Inv-2381

INTERSTATE COMMERCE COMMISSION

WASHINGTON

REPORT OF THE DIRECTOR

BUREAU OF SAFETY

ACCIDENT ON THE

CHICAGO, BURLINGTON & QUINCY RAILROAD

OLD MONROE, MO.

SEPTEMBER 16, 1939

INVESTIGATION NO. 2381

SUMMARY

Inv-2381

Railroad:	Chicago, Burlington & Quincy	
Date:	September 16, 1939	
Location:	Old Monroe, Mo.	
Kind of accident:	Rear-end collision	
Trains involved:	Freight	: Freight
Train numbers:	79	: 71
Engine numbers:	5302	: 5234
Consist:	76 cars and caboose	: 70 cars and caboose
Speed:	Standing	: 10 or 12 miles per hour
Operation:	Timetable, train orders, and automatic block system	
Track:	Single; 1° curve; practically level	
Weather:	Clear	
Time:	10:50 p.m.	
Casualties:	3 injured	
Cause:	Following train being operated in accordance with block signal indication which falsely displayed clear indication, instead of being operated under control within yard limits as required by the yard-limit rule.	

Inv-2381

October 30, 1939.

To the Commission:

On September 16, 1939, there was a rear-end collision between two freight trains on the Chicago, Burlington & Quincy Railroad at Old Monroe, Mo., which resulted in the injury of three employees.

Location and Method of Operation

The accident occurred on that part of the Hannibal Division designated as the St. Louis and Old Monroe Sub-division which extends between St. Louis, Mo., and Old Monroe, Mo., a distance of 51.6 miles. In the vicinity of the point of accident this is a single-track line over which trains are operated by timetable, train orders, and an automatic block system. The accident occurred within yard limits at a point 3,608 feet south of the station at Old Monroe. Approaching from the south there is a tangent more than 5 miles in length, followed by a 1° curve to the right 5,643 feet in length; the accident occurred on this curve at a point 316 feet from its northern end. The grade is practically level. The yard-limit board is situated 1,520 feet south of the point of accident.

The maximum authorized speed for freight trains is 45 miles per hour.

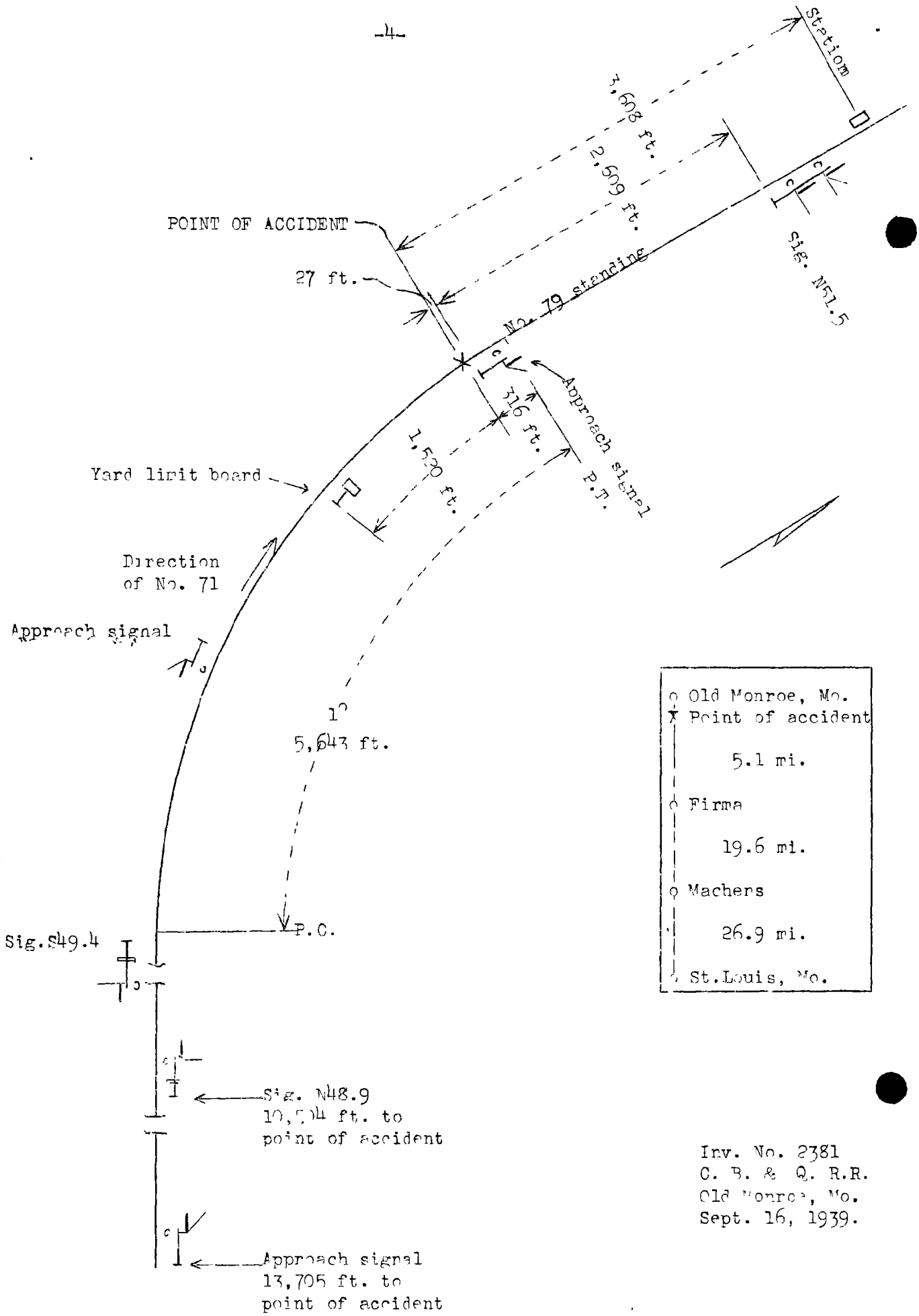
The automatic block system is of the absolute-permissive type, being comprised of home and approach signals. Each home signal is equipped with a large number plate bearing the number of the signal; the approach signals are without number plates. Intermediate home signal N48.9, governing north-bound movements, and the approach signal governing the approach thereto, are located 10,504 and 13,705 feet, respectively, south of the point of accident. These signals are two-indication, color-light signals, and their aspects, indications, and names are as follows:

Home signal N48.9:

Red - Stop; then proceed.	Name - Stop and Proceed-Signal.
Green - Proceed.	Name - Clear-Signal.

Approach signal:

Yellow - Approach next signal at restricted speed.	Name - Distant-Signal.
Green - Proceed.	Name - Clear-Distant-Signal.



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Restricted speed is defined as: Proceed prepared to stop short of train, obstruction, or anything that may require the speed of a train to be reduced.

The first signal north of signal N46.9 is the distant signal for home signal N51.5, and is located 27 feet north of the point of accident. Signal N51.5 is located 2,609 feet north of its distant signal.

The signals in this territory are equipped with reflecting mirrors, and 5.6 watt, 6-8 volt lamps are used. Track circuits are of the neutral type. Line circuits are of the neutral type; a common wire for all control circuits is used. The line control-wires are in factory-made cables and consist of insulated No. 16 solid copper wires, the assembly being taped and braided. No metallic armor is used. The number of conductors in the cable varies according to the requirements at the particular location. The cable is supported on 3/8-inch stranded galvanized messenger wire; cable rings are spaced about 18 inches apart. The messenger wire is supported by galvanized iron clamps bolted to the poles just beneath the lower cross-arms of the telegraph pole line.

The following rules of the operating department govern:

Rule 93: Within yard limits, the main track may be used clearing first-class trains as prescribed by the rules.

Second and inferior class and extra trains must move within yard limits prepared to stop unless the main track is seen or known to be clear.

Trains carrying passengers must be protected as prescribed by Rule 99.

Rule 505: Block signals govern the use of the blocks, but, unless otherwise provided, do not supersede the superiority of trains; nor dispense with the use or the observance of other signals whenever and wherever they may be required.

On the day of the accident there had been rain, hail, and lightning at Old Monroe between 2:40 and 3 p.m.; however, at 10:50 p.m., the time of the accident, the weather was clear and visibility good.

Description

No. 79, a north-bound second-class freight train, consisted of one auxiliary water car, 75 cars, and a caboose, hauled by engine 5302, and was in charge of Conductor Kirby and Engineman Bramblett. This train departed from Machens, 24.7 miles south of Old Monroe, at 9:48 p.m., according to the train sheet, 2 hours 23 minutes late, arrived at Old Monroe at 10:30 p.m., and while standing with the caboose 27 feet south of the distant signal governing approach to signal N51.5, the rear end was struck by No. 71.

No. 71, a north-bound second-class freight train, consisted of an auxiliary water car, 69 cars, and a caboose, hauled by engine 5234, and was in charge of Conductor True and Engineman Rickard. This train departed from Machens at 10:12 p.m., according to the train sheet, 2 hours 37 minutes late, passed signal N48.9, which was displaying a proceed indication, and collided with the rear end of No. 79 while moving at a speed estimated to have been 10 or 12 miles per hour.

The caboose of No. 79 was demolished and parts scattered on both sides of the track. The two rear cars were derailed and damaged, and the third and fourth cars from the rear were damaged but not derailed. The engine and first three cars of No. 71 were derailed and badly damaged. The fourth car also was derailed. The engine stopped on the right side of the track, headed southward, with its rear end on the track approximately 75 feet north of the point of accident. The tender and auxiliary water car stopped to the left of the track north of the engine. The second, third, and fourth cars stopped at various angles on the track. The twenty-sixth and twenty-seventh cars were telescoped but not derailed.

The employees injured were the engineman, fireman, and head brakeman of No. 71.

Summary of Evidence

Engineman Bramblett, of No. 79, stated that after leaving Firma he received proceed indications at all signals until reaching signal N51.5; this signal displayed a yellow aspect. The weather was clear and he had no difficulty in seeing the signals. After performing work at Old Monroe, which consumed about 27 minutes, the engine was coupled to the train and he found that he was unable to fully charge the train line, and then discovered that the accident had occurred.

Fireman Gee, of No. 79, stated that at Old Monroe there are two illuminated advertising signs so located that from one

point on the curve south of the station they look like two caboose markers, although their height is above that of markers.

Conductor Kirby, of No. 79, stated that the red marker-lights on the caboose were burning. The caboose stopped about opposite the distant signal for signal N51.5 but he did not observe its indication. He and the flagman, one on each side of the train, immediately started toward the head end. He was at the station when the accident occurred. He had no passengers on his train and, under this condition and because of being in yard limits, he said it was not necessary to furnish rear-end protection.

Flagman Hayden, of No. 79, stated that as the caboose passed signal N48.9 he observed its red aspect, but he did not see the signal before his engine reached it.

Engineman Rickard, of No. 71, stated that the air brakes were tested at his initial terminal and functioned properly en route. He was thoroughly familiar with this territory and was well aware of the locations of the signals and the yard-limit board at Old Monroe. He observed green aspects displayed by the distant signal for signal N48.9 and by signal N48.9, called their indications, and was answered by the head brakeman and the fireman. He was operating his train at a speed of between 35 and 40 miles per hour; on reaching the yard-limit board he observed the next distant signal displaying a yellow aspect and made a 20-pound brake-pipe reduction. The brakes took hold and the speed was being reduced, and he eased off on the throttle several notches. He did not think that he could have seen the distant signal at a greater distance, on account of brush on the inside of the curve; the track between his train and the distant signal appeared to be clear. He then saw the red aspect of signal N51.5, which indicated that the block was occupied, but he said that on account of the city lights, lights on advertising signs, and headlights on automobiles on the highway which parallels the track, it is difficult to locate the rear end of a train in that vicinity, and he did not see the caboose marker-lights until he was between 300 and 400 feet from the caboose. He immediately closed the throttle and placed the brake valve in emergency position. At the time of the accident the speed of his train had been reduced to 10 or 12 miles per hour. Engineman Rickard further stated that while he understood the requirements of rule 93, he depends on signal indications governing his movement into Old Monroe, although he never enters the yard limits without making an application of the air brakes. When he made the application of the air brakes at the yard-limit board he thought he was observing rule 93; he thought he could see far enough ahead to determine that there was nothing on

the track as far as the distant signal, and that he could stop at the distant signal if necessary.

Fireman Bogue, of No. 71 stated that he did not see the indication displayed by signal N48.9, as he was working with the fire. He heard the engineman call its indication as "clear" and the head brakeman answered. Prior to entering the curve on which the accident occurred Fireman Bogue resumed his seat on the left side of the cab but was unable to see a great distance around the curve. When approaching the yard-limit board the engineman applied the air brakes and the speed had been reduced to 15 or 20 miles per hour when entering the yard limits. He first saw the caboose when the engine was 300 or 400 feet from it. He heard the engineman say to the head brakeman that there was a caboose ahead, and the engineman immediately applied the air brakes in emergency. Fireman Bogue estimated the speed of his train to have been 10 or 12 miles per hour at the time of the accident.

Head Brakeman Wooten, of No. 71, stated that he observed the green aspects displayed by the distant signal for N48.9 and also signal N48.9. Before reaching the yard-limit board the engineman applied the air brakes, and Head Brakeman Wooten crossed over to the right side of the cab so as to be in position to observe the next signal. The engineman then called the indication of this signal as "yellow" and he saw it and answered; as soon as he saw the caboose ahead the engineman applied the air brakes in emergency.

Conductor True, of No. 71, stated that before reaching Old Monroe he left the cupola and did not see the indication displayed by signal N48.9, but Flagman Fisher called its indication as "red." He felt an application of the air brakes before the train reached the yard-limit board, and estimated the speed to have been 10 miles per hour at the time of accident.

Flagman Fisher, of No. 71, stated that after leaving Firma he was on the right side of the cupola, and he observed that when the caboose passed the distant signal for signal N48.9 it displayed a yellow aspect and signal N48.9 displayed a red aspect. After the accident he went back to flag, but he did not go south of signal N48.9.

Road Foreman of Engines LaMasters stated that the neon lights on advertising signs at Old Monroe are small and not very bright, and are situated a sufficient distance from the track that an engineman familiar with the territory should not confuse them with signals. He had never received a complaint with respect to these lights interfering with the view of an engineman.

It was his opinion that a marker lamp could be seen at least 3/4 mile around the curve involved; the brush in this territory is low and thin and there is only an occasional piece that would momentarily interfere with the engineman's view. The yellow light of the distant signal is conspicuous and so focused that it can be seen better at a distance than when near it. Road Foreman of Engines LaMasters also stated that on his arrival at the scene of accident about 3:15 a.m. he entered the engine cab and found the brake valve in service position. The reverse lever was two or three notches ahead of center, and the throttle appeared to be slightly open.

Signal Supervisor Tegeler arrived at the scene of accident at 1:40 p.m., September 17, and assisted by Signal Maintainer Musgrove and Trainmaster Wesson, made a test of the signal circuits. No ground or shorts in the cables were found. The AC power, which had been off, was restored; the signal indications were observed and nothing wrong was found. There was not time to test all the relays, but he considered the system safe and placed the signals in service that evening. The following day, assisted by Signal Inspector Stueber and Signal Maintainer Musgrove, he tested the relays for pickup and drop-away, and made a visual inspection of relays for mechanical defects, but nothing wrong was found except a ground at the northward distant signal for signal N48.9; this ground was of an intermittent nature as it was not found in the test the first evening, but was found during the second test on the next evening. He said that this ground was present on only one wire, and since one ground alone will not affect the operation of the signals, no cause for a signal failure was attributed to this condition. He stated that there have been cases where a hunter has shot into a cable and caused a cross in the aerial cable circuits, causing false-proceed indications. On September 20 and 21 further tests were conducted in company with the Commission's inspectors. In order to duplicate the conditions which existed at the time of the accident an identical train-operation test was made; before this test was made the ground on the circuit, referred to above, was reestablished. Cars were spotted at the point of accident to shunt the track circuit and an engine representing No. 71 was operated from Firma to the point of accident. All signals functioned properly while this test was being made. To determine if grounds or crosses existed in the cable wires, a complete test of all cables was next made. An intermittent cross between the control wire for the northward starting-signal at Firma and the control wire for signal N48.9 was found; this cross would cause a false-proceed indication on signal N48.9 when the trains were located as they were the night of the accident. Further tests revealed that the resistance

of the cross between the control wires was 20 ohms, and at that time all other wires in this cable tested clear. Several hours later a total of 15 small shot were removed from the cable at several places approximately 1,200 feet north of signal N48.9. All wires in this cable then tested clear except the wires originally crossed; the cross between these wires then measured 32 ohms. The cross was later located; it was caused by one small shot embedded in the cable at a point 1,200 feet north of signal N48.9. This shot was removed from the cable and all wires in the cable then tested clear.

Observations of Commission's Inspectors

The Commission's inspectors confirmed the statement of Signal Supervisor Tegeler relative to the tests conducted of the signal apparatus and the conditions found. A description of the circuits is as follows: Between signal N48.9 and signal S49.4 there is a seven-conductor aerial cable. In this cable are five control wires, all carrying positive energy, one common wire carrying negative energy, and one spare wire. The inspectors observed that, with the gun shot in the cable as previously described and with a train in the location of the first train at the time of the accident, a false-proceed indication could be displayed by signal N48.9. It could not be determined how long the shot had been in the cable. The cable had been painted recently and the shot hole was covered with paint.

Observations were made on the night of September 25 to determine the maximum distance the signals involved, the yard-limit board, and the caboose at the point of accident could be seen from a north-bound engine. A north-bound freight train was stopped at the location of No. 79 on the night of accident. An engine of the same class and type as that involved in the accident was used to represent the following train. It was found that signal N48.9 could be clearly seen a distance of 2 miles, and the distant signal governing the approach to signal N51.5 could be seen across the curve a distance of 5,105 feet, and remained in view until reached with the exception of a few points where it was momentarily obscured by trees in a field adjacent to the track. Advancing to within 3,428 feet of the caboose, the marker lights could be faintly discerned; continuing to within 2,333 feet of the distant signal, a full view of the signal was obtained, and after advancing 235 feet the yard-limit board came into view. At the yard-limit board, 1,519 feet south of the caboose, a clear view of the caboose markers was obtained. At no time could the distant signal or the yard-limit board be seen from the left side of the engine, and when the engine was approximately 300 feet from the caboose only the left marker could be seen from the left side. The street lights did not interfere with the signal lights or markers on the caboose.

During these tests the advertising signs were not illuminated and there were no automobile lights in the vicinity.

Discussion

According to the evidence, signal N48.9, the first signal south of the yard-limit board, displayed a proceed indication when No. 71 approached. No. 71 was being operated at a speed of 35 to 40 miles per hour. About the time he reached the yard-limit board the engineman made a 20-pound brake-pipe reduction and eased off on the throttle; he observed the next signal displaying a yellow aspect. He did not see the caboose marker-lights of the train ahead until he was from 300 to 400 feet from the caboose, whereupon he immediately closed the throttle and placed the brake valve in emergency position. The speed was 10 or 12 miles per hour at the time of the accident.

Both trains involved were second class and neither carried passengers. Under these conditions it was not necessary for the preceding train to protect within yard limits. Under the rules No. 71 was required to move within yard limits prepared to stop unless the main track was seen or known to be clear. The engineman stated that he depended upon block-signal indications in governing his movement into Old Monroe, and the investigation disclosed that the first signal south of the yard-limit board displayed a false proceed indication. The engineman said he understood the yard-limit rule and never enters yard limits at this point without making an application of the air brakes. He thought he was observing the yard-limit rule when he made the 20-pound brake-pipe reduction at the yard-limit board, but No. 71 struck the rear of No. 79 at a point 1,519 feet north of the south yard-limit board. The engineman stated that it was difficult because of various lights to locate the rear of a train when approaching Old Monroe. Tests conducted after the accident disclosed that visual conditions were good and that the engineman could have seen the caboose markers of the train ahead when he was at the yard-limit board. It is apparent that if No. 71 had entered yard limits prepared to stop unless the main track was seen or known to be clear, this accident would have been averted.

The facts and circumstances in this case as disclosed by the investigation of this accident indicate a lack of adequate supervision by officers of this railroad to insure proper observance of the rule governing operation of trains within yard limits. Another accident which involved operating practices

under the yard-limit rule occurred on this railroad at West Burlington, Iowa, on February 26, 1938. In that case the evidence clearly showed that an extra freight train was being operated at a relatively high rate of speed through yard limits and that this was in accordance with common practice. The following statement was made in the report upon the West Burlington accident:

> According to the evidence, for a long period of time it has been the practice for other than first-class trains to be operated through the yard limits at West Burlington at speeds of between 45 and 50 miles per hour under clear block-signal indications, and this practice has continued apparently with the knowledge of, and without criticism by, operating officials of this railroad. A construction of the yard-limit rule which permits high-speed main-line movements and at the same time does not impose compensating restrictions upon the use of main track by switch engines and other than first-class trains is bound sooner or later to result in accident. Had Extra 5604 been operated under control within the yard limits at West Burlington, this accident probably would have been averted.

After the accident here under investigation tests disclosed that the false proceed indication of signal N48.9 was caused by a cross in signal control wires as a result of shot being lodged in the cable.

Conclusion

This accident was caused by No. 71 being operated in accordance with the indication of a block signal which falsely displayed a proceed indication, instead of being operated under control within yard limits as required by the yard-limit rule.

Respectfully submitted,

S. N. HILLS,

Director.