

RAILROAD ACCIDENT INVESTIGATION

Ex Parte No 215

THE CENTRAL RAILROAD COMPANY OF NEW JERSEY

ELIZABETHPORT, N J

SEPTEMBER 15, 1958

INTERSTATE COMMERCE COMMISSION

Washington

INTERSTATE COMMERCE COMMISSION

Ex Parte No 215

ACCIDENT NEAR ELIZABETHPORT, N J

Decided October 31, 1958

Accident near Elizabethport N J , on September 15, 1958, caused by failure to operate the passenger train in accordance with signal indications

Richard J Lally and Elmer T Pettengill for The Central Railroad Company of New Jersey

Joseph P Lordi, F Michael Caruso and Thomas F Fallon for the State of New Jersey - Board of Public Utility Commissioners

Lt John A Sloan for the Department of Public Safety, Bayonne, New Jersey

Edward F Zampella for the Prosecutor of Hudson County, New Jersey

Thomas J Harkins and Walter W Ramsay for the Brotherhood of Locomotive Engineers

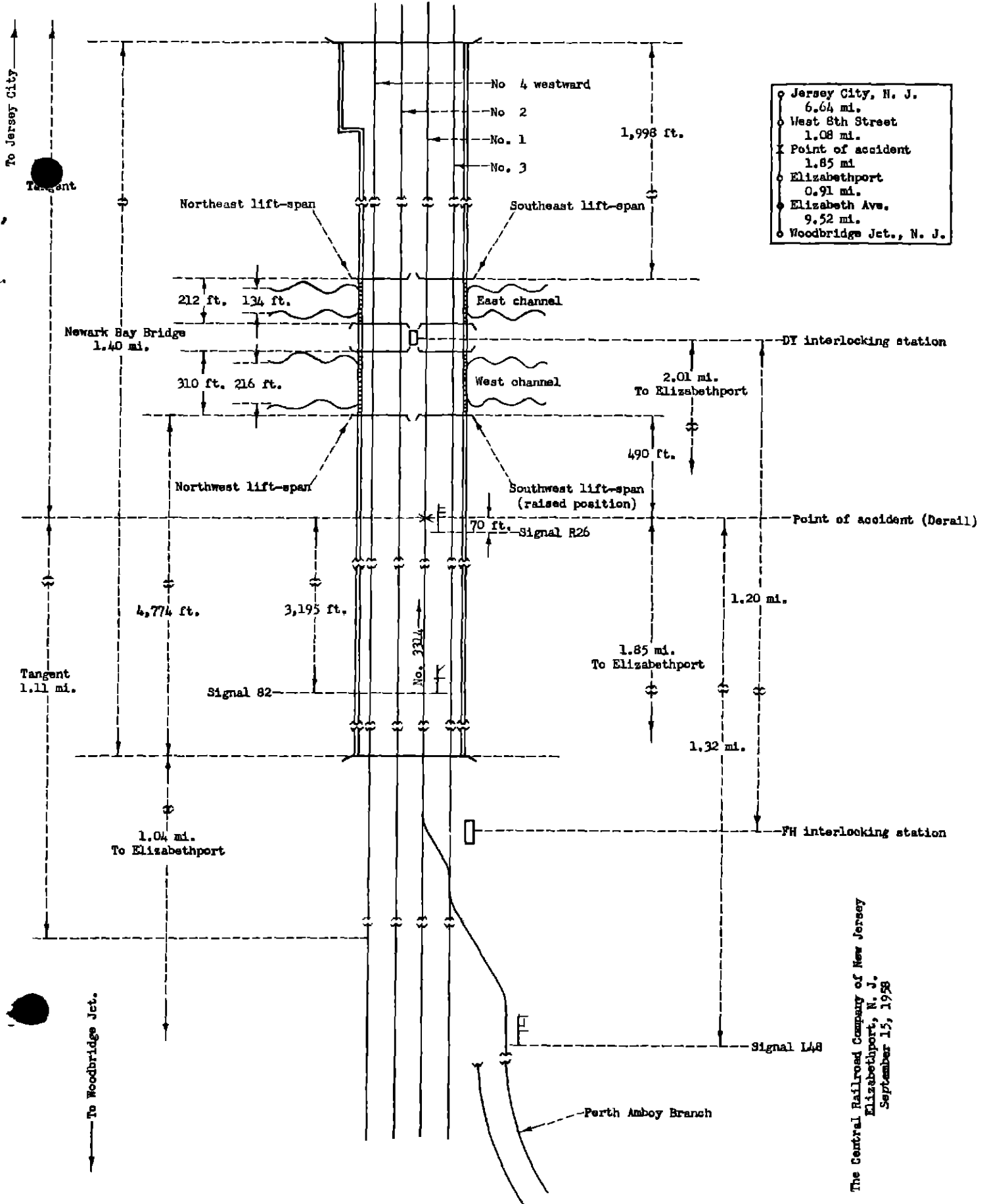
William H Gilfoill, Richard Browner and M L Mellett for The Brotherhood of Locomotive Firemen and Enginemen

REPORT OF THE COMMISSION

DIVISION 3, COMMISSIONERS TUGGLE, MURPHY, AND McPHERSON

TUGGLE Commissioner

This is an investigation by the Commission on its own motion with respect to the facts, conditions, and circumstances connected with an accident which occurred on the Central Railroad of New Jersey near Elizabethport, N J , on September 15, 1958. Hearing was had at New York, N Y , on September 18 and 19, 1958. The accident was a derailment of a passenger train approaching a movable section of a bridge which had been opened for passage of a vessel, in which the locomotive and forward portion of the train fell into the water of the transverse channel under the raised lift span of the bridge. This accident resulted in the death of 44 passengers and 4 train-service employees, and the injury of 46 passengers and 2 train-service employees.



- | | | |
|---|------------------------|----------|
| ○ | Jersey City, N. J. | 6.64 mi. |
| ○ | West 8th Street | 1.08 mi. |
| ○ | Point of accident | 1.85 mi. |
| ○ | Elizabethport | 0.91 mi. |
| ○ | Elizabeth Ave. | 9.52 mi. |
| ○ | Woodbridge Jct., N. J. | |

The Central Railroad Company of New Jersey
 Elizabethport, N. J.
 September 15, 1958

Location of Accident and Method of Operation

This accident occurred on that part of the Central Division extending between Woodbridge Jct and Jersey City, N. J., 20.00 miles, via the Perth Amboy Branch and Elizabethport, N. J. Elizabethport is located 10.43 miles east of Woodbridge Jct. That part of the railroad extending between Woodbridge Jct and Elizabeth Ave., 9.52 miles, is designated as the Perth Amboy Branch. In the vicinity of the point of accident the railroad consists of a 4-track line. The main tracks from north to south are designated as No. 4 westward, and Nos. 2, 1, and 3. Trains moving with the current of traffic on track No. 4 and in either direction on the other main tracks are operated by signal indications. Trains of the Central Railroad of New Jersey, hereinafter referred to as the C. N. J., regularly are operated over that part of the New York and Long Branch Railroad, hereinafter referred to as the N. Y. & L. B., extending between Bayhead Jct and Woodbridge, N. J., 39.70 miles. Between Elizabethport and West 8th Street, Bayonne, N. J., 2.93 miles, the main tracks span two channels of Newark Bay on a bridge 1.40 miles in length designated as the Newark Bay Bridge. The west end of the bridge is located 1.04 miles east of the station at Elizabethport. The bridge is provided with four lift spans which can be raised to permit the movement of water-borne traffic through the channels. These lift spans are designated as northwest, northeast, southwest and southeast. The northwest and southwest lift spans are 310 feet in length. The west ends of these spans are located 4,774 feet east of the west end of the bridge. The northeast and southeast lift spans are 212 feet in length. The east ends of these spans are located 1,998 feet west of the east end of the bridge. Tracks Nos. 1 and 3 are laid on the southwest and southeast lift spans, and tracks Nos. 2 and 4 are laid on the northwest and northeast lift spans. D. Y. interlocking station is located on the bridge between the westerly and easterly lift spans 2.01 miles east of the station at Elizabethport. F. H. interlocking station is located 1.20 miles west of D. Y. interlocking station. A split switch-point derail is provided in the north rail of track No. 1 at a point 490 feet west of the west end of the southwest lift span and 1.85 miles east of the station at Elizabethport. It is facing-point for eastbound movements. In the event that an eastbound train proceeds over the derail when it is in open position, the equipment of the train will become derailed to the north. The accident occurred within interlocking limits at the derail on track No. 1. Track No. 1 is tangent throughout a distance of 1.11 miles immediately west of the point of accident and a considerable distance eastward. The grade is level at the point of accident.

The width of the west channel of Newark Bay where it is spanned by the northwest and southwest lift spans is 216 feet. The width of the east channel where it is spanned by the northeast and southeast lift spans is 134 feet. The depth of water in the west channel is 35 feet at mean low water level and approximately 40 feet at mean high water level.

Newark Bay Bridge was completed in 1926 and replaced a bridge built in 1864. It consists of concrete piers and a steel superstructure. The lift spans are of the through-truss vertical-lift type. They have clearances of 35 feet above mean high water level when in lowered position, and can be raised to a maximum height of 135 feet above mean high water level. The level of the tops of the rails of track No. 1 at the west end of the southwest lift span is 45 feet 2 inches above mean low water level. The mechanisms for operating the lift spans are powered by electricity and are controlled from D. Y. interlocking station. Each lift span can be operated independently. At the time the accident occurred the lift spans over the west channel were raised to a height of 108 feet above the water level.

The track structure of track No 1 in the vicinity of the point of accident consists of 131-pound rail, 39 feet in length, laid new in 1945 on an average of 29 treated hardwood bridge ties to the rail length. It is fully tieplated with double-shoulder tie plates, single-spiked and is provided with 6-hole 39-inch joint bars. Inside and outside guard rails are provided for each running rail and extend throughout the length of the bridge. The inside guard rails consist of 135-pound rail located 10 inches inside the rails. The outside guard rails consist of 6-inch by 8-inch timber located approximately 13 inches outside the rails.

Semi-automatic signal L48, governing eastbound movements from the Perth Amboy Branch through FH interlocking to track No 1, is located 1.32 miles west of the point of accident. Automatic signal 82 and semi-automatic signal R26, governing eastbound movements on track No 1, are located, respectively, 3,195 feet and 70 feet west of the point of accident. These signals are of the color-light type and are continuously lighted. Signals L48 and R26 are of the 3-unit type and display five aspects. Signal 82 is of the 2-unit type and displays four aspects. The aspects applicable to this investigation, and the corresponding indications and names are as follows:

Signal	Aspect	Indication	Name
L48	Red-over-green-over-red	Proceed, medium speed within interlocking limits	Medium-clear
82	Yellow-over-staggered red	Proceed preparing to stop at next signal or block marker. Train exceeding medium speed must at once reduce to that speed.	Approach
R26	Red-over-red-over-red	Stop	Stop

DY interlocking is of the electro-pneumatic type. A model board is provided in the interlocking station on which track occupancy is indicated by the illumination of indicator lights. Approach, indication, and route locking are provided. Signal L48 is controlled from FH interlocking station. When the route is lined for movement from the Perth Amboy Branch through FH interlocking to track No 1, signal L48 displays a Medium-Clear aspect, which is the most favorable aspect that can be displayed by that signal, provided the blocks of that signal and signal 82 are unoccupied. Signal R26 is controlled from DY interlocking. The controlling circuits are so arranged that when signal R26 displays a Stop aspect, signal 82 displays an Approach aspect, provided the block of that signal is unoccupied. Before the southwest lift span can be raised, signal R26 and the semi-automatic signals governing westbound movements through DY interlocking on track No 1 and in either direction on track No 3 must display Stop aspects, and the control levers of those signals must be in normal position. In addition, the signals in approach to those semi-automatic signals must display an aspect no more favorable than Approach, all derails in the tracks involved must be in derailing position with their control levers in normal position, and the bridge and rail-locking devices must be released.

This carrier's operating rules read in part as follows

DEFINITIONS

* * *

Medium Speed —One-half the normal speed, not to exceed thirty miles per hour

Speed When Accepting Approach Signals —In conforming to speed requirements under Rules 285 * * *, the train should not exceed Medium Speed when passing the signal * * *

34 All members of train and engine crews must, when practicable, communicate to each other by its name the indication of each signal affecting the movement of their train or engine

663 Trains or engines must not pass an interlocking signal indicating stop * * *

General Notice No 8 reads in part as follows

In the interest of safety, engine crews assigned to Diesel locomotives having engine compartments accessible by outside footwalks, will not leave the cab from which the locomotive is operated while running. If it becomes necessary to make an inspection along the line of road of any portion of the equipment accessible only by outside footwalks in single units and by platforms between multiple units, the locomotive must be stopped before any member of the crew leaves and not started until he returns to the cab from which the locomotive is operated.

Federal regulations governing the operation of drawbridges across Newark Bay read in part as follows

203 200 Newark Bay, Passaic and Hackensack Rivers and their navigable tributaries

A The draws shall be opened promptly, upon signal, for the passage of vessels during the day or night, except as hereinafter prescribed

* * *

d When a vessel approaches within signaling distance of a bridge for passage, the master thereof shall signify his intention by three blasts of a whistle * * *

e Upon hearing or perceiving the signals prescribed, the tenders or operators of a drawbridge * * * shall at once open the draw signaled for so as to allow the prompt passage of any vessel or craft: Provided, That the bridge may not be opened when there is a train, * * * or vehicle at the time passing over said drawspan, or a train approaching so closely that it cannot be safely stopped before reaching the bridge * * *

* * *

g Trains, vehicles, vessels or other water craft shall not be stopped or manipulated in a manner hindering or delaying the operation of the draw, but all passage over the drawspan or through the draw opening shall be in a manner to expedite both land and water traffic

* * *

The maximum authorized speed for passenger trains on track No 1 in the vicinity of the point of accident is 70 miles per hour, but it was restricted on Newark Bay Bridge to 45 miles per hour

Description of Accident

No 3314, an eastbound first-class passenger train, consisted of diesel-electric units 1532 and 1526, coupled in multiple-unit control, 4 coaches, and 1 passenger-baggage car, in the order named. All cars were of all-steel construction. The first car was not occupied by passengers. This train originated at Bay Head Jct, on the N Y & L B line, and departed from that point at 7 28 a m, on time. It passed Woodbridge Jct, 12.28 miles west of the point of accident, at 8 44 a m, on time, entered the Perth Amboy Branch of the C N J, proceeded to Elizabethport, and was stopped at the station, 1.85 miles west of the point of accident. It departed from this point at 8 57 a m, on time, passed signal L48, which displayed a Medium-Clear aspect, was routed to track No 1, and passed FH interlocking station at 8 59 a m, according to the dispatcher's record of train movements. It proceeded onto Newark Bay Bridge, passed signal 82, which displayed an Approach aspect, passed signal R26, which displayed a Stop aspect, and while moving at a speed of 42.5 miles per hour, as indicated by the tape of the speed-recording device, the locomotive and all cars of the train were derailed at the derail on track No 1, west of the southwest lift span, which at that time was raised to permit passage of a vessel.

The locomotive and all cars of the train were derailed to the north and continued in line with the track until the diesel-electric units and the first three cars fell into the transverse opening in the bridge under the southwest lift span. Separations occurred between the diesel-electric units and at each end of the first three cars. The locomotive units and the first two cars stopped in various positions in the water of the west channel between the piers of the southwest lift span. This equipment was immediately submerged. The third car struck piling adjacent to the west pier of the southwest lift span as it fell from the track, and some of the appurtenances on the underside of the car became wedged on the tops of the piling. The car stopped with the front end submerged in the channel and the rear end on the pier. Approximately two hours after the accident occurred this car became dislodged, fell into the channel, and was completely submerged. The rear two cars stopped on the bridge in line with the track, with the front end of the fourth car 8 feet from the transverse opening under the lift span. The diesel-electric units were heavily damaged, the first 3 cars were destroyed and the rear 2 cars were somewhat damaged.

Forty-four passengers, who were occupying the cars which fell into the water, were killed, and forty-six passengers were injured.

The engineer, the fireman, the conductor, and the front brakeman of No 3314 were killed. The flagman and the baggageman were injured.

The weather was clear at the time of the accident, which occurred about 9 01 a m.

The average daily movement on the railroad over the bridge at the point of accident during the 30-day period preceding the day of the accident was 139.9 trains. The bridge lift spans were opened for water-borne traffic an average of 28 times each day during the same period.

Diesel-electric units 1532 and 1526 are of the road-switcher type and are provided with 24-RL type brake equipment. Diesel-electric unit 1532, the first unit, was equipped with speed-control and cab-signal apparatus. These units were equipped with dual controls with an engineer's control station on each side of the control compartment. In normal operation the engineer operates the locomotive from the control station on the right-hand side in the direction of movement, and uses the instrument panel, and the brake and control stands which are then located in front of his position. An emergency brake valve is located adjacent to the door on each side of the control compartment. The angle cocks of the diesel-electric units are of the double-

locking type with a spring-loaded latch which must be released before the handle can be turned to either open or closed position.

All cars of the train were equipped with UC type control valves.

Discussion

The operator at DY interlocking station testified that a few minutes before the accident occurred a signal was received from an approaching vessel which indicated that the lift spans of the bridge were to be raised for its passage. He said that he took immediate action to comply with this signal. At that time the lift spans of the bridge were locked in position for movements on the railroad. However, the normal indication of the semi-automatic signals, which govern movements over the bridge, is Stop, and the associated derails normally are kept in derailing position. It is the practice to clear the signals involved for each individual train only in advance of its immediate movement, and the semi-automatic signals then return to their normal or Stop indication and display their most restrictive aspect automatically after the first wheels of the locomotive of each such movement has passed the signal involved. In the instant case, under the conditions which existed at the time the vessel signaled for the bridge to be raised for its passage, signal R26 indicated Stop, signal 82 indicated Approach, and the derail on track No. 1 was in derailing position. The operator said that he manipulated the necessary levers of the interlocking machine and the bridge control apparatus, and when the required sequence of operations was completed he applied power and raised the lift spans over the west channel to a height of 108 feet above the water level. The bridge records indicate that the lift span involved was raised at 8:55 a. m. No. 3314 is scheduled to depart from Elizabethport at 8:57 a. m. The operator said that soon after the lift spans were raised he looked out the window of the tower to ascertain for his delay report the location of No. 3314 which he estimated from knowledge of its schedule should at that time be closely approaching signal R26. He said he then observed that the locomotive and the first car of this train already had passed signal R26. He was unable to take any further action to stop the train and, as he watched, it continued eastward until the locomotive and forward portion of the train fell from the bridge into the water of the west channel. The train dispatcher's record indicates the operator reported that the accident had occurred about 9:01 a. m.

The signals involved were inspected by members of the signal force of the carrier about 1 hour after the accident occurred and were found to be displaying the proper aspects. The instrument cases of the signals were then sealed until the arrival of the Commission's inspectors. In exhaustive tests of the interlocking, which were made under the supervision of inspectors of this Commission, no condition was found which could have caused or contributed to the cause of the accident. The operator at FH interlocking station said that when he lined the route for the movement of No. 3314 he observed that signal 82, which is located on the bridge at a point 2,268 feet east of FH interlocking station, displayed an Approach aspect. He said that because of the distance, signal R26 ordinarily is not visible from FH interlocking station during the daytime and he did not see the aspect displayed by that signal at that time.

Examination of track No. 1 after the accident occurred disclosed that there were no marks of wheels sliding or other indications of heavy braking on the rails throughout a considerable distance west of the derail and the rails were not sanded at any point in this area. The first mark of derailment was a flange mark on a rail clip on the north side of the north rail 12 feet 1 inch east of the derail in this track. Eastward from this point tieplates, spikes, and joint bars were marked by derailed wheels. Beginning at a point 26 feet 4 inches east of the derail there were skid marks and burns on tieplates and spikes resulting from contact with sliding wheels. The first mark of derailment on the north side of the south rail was 23 feet 1 inch east of the derail,

and 7 inches east of this point there was a flange mark on a tie where a wheel had dropped inside this rail. About 3 feet east of the initial mark there were indications of wheels sliding on the ties. Marks on the north sides of both rails extended from these initial marks to the transverse opening in the bridge. From the absence of any indication of heavy braking at any point west of the derail and from the flange marks, skid marks, and burns which were found on tieplates, spikes, joint bars and other parts of the track structure adjacent to the north rail and marks of companion wheels sliding on the ties adjacent to the south rail beginning at a point immediately east of the derail, it is apparent that the brakes on the rear cars of the train were not fully applied until after the train became derailed. Further, it is evident from these marks on the track structure east of the derail that the brakes of the rear cars became fully applied before any of the equipment fell from the bridge. This indicates that some member of the crew had initiated an emergency application of the brakes. From the location of the most westerly skid marks on the track structure it is apparent that the locomotive was closely approaching the opening under the lift-span at the west channel at the time this emergency application of the brakes was made.

The rear two cars were inspected at the scene of the accident about 45 minutes after the derailment occurred. The brakes of both cars were found fully applied. After these cars were rerailed their brakes were tested and functioned properly. Examination of the wheels disclosed that the flanges of all wheels on the north sides of these cars had slid-flat spots. These flat spots on the flanges were approximately 4½ inches long and 1/4 to 3/8 inch in depth. There were no slid-flat spots on the treads of any of the wheels of either of these cars, which indicates that the maximum braking force was exerted after the cars were derailed when the flanges of the wheels on the north sides of the cars were in contact with tieplates, spikes, joint bars and other parts of the track structure and the companion wheels were on the ties adjacent to the south rail. Examination of the other cars of No. 3314 when they were removed from the water disclosed that the angle cock at the rear end of the first car and the angle cock at the rear end of the third car were broken off and were missing. The roof and sides of the first car were crushed and distorted apparently as a result of the second car falling on it. Both trucks of the first and the third cars were missing. The emergency brake or conductor's valves in the east end of the second car and in the west end of the third car were in open position. The wheels of the second car were examined and indications that the wheels had been sliding were found on the flanges of the wheels on the north side of this car. No slid-flat spots were found on the treads of any of these wheels.

Diesel-electric units 1532 and 1526 were coupled with the cab ends together, with diesel-electric unit 1532 as the first unit of the train. Both units were submerged in the west channel after the accident occurred. The first unit was removed from the water about 8:30 p. m., September 17, 1958, and the trailing unit was removed from the water about 1:30 a. m., September 18, 1958. The control compartments of both units were unoccupied when they were raised from the water.

Examination of diesel-electric unit 1532 disclosed that at the engineer's control station on the right hand side in the direction of movement the automatic brake valve was in emergency position and the independent brake valve was in full application position. The throttle was in No. 2 position. The reverser handle was in position for forward movement. The rotair valve was in passenger position. The headlight switch was in position for illumination of the front and rear headlights. Brake-valve cut-out cocks were properly positioned. The emergency brake valves on both sides of the control compartment were in closed position and the pipe connection to the valve on the left side of the control compartment was broken. The brake-pipe angle cock at the rear end of the unit was broken off and was missing. Examination of the wheels of this unit at Communipaw Engine Terminal disclosed slid-flat spots on the flanges of left Nos. 1, 2, and 4 wheels. These flat spots were from 4 to 5 inches in length and all were on the north side of the unit. No slid-flat or burned spots were found on the treads of any of the wheels of this unit. This indicates that the wheel sliding occurred after the

equipment was derailed, as under ordinary conditions when the wheels are in normal contact with the rails, sliding of the wheels causes slid-flat spots or burns only on the wheel treads, which are in contact with the rails. In the instant case the slid-flat spots were found on those portions of the wheel flanges which came in contact with parts of the track structure after the derailment occurred and the marks on tie-plates, spikes, and other parts of the track structure corresponded with flange dimensions and locations.

Examination of diesel-electric unit 1526, the trailing unit, after the accident occurred, disclosed that all valves and control apparatus were properly positioned for operation of the locomotive from the first unit. The rotar valve was in passenger-lap position. Both brake-valve cut-out cocks were in closed position, in which position the brakes of the unit are controlled from the first unit, and the brake valve functions to apply the brakes only when the brake-valve handle is moved to emergency position. The automatic brake-valve handle on one side of this unit was found in emergency position. However, marks on the quadrant of the brake valve indicate that it was moved to this position after the accident occurred, apparently when the unit was removed from the water. The angle cock at the forward or cab end of the unit was found in closed position. Apparently this angle cock was closed after the accident occurred, otherwise it would have been impossible to apply or release the brakes of the train at Elizabethport and other points where station stops were made. Examination of the wheels of this unit at Communipaw disclosed a slid-flat spot approximately 4 inches long on the flange of the left No. 4 wheel. There were no indications of slid-flat spots on the treads of any of the wheels of this unit.

After the accident, the speed-recording device, which was removed from diesel-electric unit 1532, was tested with the calibrating machine at the carrier's Communipaw engine terminal. With calibrating test-machine speeds of 8, 32, and 56 miles per hour, the corresponding speeds indicated by the device were, respectively, 7, 32, and 56.5 miles per hour. The wheels of this unit were applied new April 9, 1957, and in the intervening period the original diameter of 40 inches had been reduced to 39.75 inches. However, as the tests indicate, the speed-recording device is relatively accurate within the speed ranges at which it was tested.

Examination of a photostatic copy of the tape removed from the first diesel-electric unit of No. 3314 indicated that there was a shrinkage in the tape or the photostat. The photostat showed a decrease equivalent to a distance of $\frac{1}{2}$ mile in the 22-mile portion which was reproduced from the original. The locomotive unit from which the original was removed was submerged in the west channel for a period of approximately 35 hours after the accident occurred. The examination of this reproduction, taking into consideration the proportionate shrinkage, indicates that after No. 3314 departed from the station at Elizabethport the speed was increased to 32 miles per hour within a distance of approximately 2,500 feet to a point immediately west of signal L48. The train continued eastward at a speed of 32 miles per hour a distance of approximately 2,000 feet to a point about 400 feet east of FH interlocking station. The speed was then increased to 41 miles per hour for a distance of about 2,350 feet to a point approximately 500 feet east of signal 82 after which the speed was increased to 42.5 miles per hour and the train was moving at this speed when the derailment occurred at the derail immediately east of signal R26. Marks on the tape indicate that the wheels connected to the driving mechanism of the speed-recording device ceased to revolve and apparently began to slide at a point approximately 160 feet west of the transverse opening under the lift span. Other marks on the tape apparently were made after the accident occurred and may have resulted from movements of the tape incidental to its removal from the device, and are not germane to this investigation.

The investigation disclosed that on the day of the accident the brakes of the locomotive had been tested before it was dispatched on a westbound train from Jersey City and again when it arrived at Bayhead Jct. about 6:40 a. m. The brakes functioned properly and no exception was taken by the members of the mechanical force of the C. N. J. at Jersey City and of the N. Y. & L. B. at Bayhead Jct. who made the inspections.

and tests at these points. An initial terminal air-brake test was made before No. 3314 departed from Bayhead Jct. and no exception was taken by the car inspector who made the inspection. The flagman testified that a running test was made after the train departed from this point and that he sounded the proper communicating-signal response. En route, station stops were made at 16 points on the N Y & L B line and in each instance the brakes functioned properly. The surviving members of the crew testified that the brakes again functioned properly when the train was stopped at the station in Elizabethport a few minutes before the accident occurred. Under these circumstances it is evident that the brakes of this train were functioning properly and that they were being controlled by the engineer. Apparently the angle cock which was found in closed position on the second diesel-electric unit was closed either as a result of the accident when the units separated as they fell from the bridge or during the subsequent wrecking operations. After the accident the engineer's brake valve of the first diesel-electric unit was found in emergency position and an emergency brake valve (conductor's valve) was found in open position in the second car and also in the third car. The movement of any of these devices to the positions in which they were found would have effected an emergency application of the brakes of the train. It could not be determined in what sequence they were operated but this indicates that action was taken by members of the crew at three points in the train to apply the brakes. As the tape of the speed-recording device indicates that there was no deceleration of the train at any point between Elizabethport and the point where the accident occurred, it is evident that neither the automatic nor the independent brake was applied prior to the time the derailment occurred, that when the brakes were fully applied the front end of the train was closely approaching the transverse opening under the southwest lift-span, and that the locomotive and the forward portion of the train fell from the bridge before the speed had been materially reduced.

The Approach aspect displayed by signal 82 required that the speed of No. 3314 be reduced to one-half of the maximum authorized speed at this signal, or 22.5 miles per hour, and the rules further required that this reduction in speed be made in such manner that the train should not exceed the prescribed speed when passing the signal. The Stop aspect displayed by signal R26 required that the train be stopped before passing the signal and remain at that point until authorized to proceed. The enginemen of No. 3314 were killed in the accident and it could not be determined why action was not taken to control the speed of the train in compliance with the indications of these signals.

Post-mortem examination of the engineer and the fireman indicated that the engineer died of asphyxia due to drowning and that the fireman died of multiple fractures and lacerations resulting from the accident. Records of the railroad indicate that the engineer last received a physical examination on July 21, 1958, at which time he met the physical requirements for his position. The medical director of the railroad testified that the engineer's blood pressure was within normal limits for his age, which was 63 at the time of the examination. The fireman, who was 42 years of age, last received a physical re-examination on August 25, 1958. The medical director of the railroad said that the fireman had a moderate elevation of blood pressure at that time, and that because of a history of elevation of blood pressure he had been re-examined at intervals of from three to six months. The records indicate that he was first re-examined at less than the usual one-year interval in 1949. The fireman, who was a qualified engineer, was restricted to yard service in that capacity. However, as a fireman he was qualified in all types of service. The surviving members of the crew and employees of the mechanical departments of the C N J and the N Y & L B who saw the enginemen at Jersey City and Bayhead Jct. on the day of the accident said that both appeared to be in normal physical condition. The operator at FH interlocking station said that the engineer waved to him as the locomotive of No. 3314 passed the station. The operator at Woodbridge Jct. said that he saw a person in the fireman's position on the locomotive of this train as it passed his office.

Locomotive 1532 is equipped with automatic cab signals, supplemented by an automatic speed-control device, for operation over the tracks of the N Y & L B Railroad, upon which an auto-

matic cab-signal system is in service. If the track, not less than stopping distance in approach of the lift span, had been equipped with this system, and if the automatic speed-control device on the locomotive had been cut in and functioning as intended, it is probable that this accident would have been averted, or its disastrous consequences considerably mitigated. With this system in service, if the engineman had been incapacitated when the locomotive passed signal 82, in approach of signal R26 at the lift span, and had taken no action at that point, an automatic brake application would have been initiated by the device, and the train would have been brought to a stop short of signal R26 and the open lift span. However, if the engineman, upon passing signal 82 had taken action to control his train in obedience to the indication of that signal, he would have been required to reduce the speed to 20 miles per hour before passing the next signal or the speed-control device would have functioned to reduce the speed to that rate, so that under no circumstances could the speed of the train have exceeded 20 miles per hour upon passing signal R26.

It is also very probable that if movements over the bridge had been protected by an automatic train-stop system of any of the many types now in service, the accident would have been averted.

We find that

- 1 The signals involved in the accident were operating properly at the time the accident occurred
- 2 The locomotive and train-brake apparatus were functioning properly at the time of the accident
- 3 The accident was caused by failure to operate No. 3314 in accordance with the indications of signals 82 and R26

RECOMMENDATION

It is recommended therefore that the Central Railroad Company of New Jersey either extend the automatic cab-signal system supplemented with automatic speed control, with which some of its locomotives are now provided, so that the tracks over Newark Bay Bridge and at least stopping distance in approach of the lift span in both directions, will be equipped with such speed-control system which will be operative in conjunction with all locomotives hauling passenger trains over the bridge, or in the alternative that an automatic train-stop system, conforming to the requirements of the Commission in Ex Parte No. 171 (278 I. C. C. 267) be installed to protect all passenger train movements over the bridge.

By the Commission, Division 3

(SEAL)

HAROLD D. MCCOY,

Secretary