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IN RE INVESTIGATION OF AN ACCIDENT WHICH OCCURRED ON THE PENNSYLVANIA RAILROAD NEAR COLONIA, N. J., ON OCTOBER 18, 1920.

January 19, 1931.

On October 18, 1920, there was a rear-end collision between a passenger train and a freight train near Colonia, N. J., resulting in the death of 2 employees, and the injury of 4 passengers and 1 Pullman porter. After investigation of this accident the Chief of the Bureau of Safety reports as follows.

The accident occurred on the New York Division, which in the vicinity of the point of accident is a four-track line over which train movements are governed by time-table, train orders transmitted by telephone, and an automatic block-signal system. Approaching the point of accident from the west, beginning at signal 322 and extending to signal 314, a distance of 4.295 feet, there is a series of short curves and tangents, the track is tangent from signal 314 to the point of accident, a distance of a little more than 500 feet. Between signal 322 and signal 314 the grade is practically level, from signal 314 eastward to beyond the point of accident it is 1.06 per cent ascending.

The signals are of the upper-quadrant, three-position, normal-clear, semaphore type, night indications being red, yellow and green for stop, caution and clear, respectively. Signal 322, located on the first signal bridge west of Colonia Station, is a single-arm signal, and signal 314, located on the first signal bridge east of Colonia, is a two-arm semaphore signal, the top arm being used as the distant signal for DK tower. At the time of the accident there was a dense fog.

Eastbound freight train MD-6, en route from Eagemoor, Del.,

to Haverly, N. J., consisted of 43 cars and a caboose, hauled by engine 3507, and was in charge of Conductor Love and Engineman Schaeffer. It left Edgemoor at 9.19 p.m. October 17, and passed Metuchen, N. J., the last reporting station 4.3 miles west of the point of accident at 2.24 a.m. October 18. Signal 21+ indicated caution and a service application of the brakes brought the train to a stop more quickly than the engineman intended, with the rear end of the train a short distance west of signal 21+. After some difficulty in getting started again, it was moved ahead a distance estimated to have been about 15 car-lengths and again came to a stop; the second stop was made on account of air-brake trouble. Shortly afterwards the rear end of train MD-6 was struck by train No. 202, the accident occurring at about 2.5+ a.m.

Eastbound passenger train No. 202, en route from Philadelphia to New York, consisted of 1 baggage car, 3 coaches, 2 Pullman sleeping cars, and 2 coaches, in the order named, all of all-steel construction, hauled by engine 530, and was in charge of Conductor Mulcany and Engineman Quail. This train left Philadelphia at 12.30 a.m., passed Metuchen at 2.43 a.m., passed signal 222 at caution, signal 21+ at stop, the flagman of train MD-6 and a burning red fusee, and collided with the rear-end of train MD-6 while traveling at a speed variously estimated to have been from 30 to 50 miles an hour.

The caboose and six cars of train MD-6 were completely destroyed, and one car badly damaged, by the collision and by fire which broke out in the wreckage; the second car from the engine buckled and was afterwards destroyed. In train No. 202, the engine was derailed, turned over on its side, and badly damaged;

the baggage car was also derailed and over-turned. With the exception of the first coach, none of the other cars in this train was derailed or damaged. The employees killed were the engineman and fireman of the passenger train.

According to Engineman Schaeffer, of train MD-6, signal 314 was in the caution position as his train approached and he made a 20-pound application of the air brakes. The train stopped sooner than he had expected, and after pumping up the brake-pipe pressure to 65 pounds he finally succeeded in starting the train after a delay estimated by him to have been 8 or 10 minutes, but had proceeded a distance which he estimated to have been only 15 carlengths when he felt the air brakes applying and noted that the brake pipe pressure had gone down to 40 pounds. The train was brought to a stop and he sent a brakeman back to locate the trouble, it was while this was being done that the accident occurred. The estimates of the engineman, fireman, and of one brakeman as to the interval which elapsed between the time of the second stop and the time of the collision varied from 2 to 4 minutes, the middle brakeman estimated that 6 minutes elapsed between the time of the first stop and the time of the collision, while Conductor Lowe estimated that interval to have been 8 or 10 minutes. According to the statements of Conductor Lowe, the flagman went back with a lighted fusee when the train first came to a stop, the conductor calling him in when the train started to move ahead. Conductor Lowe said the train proceeded very slowly and that he himself therefore threw off some more fusees. He verified the statement of Flagman Weaver that the

flagman started back to flag before the train came to a full stop the second time; Flagman Weaver said he had reached a point 3 or 3 carlengths west of signal 214 when the engine of train No. 202 passed him at a speed estimated by him to have been about 50 miles an hour, with the engine working steam. Conductor Lowe and one of his brakemen also estimated the speed of train No. 202 to have been about 50 miles an hour, and they thought the engine was working steam when the collision occurred. It was also stated by Flagman Weaver that he had not used torpedoes when flagging on either occasion, although their use is required by the rules, but that he had used five fuses.

The estimates of the train crew of train No. 202 as to the speed of their train varied from 30 to 40 miles an hour. Conductor Mulcany said a service application of the air brakes had been made approaching Colonia, but he thought no application was made after passing signal 222, Head Brakeman Kiefer and Baggage-master Bentivoglio said there was an emergency application of the air brakes immediately prior to the collision. The conductor did not see any burning fuses when he got off the train, but Head Brakeman Kiefer said that there was a burning fuse under the fourth car.

Crossing Watchman Balarkies, who was on duty at the grade crossing located a few hundred feet east of signal 214, stated that train MD-3 was moving very slowly, stopped with its caboose opposite his shack, and then moved ahead about 5 minutes before train No. 202 approached. According to his statement Flagman Weaver used only two fuses, one being dropped about 2 rail-

lengths west of the crossing and another about $2\frac{1}{2}$ rail-lengths east of the crossing, the first one had burned out and the other had nearly burned out when train No. 202 passed.

After the accident marks made by five burned fusees were found, all of these being between a point 657 feet west of signal 214 and a point 210 feet east of that signal; it was not determined which of these fusees was thrown off by Conductor Love and Flagman Weaver, or used by Rear Brakeman Farrallo when he went back after the accident to protect the rear end of train No. 202. The evidence indicated that the automatic signals were in proper working order and displaying the proper indications, but that the fog was so dense it was impossible to see more than 3 or 4 car-lengths.

This accident was caused by the failure of Engineeran Quail, of train No. 202, properly to observe and be governed by automatic block-signal indications, and the failure of Conductor Love and Flagman Weaver of train MD-6, properly to protect their train.

Several 5-minute fusees had been used by the crew of train MD-6, but it seems probable that all of them had burned out before train No. 202 approached, with the possible exception of the fusee located 210 feet east of signal 214. If those members of the crew of train No. 202 who said there was an emergency application of the brakes just before the collision occurred are correct in their statements, it is probable that Engineeran Quail had seen either this fusee or the stop indication of signal 214. The evidence indicates that signals 222 and

214 functioned properly, both before and after the accident, also that Engineman Quail sounded a road-crossing whistle signal approaching the crossing at Colonia, the whistle post of which is located between signals 232 and 214. All of this evidence indicates that Engineman Quail undoubtedly was awake, but that for some unknown reason he failed to observe the caution indication of signal 232, his first intimation of danger being when he observed either the stop indication of signal 214, or the burning fusee a short distance behind the rear of train MD-6.

Not only does the evidence indicate that Flagman Weaver at no time went back a sufficient distance to protect his train, but that he failed to use torpedoes, although according to his own statement he had them with him. The flagging rule of this railroad requires the use of torpedoes and had Flagman Weaver gone back as far as he could in the time he had at his disposal when his train first stopped, and placed two torpedoes on the rails, it is possible that in view of the existing weather conditions Engineman Quail would have brought his train sufficiently under control to have enabled him to avoid the accident.

Conductor Lowe was on the rear of his train and in position to supervise its proper protection. In view of the foggy weather prevailing, and knowing that train no. 202 was due, he displayed bad judgment in calling in Flagman Weaver.

All the employees involved were experienced men. At the time of the accident the crew of train MD-6 had been on duty approximately 8 hours, after periods off duty ranging from

14 hours to more than 24 hours. The train crew of train No. 202 had been on duty about 8 hours and the engine crew about 4 hours, previous to which they had been off duty periods ranging from 11 to 18 hours.