

INTERSTATE COMMERCE COMMISSION

REPORT OF THE DIRECTOR OF THE BUREAU OF SAFETY IN RE INVESTIGATION OF AN ACCIDENT WHICH OCCURRED ON THE CHICAGO, BURLINGTON & QUINCY RAILROAD NEAR LOCKETT, WYO., ON SEPTEMBER 27, 1923.

November 15, 1923.

To the Commission.

On September 27, 1923, there was a derailment of a passenger train on the Chicago, Burlington & Quincy Railroad near Lockett, Wyo., which resulted in the death of 17 passengers, 1 express messenger, 1 mail clerk, 1 employee and 1 Pullman porter, while 7 passengers and 3 employees are known to be missing, the injuries were confined to 1 passenger and 1 employee.

Location and method of operation.

This accident occurred on the Guernsey and Casper Subdivision of the Casper Division, extending between Guernsey and Casper, Wyo., a distance of 107.2 miles. This is a single-track line over which trains are operated by time-table, train orders, and a manual block-signal system. The point of accident was 1.51 miles west of Lockett, approaching this point from the west there is a tangent 1,337.5 feet in length, followed by a curve of 10° 22' to the right which is 5,203.5 feet in length, the accident occurring on this curve 2,214 feet from its western end, at bridge 98, spanning what is known as Cole Creek. The grade approaching from the west is undulating, and is 0.2 per cent descending for a distance of about 1,500 feet immediately preceding the point of accident. The track in this vicinity is laid with 90-pound rails, 33 feet in length, with an average of 22 treated ties to the rail length, tie plates, single spiked, and maintained in good condition.

Bridge 98 was a pile driven trestle 111 feet in length and 20 feet above the creek bed at the highest point, it was built in 1914. This bridge consisted of nine bents, spaced about 14 feet apart, each bent being made up of five piles driven to the point where they would not penetrate farther, this distance varying from 12 to 25 feet. The bents were braced with sway braces 4 inches in thickness, 10 inches in width, and of varying lengths, according to the location in which used. On top of the piles were caps 14" x 14" x 14", with stringers resting upon the caps, four on each side of the center line of the track, 8" x 16" x 14", with deck blocks 6 inches in width and 14 inches deep, dapped

up as to go over the caps and prevent longitudinal movement of the stringers. The ties rested on the stringers, and were spaced 14 inches from center to center. On each side, resting on the ends of the ties, were fenders extending the full length of the bridge. At each end of the bridge, on the up-stream side was rip rap from 7 to 8 feet thick at the bottom, 2 feet thick at the top, and about 6 feet in height. On account of the curvature of the track, this bridge is not visible by means of the rays of a headlight for more than 500 or 600 feet, and any unsafe condition which might exist undoubtedly would not be detected until an approaching train was much nearer.

There was a light rain falling at the time of the accident, which occurred at about 9.05 p.m.

Description.

Eastbound passenger train No. 30 consisted of one baggage car, one combination mail and baggage car, one coach, one chair car, and three Pullman sleeping cars, hauled by Colorado & Southern engine 350, and was in charge of Conductor Goff and Engineman Spangler. Inasmuch as the track between Casper and Wendover, Wyo., is operated by the Chicago, Burlington & Quincy Railroad, and between Wendover and Denver, Colo., by the Colorado & Southern Railway, crews of one road operate over the tracks of the other road, and the engine crew on this train was made up of employees of the Chicago, Burlington & Quincy Railroad, while the train crew was composed of employees of the Colorado & Southern Railway. The cars were of all-steel construction with the exception of the first and third, which were of steel-underframe construction. Train No. 30 departed from Casper, which is its initial station, and also the last open office, at 8.35 p.m., on time, and was derailed at bridge 98 while traveling at a speed estimated to have been 30 or 40 miles an hour.

Engine 350 came to rest on its right side, with its head end about 10 feet from the east bank of the creek, parallel with and about 15 feet south of the center line of the bridge, and was practically submerged in the sand, the tender was immediately behind the engine. The first car came to rest on the east bank of the creek, with about 20 feet of its rear end overhanging the creek, the superstructure of this car was destroyed. The next three cars went into the creek, the second and fourth resting partly on the third, which was demolished, while the second car was nearly demolished. The head end of the fifth car also went into the creek, while the rear end remained on the bank, but the water so undermined it as to cause it finally to fall into the stream and it was practically submerged in the sand. The forward truck of the sixth car was derailed.

The bridge was demolished. The employee killed was a brakeman, while the employees missing are the engineman, fireman, and conductor.

Summary of Evidence.

Cole Creek, the stream spanned by bridge 98, is a small stream about 14 miles in length, and joins the North Platte River about one-fourth mile south of the railroad, it drains an area of about 130 square miles, approximately 80 of which are composed of adobe soil, which sheds water very readily, the remaining portion consists of a very sandy soil. Within this sandy area are to be found a number of sand bars across shallow spots, forming basins or pools which after a rain of the least severity are filled with water, sometimes of considerable depth. The annual rainfall in this vicinity, as shown by the U. S. Weather Bureau records for the past nine years, is 12 inches, the precipitation for the month of September, 1935, was 5.10 inches, 2.89 inches of which fell on September 37th and 38th.

An inspection trip of the area drained by Cole Creek above the bridge, made several days after the accident by Assistant Engineer Hickox, disclosed that at three different points the sand had drifted across the channel of the stream, creating barriers and impounding large volumes of water, resulting in large areas on both sides of the creek being flooded. According to the statement of one of the inhabitants of the vicinity, there was one point 11 or 13 miles above the bridge where at 4 p. m. on the day of the accident about 520 acres of land was flooded, and on visiting this place at 9 a. m. the next day practically all of the water had disappeared, he thought that in some places the water in the flooded area was 12 or 14 feet deep and said a channel 60 or 80 feet wide had been cut through the sand bar which had held the water. He also said all this water had accumulated during the day of the accident. Assistant Engineer Hickox said that the opening under the bridge was sufficient to take care of the water from the drainage area even under flood conditions. He examined the piling found after the accident, which were of cedar, and found them in a good state of preservation, sound, and without any signs of decay. While it was his opinion that the accident was due to high water, he was unable to state whether the west approach of the bridge had been washed out before the arrival of train No. 30, or whether the bridge had been so weakened by the washing away of the soil supporting the piling as to cause the bridge to give away under the weight of the train.

Superintendent Vaygood stated that on account of the rain he got on the engine of a westbound local freight train

at about 1.00 p.m., and rode toward Casper for the purpose of observing track conditions. At 3.35 p.m., the rain was so severe that at North Glenrock, 2.39 miles east of Cole Creek and the first station east of Lockett, he instructed the section foreman to patrol the track and also notified the dispatcher at Casper that a heavy rain was falling east of North Glenrock. The train was flagged in a cut east of Lockett on account of sand having been washed upon the track, and the section foreman at Lockett was also instructed to patrol the track while the storm continued. The local left Lockett, passing over Cole Creek bridge at about 6.15 p.m., at which time he said there was approximately 8 or 10 inches of water in the creek. Upon arriving at Casper at about 7.50 p.m., he reported conditions to the dispatcher stating that while there had been heavy rains east of Lockett he did not consider the situation of a serious nature or such as would warrant the issuing of slow orders. He went to the scene of the accident shortly after its occurrence had been reported, at that time there were 10 or 12 feet of water running in the creek and no part of the bridge was visible. He further stated that in the nine years he had worked on the Casper division he had never before seen more than $2\frac{1}{2}$ or 3 feet of water in Cole Creek, and that only once, in 1915, the water had reached that depth.

Section Foreman Kellner, in charge of the section on which the accident occurred, started for the east end of his section about 7.30 p.m., for the purpose of inspecting the sand cuts at that point, and on his return trip, at about 8 p.m., made an inspection of bridge 98, and at this time the stream appeared to be about 14 or 18 feet wide and about 18 inches deep, this being an unusual amount of water. Section Foreman Kellner also said that there was no drift or debris lodged against the bridge and that he was satisfied that no dangerous condition existed. He stated that during this inspection trip no water was noticed in the ditches or in the waterways paralleling the track and conditions were found so favorable that it did not then appear to be necessary to patrol the track any more at that time.

Master Carpenter Meyer, of the Casper Division, said that he inspects the bridges under his jurisdiction semi-annually, and that bridge foremen are required by rule to inspect all the bridges under their supervision monthly. He stated the semi-annual inspection consisted of a thorough examination of all the parts of the bridge, and the piling to a depth of $2\frac{1}{2}$ feet, on September 16, 1923, such an inspection had been made and the bridge at Cole Creek found to be in first class condition. The last monthly inspection by the bridge foreman having jurisdiction over this territory was on August 28 and 29, minor repair work was done at that time.

Division Superintendent Grisinger said that he had remained in his office all day and during the evening of September 27 in order to keep in touch with operating conditions, and except as reported by Roadmaster Waygood, did not consider the track conditions east of Casper to be out of the ordinary. He thought every necessary precaution had been taken to guard against the action of unfavorable elements and from the reports he had received he did not consider the situation warranted train No. 30 being held at Casper, or the sending of a special patrol ahead of that train.

Brakeman Crews, the only surviving member of the train or engine crew of train No. 30, said that the regular air brake test was made before the train left Casper and that a running test was made after the train departed and as far as he knew the brakes were in good order. No stops were made between Casper and the point of accident, and he did not notice any application of the air brakes until just before the accident, at which time they were applied in emergency, but he did not think the full effect was obtained before the cars began falling into the stream. He was riding in the rear car at the time of the accident, which he said occurred at about 9.04 or 9.05 p.m., and estimated the speed of the train to have been about 35 or 40 miles an hour.

The statements of Pullman Conductor Coburn practically corroborated those of Brakeman Crews.

General Boiler Inspector Foggarty, of the Chicago, Burlington & Quincy Railroad, Lines West, stated he inspected the boiler of engine 350 after the accident, and found evidence of its having been struck on top by the smoking car, resulting in rupture and damage to the wrapper sheet and crown sheet. While a portion of the steel center sill and main sill was still embedded in the wrapper sheet when the engine was hoisted. He could find no indication that an explosion had occurred, although parts of the penetration stack and front door hinge were found on the east bank of the stream. Here he believed they had been knocked or thrown by equipment following the engine, it being his opinion that the smoke stack was struck and broken off by some part of the equipment which pulled the penetration stack out through the smoke stack opening. On account of the side diaphragm plates and superheater units being undisturbed, he did not think the pressure through the flues caused by the rupture in the crown sheet and flue sheet sufficient to have blown these parts out through the front end.

Careful examination of the engine was also made by an inspector of the Commission's Bureau of Locomotive Inspection, who found no indications of the water in the boiler having been low, or of overheating, it was his idea that the parts found on the east bank of the creek might

have been blown out of the smoke box as a result of steam and hot water escaping through the flues as a result of damage sustained in the accident. This inspector did not consider that there had been ^{any} defect or other condition existing on the engine which could have contributed in any way to the occurrence of the accident.

The smoke stack opening in the smoke box was found to be 21 inches in diameter, while the penetration stack flared outward at the bottom to a diameter of 30 inches. Two fragments of the penetration stack were recovered, and measurements of these parts indicated that it would have been impossible for them to have passed through the smoke stack opening.

Conclusions.

This accident was caused either by bridge 98 being washed away, or to its being so weakened as to cause its collapse under the weight of the train.

After the accident the bridge structure, with the exception of a few of the stringers, was missing. It had recently received a semi-annual inspection by the master carpenter and monthly inspection by the bridge foreman, being in good condition at those times, and had been examined by the section foreman within approximately one hour of the time the accident occurred, at this latter time there was a small volume of water passing under it, and the investigation failed to develop that there had been any heavy rains in the vicinity after that time. Under these circumstances it seems probable that the large amounts of water which appear to have been impounded by the sand bars at various points up stream finally were released through the giving way of portions of the sand bars, and that this water either weakened the bridge or washed it away entirely.

The finding of parts of the smoke stack, penetration stack, center section of draft plate, and door hinge of engine 350 on the east bank of the creek, from 30 to 50 feet from the edge, raised some question as to whether there had been a boiler explosion at about the time train No. 30 reached the bridge, but careful examination of the engine made by the inspectors of this bureau, as well as by an inspector of the Bureau of Locomotive Inspection of this Commission, and by the general boiler inspector of the railroad company, failed to disclose that such was the case.

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

Respectfully submitted,
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Director.