INTERSTATE COMMERCE COMMISSION

REPORT OF THE DIRECTOR OF THE BUREAU OF SAFETY IN RE INVESTIGATION OF AN ACCIDENT WHICH OCCURRED ON THE TRACKS OF THE TERMINAL RAILROAD ASSOCIATION OF ST. LOUIS AT ST. LOUIS, MO., ON AUGUST 21, 1931

October 2, 1931.

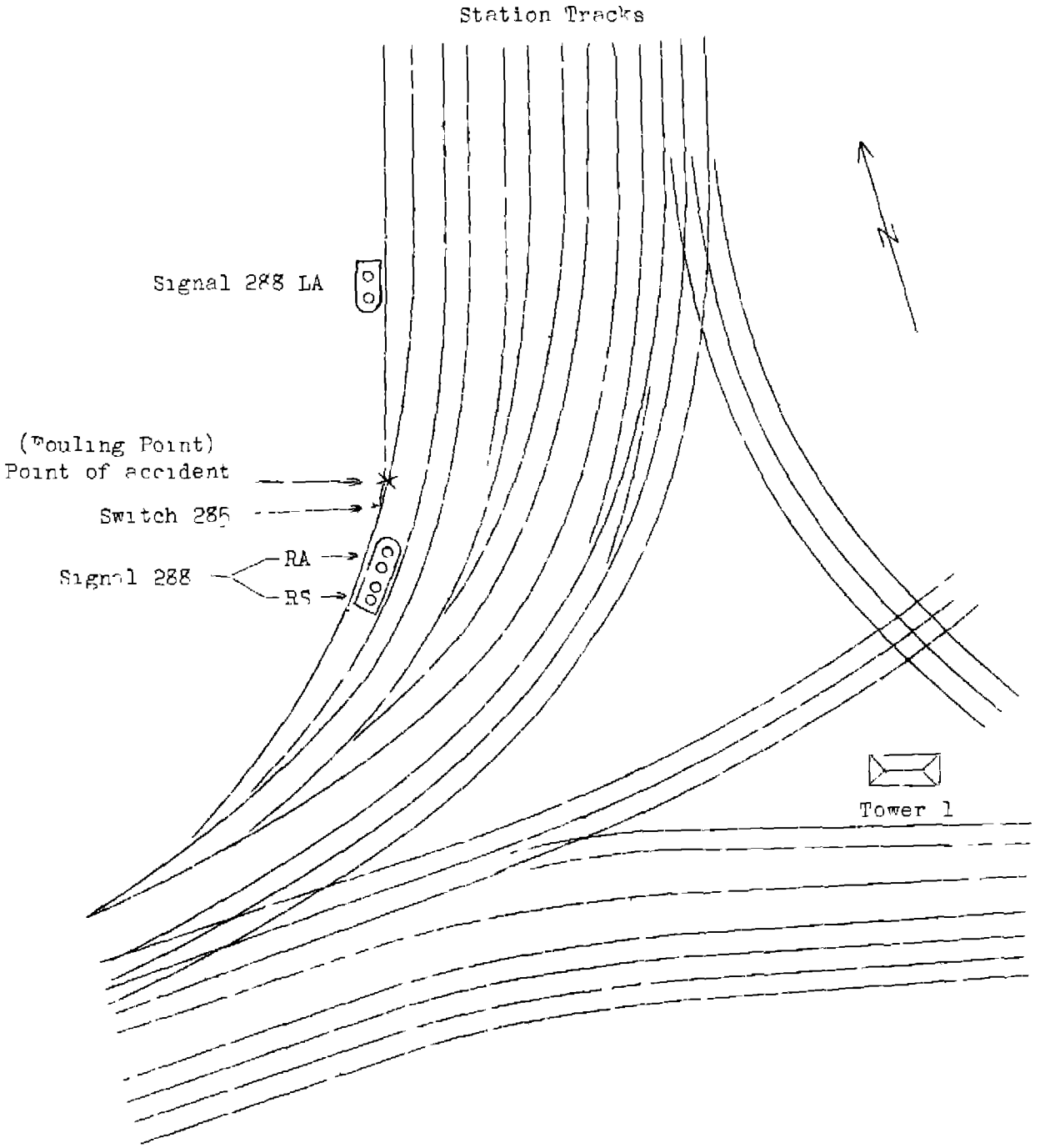
To the Commission

On August 21, 1931, there was a collision between a Terminal Railroad Association of St. Louis switch engine and an Illinois Central Railroad passenger train on the tracks of the former company at St. Louis, Mo., which resulted in the death of one employee and the injury of two employees

Location and method of operation

This accident occurred on the Eads District, which extends between East St. Louis, Ill., and Theresa Ave., St. Louis, Mo., a distance of about 5 miles. In this district there are seven main tracks, the general directions of which are east and west, and there are several tracks which lead from the main tracks to the St. Louis Union Station tracks, these latter tracks extending practically north and south. The station tracks are numbered consecutively, from east to west, tracks 32 to 1, and in addition there are other station tracks, farther west, which are lettered from A to J, inclusive, and the accident occurred at the fouling point where tracks C and D diverge as they lead towards the station. Entrance to tracks C and D is over a single lead track on which there is a sharp curve to the left, leading towards the station, the maximum curvature being about 15°, and there is a No. 7 frog at the switch where these two tracks diverge, this switch being numbered 285.

In this district train movements are controlled and directed from tower 1, located south of the station, by means of an electro-pneumatic interlocking plant. Direct current supplied from storage batteries is used on the track circuits and switch and signal units involved in the accident. The signals involved are 2-position, color-light, dwarf signals. Located opposite switch 285 there are two of these 2-position signals, one mounted above the other, each of them being controlled from tower 1. The indications of the upper signal, 288 RA, are red, indicating stop, and green for movement through the switch to either track C or D. The indications of the lower signal,



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of St. Louis,
St Louis, Mo
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288 RB, are green and yellow; a green indication of this signal indicates that the track for which switch 285 is set is clear, a yellow indication is displayed by this signal when the track for which this switch is set is occupied. Green over green, therefore, indicates that the track which is being entered, either track C or track D, is clear, green over yellow indicates that the track being entered is occupied by cars, and the movement must be made prepared to stop short of such cars. Northward from switch 285 for a distance of about five rail-lengths, to a point a short distance south of the station platforms, there is a track circuit on both tracks C and D for fouling protection. The arrangement of the interlocking is such that when this section of track is occupied and the circuit is shunted, switch 285 can not be operated and the green indication of signal 288 RB can not be displayed. An indicator in the interlocking machine in the tower gives the leverman information whether this section is clear or occupied, a green light is displayed when the track is clear, and this light is extinguished when the track circuit is shunted. The outbound starting signal on track D, signal 288 LA, is located about 18 feet north of the insulated joint in the west rail of track D which separates the fouling track circuit from the station track circuit. The track circuits on the station tracks extend to within about one rail-length from the bumping posts. The track and signal apparatus were maintained in good condition.

Some of the outgoing trains are made up on the station tracks while many of the incoming trains are turned on wye tracks and are then backed into the station. It was during two movements of this character that this accident occurred. Cars of Missouri Pacific train No. 17 were being assembled on track D, and Illinois Central train No. 13 was being backed into the station on track C. These movements were governed entirely by signal indications, and the switches and signals were operated from tower 1 Speed is restricted by time-table rule to 15 miles per hour on main tracks and to 8 miles per hour on station tracks.

The weather was clear at the time of the accident, which occurred about 10.28 p.m.

Description

TRRA switch engine No. 160 was in charge of Conductor Farris and Engineman Horn. This engine picked up six cars, comprising the head end of Missouri Pacific train No. 17, and, with the engine headed north, pushed these cars in on track D and coupled them to some cars which were

already occupying that track. The engine was then uncoupled from the cars, moved a few feet away from them, and stopped to await a signal indication on starting signal 288 LA, which would authorize it to move out of this track. At the point where the engine stopped it fouled track C and it was standing at this point when it was struck by IC train No. 13.

Illinois Central passenger train No. 13 consisted of 1 combination car, 2 chair cars, 1 dining car, and 2 parlor cars, hauled by engine 1084, and was in charge of Conductor Lordan and Engineman Church. This train was being backed into the station, the route and signals having been lined for a movement entering track C, and while this movement was being made the rear car cornered the tender of engine 160.

The impact drove engine 160 against the cars on track D, derailing both the engine and tender; the rear truck of the rear car in train No. 13 was also derailed and came to a stop on a cinder fill to the right of track C Engine 160 and the first car standing on track D were somewhat damaged while the rear car of IC train No. 13 was also damaged. The employee killed was the conductor of engine 160, who was on the footboard on the front end of the engine, and the employees injured were the engineman and fireman of the same engine.

Summary of evidence

Engineman Horn, of engine 160, stated that at about 10.20 p.m. he moved equipment for the head end of Missouri Pacific Train No. 17 into track D, and in making the stop before coupling them to the other cars comprising that train he used the independent engine brake, but did not use sand, and he did not notice any indication of sand on the track while this movement was being made. After these cars had been coupled to the other cars he moved the engine a short distance away from them, estimating this distance to have been about 1 foot, and stopped upon receiving a signal from the fireman, at this point the tender of the engine fouled track C. After stopping, the fireman maintained a lookout ahead for a signal indication on the starting signal, which was north of the engine, but suddenly looked towards the south and immediately inquired if the engine was into clear, Engineman Horn looked toward the rear and at about the same time he saw a marker of the passenger train strike the tender of his engine. Engineman Horn further stated that he was aware I.C. train No. 13 was scheduled to arrive at 10.30 p.m. but had no knowledge that it was routed to station or track C.

Fireman West, of engine 160, thought his engine was moved back about three or four feet before it was stopped to await a proceed indication on the starting signal. The engine was about 8 or 10 feet south of that signal, and as it was on his side of the track and could not be seen by the engineman, he kept watching for a proceed indication, which could have been seen only from its reflection on the track, due to his engine being south of it. In the meantime he happened to look southward and observed a train approaching about 50 feet distant. Thinking there was a possibility the tender of his engine did not clear the fouling point, he inquired of the engineman whether this was the case, but the collision occurred before the engineman replied. While Fireman West could not estimate the speed of the approaching train, yet by means of the rays of the headlight on the rear end of his own engine he was able to see the conductor of that train standing on the rear end in proper position. He also stated that he did not know whether sand was used by his engine while it was using track D, but did not think so as the weather was clear and the rails dry and he knew of no occasion for using sand. He did not examine the track after the accident to determine whether some other engine had used sand before his own engine entered this track.

Switchman Wilson, of engine 160, stated that he rode on the leading car while the movement was being made through the yard to track D and that he dropped off when this car reached the clearance point between tracks C and D. The Conductor, who was also riding on the leading car, remained on it, made the coupling to the other cars, and then gave him a signal to cut off the engine, after which the engine was backed away from the cars 4 or 5 feet and stopped, fouling track C. After the conductor returned to the engine they both boarded it and sat on the pilot beam, and he did not see nor hear a train approaching, his first intimation of anything wrong being when he was knocked from his seat by the impact of the collision. Switchman Wilson further stated that he did not hear any noise indicating that the cars were running over sanded rails when they entered track D, and that he made no examination afterwards to learn if there was sand on the rails.

Conductor Lordan, of I.C. train No. 13, stated that the brakes on his train functioned properly during the trip to St. Louis and that the rear of the train was equipped with a standard back-up hose. This equipment was first used in making a back-up movement at Springfield and again to stop the train at St. Louis preparatory to backing the train into the station, while a test was made after starting the back-up movement towards the station and it worked effectively on each occasion. The signals

governing the route to the station, including the signals leading to track C, were displaying clear indications. He was standing on the rear platform of the rear car during this movement and saw an engine standing on track D but could not determine that it was fouling track C, on account of the curve to the left, until a marker was knocked off and the rear end of the car swung outward, he then started to set the air but the accident had already occurred. He estimated the speed of his train at the time of the accident at 10 miles per hour.

Assistant Train Director Owens stated that he was on duty in tower 1 and at the time he took charge of the office the leading cars of the equipment of M.I train No 17 were standing on track 51. He gave instructions to have these cars moved into track D and at the same time told the leverman that as soon as track 51 was clear, to move I.C. train No. 13, which was then standing on track 55, in on track C, as this was the first station track that would be clear. About five minutes after engine 160 and the cut of cars entered track D, the route was lined for the movement of train No. 13 into the station, as he expected the yard engine would remain into clear on the station track until after the passenger train passed the switch He did not see the indicators on the interlocking machine after the accident but was informed by the two levermen that they displayed clear indications for the tracks over which train No. 13 was routed. He said that he had never operated this machine but knew that because of the way the interlocking functioned it would have been impossible to line the route through the plant for train No. 13 had the interlocking system been working properly.

Leverman Garrison stated that he operated the interlocking machine for most of the movements of train No. 13 through the plant. He lined the switches for the movement of this train to the station over track C and observed that all of the indicators showed a clear route, in fact, if the indicator for switch 285 had shown that engine 160 was not into clear on track D, he would have been unable to line the route for train No. 13 to enter track C. Leverman Snow stated that he saw Leverman Garrison line the route for train No. 13, and at that time the indicator for switch 285 gave a clear indication. After the route was lined he took charge of this portion of the machine and gave that train a starting signal; he did not continuously watch the indicator for switch 285 but each time he looked at this indicator it was displaying a clear indication.

Signal Maintainer Holliday stated that he was at tower 1 at the time of the accident and in response to a trouble call he proceeded to the scene of the collision and arrived at that point a short time after its occurrence He did not notice the signal indications upon his arrival, but observed considerable sand on the rails of tracks C and D He examined the track wiring and found it to be intact, and after the wreckage was cleared away and the sand removed from the rails he tested the track circuit by shunting it with a wire and meter and found it functioning properly. In his opinion the presence of sand on the rails resulted in the relay being held closed.

Signal Engineer Lix stated that at switch 285 there is a track circuit for fouling protection on tracks C and D. At the time of the accident track D was occupied on a portion of this circuit and under such conditions, providing the apparatus was working properly, it would have been impossible for the towerman to throw the switch for a movement into track C for the reason that the open relay would have held the lever in the tower by detector locking. The fact that the towerman was able to throw this switch is convincing evidence that the relay was clear although the track was occupied.

As the evidence indicated that the relay for the track circuit in the fouling section north of switch 285 had picked up when this section was occupied by engine 160, on account of sand on the rails which resulted in failure to shunt the relay, tests were made by representatives of the Commission and the railroad company on August 25, to determine whether these conditions could be reproduced and to check the operation of the signal and interlocking equipment. TRRA switch engine 166, of the same type as the engine involved in the accident, was used. First, the engine was backed slowly into the fouling section from station track D; the track relay for the circuit in this section was shunted properly and promptly, and with it so shunted it was impossible to reverse switch 285 or to display a green indication on signal 288 RB. The rails were then heavily sanded, and it was found that with this condition, when the engine was operated into the fouling section from switch 285, the track relay would pick up and hold up before the engine cleared the fouling section With the engine standing on track D in the fouling section, but with the track relay not shunted, due to the sand on the rails, switch 285 was reversed and a clear signal indication displayed for a movement into station track C. This is precisely the condition which, according to the evidence, existed just prior to the accident. At the time

of these tests, four days after the accident, it was noted that there was considerable sand on the bases of the rails which had not been replaced following the accident, confirming the evidence that at some time prior to the accident these rails had been very heavily sanded.

Conclusions

This accident was caused by the failure of a track relay to be shunted by a switch engine, due to sand on the rails, which permitted a route to be lined up and clear signals to be displayed for a conflicting movement

According to the evidence, on account of the location of cars standing on track D, the switch engine did not at any time clear the fouling track section and was standing within that section at the time of the accident The fact that the track relay was not properly shunted was established by the statement of the conductor of train No. 13 that a clear signal indication was displayed at switch 285 for his train to enter station track C, by the statements of the two levermen that a clear indication for this switch was showing on the interlocking machine in the tower, and by the fact that it was possible to reverse switch 285 while the fouling track section was occupied. When the track was cleared after the accident tests showed that the interlocking apparatus was then functioning properly. During the investigation train movements similar to those at the time of the accident were made, and these movements, when made with the rails heavily sanded, resulted in a similar failure of the interlocking and signal apparatus to function as intended.

On account of the curvature in the lead to station tracks C and D, it would be very difficult for a man riding the rear end of a train approaching the point of accident, even at very low speed, to determine whether or not an engine standing on track D at the point of accident cleared track C in time to avoid a collision with the standing engine. It is believed that Conductor Lordan was justified in relying upon the signal indications which indicated that the route was clear for the movement of his train, and that he is not at fault for not discovering that engine 160 was fouling track C.

The rules provided that sand should not be used over movable parts of an interlocking plant unless absolutely necessary. Subsequent to the accident the Maintenance of Way and Interlocking Departments were notified to have track walkers and maintainers watch the matter and to remove and also report promptly any sand deposited In addition, a general notice was issued, under date of August 28, reading as follows

"Possibility of failure of track circuits in interlocking plants due to sand on rails has developed. The use of sand through interlocking plants is prohibited by the rules.

"Please call attention of all concerned to see that the rules are complied with."

The employees involved were experienced men and at the time of the accident none of them had been on duty in violation of any of the provisions of the hours of service law.

Respectfully,

W. P BORLAND,

Director.