RAILROAD ACCIDENT INVESTIGATION

Report No 4002

THE PENNSYLVANIA RAILROAD COMPANY

HARRISON, N J

JULY 24, 1963

INTERSTATE COMMERCE COMMISSION

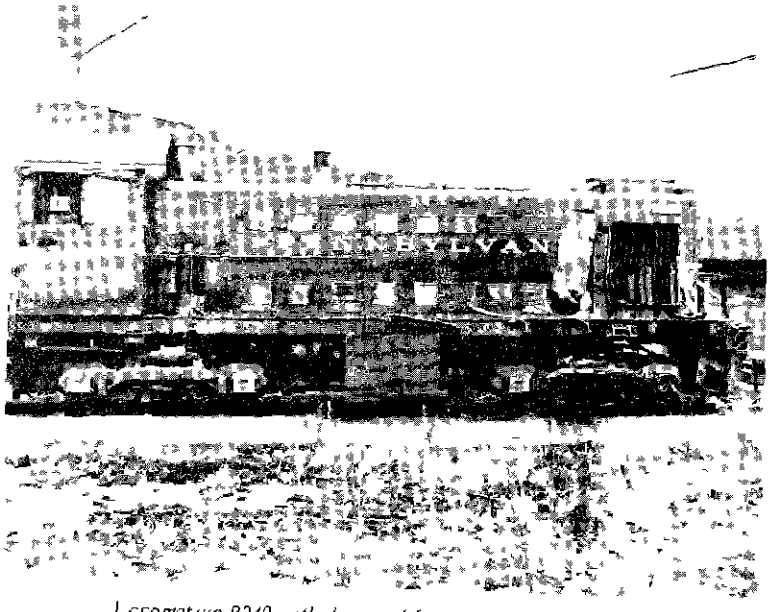
Washington

SUMMARY

DATE	July 24, 1963	
RAILROAD	Pennsylvania	
LOCATION	Harrison, N J	
KIND OF ACCIDENT	Side Collision	
EQUIPMENT INVOLVED	Passenger	Locomotive with cars
TRAIN NUMBER	3319	
LOCOMOTIVE NUMBER		Diesel-electric unit 9240
CONSISTS	4 electrically-propelled passenger units	10 cars and units
SPEEDS	25 m p h	Standing
OPERATION	Interlocking	
TRACKS	Four, tangent, level	
WEATHER	Clear	
TIME	12 06 a m	
CASUALTIES	2 killed, 27 injured	

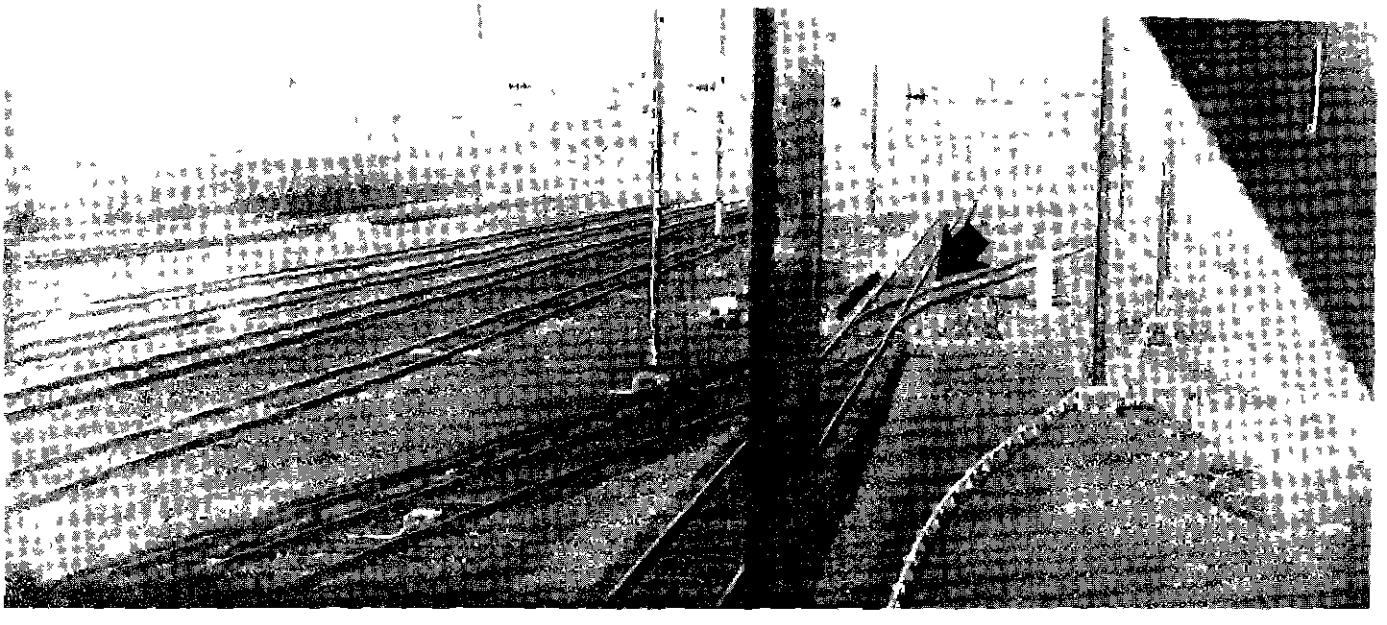
CAUSE — Failure of an interlocking system to indicate occupancy of a track section and failure of the interlocking operator to operate the interlocking system in accordance with special instructions governing routes with rusty rails

RECOMMENDATION — That the Pennsylvania Railroad Company take appropriate action to insure adequate protection for trains at known locations subject to conditions adversely effecting shunting of track circuits



Locomotive 9240 with damaged front end showing at right

Damage to first three cars of No 3319



View westward from operator s station at Hudson interlocking Point of accident marked by arrow at fouling point of tracks No 4 and No 8 at right

INTERSTATE COMMERCE COMMISSION

Report No. 4002

IN THE MATTER OF MAKING ACCIDENT INVESTIGATION REPORTS UNDER THE ACCIDENT REPORTS ACT OF MAY 6, 1910

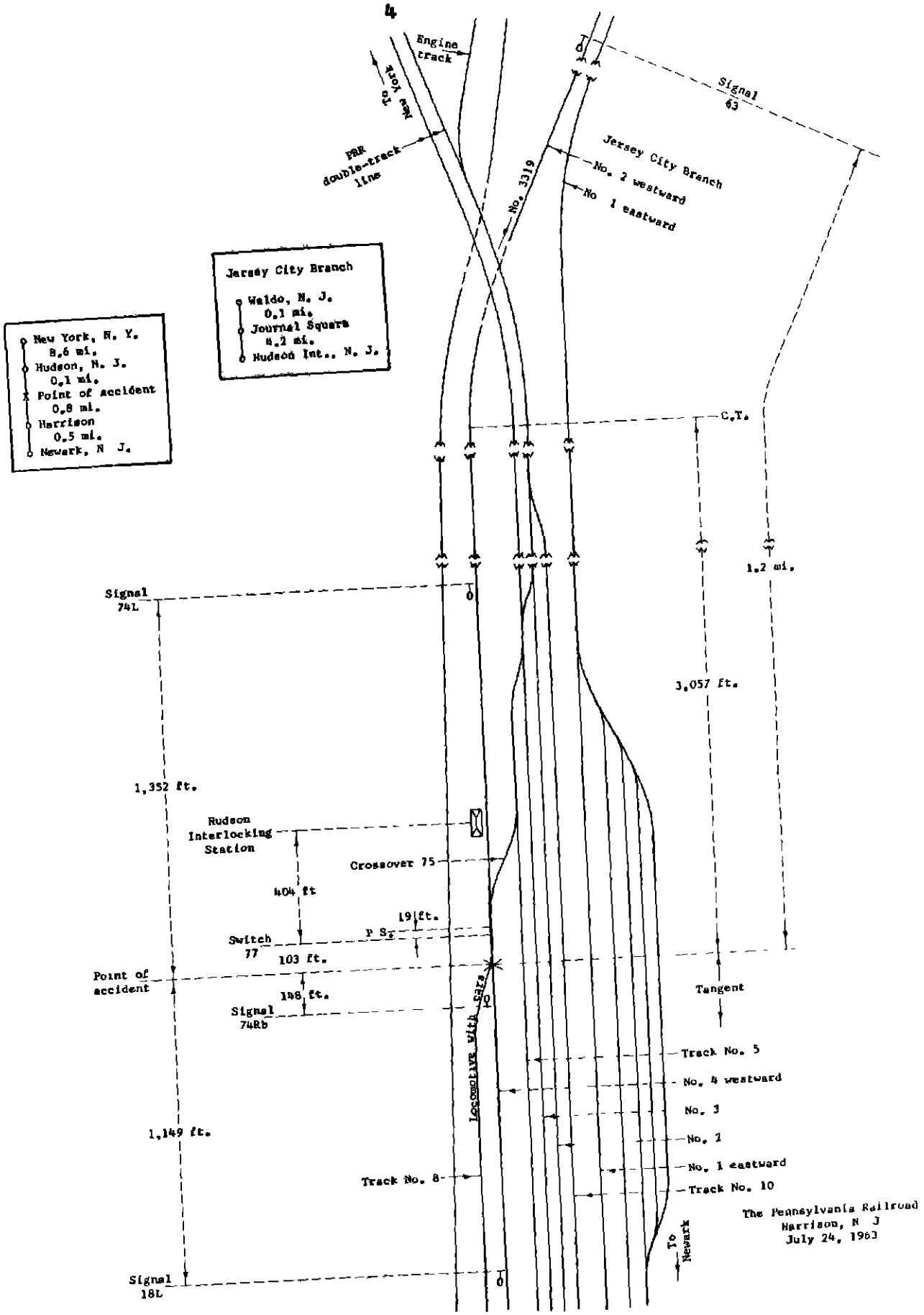
The Pennsylvania Railroad Company

Accident at Harrison, N J , on July 24, 1963, caused by failure of an interlocking system to indicate occupancy of a track section, and failure of the interlocking operator to operate the interlocking system in accordance with special instructions governing routes with rusty rails

REPORT OF THE COMMISSION

SAFETY AND SERVICE BOARD NO 1

On July 24, 1963 at Harrison, N J , there was a side collision between a passenger train and a locomotive with cars on the Pennsylvania Railroad, which resulted in the death of 2 passengers and in the injury of 25 passengers and 2 train-service employees This accident was investigated in conjunction with representatives of the New Jersey Department of Public Utilities.



The Pennsylvania Railroad
Harrison, N J
July 24, 1963

Location of Accident and Method of Operation

This accident occurred on that part of the New York Region of the Pennsylvania Railroad extending between Newark, N J , and New York, N Y , 10 miles An interlocking, designated as Hudson, is located at Harrison, N J , 0 5 miles east of Newark The accident occurred within limits of this interlocking at a point 507 feet west of the interlocking station and 0 8 miles east of the station at Harrison

Between Newark and the east end of Hudson interlocking, trains of the Pennsylvania Railroad Company (PRR) and joint service trains of the PRR and the Port Authority Trans-Hudson Corporation (PATH) are operated over a 4-track system From the north, the main tracks of this system are designated as No 4, westward, No 3, No 2, and No 1, eastward Trains moving with the current of traffic on tracks No 4 and No 1 are operated by timetable, train orders, and an automatic block-signal system, supplemented by a cab-signal system Trains moving in either direction on tracks No 3 and No 2 are operated by signal indications of an automatic block-signal system, supplemented by a cab-signal system

Between the east end of Hudson interlocking and New York, PRR trains operate over a double-track line Another double-track line of the PRR extends eastward from the interlocking It is designated as the Jersey City Branch and extends to Waldo, N J , 4 3 miles From the north, the main tracks of the Jersey City Branch are designated as tracks No 2 westward, and No 1 eastward PRR trains and PRR-PATH joint service passenger trains are operated over the Jersey City Branch, and such trains moving with the current of traffic are operated by signal indications of an automatic block-signal system,, supplemented by a cab signal system

Several auxiliary tracks parallel the main tracks of the four-track line within limits of Hudson interlocking Auxiliary track No 8 parallels track No 4 on the north at a distance of about 25 feet Its east end is connected to track No. 4 at a switch located 404 feet west of the interlocking station This switch is designated as switch 77 The accident occurred 103 feet west of switch 77, at the fouling point of track No 4 and the east end of track No 8 For details concerning the tracks in the vicinity of Hudson interlocking, see Appendix I and the sketch at the front of this report

Semi-automatic signals 18L and 74L, governing westbound movements on track No. 4 of the four-track line, and automatic signal 63, governing westbound movements on track No 2 of the Jersey City Branch and track No 4 of the four-track line, are located, respectively, 1,149 feet west, 1,352 feet east, and 1 2 miles east of the point of accident Semi-automatic signal 74Rb, a dwarf signal, governing eastbound movements from auxiliary track No 8 to track No 4, is located 148 feet west of the point of accident The semi-automatic signals mentioned above and the switches of the interlocking are controlled from the interlocking machine at Hudson interlocking station For details concerning these signals and the interlocking machine, see Appendix II

The maximum authorized speed for PRR-PATH joint service trains in the vicinity of the accident is 45 miles per hour For pertinent provisions of the PRR operating rules, refer to Appendix III

Description and Discussion of Accident

At 10 59 p m on the day preceding the day of the accident, a PRR train and engine crew, consisting of an engineer, a fireman, a conductor and a brakeman, reported on duty at Newark for

switching service in the area of Hudson interlocking Some time afterward, the conductor received instructions to remove a cut of seven head-end cars from track No 5 at Hudson interlocking, couple it to a cut of three electrically-propelled passenger units standing on track No 8, and leave the combined cut on track No 8 west of signal 74Rb About 11 40 p m , the PRR train and engine crew departed from Newark on diesel-electric unit 9240 and proceeded eastward to Hudson interlocking Before departure from Newark, the conductor telephoned the operator at the interlocking and informed him of the switching movements required at that point None of the members of the PRR crew had any further communication with the interlocking operator prior to the accident

After arrival at Hudson interlocking, locomotive 9240 entered the east end of track No 5 and moved to a point west of the crossover connecting this track to track No 4, where it was coupled to the cut of cars When the air hose were coupled and the brakes tested, the locomotive proceeded eastward with the cut of seven cars and stopped on track No 5 at a point a short distance east of the crossover connecting tracks No 5 and No 4 About 12 02 a m , after the interlocking operator established the route for movement from track No 5 to track No 8, the locomotive shoved the cut of seven cars westward through the crossover and switch 77, and stopped momentarily on the east end of track No. 8 with the west end of the cut of seven cars about 20 feet from the cut of three passenger units, which was standing on track No 8 a short distance west of signal 74Rb At this time the locomotive fouled track No 4 Both enginemen were in the control compartment at its west, or rear, end, and both the conductor and the brakeman were in the vicinity of the west end of the cut of seven cars The headlight at the front of the locomotive was lighted dimly

About 12 02 a m , locomotive 9240 shoved the cut of seven cars westward on track No 8 toward a coupling with the cut of three passenger units The first attempt to make this coupling was unsuccessful, and the locomotive was moved a few feet eastward with the seven cars to enable the conductor and the brakeman to adjust the couplers involved The locomotive then shoved the cut of seven cars and coupled it to the three units, at which time it stopped on the east end of track No 8 with its front end fouling track No 4 The brakeman began coupling the air hose in preparation for movement of the locomotive and the combined cut westward on track No 8 to a point west of signal 74Rb and clear of track No 4 While the brakeman was coupling air hose, the conductor observed westbound passenger train No 3319 closely approaching on track No 4 and realized it would collide with the locomotive He promptly pulled the brakeman from between the cars About the same time, No 3319 struck locomotive 9240, at the fouling point of track No 4 and the east end of track No 8

Locomotive 9240 with the cut to which it was coupled was moved six feet westward by the impact None of this equipment was derailed None of the members or the crew was injured Both enginemen were looking westward at the time of the collision and were unaware of anything wrong until the collision occurred

No 3319, a westbound first-class passenger train, consisted of four electrically-propelled units as described in Appendix I It approached Hudson interlocking at a speed of about 45 miles per hour The engineer was in the control compartment at the front of the first unit, and the other members of the crew were at various locations in the cars The brakes, and the cab signal at the engineer's station, had been tested and had functioned properly when used en route The headlight was lighted The weather was clear No 3319 was a PRR-PATH joint service train and the

members of the crew were PATH employees This train departed from Hudson Terminal, New York City, at 11 50 p m , on time, and operated as a PATH train on the PATH line to Waldo, where it entered the Jersey City Branch of the PRR and operated westward as a PRR train It passed Waldo at midnight, on time A few moments later, it stopped at Journal Square, Jersey City, N J , 4 2 miles east of Hudson interlocking Soon thereafter, it departed westward on track No 2 of the New Jersey Branch, en route to Newark via Hudson interlocking As the train approached the interlocking, the engineer observed signal 63 displaying an Approach aspect and then observed this aspect change to Clear, which indicated to him that a route had been established through the interlocking for movement of his train to the station at Harrison As the train proceeded westward in the block of signal 63 and entered track No 4 of the four-track line, the aspect displayed by the cab signal conformed with the Clear aspect displayed by wayside signal 63 When wayside signal 74L came into his view, the engineer observed it displayed an Approach-medium aspect Soon afterward, when the train passed this wayside signal the aspect displayed by the cab signal changed to Approach-medium and the whistle associated with the cab signal sounded The engineer promptly acknowledged this by depressing the pedal of the acknowledger switch About the same time, he started to reduce the speed by a gradual application of the brakes

A few moments later, while No 3319 was closely approaching the Hudson interlocking station, the engineer observed locomotive 9240 standing on the east end of track No 8 with its headlight dimmed, and he dimmed the headlight of his train About the same time, he noticed locomotive 9240 was close to track No 4 The engineer said he promptly looked at the cab signal to see whether its aspect had changed and observed it still displayed an Approach-medium aspect, which indicated to him that the locomotive ahead was clear of track No 4 He said the speed of his train was reduced to about 25 miles per hour in close approach to the east end of track No 8, and that he did not realize the locomotive ahead was fouling track No 4 until the collision was imminent He promptly removed his hand from the handle of the controller, causing an emergency application of the brakes He then left his position at the controls The collision occurred immediately afterward, before the speed of the train was materially reduced by the emergency brake application

No 3319 stopped on track No 4 with the front end 148 feet west of the point of accident There were no separations The rear wheels of the front truck of the first unit were derailed The north side of the superstructure of the first three units was torn out as a result of contact with the right side of the front end of locomotive 9240 Two passengers were killed The conductor, a ticket collector, and 25 passengers were injured

At the time of the accident, the rails of several routes through the interlocking were coated with rust These routes included 10 switches, including switch 77 and the switches of crossover 75, the crossover connecting tracks No 5 and No 4 A list of the switches involving "rusty rail" routes was posted under glass on the track model board associated with the interlocking machine A blocking device had been applied to each interlocking machine lever controlling a switch shown on the list posted on the track model board In addition, a "rusty rail" sign had been attached to each of these levers

Shortly after locomotive 9240 was attached to the cut of seven cars at Hudson interlocking it proceeded eastward and stopped on track No 5 at a point a short distance east of crossover 75 About the same time, the operator of the interlocking removed blocking devices from the inter-

locking machine levers controlling switch 77 and the switches of crossover 75 He then operated these levers to establish the route for the locomotive to shove the cut of seven cars westward through the crossover and switch 77 to the cut of three cars standing on track No 8 The operator said he could not recall ever having observed a "rusty rail" sign attached to the lever controlling switch 77 He said, however, that he was familiar with the "rusty rail" list posted on the track model board but had forgotten switch 77 was included therein

About the time locomotive 9240 shoved the cut of seven cars onto the east end of track No 8, the interlocking operator was informed by telephone of the approach of a two-unit locomotive from the east on the engine track Immediately thereafter, he was instructed by the train dispatcher to line a route through the interlocking for the two-unit locomotive to proceed westward on track No 3 of the four-track line Upon receipt of these instructions, the operator looked at the track model board associated with the interlocking machine and observed the indicator light for switch 77 was illuminated He said that because of this and the absence of a "rusty rail" sign on the interlocking machine lever controlling switch 77, he assumed locomotive 9240 with the combined cut of 10 cars had cleared track No 4 and was occupying track No 8 west of signal 74Rb The operator then rose from his seat to line a route through the interlocking for movement of the westbound two-unit locomotive on track No 3 He said he glanced westward through a window of the interlocking station as he walked to the interlocking machine, and that at this time he thought he saw locomotive 9240 standing on track No 8 clear of track No 4 He then operated levers of the interlocking machine and established the route for the westbound two-unit locomotive on the engine track to proceed through the interlocking About the same time, he operated the interlocking machine levers controlling switch 77 and signal 74L, and established the route for No 3319 to proceed westward through the interlocking on track No 4 He said No 3319 passed the interlocking station at 12 06 a m , and he was unaware of anything wrong until the collision occurred

Examination of the signals and the signal circuits involved disclosed no indication of a defective condition other than the rusty condition of the rails

Examination of the track structure involved revealed that the heads of the rails of track No 8 between signal 74Rb and switch 77 were heavily coated with rust

Examination shortly after the accident occurred revealed that a bracket for holding a "rusty rail" sign was not attached to the interlocking machine lever controlling switch 77 Marks found on the lever indicated such a bracket had been applied to the lever, and that it had been forcibly removed

In a test made the day after the accident a locomotive intermittently failed to shunt the track circuit between the point of switch 77 and signal 74Rb, as indicated by intermittent illumination of the indicator light associated with the interlocking machine lever controlling switch 77

A signal maintainer said that on July 21, 1963, during his last tour of duty prior to the accident, he observed the interlocking machine lever controlling switch 77 was provided with a "rusty rail" sign According to the operator and the leverman who worked at Hudson interlocking from 6 00 a m to 2 00 p m on July 23rd, the day preceding the accident, this lever was provided with a "rusty rail" sign

The investigation disclosed that locomotive 9240 and the cut of ten cars and units stopped on the east turnout of track No 8 with the front end fouling track No 4 The first two cars imme-

diately west of the locomotive were stopped on track No 8 east of signal 74Rb Under these circumstances, the locomotive and the first two cars should have shunted the track circuit and caused signals 63 and 74L to display Approach and Stop-signal aspects, respectively However, the heavy coat of rust on the rails prevented the shunting of the track circuit Shortly before No 3319 was due at Hudson interlocking, the operator observed the indicator light for switch 77 was illuminated This indicated to him that locomotive 9240 was clear of track No 4 He proceeded to the interlocking machine, where he operated the levers controlling switch 77 and the switches of crossover 75 to establish the route for movement of No 3319 through the interlocking on track No 4 As a result of the failure to shunt the track circuit the interlocking operator was able to establish this route for No 3319 and cause signals 63 and 74L to display Clear and Approach-medium aspects, respectively Soon after the route was established, No 3319 approached the interlocking and passed signals 63 and 74L at a speed of about 45 miles per hour Immediately after passing the latter signal, which displayed an Approach-medium aspect, the engineer began a gradual application of the brakes to reduce the speed as required, and the speed was reduced to about 25 miles per hour in close approach to the east turnout of track No 8 When the engineer observed that locomotive 9240 was fouling track No 4 he immediately made an emergency brake application, and the collision occurred immediately thereafter If the track circuits had been properly shunted, signal 74L would have displayed a Stop aspect Under these circumstances, No 3319 would have been required to stop short of signal 74L, and the accident would have been averted

Under the rules, the crew of locomotive 9240 was not required to provide protection against No 3319 or other trains while operating within limits of Hudson interlocking

The investigation disclosed the interlocking operator involved had been notified, by means of a list posted on the track model board, that switch 77 and the switches of crossover 75 involved routes having rails covered with rust The interlocking machine levers controlling these switches had been blocked by blocking devices as required, and a "rusty rail" sign had been attached to each of these levers as also required by the carrier However, the operator said he did not observe a "rusty rail" sign attached to the lever controlling switch 77, and that he had forgotten this switch was included in the list posted on the track model board Although the carrier's special instructions governing the operation of interlockings prescribe that the indicator lights of a track model board cannot be depended upon when the rails of the interlocking route involved are covered with rust, it is evident the interlocking operator improperly relied upon the indicator light associated with switch 77 when he assumed locomotive 9240 with the cut of 10 cars was clear of track No 4 It is also evident he operated the lever controlling switch 77 and established the route for movement of No 3319 on track No 4 without knowing whether locomotive 9240 was clear of switch 77 and track No 4 as required by rule

Cause

This accident was caused by failure of an interlocking system to indicate occupancy of a track section, and failure of the interlocking operator to operate the interlocking system in accordance with special instructions governing routes with rusty rails

Recommendation

It is recommended that the Pennsylvania Railroad Company take appropriate action to insure adequate protection for trains at known locations subject to conditions adversely affecting shunting of track circuits

Dated at Washington, D C , this twenty-third day of June, 1964

By the Commission, Safety and Service Board No 1

(SEAL)

HAROLD D McCOY,

Secretary

Appendix I

Description of Accident Area

The PRR 4-track line extends eastward from Newark to the east end of Hudson interlocking Within limits of this interlocking, auxiliary tracks No 8, No 5 and No 10 parallel the 4-track line Auxiliary track No 8 parallels track No 4 on the north, and its east end is connected to track No 4 by a No 10 turnout The switch of this turnout is 404 feet west of the interlocking station. It is designated as switch 77 and is facing point for westbound movements on track No 4 Auxiliary track No 5 is laid between tracks No 4 and No 3, and is connected to track No 4 by a crossover, which is designated as crossover 75 The west switch of this crossover is trailing point for westward movements on track No 4 and is located 19 feet east of switch 77 Auxiliary track No 10 is laid between tracks No 2 and No 1 Other auxiliary tracks are located within limits of the interlocking as indicated in the sketch at the front of this report The switches of the interlocking are power operated and are controlled from the interlocking machine at the interlocking station.

Tracks No 3 and No 2 of the 4-track line extend eastward from Hudson interlocking as shown in the sketch and form the main tracks of the double-track line over which PRR trains only are operated between the interlocking and New York City This double-track line is not involved in the accident

Tracks No 4 and No 1 of the 4-track line also extend eastward from the interlocking They form, respectively, tracks No 2 westward and No 1 eastward of the Jersey City Branch At a point 3,177 feet east of the interlocking station, track No 2 of the Jersey City Branch crosses the other double-track line by means of an underpass as indicated in the sketch at the front of this report

From the east on track No 4 there is a tangent 3,057 feet to the point of accident and a considerable distance westward In this vicinity, the grade is practically level

In the territory involved, catenary and third-rail systems are provided for the electric propulsion of trains

Description of Passenger Train Involved

The four units of No 3319 were of all-steel construction and were operated in multiple-unit control The first and fourth units were power units and the other two were trailer units Each unit was about 51 feet long and was equipped with seats for 44 passengers

An engineer's station is located at the right side of one end of each unit and is provided with a four-indication cab signal A safety control feature is also provided If the handle of the brake valve is in release, running or partial service position and downward pressure on the handle of the propulsion controller is released, an emergency application of the brakes occurs

Appendix II

Details Related to Signals Involved and Interlocking Machine

The wayside signals involved are of the position-light type and are continuously lighted The aspects applicable to this investigation and the corresponding indications and names are as follows

Signal	*Aspect*	*Indication*	*Name*
74L	3 amber lights in horizontal position	Stop	Stop-signal
	3 amber lights in diagonal position to the right over 3 amber lights in vertical position	Proceed approaching next signal at Medium speed	Approach-medium
63	3 white lights in vertical position	Proceed	Clear
63 18L	3 amber lights in diagonal position to the right	Proceed prepared to stop at next signal Train exceeding Medium speed must at once reduce to that speed	Approach
74Rb	2 white lights in horizontal position	Stop	Stop-signal

Signals 18L, 74L, and 74Rb are controlled from the interlocking machine at Hudson interlocking station This machine is of the electro-pneumatic type and is equipped with 55 working levers in an 83-lever frame A track model board is associated with the interlocking machine and is provided with indicator lights to show track occupancy When a track section is occupied, the indicator light for that section is extinguished Approach, time, route, and signal indication locking are provided The controlling circuits are so arranged that when signal 18L displays an Approach aspect and the route is established for movement of a westbound train on track No 2 of the Jersey City Branch through the interlocking via track No 4, signal 74Rb indicates Stop, signal 74L displays an Approach-medium aspect, and signal 63 displays a Clear aspect If signal 18L displays an Approach aspect with the route so lined and the track section between signals 74L and 74Rb is occupied, signal 74L indicates Stop and signal 63 displays an Approach aspect

When a locomotive equipped with a cab signal passes a wayside signal, the aspect displayed by the cab signal changes, if necessary, to conform with the aspect displayed by the wayside signal A whistle in the control compartment sounds when the aspect of the cab signal changes to a more restrictive aspect, and continues to sound until the engineer actuates an acknowledger switch by depressing a pedal on the floor in front of his position

A metal holder for a "rusty rail" sign had been attached to each interlocking machine lever controlling a switch of a "rusty rail" route This holder was 2-3/8 inches long and 1 inch wide and was secured by a bracket to the shank of the lever Its front side was grooved at the top and bottom for insertion of the "rusty rail" sign This sign consisted of aluminum sheet metal and was 2-1/8 inches long and 1 inch wide It carried the words "RUSTY RAIL" in white on a red background.

A blocking device had been secured by a spring clip to each lever controlling the switch of a "rusty rail route."

Appendix III

Pertinent Provisions of PRR Operating Rules and Special Instructions

OPERATING RULES

Medium Speed - Not exceeding one-half the speed authorized for passenger trains but not exceeding 30 miles per hour

17 The headlight will be displayed to the front of every train by day and by night

It must be dimmed at night

(a) While passing through yards,

* * *

(d) On two or more tracks approaching a train in the opposite direction,

* * *

605 Interlocking signals govern the use of the routes of an interlocking, and as to movements within interlocking limits that are protected by home signals and distant signals, their indications supersede the superiority of trains, and engine and train crews are relieved from observing Rule 99 * * *

617 Operating levers must be blocked with standard blocking devices to indicate that the operation of the lever is restricted when a track * * * *is obstructed*

SPECIAL INSTRUCTIONS GOVERNING OPERATION OF INTERLOCKINGS

11 When notified by the signal maintainer that the head of the rail in track circuit territory is covered with rust, sand, coal or any other substance that may interfere with the proper shunting of track circuits, the indication lights cannot be depended upon and must not be accepted as indicating that track sections involved are clear The levers controlling the routes involved must be secured with the approved blocking device which must not be removed except during lever operation, and a "Rusty Rail" sign must be attached After a train or engine movement has started the blocking devices must not be removed nor the levers operated until it is known that the movement is clear of all switches involved.

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