

Inv-2404

INRRERSTATE COMMERCE COMMISSION
WASHINGTON

REPORT OF THE DIRECTOR
BUREAU OF SAFETY

ACCIDENT ON THE
CHICAGO GREAT WESTERN RAILROAD

MESERVEY, IOWA

JANUARY 5, 1940

INVESTIGATION NO. 2404

SUMMARY

Inv-2404

Railroad:	Chicago Great Western
Date:	January 5, 1940
Location:	Meservey, Iowa
Kind of accident:	Derailment
Train involved:	Passenger
Train number:	31
Engine number:	736
Consist:	3 cars
Speed:	30-35 m. p. h.
Operation:	Timetable and train orders
Track:	Single; 2° curve to left; 0.92 percent ascending grade westward
Weather:	Clear and cold
Time:	About 2:20 p. m.
Casualties:	3 injured
Cause:	Spread track

Inv-2404

February 23, 1940.

To the Commission:

On January 5, 1940, there was a derailment of a passenger train on the Chicago Great Western Railroad near Meservey, Iowa, which resulted in the injury of one express messenger-baggage man and two mail clerks. The investigation of this accident was made in conjunction with the Iowa State Commerce Commission.

Location and Method of Operation

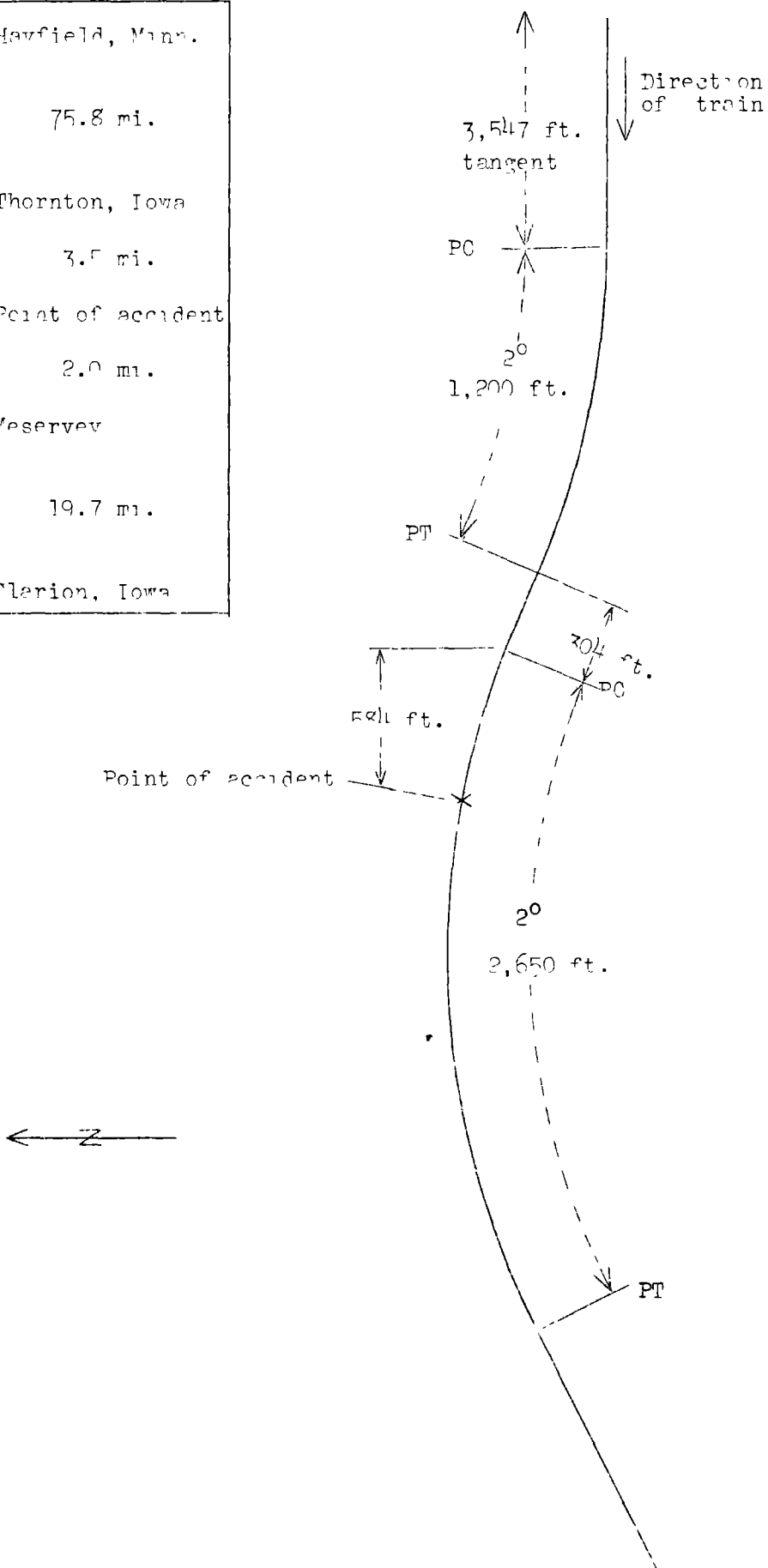
This accident occurred on that part of the Minnesota Division designated as the Fifteenth District which extends between Hayfield, Minn., and Clarion, Iowa, a distance of 101 miles. In the vicinity of the point of accident this is a single-track line over which trains are operated by timetable and train orders; there is no block system in use. The derailment occurred at a point about 2 miles east of Meservey. Approaching this point from the east there are, in succession, a tangent 3,547 feet in length, a 2° curve to the right 1,200 feet in length, a tangent 304 feet in length, and a 2° curve to the left 2,650 feet in length having a maximum superelevation of 3-1/2 inches. The derailment occurred at a point 584 feet west of the east end of this curve where the superelevation is 3-1/4 inches. The grade for west-bound trains is gradually ascending a distance of 4,850 feet, within which distance it varies from 0.19 to 0.22 percent; the maximum gradient is at the point of derailment.

The track structure consists of 77-1/2-pound rerolled rail, 33 feet in length, laid on an average of 20 untreated oak and creosoted birch ties to the rail length; it is single-spiked and is connected with 4-hole Weber joint-bars; the joints are staggered; neither tie-plates, rail anchors, nor rail braces are used. In the immediate vicinity of the point of derailment the track is laid on a 3-foot fill and was ballasted originally with 18 inches of gravel; it was raised in 1923 on 4 inches of gravel, and again in 1937 on 6 inches of cinders.

The maximum authorized speed for passenger trains hauled by freight engines in the vicinity of the point of derailment is 35 miles per hour.

The weather was clear, the ground was covered with snow, and the temperature was about 5 degrees above zero at the time of the derailment, which occurred about 2:20 p. m.

o	Hayfield, Mann.
	75.8 mi.
o	Thornton, Iowa
	3.5 mi.
X	Point of accident
	2.0 mi.
o	Meservey
	19.7 mi.
o	Clarion, Iowa



Inv. No. 2404
Chicago Great Western P.R.
Meservey, Iowa
Jan. 5, 1940

Description

No. 31, a west-bound passenger train, with Conductor Moody and Engineman Strom in charge, consisted of freight engine 736, a 2-8-2 type locomotive, one combination mail-baggage car, one combination baggage-smoking car, and one combination cafe-coach-observation car, in the order named; all cars were of steel construction. This train departed from Hayfield, 81.3 miles east of Meservey, at 11:52 a. m., according to the train sheet, 17 minutes late, departed from Thornton, the last open office, 3.5 miles east of the point of derailment, at 2:12 p. m., 12 minutes late, and, while moving at a speed variously estimated to have been between 30 and 35 miles per hour, was derailed.

The engine and tender stopped in upright position on the track at a point about 705 feet west of the first mark of derailment; the front-driving wheels, all wheels of the tender, and the three cars were derailed. The first car became uncoupled and stopped on its left side south of the track and parallel to it at the base of the fill, with the forward end about 5 feet from the tender; the second car leaned at an angle of about 45 degrees with its front end down the embankment; it remained coupled to the third car which remained upright on the roadbed with all wheels between the rails.

Summary of Evidence

Engineman Strom stated that he was in charge of engine 736, hauling east-bound passenger train No. 34 en route from Clarion to Hayfield, when it passed the point involved about 11 hours before the derailment occurred. That train consisted of five cars. Prior to entering the curve involved he made a 10-pound brake-pipe reduction which resulted in the speed being reduced to about 25 miles per hour. To prevent trailing smoke obscuring his vision a drifting throttle was used and the brakes remained applied around the curve; the speed did not exceed 30 miles per hour. There was no indication of unusual track conditions at the point where the derailment later occurred and the engine operated satisfactorily; there was no indication of mechanical defect which would require reporting. While oiling engine 736 prior to leaving Hayfield on No. 31, on the trip on which the accident occurred, he inspected the engine and found it in good mechanical condition. During the trip westward to the point where the derailment occurred the engine functioned properly and there was no indication of any mechanical defect. When about 1/4 mile east of the first curve east of the point involved he placed the throttle in drifting position, which resulted in the speed being reduced to 30 or 33 miles per hour; it was further reduced to about 28 miles per hour on the short tangent and on account of the steeper grade he then used sufficient steam to increase the speed to about 30 miles per hour on the curve in-

volved. Somewhere between the beginning of the curve and the point where the accident occurred he felt a slight swing at the front of the engine but there was no indication of anything unusual until he heard the noise made by the derailed tender; he immediately made an emergency application of the brakes, which was effective. He estimated that the accident occurred about 2:20 p. m. Soon after the accident he observed that the high rail was spread gradually throughout a distance of about 45 feet preceding the point where a wheel mark appeared on the inside of the low rail, from which mark westward the high rail was canted outward, the degree of overturn increasing gradually throughout a distance of 400 or 500 feet to an almost complete overturn at the rear of the train. He observed also that on the low rail at a point about 45 feet preceding the point of the first wheel mark a few spikes at a joint were badly throat-cut. He inspected the locomotive at the scene of the accident and found that the outside of the tire of the left front driving wheel was badly scored and the chims were bent; these conditions indicated that this driving wheel had been in contact with the gage side of the low rail and that this driving-wheel was the first wheel to become derailed. After the engine was rerailed he operated it to Clarion; it rode in a normal manner and there was nothing about its condition to contribute to the cause of the accident. It was his opinion that the derailment was caused by progressive spreading of the track each time a train passed over it; the outside rail was forced outward as a result of lateral thrusts. The weather was clear and the temperature was about 5 degrees above zero when the accident occurred.

Fireman Lunde, who was in service with Engineman Strom on both No. 34 and No. 31, corroborated the statement of the engineman except as to track conditions; he had not examined the track.

Conductor Moody stated that the maximum authorized speed was not exceeded on curves and estimated that the speed at the time of the accident was between 30 and 35 miles per hour. He did not observe the time until 2:30 p. m., and estimated that the accident occurred between 2:18 and 2:20 p. m.

Flagman Attwooll estimated that the speed at the time of the accident was between 30 and 32 miles per hour. He observed that the high rail was overturned about three car lengths behind the rear car. Subsequently, while walking eastward about 1 mile to protect his train, he observed that there were 2-1/2 or 3 inches of snow on the track and there was no mark thereon indicating dragging or derailed equipment.

Section Foreman Mosher stated that he has charge of 11 miles of main track. On the curve involved the cinder ballast was distributed and the track was raised and surfaced 2-1/2 years prior to the date of derailment. Many new white oak ties were placed

in the track at that time; a few creosoted birch ties were not replaced. During the month of November, 1939, he gaged and spotted the track at the point of accident. During freezing periods in the past it has been common to find wide track after the passage of passenger trains hauled by freight engines. Prior to this accident such condition was last experienced in the winter of 1938-1939, when at times he found the track spread from 3/4 to 1 inch. This spreading occurred on new as well as on old ties and in these instances the spikes were badly bent. The spreading at the time of derailment of No. 31 was the first instance of which he had known this winter. A daily track inspection from the motorcar is required and generally he walks the track weekly; however, because of the holidays and consequent change of working days, the walking inspection had not been made, and no work had been done at the point involved since the roadbed became frozen, two weeks prior to the time of the derailment. His last inspection was made before 10 a. m. the day of the accident. This inspection consisted of observing the gage, alignment, and other conditions of the track from a moving motorcar; no irregularity was discovered, and he did not use the track gage or cross level at any point. The track was covered with snow at this time, some of which had drifted along the rails and covered the spikes. He arrived at the scene of the accident at 4:15 p. m., and inspected the track. There was a wheel mark inside the low rail, but this rail was in normal position at that point. Westward from a joint on the high rail 40 feet east of this mark there was a gradual divergence outward from normal position to a maximum of 4 inches at a point opposite the first mark of derailment; it then kicked back to its original position after the passage of No. 31. There was no indication that any wheel on the high rail had become derailed. The spikes on the outside of the high rail were badly bent outward and many were practically pulled out; they were fairly new and generally in good condition; the spike holes were square and did not show any evidence that the spikes had been loose. A number of ties were sufficiently rail-cut under the low rail to make the gage 1/2 inch wide; otherwise, the ties were in good condition and he considered the track at this point safe for the maximum authorized speed. He believed that the high rail was spread by the heavy freight locomotive, which forced the high rail outward sufficiently for wheels to drop inside the low rail. His force consists of two men throughout the year. Since October 15 his men have been working only five days per week.

Division Engineer Hoffman stated that the first mark of derailment was a flange mark on a tie 2 feet east of a joint and 5 inches from the gage side of the low rail; this joint was located about 580 feet west of the east end of the curve involved. The low rail was not displaced at the first flange mark and when the wheel dropped off the rail the tread cleared it. Beginning at a point about 45 feet east of this wheel mark and proceeding westward, the high rail had been pushed progressively outward to

a maximum of 4 inches at a point opposite the first mark of derailment. The spikes on the outside of the high rail had been partially pulled out of the ties, which were firm and in good condition; the spikes were bent outward about 90 degrees and their heads were buried in the ties; they were in good condition, except at the joints where a few were throat-cut to some extent. The spread started about 45 feet east of the first flange mark and the wheels remained on top of the high rail this distance; within the next 54 feet the rail apparently canted outward sufficiently for the wheels to travel along the gage side of the head; for the next 280 feet the rail canted farther outward and the wheels rolled on the web and the base of the rail. Up to this point a single flange mark indicated that only one wheel had been derailed. This mark progressed westward inside the low rail. At a point 376 feet west of the first mark of derailment the high rail broke and the general derailment occurred, beyond which the track was torn up a distance of 190 feet. Accompanied by Section Foreman Mosher and Roadmaster Bloomfield, he gaged the track and took cross levels from the first mark of derailment eastward to the beginning of the superelevation. Because the track was spread from the first mark of derailment eastward, he believed that it was caused by movement of an east-bound train. He thought that the high rail then sprang back approximately to its original position and this condition was not visible to the section foreman when he inspected the track from the motorcar because it was concealed by the snow. He also thought that on the westward movement the front driving wheels of engine 736 pushed the high rail outward.

Roadmaster Bloomfield corroborated, in substance, the testimony of Division Engineer Hoffman.

Superintendent of Motive Power Olson stated that after engine 736 arrived at Clarion it was thoroughly inspected by a machinist. With the exception of frozen sand pipes no defect was found and the engine was later used in regular service the same day. After it returned to Clarion on January 6 a detailed inspection was made by the assistant to superintendent of motive power. Back-to-back measurements of all locomotive and tender wheels disclosed no defects; all flanges were in good condition and the lateral movement was well within the prescribed limits. The tender side-bearing clearance, all brake rigging, the locomotive spring rigging, driving boxes, driving-box shoes and wedges, and the radial buffer were in good condition. All parts were thoroughly lubricated and neither repair nor replacement was necessary; the locomotive was used again in regular service on the same date.

Records furnished by the mechanical department disclosed that the total wheel base of engine 736, a 2-8-2 type locomotive, is 69 feet 8-5/16 inches in length, the rigid wheel base is 16 feet 6 inches in length, and the weight on wheels is distributed

as follows: engine truck, 25,000 pounds; driving wheels, 218,000 pounds; trailer truck, 40,000 pounds.

According to the train sheet, east-bound passenger train No. 34, hauled by the locomotive involved, was the last train to pass the point where the derailment occurred; this train passed that point about 11 hours prior to the time of the accident.

Records furnished by the transportation department indicate that 4 daily passenger trains and 2 daily-except-Sunday way-freight trains are operated over the territory involved.

According to data furnished by the carrier, the first indication of spread track was at a point 539 feet west of the east end of the curve involved and the first mark of derailment was 584 feet west of the east end of this curve; the rear end of the tender stopped at a point 619 feet west of the first mark of derailment.

Observations of the Commission's Inspectors

The equipment had been removed and the track repaired prior to the arrival of the Commission's inspectors; however, the same rails and ties were in use in the vicinity of the point of derailment and the inspectors observed that the marks of derailment were as described by the division engineer. They also observed the rail-cut condition of the ties under the low rail, the absence of tie plates, rail braces and rail anchors. They found that the track was single-spiked. The roadbed was frozen so solidly that there was practically no deflection of the track under an engine of the type involved, moving at slow speed.

Discussion

According to the evidence, as the engine of No. 31 entered the curve involved the engineer and the fireman felt a slight swing at the front end of the engine and a moment later they heard a noise which they thought was caused by the tender becoming derailed. After the train stopped it was discovered that the left front driving wheel was inside the gage side of the low rail and the tender and the three cars were derailed. The first mark of derailment was on the inside of the low rail at a point 584 feet west of the east end of the curve involved and the rear of the tender stopped 619 feet west of the first mark of derailment.

No member of the crew estimated the speed as being in excess of 35 miles per hour, the maximum authorized speed for passenger trains hauled by freight engines. After the accident the engine was thoroughly inspected and no condition was found that would contribute to the cause of the derailment. There was no indication that anything had been dragged under the train. Both rails were in normal position from the east end of the curve involved to a point 539 feet west of it, but beyond this point the

high rail gradually and increasingly diverged outward a distance of about 45 feet; at the west end of this divergence there appeared the first mark of derailment, consisting of a flange mark about 4 inches inside the low rail; opposite this mark the high rail was about 4 inches outward from its normal position. The wheel mark followed closely the gage side of the low rail to the point of general derailment, while the high rail was canted outward increasingly as progression was made westward throughout a distance of about 385 feet to the point where the rear of the train stopped and at which point the rail was turned outward 90 degrees. There were marks on the high rail indicating that wheels had ridden first on the gage side of the head and then on the web and the base. The outside spikes of the high rail were bent outward about 90 degrees and their heads were buried in the ties. There was no flange mark on the head of the high rail. The left front driving wheel bore marks indicating it had been in contact with the gage side of the low rail. This evidence is conclusive that the left front driving wheel was the first wheel to become derailed; apparently the flange of the companion driving wheel remained in contact with the high rail and the wedging force exerted by the left driving wheel being inside the left rail caused the right driving wheel to cant the high rail outward. The result was that within a short distance the weight of the wheels bent the rail outward about 90 degrees and the wheels then moved on the web and the base of the rail a distance of 385 feet west of the first mark of derailment.

The track was fairly well maintained in view of the volume of traffic and the speed at which trains were operated over it. The ties were good but some of them were considerably rail-cut; no tie plates were used and the rails were only single-spiked. The section foreman said the track was safe for the authorized speeds. During the time the roadbed was not frozen he had had some trouble keeping the track in proper alinement. Last winter when the roadbed was frozen he found that the track would be spread from 3/4 to 1 inch, but until this accident occurred he had not found such condition this winter. He attributed the spreading of the track to the use of freight engines hauling passenger trains. It appeared probable that the outside rail had been shoved outward and the spikes bent outward by previous trains and that the rail returned to its normal alinement after the passage of each train, which condition was not detected by the section force as the spikes were covered with snow. The section foreman last inspected this track from a moving motorcar about 4 hours before the accident occurred and he did not see any abnormal condition.

From the facts disclosed in this investigation it appears that additional facilities should be used to secure the rails in such manner as to prevent further spreading of the track.

Conclusion

This accident was caused by spread track.

Respectfully submitted,
S. N. MILLS, Director.