INTERSTATE COMMERCE COMMISSION

FIFTIETH ANNUAL REPORT

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DIRECTOR OF LOCOMOTIVE INSPECTION

TO THE

INTERSTATE COMMERCE COMMISSION

FISCAL YEAR ENDED
JUNE 30, 1961



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ANNUAL REPORT OF THE DIRECTOR OF LOCOMOTIVE INSPECTION

Остовек 3, 1961.

To the Interstate Commerce Commission:

In compliance with section 7 of the act of February 17, 1911, as amended, the Fiftieth Annual Report of the Director of Locomotive Inspection, covering the work of the fiscal year ended June 30, 1961, 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 locomotives, 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, 9.6 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; this is a decrease of 0.6 percent from the results of the preceding year. Five hundred and four locomotives were ordered withheld from service by our inspectors because of the presence of defects that rendered the

locomotives immediately unsafe; this is a decrease of 27 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—										
	1956	1957	1958	1959	1960	1961					
Number of locomotives for which reports were filed	38, 062 97, 348 11, 107 11, 4 644 35, 560	37, 353 100, 607 9, 887 9. 8 518 26, 385	36, 905 95, 593 8, 394 8. 8 395 21, 532	36, 069 105, 347 10, 912 10. 4 648 32, 330	35, 645 108, 629 11, 126 10, 2 531 32, 830	35, 074 98, 332 9, 399 9, 6 504 28, 308					

As indicated in the preceding table there was a decrease in the number of locomotives for which carriers were filing reports on June 30, 1961, as compared to the number being filed on June 30, 1960. The decrease resulted from 421 steam locomotives being retired during the year, and a decrease of 150 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 9,883 days to regular inspections of locomotives, 406 days making shop inspections to determine that repairs and tests were being made to meet the requirements of the law and rules, 248½ days investigating accidents, 582 days on special assignment relating to locomotive inspection including investigating complaints regarding possible violations of the law and rules, 406 days conferring with carrier representatives and officials, and 1,968 days at their respective headquarters reviewing and processing inspection and repair reports filed by the carriers and performing other office work.

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. Copies of published reports of accident investigations were made available to the general public and distributed to other interested parties, and 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 decreasing accident trend.

Seventy-one accidents occurred in connection with all types of locomotives in which 77 persons were injured. Compared with the preceding year there was an increase of 21 accidents and a decrease of 4 injuries.

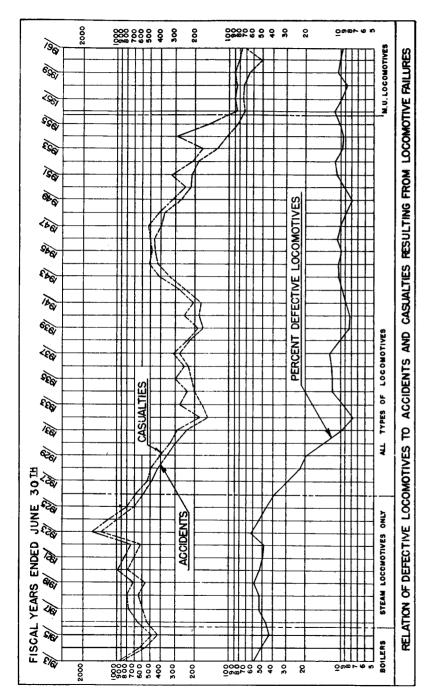
The following table provides details of accidents and casualties during the past 6 years caused by failure of some part or appurtenance of locomotives, and indicates increases or decreases in accidents and casualties:

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—									
	1956	1957	1958	1959	1960	1961				
Number of accidents	73 12. 0	75 1 2. 7	72 4. 0	66 8, 3	50 24. 2	71 1 42 , (
Number of persons killed Percent increase or decrease from previous year	1 33. 3	0 100	0	0	0	(
Number of persons injured Percent increase or decrease from previous year	79 44. 4	90 1 13. 9	86 4. 4	90 1 4. 7	81 10. 0	7 4. !				

¹ 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 is 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

- · · · · · · · · · · · · · · · · · · ·			-	Ye	ar ende	d June 3	0	•			
	19	957	19	958	58 195		19	960	1961		
	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	
Members of train crews: Engineers Firemen Brakemen Conductors Switchmen Maintenance employees Other employees		17 34 17 7 1		21 36 11 5		22 31 10 4 1 1 1 21		17 21 11 2 1 2 6 21		14 44 11 3 2	
Total	0	90	0	86	0	90	0	81	0	77	

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 end	ed June	30, 1961
	Accidents	Killed	Injure
vir compressors	1	0]
ir reservoirs, fittings, safety and check valves	2	U	1 2
Boiler:		0	١.,
Explosions Fuel explosions in firebox	1	0	1 :
Steam valves, piping and blowers	1 1	ñ	1 2
Brakes and brake rigging	A	ň	
Tab:		''	· `
Doors and windows	3	0	:
Seats	7	0	1
Control equipment—mechanical, electrical, pneumatic or electro-pneumatic	1	0	1
Couplers, draft and drawgear	1	0	1
Electrical equipment:			
Insulation, short circuits, or electrical flashes	12	0	1.
Fans and shutters		0	1
Fires due to liquid fuel or debris		0	
Floors, steps and passageways	17	0	17
nternal-combustion engines and turbines:	_		Ι.
Crankcase or air-box explosions	7	0	1
Exhaust and cooling systems		0	-
Fuel injectors and connections	1 1	0	;
verscenaneous	3		<u> </u>
Total	71	0	7

LOCOMOTIVE ACCIDENTS

Of the 71 accidents, 17 were caused by the defective condition of floors, steps, and passageways of diesel-electric locomotives. Fourteen

of the 17 resulted from accumulation of oil on walking surfaces of the locomotives, an increase of 7 compared with the preceding year.

Seven accidents were caused by defective condition of cab seats, compared with 8 in the previous year.

SPECIFICATIONS AND ALTERATION REPORTS

In compliance with rule 54 of the Rules and Instructions for Inspection and Testing of Steam Locomotives, 1 specification and 42 alteration reports 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, 470 specifications and 1,124 alteration reports for locomotive units, and 120 specifications and 216 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, six alteration reports were submitted by carriers. The information contained in these specifications and reports was analyzed and corrective measures were taken when descrepancies were found.

INSPECTION AND REPAIR REPORTS

Inspection and repair reports filed with district inspectors during the year totaled 7,363 under rules 51 and 53 of the Rules and Instructions for Inspection and Testing of Steam Locomotives; 408,051 under rules 331 and 332 of the Rules and Instructions for Inspection and Testing of Locomotives Other Than Steam; and 31,975 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, 30 applications for extension of time for removal of flues were submitted. After investigation, extensions were granted for the full period requested in 25 applications. Two extensions were granted after defects disclosed by our investigation were repaired. Two applications were canceled and one application is pending. Extensions were granted for the full period requested in the four applications pending on July 1, 1960.

SUITS FOR PENALTIES

During the year, 9 cases involving 13 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 two cases on four counts and penalties totaling

\$1,000 were assessed. Seven cases, involving nine 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. Cincinnati, New Orleans and Texas Pacific Railway Company, consisting of two causes of action, involved the use of a diesel electric locomotive unit when one of its driving wheel brakes was cut out in violation of rule 204(a). Judgment was confessed on both counts and a penalty of \$500 was assessed.
- U.S. v. Chicago, Rock Island and Pacific Railroad Company, consisting of two causes of action, involved the use of a diesel electric locomotive unit when a monthly inspection had not been made and a duplicate report of such inspection had not been filed with the district inspector as required by rule 331(a) and when a copy of the last inspection report was not in the cab of the locomotive as required by rule 331(b). Judgment was confessed on both counts and a penalty of \$500 was assessed.

CASES PENDING AT THE CLOSE OF THE YEAR

- U.S. v. The New York Central Railroad Company, consisting of three causes of action, involves the use of three locomotives when monthly inspections as required by rule 331(a) had not been made.
- 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 main reservoir had not been given the prescribed hydrostatic and hammer tests as required by rule 206 (a) and (b).
- U.S. v. Wabash Railroad 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 a diesel electric locomotive crankcase explosion, as required by rule 335.
- U.S. v. Pennsylvania Railroad Company, consisting of one cause of action, involves the use of a diesel electric locomotive unit when the oil cooler was leaking oil in violation of rules 203(a) and 262(b).
- U.S. v. Pennsylvania Railroad Company, consisting of one cause of action, involves the use of one diesel electric locomotive when the main reservoir had not been given the prescribed hydrostatic and hammer tests, as required by rule 206 (a) and (b).
- U.S. v. Baltimore and Ohio Railroad Company, consisting of one cause of action, involves the use of a diesel electric locomotive unit when the rotair valve was defective, in violation of rule 204(a).
- U.S. v. Missouri Pacific Railroad Company, consisting of one cause of action, involves 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 a locomotive cab seat failed, as required by rule 335.

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, 1961, BY ROADS

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

ATLANTIC COAST LINE RAILROAD:

June 11, 1961, unit 764-B. Green Cove Springs, Fla. Flash caused by defective magnet valve; one employee injured.

One accident; one employee injured.

BALTIMORE AND OHIO RAILROAD:

July 31, 1960, unit 4555, Illchester, Md. Rough stop due to undesired emergency brake application caused by defective gasket in airbrake equipment; two employees injured.

January 26, 1961, unit 4565, Strecker, Md. Defective rotair valve handle resulted in inoperative locomotive airbrakes; one employee injured.

Two accidents: three employees injured.

BOSTON AND MAINE RAILROAD:

November 28, 1960, unit 1115, Northampton, Mass. Defective sandbox cover; one employee injured.

May 12, 1961, unit 4225-B. Bow, N.H. Crankcase explosion caused by overheated main bearings; one employee injured.

May 14, 1961, unit 1707, Pownal, Vt. Crankcase explosion caused by overheated main bearings; one employee injured.

May 17, 1961, unit 6205, Lawrence, Mass. Failure of cab seat due to defective weld; one employee injured.

June 28, 1961, unit 1573, Holvoke, Mass. Defective cutout cock resulted in insufficient operating clearance; one employee injured.

Five accidents; five employees injured.

CHICAGO AND NORTH WESTERN RAILWAY:

March 16, 1961, unit 5029-B, Spooner, Wis. Engine lubricating oil pipe failure: one émployée injured.

One accident; one employee injured.

CHICAGO, BURLINGTON & QUINCY RAILROAD:

July 26, 1960, unit 151-B, Galesburg, Ill. Fire in high voltage cabinet: one employee injured.

December 4, 1960, unit 164-A, St. Augustine, Ill. Crankcase explosion caused by overheated connecting rod bearing; one employee injured.

Two accidents: two employees injured.

CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC RAILROAD:

October 8, 1960, unit 428, Taopi, Minn. Employee slipped on smooth floor in radiator compartment; one employee injured.

One accident; one employee injured.

ERIE-LACKAWANNA RAILROAD:

March 28, 1961, unit 1021, Leonia, N.J. Employee slipped on oil on passageway; one employee injured.

April 27, 1961, unit 7083, Lanesboro, Pa. Flash in high voltage cabinet; one employee injured.

Two accidents; two employees injured.

INDIANAPOLIS UNION RAILWAY:

June 22, 1961, unit 11, Indianapolis, Ind. Derailment caused by traction motor gear casing dropping to track structure; one employee injured. One accident, one employee injured.

MISSOURI-KANSAS-TEXAS RAILROAD:

November 22, 1960, unit 78-D. San Antonio, Tex. Failure of steam valve caused by defective threads on bonnet; one employee injured.

November 28, 1960, unit 54-C. near Ringer, Kans. Employee slipped on water on cab to engineroom steps; one employee injured.

Two accidents: two employees injured.

MISSOURI PACIFIC RAILROAD:

December 18, 1960, unit 555-A, Oakdale, La. Cab seat became detached from floor because of improper repairs; one employee injured.

**March 24, 1961, unit 4333, St. Louis, Mo. Failure of cab seat backrest positioning device; one employee injured.

Two accidents: two employees injured.

NEW YORK CENTRAL RAILROAD:

July 15, 1960, unit 1817, San Pierre, Ind. Rough train stop caused by defective automatic train stop motor-generator which permitted a drop in voltage output sufficient to automatically set the brakes; one employee injured.

September 26, 1960, unit 1650, Cleveland, Ohio. Fire in high voltage cabinet; two employees injured.

December 8, 1960, unit 1012, near Ellis, N.Y. Cab seat failed at weld securing pedestal to base; one employee injured.

January 6, 1961, unit 257, New York, N.Y. Steam heating boiler flashback; one employee injured.

June 5, 1961, unit 1066, near DeWitt, N.Y. Gas inhalation resulting from defective exhaust manifold; one employee injured.

Five accidents: six employees injured.

NEW YORK, NEW HAVEN & HARTFORD RAILROAD:

July 21, 1960, unit 1413, South Worcester, Mass. Employee slipped on oil on passageway; one employee injured.

July 31, 1960, unit 361, New Rochelle, N.Y. Main transformer relief diaphragm ruptured as a result of short circuit in transformer throwing hot coolant in locomotive carbody; two employees injured.

August 16, 1960, unit 2010, Fairfield, Conn. Failure of trainline steam heat remote control valve; two employees injured.

October 14, 1960, unit 0948, New Haven, Conn. Employee slipped on oil on passageway; one employee injured.

January 11, 1961, unit 0424, Apponaug, R.I. Employee slipped on oil on engineroom floor; one employee injured.

January 18, 1961, unit 0782, New Haven, Conn. Employee slipped on oil and water on engineroom floor; one employee injured.

June 1, 1961, unit 554, Branford, Conn. Employee slipped on oil on passageway; one employee injured.

Seven accidents; nine employees injured.

PENNSYLVANIA RAILROAD:

July 24, 1960, unit 4896, New York, N.Y. Metallic steam heat connector contacted energized third rail causing electrical flash; one employee injured.

August 9, 1960, unit 9745-A, between Beale and Harris, Pa. Failure of diesel engine high pressure fuel injection pipe; one employee injured.

August 11, 1960, unit 9700-A, between Rochester and Wood Junction, Pa. Engine exhaust gases entering engine compartment; one employee injured.

September 21, 1960, unit 4880, Philadelphia, Pa. Electrical flash and explosion in transformer tap switch group; one employee injured.

September 28, 1960, unit 8905, Bucyrus, Ohio. Employee slipped on oil on passageway; one employee injured.

December 16, 1960, unit 9266, Conway, Pa. Failure of cab seat backrest because of the use of improper screws to secure the backrest; one employee injured.

December 17, 1960, unit 8496, Morrisville, Pa. Employee slipped on oil on step; one employee injured.

December 18, 1960, unit 8960, Pitcairn, Pa. Employee slipped on oil on assageway; one employee injured.

January 8, 1961, unit 4729, Enola, Pa. Employee tripped over insecure plate sed to cover hole in passageway; one employee injured.

January 10, 1961, unit 5894-A, Elida, Ohio. Fire in train heating boiler comartment: one employee injured.

January 26, 1961, unit 9037, Philadelphia, Pa. Short circuit caused by decetive ammeter; one employee injured.

February 2, 1961, unit 9517-A, Montandon, Pa. Employee slipped on oil on ngineroom floor; one employee injured.

February 6, 1961, unit 9831-A, Greensburg, Pa. Short circuit in main genertor leads; two employees injured.

February 14, 1961, multiple unit 494, Narberth, Pa. Undesired emergency rake application caused by automatic train stop operation due to low voltage; ne employee injured.

March 7, 1961, unit 2007-A, Crestline, Ohio. Engine exhaust gases entering ab; one employee injured.

April 25, 1961, unit 4927, Baltimore, Md. Defective threads on train line

team valve; one employee injured.

May 24, 1961, unit 9786-A, Longfellow, Pa. Cap screws missing from cam witch operating mechanism; one employee injured.

June 7, 1961, unit 9251, Roebling, N.J. Angle cock insecurely fastened to rake pipe; one employee injured.

May 10, 1961, unit 9660-A, Shire Oaks, Pa. Cotter pin missing from unoupling device; one employee injured.

Nineteen accidents; twenty employees injured.

Pennsylvania-Reading Seashore Lines:

August 24, 1960, unit 6023, Camden, N.J. Explosion in battery containers; ne employee injured.

One accident; one employee injured.

T. LOUIS-SAN FRANCISCO RAILWAY:

October 8, 1960, unit 5005, Merriam, Kans. Fire at main generator; one emloyee injured.

October 19, 1960, unit 273, Tulsa, Okla. Cab door would not remain closed tue to broken latch; one employee injured.

January 19, 1961, unit 5206, Dallas, Tex. Defective cab window operating nechanism; one employee injured.

March 22, 1961, unit 309, Capleville, Tenn. Failure of seat box backrest; one employee injured.

Four accidents; four employees injured.

SEABOARD AIR LINE RAILROAD:

July 26, 1960, unit 1478, Mulberry Yard, Fla. Employee slipped on oil on bassageway; one employee injured.

November 7, 1960, unit 4011, Tampa, Fla. Cab heater fan not properly guarded; one employee injured.

June 9, 1961, unit 3014, Landrum, S.C. Ignition of combustible material inder car body and subsequent failure of fire extinguisher; one employee injured. Three accidents; three employees injured.

SOUTHERN RAILWAY:

January 20, 1961, unit 4423, Phillips, Tenn. Crankcase explosion caused by overheated crankshaft bearings; one employee injured.

March 29, 1961, unit 2501, Griffin, Ga. Crankcase explosion caused by overleated main bearing; one employee injured.

May 21, 1961, unit 4373, near Ridgecrest, N.C. Failure of air compressor lischarge pipe; one employee injured.

Three accidents; three employees injured.

SOUTHERN PACIFIC COMPANY:

October 27, 1960, unit 6463, Yuma, Ariz. Improper cab door handle permitted unexpected opening of door; one employee injured.

December 8, 1960, unit 5308, Fresno, Calif. Inadequate lubrication of automatic brake valve; one employee injured.

December 21, 1960, unit 6234, Eugene, Oreg. Failure of cab seat backrest adjusting mechanism; one employee injured.

January 3, 1961, unit 6339, Enid, Ariz. Employee slipped on oil on engineroom floor; one employee injured.

January 28, 1961, unit 6050, Leoncito, N. Mex. Heating boiler explosion; one employee injured.

April 9, 1961, unit 1333, San Jose, Calif. Employee slipped on oil on passageway; one employee injured.

April 25, 1961, unit 1052, Ozol, Calif. Crankcase explosion caused by defective piston; two employees injured.

Seven accidents; eight employees injured.

Union Pacific Railroad:

March 29, 1961, unit 523, Union Junction, Oreg. Employee slipped on oil on engineroom floor; one employee injured.

One accident; one employee injured.

WABASH RAILROAD:

**February 16, 1961, unit 710, Moberly, Mo. Crankcase explosion caused by defective piston; one employee injured.

April 17, 1961, unit 616, Centralia, Mo. Main generator flashover; one employee injured.

Two accidents; two employees injured.

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

	Parts defective, inoperative or missing, or in	Year ended June 30—							
	violation of the rules	1956	1957	1958	1959	1960	1961		
1 2	Air compressors	239	83	13	11	4	2		
3	Arch tubesAshpans and mechanism	13	1 4	1	2				
4	Axles	2							
5	Blow-off cocks Boiler checks	91 70	$\frac{30}{26}$	$\frac{2}{9}$	3	3	2		
6 7	Boiler shell	31	20	3	3 1	3	2		
8	Brake equipment	565	256	85	35	19	16		
10	Cabs, cab windows, and curtains	187 113	101 22	$\begin{bmatrix} 21 \\ 7 \end{bmatrix}$	3	3	2 2 3		
11	Cab cards	23	18	6	. 4	2	3		
12 13	Coupling and uncoupling devices. Crossheads, guides, pistons, and piston rods	$\frac{17}{223}$	8 107	3	6	1			
14	Crown bolts	10	107	22	11	6	3		
15	Cylinders, saddles, and steam chests	251	157	17	7	2			
16 17	Cylinder cocks and rigging	116 23	54 13	11	1	3	1		
18	Domes and dome caps	107	45	1 17	8	1 6	2		
19	Draw gear	57	23	6	ĭ	ĭ	l ĩ		
20	Driving boxes, shoes, wedges, pedestals, and braces	250	72	21	6	1	١,		
21	Firebox sheets	25	23		1	1	1 1		
22 23	Flues.	19	12		2	1	3		
24	Frames, tail pieces, and braces, locomotive	78 10	22 4	5	3		2		
25 1	Gages and gage fittings, air Gages and gage fittings, steam	40	25	8	3	1			
26	Gages and gage fittings, steamGage cocks	68	28	4	1	3	2		
27 28	Grate shakers and fire doors	113 54	43 34	15 6	5 1	$\frac{2}{1}$	5		
29	Handholds	112	33	8	12	5	5		
30 31	Injectors, inoperative	3 379	198	1 27	1	1	1		
32	Inspections and tests not made as required	379	198	37 12	15 10	9	4 8		
33	Lateral motion	48	24	10	2	1			
34 35	Lights, cab and classification Lights, headlight	18 32	7 18	4	$\frac{1}{3}$	1	1		
36	Lubricators and shields	38	16	5 3	1	1			
37 38	Mud rings Packing nuts	36	6	3	3				
39	Packing nuts Packing, piston rod and valve stem	$\frac{253}{106}$	$\frac{62}{74}$	14 5	10 8	4	1		
40	Packing, piston rod and valve stem	34	8	2	$\overset{\circ}{2}$	1			
41 42	Payaring goar	$\frac{15}{108}$	16 39				1		
43	Rods, main and side, crankpins, and collars	214	108	$\frac{11}{22}$	5 11	$\frac{1}{6}$	2		
44	Salety valves	17	9	1			1		
45 46	SandersSprings and spring rigging	$\frac{123}{505}$	$\frac{72}{212}$	$\frac{9}{32}$	$\frac{3}{25}$	7	3 2		
47	Squirt hose	26	14						
48 49	Staybolts. Staybolts, broken.	69 3 0	20	6	3	1	6		
50	Steam pipes	57	12 27	9 5	19 4	$\frac{8}{2}$	1		
51	Steam valves	21	7	2	3	1			
52 53	StepsTanks and tank valves	147 217	42 99	20 16	6 5	6	3		
54	Telltale holes	9	6	1		3			
55 56	Throttle and throttle rigging	133	48	9	6	5			
57	Trucks, tender	96 123	42 51	5 10	11	$\frac{2}{7}$			
57 58	Valve motion	105	55	7	4				
59 60	Stokers	83 68	39 33	1 3	$\frac{2}{2}$	7			
61	Water glasses, fittings, and shields	193	75	20	9	3			
62 63	Wheels Miscellaneous—Signal appliances, badge plates,	70	39	7	13	Ĭ	1		
w	brakes (hand)	166	68	9	6	2	1		
	Number of defects	6, 487	2,840	592	325	149	89		
	Locomotives reported	5, 875	3,868	2, 422	1, 490	788	367		
- 1	Locomotives inspected	8 794	5, 983	2, 324	967	356	243		
	Locomotives defective Percentage of inspected found defective	1, 499 17. 0	737	159	.77	38	27		
1	Locomotives ordered out of service	152	12. 3 99	6. 8 22	8. 0 16	10. 7 3	11.1		
			<u> l</u>		-				

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		Yea	r ended	June 30-	-	
	violation of the rules	1956	1957	1958	1959	1960	1961
1	Air compressors	443	328	232	337	290	208
2	Axles, truck and driving	26	34	59	100	126	91
4	Batteries	97	35	15	16	21	25
5	Boilers	275	208	172	313	284	213
6	Brake equipment	3, 259	2,906	2, 469	3, 477	3, 617	3,066
8	Cabs and cah windows	1,600	1,030	962	1, 419 231	1, 407 274	840 181
9	Cab cards.	183 1,933	187 1,940	$\begin{array}{c c} 145 \\ 2,020 \end{array}$	2,768	2, 461	2, 235
10	Cab floors, aprons, and deck plates	1,955	1, 940	2,020	2,700	2, 401	2, 200
$\frac{11}{12}$	Controllers, relays, circuit breakers, magnet	*			"	0	*
12	valves and switch groups	775	360	348	613	704	565
13	Coupling and uncoupling devices	166	116	132	172	131	144
14	Current collecting apparatus	17	6	3	4	11	5
16	Draft gear	360	253	357	489	420	402
17	Draw gear	146	121	128	173	160	108
18	Driving boxes, shoes, and wedges	291	154	135	144	223	148
20	Frames or frame braces	30	30	17	23	19	55
22	Fuel system	2,555	2, 431	2,307	3, 343	2, 702	2, 193
23	Gages or fittings, air	278	289	166	277	254	163
24	Gages or fittings, steam	60	36	58	41	37	28
25	Gears and pimions	20	10	19	35	25	156
26	Handholds	258	208	$\frac{217}{623}$	230 682	1, 063	210 847
28	Inspections and tests not made as required.	748	703 133	023 228	210	209	163
29	Insulation and safety devices	282	199	226	210	208	103
30	appurtenances	6, 356	5, 174	3, 817	6, 555	7, 184	6, 124
32	Jack shafts			200	1 255		434
33	Jumpers and cable connectors		442	306	355 25	350 49	434 28
35	Lateral motion, wheels	14 352	35 260	$\frac{46}{321}$	480	404	269
36 37	Lights, cab and classification Lights, headlight	38	35	32	46	34	18
39	Meters, volt and ampere	58	34	24	31	30	22
40	Motors and generators	1, 122	671	472	787	821	759
42	Pilots and pilot beams	78	61	41	75	64	54
43	Plugs and studs	1					1
44	Quills	26	6	32	46	24	- 5
46	Quills Rods, main, side, and drive shafts	4	5	1	1	5	
48	Sanders	2, 307	2,023	2, 310	3, 613	3,602	3, 131
49	Springs and spring rigging, driving and truck	363	370	380	542	512	415
51	Staybolts, broken or defective		104	141	100	191	93
53	Steam pipes	190	164	141 292	182 408	$\begin{array}{c c} & 131 \\ & 372 \end{array}$	307
54	Steps, footboards, et cetera	1,005 48	827 16	16	11	17	16
55	Switches, hand-operated, and fuses Transformers, resistors, and rheostats	9	10	10	4	4	6
56 57	Trucks	1,007	552	510	823	765	692
59	Water tanks	49	19	31	32	30	25
60	Water glasses, fittings, and shields	14	5	4	2	ı	ĩ
61	Warning signal appliances	182	154	124	179	142	148
62	Wheels	252	256	189	382	798	805
63	Miscellaneous	1, 220	736	762	1, 491	1,400	1, 210
	Number of defects	29, 054	23, 373	20, 668	31, 171	31, 427	26, 614
			<u> </u>				
	Locomotive units reported	29, 405 88, 269	30, 740 93, 187	31, 755 91, 522	31, 862 102, 149	32, 186 105, 702	32, 074 95, 689
j	Locomotive units inspected	9, 597	93, 187	8,067	102, 149	105, 702	95, 689
	Locomotive units defective Percentage of inspected found defective	10.9	9,031	8.8	10, 473	10, 033	9.4
	Locomotive units ordered out of service	492	417	372	628	517	469
	Pocomotive direct ordered out of service	102	1		520		1

15

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		Yea	r ended	June 30—	-	
	violation of the rules	1 1956	1957	1958	1959	1960	1961
1 2 4	Air compressors				1 87	4 53	40
5 6	Boilers						
8	Cans and can windows	1	1	23	188	491	951
9	Cab cards	1	8	13	25	26 8	11 9
10 11 12	Cab cards			1 1	2		1
13	Controllers, relays, circuit breakers, magnet valves and switch groups. Coupling and uncoupling devices. Current collecting apparatus. Draft gear. Draw gear			1	2	9	8
14	Current collecting apparetus						1
16	Draft gear		20	25 1	65 15	115 11	151 22
17	Draw gear			9	107	20	16
18 20				ة ا	1 3	3	3
20							
23	Fuel system Gages or fittings, air					<u>-</u> -	
23 24				1	8	5	4
25	Gears and pinions				4	5	9
26 28			7	45	46	61	14
29	Inspections and tests not made as required Insulation and safety devices		46	22	30	52	61
30	internal-combustion engine defects, parts and	l	1		23	87	78
32	Jack shafts.						
33	Jumpers and cable connectors	2	5	3	10	16	13
35 36	Lateral motion, wheels						
37	Lights, headlight		1		24	42	23
39	Meters, volt and ampere				4	29	5
40	appurtenances. Jack shafts. Jumpers and cable connectors. Lateral motion, wheels. Lights, cab and classification Lights, headlight. Meters, volt and ampere. Motors and generators. Pilots and pilot beams Plugs and studs.		3		31	23	15
42 43	Pilots and pilot beams				2		
44	Plugs and studs	- 					
46	Rods main side and drive shofts						
48	Sanders						
49 51	Sanders. Springs and spring rigging, driving and truck. Staybolts, broken or defective. Steam pipes Steps, footboards, et cetera. Switches, hand-operated, and fuses.		25	10	8	17	8
53 54	Steam pipes						
55	Switches, hand-operated, and fuses						
56	Transformers, resistors, and rheostats		1		1	3 14	5
57	Trucks	12	23	98	5 222	152	19 98
59	Water tanks Water glasses, fittings, and shields Warning signal appliances					102	90
60 61	Water glasses, fittings, and shields						
62	Wheels		1		1 1		- -
63	Miscellaneous		2 7	6	3	5	37
					17	1	3
	Number of defects		172	272	834	1, 254	1,605
	Locomotive units reported	2,782	2, 745	2,728	2, 717	2, 671	2,633
	LOCOMOTIVE UNITS inspected	285	1,437	1,747	2, 231	2, 571	2, 400
	Locomotive units defective	.11	119	168	362	450	372
	Locomotive units ordered out of service	3.9	8.3	9.6	16. 2 4	17. 5	15. 5
				1	4	11	31
						:	

¹ The Rules and Instructions for Inspection and Testing of Multiple Operated Electric Locomotive Units Designed to Carry Freight and/or Passenger Traffic became effective April 1, 1956.

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	Chicago, Burlington & Quincy	Denver & Rio Grande Western	Duluth, Missabe & Iron Range	Grand Trunk Western	Lake Superior & Ishpeming	Union Pacific	Roads with less than 10 loco- motives	Total
	Air compressors							2	
	Arch tubesAshpans and mechanism								
	Axles.								
	Blow-off cocksBoiler checks							2	
	Boiler shell							10	
	Cabs, cab windows and curtains.							16 2	1
	Cab aprons and decksCab cards							2 3	
	Coupling and uncoupling devices							3	
	Crossheads, guides, pistons, and piston rods Crown bolts							3	
	Cylinders, saddles, and steam chests								
	Cylinder cocks and rigging Domes and dome caps							1	
	Draft gear							2	
	Draw gear							1	
	braces							1	İ
	Firebox sheets							1 3	
	Frames, tail pieces, and braces, locomotive							2	
	Frames, tail pieces, and braces, lecomotive Frames, tender								
	Gages and gage fittings, steam							2	
1	Gage cocksGrate shakers and fire doors							5	
1	Handholds							5	
-	Injectors, inoperative							1 4	
ļ	Inspections and tests not made as required							8	
1	Lateral motion							<u>i</u> -	
İ	Lights, headlight								
	Lubricators and shields				~				
1	Packing nuts							1	
	Packing, piston rod and valve stem Pilots and pilot beams	~							
ı	Plugs and studs							1	
	Rods, main and side, erankpins, and collars							<u>2</u> -	
	Safety valves							1 3	
	Springs and spring rigging Squirt hose							2	
1	Stavbolte							6	
	Staybolts, broken								
	Staybolts, broken Steam pipes Steam valves							1	
	Step							3	
	Tanks and tank valvesTelltale holes								
	Throttle and throttle rigging								
	Trucks, engine and trailing								
ı	Valve motion								
1	Stokers								
	Water glasses, fittings, and shields Wheels							<u>-</u>	
ŀ	Miscellaneous—Signal appliances, badge plates, brakes (hand)							1	
	Number of defects							89	
-	Locomotives reported	20	22						-
ŀ	Locomotives inspected	36 1	50	24	32	12	41	200 192	3 2
	Locomotives defective		- -					27	11
	Locomotives ordered out of service					[14.1	11

Table V .-- Number of locomotive units other than steam reported,

	Parts defective, inoperative or missing, or in	Akron, Canton & Youngstown	¥	₹	Ann Arbor	Apalachicola Northern	Atchison, Topeka & Santa Fe		Atlanta & West Point	Atlantic Coast Line	Baltimore & Ohio
1 2	Air compressers. Axles, truck and driving. Batteries. Boilers. Brake equipment. Cabs and cab windows. Cab cards Cab floors, aprons and deck plates. Clutches. Controllers, relays, circuit breakers, magnet valves and switch groups.				1		4			4	
4 5	Boilers						10		2	16	1
6 8	Cabs and cab windows.		2	1			52 33		5	42 7	
9 10 11	Cab cards						50		<u>ī</u>	39	5
12	Controllers, relays, circuit breakers, magnet valves and switch groups. Coupling and uncoupling devices. Current collecting apparatus. Draft gaar. Draw gear. Draw gear. Driving boxes, shoes and wedges. Frames or frame braces. Frames or frame braces. Fuel system. Gages or fittings, air. Gages or fittings, steam. Gears and pinions. Handholds. Inspections and tests not made as required. Insulation and safety devices. Internal-combustion engine defects, parts and appurtenances.			1			4		2	11	5
13 14	Current collecting apparatus.										3
16 17	Draft gear						2			3	
18 20	Driving boxes, shoes and wedges									8	5
22 23	Fuel system						70		3	34	6 27
24	Gages or fittings, steam						3 2			$\frac{3}{2}$	2
25 26	Handholds				₁		3		1	2	3
28 29 30	Inspections and tests not made as required Insulation and safety devices						36 4			27	26 2 59
30	Internal-combustion engine defects, parts and appurtenances.				,		131		5	146	59
32 33	appurtenances. Jack shafts Lumpers and cable connectors										;;
35 36	Lateral motion, wheels									12	11
37 39	Lights, headlight									2	2
40	Motors and generators.						1 27			15	$\frac{1}{23}$
42 43	Pilots and pilot beams Plugs and studs										
44 46	Quills		~								
48 49	Sanders						169		2	15	32
51 53	Staybolts, broken or defective									6	4
54 55	Steps, footboards, et cetera						9			3 9	1 2
56	Transformers, resistors and rheostats										
57 59	TrucksWater tanks						8			10	6
60 61	Water glasses, fittings and shields Warning signal appliances										5
62 63	appurtenances. Jack shafts Jumpers and cable connectors. Lateral motion, wheels. Lights, cab and classification. Lights, headlight. Meters, volt and ampere. Motors and generators. Pilots and pilot beams. Plugs and studs. Quills. Rods, main, side, and drive shafts. Sanders. Springs and spring rigging, driving and truck. Staybolts, broken or defective. Steam pipes. Steps, footboards, et cetera. Switches, hand-operated, and fuses. Trucks. Water tanks. Water glasses, fittings and shields. Warning signal appliances. Wheels. Miscellaneous.						6		2	49	35
- 1	Number of defects		9	9	വ				26	28 511	395
	Locomotive units reported	17	17		- 02						
	Locomotive units inspected	67	19	41	55	44	1, 858 6, 016	53	114	1, 973	3, 317
	Locomotive units reported		10. 5	4, 9	3. 6		287 4.8 2		5. 3	191 9. 7 11	216 6. 5 8
<u> </u>		f		!			!	!	- 1		

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

Bangor & Aroostook	Belt Railway of Chicago	Bessemer & Lake Erie	Birn.ingham Southern	Boston & Maine	Butte, Anaconda & Pacific	Camas Prairie	Canadian National	Canadian Pacific	Canton	Central of Georgia	Central Railroad of New Jersey	Central Vermont	Chesapeake & Ohio	Chicago & Eastern Illinois	Chicago & Illinois Midland	Chicago & North Western	Chicago & Western Indiana	Chicago, Burling- ton & Quincy	Chicago Great Western	Chicago, Milwaukee St. Paul & Pacific	
1	1		8	7 14 40 36 8 65			1 1 3	9 12 5 15		40 9 1 3 4	2 37 2 1 52	1 4 1	1 1 	2	2	29 9 54 15	1	111 26 4 	5	11 17 17 26	10 11 11 11
1 2		1	2	105 21 40 3 384	4		222	<u>1</u>		21 3 3 5 7 8 117	30 4	3	77	1	1	15 10 18 10 92 5 		1 9 4 2 8	5 	7 42	10 10 10 10 20 20 20 20 20 20 20 20 20 20 20 20 20
1				52 6 			6	<u>2</u>		6	4		4 2 2 2			11 8 10 3 11 4		3 3 1 6 1	1 1 1	12, 2 5 1 1 28 3	3: 3: 3: 3: 4: 4: 4:
2	2			41 4 2 6	2	1	12	9		22 2 2 3	7 8	2 2 1	25 4	1	1	131 39 1 19 2		19	1	84 26	4 4 4 5 5 5 5
12	4	1	22	36 6 3 23 933	7	3	41	10 5 190		1 14 286	7 9 39 379	1 31	3 1 8 6 137	9	1 7	7 16 43 915	6	1 2 1 135	8 5	19 1 6 21 17 	50 50 60 60 60
31 84 5 5.9	53 55 1 1.8	56 93 1 1.1	21 58 10 17, 2	370 1, 687 285 16, 9 12	40 88 4 4. 5		97 74 9	107 154 44 28. 6 2	16 12	145 749 61 8. 1 7	192 562 98 17. 4	25 156 14 8. 9	1, 062 1, 689 58 3, 4	100 230 7 3.0	13 51 4 7. 8	810 1,951 314 16, 1	12 13 1 7. 7	703 2, 228 70 3. 1	135	899 2, 288 226 9, 9	

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

												-		•	•	
	Parts defective, inoperative or missing, or in violation of the rules	Chicago River & Indiana	Chicago, Rock Island & Pacific	Chicago South Shore	Cincinnati Union Terminal	Clinchfield	Colorado & Southern	Colorado & Wyoming	Conemaugh & Black Lick	Cuyahoga Valley	Delaware & Hudson	Denver & Rio Grande Western	Detroit & Toledo Shore Line	Detroit Terminal	Detroit, Toledo & Ironton	Donora Southern
1	Air compressors. Axles, truck and driving. Batterics. Boilers. Brake equipment. Cabs and cab windows.		5				1				2	2				
2 4	Axles, truck and driving															
5	Boilers		6								<u>ī</u>	1				
6	Brake equipment	-~-	265	2							26				8	
8 9	Cab cards		68 8								8 2	1	1		1	
10	Cab floors, aprons and deck		78								71	7				
11 12	plates. Clutches Controllers, relays, circuit breakers, magnet valves		9													
13	Coupling and uncoupling	1	1									2	<u></u>		1	
14 16	devices. Current collecting apparatus Draft gear		<u>-</u>													
17	Draw gear Driving boxes, shoes and		5								4					
18	Driving boxes, shoes and wedges.		5													
20	Frames or frames braces									i						
$\begin{array}{c} 22 \\ 23 \end{array}$	Fuel system Gages or fittings, air Gages or fittings, steam	1	74			1					37	15			4	
23 24	Gages or fittings, air		۶ 1									1				
25	Gears and pinions															
26	Handholds						2								4	
28	Inspections and tests not made as required.		42] 1		2		- -			6					
29	Insulation and safety devices.		8				1					1				
30	Internal-combustion engine defects, parts and appurtenances.	1	163				1				318	11			1	•-
32 33	Jack shafts	ĺ		2							<u>i</u>	2				
35 36	Lateral motion, wheelsLights, cab and classification.						4					2		<u>ī</u>		
37	Lights, headlight		1								1					
39 40	Lights, headlight Meters, volt and ampere Motors and generators Pilot and pilot beams Plugs and studs		3 26 1								1 4					
42	Pilot and pilot beams		ĩ									1				
43 44	Plugs and studs								- -							
46	Quills										•					
48	shafts. Sanders	4					5				5	8	6		3	
49	Springs and spring rigging, driving and truck.	1	27					2				1			1	
51	Staybolts, broken or defec- tive.															
53	Steam pipes		.7													
54 55	Steps, footboards, et cetera Switches, hand-operated,		27	2		-					7				2	
5 6	and fuses. Transformers, resistors and	1														
57	rheostats. Trucks		28		[1	,	Ì				-	1			
59 60	Water tanks Water glasses, fittings and		28 1													
61	shields.]			۔ ا		[
61 62 63	Warning signal appliances Wheels		8 35 36				2 1			1	 1 58	5		<u>i</u>	<u>5</u>	
	Number of defects	7	1, 192	9		3	18	2		1	563	69		$-\frac{1}{2}$	30	
	Topomotive write	==	<u> </u>	_	=			==	-				-			
	Locomotive units reported. Locomotive units inspected. Locomotive units defective. Percentage of inspected	16 16 2 12. 5	393	17 38 5 13. 2	12 4	66 163 1 0.6	8	20 49 1 2.0	28 33	10 17 1 5. 9	753	254 1, 441 37 2. 6	94 1	15 36 1 2.8	47 163 7 3.8	11 3
	found defective. Locomotive units ordered out of service.		15						<u>-</u>	1	4				3	

¹Atchison, Topeka & Santa Fe.

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

Duluth, Missabe & Iron Range	Duluth, Winnipeg & Pacific	Elgin, Joliet & Eastern	Erie-Lackawanna	Florida East Coast	Ft. Dodge, Des Moines & Southern	Ft. Worth & Denver	Georgia & Florida	Georgia	Grand Trunk Western	Great Northern	Green Bay & Western	Gulf, Colorado & Santa Fe	Gulf, Mobile & Obio	Houston Belt & Terminal	Illinois Central	Illinois Terminal	Indiana Harbor Belt	Indianapolis Union	Interstate	Jacksonville Terminal	
			1 1 1				ī	1 1	1			<u>1</u>			1						1
3	1 1 1	4	11 50 25 4				1	3	5	1		12 1 7	42 19 2		7	4	11		1		
			63						1	41 14		7	18		3						1 1 1
			2						5	4			6								1
		1 1	12					<u>i</u>	2 2 4	9		<u>3</u>	3				1				1: 1: 1: 1:
		 	53				12	3	<u>-</u> 5	3 2 39		1	1 61			1]
			1						1	i		5 1 1	1 <u>1</u>		6	1					2: 2: 2: 2: 2: 2: 2: 2:
1	2		29 1				3	 1	3	11 18			3 5				1				$\begin{bmatrix} 2\\2\\2\\2 \end{bmatrix}$
		2	140	1			1	12	11	162		4	62		7	1	4				30
			5		 				2	4			1 6		<u>ī</u>						33
			1						1 1	11			10								3 3
			9 1	<u>1</u>			1		1 1	1 1		2	5 								3 4 4 4
																					4
			33				1	5	41	203 9			63			3					4 4 5
			3 11	- -				1		1 11 1		1	1 1								5; 5; 5;
			10	~		1	a	1					12		1						56
																					51 59 60
	1 1 —		15 28			 		1	1 <u>2</u>	4 4 24		1 1	16 21		1 7 5	5 1	1				62 63
122 223	$\frac{8}{16}$	$\frac{15}{==}$ $\frac{140}{126}$	533 696 2, 466	107 303	$=\frac{3}{10}$ 19	46 159		31 31 178	102 === 177 421	651 644 1, 726	17 22	(1) 710	404 256 1, 095	22 37	59 632 2, 090	$\frac{20}{37}$ $\frac{37}{129}$	72 127 134	12 45	$-\frac{1}{26}$	10 28	
1. 8	9.1	3.9	7. 7 8	5 1. 7	5. 3 1	1	20. 0 2	13	26 6. 2	208 12. 1		25 3. 5	134 12. 2		36	13	15 11, 2		3. 8		

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

FIFTIETH ANNUAL REPORT

					ŀ								
	Parts defective, inoperative or missing, or in violation of the rules	Kansas City Southern	Kansas City Terminal	Kansas, Oklahoma & Gulf	Kentucky & Indiana Terminal	Lake Superior & Ishpeming	Lake Terminal	Lehigh & Hudson River	Lehigh & New England	Lehigh Valley	Long Island	Louisiana & Arkansas	Louisville & Nashville
_	Air compressors												
$\begin{array}{c c} 1 \\ 2 \end{array}$	Axles, truck and driving							<u></u>					6
2 4	Batteries	1								:			
5 6	Boilers Brake equipment	38								20	. 2	7	3 70 14 3 36
8	Cabs and cab windows	9			1			1		1 1	8 3	'	14
ğ	Cab cards										2		3
10	Cab floors, aprons and deck plates	20				1		8		15	7	8	36
11	Clutches Controllers, relays, circuit breakers,	<u>-</u> 8			~								36
12	magnet valves and switch groups.	°											36
13	Coupling and uncoupling devices										1	1	10
14	Current collecting apparatus												
16	Draft gear	2				~		1		6			15
17 18	Draw gear Driving boxes, shoes and wedges							1		1	$\frac{2}{2}$		2
20	Frames or frame braces										-		1
20 22	Fuel system	21	2		1	1		4		24	6	1	26
23	Gages or fittings, air										1		4
24 25	Gears and pinions										3		
26	Handholds										2		12
28	Inspections and tests not made as required.	3					2	4		3		1	12 3 20
29	Insulation and safety devices	1									1		94
30 32	Internal-combustion engine defects, parts and appurtenances. Jack shafts	46	1				1	6		30	8	9	94
33	Inmage and cable connectors	2											16
33 35	Lateral motion, wheels												
36	Lateral motion, wheels Lights, cab and classification Lights, headlight	3											9
37 39													
40	Motors and generators Pilots and pilot beams Plugs and studs	12								5	- -		10
42	Pilots and pilot beams										~==-		
43	Plugs and studs												
44 46	Rods, main, side, and drive shafts												
48	Sanders	21			5.	4		17		1	3	1	69
49	Springs and spring rigging, driving and	4	- -							2	2		
51	truck. Staybolts, broken or defective												
53	Staybotts, broken of delective												3
54	Steps, footboards, et cetera												5
55	Switches, hand-operated, and fuses												
56 57	Transformers, resistors and rheostats								- -			5	1 13
59	Water tanks												10
60	Water glasses, fittings and shields									-			
61	Warning signal appliances	6											5
62 63	Wheels Miscellaneous	12 12						19		12	1 8		48 15
30		<u> </u>									°		
1	Number of defects	219	3		7	8	3	61		125	66	33	549
- 1	Legameting units reported	10-	==				=		===		-	==	
1	Locomotive units reported Locomotive units juspected	161 439	17 29	15 29	23 44	16 28	18 36	13 57	32	$\frac{217}{1,118}$	79 89	16 167	734 2, 431
	Locomotive units defective	60	29	20	3	3	2	11	**	55	16	19	200
l	Percentage of inspected found defective	13.7	6. 9		6.8	10. 7	5.6	19.3		4.9	17.9	11.4	8.2
İ	Locomotive units ordered out of service	6					1			1	1	1	9
					l	<u> </u>			<u></u>	<u> </u>			<u> </u>

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

f o u	na	$def\epsilon$	ectiv	e, a	nd e	order	ea e	out	of s	ervi	ce,	et c	eiera	—оу	car	rier	s— •	on	tinu	ied	
Maine Central	Minneapolis, Northfield & Southern	Minnesota Transfer	Mississippi Central	Missouri-Illinois	Missouri-Kansas-Texas	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	
					14	4							20		12 16						1
			-		3	2							20 8 2		16 4	1					1 2 4 5 6 8 9 10 11 12
					6	$\frac{1}{6}$							17		27			1			5
2 2				$\frac{1}{2}$	167	71	1		1				346	6 2	27 218 66	1		2		33	6
2				2	167 40 1 86	71 36 3	1		1				115 20 323 3 77	2	66					33 11 1 7	8
4					86	48							323	6	246	2		1 1		7	10
													3	1						_	11
				1	29	12							77	5	13			2		22	12
2					10	1		ļ					21		7						13
					l								21 1 65 27 11		4						13 14 16 17 18 20 22 23 24 25 26 28 29 30 32
~					35 25 23 4 72 1	7							65	1	23			1		5	16
				1	25	2							27							1	17
					4	2							3		2						20
8					72	64							239	6	300			2		8	22
1					1	5							15		29					8	23
- ~-													3 239 15 2 12 30 113 17 673		5						24
					9	6 2							30	1	7	~				7	26
3					26	13	î						113		47			1	1	19	28
					7 9 26 11 133	1	:						17	4	4						29
17				~	133	119	1						673	3	855	9		1		47	30
																					1
2					27	4			- -				56 1	2	22					5	33
					16								1 1		12						35
					10	0							25 2 2		5			1		1	37
													2		í						39
					40	28							154		105	~~		1		1	40
~~-					5	2							9							1	42
																					44
																			;		33 35 36 37 39 40 42 43 44 46 48
1					162	99							401	11	143			15	1	66	48
1		 			42	6							48	1	8	1	- -			8	49
					1																51
					37	4							3 30		17					1	53
						l°							1							1	49 51 53 54 55 56 57 60 61 62 63
					1																56
2					46 1	30							94 5	2	79			2	1	2	57
		~~			l .	1							0		'						60
					17 39 49	9							4	1	1					4	61
					39	24 17	2		1				80 202	$\frac{1}{3}$	3 74			1		4 2 23	62
					49	17							202	2	/4	2				23	63
45				5	1, 186	643	6		3				3, 277	56	2, 389	16		32	3	277	
-		-	=	-				-			_	-					=				===
78 264 19 7. 2	$\frac{11}{26}$	18 20	10 10	14 52 3	222 874 334 38. 2 42	829 2, 749 221 8. 0	31 40 5 12. 5	27 34	57 220 2 0. 9	12 33	15 15	18 40	2, 059 6, 231 1, 106 17, 7	412 1, 173 32 2. 7 2	478 1, 328 446 33. 6	23 14	15 15	562 951 15	34 59 2 4.1	634 1, 900 138 7. 3	
19	∠υ	20	10	32	334	221	5	34	220	- 33	13	40	1. 106	32	446	5	19	15	29	138	
7. 2				5.8	38. 2	8.0	12. 5		$0.\tilde{9}$				17. 7	2.7	33.6	35. 7		1.6	4. 1	7. 3	
3					42	14	2						40	2	32			1		3	
,				·		•	٠ .					ا ا			١		١			·	

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

	Parts defective, inoperative or missing, or in violation of the rules	Northern Pacific Terminal	Northwestern Pacific	Ogden Union Railway & Depot	Pacific Electric	Patapsco & Back Rivers	Pennsylvania	Pennsylvania-Reading Sea- shore Lines	Peoria & Pekin Union	Philadelphia, Bethlehem & New England	Piedmont & Northern	Pittsburgh & Lake Erie	Pittsburgh & West Virginia	Portland Terminal
1 2 4 5 6 8 9 10	Air compressors			4 11 1 2	1		21 26 3 12 216 37 12 138			1	1	1 8 1	1	4
12 13 14 16 17	Controllers, relays, circuit breakers, magnet valves and switch groups. Coupling and uncoupling devices			3			21 11 30 9 13 6		1			1		
20 22 23 24 25 26 28 29 30	Fuel system. Gages or fittings, air. Gages or fittings, steam. Gears and pinions. Handholds. Inspections and tests not made as required. Insulation and safety devices. Internal-combustion engine defects,	1	1 2	2 3 1			113 5 3 29 22 29 29 7 285	1				1 1		12
32 33 35 36 37 39 40	parts and appurtenances. Jack shafts. Jumpers and cable connectors. Lateral motion, wheels. Lights, cab and classification. Lights, headlight. Meters, volt and ampere. Motors and generators. Pilots and pilot beams. Plugs and studs.						17 3 1				i	1		1
42 43 44 46 48 49 51	Rods, main, side, and drive shafts Sanders Springs and spring rigging, driving and	2		 5			5 5 141 37	2		4 				
53 54 55 56 57 59 60 61 62	Staybolts, broken or defective			1			39 37 76					1 1		
63	Number of defects	7 16 33 7 21. 2	3	10 41	3 42 109 1 0.9	<u></u>	109 1, 550 2, 768 5, 859 582 9, 9	9 48 109 3 2.8	15 40 2	15 28 47 2	5 18 43 2	24 130 224 18 8.0	26 77 2 2. 6	17 16 39 6 15. 4

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

	Richmond, Fredericksburg & Potomac	River Terminal	Rutland	Sacramento Northern	St. Louis-San Francisco	St. Louis Southwestern	Savannah & Atlanta	Seaboard Air Line	Soo Line	South Buffalo	Southern Pacific	Southern	Spokane International	Spokane, Portland & Seattle !:	Steelton & Highspire	Tennessee Central	Terminal R.R. Association of St. Louis	Texas & New Orleans	Texas & Pacific	Texas Mexican	
1	î			1	1 2 41 14 	10 7		2 2 2 44 3 2 3 3	11 2 6 1		9 6 5 166 59 21 184 	60 7 5 17 310 68 10 245 96	1	5 2 2 3		5	9 1	3 10 1 14 1	4		1 2 4 5 6 8 9 10 11 12
3 1		3		1	3 2 22 1 2 26 2 2	3 11 10 1 1	1	6 1 1 23 1 1	1 13 2		37 1 2 155 10 2 1 14 88	15 1 20 3 109 11 1 4 34 56		7		2	3 5 1	1 4	1		13 14 16 17 18 20 22 23 24 25 26 28
2					53	35		3 33	4		16 464	29 586		25		5	8	23	6		29 30 32
					3 1 4 13	3 1		3 1 2	2 		26 2 32 3 1 22 5	42 4 73 2 1 81		1 5		i		2			32 33 35 36 37 39
					1 1 1 50	16		2 3 14 14	8		5 173 28	242	5	17			20	 2 1	 7 1		40 42 43 44 46 48 49
					6 8			7			10 19 3	6 18 4		3		1	5				i
3				1	5 1 1 13 11			2 2 10 4	6		26 7 14 65	49 4 1 27 67 130		3 1 3		13	7 1	1	1 2		51 53 54 55 56 57 59 60 61 62 63
17	1	3	i	3	316		1	199			1,741	2, 485	6			35	73	73	42	===	
356 805 10 1. 2	70 91 1 1.1	21 25 2 8. 0	15 42	13 51 2 3. 9	422 1, 404 125 8, 9	145 530 40 7. 5	12 16 16 6, 3	546 1, 432 74 5. 2 6	236 576 25 4. 3	48 42	1, 638 7, 898 711 9. 0 25	924 3, 386 719 21, 2 67	12 8 1 12. 5	107 444 41 9. 2	14 52	21 88 16 18. 2 9	101 229 37 16. 2	360 1, 027 26 2. 5	222 971 25 2. 6	19 36 	

Table V.—Number of locomotive units other than steam reported, inspected, found defective, and ordered out of service, et cetera—by carriers—Continued

	<u> </u>	•		,			- 3							
	Parts defective, inoperative or missing, or in violation of the rules	Texas Pacific-Missouri Pacific Terminal R. R. of New Orleans	Wester	Toronto, Hamilton & Buffalo	Union Pacific	Union Railroad	Union Railway	Wabash	Washington Terminal	Western Maryland	Western Pacific	Youngstown & Northern	Roads with less than 10 locomotive units	Total
							1							
1	Air compressors				7 6								1	
2 4 5 6	Axles, truck and driving				0	1								91 25
5	Boilers				8			1						213
6	Brake equipment		3		54			17			14		55	3,066
8	Cabs and cab windows				9	1	1	1			1		14	840
9 10	Cab eardsCab floors, aprons and deck plates				15						6		7	181
11	Clutches.				. 86			12			20		9	2, 235 4
$\hat{1}\hat{2}$	Controllers, relays, circuit breakers,													4
	magnet valves and switch groups				16		3	1			2		9	565
13	Coupling and uncoupling devices				2			3					2	
14	Current collecting apparatus													5
16	Draft gear			~				7					12	402
17 18	Draw gear				7									108
20	Frames or frame braces				4								4	148 55
22	Fuel system		~		78	2	4	8			4		25	2, 193
23	Gages or fittings, air				5						1		2	163
24	Gages or fittings, steam		~		1			::					<u>ī</u>	28
$\frac{25}{26}$	Gears and pinions							15					1 7	156 210
28	Inspections and tests not made as							'					'	210
	required				16	1		1			2		29	817
29	Insulation and safety devices				6			1					16	163
30	Internal-combustion engine defects,													
00	parts and appurtenances				204	2	~	33			39	1	40	6, 124
$\frac{32}{33}$	Jack shafts				8						3		5	1 434
35	Lateral motion, wheels							1					8	28
36	Lights, cab and classification.				ī			ī					1	269
37	Jumpers and cable connectors Lateral motion, wheels Lights, cab and classification Lights, headlight Maters, well and amore													18
39					:									22
40 42	Motors and generators Pilots and pilot beams Plugs and studs				15 3			4			1		2	759
43	Plugs and studs							1					1	54 1
44	Quills													5
46	Rods, main, side, and drive shafts													
48	Sanders		4		101	~	1	23			16		56	3, 131
49	Springs and spring rigging, driving and truck		ļ		ا _ا									
51	Staybolts, broken or defective				7	2							6	415
53	Steam pines		1222					6			1.			93
54	Steps, footboards, et cetera		1		7			ĭ					11	307
55	Steps, footboards, et ceteraSwitches, hand-operated, and fuses				1									16
56 57	1 ransformers, resistors and rneostats.													6
59 59	Trucks Water tanks				20	. 1	1	2			I		1.7	692 25
60	Water glasses, fittings and shields													1
61	Water glasses, fittings and shields Warning signal appliances				3			1						148
62	w neels				14			2		1			41	805
63	Miscellaneous				18			9			3		7	1,210
- 1	Number of defects		8		726	10	10	152		1	114	1	200	26, 614
- [T. daniel of delectricing		<u></u>		===		===	102			114		200	20, 014
ļ	Locomotive units reported	11	15	10	1, 363	134	11	317	25	126	177	11	1,375	32,074
	Locomotive units inspected	23	45		5, 136	87	22	974	11	292	861	12	2, 196	95, 689
	Locomotive units defective		5		323	6	3	74		1	61	1	134	9,000
	Percentage of inspected found defec-		11. 1		6.3	6.0	13. 6	7.6		0, 3	7.1	8.3	٠,١	0.4
	Locomotive units ordered out of	~==-	11.1		0. 0	0.9	10.0	1.0		9. 5	4.1	5. 3	6. 1	9.4
	service				7		2	3		1	2		19	469
			l				l				j]		

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 North Shore	Chicago South Shore	Erie-Lackawanna	Illinois Central	Long Island	New York Central	New York, New Haven & Hartford	Pennsylvania	Reading	Total
!	A 2	į							1			
1	Air compressors.							24				
2	Axies, truck and driving							24		10		40
4	Batteries											
5 6	Air compressors. Axles, truck and driving Batteries. Boilers. Brake equipment. Cabs and cab windows Cab cards. Cab floors, aprons and deck plates.						12	828		55		
	Cohe and sob mindage		1		l °		19	11				
8	Cab and cab windows	[11	3			11
10	Cab dama and dala alata						4	3	2		- -	9
10	Cab hoors, aprons and deck plates							1				1
11	Clutenes											-
12	Controllers, relays, circuit breakers, magnet		1		}			_				
10	valves and switch groups.						3	o o				8
13	Coupling and uncoupling devices									1		
14	Current collecting apparatus						32	117	İ	1 1		151
16	Drait gear							15	İ	5		22
17	Praw gear							8	1	7		16
18	Driving boxes, snoes and wedges						2	1				3
20	Frames or frame braces											
$\frac{22}{23}$	ruei system									<u>-</u>		
23	Gages or nttings, air								2	2		4
25	Gages or fittings, steam.											
20	Gears and pinions							9			~	9
26 28	Transactions and tests not made as required	~~			1		9	20		ျ		14
29	Inspections and tests not made as required				1		6	32	20	3	[91
30	Internal combustion engine defects parts and						-	10				10
90	annustanances											
32	Tank shafts										-•	
33	Tumpore and cable connectors											19
35	Lateral motion wheels						1 1			1		10
36	Lighte cah and electification							99			-	
37	Lights headlight							5				20
39	Meters volt and amnere						~	ı "				
40	Motors and generators						4	1	2	8		15
42	Pilots and pilot beams						1	•		١ ٥		10
43	Plugs and studs					1				- -	,	
44	Quills											
46	Rods, main, side, and drive shafts											
48	Sanders											
49	Cabs and cab windows Cab cards. 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. Draft gear. Draw gear Driving boxes, shoes and wedges. Frames or frame braces. Frames or frame braces. Fuel system Gages or fittings, air. Gages or fittings, air. Gages or fittings, steam Gears and pinions. Handholds. Inspections and tests not made as required. Insulation and safety devices. Internal-combustion engine defects, parts and appurtenances. Jack shafts. Jumpers and cable connectors. Lateral motion, wheels. Lights, cab and classification. Lights, headlight. Meters, volt and ampere. Motors and generators. Pilots and pilot beams Plugs and studs. Quills. Rods, main, side, and drive shafts. Sanders. Springs and spring rigging, driving and truck. Staybolts, broken or defective. Steam pipes. Steps, footboards, et cetera. Switches, hand-operated, and fuses Transformers, resistors and rhoostats. Trucks. Water glasses, fittings and shields. Warning signal appliances. Miscellaneous.				2		2		2	2		8
51	Staybolts, broken or defective											
53	Steam pipes											
54	Steps, footboards, et cetera											
55	Switches, hand-operated, and fuses						2	3				5
56	Transformers, resistors and rheostats							15	1	3		19
57	Trucks				3		3	18	1	73		98
59	Water tanks											
60	Water glasses, fittings and shields									-		
61	Warning signal appliances											
62	Wheels				3		17	5	,	12		37
63	Miscellaneous						1	1		1		3
- 1	37 1 43 4 4											
	Number of defects		1		18		99	1, 213	42	232		1,605
	T		100	===		==	==			===	=	===
	Locomotive units reported	55	138	65		280 70	667	351	221	450	136	2, 633 2, 400
	Locomotive units inspected	19	65	29		70	422	580		635	138	2, 400
	Locomotive units reported		,]		9		29	229	18	86		372
	Tercentage of inspected found defective		1.5		3.9		6.9	39.5	8.4	13. 5		15. 5
	Locomotive units ordered out of service				2		9	10	1	9		31
					<u> </u>						[<u> </u>
												-