

RAILROAD ACCIDENT INVESTIGATION

REPORT NO 4091

**CHICAGO, MILWAUKEE, ST PAUL AND PACIFIC
RAILROAD COMPANY**

SIXTEEN, MONT

MAY 23, 1966

INTERSTATE COMMERCE COMMISSION

WASHINGTON

SUMMARY

DATE	May 23, 1966
RAILROAD	Chicago, Milwaukee, St Paul and Pacific
LOCATION	Sixteen, Mont
KIND OF ACCIDENT	Derailment
TRAIN INVOLVED	Freight
TRAIN NUMBER	Extra E78 West
LOCOMOTIVE NUMBERS	Electric units E78, E73, diesel-electric unit 280
CONSIST	99 cars, caboose
SPEED	62 m p h
OPERATION	Timetable, train orders, automatic block-signal system
TRACK	Single, 10 ⁰⁰ ' curve, 0.24 percent descending grade westward
WEATHER	Clear
TIME	11-01 p m
CASUALTIES	2 injured
CAUSE	Failure of crew members to take proper and timely action to control train approaching speed restriction zones, resulting in excessive speed on a curve and derailment of the train
RECOMMENDATION	That the Chicago, Milwaukee, St Paul and Pacific Railroad take immediate action to insure compliance with its rules and instructions governing movements of trains through speed restriction zones

INTERSTATE COMMERCE COMMISSION
RAILROAD SAFETY AND SERVICE BOARD

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SYNOPSIS

On May 23, 1966, a Chicago, Milwaukee, St Paul and Pacific Railroad freight train derailed near Sixteen, Mont, injuring two crew members

The accident was caused by failure of crew members to take proper and timely action to control train approaching speed restriction zones, resulting in excessive speed on a curve and derailment of the train

LOCATION AND METHOD OF OPERATION

The accident occurred on that part of the Rocky Mountain Division extending between Harlowton and Three Forks, Mont, a distance of 113.9 miles. This is a single-track line over which trains operate by timetable, train orders and an automatic block-signal system. A catenary system is provided for the electric propulsion of trains.

The derailment occurred on the main track, 69.5 miles west of Harlowton and 1.9 miles west of Sixteen.

In the derailment area, the main track is laid in a 10-degree curve in a deep cut. Reduce speed signs for westbound trains

are located 1 2 miles and 3,258 feet east of the east end of the curve. The outside figures on the signs and provisions of the carrier's operating rules indicate that beginning 3,000 feet west of the first reduce speed sign mentioned above, the maximum authorized speed for westbound freight trains is restricted to 30 miles per hour and that beginning 3,000 feet west of the second reduce speed sign, the maximum authorized speed for freight trains is further restricted to 25 miles per hour. The latter speed restriction zone extends westward through the 10-degree curve, beginning 258 feet east of the curve.

Details concerning the main track, carrier's operating rules, train involved, damages, and other factors are set forth in the appendix.

DESCRIPTION AND DISCUSSION

Extra E78 West, a westbound freight train consisting of 2 electric units, 1 diesel-electric unit, 99 cars and a caboose, left Harlowton at 8 20 p m the day of the accident. Before leaving, the train brakes were tested by the engineer and car inspectors, and no exceptions were taken. As the train proceeded toward Loweth, 21 6 miles east of Sixteen, the engineer applied the regenerative brake and automatic air brake on several occasions, and the brakes functioned properly.

As the train neared Loweth and a heavy descending grade, the engineer increased brake pipe pressure to 90 pounds as required by timetable special instructions. He applied the regenerative brake when the train moved onto the descending grade, and shortly after passing Hamen, 17 9 miles east of Sixteen, he also applied the automatic brake to reduce speed as required through a speed restriction zone. When he released the automatic brake application, the train brakes applied in emergency because of a separation between two cars in the middle portion of the train, caused by a coupler pin lifting sufficiently to uncouple the two cars. Soon afterward, when the train was reassembled, the conductor saw that the brake pipe pressure was being restored, as indicated by the caboose air gauge. The train then proceeded westward at accelerating speed. As it moved in the vicinity of Ringling, 10 6 miles east of Sixteen, and through 45 miles per hour speed restriction zones, its speed was 58 miles per hour. A few minutes later, while moving at 57 miles per hour, it approached 30 miles per hour speed restriction zones in the vicinity of Moyne, 7 0

miles east of Sixteen. The engineer stated that he initiated a 15-pound brake pipe reduction to reduce speed as required in these zones, but this brake application did not reduce the speed as intended. The train proceeded through the 30 miles per hour speed restriction zones at 56 miles per hour. Shortly thereafter, its speed was reduced to 20 miles per hour while moving through another 30 miles per hour speed restriction zone located a short distance west of Moyne. After moving through this zone, the train proceeded in territory where its maximum authorized speed was 60 miles per hour. The train accelerated in this territory and passed Sixteen at 62 miles per hour. It continued to accelerate and was moving at 68 miles per hour as it approached the reduce speed sign located 1.2 miles east of the 10-degree curve where the derailment occurred.

According to the engineer's statements, he initiated a slight brake pipe reduction as the train approached the reduce speed sign mentioned above, then partially closed the throttle and continued the brake pipe reduction to 10 or 12 pounds. He said this brake application was ineffective in reducing the speed and that he made a further brake pipe reduction to about 20 pounds, apparently as the train was moving in the vicinity of the reduce speed sign located 3,258 feet east of the 10-degree curve. He said that although there was a heavy exhaust from the automatic brake valve, the heavy brake pipe reduction seemed ineffective in reducing the speed. He stated that he then applied the train brakes in emergency, as the train approached the 10-degree curve at about 1,000 feet. However, stylus marks on the speed-recording tape indicate that the train started to reduce speed about one-half mile from the 10-degree curve, apparently as a result of a service brake application, and the speed was decreased to 62 miles per hour as the train entered this curve. A moment or two later, at 11:01 p. m., while moving on the curve at excessive speed, the three locomotive units derailed and overturned to the right, 184 feet west of the east end of the curve and 1.9 miles west of Sixteen. Immediately thereafter, the 1st to 23rd and 47th to 72nd cars, inclusive, also derailed.

The engineer and front brakeman were injured.

The front brakeman, who had only a few months road experience, stated that he could not recall any of his actions or observations between the time that the train broke in two near Hamen and the time of the accident. According to statements of the conductor
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and flagman, they thought that the train was operated normally en route to the accident point. Hence, they had taken no exception to the excessive speeds at which the train moved through various speed restriction zones en route to the derailment point. They stated that they felt the train brakes being applied at a service rate in the vicinity of Sixteen. They thought the engineer was applying the brakes at this time to control the speed as required nearing the curve involved. They were unaware of anything wrong before they heard the brakes apply in emergency shortly before the derailment.

Tests of the train air brake equipment were made to the extent possible after the accident. They revealed that the automatic brake valve, distributing valve, feed valve and air compressor of the first diesel-electric unit and the air brake equipment on 53 of the cars functioned properly, with the exception that four of these cars had excessive piston travel.

Examination after the accident revealed that the track structure was destroyed a considerable distance east and west of the derailment point. The north rail in that area was canted or displaced northward.

According to the carrier's computations, the center of gravity of each locomotive unit of Extra E78 West was 60.5 inches above the rails. The computed equilibrium, safe and overturning speeds for these units on the 10-degree curve involved were 22.4, 41.2 and 67.8 miles per hour, respectively.

FINDINGS

According to the speed recording tape of the 2nd locomotive unit, the speed of the train was reduced from 68 miles per hour, at a point about one-half mile east of the derailment point, to 62 miles per hour at the derailment point. During this movement, the engineer initiated a service brake application in the vicinity of the 25 miles per hour reduce-speed sign. The train's speed was then 68 miles per hour, 38 miles per hour in excess of the 30 miles per hour maximum authorized speed. As the train entered the 10-degree curve on which the derailment occurred, the engineer moved the brake valve to emergency position. Immediately afterward, while moving at a speed of 62 miles per hour on the curve, which had a maximum permissible speed of 25 miles per hour, the locomotive units derailed to the right and overturned, damaging the track structure and causing the

general derailment of following equipment. The exact manner in which the derailment occurred could not be determined because the track was destroyed a considerable distance east and west of the derailment point. The indications of the speed tape and the positions of the derailed equipment confirm that the derailment was due to excessive speed.

It is evident that the train brakes were in effective operating condition and that the engineer did not properly control the speed of the train en route to the derailment point. It is further evident that no crew member took timely action to control the speed as required, or to stop the train, as it neared the 10-degree curve involved. As a result, the train entered the curve considerably in excess of safe speed, causing the derailment.

CAUSE

This accident was caused by failure of crew members to take proper and timely action to control train approaching speed restriction zones, resulting in excessive speed on a curve and derailment of the train.

RECOMMENDATION

It is recommended that the Chicago, Milwaukee, St Paul and Pacific Railroad take immediate action to insure compliance with its rules and instructions governing movements of trains through speed restriction zones.

*Dated at Washington, D C this 6th
day of October 1966
By the Commission, Railroad Safety
and Service Board*

(SEAL)

H NEIL GARSON
Secretary

APPENDIX

Track

From the east on the main track there are, in succession, a short tangent, a 1⁰⁰⁰' curve to the left 2,416 feet, a tangent 441 feet, a spiral 143 feet, and a 10⁰⁰⁰' curve to the left 41 feet to the derailment point and 680 feet westward. The grades for westbound trains are, successively, 0.95 percent descending 2,300 feet, a vertical curve 1,600 feet, 0.12 percent descending 800 feet, 0.05 percent descending 700 feet, and 0.24 percent descending 800 feet to the derailment point.

The track structure in the derailment area consists of 112-pound rail, 39 feet long, on the north side of the track, and 132-pound rail, 39 feet long, on the south side, relaid in 1964 on an average of 24 treated ties per rail length. It is fully tieplated with double-shoulder tie plates, spikes with 2 rail-holding and 4 plate-holding spikes per tie plate, and is provided with 36-inch 6-hold joint bars and an average of 14 rail anchors per rail. It is ballasted with gravel to a depth of 8 inches below the ties.

The prescribed super-elevation of the north rail at the derailment point was 3-1/2 inches.

Carrier's Operating Rules

DEFINITIONS

FIXED SIGNAL - A signal of fixed location indicating a condition affecting the movement of a train or engine.

Note.-The definition of a "Fixed Signal" covers such signals as ***reduced speed and resume speed signs, ***

USE OF SIGNALS

34 All members of the crew in cab of engine must, and other members of train crew, when practicable, will communicate to each other by its name the indication of each signal affecting the movement of their train or engine as soon as it becomes visible or audible. ***

REDUCE SPEED AND RESUME SPEED SIGN INDICATIONS

240-W Speed control signs located on right hand or left hand side of the track in advance of the restriction,

Figures shown on sign indicate in miles per hour the maximum speed permitted beginning at a point 3,000 feet from the sign and continuing until another Reduce Speed or a Resume Speed sign is encountered.

TRAIN AND YARD SERVICE

803 Members of train and engine crews *** must call attention to or take necessary action in event of any oversight or mistake. Other members of the crew in cab of engine must give instant notice to the engineer of any signals or indication of danger ***

When conditions or signals require that the train be stopped or speed of train be reduced and the engineer or conductor fails to take proper action to do so, *** other members of the crew must take immediate action to stop train

819 Trainmen must know by speed of train, grade or caboose air gauge that train is being handled safely and under control, and, when necessary, take immediate action to get train under safe control

Train

Extra E78 West consisted of electric units E78, E73 and diesel-electric unit 280, coupled in multiple-unit control, 99 cars and a caboose. The train brakes had been tested and functioned properly. As the train approached the derailment point, the engineer and front brakeman, the only crew members on the locomotive, were in the control compartment of the first electric unit. The conductor and flagman were in the caboose.

Damages

The train stopped with the front end 352 feet west of the derailment point. The three locomotive units, the 1st to 23rd cars and the 47th to 72nd cars, inclusive, were derailed. The locomotive units overturned to the north and stopped in line, on their right sides, against and parallel to the north side of the track structure. The derailed cars stopped in various positions on or near the track structure.

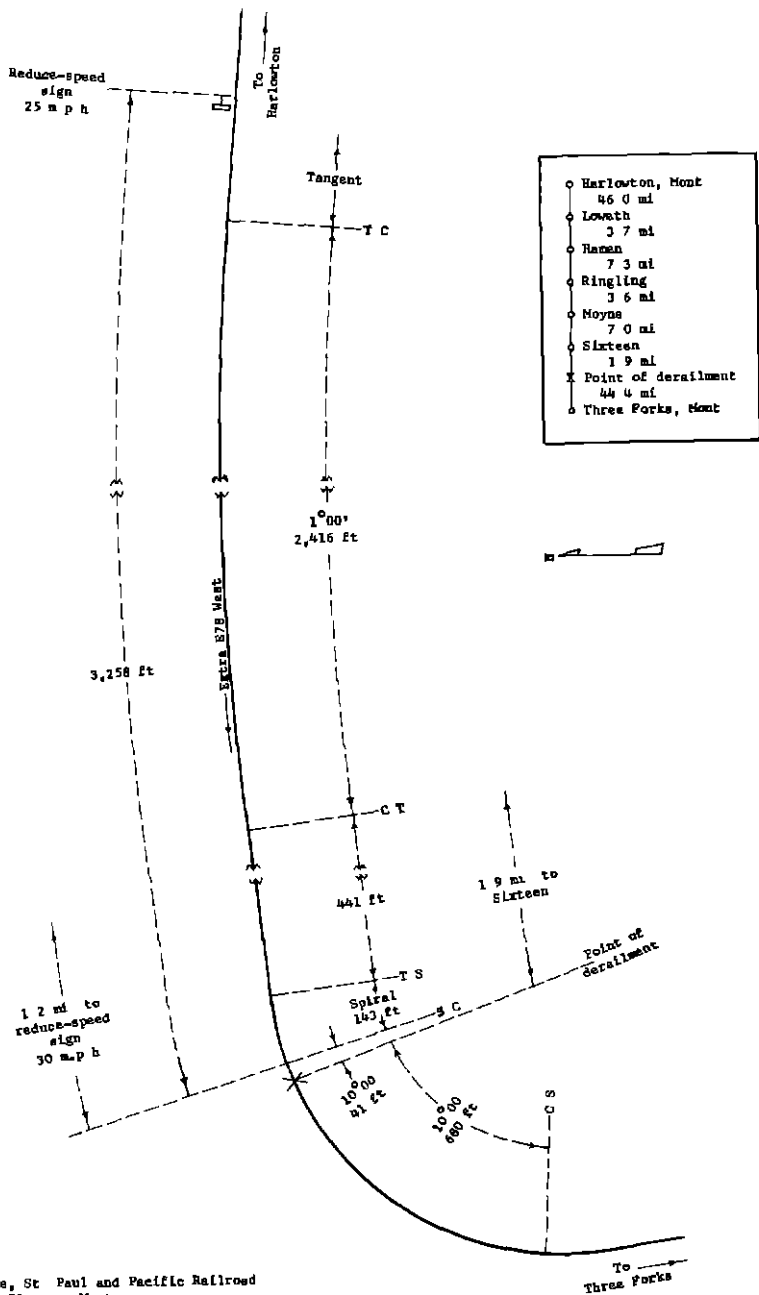
The locomotive units were heavily damaged. Of the 49 derailed cars, 29 were destroyed, 17 heavily damaged, 1 slightly damaged, and 2 undamaged.

Other Factors

The derailment occurred at 11 01 p m , in clear weather

The maximum authorized speed for freight trains in the territory involved was 60 miles per hour, but was restricted to 25 miles per hour on the curve where the accident occurred

According to their daily time returns, the engineer, conductor, front brakeman and flagman of Extra E78 West had been on duty 5 hours 1 minute at the time of the accident. The engineer had been off duty 16 hours 50 minutes and the other crew members had been off duty 17 hours 5 minutes before going on duty at Harlowton for the trip involved



Chicago, Milwaukee, St. Paul and Pacific Railroad
 Sixteen, Mont
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Washington, D. C. 20423

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