RAILROAD ACCIDENT INVESTIGATION

Report No 3795

CHICAGO, MILWAUKEE, ST PAUL AND PACIFIC RAILROAD COMPANY

PORTAGE, WIS

JANUARY 8 1958

INTERSTATE COMMERCE COMMISSION

Washington

SUMMARY

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DATE	January 8, 1958	
RAILROAD	Chicago, Milwaukee, St Paul and Pacific	
LOCATION	Portage, Wis	
KIND OF ACCIDENT	Derailment and collision	
TRAINS INVOLVED	Passenger	Freight
TRAIN NUMBERS	4	Extra 90A East
LOCOMOTIVE NUMBERS	Diesel-electric units 103A, 202B, and 17B	Diesel-electric units 90A, 72B, and 110A
CONSISTS	17 cars	85 cars, caboose
SPEEDS	68 m p h	Standing
OPERATION	Timetable, train orders, and automatic block-signal and cab-signal system	
TRACKS	Double, 1°00' and 1°47' curves, 0 56 and 0 25 percent descending grades eastward	
WEATHER	Clear	
TIME	4 00 a m	
CASUALTIES	12 injured	
CAUSE	Broken driving axle, and derailed passenger equipment colliding with freight train standing on adjacent main track	

INTERSTATE COMMERCE COMMISSION

REPORT NO 3795

IN THE MATTER OF MAKING ACCIDENT INVESTIGATION REPORTS UNDER THE LOCOMOTIVE INSPECTION ACT OF FEBRUARY 17, 1911, AS AMENDED, AND THE ACCIDENT REPORTS ACT OF MAY 6, 1910

CHICAGO, MILWAUKEE, ST PAUL AND PACIFIC RAILROAD COMPANY

July 22, 1958

Accident at Portage, Wis , on January 8, 1958, caused by a broken driving axle, and derailed passenger equipment colliding with a freight train standing on an adjacent main track

REPORT OF THE COMMISSION[1]

TUGGLE, Commissioner

On January 8, 1958, there was a derailment of a passenger train, and a collision between derailed equipment of that train and a freight train standing on an adjacent main track, on the Chicago, Milwaukee, St Paul and Pacific Railroad at Portage, Wis , which resulted in the injury of 1 passenger and 11 railway mail clerks

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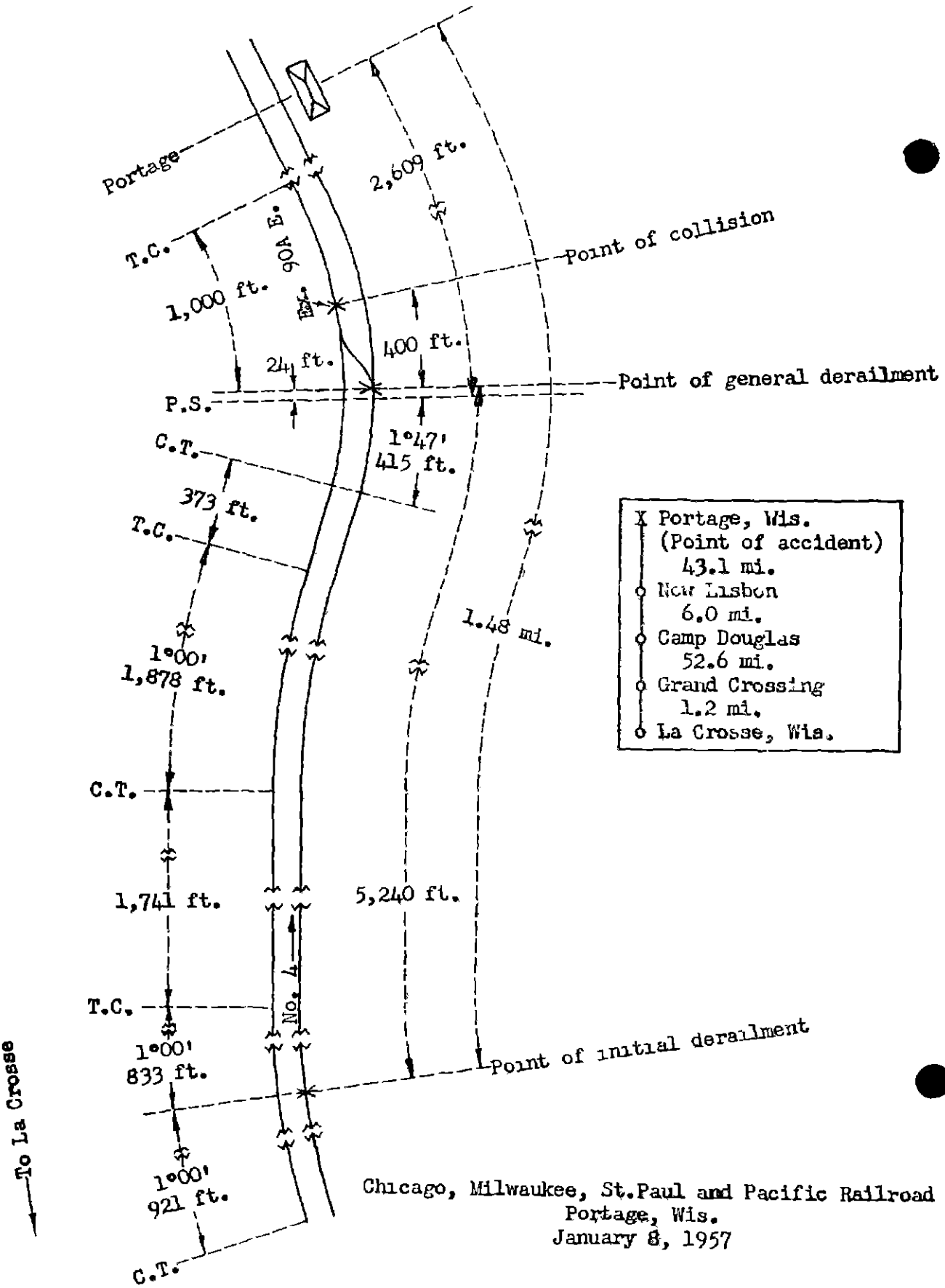
[1] Under authority of section 17 (2) of the *Interstate Commerce Act* the above-entitled proceeding was referred by the Commission to Commissioner Tuggle for consideration and disposition



Chicago, Milwaukee, St.Paul and Pacific Railroad
Portage, Wis.
January 8, 1957

Location of Accident and Method of Operation

This accident occurred on that part of the La Crosse and River Division extending between La Crosse and Portage, Wis , 102 9 miles In the vicinity of the point of accident this is a double-track line, over which trains moving with the current of traffic are operated by timetable, train orders, and an automatic block-signal and cab-signal system At Portage a facing-point crossover connects the two main tracks The west switch of the crossover is located 2,609 feet west of the station The initial derailment occurred at a point 1 48 miles west of the station, and the general derailment occurred at the west switch of the crossover 5,240 feet east of the point of initial derailment The collision occurred at a point approximately 400 feet east of the point of general derailment From the west there are, in succession, a 1°00′ curve to the right 921 feet to the point of initial derailment and 833 feet eastward, a tangent 1,741 feet, a 1°00′ curve to the right 1,878 feet, a tangent 373 feet, and a compound curve to the left 415 feet to the point of general derailment and 1,000 feet eastward The curvature at the point of general derailment is 1°47′ The grades at the points of initial and general derailment are, respectively, 0 56 percent and 0 25 percent descending eastward

In the vicinity of the point of accident the track structure of the eastward main track consists of 132-pound rail, 39 feet in length, laid new in 1951 and 1952 on an average of 24 treated ties to the rail length It is fully tieplated with double-shoulder tie plates, double spiked, and is provided with 6-hole 36-inch joint bars and an average of 10 rail anchors per rail It is ballasted with gravel to a depth of 18 inches below the bottoms of the ties

This carrier's operating rules read in part as follows

SIGNALMEN

626 Signalmen must, as far as practicable, observe all passing trains and note whether they are complete and in order, * * *

TRAIN AND YARD SERVICE

812 In departing from stations, and at every opportunity on the road, trainmen must carefully inspect their train for * * * possible defects of the running gear, * * *

* * *

ENGINEMEN

927 Enginemen must frequently look back, especially while rounding curves, to observe the condition of the train

* * *

The maximum authorized speed for passenger trains is 90 miles per hour, but it is restricted to 40 miles per hour at Portage

Description of Accident

Extra 90A East, an eastbound freight train consisting of diesel-electric units 90A, 72B, and 110A, coupled in multiple-unit control, 85 cars, and a caboose, stopped on the westward main track at Portage at 3 25 a. m with the rear end of the train approximately 2,100 feet west of the station About 35 minutes later the caboose and several of the cars at the rear end of the train were struck by derailed equipment of No 4

No 4, an eastbound first-class passenger train, consisted of diesel-electric units 103A, 202B, and 17B, coupled in multiple-unit control, 4 baggage cars, 1 mail car, 3 baggage cars, 3 coaches, 1 club car, and 5 sleeping cars, in the order named Diesel-electric unit 17B was operating backward with the control compartment at the west end of the locomotive The 1st car, and 5th to the 17th cars inclusive, were of lightweight steel construction The other cars were of conventional all-steel construction The 8th car, and the 12th to the 17th cars, inclusive, were equipped with tightlock couplers This train departed from La Crosse at 2 17 a m , 6 minutes late, departed from New Lisbon, 59 8 miles east of La Crosse, the last open office, at 3 20 a m , on time, and while moving at a speed of 68 miles per hour, as indicated by the tape of the speed-recording device, the right front wheel at location L-6 of the third diesel-electric unit was derailed at a point 1 48 miles west of the station at Portage While the train was moving at a speed of 42 miles per hour the rear truck of the 2nd diesel-electric unit, the front truck and left wheels of the rear truck of the 3rd diesel-electric unit, all trucks of the 1st to the 10th cars, inclusive, and the front truck of the 11th car were derailed at the west switch of the crossover at a point 5,240 feet east of the point of initial derailment Derailed equipment struck the caboose and several cars of Extra 90A East standing on the westward main track

The locomotive of No 4 stopped with the front end 1,101 feet east of the point of general derailment Separations occurred at both ends of the 4th to the 6th cars, inclusive The rear truck of the 3rd diesel-electric unit and the 1st to the 3rd cars, inclusive, derailed to the north and stopped upright and in line on the track structure The 4th car stopped upright on the track structure with the front end 532 feet east of the point of general derailment The front truck of this car was torn from the underframe The 5th car stopped on its right side to the rear of the 4th car with the front end on the track structure and the rear end approximately 40 feet south of the track The 6th car stopped upright to the rear of the 5th car and across the eastward main track with the front end approximately 60 feet south of the track The 7th car stopped upright to the rear of the 6th car with the front end approximately 14 feet north of the track and the rear end on the track structure The other derailed cars derailed to the north and stopped upright and in line on the track structure The 3rd to the 6th cars inclusive, were heavily damaged The 3rd diesel-electric unit, the 1st and 2nd cars, and the 7th to the 10th cars, inclusive, were somewhat damaged The 2nd diesel-electric unit was damaged slightly The caboose, the 84th car, and the 85th car of Extra 90A East were derailed to the north and stopped on the track structure The caboose was destroyed as a result of the collision and fire The 85th car was heavily damaged Four other cars were somewhat damaged, and 3 other cars were slightly damaged

The weather was clear at the time of the accident, which occurred about 4 00 a m

Description of Locomotive Unit Involved

Diesel-electric unit 17B was built in June 1946 by the Electro-Motive Division of General Motors Corporation at La Grange, Ill , and is equipped with two model 12-567B, 12-cylinder, 2-cycle, V-type diesel engines, rated at 1,000 horsepower each at 800 revolutions per minute A type D4 generator and a Garaner-Denver Company type ADX air compressor is directly connected to each diesel engine The unit is equipped with type 24RL Westinghouse Air Brake Company brake equipment and a Vapor Heating Corporation type CFK 4225 steam boiler

The unit is mounted on two swing-bolster six-wheel trucks having an A1A-A1A axle-truck arrangement with a 14 feet 1 inch wheelbase for each truck. Each traction motor is supported on its respective axle by two motor-support bearings and by a spring-cushioned nose-support which bears on the truck transom. The specified total weight of the unit with full supplies is 323,340 pounds and the weight on the driving wheels is 218,200 pounds. The maximum tractive effort is 54,550 pounds at 25 percent adhesion. The traction motors are E M D type D7 and the diameter of the driving wheels when new is 36 inches.

Examination of Track

Examination of the track structure after the accident occurred disclosed that eastward from a point approximately 21 miles west of the point of general derailment the planking of each track motorcar setoff and highway crossing bore a scrape mark apparently made by the flange of a wheel. These marks, which were approximately 2 inches in width, were located about 2 inches north of the gage side of the south rail and extended throughout the length of the planking. A piece of planking was torn from the west end of a highway crossing located 4,947 feet west of the point of general derailment and the planking bore a heavy scrape mark having a maximum width of 6 inches. Eastward from a point 5,240 feet west of the point of general derailment the inside top edge of each of the inside joint bars of the south rail was sheared apparently from contact with a wheel. The shearing extended from the west ends of the joint bars throughout a distance of about 4 inches. The maximum depth of sheared metal, located at the west ends of the joint bars, was about 1 inch. Most of the joint-bar bolts of these joint bars were sheared on the inside. The tops of the rail anchors of the south rail in that area bore heavy marks. The south switch point of the west switch of the crossover was struck a heavy blow. Metal was torn from the top of the switch rail throughout a distance of 14 inches. A scraping mark appeared on the gage side of the north switch rail at a point about 24 feet east of the switch point. This mark continued along the switch rail and closure rail to the frog. The closure rail was broken and canted northward. The frog was struck a heavy blow and was badly damaged. A piece of metal about 5 inches long and 1-1/2 inches thick was torn from the top of the guard rail at the west end. The track structure east of the frog was considerably damaged throughout a distance of approximately 1,000 feet.

Parts Involved

Examination of diesel-electric unit 1718 after the accident occurred disclosed that the No. 6 axle had broken and that the axle was discolored at the inner ends because of excessive heat. The failure of the axle consisted of a vertical break 2 feet 9-13/32 inches from the end of the axle and 7-3/8 inches from the axle gear seat. The fracture occurred approximately at the center of the right traction-motor support bearing (See Plate 1). The support bearing shell, lubricating oil, and oil wick were destroyed. The top of the housing of the motor-support bearing was worn to a maximum depth of 5/8 inch by contact with the broken ends of the axle. The traction-motor pinion and the axle gear were found to be in mesh but the teeth were badly worn as a result of the broken axle. The outside surface of the rim and the outside edge of the tread of the wheel at location L-6 were badly battered indicating that the wheel had been in contact with the track structure. The flange of the wheel at location R-6 bore a heavy mark apparently caused when it struck the frog of the west turnout of the crossover.

The axle that failed was manufactured by the Standard Forging Corporation in February 1953 in accordance with Association of American Railroads' specification M-126-53 for Grade E carbon steel forgings. Records indicate that the axle received magnaflux inspections on October 18, 1955,

and June 7, 1957, and that no defects were found At the time of the failure the axle had completed 96,7[illegible] miles of service since the date of the last magnaflux inspection

Tests performed in the laboratory of the carrier disclosed that the chemical composition of the axle was in accordance with the specifications of the Association of American Railroads, and etching of a cross section of metal of the wheel seat indicated that the metal was slightly porous but satisfactory Several circumferential thermal cracks were found within a distance of 3-1/4 inches from the broken end of the gear-end portion of the axle Copper penetration had occurred at one of these cracks

The axle motor-support journals were 8 inches in diameter when new and had been turned to 1/8 inch undersize which is the carrier's established maximum reduction in diameter The motor-support bearings were manufactured by the Magnus Metal Corporation and consisted of two pieces with an integral thrust collar at the outer end Lubrication was supplied to the journal by a felt wick manufactured by the Miller Lubricator Company One end of the wick was suspended in an oil reservoir in the traction-motor frame and the other end was in contact with the journal through an opening in the support bearing

Inspection and Repair Reports

Unit 17B received its monthly inspection on December 20, 1957, at Chicago, Ill , and its last hydrostatic test of main air reservoirs and required dielectric test of electrical circuits on October 21, 1957 at Milwaukee, Wis

Daily inspection and repair reports from December 1 1957, to date of the accident covering inspections made at Chicago, Milwaukee, Portage, La Crosse and at Minneapolis, Minn., were examined, and nothing was found reported which would have a bearing on the accident

Discussion

No 4 arrived at La Crosse at 2 05 a m , on time, and the crew was changed at that point The inbound engineer reported no defective equipment The outbound engineer said that he inspected the diesel-electric units before departing from La Crosse and that he observed nothing defective A car inspector said that he inspected No 4 as it passed him immediately before it stopped at La Crosse and he did not observe anything defective The engineer said that en route from La Crosse to the point of accident the wheel-slip indicator light became lighted only when the train started at La Crosse, apparently because of track conditions, and when transition occurred As No 4 was approaching the point where the accident occurred the enginemen were in the control compartment of the first diesel-electric unit, the conductor and the front brakeman were in the ninth car, and the flagman was in the rear car The brakes of this train had been tested and had functioned properly when used en route Members of the crew said that the equipment of the train rode smoothly prior to the accident and that there was no unusual slack action They said that they made observations of the train en route and observed nothing defective The operators at La Crosse, at Grand Crossing and Camp Douglas, 1 2 miles and 53 8 miles east of La Crosse, respectively, and at New Lisbon said that they observed No 4 as it passed and that they did not observe any defective equipment The engineer initiated a service brake application when the train was approximately 1-1/2 miles west of Portage to reduce the speed to comply with the speed restriction at Portage The general derailment occurred shortly after the brakes were released The first the enginemen became aware of anything being wrong was when the brakes of the train became applied in emergency as a result of the general derailment The first the members of the train crew became aware of anything being wrong was when the general derailment occurred

It is evident from the marks on the track structure and the condition of the No 6 axle, wheels and traction-motor assembly after the accident occurred, that the axle failed at a point of more than 21 miles west of the point of general derailment Wear on the support-bearing shell and then on the housing of the support bearing by contact with the broken ends of the axle permitted the broken end of the gear end of the axle to rise moving the L-6 wheel inward at the rail As wear continued the broken end of the axle rose sufficiently to permit the wheel to drop inside the rail The R-6 wheel remained on the rail until it reached the turnout of the west switch of the crossover.

The broken surfaces of the axle were damaged to the extent that the cause of the fracture could not be determined (See Plates 2 and 3)

Cause

This accident was caused by failure of a driving axle, and derailed passenger equipment colliding with a freight train standing on an adjacent main track

Dated at Washington, D C, this twenty-second day of July, 1958

By the Commission, Commissioner Tuggle

(SEAL)

HAROLD D McCOY,

Secretary

Figure 1. [illegible] axle and traction-motor support bearing housing

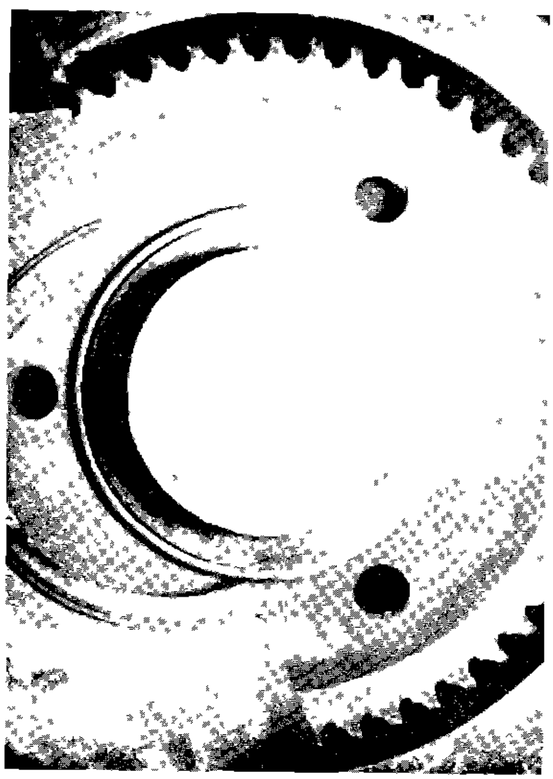


Figure 2. Broken surface [illegible]

Figure 3. Broken surface [illegible]