IN RE INVESTIGATION OF AN ACCIDENT WHICH OCCURRED ON THE ST. LOUIS-SAN FRANCISCO RAILWAY NEAR HEYBURN, OKLA., ON MAY 9, 1918.

July 1, 1918.

On May 9, 1918, there was a derailment of a passenger train on the St. Louis-San Francisco Railway, near Heyburn, Okla., which resulted in the death of 1 employee, and the injury of 1 passenger and 4 employees. After investigation of this accident the Chief of the Bureau of Safety reports as follows:

The Oklahoma Sub-division on which this derailment occurred is a single track line extending between Oklahoma City and Sapulpa, a distance of 105 miles over which the movement of trains is governed by time-table and train orders, no block signal system being in use. A maximum speed of 50 miles an hour for passenger trains and 35 miles an hour for freight trains is permitted.

The train involved in this accident was eastbound passenger train No. 10, known as the Meteor, en route from Oklahoma City, Okla., to St. Louis, Mo. It consisted of 1 combination mail and baggage car, 1 baggage and express car, 1 day coach, and 1 chair car, all of steel construction, and Pullman cars Falkirk and Reginal. This train hauled by locomotive No. 1034 and in charge of Conductor Rosenberry and Engineman Westfall, left Oklahoma City at 3.25 p.m. on time, left Bristown, 83.3 miles east of Oklahoma City, at 4.53 p.m., 6 minutes late, and at 5.10 p.m. while running at

at a speed estimated between 40 and 45 miles an hour, was derailed near Bridge 450-8, which is about 8.2 miles east of Bristow and .5 miles west of Heyburn.

Approaching from the west the grade is descending eastward, varying from 1% one mile west to .44% at the point of derailment. The derailment occurred on the spiral leaving the east end of a 4-degree curve to the right 393 feet in length the east end of which is on a 5-foot fill. The track consists of 75-pound rails, 33 feet in length, rolled in 1909 and laid in 1910. There are about 20 pine and cypress ties under each rail, tie plated and single spiked, and laid on 13 to 18 inches of chats ballast. About 50% of the ties are treated. Six anti-creepers are applied to each rail at the point of derailment and to a point one mile west. The weather was clear and the temperature on that date as recorded by the Government Weather Bureau at Sapulpa, 13 miles from the point of derailment, varied from 66 degrees minimum to 97 degrees maximum.

The first marks of the derailment appearing were flange marks on the ties on the south or low side of the rail at a point about 45 feet west of Bridge 450-8, which is about 350 feet in length. These marks apparently made by a four-wheel truck paralleled the south side of both rails, slightly diverting to the right across the bridge and on the ties to a point east of the bridge where the tender, combination mail and baggage, and the baggage car turned over on their left

side on the north side of and parallel with the track; the tender coming to rest at a point 1080 feet east of the initial point of derailment. The coach and chair car were also derailed and leaned partly over. The front truck of Sleeper Falkirk was derailed, but the car remained upright; the engine and rear sleeper were not derailed.

Section Foreman Staiger stated that the worst trouble with the track at the point of derailment was that it would keep slipping down. About two weeks previous to the derailment the track at that point had been relined and surfaced and that during the morning of the day of the derailment, it was again relined and surfaced from the bridge to a point about 300 feet west. About 11 o'clock he started to Bristow, boarding a work train about 1/2 mile east of the bridge and while passing over the track west of the bridge en route to Bristow, observed that it was in good line and surface, but there was not much shoulder on the outside of the ties. He left the men in charge of John McClung whom he had on previous occasions used as a temporary foreman and had always found his work satisfactory. At the time he left, the men were completing about one rail length of the work about 5 rail lengths west of the point where the derailment later occurred. On the morning following the accident he found the track from the bridge to a point about 5 or 6 rail lengths west of the point of accident irregularly moved out of line from 2 to 6 inches, being out of line at the point

of derailment about 4½ inches. Previous to the derailment he considered the track in safe condition and the only improvement that could have been made was to strengthen the shoulder which would have required about 3 car loads of chats ballast at that particular place. He had made previous requests for ballast, but had received none. To put his section of track to the proper shoulder, in accordance with the blue print, would require about 300 car loads of ballast. He stated that the anchors which had been put on the rails about 3 years ago had been pulled away from the ties from one to one and a half inches. He also stated that on the hot days recently he had noticed the rail running down hill.

Acting Section Foreman John McClung stated that the regular foreman had surfaced the track and had left only one or two rails for him to line and finish dressing up. He completed the work in 35 or 40 minutes after the regular foreman had started to Bristow and was later picked up by the work train and taken to another point to unload cinders. He stated that the track was in perfect line and surface, but owing to insufficient material at that point did not have a full shoulder of ballast.

Roadmaster Abrahamson stated that on the day of the derailment he passed over the track on train 418 between 11 and 11.40 o'clock a.m. and again on train 7 about 3.45 p.m., and observed nothing wrong with it at the point where

the derailment later occurred. The track was in good line and surface and rode good; he would have considered it good track if it had a shoulder. About 18 months previous to the derailment he had been informed that he would be supplied with sufficient ballast to take care of all his skeleton track; therefore, in order to take care of the worst condition first he began at Bridge 451-5, and unloaded down the hill, but ran out of ballast, leaving a partly open section of track 150 feet in length about 150 feet west of Bridge 450-8, and did not get any more to complete the work. Shortage of this material left the shoulder on the outside of the curve weak in that vicinity which gradually grew weaker by the continual use of the ballast forming the shoulder in resurfacing the track. The tie condition was good, but for a long time ballast had been rather scarce. There had been no occasion, however, for slow orders at that point. He arrived at the derailment about midnight and upon examination of the track after daylight on the morning following the derailment, he found there had been a sun kink. One rail had kicked out, the adjoining rail had apparently not moved and the next rail kicked out to a maximum of 4 inches on the outside of the curve, and at this point the wheels derailed on the inside of the curve. The kinks occurred at the rail joints.

Engineman Westfall of train No. 10 stated that he left Bristow about 4.53 p.m. and at M.P. 454, when starting

down the grade about 3 or 3½ miles west of the point of derailment, cut the engine down to a drifting throttle. He reduced speed to 18 or 20 miles an hour crossing over Bridge 452-5 and after crossing that bridge, though not working steam any more than to cushion the engine, the speed increased down the grade and the train was running about 40 miles an hour when the derailment occurred. Approaching the point where the derailment occurred he was looking ahead with a good view of the track, but noticed nothing wrong with it. He further stated that it might have been out of line some, but could not have been anything like it was after he passed over it or it would have been noticed. His first intimation of anything wrong was when the engine gave a twisting lunge from one side to the other and began rocking as if it would leave the track. Thinking it was caused by a broken rail he applied the brakes in the emergency. The engine then righted itself and he saw it was not off the track, but while crossing the bridge he heard a noise back of the engine and knew something was derailed. The front part of the tender seemed to stay lined up with the engine and he thought the rear tender truck was first to derail. After crossing the bridge he saw the mail car turn over and pull the tender over with it. He went back to examine the track and found it kinked in two places forming the letter "S" shape, the ties having moved 4 inches out

of their original positions. He thought that due to expansion the track had buckled or sprung out of line while his engine was passing over it.

The statement of Fireman McLaughlin of train No. 10 was practically the same as that of Engineman Westfall, except that he stated that at the place where the track was kinked the ties had slipped from 6 to 8 inches from the old bed.

Conductor Rosenberry of train No. 10 stated that he was riding in the head end of the smoking car and that the speed of the train at the time of derailment was about 45 miles an hour. He thought the front tender truck was the first to derail. After the derailment he found the track crooked in the shaped of the letter "S" about one car length west of Bridge 450-S, and in his opinion it was caused by expansion.

The records show that between noon the time at which the sectionmen completed the work of relining and surfacing the track and the time of derailment, No. 8 an eastbound passenger train, 1st No. 7, a westbound passenger train, and 2d No. 7, a westbound train of deadhead equipment, passed the point where the derailment occurred approximately at 12.45 p.m., 2.50 p.m. and 3.00 p.m.

After the accident an examination of Bridge 450-S showed that something had contacted the wooden guard rail on

the right or south side of the bridge, at a point about 15 feet from the west and defaced it to the east end of the bridge. It was also found that the lower portion of the nut on the right front column bolt of the front tender truck was filled with wooden splinters, evidently having been the projection that came in contact with the guard rail; this, together with the fact that there was an abrasion on the outside rim of the left front tender wheel, apparently caused by contact with the gauge side of the left rail evidence of which appeared for a distance of about 8 feet on the side of the rail at the point of derailment, indicates that the front tender truck was the first to derail.

Locomotive 1024 is of the Pacific type and with the tender has a combined weight of 377,300 pounds. The tender has a cistern capacity of 8100 gallons of water and the cistern is provided with both longitudinal and vertical splash plates. There is also space for 11½ tons of coal. At the time of derailment from 3 to 3½ tons of coal had been used and the cistern was practically full of water, having been filled at Bristow only 17 minutes before. Inspection disclosed no defect about the locomotive or tender that would contribute to the derailment.

The statements of the employees who were on the ground at the time of the accident and of those who examined the track after the accident, are to the effect that the de-

railment was caused by a sun kink.

Examination and measurements of the track made by the company's engineer on the day following the derailment disclosed facts from which it is evident the derailment was due to the condition of the track. While it is believed that the immediate condition of the track causing the derailment was due to expansion of the rails causing them to buckle, the investigation showed that the maintenance was not up to the standard required by the company's own specifications, and that the proximate cause of this accident was the poor condition of the track. If the track had been properly maintained and ballasted, it is believed that this accident would not have occurred.

During the investigation it developed that there are several other similar places on this particular section requiring ballast to properly strengthen the track. Those charged with the responsibility of maintenance should take immediate steps to provide sufficient material to maintain the track to the proper standard of safety.

At the time of the accident the crew of the train involved had been on duty 3 hours and 15 minutes after a period of 15 hours off duty.

H.C.M.