INTERSTATE COMMERCE COMMISSION.

REPORT OF THE CHIEF INSPECTOR OF SAFETY APPLIANCES IN RE INVESTIGATION OF ACCIDENT ON THE PACIFIC ELECTRIC RAILWAY, NEAR LOS ANGELES, CAL., ON JULY 13, 1913.

AUGUST 6, 1913

On July 13, 1913, there was a rear-end collision between two passenger trains on the Pacific Electric Railway, near Los Angeles, Cal., resulting in the death of 14 passengers and the injury of about 200 passengers.

After investigation of this accident, I beg to submit the following report.

This collision occurred on what is known as the Venice Short Line, extending from Los Angeles to Venice and other seaside resorts west of Los Angeles. The division on which the accident occurred is a double-track line, operated by time card, without signals or orders and with no means of spacing trains except by vision. Train crews are checked out of car barns at Venice and handled by starters at Venice and at Hill Street Station, Los Angeles, the time that regular trains are scheduled to pass stations is entered on the time card, but no record is kept of the time extra trains pass any of the stations, extra trains being expected to make the running time of regular trains.

On this line trains are operated under the multiple unit system, the motors on all cars being of equal power and being controlled by a motorman on the head car of each train. All the cars are equipped with automatic air brakes, which are operated by the motorman on each train.

The trains involved in this collision were extra 532, which left Venice at 8 55 p. m., and extra 874, which left North Beach, Santa Monica, at 8 53 p. m., and is supposed to have passed Venice about 12 minutes later. There is no record of the time these trains passed any of the stations between their terminals and the point where the collision occurred. Each train consisted of three cars.

At about 9 p. m. on the day of this accident east-bound trains on the Venice Short Line were stopped on account of a broken overhead trolley wire about 50 feet east of Vineyard, a junction point 5 5 miles from Los Angeles. On the Pacific Electric Railway the trolley wires are fed in sections, and this break resulted in the

putting out of service only one section of trolley wire about 50 feet in length Some little time was consumed in securing and tying up the broken trolley wire, and a number of trains were stopped at that point When the loose end of the wire was secured where it would not endanger passengers, the trains began to move forward starting some distance away and gathering sufficient momentum to coast past the broken section of trolley At this point there was an ascending grade of 1 7 per cent for eastbound trains, and considerable space was required for a train to gain sufficient momentum to carry it beyond the break in the trolley wire

The track is straight for a distance of about 180 feet west of the point where the accident occurred, and then there is a curve of about 2½°, 639 feet in length, diverging toward the south A slow board is located on this curve, 609 feet from the point where the collision occurred and 1,000 feet from the junction at Vineyard Approaching from the west the view of the track at the point of collision was obstructed by the bank of a cut and by poles lining the track

When extra 532 approached Vineyard, at about 9 15 p m , it was flagged by the flagman of the preceding train Extra 532 stopped to pick up the flagman and then moved up until within about 15 feet of the preceding train, when it stopped While standing at this point it was struck by extra 874, at about 9 20 p m At the time of the collision the weather was clear.

Motorman Clark, of extra 532, stated that as soon as he brought his train to a stop at the place where the collision occurred, he sounded a whistle signal for the flagman to go back and protect the train When the train ahead began to move he sounded a signal recalling the flagman, but as the train ahead moved only a short distance he immediately sounded the signal for the flagman to go back again

Conductor Van Dorn, who was in charge of the first car of extra 532, stated that the signal for the flagman to go back was sounded as soon as his train stopped, and he saw the flagman start to run back, and also saw him signal extra 874 to stop He thought the flagman had gone back a distance of between 600 and 700 feet when the train passed him Conductor Van Dorn said he heard the motorman answer the flagman's signal after the train reached the flagman

Conductor Hart, who was in charge of the second car of extra 532, stated that as soon as this train came to a stop the flagman was signaled to go back, and he started immediately, carrying one red and one white lantern He stated that the flagman went back as far as the beginning of the curve, and that when the motorman sounded the signal recalling him he did not start to return toward the train

Conductor Bartholomai, who was in charge of the rear car and acted as flagman for train extra 532, stated that when his train came

General view of track approaching scene of accident, showing slow board, brink of cut, and trolley poles along the track

to a stop near Vineyard he was signaled out immediately, and he started to run back between the tracks. About two minutes later, when he had gone about 500 feet from the rear end of his train, he saw extra 874 approaching more than half a mile away. He heard the signal recalling him, but continued walking and running back toward the approaching train. The motorman of that train did not answer his signal until after the train had passed him. He had fusees and torpedoes with him, but he did not use either, as he wanted to get back as far as possible before the train reached him. He thought he had gone a short distance beyond the slow board before the train passed him, and he estimated the speed of extra 874 at 30 or 35 miles per hour.

Motorman Forster, of extra 874, stated that the flagman was near the slow board. He had shut off the current and whistled for the junction just as the train passed the slow board, and he then saw the flagman, who was only a short distance away and was signaling him to stop; he acknowledged the flagman's signal and made an application of the brakes; he thought his train was running at a speed of 50 miles per hour at that time. When he saw extra 532 ahead of him he made an emergency application of the brakes. He thought the speed of his train at the time of the collision was between 10 and 15 miles per hour. He stated that the brakes were in good condition and working properly.

Conductor Shafer, who was in charge of the head car of extra 874, stated that three or four stops were made between Venice and the point where the collision occurred, and the brakes appeared to be in good working order. He stated that the motorman had not been running the train at an unusually high rate of speed, as the train approached the slow board he thought it was running at about 30 miles per hour, and he did not notice that the speed had been reduced before the collision occurred.

Conductor Sexton, who was in charge of the rear car of extra 874, stated that on his car there were passengers who were bound for Vineyard, and as the train approached that station he gave the motorman a signal to stop; he did not hear the motorman acknowledge the signal, but as the train approached Vineyard the speed was reduced.

At the time of the collision four passengers were riding in the front vestibule of the leading car of train extra 874. One of them stated that as the train approached the scene of the accident he saw the flagman running toward extra 874 and giving a stop signal, the power had already been shut off and the motorman made an application of the brakes. He thought the flagman was about halfway between the slow board and the point where the accident occurred, and that the speed at the time of the collision was about 20 miles per hour.

The speed of trains when approaching junctions on this road was limited by rule to 10 miles per hour, and a bulletin order directed that trains be operated under complete control around sharp curves

The flagging rule in force on the Pacific Electric Railway required the flagman to go back 500 feet from the rear end of his train and place one torpedo on the rail, then go back 500 feet farther and place two torpedoes on the rail 60 feet apart, should an approaching train be heard or seen before the flagman has gone the required distance he must at once place one torpedo on the rail If conditions require it, a red fusee must be displayed

In this case it is believed that the flagman did not go back the required distance, the evidence indicating that he had not reached the slow board which was only 609 feet from the rear end of the standing train, and although he had both fusees and torpedoes with him he did not use either

Had the motorman of extra 874 observed the speed restriction in effect at this point the accident probably would have been averted, in spite of short flagging The evidence indicates that the speed of the train when it passed the slow board was in excess of 30 miles per hour and it was undoubtedly more than 10 miles per hour when the collision occurred On July 16 tests were made with a train of three cars of the 800 class to determine the distance within which a train of this character could be brought to a stop During these tests there were about 30 people in the train, and the speed in each case was 41 miles per hour In the first test the current was shut off at the slow board and immediately a 10-pound reduction was made, resulting in a service application of the brakes, and the train was brought to a full stop in 425 feet In the second test an emergency application of the brakes was made at the slow board and the train was brought to a full stop in 400 feet As a result of these tests, it is believed that had the motorman of extra 874 applied the brakes at the slow board the train would have been stopped in time to avert the collision, the distance between the slow board and the point where the accident occurred being sufficient to allow for the greater distance required for stopping the loaded train as compared with the train used in these tests

This investigation disclosed the fact that Flagman Bartholomai had entered the service of the Pacific Electric Company on June 20, 1913, only 24 days before the accident occurred He had had no previous electric or steam railroad experience, nor had he been examined, yet he was holding the position of greatest responsibility on this train Motormen Clark and Forster each had had several years' experience Of the other employees on these trains only one was an experienced man He had had about three and one-half years' experience on other lines and had been employed by this com-

pany for about one month Of the others, one had been employed by this company for five months, two for four months each, and one for one month, none of these men having had any previous railroad experience

In the evening, when the traffic from beach resorts to the city is heavy, it is the usual practice on the Pacific Electric Railway to give trains a five-minute headway out of Venice The distance between Venice and Vineyard is 8¼ miles, and there are two stations and a junction between these two points The number of trains over this line is increased east of Ivy Junction, 3 6 miles west of Vineyard, as trains from Redondo Beach also use this track The records show that on Sunday, July 13, between 9 a. m and 9 20 p m, the time of the accident, 123 trains passed over the eastbound track between Ivy Junction and Vineyard, or an average of 1 train every 6 minutes for more than 12 hours

This accident was caused by failure of Flagman Bartholomai of extra 532, properly to protect his train, failure of Motorman Forster, of extra 874, properly to control the speed of his train and failure of the railway company to provide an adequate method of operation to insure the safety of trains running on its lines

To prevent the recurrence of accidents of this character certain operating conditions disclosed by this investigation should be materially improved Flagman Bartholomai had been employed less than four weeks and was still classed as a "student conductor" not having been examined on the rules or for the position of conductor It is noted that only one of the six conductors on the two trains involved in this accident had had any considerable experience Train crews should not be made up entirely of new men, at least one experienced conductor should be assigned to each train on this road and a proper regard for the safety of passengers should not permit the assignment of an inexperienced man to the responsible position of conductor of the rear car and flagman of the train

The rules restricting the speed of trains at dangerous points along the road should be strictly adhered to and rigidly enforced On a road of this character, where trains run from terminal to terminal without direct supervision of superior officers, signalmen, or operators, train employees should be impressed with the absolute necessity of obeying rules and orders issued and established for the safety of train operation

But even if, by careful selection, training, and supervision of employees, accidents resulting from recklessness or willful disregard of rules could be entirely eliminated, errors of judgment may be expected to occur frequently under the existing method of operation on this line, where the operation of trains is left almost entirely to the train employees, and in view of the density of traffic the installa-

tion of an adequate block system is urgently required The inexperience of a large proportion of the men employed, if the records of the employees involved in this accident furnish any criterion, increases and emphasizes the need of a block system, under which the opportunities for errors likely to lead to disastrous results are materially diminished

In this connection attention is called to the fact that automatic train-control systems are installed on a number of electric railroads in this country and in some cases have been successfully operated for a considerable period of time The application of a device of this character to electric railways is comparatively simple, as the propulsion current furnishes a readily available source of power, and the operating conditions on electric roads are materially different from the operating conditions on steam roads The advisability of installing an automatic train-control system on the Pacific Electric Railway should be given serious consideration

None of the employees involved in this accident was on duty contrary to the hours-of-service law

Respectfully submitted

H W BELNAP,
Chief Inspector of Safety Appliances

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