

INTERSTATE COMMERCE COMMISSION

IN RE INVESTIGATION OF AN ACCIDENT WHICH OCCURRED ON THE CHICAGO, MILWAUKEE & ST PAUL RAILWAY AT PIED- MONT, MONT, ON SEPTEMBER 30, 1920

JANUARY 15, 1921

To the Commission

On September 30, 1920, there was a collision between a freight train and runaway cars on the Chicago Milwaukee & St Paul Railway at Piedmont, Mont., which resulted in the death of 1 employee and 7 trespassers, and the injury of 1 employee and 2 trespassers. This accident was investigated in conjunction with representatives of the Montana Railroad & Public Service Commission a joint hearing being held at Deer Lodge, Mont., on October 4 and 5, 1920. As a result of this investigation I respectfully submit the following report.

This accident occurred on a subdivision of the Rocky Mountain division extending between Three Forks, Mont., and Deer Lodge, a distance of 112.1 miles, which is a single-track line over which trains are operated by time-table, train orders, and an automatic block-signal system. Beginning at a point 961 feet west of the west switch at Vendome, 5.5 miles west of Piedmont, and proceeding eastward, there is a 4-degree curve to the left 2,834 feet in length, from this point to the east switch is a distance of 2,174 feet, the track being tangent for this distance and for an additional distance eastward of 3.7 miles, then there is a 1-degree curve to the left 1,900 feet in length and a tangent of 2,575 feet to the point of accident. Throughout this entire distance, the grade is descending for eastbound trains, varying from 1.74 per cent to 2 per cent for more than 3 miles, at the point of accident it is 1.3 per cent.

This part of the Chicago Milwaukee & St Paul Railway is operated by electric power, steam engines seldom being used. Helpers are frequently used in freight-train movements in each direction in the territory within which this accident occurred. It is the practice to cut in these helpers at or slightly in advance of the middle of the train, the exact location depending usually upon the comparative strength of the cars. These helpers remain in the train after the top of the mountain has been reached in order that the regenerative braking feature of the motors may be utilized and the speed of the train descending the grade be better controlled. This device is operative only at speeds ranging from about 17 to 22 miles an hour, and it is necessary to use the air-brake system of the train when bringing it to a stop. At the time of the accident the weather was clear.

cated that rule 99 is disregarded at times in order that the train crew may make the necessary air-brake test before descending the grade. It also appears that while under time-table rules 4 and 5 it is necessary for employees in train service to use air cut-out cards, Conductor Lyons stated that he had not been using them, saying that after cutting out the brakes of a particular car he merely added it to the number of brakes shown on Form 975 as being cut out.

Assistant Superintendent Wiltout stated that of time-table rules 1, 4, and 5 and flagging rule 99, he considered rule 99 to be the most important, followed in importance by time-table rule 1. While he assumed that trains were given flag protection at Donald, he was unable to say whether it had been done in all cases which had come under his observation and said he had never censured a conductor or a flagman for failure to observe the rule or for failure to observe the time-table rules. Assistant Superintendent Wiltout said that one way to observe these rules with the number of men now composing a train crew would be for the train to be into clear, thus doing away with the necessity of flag protection, one brakeman to be stationed on the rear of the train, as required by time-table rule 1 and the other brakeman together with the conductor, to make the air-brake tests, but he said he had never seen it done this way.

The investigation also developed that at terminals where car men are on duty it is the custom to have them make the required air-brake test, conductors depending on the information shown on Form 975 for knowledge as to whether 85 per cent of the brakes are in use. As previously stated, however, this form only shows brakes cut out, and trains might frequently have no brakes cut out, and yet not have the required percentage of brakes in operative condition.

Three Forks is between two mountain grades—one about 35 miles west on which this accident occurred, and another about 75 miles east of Three Forks. Heavy trains are operated over both of these mountain grades, the car limit being 100 cars. Not only does the investigation indicate that the methods of inspection and test at this point are not thorough but the statement of Conductor Kirwan indicated that the only time he knew of a train being delayed on account of an air-brake test was when some Government inspectors were present, while the delay of approximately five hours encountered by extra 10207 in obtaining the minimum percentage of operative air brakes at the time the Commission's inspectors were present on October 9 and 10 raises a doubt as to the general conditions concerning air-brake maintenance in this territory. It also appears that at many points in this territory important rules are frequently violated, apparently with the knowledge and tacit consent of supervising officials. It was shown that in many cases violations of the rules were due to the fact that there was an insufficient num-

of the eighth car behind helper motor 10227 shortly after which the rear portion of extra 10203 consisting of 55 cars and a caboose, ran back down the mountain and collided with the rear end of extra 10215 at Piedmont while traveling at a very high rate of speed.

The caboose and 4 rear cars of extra 10215 were demolished, together with the caboose and 38 cars of the runaway portion of extra 10203 a portion of the wreckage was destroyed by fire. The employee killed was Engineman Mutz, who was off duty.

Before leaving Piedmont, Conductor Lyons, of extra 10203, told the members of his crew what moves were to be made at Vendome, so that they would know what to do and what signals to look for, and also instructed Rear Brakeman Gornley that when the train had gotten into clear at Vendome he was to set enough hand brakes on the rear of the train to hold the slack when it was backed out on the main line after the departure of extra 10215. After extra 10215 departed from Vendome, extra 10203 was cut at the head end of helper motor 10227 so that the road motor and the helper motor were each handling a portion of the train when preparing to "saw by" train No. 18. Conductor Lyons, who had ridden on helper motor 10227 from Piedmont to Vendome, cut the train at the head end of the helper motor and after a back-up signal was received from the rear end, indicating that the rear brakeman had opened the passing-track switch after the departure of extra 10215, Conductor Lyons had Engineman Davies back the rear portion of the train part way out on the main track, after which he had Engineman Hyrup back the head portion of the train into clear at the west end of the passing track. Conductor Lyons then signaled to the engineman of the helper motor to pull ahead, intending to recouple the two portions of the train and be in readiness to depart when train No. 18 arrived.

In the meantime, before backing the rear portion of the train, Engineman Davies, according to his statement, had cut in his brake valve and had pumped up the brake-pipe pressure from 35 pounds to 52 or 54 pounds. As he started to back the rear portion of the train he made a slight application of the automatic air brake and then released, this application being in the nature of a test. He said that in regulating the speed while backing up, and also when bringing the rear portion to a stop after having backed a sufficient distance, he used the independent brake, having been told by the conductor that the rear brakeman had instructions to set 10 or 12 hand brakes for the purpose of holding the slack while this movement was being made and he said that when he stopped after backing the required distance, the gauge on the motor indicated a brake-pipe pressure of 44 pounds. After the head portion of the train had backed into clear and he had received the signal to pull ahead given

by Conductor Lyons. Engineman Davies turned on the current, but was unable to start with 200 amperes, on increasing this to 220 amperes the rear portion parted between the seventh and eighth cars.

On arriving at Vendome Head Brakeman Brown had gotten off, at the direction of Engineman Hyrup for the purpose of looking for leaks in the train line as the train pulled into the passing track and had boarded the eighth or ninth car behind the helper motor, having found two leaks in that part of the train one of which necessitated putting in a new gasket. He said he had repaired these leaks and was walking toward the helper motor when the back-up movement started. When the rear portion of the train broke in two and went back with Fireman Merrill of the helper motor to ascertain the cause of the trouble. Fireman Merrill rolled the pulled-out coupler off the track while Head Brakeman Brown said he gave a signal to the helper motor to back up, and then started to board the head car to set hand brakes. At about this time the rear portion of the train started to move, and he signaled to the helper motor to stop, and, with the assistance of Fireman Merrill, he set five or six hand brakes and then got off, it being seen that the cars were beyond control. Head Brakeman Brown thought the cars started to move within three or four minutes after the train broke in two and that they moved off easily while Fireman Merrill estimated that they began to move within one or one and one-half minutes after the coupler had been rolled from the track. Fireman Merrill said there was no squeaking of brakes the cars seemed to drag a little when starting but then speed increased rapidly. Head Brakeman Brown said the cars being backed by Engineman Davies did not come in contact with the standing cars, which statement was partly supported by the statement of Engineman Davies that he felt nothing to indicate that such contact had occurred. Conductor Lyons estimated that from five to seven minutes elapsed between the time he signaled the helper motor to pull ahead and the time the cars started to run away. His statement of his movements during this interval indicated that seven minutes undoubtedly is a maximum estimate.

The only employee near the rear end of the train at the time it began to run away was Rear Brakeman Gormley. On account of injuries sustained by him in the accident he could not be questioned, but when interviewed several weeks afterwards he stated that he had set 10 or 12 hand brakes for the purpose of holding the slack and that when the back-up movement stopped he began to release the hand brakes. When the cars began to move again, he at first thought the engineman of the helper motor was taking the slack, but soon realized that the train was running away and began to set hand brakes. He further stated that he did not recall hearing any one on extra

10215 call to him about leaks in the train line of his train and that he did not make any repairs of any kind to the train line. At the time of the interview he said he remembered nothing as to what happened at Piedmont, where the helper was cut into the train.

According to Conductor Lyons, test made of the remaining 41 cars of his train on their arrival at Butte disclosed that on only 30 were the air brakes in working order, but on account of the fact that no proper air-brake tests had been made by the crew, or the car men, either at the terminal at Three Forks or afterwards, it is impossible to say definitely what was the condition of the air brakes on his train as a whole at the time it broke in two.

Car Inspector Bond, on duty at Three Forks at the time extra 10203 departed, said that when Conductor Lyons told him the train had been made up, he coupled the air hose, signed a copy of Form 975 and placed it in the caboose. In this form is a space for the insertion of the number of brakes cut out, and the signature of the car inspector, but no space for information as to the number of brakes which are otherwise inoperative. On the bottom of the form, in a footnote, it is provided that the inspector will fill in the number of brakes cut out, and leave the form in the caboose before the train departs. At about the time Inspector Bond left this form in the caboose another freight train arrived, and Inspector Bond at once went to that train and inspected it on account of its being a preference train. When he had finished he found that extra 10203 had departed.

Conductor Lyons said that trainmen were not required to make an air-brake test at Three Forks, and that he had not seen the car men make such a test of his train before its departure. His statements also indicated that at no time on this trip did he look at his copy of Form 975, or in any other way try to obtain definite information as to the condition of the air brakes. On arriving at Piedmont he had the road motor pull the first 34 cars out on the main line, after which the helper motor coupled to the remaining 62 cars, pulled ahead and coupled to the rear end of the head portion of the train, the engineman of the helper motor then applying the air brakes on the rear portion of the train and cutting out his brake valve. The brakes were then released by the road motor, after which the train departed. Conductor Lyons admitted a complete test of the air brakes was not made as required by rule. He stated that the air was working through to the caboose and that the establishment of this fact was the usual extent of their air-brake test. He expressed the opinion that the rear portion of his train would have stood a much longer period of time after breaking in two at Vendome if the air brakes had been in proper condition, and when the test of the remaining portion of his train showed that there were only 30 cars on which the air brakes were operative, he said he judged that the run-

away was due to a similar lack of proper braking power on the rear portion of the train.

Not only do the statements of Engineman Hyrup agree with those of Conductor Lyons as to the lack of a test of the air brakes at Three Forks but the enginemen said that the car men who are supposed to make the test, never tell him how many brakes are cut out or otherwise inoperative. He verified Conductor Lyons's statement as to the manner in which the brakes were released at Piedmont after the helper motor had been cut in. It further appeared from his statements that after leaving Piedmont with brake-pipe pressure of nearly 70 pounds he had difficulty in maintaining the brake-pipe pressure, and he verified Head Brakeman Brown's statement about directing the head brakeman to drop off at the entrance to the passing track at Vendome for the purpose of looking for leaks in the train line. Engineman Hyrup thought that had the brakes on the rear portion of the train been in good condition they would have held at least 15 minutes. Engineman Elliott and Head Brakeman Lee, both of eastbound extra 10215, said that when extra 10203 passed them when pulling into the passing track at Vendome they noticed a bad leak in the train line of that train 10 or 12 car-lengths from the caboose, Head Brakeman Lee saying that he called Rear Brakeman Gormley's attention to it. The statements of Engineman Davies, of helper motor 10227, indicated that the gauge on his motor showed a brake-pipe pressure of 70 pounds when he coupled the rear portion of the train to the head portion at Piedmont, after which he made a 25-pound brake-pipe reduction and cut out his brake valve. When the train departed from Piedmont the gauge on his motor showed only 40 pounds brake-pipe pressure, while when arriving at Vendome this pressure was only 35 pounds. Engineman Davies expressed the opinion that with the gauge on the road motor showing a brake-pipe pressure of 65 or 70 pounds and the gauge on the helper motor, 34 cars from the road motor, showing only 40 pounds, it was probable that the pressure at the caboose, 62 cars farther back, would not be more than 30 pounds.

According to Car Inspector Bond, he told Rear Brakeman Gormley that the air was coupled and if he was not around, to make certain that the air was through to the caboose, after which the train could proceed. Car Inspector Bond said it was customary in the case of a through train to inspect it upon its arrival and upon its departure merely to see that the air was through to the caboose. In the case of extra 10203, however, which was made up at Three Forks, he said it had been his intention to give it a proper inspection and test, conducted in the following manner: Cut in the air and wait at the caboose until the air came through, proceed along the train looking for and repairing leaks, have the engineman make an application of

the air brakes and their return to the rear of the train looking at the brakes for the purpose of seeing if the required percentage was in operation, if such were the case, give the engineman a signal to release the air brakes and tell the conductor that everything was all right and that the train could depart. Car Inspector Bond afterwards said that such tests are the exception and not the rule. He also stated that the air-brake tests made by him are not thorough, on account of the lack of time and assistance, and he did not think they were being made as desired by the car foreman, although he stated he did not think the car foreman knew of the existence of this condition. The statement of Car Foreman Schmitz located at Three Forks, indicated that he supposed a car-to-car test of the air brakes was being made.

While it is impossible to say what was the condition of the hand brakes on the runaway cars, 44 of them were gravel cars of the same type as the gravel cars now remaining in such service on this division, and an examination made on October 9 of 64 gravel cars then at Three Forks, none of which were on the repair track or marked 'bad order,' showed that the hand brakes on 23 cars were inoperative.

Time-table rules 1, 4, and 5 under the heading "Special Rules and Instructions Regarding the Operation of Trains on Mountain Grades," read as follows:

1. When no helper power on rear the last car must be one that is equipped with a good brake and a trainman stationed upon it at all times. Conductors are responsible for having trainmen properly stationed.

4. An air brake test will be made before commencing descent, which must be carefully supervised by the conductor. Such tests shall be made by setting the brakes and leaving them set while a trainman walks from each end of the train toward the middle, who must observe that the piston travel is properly adjusted, not less than 4 inches nor more than 8 inches, that retainers are in good condition and that the hand brakes are ready for operation. If any of the air brake apparatus is out of order, the air will be cut out on such car and "Air Cut Out Cards" attached to car. Conductors must notify enginemen when air is cut out on a car, or any change made in the brake equipment, and see that proper test is made after every such change.

5. Same rule to apply before commencing ascent.

The time-table states that the territory between Piedmont and Newcomb is mountain territory and under time-table rule 5, therefore, stops should be made at these points for the purpose of testing the air brakes. Not only does the evidence indicate that time-table rules 1 and 5 are often disobeyed, but Conductor Knwan stated that it is not customary to observe time-table rule 5, while Assistant Superintendent Hamilton and Traveling Engineers McAvooy and Maxwell stated that they did not consider the observance of time-table rules 4 and 5 necessary at Piedmont and Newcomb, and the

evidence indicated that no one had ever been disciplined for not obeying these rules

This accident is believed to have been caused by inoperative or inefficient brake equipment on extra 10203

Investigation disclosed that no proper inspection and test of the brake equipment on this train was made at its initial terminal or at any other point on this trip prior to the accident, that brake-pipe pressure was not properly maintained on this trip, which undoubtedly greatly reduced, if it did not entirely destroy, the efficiency of the brake system on the rear portion of the train, that after the break-in-two, the cars most if not all of which were empty, forming the rear portion of the train started down the grade within a very short interval of time, establishing beyond question that the brake equipment on that portion of the train was not in operative or efficient condition, and that of the undamaged cars in this train there was a very large percentage with inoperative air brakes

Although the tests at Three Forks, which is a terminal, are supposed to be performed by the car men on duty at that point, the employees in charge of trains are in no way relieved of the duty of knowing that such tests have been made and that 85 per cent of the brakes in the train are in service. These requirements are covered by rules 932 and 933, which are shown in the rule book as general rules under the heading 'Conductors'. These rules read as follows:

932 See that train are properly made up and inspected, that at least 85 per cent of all cars in trains are equipped with air brakes in service, that proper signals are provided and that air brake, signal-whistle and steam heat tests are made before starting. Make same tests whenever any cars are taken from (except rear) or added to trains.

933 Do not start trains from inspecting stations until inspector's work is completed.

Not only is Conductor Lyons open to the most severe censure for his failure to pay any attention to these important rules but he is also at fault, together with Engineman Hyrup for failing to comply with time-table rule 5 previously quoted. In this particular, however, these employees were only following what appears to have been a common practice, and in this connection attention is called to the fact that some of the officials stated that they did not consider the observance of time-table rules 4 and 5 to be necessary at Piedmont and Newcomb. Regardless of the opinion of these officials and of the practice which has grown up possibly as a result of this attitude, the fact remains that had time-table rule 5 been properly observed the crew of extra 10203 would have discovered any dangerous condition existing with respect to the air-brake system, the remedying of which undoubtedly would have prevented the occurrence of this accident.

For the purpose of observing the air-brake conditions on this division, the Commission's inspectors arranged to ride on westbound freight train extra 10207 which was called to leave Three Forks at 11 p. m., October 9, with 100 empty cars. The work of completing the making up of the train and coupling the motor to the train was finished at 1:13 a. m., October 10. Air-brake tests which were made by the car men and the train crew were observed by the Commission's inspectors. At 1:48 a. m. a 15-pound brake-pipe reduction was made, after which the car inspector reported the results of his inspection. Two cars had short piston travel, 3 cars excessive piston travel, on 2 cars the air brakes were cut out while on 18 cars the air brakes did not apply. The crew then set out 11 cars, and after the dispatcher had told the conductor not to fill out the train to 100 cars, another test was made of the remaining 89 cars the brake-pipe pressure being 90 pounds with a 20-pound brake-pipe reduction. The car inspector reported that some brakes applied which had not operated on the previous test, but that there were others which had excessive piston travel, 18 defective brakes were discovered as a result of this second test. The brakes were then released, about 40 minutes were spent in adjusting the piston travel on various cars, and then a 15-pound reduction was made from a brake-pipe pressure of 80 pounds. The car inspector then reported 13 defective brakes, which brought the percentage of operative brakes up to 85 per cent, and the train finally departed at 5:57 a. m. after nearly 5 hours had been spent in testing the air brakes and in obtaining the minimum percentage of effective brakes required by law.

After the departure of this train, observations made at 10-minute intervals during the trip from Three Forks to the top of the grade at Donald 55.2 miles indicated that between Three Forks and Piedmont the brake-pipe pressure on the road motor averaged about 9 pounds higher than at the caboose. After a helper motor was cut in at Piedmont the train departed with the governor on the road motor set at 70 pounds, at the time of departure the brake-pipe pressure on the road motor was 65 pounds, on the helper motor 50 pounds and on the caboose 45 pounds. Shortly afterwards the helper motor showed a brake-pipe pressure of 66 pounds and the caboose a brake-pipe pressure of 64 pounds. Later on, with the governor on the road motor set at 80 pounds the other pressures were increased to 70 and 68 pounds respectively. In this case the helper motor was cut in behind the thirty-fifth car of the train, and therefore had 54 cars behind it.

The investigation disclosed that at Donald the top of the grade between Piedmont and Newcomb it is impracticable to observe timetable rules 1 and 4, or 1 and 5, and also flagging rule 99, in view of the number of men composing the train crew, and the evidence indi-

cated that rule 99 is disregarded at times in order that the train crew may make the necessary air-brake test before descending the grade. It also appears that while under time-table rules 4 and 5 it is necessary for employees in train service to use air cut-out cards, Conductor Lyons stated that he had not been using them, saying that after cutting out the brakes of a particular car he merely added it to the number of brakes shown on Form 975 as being cut out.

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Three Forks is between two mountain grades—one about 35 miles west on which this accident occurred, and another about 75 miles east of Three Forks. Heavy trains are operated over both of these mountain grades, the car limit being 100 cars. Not only does the investigation indicate that the methods of inspection and test at this point are not thorough but the statement of Conductor Kirwan indicated that the only time he knew of a train being delayed on account of an air-brake test was when some Government inspectors were present, while the delay of approximately five hours encountered by extra 10207 in obtaining the minimum percentage of operative air brakes at the time the Commission's inspectors were present on October 9 and 10 raises a doubt as to the general conditions concerning air-brake maintenance in this territory. It also appears that at many points in this territory important rules are frequently violated, apparently with the knowledge and tacit consent of supervising officials. It was shown that in many cases violations of the rules were due to the fact that there was an insufficient num-

ber of employees in the crew to comply with all of the rules at the same time

It is a matter of surprise that such dangerous practices should have been allowed to continue until finally they resulted in the occurrence of a disastrous accident, causing the loss of many lives. The continued existence of such conditions is a serious menace to the lives of the traveling public, as well as of employees, and the responsible operating officials of this railway should take prompt and efficient measures to improve air-brake conditions on this line and to insure the strict enforcement of their rules, if the occurrence of future accidents of this character is to be avoided.

All of the employees involved in this accident were experienced men. At the time of the accident the train crew and the crew of the road motor had been on duty about $5\frac{1}{2}$ hours, after nearly 11 hours off duty, the crew of the helper motor had been on duty about 1 hour after more than 14 hours off duty.

Respectfully,

W P BORLAND,
Chief, Bureau of Safety

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