

INTERSTATE COMMERCE COMMISSION.

REPORT OF THE DIRECTOR OF THE BUREAU OF SAFETY IN RE INVESTIGATION OF AN ACCIDENT WHICH OCCURRED ON THE ST LOUIS-SAN FRANCISCO RAILWAY AT MEADOWS, ARK., ON NOVEMBER 11, 1923.

January 16, 1924.

To the Commission

On November 11, 1923, there was a derailment of a passenger train on the St. Louis-San Francisco Railway at Meadows, Ark., resulting in the death of one employee, and the injury of two passengers and one employee.

Location and method of operation.

This accident occurred on the Ft. Smith Sub-Division of the Central Division, extending between Monett, Mo., and Ft. Smith, Ark., a distance of 134.4 miles; in the vicinity of the point of accident this is a single-track line over which trains are operated by time-table and train orders, no block-signal system being in use. The accident occurred at the south switch of the passing track at Meadows: approaching this point from the south there is a curve of 5 degrees to the left 1,300 feet in length, followed by more than 2,000 feet of tangent, the accident occurring on this tangent at a point 145 feet from its southern end. The grade is descending for northbound trains to within 362 feet of the point of accident, then level for 200 feet, after which it is 0.2 per cent ascending for 1,500 feet.

The switch involved is a facing-point switch for northbound trains, leading off the main track to the east, with the switch-stand located on the fireman's side; night indications are green when the switch is closed, and red when it is open. The switch points are 15 feet in length, reinforced with a 5/8 inch bar riveted to the gauge side of the web; the points are spaced with two rods, numbered 1 and 2, each 3/4 inch thick and 2 3/4 inches wide, and located 10 inches and 48 inches from the receiving end of the switch points, respectively. The rods are connected to the switch points at each end by transit clips, 1/2 inch thick, having a maximum width of 7 inches and a minimum width of 3 1/4 inches; each clip is provided with 5 holes to permit of a maximum variation of 2 inches in the spacing of the points, for the purpose of adjusting the points to the stock rails. Stop blocks are also riveted to the outside of each point, 11 feet 2 3/4 inches from the receiving end, to prevent the rear portion of the point from spreading out of gauge. The switch points are connected to the adjoining rails with

continuous joints. The point of frog is 78 feet from the switch points. Rail braces are securely fastened to the head block tie and the next eight ties north thereof; there is also a gauge plate on the head block tie. The track in this vicinity is laid with 90-pound rails, 33 feet in length, single-spiked on tangents, and double-spiked on the outside of the rails on curves, with about 20 hardwood ties to the rail-length, and ballasted with chatts 10 to 20 inches deep; tie plates are used on curves of 3 degrees or more and at switches. The weather was clear at the time of the accident, which occurred at about 3.15 a.m.

Description.

Northbound passenger train No. 4 consisted of one baggage-car, one combination mail car and coach, one chair car, one dining car, and two Pullman sleeping cars, in the order named, hauled by engine 1048, and was in charge of Conductor Horn and Engine Man Moore. The first, second, and fourth cars were of all-steel construction, while the remainder were of steel-underframe construction. This train left Van Buren, the last open office and 7.3 miles from Meadows, at 6.04 a.m., 14 minutes late, and was derailed at the south switch at Meadows while traveling at a speed estimated to have been between 30 and 36 miles an hour.

Engine 1048 came to rest with its head end 305 feet north of the switch, upright, its head end being partially on the main track and its rear portion across the passing track, the tender was on its left side, across the tracks and reversed. The first four cars, and the forward truck of the fifth car were also derailed but remained upright. The employee killed was the fireman.

Summary of evidence.

Engineman Moore stated that the headlight was burning brightly and that the air brakes were tested and worked properly en route, he observed nothing irregular with the riding qualities of the engine prior to the derailment, and did not notice anything dragging or see any indication of fire flying from under the engine. When passing over the south switch at Meadows, he felt the engine lurch as though the wheels were climbing a switch point, and he immediately applied the air brakes in emergency, at which time he estimated the speed to have been between 35 and 38 miles an hour about the time the cab passed the switch stand the engine seemed to rise, and it appeared as though it was going between the passing track and the main track. Although he examined the track for a short distance south of the switch just after the accident, he found no marks to indicate there

had been any dragging equipment. On being informed, during the course of this investigation, that an examination of the engine after the accident disclosed that the trailer truck radius bar was broken in two just left of the center pin, he said that while this condition probably would have no effect on the riding qualities of the engine, in his opinion had it existed prior to the accident the wheel flanges would have ground against the rail to such an extent as to have attracted his attention. Conductor Fern estimated the speed to have been about 30 or 35 miles an hour at the time of the derailment.

After the accident the switch was found properly lined for the main track, with the lever latched in the socket and locked, and the switch light burning. The switch stand was securely fastened to the head block tie, while the connecting rod was in good condition and in its proper place. About 3 feet 8 inches of the receiving end of the west switch point was broken off, the transit clips being broken from this point, and it was turned over and outward for some distance beyond the continuous joint, its head resting against the stock rail. The east switch point was not broken, but the clips were bent, and this point was also turned over and outward for some distance beyond the continuous joint; for a distance of about 4 feet from its receiving end, this point had the usual traffic-worn feather edge on the outside of the head. Rod 1 was in place but bent upward to about 8 inches above the top of the ties. The west lead rail and the east main line closure rail were spread, the frog bolts broken in two and the frog torn apart. There was a flange mark on the gauge side of the west switch point at the base of the head, near the continuous joint, extending the length of the joint, while flange marks also appeared on the reinforcing bar on the east side of the track at a point 8 feet 2 inches from the receiving end of the switch point, continuing on to the adjoining rail. There were no wheel-flange marks on the ties between the switch points and frog; beyond this point the track was torn up for some distance. A piece of the broken west switch point, 7 1/4 inches in length, was found in the vicinity of the switch, and when placed next to the broken portion remaining in the track the ends fitted. A piece of the receiving end of this point 28 inches in length, was found penetrating the front channel iron of the forward tender truck, in a hole about 6 inches in diameter, at a point about 9 inches below the top of the truck channel bar and directly above where the switch point would normally be with the switch lined for the main track, there were several abrasions on both the gauge and outside of this piece of the point but they were most prominent across the entire end, vertically, at the outside corner, and it was bent

outward starting at a point about 10 inches from the point.

Measurements of the elevation of the outside rail on the curve, and the gauge for a distance of 1,500 feet south of the point of accident disclosed no difference of any consequence, at the switch points the gauge was $1/4$ inch over the standard. A check of the manner in which the switch was adjusted indicated that prior to the accident the clearance between the west switch point and the stock rail was $3 \frac{5}{8}$ inches.

Examination of the engine, after being derailed, disclosed that some parts of the brake rigging were bent, some broken, and others missing, and the trailer truck radius bar was broken in two at a point about 14 inches to the left of the center pin.

Assistant Division Engineer Topping was of the opinion that the left trailer truck wheel of the engine rode the inside of the west switch point, causing it to overturn, after which the stock block of this point acted as a fulcrum, the transit clips having been broken from this point, then the receiving end of the switch point was raised and penetrated the front channel iron of the forward tender truck.

Night Roundhouse Foreman Wegman stated that on the arrival of engine 1048 at Ft. Smith on the night of November 10th, it was as usual given preferred handling as it departs within a few hours, and on this occasion all necessary work was properly performed and inspected before the engine departed.

Section Foreman Dodd stated that in compliance with special instructions issued two days prior to the accident to inspect all main line switches, the switches under his supervision were given special and careful inspection, the south switch at Meadows being last inspected prior to the accident in the afternoon of November 10th, at which time it was found to be in good condition. He further stated that there is a road crossing just south of the switch at which the accident occurred, and there were no marks on the crossing planks of any description to indicate that there had been any dragging equipment. Section Foreman Dodd was of the impression that the engine tender was the first to be derailed.

The last train to use the south switch at Meadows was southbound work extra 148, on the night prior to the accident, to meet northbound passenger train No. 6, which was the last northbound train to use this switch prior to the accident. The crew of extra 148 stated that they left the switch properly lined for the main track, and at this time there was nothing wrong with it. Subsequent to this, and prior to the accident, three southbound trains passed over this switch, one passenger, one freight, and an extra, while inspection of cars in these trains disclosed nothing was missing or had been dragging that would have contributed to the accident.

Furthermore, after the accident the east switch point was found to have a sharp feather edge on the outside of the head, worn by traffic, whereas, had the switch been run through this edge would have been damaged to some extent.

Engine 1048 is of the 4-3-2 type, having a total weight, engine and tender, of 425,500 pounds, weight on driving wheels 159,200 pounds, and weight on trailer truck of 48,200 pounds. Tests were made of this engine at Springfield, Mo., on November 16th, the test track having a gauge of 56 1/4 inches, to ascertain what effect the break in the trailer truck radius bar would have had on the accident had it existed prior thereto. With the flange of the right trailer truck wheel against the rail, the left wheel was blocked and the engine moved forward until the back of the trailer frame came in contact with the centering device, which prohibited the frame or wheel from going back farther and caused the blocking to slide on the rail, under these conditions the break in the bar opened 5 1/8 inches, the wheel was back of its normal position, and the center of the flange, measuring on the level of the top of the rail, was 1 3/4 inches from the rail. The wheel was then blocked for a reverse movement, provision also being made to permit the break in the radius bar to overlap, and the engine was then moved backwards until the spring in the centering device went solid, preventing the frame from moving farther forward and causing the blocking to slide on the rail; under this test the broken ends of the bar overlapped 3 5/8 inches and the distance between the center of flange and the rail was 1 7/16 inches. The gauge of the track at the switch where the accident occurred was 56 3/4 inches. Owing to the condition of the engine after the derailment it could not be ascertained whether or not parts of the brake rigging were suspended low enough prior to the accident as to have come in contact with the switch point.

Conclusions.

The cause of this accident was not definitely ascertained.

The evidence indicates that the switch was properly lined for the main track and in good condition prior to the accident; that there were no marks on the track or ties south of the switch such as would be made by dragging equipment, that the engine was inspected at Ft. Smith and departed from this point in good condition on this trip, nothing unusual being noticed with its riding qualities en route; and, from the condition of the torn up track and the manner in which the engine came to rest, being upright with its head end partially on the main track and the rear portion across the passing track, that the forward part of the engine did not leave the rails until about the time it came to rest. It is also obvious that the left forward tender truck wheel was not on the switch point but on the stock rail, as the receiving end of the west switch point was found penetrating the front channel iron of this truck.

From the evidence developed by this investigation it is believed one of the wheels on the left side of the engine back of the lead truck took the west switch point, turned it over and outward breaking the two switch-rod clips, and overturning the opposite rail; when this wheel passed beyond the stop block, fastened to the switch point at a distance of 11 feet 2 3/4 inches from its receiving end which acted as a fulcrum, the receiving end of the switch point was raised to such an extent that it penetrated the front channel iron of the forward tender truck.

Examination of the equipment after the accident disclosed that the engine trailer truck radius bar was broken, although it could not be determined whether this condition existed prior to or occurred as a result of the accident, and tests were not conclusive whether this condition, if it existed prior to the accident, could have caused this derailment.

All of the employees involved were experienced men, at the time of the accident they had been on duty less than 8 hours previous to which they had been off duty more than 10 hours.

Respectfully submitted,

W. P. BORLAND

Director.