

INTERSTATE COMMERCE COMMISSION

WASHINGTON

REPORT NO. 3749

FLORIDA EAST COAST RAILWAY COMPANY

IN RE ACCIDENT

AT DAYTONA BEACH, FLA., ON

MARCH 16, 1957

- 2 -

SUMMARY

Date: March 16, 1957

Railroad: Florida East Coast

Location: Daytona Beach, Fla.

Train involved: Passenger

Train number: 8

Locomotive number: Diesel-electric units 1010, 1015,
and 1002

Consist: 20 cars

Speed: 30 m. p. h.

Operation: Timetable, train orders, and automatic
block-signal system

Tracks: Double; tangent; level

Weather: Foggy

Time: 11:40 p. m.

Casualties: 18 injured

Cause: False flange on slid-flat driving
wheel resulting from seized traction-
motor armature bearing

INTERSTATE COMMERCE COMMISSION

REPORT NO. 3749

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.

FLORIDA EAST COAST RAILWAY COMPANY

June 21, 1957

Accident at Daytona Beach, Fla., on March 16, 1957, caused
by a false flange on a slid-flat driving wheel resulting
from a seized traction-motor armature bearing.

REPORT OF THE COMMISSION¹

TUGGLE, Commissioner:

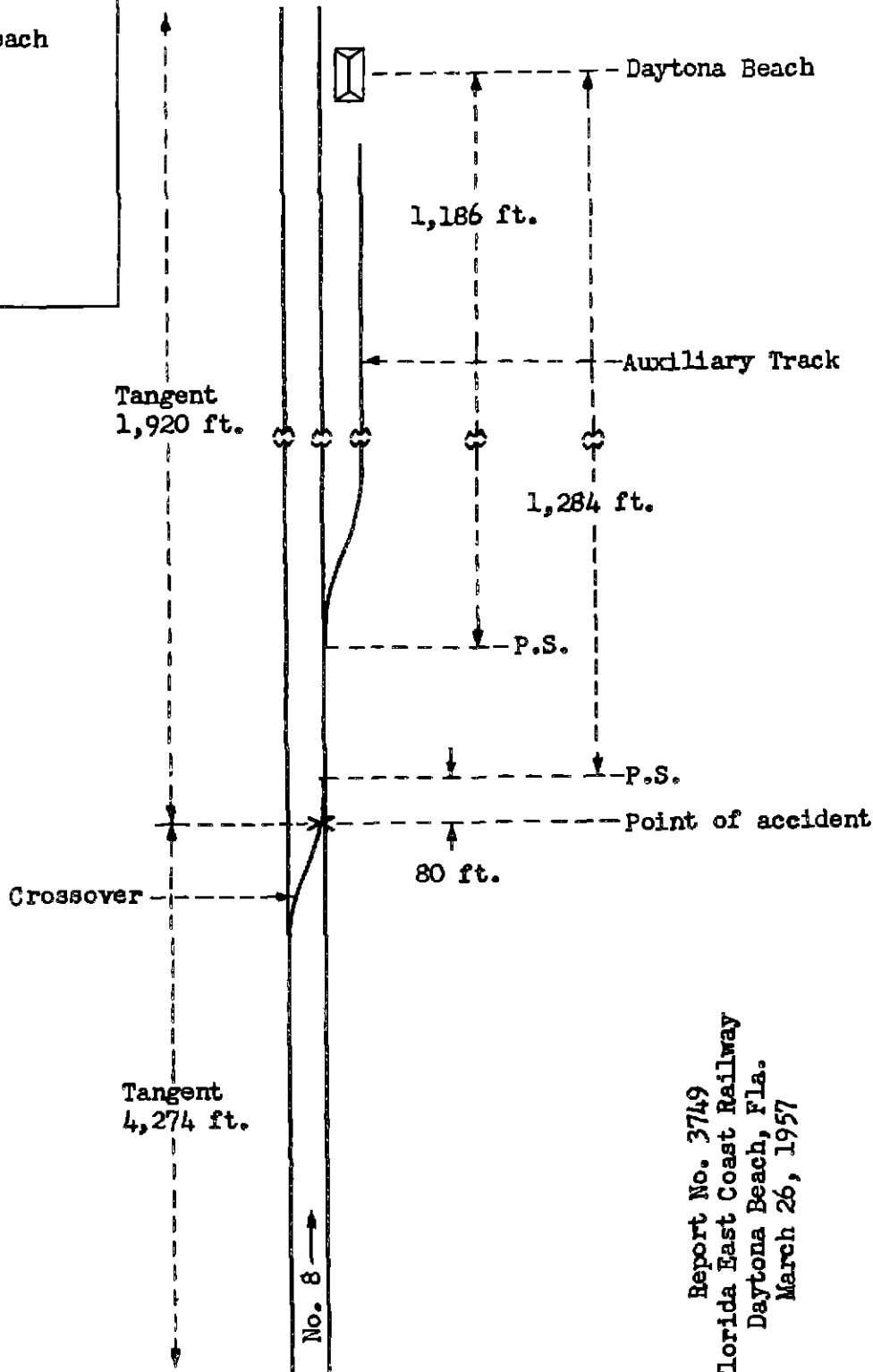
On March 16, 1957, there was a derailment of a passenger
train on the Florida East Coast Railway at Daytona Beach, Fla.,
which resulted in the injury of 16 passengers, 1 dining-car
employee, and 1 train-service employee.

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Under authority of section 17 (2) of the Interstate Commerce
Act the above-entitled proceeding was referred by the Commis-
sion to Commissioner Tuggle for consideration and disposition.

To Jacksonville ↑

- Jacksonville, Fla.
90.3 mi.
- X Daytona Beach
(Point of accident)
14.9 mi.
- New Smyrna Beach
25.7 mi.
- East Mims
4.1 mi.
- Titusville,
87.2 mi.
- Fort Pierce
124.0 mi.
- Miami, Fla.



↓ To Miami

Report No. 3749
 Florida East Coast Railway
 Daytona Beach, Fla.
 March 26, 1957

Location of Accident and Method of Operation

This accident occurred on that part of the railroad extending between Miami and Jacksonville, Fla., 346.2 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 system. At Daytona Beach, 255.9 miles north of Miami, a trailing-point crossover connects the two main tracks, and an auxiliary track parallels the main tracks on the east. The north crossover-switch and the auxiliary-track switch, which is facing-point for north-bound movements, are located, respectively, 1,284 feet and 1,186 feet south of the station. The derailment occurred at the frog at the north end of the crossover. The tracks are tangent throughout a distance of 4,274 feet immediately south of the point of accident and 1,920 feet northward. The grade is practically level at the point of accident.

In the vicinity of the point of accident the track structure consists of 112-pound rail, 39 feet in length, laid new in 1943 on an average of 22 ties to the rail length. It is fully tieplated with single-shoulder tie plates, single spiked, and is provided with 4-hole 24-inch joint bars and an average of eight rail anchors per rail. It is ballasted with rock to a depth of 8 inches below the bottoms of the ties. The turnout at the north end of the crossover is provided with a No. 10 spring-rail frog.

The maximum authorized speed for passenger trains is 79 miles per hour, but it is restricted to 30 miles per hour in the vicinity of the point of accident.

Description of Accident

No. 8, a north-bound first-class passenger train, consisted of diesel-electric units 1010, 1015, and 1002, coupled in multiple-unit control, one passenger-baggage car, six coaches, one tavern car, one dining car, ten sleeping cars, and one dining car, in the order named. The first to the ninth cars, inclusive, were of lightweight construction, and the other cars were of conventional all-steel construction. This train departed from New Smyrna Beach, 14.9 miles south of Daytona Beach, the last open office, at 10:49 p. m., 35 minutes late, and while it was moving at a speed of about 30 miles per hour a false flange on the left rear wheel of unit 1010 struck the gage side of the spring wing-rail of the frog at the north end of the crossover at Daytona Beach. The spring wing-rail was bent outward, and the rear wheels of the rear truck of the first diesel-electric unit, all trucks of the second and third diesel-electric units and the first to the fourth cars, inclusive, and the front truck of the fifth car were derailed.

The rear wheels of the rear truck of the first diesel-electric unit rerailed before the unit stopped. This unit stopped with the front end 570 feet north of the point of derailment. No separations occurred between units of the train. The side of the second diesel-electric unit struck a freight car standing on the auxiliary track. The rear end of this unit, the second diesel-electric unit, and the first car stopped on the track structure of the auxiliary track. The other derailed equipment stopped approximately in line with the northward main track. The second diesel-electric unit and the second car were badly damaged. The third diesel-electric unit, and the first, third, and fourth cars were considerably damaged. The first diesel-electric unit and the fifth car were somewhat damaged.

The train baggageman of No. 8 was injured.

The weather was foggy at the time of the accident, which occurred at 11:40 p. m.

Description of Locomotive Unit Involved

Diesel-electric unit 1010, the leading unit of the locomotive, was built in June 1945, at La Grange, Ill., by the Electro-Motive Division of General Motors Corporation. It is equipped with two E.M.D. model 12-567-A, 12-cylinder, 2-cycle, V-type diesel engines, rated at 1,000 horsepower each at 800 r. p. m. Each engine is directly connected to an E.M.D. type D-4 generator. The unit is equipped with HSC air-brake equipment, and is provided with a Vapor Car Heating Company type CFK-4225-3A heating boiler.

The unit is mounted on two six-wheel trucks of the swingbolster type. The wheelbase of each truck is 14 feet 1 inch. The specified diameter of the wheels is 36 inches when new. The front and rear axles of each truck are motor driven. Each traction motor is supported by axle-support bearings, and a spring-cushioned nose support which bears on a truck transom. The specified total weight of the unit is 312,320 pounds, and the weight on the driving wheels is 210,500 pounds. The maximum tractive effort is 52,630 pounds at 25 percent adhesion.

The No. 4 traction motor, a type D-7, in which bearing seizure was later found, was equipped with sealed grease Hyatt armature bearings. It was placed in service in June 1945, and was last overhauled in December 1954. It was installed in the No. 4 position in unit 1010 in January 1957. The motor accumulated 199,399 miles of service from the time it was overhauled until the time it was removed from unit 1010 after the accident occurred.

Unit 1010 is equipped with a wheel-slip relay for each power unit. A wheel-slip relay functions when there is an appreciable difference in the rotational velocities of the wheels of a truck provided the unit is moving at other than low speeds and power is being supplied to the traction motors of the truck involved. When the wheel-slip relay functions, a wheel-slip indicator located on the engineer's instrument panel becomes lighted and the power supplied to the traction motors of the truck involved is automatically reduced. In the event that a wheel-slip relay functions as a result of sliding wheels, the indicator will remain lighted provided the engine supplying power to the traction motors of the truck involved is not isolated.

Examination of Track

Examination of the track structure after the accident occurred disclosed that the gage side of the spring wing-rail of the frog at the north end of the crossover had been heavily scraped where the false flange on the left No. 6 wheel of unit 1010 had engaged the side of the wing rail between the point rail and the wing rail near the flared end. The spring wing-rail was bent outward. Heavy marks on the toe block and toe-block bolts indicated that wheels had derailed between the spring wing-rail and the rigid wing-rail of the frog. North of the frog the east rail was canted outward. The canting of the rail increased progressively, and at a point about 32 feet north of the point-of-frog flange marks appeared in the web of the rail. The track was destroyed throughout a distance of 225 feet north of the heel of the switch.

Examination of Parts Involved

Slid-flat spots approximately 8-1/2 inches long and 3 inches wide were found on the treads of the right and left No. 6 wheels of unit 1010. A false flange about 7/16 inch high had been formed on the outer edge of the tread of each wheel. At other points on the wheels flange height and rim thickness were 1-1/4 inches and 1-15/32 inches, respectively. The outer edge of the rim of the left wheel was heavily abraded as a result of contact with the gage side of the west rail.

Examination of the No. 4 traction motor after it was disassembled at Miami, Fla., disclosed that the armature bearing at the pinion end had seized. The roller-bearing assembly at that end was discolored from heating. The heads of nine of the 14 roller-bearing cage rivets were sheared at the outer retainer ring. Six of the 14 roller bearings had 3/8-inch to 1/2-inch flat spots extending the length of the bearing.

Five other roller bearings had smaller flat spots. The inside bearing surface of the outer race and the outside bearing surface of the inner race bore indentations where the roller bearings had been embedded. Marks on the journal and on the inner bearing surface of the inner race indicated that the race had turned on the journal. An oil thrower and the inner race were fused to the armature shaft.

The wheel-slip relay system was tested after the damaged traction motor was replaced and it was found that it functioned as intended.

Inspection and Repair Reports

Unit 1010 received last monthly inspection and repair on March 12, 1957, at Miami, Fla.

The work report rendered by the inbound crew of No. 8 at New Smyrna Beach on the day the accident occurred contained the following items:

Examine brakes back truck to see if too tight.

Examine No. 2 traction motor had to shut No. 2 engine down at mile post 145.

Remarks: Saw fire flying from wheels of back truck of unit 1010 and stopped to see what it was.

Both the inbound and outbound crews jointly inspected unit 1010 after it arrived at New Smyrna Beach and particular attention was given to the above-listed items. The inspection did not disclose any defective condition of the traction-motor bearing.

Other work reports covering a period extending from February 1, 1957, to the day the accident occurred were examined and no items were found which would have any bearing on the accident.

Discussion

No. 8 originated at Miami, Fla., 255.9 miles south of Daytona Beach. Crews were changed at Fort Pierce, 131.9 miles south of Daytona Beach, and at New Smyrna Beach. The inbound crew at Fort Pierce reported no defective equipment. The engineer said that the wheel-slip indicator did not light en route from Miami to Fort Pierce. The engineer said that after the

train departed from Titusville, 44.7 miles south of Daytona Beach, the wheel-slip indicator became lighted momentarily. He said that while the train was moving on a curve near East Mims, 4.1 miles north of Titusville, the wheel-slip indicator became lighted and remained lighted, and that he observed sparks in the vicinity of the rear wheels of unit 1010. The fireman was inspecting the engines of the locomotive at that time. He said that he observed sparks in the vicinity of the rear wheels of unit 1010. He said that there was smoke emerging from the No. 2 engine of unit 1010 and that the speed of the engine was irregular. The train was stopped after leaving the curve, and the engineer and fireman inspected the rear wheels of unit 1010. Both the engineer and the fireman said that they observed no defective condition and that they touched the traction-motor housing and found that it was cool. The engineer then moved the train forward while the fireman inspected the wheels. The fireman said that all wheels were turning. The fireman boarded unit 1010 and isolated the No. 2 engine of that unit. The train then proceeded to New Smyrna Beach. The engineer and fireman said that after isolating the engine they observed no unusual condition en route to New Smyrna Beach. After the train arrived at New Smyrna Beach, the inbound and outbound crews examined the rear wheels of unit 1010 and found nothing defective. The engineer said that after the train departed from New Smyrna Beach he looked to the rear of unit 1010 frequently from his position in the control compartment and that he did not observe any defective condition. He said that the first he became aware of anything being wrong was when the derailment occurred.

The investigation disclosed that the armature bearing of the No. 4 traction motor of unit 1010 seized in the vicinity of East Mims and that the wheel-slip indicator indicated this condition. The wheel-slip relay circuits are so arranged that, after the No. 2 engine of unit 1010 was isolated, the wheel-slip indicator displayed no further warning to the crew that wheels on the rear truck were sliding.

Cause

This accident was caused by a false flange on a slid-flat driving wheel resulting from a seized traction-motor armature bearing.

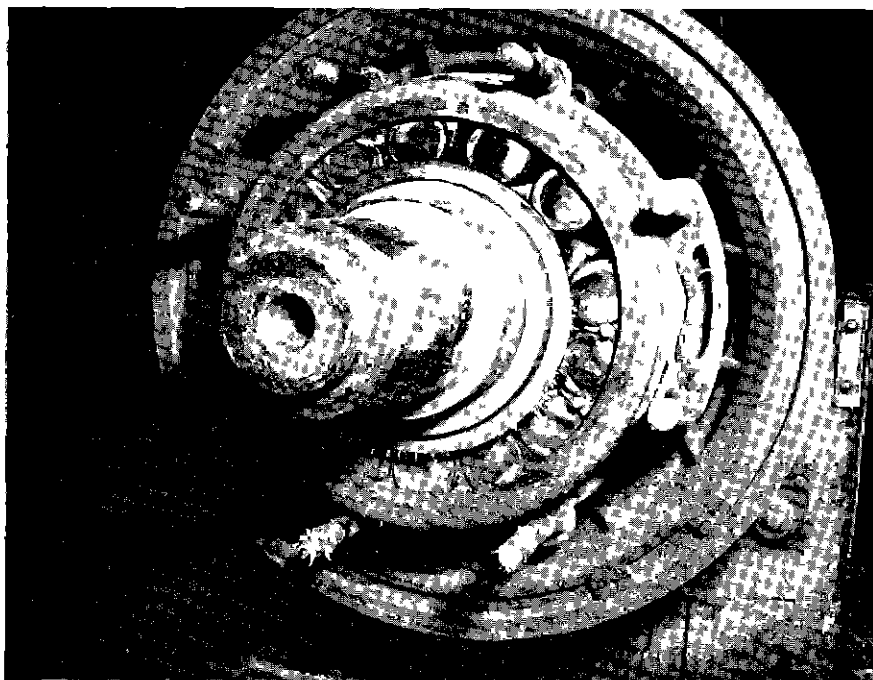
Dated at Washington, D. C., this twenty-first day of June, 1957.

By the Commission, Commissioner Tuggle.

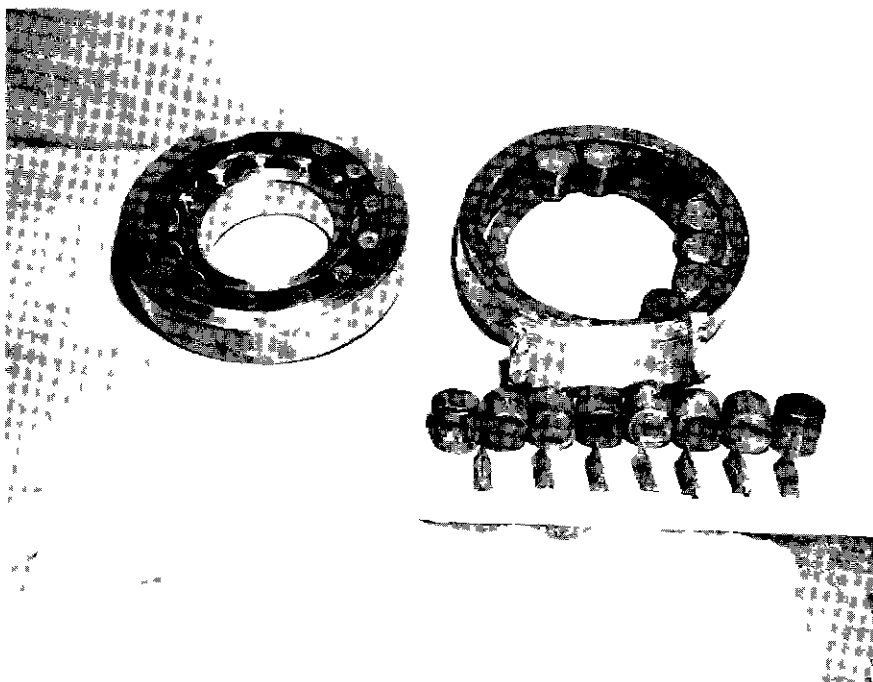
(SEAL)

HAROLD D. McCOY,

Secretary.



Traction-motor armature bearing, pinion end, after removing housing.



Races, rollers, and cage compared with new bearing of same type.