

INTERSTATE COMMERCE COMMISSION
WASHINGTON

REPORT OF THE DIRECTOR
BUREAU OF SAFETY

ACCIDENT ON THE
CHICAGO & NORTH WESTERN RAILWAY

CRYSTAL LAKE, ILL.

MARCH 25, 1940

INVESTIGATION NO. 2420

- 2 -

SUMMARY

Inv-2420

Railroad:	Chicago & North Western
Date:	March 25, 1940
Location:	Crystal Lake, Ill.
Kind of accident:	Derailment
Train involved:	Passenger
Train number:	502
Engine number:	2908
Consist:	7 cars
Speed:	30 to 63 miles per hour
Operation:	Timetable, train orders and automatic block system
Track:	Tangent; 0.42 percent descending grade eastward
Weather:	Clear and daylight
Time:	5:09 p. m.
Casualties:	1 killed and 10 injured
Cause:	Train entering an open switch at excessive rate of speed

May 24, 1940.

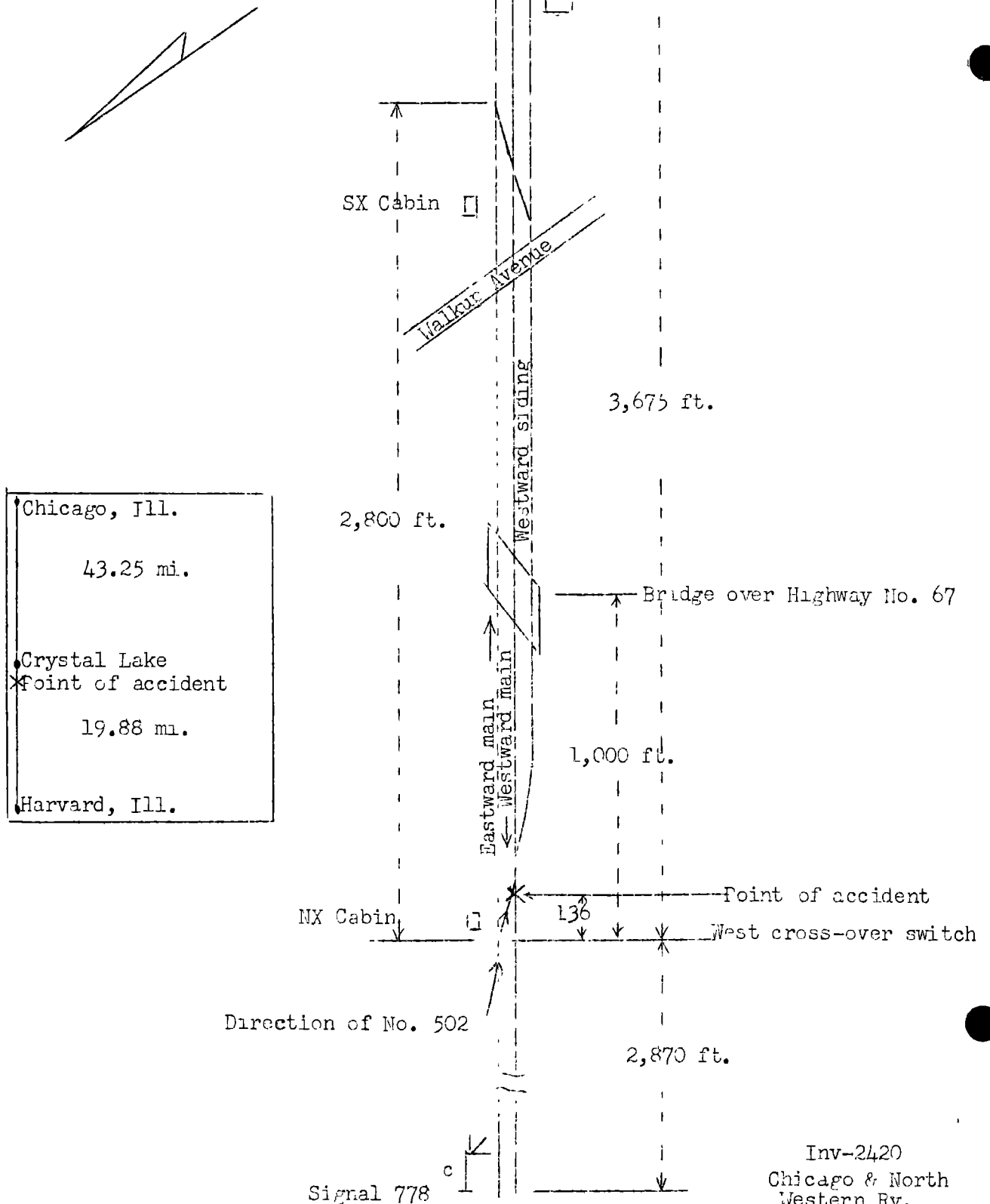
To the Commission:

On March 25, 1940, there was a derailment of a passenger train on the Chicago & North Western Railway at Crystal Lake, Ill., which resulted in the death of one train-service employee and the injury of six passengers, two dining-car employees, one express messenger, and one train-service employee. The investigation of this accident was made in conjunction with a representative of the Illinois Commerce Commission.

Location and Method of Operation

This accident occurred on that part of the Wisconsin Division designated as Subdivision 4 which extends between Chicago and Harvard, Ill., a distance of 63.13 miles. In the vicinity of the point of accident this is a double-track line over which trains are operated by timetable, train orders and an automatic block system. Trains moving with the current of traffic are operated to the left. The west switch of the westward siding, which parallels the main tracks on the south, is located 3,675 feet west of the station at Crystal Lake. Bridge construction work was in progress on the railroad in connection with an underpass of highway No. 67 at a point approximately 2,675 feet west of the station at Crystal Lake. Temporary crossovers connecting the two main tracks were located east and west of the bridge, approximately 2,800 feet apart. The west siding-switch is located about 20 feet east of the west crossover. During the progress of this construction work, that portion of either the eastward main track, the westward main track, or the westward siding extending between the crossovers was operated as a single track. The accident occurred on the west crossover, which was a No. 10 turnout, approximately 136 feet east of the west switch. Approaching from the west the track is tangent a distance of more than 2 miles to the point of accident and more than 1 mile beyond. At the point of accident the grade for east-bound trains is 0.42 percent descending.

The west switch of the crossover involved is facing-point for east-bound trains. The switch stand, which is located between the two main tracks, is of the Buda No. 50 type, and is equipped with a lamp which displays a red aspect when the switch is lined for the crossover; the lens of this lamp is 27 inches above the head block. The switch stand is not equipped with a target. NX Cabin and SX Cabin are located north of the eastward



Inv-2420
Chicago & North
Western Ry.
Crystal Lake, Ill.
March 25, 1940

main track and respectively near the west crossover and the east crossover. Each cabin is equipped with a Nunn train-order signal. The signal at NX Cabin is located 44-1/2 feet east of the west crossover switch; the target, which is painted red, is oval-shape, 24 inches in length, and in each end there is an opening 5-1/4 inches in diameter; the center-line of the target is 8-1/2 feet above the top of the rail. Whenever the single-track operation between the two crossovers was in effect, a train dispatcher and a telegrapher were on duty at SX Cabin and NX Cabin, respectively.

The last automatic signal west of the point of accident, governing east-bound movements, is signal 778, which is located 2,870 feet west of the west crossover; this signal is of the searchlight type and displays three indications. The control circuits are so arranged that the opening of a switch or the occupancy of the track in advance of this signal will cause the signal controlling the block to display a stop-and-proceed indication, and the next signal to the rear thereof to display an approach indication.

The eastward main-track structure consists of 100-pound rail, 33 feet in length, laid on 18 or 19 ties to the rail length; it is single-spiked, fully tieplated, equipped with four rail anchors to the rail length, and is ballasted with gravel to a depth of 1 foot below the ties. The crossover is of similar construction, except that six rail anchors are used per rail length, and the rails in the east turnout are 33 feet in length and those in the west turnout are 39 feet in length. The rails in the westward main track are 39 feet in length, laid on 24 ties to the rail length, and are equipped with six rail anchors per rail length.

Bulletin No. 120, issued by the Division Superintendent on February 29, 1940, addressed to all conductors, trainmen, and enginemen of the Wisconsin and the Madison Divisions, to all train dispatchers, and to operators at Crystal Lake and Woodstock, reads in part as follows:

* * *

During the hours and on the date indicated in a Train Order which will be issued to all concerned on the dates that single track is to be operated, this single track will be controlled by a Train Dispatcher on the ground at the crossover 400 feet east of Walkup Avenue.

The cabins located at the two crossovers will be equipped with Nunn Train Order signal and trains will not require a train order in order to operate against the current of traffic over this single track.

If the signal shows clear indication and in addition a proceed signal is given by the Train Dispatcher or Telegrapher on duty, trains may proceed over this piece of single track without further orders; however, trains operating against the current of traffic will not exceed a speed of twenty (20) miles per hour at any point. Trains in either direction will not exceed twenty (20) miles per hour when using the westward passing track.

Train Dispatcher and Telegrapher will handle the switches at both ends of this single track.

Trains or engines operating over this single track on either of the present main lines in the direction that traffic is ordinarily normal will be governed by automatic signal. This, however, in no way relieves conductors or Enginemen from properly observing the position of Train Order signal at the point where single track starts.

Trains or engines operating over the single track against the current of traffic will be governed by manual block rules. Permissive card, however, may be used in such cases provided in the judgment of the Train Dispatcher conditions will permit but a positive block must be maintained ahead of and behind any passenger trains that are operated in this district.

When the westward passing track is being operated as single track movements in both directions will be governed by manual block rules.

Trains and engines about to enter upon this single track against the normal current of traffic must be under full control and then proceed only upon clear train order signal indication in addition to a proceed signal from the Train Dispatcher or Telegrapher on duty. When such trains reach the opposite end of the single track they may, upon proper signal from the Train Dispatcher or Telegrapher, cross back to their proper track without coming to a stop.

All trains and engines in both directions will operate with extreme care through this territory, keeping sharp lookout for workmen on or near the tracks, and also keeping sharp lookout for hand signals at the viaduct of the new subway as it is expected that derricks will be in operation in this territory and may foul either main track or westward passing track.

On March 23, train order No. 537, Form 19, was issued to the operator at Harvard for C&E trains east, as follows:

In accordance with Superintendents Bulletin No. 120 of Feby 29th 1940.

Between the hours of 701 a m and 401 p m daily except Sunday the westward track will be used as a single track between the facing point crossover located about 2400 feet west of Walk-up Ave. and the crossover about 400 feet east of Walk-up Ave the second crossing west of Crystal Lake passenger station

Do not exceed 10 miles per hour through crossover and 20 miles per hour against the normal current of traffic.

The following rules of the operating department read in whole or in part as follows:

211. * * *

When a '19' train order restricting the superiority of a train is issued for it at the point where such superiority is restricted, the train must be brought to a stop before delivery of the order.

* * *

220. Train orders once in effect continue so until fulfilled, superseded or annulled. Any part of an order specifying a particular movement may be either superseded or annulled.

* * *

221a. When a train-order office is open at an irregular hour, trains must be notified by train order or special instructions, and special precautions must be taken to call the attention of trains approaching such station.

The maximum authorized speed for passenger trains on the main track is 70 miles per hour and through a crossover it is 10 miles per hour.

The weather was clear and it was daylight at the time of the accident, which occurred at 5:09 p. m.

Description

No. 502, an east-bound passenger train, known as the "Viking," with Conductor Vethe and Engineman Conway in charge, consisted of engine 2908, of the 4-6-2 type, one express car, one mail-express car, one coach-baggage car, one coach, one cafe-lounge car, one coach, and one parlor car, in the order named; all cars were of steel construction. This train left Harvard, 19.88 miles west of Crystal Lake, at 4:43 p.m., according to the train sheet, on time, passed signal 778 displaying a proceed indication, entered an open switch at the west crossover at Crystal Lake, and, while moving at a speed variously estimated to have been from 30 to 63 miles per hour, was derailed.

The engine stopped on its right side down an 8-foot embankment south of the tracks, with its front end 475 feet beyond the initial point of derailment. The tender cistern was thrown from its frame and stopped on its right side to the rear of the engine; the tender frame remained coupled to the engine. Both the engine and the tender were badly damaged. The wheels of all the cars except one pair of wheels of the front truck of the second car were derailed; the cars stopped practically in line on the westward main track and the westward siding; the rear car stopped a short distance beyond the westward siding switch.

The employee killed was the fireman, and the employee injured was the engineman.

Summary of Evidence

Engineman Conway stated that the air brakes had been tested and functioned properly en route. He did not receive any train order at Harvard, nor did he receive any order pertaining to single-track operation in the vicinity of Crystal Lake. He received a proceed indication at signal 778. After his train moved over the highway crossing located just east of signal 778, it met No. 529; then he observed men working on the track beyond the crossover, made a brake-pipe reduction, and sounded the whistle.

He did not see the train-order signal and the fireman did not mention it. He was maintaining a lookout ahead but his view was cut off a few seconds by steam from the whistle; when the steam cleared away he saw a man waving a flag, and about the same instant his engine entered the crossover. He called to the fireman and applied the air brakes in emergency. The throttle was open just enough to cushion the cylinders, and he estimated the speed of his train as between 45 and 50 miles per hour when he made the first brake-pipe reduction; it had been reduced to 30 or 35 miles per hour when the train entered the open switch. He had been operating on this schedule since March 13, and the single-track operation had not been in effect at any time when he had passed through Crystal Lake.

Conductor Vethe, who was in the rear car, stated that his train was approaching Crystal Lake at a speed of between 40 and 50 miles per hour when it stopped suddenly. He did not feel an application of the air brakes at any time.

Baggageman Crockett, who was in the third car, and Front Brakeman Courtier, who was in the rear car, stated that the sudden jolt of the train just before it stopped indicated that the air brakes may have been applied in emergency, although no application had been felt prior to that time.

Flagman Kolls, estimated that the speed of the train was about 50 miles per hour at the time of the accident.

Operator Hurley, on duty at NX Cabin, stated that he worked exclusively under the direction of the dispatcher, who was on duty at SX Cabin. In connection with his duties as operator he handled the crossover switch. He had in his possession a copy of Bulletin No. 120 and a copy of train order No. 537. At 5:02 p.m. the dispatcher informed him that No. 529 would pass westward before No. 502 would arrive; at 5:03 p. m. the dispatcher called again and gave him train order No. 106, Form 19, reading as follows:

No 502 has right over opposing trains on westward track from the facing point crossover about 2400 feet west of Walkup Avenue to the crossover about 400 feet east of Walkup Avenue and return to eastward track Westward trains get this order at crossover east of Walkup Avenue Do not exceed 20 miles per hour.

At the time he repeated this order, No. 529 was leaving the station at Crystal Lake and the dispatcher told him to hold the order and that he would not make it complete until after No. 529 had passed NX Cabin. Operator Hurley then cleared the train-

order signal for No. 529, and after that train passed he placed the train-order signal in stop position and reported to the dispatcher that No. 529 had passed at 5:07 p. m. The dispatcher then gave him train order No. 106, Form 19, addressed to the operator, which read, "No. 502 may go on westward track." This order was issued because order No. 101, Form 31, which read, "Hold all eastward trains," was addressed to the operator at NX Cabin and completed at 7:13 a. m. Train orders Nos. 105 and 106 were made complete at 5:08 p. m. The dispatcher did not say anything about flagging No. 502. Operator Hurley picked up the train order, clearance card, and his flag and started toward the west crossover switch. He saw No. 502 approaching closely; it had passed signal 778. He looked eastward and saw that the bridge men were still working. He had only a few seconds in which to decide whether to allow No. 502 to proceed on the eastward main track or to divert it to the westward main track; either alternative presented a dangerous situation; however, he opened the west crossover switch, realized that he did not have time to open the other switch, and started toward No. 502, waving his flag, but was only 25 feet west of the switch when No. 502 passed him at a speed of 62 or 63 miles per hour; the engine was working steam and the air brakes did not appear to be applied. He did not receive a response to his flagging signals and he did not hear a whistle signal at any time. The accident occurred at 5:09 p. m. Subsequent to the accident the bridge foreman indicated to him that the consequences might have been worse if No. 502 had been permitted to continue on the eastward main track.

Dispatcher Cook, at SX Cabin, stated that he had an understanding with the bridge foreman that whenever the track could not be restored to service by 5 p. m. the bridge foreman would notify him; however, the bridge foreman had not notified him, and he left his cabin several times to see if he could ascertain how the work was progressing as he expected at any moment to receive some indication from the foreman that the eastward track was in condition for service. At 4:56 p. m. he issued train order No. 105 addressed to No. 502 and operator at NX Cabin and to all westward trains and operator at SX Cabin. He explained to the operator at NX Cabin that he would complete this order after No. 529 passed NX Cabin. No. 529 passed his station at 5:06 p. m. and the operator at NX Cabin reported it as having passed that station at 5:07 p. m. The dispatcher then issued train order No. 106 to the operator at NX Cabin and after it was repeated he made this order and order No. 105 complete. He then left the cabin to line the switches for No. 502 to move from the westward main track to the eastward main track but he had not yet unlocked the switches when the accident occurred.

The sun was shining and he could see that the train-order signal at NX Cabin was in stop position. He had expected that normal operation would be resumed before the arrival of No. 502, or he would have notified the crew of that train at Harvard. No. 502 was due to leave Harvard at 4:43 p. m., but it did not occur to him at that time that the eastward track would not be in service by the arriving time of No. 502 at Crystal Lake, which is 5:07 p. m. He expected to issue train order No. 105 to No. 502 at the west crossover in sufficient time for necessary precautions to be taken and thought that the train-order signal would serve as a stop signal. He thought he had told Operator Hurley that No. 502 would have to be stopped. The single-track operation had been in effect during the daytime for seven days prior to the accident, and on two occasions double-track operation was not resumed until 6 p. m.

Bridge Foreman Miller, in charge of the bridge construction work, stated that while the hours of single-track operation, which started on March 13, were from 7 a. m. to 4 p. m., the work was not always completed at 4 p. m. and he had an understanding with the dispatcher that the track would not be used until he had released it. He had expected to have the track restored to service before the arrival of No. 502, and previously he had always notified the dispatcher before 4 p. m. whether the track would be released; however, on the day of the accident he did not notify the dispatcher that the track would be out of service later than 4 p. m. He had an understanding with the dispatcher that any time he could not release the track by 5 p. m. or the time No. 529 was due to leave Crystal Lake, which was 5:03 p. m., he would notify the dispatcher. At the time of the accident there were about 12 feet of track to be spiked and about five pieces of 2-inch shims to be placed. He was doubtful that the track was safe for the passage of No. 502. He did not provide flag protection for the track at any time; however, the rules required that he furnish flag protection whenever he had a track out of service but in this instance he considered that the dispatcher and the operator were sufficient protection, although no one had instructed him to that effect. He saw Operator Hurley throw the west crossover switch and at that time No. 502 had passed the last automatic block signal. The train-order signal at NX Cabin was in stop position. He estimated that the speed of No. 502 was 50 miles per hour as it entered the crossover; the engine was working steam.

Operator Price, on duty at Harvard from 4 p. m. to midnight, stated that on the day of the accident train order No. 537 was transferred to him by the first-trick operator. He did not deliver copies of this order to No. 502 because it had been customary the last few years when single-track operation is in effect not to deliver a train order after the time it indicates

that double-track operation will be resumed. Although the train order in question was in effect until annulled by the dispatcher, there had been several occasions during the last few years when he had been advised by dispatchers that it was not necessary to deliver such orders. He did not ask the dispatcher on the day of the accident about delivering the order. Soon after 4 p. m. on Sunday, the day prior to the accident, the dispatcher at Chicago had sent him a train order instructing him not to deliver train order No. 537 to eastward trains until 2 a. m. The reason he did not deliver the train order to No. 502 was to save delay because the engineman would have to read the long bulletin and the train order. He does not check with the dispatcher the numbers of the orders to be delivered to trains.

Dispatcher Richardson, on duty at Chicago, stated that the movement involved in the accident was controlled entirely by the dispatcher and the operator at the cabins at Crystal Lake. He did not receive any information from Dispatcher Cook that the eastward track would not be ready for normal operation after 4:01 p. m.; if he had been advised of the situation he would have issued train orders to all trains in both directions instructing crews that the eastward track between the two cross-overs was out of service and trains should stop at NX Cabin and SX Cabin and proceed only on proper authority.

Observations of the Commission's Inspectors

The Commission's inspectors observed that the first mark of derailment was a light flange mark on the south rail of the west crossover 18 feet east of the east frog, or 136 feet east of the west crossover switch. The switch point at the east end of the crossover was torn out, and from that point eastward the westward main track was torn up a distance of 580 feet. The siding was torn up a distance of 200 feet.

On a clear day the train-order signal at NX Cabin could be seen from the right side of an approaching east-bound engine a distance of 1,050 feet.

Discussion

According to the evidence, the westward main track was being operated as single track between two cross-overs, 2,800 feet apart, because of construction work being done on a bridge in connection with a highway underpass. A train order addressed to all trains in both directions specified that the single-track operation on the day of the accident would be in effect from 7:01 a. m. until 4:01 p. m. The crew of the train involved did not receive a copy of this order. After this train passed the last automatic signal west of the point of accident, the west crossover switch was lined for the westward main track and the

train entered the crossover at an excessive rate of speed and was derailed.

The train order creating the single-track operation was issued by a dispatcher in Chicago two days before the accident occurred. The dispatcher located at SX Cabin had supervision over the single-track operation. The dispatcher at SX Cabin expected that double-track operation would be resumed at 4:01 p. m. because previously he had arranged with the bridge foreman that whenever the track would not be available for service at 4:01 p. m., the bridge foreman would inform him of that fact so that he could instruct crews of trains affected that single-track operation was still in effect. The dispatcher could see the bridge gang working on the track but momentarily he expected them to finish the work and report the track ready for service. No. 502 left Harvard at 4:43 p. m. and the next opportunity to deliver an order to that train was at NX Cabin. Since No. 502 was due to leave Crystal Lake at 5:07 p. m., the dispatcher began to make arrangements at 4:56 p. m., by transmitting an order to NX Cabin, to operate this train against the current of traffic between these crossovers on the westward main track; however, the operator at NX Cabin said this order was transmitted at 5:03 p. m. No. 529, a west-bound train, passed NX Cabin at 5:07 p. m., after which the dispatcher sent another order to the operator at NX Cabin; this order and the order sent a few minutes previously were made complete at 5:08 p. m. The train-order signal was displayed for delivering an order to No. 502. The operator hurried outside to flag No. 502, which was approaching at a short distance. In the few seconds he had for considering the matter, he thought that it was equally dangerous for No. 502 to continue on the eastward track or to be diverted through the crossover to the westward main track, as the bridge gang was working only about 1,000 feet distant; however, he diverted the train to the crossover but did not have time to open the switch at the east end of the crossover. He began to flag No. 502 but did not receive an acknowledgment of his signals. This movement was being made more than an hour after the regular closing time of the office at NX Cabin, according to train order No. 537, and the crew of No. 502 did not have any information that this office was open at irregular hours. To comply with the rules, the crew should have been notified that the office was open at irregular hours so that the crew would have been prepared to receive train orders at NX Cabin. In addition, the rules required that when the superiority of a train is restricted at the point where such train order is received, the train must be brought to a stop before the order is delivered. In order to comply with the rules, it was necessary for the operator to flag No. 502 from a point which would enable the engineman to stop his train short of the crossover switch. After he had received complete to the two train orders, the operator had not more than one minute in which to furnish flag protection. If the operator had made

arrangements to flag No. 502 immediately after receiving the train order which he said was transmitted at 5:03 p. m. but which the dispatcher said was transmitted at 4:56 p. m., it is probable that the accident would have been averted.

The engineman had received a proceed indication at the last signal west of the crossover involved. He saw the bridge gang working on the track and, according to his statement, he made a brake-pipe reduction and sounded the whistle. He did not see the train-order signal and, because of steam obscuring his view, he did not see the operator's flagging signals until about the time the engine started to enter the crossover. The train-order signal could have been seen a distance of 1,050 feet.

The work being done by the bridge gang made the eastward main track unsafe for the passage of trains while the work was in progress. The rules required the bridge foreman to furnish flag protection when the track was in this condition, but he did not furnish protection because he depended upon the dispatcher and the operator to protect this portion of the track. As a result of this situation, the only protection given east-bound trains from 4:01 p. m. to the time of the accident was that which was afforded by the dispatcher and the operator. If the bridge foreman had notified the dispatcher that the track would not be ready for use at 4:01 p. m., no doubt the dispatcher would have instructed the crew of No. 502 at Harvard and thereby the accident would have been averted.

This investigation disclosed that it had been a practice to permit the operator at Harvard to file certain train orders without receiving an annulment or, as in the case of No. 502, to permit trains to leave his station without delivering to the crews copies of orders which, in his judgment, would not affect the operation of those trains. While this practice was not directly involved in this accident, nevertheless, it results in the train dispatcher not knowing what train orders on Form 19 have been delivered to trains and in the possibility of an operator filing a train order which the dispatcher does not wish to be filed. The single-track operation was started on March 18 and on several occasions it had been necessary to keep the track out of service after 4:01 p. m. Order No. 537 had been in effect since March 23. If the dispatchers had issued this order in such form that it would have covered the single-track operation until after the bridge foreman had reported the track ready for service, the crew of No. 502 would have received copies of the order at Harvard and, according to the terms of the order, this train would have been required to approach the west crossover prepared to enter it at a speed not in excess of 10 miles per hour.

Conclusion

This accident was caused by No. 502 entering an open crossover switch at an excessive rate of speed.

Respectfully submitted,

S. N. MILLS,

Director.