

INTERSTATE COMMERCE COMMISSION

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FIFTY-THIRD ANNUAL REPORT  
OF THE  
DIRECTOR OF LOCOMOTIVE INSPECTION  
TO THE  
INTERSTATE COMMERCE COMMISSION

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FISCAL YEAR ENDED  
JUNE 30, 1964



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**ANNUAL REPORT OF THE  
DIRECTOR OF LOCOMOTIVE INSPECTION**

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December 2, 1964.

*To the Interstate Commerce Commission:*

In compliance with section 7 of the act of February 17, 1911, as amended, the Fifty-third Annual Report of the Director of Locomotive Inspection, covering the work of the fiscal year ended June 30, 1964, is respectfully submitted.

Summaries are given, by railroads, of all accidents which resulted in serious injury or death to one or more persons due to the failure of parts and appurtenances of locomotives, as reported and investigated under section 8 of the Locomotive Inspection Act. Accidents which occurred as a result of failure of parts and appurtenances of locomotive, and which resulted in damage to property or equipment but not serious injury or death, are not included in this report. For additional information concerning railroad accidents, see Accident Bulletin, prepared by the Bureau of Transport Economics and Statistics.

Tables contained in the report show the results of inspection of locomotives, the number of accidents and resultant casualties caused by failure of some part or appurtenance of individual locomotives, and the parts and appurtenances which caused accidents and casualties. The tabulated inspection data cover the number of locomotives for which reports were filed, the number inspected, the number and percentage found defective, the number for which written notices for repairs were issued in accordance with section 6 of the act, and the total number of defects found and reported. Tables are included to show, by railroads, all locomotive defects found by district locomotive inspectors. Data for preceding years are given where possible, for comparative purposes.

**GENERAL CONDITIONS OF LOCOMOTIVES AND INVESTIGATION OF  
ACCIDENTS**

During the year, 11.1 percent of the locomotives inspected by our inspectors were found with defects or errors in inspection that should have been corrected before the locomotives were put into use. Five hundred and seventy-nine locomotives were ordered withheld from

service by our inspectors because of the presence of defects that rendered the locomotives immediately unsafe; this is an increase of 159 locomotives compared with the preceding year.

Results of locomotive inspections made by district locomotive inspectors in performance of duties prescribed under section 6 of the act are shown in the following table:

*Reports and inspections—steam locomotives, locomotive units other than steam, and multiple operated electric locomotive units*

	Year ended June 30—					
	1959	1960	1961	1962	1963	1964
Number of locomotives for which reports were filed.....	36,069	35,645	35,074	34,789	34,473	34,350
Number inspected.....	105,347	108,629	98,332	94,592	79,781	79,682
Number found defective.....	10,912	11,126	9,399	9,050	8,497	8,852
Percent of inspected found defective.....	10.4	10.2	9.6	9.6	10.7	11.1
Number ordered out of service.....	648	531	504	488	420	579
Number of defects found.....	32,390	32,830	28,308	26,032	25,718	28,453

As indicated in the preceding table there was a decrease in the number of locomotives for which carriers were filing reports on June 30, 1964, as compared to the number filed on June 30, 1963. The decrease resulted from 33 steam locomotives being retired during the year, and a decrease of 90 in the number of other than steam and multiple operated electric locomotive units for which reports were filed during the same period.

During the year, district locomotive inspectors devoted 8,189 days to regular inspections of locomotives, 473½ days making shop inspections to determine that repairs and tests were being made to meet the requirements of the law and rules, 460 days investigating accidents, 313½ days on special assignment relating to locomotive inspection including investigating complaints regarding possible violation of the law and rules, 722½ days conferring with carrier representatives and officials, 2,425½ days at their respective headquarters reviewing and processing inspection and repair reports filed by the carriers and performing other office work, and 7 days 4¼ hours in connection with delegated mobilization functions.

Tables I, II, and III in the appendix show details of defective parts and appurtenances of steam locomotives, locomotive units other than steam, and multiple operated electric locomotive units reported, inspected, found defective, and ordered out of service. If the reported defective parts shown by the tables are considered, those parts which may be expected to require most maintenance will be indicated, and inspection and repair programs may be set up accordingly.

Detailed results of inspections of steam locomotives, locomotive units other than steam, and multiple operated electric locomotive units are shown, by carriers, in tables IV, V, and VI in the appendix.

#### INVESTIGATION OF ACCIDENTS

Accidents reported under requirements of the law and Commission rules were investigated and appropriate action taken to prevent recurrence so far as possible. All district inspectors were advised of details and causes of unusual accidents to better assist them in their safety promotional contacts. The dissemination of such information combined with the active enforcement of the requirements has been effective in promotion of locomotive safety and has resulted in a generally decreasing accident trend.

Seventy-six accidents occurred in connection with all types of locomotives in which 96 persons were injured and 1 killed. One of these accidents involving one injury occurred during the previous year, but was reported too late to be included in the last annual report. Compared with the preceding year there was an increase of 5 accidents and a decrease of one casualty.

Of the 76 accidents, 17 were caused by the defective condition of floors, steps, and passageways of diesel-electric locomotives. Nine of the 17 resulted from accumulation of oil on walking surfaces of the locomotives, a decrease of 5 compared with the preceding year.

Twelve accidents were caused by the defective condition of cab seats, compared with six in the previous year.

Nine accidents were caused by diesel engine crankcase explosions, compared with four in the previous year.

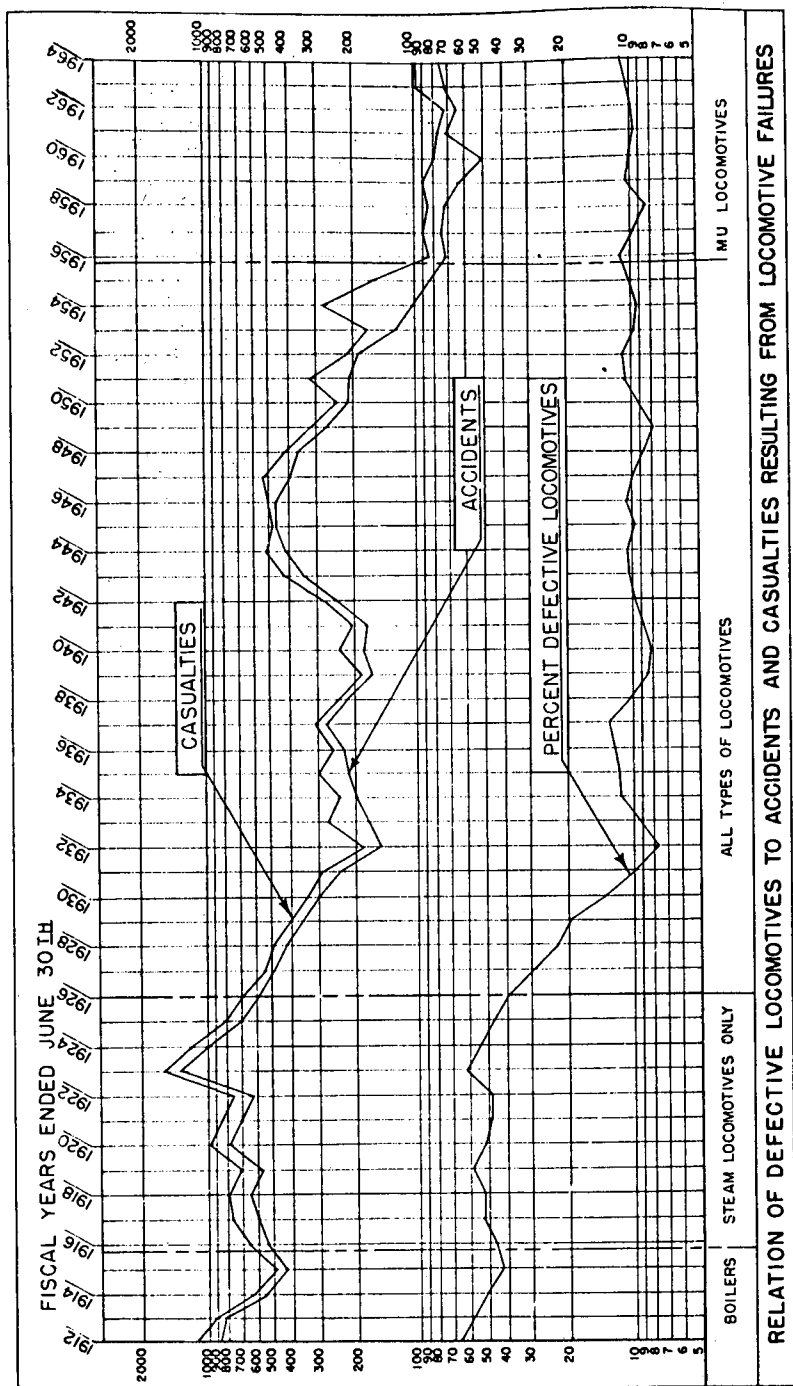
The following table provides details of the accidents and casualties during the past 6 years caused by failure of some part or appurtenance of locomotives, and indicates increases or decreases in accidents and casualties:

*Accidents and casualties caused by failure of some part or appurtenance of steam locomotives, locomotive units other than steam, and multiple operated electric locomotive units*

	Year ended June 30—					
	1959	1960	1961	1962	1963	1964
Number of accidents.....	66	50	71	67	71	76
Percent increase or decrease from previous year.....	8.3	24.2	142.0	5.6	15.9	17.0
Number of persons killed.....	0	0	0	0	0	1
Percent increase or decrease from previous year.....	0	0	0	0	0	100
Number of persons injured.....	90	81	77	73	98	96
Percent increase or decrease from previous year.....	14.7	10.0	4.9	5.2	134.2	2.0

<sup>1</sup> Increase.

The chart on page 4 shows the relation between the percentage of defective locomotives and the number of accidents and casualties



which have resulted from defective parts and appurtenances and illustrates the effect of operating locomotives in defective condition.

Data are given for the past 5 years on the distribution of casualties among railroad personnel by occupations and nonemployees in the following table:

Number of casualties classified according to occupation—steam locomotives, locomotive units other than steam, and multiple operated electric locomotive units

	Year ended June 30—									
	1960		1961		1962		1963		1964	
	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured
Member of train crews:										
Engineers.....		17		14		23		17		20
Firemen.....		21		44		37		36		35
Brakemen.....		11		11		8		9		18
Conductors.....		2		3		2		5		1
Switchmen.....		1		2		1		1		2
Maintenance employees.....		2				2				4
Other employees.....		6		3				2		0
Nonemployees.....		21						28		1
<b>Total.....</b>	<b>0</b>	<b>81</b>	<b>0</b>	<b>77</b>	<b>0</b>	<b>73</b>	<b>0</b>	<b>98</b>	<b>1</b>	<b>96</b>

The following table illustrates the parts or appurtenances of locomotives that caused the accidents which occurred during the past fiscal year:

Accidents and casualties resulting from failure of steam locomotives, tenders, locomotives other than steam, multiple operated electric locomotive units, and their appurtenances

Part or appurtenance which caused accident	Year ended June 30, 1964		
	Accidents	Killed	Injured
Air compressors.....	2	0	2
Air reservoirs, fittings, safety and check valves.....	0	0	0
Boiler:			
Explosions.....	0	0	0
Fuel explosion in firebox.....	0	0	0
Steam valves, piping and blowers.....	1	0	1
Brakes and brake rigging.....	2	0	2
Cab:			
Doors and windows.....	5	0	5
Seats.....	12	0	12
Control equipment—mechanical, electrical, pneumatic, or electropneumatic.....	0	0	0
Couplers, draft and drawgear.....	0	0	0
Electrical equipment:			
Armature journals and bearings.....	1	1	4
Energized electrical parts.....	1	0	1
Insulation, short circuits, or electrical flashes.....	10	0	25
Fans and shutters.....	0	0	0
Fires due to liquid fuel or debris.....	1	0	1
Floors, steps, and passageways.....	17	0	17
Handholds.....	1	0	1
Internal combustion engines and turbines:			
Crankcase or air-box explosions.....	9	0	9
Exhaust and cooling systems.....	6	0	6
Fuel injectors and connections.....	0	0	0
Miscellaneous.....	8	0	10
<b>Total.....</b>	<b>76</b>	<b>1</b>	<b>96</b>

## SPECIFICATIONS AND ALTERATION REPORTS

In compliance with rule 54 of the Rules and Instructions for Inspection and Testing of Steam Locomotives, 12 specifications for steam locomotives were submitted by carriers. Under rules 328 and 329 of the Rules and Instructions for Inspection and Testing of Locomotives Other Than Steam, 1,173 specifications and 672 alteration reports for locomotive units, and 70 specifications and 117 alteration reports for heating boilers mounted in locomotive units were submitted by carriers. As required by rule 449 for Multiple Operated Electric Locomotive Units Designed to Carry Freight and/or Passenger Traffic, 320 specifications and 1 alteration report were submitted by carriers. The information contained in these specifications and reports was analyzed and corrective measures were taken when discrepancies were found.

## INSPECTION AND REPAIR REPORTS

Inspection and repair reports filed with district inspectors during the year totaled 2,007 under rules 51 and 53 of the Rules and Instructions for Inspection and Testing of Steam Locomotives; 412,129 under rules 331 and 332 of the Rules and Instructions for Inspection and Testing of Locomotives Other Than Steam; and 28,780 under rule 451 for Multiple Operated Electric Locomotive Units Designed to Carry Freight and/or Passenger Traffic.

## EXTENSION OF TIME FOR REMOVAL OF FLUES

Under rule 10 of the Rules and Instructions for Inspection and Testing of Steam Locomotives, 24 applications for extension of time for removal of flues were submitted. After investigation, extensions were granted for the full period requested in 13 applications, of which 4 extensions were granted after defects disclosed by our investigations were repaired. Extensions were granted on five locomotives for 12 months of service provided such service was performed within 2 years. One extension was denied and a shorter extension than requested was granted for one locomotive because of conditions disclosed by our investigations. Three applications were canceled and one application was pending. Extensions were granted for the full period requested and one was refused in the four applications pending on July 1, 1963.

## SUITS FOR PENALTIES

During the year, 7 cases involving 45 counts for alleged violations of the locomotive Inspection Act and rules prescribed thereunder were

transmitted to United States attorneys for prosecution. Judgment was confessed in six cases on seven counts. One case of one count was decided in favor of the railroad and is pending on appeal. Penalties totaling \$1,750 were assessed. Seven cases, involving 46 counts, were pending in the district courts at the end of the year. The following is a brief summary of the cases:

## CASES INSTITUTED AND DISPOSED OF DURING THE YEAR

*U.S. v. The New York Central Railroad Company*, consisting of one cause of action, involved the failure to immediately report to the Director of Locomotive Inspection, at his office in Washington, D.C., by wire, an accident resulting in serious injury to an employee when said employee slipped on oil from a defective fuel tank of a diesel-electric locomotive in violation of rule 335. The defendant confessed judgment and a penalty of \$250 was assessed.

*U.S. v. Erie-Lackawanna Railroad Company*, consisting of one cause of action, involved the failure to preserve intact the part or parts of a diesel-electric locomotive affected by an accident, as required by section 32 of Title 45 of the United States Code. The defendant confessed judgment and a penalty of \$250 was assessed.

*U.S. v. Erie-Lackawanna Railroad Company*, consisting of one cause of action, involved the failure to immediately report to the Director of Locomotive Inspection, at his office in Washington, D.C., by wire, an accident resulting in the death of one illegal trainrider and serious injury to four employees when a diesel-electric locomotive derailed as a result of a seized traction motor armature bearing, in violation of rule 335. The defendant confessed judgment and a penalty of \$250 was assessed.

## OTHER CASES DISPOSED OF DURING THE YEAR

*U.S. v. Claremont and Concord Railway Company, Inc.*, consisting of two causes of action, involved the failure to file a specification card, size 8 x 10½ inches, Form No. 4, for a steam locomotive, in the office of the Director of Locomotive Inspection, as required by rule 54, and when a duplicate of the report of the inspection of the interior and exterior of the boiler of the locomotive had not been filed with the inspector in charge, as required by rules 54, 9, and 15. Defendant confessed judgment and a penalty of \$500 was assessed.

*U.S. v. Georgia Railroad, Lessee Organization*, consisting of one cause of action, involves the failure to preserve intact the part or parts of a diesel-electric locomotive affected by an accident, as required by section 32 of Title 45 of the United States Code. Government's Motion for Judgment was granted and a penalty of \$250 was assessed.

*U.S. v. Georgia Railroad, Lessee Organization*, consisting of one cause of action, involves the failure to immediately report to the Director of Locomotive Inspection, at his office in Washington, D.C., by wire, an accident resulting in serious injury to two employees as a result of a diesel-electric locomotive crankcase explosion, as required by rule 335. Government's Motion for Judgment was granted and a penalty of \$250 was assessed.

*U.S. v. Quincy Railroad Company*, consisting of one cause of action, involves the use of steam locomotive when a monthly inspection and report had not been made as required by rule 159. Judgment for the defendant is presently pending on appeal.

## CASES PENDING AT THE CLOSE OF THE YEAR

*U.S. v. The New York Central Railroad Company*, consisting of one cause of action, involves the use of a diesel-electric locomotive unit when the airbrakes were cut out and inoperative, in violation of rule 204(a).

*U.S. v. Union Pacific Railroad Company*, consisting of two causes of action, involves the uses of a diesel-electric locomotive when said locomotive was not in serviceable condition because proper repairs had not been made as required by a Form No. 5, in violation of section 29 of Title 45 of the United States Code.

*U.S. v. Union Pacific Railroad Company*, consisting of one cause of action, involves the use of a diesel-electric locomotive when said locomotive was not in serviceable condition because proper repairs had not been made as required by a Form No. 5, in violation of section 29 of Title 45 of the United States Code.

*U.S. v. The New York Central Railroad Company*, consisting of 39 causes of action, involves the use of a diesel-electric locomotive when daily locomotive inspection reports were not on file as required by rule 203(a).

*U.S. v. The New York Central Railroad Company* consisting of one cause of action, involves the failure to preserve intact the part or parts of a diesel-electric locomotive affected by an accident, as required by section 32 of Title 45 of the United States Code.

*U.S. v. Great Northern Railway Company*, consisting of one cause of action, involves the failure to immediately report to the Director of Locomotive Inspection, at his office in Washington, D.C., by wire, an accident resulting in serious injury to an employee as a result of defective brakes on a diesel-electric locomotive, as required by rule 335.

*U.S. v. Great Northern Railway Company*, consisting of one cause of action, involves the use of a diesel-electric locomotive unit when the airbrakes were not in a safe and proper condition for service as required by section 23 of Title 45 of the United States Code.

## APPEALS

No formal appeals from decisions of district inspectors were filed by the carriers.

JOHN A. HALL,  
*Director of Locomotive Inspection.*

**ACCIDENTS AND CASUALTIES RESULTING FROM THE FAILURE OF STEAM LOCOMOTIVES, TENDERS, LOCOMOTIVES OTHER THAN STEAM, MULTIPLE OPERATED ELECTRIC LOCOMOTIVE UNITS AND THEIR APPURTENANCES, DURING THE FISCAL YEAR ENDED JUNE 30, 1964, BY ROADS**

[A double star (\*\*)] indicates accidents not properly reported, as required by rules 55, 162, 335, and 454]

**ATCHISON, TOPEKA AND SANTA FE RAILWAY:**

November 13, 1963, Unit 27, Blanchard, N. Mex. A short circuit in jumper receptacle of train lined control circuit caused reverser to assume reverse position. Passengers were injured when, at 2 to 4 miles per hour, the reversed propulsion circuits were energized, applying tractive effort in opposite direction to train motion, causing sudden stop; 14 passengers injured.

One accident; 14 passengers injured.

**ATLANTIC COAST LINE RAILROAD:**

April 22, 1964, Unit 247, Garland, N.C. Crankcase explosion caused by overheated main and connecting rod bearings; one employee injured.

May 17, 1964, Unit 156, Pelham, Ala. Crankcase explosion and fire caused by defective pistons and overheated main and connecting rod bearings; one employee injured.

Two accidents; two employees injured.

**BALTIMORE AND OHIO RAILROAD:**

December 17, 1963, Unit 4650, Martinsburg, W. Va. Employee lost his balance and fell from insecure cab-to-engineer room step; one employee injured.

February 4, 1964, Unit 2416, Chicago, Ill. Employee suffered back injury when he slipped on oil which had leaked from diesel engine crankcase to walkway; one employee injured.

April 22, 1964, Unit C&O 7515, Ellicottville, N.Y. Defective coil spring in end door safety gate locking device permitted gate to become disengaged from locking socket and fall, striking employee on the head; one employee injured.

May 23, 1964, Rdg. Unit 43, Pittsburgh, Pa. Fire extinguisher became detached from bracket on engineer room door and fell injuring employee; one employee injured.

Four accidents; four employees injured.

**BOSTON AND MAINE RAILROAD:**

July 1, 1963, Unit 6147, Littleton, Mass. Employee suffered injury when cab seat post failed causing employee to fall to floor; one employee injured.

August 9, 1963, Unit 1556, East Deerfield, Mass. Defective window guides permitting cab side window to fall in; one employee injured.

January 8, 1964, Unit 1560, between Brattleboro, Vt. and White River Junction, Vt. Employee was overcome by inhalation of smoke and fumes which entered cab from defective steam-heating-boiler temperature-limit-control sealing collar. Condition was aggravated by leaking fuel oil solenoid valve and pipefitting; one employee injured.

February 3, 1964, Unit 1575, Arlington, Mass. Wood screws fastening cab seat cushion to seat base pulled out permitting seat to overturn; one employee injured.

Four accidents; four employees injured.

**CHESAPEAKE AND OHIO RAILWAY:**

April 17, 1964, Unit 8002, north of Stockdale, Ohio. Crankcase explosion caused by failure of main bearings due to lube oil dilution; one employee injured.

May 2, 1964, Unit 6021, Columbus, Ohio. Crankcase explosion caused by cracked piston; one employee injured.

Two accidents; two employees injured.

**CHICAGO AND NORTH WESTERN RAILWAY:**

August 26, 1963, Unit 58, Sioux City, Iowa. Failure of window sill armrest brackets caused employee to fall from cab; one employee injured.

December 12, 1963, Unit 1638, Adams, Wis. Engine-cooling water leaking from radiator vent pipe froze on walkway and steps, causing employee to fall; one employee injured.

Two accidents; two employees injured.

**CHICAGO, BURLINGTON AND QUINCY RAILROAD:**

March 26, 1964, Unit 162-A, Monmouth, Ill. Flash in high voltage cabinet due to failure of field shunt resistor and subsequent failure of wheel slip relay parallel operating coil; one employee injured.

One accident; one employee injured.

**CHICAGO, MILWAUKEE, ST. PAUL AND PACIFIC RAILROAD:**

September 12, 1963, Unit 17-B, Chicago, Ill. Employee was overcome by fumes when defective air box cover blew off engine allowing exhaust gases to enter the engine compartment; one employee injured.

November 4, 1963, Unit 730, Milwaukee, Wis. Employee was overcome by exhaust fumes which entered the cab from diesel engine exhaust system leaks, aggravated by restricted spark arrestors; one employee injured.

Two accidents; two employees injured.

**CHICAGO, SOUTH SHORE AND SOUTH BEND RAILROAD:**

July 13, 1963, Unit MU-106, Chicago, Ill. Employee suffered electrical shock and burns when he contacted energized overhead current collector while standing on a ladder; one employee injured.

One accident; one employee injured.

**ERIE-LACKAWANNA RAILROAD:**

\*\*July 24, 1963, Unit 6601, Warsaw, N.Y. Derailment caused by seized traction motor armature bearing; one illegal trainrider killed, four employees injured.

January 9, 1964, Unit 818, Corry, Pa. Employee slipped on oil on engine-room floor; one employee injured.

February 20, 1964, Unit 1102, Dalton, N.Y. Defective fuel tank fill cap permitted oil to leak onto rear deck causing employee to slip and fall to the ground; one employee injured.

April 20, 1964, Unit 543, Clark's Summit, Pa. Employee inhaled smoke and fumes while attempting to extinguish oil fire in vicinity of exhaust manifold caused by defective power assemblies; one employee injured.

Four accidents; one illegal trainrider killed and seven employees injured.

**GREAT NORTHERN RAILWAY:**

\*\*1 June 6, 1963, Unit 682, Cut Bank, Mont. Independent brake valve could not properly control brake cylinder pressure due to ruptured Relay air valve diaphragm causing hard coupling which threw brakeman to ground; one employee injured.

March 17, 1964, Unit 460-C, Bonners Ferry, Idaho. Loose platform step due to defective bracket weld caused employee to lose his balance and strike his hand on door frame; one employee injured.

April 3, 1964, Unit 508, Minneapolis, Minn. Crankcase explosion due to overheated main bearings; one employee injured.

Three accidents; three employees injured.

**ILLINOIS CENTRAL RAILROAD:**

September 2, 1963 Unit 8902, Monroe, La. Employee suffered injury when fire extinguisher hose ruptured in use; one employee injured.

June 3, 1964, Unit MP 305, Destrehan, La. Electrician suffered flash burns when movement of the power contactors took place while he was inspecting the electrical cabinet for malfunction with train in motion; one employee injured.

Two accidents; two employees injured.

**INDIANA HARBOR BELT RAILROAD:**

June 24, 1964, Unit 8826, Franklin Park, Ill. Employee fell when handhold became separated from upper connection account of deteriorated threads; one employee injured.

One accident; one employee injured.

**KANSAS CITY SOUTHERN RAILWAY:**

September 15, 1963, Unit 101, Gravette, Ark. Employee slipped on oil that had accumulated on an unroughened walking surface as a result of a leaking air compressor intake valve; one employee injured.

One accident; one employee injured.

**LONG ISLAND RAILROAD:**

February 18, 1964, Unit MU-4396, New York, N.Y. Loose connection at bus bar caused short circuit to ground resulting in electrical fire in high voltage compartment; one passenger injured.

One accident; one passenger injured.

**MISSOURI-KANSAS-TEXAS RAILROAD:**

July 2, 1963, Unit 72-A, near Beaman, Mo. Employee stumbled and fell over rerailing frogs lying on passageway floor; one employee injured.

September 18, 1963, Unit 64-A, Pilot Point, Tex. Cab seat cushion and backrest attached to pedestal with wood screws became separated causing employee to fall backwards to floor; one employee injured.

Two accidents; two employees injured.

**MISSOURI PACIFIC RAILROAD:**

February 3, 1964, Unit 822-B, Erwinville, La. Employee suffered severe burns when the cooling water system expansion tank burst due to an undetermined steam pressure. The rapid vapor formation was due to a broken control wire which caused failure of system fans and shutters, followed by an increase in water temperature and cavitation at circulating pump. The hot-engine alarm was defective; one employee injured.

April 25, 1964, Unit 486, Menard, Ill. Wood screws securing the drinking water cooler frame to cab floor were loose and missing, permitting the cooler to overturn and fall striking employee on the leg; one employee injured.

Two accidents; two employees injured.

**NEW YORK CENTRAL RAILROAD:**

August 19, 1963, Unit MU-4313, Woodlawn, N.Y. Electrical fire caused by loose terminal connection at main switch; one employee and one passenger injured.

August 28, 1963, Unit 236, Harmon, N.Y. High potential short to ground caused fire in electrical cabinet; one employee injured.

September 4, 1963, Unit 5673, Clay Bank, Ohio. Employee thrown from end car onto the track structure as a result of slack action due to defective Relay air valve; one employee injured.

October 18, 1963, Unit 5934, Ridgeway, Ohio. An overheated air hose burst, blowing smoke, fumes, and fire extinguisher chemicals into the face of an employee who was attempting to extinguish a fire in a combustible mixture of grease, oil, and dirt on the trucks; one employee injured.

November 14, 1963, Unit 3813, Paris, Ill. Employee suffered back injury while attempting to adjust improperly assembled right cab seat; one employee injured.

January 1, 1964, Unit 1692, Rockwood, Mich. Overloaded air compressor caused overheating and failure of air compressor discharge line; one employee injured.

March 13, 1964, Unit 1833, Lake City, Pa. Employees were injured while attempting to extinguish a fire in the area of the main generator well; two employees injured.

March 28, 1964, Unit 6226, Carthage, Ohio. Employee inhaled chemicals from fire extinguisher he was discharging on exhaust manifold fire caused by manifold joint leaks. The manifold insulation was oil soaked due to improperly timed engine passing fuel oil into exhaust system; one employee injured.

April 8, 1964, Unit 8627, Charlotte, N.Y. Employee slipped on accumulation of oil on wooden cab floor; one employee injured.

May 1, 1964, Unit 5775, Riverdale, N.Y. Employee inhaled smoke and fumes while attempting to extinguish fire in electrical control cabinet; one employee injured.

Ten accidents; 11 employees and 1 passenger injured.

<sup>1</sup> Investigation not completed in time to be included in the 1963 annual report.

## NEW YORK, NEW HAVEN AND HARTFORD RAILROAD:

April 4, 1964, Unit 0973, Cedar Hill, Conn. Nonreturn valve in fuel oil return line had been replaced with a fitting, permitting fuel oil to be forced from tank to open accumulator. Employee slipped on oil which had overflowed from accumulator to walkway; one employee injured.

May 12, 1964, Unit 370, New York, N.Y. Employees, engaged in extinguishing an electrical fire at a third rail shoe, received arc burns when a passing train bridged a third rail gap and were further injured by the inhalation of smoke and fumes. The fire was caused by a short circuit from a defective third rail shoe-mechanism bus terminal to the truck frame; two employees injured.

Two accidents; three employees injured.

## PENNSYLVANIA RAILROAD:

August 10, 1963, Unit 9799-A, Conway, Pa. Insecure cab ladder step tread due to defective attaching bolts; one employee injured.

September 11, 1963, Unit 8581, LaJose, Pa. Crankcase explosion caused by overheated main bearings; one employee injured.

December 29, 1963, Unit 4884, Washington, D.C. Employee suffered back injury when insecure steam train-line valve handwheel became detached, causing him to lose his balance and fall against the carbody wall; one employee injured.

February 17, 1964, Unit MU-630, Penns Neck, N.J. Wood screws which fastened the hinge of the folding leg to the cab seat pulled out causing seat to collapse; one employee injured.

March 12, 1964, Unit 9263, Wellsville, Ohio. Wood screws fastening the cab seat pedestal base to the floor pulled out permitting seat to overturn; one employee injured.

May 19, 1964, Unit 8793, Detroit, Mich. Defective weld, securing the seat base column to the base plate, and loose bolts permitted the seat to tip backwards when severe slack action occurred, causing engineer to strike his elbow on the window frame; one employee injured.

June 9, 1964, Unit 8569-A, Blairsville, Pa. Crankcase explosion caused by cracked piston; one employee injured.

Seven accidents; seven employees injured.

## READING COMPANY:

April 27, 1964, Unit 2716, Williamsport, Pa. Employee lost balance and fell to ground while attempting to force cooling system shutters open. Broken fulcrum lever bolt had caused shutters to be inoperative; one employee injured.

One accident; one employee injured.

## ST. LOUIS-SAN FRANCISCO RAILWAY:

February 13, 1964, Unit 629, Chaffee, Mo. Employee fell while alighting from locomotive when step-tread-support bracket failed due to defective welding; one employee injured.

One accident; one employee injured.

## SEABOARD AIR LINE RAILROAD:

August 29, 1963, Unit 1471, Sulphur Springs, Fla. Employee slipped on oil on insufficiently roughened walkway; one employee injured.

December 12, 1963, Unit 1633, Auburndale, Fla. Lubricating oil, leaking from flange on inlet side of strainer to walkway, caused employee to slip and fall; one employee injured.

Two accidents; two employees injured.

## SOUTHERN RAILWAY:

November 11, 1963, Unit GM&O 733, Rather, Tenn. Employee slipped on water that had leaked onto passageway floor from a cracked diesel engine cooling water outlet header; one employee injured.

December 21, 1963, Unit AGS 6712, Dallas, Ga. Employee suffered injury when cab seat backrest hinge of faulty design failed causing him to fall to floor; one employee injured.

Two accidents; two employees injured.

## SOUTHERN PACIFIC COMPANY:

August 13, 1963, Unit 6060, Des Allemands, La. Crankcase explosion due to fracture of crankshaft; one employee injured.

December 18, 1963, Unit 5748, Selby, Calif. Employee fell backwards when cab seat broke due to ineffective welding of seat-cushion plate to supporting column; one employee injured.

April 13, 1964, Unit 5326, Decoto, Calif. Employee suffered flash burns when movement of the power contactors took place while he was inspecting the electrical cabinet for malfunction; one employee injured.

Three accidents; three employees injured.

## TEXAS AND PACIFIC RAILWAY:

October 25, 1963, Unit M.P. 947, New Orleans, La. Employee slipped and fell on walkway due to oil from undetermined source; one employee injured.

One accident; one employee injured.

## UNION PACIFIC RAILROAD:

August 3, 1963, Unit 963-B, between Parma and Caldwell, Idaho. An improperly secured sump oil strainer-housing cover allowed lubricating oil to be discharged into engine compartment, severely burning employee, when a crankcase explosion occurred due to overheated main and connecting rod bearings. The hot engine temperature switch did not function; one employee injured.

June 24, 1964, Unit 14, Rawlins, Wyo. Failure of flexible coupling on air compressor drive shaft caused by the coupling bolts becoming loose; one employee injured.

Two accidents; two employees injured.

## UNION RAILWAY COMPANY:

June 4, 1964, Unit M.P. 1210, Memphis, Tenn. Sudden stop caused a defective cab seat elevation locking device to become disengaged permitting the seat to drop from maximum to minimum elevation throwing the seat cushion and an employee to the floor. The seat elevating tube compression spring and the seat backrest tube securing pin were missing; one employee injured.

June 16, 1964, Unit M.P. 1210, Memphis, Tenn. Defective cab seat elevation locking device failed, permitting the seat to drop from maximum to minimum elevation striking the employee on the leg; one employee injured.

Two accidents; two employees injured.

## WABASH RAILROAD:

October 18, 1963, Unit 708, Magnor, Ill. Drinking water, leaking from cooler to cab floor, caused employee to slip and fall; one employee injured.

November 30, 1963, Unit 379, Tilton, Ill. Fireman's seat, not secured by locking pin, swiveled when yard movement coupled hard to standing cars; one employee injured.

January 9, 1964, Unit 602, near Keytesville, Mo. Employee suffered severe burns when the cooling water system expansion tank burst due to overheating and vaporizing of engine cooling water. The hot-engine alarm was inoperative; one employee injured.

April 13, 1964, Unit 324, Fort Wayne, Ind. Excessive fumes entered cab from diesel engine exhaust due to defective piston assemblies; two employees injured.

May 8, 1964, Unit 717, Wabash, Ind. Employee was injured, while stepping down from the apron of a hood-type unit to the floor level of a carbody type unit, when he struck his head on a control jumper cable support which was projecting down into the clearance area of the carbody diaphragm frame; one employee injured.

May 28, 1964, Unit 686, Newell, Ill. Defective interlock on series contactor caused transition malfunction. Foreman injured by electrical flash when attempting repairs with train in motion and propulsion circuits under full load; one employee injured.

June 12, 1964, Unit 511, Lagro, Ind. Failure of panel latches to secure the left number plate lamp panel, permitting panel to drop open into the cab striking the brakeman on the head; one employee injured.

June 28, 1964, Unit 1015, Chicago Ridge, Ill. Fireman scalded by hot water that surged from open treatment application pipe at the top of a diesel engine cooling water expansion tank. Pipe cap was defective and easily displaced. The hot coolant was due to defective fan switch and radiator sections 50 percent closed by foreign matter; one employee injured.

Eight accidents; nine employees injured.



TABLE I.—Number of steam locomotives reported, inspected, found defective, and ordered out of service

Parts defective, inoperative or missing, or in violation of the rules	Year ended June 30—					
	1959	1960	1961	1962	1963	1964
1 Air compressors.....	11	4	2			2
2 Arch tubes.....	2					
3 Ashpans and mechanism.....						
4 Axles.....						
5 Blow-off cocks.....						
6 Boiler checks.....	3	3	2			
7 Boiler shell.....	1					1
8 Brake equipment.....	35	19	16	7	5	5
9 Cabs, cab windows, and curtains.....	3	3	2		1	1
10 Cab aprons and decks.....	3		2	1		1
11 Cab cards.....	4	2	3	8	2	
12 Coupling and uncoupling devices.....	6	1				
13 Crossheads, guides, pistons, and piston rods.....	11	6	3			
14 Crown bolts.....						
15 Cylinders, saddles, and steam chests.....	7	2				
16 Cylinder cocks and rigging.....	1	3	1	1		
17 Domes and dome caps.....		1		1		
18 Draft gear.....	8	6	2	1	1	2
19 Draw gear.....	1	1	1	1		
20 Driving boxes, shoes, wedges, pedestals, and braces.....	6	1	1			
21 Firebox sheets.....	1	1	1			
22 Flues.....	2	1	3			
23 Frames, tail pieces, and braces, locomotive.....	3		2	1	2	
24 Frames, tender.....						
25 Gages and gage fittings, air.....	3	1		1		1
26 Gages and gage fittings, steam.....	1	3	2		2	
27 Gage cocks.....	5	2	5		3	
28 Grate shakers and fire doors.....	1	1				
29 Handholds.....	12	5	5	3	2	
30 Injectors, inoperative.....	1	1	1		1	
31 Injectors and connections.....	15	9	4	2	1	
32 Inspections and tests not made as required.....	10		8	8	3	3
33 Lateral motion.....	2	1		2		
34 Lights, cab and classification.....	1	1	1			
35 Lights, headlight.....	3	1				
36 Lubricators and shields.....	1					
37 Mud rings.....	3			1		
38 Packing nuts.....	10	4	1			
39 Packing, piston rod and valve stem.....	8					
40 Pilots and pilot beams.....	2	1		1		1
41 Plugs and studs.....		1	1		1	
42 Reversing gear.....	5	1				
43 Rods, main and side, crankpins, and collars.....	11	6	2			
44 Safety valves.....			1		1	1
45 Sanders.....	3	7	3	2	1	
46 Springs and spring rigging.....	25	4	2		1	
47 Squirt hose.....						
48 Staybolts.....	3	1	6	3		1
49 Staybolts, broken.....	19	8		1	1	1
50 Steampipes.....	4	2	1			
51 Steam valves.....	3	1		1	1	
52 Steps.....	6	6	3	2	1	1
53 Tanks and tank valves.....	5	3			2	1
54 Telltale holes.....					1	
55 Throttle and throttle rigging.....	6	5			2	
56 Trucks, engine and trailing.....	2	2		1		1
57 Trucks, tender.....	11	7		1		
58 Valve motion.....	4					
59 Washout plugs.....	2	7		1		
60 Stokers.....	2					
61 Water glasses, fittings, and shields.....	9	3			3	1
62 Wheels.....	13	1	1	1	6	1
63 Miscellaneous—Signal appliances, badge plates, brakes (hand).....	6	2	1			
Number of defects.....	325	149	89	52	44	26
Locomotives reported.....	1,490	788	367	257	192	159
Locomotives inspected.....	967	356	243	195	157	104
Locomotives defective.....	77	38	27	14	16	12
Percentage of inspected found defective.....	8.0	10.7	11.1	7.2	10.2	11.5
Locomotives ordered out of service.....	16	3	4	3	3	2

TABLE II.—Number of locomotive units other than steam reported, inspected, found defective, and ordered out of service

Parts defective, inoperative or missing, or in violation of the rules	Year ended June 30—					
	1959	1960	1961	1962	1963	1964
1 Air compressors.....	337	290	208	203	189	289
2 Axles, truck and driving.....	100	126	91	71	61	100
3 Batteries.....	16	21	25	29	22	18
4 Boilers.....	3,313	284	213	190	231	165
5 Brake equipment.....	3,477	3,617	3,066	2,658	2,810	3,278
6 Cabs and cab windows.....	1,419	1,407	840	801	878	971
7 Cab cards.....	231	274	181	166	166	150
8 Cab floors, aprons, and deck plates.....	2,768	2,461	2,235	2,276	1,982	2,491
9 Clutches.....	3	6	4	4		2
10 Controllers, relays, circuit breakers, magnet valves, and switch groups.....	613	704	565	504	458	372
11 Coupling and uncoupling devices.....	172	131	144	97	106	71
12 Current collecting apparatus.....	4	11	5	6	4	5
13 Draft gear.....	489	420	402	349	326	405
14 Draw gear.....	173	160	108	123	133	139
15 Driving boxes, shoes, and wedges.....	144	223	148	169	153	168
16 Frames or frame braces.....	23	19	55	81	80	82
17 Fuel system.....	3,343	2,702	2,193	2,184	2,205	2,452
18 Gages or fittings, air.....	277	254	163	142	109	107
19 Gages or fittings, steam.....	41	37	28	28	19	24
20 Gears and pinions.....	35	25	156	505	629	505
21 Handholds.....	230	244	210	181	158	172
22 Inspections and tests not made as required.....	682	1,063	847	685	602	636
23 Insulation and safety devices.....	210	209	163	179	179	252
24 Internal-combustion engine defects, parts and appurtenances.....	6,555	7,184	6,124	5,880	6,459	6,859
25 Jack shafts.....	1		1	1		1
26 Jumpers and cable connectors.....	355	350	434	346	321	306
27 Lateral motion, wheels.....	25	49	28	63	67	77
28 Lights, cab and classification.....	480	404	269	151	134	226
29 Lights, headlight.....	46	34	18	19	18	15
30 Meters, volt and ampere.....	31	30	22	18	10	22
31 Motors and generators.....	787	821	759	780	704	770
32 Pilots and pilot beams.....	75	64	54	43	27	37
33 Plugs and studs.....						
34 Quills.....	46	24	5	17	9	39
35 Rods, main, side, and drive shafts.....	1	5		2	2	4
36 Sanders.....	3,613	3,602	3,131	2,351	2,319	2,505
37 Springs and spring rigging, driving and truck.....	542	512	415	397	391	373
38 Staybolts, broken or defective.....						
39 Steampipes.....	182	131	93	113	54	56
40 Steps, footboards, et cetera.....	408	372	307	256	298	329
41 Switches, hand-operated, and fuses.....	11	17	16	16	13	7
42 Transformers, resistors, and rheostats.....	4	4	6	3	2	6
43 Trucks.....	823	765	692	657	716	1,022
44 Water tanks.....	32	30	25	22	20	20
45 Water glasses, fittings, and shields.....	2	1	1	3		
46 Warning signal appliances.....	179	142	148	127	103	142
47 Wheels.....	382	798	805	755	924	1,057
48 Miscellaneous.....	1,491	1,400	1,210	997	1,229	1,325
Number of defects.....	31,171	31,427	26,614	24,648	25,320	28,052
Locomotive units reported.....	31,862	32,186	32,074	31,917	31,793	31,651
Locomotive units inspected.....	102,149	105,702	95,689	91,493	78,066	77,368
Locomotive units defective.....	10,473	10,638	9,000	8,702	8,310	8,645
Percentage of inspected found defective.....	10.3	10.1	9.4	9.5	10.6	11.2
Locomotive units ordered out of service.....	628	517	469	467	413	569

TABLE III.—Number of multiple operated electric locomotive units reported, inspected found defective, and ordered out of service

Parts defective, inoperative or missing, or in violation of the rules	Year ended June 30—					
	1959	1960	1961	1962	1963	1964
1 Air compressors.....	1	4		2	1	2
2 Axles, truck and driving.....	87	53	40	34	6	5
4 Batteries.....						
5 Boilers.....						
6 Brake equipment.....	188	491	951	835	141	80
8 Cabs and cab windows.....	25	26	11	12	4	10
9 Cab cards.....	5	8	9	4	5	2
10 Cab floors, aprons, and deck plates.....	2		1		1	
11 Clutches.....						
12 Controllers, relays, circuit breakers, magnet valves and switch groups.....	2	9	8	16		
13 Coupling and uncoupling devices.....			1	2		
14 Current collecting apparatus.....	65	115	151	99	58	89
16 Draft gear.....	15	11	22	9	2	4
17 Draw gear.....	2	20	16	16	4	11
18 Driving boxes, shoes, and wedges.....	3	3	3	5	2	16
20 Frames or frame braces.....						1
22 Fuel system.....						
23 Gages or fittings, air.....	8	5	4	1		
24 Gages or fittings, steam.....						
25 Gears and pinions.....	4	5	9	4	5	17
26 Handholds.....	46	61	14	11	2	
28 Inspections and tests not made as required.....	30	52	61	55	29	23
29 Insulation and safety devices.....	23	87	78	29	1	4
30 Internal-combustion engine defects, parts and appurtenances.....						
32 Jack shafts.....						
33 Jumpers and cable connectors.....	10	16	13	10	17	13
35 Lateral motion, wheels.....						
36 Lights, cab and classification.....	24	42	23	16		1
37 Lights, headlight.....	4	29	5	2		1
39 Meters, volt and ampere.....						
40 Motors and generators.....	31	23	15	21	8	13
42 Pilots and pilot beams.....	2	1				
43 Plugs and studs.....						
44 Quills.....						
46 Rods, main, side, and drive shafts.....		1				
48 Sanders.....						
49 Springs and spring rigging, driving and truck.....	8	17	8	28	20	23
51 Staybolts, broken or defective.....						
53 Steampipes.....						
54 Steps, footboards, et cetera.....						
55 Switches, hand-operated, and fuses.....	1	3	5	20		1
56 Transformers, resistors, and rheostats.....	5	14	19	7	2	2
57 Trucks.....	222	152	98	66	34	39
59 Water tanks.....						
60 Water glasses, fittings, and shields.....						
61 Warning signal appliances.....	1					
62 Wheels.....	3	5	37	23	6	6
63 Miscellaneous.....	17	1	3	5	6	12
Number of defects.....	834	1,254	1,605	1,332	354	375
Locomotive units reported.....	2,717	2,671	2,633	2,615	2,488	2,540
Locomotive units inspected.....	2,231	2,571	2,400	2,904	1,558	2,210
Locomotive units defective.....	362	450	372	334	171	195
Percentage of inspected found defective.....	16.2	17.5	15.5	11.5	11.0	8.8
Locomotive units ordered out of service.....	4	11	31	18	4	8

TABLE IV.—Number of steam locomotives reported, inspected, found defective, and ordered out of service, et cetera—by carriers

Parts defective, inoperative or missing, or in violation of the rules	Denver & Rio Grande Western	Marquette & Huron Mountain	Union Pacific	Roads with less than 10 locomotives	Total
2 Arch tubes.....					
3 Ashpans and mechanism.....					
4 Axles.....					
5 Blow-off cocks.....					
6 Boiler checks.....					
7 Boiler shell.....					
8 Brake equipment.....				1	1
9 Cabs, cab windows, and curtains.....				5	5
10 Cab aprons and decks.....				1	1
11 Cab cards.....				1	1
12 Coupling and uncoupling devices.....					
13 Crossheads, guides, pistons, and piston rods.....					
14 Crown bolts.....					
15 Cylinders, saddles, and steam chests.....					
16 Cylinder cocks and rigging.....					
17 Domes and dome caps.....					
18 Draft gear.....				2	2
19 Draw gear.....					
20 Driving boxes, shoes, wedges, pedestals, and braces.....					
21 Firebox sheets.....					
22 Flues.....					
23 Frames, tail pieces, and braces, locomotive.....					
24 Frames, tender.....					
25 Gages and gage fittings, air.....				1	1
26 Gages and gage fittings, steam.....					
27 Gage cocks.....					
28 Grate shakers and fire doors.....					
29 Handholds.....					
30 Injectors, inoperative.....					
31 Injectors, and connections.....					
32 Inspections and tests not made as required.....				3	3
33 Lateral motion.....					
34 Lights, cab and classification.....					
35 Lights, headlight.....					
36 Lubricators and shields.....					
37 Mud rings.....					
38 Packing nuts.....					
39 Packing, piston rod and valve stem.....					
40 Pilots and pilot beams.....				1	1
41 Plugs and studs.....					
42 Reversing gear.....					
43 Rods, main and side, crankpins, and collars.....					
44 Safety valves.....				1	1
45 Sanders.....					
46 Springs and spring rigging.....				1	1
47 Squirt hose.....					
48 Staybolts.....				1	1
49 Staybolts, broken.....				1	1
50 Steampipes.....					
51 Steam valves.....					
52 Steps.....				1	1
53 Tanks and tank valves.....				1	1
54 Telltale holes.....					
55 Throttle and throttle rigging.....					
56 Trucks, engine and trailing.....				1	1
57 Trucks, tender.....					
58 Valve motion.....					
59 Washout plugs.....					
60 Stokers.....					
61 Water glasses, fittings, and shields.....				1	1
62 Wheels.....				1	1
63 Miscellaneous—Signal appliances, badge plates, brakes (hand).....				1	1
Number of defects.....				26	26
Locomotives reported.....	22	11	11	115	159
Locomotives inspected.....	8	2		94	104
Locomotives defective.....				12	12
Percentage of inspected found defective.....				12.8	11.5
Locomotives ordered out of service.....				2	2

TABLE V.—Number of locomotive units other than steam reported,

Parts defective, inoperative or missing, or in violation of the rules	Akron, Canton & Youngstown	Aliquippa & Southern	Alton & Southern	Ann Arbor	Apalachicola Northern	Atchison, Topeka & Santa Fe	Atlanta & St. Andrews Bay	Atlanta & West Point	Atlantic Coast Line	Baltimore & Ohio
Air compressors						15			2	5
Axles, truck and driving										7
Batteries						1				
Boilers						7			3	9
Brake equipment			2			82		1	51	98
Cabs and cab windows						25			7	27
Cab cards						8		1		6
Cab floors, aprons, and deck plates						83			38	51
Clutches						1				
Controllers, relays, circuit breakers, magnet valves and switch groups				1	2	13			24	5
Coupling and uncoupling devices						4			1	2
Current collecting apparatus										
Draft gear			1			12			7	13
Draw gear						7			1	
Driving boxes, shoes and wedges						2			2	17
Frames or frame braces						9			4	5
Fuel system						84		3	53	41
Gages or fittings, air						3				4
Gages or fittings, steam						4				
Gears and pinions						6			9	18
Handholds						2			7	2
Inspections and tests not made as required						31			3	19
Insulation and safety devices						5			12	9
Internal-combustion engine defects, parts and appurtenances				5		136		4	132	122
Jack shafts									7	5
Jumpers and cable connectors						13			7	5
Lateral motion, wheels						1			2	
Lights, cab and classification						5		1	7	
Lights, headlight						1				2
Meters, volt and ampere						1			4	
Motors and generators						25			33	40
Pilots and pilot beams										1
Plugs and studs										
Quills										
Rods, main, side, and drive shafts										
Sanders						126		2	84	33
Springs and spring rigging, driving and truck						6			11	13
Staybolts, broken or defective										
Steampipes										3
Steps, footboards, et cetera			2			6			9	8
Switches, hand-operated, and fuses									1	
Transformers, resistors and rheostats										
Trucks						24		1	21	35
Water tanks										1
Water glasses, fittings and shields										
Warning signal appliances						8			2	2
Wheels			1		1	20		2	17	37
Miscellaneous			1			23		1	34	42
Number of defects			7	6	3	799		16	589	686
Locomotive units reported	19	17	27	18	11	1,865	14	28	597	1,268
Locomotive units inspected	23	14	55	35	43	4,480	65	89	1,423	2,933
Locomotive units defective			3	2	3	289		2	201	322
Percentage of inspected found defective			5.5	5.7	7.0	6.5		2.2	14.1	11.0
Locomotive units ordered out of service			1		1	10			11	12

inspected, found defective, and ordered out of service, et cetera—by carriers

Bangor & Aroostook	Belt Rwy. of Chicago	Bessemer & Lake Erie	Birmingham Southern	Boston & Maine	Butte, Anaconda & Pacific	Camas Prairie	Cambria & Indiana	Canadian National	Canadian Pacific	Canton	Central Railroad of New Jersey	Central Vermont	Chesapeake & Ohio	Chicago & Eastern Illinois	Chicago & Illinois Midland	Chicago & North Western	Chicago, Burlington & Quincy	Chicago Great Western	Chicago, Milwaukee, St. Paul & Pacific	Chicago River & Indiana
				29					2				10			7		1	7	1
				4							3					1				2
				5																4
				13					3		4	1		1		2				5
	3			81				2	11		45		103	3		242	14	12	100	6
	3			87				2	6		13	1	12	2		19	1	4	9	8
				12							2		2	1					2	9
	2	1		129					15		62	2	40			45	9	4	36	10
									1											11
							2		5		4		3			14	4		7	12
									5				1			2			1	13
																				14
	1								13		2		12			11			11	16
									3		1		4			4		1	3	17
									2		3		2			1				18
													1							20
	2			1	146			3	52		83	2	31	3		51	6	3	48	22
	1				18			1	1		3					1	1		2	23
					7						1	1								24
					1															25
					11			2	2		12		11	1		35			3	18
	2				7				4		1		2			4			1	26
					39			14	6		24		6			33	3	2	9	28
					4						4		3			36			5	29
	6				456		2	11	59		255	4	156	3		96	33	1	151	30
																				32
											9		2			8	2		5	33
											1					9	1		10	35
	1								43		5		1			7	3		1	36
																				37
													2			2				39
	1								30		14		10	1		19	4		24	40
									1							2			1	42
																				43
																				44
																				46
																				48
	7								86	2	3	20	11	3	9	84	15	8	54	48
									6		4		3	1		16	1	1	21	49
																				51
									4											53
											5			4		14				54
													1							55
																				56
																				57
																				58
																				59
																				60
																				61
																				62
																				63
	29	1							3	1,410										
	34	53	41	15	333	40	10	70	136	13	177	48	999	111	15	793	688	140	854	31
	62	29	46	46	1,633	43	27	158	120	7	503	165	1,889	245	44	1,551	1,781	293	1,857	5
	6	1		2	387	3		20	40		141	7	183	12	3	263	49	21	214	
	9.7	3.4		4.3	23.7		11.1	12.7	33.3		28.0	4.2	9.7	4.9	6.8	17.0	2.8	7.2	11.5	
					14			1			18		6			15			5	



TABLE V.—Number of locomotive units other than steam reported, inspected,

Parts defective, inoperative or missing, or in violation of the rules	Lake Superior & Ishpeming	Lake Terminal	Lehigh and Hudson River	Lehigh Valley	Long Island	Louisiana & Arkansas	Louisville and Nashville	Maine Central	Minneapolis, Northfield & Southern	Minnesota Transfer	Missouri-Kansas-Texas
1 Air compressors				1		1	19	1			8
2 Axles, truck and driving							1	1			2
4 Batteries				1							
5 Boilers					1	2					
6 Brake equipment		1	1	19	9	9	142	8			118
8 Cabs and cab windows			4	8	4	8	45				23
9 Cab eards				3			2				1
10 Cab floors, aprons and deck plates		2	11	63	19	6	66	12			60
11 Clutches											
12 Controllers, relays, circuit breakers, magnet valves and switch groups					3	2	14				37
13 Coupling and uncoupling devices							2				11
14 Current collecting apparatus											
16 Draft gear				5	1	2	10	1			19
17 Driving gear				3	1		3				17
18 Driving boxes, shoes and wedges				1			9				30
20 Frames or frame braces											5
22 Fuel system	1		17	84	19	5	58	16			29
23 Gages or fittings, air							1				
24 Gages or fittings, steam											
25 Gears and pinions				14	1	2	22	3			17
28 Handholds				1	2		2				3
28 Inspections and tests not made as required				1			1	25	2		17
29 Insulation and safety devices				1			4				6
30 Internal-combustion engine defects, parts and appurtenances			40	228	33	17	187	51			73
32 Jack shafts											
33 Jumpers and cable connectors				1	1		14	1			12
35 Lateral motion, wheels											2
36 Lights, cab and classification					1		12	1			13
37 Lights, headlight											
39 Meters, volt and ampere											
40 Motors and generators				10	3	3	23	1			40
42 Pilots and pilot beams							1				1
43 Plugs and studs											
44 Quills											
46 Rod, main, side, and drive shafts											
48 Sanders				34	4	3	160	1			129
49 Springs and spring rigging, driving and truck			1	4			4	3			20
51 Staybolts, broken or defective											
53 Steampipes											
54 Steps, footboards, et cetera					5	2	9				25
55 Switches, hand-operated, and fuses											1
56 Transformers, resistors and rheostats											
57 Trucks					4	2	16	1			35
59 Water tanks											
60 Waterglasses, fittings and shields											
61 Warning signal appliances							13				15
62 Wheels					24	14	1	59			24
63 Miscellaneous			3	36	12	6	31	2			30
Number of defects	3	1	77	541	137	80	967	106			824
Locomotive units reported	18	15	15	208	82	24	769	73	14	15	215
Locomotive units inspected	17	22	41	736	169	134	2,423	258	17	23	719
Locomotive units defective	2	1	8	129	29	23	316	36			200
Percentage of inspected found defective	11.8	4.5	19.5	17.5	17.2	17.2	13.0	14.0			27.8
Locomotive units ordered out of service				7		3	26				32

found defective, and ordered out of service, et cetera—by carriers—Continued

	Missouri Pacific	Monongahela Connecting	Monongahela	Monon	Montour	Newburgh & South Shore	New Orleans Public Belt	New York Central	New York, Chicago & St. Louis	New York, New Haven & Hartford	New York, Susquehanna & Western	Norfolk & Portsmouth Belt Line	Norfolk & Western	Norfolk Southern	Northern Pacific	Northern Pacific Terminal	Northwestern Pacific	Pacific Electric	Patapsco & Back Rivers	Pennsylvania	Pennsylvania-Reading Seashore Lines	Peoria & Pekin Union	Philadelphia, Bethlehem & New England	Piedmont & Northern	
1								45		12						1					14				1
2	22							11		2											27				2
4	2							3		2											3				4
5	2							11		18											25				5
6	87							470	14	92			48	1	19	2	2	3			208	10			8
8	32				8			189	1	72					8	1					44	1			4
9								8		12											4				9
10								449	2	22											175	6	1		10
11	66			5				33	1	10			30		14						6				11
12	8							11		1		2	1		2						28				12
13	3							3		1											5				13
14								3		2															14
16	14			1				63	2	19				1	2						26				16
17								29		7			11	1							4				17
18	4							31	1	1			3								6				18
20	2							16		6											4				20
22	59							325	5	235	5		38		17						148	1			22
23	3							14		12											3				23
24	1							4		5											2				24
25	25							64		4											66	2			25
28	1							12		1											5				28
28	13			1				40	6	24											11		2		28
29	2							27		19											10				29
30	204			5			1,061	15	724	13	2	65			48				3		447	1			30
32																									32
33	4							65		33					3						8				33
35								11		1											5				35
36	11							12	1	29					2						3				36
37	1							3		5															37
39	2							2		3															39
40	20							132	3	72	1		1		1						77	2			40
42	2							5	1	1															42
43																									43
44																									44
46								2		1															46
48	145			1				308	25	53	1		35	2	21						66	3			48
49	6							63	1	4					9						48				49
51																									51
53	1							3		24											1				53
54	7							77	3	9					2						16	2	1		54
55																									55
56																									56
57	24							146	7	46			8	1	8						128	2			57
59	1							2		9											1				59
60	3							14	1																60
61	26							65	8	10			6								5				61
62	27							210	6	128			3		11						122	11			62
63																					90				63
	831		2	74				4,115	110	1,937	45	4	287	6	181	4	15	22		1,905	53	6	3	2	
	750	31	25	64	12	13	18	2,038	408	429	24	15	649	47	631	14	36	42	55	2,614	44	15	26	16	
	2,148	21	55	209	19	9	23	4,440	809	1,054	21	26	1,546	74	1,847	31	118	69	13	4,721	132	40	132	33	
	241		2	23				1,130	41	425	11	2	132	2	103	3	9	4		629	15	3	1	1	
	11.2		3.6	11.0				25.5	5.1	40.3	52.4	7.7	8.5	2.7	5.6	9.7	7.6	5.8		13.3	11.4	7.5	0.8	3.0	
	17		1	1				85	2	41			1		7					26	2				

TABLE V.—Number of locomotive units other than steam reported, inspected,

	Pittsburgh & Lake Erie	Pittsburgh & West Virginia	Portland Terminal	Reading	Richmond, Fredericksburg & Potomac	River Terminal	Sacramento Northern	St. Louis-San Francisco	St. Louis Southwestern	Savannah & Atlanta	Seaboard Air Line	Soo Line
Parts defective, inoperative or missing, or in violation of the rules												
1 Air compressors	1					2		3	5		1	1
2 Axles, truck and driving								1	1			
3 Batteries												
4 Boilers								1	4			2
5 Brake equipment	5		2	7	12			34	25		83	16
6 Cabs and cab windows	2			8				16	9	1	11	2
7 Cab cards												
8 Cab floors, aprons and deck plates	1			12	7			34	11		9	4
9 Clutches												
10 Controllers, relays, circuit breakers, magnet valves and switch groups					3		1	7	3		6	1
11 Coupling and uncoupling devices											1	
12 Current collecting apparatus												
13 Draft gear								7	2	1	7	
14 Draw gear												
15 Driving boxes, shoes and wedges					1							
16 Frames or frame braces								1				
17 Fuel system	2	1	1	12	2	1		28	10		19	9
18 Gages or fittings, air								1				
19 Gages or fittings, steam												
20 Gears and pinions				3				11	8		2	3
21 Handholds			1		1						9	
22 Inspections and tests not made as required	2		1	1	1			10	2		4	5
23 Insulation and safety devices	2							1			4	3
24 Internal-combustion engine defects, parts and appurtenances	5		9	40	10			81	73	1	41	14
25 Jack shafts												
26 Jumpers and cable connectors				2	2						2	
27 Lateral motion, wheels									1			
28 Lights, cab and classification								3			2	
29 Lights, headlight												
30 Meters, volt and ampere				3	3			1			1	
31 Motors and generators	1					1		10			3	1
32 Pilots and pilot beams								2	2		1	
33 Plugs and studs												
34 Quills												
35 Rods, main, side, and drive shafts												
36 Sanders	2			1	3			44	13	3	61	2
37 Springs and spring rigging, driving and truck	2			1				7	1		3	1
38 Staybolts, broken or defective												
39 Steampipes								3			3	
40 Steps, footboards, et cetera				1				5	2		4	2
41 Switches, hand-operated, and fuses												
42 Transformers, resistors and rheostats												
43 Trucks		1		2	1			15	6	5	9	1
44 Water tanks					1							
45 Water glasses, fittings and shields								2			4	
46 Warning signal appliances					2			23	22		5	9
47 Wheels	4		2					16	2		19	2
48 Miscellaneous				5	3							
Number of defects	29	2	16	99	55	4	2	363	201	11	311	78
Locomotive units reported	112	25	16	347	65	19	13	418	126	13	550	216
Locomotive units inspected	137	34	38	906	142	12	34	1,328	644	22	1,237	419
Locomotive units defective	14	2	5	24	16	1	1	113	51	2	92	26
Percentage of inspected found defective	10.2	5.9	13.2	2.6	11.3	8.3	2.9	8.5	7.9	9.1	7.4	6.2
Locomotive units ordered out of service		1	1	3				3	8		7	1

found defective, and ordered out of service, et cetera—by carriers—Continued

	South Buffalo	Southern Pacific	Southern	Spokane, Portland & Seattle	Steelton & Highspire	Tennessee Central	Terminal R.R. Association of St. Louis	Texas & Pacific	Texas Mexican	Texas Pacific-Missouri Pacific Terminal R.R. of New Orleans	Toledo, Peoria & Western	Toronto, Hamilton & Buffalo	Union Pacific	Union Railroad	Wabash	Washington Terminal	Western Maryland	Western Pacific	Youngstown & Northern	Roads with less than 10 locomotive units	Total	
	10	18											2		2						6	289
	16		1										4									100
		1													1							18
	5	4											6									165
	161	180	2			9	12						71	2	62						32	3,278
	17	46	2			2	3		4				5		3						20	971
	23	6			1		1						9		3						27	150
	106	70	2		2	4	11		9				43		31						27	2,491
	41	19	3				5	1					4		5						5	372
	4	4											2		5							71
	10	45	1			1	2						5		6						1	405
	5	5											5		2							139
	2	14											2		3							168
	9	6											1		1							82
	90	83	15		1	2	7		9				64		5						52	2,452
	7	9					2		2				1								2	107
	11	5					4		2				5								2	24
	9	11	1				1						2		11						4	505
	36	15				1	1						26		1						1	172
	47	13											5		2						25	636
	324	177	4	2	6	30	15			1	1		103	3	76						64	6,859
	1																					1
	16	9	1										13								3	306
	1	4					2								5							77
	6	11													5						1	226
	2	1																				15
	20	13				1	1		1				2		12						2	22
	3	6											2								8	770
																						37
	1																					43
	112	178	7			6	21		13				70		41						50	39
	17	22	4										6		6						2	4
	1	2																				46
	19	18	4										2		3						9	51
	2	3																				53
	1																					54
	29	36	1										6		6						3	329
	7	3	1																			7
	17	67	3			9	4		5				3		3							6
	51	62	3	1		1	10						9		10						65	1,057
													22		8						26	1,325
	1,240	1,163	67	7	33	109	94			3	8		502	5	323						455	28,052
	43	2,075	1,096	116	12	20	97	217	22	14	15	10	1,396	127	326	21	129	171	13	1,410	31,651	
	35	5,797	3,064	409	32	54	211	542	38	30	57	2	3,967	130	805	10	444	653	9	2,124	77,368	
		465	346	36	1	10	50	35		1	2		225	2	113		6	39			135	8,645
		8.0	11.3	8.8	3.1	18.5	23.7	6.5		3.3	3.5		5.7	1.5	14.0		1.4	6.0			6.4	11.2
		23	30	4		5	2	5					10									

TABLE VI.—Number of multiple operated electric locomotive units reported, inspected, found defective, and ordered out of service, et cetera—by carriers

Parts defective, inoperative or missing, or in violation of the rules	Baltimore & Ohio	Chicago South Shore & South Bend	Erie-Lackawanna	Illinois Central	Long Island	New York Central	New York, New Haven & Hartford	Pennsylvania	Port Authority Trans-Hudson	Reading	Total
Air compressors.....								1			2
Axles, truck and driving.....					2			3			5
Batteries.....											
Boilers.....		1	6		8	39	5	21			80
Brake equipment.....						1		9			10
Cab and cab windows.....						1		1			2
Cab cards.....											
Cab floors, aprons and deck plates.....											
Clutches.....											
Controllers, relays, circuit breakers, magnet valves and switch groups.....											
Coupling and uncoupling devices.....											
Current collecting apparatus.....			1		37	47	4				89
Draft gear.....							2	2			4
Draw gear.....			1		1		1	8			11
Driving boxes, shoes and wedges.....								16			16
Frames or frame braces.....					1						1
Fuel system.....											
Gages or fittings, air.....											
Gages or fittings, steam.....											
Gears and pinions.....					6	1		10			17
Handholds.....											
Inspections and tests not made as required.....						17	3				23
Insulation and safety devices.....					1	2		1			4
Internal-combustion engine defects, parts and appurtenances.....											
Jack shafts.....											
Jumpers and cable connectors.....			1		3	8		1			13
Lateral motion, wheels.....											
Lights, cab and classification.....					1						1
Lights, headlight.....			1								1
Meters, volt and ampere.....											
Motors and generators.....					4	2	2	5			13
Pilots and pilot beams.....											
Plugs and studs.....											
Quills.....											
Rods, main, side, and drive shafts.....											
Sanders.....											
Springs and spring rigging, driving and truck.....			7		1	2		13			23
Staybolts, broken or defective.....											
Steampipes.....											
Steps, footboards, et cetera.....											
Switches, hand-operated, and fuses.....								1			1
Transformers, resistors and rheostats.....								2			2
Trucks.....					10	3	1	25			39
Water tanks.....											
Water glasses, fittings and shields.....											
Warning signal appliances.....											
Wheels.....		1			1	2		2			6
Miscellaneous.....					5	6		1			12
<b>Number of defects.....</b>		<b>2</b>	<b>17</b>		<b>81</b>	<b>131</b>	<b>20</b>	<b>124</b>			<b>375</b>
Locomotive units reported.....	48	65	267	280	667	214	192	428	232	147	2,540
Locomotive units inspected.....	27	56	310	136	553	342	146	449		191	2,210
Locomotive units defective.....		1	16		43	65	11	59			195
Percentage of inspected found defective.....		1.8	5.2		7.8	19.0	7.5	13.1			8.8
Locomotive units ordered out of service.....		1				2	1	4			8

ILLUSTRATIONS OF LOCOMOTIVE DEFECTS THAT HAVE BEEN RESPONSIBLE FOR INJURIES TO EMPLOYEES, AND TYPES OF DEFECTS ON LOCOMOTIVES ORDERED OUT OF SERVICE BY OUR INSPECTORS



Plate 1

Plate 1 shows condition of engineroom floor on a diesel-electric locomotive ready for service. Paper bags and rags are piled on the passageway floors. The locomotive was ordered out of service by our inspector because of this condition.

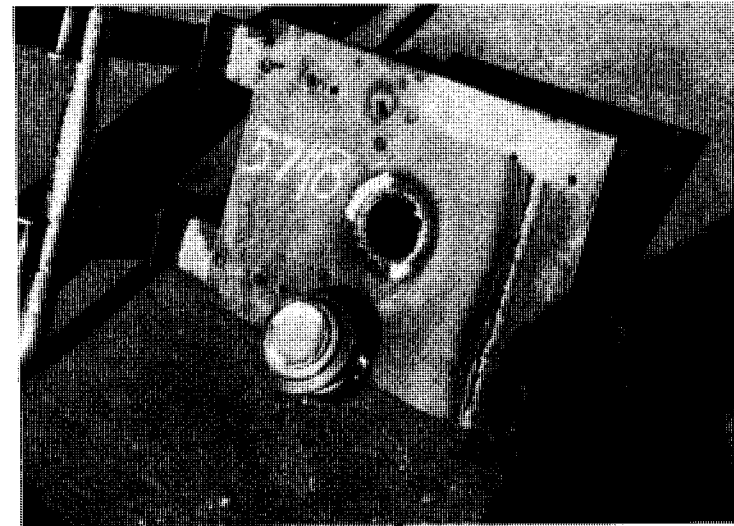


Plate 2

Plate 2 shows a cab seat frame base and center column which failed due to improper repairs. One employee was injured when seat failed.