IN RE INVESTIGATION OF AN ACCIDENT WHICH OCCURRED ON THE ATLANTIC COAST LINE RAILROAD NEAR WORTHINGTON SPRINGS, FLA., JUNE 19, 1919.

August 12, 1919.

On June 19, 1919, there was a rear-end collision between a passenger and freight train on the Atlantic Coast Line Railroad near Worthington Springs, Fla., which resulted in injuries to 22 passengers, 2 persons hauled by contract and 3 employees. After investigation, the Chief of the Bureau of Safety reports as follows:

The Gainesville District of the 3rd Division of the Atlantic Coast Line Railroad extends between Jacksonville, Fla., and St. Petersburg, Fla. It is a single track line, over which trains are operated by time table and train orders, no block signal system being used. Under rule No. 91, following movements are spaced 10 minutes apart, except when closing up at stations. The speed of passenger trains is limited to 50, and that of freight trains to 30, miles an hour.

Approaching the point of collision from the south there is 8,000 feet of tangent, a 3° curve to the left about 980 feet in length and 4,000 feet of tangent. In about the center of this tangent is a 400-foot pile bent trestle over the Santa Fe River, the point of collision being 40 feet south of the trestle. The grade is descending nearly all the way from Haynesworth, a distance of over 6 miles, the maximum being 1.3 per cent. Beginning 4,600 feet south of the point of collision, it is 1.2 per cent descending for 2,100 feet, 0.65 per cent descending for 1,800 feet, and then level to the point of col-

lision, a distance of nearly 700 feet. The curve is bordered by trees which restrict the view to about the length of the curve itself.

The trains involved were northbound passenger train No. 38, en route from St. Petersburg to Jacksonville, and northbound freight train extra 905, en route from Carbur, Fla., a station on the Perry Branch, to Jacksonville.

Train No. 38 consisted of locomotive 307, 1 all-steel combination mail and baggage car, 1 steel-underframe combination baggage and coach, 1 coach with steel underframe and 1 all-steel Pullman sleeping car, in charge of Conductor Colson and Engineman Davis. This train left St. Petersburg at 8.30 p.m. and passed Gainesville, the last open telegraph station south of and 23.1 miles distant from the point of accident, at 3.54 a.m., 6 minutes late. At Haynesworth it was run through the passing track around extra 905. Passing the north switch of the passing track at about 4.36 a.m., 8 minutes late, train No. 38 proceeded northward at usual speed for about 6 miles, when the engineman discovered a fire on the trestle before mentioned and made an emergency application of the brakes, bringing the train to a stop 200 yards from the fire. The brakes were released, the train was moved forward to within a few feet of the fire, which was near the northern end of the trestle, and the members of the crew extinguished the blaze.

The train was just starting to proceed and had attained a speed of about 2 miles an hour when the rear end was struck by extra 905 at about 4.59 a.m.

Extra 905 consisted of locomotive 905, 25 steel flat cars loaded with logs, 1 box car and a caboose, in charge of Conductor Hubbard and Engineman Crabb. South of Haynesworth the train stalled on account of low steam pressure and doubled into Haynesworth. A badly loaded car was then switched from the rear to the head end of the train, and in order to avoid delay to train No. 38, extra 905 held the main track while train No. 38 was run through the siding. Extra 905 followed train No. 38 out of Haynesworth, colliding with the rear end of that train at the Santa Fe River trestle while running at a speed estimated to have been 20 miles an hour.

Train No. 38 was driven forward about its own length. The rear of the Pullman sleeping car was crushed and both vestibules of the coach ahead of it badly damaged. This coach telescoped the rear end of the combination car a distance of about 8 feet. The front end of locomotive 905 was damaged, while the tender broke loose and fell into the river. The 8 head cars of extra 905 were torn from their trucks and piled up on the south end of the trestle and on the roadway, but owing to their steel construction, the damage was confined mostly to the running gears. The wreckage knocked down about 10 bents of the trestle and necessitated the renewal of all the ties in the trestle.

Engineman C. A. Davis, of train No. 38, stated that as nearly as he could remember, his train left Haynesworth at 4.36 or 4.37 a.m. and passed the north passing track switch at 4.38

or 4.39 a.m. The speed of his train was about 50 miles an hour when he came around the curve south of the trestle and saw that it was ablaze about 100 feet from its northern end. After bringing his train to a stop about 200 yards south of the fire, he immediately sounded the whistle signal for the flagman to go back, and in about a minute, or as soon as the brakes released, moved the train up to within about 40 feet of the fire, again whistling out the flagman while pulling ahead, as he was afraid the flagman might think he was leaving. The first stop was made at about 4.47 or 4.48 a.m., and he estimated that from 2½ to 3 or possibly 3½ minutes intervened between the first and second stops. He said he did not see the flagman go back, but realized his train was standing in a dangerous location and when the fire had been about extinguished told the conductor he would pull ahead around the curve a safe distance and wait for the flagman, as this would give the train behind them a greater distance in which to stop, in case they should happen to need it. He hurried to his engine, opened the throttle and had moved the train ahead about 40 feet when the collision occurred.

Fireman Davis, of train No. 38, stated that when they made the first stop at the trestle, he called the attention of the engineman to the necessity of sending out a flagman and the engineman then whistled out the flagman, then after having moved forward, he whistled out the flagman a second time. He estimated that the train stopped a total of 10 or 12 minutes. He

heard extra 905 answer the signals of the flagman, and, judging by the shock of the collision, estimated the speed of that train at 15 or 20 miles an hour.

Conductor Colson, of train No. 38, stated that his train left Haynesworth at 4.36 or 4.37 a.m., 5 minutes late, and that its speed between that point and the trestle was about 40 miles an hour. When the first stop was made he was looking toward the front of the train to see what the obstruction was, taking no action toward seeing that his flagman went back. After making the first stop, Engineman Davis sounded the whistle for the flagman to go out, then pulled up nearer the fire and again whistled for the flagman to go out. He thought his train remained 1½ or 2 minutes at the point of the first stop. When the second stop was made, he was standing on the steps of the 3rd coach and suggested to the baggageman that they see that the flagman went out before going to the front of the engine. The baggageman replied that the flagman was then going out and, leaning out from the coach, they saw the flagman then going back, whereupon they proceeded through the cars and over the engine to the front of the train. He stated he did not see the flagman going back until after the second stop was made, but at that time the flagman went promptly to the rear and when he and the baggageman saw him going out over the trestle he was about a car length from the rear of the train, proceeding at a rather brisk walk, and carrying red and white lanterns. The fire was about extinguished when he heard extra 905 answer the signals of the flagman and then saw it approaching, but he sup-

posed the engineman of that train was proceeding under control. Engineman Davis told him he was going to pull ahead because it was a dangerous place, had boarded the engine and the train had just started moving ahead when the collision occurred. He estimated the speed of extra 905 at 15 miles an hour. He first estimated the time that elapsed between the second whistling out of the flagman and the time of collision as 6 minutes. Subsequent tests with train No. 38, under as nearly the same conditions as possible, developed that 9 minutes were consumed in making the run from Haynesworth and coming to a stop at the trestle with an emergency application, while a total of 12 minutes was consumed in making the two stops. The figures as developed by the test practically agree with the figures given by the engineman and conductor as to the time consumed on the morning of the accident, and indicate that if the train passed the north switch as late as 4.38 a.m., the first stop at the trestle was made at 4.47 a.m., or 12 minutes before the accident occurred.

Baggagemaster McArthur, of train No. 38, thought his train passed the north passing track switch at about 4.48 a.m. When the engineman made the first stop at the trestle, he saw the flagman jump off the rear and start back with red and white lanterns. He said that when the train started ahead, he saw the flagman come back and catch the rear of the train and when the engineman whistled him out again, he jumped off and started back again before the second stop was made; at this time he and the conductor saw the flagman going back, and he appeared to be

running. With the conductor, he then went through the train to the front end and assisted the other trainmen in putting out the fire. He estimated that they were there 4 or 5 minutes before the collision occurred, and that 7 minutes elapsed from the time he last saw the flagman get off the train until they were struck. He heard the engineman of extra 905 answer the signals of the flagman when the flagman was about at the curve, about 1 minute before the collision. He estimated the speed of extra 905 at from 15 to 16 miles an hour and said he heard the conductor of that train make the statement that the air brakes on the cars did not apply.

Flagman Mills, of train No. 38, stated that when the train first stopped, Engineman Davis sounded the whistle signal for him to go out. He stepped off the rear end of the Pullman car just before it came to a complete stop and started back, carrying red and white lanterns. In about 20 seconds, when he was 10 or 15 feet from the rear of the train, Engineman Davis sounded another whistle, and thinking that the train was about to depart and Engineman Davis was calling him in, he boarded the rear of the train as it was pulling away. He waited until the engineman completed his signal, but the signal was for him to again go back, so he went back as fast as he could. In another statement he said he was 25 or 30 yards from the rear of his train when the second whistle signal was sounded. He was about 75 or 100 yards from the rear of his train when he heard extra 905 approaching and had reached a point about 830 yards from the rear of his train when he saw and flagged extra

905. When the engine was 125 or 150 yards from him, Engineman Crabb applied the brakes, answered his flag signals, and then sounded the whistle signal for train No. 38 to pull ahead. He estimated that extra 905 was running about 50 miles an hour when it passed him and that it had slowed down to 15 or 18 miles an hour when the collision occurred. He said that the caboose of extra 905 was 15 or 18 car lengths past him when it stopped. When the engine passed him the brakes on it were applied, as it was throwing sparks as high as his head, but the brakes did not seem to be applied on any of the cars. After the accident he asked Conductor Hubbard why they could not stop, and the conductor replied that he did not think he had any air, and Fireman Freeman said the air had been bad all night. He said Engineman Crabb also informed him that he had been having trouble with his air all night, but had air at the time of the accident. He said he had no torpedoes; that he had applied to the trainmaster for a signal case, but that the trainmaster had none. He did have some fusees, however, but did not take any with him when he went back to flag. In one statement Flagman Mills estimated his train had been at the trestle not more than 3 or 4 minutes when the collision occurred, while in another statement he estimated this time to have been 6 minutes.

Colored Porter Grant, of train No. 38, stated that he looked at his watch when the first stop was made and it was 4.45 a.m. He saw the flagman get off and start back, but when the train started to pull down to the fire, the flagman got on the train again and rode until the second stop was made, when he

again got off and ran to the rear, carrying red and white lanterns and a fusee. He said that 2½ minutes elapsed between the first and second stops, and that it was 5 or 6 minutes from the time the flagman went back the second time until they were struck. He also estimated that the train had been standing at the trestle a total of 14 or 15 minutes. He heard Engineman Crabb answer Flagman Wills' signals when the latter was going around the curve, about 35 car lengths back, then heard him whistle No. 38 to go ahead. He heard Engineman Crabb say the brakes on his train were not working.

Engineman Crabb, of extra 905, stated that the brakes on his train were tested at Carbur, its starting point, but that he did not get a report from the inspector as to the number of brakes in operation. He had trouble with low air pressure at Newberry and reported this condition to the car inspector, but after setting off 5 cars there, the train was inspected and he had no trouble maintaining proper pressure after leaving there, nor did he have any trouble in stopping his train at any time prior to the accident and he believed that the brakes on his train were in as good condition as normally. He stated that he doubled into Haynesworth and made a switch in his train there, but made no brake test, as required by rule. He observed the indicator fall when the air was cut in, however, and this satisfied him that the brakes were operative throughout the train. He stated that he waited 10 minutes before following train No. 38 out of Haynesworth, departing at 4.46 a.m., that he operated his train at a speed of 10 or 12 miles an hour for the first 3

miles, on account of bringing it up to speed, but at no time did his train exceed a speed of 30 miles an hour between Haynesworth and the point of collision. He was making a run for the hill north of the trestle and was travelling at a speed of about 30 miles an hour rounding the curve south of the trestle when he saw a flagman, whose signal he answered, and at the same time saw the markers of train No. 38. He did not see the flagman sooner because of the curve and the flagman's not being back far enough, saying that he thought the flagman was about 30 car lengths from the rear of No. 38; had the flagman been back an additional distance of 600 feet, he could have seen him a distance of over a mile. As soon as he saw the flagman he applied the air brakes in emergency, opened the sanders and whistled No. 38 ahead, jumping from the engine when it was about 6 car lengths from the rear of the passenger train. It was 5.00 a.m. when he picked himself up after jumping, and from this he concluded that the collision occurred at 4.59 a.m. He thought the speed of his train had been reduced to about 10 miles an hour at this time. He further stated that when he applied the brakes in emergency he could feel the speed of the train being checked; the exhaust of air from the brake valve sounded normal for a train of 86 cars and he thought the air was cut in properly. While he considered the brakes on his train as good as the average for that class of equipment, he did not think he could have stopped in 5,000 feet, but would have required at least 3/4 of a mile.

Fireman Freeman, of extra 905, stated that when the air

was cut in after coupling up at Haynesworth, he noticed the gauge hand drop. The train line pressure was about 60 pounds, whereas it should have been 70 pounds. He estimated that his train left Haynesworth 8 or 10 minutes after train No. 38 and had reached a speed of probably 30 miles an hour within the first 2 miles. He said that after passing Santa Fe Station, 4.3 miles from Haynesworth, Engineman Crabb shut off steam and the train drifted down the hill with the blower open, trying to get up steam. Just before reaching the curve south of the trestle, Engineman Crabb opened the throttle to make a run for the next hill and he thought their speed was about 35 miles an hour when the flagman was seen. He said he did not see Flagman Wills, but while rounding the curve, after answering the flagman's signal, his engineman sounded the whistle signal for train No. 38 to go ahead, applied the brakes in emergency, opened the sanders and reversed the engine. It seemed to him that the brakes applied on the engine, but not on the cars and he did not notice much reduction in speed.

Conductor Hubbard, of extra 905, stated that the brakes were tested on his train before leaving Carbur, but that he got no report from the inspector, and hence knew nothing of their condition. When getting his train together after doubling into Haynesworth and switching the badly loaded car from the rear to the head end, he made the coupling between the first and second cuts, opened the angle cock and heard the air passing through to the cars behind, this satisfying him that the air was cut in

from the engine. He did not have any brake test made, however, nor did he look at the air gauge in the caboose at any time thereafter. His train waited 10 minutes before following train No. 38 out of Haynesworth, leaving there at 4.46 a.m. For the first 2 miles it did not exceed 14 miles an hour and at no time up to the point of accident did it exceed 30 miles an hour. On cross examination he stated that if his train had exceeded 30 miles an hour, he would not admit it. While rounding the curve south of the trestle, his flagman called to him: "Get the air, we have run by a flag," and the collision occurred by the time he reached the conductor's emergency valve. Previous to this time he had not felt any application of the brakes, although when he started to apply the air from the caboose he saw fire flying from the wheels of the engine. He stated that when his train stopped, the flagman of train No. 38 was about 5 car lengths to the rear of his caboose. He stated that he did not feel the brakes apply on the caboose just prior to the accident, but that the caboose brakes had previously been cut in, as he had felt them apply while making stops previous to arriving at Haynesworth.

Colored Brakeman Rise, of extra 905, stated that the air was not tested but that the hose was properly coupled and the angle cocks opened at the two points where he made couplings in getting the train together after doubling into Haynesworth. He said that he closed the north passing track switch after train No. 38 had passed them, and then walked toward his engine, which was about 25 or 30 car lengths from the switch, and al-

though he walked briskly, his train had started before he reached the engine and he did not think the time between the departure of train No. 38 and that of extra 905 would exceed 5 or 6 minutes. He stated that no difficulty was experienced in getting started from Hayneswerth and that by the time the train was 2 or 3 miles out it was travelling about as fast as the engine would run, saying the speed was at least 40 miles an hour. After getting over the hill between Hayneswerth and Santa Fe, the engineman shut off steam and drifted through Santa Fe. About ½ of a mile beyond Santa Fe he again began to work steam; the speed here was also high and he did not think it was reduced to any extent up to the time he jumped off. He said he could hear the brakes applying on some of the cars to the rear.

Flagman Phares, of extra 905, stated that he did not know if the air was tested at Hayneswerth, as he was out protesting against train No. 38. He said they waited 10 minutes before following that train out of Hayneswerth and that after leaving there the speed of his train was 8 to 10 miles an hour for 2 or 2½ miles, when the speed was increased. The train was travelling at a speed of 45 miles an hour when he felt it being reduced, and on looking out, he saw the flagman of train No. 38. He had not noticed any application of the brakes and called to the conductor that they had passed a flag. The conductor started for the emergency valve, but the collision occurred before he could reach it. As they passed the flagman, he looked ahead and saw fire flying from the wheels of the engine and 10 or 12

cars on the head end of the train, and thought the speed had been reduced until at the time of collision it was 10 or 12 miles an hour.

From the evidence at hand it is impossible definitely to determine what time it was when train No. 38 first stopped at the trestle, what time extra 905 left Haynesworth passing track, or what time the collision occurred. If train No. 38 passed Haynesworth at 4.38 a.m. and made an average run from there to the Santa Fe River trestle, as developed by the three test runs, it would have consumed about 9 minutes between the two points, which would make the time of stopping at the trestle 4.47 a.m. This leaves an interval of 12 minutes between the first time of/stopping at the trestle and the time of the collision, which probably occurred at about 4.59 a.m. While the flagman's statements are conflicting, it is evident that after starting out the first time he returned to his train when it started to pull ahead, not finally going back to flag until the engineman sounded the whistle signal for the second time. It is apparent that 3 or 4 minutes were lost in this manner. His estimate as to the point he reached before being passed by extra 905 practically agrees with the estimate of the engineman of the extra, and by actual measurement was found to be 1,950 feet. This only brought him onto the northern end of the curve. Had he gone back the first time his train stopped, he would have saved the distance which his train pulled ahead, as well as the 3 or 4 minutes time, and by actual test could have reached the beginning

of the curve in 4 minutes' brisk walking, and in a total of 6½ minutes could have reached the southern end of the curve and have been visible to the engineman of the extra a distance of more than 1 mile. Had he gone back at a slow trot, he could have covered the distance from the trestle to the northern end of the curve in 2 minutes and 25 seconds and to the southern end of the curve in 4 minutes. His own statements indicate that he did not properly perform his duties and it is also apparent that the conductor failed properly to supervise his performance of his duties.

The statements of the members of the crew of extra 905 do not agree either as to the time their train waited at Haynesworth before following train No. 38, or as to the speed at which their train was operated after its departure from Haynesworth. Assuming that train No. 38 passed Haynesworth as early as 4.36 a.m. and that extra 905 waited 10 minutes, as required by Rule No. 91, before following that train, then extra 905 left at 4.46 a.m. and consumed 13 minutes in travelling from Haynesworth to the point of collision. This is a distance of 6.21 miles, and if the statements of the conductor and engineman in charge of the train are to be believed, their train consumed about 10 minutes in travelling the first 2 miles. This means that the remaining 4.21 miles were traversed in about 3 minutes, or at a rate of speed in the neighborhood of 85 miles an hour, which is obviously incorrect. It is believed that the statement of the colored brakeman comes nearer the truth, and that is that extra 905 started from Haynesworth within 5 or 6 minutes after the de-

parture of train No. 38, in violation of rule No. 91, and that it gradually increased its speed until it was travelling 40 miles an hour. In this connection, it is to be noted that while the flagman of extra 905 said his train waited 10 minutes at Haynesworth, yet he said its speed increased until it was travelling at the rate of 45 miles an hour at the time the engineman saw the flagman of train No. 38.

There is also a question as to whether or not all of the brakes on extra 905 were in operation. Although 3 cuts were made in the train line at Haynesworth, no air-brake test was made when it was coupled together, neither was any test made immediately after the accident of the cars which remained intact. As a consequence, it is impossible to say definitely whether or not the engineman obtained the proper results when he applied the air brakes in emergency after seeing the flagman of train No. 38. The action of the engineman in leaving Haynesworth without an air-brake test is in direct violation of Rule No. 1064, which reads as follows:

> "Enginemen must not leave any terminal or intermediate station where the makeup of a train has been changed until air brakes have been tested and they have been informed by Inspector or Conductor that the brakes are all right, and of the number of available air braked cars in train."

This accident was caused by the failure of Flagman Wills of train No. 38 properly to protect his train and the failure of Conductor Colson to see that his flagman went back promptly when the first stop was made at the trestle. Contributing causes were the failure of Engineman Crabb and Conductor

Hubbard, of extra 905, to wait 10 minutes before following train No. 38 out of Haynesworth, coupled with the excessive speed at which Engineman Crabb must have been operating his train just prior to the collision.

All the employees involved were experienced men with good records. Engineman Davis had been on duty 7 hours after a lay-off of several days, while the train crew had been on duty 11 hours, after a restperiod of about 11 hours. The crew of extra 905 had been on duty 11 hours and 15 minutes, after a period of 12 hours and 50 minutes off duty.

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