Inv-2057

INTERSTATE COMMERCE COMMISSION

WASHINGTON

REPORT OF THE DIRECTOR

BUREAU OF SAFETY

ACCIDENT ON THE

UNION PACIFIC RAILROAD

MENOKEN, KANS.

APRIL 20, 1936.

INVESTIGATION NO. 2057

SUMMARY

Railroad:	Union Pacific
Date:	April 20, 1936
Location:	Menoken, Kans.
Kind of accident:	Derailment
Train involved:	Passenger
Train Number:	105
Engine number:	Motor M-24
Consist:	Motor car and trailer
Speed:	35 m.p.h.
Track:	1° curve; 0.22 ascending grade.
Weather:	Cloudy
Time:	5:27 p.m.
Casualties:	2 killed and 6 injured
Cause:	Metal highway grade crossing plate became dislodged and was struck by train.

To the Commission:

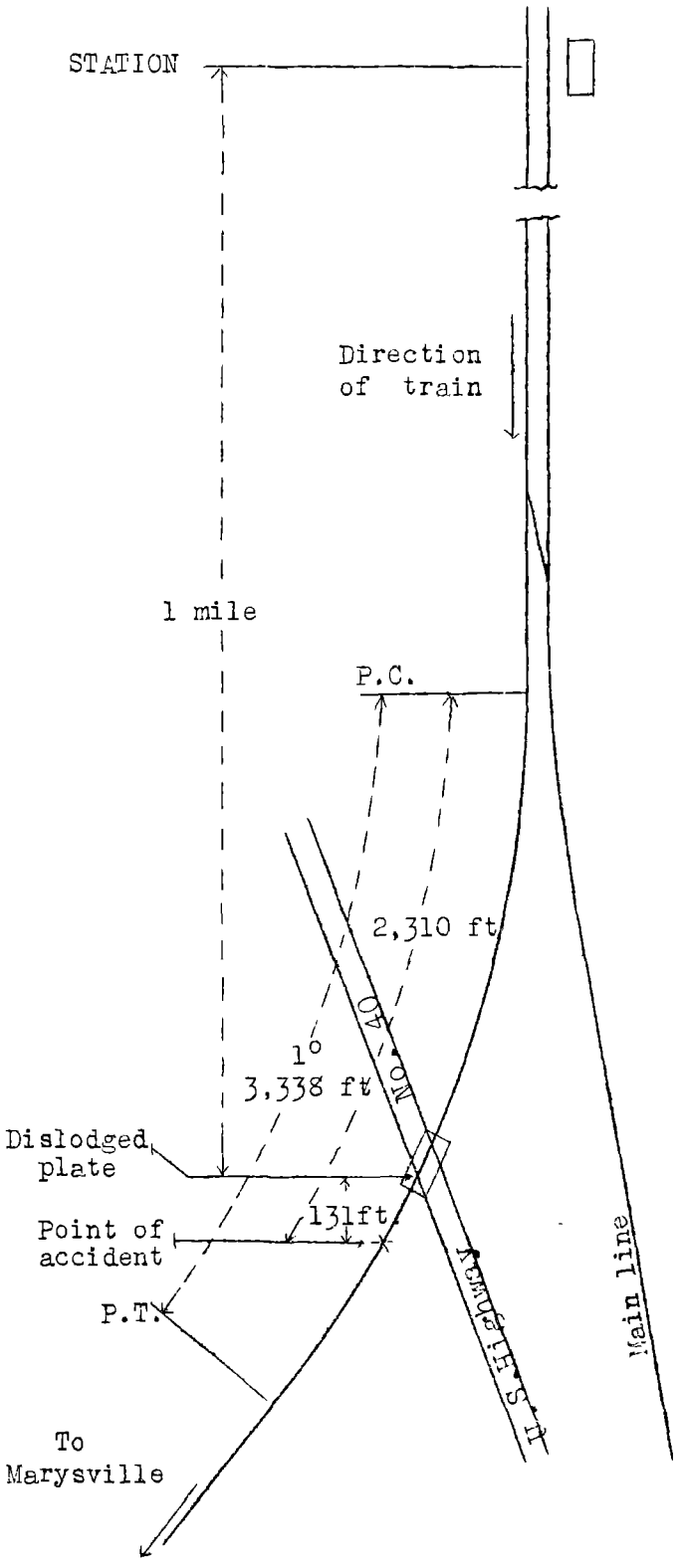
On April 20, 1936, there was a derailment of a passenger train on the Union Pacific Railroad near Menoken, Kans., which resulted in the death of 2 passengers and the injury of 6 passengers. The investigation of this accident was made in conjunction with representatives of the Kansas Commerce Commission and the Kansas Corporation Commission.

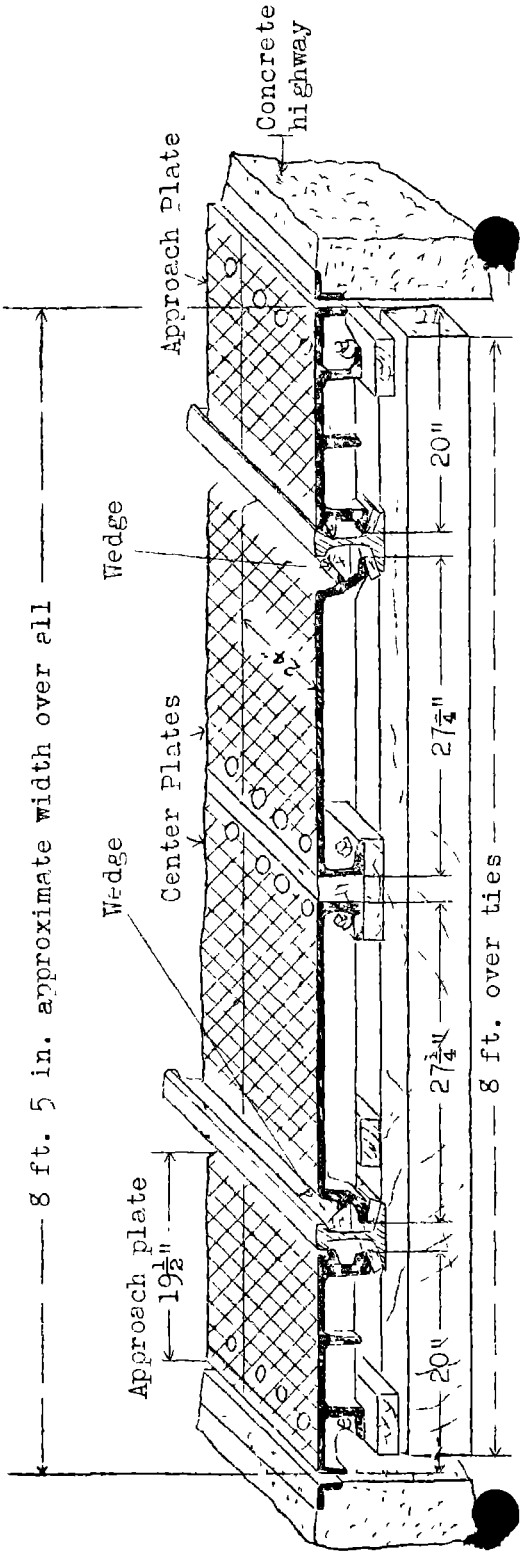
Location and method of operation

This accident occurred on the Topeka Sub-division of the Kansas Division, which extends between Menoken and Marysville, Kans., a distance of 76.5 miles, and is a single-track line over which trains are operated by time table, train orders, and an automatic block-signal system. The accident occurred at the crossing of U. S. Highway No. 40, located approximately 1 mile west of the station at Menoken. Approaching the point of accident from the east, there is a 1° curve to the right 3,338 feet in length, the accident occurring on this curve at a point 2,310 feet from its eastern end. The grade is 0.32 percent ascending at the point of accident.

The track is laid with 90-pound rails, 39 feet in length, with 22 treated pine ties to the rail length, single-spiked on the outside and double-spiked on the inside on the curve, fully tieplated, and ballasted with gravel to a depth of 4 inches below the ties. The track is well maintained.

U. S. Highway No. 40 crosses the tracks at an angle of 28° and the surface of the crossing is of the type known as the Universal Permanent Highway Crossing, manufactured by the Locomotive Finished Material Company of Atchison, Kans., and was installed in November, 1930, after the Kansas State Highway Commission had called the attention of the Union Pacific Railroad on September 18, 1930, to the rough condition of this crossing. Crossing plates of this type had been installed at a crossing of U. S. Highway No. 40, located about 2½ miles west of Menoken, on January 24, 1927; also at 15 additional crossings in 1929 and 4 more in 1930, the latter number including the crossing involved in this accident. This crossing surface consists of 4 rows of iron plates, with an overall width of 8 feet 5 inches and a length of 46 feet. The plates in the single row on the outside of each rail are known as approach plates, measuring 20 by 24 inches, and those between the rails are the center plates, measuring 24 by 24 inches and are 4 inches in depth. The plates are of a box-grill construction, each weighing approximately 200 pounds. Because of the automatic block-signal installation, a special





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insulating strip of treated pine is used, running the full length of the crossing between the two rows of center plates. Under this strip there is a leveling strip 10 inches wide and 1½ inches thick, and on the gauge side of the rail there is an insulating strip which lies on the base of the rail and supports the outside edge of the middle section. An additional treated wood strip was installed under the center plates near the rail location for better support. Between the ball of the rail and the wedge lug on the outside of the middle plates are two creosoted tapered wedges, 12 inches in length, which are used as a means of tightening the plates in place on the insulating strips. The metal plates are then secured to the ties by 8-inch lag screws, there being at least one in each plate and two in every alternate plate. The lag screw holes in the center plates are located near the insulating strip in the center of the track; in the approach plates the screw holes are located near the ends of the ties. A casting flange on the approach plate fits under the ball of the rail. The ties under the crossing were creosoted, sound and in good condition, and the center plates were regular and even and the approach plates level except in the traffic lane, where the insulating or shimming strips were somewhat worn, permitting the plates to settle. At the time of this investigation a few of the lag screws were found to be slightly loose and the plates vibrated and rattled under traffic. This crossing is protected by a wig-wag signal and bell and is open to view for a long distance in either direction; there is little if any reduction in the speed of motor traffic when passing over it.

The weather was cloudy at the time of the accident, which occurred about 5:27 p.m.

Description

Train No. 105, a west-bound passenger train, consisted of motor car M-24 and trailer T-18, both of steel construction, and was in charge of Conductor McCune and Motorman Benson. This train departed from Topeka at 5:15 p.m., on time, passed Menoken at 5:31 p.m., according to the train sheet, on time, and was traveling at a speed estimated to have been about 35 miles per hour when it was derailed after striking a center plate which had become dislodged at the crossing of U. S. Highway No. 40.

The motor car was not derailed but remained coupled to the trailer, which turned over on its right side and stopped at a point 351 feet beyond the point of derailment.

Summary of evidence

Motorman Benson stated that approaching the crossing he was operating the train at a speed of about 35 miles per hour; he had a clear view, but saw nothing wrong with the crossing and was paying particular attention to the traffic, there being cars on either side. He did not hear the train strike anything, and his first intimation of anything wrong was when the air signal whistle sounded in the cab and on looking back he saw the trailer turning over; he immediately applied the air brakes in emergency, opened the sand valve and shut off the power. After the accident Motorman Benson walked back to the crossing and saw that a crossing plate was missing and that there were pieces of iron scattered along the track.

Conductor McCune was in the smoking compartment in the front end of the trailer when he felt and heard something strike underneath the rear of the car; the car was raised and then dropped on the ties, traveling a short distance before it turned over and moving 4 or 5 rail lengths on its side before it stopped. Afterwards he saw pieces of cast iron scattered along the track and immediately formed the opinion that one of the crossing plates had become dislodged and wedged in a truck, causing the derailment.

Section Foreman Queen stated that he made his last inspection prior to the accident on Saturday, April 18, and at that time he tightened the wooden wedges between the rails and plates; he did not observe anything wrong with the lag screws and none of them was loose, the foreman stating that if any had been up near the top of the plate he would have noticed it, and he did not recall tightening the wedges which secured the plate that afterward became dislodged. He further stated that the lag screws had not been tightened recently, the last work having been performed on this crossing in September, 1935, when new shimming strips were put in, although he also renewed a shim on a plate on the north side in November. On the day following the accident he found it necessary to tighten the lag screws, some of them having worked upward about three-quarters inch, and he removed about 18 of the screws and plugged the holes so that the screws would be tight. The crossing was not in good condition at that time, there being two or three plates that needed to be raised. He also observed that a shimming strip 3 inches in width and 6 feet in length was split lengthwise for a distance of 2 or 3 feet.

Roadmaster Esse stated that he did not think a plate could get out of place except by a direct lifting action; he considered the crossing after the accident to be in fair condition

except that some of the plates were a little low. He had last inspected this crossing on April 13 and also had passed over it twice on April 16, finding it at that time to be in fair condition. His instructions to section foremen in regard to maintenance of these crossings are to see that the wedges are in place at all times and that the lag screws are kept tight. Roadmaster Esse did not think that if that portion of a plate next to the rail, where wedges are used, had been broken, it could have been observed even by careful inspection unless there was a portion of it missing.

Division Engineer Perkins stated that he arrived at the scene about 5 hours after the occurrence of the accident and found the fifth center plate from the west end, on the left or south side, to be missing, while the approach plate on the opposite side of the rail had been removed at the time gravel was filled in the hole left by the missing center plate. Further inspection on the day following the accident showed that the leveling strip in the center of the track was still in place but shattered and split lengthwise in a number of places. In order to determine the condition of the tie and the condition of the screw spikes and lag-screw holes, he removed and split off a portion of the leveling strip which had been under the missing center plate, and found that the fibers of the wood in the tie were sticking straight up as though the spike had been pulled upward; the hole was round and not elongated. He considered that the crossing was maintained in reasonably good condition and said that at no previous time had he ever seen one of these crossing plates out of position. Division Engineer Perkins further stated that a computation based on a count of vehicles passing over this crossing, made by the State Highway Department on March 23, 1936, and covering the period from 2 p.m. to 10 p.m., showed the average daily traffic to be 1,596 passenger cars and 543 trucks, a total of 2,139 motor vehicles. It was his opinion that the trucks averaged a speed of about 40 miles per hour over this crossing and he had noticed that there was a tendency for the lag screws to work up by reason of the vibration of the vehicles.

Engineman Glover, representing Motorman Benson, stated that he examined motor 24 on the morning following the accident and found a slight mark or scratch on the lower side of the pilot, and approximately 10 feet back of the pilot there was a mark on the motor case indicating that some metal had cut it, and it was his opinion that the lag screw had worked upward and was caught by the motor casing, resulting in the plate being pulled out of position.

Mr. L. H. Olson, of Silver Lake, Kans., stated that he drove over the crossing in his automobile west-bound between 4:30 and 5 p.m., on the day of the accident and saw one of the plates lying upside down about on the third plate from the western end of the crossing; it did not appear to be broken, as he did not see any pieces lying nearby. It was out of the lane of traffic, but motor vehicles were dodging the hole in the crossing. Mr. Olson stated that he would have stopped and taken the plate off the track, but there was a great deal of traffic in both directions and as there was no good place in which to stop he continued on to Silver Lake, about 9 miles from Menoken, arriving there about 5 p.m. He immediately tried to get in touch by telephone with Agent Bell at Grove in order to report the dislodged plate, but it was 10 or 15 minutes before he finally got in touch with the agent.

Agent Bell, located at Grove, stated that Mr. Olson called him at 5:25 p.m. and told him of the plate being out of the highway crossing. He immediately got in his car and went to notify the section foreman and at that time he saw that the block signal was in stop position, indicating that Train No. 105 was out of Menoken, and on returning to the station after notifying the section foreman, the dispatcher informed him of the accident.

Several other persons who passed over the crossing on the highway after 4:30 p.m., saw the displaced center plate, and subsequently a statement was obtained by a special agent of the railroad company from a Mr. Stenger, who said he was proceeding westward about 4:30 p.m. and a large newspaper truck, equipped with dual tires, passed over the crossing about 300 yards ahead of him. Before the rear end of the truck had cleared the crossing he saw an object which he thought was falling from the rear end of the truck and was of the impression that it was a cushion seat, but when he reached the crossing he saw that it was one of the crossing plates, which then was lying between the rails on the west side.

Examination of the parts of the center plate showed that the wedge lug and base had been broken prior to the accident, as the rough surfaces of the fractures had been rubbed comparatively smooth at some points, although it did not appear that the fractures existed for any great length of time before the accident; all the other pieces of the plate showed clean and more recent fractures. Examination was made of the crossing and many of the plates were removed for inspection. One of the approach plates in the traffic lane in direct line with the center plate involved was found to have several

cracks in the box grilling on the under side, but the cracks did not extend into the upper surface. Another approach plate had one deep crack in the center rib which did not extend into the upper surface. Five center plates were found to have the corners broken from the base which rests upon the wood insulating strip along the base of the rail. These breaks did not extend far enough along the base to destroy the value of the wedge lug and wedges but they decreased the supporting strength of the casting. This examination also showed that in order to lift out one of these center plates, after the wedge blocks and lag screws are removed, the plate must be lifted until the end of the plate clears the insulating strip; it is not possible to pry a plate out of position unless the wedge lug and base of the plate are broken off, for the base of the casting will not clear the under side of the ball of the rail.

Discussion

The evidence indicates that the wedge lug and base of a metal highway crossing plate had been broken prior to the accident, and that the plate then was struck by some heavy vehicle in such a way that it became dislodged and eventually rested on the track, where it was struck by Train No. 105, resulting in its derailment. The section foreman examined the crossing 2 days prior to the accident and tightened some wedges, but none of the lag screws was loose at that time. On the day after the accident, however, he found that some of the lag screws had worked up about three-quarters of an inch, and he removed about 18 of them and plugged the holes so that the screws would be tight when they were replaced. Subsequently several of the plates were removed for examination and some of them were found to be cracked, or to have broken corners where the base of the plate rests upon the insulating strip along the base of the rail. The section foreman and the roadmaster said that some of the plates were a little low and the investigation led to the conclusion that the crossing was not well maintained and that this condition paved the way for the occurrence of the accident.

Conclusion

This accident was caused by a metal highway grade crossing plate becoming dislodged and being struck by a train.

Respectfully submitted,

W. J. PATTERSON,

Director.