IN RE INVESTIGATION OF AN ACCIDENT WHICH OCCURRED ON THE PENNSYLVANIA RAILROAD NEAR NEW WATERFORD, OHIO, ON JANUARY 20, 1920.

March 10, 1920

On January 20, 1920, there was a derailment of a passenger train on the Pennsylvania Railroad near New Waterford, Ohio, which resulted in the death of 1 passenger and injuries to 15 passengers and 2 employees off duty After investigation of this accident the Chief of the Bureau of Safety reports as follows

This accident occurred on a double-track section of the Eastern Division of the Pennsylvania Lines West, which extends between Pittsburgh, Pa., and Crestline, O. Trains are operated over this division by time-table, train orders and an automatic block signal system. The track is laid with 100-pound rails, 33 feet in length, with 18 ties to the rail. About two-thirds of the ties are treated oak ties and about one-third are of untreated pine. Tie plates are used on all ties on curves, while on straight track about 6 tie plates are used to each rail length. The track is ballasted with crushed stone about 18 inches deep and is maintained in good condition.

Approaching the point of derailment from the east there are about 4,000 feet of tangent, followed by a 2°8' curve to the right, 791 feet long, the derailment occurred on this curve about 162 feet from its eastern end. The grade is .71 percent descending for 4,500 feet, then .13 percent descending for 3,000 feet, followed by a short stretch of level track on which the derailment occurred. At the point of derailment the gauge varied between 4 feet 8-5/8 inches and 4 feet 8-3/4 inches, with a superelevation of 5-1/2 inches. The weather at the time of the accident was cloudy and cold.

Westbound passenger train No. 1007, en route from Pittsburgh, Pa , to Chicago, Ill., consisted of 1 express car, 2 box express cars, 1 combination car, 3 coaches, 2 Pullman sleeping cars, 1 Pullman parlor car, and 1 dining car, in the order named, hauled by engines 7271 and 8347. The cars were of all-steel construction excepting the dining car, which had a steel underframe. The train was in charge of Conductor Nell and Enginemen C. H. Brandt and J. C. Brandt. It left Pittsburgh at 6 38 a.m., 1 hour and 18 minutes late, passed O.H. Tower, 2.9 miles east of the point of derailment, at 8:18 a.m., 1 hour and 27 minutes late, and was derailed at about 8.21 a.m. while traveling at a speed estimated at between 45 and 50 miles an hour.

The tender of the second engine was derailed on the south or high side of the curve, while the cars were derailed on the opposite side. The two engines continued a distance of 1,619 feet from the initial point of derailment before being brought to a stop 990 feet west of the first car of the train, with the rear of the tender of the second engine fouling the eastbound main track. The first car came to rest on its right side,

parallel with and about 15 feet north of the track. The second car remained upright, about 60 feet to the rear of the first car and equally distant from the track. The third car turned over on its right side, its rear end crushing the side of the combination car, which was on its trucks at an angle with the track of about 45°. The fifth car was nearly upright, parallel with and about 12 feet from the track. The sixth car was turned over on its right side, with its front end about 15 feet and its rear end about 50 feet from the track. The seventh car remained upright, with its forward end nearly 50 feet from the track. The last four cars of the train were derailed but remained upright, the dining car being approximately 40 feet beyond the initial point of derailment.

Examination of the track after the accident showed that east of the point of derailment there were no marks indicating that anything had been dragging. There were marks on the outside rail on the curve, near the point of derailment, but it was impossible to determine when these were made. The outside rail was intact, but the inside rail was turned over and 15 of the rails damaged to such an extent that they had to be replaced. Several hundred ties were also damaged.

Examination of engine 8347 made three days after the accident showed that the brake beam guards or safety hangers, which were attached to the truck bolster and extended to the rear, were bent, the left one upward and the right one downward. The No. 4 tender brake beam was examined end on the right end, the end which was found down after the derailment, there was a mark or depression indicating that it had been struck by some heavy object. The retaining nuts were still in place on both ends, indicating that the right brake head must have been broken or crushed in order to have been separated from the brake beam. The bottom portion of No. 4 right brake beam hanger which passes through the brake head was missing, and when this hanger, made of 3/4 inch round iron, was removed from the truck, what appeared to be an old break was discovered, extending about two-thirds of the way through the outside section of it, there was also an indication of a light fracture extending about one-third of the way through the inside section, nearly opposite the flaw on the outside. The front tender trucks had no side bearings, but those on the rear trucks appeared to be in proper condition and to have the proper clearance. Excepting the flat spot on No. 3 tender wheel on the right side, the wheels were in good condition. The cistern of the tender was found well braced, but it was not equipped with splash plates.

Engineman C. E. Brandt, in charge of engine 7271, the leading engine, stated that both engines were given a thorough inspection by two inspectors after the engines had been coupled together at the enginehouse, while the train brakes were inspected and tested before leaving the station. The engineman in charge of the second engine had asked him not to run too fast, as engine 8347 did not ride well, and he had accordingly run at slightly slower speed than he might have otherwise. He

had noticed nothing unusual with the exception that his own engine was inclined to nose slightly, and in making two stops for block signals several miles east of the point of derailment, the air brakes worked normally. The last brake application he had made before the derailment was a light application made approximately 11 miles east. He was using a light throttle and estimated the speed at a little less than 50 miles an hour when he felt the brakes apply and on looking back saw the cars off the track. After the accident he inspected his engine, found that one of the rear brake hangers was low and that the steam heat pipe sagged about 2 inches. He had no opinion as to what caused the derailment.

Fireman Ferry, of engine 7271, estimated the speed at about 45 miles an hour at the time of the derailment, the first shock of which led him to think an air hose had burst. He said Engineman Brandt looked back, and then called to him to go ahead of the train and flag, he got off before the engine came to a stop and did not know there had been a derailment until later. He stated that he had fired engine 8347 about three weeks before this derailment, at which time it had a bad swing, but about a week previous to the derailment had again fired the engine and at that time it appeared to ride smoothly.

Engineman J. C. Brandt, of engine 8347, stated that he always looked over the engine, but not the tender. The brakes were tested at the station and reported in good order. On a previous trip with this engine he had noticed that it would ride roughly at high speed and accordingly before leaving Pittsburgh, had told the engineman of the leading engine not to run too fast in an endeavor to make up time. He stated that no attempt had been made to make up lost time and they were not running at excessive speed. He had not used the air brakes previous to the accident, the brakes being controlled from the leading engine. He stated that the tender was about two-thirds full of coal and there was about 2 feet of water in the tank at the time of derailment but he had noticed nothing unusual previous thereto except that at one point, either PA or OH Tower, he had noticed the engine swing badly in passing over a frog, this attracting his attention more than had the rocking of the tender. He stated that he was using a light throttle, and he estimated the speed at about 50 miles an hour when he felt the derailment of the tender, the fireman called to him at the same time and he at once applied the brakes, although he said he supposed they had already been applied. He thought the rear tender truck was derailed first, as it was off the ties when the engine stopped, while the front truck was just off the rail, but he did not think that the tender truck leaving the rails in the manner it did would cause the derailment of the train. The manner in which the cars were derailed indicated to him that the track had spread, but he could not account for its spreading. The coupler on the rear of the tender was intact, but the coupler on the first car was over the bank and he did not examine it. There was a bent brake beam on the tender and the brake rods and rigging were badly torn up, but he did not notice anything which could have caused the derailment. Leaving the

scene of derailment after the tender had been re-railed, it seemed to lean too far to the right while going around curves leading to the right, and one of the right tender boxes got very hot.

Fireman Beck, of engine 8347, stated that he had just finished putting in a fire when he heard the tender bumping, saw that it was jumping up and down, and called to the engineman to apply the brakes, but he did not know the train was derailed until after they stopped. He estimated the speed to have been about 45 miles an hour. In his opinion the rear tender truck was the first to derail. He did not go back as far as the initial point of derailment and did not know what caused the accident. Previous to the derailment he had noticed nothing unusual except that the engine had rolled a little at one point.

Conductor Mell stated that the train brakes were tested, inspected and reported as all right leaving Pittsburgh, and he recalled nothing unusual about the trip previous to the accident, which occurred while the train was traveling at a speed of from 45 to 50 miles an hour. He felt the car ahead leave the rails, then the combination car, in which he was riding, seemed to drop off the rails His opinion was that the tender of the second engine was the first to derail Owing to the complaint of the engineman of the second engine that it rode roughly he thought the speed was somewhat less than it would have been otherwise.

Head Brakeman Brown stated that the train had not been running at excessive speed and no trouble had been experienced with it on the run from Pittsburgh. He was riding in the second coach and at first thought that an air hose had burst, but after the car had run a few feet farther he realized it was off the rails, reached for the emergency cord and had just grasped it when the car turned over. He had formed no opinion as to what caused the accident.

Flagman Martin stated that the train had been running about 45 miles an hour previous to the derailment. He was sitting in the parlor car when he felt a sudden jolt and thought the train had struck some obstruction; after another jar the car stopped. He then went back to flag and notified the towerman at OH Tower of the accident by telephone. He looked at the rails while going back to flag but they appeared to be in good condition and he saw no indications of anything having been dragging.

Supervisor of Track Myers stated that between the first part of September and the first part of October, an average of about 8 treated ties to the rail length had been laid on this portion of track, while all defective rails were removed before the cold weather set in. The section on which this accident occurred was three miles in length, in charge of a section gang consisting of an average of nine men. Supervisor Myers said that previous to the derailment he had been over this portion of the track at intervals of 10 days or two weeks and had found nothing wrong; the section foreman had been over it the preceding Saturday, while

trackwalkers passed over it in the forenoon and afternoon, in addition to two trips by a night trackwalker. At the time of the accident the day trackwalker had not reached the point where the derailment occurred. After the derailment he examined the rails and while he found none broken, 15 new rails were required to replace those bent. About 900 ties were damaged, 500 of which needed renewing After the damaged rails were replaced, the track was found to be ½ inch out of surface He discovered marks on the south side of the south rail within 5 rail lengths of the point of derailment, but could not tell when they were made. His opinion was that the north rail was turned over by the cars themselves in turning over in that direction. He found no broken or fallen parts near the scene of accident and an examination of a road crossing 15 rail lengths east of the point of derailment failed to disclose any marks of anything having been dragging. He was unable to say what caused the derailment, but did not believe it was due to the condition of the track

Trackman Marlatt, who had only had a month's experience, stated that he was working near OH Tower and that he heard an unusual bumping of the tender of the second engine as the train passed, it sounded like a flat wheel. He did not notice any marks in the snow after the train passed.

Wreckmaster Motz stated that upon inspecting the tender of engine 8347 about 2 hours and 10 minutes after the derailment he found both trucks off the track and slightly damaged. The rear brake beam hanger on the right side of the rear truck was broken and the brake head, shoe and key were missing. Both brake shoes and keys were also missing from the left side of the front truck The brake beam safety guards were bent, probably due to coming in contact with the rails after derailment, while there were no side bearings on the front body bolster.

Enginehouse Foreman Wigmore, at Allegheny, stated that when engine 8347 arrived on train No. 142 the previous day several small items were reported by the engineman. Among these were the following. riding roughly and swinging badly, back and right main rod hot, injectors not working and all boxes pounding. He said that stuck wedges often cause swinging and that the wedges were examined. This work was taken care of by a gang foreman, the machinery part being handled by a machinist. An inspection by Tender Inspector Hambright at 12:50 p.m., January 19, resulted in the following work on the engine and tender being reported, bottom bolts loose on engine coupler, lost motion between engine and tender, shelled out worn spot on No. 3 wheel, right side, and bottom connection on front truck low and striking crossings. All of this work was attended to by a tender repairman with the exception of the shelled spot on the wheel, this was found to be about 1 inch long, and since it was within the safety limit of 1½ inches for defects of this nature, it was considered serviceable. The tender gang foreman also examined the shelled spot and saw that the bottom connection had been raised about 1½ inches so as to clear crossings. When notified of the accident Mr. Wigmore went to Alliance, Ohio, where, with Mr. Bengnot, he made a joint

inspection of the engine and tender. This inspection developed nothing except that the right back brake head was missing from the tender brake beam on the rear truck, the beam itself was dirty and it was difficult to tell whether the defects were new or old. He had had no complaints about engine 8347, in fact, in talking with an engineman who had had it sometime previously, the latter had recommended it.

Tender Inspector Hambright stated that when inspecting the tender of engine 8347 it had been necessary to knock off snow and ice from the brake beam hangers, after which he had tapped all of them with a hammer to detect any fracture, but had found all in good condition. All the tender trucks were equipped with safety chains, which he found coupled up and in good order. The trucks were also equipped with brake beam safety guards, bolted to the truck bolster, and none of them was bent at the time of his inspection. The accumulation of ice and snow had prevented his inspection of the side-bearing clearance on the tender, he said he usually watched this carefully and he considered he was safe in assuming it was adequate. He stated that sometimes an inspector is handicapped in making a thorough inspection by insufficient time and further impeded by accumulations of ice and snow on the equipment and in such instances some of the parts would not be examined. The inspection pit is not quite large enough to accommodate engines of the class of engine 8347, but he stated that he had cleaned the hangers and other important parts of the rigging and considered that he had given the tender the best inspection he could under the conditions. He further stated that he had not been under the tender since the derailment, but his opinion was that if any obstruction were encountered by the rear hangers while the tender was moving forward they would be bent upward instead of downward. It was stated that, following the accident, the couplers on the rear of the tender and the front end of the express car were found in good condition, with knuckles closed. On account of the dummy vestibule of the express car extending closely over the coupler, it would have been impossible for the knuckle of the tender coupler to become disengaged from the express car coupler by being raised up, but whenever the tender coupler became sufficiently lower than the coupler of the express car, there was nothing to prevent their slipping by, thus indicating that the tender had been the first to derail.

This accident is believed to have been caused by the breaking of the hanger on the right end of No. 4 tender brake beam of engine 8347, permitting the brake beam to drop down on the safety hanger, from which place it worked off, allowing the brake head and brake shoe to wedge between the right rear tender wheel and rail. In connection with the tendency of the left wheels to crowd against the left rail while rounding the curve at high speed, this caused the left wheels to climb the left rail and the right wheel to drop off the right rail, turning over the rail and resulting in the derailment of the cars in the train.

The employees involved were experienced men. The engine crews had been on duty 4 hours and 15 minutes, after rest periods varying from 12 hours to 43 hours, while the train crew had been on duty 3 hours and 15 minutes after rest periods varying from 19 to 30 hours.