

IN RE INVESTIGATION OF AN ACCIDENT WHICH OCCURRED ON THE  
PENNSYLVANIA RAILROAD NEAR BENNINGTON STATION, PA., ON  
APRIL 27, 1921.

May 18, 1921.

On April 27, 1921, there was a derailment of a passenger train on the Pennsylvania Railroad near Bennington Station, Pa., which resulted in the death of 2 employees, and the injury of 20 passengers and 1 employee. After investigation of this accident the Chief of the Bureau of Safety reports as follows

Location and method of operation.

The Pittsburgh Division, on which this accident occurred, extends between Pittsburgh and Altoona, Pa., a distance of 113.8 miles, and is a four-track line over which trains are operated by time-table, train orders and an automatic block-signal system. Approaching the point of accident from the west, the track is tangent for 2,167 feet, followed by a curve of  $8^{\circ} 38'$  to the right 1,285 feet in length; the derailment occurred on this curve about 455 feet from its western end, at which point the grade is about 1.73 per cent descending for eastbound trains. The tracks are numbered, from south to north, 1, 2, 3 and 4 and the accident occurred on track 2, which is the eastbound passenger track. The track in this vicinity is laid with 130-pound rails, 33 feet in length, with 18 oak ties to the rail-length, tie-plat single-spiked, and ballasted with a mixture of slag and cinders. Under special instructions in the time-table the speed of trains in the territory within which this accident occurred is restricted to 30 miles an hour. The weather was misty at the time of the accident, which occurred at about 10.08 p.m.

Description.

Eastbound passenger train No. 64, consisting of 1 baggage car, 4 coaches, 3 Pullman sleeping cars, and 1 coach, in the order named, hauled by engine 3679, was in charge of Conductor Fyler and Engineman Dunmire. The cars were of all-steel construction. Train No. 64 left Pittsburgh at 7.00 p. m., on time, passed SF Block Station at 10.06 p.m., 9 minutes late, and was derailed near Bennington Station, a little more than 1 mile east of SF Block Station, while running at a speed variously estimated at between 25 and 45 miles per hour.

Engine 3679 came to rest on its left side about 300 feet beyond the point of derailment, diagonally across track 4, with its head end fouling track 3. The cistern was torn from the tender frame; both came to rest just west of the engine, while the tender trucks were about 60 feet west of the frame. The baggage car was about 145 feet east of the

engine, diagonally across tracks 3 and 4. All of the coaches were derailed, but remained upright and practically in line with track 2, the first coach being about 20 feet east of the engine while the second was opposite the engine. Parts of the engine were found along the track at various points between the point of derailment and the point where the engine came to rest; the first of these was a running board, which was on track 3 about 40 feet east of the point of derailment. Track 1 was torn up for a distance of about 200 feet and tracks 2, 3 and 4 for nearly 500 feet. There was considerable damage to all of the tracks. The employees killed were the engineman and fireman.

#### Summary of evidence.

According to Conductor Fyler, who was riding in the fourth car, the train was travelling faster than usual just before the accident occurred, but he felt no alarm on account of his confidence in the engineman. His first knowledge of anything wrong was when he felt three jolts in quick succession. He estimated the speed at the time of the accident to have been from 40 to 45 miles an hour. Conductor Fyler further stated that the last application of the air brakes noticed by him was a running test at AR Block Station, which is 1.1 miles west of SF Block Station, although he thought it possible that a light application was made subsequently and that he had not noticed it. Conductor Fyler said the air brakes had been used several times in making stops en route and at no time had any trouble been experienced, the only delay to the train aside from station work had been when it stalled a few miles west of SF Block Station on account of the sand pipes on the engine having become clogged.

The statements of the other members of the train crew, and of employees riding on the train, practically corroborated those of Conductor Fyler except as to the brake application and the speed. Head Brakeman Reidell noticed a service application of the brakes just west of SF Block Station and estimated the speed at the time of the accident to have been 30 miles an hour, perhaps more. Just before reaching the curve he had a feeling that the train would not get around it, but was unable to explain this feeling other than to say that he had always considered it a dangerous place. Flagman Luther was not positive about a brake application east of where the running test was made and did not think the speed was greater than usual. Engineman Amigh, who was riding in the fifth car as a passenger, did not notice whether the brakes were applied between SF Block Station and the point of accident except that he felt an application at about the time the car in which he was riding was derailed; he did not think the speed was more than 25 miles an hour. Engineman Moyer, also a passenger, who was riding in the second car, said he did not think the speed was

more than 25 miles an hour. C. C. Ligenfelter, a retired engineman who had had 40 years' service between Pittsburgh and Altoona, thought the brakes were not applied approaching Bennington Station quite as soon as is usually the case and that the speed was a little high; he estimated it to have been 30 or 35 miles an hour passing SF Block Station, and while he thought a train without a brake application being made would increase its speed to 50 miles an hour by the time the crossing at Bennington was reached he said the speed had been considerably reduced before the accident occurred and that it was a little more than 30 miles an hour at the time of the accident.

Towerman Lynch, located at SF Block Station, said train No. 64 passed that point at exactly 10.06 p.m., and that soon afterwards, as near as he could judge about 10.07.40 p.m., the approach indicator light for westbound track 3 went out, indicating that there was something on that track. He then called AG Block Station, 2.9 miles east, to find out what westbound train was using the track and was told no train had passed that point.

Supervisor Bentley, who reached the scene of the accident 40 minutes after its occurrence, found no wheel marks on the ties except some old marks made last winter, neither was there anything to indicate that there had been an obstruction on the track, while Division Engineer Fareis said that two track walkers had passed over this portion of the road within less than 2 hours of the time of the accident. Supervisor Bentley thought the accident was due to excessive speed.

Measurements of the gauge showed that at the point of derailment, and also at points 11, 33, 44, 55, 165 and 176 feet west thereof, the gauge was tight, the measurements at these points being as follows: 4 feet, 8 5/16 inches, 4 feet, 8 13/32 inches; 4 feet, 8 15/32 inches; 4 feet, 8 3/8 inches; 4 feet, 8 7/16 inches, 4 feet, 8 3/8 inches, and 4 feet, 8 3/8 inches. Measurements of the elevation on the curve showed it to be uniform; it was 4 3/8 inches at the point of derailment. Division Engineer Fareis did not think the tight gauge had any effect on the occurrence of the accident, as according to his statement the engine was not derailed but was overturned, there was no evidence of any binding between the rails, and the top surface of the inside rail had been rolled inward uniformly from 1/8 to 3/16 inch and if the rails had been too close together to allow trains to pass without binding, he said this inward rolling action of the inside rail would not have occurred.

Mr. Fareis said his calculations, based on theoretical conditions, indicated that the equipment involved in this accident would overturn at the point of accident at a speed of 66.4 mile an hour; these calculations did not take into account any slight shifting of the center of gravity of the engine due to lateral motion, slight irregularities in track, the effect of water in the boiler, etc. He expressed the opinion that a speed of from

50 to 55 miles an hour would have been unsafe.

According to the recommended practice of the American Railway Engineering Association, on a curve of  $8^{\circ}38'$ , which was the curvature at the point of accident, an elevation of  $5 \frac{1}{8}$  inches should be provided for a speed of 30 miles an hour; for a speed of 35 miles this elevation should be approximately 7 inches, while for a speed of 40 miles an hour it should be about  $9 \frac{1}{8}$  inches.

Engine 3679 was of the 4-6-2 type, having a total weight of 308,890 pounds, a driving wheel base of 13 feet 10 inches, and a total length of 48 feet 3 inches. An examination of this engine after the derailment failed to disclose anything which could have caused the accident, while the statements of 15 inspectors and repairmen who had worked on the engine prior to its departure brought out no information of importance.

#### Conclusions.

This accident is believed to have been caused by the train being operated on a curve of  $8^{\circ}38'$  at an excessive rate of speed.

According to the statements of Towerman Lynch, an interval of 1 minute and 40 seconds elapsed between the time the train passed SF Block Station and the time of the accident, this distance is approximately 5,500 feet, and if the train was reported as having passed SF Block Station when the rear end was opposite the block station then the engine was approximately 800 feet east of the block station and the distance between that point and the point of derailment therefore was 4,700 feet. To travel a distance of 4,700 feet in 1 minute 40 seconds would necessitate an average speed of approximately 32 miles an hour. While the estimates of the various witnesses, with the exception of the conductor, do not indicate that the speed was much in excess of 25 or 30 miles an hour, it is believed that the conductor's estimate of 40 or 45 miles an hour more nearly approached the actual speed of the train, and this is supported by the condition of the wreckage, while the absence of wheel marks of any kind on the ties at the point of derailment, together with the finding of the running board and other parts of the engine on the outside of the curve within a very short distance of the point of derailment, indicates that the engine was overturned as a result of excessive speed.

All of the employees involved were experienced men. At the time of the accident the crew of train No. 64 had been on duty less than 4 hours, previous to which they had been off duty 17 hours or more.