 trying to contact Desk 223.

The Track

In the immediate vicinity of the accident, the No. 1 southward receiving track consisted of 33-foot sections of 100-pound (per yard) second-hand RA rail which had been rolled by the Bethlehem Steel Company in 1924. The

track was laid in 1930 The ballast was a mixture of cinders and gravel.

After the accident, a break was found in the east rail of the No. 1 southward receiving track 635 feet south of the north switch. Inspection revealed an internal, vertical 9-foot-2-inch-long split in the rail head A 5-foot-3/8-inch section of the rail had broken out. (See Figure 7.) The battered ends of the pieces of this broken rail section indicated that the pieces had broken out progressively. About 75% of one of the cross-sectional breaks showed evidence of a preexisting break. The web exposed by the break had been traversed by wheels.

There was no sign of a derailment north of the broken rail Wheel marks which originated on crossties in the disturbed area were traced to the 12th car of train B-4

Federal Track Safety Standards

Federal Track Safety Standards (49 CFR 213), which became effective on October 16, 1972 (almost six months after this accident), require that: "If an owner of track to which this part applies learns, through inspection or otherwise, that a rail in the track contains any of the defects listed in the following table, a person designated under Section 213.7 shall determine whether or not the track may continue in use" (See 49 CFR 213 113(a).) A vertical split in the rail head is included in the listed defects. If such track is determined safe, speed over the defective rail may not be more than 10 m p.h

Federal regulations also require that such track be inspected weekly, although no search for internal defects is required. (See 49 CFR 213 233 and 213.237)

Qualifications of the B-4 Crewmembers

Operating employees on the Penn Central qualify by passing an oral examination on the Penn Central Rules for Conducting Transportation and on special instructions from the current timetable, as well as on airbrake and safety rules, and physical characteristics of the portion of the railroad over which they will operate The employees are reviewed every two years on their knowledge of airbrake rules and once a year on their knowledge of all other requirements Employees are not required to pass an examination on the Potomac Yard Special Rules.

The engineer on train B-4 was hired by the Pennsylvania Railroad as a fireman in 1955 He was promoted to engineer on November 15, 1961. He had worked as a fireman on trains which operate in and out of Potomac Yard for more than 2 years but he had operated locomotives in and out of the yard for less than a year. He was last examined on the Penn Central operating rules on April 6, 1971 The examination included references to the Potomac Yard Special Rules, on which he considered himself qualified.

The head brakeman was hired by Penn Central as a trainman on January 30, 1970 He was promoted to flagman on March 28, 1970, and to conductor on March 3, 1972. He was last examined on the Penn Central operating rules on February 8, 1972, but the examination did not include any references to the Potomac Yard Special Rules He had worked on trains which operate in and out of Potomac Yard frequently for about 1-1/2 years, but he did not consider himself qualified on the yard's special rules He was called for duty on train B-4 from an extra list.

The conductor was employed as a trainman in 1966 and was promoted to conductor on August 15, 1967. He had been working on trains which use Potomac Yard for about 6 years and had been assigned to train B-4 for about a week. His last examination on the Penn Central rules took place on March 24, 1972 and he considered himself qualified on the Potomac Yard Special Rules

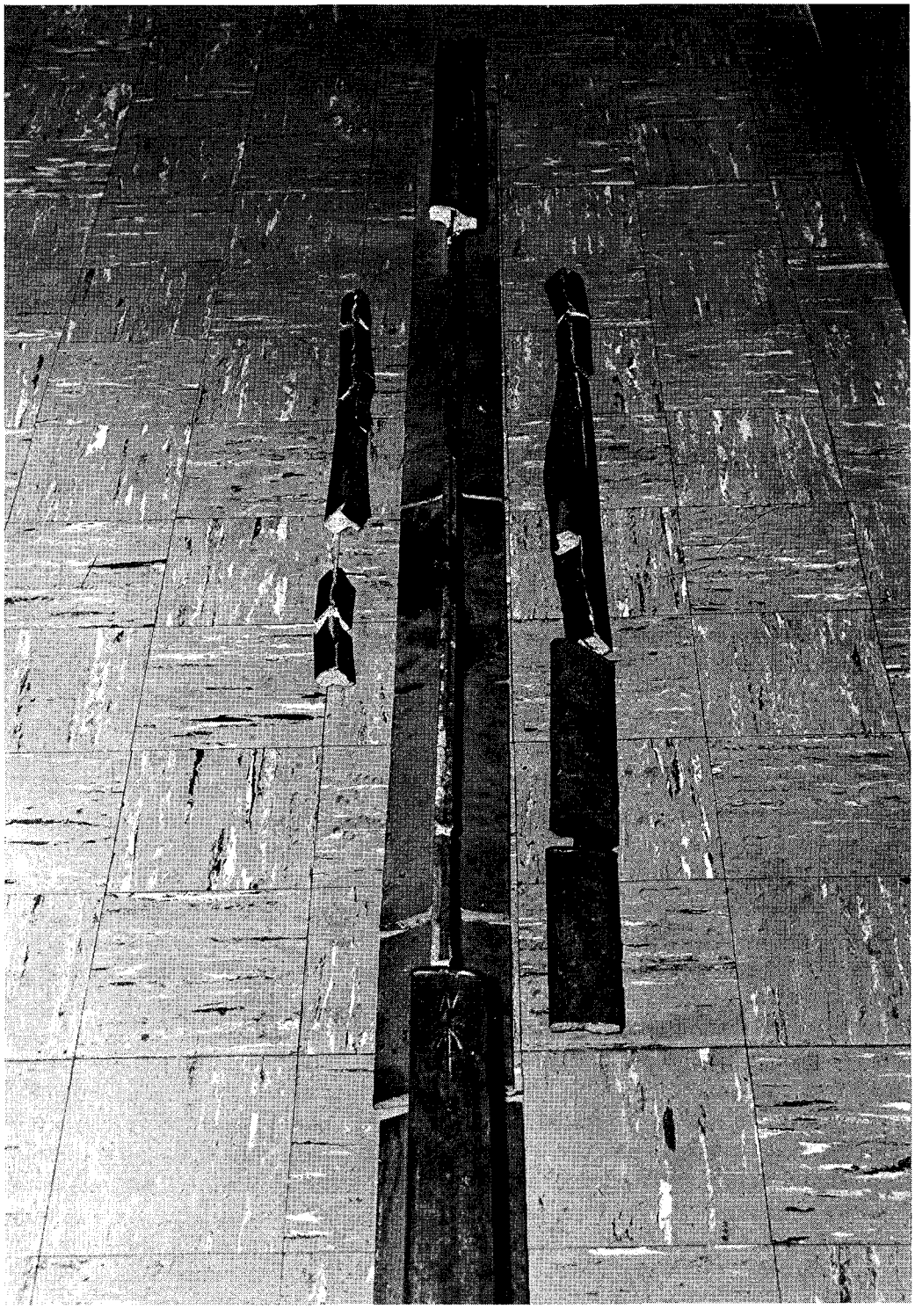

Figure 7. Section of broken rail from No. 1 southward receiving track.

The flagman was hired by the railroad in March 1971 He was last examined on the Penn Central rules on April 28, 1971 The examination did not include any references to the Potomac Yard Special Rules, and he did not have a copy of these rules, even though he had been working regularly on trains which use Potomac Yard

III ANALYSIS

Potomac Yard Operations

Although yard operations of tenant-line crews are governed by the Potomac Yard Special Rules and crews are required to qualify on the rules, the crews are not required to pass an examination on them Testimony by Penn Central crewmembers indicated that only in some cases had the Potomac Yard Special Rules been referred to in their annual review of rules.

The fact that the front brakeman of train B-4 had been working on trains which use Potomac Yard frequently even though he did not qualify on the yard's rules suggests the need for more stringent requirements for tenant-line crews For example, requirements could include classes on the rules conducted by the yard followed by a qualifying examination and annual reviews conducted by a rules examiner.

The fact that no one at the yard's two-way radio stations heard the Penn Central engineer's radio call could have been due to the location of the locomotive in a "dead spot" relative to Potomac Yard's receiver location or due to distracting activities at Desk 223 or in the yardmasters' offices It also is possible that Desk 223's radio was turned off or the volume was turned too low

It is unlikely, however, that the locomotive was in a dead spot, since the engineer was able to contact Virginia Interlocking and was then contacted by Desk 223 and since the engineer on the nearby Penn Central train heard the call from B-4

Even though the radio at Desk 223 may have been turned off, or other activities at the desk so demanding that the call was disregarded, it would seem that one of the hump yardmasters would have heard the call on his radio. Repeated calls from B-4, a train that the southbound yardmaster was expecting, should have been of interest to him, even though the call was not addressed to him. It is also significant that as soon as a crewmember on the passenger train mentioned an emergency brake application, the assistant trainmaster at Desk 223 responded to the call. It may be that if the engineer's call had indicated the urgency of the message he was about to transmit, Desk 223 may have been alerted to it.[5]

One can understand a possible "mental tuning out" of radio calls by personnel such as hump yardmasters, who are constantly subjected to radio conversations not addressed to themselves However, the engineer's call was addressed to Desk 223, and it is difficult to understand why two assistants to the trainmaster and an assistant trainmaster did not hear the call over a 7-minute period.

Activities of the B-4 Crewmembers

Penn Central Rules 106, 400N-1, and 400N-3 specifically assign to the conductor, the engineer, and the pilot joint responsibility for the safety of their train and the conduct of employees working with them. Rule 400N-3 specifies that engineers "will require the assistance of crewmembers in any duties relative to the prompt and safe movement of their trains ." This rule also states that: "The engineman is responsible for the vigilance and conduct of other employees on the engine.

[5] In International Radio communications, the word "PAN" is used to indicate an urgent radio message transmission (Rule 408, *The Standard Code of Operating Rules*)

He will see that they are familiar with their duties and instruct them if necessary "[6]

Penn Central Rules 102 and 102a and Potomac Yard Special Rule 52 clearly state that adjacent tracks *must* be protected when a train is stopped by an emergency brake application. Potomac Yard Special Rule 52 requires that:

> "When a sudden or severe application of the brakes takes place or an equipment failure occurs that may obstruct adjoining tracks, immediate action *must* be taken to protect any train or yard movement on adjacent tracks (Attention of crews using either northward or southward freight running tracks is directed to the fact that they are adjacent to passenger tracks.) The Assistant to the Trainmaster, Desk 223, *should* be notified immediately in order that he can *assist* in providing protection through the use of his radio systems." (Italics added.)

This rule leaves no doubt as to the priorities of action—first, "immediate action MUST be taken to protect any train or yard movement on adjacent tracks"; second, "Desk 223, SHOULD be notified immediately so that he can ASSIST in providing protection . " (Emphasis added.) It is quite clear that the rule intends Desk 223's role to be an assisting role. Rule 52 does not relieve the crews of their assigned responsibilities to protect adjacent tracks.

Therefore, when an emergency brake application halted the freight train, the engineer's primary responsibility was to ensure that adjacent tracks were protected Only then should he have attempted to notify Desk 223 The situation could have been handled properly if the engineer had simply instructed the brakeman to flag the adjacent tracks immediately.

If he considered it more important that the brakeman investigate the cause of the emergency stop, the engineer could have lighted a fusee and attempted to convey a stop signal to the passenger train from the locomotive window, or he could have tossed a lighted fusee onto the adjacent track, which was less than 15 feet away.

When his efforts to establish radio contact with Desk 223 failed initially, the engineer could have proceeded southward to the nearest telephone at milepost 108 and contacted the RF&P dispatcher in Richmond. (See Appendix A, Potomac Yard Special Rule 3(b)) The dispatcher may have been able to stop the passenger train by changing the signals or by instructing Desk 223 to radio the passenger train's engineer.

However, the engineer did none of these things because, as he stated, he thought his efforts to contact Desk 223 by radio fulfilled his responsibility. This indicates that although the engineer was unaware of the derailment, he did not understand the importance of ensuring that the second man on the locomotive understood and performed his duty properly He apparently was unaware of the fact that he was the supervisor of the head-end crew, as specified in Penn Central Rule 400N-3. If this hypothesis is correct, it may have been because the engineer's training was inadequate

Another possibility is that the engineer may have suffered a mental lapse which contributed to his failure to take immediate action to protect the adjacent tracks

The question arises as to whether the engineer's previous practice of not flagging when an emergency brake application occurred in yard tracks or whether his previous dependence on a fireman to flag trains may have contributed to the failure to protect the adjacent tracks In some Penn Central yards, conductors who do not have a radio in the caboose apply the brakes to inform the engineer that the caboose has cleared the switch of the track in

[6] For the exact working of applicable sections of the *Penn Central Rules for Conducting Transportation,* see Appendix B

which the train is being yarded However, the locomotive had only traveled a short distance on the No 1 receiving track, and the engineer must have known that the caboose could not have passed the track switch when the emergency brake application occurred

As for the brakeman, he knew that the adjacent track was used by passenger trains, but he elected to look for a possible ruptured airhose instead of flagging the main tracks

There are indications that the conductor also did not carry out his responsibilities fully The caboose stopped near the Solite switch, where a telephone box is located. (See Appendix A, Potomac Yard Special Rule 3(b).) If the conductor had gone to that telephone immediately and notified the RF&P dispatcher of the emergency brake application, the Southern Railway passenger train could have been held either at the Alexandria Station or at the crossover from the No 3 to the No. 2 main track.

The flagman apparently complied with Penn Central Rules 99 and 102 by protecting his end of the main track.

It is evident that the crewmembers of the freight train were not well versed in the Potomac Yard Special Rules. If they had been more familiar with them, they would have known the locations of the nearest telephones which they could have used to notify the RF&P dispatcher of the emergency brake application The dispatcher had direct communication with the central control point at Desk 223, and he also controlled the home signal north of Alexandria Station.

The accident indicates that the crews' on-the-job training for emergency situations may have been inadequate. The causes and consequences of this derailment and procedures which might have prevented the collision could easily be described in a training exercise. Trainees could then be tested on their understanding of the proper action to take when faced with a similar situation Formal instruction and examination followed by consistent interpretation and enforcement of the rules are standard methods of developing a corps of operating employees dedicated to safe, efficient train operations

The Passenger Train

This accident illustrates the fact that if derailed passenger cars remain upright and in line with the track structure, the probability of serious injury to occupants is slight. Moreover, the train's massive locomotive prevented serious damage to the coaches by clearing away the empty freight car obstructing the track.

The Track

There are few published criteria to assist railroad managers in determining the safety of second-hand rail for yard tracks The age of the rail, its weight, length, or wear characteristics do not disqualify its reuse. In this case, only the defect in the rail head made it unsafe for use in the No 1 southward receiving track.

Although sections 213 231 through 213.237 of the Federal Track Safety Standards require visual inspections of this class of track, the standards do not require a "continuous search" for internal defects in the rails of track below Class 4 over which freight trains operate. Moreover, the standards do not appear to require that all substandard conditions be found and corrected, but only require that inspections should be made in an effort to find and correct them

In the past, Potomac Yard employees inspected freight running tracks with rail defect-detector cars, but this inspection technique has not been used on yard tracks. This accident indicates that there may be a need to test yard tracks with rail defect-detectors wherever such tracks lie adjacent to mainline tracks and are used regularly by heavy freight trains.

Federal Track Safety Standards permit trains to operate at speeds up to 10 m.p.h. over rail with defects such as the one found in this track Section 213.113 only requires that a qualified person determine whether the track is safe for use. Therefore, it is possible that this accident could have happened even if an inspection had indicated the presence of a vertical split in the rail head. This is not to suggest that an inspector or supervisor necessarily would have determined the track safe for use had he known that the defect existed. However, the standards would have permitted a qualified person to make that determination.

IV CONCLUSIONS

1 The Penn Central Rules for Conducting Transportation and the Potomac Yard Special Rules specifically state what actions are required when a train is stopped suddenly by an emergency brake application

2 B-4 crewmembers were not well versed on the Potomac Yard Special Rules and Penn Central rules

3 Potomac Yard procedures do not ensure compliance with the requirement that tenant-line crews be qualified on the yard's special rules.

4. Penn Central freight train B-4 was operated in compliance with applicable rules at the time of derailment.

5. After the derailment, the engineer on B-4 did not comply with Penn Central Rules 102, 106, and 400N-3 or with Potomac Yard Special Rule 52; the head brakeman did not comply with Penn Central Rule 102 and Potomac Yard Special Rule 52; and the conductor did not comply with Penn Central Rule 106 in that he failed to make use of the telephone at the Solite switch to notify the RF&P dispatcher of the emergency brake application after the caboose stopped

6. Had the conductor telephoned him, the dispatcher could have set the home signal at the North Alexandria Interlocking at stop and prevented the collision.

7 Southern Railway Passenger train No 6 was operated in compliance with applicable rules

8 Potomac Yard track inspection procedures are not designed to detect internal rail defects

9. Federal Track Safety Standards do not prohibit the use of rail with internal defects in yard tracks adjacent to main tracks, despite the fact that applicable standards became effective on October 16, 1972, almost 6 months after this accident.

10. The operation of freight and passenger trains on adjacent tracks without adequate safeguards to prevent collisions between the two types of trains creates hazards which should be analyzed and controlled

V. PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of the derailment of the freight cars was a defective rail, which broke while the train was passing over it The probable cause of the collision between the passenger train on the adjacent main track and the derailed B-4 freight car was that the crewmembers of B-4 did not flag the passenger train as they were required to do by the operating rules

VI. RECOMMENDATIONS

The National Transportation Safety Board recommends that:

1. The Federal Railroad Administration modify Federal Track Safety Standards to insure that yard tracks adjacent to main tracks are maintained and inspected in such a way as to eliminate the probability of track-related derailments (Recommendation No. R-73-5). In this connection the Safety Board reiterates and emphasizes one of the Board's recommendations in its report on the derailment of a Penn Central freight train and the collision of one of its derailed cars containing hazardous material with a passenger train at Sound View, Conn., on October 8, 1970. The recommendation urged that the:

> "Federal Railroad Administration initiate studies to identify the hazards involved in the joint use of tracks by passenger and freight trains as a means of understanding the risks assumed. This study should be done jointly with the Urban Mass Transportation Administration and should include, but not be limited to, clearance, means of keeping derailed cars in line, danger of shifted lading, and systems for detecting when track space has been violated."

2 The Penn Central Transportation Company revise its training, testing, and enforcement program to ensure that employees are, in fact, qualified on all aspects of the jobs to which they are assigned (Recommendation No. R-73-6).

3 The Potomac Yard develop procedures for insuring that tenant-line employees are qualified on and comply with Potomac Yard Special Rules (Recommendation No. R-73-7).

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

/s/ JOHN H. REED
Chairman

/s/ FRANCIS H. McADAMS
Member

/s/ LOUIS M THAYER
Member

/s/ ISABEL A. BURGESS
Member

/s/ WILLIAM R. HALEY
Member

February 28, 1973

APPENDIX A

EXCERPTS FROM POTOMAC YARD SPECIAL RULES

Potomac Yard
Special Rules
For The
Government of Employees
of
Potomac Yard

The Baltimore and Ohio Railroad Company
The Chesapeake and Ohio Railway Company
The Penn Central Transportation Company
Richmond, Fredericksburg and Potomac
Railroad Company
Southern Railway Company

IN EFFECT
February 1, 1971

The following Special Rules govern Potomac Yard employees and employees of all lines operating into and out of Potomac Yard.

They take effect February 1, 1971, and cover the operation on all tracks within Potomac Yard between "RO" Interlocking and "AF" Interlocking, but do not apply to the passenger tracks between these two points

These Special Rules will supersede operating rules and any special instructions in conflict therewith. Otherwise, employees of lines using Potomac Yard facilities will be governed by the operating rules and special instructions of their respective employing lines

Except as superseded herein, Potomac Yard employees will be governed by the Book of Rules of the Richmond, Fredericksburg and Potomac Railroad Company.

J. F McGinley,
Superintendent

GENERAL RULES

B Potomac Yard employees will be required to pass a periodic oral examination on the rules, and those failing to do so will be required to pass a written examination to remain in the service

Employees of lines operating into and out of Potomac Yard must be qualified on the rules and physical characteristics of that portion of Potomac Yard over which their respective lines operate

3 TELEPHONES

(a) Telephones connected with the Potomac Yard automatic exchange are at various locations through the Terminal The following is a list of telephone extensions to be used in conjunction with yard and train operations:

Trainmaster's Office . .	216
Assistant Trainmaster .	223-235
Yardmaster's Office, Northbound Hump .	253
Yardmaster's Office, Southbound Hump . . .	266
Yardmaster, Consolidated Office.	205
Crew Clerk .	222

(b) Telephones connected with RF&P Train Dispatcher at Richmond:

3 Telephone box at the junction of the north ends of 4, 5, and 6 running tracks with the northward freight track

4 Telephone box at the Solite switch, west of the southbound freight track

5 Telephone box north of Signal 1091, west side of No 3 main track

6. Concrete telephone booth at the south home signal at the Duckunder

7 Concrete telephone booth south of the overhead bridge, between No. 5 and No 6 northward running tracks

8 Telephone box at No. 49 switch box

9 Telephone box, west side of No. 3 main track at MP 108

4. Two-way radio land based stations are at the following locations:

Location	Can Communicate With
Assistant Trainmaster, 223	Potomac Yard Channels 1 through 10, PC, RF&P, SOU, C&O
Yardmaster, and Hump Conductor, Southbound Hump	Potomac Yard Channels 1 through 10, RF&P, SOU, C&O
Yardmaster, and Hump Conductor, Northbound Hump	Potomac Yard Channels 1 through 10, RF&P, SOU, C&O

* * *

11 All trains, yard movements and engines must move at yard speed, unless the track is known to be clear Higher speed than yard speed is authorized where conditions of track ahead can be determined by signal indications in locations covered by Rule 15, in compliance with the provisions of Rule 14.

(a) Definition of speeds:

Medium Speed	– Not exceeding twenty-five(25) miles per hour.
Slow Speed	– Not exceeding fifteen (15) miles per hour through cross-overs and turnouts, then proceed at authorized speed
Restricted Speed	– Not exceeding fifteen (15) miles per hour, prepared to stop short of train, obstruction or switch not properly lined and to look out for broken rail.

Yard Speed — A speed that will permit stopping within one-half range of vision.

(b) Trains entering Potomac Yard will not exceed a speed of fifteen (15) miles per hour when any portion of train is moving over hand-operated or dual-control switches at entrance to respective receiving yards

* * *

13 The following are designated freight running tracks:

Assigned Direction	Limits From	To
(a) Southward	Connection with No 3 Main Track at "RO" Interlocking	Duckunder

* * *

18 An electrically illuminated track designation and yard instruction indicator to convey information relative to yarding of southward freight trains in the southward receiving yard, is located on the west side of the southward freight running track at "RO" The top set of figures displayed will indicate the track on which the southward train will be received The bottom set of figures will indicate the track on which the surplus cars will be placed

For example: 06
08

The track designation and yard instruction indicator displaying such an aspect will indicate to the southward train that the train will be received on No. 6 track, southward receiving yard, and that surplus cars will be placed on No 8 track.

In the event a train is to be received on No. 1 running track or No 2 running track, track designation indicator at "RO" will display aspect as outlined below:

R 01 or R 02

19. Five (5) indicators are located south of the Duckunder to govern southward movements into and northward movements out of Potomac Yard
(a) Indicator governing southward movement from the southward freight running track through the dual control switches leading to 1, 2, and 3 running tracks in the southbound receiving yard is located 912 feet south of the Duckunder on the west side of that track

* * *

20 (a) Southward freight trains to be yarded on No 1 or No 2 running tracks will proceed directly into designated track at Duckunder on proper signal indication, and not exceeding yard speed (Rule 11)

* * *

52 When a sudden or severe application of the brakes takes place or an equipment failure occurs that may obstruct adjoining tracks, immediate action must be taken to protect any train or yard movement on adjacent tracks. (Attention of crews using either northward or southward freight running tracks is directed to the fact that they are adjacent to passenger tracks) The Assistant to Trainmaster, Desk 223, should be notified immediately in order that he can assist in providing protection through the use of his radio systems.

* * *

APPENDIX B
EXCERPTS FROM PENN CENTRAL RULES FOR CONDUCTING TRANSPORTATION

102 When a train is disabled or stopped suddenly by an emergency application of air brakes or other causes, adjacent tracks as well as tracks of other railroads that are liable to be obstructed must, while stopping and when stopped, be protected in both directions until it is ascertained they are safe and clear for the movement of trains

102a When a train is stopped or delayed from any cause including "Stop Signal" (Rule 292), the conductor, engineman, or member of their crew, when authorized by the conductor or engineman must, as soon as the safety of their train will permit, ascertain the cause and, when practicable, communicate with the Train Dispatcher or operator.

106. The conductor, enginemen, and pilot are responsible for the safety of the train and the observance of the rules, and under conditions not provided for by the rules, must take every precaution for protection This does not relieve other employees of their responsibility under the rules

108 In case of doubt or uncertainty, the safe course must be taken

Conductor

* * *

400N-1. Conductors have general charge of the train to which assigned and all persons employed thereon are subject to their instructions. They are responsible for the prompt movement, safety, and care of their respective trains and the passengers and commodities carried, for the vigilance and conduct of the men employed thereon and for the prompt reporting to the Superintendent of conditions that interfere with the prompt and safe movement of trains

Engineman

* * *

400N-3. They will require the assistance of crewmembers in any duties relative to the prompt and safe movement of their trains, engine and cars, promptly reporting irregularities or failures

* * *

The engineman is responsible for the vigilance and conduct of other employees on the engine He will see that they are familiar with their duties and instruct them if necessary

73380