INTERSTATE COMMERCE COMMISSION

WASHINGTON

INVESTIGATION NO. 2462

THE NEW YORK, CHICAGO & ST. LOUIS RAILROAD COMPANY

REPORT IN RE ACCIDENT

AT PANAMA, ILL., ON

NOVEMBER 14, 1940

SUMMARY

Railroad:	New York, Chicago & St. Louis
Date:	November 14, 1940
Location:	Panama, Ill.
Kind of accident:	Derailment
Train involved:	Passenger
Train number:	9
Engine number:	166
Consist:	5 cars
Speed:	35-45 m. p. h.
Operation:	Timetable and train orders
Track:	Single; 4°46' left curve; 0.515 percent descending grade westward
Weather:	Clear
Time:	6:23 a. m.
Casualties:	15 injured
Cause:	Accident caused by broken rail, as result of presence of transverse fissures

INTERSTATE COMMERCE COMMISSION

INVESTIGATION NO. 2462

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

THE NEW YORK, CHICAGO & ST. LOUIS RAILROAD COMPANY

January 14, 1941.

Accident near Panama, Ill., on November 14, 1940, caused by broken rail, as a result of presence of transverse fissures.

REPORT OF THE COMMISSION[1]

PATTERSON, Commissioner:

On November 14, 1940, there was a derailment of a passenger train on the New York, Chicago & St. Louis Railroad near Panama, Ill., which resulted in the injury of four passengers, one railway-mail clerk, one express messenger, two Pullman employees, one news agent, four train-service employees, and two other railroad employees.

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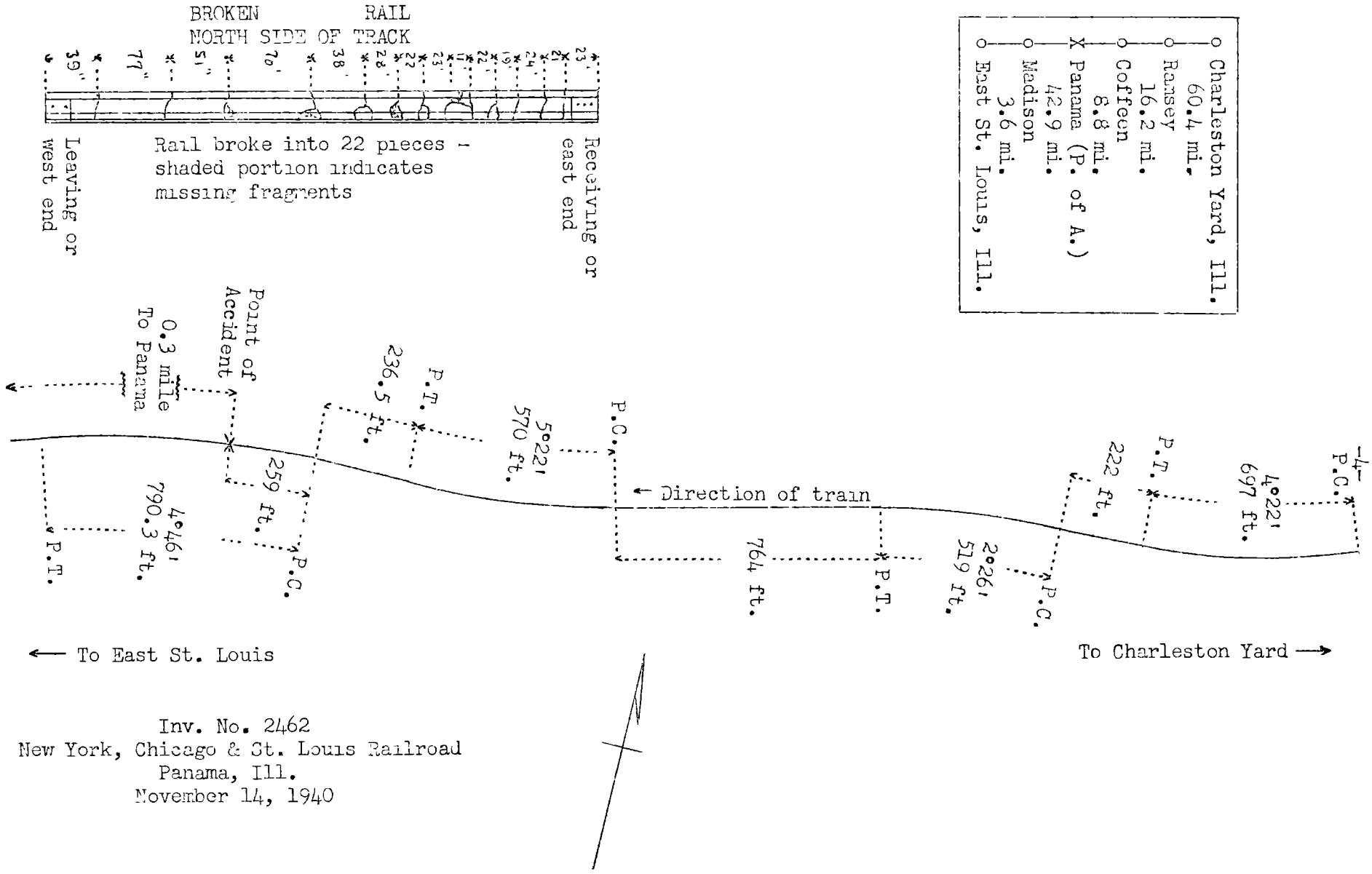
[1] Under authority of section 17 (2) of the Interstate Commerce Act the above-entitled proceeding was referred by the Commission to Commissioner Patterson for consideration and disposition.



Inv. No. 2462
New York, Chicago & St. Louis Railroad
Panama, Ill.
November 14, 1940

Location and Method of Operation

This accident occurred on that part of the Clover Leaf District designated as Subdivision 4 which extends between Charleston Yard and East St. Louis, Ill., a distance of 131.9 miles. In the vicinity of the point of accident this is a single-track line over which trains are operated by timetable and train orders; there is no block system in use. The accident occurred at a point 0.3 mile east of Panama. As the point of accident is approached from the east there are, in succession, a 4°22' curve to the right 697 feet in length, a tangent 222 feet, a 2°26' curve to the left 510 feet, a tangent 764 feet, a 5°00' curve to the right 570 feet, a tangent 236.5 feet, and a 4°40' curve to the left 780.3 feet including a spiral at each end 270 feet in length; the derailment occurred on the east spiral of the last-mentioned curve at a point 259 feet from its eastern end. The grade for west-bound trains is, successively, 1.65 percent descending a distance of 1,200 feet, 0.835 percent descending 900 feet, 0.42 percent descending 400 feet, and 0.516 percent descending 2,054.5 feet to the point of accident and 56.3 feet beyond.

From the point of accident westward a distance of 547 feet the track is laid on a fill about 14 feet in height. The track structure consists of 110-pound rail, 39 feet in length, laid in October, 1933, on an average of 24 treated oak ties to the rail length; it is fully tieplated, single-spiked, equipped with 6-hole 100-percent angle bars and 6 anticreepers to each rail, and is ballasted with 10 inches of crushed rock. The maximum superelevation of the curve involved was 5 inches and the gage varied between 4 feet 8-1/2 inches and 4 feet 8-5/8 inches. The superelevation at the point of derailment was about 4-1/4 inches.

In the vicinity of the point of accident the maximum authorized speed is 45 miles per hour.

The weather was clear at the time of the accident, which occurred at 6:23 a. m.

Description

No. 9, a west-bound passenger train, with Conductor Turner and Engineman Schnader in charge, consisted of engine 166, of the 4-6-2 type, one baggage car, one combination mail-baggage car, one baggage car, one coach, and one Pullman sleeping-lounge car, in the order named; all cars were of steel construction. This train departed from Charleston Yard, 86.4 miles east of Panama, at 4:13 a. m., according to the train sheet, 3 minutes late, passed Coffeen, 8.8 miles east of Panama, at 6:14 a. m., 14 minutes late, and was derailed when approaching Panama and moving at a speed estimated at 35 to 45 miles per hour.

Engine 166 and its tender were derailed to the right and stopped, bottom up, down the embankment, with the front end of the engine about 487 feet west of the initial point of derailment and 30 feet north of the track and its rear end 45 feet north of the track. Some of the engine-cab appurtenances were damaged; the engine truck and the tender trucks were detached. The first car stopped on its right side about 5 feet from the tender; the front and rear ends of this car were, respectively, 45 feet and 55 feet north of the track. The second car stopped on its right side about 37 feet from the first car; the front and rear ends of the second car were, respectively, 66 feet and 75 feet north of the track. The third car stopped on its right side with its front and rear ends, respectively, 75 feet and 30 feet north of the track. The fourth and the fifth cars remained coupled and leaned to the right down the embankment; the front and rear ends of the fourth car were, respectively, 29 feet and 15 feet north of the track; the front end of the fifth car was 15 feet north of the track and its rear end was on the shoulder of the ballast and 12 feet west of the point of derailment. The coupler at the west end of the first car was twisted and broken off at the shank and the coupler at the east end of the second car was broken. The first, second and third cars each had one truck detached. The track was torn up a distance of 466 feet.

The train-service employees injured were the engineman, the fireman, the conductor and the flagman; the other two railroad employees injured were an engineman, who was on the engine to requalify for service, and a road foreman of engines who was in the fourth car.

Summary of Evidence

Engineman Schnader stated that when the engine reached the county line, 3,825 feet east of the point where the accident occurred, he reduced speed to about 40 miles per hour. As the engine approached the curve involved he was maintaining a lookout ahead and did not see any irregularity in the track. He had just released the air brakes but had not removed his hand from the brake valve when he heard an unusual noise which apparently came from beneath the engine. He moved the brake valve to service position immediately, and then to emergency position. In his opinion either the trailer truck or the front tender truck was the first to be derailed, and he thought that the driving wheels remained on the rails until the engine had practically stopped; then the engine rolled over. After the accident occurred he started back to ascertain what had happened and met a maintenance-of-way employee who informed him that the accident was caused by a broken rail. The air brakes functioned properly en route. He said that the accident occurred at 6:23 a. m.

Fireman Baker stated that a drifting throttle was being used as the train descended the grade involved. Near the county line the engineman reduced the speed of the train to 35 or 40 miles per hour. As the engine approached the curve involved, the fireman was sitting on his seatbox and was maintaining a lookout ahead. The first intimation he had of anything being wrong was an unusual noise from beneath the engine cab. The engineman immediately applied the air brakes in emergency. After the accident occurred the fireman saw a broken rail. The air brakes functioned properly en route, and the engine rode satisfactorily. In addition to the engineman and himself, an engineman, who was requalifying for service, and a traveling fireman were on the engine at the time of the accident.

Traveling Fireman Conner stated that engine 166 had recently been released from the shop. On the trip involved he accompanied the engine from Frankfort to observe its performance in service. When the train reached Charleston he inspected the engine truck and the driving wheels and all bearings. At Charleston the proper air-brake test was made, a running test was made soon after the train departed, and the brakes functioned properly en route. He was on the brakeman's seatbox ahead of the fireman, and the engineman who was requalifying was standing beside the engineman in charge. When the train reached the county line a brake-pipe reduction was made and the speed was reduced to about 35 miles per hour, then the air brakes were released, and the speed increased to 42 or 45 miles per hour. His first intimation of anything being wrong was a loud noise which sounded as if the right front wheels of the engine had struck some solid object. He said that the engineman immediately moved the brake valve to service position and then to emergency position, and the brakes responded properly. The engine had practically stopped before it began to roll over. The traveling fireman went back and found a broken rail on the north side of the track. The rail was broken into numerous pieces, and he saw a transverse fissure at the point where the first break occurred; this fracture occurred near the receiving or east end of the rail and the most easterly piece was held in place by the angle bars and bolts; the next piece of the broken rail was sticking upright between two ties.

Conductor Turner was in the fourth car and Flagman Meiers was in the fifth car as the train approached Panama; the speed was 40 or 45 miles per hour, and neither was aware of anything being wrong until the derailment occurred.

Section Foreman Corrington, in charge of the section on which the accident occurred, stated that he arrived at the scene of the accident within less than 1 hour after the accident occurred. The broken rail involved was on the outside of the curve. The first break, which occurred at a point 23 inches from the east end of the rail, showed a large transverse fissure.

This piece of rail was held in place by the angle bars and bolts. The angle bars were in good condition. At the time of the accident the temperature was about 12° F. He had passed over the curve involved about 16 hours prior to the time of the accident and observed nothing unusual. He surfaced the track involved on September 11, 1940, and there had been no difficulty in maintaining alinement and surface.

Roadmaster Bracken stated that he arrived at the scene within 2-1/2 hours after the accident occurred. The rail involved was broken into numerous pieces. At the first break there was a large transverse fissure. From the broken rail involved to the point where the engine stopped the north rails of the curve were torn out. Within this distance the ballast was torn away from the north ends of the ties and the ends of the ties were splintered. It was necessary to replace 218 ties out of a total of 312 ties. He thought the rail broke under the engine, and that the engine continued on the rails around the curve and its forward movement had practically stopped before it rolled over, and that the cars became derailed at the broken rail. He inspected the track eastward from the broken rail a distance of 1,000 feet but found no mark made by dragging equipment. The track was in good condition and there was no indication of malicious tampering. He last inspected the track involved on the day before the accident. A detector car was last operated over this track on August 16, 1940, and two or three rails having transverse fissures were found on this section.

Division Engineer Oberdorf stated that most of the track repairs had been made before he arrived at the scene about 9 hours after the accident occurred. The pieces of broken rail involved had been removed. The rail was broken into 22 pieces, 17 of which were recovered, but 5 small pieces were not found. The most easterly break occurred 23 inches from the east end of the rail; this point was 3-1/2 inches west of the angle bar and 2 inches west of the edge of a tie. This break was practically vertical and it showed a transverse fissure, elliptical in shape, 1 inch high and 2 inches wide, the major portion of which was on the gage side of the head of the rail; it covered 62 percent of the cross-sectional area of the head. Smaller transverse fissures appeared at 10 other breaks in the rail. The rail involved was a 39-foot, 110-pound R. E. rail, rolled by the Carnegie Illinois Steel Co., October, 1933, at its Gary, Ind., plant. It bore the following markings: Heat number 37242, Letter D, Ingot 2. Chemical analysis at the time of rolling was as follows:

Element	Percent Maximum	Percent Average
Carbon	.84	.82
Manganese	.74	.70
Phosphorus		.028
Sulphur		.028
Silicon		.30

When a detector car was operated over this district on August 16, 1940, between Frankfort and Madison, a distance of 240.3 miles, 22 rails containing transverse fissures were found. On the section involved, 3 rails having transverse fissures were found; one of these was from the same heat number as that of the broken rail involved.

General Car Foreman Campbell stated that after the accident occurred he inspected the derailed equipment. As a result of the derailment, the front axle of the front truck of the second car was bent, the cast-steel truck-frames were broken and bent, and the coupler at the rear end was broken off at the shank; also, the coupler at the front end of the first car was broken off at the shank, and the truck spring-plank at the west end of the third car was broken. One truck was detached from each of the first three cars, but all other trucks were intact.

Locomotive Foreman Moses stated that he inspected engine 136 within 4 hours after the accident occurred but found nothing about its condition that might have contributed to the accident.

Master Mechanic Wright stated that after the accident occurred he inspected the engine. The safety bars and the drawbar between the locomotive and the tender were twisted, and the draw-bar casting at the rear of the locomotive was broken. The manner in which the drawbar was twisted indicated that the tender was the first to be derailed. In his opinion there was nothing about the condition of the engine that would have contributed to the accident.

According to data furnished by the railroad, the total weight of engine 136 which is of the 4-6-2 type, is 252,000 pounds, distributed as follows: Engine truck, 49,000 pounds; first pair of driving-wheels, 51,700 pounds; second pair of driving-wheels, 51,600 pounds; third pair of driving-wheels, 51,700 pounds; and the trailer truck, 48,000 pounds. The tender has two four-wheel trucks; its capacity is 16 tons of coal and 10,800 gallons of water. The gross weight of the tender is 202,900 pounds. The length of the rigid wheel-base of the engine is 13 feet, the total length of the engine wheel-base is 34 feet, and the over-all length of the engine and tender is 78

feet 8-5/8 inches. This engine received class 4 repairs and was released from Frankfort shop on November 9, 1940. During the time repairs were being made the engine-truck wheels, the driving-wheel tires and the trailer-wheel tires were turned. From the time the engine was released from the shop until the time of the accident, it had covered a distance of 587 miles. All wheels of the engine had either marks, cuts or sheared spots on their treads and both sides of their flanges, with the exception of the right front engine-truck wheel and the left trailer-wheel. The right Nos. 1 and 2 wheels of the tender each had two indentations on top of their flanges; the other wheels of the tender were not marked.

The last train to pass the point where the accident occurred prior to the train involved in the accident was an eastbound freight train which passed at 4:30 a. m.

During the 30-day period prior to the day of the accident there were 395 train movements over the territory involved, or a daily average movement of 13.16 trains.

Observations of the Commission's Inspectors

Seventeen pieces of the broken rail were assembled; the broken pieces varied in length from 11 to 77 inches. Transverse fissures were evident at 11 of these fractures. At the most easterly break the transverse fissure reached the running surface and the gage side of the rail. The fracture showed two distinct elliptical areas, an inner area and an outer area. The inner area was smooth, and the outer area was smooth at some places. The fissure was discolored and the entire break was darkened to some extent.

Examination of the track a distance of more than 1/2 mile east of the point of derailment was made but no mark was found such as would have been made by defective or dragging equipment. The track was well maintained. The engine pilot was attached to the sill and no part of the front end of the engine bore any mark such as would have been made by contact with the track or the ballast. The fact that there was no accumulation of loose earth ahead of the boiler indicated that the forward movement of the engine had practically stopped before the engine turned over. Subsequent inspection of the engine disclosed it to be in the condition described previously.

Discussion

According to the evidence, No. 9 was moving at an estimated speed of 35 to 45 miles per hour when it became derailed at a point 259 feet west of the eastern end of the east spiral

of a 4°46' curve to the left. At the point of derailment the superelevation was 4-1/4 inches. The maximum authorized speed on this curve was 45 miles per hour. The temperature was 12 degrees above zero. Examination of the engine and the cars disclosed no condition that would have contributed to the cause of the accident. A broken rail, which was found at the point of derailment, apparently failed under the engine; employees on the engine heard an unusual noise from beneath the engine when it was at the point where the derailment occurred. According to the evidence, the manner in which the drawbar between the engine and the tender was twisted indicates that the engine became derailed after the tender.

The rail involved, which was on the north side of the curve, was broken into 23 pieces and at 11 of these fractures transverse fissures were found. The most easterly fracture occurred 23 inches west of the eastern end of the rail, 3-1/2 inches west of the angle bar and 2 inches west of a tie. This fracture showed a transverse fissure, 1 inch high and 2 inches wide, which covered 62 percent of the cross-sectional area of the head of the rail and extended to the running surface and to the gage side of the rail. The discoloration of the fissure indicated that it had existed for some time.

When a detector car was operated over this line about 3 months prior to the occurrence of the accident, 22 rails containing transverse fissures were found; 3 of these rails were on the section involved, one of which bore the same heat number as that of the rail involved. At the time of the accident, the rail that failed had been in service about 7 years.

Cause

It is found that this accident was caused by a broken rail, as a result of the presence of transverse fissures.

Dated at Washington, D. C., this fourteenth day of January, 1941.

By the Commission, Commissioner Patterson.

W. P. BARTEL,

SEAL

Secretary.