Chairman Clark

March 1770

IN RE INVESTIGATION OF ACCIDENT WHICH OCCURRED ON THE PENNSYLVANIA RAILROAD NEAR QUARRYVILLE, PA., ON MARCH 6, 1920.

March 13, 1920.

On March 6, 1920, there was a rear-end collision on the Pennsylvania Railroad about six miles west of Quarryville, Pa., which resulted in the death of 1 employee and injury of 2 employees. After investigation of this accident, the Chief of the Bureau of Safety submits the following report.

This accident occurred on the Atglen and Susquehanna branch, a double-track line extending from Cago Junction, Pa., to Parkesburg, Pa., a distance of 50.6 miles. This branch is used exclusively for freight trains, all of which are operated as extras. There is a permissive manual block signal system in use, under which a train is allowed to enter a block occupied by a preceding train in the same direction, under a caution signal as soon as it is ready to proceed.

Approaching the point of accident from the west, beginning at JF block station, there is a tangent nearly three miles long, followed by a 3-degree curve to the right about 1,660 feet in length, 3,037 feet of tangent, and a 1-degree curve to the right 7,695 feet in length. The accident occurred on this curve within about 600 feet of its eastern end. The last part of the curve is in a cut, the sides of which restrict the view of the engineman of an eastbound train to approximately 700 feet. The grade is 0.6 ascending for eastbound trains except on the curves, where it is slightly less in order to compensate for the curvature. At the time of the

accident it was snowing, with a strong wind.

Eastbound freight train extra 3282, which was en route from Enola, Pa., near Harrisburg, to Philadelphia, Pa., consisted of 56 cars and a caboose, hauled by engine 3282, and was in charge of Conductor Forney and Engineman Cable. This train was being assisted up the grade by helper engine 739 coupled to the rear of the train; this engine was in charge of Engineman Smith. Extra 3282 left SF block station, according to the train sheet, at 2.46 a.m., and at a time thought to have been about 3.15 a.m. stalled on the grade on account of low steam on the road engine. The train had been standing only a few minutes when its rear end was struck by eastbound extra 554.

Eastbound freight train extra 554, which was en route from Harrisburg to White Marsh Junction, Pa., consisted of 47 cars and a caboose, hauled by engine 554, and was in charge of Conductor Veit and Engineman Howard. This train was also being assisted up the grade by a helper engine coupled to the rear of the train, engine 1201, which was in charge of Engineman Dennison. Extra 554 left SF block station, according to the train sheet, at 3.00 a.m. and at about 3.28 a.m. collided with the helper engine on the rear of extra 3282 while traveling at a speed estimated to have been from 10 to 15 miles an hour.

The tender cistern of helper engine 739 was torn from its frame and considerably damaged. The engine was driven forward against the caboose, which was practically destroyed, while

a flat car ahead of the caboose buckled and was thrown over on the westbound track, together with the wreckage of the caboose. The car ahead of the flat car was not derailed and was only slightly damaged. With the exception of its tender, engine 739 remained on the rails, while only slight damage was sustained by the front of engine 554, which was able to continue with its train as soon as the track was cleared.

Engineman Cable, of engine 3262, stated that when the fireman was relieved at F block station by a brakeman, this being the usual practice at this point in order to give firemen a chance to eat, the engine began to lose steam on account of the brakeman being an inexperienced man. Engineman Cable said that his engine entered the cut where the accident occurred at a speed of about 6 miles an hour, and at that time he thought his train would be able to get around the curve before stalling. He shut off in an endeavor to get up steam, but the steam pressure went down to such an extent that the brakes applied, the train coming to a gradual stop. When the train stopped, the steam pressure was 100 pounds. He got off his seat box, put on the blower, shook the grates, and the steam pressure had been raised to about 110 pounds when he felt a surge as though the slack was being taken up. He did not think more than two or three minutes elapsed between the time of stopping and the time of the collision, which occurred at 3.30 a.m. He stated that between CO block station and the top of a summit east of Quarryville, a distance of approximately

25 miles, within which territory the accident occurred, fusees were seldom encountered.

Brakeman Irwin, who was on engine 3282 at the time of the accident, stated that the speed of his train was lower than usual, and that it came to a gradual stop. He did not know whether or not the brakes applied as a result of the low steam pressure. He said the speed of the train seemed to decrease at the western end of the cut, and although the weather conditions were bad, he believed that a flagman could have put down torpedoes half a mile west of where the accident occurred and then have overtaken the train. He also stated that if he had been acting as flagman he might have put down torpedoes, but that he would not have used a fusee as the speed of trains on this ascending grade is very low. No instructions not to use fusees had been issued.

Flagman Simpson, of extra 3282, stated that the markers on the rear of the helper and also on the caboose were burning brightly when the train left SF block station. The speed of the train going up the grade from SF block station was about 8 or 10 miles an hour, beginning to decrease about half a mile west of where the rear of the train finally stopped. He also said that a speed of 7 miles an hour was maintained until within 25 yards of where the stop was made. He had been riding with the conductor in the cupola during the time the train had been losing speed. When the train stopped, he put on his overcoat, obtained his lanterns and went back to flag. He did not think

more than two minutes elapsed between the time the train stopped and the time he got off the caboose. He stated that he went back on the westbound track, which gave him a better view around the curve, on account of the snow being so deep on the eastbound track. When he had gotten back about six car lengths he saw extra 554 approaching, it being at this time about 200 yards distant. He at once began to give stop signals, but he said he had seen the approaching engine for some little time before his stop signals were acknowledged by the engineman, who also shut off steam. He estimated the speed of extra 554 at this time to have been about 30 miles an hour, which speed had been reduced to about 15 miles an hour when the engine passed him, at which time he was six or seven car lengths from the rear of his train on the fireman's side of the approaching train. He did not know whether or not the brakes had been applied at this time, but said that there was no fire flying from the wheels. He did not use a fusee in flagging extra 554 and said that he had not dropped off any fusees en route because trains usually come up the hill at a low rate of speed, not more than 10 miles an hour, and also because he did not want to stop a train on the hill as it would be difficult for it to get started again. He thought the collision occurred at 5.30 a.m. Flagman Simpson also stated that while helpers working out of SP block station usually have flagmen, in this case engine 739 did not have a flagman. He knew of this, however, and fully understood that it was his duty to protect the rear of the train.

Engineman Smith, of helper engine 739, who was injured, stated that the speed of the train going into the cut was about 10 miles an hour, and that when the rear of the train reached the cut it was about 6 miles an hour. The flagman was back about 2 car lengths when extra 554 approached and collided with his train less than a minute after it had stopped. He did not hear extra 554 approaching.

Fireman Noble, of helper engine 739, stated that the speed of extra 5282 was about 8 or 9 miles an hour until about the time of passing the telephone booth known as L & C 17. It then began to decrease until at the entrance of the cut in which the accident occurred it was 6 or 7 miles an hour, but he did not think it was reduced to such an extent as to require protection at that time. The train came to a gradual stop, at which time he had just seated himself on his seat box, and he said that at this time he could not see ahead more than 2 car lengths on account of the smoke and steam from his engine blowing down in front of him. He saw the flagman get off the caboose on the left side as soon as the train stopped. Shortly afterward he happened to look back and saw extra 554 approaching, it then being about 8 car lengths distant. He thought about 40 seconds elapsed between the time his own train stopped and the time of the collision, and was positive that Flagman Simpson was incorrect when he said that two minutes elapsed between the time the train stopped and the time he started back to flag, saying that he noticed this particularly because if the

flagman had not gotten off to protect the train he would have had to do it himself. The markers on the caboose and on the tender of his engine were burning brightly.

Engineman Howard, of extra 554, stated that the train of extra 3282 had been standing beside his train before departing from 3F block station. His own train started from that point at about 2.50 or 2.52 a.m., and did not exceed a speed of 10 miles an hour at any point. The first he knew of his train overtaking extra 3282 was when he saw the flagman of that train on the left side of the track, about 4 or 5 car lengths distant, the flagman not being more than one car length from the rear of the tender of the helper engine; at about the same time he saw the markers. He at once shut off steam, opened the sanders and applied the air brakes in emergency, but said that the brakes did not take hold immediately on account of the snow. He did not know at what time the accident occurred. He had not had any trouble with the air brakes, but on account of the snow and also the smoke and steam from his own engine blowing down in front of him, it was impossible to see ahead any great distance. Shortly after daylight, when the weather conditions were not so bad, he walked back along his train to find out just how far he could have seen the train ahead, taking into consideration the curvature of the track and the side of the cut, and found this distance to be 15 car lengths, and he said he could have stopped easily in that distance. Engineman Howard further stated that when coming into 3F block station,

he had been flagged by a fusee, seeing the glare of the light before seeing the fusee itself; also that he had often been flagged on this grade by fusees.

Head Brakeman Kraver, acting as fireman on engine 554 at the time of the accident, stated that the speed of his train had not been over 12 or 15 miles an hour at any point between SF block station and the point of accident. Brakeman Mitzel, who was on the fireman's seat box, was the first to call out that there was a flagman ahead, following which the engineman applied the brakes. Brakeman Kraver also stated that at the time of the accident it was impossible to see ahead more than three or four car lengths.

Rear Brakeman Mitzel, who was riding on engine 554 at the time of the accident, stated that he thought the speed of his train did not exceed 10 miles an hour between SF block station and the point of accident. The speed was about 8 or 10 miles an hour when, from his position on the seat box, he saw the flagman of extra 3282 standing between the two main tracks. The flagman was about 4 or 5 car lengths distant and about two car lengths behind the rear of the helper engine of extra 3282. Brakeman Mitzel said he at once called to Engineman Howard, who shut off steam and applied the air brakes in emergency, the speed being reduced to about 4 or 5 miles an hour at the time of collision. He thought that the weather conditions accounted for his seeing the flagman before the engineman saw him, saying that the wind blowing from his side of the engine would blow the smoke and steam down in front of the

engineman, thus cutting off the engineman's view.

Conductor Veit, of extra 554, who was riding in the caboose, stated that he did not think the speed of his train exceeded 10 miles an hour at any point. There was no reduction in speed previous to the collision, the application of the brakes and the shock of the collision seeming to come together. He said that the accident occurred at 3.28 a.m. He did not know that there had been a collision until one of the brakemen came back from the engine and told him about it. He estimated that when going forward toward the head end of his train, he could have seen a flagman's signals about 20 car lengths. Conductor Veit also stated that several stops had been made between Harrisburg and BF block station, no difficulty with the air brakes being experienced at any time. At the time of the accident, the air hose was not coupled between the caboose and helper engine 1201.

Flagman Grubb, of extra 554, stated that he did not think the speed of his train was over 8 or 9 miles an hour at any point between BF block station and the point of accident, while he estimated it to have been about 5 miles an hour at the time the collision occurred. The shock was not severe in the caboose, and he thought that the sudden stop was due to the breaking of an air hose in the forward part of the train.

Fireman Lamour, of engine 554, who was riding in the caboose at the time of the accident, stated that he thought 10 miles an hour was the highest rate of speed reached by his train.

the brakes were applied at the time of the collision, but the train did not stop suddenly and there was not much of a shock at the rear end.

Engineman Dennison, in charge of helper engine 1201, of extra 554, stated that after starting the train out of 3F block station, he stopped for water and overtook the train at a point about half a mile beyond. When overtaking the train, the caboose was about 10 or 15 car lengths distant when he first saw it. He did not think the speed of the train at any point exceeded 10 miles an hour, which was the speed at the time of the collision. He did not know whether or not the brakes were applied before the collision occurred, and stated that the shock was not severe. He did not notice the time. Engineman Dennison also stated that at times it was possible to see quite a distance, while at other times he could not see the markers on the caboose ahead of him.

Fireman Shaub, of engine 1201, stated that when recoupling to the rear of extra 554 after taking water, it was impossible to see more than 3 or 4 car lengths. The speed of the train was about 10 miles an hour up to the point of collision.

This accident was caused by the failure of Flagman Simpson, of extra 3282, properly to protect the rear of his train in accordance with the requirements of that part of time-table rule No. 172 which reads as follows:

"When a train stops under circumstances in which it may be overtaken by another train, the flagman must

> go back immediately with flagman's signals a sufficient distance to insure full protection, placing two torpedoes, and when necessary, in addition, displaying lighted fusees.
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> "When a train is moving under circumstances in which it may be overtaken by another train, the flagman must take such action as may be necessary to insure full protection. By night, or by day, when the view is obscured, lighted fusees must be thrown off at proper intervals."

This timetable rule supersedes flagging rule No. 99 of the book of rules.

Flagman Simpson was an experienced employee, thoroughly familiar with the branch over which his train was operating, and in view of the extreme weather conditions which existed at the time and also in view of the low rate of speed at which it was moving when entering the cut, he should have been prepared to leave the caboose immediately when it came to a stop, which, according to his statement, was within a distance of 25 yards. The weight of testimony, however, indicates that extra 3282 came to a gradual stop, and under these circumstances and especially in view of the extreme weather conditions existing, the provisions of timetable rule No. 172 referred to above should have been followed and a lighted fusee thrown off.

Flagman Simpson was employed as a brakeman in 1898, promoted to extra flagman in 1905, and to regular flagman in 1912. He was suspended twice in 1919 for improper flagging.

All of the employees involved had been on duty from 8 to 12 hours, after periods off duty ranging from 11 hours to approximately 3 days.

The evidence indicates that fusees are sometimes used by flagmen when actually flagging trains, but there is some question as to whether or not they are used to any great extent under other conditions, as in the case of a train moving so slowly that there is danger of its being overtaken by a following train. While the fusees used by track watchmen are 10-minute fusees, those used by trainmen burn only 5 minutes. An engineman finding a burning fusee on the track being used by his train is required to stop and extinguish the fusee, and then proceed cautiously looking out for a stop signal. When a fusee has been thrown from a train, therefore, the same protection is afforded as would be afforded by an automatic block signal, except that the following train knows that the train ahead has passed within 5 minutes, whereas in the case of an automatic signal the approaching train knows that the train ahead is somewhere within the next block section. While the use of fusees may be undesirable from an operating standpoint, in the case of eastbound trains ascending this grade, there is no question as to their desirability from the standpoint of safety, especially in foggy or stormy weather and more especially when it is considered that the block signal system as operated affords but little protection for train movements. As the block system on this line is operated, there is no definite space interval between trains. There are water stations at the three principal block stations where the great majority of trains take water, and this practice serves to provide an interval of time between them at these particular points.

Under rule No. 313 of the current timetable, which comes under the heading "Manual Block System," it is stated that operating rule 318a will apply, among others, to the Ariglen and Susquehanna Branch. Operating rule 318a reads as follows:

> "To admit a train to a block the signalman must examine the block record, and if the block is clear, give "2 for -----," or "36 for -----" to the next block station in advance. The signalman receiving this signal, if the block is clear, must reply "2 for -----." If the block is not clear, he must reply "6 of -----," or "56 of -----." The signalman at the entrance of the block must then display the proper signal indication.
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> "A train must not be admitted to a block which is occupied by a passenger train, and a passenger train must not be admitted to a block which is occupied by any train, except as provided in Rule 532 or by train order.
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> "A train other than a passenger train may be permitted to follow a train other than a passenger train into a block under Caution-signal without giving "6" to the next block station in advance.
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> "When two or more tracks are being used in the same direction, each signalman, in addition to giving the prescribed code signals, must also indicate the track."

It will be noted that under this rule, in train movements in which no passenger train is involved trains are allowed to follow one another at any time restricted only by the caution signal indication, which means that the block is not clear and authorizes the train to proceed with caution. The distance from SF block station east to Q block station, near the top of the grade, is 11.4 miles, and from SF block station, west to OO block station, at the bottom of the grade, it is 11.1 miles. There is an average daily eastbound movement of from 35 to 40 trains. Under the existing practice it is clearly apparent that dangerous conditions may arise at any time on this line.

leading to the occurrence of accidents which an adequate block system is designed to prevent. For this reason, as well as in view of the additional fact that enginemen operating under such a system as exists on this branch may become accustomed to paying little or no attention to the caution signal indication in any system, the signal system should be so operated as to provide a more definite space interval between trains, either by shortening the distance between the block stations and issuing a caution card when a train enters an occupied block, or by the installation of automatic signals.

GVL