

INTERSTATE COMMERCE COMMISSION

WASHINGTON

REPORT OF THE DIRECTOR

BUREAU OF SAFETY

ACCIDENT ON THE

MISSOURI-KANSAS-TEXAS RAILROAD

STARK, KANS.

APRIL 8, 1937

INVESTIGATION NO. 2168

SUMMARY

Inv-2168

Railroad: Missouri-Kansas-Texas
Date: April 8, 1937
Location: Stark, Kans.
Kind of accident: Derailment
Train involved: Freight
Train number: 271
Engine number: 857
Consist: 44 cars and caboose
Speed: 35-40 m.p.h.
Track: Tangent; 0.4 percent descending
grade
Time: 12:51 p.m.
Weather: Cloudy
Casualties: 1 injured
Cause: Arch bar failure

June 10, 1937

To the Commission.

On April 8, 1937, there was a derailment of a freight train on the Missouri-Kansas-Texas Railroad at Stark, Kans., which resulted in the injury of one trespasser.

Location and method of operation

This accident occurred on the Kansas City Division of the Northern District which extends between Paola and Parsons, Kans., a distance of 93.7 miles. In the vicinity of the point of accident this is a single-track line over which trains are operated by timetable, train orders, and an automatic block-signal system. At Stark, a passing track 1,524 feet in length parallels the main track on the west, the north switch of which is located 568 feet north of the station, the accident occurring about 68 feet south of this switch. Approaching this point from the north the track is tangent for a distance of 8,678 feet, followed by a 1° curve to the right 553 feet in length, then tangent for 1,178 feet to the point of accident and for some distance beyond. The grade in this vicinity is undulating, being 0.4 percent descending at the point of accident. The track is laid with 90-pound rails, 33 feet in length with 20 ties to the rail length, fully tie plated, single spiked and ballasted with 12 inches of chat. The track is well maintained.

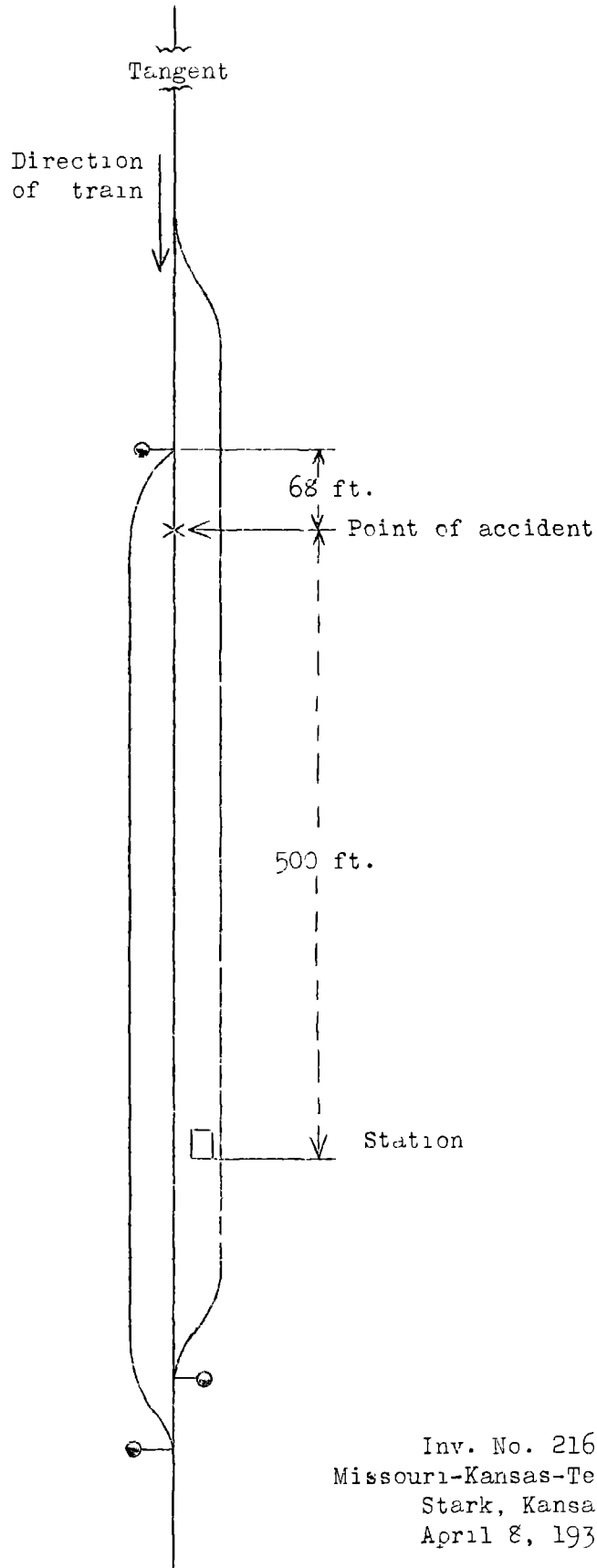
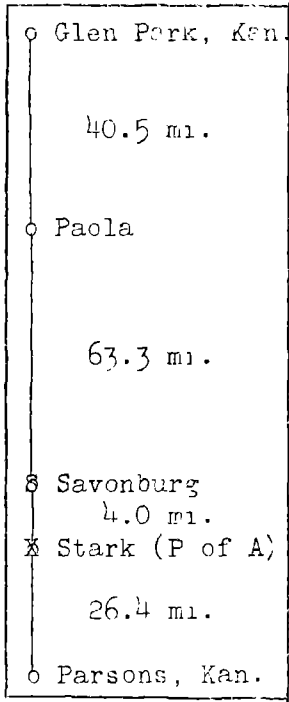
The maximum speed for schedule freight trains is 35 miles per hour.

The weather was cloudy at the time of accident which occurred at 12:51 p. m.

Description

Train No. 271, a third-class south-bound freight train, running as Extra 857 South, consisted of 44 cars and a caboose, hauled by engine 857, and was in charge of Conductor Harlow and Engineman Carter. This train left Glen Park at 9:15 a.m., passed Savonburg, 4 miles north of Stark and the last open office, at 12:45 p.m., according to the train sheet, and was derailed at the north end of Stark passing track while running at a speed estimated to have been between 35 and 40 miles per hour.

The engine and first 36 cars in the train were not derailed; the rear truck of the 37th car, B. & O. 181062, became derailed but the car remained coupled to the head portion of the train and stopped 1,475 feet south of the initial point of derailment. The rear 7 cars and the caboose were derailed and slightly damaged, but remained coupled and stopped in general line with the track, 975 feet from the head portion of the train.



Inv. No. 2168
Missouri-Kansas-Texas R.R.
Stark, Kansas
April 8, 1937

Summary of evidence

Conductor Harlow stated that he inspected the rear portion of his train, including B. & O. 181062, as it passed him departing from Glen Park yard (Kansas City). He received proceed signals from trackmen whom he passed enroute and also from the agent at Savonburg. He made several observations of his train and noted track conditions from the east side of the cupola and the rear platform of the caboose enroute and the first knowledge he had of any trouble was when the train parted between the 7th and 8th cars from the rear end and became derailed at Stark due to an arch bar failing on the west side of the rear truck of B. & O. 181062, the 8th car from the caboose. He estimated the speed of the train to have been 37 or 38 miles per hour at the time of the accident. Flagman W. F. Carter inspected the east side of the rear portion of the train at Paola and enroute he rode in the west side of the caboose cupola and made frequent observations of the train but saw no indication of trouble until the accident occurred. He saw several gangs of trackmen along the line and received proceed signals from them. After the accident he found the rear truck torn from under B. & O. 181062, the arch bars were broken on the west side, and one pair of wheels and one journal box were missing from the truck. He estimated the speed of his train at the time of derailment as being 35 miles per hour.

Engineman R. E. Carter stated that a test of the air brakes was made at Glen Park; all brakes were reported in working order and they functioned properly enroute. He looked back along the train when rounding various curves and everything appeared to be all right. His first indication of trouble was when the brakes became applied in emergency. He estimated the speed of his train as being between 35 and 40 miles per hour when the derailment occurred. Fireman Cessna also made frequent observations of the train from his side of the engine and the first knowledge he had of anything wrong was when the brakes became applied in emergency.

Car Inspectors Brooks and Cook located at Glen Park, stated that B. & O. 181062 was received from the Alton Railway at 2:55 a.m. April 8th, and that they gave this car a general mechanical inspection at that time, using magnifying mirrors to inspect the trucks. They again inspected this car after it had been assembled in Extra 357 South, but did not use mirrors to inspect the arch bars. No defects were found. They were familiar with bulletin instructions requiring close inspection of arch bar trucks and the use of mirrors for that purpose and had also received verbal instructions from their foreman in this respect.

Car Foreman Allen arrived at the scene of accident at 3:25 p.m. and found the rear truck of B. & O. 181062 a short distance north of the car, in badly damaged condition. The lead pair of wheels were detached and both arch bars and the tie bar on the west side were each broken in two places. All of these fractures were new; a break in the bottom arch bar at the bend just back of the front journal box, presented a comparatively smooth appearance while the other breaks appeared to have been pulled and twisted. It was his opinion that the initial failure occurred at the smooth appearing fracture in the bottom arch bar. There was no evidence of old breaks.

Car Repairer Skeeters corroborated the statement of Car Foreman Allen regarding the location and appearance of the arch bar fractures and the point of initial failure. The leading column-bolt and rear journal-box bolt were broken off. The other bolts were intact, but the trailing column-bolt appeared to have been dragging. He later dismantled the truck, removed the bolts, which were tight, with a cutting torch and found the arch bar fitted snugly to the top of the journal box. There was no condition apparent in the arch bars or bolts to indicate anything wrong prior to the failure of the bottom bar.

Lead Wheel-Machinist Henson inspected wheels from the truck involved and found full flange contour, practically true treads, no slid-flat spots, fractures, brake burns or prominent scars, and the outer circumferences were true.

District Engineer Dunlay made a careful examination of the track for about 10,000 feet preceding the point of derailment and found no track condition which, in his opinion, might have caused the accident. He found a mark at a crossing about 4,600 feet north of the point of accident, extending the entire length of the 16-foot crossing plank, 9 inches outside of the gauge side of the west rail but there were no marks on a crossing about 500 feet farther south. The first mark in the immediate vicinity of the point of accident was a mark on the outside of the ball of the passing track stock rail, 21 feet 2 inches south of the point of switch and 9 inches from the gauge side of the main track west rail; from this mark it appeared that something had engaged the stock rail, pulling it toward the main track. The mark ended at an outside angle bar, 57 feet 3 inches from the point of switch; on the top of the angle bar was a 3-inch scar, and a crack extended vertically from the top of the bar into a bolt hole, indicating that it had received a sharp blow. The first mark of derailment was a flange mark on the ties between the main track rails, 68 feet 3 inches south of the passing track switch and $6\frac{1}{2}$ inches from the gauge side of the east rail. A number of flange marks appeared farther south. The main and passing tracks were considerably damaged.

The report of Engineer of Tests Boughton was to the effect that the fracture in the bottom bar, which appeared to have been the original break, seemed to have occurred suddenly rather than progressively. It contained two irregularities which indicated defects in the steel. One piece of the arch bar was cut in two at the laboratory about an inch from the fracture, and after polishing and etching in hot sulphuric acid, it showed that the steel contained two inclusions of foreign matter which probably caused the bar to break at that locality. These impurities were near the wide surfaces of the bar and therefore were subjected to maximum stresses and acted much like nicks, thus weakening the bar at this locality; one was located near the top side and one near the bottom side of the bar. The one at the top extended horizontally for about $19/32$ inch and was about $3/32$ inch from the top side. It was about $2-3/16$ inches from one edge and about $2-1/16$ inches from the other edge of the bar. The thickness of the foreign matter was about $3/64$ inch at its greatest part and tapered toward each edge. The one near the bottom of the bar extended in a plane nearly vertical to the width of the bar and at a slight angle to the center line and was about $11/32$ inch long and about $3/32$ inch wide. It was located about $1-9/16$ inch from one edge and about $3-3/8$ inches from the other edge, and extended to about $9/64$ inch from the side of the bar.

Inspection of the track, by the Commission's inspectors, for a distance of about 2 miles north of the point of accident did not disclose any track conditions that would have contributed to the cause of the accident. Several highway crossings were within this territory but there were no indications of anything dragging except at one crossing about 4,600 feet north of the point of accident. A newly made shallow mark $7/16$ inch deep and 9 inches outside the gauge-side of the west-rail extended throughout the length of the crossing plank. The width of the mark could not be determined. The first mark in the vicinity of the point of accident was an abrasion on the outside of the stock rail of the passing track, 21 feet 2 inches south of the north switch; this mark continued to a rail joint, 36 feet 1 inch beyond. There was a scar $7/16$ inch deep and 3 inches long on top of the outside angle bar and there were indications of two rails south of the stock rail having been pulled toward the main track. The first marks of derailment were flange marks on the ties 68 feet 3 inches south of the north switch of the passing track. One mark was $6\frac{1}{2}$ inches inside of the east rail, another mark was on a tie plate outside the west rail. Additional flange marks appeared farther south and the main and passing tracks were considerably damaged. The car involved was B. & O. 181062, a steel underframe box car stenciled: built January 1906, 80,000 pound capacity, load

limit 88,000 pounds, light weight, 43,600 pounds. According to the waybill the car was loaded with 73,512 pounds of fire brick and clay. The trucks were arch bar type with Simplex bolsters. The arch bars were $1\frac{1}{4}$ " by 5", fastened at one end with a 1 inch rivet, and there was a lip on the bottom arch bar at the opposite end. The tie bars were $5/8$ " by 5", with a lip on each end. The wheels and axles appeared to be in good condition. Both arch bars on the west side of the truck involved were broken in two places; the tie bar was broken in two or more places, one section of which could not be found. The top arch bar was broken at each column bolt hole; the bottom arch bar was broken at the bend, 3 inches back of the second journal-box bolt hole, and also 3 inches in front of the leading column bolt hole. All breaks were new and bore no evidence of previous fracture. The break in the bottom bar near the journal-box bolt hole was comparatively smooth and the ends were not scarred or rubbed which indicated that it had snapped and the ends had not again come into contact with each other. The other breaks in the metal appeared torn and twisted and they were evidently the result of the derailment. Three journal-box bolts and one column bolt were intact; one journal-box bolt and the leading column bolt had been sheared off flush with the bottom of the tie bar and the nuts were missing. The journal-box bolts and column bolts showed no signs of wear nor was there any elongation of the bolt holes; all points of contact indicated that the truck-side assembly was firm and had been properly fitted. Five of the eight truck springs were recovered and there was no evidence of excessive vertical oscillation.

Discussion

B. & O. 181062, loaded with fire brick and clay, was received from the Alton Railway at Glen Park about 10 hours prior to the accident. At that time it was given a general mechanical inspection by the car inspectors, magnifying mirrors being used to inspect the trucks, and it was again inspected by the car inspectors after it was assembled in Extra 857 South, being the 8th car from the caboose. However, during this inspection mirrors were not used to inspect the arch bars. The train departed from Glen Park yard at 9:15 a.m. and members of the crew inspected it while rounding curves enroute, but nothing wrong was observed. While passing through Stark, 107.8 miles beyond, traveling at a speed of about 35 or 40 miles per hour, the rear truck collapsed due to the failure of both arch bars on the west side of the rear truck, precipitating the derailment.

The car in question was built in January, 1906, had a capacity of 80,000 pounds, load limit 88,000 pounds and light weight 43,600 pounds; it carried a load of 73,512 pounds. The

arch bars were $1\frac{1}{4}$ " by 5", and the tie bars $\frac{5}{8}$ " by 5"; the journals were 5" by 9". The top bar was broken at each column bolt hole, and the bottom bar at the bend, 3 inches back of the second journal-box bolt hole and also 3 inches in front of the leading column bolt hole, all fractures being new breaks. Examination by the engineer of tests indicated that the original break occurred in the bottom bar, and that it broke suddenly rather than progressively, apparently due to impurities in the metal.

Conclusion

This accident was caused by a broken arch bar.

Recommendations

The recommendations made in previous reports are hereby repeated:

1. That arch bar trucks be removed from service at the earliest practicable date.
2. That until arch bar trucks can be eliminated from service, a reduction sufficient to guarantee safety of operation should be made in the permissible load limit on cars equipped with such trucks.
3. That inflammables, explosives or other dangerous articles should not be transported in cars which are equipped with arch bar trucks.
4. That provision be made in interchange rules whereby a receiving line may refuse to accept from a connecting line any car equipped with arch bar trucks.

Respectfully submitted,

W. J. PATTERSON,

Director.