In re Investigation of an accident which occurred on the Pennsylvania Railroad at New Portage Junction, Pa., on November 6, 1916.

On November 6, 1916, a runaway freight train on the New Portage line of the Pennsylvania Railroad collided with four light engines, standing coupled together, at New Portage Junction, Pa., the runaway and the collision resulting in the death of seven employees and the injury of three employees. After investigation of this accident the Chief of the Division of Safety submits the following report:

The freight train involved in this accident, loaded principally with iron and steel products, en route to the Atlantic seaboard, as received by the Pittsburgh Division of the Pennsylvania Railroad at Conemaugh, Pa. From that point it was run eastward as extra 2736, with Conductor Schrum and Engineman Rising in charge, and at the time of the accident it consisted of engine 2736, sixty cars and a caboose. The four light engines had been used as helpers on the Gallitzin grade of the New Portage line, and at the time of the collision were en route from Gallitzin to Altoona via the New Portage line.

The New Portage line extends from Gallitzin, the summit of the Alleghany Mountains, eastward to New Portage Junction, located at the foot of the mountain, a distance of 15.3 miles. At New Portage Junction this line joins a branch of the Middle Division extending from Altoona to Hollidaysburg and Petersburg. The line is double track, used exclusively for freight traffic, and is used principally to relieve the main line. Trains are operated by a manual block system; there are three block stations, SF, located near the summit of the grade, just east of the Gallitzin tunnels, at the junction of the New Portage line with the main line; MS, 7.7 miles east of SF and about half way down the grade; and SN, 7.6 miles east of MS at New Portage Junction at the foot of the grade. From New Portage Junction eastward the line is equipped with automatic block signals. At New Portage Junction there is an interlocking plant, controlled from SN tower, and there are four main tracks extending eastward from that point.

The grade extends nearly the entire distance between SF and SN towers; it is a practically uniform grade of 1.6% descending eastward. This line consists to a large extent of curves; in the entire distance there are only four pieces of tangent track half a mile or more in length, and three or four additional tangents from a quarter to half a mile in length. The maximum curvature is 8 degrees 16 minutes, and nearly all of the curves are between five and eight degrees.

The light engines involved in this accident were Nos. 2665, 2477, 2759 and 971. The first three, coupled together, left CF tower at 3.58 a. m., passed MS at 4.19 a. m., and stopped a short distance east of MS for the purpose of changing engine crews with westbound freight trains standing at water plugs at that point. While this was being done, engine 971, which passed MS at 4.29 a. m., came down the east-bound track and coupled to the other engines. The four engines then proceeded to SN tower, arriving there at 4.51 a. m., pulled down east of the tower and stopped clear of the crossover switch on track No. 1, the intention being to back across to track No. 4, go around a wye located at that point, and thence over the Hollidaysburg Branch to Altoona. However, the crossover switches were not promptly thrown by the towerman, and a special-duty engineman on one of the engines had just started toward a telephone for the purpose of communicating with the towerman regarding the proposed move ent when the collision occurred.

The freight train involved in this accident was received by the Pittsburgh Division at Conemaugh from the Conemaugh Division. At that time it consisted of 78 cars. At Conemaugh 18 cars were cut off. An inspection of the car equipment was made by car inspectors located there, and air brake inspectors inspected the brake equipment and made a terminal air brake test. In the total of 78 cars arriving there in that train, seven were found on which the air brakes were not working, two of which were among the eighteen cars cut off at that point, leaving five cars in train extra 2736 east on which the air brakes were not operating. After hauling engine 2736, and two helping engines on the rear, had been coupled to the train, a road test of the brakes was made by the train crew, and this train left Conemaugh at 12.57 a. m., the crew having instructions to store the train on a siding just east of MS tower. A stop for water was made at Portage. Extra 2736 arrived at AR tower, west of Gallitzin tunnel, at 3.54 a. m., and the hauling engine was cut off to take water. Six car inspectors stationed at that point examined the train for defective equipment, and at the same time the train crew made a terminal test of the air brakes. This test also disclosed five cars with the air brakes inoperative, located in different parts of the train. When engine 2736 was again coupled to the train, a road test of the brakes was made, and the train departed at 4.12 a. m., the helping engines being cut off just west of the tunnel.

The investigation disclosed that this train passed SF tower at 4.22 a. m., receiving a green or caution signal indication at that point. Before starting down the grade the brake pipe pressure of 100 pounds required by the rules was secured, and between SF tower and Healey's crossing, six miles

east, several brake applications were made to control the speed, there being nothing unusual in connection with the operation of the train up to that point. As the train proceeded, however, the speed increased, and service brake applications made by the engineman failed to check it properly. The engineman then told the fireman he had drawn down his brake pipe pressure to 35 pounds and asked what he should do. The fireman suggested opening the sander, which was done, and as the speed continued to increase the engineman sounded the whistle signal calling for hand brakes. Before reaching Mule Shoe curve, west of MS tower, he placed the brake valve handle in full release position, and when brake pipe pressure had been pumped up to about 55 pounds he made an emergency application; this, however, had no effect. He then called for brakes again. The train passed MS tower at 4.45 a. m., at a rate of speed variously estimated at from 20 to 40 miles per hour. Engineman Rising reversed the locomotive a number of times, and the wheels slipped, but he finally got the engine working in back motion with the drivers turning. The fireman started back over the tank for the purpose of setting hand brakes, but upon reaching the rear end of the tender concluded that any attempt would be useless, and he jumped off a mile or two east of MS tower, being only slightly injured. The engineman evidently fastened down the whistle; some distance farther east, just before reaching Duncansville, about 6 miles from MS tower, he also jumped off the engine, being fatally injured.

When the train started down the grade, the train crew turned up the retainers on all cars. The conductor and head brakeman remained on the cars toward the front end of the train, having applied some hand brakes on the head end. The rear brakeman was stationed about 20 cars ahead of the caboose and the flagman was on the front platform of the caboose. The rear brakeman, realizing that the train was running too fast to be stopped at MS siding, began to apply hand brakes before he heard the whistle signal calling for brakes, and thought that he had set eight or ten, working back toward the caboose, before he was compelled to stop on account of the motion and high speed of the train. The flagman set three or four; he also opened the angle cock on the rear end of the caboose at two different times, but found no air in the train line; this was undoubtedly done after the engineman made the emergency application. The conductor and the head brakeman were both killed in the collision, and it is not known how many hand brakes were set on the head end, although the rear brakeman and the flagman thought that from the fire flying from the wheels on the head end of the train a number of hand brakes had been set up there, while toward the middle of the train the brakes were of little if any effect.

The operator at MS tower estimated the speed of the train when it passed his tower at 20 miles per hour, and although he thought it was running a little faster than it should under caution signals, he had no reason to think that it was beyond

control, particularly in view of the fact that it had consumed 23 minutes, the minimum running time permitted, between SF and MS towers. Several members of the crews of the westbound trains standing east of MS tower realized that the train was beyond control and running away, and as soon as the train passed one of them telephoned, from a telephone booth located on the south side of the track approximately a mile east of MS tower, to the operator atSN tower, warning him of the runaway and telling him to get the light engines out of the way. Operator Oyler, at SN tower, said that he received this message a few minutes before the light engines reached his tower. He understood that the light engines were to proceed to Hollidaysburg, and not realizing the imminence of the danger, he did not give them any warning, but as they passed the tower merely signaled them to proceed. When the light engines came to a stop east of the tower, he again gave a hand signal to proceed. A signal maintainer who was on the ground a short distance east of the tower saw that signal and called to the operator, asking what he meant by it; upon being informed of the runaway, he immediately started to run toward the light engines, swinging his lantern and shouting warnings, but he did not reach the engines or attract the attention of any of the men on them before the collision occurred. Engineman Miller, of engine 2665, the leading engine, said that he saw the operator's hand signal as he passed the tower, and thinking that the operator knew of the proposed crossover movement, he pulled down and stoped when he thought the rear engine had cleared the dwarf signal governing the crossover movement. However, he received another proceed signal from one of the other engine men and moved ahead a little farther; he then stopped again, and was waiting to receive a back-up signal when he caught sight of the runaway almost upon them. He jerked his engine throttle open, and his engine started forward just as the collision occurred. The special-duty engineman, who had ridden down with the light engines to see that the crews changed properly, and at the time of the collision was on the second engine, thought the engines had been standing at the dwarf signal about three minutes before the collision occurred; he had just gotten off the fireman's seat box to go to a telephone for the purpose of communicating with the towerman when the collision occurred.

Engine 2665 and its tender were practically undamaged, and with the second engine, No. 2477, ran forward eight or ten car lengths, being stopped clear of the crossover; the tender of engine 2477 was torn loose, and with the two following light engines was driven forward only a short distance. The point of collision was approximately 200 feet west of the signal bridge and 300 feet east of SN tower, on a slight curve toward the south, in a cut approximately 25 feet deep. One of the light engines and one tender were driven forward nearly to the signal bridge, one other tender was thrown forward clear of the bank

of the wreckage, and the other locomotives and tenders, together with 46 cars of extra 2736 were piled up in a distance of 330 feet, blocking all four tracks. The thirteen rear cars and the caboose were not damaged or derailed.

The air brake equipment of locomotive 2736 included two 9-1/2 inch Westinghouse pumps, and a type S-4 pump governor, the normal pressures carried being 100 pounds for main reservoir and 70 pounds for brake pipe. The time-table instructions require that before descending this grade with a train of loaded cars, "the brake pipe pressure will be 100 pounds (to be obtained by placing the brake valve in the full release position)."

The investigation disclosed that both at Conemaugh and at Gallitzin the brakes were in proper working condition on 97 per cent of the cars in extra 2736; the required brake tests were made, the required brake pipe pressure was obtained before starting down the mountain, and the speed of the train was properly controlled for approximately the first six miles of the grade. There is no evidence of any character to indicate that any defect of equipment existed, or failure of operation occurred which would preclude the proper operation of the train brake system. It is established by the direct evidence furnished by the fireman of extra 2736 that the engineman depleted brake pipe pressure to 35 pounds, and that then even when the train was continuing to gain speed he released the brakes before placing the brake valve in emergency position.

This accident was caused by the failure of Engineman Rising properly to manipulate the train brake system to control the speed of his train down the mountain grade. The instructions in the time-table, relative to the handling of loaded trains down mountain grades, require that "the engineman must operate the air brake in such a manner as to maintain a brake pipe pressure of not less than 65 pounds at all times." In accordance with this rule, the engineman should have allowed the brake pipe pressure to be reduced so low as 35 pounds; instead, he should have much earlier resorted to an emergency application of the brakes and brought his train to a stop.

It is apparent from the statement of Towerman Oyler that he received information concerning the runaway train in ample time to convey a warning to the men on the light engines, as they had not yet arrived at SN tower when he received the telephone message. Had he taken the necessary steps to warn those men of the impending danger, as it was entirely possible to do when the engines passed the tower, undoubtedly the serious effects of the accident, particularly with respect to the loss of life, would at least have been greatly mitigated. The only explanation of his neglect offered by Towerman Oyler was that he failed to realize the gravity of the situation.

Engineman Rising was employed by the Pennsylvania Railroad as a fireman from October 25, 1902, to November 11, 1915, when he was promoted to the position of engineman; he was demoted to fireman April 6, 1914, promoted to engineman December 26, 1915, demoted to fireman again June 15, 1916, and promoted to engineman October 27, 1916. He had passed the air brake examination three times, the last time on November 17, 1915, with a percentage of 94.5 on knowledge of mechanism and working, and 88 on proficiency in handling. He had also passed the examinations on locomotive machinery, book of rules, signals, and eyesight, hearing and color perception. His record was good. At the time of the accident he had been on duty 6 hours and 10 minutes, after a period off duty of 23 hours and 25 minutes.

Towerman Oyler had been in the employ of the Pennsylvania Railroad as an operator since 1905, and had been employed at SA tower since October 11, 1916. At the time of the accident he had been on duty 6 hours and 40 minutes, after a period of 16 hours off duty.