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RAILROAD ACCIDENT INVESTIGATION.

REPORT NO. 4168

CHICAGO, ROCK ISLAND AND PACIFIC RAILROAD COMPANY

UNION, MISSOURI

MARCH 25, 1970

FEDERAL RAILROAD ADMINISTRATION

BUREAU OF RAILROAD SAFETY

Washington, D C 20590

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Summary

DATE:	March 25, 1970	
RAILROAD:	Chicago, Rock Island & Pacific	
LOCATION:	Union, Mo	
ACCIDENT TYPE:	Rear-end collision	
TRAINS INVOLVED:	Freight	Freight
TRAIN NUMBERS:	Extra 1339 East	74
LOCOMOTIVE NUMBERS:	1339	347, 229
CONSISTS:	12 cars, caboose	20 cars, caboose
SPEEDS:	Standing	10-15 m p.h
OPERATION:	Timetable, train orders	
TRACK:	Single; tangent; 0.5% descending grade eastward	
WEATHER:	Rainy	
TIME:	5:50 a m , Dawn	
CASUALTIES:	1 killed; 1 injured	
CAUSE:	Following train diverted onto siding occupied by a preceding train, due to failure of conductor of preceding train to restore siding-switch to normal position.	

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Synopsis

On March 25, 1970, a rear-end collision occurred between two freight trains on the Chicago, Rock Island and Pacific Railroad at Union, Missouri It resulted in death to one, and injury to one, crew members of the following train

The accident was caused by the following train being diverted onto a siding occupied by a preceding train, due to failure of the conductor of the preceding train to restore a siding-switch to normal position

Location and Method of Operation

The accident occurred on that part of the railroad extending eastward from Eldon to Carrie Avenue, St Louis, Mo , a distance of 157 3 miles This is a single-track line over which trains operate by timetable and train orders There is no block-signal system in use

At Union, 100 4 miles east of Eldon, a siding 2977 feet in length parallels the main track on the north Its west switch is 1000 feet west of the station

The collision occurred on the siding at Union, 265 feet east of the west siding-switch

Washington Street crosses the main track and siding at grade, 590 feet east of the collision point and 145 feet west of the station

Time and Weather

The collision took place about 5:50 a m , at dawn and in a light rain

Track

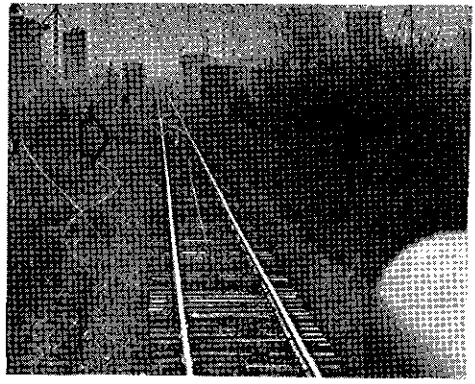
From the west on the main track there are, in succession, a 3°01' curve to the left 2066 feet, and a tangent 742 feet to the west switch of the Union siding and a considerable distance eastward

The grade for eastbound trains is, successively, 1 0% descending 2200 feet, and 0 5% descending 638 feet to the collision point and a considerable distance eastward

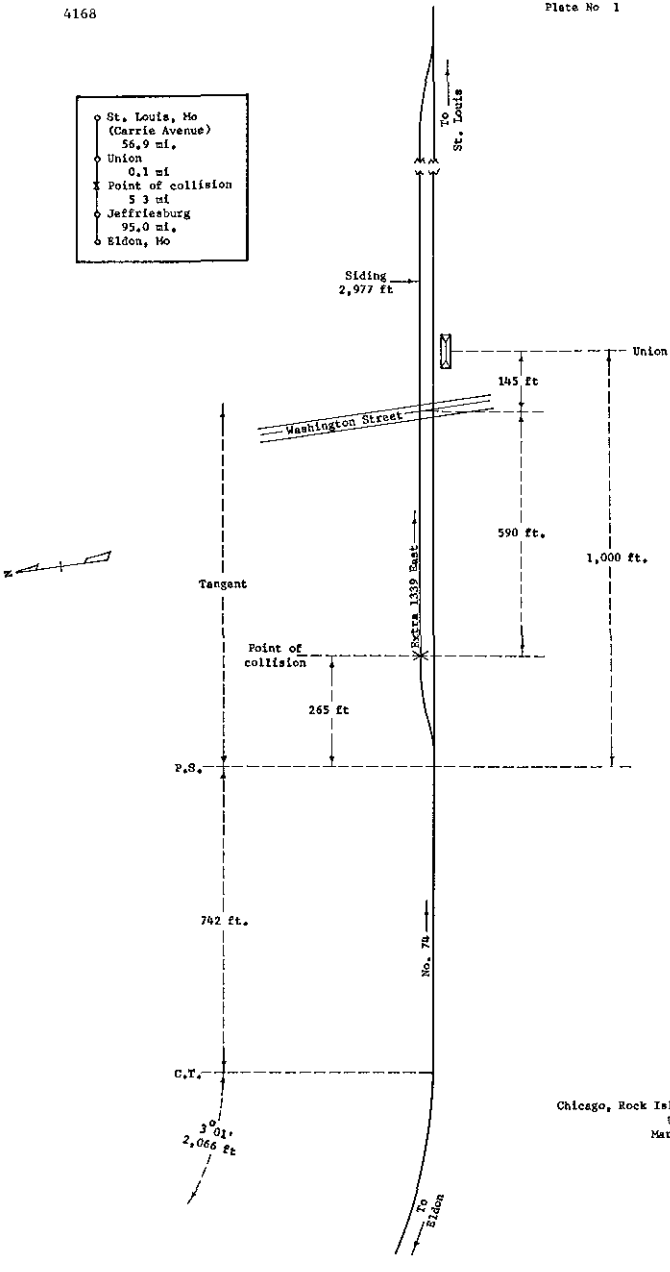
Siding-Switch

The west switch of the siding at Union is part of a No. 10 left-hand turnout The switch stand is on the north side of the main track. It is of the column-throw type, about seven feet in height

A circular non-reflectorized target, approximately 15 inches in diameter, was attached to the top of the switch stand. It was displayed when the switch was in reverse position, lined for movement from the main track to the siding or vice versa The switch stand had no lamp See photo below for west siding-switch, in reverse position, with switch target displayed



West siding-switch at Union, from distance of 310 feet.



Chicago, Rock Island and Pacific Railroad
Union, Mo,
March 25, 1970

Authorized Speed

The maximum authorized speed for all trains in the area of Union is 35 m p h

Carrier's Operating Rules

Restricted Speed - Proceed prepared to stop short of train, engine, obstruction, or switch not properly lined

11 *** A train or engine finding a fusee burning on or near its track must stop After stopping, train or engine will then proceed at Restricted Speed for a safe flagging distance

***

11 (a) ***
The explosion of two torpedoes is a signal to immediately reduce speed and proceed for a safe flagging distance at Restricted Speed

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 red fusees ***

104. ***

***
(2) Main track switches must not be left open after movement through them is completed ***

Carrier's Radio Rules

1. These rules do not modify or supersede any rule in the Uniform Code of Operating Rules ***

The railroad radio communications system must not be used in any manner which would cause a violation of such Uniform Code of Operating Rules ***

12 *** Trains and engines shall preface their call with the railroad name, for example, "Rock Island caboose Train 92 calling engine of Train 92." Care must be used to properly identify station, train, engine or caboose being called Acknowledgement of call must be made in same manner.

Circumstances Prior to Accident

Train Order No. 5

Copies of train order No. 5, a wait order, were held by the crews of Extra 1339 East and No 74 A provision of the order restricted No 74, the following train, from passing Jeffriesburg, 5 4 miles west of Union, before 5:20 a m , the day of the accident

Train Extra 1339 East

Extra 1339 East, an eastbound local freight train, left Eldon at 6:55 p m the day before the accident and performed switching operations at several points en route eastward About 5:00 a m the following morning, this train, consisting of 1 diesel-electric unit, 12 cars and a caboose, passed Jeffriesburg The engineer, front brakeman, and flagman were on the locomotive The conductor was alone in the caboose All the crew members understood the train would stop at Union, for a determination as to whether switching operations were required at that point

Train No. 74

No. 74, an eastbound second-class freight train consisting of 2 road-switcher type diesel-electric units, 20 cars and a caboose, left Eldon at 2:15 a m the day of the accident, 3 hours 40 minutes late It passed Jeffriesburg about 5:45 a m , 45 minutes after Extra 1339 East and 25 minutes after the time shown in train order No 5 The engineer and front brakeman were in the control compartment near the front of the first diesel-electric unit The conductor and flagman were in the caboose

The Accident

Extra 1339 East

Soon after passing Jeffriesburg, Extra 1339 East stopped on the main track with the rear end 2 4 miles west of Union to permit the conductor to place two torpedoes on the rails Later, the conductor dropped a 10-minute lighted fusee onto the main track structure at a point about 0 3 mile west of the west switch of the Union siding The train then passed that switch and, at 5:17 a m , stopped on the main track with the caboose in front of the Union station One or two minutes afterward, upon learning the easterly portion of the siding was occupied by about thirty cars and there was considerable switching to be performed at Union, the conductor decided his train should promptly clear the main track for No 74 by backing up and then heading in on the Union siding at the west switch As a result, he signaled the train to back up toward the west siding-switch, relying on train order No 5 and the flagging signals (torpedoes and fusee) previously placed on the track structure for protection of the reverse movement on the main track

When Extra 1339 East began to back up, the conductor reboarded the caboose, instructed the crew members on the locomotive by radio that the train should move back a sufficient distance to clear the west siding-switch, and that it should then head in on the siding and clear the main track for No 74 In addition, he informed them that he would remain on the caboose and restore the west siding-switch to normal position, lined for movements on the main track, after the train entered the siding

The front brakeman and conductor remained on the locomotive and caboose, respectively, while Extra 1339 East backed up preparatory to entering the Union siding During this interval, the flagman left the train and walked to the vicinity of the cars occupying the siding east of the Washington Street crossing, to be in an advantageous position should it be necessary to move those cars while clearing the main track for No 74

After backing up on the main track for a distance of about 1700 feet, Extra 1339 East stopped with the front end west of the west siding-switch The front brakeman moved that switch to reverse position, and reboarded the locomotive when the train began to enter the siding About the same time, according to his statements, the conductor dropped another lighted fusee onto the main track structure He remained on the caboose as his train entered the siding and signaled the engineer to stop when the rear of the train cleared the main track Immediately thereafter, at 5:23 a m , Extra 1339 East stopped on the siding with the front end on or over the Washington Street crossing and the rear end 265 feet east of the west siding-switch The locomotive and the first two or three cars were then moved approximately 70 feet farther eastward, opening the crossing for highway traffic

The conductor stated that he forgot to restore the west siding-switch to normal position after his train cleared the main track Thus, the switch was left lined for movements from the main track to the siding The conductor alighted from the caboose when it stopped on the siding and, according to his statements, walked forward to the Union station with a feeling of having forgotten something He met the front brakeman and flagman on his arrival at the station, then used a telephone in the station to report to the train dispatcher that Extra 1339 East had cleared the main track at Union

Some time between 5:25 and 5:35 a m., approximately four or five radio communications took place between crew members of Extra 1339 East and crew members of No. 74 While statements relative to those communications differ and/or conflict to some extent, it appears that (a) on one or two occasions, the engineer of No 74 advised the conductor of Extra 1339 East as to the location of No 74, (b) on at least one occasion the aforesaid conductor informed the engineer of No. 74 that Extra 1339 East had cleared the main track at Union for No 74 and urged him to pass Union without delay, and (c) on one occasion the engineer of Extra 1339 East urged the engineer of No. 74 to disregard the torpedoes that had been placed on the main track about 2 4 miles west of Union Statements made by the employees involved leave little doubt that the radio communications were conducted in a manner not conducive to railroad safety, i e without identifications and acknowledgements having been made as prescribed by the carrier's radio rule No 12

A few minutes before the accident, the engineer of Extra 1339 East alighted from his locomotive and proceeded toward the Washington Street crossing About the same time, the front brakeman and flagman left the Union station and walked to the crossing, to provide protection for highway traffic when No 74 passed Soon thereafter, at about 5:49 a.m , the conductor left the station to join the crew members at the crossing. While walking to the crossing, he saw the headlight of No 74 approaching the west switch of the siding at Union Moments later, No 74 entered the siding at the west switch and struck the rear end of Extra 1339 East

When he saw the headlight of No 74 swerve to the north at the west siding-switch, the conductor of Extra 1339 East immediately realized he had forgotten to restore that switch to normal position

No. 74

Shortly before or after passing Jeffriesburg, No 74 entered a descending grade which extends eastward to and beyond Union The engineer, whose surname was Beanland, said the train was moving at a speed of 35 to 40 m p h in the vicinity of Jeffriesburg, and further said he initiated a light application of the brakes at that time to control the speed of the train on the grade Soon afterward, according to his statements, he heard unidentified voices over the radio say that "Extra 1339 was in the clear at Union," call "Come on Beany, come on," and mention something about torpedoes that he was unable to understand The engineer said his locomotive exploded two torpedoes about the same time that the unidentified voice on the radio mentioned torpedoes, and he increased the application of the brakes as a result This, he said, caused the train to reduce speed to approximately 20 or 25 m p h. by the time it started to enter the tangent track extending to and beyond the west siding-switch at Union He further said that he saw no fusee burning on or near the track structure while approaching Union

Although it was somewhat dark when No 74 entered the tangent at Union, the engineer was able to see the caboose of Extra 1339 East standing on the Union siding and could also see the main track was clear as far as the station Consequently, he began to restore brake pipe pressure by moving the automatic brake valve to release position When the train was at a distance of about 75 feet, according to his estimate, the engineer saw that the target for the west siding-switch was displayed Realizing that the switch was not properly lined and that a collision with the caboose of Extra 1339 East was inevitable, the engineer promptly applied his train brakes in emergency and jumped from the locomotive No. 74 then entered the siding at the improperly lined switch Immediately afterward, when its speed

had been reduced to approximately 10 or 15 m p h , as estimated by the conductor and indicated by subsequent damages, No 74 struck the rear end of Extra 1339 East

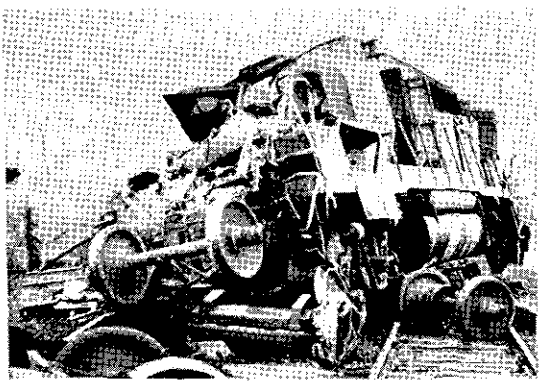
Damages

Extra 1339 East

The impact propelled the rear portion of this train about 70 feet eastward, to a coupling with the front portion (locomotive and two or three cars) standing east of the Washington Street crossing The rear truck of the next-to-last car, and all trucks of the last car and caboose were derailed The last car overturned and stopped on its right side The caboose overrode the underframe at the front of the first diesel-electric unit of No 74; struck and destroyed the control compartment of that unit; overturned, and stopped on its right side on the main track structure The last car and caboose were heavily damaged and destroyed, respectively

No. 74

This train stopped with the front end 40 feet east of the collision point Both trucks of the first diesel-electric unit derailed This unit stopped upright with its rear truck on the siding structure, and with the front end on the north side of the main track structure and against the overturned caboose of the preceding train Its control compartment was demolished by the caboose (see photo below) and other appurtenances were heavily damaged The second unit was slightly damaged



Leading, or control compartment, end of first locomotive unit of No. 74.

The total cost of damages to track structure and equipment of both trains was $166,505, according to the carrier's estimate

Casualties

The engineer of No 74 was seriously injured as a result of jumping from the locomotive just before the collision The front brakeman of that train remained in the control compartment at the front of the first locomotive unit and was killed

Train Crews' Hours of Service

Extra 1339 East

At the time of the accident, all the crew members of this train had been on duty 13 hours 25 minutes, after having had an off-duty period of more than 24 hours Statements of the conductor indicate that he had been up and about 10 or 11 hours before going on duty for the accident trip

No. 74

All the crew members of No 74 had been on duty 4 hours 5 minutes at the time of the accident, after having been off duty in excess of 24 hours

Missouri Public Service Commission

In an order dated September 10, 1968, the Missouri Public Service Commission authorized the CRI&P to maintain reflectorized switch stand targets in lieu of switch lamps at its main line switches in the State of Missouri This authority was granted after the CRI&P reported tests conducted on tangent track at night revealed the red aspect of a kerosene switch lamp could be seen at a maximum distance of 800 feet and a red scotchlite circle of the same size as the lens of the kerosene switch lamp could be seen at a maximum distance of 3005 feet

At the time of the collision, the switch stand for the west switch of the siding at Union had neither a switch lamp nor a reflectorized target This condition was brought to the attention of the Missouri Public Service Commission Two days after the accident, the State agency initiated action to ensure the CRI&P's compliance with the order of September 10, 1968

Interpretation of Operating Rule

When No 74 exploded two torpedoes in approach to Union, it was required by the carrier's operating rule No 11(a) to immediately reduce speed and proceed for a safe flagging distance at Restricted Speed, prepared to stop short of a train, engine, obstruction, or switch not properly lined Although several requests were made, carrier officials declined to define what constituted a "safe flagging distance" as applied to the circumstances involved in this case other than to interpret the term as meaning a "sufficient distance "

Findings

1 The conductor of Extra 1339 East placed two torpedoes on the main track 2 4 miles west of Union for protection against following trains and subsequently dropped two lighted 10-minute fusees on the main track structure Having evidently burned out before No 74 approached Union, the fusees were not a factor in the accident

2 Failure of the conductor of Extra 1339 East to restore the west siding-switch at Union to normal position after his train entered the siding and cleared the main track was the primary cause of the accident The reason for this failure appears to be that due to fatigue resulting from having been up and about for 23 or 24 hours, the conductor forgot to restore the switch to proper position, lined for movements on the main track

3. After exploding the torpedoes placed on the main track 2 4 miles west of Union, No 74 proceeded eastward more than a safe flagging distance before entering the tangent track leading to the west switch of the Union siding

4 When the train entered the aforesaid tangent track it was moving at 20 to 25 m p h in accordance with applicable rules and regulations of the carrier

5. Apparently because of it being somewhat dark at the time, the engineer of No 74 did not notice the west switch of the Union siding was improperly lined before reaching a point a relatively short distance from the switch.

6 The engineer promptly initiated an emergency brake application when the west siding-switch was seen to be improperly lined Immediately afterward, No 74 entered the siding at the improperly lined switch and collided with the rear of Extra 1339 East while moving at a speed of about 10 to 15 m p h

7 While the investigation revealed that crew members of both trains used the radio in an improper and/or unsafe manner before the accident, their misuse of the radio does not appear to be a causal factor in the accident

8 The absence of a switch lamp or a reflectorized target on the switch stand for the west siding-switch at Union appears to have been a causal factor in the accident Had such lamp or target been provided, there is a possibility the engineer of No. 74 would have been alerted to the fact that the switch was not properly lined in sufficient time to avert the collision

9 The incident at Union was another slow-speed collision resulting in fatal injury to a crew member in the control compartment at the front of a road-switcher type diesel-electric unit, due to a struck caboose or other car overriding the underframe of the unit and telescoping the

control compartment The aforesaid fatal injury and casualties from similar slow-speed collisions investigated by the FRA appear to have been caused by control compartments lacking the structural strength to withstand impacts of overriding equipment, and/or being insufficiently protected by structural components of that part of diesel-electric units in front of the control compartments

10 The investigation revealed the carrier's flagging rule (No 99) is ambiguous to the extent that officials of the carrier were unable or unwilling to define adequately the meaning of the term "safe flagging distance" as applied to the movement of No 74 in approach to the collision point

Dated at Washington, D C , this 24th day of June 1971
By the Federal Railroad Administration

Mac E Rogers, Director
Bureau of Railroad Safety

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