

INTERSTATE COMMERCE COMMISSION  
WASHINGTON

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REPORT OF THE DIRECTOR  
BUREAU OF SAFETY

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ACCIDENT ON THE  
BOSTON AND MAINE RAILROAD

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CHARLEMONT, MASS.

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NOVEMBER 7, 1938

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INVESTIGATION NO. 2307

SUMMARY

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Inv-2307

Railroad: Boston and Maine  
Date: November 7, 1938  
Location: Charlemont, Mass.  
Kind of accident: Head-end collision  
Trains involved: Freight : Passenger  
Train numbers: ER-1 : 60  
Engine numbers: 4004 : 3660  
Consist: 76 cars, caboose : 5 cars  
Speed: 8-10 m.p.h. : standing  
Operation: Centralized-traffic-control system  
Track: Double; 5°35' curve; grade practically level  
Weather: Clear  
Time: 4:35 p.m.  
Casualties: 1 killed, 20 injured  
Cause: Failure to route the west-bound train on the westward track as intended, failure correctly to record its movement on eastward track over route which had been set up for a preceding train, and subsequent authorization for an east-bound train to pass a home interlocking signal, displaying stop, when the eastward track was occupied by the opposing train.

January 28, 1939.

To the Commission:

On November 7, 1938, there was a head-end collision between a passenger train and a freight train on the Boston and Maine Railroad near Charlemont, Mass., which resulted in the death of 1 employee, and the injury of 10 passengers, 2 railway mail clerks, 1 express messenger, 5 employees on duty and 2 employees off duty. This accident was investigated in conjunction with the Massachusetts Department of Public Utilities.

#### Location and Method of Operation

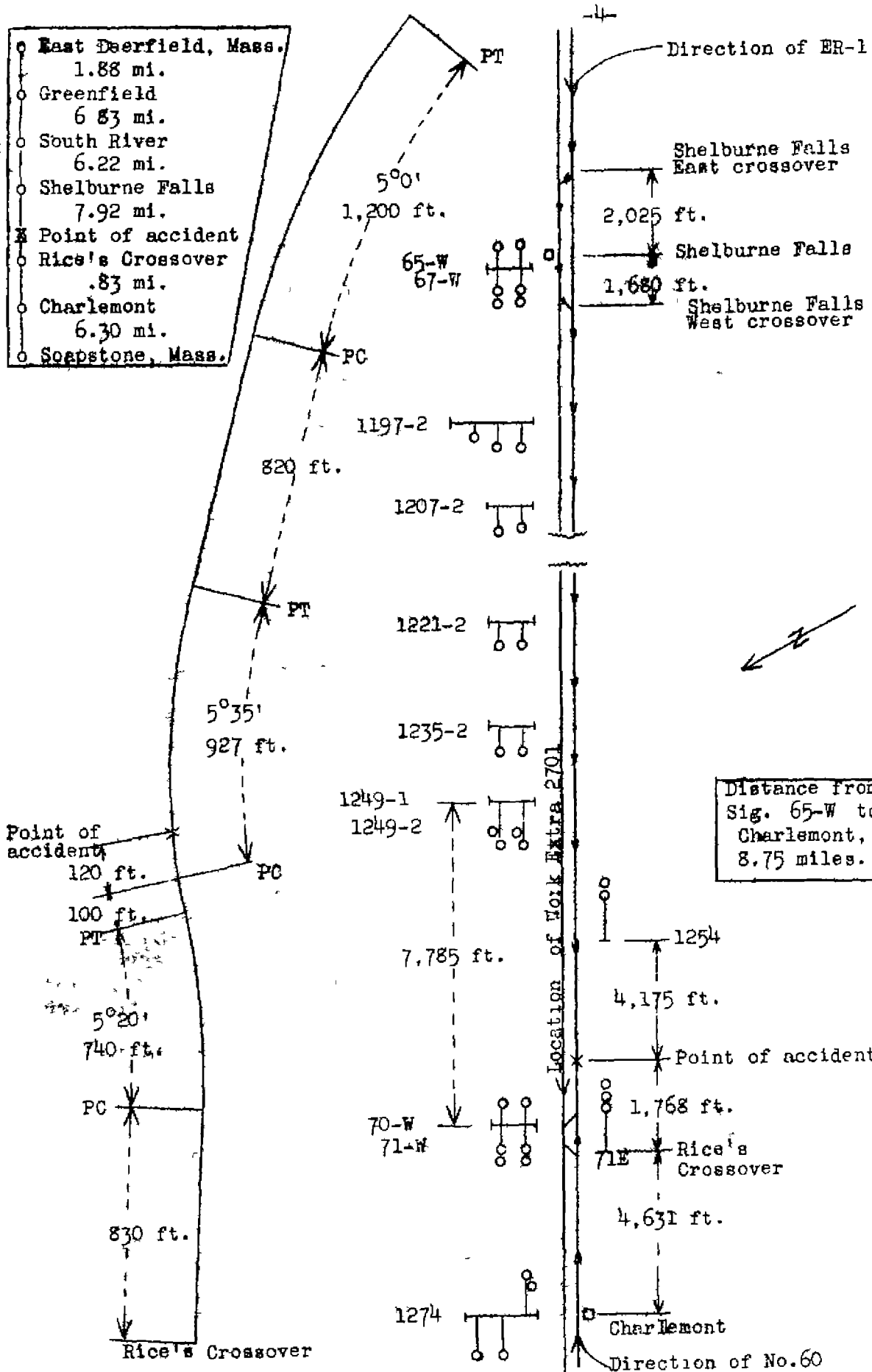
This accident occurred on that part of the Fitchburg Division which extends between Greenfield and Soapstone, Mass., a distance of approximately 29 miles. This is a double-track line over which trains are operated by a centralized-traffic-control system, in parts of this territory movements in either direction on both tracks being governed by signal indications. Shelburne Falls is located approximately 13 miles west of Greenfield. There is a trailing-point cross-over for westward trains, known as Shelburne Falls East, located 2,025 feet east of Shelburne Falls, and a facing-point cross-over for westward trains on the westward track, known as Shelburne Falls West, located 1,680 feet west of Shelburne Falls. At Rice's Crossover, 7.92 miles west of Shelburne Falls and 0.83 mile east of Charlemont, there are facing and trailing-point cross-overs.

The accident occurred on the eastward track at a point 1,768 feet east of Rice's Cross-over. Approaching the point of accident from the west the track is tangent a distance of 830 feet, followed by a  $5^{\circ}20'$  curve to the left 740 feet in length, 100 feet of tangent track and a  $5^{\circ}35'$  curve to the right 927 feet in length; the accident occurred on this last-mentioned curve at a point 120 feet from its western end. Approaching from the east there is a compound curve to the left 1,200 feet in length with a maximum curvature of  $5^{\circ}$ , followed by 820 feet of tangent track and the curve on which the accident occurred. The grade is practically level.

The view of the point of accident is materially obstructed from both directions by a knoll approximately 29 feet in height on the south side of the tracks.

Signals and switches within the territory involved are embraced in a centralized-traffic-control system which is operated through a machine located in the train dispatchers' office at Greenfield. The machine, which was placed in service on March 29, 1931, consists of a track model, switch levers, signal levers,

- East Deerfield, Mass. 1.88 mi.
- Greenfield 6.83 mi.
- South River 6.22 mi.
- Shelburne Falls 7.92 mi.
- ✕ Point of accident
- Rice's Crossover .83 mi.
- Charlemont 6.30 mi.
- Soapstone, Mass.



Inv. No. 2307  
 Boston & Maine R.R.  
 Charlemont, Mass.  
 November 7, 1938.

model lights for "OS" track circuits, and signal indicator lights for both the westward and eastward tracks. Twenty operating and four spare switch levers are located near the bottom of the machine and the track model is near the top. There are nineteen operating and three spare signal levers and four operating and three spare push buttons; signal levers and push buttons for the eastward track are located above the track model and for the westward track below the track model. When a switch is in normal position the switch lever is in the "down" position and when the switch is reversed the lever is in the "up" position. The signal levers are rotary buttons and on each one there is an arrow. When a signal lever is rotated 90° to the left it clears the corresponding eastward signal and to the right it clears the corresponding westward signal, provided track conditions permit. Signal indicator lights are arranged near the signal levers in such manner that the left arrow indicator is lighted when the corresponding eastward signal is cleared and the right arrow indicator is lighted for the corresponding westward signal. There is one model light provided for each "OS" track circuit and this light also provides switch indication. Whenever the "OS" track circuit between interlocking signals is occupied, a tap of a bell is received and the light remains lit until that track/circuit is cleared. Provision is made on the track model for the use of train tokens between "OS" locations; these tokens are moved along by the dispatcher as he receives information regarding the progress of a train; he moves the token ahead of the train to the next "OS" point so that the train is always approaching the token. Provision is made for the use of three tokens to care for three trains between two "OS" locations.

All signals involved are of the color-light type, approach-lighted. Home interlocking signal 65W, mounted on a signal bridge, is located at Shelburne Falls West and governs westward movements on the westward track and cross-over movements from the westward track to the eastward track. Home interlocking signal 71E, mounted on a ground mast, is located at Rice's Cross-over and governs eastward movements on the eastward track. Both of these signals are of the three-unit type, and aspects and indications which were involved in this case are as follows:

Red-over-green-over-red. .Proceed through cross-overs or turnout at not exceeding medium speed, then resume normal speed to next signal. Name:- Clear, medium through cross-overs or turnout. Medium speed, in accordance with the above, for freight trains through cross-overs or turnout only, is 30 instead of 20 miles per hour.

Red-over-red-over-red.....Stop. Name:- Stop.

Automatic signals numbers 1197-2, 1207-2, 1221-2, 1235-2 and 1249-2, governing westward movements on the eastward track are located 0.82 mile, 1.8 miles, 3.2 miles, 4.6 miles and 5.96 miles, respectively, west of signal 65W. Signal 1249-2 is located 6,837 feet east of the point of accident and 7,785 feet east of signal 71E and governs the approach to interlocking signal 71W, which is located 819 feet east of signal 71E. The first four of these automatic signals are of the single-unit type on which a green aspect indicates "proceed". Signal 1249-2 is a two-unit type, staggered, on which a yellow-over-red aspect indicates "prepare to stop at next signal; train exceeding medium speed must at once reduce to that speed". The first signal east of signal 71E, governing eastward movements on the eastward track, is automatic signal 1254, located 5,124 feet east of signal 71E, and the first signal west of signal 71E, governing eastward movements on the eastward track is signal 1274 located 4,631 feet west of signal 71E.

Operating rule No. 265 reads in part:

\*\*\* Trains must not pass any interlocking signal indicating stop without first securing authority from the train director or signalman and then only when switches are properly lined and at restricted speed.

Restricted speed and medium speed are defined as follows:

RESTRICTED SPEED - Proceed prepared to stop short of train, obstruction, or anything that may require the speed of a train to be reduced.

MEDIUM SPEED - Passenger trains - not exceeding (30) miles per hour. Freight trains - not exceeding (20) miles per hour.

The weather was clear at the time of the accident, which occurred at 4:35 p.m.

#### Description

ER-1, a west-bound freight train, consisted of 76 cars and a caboose, hauled by engine 4004, and was in charge of Conductor Lawrence and Engineman Harnett. This train left East Deerfield, approximately 15 miles east of Shelburne Falls, at 3:30 p.m., according to the train sheet, passed signal 65W displaying a red-over-green-over-red aspect, crossed from the westward to the eastward track at Shelburne Falls West, departed on the eastward track at 4:18 p.m., passed the next four automatic signals which displayed proceed indications, passed signal 1249-2 which displayed a yellow-over-red aspect, and collided with No. 60 while traveling at an estimated speed of 8 to 10 miles per hour.

No. 60, an east-bound passenger train, consisted of two milk cars, one express car, one combination mail and baggage car, and one coach, in the order named, all of all-steel construction except the third car which had a steel underframe and a wooden superstructure, hauled by engine 3660, and was in charge of Conductor Lawless and Engineman Wood. This train passed signal 1274, displaying a yellow-over-red aspect, and departed from Charlemont at 4:31 p.m., according to the testimony, four minutes late, stopped at signal 71E which displayed a red-over-red-over-red aspect, and on authorization from the train dispatcher to pass the stop signal departed from Rice's Cross-over at 4:34 p.m., according to the train sheet and, one minute later, after having just stopped, was struck by ER-1.

Both engines were badly damaged. The engine truck of engine 3660 was derailed and the first car telescoped the rear of the tender, forcing the cistern against the rear of the cab. The impact forced the third car of ER-1 to the roadbed on the south side of the track. The fifth car telescoped the fourth car which buckled and telescoped the second car, the rear truck of which was derailed.

The employee killed was the fireman of No. 60, and the employees injured were the engineman of No. 60, a road foreman of engines who was on No. 60 and the conductor and two brakemen of ER-1.

#### Summary of Evidence

Engineman Wood, of No. 60, stated that a terminal test was made prior to departure from Troy, N. Y., 63.78 miles west of Rice's Cross-over, and the brakes functioned properly at numerous stops en route. No. 60 stopped at Charlemont and departed at 4:31 p.m., four minutes late. Signal 1274 displayed a yellow-over-red aspect and No. 60 was operated at slow speed, not exceeding 15 miles per hour, to Rice's Cross-over where a stop was made at signal 71E which displayed a red-over-red-over-red aspect. Conductor Eaton, in charge of a work train nearby on the westward track, informed him that the signal was out of order, and that the dispatcher had said for No. 60 to disregard it and proceed. Proceeding eastward prepared to stop within his range of vision, No. 60 was moving at a speed of about 15 miles per hour, which he considered to be restricted speed, when he saw ER-1 on the curve approaching closely at a very low rate of speed. At first he thought the opposing train was on the westward track but suddenly realizing that it was on the eastward track, he made an emergency application of the brakes, called a warning and jumped off the north side of the engine. The emergency application was effective and No. 60 was practically stopped at the time of the collision. He stated that the movement past signal 71E on instructions from the dispatcher as communicated to him by Conductor Eaton was in

accordance with the rules; Road Foreman of Engines Gurley was on the locomotive and participated in the conversation with Conductor Eaton.

Road Foreman of Engines Gurley, who was on the engine of No. 60, corroborated the testimony of Engineman Wood in all essential details. When approaching the point of accident he heard the engineman call a warning and he leaned out the left cab window, saw the approaching train, and then jumped out the right gangway, the collision occurring almost simultaneously. He thought No. 60 was stopped at the time of impact. He stated the operating rules were not violated by the crew of No. 60 in disregarding the stop signal pursuant to instructions issued by the dispatcher; the conditions in this instance were unusual, but it had been the practice to pass signals displaying stop indications upon information received from signalmen.

Engineman Harnett, of ER-1, stated that a terminal test of the brakes was made prior to departure from East Deerfield and they functioned properly en route. The train was operated on the westward track to South River, then on the eastward track to Shelburne Falls East where it was routed over the westward track to Shelburne Falls West. Signal 65W displayed a red-over-green-over-red aspect and ER-1 accordingly moved via the cross-over to the eastward track and proceeded westward without stopping. The next four signals displayed proceed indications; the fifth signal which governs the approach to signal 71W displayed a yellow-over-red aspect. He immediately reduced speed to about 20 miles per hour, closed the throttle and allowed the train to drift. Within 30 or 40 car lengths of the point of accident the fireman called the aspect of signal 71W as red-over-red-over-red. He again applied the brakes, reducing to restricted speed or 8 to 10 miles per hour, and shortly thereafter when No. 60 was within one or two car lengths of ER-1, the fireman called a warning of the impending collision; he made an emergency application of the brakes but the time was insufficient for the emergency application to take effect before the collision occurred. The weather was clear and ER-1 was moving at a speed of about 8 miles per hour at the time of the accident, which occurred at 4:35 p.m.

Fireman Hebert, of ER-1, corroborated the testimony of his engineman in all details and added that he was keeping a lookout ahead and saw No. 60 when it was about four car lengths distant approaching at a speed not exceeding 10 miles per hour; he could not say whether No. 60 was stopped at the time of collision. There was nothing unusual in the signal indications en route.

The testimony of Conductor Lawrence, and Head Brakeman Porter, of ER-1, corroborated the testimony of the engineman and the fireman in regard to movement of their train. Conductor Lawrence was in the caboose and did not see the signal aspects which were displayed for his train.



Conductor Eaton, of Work Extra 2701, which was working on the westward track immediately east of Rice's Cross-over, stated that about 3:15 p.m. Dispatcher Short instructed him by telephone to remain east of the cross-overs until after No. 57, a west-bound passenger train, had passed as he intended to move that train westward via the eastward track from Shelburne Falls to Rice's Cross-over. After No. 57 had passed, the dispatcher informed him that after No. 60 had gone east he would move the work train via the west cross-over to the eastward track to clear the westward track for ER-1. About 4:17 p.m. the dispatcher told him that signal 71E would not clear and instructed him to examine the east cross-over switch points, which he and the brakeman did; the switches were lined for a cross-over movement and then the dispatcher lined them for the main tracks; they found the switch points in good order and the conductor reported this to the dispatcher who told him that a signalman was on his way to repair signal 71E which was out of order. The dispatcher instructed him to notify the crew of No. 60 to disregard the stop signal and proceed, which he did. He reported the departure of No. 60 and while the dispatcher was informing him that ER-1 should be nearing the work train on the westward track he heard the crash of the collision. Conductor Eaton was listening on the dispatcher's telephone circuit continuously from 3:12 to 4:17 p.m. and heard the dispatcher converse frequently with employees at various points regarding the movement of trains and section motor-cars.

Dispatcher Short stated that for the past four years, in addition to other duties, he has operated the centralized-traffic-control machine involved. The movement of a train is indicated by the ringing of a bell and the illumination of an "OS" light as each "OS" circuit is contacted. The "OS" lights do not remain illuminated, and tokens are placed on the board to indicate the progress of each train within certain limits. The control unit is equipped with two bells, one of which was out of adjustment on the date of the accident and had been for several days prior thereto; as it was not clearly audible, he said he was very particular in watching the "OS" lights. No. 57, a west-bound passenger train, next preceded ER-1 and was routed over the westward track Shelburne Falls East to Shelburne Falls West where it arrived at 3:27 p.m. Shortly after No. 57 passed Shelburne Falls East, TE-2, an east-bound train, proceeding on the eastward track, cleared the cross-over at Shelburne Falls West and he lined the route at that point for movement of No. 57 via the eastward track to Rice's Cross-over to run it around the work train which was on the westward track just east of Rice's Cross-over. No. 57 left Shelburne Falls West at 3:30 p.m. proceeding on the eastward track to Rice's Cross-over where it departed at 3:40 p.m. via the westward track. At 3:30 p.m. when No. 57 was departing from Shelburne Falls West, ER-1 entered the line at East Deerfield and he notified Conductor Eaton of his intention to route ER-1 via the westward track from Shelburne Falls West

to Rice's Cross-over to have a clear route for No. 60 which would soon be due eastward. He stated that under these conditions it was his practice to restore the cross-over at Shelburne Falls to normal position and display the proper indication for ER-1, and he felt certain that he did so in this case although he had no positive recollection of operating the switch after No. 57 had passed. In order to line the route for No. 60 he normalized the east cross-over switch at Rice's Cross-over after No. 57 had passed that point but then found that he could not clear signal 71E, and several tests did not reveal the cause. About 4:18 p.m. he instructed Conductor Eaton to inspect the cross-over switch points at Rice's Cross-over. Conductor Eaton could find nothing defective. Dispatcher Short consumed several minutes thereafter in trying to clear the signal; failing to do so he called the signal maintainer and then instructed the conductor to inspect the switches again and if no defects were found to inform the crew of No. 60 to disregard the signal and proceed. He stated that his notation on the train sheet and the location of the token on the track model indicated that ER-1 was proceeding on the westward track, which was in accordance with his intended routing of that train and his understanding of the route which was being followed by that train. Shortly after he had instructed Conductor Eaton to tell the crew of No. 60 to proceed, Conductor Eaton reported the accident; at first he thought that ER-1 had run into the rear end of the work train, and he did not know until Conductor Eaton so informed him after the accident, that ER-1 was on the eastward track. He stated that he distinctly recalled having observed the "OS" lights at each end of the cross-over as No. 57 was moving from the westward to the eastward track as he was waiting to see whether TE-2 cleared the cross-over at Shelburne Falls in time to route No. 57 over the eastward track so as to run around the work train. He could not explain how ER-1 got on the eastward track, except that its presence thereon indicated that it had followed the route of No. 57. There was no movement over the cross-over involved between No. 57 and ER-1. While he could not recall handling the switch lever to restore the cross-over to normal or operating the button to change the signal indications, because of having so many movements to make, he felt certain that he had done so immediately after the passage of No. 57 because that was his habit and customary practice. However, he did not start to line up the route for No. 60 until after ER-1 had passed Shelburne Falls; he stated that there was a possibility that after ER-1 had gone by Shelburne Falls he made a notation of the movement where it belonged on his record and cleared up the signal, and that it was after he had done that when he found he could not clear signal 71E for No. 60. He stated that he checked that signal several times and could not see any reason why it would not clear when there was no train on the eastward track, and he therefore came to the conclusion that the signal was out of order and called the maintainer. He said that in making the cross-over movement ER-1 would have kept one or both "OS" lights for Shelburne Falls West lighted for

2 or 3 minutes. It was his opinion that a defective condition could have occurred in the circuits to cause the undesired cross-over movement of ER-1 without his knowledge. The operating conditions were not unusual and he was in normal physical and mental condition. He has never had any reason to question the safety of operation of the system involved; however, in view of the occurrence of this accident, it was his opinion that the rule which gives dispatcher the right to authorize a train to disregard a stop signal, should require the observance of an arbitrary time limit before such movement is made.

Flagman Langua, of TE-2, stated that he observed that signal 65W displayed a "middle green" aspect when ER-1 arrived and crossed to the eastward track. He could not recall the aspect of the upper and lower units and he did not observe the signal after the passage of that train.

Assistant Chief Dispatcher Dugas, who was supervising the second-trick dispatchers on the day of the accident, stated that no complaint had been made to him that the circuit bell was out of order. He was immediately informed by Dispatcher Short of the trouble in clearing signal 71E, and of the occurrence of the accident; he checked the track model, the switch levers, the signal indicator lights, the notation on the train sheet and the token for ER-1, and everything indicated that ER-1 had been routed over the westward track beyond Shelburne Falls West. He stated that after hearing the testimony of the employees involved it was his opinion that the cross-over at Shelburne Falls West was not normalized between the departure of No. 57 and the arrival of ER-1.

Assistant Signal Supervisor O'Connell stated that the signal maintainer was called on account of signal 71E being reported out of order but did not arrive at the scene until after the accident. At about 6:45 p.m. tests made of the operation of signal 65W established that it was functioning properly. Wreckage at the point of accident prevented such tests of signal 71E, until noon of the following day, after three rails were renewed and their bond wires replaced tests disclosed that that signal functioned properly. One of the circuit bells on the control machine had been broken and was repaired during the week preceding the day of the accident; he had received no report regarding the bells thereafter.

#### Discussion

The investigation disclosed that west-bound passenger train No 57 was routed from the westward to the eastward track at Shelburne Falls West and was operated on the eastward track to Rice's Cross-over where it returned to the westward track and departed at 3:40 p.m.; during this time ER-1 was proceeding westward toward Shelburne Falls West. ER-1 received an indication at signal 65W to cross to the eastward track at Shelburne Falls West and left

this point at 4:18 p.m.; the first four signals thereafter encountered displayed proceed indications and the fifth signal displayed a yellow-over-red aspect; the collision occurred shortly after this train had passed the last-mentioned signal. No. 60 stopped at signal 71E at Rice's Cross-over as that signal displayed a stop indication; the crew received information from the conductor of a work train at this point that the dispatcher had issued instructions for No. 60 to disregard the stop indication as that signal was out of order; it proceeded at a speed of not exceeding 15 miles per hour and collided with ER-1 at a point 1,768 feet east of signal 71E; No. 60 had stopped and ER-1 was proceeding at a speed of 8 or 10 miles per hour just before the accident occurred. According to the evidence it had been the practice for trains to pass signals displaying stop indications upon authority from the train dispatcher or upon information received from a signalman. This practice appeared to conform with the provisions of rule 265.

The dispatcher had planned to run ER-1 on the westward track from Shelburne Falls West to Rice's Cross-over and did not know that this train was on the eastward track until advised of the fact after the occurrence of the accident. No. 57 had preceded ER-1 by about 48 minutes and the dispatcher said his practice always had been to normalize cross-over switches as soon as the "OS" lights indicated that the train using the cross-over had passed from the circuit, and he thought he had done so in this case, but he had so many movements that he could not remember. He thought there was a possibility that a defect in the circuits may have caused an undesired cross-over movement, but subsequent investigation and tests disclosed no such defective condition. He remembered seeing both "OS" lights for Shelburne Falls West function when No. 57 passed over the cross-over but he did not recall either hearing the warning bell or seeing either of the "OS" lights for this cross-over become lighted for ER-1. He said that one of the warning bells had been defective for some time prior to the accident. He thought that one or both "OS" lights would be illuminated two or three minutes during the cross-over movement of ER-1. He placed a token on the track model in a position to indicate that ER-1 was on or was about to enter the section west of Shelburne Falls West on the westward track but there was no light or other indication on the board itself to show actual location of ER-1. About 4:18 p.m. he normalized the cross-over at Rice's Cross-over and then tried to clear signal 71E for No. 60 but found after repeated attempts that he was unable to do so. He made several tests on the board and had the work train conductor examine the cross-over switches at Rice's Cross-over; they were found to fit properly. The dispatcher then informed the assistant chief dispatcher and he checked the track model, switch levers, signal indicator lights, the train sheet and the token for ER-1, and everything indicated that ER-1 had been routed over the westward track west of Shelburne Falls West. After hear-

ing the testimony of the employees involved the assistant chief dispatcher was of the opinion that the cross-over switches at Shelburne Falls West were not normalized between the time that No. 57 passed and the time ER-1 passed that point. The dispatcher did not recall that he normalized the switches after ER-1 passed this point but apparently he subconsciously normalized the switches because when checking the control board neither he nor the assistant chief dispatcher observed the switch lever in the "up" position, which would be the position if the switch were reversed.

The investigation did not disclose any failure or cause of failure of signal 71E; it appears that inability of the dispatcher to clear that signal was due to the presence of ER-1 on the eastward track, instead of being on the westward track as the dispatcher thought, and the instructions issued by the dispatcher resulted in train No. 60 passing a properly displayed stop signal when an opposing train was approaching on the same track. Had this installation provided for lights on the track model on the control board to show track-circuit occupancy, the fact that ER-1 was on the eastward track would have been at once apparent, and this accident would undoubtedly have been avoided.

Five days after the accident the officials issued a supplement to rule 265 to the effect that no train or engine is to be authorized to pass a home signal indicating stop and governing movements on a two-way running track unless there are no trains or engines moving on either track in the opposite direction to the movement to be authorized in the area controlled by the signal to be passed; in case there are opposing movements, then each train and engine moving on either track in the opposing direction must pass one "OS" station where its position as to track and location can, and has been, checked; in all cases the situation must be explained to the chief train dispatcher and he must authorize the movement before it can be made. Had this supplement to rule 265 been in effect at the time, it is probable that this accident would have been prevented.

#### Conclusion

This accident was caused by failure to route the west-bound train on the westward track as intended, failure correctly to record its movement on the eastward track over a route which had been set up for a preceding train, and subsequent authorization for an east-bound train to pass a home interlocking signal, displaying stop, when the eastward track was occupied by the opposing train.

Respectfully submitted,

W. J. PATTERSON,  
Director.

The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that every entry should be supported by a valid receipt or invoice. This ensures transparency and allows for easy verification of the data.

In the second section, the author details the various methods used to collect and analyze the data. This includes both primary and secondary sources, as well as the specific statistical techniques employed to interpret the results.

The third section presents the findings of the study. It shows a clear trend in the data, which is consistent with the initial hypothesis. The analysis reveals that there is a significant correlation between the variables being studied, and this relationship is supported by the statistical evidence.

Finally, the document concludes with a summary of the key points and offers some recommendations for future research. It suggests that further exploration of the underlying causes of the observed trends would be beneficial, and that similar studies should be conducted in other contexts to validate the findings.

