RAILROAD ACCIDENT INVESTIGATION

REPORT NO 4093

CHICAGO & EASTERN ILLINOIS RAILROAD COMPANY

HOOPESTON, ILL

APRIL 11, 1966

INTERSTATE COMMERCE COMMISSION

WASHINGTON

SUMMARY

DATE	April 11, 1966
RAILROAD	Chicago & Eastern Illinois
LOCATION	Hoopeston, Ill
KIND OF ACCIDENT	Derailment
TRAIN INVOLVED	Passenger
TRAIN NUMBER	93
LOCOMOTIVE NUMBERS	Diesel-electric units 1102, 1502, 1604
CONSIST	14 cars
SPEED	60 m p h
OPERATION	Signal indications
TRACK	Single, tangent, level
WEATHER	Cloudy
TIME	5 43 p m
CASUALTIES	18 injured
CAUSE	Spring rail frog assembly which was defective due to inadequate maintenance
RECOMMENDATION	That the Chicago & Eastern Illinois Railroad Company take such action as is necessary to insure the adequate maintenance of spring rail frog assemblies

INTERSTATE COMMERCE COMMISSION

RAILROAD SAFETY AND SERVICE BOARD

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SYNOPSIS

On April 11, 1966, a southbound passenger train on the Chicago & Eastern Illinois Railroad derailed at Hoopeston, Ill Sixteen passengers, one railroad employee, and one railway post office employee were injured

The accident was caused by a spring rail frog assembly which was defective due to inadequate maintenance

LOCATION AND METHOD OF OPERATION

This accident occurred on that part of the Danville Subdivision extending between Yard Center, 18 miles south of Chicago, and Danville, Ill , a distance of 105 2 miles In the accident area this is a single-track line over which trains operate by signal indications of a traffic control system At Hoopeston, 81 2 miles south of Yard Center, a yard track, designated as track No 1, parallels the main track on the west The main track and track No 1 are connected by a crossover, the south switch of which is in the main track 700 feet north of the station It is trailing point for southbound movements

The derailment occurred on the main track, 779 feet north of the station, at the frog of the south turnout of the crossover

A single-track line of the Norfolk and Western Railway crosses the C &E.I. main track at grade, 88 feet north of the station and 691 feet south of the derailment point

Details of the track, train, damages and other factors are set forth in the appendix

DESCRIPTION AND DISCUSSION

No 93, a southbound first-class passenger train, consisting of 3 diesel-electric units and 14 cars, left Chicago on the day of the accident at 3 48 p m , 3 minutes late, and passed Yard Center at 4 27 p m , 9 minutes late The fireman, a qualified engineer, was operating the locomotive As the train was moving at 60 miles per hour on a curve to the right, about one-half mile north of the station at Hoopeston, the fireman and the flagman simultaneously observed the west side of equipment in the train and saw no indication of any defective condition A few moments later at 5 43 p m., as the flagman looked forward along the east side of the train, wheels on the west side of the front truck of the 2nd locomotive unit derailed at the south turnout of the crossover north of the station and immediately afterward rerailed The rear truck of the 2nd locomotive unit, both trucks of the 3rd locomotive unit, and the first 11 cars then derailed at or near the frog At this time the crew on the locomotive noticed a slight irregular movement The engineer looked back and saw dust and debris flying along the east side of the train as a result of the derailment and called a warning The fireman immediately applied the train brakes in emergency

Sixteen passengers, one railway post office employee, and one train attendant were injured

Examination of the train equipment after the accident disclosed no condition which could have contributed to the cause of the derailment Scraping marks, which extended around the outside of the rims of the west wheels, were found on both trucks of the 2nd and 3rd diesel-electric units All wheels of the rear truck of the 2nd unit bore a three-fourths inch indentation in each flange caused by the derailed wheels striking the rails of the N&W crossing All wheels of the 3rd unit bore similar indentations which diminished in depth toward the rear wheels of this unit, apparently as a result of the progressive deterioration of the crossing under the battering of derailed wheels

Examination of the track structure of the main track throughout a considerable distance north of the frog disclosed no indication of defective track, dragging equipment, or any obstruction having been on the track

The first mark of the derailment on the track structure was a wheel flange mark on the top of the south edge of the flange-way filler block, 1 5/8 inches below and 5 inches south of the one-half inch frog point Beginning 18 inches south of the frog point, wheel marks appeared on tops of bolt heads and on a metal foot guard 38 inches south of the frog point at a level 3 inches below the top of the rail Scrape marks also appeared on the inside face of the spring wing rail, beginning 37 inches north of the frog point and extending to the toe of the frog The toe block was found near the west side of the track about 360 feet south of the frog The bolts securing the toe block had been broken, and there were wheel marks on the top surface of the toe block The receiving end of the closure rail was heavily battered, and the track structure was destroyed from the toe of the frog southward throughout a distance of 1,225 feet

The frog was provided with hold down horns and housings 4 inches and 40 inches north of the frog point The welds securing the hold down housings to the frog base plate were broken The spikes supplementing the welds were loose These defective conditions permitted vertical movements in excess of the allowable one-eighth inch of the spring wing rail above the level of the frog and of the frog below the level of the spring wing rail. Examination of the fractures of the welds disclosed worn and rusty surface conditions indicating a 75 percent old fracture at the south hold down housing and a 95 percent old fracture at the north housing The spike holes in the ties for the hold down housings were worn to the extent that the spikes could be inserted full length by hand The south hold down housing was found 108 feet south of the frog on the west side of the track The north housing was found along the west side of the frog base plate

FINDINGS

The worn and rusty condition of the fractures of the welds and the loose condition of the spikes clearly indicates that the hold down housings of the spring rail frog were inadequately maintained

Apparently, as the first locomotive unit moved over the frog, the complete fracture occurred in the 95 percent defective weld of the north hold down housing This immediately put additional strain on the south hold down housing, resulting in the complete fracture of its 75 percent defective weld As the first wheel of the second locomotive unit moved onto the frog, which then had no

effective hold down assemblies, the frog was depressed sufficiently for the rim of the wheel to engage the spring wing rail and force it outward. This allowed the wheel to drop from the frog point into the throat of the frog The wheel then rerailed at the toe of the frog The second wheel likewise was derailed at the frog and rerailed south of the frog The two wheels on the west side of the rear truck of the second locomotive unit and all wheels of the third unit and first 11 cars of the train derailed at the frog The resultant battering of the receiving end of the closure rail and subsequent displacement of track components caused the general derailment south of the frog

CAUSE

This accident was caused by a spring rail frog assembly which was defective due to inadequate maintenance

RECOMMENDATION

It is recommended that the Chicago & Eastern Illinois Railroad Company immediately take such action as is necessary to insure the adequate maintenance of spring rail frog assemblies

Dated at Washington, D C this 1st *day of* November 1966
By the Commission, Railroad Safety and Service Board

(SEAL)

H NEIL GARSON
Secretary

APPENDIX

Track

From the north on the main track there are, successively, a $0^{\circ}45'$ curve to the right 650 feet and a tangent 1,500 feet to the derailment point and a considerable distance southward In this area the grade of the track is level

The structure of the main track in the derailment area consists of 112-pound rail, 39 feet long, laid new in 1945 and 1946 on an average of 24 treated ties to the rail length It is fully tie-plated with double-shoulder tie plates, spiked with 2 rail holding spikes per tie plate, and is provided with 24-inch 4 hole joint bars and an average of 12 rail anchors per rail It is ballasted with crushed slag to a depth of 12 inches below the ties

The frog involved is a 112-pound left hand, No 10, spring rail frog, 16 feet 6 inches long. The actual one-half inch frog point is 77 inches from the toe of the frog The frog angle is $5^{\circ}43'29''$ The double coil spring assembly, which holds the spring wing rail against the long point rail, is 7 inches south of the frog point The frog is supported by a base plate and 7 frog plates on 11 treated switch ties

The carrier's records indicate that the frog was placed in the track in 1946, and that work was last performed on the frog on January 3, 1966, when a hold down housing was welded

The frog and the track in the derailment area were last inspected by an Assistant Track Supervisor riding over it on a track motorcar on the morning of April 11, 1966 No exceptions were taken to the condition of the frog.

Train

No 93 consisted of car-body type diesel-electric units 1102, 1502, and 1604, coupled in multiple-unit control, 1 box-express car, 2 baggage cars, 1 postal car, 1 baggage car, 1 dormitory car, 2 coaches, 1 dining car, 1 lounge car, 2 coaches, and 2 sleeping cars, in that order The cars were of all-steel construction The 1st and 3rd locomotive units and the 7th to 14th cars, inclusive, were equipped with tightlock couplers

As the train approached the derailment point, the engineer and fireman were in the control compartment at the front of the first

diesel-electric unit The conductor was in the 7th car, and the flagman was on the rear platform of the rear car The brakes had been tested and had functioned properly when used en route The headlight was lighted

Damages

No 93 stopped with the front end 1,299 feet south of the derailment point The wheels of the rear truck of the 2nd locomotive unit, all wheels of the 3rd locomotive unit and following 11 cars were derailed. Separations occurred at the south end of the 1st car and both ends of the 3rd, 5th and 7th cars The derailed equipment stopped in various positions on or near the track structure as shown in the sketch appended to this report The 2nd and 3rd locomotive units and the first 9 cars were heavily damaged The remaining 2 derailed cars were slightly damaged

Other Factors

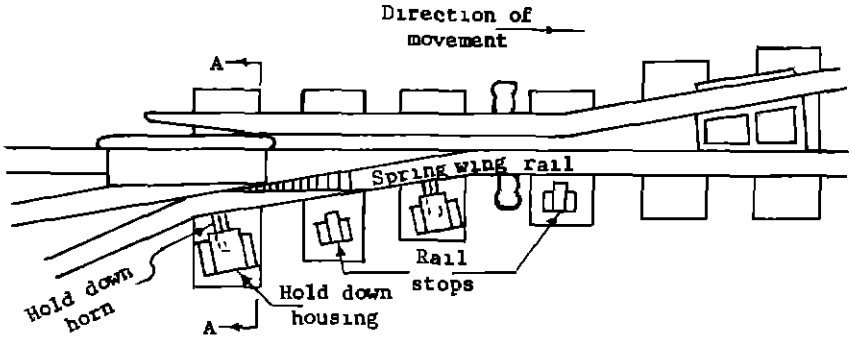
The accident occurred at 5 43 p m , in cloudy weather

The maximum authorized speed for passenger trains in the accident area is 60 miles per hour

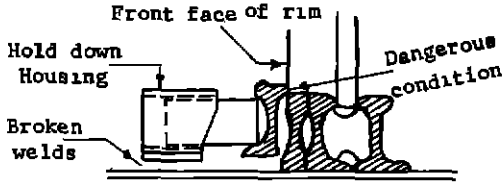
The average daily movement in the accident area during the 30-day period immediately preceding the day of the accident was 13 5 trains

According to the daily time returns the conductor and flagman of No 93 had been on duty 2 hrs. 28 min at the time of the derailment after having been off duty 4 hrs 15 min at Chicago Previously their on duty time on the northbound trip from Danville was 3 hrs 25 min. They had been off duty at Danville 48 hrs prior to the northbound trip.

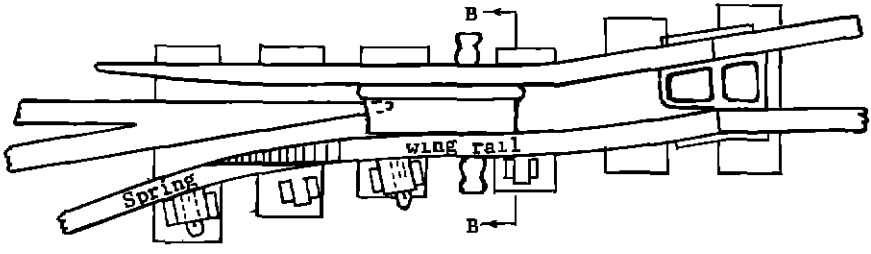
The engineer and fireman of No 93 had been on duty 2 hrs 58 min at the time of the derailment after having been off duty 4 hrs. 10 min at Chicago. Previously, their on duty time on the northbound trip from Danville was 4 hrs. 50 min They had been off duty at Danville 24 hrs prior to the northbound trip



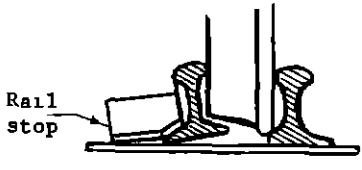
Sketch of frog showing position of wheel where a dangerous condition existed, due to defective hold downs, as shown in Section A-A.



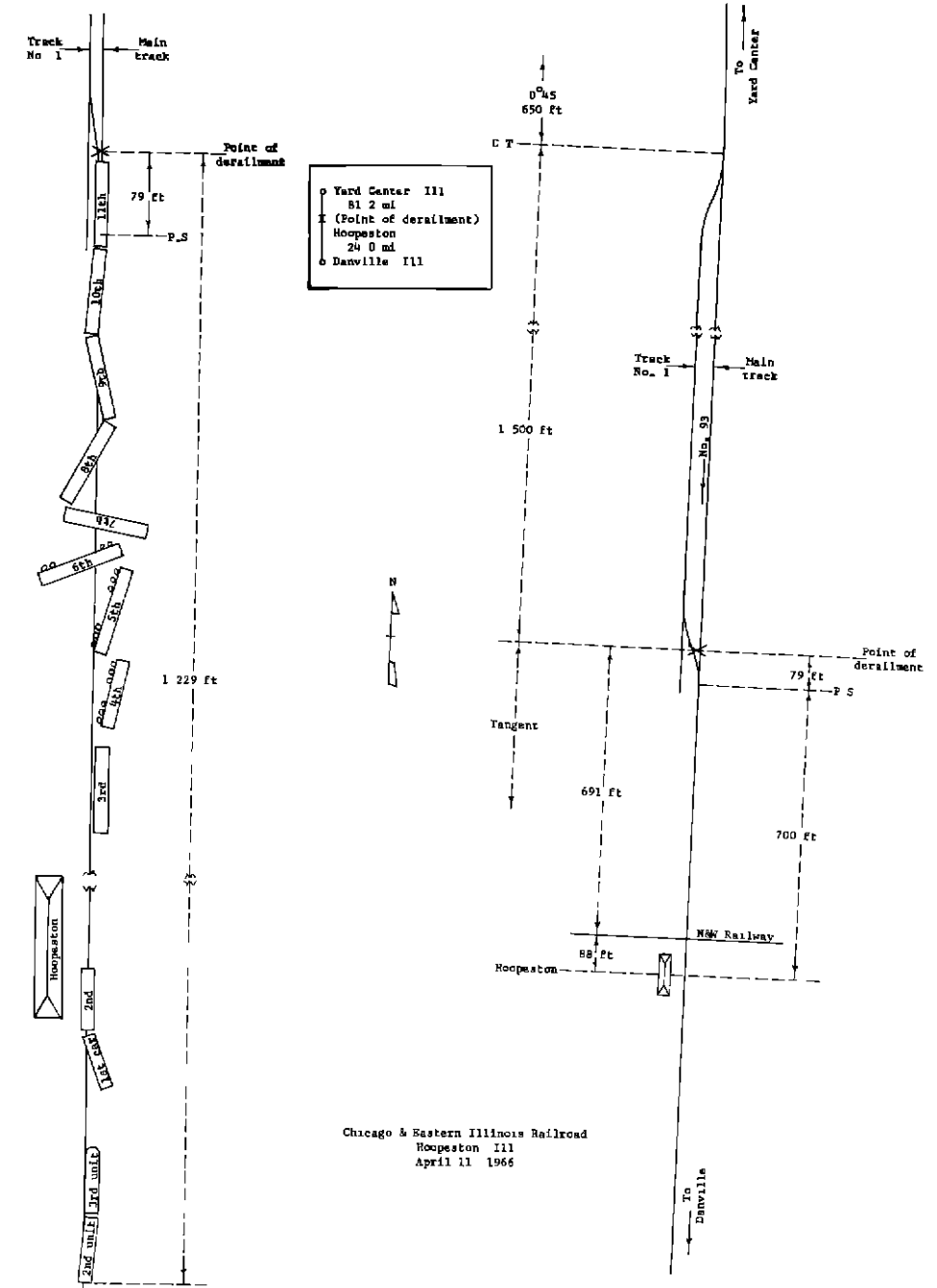
Section A-A
Defective hold down



Sketch of frog showing wheel derailed after engaging spring wing rail and forcing it out of position, as shown in Section B-B



Section B-B
Wheel derailed after passing over point of frog.



Chicago & Eastern Illinois Railroad
Hoopeston Ill
April 11 1966

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