

INTERSTATE COMMERCE COMMISSION
WASHINGTON

REPORT OF THE DIRECTOR
BUREAU OF SAFETY

ACCIDENT ON THE
ILLINOIS CENTRAL RAILROAD

ARCOLA, ILL.

JANUARY 1, 1940

INVESTIGATION NO. 2403

SUMMARY

Inv-2403

Railroad: Illinois Central

Date: January 3, 1940

Location: Arcola, Ill.

Kind of accident: Rear-end collision

Trains involved: Passenger : Passenger

Train numbers: Second 4 : 6

Engine numbers: 2412 : 1188

Consist: 12 cars : 5 cars

Speed: 3 - 5 m.p.h. : 20 - 50 m. p. h.

Operation: Timetable, train orders, and automatic
cab-signal and train-stop system

Track: Double; tangent; level

Weather: Clear and dark

Time: 5:55 a. m.

Casualties: 1 killed and 107 injured

Cause: Failure to provide flag protection for
the preceding train, and operation of
following train with inoperative auto-
matic cab-signal and train-stop equip-
ment without providing adequate protec-
tion.

March 7, 1940.

To the Commission:

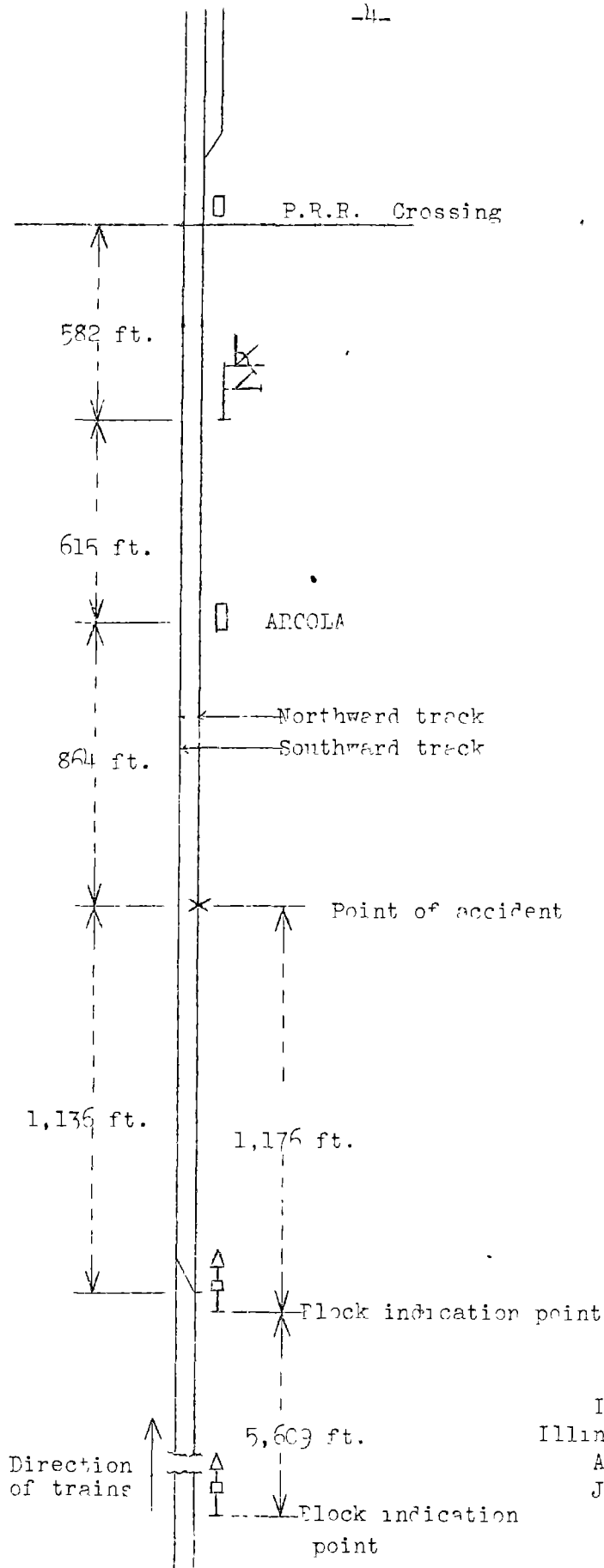
On January 1, 1940, there was a rear-end collision between two passenger trains on the Illinois Central Railroad at Arcola, Ill., which resulted in the death of 1 passenger and the injury of 105 passengers, 17 dining-car employees, 1 club-car porter, 1 Pullman porter, 1 train porter, and 2 train-service employees. This accident was investigated in conjunction with representatives of the Illinois Commerce Commission.

Location and Method of Operation

This accident occurred on that part of the Illinois Division designated as the Champaign District which extends between Centralia and Champaign, Ill., a distance of 124.4 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 cab-signal and train-stop system without wayside signals except at interlockings. The accident occurred on the northward track at a point 864 feet south of Arcola station. Approaching this point from the south there is a tangent which extends more than 5 miles to the point of accident and approximately 7 miles beyond. The grade for north-bound trains is, successively, 0.12 percent descending a distance of 2,500 feet, 0.20 percent descending 1,900 feet, level 1,100 feet, 0.16 percent ascending 2,500 feet, and level 620 feet to the point of accident and 270 feet beyond.

The automatic cab-signal and train stop system is of the continuous-inductive type; engines are equipped with two-indication color-light cab signals which display either a green or a red aspect. There are no wayside signals except semiautomatic home signals located at interlockings. Cab signals are actuated at block-indication points which correspond with the points at which wayside signals, if used, would be located. When the cab signal changes from a green to a red aspect a warning whistle in the cab of the engine sounds; if the red aspect is not acknowledged within 6 seconds, by operation of the engineman's acknowledging lever, an automatic brake application sufficient to stop the train will occur. When a brake application is forestalled by an engineman, the train may proceed under his control in accordance with operating rules. When a train is operated under a red cab-signal aspect in two consecutive blocks and it passes a block-indication point between the two blocks, the cab signal changes to green while the engine is moving over an energized section of the track 200 feet in advance of the block-indication point and then changes back to a red aspect, which causes the cab warning-whistle to sound and the automatic train-stop device to operate if it is not forestalled by the engineman. Block-indication points are located 6,785 and 1,176 feet south of the point of

o	Champaign, Ill.
	22.0 mi.
o	Fuscola
	8.1 mi.
x	Arcola (Point of accident)
	5.7 mi.
o	Humboldt
	8.8 mi.
o	Wattoon
	11.9 mi.
o	Neoga
	14.9 mi.
o	Effingham
	15.4 mi.
o	Edgewood
	3.9 mi.
o	LaCade
	4.6 mi.
o	Farina
	5.8 mi.
o	Kinmundv
	15.3 mi.
o	Odin
	5.7 mi.
o	Branch Junction
	2.7 mi.
o	Centralia, Ill.



Inv. No. 2403
 Illinois Central R.P.
 Arcola, Ill.
 Jan. 1, 1940

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accident.

A single-track line of the Pennsylvania Railroad crosses the tracks of the Illinois Central at a point 1,197 feet north of Arcola station; this crossing is protected by interlocking. At a point 615 feet north of the station there is a 2-arm upper quadrant semaphore home signal which governs northward movements on the Illinois Central. The top arm, which is 35 feet 1 inch above the top of the rail, is electrically operated and displays two indications; its night aspects are either green or red. Between 7 a. m. and 11 p. m., when the interlocking office at Arcola is open, this signal is semiautomatic, but between 11 p. m. and 7 a. m., when the office is closed, the signal is automatic. The bottom arm is mechanically operated and its night aspects are either yellow or red.

Transportation rules provide in whole or in part as follows:

11. A train finding a fusee burning on or near its track must stop and extinguish the fusee, and then proceed at restricted speed.

85. When a train of one schedule is on the time of another schedule of the same class in the same direction, it will proceed on its own schedule.

* * *

99. When a train stops under circumstances in which it may be overtaken by another train, the flagman must go back immediately with flagman's signals a sufficient distance to insure full protection, placing two torpedoes, and when necessary, in addition, displaying lighted fusees. When recalled and safety to the train will permit, he may return.

When the conditions require, he will leave the torpedoes and a lighted fusee.

* * *

When a train is moving under circumstances in which it may be overtaken by another train, the flagman must take such action as may be necessary to insure full protection. By night, or by day when the view is obscured, lighted

fusees must be thrown off at proper intervals.

* * *

According to rules 284 and 289-A, cab-signal aspects and their corresponding indications and names are as follows:

Aspect	Indication	Name
Green	Proceed	Clear
Red	Proceed at Restricted Speed, Not Exceeding 15 Miles Per Hour	Restricting

Restricted speed is defined as follows:

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

732. Notice of new time-table must be bulletined at least twenty-four hours prior to its taking effect. Commencing twenty-four hours prior to and continuing for six days after new time-table takes effect, dispatcher must require an acknowledgment from each conductor, engineman, yard master, or employee in charge of yard.

917. Conductors must not allow other duties to interfere with the proper protection of their train, and must require their flagman to act promptly and in strict accordance with the rules. On moving trains the proper position for a flagman is on the rear car. At stops of usual duration and under normal conditions, a passenger train flagman, unless specifically required to assist in handling passengers, should stand about thirty feet behind the train, on the engineman's side where practicable. * * *.

Special instruction 239-A of the current timetable which took effect at 12:01 a. m., January 1, 1940, provides as follows:

Engine Cab Signal: When the electrical engine equipment or the signalling current in the rails has failed, the pneumatic equipment may be cut out, electrical engine equipment remaining cut in, and train proceed at speed considered safe, taking weather conditions into consideration. Approach all home signals at interlocking plants prepared to stop, and be governed by position of home signal;

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also approach all facing point switches prepared to stop unless the way is seen to be clear.

Report must be made to the train dispatcher from first available point of communication and train proceed in accordance with instructions.

Instructions to dispatchers dated January 18, 1937, read in part as follows:

Referring to rules and instructions to be used by dispatchers governing train movements through automatic train stop territory when the electrical engine equipment or the signalling current in the rails has failed.

In the future, arrange to enter all instructions issued in train order book covering such failures.

In no case must an engineer be given verbal instructions except when a failure is reported by him from a point where there is no operator, then he must be given written instructions at the first open train order office on message form reading:

"Proceed at speed you consider safe, taking weather conditions into consideration, and approach all crossovers prepared to stop," and notify him of location of trains ahead.

Also notify all trains to be met or passed, * * * and all others concerned of failure by message reading, "Automatic train stop Engine _____ Train No. _____ has failed."

* * *

The maximum authorized speed for passenger trains is 30 miles per hour.

It was dark and the weather was clear at the time of the accident, which occurred about 5:55 a. m.

Description

Second 4, a north-bound first-class passenger train, with Conductor Tierney and Engineman Stout in charge, consisted of engine 2412, four coaches, one dining car, one club car, and six Pullman sleeping cars, in the order named; all cars were of steel construction. At Effingham, 41.3 miles south of Arcola, the crew received a message reading as follows:

Come to Champaign ahead of No. 6 unless otherwise advised. Automatic train control has failed on No. 6's engine. Do not give them a short flag.

This train departed from Effingham at 4:52 a. m., 54 minutes late, according to the train sheet, passed Mattoon, the last open office, 14.5 miles south of Arcola, at 5:25 a. m., 52 minutes late, stopped at Arcola to receive a passenger and, just after starting to move, the rear end was struck by No. 6.

No. 6, a north-bound first-class passenger train, with Conductor Cavanaugh and Engineer Scott in charge, consisted of engine 1188, one baggage-club car, one Pullman sleeping car, one dining car, and two Pullman sleeping cars, in the order named; all cars were of steel construction. This train departed from Centralia, 94.5 miles south of Arcola, at 3:50 a. m., according to the train sheet, 5 minutes late, entered automatic train-stop territory at Branch Junction, 92 miles south of Arcola, and, at a point about 1-1/2 miles north of Branch Junction, the automatic cab-signal and train-stop system failed. At Odin, 86.3 miles south of Arcola, the crew reported the failure of the automatic cab-signal and train-stop system and received a message reading as follows:

Proceed at a speed you consider safe, taking weather conditions into consideration. 2nd 4 passed Kinmundy 4:05 AM. Advise if train control comes O.K., if so at what location.

Kinmundy is located 71 miles south of Arcola. This train departed from Odin at 4:13 a. m., 18 minutes late, passed Effingham at 5:10 a. m., 25 minutes late, passed Neoga, 26.4 miles south of Arcola, at 5:25 a. m., 24 minutes late, passed Mattoon at 5:35 a. m., 21 minutes late and, while moving at a speed estimated to have been between 20 and 50 miles per hour, collided with the rear end of Second 4.

Second 4 was shoved forward by the impact a distance of about 130 feet. The engine broke away from the train and stopped at a point about four car lengths beyond the first car. The engine, the first car and the seventh car were slightly damaged. The rear end of the eighth car telescoped the front end of the ninth car a distance of 12 feet and the front truck of the ninth car was derailed. The tenth and the eleventh cars sustained considerable damage. The rear truck of the twelfth car was derailed and the rear vestibule was crushed by the engine of No. 6.

Engine 1188, of No. 6, was badly damaged. The engine truck

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and both front driving wheels were derailed. The frame and the cistern of the tender were raised from the trucks and telescoped the front end of the first car a distance of about 32 feet. The second and fourth cars were considerably damaged. None of the cars of this train was derailed.

The train-service employees injured were the engineman and the fireman of No. 6.

Summary of Evidence

Engineman Stout, of Second 4, stated that at Effingham he received a message instructing him that his train should go to Champaign ahead of No. 6, and also that the automatic train-stop system on the engine of No. 6 had failed. Approaching Mattoon expecting to find First 4 at that station, he reduced the speed of his train; however, First 4 was not there. From a point 2 miles south of Humboldt, which is 5.7 miles south of Arcola, to Humboldt, the cab signal displayed a red aspect and he reduced the speed of his train to 15 miles per hour between these points. He thought the red cab-signal aspect was being displayed because of First 4 moving closely ahead of his train. At Mattoon he had been advised that his train would be flagged at Arcola to receive a passenger and he was prepared to make the stop. The station clerk at Arcola flagged him with a burning newspaper, which he was able to see when about 3/4 mile distant. He knew that No. 6 was following but he did not signal out a flagman at Arcola as the time consumed for the stop was not over 30 seconds. He said that when making a stop of short duration enginemen are not required either to signal out a flagman or to recall him. He started the train at 5:55 a. m. and it had moved two or three car lengths when the rear end was struck by No. 6. At Arcola he looked back but escaping steam obscured his view of the rear end of his train. His understanding of timetable special instruction No. 239-A was that when operating a train with the automatic cab-signal and train-stop system inoperative he was required to approach facing-point switches prepared to stop unless the track was seen to be clear.

Fireman Carson, of Second 4, corroborated the statement of Engineman Stout and added that he could see the home signal at Arcola a distance of about 100 car lengths.

Conductor Tierney, of Second 4, stated that at Effingham he received a message instructing him that his train should go to Champaign ahead of No. 6 and that the automatic cab-signal and train-stop system on the engine of No. 6 had failed. This message also instructed him to provide proper flag protection. He read the message aloud in the presence of the flagman and both he and the flagman understood it. The flagman remarked that he would not give No. 6 a short flag. The conductor stated

that his train was delayed at Effingham and at Mattoon; it was also delayed about 10 minutes south of Humboldt because of a red cab-signal aspect which necessitated running at reduced speed. At Mattoon he was notified that his train would be flagged at Arcola and he was in the first car to perform his duty at that point. At Arcola he was unable to see the flagman because of escaping steam but he could see the headlight of No. 6 in the distance. After starting, the train had moved about two or three car lengths when the rear end was struck by No. 6. There was between 4 and 6 inches of snow on the ground at the point of accident. He did not instruct his flagman regarding flagging duties as he considered him competent and reliable.

Flagman White, of Second 4, stated that he read the message received at Effingham and remarked to the conductor that he would not give No. 6 a short flag. He maintained a constant lookout from a position inside the rear door of the rear car and, after leaving Effingham and also while at Mattoon, saw the headlight of No. 6. At these two points he observed that the markers on the rear of his own train were burning brightly. The headlight of No. 6 again was visible when his train reduced speed at Humboldt; he did not think it necessary to drop a lighted fusee, as No. 6 appeared to be about 2-1/2 miles distant, and his train soon resumed normal speed. When the brakes were applied for the station stop at Arcola he observed that the headlight of No. 6 was about 2 miles distant. He dropped a lighted fusee; it bounced and rolled against the gage side of the west rail and did not blaze properly. After getting off the train at Arcola and observing that the fusee was not burning, he got back on the train to get another fusee. By this time his train had started and, in his haste to get off again, he slipped and fell. Before he was able to light the fusee the collision occurred. He stated that at the time of the accident the speed of his train was about 3 or 5 miles per hour and the speed of No. 6 was about 50 miles per hour. He said that the steam-heat valve at the rear end of the train was open sufficiently to prevent the line from freezing, but there was not enough escaping steam to obscure the markers on the rear of his train. He was thoroughly familiar with the duties of a flagman. In view of the rapid approach of No. 6 while Second 4 was reducing speed approaching Arcola, he thought that probably a lighted fusee displayed on the rear of his train would have been an extra precaution. Although the block system did not relieve him from providing flag protection at all times, he thought that an absolute manual block-system should be provided for a train operating with an inoperative automatic cab-signal and train-stop system.

Engineman Scott, of No. 6, stated that at Centralia an electrician tested the automatic train-stop device on engine 1188

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and reported that it functioned properly. He saw Second 4 leaving Centralia ahead of his own train. After leaving Centralia he made a running test of the air brakes and they functioned properly. The cab signal changed from green to red at a point about 1 1/2 miles north of Branch Junction, and he reduced the speed of his train to 15 miles per hour and maintained that speed to Odin. At Odin he reported that the automatic train-stop device on his engine was not functioning properly and received a copy of the message previously quoted. After leaving Odin he resumed normal speed. The cab signal displayed green and red aspects alternately until, at a point between Farina and LaClede, approximately 27 miles north of Branch Junction, the alternation became so rapid that he was unable to operate the acknowledging lever fast enough to forestall a brake application which stopped the train at LaClede, located 60.6 miles south of Arcola. At this point he broke the seal and cut out the pneumatic feature but did not cut out the main electric switch. His train was delayed at Effingham and at Mattoon, and left Mattoon at 5:36 a. m. When approaching Arcola and when about 1 1/4 miles distant he could see the green aspect of the home interlocking signal at that point and called its indication to the fireman, who replied, as he had done at all interlocking signals. Engineer Scott thought that the green aspect was displayed for his train. By the beam of the headlight, when about 1,000 feet distant, he could see the banner of the facing-point cross-over switch-stand located 2,000 feet south of Arcola station; it was lined for normal movement. The first time he saw Second 4 after its departure from Centralia was upon reaching a point 700 or 800 feet to the rear of Second 4, when it was standing at Arcola station; he and the fireman simultaneously observed its rear end. At this point the speed of his train was about 50 miles per hour and he applied the brakes in emergency, but too late to avert the collision. He estimated that the speed of his train was reduced to between 20 and 25 miles per hour at the time of the accident. He did not encounter fuses between Centralia and the point of accident. He said that he did not realize the average speed of his train, as shown by the records, was 71.8 miles per hour between Neoga and Mattoon, a distance of 11.9 miles. In other instances he had operated train at similar speed with the automatic train-stop device cut out and was not criticized by the officials. He said that he was unable to obtain a copy of the new timetable which took effect at 12:01 a. m., January 1, 1940, until he reported for his run departing from Champaign at 9:05 p. m., December 31. He did not read special instruction No. 289-A but he was familiar with the same instruction which was issued previously in message form when the automatic train-stop device failed. His understanding of special instruction 289-A was that he was required to approach all home signals prepared to stop unless the signal was displaying a clear indication and that he was required to approach all facing-point switches prepared to stop unless the switch was seen to be clear of trains.

It was not his understanding that the rules required him, when approaching a facing-point switch, to operate his train prepared to stop until reaching a point where he could see the position of the switch points. He said that a train moving on the schedule of No. 6 would lose about 1 hour if it were required to reduce speed until the position of the switch points could be seen at each of the 28 facing-point switches between Branch Junction and Champaign. Officials had never criticized him because of losing time when the automatic train-stop system failed. He said that prior to the installation of any type of block system or train-stop system on this line, trains were operated by time-table and train-order authority and crews of following trains depended upon flag protection being furnished by preceding trains. After receiving the message at Odin to proceed he assumed that the same method obtained, except that the provisions concerning weather conditions and facing-point switches were added in rule 289-A. He understood that the provision to approach home interlocking signals prepared to stop applied only when the signals displayed restrictive indications. He had no means of knowing the location of preceding trains, but, the weather being clear, he considered the operation of his train, after the failure of the automatic train-stop device, to be safe if preceding trains provided proper protection.

Fireman Fulfer, of No. 6, corroborated in substance the statement of his engineman. He estimated that the speed of his train was between 35 and 40 miles per hour when he got off the engine just before the accident occurred. He added that the weather was clear but there was a frosty condition near the ground which somewhat restricted visibility. He did not see either the flagman of Second 4 or his lanterns, nor did he see any lighted fusee.

Conductor Cavanaugh, of No. 6, stated that the air brakes were tested at Centralia and they functioned properly en route. When his train stopped at Odin he learned that the automatic train-stop device had failed. Its failure was reported at that point and a message authorizing No. 6 to proceed was received. After leaving Odin a speed of 50 or 55 miles per hour was maintained, which he believed to be safe as the weather was clear. Approaching the point of accident he was in the first car and felt the brakes become applied in emergency. The speed of his train had been reduced to about 45 miles per hour at the time of the accident, which occurred between 5:50 and 5:55 p. m. He said weather conditions were such that the rear end of a train could have been seen a distance of about 1 mile. The markers on Second 4 were destroyed in the accident and he could not determine if they were lighted at the time of the

accident. He said that he had been in charge of trains on previous occasions when the automatic train-stop device failed, yet schedule speed was maintained.

Flagman Mills, of No. 6, corroborated the statement of his conductor and added that, while providing flag protection for his train at Arcola, he saw the markers on his own train when 3/4 mile distant, but at a distance of 1-1/2 miles the markers were obscured. He said that there was no indication of a fusee to the rear of his train.

Train Dispatcher Knight stated that he was on duty at Champaign when the engineman of No. 6 reported from Odia the failure of the automatic train-stop device. He gave the crew of No. 6 a message authorizing them to proceed. In this message he did not include instructions to approach all cross-overs prepared to stop because the new timetable had been in effect 4 hours and such instructions were included in rule 289-A of the time-table special instructions; he understood that the engineman of No. 6 had a copy of the new timetable. He also instructed Second 4 to go to Champaign ahead of No. 6, and added, as an extra precaution, the instruction not to give No. 6 a short flag. About midnight the crew of No. 26 had reported that a red cab-signal aspect was received near Humboldt. He notified the maintainer, who patrolled the track and about 3 a. m. reported that he found no defective condition. As no other train reported that a restrictive indication was received while traversing this block he believed that the track was safe for normal operation and did not notify No. 6 of possible defective track. It was not customary to notify trains of conditions existing in a block which might cause a red aspect to be displayed by a cab signal, and he had not notified any train of such conditions existing near Humboldt on the night of the accident. He said that there are eight train-order offices between Branch Junction and Champaign and if manual-block protection had been provided for No. 6 it would have resulted in about 25 minutes delay to that train on the Champaign District.

Assistant Chief Train Dispatcher Heinz stated that he was on duty at Champaign when the accident occurred. No. 6 departed from Centralia 18 minutes after Second 4. It was first planned that No. 6 should pass Second 4 at Effingham and run ahead, but No. 6 was delayed by the failure of the automatic train-stop device and passed Edgewood 27 minutes after Second 4. At Effingham Second 4 was instructed to go to Champaign ahead of No. 6. He said that, although the message issued by the dispatcher to No. 6 was not strictly in accordance with the instructions issued to dispatchers, special instructions in the new timetable contained instructions which were omitted from the message. The purpose of the change in special instruction 289-A was to shorten the usual message permitting trains to

proceed after the failure of an automatic train-stop device. He did not think that blocking trains manually would be successful on the Champaign District because the stations available for blocking are spaced at distances which would cause a total delay of about 44 minutes over that district. He kept informed of weather conditions at various points between Centralia and Champaign and, as the weather was clear, he was not apprehensive of No. 6 colliding with Second 4. A freight engine equipped for passenger service arrived at Edgewood 1 minute before No. 6 and could have been exchanged with the engine of No. 6, but this exchange would have caused a delay of 35 or 40 minutes to No. 6. It is not the practice to exchange engines when the automatic train-stop device on a passenger engine fails. He stated that between Branch Junction and Champaign the only switches equipped with lamps are within yard limits.

Station Clerk Davis, on duty at Arcola, stated that just prior to the accident he flagged Second 4 with a burning newspaper; the engineman acknowledged the signal from a point about 1/4 mile south of the station and stopped with the engine opposite the station. The stop was very brief and, as Second 4 started to move, he saw the headlight of No. 6 at a point about 1/2 mile distant; the headlight remained in sight until it was close to the rear end of Second 4 and then escaping steam from Second 4 obscured his view. He did not see either the flagman of Second 4 or any lighted fusee.

Electrician Etz stated that at Centralia he tested the automatic cab-signal and train-stop system of engine 1188 on No. 6 and it functioned properly. Upon completion of the test he left the automatic train-stop device in service for the departing enginemen. The pneumatic feature of the automatic train-stop device on through engines is sealed before an engine leaves Memphis.

Train Control Supervisor Kelley stated that the automatic train-stop equipment on engine 1188 was so badly damaged in the accident that it could not be tested. A close examination disclosed that the plate reactor-coil on the local side of the amplifier lead was corroded off at the outside point of connection to the coil; the corrosion was between the mica insulation and the tape. He said that four instances of this particular type of failure had been experienced since April, 1937, and investigation developed that sufficient plate current could cross the corrosion to pick up the relay when the engine was standing but the vibratory action of an engine in motion prevented sufficient current from flowing to the plate of the tube, and unreliable relay action resulted. He examined engine 1188 after the accident and found both the pneumatic apparatus and the electric switch cut out; he was told that the electric switch had been cut out after the accident occurred. Under normal

operating conditions the pneumatic apparatus is sealed but the electric switch is not; there is nothing to prevent an engine-man from disengaging the switch. Periodic inspections of the automatic train-stop system are conducted; the last periodic inspection of engine 1188 was made December 15, 1939, at which time all parts of its train-stop system conformed to the requirements of the carrier.

Traveling Engineer Buckles stated that at all periodic air-brake examinations engine-men are instructed concerning the proper use of the automatic train-stop device. During these examinations he has emphasized the importance of not cutting out the electric switch of the automatic train-stop device in case of its failure. Surprise tests are conducted by causing a red aspect to be displayed and observing how the engine-man controls the speed after passing the indication point. Compliance with the rule after passing a point of restrictive indication is accepted as evidence that the engine-man being tested does not have the automatic train-stop device cut out. His opinion, based on observation, was that engine-men were obeying instructions. He said that Engine-man Scott was last examined in 1938.

Trainmaster Gorman stated that the management's interpretation of rule 289-A of the time-table special instructions is that all trains operating with the automatic train-stop devices inoperative must approach all facing-point switches prepared to stop or know that the switch points are properly lined.

Assistant Superintendent Stanford stated that the term "safe speed" as used in special time-table rule 289-A is interpreted as coming within the purview of the current transportation rules under the following headings:

Movement of Trains

101. Trains must be fully protected against any known condition which interferes with their safe passage at normal speed.

When conditions are found which may interfere with the safe passage of trains at normal speed and no protection has been provided, such action must be taken as will insure safety.

106. Both the conductor and the engine-man are responsible for the safety of the train and the observance of the rules, and, under conditions not provided for by the rules, must take every precaution for protection.

108. In case of doubt or uncertainty the safe course must be taken.

Enginemen

990. Must be alert in all matters pertaining to safety, and when it becomes evident that rear of train requires protection, immediately sound whistle signal for flagman and, if necessary, repeat the signal until protection is assured.

993. During foggy or stormy weather must not attempt to recover lost time; take extraordinary precautions, both at switches and at all places where authority to proceed depends upon signals.

996. Must read all rules, special instructions and notices involving the movements or safety of trains and see that they are understood by fireman.

The assistant superintendent also stated that he believed all train-service and engine-service employees have a common workable understanding of the term "safe speed." At the time of general examination in 1958, the above quoted rules were interpreted as being applicable to circumstances which existed in the case at issue. The interpretation and the instructions as related to the crew of No. 6 were given in January, 1938.

There is no provision in either the book of operating rules or the timetable of this railroad for blocking trains manually in this territory.

During the 30-day period preceding the day of the accident the average daily movement over this district was 30.4 trains.

According to the timetable and the train sheet the movements of Second 4 and No. 6 were as follows:

Station	Second 4		No. 6	
	Due to leave	Left	Due to leave	Left
Centralia	2:55 a. m.	3:32 a. m.	3:45 a. m.	3:50 a. m.
Odin	3:06 a. m.	3:48 a. m.	3:55 a. m.	4:13 a. m.
Kinmundy	3:21 a. m.	4:05 a. m.	4:10 a. m.	4:29 a. m.
Edgewood	3:34 a. m.	4:19 a. m.	4:23 a. m.	4:46 a. m.
Effingham	3:58 a. m.	4:52 a. m.	4:45 a. m.	5:10 a. m.
Neoga	4:13 a. m.	5:11 a. m.	5:01 a. m.	5:25 a. m.
Mattoon	4:33 a. m.	5:25 a. m.	5:14 a. m.	5:35 a. m.
Arcola	4:49 a. m.	-----	5:28 a. m.	-----

Records of the carrier disclose that the air brakes on

No. 6 were tested at Centralia January 1, 1940, and the brake on the engine and each car functioned properly.

According to the records, a maintainer was notified at 12:20 a. m., January 1, of defective track conditions in the vicinity of Humboldt; he reported at 4:05 a. m., from Tuscola, that he could not locate any defect, but later he discovered at Humboldt a broken rail at the cross-over, which is about 700 feet north of a signal-indication point.

According to the records, there are 28 facing-point switches on the northward track in high-speed territory between Branch Junction and Champaign.

Observations of the Commission's Inspectors

Investigation by the Commission's inspectors disclosed that during the 6-month period prior to the day of the accident there were 28 instances in which trains were operated in automatic train-stop territory between Branch Junction and Champaign with the automatic train-stop device cut out or otherwise inoperative over distances varying from 15.3 to 122.1 miles. In 4 of these instances trains were operated over the entire automatic train-stop territory. In 8 instances only were messages received containing instructions for the train to proceed, and in 10 instances trains made up time ranging from 6 to 17 minutes. In another instance a rear-end collision occurred at Mattoon on November 19, 1939; in that case the engineman of a passenger train failed to cut in the automatic cab-signal and train-stop device at Champaign and operated his train throughout the distance of 44.1 miles between Champaign and Mattoon with the automatic cab-signal and train-stop device cut out.

Discussion

According to the evidence, Second 4 was gradually losing time and was about 24 minutes late at Effingham where the crew received a message instructing them that their train should go to Champaign ahead of No. 6, which was then 7 minutes overdue at Effingham, and that No. 6 should not be given a short flag because the automatic train-stop device on the engine of No. 6 was inoperative. The conductor and the flagman of Second 4 understood this message. At each of several stops made the flagman observed that the markers were burning brightly and in several instances he saw the headlight of No. 6. At a point about 2 miles south of Humboldt Second 4 received a restrictive cab-signal indication, which necessitated running at restricted speed a distance of about 2 miles, throughout which the flagman maintained, from inside the rear car, a lookout to the rear. When the speed was reduced south of Humboldt he could see the headlight of No. 6 plainly but did not consider it necessary to

drop a lighted fusee as No. 6 was about 2-1/2 miles distant. Second 4 was to make a flag stop at Arcola and the conductor and the engineman had been so informed in advance; the flagman did not know about this stop; however, he was aware that Arcola was a flag stop for his train and that it was not unusual to stop there. When the brakes were applied preparatory to stopping at Arcola the flagman, observing that No. 6 was about 2 miles distant, dropped a fusee, and when his train stopped he alighted with only lanterns as flagging equipment. He then observed that the fusee was not burning and returned to the train to obtain another. However, the train started and, as No. 6 was approaching rapidly, he attempted to get off in order to flag that train but slipped and fell, and before he could get up the accident occurred.

The flagging rule requires that when a train is moving under circumstances in which it may be overtaken by another train, the flagman must take such action as may be necessary to insure full protection; by night lighted fusees must be thrown off at proper intervals. If the flagman of Second 4 had dropped a lighted fusee when his train reduced speed south of Humboldt and another when approaching Arcola, the engineman of No. 6 would have been warned that he was closely following another train. The flagman said that when approaching Arcola a lighted fusee displayed at the rear of his train would have provided additional protection. The engineman of Second 4 did not signal out the flagman at Arcola as it is not customary to do so when making stops of short duration. When approaching Arcola the conductor of Second 4 was in the first car; at Arcola escaping steam from the car heating-system obscured his view of the rear of his train and he could not see the flagman. He had not given the flagman definite flagging instructions because he considered the flagman competent and reliable. The result was, therefore, that no flag protection was provided, notwithstanding the requirements of the rules and the warning in the message against short flagging. If proper rear-end protection for Second 4 had been provided, undoubtedly this accident would have been averted.

Soon after No. 6 departed from Centralia the automatic train-stop device became defective and this fact was reported at Odin. A message to proceed at a rate of speed considered safe, taking weather conditions into consideration, was received at this point. At a point about 60 miles south of Arcola the automatic train-stop device became so defective that it caused an undesired stop; then the engineman cut out the device pneumatically and proceeded at practically schedule speed. Approaching Arcola No. 6 was moving at a speed estimated at 50 miles per hour. Both members of the engine crew agreed that, although frost was in the air, the visibility was good. The engineman said that when about 1,000 feet distant it was possible

to see by the beam of the headlight the banner of the cross-over switch-stand south of Arcola station; the engineman and the fireman saw the indication of the home signal north of the station when about 1-1/2 miles distant, but both failed to see Second 4 standing at the station, between their train and the signal. Reaching a point 700 or 800 feet to the rear of Second 4, the engineman and the fireman of No. 6 simultaneously saw the rear end of Second 4. The brakes were applied in emergency, but too late to avert the accident. The engineman did not see any burning fuses en route and he did not see the markers of Second 4 subsequent to the departure of that train from Centralia until just before the accident.

Prior to 12:01 a. m., January 1, 1940, time-table special rule 289 (a) provided that when the electrical engine-equipment of the automatic cab-signal and train-stop device failed, the pneumatic equipment might be cut out but the electrical equipment would continue to be cut in and the train would proceed at restricted speed. The defective condition should be reported to the train dispatcher from the next point of communication and the train would proceed in accordance with instructions received from the dispatcher. This rule was superseded by time-table special rule 289-A, which became effective at 12:01 a. m., January 1, 1940, or 3 hours 49 minutes before No. 6 departed from Centralia. This rule provides that when the electrical engine-equipment has failed, the pneumatic equipment may be cut out and the electrical equipment continue to be cut in, and the train proceed at a speed considered safe, taking weather conditions into consideration, approach all home signals at interlockings prepared to stop, being governed by position of home signals, and approach facing-point switches prepared to stop unless the way is seen to be clear. The defective condition must be reported to the dispatcher from the first available point of communication and then the train will proceed in accordance with instructions received from the dispatcher. Under date of January 18, 1937, instructions issued to dispatchers in regard to the method of handling cases wherein the electrical engine-equipment becomes defective in automatic train-stop territory specified that the dispatcher should issue to the crew involved a message to proceed at a speed the crew considers safe, taking weather conditions into consideration, and approach all cross-overs prepared to stop, and he should inform the crew of the location of trains ahead; also, the dispatcher was required to notify other trains concerned in regard to the inoperative condition of the automatic train-stop device on a designated train. The engineman of No. 6 said that he did not have time to read the new rule but, since formerly the substance of it was issued in message form and since he had operated trains under the provisions contained in messages, he was familiar with the requirements of the new rule. The engineman of Second 4 understood that time-table rule 289-A required a train to approach all facing-point switches prepared to stop unless the

way was seen to be clear, but the engineman of No. 6 understood that this rule required a train, until reaching a point from where it could be seen that no other train was using the switch, to approach each facing-point switch prepared to stop, and then it was permissible to resume normal speed. The trainmaster said the management's interpretation of this rule was that until the switches are seen to be properly lined, trains should approach facing-point switches prepared to stop. The assistant superintendent cited six rules as being applicable to the operation of No. 6, but these rules are expressed in general terms and do not appear to be particularly applicable to operation of a train having an inoperative automatic train-stop device. The understanding of the two enginemen and the interpretation of the management indicate the lack of a common understanding of this provision of the rule. Since the engineman of No. 6 from a distance of about 1,000 feet saw that the banner of the switch-stand involved indicated the switch was lined for a main-track movement, it appears that he was practically conforming to his interpretation of the rule. The engineman of No. 6 stated that if he approached each of the 28 facing-point switches between Centralia and Champaign prepared to stop, delay amounting to 1 hour would result; however, he had never been criticized for losing time when the automatic train-stop device was inoperative. It is clearly apparent that the management's interpretation of these requirements was not enforced as the investigation disclosed that during the 6-month period prior to the day of the accident 10 trains operating over this district with automatic train-stop devices inoperative, made up time varying from 6 to 17 minutes on their schedule time. If No. 6 had approached the switch involved at a low rate of speed it is probable that the accident would have been averted, since the rear of Second 4 was about 800 feet north of the switch; however, the fact that the collision occurred near a facing-point switch and an interlocking was purely coincidental. Under the operating practices which were in effect on this railroad, at a point remote from either a facing-point switch or an interlocking the only means provided to guard against the occurrence of a similar accident would be flag protection of the preceding train and the interpretation placed by the engineman of the following train upon the term "safe speed" under prevailing weather conditions.

The time-table special rule referred to in the foregoing does not provide adequate safeguards for the operation of trains in case of failure of automatic cab-signal and train-stop devices en route; the procedure which it provides, even if fully adhered to, would result in a material reduction of the protection provided under normal operation, particularly in view of the fact that there are no wayside signals in this territory other than at interlockings. In general practice throughout the country, one or another of the following measures is adopted in case of a failure en route of automatic train stop, train

control or cab signal devices:

1. Substitution of an engine with equipment in proper operative condition.
2. Protection by absolute manual block system.
3. Continued operation of engine with equipment cut out but at materially reduced speed.

All these alternatives were available to the Illinois Central in this case. A freight engine which was equipped for passenger service was available at Edgewood, 56.7 miles south of Arcola, and there were eight train-order offices between Branch Junction and Champaign which could have been utilized as manual block offices; however, the investigation indicates that neither of these alternatives was adopted principally for the reasons that some delay would have resulted and no provision had been made for establishing a manual block system under these conditions; it is apparent that delay also would have resulted had the third alternative listed above been employed. The accident which occurred at Mattoon only a few weeks prior to the Arcola accident, on the same division, should have directed attention of operating officers to the lack of adequate protection provided for a train on this line when automatic cab-signal and train-stop devices were inoperative, and should have prompted them to provide adequate means of protection.

Conclusion

This accident was caused by failure to provide flag protection for the preceding train and by operation of the following train with inoperative automatic cab-signal and train-stop equipment without providing adequate protection.

Recommendation

It is recommended that officials of this railroad promptly take necessary steps to provide adequate protection for train movements when automatic cab-signal and train-stop equipment is inoperative.

Respectfully submitted,

S. N. MILLS

Director.