

INTERSTATE COMMERCE COMMISSION

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TWENTIETH ANNUAL REPORT

OF THE

CHIEF INSPECTOR  
BUREAU OF LOCOMOTIVE INSPECTION

TO THE

INTERSTATE COMMERCE COMMISSION

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FISCAL YEAR ENDED

JUNE 30, 1931



UNITED STATES  
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**ANNUAL REPORT OF THE CHIEF INSPECTOR  
BUREAU OF LOCOMOTIVE INSPECTION**

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OCTOBER 1, 1931.

*To the Interstate Commerce Commission:*

In compliance with section 7 of the act of February 17, 1911, as amended, the Twentieth Annual Report of the Chief Inspector, covering the work of the bureau during the fiscal year ended June 30, 1931, is respectfully submitted.

Summaries are given, by railroads, of all accidents, showing the number of persons killed and injured due to the failure of parts and appurtenances of locomotives, as reported and investigated under section 8 of the locomotive inspection law, and those reported to the Bureau of Statistics under the accident report act of May, 1910, and not reported to this bureau in accordance with the requirements.

The tables showing the number of accidents, the number of persons killed, and number injured as a result of the failure of parts and appurtenances of locomotives have been arranged to permit comparison with previous years as far as consistent. These tables also show the number of locomotives inspected, the number and percentage of those inspected and found defective, the number for which written notices for repairs were issued in accordance with section 6 of the law, and the total defects found and reported. The data contained therein cover all defects on all parts and appurtenances of locomotives found and reported by our inspectors, arranged by railroads.

Summaries and tables show separately accidents and other data in connection with steam locomotives and tenders and their appurtenances and accidents and other data in connection with locomotives other than steam.



TABLE IX.—Accidents and casualties resulting from failures of steam locomotives and tenders and their appurtenances

Part or appurtenance which caused accident	Year ended June 30—														
	1931			1930			1929			1928			1927		
	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured
Air reservoirs															
Aprons	3														
Arch tubes	2														
Ash-pan blowers															
Axles	6			3	1	2	1		2	5		3			3
Blow-off cocks	5			7		9			7		8				2
Boiler checks	5			4		4			7		5				7
Boiler explosions:	1			1		5			1		3				2
A. Shell explosions															
B. Crown sheet; low water; no contributory causes found	10	7	32	6	7	5	11	11	12	15	16	25	14	14	14
C. Crown sheet; low water; contributory causes or defects found															
D. Fire box; defective stay bolts, crown stays, or sheets	3	8	8	5	4	8	6	2	8	7	4	12	5	3	12
Brakes and brake rigging	1			1		1			3						
Couplers	8			9		21			17						
Crank pins, collars, etc	9	1	10	9	1	13	5		6	13		14	25	1	26
Crossheads and guides	4			8		3			8		1	14	15		16
Cylinder cocks and rigging	4			4		4			3			3	3		4
Cylinder heads and steam chests	3			3		1			3			3	3		3
Dome caps				2		2			1			1	4		4
Draft appliances									1			1	2		2
Draw gear				1		1			3			1	1		2
Fire doors, levers, etc				1		1			6			2	5		6
Flues	2			2		8			6			2	8		6
Flue pockets	13			13		10			4			5	6		6
Footboards						14			7			21	23	1	26
Gauge cocks	4			4		7			7			11	10		10
Grease cups	1			1		3			1			11	10		10
Grate shakers	1			1		3			1			1	1		1
Handholds	8			8		18			6			25	29		29
Headlights and brackets	6			6		5			16			12	12		11
Injectors and connections (not including injector steam pipes)	1			1		2			1			2	6		5
Injector steam pipes	5			5		4			6			7	7		7
Lubricators and connections	1			1		2			2			3	3		3
Lubricator glasses	5			5		1			5			8	4		5
Patch bolts	1			1		2			2			1	7		8
Pistons and piston rods									2			1	1		1
Plugs, arch tube and washout	5			5		2			4			2	4		3
Plugs in fire box sheets						2			2			1	1		3
Reversing gear	12			12		14			1			1	6		8
Rivets	1			1		1			1			1	1		2
Rods, main and side	1			1		1			1			1	1		2
Safety valves	4			4		11			3			35	30		30
Sanders						15			17			1	1		2
Side bearings	3			3		2			1			1	1		1
Springs and spring rigging						3			3			2	5		5
Squirt hose	4			4		4			10			1	1		1
Stay bolts	7			7		20			10			11	14		18
Steam piping and blowers	4			4		1			10			33	33		33
Steam valves	3			3		5			4			4	8		8
Studs	4			4		6			6			10	11		11
Superheater tubes	1			1		2			2			2	6		6
Throttle glands	1			1		5			5			1	1		3
Throttle leaking	1			1		7			1			2	5		7
Throttle rigging						1			1			1	2		2
Trucks, leading, trailing or tender	1			1		3			2			1	1		6
Valve gear, eccentrics and rods	1			1		2			2			3	4		4
Water glasses	6			6		5			18			8	9		9
Water glass fittings	8			8		15			18			13	22		23
Wheels	2			2		1			1			13	10		11
Miscellaneous	1			1		3			1			1	2		2
Total	230	16	269	295	13	320	356	19	390	419	30	463	488	28	617

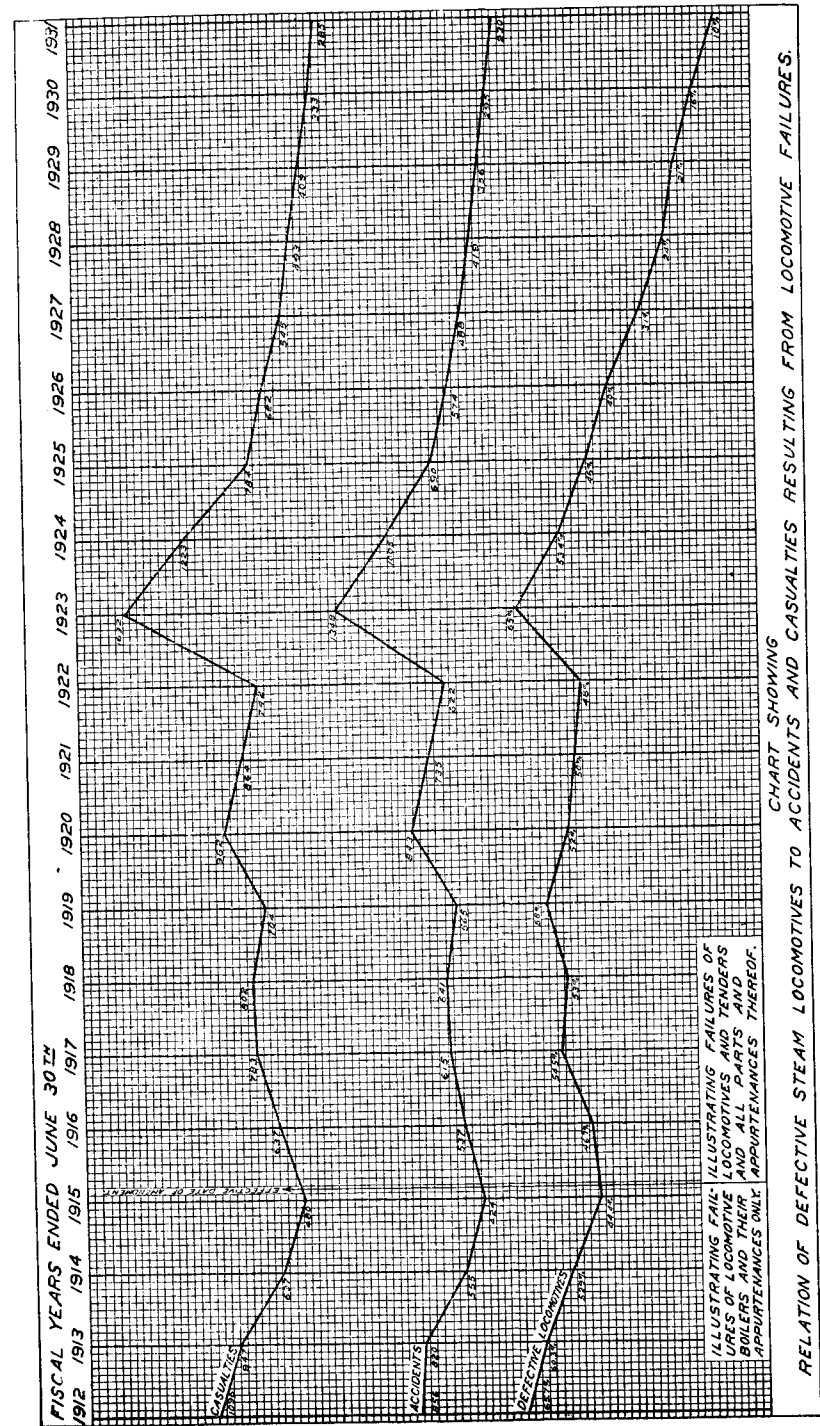


CHART SHOWING RELATION OF DEFECTIVE STEAM LOCOMOTIVES TO ACCIDENTS AND CASUALTIES RESULTING FROM LOCOMOTIVE FAILURES. ILLUSTRATING FAILURES OF LOCOMOTIVES AND TENDERS AND ALL PARTS AND APPURTENANCES THEREOF.

REPORT OF CHIEF INSPECTOR OF LOCOMOTIVES

TABLE X.—Accidents and casualties resulting from failures of locomotives other than steam, and their appurtenances

Part or appurtenance which caused accident	Year ended June 30—														
	1931			1930			1929			1928			1927		
	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured
Circuit breakers.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Insulation.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Pantagraphs and trolleys.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Third-rail shoes.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Transformers.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Miscellaneous.....	3	4	2	2	1	1	2	2	1	1	1	1	1	1	1
<b>Total.....</b>	<b>5</b>	<b>1</b>	<b>5</b>	<b>3</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>4</b>	<b>1</b>	<b>3</b>	<b>5</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>5</b>

TABLE XI.—Number of steam locomotives reported, inspected, found defective, and ordered from service

Parts defective, inoperative or missing, or in violation of rules	Year ended June 30—					
	1931	1930	1929	1928	1927	1926
1. Air compressors.....	491	873	1,202	1,282	1,679	2,151
2. Arch tubes.....	60	87	104	103	127	204
3. Ash pans and mechanism.....	81	76	132	133	192	211
4. Axles.....	10	12	20	7	13	8
5. Blow-off cocks.....	191	325	442	469	650	780
6. Boiler checks.....	263	521	761	914	1,043	1,200
7. Boiler shell.....	430	579	841	954	1,422	1,888
8. Brake equipment.....	1,923	2,706	3,894	5,214	6,572	7,062
9. Cabs, cab windows, and curtains.....	1,484	3,066	2,140	1,670	2,055	2,666
10. Cab aprons and decks.....	415	710	1,005	852	1,086	1,307
11. Cab cards.....	211	226	305	179	289	394
12. Coupling and uncoupling devices.....	98	122	154	378	575	696
13. Crossheads, guides, pistons, and piston rods.....	856	1,421	1,887	2,088	2,602	3,018
14. Crown bolts.....	96	95	129	164	235	334
15. Cylinders, saddles, and steam chests.....	1,265	2,311	3,210	3,264	4,526	5,080
16. Cylinder cocks and rigging.....	411	848	967	1,007	1,634	1,904
17. Domes and dome caps.....	83	154	227	281	388	463
18. Draft gear.....	568	950	1,310	1,453	2,037	2,634
19. Draw gear.....	640	1,003	1,367	1,650	2,210	3,140
20. Driving boxes, shoes, wedges, pedestals, and braces.....	925	1,359	1,909	1,900	2,710	3,342
21. Fire-box sheets.....	341	471	657	730	796	1,129
22. Flues.....	187	254	334	404	465	556
23. Frames, tailpieces, and braces, locomotive.....	740	1,271	1,377	1,354	1,682	1,973
24. Frames, tender.....	105	177	207	256	264	373
25. Gauges and gauge fittings, air.....	192	290	309	461	721	886
26. Gauges and gauge fittings, steam.....	324	553	678	969	1,425	2,038
27. Gauge cocks.....	415	783	1,114	1,413	2,024	3,068
28. Grate shakers and fire doors.....	410	767	205	377	613	720
29. Handholds.....	562	865	1,125	1,373	2,285	3,100
30. Injectors, inoperative.....	55	103	86	93	84	78
31. Injectors and connections.....	1,815	3,275	4,484	5,563	7,188	8,303
32. Inspections and tests not made as required.....	4,862	7,456	9,246	6,623	8,889	10,646
33. Lateral motion.....	289	372	618	699	673	758
34. Lights, cab and classification.....	77	119	121	118	107	106
35. Lights, headlights.....	180	373	488	571	835	946
36. Lubricators and shields.....	176	312	423	500	746	883
37. Mud rings.....	318	445	636	822	1,073	1,458
38. Packing nuts.....	523	828	991	1,265	1,851	2,772
39. Packing, piston rod and valve stem.....	706	1,429	1,708	1,904	2,214	2,489
40. Pilots and pilot beams.....	160	272	371	386	507	638
41. Plugs and studs.....	182	348	482	619	740	1,087
42. Reversing gear.....	299	579	788	967	1,247	1,530
43. Rods, main and side, crank pins, and collars.....	1,520	2,488	3,465	4,152	5,137	5,683
44. Safety valves.....	61	116	170	172	212	270
45. Sanders.....	314	804	1,008	1,031	1,268	1,769
46. Springs and spring rigging.....	2,161	3,311	4,557	4,939	5,956	6,826
47. Squire hose.....	184	313	387	478	644	975
48. Stay bolts.....	293	395	542	590	631	905
49. Stay bolts, broken.....	938	1,098	1,197	1,867	2,373	3,582
50. Steam pipes.....	512	730	925	1,200	1,587	2,174
51. Steam valves.....	226	399	471	708	902	1,200
52. Steps.....	676	1,021	1,394	1,817	2,440	3,227

REPORT OF CHIEF INSPECTOR OF LOCOMOTIVES

TABLE XI.—Number of steam locomotives reported, inspected, found defective, and ordered from service—Continued

Parts defective, inoperative or missing, or in violation of rules	Year ended June 30—					
	1931	1930	1929	1928	1927	1926
53. Tanks and tank valves.....	732	1,426	1,717	1,941	2,747	3,430
54. Telltale holes.....	151	183	174	241	377	487
55. Throttle and throttle rigging.....	574	1,175	1,554	1,889	2,233	2,618
56. Trucks, engine and trailing.....	714	1,141	1,605	1,914	2,363	2,860
57. Trucks, tender.....	1,059	1,531	2,144	2,610	4,114	4,929
58. Valve motion.....	497	827	1,067	1,262	1,568	1,576
59. Washout plugs.....	815	1,283	1,871	2,211	2,786	3,649
60. Train control equipment.....	9	48	60	112	112	112
61. Water glasses, fittings, and shields.....	955	1,501	1,816	2,115	2,973	3,621
62. Wheels.....	750	1,025	1,325	1,609	2,119	2,243
63. Miscellaneous—Signal appliances, badge plates, brakes (hand).....	418	691	1,101	1,273	1,511	1,746
<b>Total defects.....</b>	<b>36,968</b>	<b>60,292</b>	<b>77,268</b>	<b>85,530</b>	<b>112,008</b>	<b>136,973</b>
Locomotives reported.....	60,841	61,947	63,562	65,940	67,835	69,173
Locomotives inspected.....	101,224	100,794	96,465	100,415	97,227	90,475
Locomotives defective.....	10,277	16,300	20,185	24,051	29,995	36,354
Percentage of inspected found defective.....	10	16	21	24	31	40
Locomotives ordered out of service.....	688	1,200	1,490	1,725	2,539	3,281

TABLE XII.—Number of locomotives other than steam reported, inspected, found defective, and ordered from service

Parts defective, inoperative or missing, or in violation of rules	Year ended June 30—				
	1931	1930	1929	1928	1927
Air compressors.....	4	5	6	5	2
Axles.....	1	1	1	1	1
Batteries.....	2	2	2	1	1
Boiler.....	23	40	44	32	13
Brake equipment.....	10	14	39	32	72
Cabs and cab windows.....	1	2	3	1	1
Cab floors, aprons, and deck plates.....	3	7	10	1	20
Controllers, relays, circuit breakers, and switch groups.....	11	17	36	41	9
Current collecting apparatus.....	6	1	16	17	8
Draft gear.....	2	1	16	17	8
Driving boxes, shoes, wedges, pedestals, and pedestal braces.....	3	15	1	6	1
Frames, tailpieces, and braces.....	2	3	3	3	1
Fuel tank, its piping and valves.....	1	5	3	3	1
Gauges and gauge fittings, air.....	3	3	4	1	1
Gears and pinions.....	4	7	5	29	11
High tension equipment not properly guarded against accidental contact.....	39	45	40	84	79
Inspections and tests not made as required.....	1	2	11	11	1
Internal combustion engine defects, including parts and appurtenances.....	1	2	11	11	1
Insulation.....	4	4	5	5	1
Jack shafts.....	1	3	3	2	18
Lateral motion, wheels.....	3	7	17	10	5
Lights, cab and classification.....	3	3	5	9	1
Lights, headlights.....	2	2	1	1	1
Meters, volt and ampere.....	10	23	11	10	5
Motors and generators.....	2	4	1	3	1
Pilots and pilot beams.....	2	4	1	3	1
Plugs and studs (boiler, other than fusible plugs).....	1	1	1	1	1
Quills.....	1	1	1	2	38
Rods, motor, main and side, drive shafts.....	4	8	8	12	12
Sanders.....	10	21	24	10	18
Springs and spring rigging, driving and truck.....	1	1	1	1	1
Steam pipes.....	1	1	2	6	6
Switches, hand-operated, and fuses.....	11	11	14	10	56
Transformers, resistors, and rheostats.....	11	11	14	10	56
Trucks.....	12	5	6	17	17
Water glasses, fittings, and shields.....	2	1	1	1	1
Wheels.....	12	5	6	17	17
Whistles, bells, and train signal system.....	2	1	1	1	1
Miscellaneous.....	16	26	20	45	20
<b>Total defects.....</b>	<b>192</b>	<b>289</b>	<b>329</b>	<b>411</b>	<b>423</b>
Locomotive units reported.....	1,242	1,135	1,071	1,034	951
Locomotive units inspected.....	1,256	1,306	1,039	1,119	604
Locomotive units defective.....	75	120	131	169	174
Percentage inspected found defective.....	6	9	12	15	29
Locomotive units ordered out of service.....	3	6	4	9	9

INVESTIGATION OF ACCIDENTS AND GENERAL CONDITION OF  
LOCOMOTIVES

All accidents reported to the bureau as required by the law and rules were carefully investigated and appropriate action taken to prevent recurrences as far as possible. Copies of accident investigation reports were furnished to parties interested when requested, and otherwise used in our effort to bring about a diminution in the number of such accidents.

During the year 10 per cent of the steam locomotives inspected by our inspectors were found with defects or errors in inspection that should have been corrected before being put into use as compared with 16 per cent for the previous year. This reflects the best condition of locomotives in service ever recorded. A summary of all accidents and casualties to persons occurring in connection with steam locomotives compared with the previous year shows a decrease of 22 per cent in the number of accidents, an increase of 23 per cent in the number of persons killed, and a decrease of 15.9 per cent in the number of persons injured. The increase in the number of persons killed was due to one particularly violent boiler explosion in which six persons were killed. This explosion was due to lapse of ordinary caution on the part of the engine house force rather than to any structural defect in the boiler.

The decrease in accidents and casualties brought about by decrease in defective locomotives, and the converse, are graphically illustrated by chart shown on page 5.

The percentage of locomotives inspected found defective; number ordered out of service; number of accidents resulting from the failure of some part or appurtenance of the locomotive or tender, including the boiler; number of persons killed; number of persons injured are shown in the following table for the fiscal years ended June 30, 1923 to 1931:

Fiscal year ended June 30	Per cent of locomotives inspected found defective	Number of locomotives ordered out of service	Number of accidents	Number of persons killed	Number of persons injured
1923	65	7,075	1,348	72	1,560
1924	53	5,764	1,005	66	1,157
1925	46	3,637	690	20	764
1926	40	3,281	574	22	660
1927	31	2,539	488	28	517
1928	24	1,725	419	30	463
1929	21	1,490	356	19	390
1930	16	1,200	295	13	320
1931	10	688	230	16	269

It will be noted from the table that from 1923 to 1931, both inclusive, the percentage of locomotives inspected found defective consistently decreased from 65 to 10; the number of locomotives ordered out of service decreased in the same manner from 7,075 to 688, or 90.3 per cent; the number of accidents decreased from 1,348 to 230, or 82.9 per cent; the number of persons killed decreased from 72 to 16, or 77.8 per cent; the number of persons injured decreased from 1,560 to 269, or 82.8 per cent.

It may be noted from the chart above referred to that there were fewer locomotive accidents during the year than at any time during the past 20 years, and that this reduction has been consistently made in about the same ratio as has the condition of locomotives been improved.

Table IX shows the various parts and appurtenances of steam locomotives and tenders which through failure have caused serious and fatal accidents. If the information contained in this table is taken advantage of and proper inspections and repairs made in accordance with the requirements of the law and rules many accidents will be avoided.

Detailed results of our inspections of steam locomotives of each carrier are shown in Table XIII, and a comparison of condition of locomotives over a period of years is shown in Table XV. It will be noted from Table XV that some of the carriers are maintaining their locomotives in such condition as to fully meet all the requirements of the law and the rules, regulations, and instructions made or given thereunder while other carriers were found to be delinquent in various degrees. This table shows that the general condition of locomotives has steadily improved over a period of years which has resulted in the low point of 10 per cent found defective in the year ended June 30, 1931.

## BOILER EXPLOSIONS OR CROWN-SHEET FAILURES

As in former years, boiler explosions caused by crown-sheet failures continue to be the source of most of the fatal accidents; 93.7 per cent of the fatalities during the year occurred from this cause as compared with 84.6 per cent for the previous year. It has been pointed out in former reports that the increasing size of locomotive boilers and the higher pressures carried therein tend to increase the violence of explosions and cause increase in the average number of casualties per accident. Notwithstanding, there has been a marked decrease in the number of boiler explosions and firebox failures as the result of low water and other causes. For instance, during 1912

there were 94 accidents as compared with 14 during 1931, or a reduction of 85.1 per cent; 54 persons killed as compared with 15, or a reduction of 72.2 per cent; and 168 persons injured as compared with 41, or a reduction of 75.6 per cent. This class of accidents can be minimized only by the use of the safest practicable firebox construction, reliable boiler feeding and water level indicating devices, and maintenance of proper water level in the boiler.

#### EXTENSION OF TIME FOR REMOVAL OF FLUES

Four hundred and fifty-two applications were filed for extensions of time for removal of flues, as provided in rule 10. Our investigations disclosed that in 34 of these cases the condition of the locomotives was such that extensions could not properly be granted. Seventy-three were in such condition that the full extensions requested could not be authorized, but extensions for shorter periods of time were allowed. Forty-one extensions were granted after defects disclosed by our investigations had been repaired. Seventeen applications were canceled for various reasons. Two hundred and eighty-seven applications were granted for the full periods requested.

#### SPECIFICATION CARDS AND ALTERATION REPORTS

Under rule 54 of the Rules and Instructions for Inspection and Testing of Steam Locomotives, 845 specification cards and 7,138 alteration reports were filed, checked, and analyzed. These reports are necessary in order to determine whether or not the boilers represented were so constructed or repaired as to render safe and proper service and whether the stresses were within the allowed limits. Corrective measures were taken with respect to numerous discrepancies found.

Under rules 328 and 329 of the Rules and Instructions for Inspection and Testing of Locomotives Other Than Steam, 114 specifications and 6 alteration reports were filed for locomotive units and 6 specifications and 13 alteration reports were filed for boilers mounted on locomotives other than steam. These were checked and analyzed and corrective measures taken with respect to discrepancies found.

#### SUITS FOR PENALTIES

Three suits for penalties, involving 44 counts for alleged violations of the locomotive inspection law and rules, were pending in the district courts at the beginning of the year. Judgments in favor of the Government were obtained in 2 cases, involving 14 counts; 5 counts

were dismissed by stipulation or agreement, and penalties imposed on 9 counts in the sum of \$900. One case, involving 30 counts, was pending at the end of the year.

#### CASES PENDING AT THE BEGINNING OF THE YEAR AND DISPOSED OF DURING THE YEAR

*U. S. v. Chicago, Indianapolis & Louisville Railway Co.*, northern district of Indiana, involved 10 counts for use of locomotive while in violation of cab-curtain order. Judgment on 7 counts for \$700; 3 counts dismissed.

*U. S. v. The Pennsylvania Railroad Co.*, northern district of Indiana, involved 4 counts for use of locomotives while in violation of fire-door order. Judgment on 2 counts for \$200; 2 counts dismissed.

#### CASES PENDING AT THE CLOSE OF THE YEAR

*U. S. v. Chicago, Springfield & St. Louis Railway Co.*, southern district of Illinois, involves 30 counts for use of locomotives while defective and in violation of rules.

#### APPEALS

No formal appeal by any carrier was taken from the decisions of any inspector during the year.

A. G. PACK, *Chief Inspector.*

**ACCIDENTS AND CASUALTIES RESULTING FROM THE FAILURE OF STEAM LOCOMOTIVES AND TENDERS AND THEIR APPURTENANCES DURING THE FISCAL YEAR ENDED JUNE 30, 1931, BY ROADS**

[A star (\*) indicates accidents taken from records of the Bureau of Statistics of the Interstate Commerce Commission. A double star (\*\*) indicates accidents not properly reported, as required by rules 55 and 162. A complete investigation, therefore, could not be made, inasmuch as the bureau was not apprised of the accidents in sufficient time after they occurred to permit them to be properly investigated.]

**ANN ARBOR RAILROAD:**

July 9, 1930, locomotive 1, Toledo, Ohio. Front uncoupling lever on locomotive pulled out of bracket; 1 injured.  
One accident; 1 injured.

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

July 12, 1930, locomotive 1625, near Pyron, Tex. Nonlifting injector starting throttle lever became disconnected due to lever pin working out account of improper application; 1 injured.

July 14, 1930, locomotive 1703, between Manter and Dodge City, Kans. Air pipe to fire door operating cylinder broke away from cylinder head; 1 injured.

July 26, 1930, locomotive 2537, Anthony, Kans. Throat sheet blow-off cock leaking; face of blow-off cock valve and seat worn and part of piping was lower than discharge end and formed water trap; 1 injured.

August 9, 1930, locomotive 1966, San Bernardino, Calif. Gas pipe improperly applied on locomotive, allowing fuel oil to pocket in gas pipe and prevent free flow of gas to burner, resulting in a heavy explosion in fire box when pressure built up sufficiently to force pocket of cold oil out of pipe (natural gas used for firing up dead engines); 1 injured.

August 11, 1930, locomotive 3802, Madrone, N. Mex. Undesired emergency application of brakes, caused by defective brake pipe vent valve on tender, resulted in rough stop which caused injury to employee; brake pipe vent valve not properly maintained; 1 injured.

August 28, 1930, locomotive 4004, Cushing, Okla. Fireman fell from running board of locomotive while tightening air compressor gland packing nut to piston rod, due to leakage; 1 injured.

August 29, 1930, locomotive 2546, Wellington, Kans. Pilot bracket struck end of wing rail of switch frog; pilot bracket had less than 3-inch clearance above rail; 1 injured.

August 30, 1930, locomotive 3261, Edelstein, Ill. Tender cistern filling hole cover gave way due to defective hinge; 1 injured.

November 26, 1930, locomotive 3851, Seligman, Ariz. Broken radial stay blew out while being calked under pressure; head of stay was badly flattened indicating that it had been hammered numerous times in vain attempts to stop leakage; leakage and corrosion had destroyed practically all evidence of threads on stay and in the sheet. Had proper and timely repairs been made to this defect, this accident resulting in serious injury to an employee would have been avoided; 1 injured.

December 4, 1930, locomotive 3163, Emporia, Kans. Rear section of coupling came loose from handrail, causing fireman to fall and engine truck passed over his leg; front section of coupling had not been replaced when coupling was disconnected at some previous time and rear section was not securely attached to handrail; 1 injured.

January 16, 1931, locomotive 3854, near Hackberry, Ariz. Cab ventilator lever bolt worked out of position and fell, striking employee on the head; bolt not properly secured; 1 injured.

January 23, 1931, locomotive 3822, near Iden, N. Mex. Stoker engine reversing rod broke at fillet at valve end of button rod, the break being approximately one-third old fracture; 1 injured.

March 6, 1931, locomotive 1301, near Ash Hill, Calif. Shank of coupler at rear of tender broke, causing emergency application of brakes; old fracture covered approximately 25 per cent of cross-sectional area; 1 injured.  
Thirteen accidents; 13 injured.

**ATLANTA, BIRMINGHAM & COAST RAILROAD:**

August 20, 1930, locomotive 74, Douglas, Ga. Lubricator steam pipe broke off at collar; 1 injured.

One accident; 1 injured.

**ATLANTIC COAST LINE RAILROAD:**

May 22, 1931, locomotive 941, near Auburndale, Fla. Arch tube pulled out of flue sheet; arch tube cut too short and not properly beaded; 1 injured.

One accident; 1 injured.

**BALTIMORE & OHIO RAILROAD:**

July 25, 1930, locomotive 2897, Flemington, W. Va. Steam end of feed water pump burst, caused by racing of turbine; 1 injured.

\*\*August 1, 1930, locomotive 4581, Garrett, Ind. Pilot coupler pocket broke through old fracture, causing emergency application of brakes; 1 injured.

\*\*August 5, 1930, locomotive 5199, Cottage Grove, Ind. Tender truck axle broke, due to old defect, causing derailment of tender and cars of passenger train; 1 injured.

\*\*August 29, 1930, locomotive 163, Petersburg, W. Va. Lubricator drain plug broke off while being tightened under pressure; 1 injured.

September 26, 1930, locomotive 684, Baltimore, Md. Squirt hose blew off nipple due to not being securely clamped; 1 injured.

\*\*October 3, 1930, locomotive 694, Parkersburg, W. Va. Burned by hot water and steam when squirt hose valve was accidentally opened; left injector steam ram seat and check valve seat were cut, apparently causing the pressure in hose at this time as neither injector was in operation; injectors reported on September 23, October 1, and 2, and boiler checks on October 1; 1 injured.

October 14, 1930, locomotive 5111, Cincinnati, Ohio. Trailer spring hanger broke due to old fracture covering approximately 75 per cent of cross-sectional area; 1 injured.

November 18, 1930, locomotive 4108, Mount Vernon, Ohio. Employee's clothing caught on loose end of molding strip on tender floor, causing him to fall to the ground; 1 injured.

November 20, 1930, locomotive 1140, Cleveland, Ohio. Grate shaker connecting rod failed at defective weld; rod had been burned and reduced to seven-eighth inch in diameter at point of failure; 1 injured.

November 27, 1930, locomotive 2032, near Glenwood, Pa. Crown-sheet failure caused by overheating due to low water; 1 killed, 1 injured.

January 19, 1931, locomotive 2716, Osgood, Ind. Locomotive moved from standing position on descending grade; throttle lever latch would not hold account of quadrant being loose; teeth on quadrant and latch worn; drifting valve leaking; application air pipe leaking; 1 injured.

January 24, 1931, locomotive 6107, Cherry Run, W. Va. Piece of crosshead shoe broke off and was thrown from rapidly moving locomotive, striking track employee. "Left top crosshead shoe cracked" was reported on January 2, 6, 12, 13, and 19; 1 injured.

\*February 5, 1931, locomotive 7108, Holloway, Ohio. Glass fell out of cab door; 1 injured.

\*\*February 10, 1931, locomotive 4474, Potomac Yard, Va. Fell from running board while going to repair defective sand pipe; 1 injured.

February 24, 1931, locomotive 7205, Connellsville, Pa. Broken reduced-body radial stay blew out of crown sheet while being calked under pressure. The stay broke near the root of the fillet joining the reduced body and outer end and had been in this condition for some time prior to accident. Threads on fire-box end had been practically destroyed by erosion and the head had been excessively hammered and flattened in attempts to stop leakage. Four near-by stays were found fractured near roots of fillets at outer ends and heads and threads at fire-box ends were in similar condition to that of the stay which blew out; 1 injured.

April 25, 1931, locomotive 7202, Frankville, Md. Crown sheet failure caused by overheating due to low water; 2 injured.

May 7, 1931, locomotive 2548, Bertha, Pa. Grate shaker bar stuck fast on shaker post then came off suddenly; shaker post thicker than other posts and shaker bar burred on inside; 1 injured.

Seventeen accidents; 1 killed, 18 injured.



**BESSEMER & LAKE ERIE RAILROAD:**

July 31, 1930, locomotive 609, Refractory, Pa. Link block pin worked out of position permitting valve to cover ports in valve chamber and trap steam in cylinder, breaking cylinder casting. Broken parts thrown from moving locomotive struck employee who was on station platform; 1 injured.  
One accident; 1 injured.

**BOSTON & ALBANY RAILROAD:**

\*\*June 22, 1931, locomotive 1445 (place not given). Locomotive lurched, causing injury to employee; springs in radial buffer between engine and tender were broken and shoes and wedges were very dry; 1 injured.  
One accident; 1 injured.

**BOSTON & MAINE RAILROAD:**

August 30, 1930, locomotive 646, East Somerville, Mass. Injured while attempting to start feed water pump; feed water pump reported on August 8, 15, 16, 19, 26, 28, 29, 30, September 5, 7, 9, 10, 12, 14, and 19; 1 injured.  
September 27, 1930, locomotive 613, Mechanicville, N. Y. Handle came off top water glass cock due to nut missing from spindle; 1 injured.

\*\*November 6, 1930, locomotive 3601, State Line, N. H. Reverse lever became unlatched; defective condition of reversing gear reported on November 3, 6 (two times), 7, and 8; 1 injured.  
March 14, 1931, locomotive 3600, Hoosac Tunnel, Mass. Reverse lever unlatched and went to full forward position; "No tension on reverse lever latch spring. Lever goes into corner, dangerous," was reported on March 14; 1 injured.

\*\*May 30, 1931, locomotive 627, White River Junction, Vt. Employee's foot caught under footboard at rear of tender; both footboard brackets slightly bent tilting edge of footboard downward; height from top of rail to top of tread was only 8 $\frac{1}{2}$  inches and footboard bracket bolts extended approximately 1 $\frac{1}{2}$  inches below the brackets; 1 injured.  
Five accidents; 5 injured.

**BUFFALO, ROCHESTER & PITTSBURGH RAILWAY:**

July 31, 1930, locomotive 525, East Salamanca, N. Y. Boiler tube broke at front flue sheet due to having been grooved to less than one-sixteenth inch in thickness for entire circumference; 1 injured.

August 7, 1930, locomotive 532, Rochester, N. Y. Superheater flue failed at defective safe end weld; 1 injured.  
Two accidents; 2 injured.

**BURLINGTON-ROCK ISLAND RAILROAD:**

\*January 5, 1931, locomotive (C. B. & Q.) 5514, Waxahachie, Tex. Handrail on side of locomotive gave way causing employee to fall; nipple connecting hand-rail and cab bracket was missing; 1 injured.  
One accident; 1 injured.

**CENTRAL OF GEORGIA RAILWAY:**

\*\*October 10, 1930, locomotive 153, Macon, Ga. Boiler tube burst; 1 injured.  
November 17, 1930, locomotive 580, Athens, Ga. Pilot beam step hanger bent; 1 injured.

April 8, 1931, locomotive 480, near Barnesville, Ga. Back end brass of left main rod broke due to overheating, causing rods and main crank pin to be stripped from locomotive; 1 injured.

May 3, 1931, locomotive 482, Macon, Ga. Valve chamber drain valve and nipple blew out of drifting valve; nipple showed old fracture; 1 injured.  
Four accidents; 4 injured.

**CENTRAL RAILROAD OF NEW JERSEY:**

August 21, 1930, locomotive 166, Phillipsburg, N. J. Seat attached to tender cistern folded unexpectedly due to improper construction of knee joint in supporting rod; 1 injured.

September 30, 1930, locomotive 400, Natco, N. J. Insufficient clearance between rear edge of apron and tender cistern; 1 injured.  
Two accidents; 2 injured.

**CENTRAL VERMONT RAILWAY:**

\*October 27, 1930, locomotive 221, Charlestown, N. H. Reverse lever unlatched; 1 injured.  
One accident; 1 injured.

**CHESAPEAKE & OHIO RAILWAY:**

August 22, 1930, locomotive 1184, Newkirk, Ohio. Burned by steam and hot water emitted through hole around blow-off cock handle, due to improper application of piping and loose nipple in pipe to left blow-off cock; 1 injured.

October 13, 1930, locomotive (H. V.) 201, South Columbus, Ohio. Rivet blew out of door-sheet crown-sheet seam while being calked under pressure, due to rivet head missing on water side; head missing from adjacent rivet on each side and there was a one-sixteenth inch opening between the sheets for these 3 rivet spaces; heads of 10 adjoining rivets were fractured; records show that door-sheet seam had been calked frequently during the past few months. Failure of rivets was caused by fire-box sheets not being properly laid up at time of application; 1 injured.

Two accidents; 2 injured.

**CHICAGO & NORTH WESTERN RAILWAY:**

August 13, 1930, locomotive 1396, Garden Prairie, Ill. Insufficient clearance between reverse lever and air pipes on boiler back head due to stop missing from forward end of reverse lever quadrant; 1 injured.

\*\*August 17, 1930, locomotive 422, Hortonville, Wis. Reverse lever stop improperly located on forward end of quadrant, permitting reverse lever to foul on air pipe; 1 injured.

November 15, 1930, locomotive 3028, Malta, Ill. Feed water pump pressure gauge burst; 1 injured.

June 27, 1931, locomotive 1606, near California Junction, Iowa. Cab window fell out, striking employee; wood cleat fastened on cab to guide top of window split and broke off; 1 injured.

Four accidents; 4 injured.

**CHICAGO, BURLINGTON & QUINCY RAILROAD:**

November 24, 1930, locomotive 5240, near Norway, Nebr. Main driving axle broke off at wheel fit, due to old fracture extending over approximately 75 per cent of cross-sectional area; emergency application of brakes resulting from broken air pipes caused brakeman to be thrown against table in caboose; 1 injured.

January 15, 1931, locomotive 552, Galesburg, Ill. Steam valve leaking account of defective bonnet; 1 injured.

March 2, 1931, locomotive 511, Chicago, Ill. Boiler tube burst near back flue sheet due to being badly pitted; 1 injured.

\*\*May 17, 1931, locomotive 5100, Paducah, Ky. Blow-off cock was accidentally opened, scalding employee; handholds of blow-off cock lever and cylinder cock lever very similar in design and located close together; no provision for holding blow-off cock in closed position; 1 injured.

Four accidents; 4 injured.

**CHICAGO GREAT WESTERN RAILROAD:**

\*October 30, 1930, locomotive 283, Mason City, Iowa. Shovel caught on worn shoveling sheet; 1 injured.

\*\*January 5, 1931, locomotive 850, St. Paul, Minn. Handhold gave way; 1 injured.

\*June 20, 1931, locomotive 877, Coates, Minn. Grate shaker bar came off post due to improper fit; 1 injured.

Three accidents; 3 injured.

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

July 30, 1930, locomotive (C. T. H. & S. E.) 7078, Terre Haute, Ind. Fire hose blew off connection at boiler check due to being insecurely attached; connection not according to company's standard; 1 injured.

One accident; 1 injured.

**CHICAGO, ROCK ISLAND & PACIFIC RAILWAY:**

\*\*November 15, 1930, locomotive 148, Burr Oak, Ill. Blower valve spanner nut blew off, due to excessive taper and badly worn threads; blower valve reported leaking at union on day prior to accident and repairs reported as made; 1 injured.

January 23, 1931, locomotive 4050, East Des Moines, Iowa. Bell cord broke; 1 injured.

March 15, 1931, locomotive 1737, Magazine, Ark. Main reservoir pipe pulled out of elbow due to not being properly threaded; 1 injured.

Three accidents; 3 injured.

## CHICAGO, ST. PAUL, MINNEAPOLIS &amp; OMAHA RAILWAY:

October 18, 1930, locomotive 344, near Chili, Wis. Main steam valve seized, causing reverse lever to go suddenly into full forward position; valve chamber dry and carbonized; insufficient clearance between reverse lever and air piping; 1 injured.

One accident; 1 injured.

## CLEVELAND, CINCINNATI, CHICAGO &amp; ST. LOUIS RAILWAY:

\*July 1, 1930, locomotive 326, Bellefontaine, Ohio. Boiler tube failed at front flue sheet, caused by tube being badly pitted; 1 injured.

One accident; 1 injured.

## CLINCHFIELD RAILROAD:

January 3, 1931, locomotive 725, Toecane, N. C. Fusion welded crown-sheet side-sheet seam failed for its entire length of 156 inches and welding on throat sheet failed at intersection of side-sheet seam, extending up and around ear of throat sheet for a distance of 8 inches; 1 injured.

One accident; 1 injured.

## COLORADO &amp; SOUTHERN RAILWAY:

November 15, 1930, locomotive 604, near Longmont, Colo. Grate shaker lever slipped off post; design of post permitted lever to slip off easily and no provision made to secure lever on post; 1 injured.

One accident; 1 injured.

## DELAWARE &amp; HUDSON RAILROAD CORPORATION:

April 21, 1931, locomotive 559, Menands, N. Y. Fire tube failed in two places. One break occurred in a safe end weld 15 inches from back flue sheet and the other break occurred approximately 4 inches to the rear of the failed weld and 2 inches forward of another safe end weld; material had been overheated in welding and failed weld had been improperly made; 1 injured.

April 30, 1931, locomotive 1215, East Windsor, N. Y. Hole burned in cab deck under right fire door pedal, causing employee to fall; 1 injured.

May 21, 1931, locomotive 1217, Bainbridge, N. Y. Blower pipe disconnected in front end, causing back draft; blower pipe connection not properly screwed up; 1 injured.

June 3, 1931, locomotive 954, Worcester, N. Y. Coupler knuckle at rear of leading locomotive broke through pinhole, causing emergency application of brakes; old flaw in material of top part of knuckle; 1 injured.

Four accidents; 4 injured.

## DELAWARE, LACKAWANNA &amp; WESTERN RAILROAD:

July 22, 1930, locomotive 1172, Lehigh, Pa. Crown sheet failure caused by overheating due to low water; 2 killed, 20 injured.

\*August 13, 1930, locomotive 1050, Towaco, N. J. Driving wheel tire broke due to old fracture; 1 injured.

\*\*April 3, 1931, locomotive 386, Hampton, Pa. Tender sill step broke off through supporting bolt holes due to old fracture covering approximately 75 per cent of cross-sectional area of supporting flange; 1 injured.

June 25, 1931, locomotive 135, Syracuse, N. Y. Broken stay bolt blew out of inside fire-box sheet; bolt was too small to engage threads in inside sheet; bolt, which broke near outside sheet, did not have a telltale hole although the length of bolt was less than 8 inches; 1 injured.

Four accidents; 2 killed, 23 injured.

## DENVER &amp; RIO GRANDE WESTERN RAILROAD:

\*\*December 28, 1930, locomotive 942, Garfield, Utah. Dump grate operating lever improperly applied; 1 injured.

May 6, 1931, locomotive 3613, Cotopaxi, Colo. Water glass broke, breaking water-glass shield; 1 injured.

Two accidents; 2 injured.

## ERIE RAILROAD:

July 31, 1930, locomotive 85, Buffalo, N. Y. End of reduced body stay bolt blew out while being calked; the reduced body of bolt was too long and only two threads of the enlarged end engaged the threads in the fire-box sheet. The bolt broke near the root of the fillet joining the body and outer end; telltale hole did not extend into the reduced body a sufficient depth to serve its intended purpose; 1 injured.

September 8, 1930, locomotive 3204, Warsaw, N. Y. Coupler key worked out of tender deck frame channel, permitting coupler to pull out far enough to part air hose and cause emergency application of brakes; coupler key not properly secured; 1 injured.

September 10, 1930, locomotive 117, Jersey City, N. J. Reverse lever stuck due to right go-ahead eccentric rod bolt striking on back-up eccentric set screw; right rocker box loose on frame and working badly; 1 injured.

October 12, 1930, locomotive 3085, Espyville, Ohio. Coupler knuckle at rear of tender opened, permitting locomotive to separate from train and cause emergency application of brakes; uncoupling lever lock link fouled in lever eye, preventing lock lift from properly seating in coupler; 1 killed.

February 19, 1931, locomotive 2932, Greenville, Pa. Fell from locomotive while attempting repairs to bell ringer which was inoperative; 1 injured.

March 20, 1931, locomotive 1762, Buffalo, N. Y. Lubricator drain plug blew out due to threads on plug being badly worn; 1 injured.

April 18, 1931, locomotive 1728, near Campbell Hall, N. Y. Crown sheet failure caused by overheating due to low water; top water-glass cock closed; 2 killed.

May 1, 1931, locomotive 3300, Jamestown, N. Y. Employee who was riding on running board for the purpose of keeping sand running leaned out in attempt to locate steam leak near front end and was struck by water crane; feed water heater inlet exhaust pipe joint was leaking and had been reported on April 2 and 28; sanders reported four times during the previous month; 1 injured.

May 30, 1931, locomotive 3349, Mansfield, Ohio. Employee's foot caught under cab apron account of apron raising off locomotive deck; cab apron did not have sufficient roll to clear front edge of tender deck; 1 injured.

June 24, 1931, locomotive 220, Meadville, Pa. Fire hose nozzle blew off due to nipple being badly worn and clamp not securely tightened; 1 injured.

June 27, 1931, locomotive 3392, Kent, Ohio. While locomotive was being reversed, lock nut on reverse shaft counterbalance spring rod, which had become loose and backed partially off bolt, caught on boiler waist-sheet brace, then suddenly let go, causing reverse gear wheel to whirl in back motion; the two bolts supporting spring casing to waist sheet had lost out permitting reverse gear assembly to drop out of alignment with hole in waist sheet through which the rigging worked and allowed the loose lock nut to catch on lower edge of the hole; reverse shaft counterbalance assembly not properly supported; 1 injured.

Eleven accidents; 3 killed, 9 injured.

## FLORIDA EAST COAST RAILWAY:

March 25, 1931, locomotive 452, near Delray Beach, Fla. Main axle broke in wheel fit due to old fracture, causing derailment of this locomotive, second locomotive and six coaches at front of a passenger train; 3 injured.

One accident; 3 injured.

## GRAND TRUNK WESTERN RAILWAY:

\*November 9, 1930, locomotive 3718, Olivers, Ind. Piston rod broke at old flaw, knocking out front cylinder head; 1 injured.

One accident; 1 injured.

## GREAT NORTHERN RAILWAY:

\*July 3, 1930, locomotive 3047, Fargo, N. Dak. Tender truck derailed due to loose wheel on axle; 2 injured.

September 24, 1930, locomotive 2008, Red Eagle, Mont. Vertical part of right handrail broke off in threaded section at pilot beam, causing employee to fall; handrail construction was not substantial; 1 injured.

\*\*November 15, 1930, locomotive 379, Graceville, Minn. Brake beam dropped down due to cotter key shearing off allowing pin to work out; 1 injured.

\*\*May 17, 1931, locomotive 2587, near Walton, Mont. Wrist pin in front end of right main rod heated, due to being keyed too tight, and when grease plug was removed to add grease the remaining hot grease was blown out, striking employee's face and causing severe burns; "Lock nut seized on wedge bolt, front end right main rod" was reported on May 14 and 15; 1 injured.

Four accidents; 5 injured.

## GULF COAST LINES:

July 3, 1930, locomotive (N. O. T. & M.) 1036, Lucas, La. Guide for steam spindle of left injector failed due to old fracture covering approximately 20 per cent of cross-sectional area; 1 injured.

March 1, 1931, locomotive (N. O. T. & M.) 939, Beaumont, Tex. Crown sheet failure caused by overheating due to low water; 1 injured.

March 13, 1931, locomotive (St. L. B. & M.) 256, Weslaco, Tex. Crown sheet failure, while in charge of engine watchman, caused by overheating due to low water; 1 injured.

April 9, 1931, locomotive (N. O. T. & M.) 303, Port Barre, La. Crown sheet failure, while in charge of engine watchman, caused by overheating due to low water; 1 injured.

Four accidents; 4 injured.

#### ILLINOIS CENTRAL SYSTEM:

July 8, 1930, locomotive 214, Chicago, Ill. Driving spring transverse equalizer carrier broke through pin hole; old flaw in carrier casting at point of failure; 1 injured.

July 22, 1930, locomotive 3503, Chicago, Ill. Cab seat box tipped causing injury to employee; seat box not fastened to cab floor; 1 injured.

\*August 13, 1930, locomotive 1152, Tickfaw, La. Water glass burst; injured while closing water-glass valves; 1 injured.

\*September 6, 1930, locomotive 2417, near Jasper, Ala. Air hose at rear of tender burst; 1 injured.

September 27, 1930, locomotive (C. & I. W.) 804, Chicago, Ill. Top water-glass nut leaking; 1 injured.

\*October 25, 1930, locomotive 2983, Dubuque, Iowa. Main driving wheel axle broke, due to old fracture: 1 injured.

November 28, 1930, locomotive 2403, Goodman, Miss. Grate shaker lever broke at top of socket, due to old fracture extending over approximately 70 per cent of cross-sectional area; 1 injured.

December 24, 1930, locomotive 2452, Clinton, Ill. Whistle valve stuck open; operating mechanism defective; 1 injured.

May 31, 1931, locomotive 2006, Asylum, Miss. Shaker bar broke; bar defective; 1 injured.

Nine accidents; 9 injured.

#### INTERNATIONAL-GREAT NORTHERN RAILROAD:

May 13, 1931, locomotive (T. & P.) 510, Palestine, Tex. Automatic safety fuel-oil cut-out valve leaking, resulting in gas explosion in fire box; 1 injured.

One accident; 1 injured.

#### KANSAS CITY SOUTHERN RAILWAY:

September 28, 1930, locomotive 554, Jaudon, Mo. Coil of cast iron steam heat radiator in floor of brakeman's cab burst, due to being badly corroded and reduced from three-sixteenths to one-thirty-second inch in thickness; entire bottom of radiator so badly corroded that a casual inspection would have disclosed the excessive corrosion; 1 injured.

One accident; 1 injured.

#### LEHIGH VALLEY RAILROAD:

July 25, 1930, locomotive 4047, Ashmore, Pa. Cab seat frame pulled out of guides due to broken spring, worn guides, and loose rivets; 1 injured.

\*November 19, 1930, locomotive 3043, Manchester, N. Y. Brake beam broke through brake rod pin hole; 1 injured.

December 14, 1930, locomotive 2111, near Laurys, Pa. Inspirator steam pipe pulled out of collar due to not being properly secured; means provided for securing pipe in collar was fusion welding around pipe at top of collar; only 1½ inches of the circumference of the welding was fused to the collar and this failed. Pounds in rods and driving boxes contributed to the excessive vibration of steam pipe, which together with operating valve, was improperly supported due to loose anchor bolt and loose bracket, permitting three-fourths inch vertical movement. Rods and driving boxes reported pounding 40 times since October 1; 1 injured.

Three accidents; 3 injured.

#### LOUISVILLE & NASHVILLE RAILROAD:

July 12, 1930, locomotive 1433, near Chavies, Ky. Main rod strap broke due to old defect covering approximately 10 per cent of cross-sectional area of top section of strap and metal in strap badly crystallized; 1 injured.

July 19, 1930, locomotive 1870, near Morning View, Ky. Crown sheet failure caused by overheating due to low water. Right tank valve approximately one-third closed with handle in wide open position; right injector was reported as not supplying the boiler 12 times between April 7 and date of accident and an additional report was made that neither injector would supply the boiler when the locomotive was working hard; 2 injured.

September 20, 1930, locomotive 409, Tunnel Hill, Ky. Piston rod broke, knocking out front cylinder head; piston and rod alighted on adjacent track and later caused derailment of engine truck of a passing train; old fracture covering approximately 65 per cent of cross-sectional area of piston rod at point of failure; 1 injured.

\*\*September 20, 1930, locomotive 705, Flomaton, Ala. Cab apron gave way, causing employee to fall to the ground; bolt lost out of cab apron hinge; 1 injured.

October 5, 1930, locomotive 1192, near Porter's, Tenn. Crosshead pin failed due to old fracture covering approximately 95 per cent of cross-sectional area. Emergency repairs were made by applying a stud to hold pin in place and this stud failed while locomotive was being returned to shop, causing injury to an employee; 1 injured.

October 23, 1930, locomotive 1422, near Perrone, Ky. Left front sand trap stopped up; 1 injured.

November 6, 1930, locomotive (L. H. & St. L.) 83, Baskett, Ky. Boiler tube failed at defective safe end weld; flues reported leaking 26 times since October 1; 1 injured.

June 11, 1931, locomotive 1808, Paschal, Tenn. Injured while endeavoring to get stoker to function properly; stoker defective and had been reported on May 23, 25 (twice), 27, 29, 30, June 1, 2, 3, 5, and 6; 1 injured.

Eight accidents; 9 injured.

#### MAINE CENTRAL RAILROAD:

\*\*August 25, 1930, locomotive 409, Bangor, Me. Hot water discharged from squirt hose when squirt hose valve was accidentally opened; pressure in hose apparently caused by leaky boiler check as neither injector had been operated for some time; "Injector blows back in tender. Boiler check leaks," was reported on August 22 and 26; 1 injured.

September 3, 1930, locomotive 504, Leeds Junction, Me. Steam heat valve leaking due to seat cut; 1 injured.

January 12, 1931, locomotive 632, New Gloucester, Me. Squirt hose parted at extension connection; 1 injured.

Three accidents; 3 injured.

#### MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE RAILWAY:

\*December 14, 1930, locomotive 729, Carrington, N. Dak. Blow-off cock lever bracket bolt missing; 1 injured.

\*\*April 21, 1931, locomotive 2412, Neenah, Wis. Insufficient clearance between reverse lever and back cab post; 1 injured.

June 5, 1931, locomotive 2716, near Ripplinger, Wis. Injured account of engine riding rough; wedges reported on May 24 and June 5 (after the accident); 1 injured.

\*\*June 23, 1931, locomotive 2431, near Fifield, Wis. Seat box defective; 1 injured.

Four accidents; 4 injured.

#### MISSOURI-KANSAS-TEXAS LINES:

November 9, 1930, locomotive 628, Junction City, Kans. Tubular water glass burst; particles of glass struck engineer's eye; 1 injured.

May 30, 1931, locomotive 308, Downing, Kans. Bolt at front end of connecting rod to cylinder cock slide rod lost out, allowing rod to drop and strike on ties causing operating lever in cab to fly back and strike employee; cylinder cock rigging not the company's standard; 1 injured.

Two accidents; 2 injured.

#### MISSOURI PACIFIC RAILROAD:

October 18, 1930, locomotive 1123, near Howe, Nebr. Crank pin broke off inside of pin fit in hub; old fracture covered approximately 75 per cent of cross-sectional area; 1 injured.

\*April 17, 1931, locomotive 2312, Norphlet, Ark. Pin in fuel oil firing valve lever to which front end of firing valve reach rod was attached broke; 1 injured.

Two accidents; 2 injured.

#### MOBILE & OHIO RAILROAD:

October 16, 1930, locomotive 479, Davis, Ill. Extension handle to headlight generator throttle became disconnected account of cotter key extending through handle and throttle valve stem shearing off; throttle valve stem and socket of extension handle worn, causing improper fit; 1 injured.

\*\*November 1, 1930, locomotive 470, Columbia, Ill. Fireman injured when foot slipped due to clevis bolt on lateral adjustment pin of fire door pedal being loose; 1 injured.

\*\*November 4, 1930, locomotive 43, Jackson, Tenn. Grate shaker bar slipped off fulcrum lever; fulcrum lever bearing in shaker bar socket too short to permit proper engagement; 1 injured.

\*\*May 5, 1931, locomotive 358, near Montgomery, Ala. Main driving axle broke at wheel fit due to old fracture covering approximately 65 per cent of cross-sectional area; 1 injured.

Four accidents; 4 injured.

#### NEW YORK CENTRAL—LINES EAST:

September 27, 1930, locomotive 5202, Garrison, N. Y. Bolt worked out of front end of eccentric rod, permitting eccentric rod to drop; 1 injured.

\*\*November 23, 1930, locomotive 3096, Newburgh, N. Y. Sight feed glass and follower blew out of lubricator gauge glass casing while sight feed was being blown out; two outer threads in casing in poor condition due to having been cross-threaded; 1 injured.

December 5, 1930, locomotive 2720, Richland, N. Y. Boiler tube broke off at back flue sheet due to being improperly expanded; 1 injured.

April 13, 1931, locomotive 429, Buffalo, N. Y. Cylinder cock rigging dropped down account of a bolt losing out; 1 injured.

May 12, 1931, locomotive 2882, Newton Hook, N. Y. Main crank pin broke due to old fracture covering approximately 75 per cent of cross-sectional area; 1 injured.

Five accidents; 5 injured.

#### NEW YORK CENTRAL—LINES WEST:

\*June 23, 1931, locomotive 4496, Erie, Pa. Eccentric rod broke; 1 injured.

One accident; 1 injured.

#### NEW YORK, NEW HAVEN & HARTFORD RAILROAD:

\*\*July 21, 1930, locomotive 3246, near Newtown, Conn. Main crank pin broke due to old fracture comprising approximately 90 per cent of cross-sectional area; 1 injured.

\*\*October 10, 1930, locomotive 1388, Stonington, Conn. Air pipe to reverse cylinder broke, causing emergency application of brakes; 1 injured.

October 20, 1930, locomotive 2389, Providence, R. I. Reverse lever moved violently toward back end of quadrant when unlatched; right side forward motion eccentric rod pin nut rubbing on bottom rocker arm; 1 injured.

Three accidents; 3 injured.

#### NORFOLK & WESTERN RAILWAY:

October 30, 1930, locomotive 1160, near Williamsburg, Ohio. Stoker adjusting sprocket cover hinge broke through old fracture covering approximately 50 per cent of cross-sectional area; hinge of insufficient strength; 1 injured.

November 3, 1930; locomotive 2028, near Roanoke, Va. Arch tube burst; 2 injured.

December 5, 1930, locomotive 2050, Borderland, W. Va. Air pipe nipple in coupling between locomotive and tender pulled out of manifold, causing undesired application of brakes; nipple extended into manifold only three threads; 2 injured.

January 19, 1931, locomotive 1382, Williamson, W. Va. Blower valve extension rod handle became disconnected account of cotter key missing; square fittings of universal joint, blower valve stem and extension rod handle badly worn; 1 injured.

January 30, 1931, locomotive 1127, Solitude, Va. Crank pin worked out of driving wheel center; crank pin loose in fit; 1 injured.

February 12, 1931, locomotive 759, Nemours, W. Va. Handrail on side of boiler slipped out of column, causing employee to fall; pin for securing handrail in column missing; 1 injured.

Six accidents; 8 injured.

#### NORFOLK SOUTHERN RAILROAD:

\*May 20, 1931, locomotive 540, Charlotte, N. C. Main rod strap broke; 1 injured.

One accident; 1 injured.

#### NORTHERN PACIFIC RAILWAY:

December 13, 1930, locomotive 1027, Duluth, Minn. Throttle stem worn; 1 injured.

One accident; 1 injured.

#### OKLAHOMA CITY-ADA-ATOKA RAILWAY:

\*September 22, 1930, locomotive 6, Centrahoma, Okla. Superheater flue failed at weld; 1 injured.

One accident; 1 injured.

#### PENNSYLVANIA RAILROAD:

\*\*July 20, 1930, locomotive 9857, near Urbana, Ohio. Undesired emergency application of brakes caused by defective acknowledging switch in automatic train control; automatic train control signals and acknowledging valve reported on July 18; 1 injured.

August 1, 1930, locomotive 3864, Tuxedo, Md. Grease cup plug was thrown from main rod while train was running about 55 miles per hour and struck track employee; 1 injured.

August 15, 1930, locomotive 8162, near Urbana, Ohio. Undesired operation of automatic train control applied air brakes, causing a rough stop; application control valve defective; leak in brake pipe connection to double-heading cock; improper operation of train control equipment reported on August 14; 1 injured.

August 17, 1930, locomotive 8404, Bertha, Pa. Boiler tube broke off at front flue sheet due to having been excessively grooved; 1 injured.

August 22, 1930, locomotive 6857, Canton, Ohio. Lubricator steam pipe disconnected from lubricator due to failure of defective union nut and flange; union nut not of sufficient strength; 1 injured.

August 28, 1930, locomotive 3724, Cresson, Pa. Injector did not work properly account of combining tube being loose in injector body and joint between tube and body badly cut and leaking; "Both injectors are leaking" was reported twice on August 24 and on August 28 (previous to accident); 1 injured.

September 7, 1930, locomotive 4382, Black Lick, Ohio. Coupler at rear of tender broke at pivot pin hole; 30 per cent old defect in metal at pin hole; 2 injured.

September 8, 1930, locomotive 9687, Waynesburg, Pa. Left main crank pin broke off flush with driving wheel center due to old defect extending through 50 per cent of cross-sectional area; 1 injured.

\*\*September 14, 1930, locomotive 174, Tipton, Pa. Undesired full service application of brakes caused by defective automatic train control equipment; 2 injured.

October 13, 1930, locomotive 1298, Edge Moor, Del. Bonnet of cylinder cock operating valve came off, due to not having been properly tightened; 1 injured.

October 20, 1930, locomotive 8184, Richmond, Ind. Boiler tube broke off at front flue sheet, due to being badly eroded and reduced in thickness at prosser groove; insufficient slack in fire door chain prevented swing type fire door from being latched properly; 1 injured.

October 20, 1930, locomotive 9957, Mingo Junction, Ohio. Cab bracket stud blew out of fire-box wrapper sheet when attempt was made to stop leak; stud improperly applied and threads in sheet and on stud almost entirely gone due to corrosion; 1 injured.

October 28, 1930, locomotive 2844, Barnesboro, Pa. Head of roofing nail projected from back edge of cab roof; wood frame at rear edge of cab roof badly decayed and perforated by nail holes due to frequent repairs; 1 injured.

November 17, 1930, locomotive 6912, Union Furnace, Pa. Barco flexible joint of train line pipe between locomotive and tender failed, causing emergency application of brakes; part of an old gasket was left in casing flange angle when new gasket was applied, permitting spanner nut to engage only 3½ threads; spring lock for securing spanner nut not in locked position; spanner nut and threaded end of casing flange distorted due to attempts to tighten nut with a sharp tool; 1 injured.

December 6, 1930, locomotive 4620, near South Amboy, N. J. Reflex type water glass burst; joint surface of outer section of water glass body distorted; 1 injured.

December 9, 1930, locomotive 1454, near Riverton, N. J. Back end brasses of left main rod broke in many pieces due to excessive overheating caused by having been improperly fitted; 1 injured.

\*\*February 11, 1931, locomotive 608, Lanham, Md. Nuts on bolts securing feed valve to brake pipe worked loose, causing sudden application of brakes; 1 injured.

March 10, 1931, locomotive 6933, Goldsboro, Pa. Upright wall of transfer hopper casting broken, permitting employee's foot to be caught in revolving screw of stoker elevator; "Piece broke out bottom R. coal elevator" was reported on February 12; 1 injured.

March 11, 1931, locomotive 2888, Rimersburg, Pa. Boiler tube broke off at front flue sheet due to being badly grooved; five other tubes removed for inspection were found badly grooved in like manner; 1 injured.

\*\*March 31, 1931, locomotive 3607 (place not given). Liner riveted under deck of locomotive fouled grate shaker post; 1 injured.

May 9, 1931, locomotive 4500, Toronto, Ohio. Fire tube failed at front flue sheet due to grooving; 1 injured.

June 8, 1931, locomotive 6737, Muncy, Pa. Eccentric rod pin worked out; 1 injured.

Twenty-two accidents; 24 injured.

#### PEORIA & EASTERN RAILWAY:

\*\*August 3, 1930, locomotive 7496, Urbana, Ill. Reverse lever latch teeth badly worn, permitting lever to unlatch; 1 injured.  
One accident; 1 injured.

#### PERE MARQUETTE RAILWAY:

March 14, 1931, locomotive 1337, Wyoming, Mich. Water glass burst; injured while closing water-glass valves; 1 injured.  
One accident; 1 injured.

#### PITTSBURGH & LAKE ERIE RAILROAD:

December 24, 1930, locomotive 9148, McKees Rocks, Pa. Handrail on sloping tender improperly applied; 1 injured.

May 1, 1931, locomotive 9244, Pittsburgh, Pa. Back pressure steam gauge cock blew out of valve body; taper valve not properly secured in place; 1 injured.  
Two accidents; 2 injured.

#### PITTSBURGH & WEST VIRGINIA RAILWAY:

June 10, 1931, locomotive 923, Bowest, Pa. Water glass burst, resulting in fatal injury of an enginehouse employee; 1 injured.  
One accident; 1 injured.

#### QUANAH, ACME & PACIFIC RAILWAY:

December 1, 1930, locomotive 33, Quanah, Tex. Crown sheet failure caused by overheating due to low water; 1 injured.  
One accident; 1 injured.

#### READING Co.:

July 18, 1930, locomotive 1497, Rutherford, Pa. Bell rope broke due to having been scorched; 1 injured.

July 25, 1930, locomotive 407, Lykens, Pa. Two boiler tubes failed near front flue sheet due to being badly grooved; 1 injured.

September 9, 1930, locomotive 1705, Philadelphia, Pa. Crown sheet failure caused by overheating due to low water; water column steam pipe fitting at wrapper sheet contained a blind gasket of rubberized fabric which blocked the connection to top of water column causing a false reading of water glass and gauge cocks (gasket applied when boiler fittings were capped previous to hydrostatic test and not removed when fittings were reapplied); 6 killed, 6 injured.

September 30, 1930, locomotive 1545, Shamokin, Pa. Piston rod broke, due to old fracture covering approximately 75 per cent of cross-sectional area, knocking out front cylinder head; piston rod had been working in crosshead; 1 injured.

November 10, 1930, locomotive 105, Dunellen, N. J. Brake shoe thrown from rapidly moving locomotive due to engine truck brake hanger pin working out of frame; 1 injured.

Five accidents; 6 killed, 10 injured.

#### ST. LOUIS-SAN FRANCISCO RAILWAY:

September 26, 1930, locomotive 51, near Crocker, Mo. Back end of arm rest pulled loose from cab, due to nut missing from bolt securing arm rest to back bracket; 1 injured.

\*\*November 4, 1930, locomotive 672, Pocahontas, Ark. Bell ringer connecting rod disconnected from bell ringer yoke, due to adjusting nut on operating rod being loose; 1 injured.

\*\*November 20, 1930, locomotive 3677, Fort Scott, Kans. Sand blew into fireman's eye, due to hole in sand pipe; 1 injured.

December 14, 1930, locomotive 4215, Dora, Ala. Employee fell from side of boiler while attempting to shut off low water alarm whistle; whistle gave frequent trouble throughout trip and repairs had been attempted en route at Amory, Miss., and Birmingham, Ala.; melting point of fusible metal too low; 1 injured.

March 9, 1931, locomotive 4019, near Peirce City, Mo. Superheater flue failed at defective safe end weld; metal failed to unite for approximately 80 per cent of its area; 1 injured.

Five accidents; 5 injured.

#### ST. LOUIS SOUTHWESTERN RAILWAY:

December 28, 1930, locomotive 250, Big Sandy, Tex. Superheater damper arm broke when attempt was made to bend it to free damper weight which caught on angle iron between running board and boiler; "Superheater damper hangs open," was reported on December 26, and proper repairs were not made; malleable iron damper arm had been damaged by heating with acetylene torch during the attempted repairs; 1 injured.

\*June 8, 1931, locomotive 763, Marmaduke, Ark. Locomotive 763 separated from leading locomotive due to coupler knuckle lock working upward until locomotives were uncoupled; front end coupler parts were gummy with paint, preventing the lock from falling back into proper position; 2 injured.

Two accidents; 3 injured.

#### SEABOARD AIR LINE RAILWAY:

July 11, 1930, locomotive 441, near Petersburg, Va. Crown sheet failure caused by overheating due to low water; many parts and appurtenances lost or so damaged that their previous condition could not be determined; 2 killed, 1 injured.

\*\*October 1, 1930, locomotive 207, Crown Hill, S. C. Crank pin collar broke; 1 injured.

\*\*November 5, 1930, locomotive 419, near Hinson, Fla. Stoker cover plate broken; 1 injured.

\*\*November 15, 1930, locomotive 2406, Thrift, N. C. Train parted between tender and first car in train due to tender drawhead being low; 1 injured.

December 5, 1930, locomotive 514, Lobeco, S. C. Crown sheet failure caused by overheating due to low water; 4 injured.

April 13, 1931, locomotive 242, Alberta, Va. Insufficient clearance between right injector operating valve handle and bell ringer operating valve handle; 1 injured.

\*May 17, 1931, locomotive 520, Vidalia, Ga. Tank valve disconnected; 1 injured.

Seven accidents; 2 killed, 10 injured.

#### SOUTHERN RAILWAY SYSTEM:

\*\*August 1, 1930, locomotive 5249, Hutsell, Tenn. Spring hanger broke; 1 injured.

October 29, 1930, locomotive 4752, Hanes, N. C. Superheater flue failed at defective safe end weld; 2 injured.

\*\*October 29, 1930, locomotive 4525, Springfield, S. C. Main driving axle broke; 1 injured.

November 17, 1930, locomotive 6463, Stearns, Ky. Fireman burned by hot grease from cellar of crosshead pin when grease plug was removed; bearing ran hot due to brasses improperly keyed; 1 injured.

\*\*January 31, 1931, locomotive 4813, Potomac Yard, Va. Packing nut on steam valve to mechanical lubricator leaking; 1 injured.

April 21, 1931, locomotive 1386, near Benaja, N. C. Fire tube broke off at back tube sheet where grooved by excessive use of prosser; 1 injured.

May 21, 1931, locomotive 591, Newton, N. C. Nut came off eccentric rod bolt, permitting bolt to work out; 1 injured.

June 2, 1931, locomotive 797, Newport, Tenn. Injector inoperative due to a section of feed water hose strainer being lodged in forcer tube; feed water hose strainer missing; 1 injured.

Eight accidents; 9 injured.

## SOUTHERN PACIFIC—LINES EAST:

\*\*August 25, 1930, locomotive (G. H. & S. A.) 278, Dayton, Tex. Reverse lever jerked out of engineer's hand and moved violently backward and forward; counterbalance spring not properly adjusted; reverse lever latch reported on August 16 and 23; 1 injured.

December 4, 1930, locomotive (G. H. & S. A.) 989, New Caney, Tex. Fell from running board after attempting to repair defective front cab door; 1 injured.

January 1, 1931, locomotive (G. H. & S. A.) 996, San Antonio, Tex. Employee slipped and fell due to oil on top of fuel tank; two strainer bolts missing from oil tank manhole, permitting oil to leak and flow over a portion of the tank; 1 injured.

\*\*May 28, 1931, locomotive (E. P. & S. W.) 3410, El Paso, Tex. Squirt hose burst; hose defective; 1 injured.

Four accidents; 4 injured.

## SOUTHERN PACIFIC—LINES WEST:

\*\*September 17, 1930, locomotive (C. P.) 4131, Gold Run, Calif. Nozzle sleeve blew out of fire hose; hose of inferior quality and softened when used on injector delivery pipe connection; 3 injured.

\*September 23, 1930, locomotive 2361, Crows Landing, Calif. Main pin broke flush with wheel center due to old fracture covering approximately 75 per cent of cross-sectional area; 2 injured.

\*October 8, 1930, locomotive 3242, Lakeside, Utah. Combination lever broke due to old flaw; 2 injured.

April 5, 1931, locomotive 3655, Vaughn, N. Mex. Blow-off cock stuck open; 1 injured.

May 28, 1931, locomotive (C. P.) 4125, Woodford, Calif. Steam heat pipe union between locomotive and tender leaking; 1 injured.

June 11, 1931, locomotive 2824, Roseville, Calif. Bonnet blew out of blow down valve in steam dome due to worn threads on valve body; 1 injured.

Six accidents; 10 injured.

## TERMINAL RAILROAD ASSOCIATION OF ST. LOUIS:

\*\*July 10, 1930, locomotive 315, East St. Louis, Ill. Water glass burst; 1 injured.

\*September 16, 1930, locomotive 157, St. Louis, Mo. Injured while adjusting driving box wedge which came down while locomotive was in service; 1 injured.

May 19, 1931, locomotive 78, St. Louis, Mo. Piece of cab running board split off; old defect; 1 injured.

May 26, 1931, locomotive 333, St. Louis, Mo. Squirt hose burst; 1 injured.

Four accidents; 4 injured.

## ULSTER &amp; DELAWARE RAILROAD:

August 23, 1930, locomotive 24, near Ashokan, N. Y. Crown sheet failure caused by overheating due to low water; many appurtenances lost or damaged to such an extent that their previous condition could not be determined; 2 killed.

One accident; 2 killed.

## VIRGINIAN RAILWAY:

September 30, 1930, locomotive 725, Affinity, W. Va. Reflex type water glass burst; 1 injured.

One accident; 1 injured.

## WABASH RAILWAY:

March 8, 1931, locomotive 1530, Detroit, Mich. Fireman's foot slipped on cab apron; apron worn smooth where fireman's foot rested while he was firing locomotive; 1 injured.

One accident; 1 injured.

## WESTERN MARYLAND RAILWAY:

December 27, 1930, locomotive 755, near Harrison, W. Va. Piston head came loose knocking out front cylinder head; piston had been working in crosshead, permitting piston rod nut to foul on cylinder head, distorting threads on nut and rod until nut sheared off; 1 injured.

One accident; 1 injured.

## ACCIDENTS AND CASUALTIES RESULTING FROM THE FAILURE OF LOCOMOTIVES OTHER THAN STEAM AND THEIR APPURTENANCES DURING THE FISCAL YEAR ENDED JUNE 30, 1931, BY ROADS

[A doublestar (\*\*) indicates accidents not properly reported, as required by rule 335. A complete investigation, therefore, could not be made, inasmuch as the bureau was not apprised of the accidents in sufficient time after they occurred to permit them to be properly investigated.]

## BOSTON &amp; MAINE RAILROAD:

June 17, 1931, locomotive unit 5001, Hoosac Tunnel, Mass. Employee leaned out of cab door of electric locomotive unit to examine pantographs in an endeavor to locate cause of intermittent loss of power and was struck by electric locomotive unit 5001 which was the leading unit of an electric locomotive going through tunnel in the opposite direction about 2.50 a. m. without headlight. Loss of power and failure to display headlight caused by flash over at power cable wye connection on roof of unit 5001; 1 killed.

One accident; 1 killed.

## GREAT NORTHERN RAILWAY:

June 15, 1931, locomotive units 5004-A and 5004-B, between Monitor and Dryden, Wash. One employee was seriously injured by coming in contact with free end of high tension jumper when passing between units for the purpose of giving attention to defective air compressor governor and another employee was injured in like manner in attempting to care for the first employee. Locomotive was dispatched from terminal with one end of jumper between units hanging free. "Clean train line pressure control, 5004-B; pressure raises and lowers 10 pounds," was reported on June 5, and neither unit was again in service until June 15. Monthly locomotive unit inspection and repair reports, dated and sworn to on June 6, 1931, and shop records purport to show that monthly inspections and repairs were made while out of service during this period, however, these inspections and repairs were not completed. In attempt to avoid delay and payment of overtime, the customary outbound inspection was not made; 2 injured.

One accident; 2 injured.

## NEW YORK, NEW HAVEN &amp; HARTFORD RAILROAD:

\*\*May 6, 1931, locomotive unit 4, New Haven, Conn. Defective trolley pole broke, causing fatal injury of employee; hole in side of trolley pole with transverse fracture extending therefrom; 1 injured.

One accident; 1 injured.

## NORFOLK &amp; WESTERN RAILWAY:

April 30, 1931, locomotive unit 2, Bluefield, W. Va. Vertical handhold at back cab door on side of locomotive unit gave way at top end, causing employee to fall to track between the units; bolt securing top end of handhold broke off due to old fracture; 1 injured.

One accident; 1 injured.

## PENNSYLVANIA RAILROAD:

\*\*October 16, 1930, locomotive unit 7806, Manhattan Transfer, N. J. Right No. 2 motor pinion flexible unit springs broke; 1 injured.

One accident; 1 injured.

TABLE XIII.—Number of steam locomotives inspected

Parts defective, inoperative or missing, or in violation of the rules	Akron, Canton & Youngstown	Alabama, Tennessee & Northern	Aliquippa & Southern	Ann Arbor	Atchison, Topeka & Santa Fe	Atlanta & West Point	Atlanta, Birmingham & Coast	Atlantic & Yadkin
1 Air compressors	1				34			
2 Arch tubes					1			
3 Ash pans and mechanism					2			
4 Axles								
5 Blow-off cocks					8	1		
6 Boiler checks					5		1	
7 Boiler shell					9			
8 Brake equipment					32			
9 Cabs, cab windows, and curtains	2				14			
10 Cab aprons and decks					7	1		
11 Cab cards					3			
12 Coupling and uncoupling devices								
13 Crossheads, guides, pistons, and piston rods		1			19		1	1
14 Crown bolts					2			
15 Cylinders, saddles, and steam chests	2	1			34	1		
16 Cylinder cocks and rigging					20			
17 Domes and dome caps					4			
18 Draft gear					7			
19 Draw gear	1	1			5		1	
20 Driving boxes, shoes, wedges, pedestals, and braces		2			17		1	1
21 Fire-box sheets					2			
22 Flues					5	1		
23 Frames, tailpieces, and braces, locomotive		1			22			
24 Frames, tender					1			
25 Gauges and gauge fittings, air					7			
26 Gauges and gauge fittings, steam	1				13			
27 Gauge cocks		5			9			
28 Grate shakers and fire doors					4			
29 Handholds					4			
30 Injectors, inoperative					4			
31 Injectors and connections	3				82			
32 Inspections and tests not made as required	5	2			125			
33 Lateral motion					5			1
34 Lights, cab and classification								
35 Lights, headlights					5			
36 Lubricators and shields					3			
37 Mud rings					21			
38 Packing nuts					12	1	1	
39 Packing, piston rod, and valve stem	2				17			
40 Pilot and pilot beams					4			
41 Plugs and studs					8			
42 Reversing gear		1			6			
43 Rods, main and side, crank pins, and collars		1			40			
44 Safety valves								
45 Sanders					23			
46 Springs and spring rigging					53		2	
47 Squirt hose					6			
48 Stay bolts	1				4			1
49 Stay bolts, broken	6							
50 Steam pipes	1				13			
51 Steam valves					3			
52 Steps					6			
53 Tanks and tank valves	1				9		1	
54 Telltale holes								
55 Throttle and throttle rigging	1				26			
56 Trucks, engine and trailing	1				15		1	
57 Trucks, tender		1			8			
58 Valve motion					9			
59 Washout plugs	2				41		1	
60 Train-control equipment								
61 Water glasses, fittings, and shields					9	2	2	2
62 Wheels		2			11		1	
63 Miscellaneous—Signal appliances, badge plates, brakes (hand).	1				16			
Number of defects	34	19			871	7	12	6
Locomotives reported	23	19	20	57	1,953	53	80	17
Locomotives inspected	65	25	41	138	3,487	75	141	33
Locomotives defective	9	7			268	3	6	2
Percentage of inspected found defective	14	28			8	4	4.3	6
Locomotives ordered out of service	1	3			9			

found defective, and ordered from service, etc.

Atlantic Coast Line	Baltimore & Ohio Lines East	Baltimore & Ohio Lines West	Bangor & Aroostook	Belt Railway of Chicago	Bessemer & Lake Erie	Birmingham Southern	Boston & Albany	Boston & Maine	Buffalo & Susquehanna	Buffalo Creek	Buffalo, Rochester & Pittsburgh	Burlington-Rock Island	Camas Prairie	Canadian National	Canadian Pacific	Carnegie Steel
4	1	5						3	1		1		1	3	1	1
1	4	1			3			5								
1																
6	7	2					4	1	1		2			2		1
3	9	2			2		1	1	1		4			7		2
19	15	13		1	2		1	19	2		5			1		2
J4	12	28		1	9		8	22	2		3			3		2
6	2	4			1		1	8	1					3		2
		1		1	1		1	1	6					2		
4	1	17			8		3	6	1		1			7		1
35	8	1			1			3	1		3					
1	7	18			6			2	1		8					
3	1	18			1			2	1		1					
3	1	1			1			2	1		2					
2	2	7			1			3	5		4					
2	6	2			2			12	1		1			3		
11	7	2			3			3	5		4			5		
2	7	2			2			1	1		1			2		
1	18	9			3			5	2		4			9		
4	3	3			3			5	2		4			2		
2	2	2			2			1	1		1			1		
8	14	12			1			10	1		5			1		
1	1	1			1			1	1		1			1		
1	2	2			2			1	1		4			2		
1	4	4			1			1	1		2			1		
11	1	1			1			8	1		2			3		
3	1	1			1			1	1		2			3		
3	1	4			1			5	1		2			5		
2	2	1			1			2	1		4			5		
25	15	10			1			11	1		4			8		1
107	41	60		6	1	1	20	93	4		21			30		24
	6	6		1				6	2		1			4		1
2		3						1	1		1					
1		9						1	1		3					
4	2	5		3			1	1	1		2					
4		3						2	2		3					
1	3	12		2			1	4	1		1			1		
1		1						1	1		1					
2	2	1						4	3		2					
1	4	7						1	1		3					
6	4	1						2	6		14					
6	19	16						22	6		3			9		3
1	1	3						1	1		1					
1	2	7						1	2		1			17		3
34	47	33		3			5	9	35		19			1		
1	1	1		1			1	1	1		1			2		
5	1	3					3	1	3		9			2		6
8	8	3					3	7	7		34			1		2
5	5	3					1	3	3		10			2		1
2	1	3					3	3	4		4			3		3
3	10	4					1	9	4		8			3		2
23	9	8					4	7	9		3			5		2
2	2	1						1	1		1			2		1
14	1	9					1	5	3		1			5		5
8	11	3						5	11		3			8		3
22	16	9						4	1		1					
3	1	4					1	7	1		2					
19	3	8		1			1	17	3		3			1		
6	11	5					1	3	4		9			4		
10	5	2						5	2		10			5		
3	1	10					3	5	2		2					
476	352	381		23	12	138		126	385	66	246		9	13	197	82
979	2,376	2,198		80	101	129	23	324	768	46	20		33	14	233	165
1,572	2,188	2,198		99	94	239	11	356	1,222	116	6		32	15	157	115
214	90	103		5	4	28		53	158	16			3	7	58	29
14	4.1	4.7		5	4.3	12		15	13	14			9	47	37	25
7	3	8		1		1			6	3				5	2	1.4

TABLE XIII.—Number of steam locomotives inspected,

Parts defective, Inoperative or missing, or in violation of the rules		Carolina & Northwestern	Central of Georgia	Central R. R. of New Jersey	Central Vermont	Charleston & Western Carolina	Chesapeake & Ohio	Chicago & Alton	Chicago & Eastern Illinois
1	Air compressors		4	4			8		
2	Arch tubes						1		
3	Ash pans and mechanism					1		1	
4	Axles								
5	Blow-off cocks		8		2		8		
6	Boiler checks		1				5		
7	Boiler shell		1	5		1	13		2
8	Brake equipment		12	12		1	19		
9	Cabs, cab windows, and curtains		7	19	10		37	7	9
10	Cab aprons and decks		2	3			9		
11	Cab cards			1			2		
12	Coupling and uncoupling devices		2				2		
13	Crossheads, guides, pistons, and piston rods		6	5	4		3	2	
14	Crown bolts						2	3	
15	Cylinders, saddles, and steam chests		3	4			31	17	
16	Cylinder cocks and rigging		1	4			3	19	
17	Domes and dome caps		1	1				19	
18	Draft gear		1	1					
19	Draw gear		3	5			3	4	
20	Driving boxes, shoes, wedges, pedestals, and braces		12	1			5	1	
21	Fire-box sheets		5	2	5	1	19		
22	Flues		2	2			10	4	
23	Frames, tailpieces, and braces, locomotive		1	3			2	1	
24	Frames, tender		14		1	1	12	2	
25	Gauges and gauge fittings, air		6				1	1	
26	Gauges and gauge fittings, steam		1	3					
27	Gauge cocks		4	1			2		
28	Grate shakers and fire doors		12	7			7	2	
29	Handholds		1	3			10	3	
30	Injectors, inoperative		2	3			3	3	
31	Injectors and connections							1	
32	Inspections and tests not made as required		12	6	2		23	12	
33	Lateral motion	2	20	32	16	9	62	41	
34	Lights, cab and classification		2	8	2			1	
35	Lights, headlights						1	2	
36	Lubricators and shields			1				1	
37	Mud rings			1			3		
38	Packing nuts		1	1	2		8	4	
39	Packing, piston rod and valve stem		7		2		5	1	
40	Pilot and pilot beams		3	4			5	12	
41	Plugs and studs		1						
42	Reversing gear		1	1	1		4		
43	Rods, main and side, crank pins, and collars		10	14	4	2	13	3	
44	Safety valves			1			2	2	
45	Sanders			2			8		
46	Springs and spring rigging		19	8	2	1	31	5	
47	Squirt hose		3				2		
48	Stay bolts		3	1			13	2	
49	Stay bolts, broken					1	10		
50	Steam pipes		4	5			9	2	
51	Steam valves		4				4	2	
52	Steps		15		1		2	3	
53	Tanks and tank valves		12	3	1	1	3	7	
54	Telltale holes								
55	Throttle and throttle rigging		2	1			9	2	
56	Trucks, engine and trailing		6	3	2	1	3		
57	Trucks, tender		20				7	2	
58	Valve motion		4	7	2		8		
59	Washout plugs		11	3			36	2	
60	Train-control equipment								
61	Water glasses, fittings, and shields		6	3	1	1	26	3	
62	Wheels		8	11			6	2	
63	Miscellaneous—signal appliances, badge plates, brakes (hand)		3				6	1	
Number of defects		4	293	203	59	24	581	194	
Locomotives reported		12	325	526	67	55	1,109	292	292
Locomotives inspected		27	546	586	218	64	1,968	605	507
Locomotives defective		2	105	75	23	10	178	61	61
Percentage of inspected found defective		7	20	13	11	16	9	12	12
Locomotives ordered out of service									

found defective, and ordered from service, etc.—Continued

Chicago & Illinois Midland	Chicago & Northwestern	Chicago & Western Indiana	Chicago, Burlington & Quincy	Chicago Great Western	Chicago, Indianapolis & Louisville	Chicago, Milwaukee, St. Paul & Pacific	Chicago River & Indiana	Chicago, Rock Island & Pacific	Chicago, St. Paul, Minneapolis & Omaha	Chicago Short Line	Chicago, West Pullman & Southern	Cleveland, Cincinnati, Chicago & St. L.	Clinchfield	Colorado & Southern	Colorado & Wyoming	Columbus & Greenville
	4	2	6	11	2	7		17	1			7		1		1
						5		1	1			1				2
						1		4				1				3
						3										4
						1		8	1							5
						3		1	1							6
						11		11	1							7
						12		76	31		1					8
						19		37	10							9
						3		16	1							10
						2		1								11
						4		1								12
						2		23	1							13
						39		1								14
						3		60								15
						2		15								16
						11		9								17
						2		11								18
						12		11								19
						18		57								20
						4		8								21
						6		11								22
						13		11								23
						1		28								24
						4		9								25
						10		8								26
						9		15								27
						7		8								28
						15		15								29
						12		11								30
						21		8								31
						1		15								32
						1		1								33
						6		2								34
						13		4								35
						1		1								36
						4		4								37
						4		4								38
						10		10								39
						9		9								40
						8		7								41
						3		3								42
						7		4								43
						12		15								44
						1		1								45
						1		2								46
						31		36								47
						3		107								48
						2		12								49
						3		8								50
						2		4								51
						10		23								52
						5		8								53
						12		16								54
						11		15								55
						1		1								56
						16		23								57
						16		27								58
						4		18								59
						20		22								60
						9		8								61
						16		24								62
						7		4								63
						11		25								64
						20		35								65
						6		11								66
						7		3								67
						8		3								68
						1		4								69
						3		11								70
						4		8								71
						8		3								72
						1		4								73
						2		3								74
						11		20								75
						6		7								76
						3		4								77
						4		8								78
						1		3								79
						4		4								80
						2		3								81
						11		20								82
						6		7								83
						3		4								84
						4		8								85
						1		3								86
						4		4								87
						2		3								88
						11		20								89
						6		7								90
						3		4								91



TABLE XIII.—Number of steam locomotives inspected,

Parts defective, inoperative or missing, or in violation of the rules	Number of steam locomotives inspected										
	Conemaugh & Black Lick	Copper Range	Cumberland & Pennsylvania	Davenport, Rock Island & Northwestern	Delaware & Hudson	Delaware, Lackawanna & Western	Denver & Rio Grande Western	Denver & Salt Lake			
1 Air compressors.....											
2 Arch tubes.....						9	9				
3 Ash pans and mechanism.....											
4 Axles.....											
5 Blow-off cocks.....						1					
6 Boiler checks.....											
7 Boiler shell.....			1		2	22					
8 Brake equipment.....		2		1	7	15	8				
9 Cabs, cab windows, and curtains.....		1			31	6					
10 Cab aprons and decks.....					1	3					
11 Cab cards.....											
12 Coupling and uncoupling devices.....											
13 Crossheads, guides, pistons, and piston rods.....					1						
14 Crown bolts.....					8	18					
15 Cylinders, saddles, and steam chests.....					19	24					
16 Cylinder cocks and rigging.....					8	2					
17 Domes and dome caps.....					2						
18 Draft gear.....				2	1	7					
19 Draw gear.....			2		5	4					
20 Driving boxes, shoes, wedges, pedestals, and braces.....				1	5	5					
21 Fire-box sheets.....		1			5	5					
22 Flues.....	1				3	3					
23 Frames, tailpieces, and braces, locomotive.....			1		10	8					
24 Frames, tender.....				1							
25 Gauges and gauge fittings, air.....					3						
26 Gauges and gauge fittings, steam.....					5	5					
27 Gauge cocks.....					5	5					
28 Grate shakers and fire doors.....					7	7					
29 Handholds.....				1	5	2					
30 Injectors, inoperative.....					2	2					
31 Injectors and connections.....		1		1	34	18					
32 Inspections and tests not made as required.....		4	2	1	31	22					
33 Lateral motion.....				6	5	4					
34 Lights, cab and classification.....											
35 Lights, headlights.....		1									
36 Lubricators and shields.....					3	1					
37 Mud rings.....					3	3					
38 Packing nuts.....					13	1					
39 Packing, piston rod and valve stem.....					6	10					
40 Pilot and pilot beams.....					13	10					
41 Plugs and studs.....						4					
42 Reversing gear.....					1	3					
43 Rods, main and side, crank pins, and collars.....					4	13					
44 Safety valves.....				2	1	5					
45 Sanders.....					4	11					
46 Springs and spring rigging.....				3	15	15					
47 Squirt hose.....	3				4	3					
48 Stay bolts.....	1										
49 Stay bolts, broken.....				1	4						
50 Steam pipes.....		3			2						
51 Steam valves.....			1		11	2					
52 Steps.....					4	1					
53 Tanks and tank valves.....					3	2					
54 Telltale holes.....				5	7	2					
55 Throttle and throttle rigging.....					1						
56 Trucks, engine and trailing.....					10	2					
57 Trucks, tender.....				2	3	7					
58 Valve motion.....		1		1	6	1					
59 Washout plugs.....					9	7					
60 Train-control equipment.....					2	3					
61 Water glasses, fittings, and shields.....											
62 Wheels.....	1			2	6	2					
63 Miscellaneous—Signal appliances, badge plates, brakes (hand).....	1	1	1		2	6	2				
Number of defects.....	6	15	9	3	42	385	282				
Locomotives reported.....	33	20	14	10	438	616	476	58			
Locomotives inspected.....	19	28	24	33	715	1,084	842	74			
Locomotives defective.....	3	5	3	1	19	124	83				
Percentage of inspected found defective.....	16	18	12	3	2.7	11	10				
Locomotives ordered out of service.....		1				3	7				

found defective, and ordered from service, etc.—Continued

Parts defective, inoperative or missing, or in violation of the rules	Number of steam locomotives inspected																
	Detroit & Mackinac	Detroit & Toledo Shore Line	Detroit Terminal	Detroit, Toledo & Ironton	Donora Southern	Duluth & Northeastern	Duluth, Missisabe & Northern	Duluth, South Shore & Atlantic	East Broad Top Railroad & Coal	East St. Louis Junction	East Tennessee & Western North Carolina	Elgin, Joliet & Eastern	Erie	Florida East Coast	Fort Smith & Western	Fort Worth & Denver City	Galveston, Houston & Henderson
1 Air compressors.....													18				
2 Arch tubes.....					1								1				
3 Ash pans and mechanism.....													9				
4 Axles.....													1				
5 Blow-off cocks.....													9				
6 Boiler checks.....													23				
7 Boiler shell.....													19				
8 Brake equipment.....			2	1			1						2		1		
9 Cabs, cab windows, and curtains.....													56				
10 Cab aprons and decks.....													44				
11 Cab cards.....													23				
12 Coupling and uncoupling devices.....													22				
13 Crossheads, guides, pistons, and piston rods.....													2				
14 Crown bolts.....													1				
15 Cylinders, saddles, and steam chests.....													25				
16 Cylinder cocks and rigging.....	1												3				
17 Domes and dome caps.....													21				
18 Draft gear.....													4				
19 Draw gear.....													28				
20 Driving boxes, shoes, wedges, pedestals, and braces.....													26				
21 Fire-box sheets.....													21				
22 Flues.....													9				
23 Frames, tailpieces, and braces, locomotive.....													5				
24 Frames, tender.....													23				
25 Gauges and gauge fittings, air.....													4				
26 Gauges and gauge fittings, steam.....													1				
27 Gauge cocks.....													15				
28 Grate shakers and fire doors.....													33				
29 Handholds.....													26				
30 Injectors, inoperative.....													12				
31 Injectors and connections.....													97				
32 Inspections and tests not made as required.....													91				
33 Lateral motion.....													33				
34 Lights, cab and classification.....													2				
35 Lights, headlights.....													7				
36 Lubricators and shields.....													7				
37 Mud rings.....													7				
38 Packing nuts.....													6				
39 Packing, piston rod and valve stem.....													21				
40 Pilot and pilot beams.....													14				
41 Plugs and studs.....													10				
42 Reversing gear.....													15				
43 Rods, main and side, crank pins, and collars.....													14				
44 Safety valves.....													51				
45 Sanders.....													10				
46 Springs and spring rigging.....													114				
47 Squirt hose.....													14				
48 Stay bolts.....													6				
49 Stay bolts, broken.....													9				
50 Steam pipes.....													35				
51 Steam valves.....													29				
52 Steps.....													8				
53 Tanks and tank valves.....													15				
54 Telltale holes.....													48				
55 Throttle and throttle rigging.....													7				
56 Trucks, engine and trailing.....													26				
57 Trucks, tender.....													33				
58 Valve motion.....													36				
59 Washout plugs.....													27				
60 Train-control equipment.....													7				
61 Water glasses, fittings, and shields.....													10				
62 Wheels.....													42				
63 Miscellaneous—Signal appliances, badge plates, brakes (hand).....													23				
Number of defects.....	38	16	18	7	10	17	27	25	13	22	11	1,335	5	520	35		
Locomotives reported.....	22	30	84	76	14	12	186	70	11	11	12	271	1,080	175	26	117	12
Locomotives inspected.....	17	42	22	100	20	11	142	84	30	23	18	274	2,220	148	86	198	12
Locomotives defective.....	7	4	6	1	3	6	8	4	4	6	2	279	2	61	10		
Percentage of inspected found defective.....	41	18	3.8	5	27	4.2	10	13	17	33	0.7	13	1.4	71	5		
Locomotives ordered out of service.....													17		2		











TABLE XIII.—Number of steam locomotives inspected,

Parts defective, inoperative or missing, or in violation of the rules	Toledo & Western	Toledo Terminal	Toronto, Hamilton & Buffalo	Tremont & Gulf	Uintah	Ulster & Delaware	Union Pacific
1 Air compressors.....							7
2 Arch tubes.....							
3 Ash pans and mechanism.....							
4 Axles.....							
5 Blow-off cocks.....							
6 Boiler checks.....	1						4
7 Boiler shell.....						1	3
8 Brake equipment.....						2	51
9 Cabs, cab windows, and curtains.....	1						12
10 Cab aprons and decks.....							3
11 Cab cards.....							2
12 Coupling and uncoupling devices.....							1
13 Crossheads, guides, pistons, and piston rods.....							10
14 Crown bolts.....	1						1
15 Cylinders, saddles, and steam chests.....							43
16 Cylinder cocks and rigging.....							12
17 Domes and dome caps.....							11
18 Draft gear.....							31
19 Draw gear.....	3	2					1
20 Driving boxes, shoes, wedges, pedestals, and braces.....							9
21 Fire-box sheets.....							1
22 Flues.....							2
23 Frames, tailpieces, and braces, locomotive.....							1
24 Frames, tender.....						2	9
25 Gauges and gauge fittings, air.....	1						1
26 Gauges and gauge fittings, steam.....							1
27 Gauge cocks.....					1		2
28 Grate shakers and fire doors.....							2
29 Handholds.....							2
30 Injectors, inoperative.....							1
31 Injectors and connections.....							13
32 Inspections and tests not made as required.....					2		18
33 Lateral motion.....	5				9		2
34 Lights, cab and classification.....							4
35 Lights, headlights.....							4
36 Lubricators and shields.....							4
37 Mud rings.....							4
38 Packing nuts.....					4		12
39 Packing, piston rod and valve stem.....					1		2
40 Pilot and pilot beams.....					1		2
41 Plugs and studs.....							2
42 Reversing gear.....							4
43 Rods, main and side, crank pins, and collars.....	2				3		33
44 Safety valves.....							2
45 Sanders.....							5
46 Springs and spring rigging.....							44
47 Squirt hose.....	2						
48 Stay bolts.....							2
49 Stay bolts, broken.....							7
50 Steam pipes.....					5		20
51 Steam valves.....					1		2
52 Steps.....							8
53 Tanks and tank valves.....	1						3
54 Telltale holes.....							5
55 Throttle and throttle rigging.....							2
56 Trucks, engine and trailing.....							2
57 Trucks, tender.....							6
58 Valve motion.....							7
59 Washout plugs.....					1		18
60 Train-control equipment.....							4
61 Water glasses, fittings and shields.....							11
62 Wheels.....							
63 Miscellaneous—Signal appliances, badge plates, brakes (hand).....	1	1					
Number of defects.....	18	3				33	447
Locomotives reported.....	22	21	18	11	10	29	849
Locomotives inspected.....	20	42	1	10	21	78	1,837
Locomotives defective.....	5	2				10	159
Percentages of inspected found defective.....	25	5				13	9
Locomotives ordered out of service.....	2					1	2

found defective, and ordered from service, etc.—Continued

	Union	Upper Merion & Plymouth	Utah	Virginian	Wabash	Washington Terminal	Western Maryland	Western Pacific	Whealing & Lake Erie	Whealing Steel Corporation	Wichita Falls & Southern	Winston-Salem South-bound	Woodward Iron Company	Wrightsville & Ten-nille	Roads with less than 10 locomotives	Total defects
				1				2	3						51	481
							1			2					2	60
							1								10	81
																10
															14	191
	1			1					1						26	263
							2								32	430
							2		2				1		303	1,923
	1						1		5						279	1,484
		2							9						80	415
									1						70	211
	1						1	5							55	98
															79	856
							3	5	1	2		3			12	96
															12	96
															40	1,265
														2	40	411
															5	83
															149	568
															152	640
	1						1	1	1						103	925
							4			5					34	341
									1						49	187
	1								1						63	740
										1					20	105
															24	192
															28	324
															67	415
														1	44	410
	3														189	562
															6	55
															241	1,816
	1														492	4,862
															33	289
															6	77
															28	180
															14	176
															35	318
															95	533
															125	703
															36	160
															21	182
															28	209
															238	1,520
															9	61
															18	314
															194	2,161
															52	184
															28	293
															359	938
															34	512
															14	226
															230	676
															81	732
															65	151
															71	574
															138	714
															307	1,059
															43	497
															59	815
															130	955
															185	750
															29	418
	30	30		42			123	103	78	36	9	8	10	2	5,561	36,968
	144	11	16	161	710	18	257	168	184	17	18	11	14	13	2,360	60,841
	62	36	3	175	1,223	8	350	204	277	20	17	18	4	31	3,230	101,224
	7	10		30			45	32	22	7	3	4	3	1	1,040	10,277
	11	28		17			13	16	8	35	18	22	75	3.2	32	10
	1			1			1	5	1	3	1				182	688





TABLE XIV.—Number of locomotives other than steam inspected,

Parts defective, inoperative or missing, or in violation of the rules	Hoboken Mfgs.	Houston North Shore	Hutchinson & Northern	Illinois Central	Illinois Traction System	International	Interstate Public Service Traction	Jamestown, Westfield & Northwestern	Jay Street Connecting
Air compressors.....									
Axles.....									
Batteries.....									
Boiler.....									
Brake equipment.....									
Cabs and cab windows.....									
Cab floors, aprons, and deck plates.....									
Controllers, relays, circuit breakers, and switch groups.....									
Current-collecting apparatus.....									
Draft gear.....									
Draw gear.....									
Driving boxes, shoes, wedges, pedestals, and pedestal braces.....									
Frames, tail pieces, and braces.....									
Fuel tank, its piping and valves.....									
Gauges and gauge fittings, air.....									
Gears and pinions.....									
High-tension equipment not properly guarded against accidental contact.....									
Inspections and tests not made as required.....	2								
Internal-combustion engine defects, including parts and appliances.....									
Insulation.....									
Jack shafts.....									
Lateral motion, wheels.....									
Lights, cab and classification.....									
Lights, headlights.....									
Meters, volt and ampere.....									
Motors and generators.....									
Pilots and pilot beams.....									
Plugs and studs (boiler, other than fusible plugs).....									
Quills.....									
Rods, motor, main and side, drive shafts.....									
Sanders.....									
Springs and spring rigging, driving and truck.....									
Steam pipes.....									
Switches, hand-operated, and fuses.....									
Transformers, resistors, and rheostats.....									
Trucks.....	1								
Water glasses, fittings, and shields.....									
Wheels.....	1								
Whistles, bells, and train-signal system.....	1								
Miscellaneous.....	1								
Total defects.....	2								
Locomotive units reported.....	2	2	2	10	51	3	3	2	2
Locomotive units inspected.....	4	4	8	3	30	3	3	4	1
Locomotive units defective.....	2								
Percentage inspected found defective.....	50								
Locomotive units ordered out of service.....									

found defective, and ordered from service, etc.—Continued

	Joplin & Pittsburg	Kansas City, Kaw Valley & Western	Lackawanna & Wyoming Valley	Lehigh Valley	Long Island	Michigan Central	New York Central	New York, New Haven & Hartford	Niagara Junction	Norfolk & Western	Norfolk Southern	Northeast Oklahoma	Oklahoma	Oregon Electric	Pacific Coast Aggregates	Pacific Coast Railway	Pacific Electric	Pacific Northwest Public Service	Pennsylvania	Petaluma & Santa Rosa	
					1																
1					2		1	1			2										
					1		3														
							1			4											
			3		2																
									2												
1																	1				
2				1																	
					1																
							3	2		1										1	
1								2													
1							2														
1								1													
6	2	3	2	11			11	6		5	2							1		1	
3	2	4	10	53	16	174	147	6	32	4	3	7	10		2	2	60	13	81	8	
15	3	11	5	28	19	65	103	11	115	5	15	6	11				39	12	13	6	
1	2	3	1	3		4	4		3	2	2						1		1		
7	67	27	20	17		6	4	4	3	40							3		8		

TABLE XIV.—Number of locomotives other than steam inspected,

Parts defective, inoperative or missing, or in violation of the rules	Philadelphia Coke	Piedmont & Northern	Reading	Red River Lumber Co.	Republic Steel Corporation	Sacramento Northern	St. Louis & Belleville	Salt Lake & Utah	Sand Springs
Air compressors									
Axles									
Batteries									
Boiler		1							5
Brake equipment									
Cabs and cab windows									
Cab floors, aprons, and deck plates									
Controllers, relays, circuit breakers, and switch groups									
Current-collecting apparatus									
Draft gear									
Draw gear									
Driving boxes, shoes, wedges, pedestals, and pedestal braces									
Frames, tall pieces, and braces									
Fuel tank, its piping and valves									
Gauges and gauge fittings, air									
Gears and pinions									
High-tension equipment not properly guarded against accidental contact									
Inspections and tests not made as required		1				1			4
Internal-combustion engine defects, including parts and appliances									
Insulation									
Jack shafts									
Lateral motion wheels									
Lights, cab and classification									
Lights, headlights									
Meters, volt and ampere									
Motors and generators									
Pilots and pilot beams									
Plugs and studs (boiler, other than fusible plugs)									
Quills									
Rods, motor, main and side, drive shafts									
Sanders									
Springs, and spring rigging, driving and truck									
Steam pipes									
Switches, hand-operated, and fuses									
Transformers, resistors, and rheostats									
Trucks		1							4
Water glasses, fittings, and shields									
Wheels									
Whistles, bells, and train-signal system									
Miscellaneous									
Total defects		3				1			13
Locomotive units reported	2	17	2	4	4	22	3	7	4
Locomotive units inspected	25	3	3	3	4	15	6	1	17
Locomotive units defective	1					1			4
Percentage inspected defective		4				7			24
Locomotive units ordered out of service									

found defective, and ordered from service, etc.—Continued

	Southern New York	Southern Pacific	Southwest Missouri	Spokane, Coeur D'Alene & Palouse	Terre Haute, Indianapolis & Eastern	Texas Electric	Tidewater Southern	Toledo & Western	Twin Branch	Utah Copper	Utah-Idaho Central	Virginian	Visalia Electric	Washington & Old Dominion	Waterloo, Cedar Falls & Northern	Westinghouse Electric	Wildwood & Delaware Bay Short Line	Yakima Valley Transportation	Roads with but 1 locomotive unit	Total defects	J
																				1	4
																				3	23
																				5	10
																				1	1
																				3	3
																				3	11
														1							6
																				3	2
																				3	3
																				1	1
																				14	4
																				1	39
																				1	1
																				1	4
																				1	1
																				2	3
																				2	2
																				2	10
																				1	2
																				1	1
																				2	4
													1							1	10
																				1	1
																				1	1
																				1	11
																				10	12
																				2	2
																				11	16
																				60	192
	2	3	4	13	3	8	2	5	2	5	7	36	2	2	7	2	2	2	39	1,242	
	3	12	22	2	1	3	3	15	5	5	7	66	2	4	3	2	2	2	46	1,256	
												1		1					15	76	
												2		25					33	6	
																			2	8	8

TABLE XV.—Summary of comparison of the percentage of steam locomotives inspected and found defective, with the number ordered out of service for the years ended June 30, on roads reporting on 10 or more locomotives

Road	Percentage inspected defective						Ordered out of service					
	1931	1930	1929	1927	1925	1923	1931	1930	1929	1927	1925	1923
Akron, Canton & Youngstown	14	23	47	42	56	38	1	1	12	1	5	0
Alabama, Tennessee & Northern	28	38	37	56	53	78	3	2	1	2	1	1
Aliquippa Southern	0	19	31	26	69	0	0	0	0	0	0	0
Ann Arbor	0	5	9	25	71	97	0	1	0	2	15	24
Atchison, Topeka & Santa Fe	8	13	14	24	32	49	9	11	14	40	30	84
Atlanta & West Point	4	4	6	9	23	27	0	0	0	1	4	1
Atlanta, Birmingham & Coast	4	4	6	9	23	27	0	0	0	1	4	1
Atlantic & Yadkin	4.3	10	27	40	54	78	0	0	2	8	12	6
Atlantic Coast Line	6	19	10	16	100	0	0	0	1	0	0	0
Baltimore & Ohio Lines, East	4.1	13	10	30	35	58	7	0	2	4	15	45
Baltimore & Ohio Lines, West	4.7	8	15	30	52	62	3	3	10	32	113	153
Bangor & Aroostook	5	13	31	43	28	50	1	0	1	3	1	6
Belt Railway of Chicago	4.3	23	35	54	51	66	0	1	4	5	4	6
Birmingham Southern	12	24	22	21	63	43	1	13	6	1	1	2
Boston & Albany	0	0	14	100	0	0	0	0	0	0	0	0
Boston & Maine	15	20	16	26	47	54	0	4	0	0	10	7
Buffalo & Susquehanna	13	16	16	23	36	67	6	4	3	13	23	191
Buffalo Creek	14	13	21	29	54	57	3	3	11	3	0	1
Buffalo, Rochester & Pittsburgh	0	0	0	18	0	0	0	0	0	0	0	0
Burlington-Rock Island	9	11	10	14	51	69	8	5	0	9	26	13
Camas Prairie	9	14	18	41	61	58	0	1	0	2	4	2
Canadian National	47	60	16	0	0	0	0	1	0	0	0	0
Canadian Pacific	37	30	34	50	50	84	5	7	7	30	24	4
Carnegie Steel	25	32	32	44	56	76	2	1	1	4	0	5
Carolina & Northwestern	1.4	18	15	34	48	0	0	1	0	5	3	0
Central of Georgia	7	26	32	50	50	36	0	0	1	0	0	1
Central R. R. of New Jersey	20	19	19	30	37	33	10	3	5	10	8	10
Central Vermont	13	27	42	38	47	77	2	8	14	20	46	139
Charleston & Western Carolina	11	15	12	11	27	47	1	1	1	2	4	4
Chesapeake & Ohio	16	27	28	58	63	68	1	1	2	2	1	1
Chicago & Alton	9	9	17	28	49	68	5	3	5	26	29	58
Chicago & Eastern Illinois	0	0.6	3	14	35	75	0	1	3	5	9	29
Chicago & Illinois Midland	12	17	28	38	64	75	3	14	3	25	31	77
Chicago & Northwestern	0	2	14	83	0	0	0	0	0	29	0	0
Chicago & Western Indiana	7	8	12	19	35	67	5	3	8	18	29	193
Chicago, Burlington & Quincy	25	30	43	22	86	67	0	1	3	0	2	0
Chicago Great Western	6	11	14	21	46	60	4	15	18	39	185	176
Chicago, Indianapolis & Louisville	26	19	11	20	40	52	23	6	2	0	10	20
Chicago, Milwaukee, St. Paul & Pacific	4.5	26	26	29	45	57	1	6	2	14	7	13
Chicago River & Indiana	0	6	9	13	27	48	2	2	5	9	12	58
Chicago, Rock Island & Pacific	0	0	5	0	70	62	0	0	0	5	0	0
Chicago, St. Paul, Minneapolis & Omaha	11	15	17	29	55	76	17	18	13	49	124	367
Chicago Short Line	9	12	17	30	46	70	2	4	6	12	20	54
Chicago, West Pullman & Southern	0	7	44	38	0	0	0	0	3	0	0	0
Cleveland, Cincinnati, Chicago & St. L.	7	23	47	53	100	58	0	4	5	1	7	0
Clinchfield	6	22	24	34	44	67	3	24	16	37	47	77
Colorado & Southern	9	14	38	25	76	68	1	3	5	0	1	10
Colorado & Wyoming	8	15	43	40	76	81	2	1	10	4	52	71
Columbus & Greenville	0	6	21	27	15	14	0	0	1	3	2	0
Conemaugh & Black Lick	17	5	25	21	26	44	0	0	0	0	0	0
Copper Range	16	15	58	0	0	0	0	3	2	0	0	0
Cumberland & Pennsylvania	18	39	28	84	59	75	1	2	1	7	7	0
Davenport, Rock Island & North-western	12	24	29	13	20	25	0	0	1	0	0	0
Delaware & Hudson	3	5	19	0	0	0	0	2	2	0	0	0
Delaware, Lackawanna & Western	2.7	3	2.6	9	24	62	0	0	0	1	2	52
Denver & Rio Grande Western	11	12	21	22	36	62	3	0	17	4	3	47
Denver & Salt Lake	10	25	36	54	58	92	7	31	32	88	72	174
Detroit & Mackinac	0	0	19	44	68	93	0	0	2	7	39	8
Detroit & Toledo Shore Line	41	17	33	36	82	26	0	0	0	0	2	0
Detroit Terminal	0	26	8	33	51	78	0	0	0	1	5	3
Detroit, Toledo & Ironton	18	32	31	46	72	76	0	1	1	0	7	0
Donora Southern	3.8	5	5	15	28	29	0	0	0	3	4	7
Duluth & North Eastern	5	14	0	0	0	0	0	0	0	0	0	0
Duluth, Missabe & Northern	4.2	14	1	12	37	74	0	0	0	0	1	2

1 Atlanta, Birmingham & Atlantic prior to 1927.  
 2 Locomotives reported included in Baltimore & Ohio, East. Statistics prior to 1927 included in Baltimore & Ohio, East.  
 3 Trinity & Brazos Valley prior to 1931.  
 4 Includes Grand Trunk Western, 1925-1927.  
 5 1931 includes former Hocking Valley.  
 6 Includes Peoria & Eastern prior to 1931.

TABLE XV.—Summary of comparison of the percentage of steam locomotives inspected and found defective, with the number ordered out of service for the years ended June 30, on roads reporting on 10 or more locomotives—Continued

Road	Percentage inspected defective						Ordered out of service					
	1931	1930	1929	1927	1925	1923	1931	1930	1929	1927	1925	1923
Duluth, South Shore & Atlantic	10	17	24	29	35	69	1	2	4	2	5	3
East Broad Top R. R. & Coal Co.	13	19	25	46	44	67	2	0	0	1	0	1
East St. Louis Junction	17	36	27	46	59	100	0	0	0	0	1	0
East Tennessee & Western North Carolina	33	62	30	45	82	17	0	6	1	2	1	0
Elgin, Joliet & Eastern	0.7	5	4.7	13	68	50	0	1	0	1	58	1
Erie	13	27	45	30	39	70	17	63	137	41	26	100
Florida East Coast	1.4	5	7	21	22	22	0	0	0	0	0	0
Fort Smith & Western	71	38	49	60	62	87	29	0	5	5	2	2
Fort Worth & Denver City	5	16	13	23	36	27	2	7	2	3	8	4
Galveston, Houston & Henderson	0	0	0	8	0	22	0	0	0	0	0	0
Georgia & Florida	57	60	47	55	62	46	5	7	2	2	3	1
Georgia	1.1	3	11	12	34	28	0	0	3	0	2	5
Grand Trunk Western	7	25	28	61	0	0	3	4	0	0	0	28
Great Northern	8	20	31	33	46	76	5	23	42	27	31	262
Green Bay & Western	13	19	45	47	67	59	2	1	1	1	9	0
Gulf Coast Lines	1	6	7	58	59	70	0	1	0	15	26	7
Gulf, Colorado & Santa Fe	7	12	19	47	45	72	3	6	6	31	32	7
Gulf, Mobile & Northern	18	13	22	23	38	62	0	3	1	2	7	6
High Point-Thomasville & Denton	18	32	33	0	0	0	0	0	0	0	0	0
Huntingdon & Broad Top Mountain R. R. & Coal	0	20	36	44	78	67	0	0	3	4	0	0
Illinois Central	12	11	10	14	30	43	22	19	14	35	30	48
Illinois Terminal	32	35	29	40	12	42	4	2	1	0	0	0
Indiana Harbor Belt	0	0.8	1	14	62	68	4	0	0	0	18	4
Indianapolis Union	14	4	13	30	26	38	0	0	0	0	0	2
International-Great Northern	7	3	5	27	29	66	1	1	0	11	9	16
Interstate	42	32	60	83	94	78	1	0	4	6	6	3
Jacksonville Terminal	0	0	50	0	0	0	0	0	0	0	0	0
Kansas City Southern	1.9	4	7.9	26	52	92	0	1	1	12	11	121
Kansas City Terminal	0	0	24	24	80	88	0	0	1	0	2	3
Kansas, Oklahoma & Gulf	1.3	2	43	50	0	0	0	0	1	0	1	0
Kentucky & Indiana Terminal	3.7	36	8	6	0	79	0	0	0	1	0	10
Lake Erie & Eastern	0	5	0	0	0	0	0	0	0	0	0	0
Lake Superior & Ishpeming	17	14	52	39	46	59	1	2	7	1	2	3
Lake Superior, Terminal & Transfer	0	0	10	21	44	67	0	0	0	0	1	2
Lake Terminal	10	7	56	20	50	0	1	0	1	0	0	0
Lehigh & Hudson River	14	24	25	20	14	60	0	2	1	0	1	0
Lehigh & New England	12	19	21	26	95	70	0	5	4	2	5	10
Lehigh Valley	10	24	39	26	36	71	8	21	42	14	26	219
Litchfield & Madison	20	60	75	84	55	75	0	2	3	3	4	10
Long Island	10	41	59	48	35	66	0	5	2	3	1	10
Los Angeles & Salt Lake	7	26	24	26	51	80	0	3	3	1	14	38
Louisiana & Arkansas	15	31	50	36	75	0	3	35	3	4	2	8
Louisiana & Northwest	17	38	50	36	75	0	3	11	0	0	0	0
Louisiana, Arkansas & Texas	28	37	50	36	75	0	3	3	4	2	8	0
Louisville & Nashville	9	19	33	41	57	68	6	2	13	54	94	136
McCloud River	0	0	29	25	63	46	0	0	0	0	0	0
McKeessport Connecting	0	0	0	0	0	0	0	0	0	0	0	0
Macon, Dublin & Savannah	9	17	24	56	64	60	0	0	0	10	0	0
Maine Central	12	31	27	42	41	68	4	1	1	6	14	15
Maryland & Pennsylvania	24	54	42	50	55	78	0	1	3	3	4	4
Michigan Central	19	36	36	57	66	75	6	15	9	38	44	22
Midland Valley	0	0	1	42	40	72	0	0	0	1	2	0
Minneapolis & St. Louis	7	10	9	17	35	57	2	5	1	7	6	49
Minneapolis, Northfield & Southern	12	39	25	0	0	0	0	1	0	0	0	0
Minneapolis, St. Paul & Sault Ste. Marie	6	8	14	13	25	60	0	7	5	2	4	14
Minnesota, Dakota & Western	0	11	21	33	100	100	0	0	0	1	3	3
Minnesota Transfer	31	15	32	71	67	97	1	0	0	8	1	35
Mississippi Central	12	12	14	32								

TABLE XV.—Summary of comparison of the percentage of steam locomotives inspected and found defective, with the number ordered out of service for the years ended June 30, on roads reporting on 10 or more locomotives—Continued

Road	Percentage inspected defective						Ordered out of service					
	1931	1930	1929	1927	1925	1923	1931	1930	1929	1927	1925	1923
Nevada Northern	0	0	0	44	25	0	0	0	0	1	0	0
Newburgh & South Shore	4	22	0	52	92	100	0	0	0	1	21	0
New Orleans Great Northern	13	21	7	32	31	54	0	2	0	2	1	0
New York Central Lines East	10	11	14	25	43	60	8	20	6	19	27	73
New York Central Lines West <sup>10</sup>	7	18	25	41	66	61	7	24	22	55	59	53
New York, Chicago & St. Louis	10	28	24	31	48	70	10	31	30	14	47	36
New York, New Haven & Hartford	14	16	12	23	39	73	2	0	0	5	12	131
New York, Ontario & Western	36	30	38	36	44	71	3	7	16	10	6	7
Norfolk & Portsmouth Belt	6	18	23	44	48	53	0	0	0	0	1	1
Norfolk & Western	9	16	23	42	49	78	2	3	9	24	24	163
Norfolk Southern	16	23	24	45	45	57	3	1	2	4	5	10
Northern Pacific	16	20	13	29	37	61	22	6	6	50	28	113
Northern Pacific Terminal	20	0	12	22	12	32	0	0	0	0	0	0
Northwestern Pacific	8	11	1	6	6	57	0	1	0	0	0	12
Oregon Short Line	11	24	22	27	42	61	4	3	0	2	3	13
Oregon-Washington R. R. & Navigation Co.	16	14	12	17	11	35	2	3	2	4	6	13
Patapsco & Back Rivers	0	30	50	47	64	60	0	2	1	1	0	1
Pennsylvania	10	25	33	44	41	76	33	137	153	335	573	687
Peoria & Eastern <sup>11</sup>	30						5					
Peoria & Pekin Union	40	18	14	23	31	54	0	0	0	0	0	1
Pere Marquette	12	22	21	38	57	83	3	5	8	14	21	65
Philadelphia, Bethlehem & New England	21	28	65	74	76	67	1	3	16	14	2	2
Pittsburgh & Lake Erie	1.9	5	6	12	10	27	0	0	0	0	0	10
Pittsburgh & Shawmut	4	2	4	0	47	52	0	0	0	0	0	2
Pittsburgh & West Virginia	32	50	57	39	0	33	4	11	30	8	0	0
Pittsburgh, Chartiers & Youghiogheny		0	0	17	0				0	0	0	
Pittsburgh, Shawmut & Northern	3.6	6	8	25	53	86	0	0	0	1	2	0
Portland Terminal	20	21	12	60	67	85	2	0	0	1	3	14
Public Belt of New Orleans	11	19	13	5	28	57	1	0	1	0	2	2
Quannah, Acme & Pacific	29						1					
Quincy, Omaha & Kansas City	0			30	86	93	0		0	4	7	
Reading	13	22	33	42	48	59	5	17	31	22	26	12
Republic Steel Corporation of Alabama	100	10	17	40	67	27	1	0	0	0	0	0
Republic Steel Corporation of Ohio	12	17	67	100	82	62	3	3	10	9	3	0
Richmond, Fredericksburg & Potomac	14	29	18	30	43	58	0	0	1	1	2	3
Rio Grande Southern	0	27	0	70	62	100	0	2	0	8	8	2
River Terminal	0	15	71	43	70	0	0	0	5	1	0	0
Rutland	6	3	6	12	44	54	0	0	0	1	3	1
St. Johnsbury & Lake Champlain	16						0					
St. Joseph & Grand Island	21	23	11	36	38	43	0	0	0	1	1	
St. Louis & Hannibal	51	58	43	57	100	100	0	0	0	1	1	2
St. Louis-San Francisco	3.9	10	14	22	49	88	1	10	7	12	65	346
St. Louis Southwestern	8	6	4	3	22	47	86	4	8	2	22	14
San Antonio, Uvalde & Gulf	0	5	0	36	59	72	0	0	0	5	5	4
San Diego & Arizona	13	35	38	30	55	44	2	2	4	3	0	1
Sandy River & Rangeley Lakes	10	0	0	62	7		0	0	0	1	1	
San Joaquin & Eastern	0	40	0	20			0	0	0	0		
Savannah & Atlanta	19	33	80	67	73	68	0	0	0	0	2	3
Seaboard Air Line	9	18	37	56	51	55	2	13	24	43	33	23
Sierra Railway of California	0	25	0				0	0	0	0		
Sloss-Sheffield Steel & Iron	75	42	88	86			0	0	0	1		
Solvay Process	0						0	2	0	0		
South Buffalo	39	37	23	29	75	0	0	8	1	0	0	0
Southern Pacific Lines East	3.3	5	5	13	30	47	1	3	0	10	37	28
Southern Pacific Lines West	11	24	24	27	33	38	13	64	47	50	51	24
Southern Pacific of Mexico	0	0	30	100	100		0	0	2	3	1	
Southern	9	11	12	24	36	59	15	9	13	38	56	177
Spokane International	9	5	13	28	0	37	0	0	0	0	0	2
Spokane, Portland & Seattle	22	21	22	33	32	60	1	0	1	2	4	13
Steelton & Highspr.	19	29	24	48			1	0	0	2		
Tennessee Central	14	31	47	65	74	89	0	4	14	40	23	63
Tennessee Coal, Iron & Railroad	7	12	38	67	40	50	0	0	0	0	0	0
Terminal R. R. Association of St. Louis	32	36	41	44	62	76	4	3	0	3	1	6
Texas & Pacific	0	0.4	1	12	16	62	0	0	1	3	1	91
Texas-Mexican	27	22	43	50	33	50	0	0	0	1	0	1
Texas Pacific-Missouri Pacific Term. of N. O.	0	0	4	10	57	83	0	0	0	0	2	0
Tionesta Valley	100	9	38	17	80	100	0	0	2	7	7	0
Toledo, Peoria & Western	25	56	65	88	87	93	2	8	4	2	2	4
Toledo Terminal	5	0	45	35	3	41	0	0	0	0	0	3

<sup>10</sup> Includes Ohio Central Lines, 1927-1931.<sup>11</sup> Included in Cleveland, Cincinnati, Chicago & St. Louis prior to 1931.

TABLE XV.—Summary of comparison of the percentage of steam locomotives inspected and found defective, with the number ordered out of service for the years ended June 30, on roads reporting on 10 or more locomotives—Continued

Road	Percentage inspected defective						Ordered out of service					
	1931	1930	1929	1927	1925	1923	1931	1930	1929	1927	1925	1923
Toronto, Hamilton & Buffalo	0	0	0	0			0	0	0	0		
Tremont & Gulf	0	0	67	20	58	0	0	0	0	0	3	0
Utah	0	0	0	0	75	0	0	0	0	0	0	0
Ulster & Delaware	13	1	4	16	18	0	1	0	0	0	1	0
Union Pacific	9	14	17	20	30	41	2	11	8	17	19	26
Union Railroad	11	11	9	29	80	10	1	3	2	0	0	2
Upper Merion & Plymouth	28	36	60	62			0	6	7	8		
Utah	0	29	11	4	26	19	0	0	0	0	0	0
Virginian	17	18	22	50	58	75	1	0	0	2	5	45
Wabash	0	0.8	1.5	6	47	82	0	1	1	2	21	89
Washington Terminal	0	6	10	43	40	89	0	0	0	1	1	2
Western Maryland	13	18	26	42	54	76	1	4	3	13	22	90
Western Pacific	16	19	25	19	36	37	5	3	9	1	13	9
Wheeling & Lake Erie	8	15	42	55	67	74	1	3	7	10	20	31
Wheeling Steel	35	60	50	87	100		3	0	0	4	0	
Wichita Falls & Southern	18	8	4	0	87	100	1	1	1	0	6	1
Winston-Salem Southbound	22	19	33	50	56	77	0	0	0	0	1	1
Woodward Iron Co.	75	11	29	60	57	50	0	0	0	0	0	0
Wrightsville & Tennille	3.2	9	12	24	54	29	0	0	0	0	3	0
Less than 10 locomotives, discontinued roads and miscellaneous	32	37	40	51	56	56	182	200	307	514	526	338
All roads	10	16	21	31	46	65	688	1,200	1,490	2,539	3,637	7,075

NOTE.—Omitted statistics not comparable, due to consolidations, separations, changes in corporate identity, carrier not in existence in year shown, less than 10 locomotives, etc.

Fractional percentages not shown unless per cent defective is less than 5; otherwise, nearest numeral is given.