

## INTERSTATE COMMERCE COMMISSION

REPORT OF THE DIRECTOR OF SAFETY IN RE INVESTIGATION OF AN ACCIDENT WHICH OCCURRED ON THE ST. LOUIS-SAN FRANCISCO RAILWAY NEAR OSAGE HILLS, MO , ON AUGUST 31, 1930.

October 9, 1930.

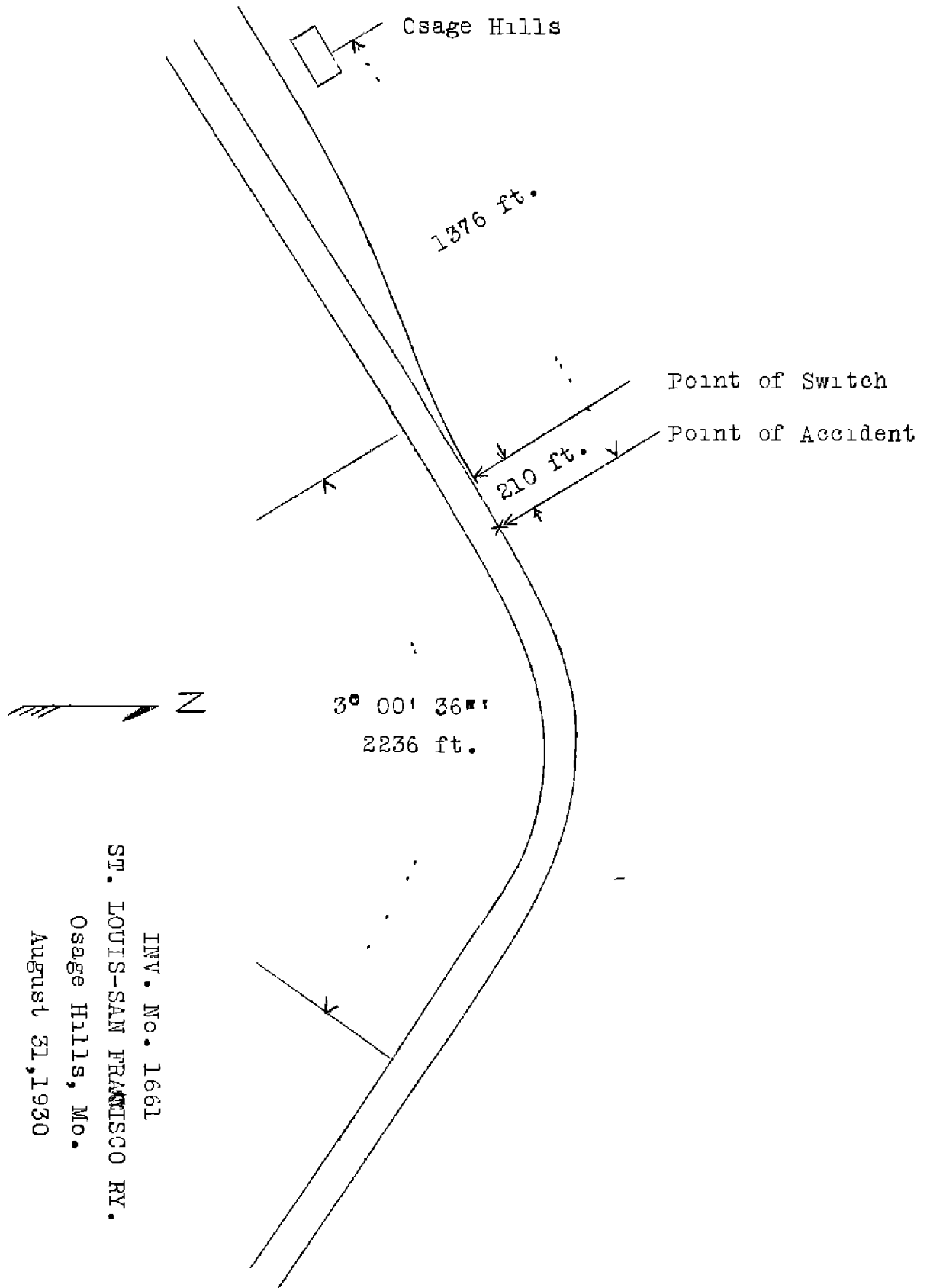
To the Commission:

On August 31, 1930, there was a derailment of a passenger train on the St. Louis-San Francisco Railway near Osage Hills, Mo., which resulted in the death of 4 passengers and 2 employees, and the injury of 64 passengers, 4 employees, and 2 Pullman employees.

Location and method of operation

This accident occurred on the Rolla Sub-division of the Eastern Division, extending between St. Louis and Newburg, Mo., a distance of 119.1 miles. In the vicinity of the point of accident, this is a double-track line over which trains are operated by time-table, train orders, and an automatic block-signal system. The accident occurred on the westbound track, at a point 1,376 feet east of the station, approaching this point from the east there is a  $3^{\circ} 00' 36''$  curve to the left 2,236 feet in length, including 360 feet of spiral track at each end, the accident occurring on the leaving spiral at a point 278 feet from its western end. The grade is descending for westbound trains, being 1.1 per cent at the point of accident.

In the vicinity of the point of accident the main tracks are 45 feet apart, and the westbound track is 7 feet higher than the eastbound track. At a point 210 feet west of the initial point of derailment, there is a facing-point switch which leads from the westbound main track to an industrial track located on the north side thereof. The main track is laid with 100-pound rails, 39 feet in length, with approximately 24 oak ties to the rail-length, 75 per cent creosoted, and is single-spiked, fully tie-plated, and ballasted with river gravel to a depth of from 12 to 15 inches. The superelevation graduates from level at the west end of the spiral to a maximum of  $6\frac{1}{2}$  inches at the west end of the main curve. The track is in good condition and well maintained. The maximum speed permitted by time-table for passenger trains is 55 miles per hour.



The weather was clear at the time of the accident, which occurred at 7.02 p.m.

#### Description

Westbound train No. 1 consisted of one combination mail and baggage car, one combination baggage and passenger car, one chair car, one dining car, seven Pullman sleeping cars, and one observation car, all of steel construction, hauled by engine 1511, and was in charge of Conductor Meador and Engineman Ray. This train departed from St. Louis, its initial terminal, at 6.30 p.m., on time, passed Southeastern Junction, the last open office, 7.5 miles east of Osage Hills, at 6.49 p.m., according to the train sheet, and was derailed near Osage Hills while traveling at a speed estimated to have been between 35 and 55 miles per hour.

The lead pair of engine track wheels were the first to be derailed, and they continued on the ties a distance of 220 feet to the switch, where the engine was derailed to the right and traveled an additional distance of 357 feet to the point where it came to rest on its left side, across the industrial track, with its front end against a rock bluff 60 feet from the main track. The first six cars were derailed, the first four were torn from their trucks and came to rest in various positions on both main tracks and the industrial track, in upright position, the second car rested across one end of the third car, demolishing it. The remaining equipment was not derailed nor damaged. All the passengers killed were riding in the third car. The employees killed were the engineman and fireman, while those injured were the conductor, head brakeman, train auditor, and flagman.

#### Summary of evidence

Conductor Meador stated that he was riding in the second car of the train, which was traveling at a speed of about 50 or 55 miles per hour when the accident occurred, and he thought an application of the air brakes was made just before he felt a severe lurch of the train. He stated that the usual air-brake inspection was made at St. Louis, and a running test also was made on their departure from that point. Pullman Conductor Bersch, Head Brakeman Wickersham and Train Auditor Williams also were riding in the second car of the train, and could give no information in addition to that furnished by Conductor Meador. The speed was variously estimated by them to have been from 35 to 50 miles per hour at the time of the accident, and they thought the air brakes

were applied in emergency just before the derailment. All of these men were injured, and were interviewed in the hospital.

Rear Brakeman Bodanski stated that the speed of the train was not more than 40 miles per hour, and his first intimation of the impending accident was an emergency application of the air brakes, the severity of which alarmed a lady passenger. At this time he was standing in the aisle near the rear seat of the eleventh car, or second car from the rear, and he remained there long enough to reassure the passenger. He then felt a second shock, after which he walked to the rear platform of the car, and was picking up his flagging equipment, which was scattered, when he felt a third shock which brought the train to a stop. He went back to flag after the accident.

Signal Maintainer Laretto stated that he reached the scene of the accident about 40 minutes after its occurrence and his inspection of the track showed that the switch had not been damaged in any way. He found marks on the ties east of the switch which extended to a joint in the north rail, where the outside ends of two splice bar bolts had been sheared off. East of this joint he saw a mark on top of the rail, apparently made by a flange of an engine-truck wheel, and beyond this mark he found a quantity of pulverized rock on top and on both sides of the rail, four or five pieces of stone, and a number of small stones, lying on the track, some of which were 2 inches in diameter. The pieces appeared to have been freshly broken.

Sergeant Special Officer Noland, accompanied by Special Officers Rock and Hefti, all of the St. Louis-San Francisco Railway, arrived at the scene of the accident about one and one-half hours after its occurrence, and their examination of the track disclosed about the same condition as found by Signal Maintainer Laretto. The pulverized rock covered an area of about 8 inches on top of the north rail, and four or five pieces of rock were found near the rails, the largest piece measuring about 5 inches x 4 inches. A flange mark then appeared on the top of the north rail westward for a distance of about 25 feet to a joint where two bolts had been sheared off, the marks then continued on the ties to the switch, which was found to be in good condition, the track was then torn up beyond that point. Special Officer Noland stated that he took the rocks and the two damaged bolts and later gave them to another special officer. He further stated that the rock was found under the third car from the rear.

Assistant Chief Engineer Barry, who arrived at the point of accident about three hours after its occurrence, stated that his examination of the track disclosed lime stone dust on both sides of the rail for a distance of about 12 inches, he did not see any rocks on the track at that time, but was informed that some rocks had been found and had been taken away by a special officer. Immediately west of the point where the stone dust was found he saw a flange mark which extended across the top of the north rail and terminated near a track joint, where the outside ends of two splice-bar bolts had been sheared off. This joint was about 20 feet west of the point where the limestone dust had been found. He also observed the wheels marks on the ties which extended to the switch. Soon after his arrival, he and the section foreman gauged the track and found it in proper gauge. The statements of Section Foreman Taylor practically corroborated those of Assistant Chief Engineer Barry. He further stated that he had been in charge of this section of track about three years, and during his supervision it had not been necessary to surface the track east of the point of derailment nor has it required much work to properly maintain the track.

The statements made by Division Engineer Gelwix brought out nothing additional of importance as to the marks of the derailment. The track east of the point of derailment was in first-class condition, and there were no signs of anything dragging from the equipment. He was of the opinion that something caused the engine-truck wheels to climb the rail, and when this truck reached the switch, it turned to the right around the switch lead rail and then pulled the driving wheels off the rail. He checked the gauge and cross levels for a distance of 500 feet east of the point of derailment, and found at three points the gauge was  $1/2$  inch wide and at one point it was  $1/4$  inch tight. The super-elevation was good, averaging from 6 to  $6\ 3/8$  inches, although at a point 300 feet east of the point of derailment it measured  $6\ 3/4$  inches. In his opinion the track conditions at the point of derailment were safe for the operation of a train at a speed of 70 miles per hour. The statements of Roadmaster Rutledge corroborated those of Assistant Chief Engineer Barry and Division Engineer Gelwix.

The statements of Superintendent St. Louis Terminals Conley and Division Superintendent Moran brought out nothing additional of importance.

Master Mechanic Harvey stated that he made a detailed inspection of engine 1511, and found the flanges, treads, and gauge, of all wheels in good and serviceable condition. Some portions of the pilot, engine truck, and brake rigging, were broken or detached, but these failures occurred during the progress of the derailment and no defective condition of the engine contributed to its derailment.

Engineman Jones, who was the last engineman to operate engine 1511 previous to the trip on which it was derailed, stated that he operated this engine from Newburg to St. Louis on August 30, at which time the engine rode smoothly and took the curves nicely. His examination of the engine at the completion of this trip showed the wheels, flanges, brakes and other appurtenances to be in good condition.

The investigation disclosed that the first indication of derailment was a mark near the gage side of the north rail, extending diagonally across it for a distance of about 25 feet, where it terminated near a track joint. The splice bars at this point were held by four bolts, and at the time of the inspection by the Commission's inspectors two of these bolts were missing. On the outside of the north rail there was a mark on the last spike holding the splice bar, and on top of the tie-plate of the third tie west of this joint, another mark was seen. This mark was  $2\frac{1}{2}$  inches from the base of rail and extended over tops of ties for a distance of approximately 220 feet, its maximum distance from the rail being 10 inches. Another mark, paralleling the one just described, appeared on the ties between the rails and at a similar distance from the gage side of the south rail. At a point 28 feet east of the joint where the bolts were missing, there was some pulverized stone on each side of the north rail.

Engine 1511 is of the 4-8-2 type, having a total weight, engine and tender, of 582,700 pounds, the weight of the engine was distributed as follows. engine truck 57,100 pounds, driving wheels, 233,700 pounds, trailer wheels, 51,400 pounds. This engine received class 3 repairs in December, 1928, having traveled 153,725 miles until April 1930, when it received class 5 repairs, and since that time it had traveled approximately 32,000 miles. A careful inspection was given the engine truck, as apparently the front pair of wheels of this truck were the first to be derailed. The flanges and treads showed uniform wear and were in good condition. The rear wheels were found in proper gage, but the front

wheels were slightly out of gage, due to a bent axle. The greatest damage was at the front of the truck, where the cross brace and axle displayed bends. The left forward pedestal jaw was detached from the frame, and the bolts which had held these members together were missing. It is probable these members were separated when the cross brace, which was attached to the pedestal jaw by five rivets, was bent. These bolts were not found. The pedestal sagged, which indicated that it was pulled or forced downward, concurrent or incidental to the bending of the cross brace to which it was attached. The left forward end of the frame was bent inward, and the equalizer bars at this location were also bent inward slightly, and displaced from their original seats on the journal box, but their disarrangement was very slight and they were still riding the top of the journal box. Some of the rear braces of the pilot were bent or broken. Under the right side of the lower angle iron, to which the bottoms of the slats are attached, there was a very plain abrasion which indicated that this portion had come in contact with something while moving, possibly the top of the north rail after the truck wheels were derailed. Another abrasion appeared on the rim of the right front wheel, which clearly indicated that it had also come in contact with something during the progress of the derailment, probably the outside of the north rail.

### Conclusions

It is believed that this accident was caused by pieces of limestone rock on the high rail of the curve.

Pulverized limestone was found on the top of the high rail, covering an area approximately 12 inches in length, this pulverized stone also covered both sides of the rail, and five pieces of stone were found lying on the track nearby, the largest piece measuring  $2\frac{1}{2}$ " x  $4\frac{1}{2}$ " x 5". The rocks apparently caused the right front wheel to mount and cross the rail, dropping off on the ties on the outside and continuing for a distance of approximately 225 feet where the right wheel encountered the lead rail of the switch, which diverted the derailed wheels to the right, precipitating the final derailment of the engine and first six cars. The track was in good condition and sustained only minor injury from the initial point of derailment to the switch, although west of the switch the track was demolished for a distance of about 300 feet.

Tests were conducted with an engine of the same type as engine 1511, having it pass over various sizes of limestone rocks of the same kind as found at point of derailment. A limestone rock 1 9/16" x 5 1/4" was crushed by the right front truck wheel, the wheel was stopped on this pile of crushed stone until observations and measurements could be made, and it was found that the pulverized stone supported the wheel and held it 3/4 inch above the rail. The flange of the first wheel of engine 1511 was 1" in height and this test clearly indicates that a stone of this size could precipitate a derailment. At the time of this investigation, however, it had not been determined how the rocks came to be on the track.

Examination of the engine truck disclosed no defects that could have contributed to the cause of the accident. There was no serious damage to any portion of the truck, and the bent or broken parts appeared to have been a result of the accident rather than a contributing cause.

The testimony of the surviving members of the train crew indicated that the brakes had been applied in emergency immediately before the derailment. While it is doubtful that the engine crew was able to see any obstruction such as rocks on the track, on a curve, with the train traveling at a high rate of speed, it is possible the engineman realized that the engine truck wheels had been derailed and immediately applied the air brakes in emergency.

All of 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 submitted,

W. P. BORLAND,

Director.