

R. B. CARNEAL

INTERSTATE COMMERCE COMMISSION

TWENTY-SECOND ANNUAL REPORT

OF THE

CHIEF INSPECTOR
BUREAU OF LOCOMOTIVE INSPECTION

TO THE

INTERSTATE COMMERCE COMMISSION

FISCAL YEAR ENDED
JUNE 30, 1933



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ANNUAL REPORT OF THE CHIEF INSPECTOR BUREAU OF LOCOMOTIVE INSPECTION

OCTOBER 1, 1933.

To the Interstate Commerce Commission:

In compliance with section 7 of the act of February 17, 1911, as amended, the Twenty-second Annual Report of the Chief Inspector, covering the work of the Bureau during the fiscal year ended June 30, 1933, 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 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 I.—*Reports and inspections—Steam locomotives*

	Year ended June 30—					
	1933	1932	1931	1930	1929	1928
Number of locomotives for which reports were filed.....	56,971	59,110	60,841	61,947	63,562	65,940
Number inspected.....	87,658	96,924	101,224	100,794	96,465	100,415
Number found defective.....	8,388	7,724	10,277	16,300	20,185	24,051
Percentage inspected found defective.....	10	8	10	16	21	24
Number ordered out of service.....	544	527	688	1,200	1,490	1,725
Total number of defects found.....	32,733	27,832	36,968	60,292	77,268	85,530

TABLE II.—*Accidents and casualties caused by failure of some part of the steam locomotive, including boiler, or tender*

	Year ended June 30—					
	1933	1932	1931	1930	1929	1928
Number of accidents.....	157	145	230	295	356	419
Percent increase or decrease from previous year.....	18.3	36.9	22	17.1	15	14.1
Number of persons killed.....	8	9	16	13	19	30
Percent increase or decrease from previous year.....	11.1	43.7	123	31.6	36.6	17.1
Number of persons injured.....	256	156	269	320	390	465
Percent increase or decrease from previous year.....	164.1	42	15.9	17.9	15.8	10.4

¹ Increase.

TABLE III.—Accidents and casualties caused by failure of some part or appurtenance of the steam locomotive boiler ¹

	Year ended June 30—							
	1933	1932	1931	1930	1929	1928	1915	1912
Number of accidents.....	53	43	91	105	119	150	424	856
Number of persons killed.....	3	8	15	12	14	26	13	91
Number of persons injured.....	55	46	122	113	133	174	467	1,005

¹ The original act applied only to the locomotive boiler.

TABLE IV.—Number of casualties classified according to occupation—Steam locomotive accidents

	Year ended June 30—									
	1933		1932		1931		1930		1929	
	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured
Members of train crews:										
Engineers.....	2	58	3	59	5	73	4	100	7	128
Firemen.....	1	48	4	49	5	75	4	123	7	128
Brakemen.....		17	2	18		39	4	32	1	45
Conductors.....		10		7		21		10		24
Switchmen.....		8		3		8		10		24
Roundhouse and shop employees:										
Boiler makers.....		1		1		3		1		5
Machinists.....		2		1		4		3		2
Foremen.....		1		1		4		1		1
Inspectors.....		1		2		3		1		1
Watchmen.....		3		1		5		3		1
Boiler washers.....	2	3		1		5		2		3
Hostlers.....		1						2		1
Other roundhouse and shop employees.....				5		4		3		5
Other employees.....		3		4	2	6	1	8	1	3
Nonemployees.....		2		2		6		6		10
Total.....	3	102		6	1	22		16		23
Total.....	8	256	9	156	16	269	13	320	19	390

TABLE V.—Reports and inspections—Locomotives other than steam

	Year ended June 30—				
	1933	1932	1931	1930	1929
Number of locomotive units for which reports were filed.....	1,349	1,274	1,242	1,135	1,071
Number inspected.....	1,368	1,411	1,256	1,306	1,099
Number found defective.....	74	57	75	120	131
Percentage inspected found defective.....	5	4	6	9	12
Number ordered out of service.....	4	6	3	6	4
Total number of defects found.....	176	126	192	289	329

TABLE VI.—Accidents and casualties caused by failure of some part or appurtenance of locomotives other than steam

	Year ended June 30—				
	1933	1932	1931	1930	1929
Number of accidents.....	2	2	5	3	1
Number of persons killed.....			1		
Number of persons injured.....	2	2	5	3	1

TABLE VII.—Number of casualties classified according to occupation—Locomotives other than steam

	Year ended June 30—									
	1933		1932		1931		1930		1929	
	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured
Members of train crews:										
Engineers.....				1		1		2		
Firemen.....		2			1	1		1		1
Brakemen.....						2				
Roundhouse and shop employees:										
Inspectors.....						1				
Other roundhouse and shop employees.....						1				
Other employees.....				1						
Total.....		2		2	1	5		3		1

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

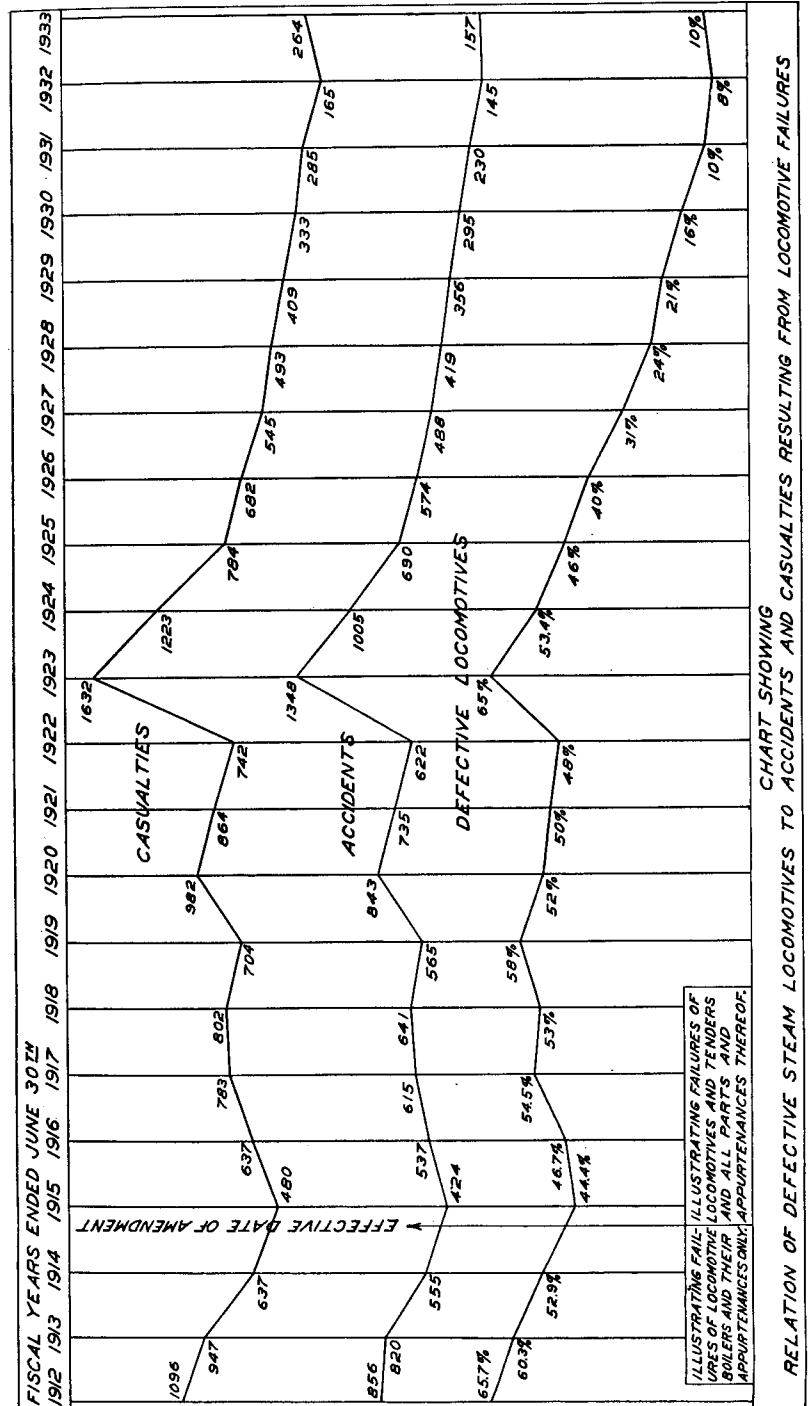
Part or appurtenance which caused accident	Year ended June 30—														
	1933			1932			1931			1930			1929		
	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured
Air reservoirs.....	1		1												
Aprons.....	1		1	1		1	3		3						
Arch tubes.....	1		1				2		3				1		2
Ash-pan blowers.....										3		1	2		2
Axles.....	5	3	16	1		1	6		8	7		7	9		7
Blow-off cocks.....	8		8				5		5	4		4	7		7
Boiler checks.....							1		1	5		5	1		1
Boiler explosions:															
A. Shell explosions.....															
B. Crown sheet; low water; no contributory causes found.....	5	2	6	5	5	6	10	7	32	6	7	5	11	11	12
C. Crown sheet; low water; contributory causes or defects found.....				1	3	3	3	8	8	5	4	8	6	2	8
D. Miscellaneous fire-box failures.....	5			2		2	1		1	1		1	1		3
Brakes and brake rigging.....	5	5	10	11	8	9	9	21	9	23	16	17	6	2	6
Couplers.....	8	9	3	4	9	1	10	9	1	13	5	5	2	2	
Crank pins, collars, etc.....	2	2	4	4	7	4	8	3	4	5	2	5	2	10	
Crossheads and guides.....	3	1	2		4	4	4	4	4	5	3	5	3	10	
Cylinder cocks and rigging.....				3	3	3	3	3	1	1	1	1	1	1	
Cylinder heads and steam chests.....	4	87	1	1	1	1	3	2	2	2	4	4	4	4	
Dome caps.....				1	1	1							3		3
Draft appliances.....	1	1								1	1	3	1	6	6
Draw gear.....	1	1	1	1	1					1	1	6	4	4	4
Fire doors, levers, etc.....	3	3	2	2	2	2	2	2	8	8	4	4	4	4	
Flues.....	5	6	4	4	4	13	13	10	14	7	7	7	7	7	
Flue pockets.....															
Footboards.....	2	2	2	2	2	4	4	7	7	7	7	7	7	7	7
Gage cocks.....													1	1	1
Grease cups.....	1	1	1	1	1	1	1	3	3	5	5	6	6	6	6
Grate shakers.....	4	4	7	7	8	8	18	18	18	16	16	16	16	16	16
Handholds.....	6	6	4	4	6	6	5	5	5	10	1	1	9	9	9
Headlights and brackets.....	2	2	3	3	1	1	2	2	2	2	1	1	1	1	1
Injectors and connections (not including injector steam pipes).....	4	4	1	1	5	5	4	4	4	6	6	6	6	6	6
Injector steam pipes.....	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2
Lubricators and connections.....	2	2	3	3	5	5	1	1	1	5	5	5	5	5	5
Lubricator glasses.....			1	1	1	1	1	1	1	2	2	2	2	2	2
Patch bolts.....															
Pistons and piston rods.....	2	2	1	1	5	5	5	5	2	4	4	4	4	4	4
Plugs, arch tube and washout.....	2	3								3	2	2	2	2	2
Plugs in fire-box sheets.....										1	1	1	1	1	1

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

Part or appurtenance which caused accident	Year ended June 30—														
	1933			1932			1931			1930			1929		
	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured
Reversing gear	8														
Rivets		8	12				12	1		12	14		23	3	23
Rods, main and side	3														
Safety valves		3		8			9	4		4	11		15	14	
Sanders	2														17
Side bearings		2													
Springs and spring rigging															
Squirt hose	2			3			3			3	2		2	3	
Stay bolts	4			10			10			4	4		10	10	
Steam piping and blowers		4		2			2			9	20		20	23	
Steam valves	2	1		1			1			4	1		1	4	
Studs	1			1			1			3	5		5	4	
Superheater tubes										4	6		6		
Throttle glands	3			2			2			1	1		1	2	
Throttle leaking		3					4			5	5		7	1	
Throttle rigging							1			1					
Trucks, leading, trailing, or tender	1			1			1			1	3		3	2	
Valve gear, eccentrics and rods	4			4			3			2	2		2	4	
Water glasses	11			11			7			7	5		5	14	
Water-glass fittings				7			7			8	15		15	18	
Wheels	4			8			1			2	1		1	1	
Miscellaneous	33	1	32	29			29			50	63		64	71	
Total	157	8	256	145	9	156	230	16	269	295	13	320	356	19	390

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

Part or appurtenance which caused accident	Year ended June 30—														
	1933			1932			1931			1930			1929		
	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured
Circuit breakers															
Insulation	1														
Pantographs and trolleys		1					1			1			1		
Third-rail shoes				1			1			1			1		
Transformers		1													
Miscellaneous	1						3			4			2		
Total	2		2	2		2	5	1	5	3		3	1		1



REPORT OF CHIEF INSPECTOR OF LOCOMOTIVES

TABLE X.—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—					
	1933	1932	1931	1930	1929	1928
1. Air compressors	474	417	481	873	1,202	1,282
2. Arch tubes	51	54	60	87	104	103
3. Ash pans and mechanism	40	69	81	76	132	133
4. Axles	21	13	10	12	20	7
5. B F W-off cocks	210	144	191	325	442	469
6. Boiler checks	293	214	263	521	761	914
7. Boiler shell	296	220	430	579	841	954
8. Brake equipment	1,696	1,645	1,923	2,706	3,894	5,214
9. Cabs, cab windows, and curtains	1,183	851	1,484	3,066	2,140	1,670
10. Cab aprons and decks	309	262	415	710	1,005	852
11. Cab cards	121	162	211	226	305	378
12. Coupling and uncoupling devices	67	85	98	122	154	179
13. Crossheads, guides, pistons, and piston rods	773	763	866	1,421	1,887	2,088
14. Crown bolts	67	50	96	95	129	164
15. Cylinders, saddles, and steam chests	1,084	841	1,285	2,311	3,210	3,284
16. Cylinder cocks and rigging	374	376	411	848	967	1,007
17. Domes and dome caps	76	45	83	154	227	281
18. Draft gear	318	325	568	950	1,310	1,453
19. Draw gear	357	371	640	1,003	1,367	1,650
20. Driving boxes, shoes, wedges, pedestals, and braces	1,080	821	925	1,359	1,993	1,990
21. Fire-box sheets	246	235	341	471	657	730
22. Flues	150	120	187	254	334	464
23. Frames, tailpieces, and braces, locomotive	669	611	740	1,271	1,377	1,354
24. Frames, tender	80	86	105	177	297	256
25. Gages and gage fittings, air	145	156	192	290	309	461
26. Gages and gage fittings, steam	258	214	324	553	678	969
27. Gage cocks	388	330	415	783	1,114	1,413
28. Grate shakers and fire doors	245	288	410	767	295	377
29. Handholds	363	382	562	865	1,125	1,373
30. Injectors, inoperative	20	31	55	103	86	93
31. Injectors and connections	1,357	1,168	1,815	3,275	4,484	5,563
32. Inspections and tests not made as required	6,358	3,801	4,862	7,456	9,246	6,623
33. Lateral motion	269	237	289	372	618	699
34. Lights, cab and classification	76	57	79	119	121	118
35. Lights, headlights	169	119	180	373	488	571
36. Lubricators and shields	157	119	176	312	423	500
37. Mud rings	232	166	318	445	636	822
38. Packing nuts	419	402	523	828	991	1,265
39. Packing, piston rod and valve stem	592	444	706	1,429	1,708	1,904
40. Pilots and pilot beams	123	145	160	272	371	386
41. Plugs and studs	151	176	182	348	482	619
42. Reversing gear	254	202	299	579	788	967
43. Rods, main and side, crank pins, and collars	1,327	1,256	1,520	2,488	3,465	4,152
44. Safety valves	53	63	61	116	170	172
45. Sanders	376	289	314	804	1,008	1,031
46. Springs and spring rigging	2,122	1,851	2,161	3,311	4,557	4,939
47. Squirt hose	93	96	184	313	387	478
48. Stay bolts	219	181	293	395	542	590
49. Stay bolts, broken	368	552	938	1,068	1,197	1,867
50. Steam pipes	338	285	512	730	925	1,020
51. Steam valves	193	143	226	399	471	708
52. Steps	498	622	678	1,021	1,394	1,817
53. Tanks and tank valves	600	587	732	1,426	1,717	1,941
54. Telltale holes	90	108	151	183	174	241
55. Throttles and throttle rigging	448	434	574	1,175	1,554	1,889
56. Trucks, engine and trailing	664	648	714	1,141	1,605	1,914
57. Trucks, tender	747	766	1,059	1,531	2,144	2,610
58. Valve motion	640	520	497	827	1,067	1,262
59. Washout plugs	623	599	815	1,283	1,871	2,211
60. Train-control equipment	4	13	9	48	60	112
61. Water glasses, fittings, and shields	716	676	955	1,501	1,816	2,115
62. Wheels	580	603	750	1,025	1,325	1,609
63. Miscellaneous—signal appliances, badge plates, brakes (hand)	423	325	418	691	1,101	1,273
Total number of defects	32,733	27,832	36,968	60,292	77,268	85,530
Locomotives reported	56,971	59,110	60,841	61,947	63,562	65,940
Locomotives inspected	87,658	96,924	101,224	100,794	96,465	100,415
Locomotives defective	8,388	7,724	10,277	16,300	20,185	24,051
Percentage of inspected found defective	10	8	10	16	21	24
Locomotives ordered out of service	544	527	688	1,200	1,490	1,725

REPORT OF CHIEF INSPECTOR OF LOCOMOTIVES

TABLE XI.—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—					
	1933	1932	1931	1930	1929	1928
Air compressors	2	3	4	5	6	5
Axles				2	1	1
Boiler	16	13	23	40	44	32
Brake equipment	14	6	10	14	39	32
Cabs and cab windows	1	2	1	2	3	1
Cab floors, aprons, and deck plates			3	7	10	1
Controllers, relays, circuit breakers, and switch groups	2	7		7	10	1
Current-collecting apparatus	8	13	11	17	36	41
Draft gear		2		1		
Draw gear						
Driving boxes, shoes, wedges, pedestals, and pedestal braces	2	4	6	1	16	17
Frames, tail pieces, and braces	2	2	2	3	1	1
Fuel tank, its piping and valves	1	3	3	15	1	6
Gages and gage fittings, air	2	3	1	5	3	3
Gears and pinions				3	4	1
High-tension equipment not properly guarded against accidental contact		2	4	7	5	29
Inspections and tests not made as required	58	23	41	45	40	84
Insulation	2			1		
Internal-combustion engine defects, including parts and appliances	18		1	2		11
Jack shafts	1	2	1	4	5	2
Lateral motion, wheels	1	4	3	3	3	2
Lights, cab and classification		1	3	7	17	10
Lights, headlights	3	1	3	3	5	9
Meters, volt and ampere		2	2	2	1	1
Motors and generators	8	1	10	23	11	10
Pilots and pilot beams	4		2	4	1	3
Plugs and studs (boiler, other than fusible plugs)						
Quills			1			2
Rods, motor, main and side, drive shafts	2		1	1	8	12
Sanders		4	8	8	24	10
Springs and spring rigging, driving and truck	8	9	10	21	24	10
Steam pipes			1			6
Switches, hand-operated, and fuses	4		1		2	1
Transformers, resistors, and rheostats		2			2	10
Trucks	7	5	11	11	14	10
Water glasses, fittings, and shields		1				1
Wheel	5	11	12	5	6	17
Whistles, bells, and train-signal system			2	1	1	1
Miscellaneous	7	9	16	26	20	45
Total defects	176	126	192	289	329	411
Locomotive units reported	1,349	1,274	1,242	1,135	1,071	1,034
Locomotive units inspected	1,388	1,411	1,256	1,306	1,099	1,119
Locomotive units defective	74	57	75	120	131	169
Percentage inspected found defective	5	4	6	9	12	15
Locomotive units ordered out of service	4	6	3	6	4	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 recurrence 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.

A summary of all accidents and casualties to persons occurring in connection with steam locomotives compared with the previous year shows an increase of 8.3 percent in the number of accidents, a decrease of 11.1 percent in the number of persons killed, and an increase of 64.1 percent in the number of persons injured.

During the year 10 percent 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 8 percent for the previous year.

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

Table VIII 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 XII, and a comparison of condition of locomotives over a period of years is shown in table XIII.

BOILER EXPLOSIONS OR CROWN-SHEET FAILURES

There was a decrease of 16.6 percent in the number of crown-sheet failures, a decrease of 71.4 percent in the number of persons killed, and a decrease of 33.3 percent in the number of persons injured from this cause as compared with the previous year. Fatalities occurred in 2 of the 5 crown-sheet failures caused by low water, both of the locomotives involved were oil fired, and in each instance the locomotive was in charge of an engine watchman who was killed. The assigned hours of each of these watchmen were such as to preclude the possibility of obtaining sufficient rest without sleeping on duty. One of the watchmen was working on a tour of duty of 40 consecutive hours and the accident occurred at about the fourteenth hour of duty; the other watchman was assigned to shifts of 18 hours each, with 6-hour rest periods intervening, but had been required to perform other service during his rest period and had been working about 36 hours when the accident occurred.

EXTENSION OF TIME FOR REMOVAL OF FLUES

One thousand four hundred applications were filed for extensions of time for removal of flues, as provided in rule 10. Our investigations disclosed that in 78 of these cases the condition of the locomotives was such that extensions could not properly be granted. Sixty-seven were in such condition that the full extensions requested could not be authorized, but extensions for shorter periods of time were allowed. One hundred and ninety-seven extensions were granted after defects disclosed by our investigations had been repaired. Thirty-nine applications were canceled for various reasons. One thousand and nineteen 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, 151 specification cards and 3,601 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, 98 specifications and 16 alteration reports were filed for locomotive units and 72 specifications and 71 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.

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, 1933, 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.]

ALTON RAILROAD

January 24, 1933, locomotive 4391, Larrabee, Mo. Burned by hot grease which blew out of side rod grease cup when cup was being refilled due to crank pin running hot; 1 injured.
One accident; 1 injured.

ATCHISON, TOPEKA & SANTA FE RAILWAY

July 31, 1932, locomotive 3448, Prowers, Colo. Bolt in back end of connecting rod to power reverse gear floating lever broke or lost out; 1 injured.

*August 12, 1932, locomotive 3416, Shopton, Iowa. Step at side of engineer's seat box gave way, causing engineman to fall; 1 injured.

January 11, 1933, locomotive 1498, Shattuck, Okla. Water glass burst; wire netting water-glass shield not properly secured in place; 1 injured.

April 4, 1933, locomotive 818, Belen, N.Mex. Clinker hook slipped off water leg of tank, slid out of gangway, and fouled wayside structure which caused the hook to swing around and strike fireman; no hook provided on left side of tender for hanging clinker hook; 1 injured.

**June 9, 1933, locomotive 609, La Junta, Colo. Fell from running board while giving attention to defective air compressor; stud in top head of compressor leaking and this permitted oil to be sprayed on running board; 1 injured.
Five accidents; 5 injured.

ATLANTA, BIRMINGHAM & COAST RAILROAD

*November 27, 1932, locomotive 122, Lineville, Ala. Pipe nipple broke; 1 injured.
One accident; 1 injured.

ATLANTIC COAST LINE RAILROAD

**July 5, 1932, locomotive 1137, Tampa, Fla. Fire hose burst; hose defective; 1 injured.

June 28, 1933, locomotive 1758, Bennett, S.C. Burned by hot water discharged from steam heat pipe; steam heat valve leaking and steam heat pipe bent upward at back end forming a pocket from which the accumulated hot water was discharged when pressure built up in the pipe; handle missing from steam heat throttle; 1 injured.
Two accidents; 2 injured.

BALTIMORE & OHIO RAILROAD

**July 9, 1932, locomotive 4559, Mitchell, Ind. Blow-off cock muffler caught on switch frog and was torn off; muffler brackets improperly secured to auxiliary brackets and muffler did not have sufficient clearance above top of rail; on July 8 two inspectors at Cone, Ill., reported bolts missing from muffler bracket, and while en route on this trip a report was made at Washington, Ind., that muffler was very loose and dragging, but proper repairs were not made; 1 injured.

August 6, 1932, locomotive 7104, Tunnelton, W.Va. Grease cup plug blew out while being replaced after applying new grease to bushing which had been running very hot; bushing and pin were badly scored after being operated less than 100 miles; 1 injured.

October 27, 1932, locomotive 2225, Liberty, Ind. Left main crank pin failed due to progressive fracture at fillet between main and side rod bearings covering approximately 80 percent of cross-sectional area; 1 injured.

**December 22, 1932, locomotive 2859, West Mosgrove, Pa. Fireman slipped due to stepping on push pole which was carried on top of tender behind fuel space in violation of rule 153 (e); 1 injured.

**February 22, 1933, locomotive 5054, Newton Falls, Ohio. Reverse lever unlatched and went to full forward position; reversing gear defective; 1 injured.
March 11, 1933, locomotive 603, Grafton, W.Va. Handrail pulled out of bracket causing employee to fall against switch stand; handrail not of sufficient length to avoid shifting and pulling out of brackets and not pinned to prevent shifting; 1 injured.

March 23, 1933, locomotive 6107, near Glencoe, Pa. Train parted between tender and first car, causing emergency application of brakes; tender coupler carrier iron and bolt defective, permitting coupler to drop to 30 inches above rail; 1 injured.

May 13, 1933, locomotive 607, Pittsburgh, Pa. Injector throttle valve bonnet blew out, due to loose fit; threads on bonnet and in body of valve badly tapered and threads in stuffing box and in packing nut were badly worn; 1 injured.
Eight accidents; 8 injured.

BANGOR AND AROOSTOOK RAILROAD

*April 3, 1933, locomotive 102, South Lorange, Maine. Train parted between tender and first car, causing emergency application of brakes; coupler on tender was low; 1 injured.
One accident; 1 injured.

BOSTON & MAINE RAILROAD

August 20, 1932, locomotive (N.H.) 1389, South Lawrence, Mass. While attempting to take water, fireman stepped from coal pile on tender onto an equipment box on top of tank behind fuel space; box was in defective condition, causing fireman to fall; 1 injured.
One accident; 1 injured.

CENTRAL RAILROAD OF NEW JERSEY

October 11, 1932, locomotive 915, Glen Gardner, N.J. Grate shaker bar slipped off shaker lever, due to lever being worn below gage; 1 injured.
One accident; 1 injured.

CHICAGO & EASTERN ILLINOIS RAILWAY

*July 24, 1932, locomotive 1017, Westervelt, Ill. Lubricator pipe broke off; 1 injured.
One accident; 1 injured.

CHICAGO & NORTH WESTERN RAILWAY

*October 4, 1932, locomotive 1869, Mason City, Iowa. Coupler at front end of helper locomotive broke, due to old defects on under side of shank, resulting in emergency application of brakes; 1 injured.

January 2, 1933, locomotive 2442, Cortland, Ill. Left piston head came off piston rod, causing cylinder head to be blown out; condition of piston and shoulder on piston rod indicated that piston had been loose for some time; various pounds on left side were reported seven times between December 19 and date of accident; 1 injured.
Two accidents; 2 injured.

CHICAGO, BURLINGTON & QUINCY RAILROAD

August 4, 1932, locomotive 5600, near Bernhart, Iowa. Main driving axle broke at wheel fit causing derailment of locomotive and 16 cars of train; old fractures covered approximately 25 percent of cross-sectional area of axle; 2 killed, 11 injured.

*November 19, 1932, locomotive 2565, Monroe City, Mo. Eye in bracket of engineer's cab seat for securing seat post broke through old fracture, causing cab seat to fall; 1 injured.
Two accidents; 2 killed, 12 injured.

CHICAGO GREAT WESTERN RAILROAD

**February 9, 1933, locomotive 866, near Peru, Iowa. Train separated between locomotive and first car, causing sudden stop; locomotive coupler was 1 inch low; 1 injured.
One accident; 1 injured.

CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC RAILROAD

April 11, 1933, locomotive 8203, near Lawson, Mo. Crown sheet failure caused by overheating due to low water; 3 injured.
One accident; 3 injured.

CHICAGO, ROCK ISLAND & PACIFIC RAILWAY

**August 11, 1932, locomotive 4044, near Latimer, Kans. Main driving axle broke; old fracture covered approximately 75 percent of cross-sectional area; 1 killed.

October 4, 1932, locomotive 2510, Kansas City, Kans. Injured while attempting to tighten loose lock nut on end of valve stem to blow-off cock; 1 injured.

**October 23, 1932, locomotive 2582, Valley Junction, Iowa. Blow-off cock opened while employee was attempting to make repairs to blow-off valve rigging; blow-off valve operating arm extension rod so designed and applied that it was difficult to operate the blow-off valve, and the rod could not be latched to prevent inadvertent opening of blow-off valve; 1 injured.

January 7, 1933, locomotive 66, Burlington, Iowa. Handrail on tender failed, due to defective pipe union, causing employee to fall to the ground; threads in union were corroded and badly worn due to excessive vibration account of union nut being loose; 1 injured.

**February 7, 1933, locomotive 2651, Stuart, Iowa. Grate shaker bar worked off shaker post; shaker post worn; 1 injured.

**April 5, 1933, locomotive 235, Waterloo, Iowa. Blow-off cock was accidentally opened due to ineffective latch; excessive lost motion in blow-off cock rigging prevented latch from properly engaging; 1 injured.

**May 8, 1933, locomotive 1935, St. Joseph, Mo. Intermediate steam valve to headlight turbo-generator inoperative; valve became disconnected from valve stem; 1 injured.

Seven accidents; 1 killed, 6 injured.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS RAILWAY

*December 16, 1932, locomotive 6093, Alexandria, Ind. Coupler on second locomotive pulled off buffer beam, due to bolts securing it breaking, causing sudden stop; 1 injured.

One accident; 1 injured.

DELAWARE & HUDSON RAILROAD CORPORATION

October 19, 1932, locomotive 1052, Bluff Point, N.Y. Employee's foot was caught between end of cab deck apron and coal saver plate due to corner of coal saver plate being bent upward; 1 injured.

December 3, 1932, locomotive 1402, near Delanson, N.Y. Fire tube broke off inside of front flue sheet due to having been improperly applied; tube reduced to ¼ inch in thickness on one side by expander; 1 injured.

February 4, 1933, locomotive 1116, near Crescent, N.Y. Burned by back draft from fire box when throttle was closed, due to blower pipe in front end leaking badly at union near smoke box and at nipple where it screwed into blower pipe fitting at smoke box; threads in union nut and fitting were badly eroded and nipple was fractured approximately 90 percent; 1 killed.

Three accidents; 1 killed, 2 injured.

DENVER & RIO GRANDE WESTERN RAILROAD

June 19, 1933, locomotive 3300, Helper, Utah. Rapid movement of reverse lever broke engineer's arm; oil in dash pot too thin; 1 injured.

One accident; 1 injured.

ERIE RAILROAD

August 28, 1932, locomotive 3313, near Canaseraga, N.Y. Feed water pump stopped working and became steam bound; employee fell from running board while attempting to open pet cock on steam end of water pump to relieve the pressure from cylinders and reversing gear; water in boiler foaming. Trouble with the feed water pump stopping had been reported 20 times in 56 days preceding the accident; 1 injured.

September 27, 1932, locomotive 3343, Bear Lake, Pa. Struck by chisel which had been placed between stoker elevator pawl shifter and shifter casing to hold elevator in neutral position; stoker did not distribute properly account of distributor plate being burned away on each top corner; elevator pawl shifter catch pins did not hold account of poor fit in holes in wings on pawl shifter and catch pin holes burred; 1 injured.

*December 16, 1932, locomotive 3053, Akron, Ind. Train parted between locomotive and first car due to low coupler on tender; wearing plate on top of carrier iron was missing, allowing coupler to drop to 28¼ inches above the rail; 1 injured.

March 29, 1933, locomotive 2937, near Corning, N.Y. Superheater flue failed at safe end weld located in the swedged part, due to being cinder cut to about ½ inch in thickness; weld was not properly rolled down; 1 injured.

**April 28, 1933, locomotive 3319, Campbell Hall, N.Y. Fell from locomotive while giving attention to defective bell ringer; 1 injured.

Five accidents; 5 injured.

FLORIDA EAST COAST RAILWAY

December 16, 1932, locomotive 428, Bowden, Fla. Air hose between locomotive 428 and locomotive 427 (being hauled dead) became uncoupled, causing brakes to go into emergency; 1 injured.

*April 30, 1933, locomotive 820, New Smyrna, Fla. Main driving wheel axle broke; 1 injured.

Two accidents; 2 injured.

FORT WORTH & DENVER CITY RAILWAY

September 4, 1932, locomotive 210, Abilene, Tex. Crown sheet failure caused by overheating due to low water; 1 injured.

One accident; 1 injured.

GRAND TRUNK WESTERN RAILWAY

November 11, 1932, locomotive 5041, Durand, Mich. Reverse lever stuck in quadrant due to lack of clearance at front end; quadrant low in front and reach rod binding on valve gear frame; 1 injured.

One accident; 1 injured.

GREAT NORTHERN RAILWAY

September 14, 1932, locomotive 3385, Trenton, N.Dak. Crosshead broke, caused by old fracture which started in keyway; 1 injured.

February 6, 1933, locomotive 2036, Spokane, Wash. Struck by overhead bridge while on cab to close right steam valve stand cover which had opened due to staple pulling out of anchor plate to hinge hasp; 1 injured.

Two accidents; 2 injured.

GULF COAST LINES

November 11, 1932, locomotive (M.P.) 9311, DeQuincy, La. Foreign matter blew into employee's eyes when he attempted to drain main reservoir; drain pipe extension to left main reservoir was loose in drain cock and not braced, permitting pipe to turn so that the discharge struck the employee's face; 1 injured.

June 15, 1933, locomotive (St. L. B. & M.) 1026, Kingsville, Tex. Blow-off cock opened, burning employee; pin missing from blow-off cock lever locking device; 1 injured.

Two accidents; 2 injured.

GULF, COLORADO & SANTA FE RAILWAY

October 27, 1932, locomotive (A.T. & S.F.) 1278, near Zephyr, Tex. Fuel-oil pipe became disconnected and the escaping oil ignited, filling locomotive cab with flames; trailer frame striking oil pipe caused pipe clamp to become disconnected, union to loosen, and pipe to become disconnected. "Cross bar back of trailer is striking fuel-oil line" and "Fuel-oil line leaks back of heater box" were reported on October 26, though proper repairs were not made; 1 injured.

One accident; 1 injured.

HAMILTON COKE & IRON CO.

**September 21, 1932, locomotive 704, Hamilton, Ohio. Water glass burst; 1 injured.

One accident; 1 injured.

ILLINOIS CENTRAL SYSTEM

August 26, 1932, locomotive 3001, Vandalia, Ill. Blow-off cock stuck open due to a small piece of boiler stud being on blow-off cock seat; "Left blow-off cock will not close from cab" was reported on August 22; 1 injured.

*October 5, 1932, locomotive 3533, Champaign, Ill. Pin came out of injector throttle lever connection account of cotter key missing; 1 injured.

October 10, 1932, locomotive 280, Chicago, Ill. Air compressor throttle valve stem wheel came off while being used as a handhold, due to not being securely attached to stem; 1 injured.

October 19, 1932, locomotive 1152, Madison, Miss. Water glass burst; injured while closing water-glass cocks; 1 injured.

*November 14, 1932, locomotive 2443, Chicago, Ill. Cotter key in steam valve handle sheared, permitting handle to come off; 1 injured.

**November 27, 1932, locomotive 2442, Tonti, Ill. Engine truck tire broke, causing derailment of the locomotive, tender, and nine cars of passenger train; 4 injured.

**February 27, 1933, locomotive 1516, Central City, Ky. Pin worked out of grate shaker connecting rod due to cotter key having been left out of pin; 1 injured.

March 28, 1933, locomotive 1569, Homewood, Ill. Right front uncoupling lever column turned over while being used as handhold, causing employee to lose his balance and fall; bolt for securing column to buffer beam was missing; 1 injured.

May 18, 1933, locomotive 2941, Bois, Ill. Squirt hose valve worked open; 1 injured.

Nine accidents; 12 injured.

INDIANA HARBOR BELT RAILROAD

August 9, 1932, locomotive 252, Proviso, Ill. Fire tube broke off at front flue sheet; thickness of tube reduced approximately 50 percent due to excessive rolling; 1 injured.

One accident; 1 injured.

KANSAS CITY TERMINAL RAILWAY

**January 22, 1933, locomotive 35, Kansas City, Mo. Shaker bar slipped off fulcrum lever; fulcrum lever did not extend sufficient depth into shaker bar pocket; 1 injured.

One accident; 1 injured.

LEHIGH VALLEY RAILROAD

July 19, 1932, locomotive 5206, Jenkins Junction, Pa. Petticoat pipe dropped down causing back draft; one of the four bolts supporting petticoat pipe was broken and nuts were missing from two of the bolts; 1 injured.

One accident; 1 injured.

LOUISVILLE & NASHVILLE RAILROAD

December 2, 1932, locomotive (L.H. & St.L.) 48, Columbia, Tenn. Tender sill step pulled off; step vertical bolting flange had been broken and step was held in place by two improperly applied bolts which pulled through bolt holes when employee got on step; 1 injured.

**June 6, 1933, locomotive 1808, Corbin, Ky. Stoker distributor plate broke where the small end joins the main body when employee picked it up, and the main body of the plate fell on his foot; 1 injured.

Two accidents; 2 injured.

MACON, DUBLIN & SAVANNAH RAILROAD

**February 7, 1933, locomotive 106, near Dry Branch, Ga. Engineer lost control of manually operated reverse lever and was jerked forward, striking against handhold of throttle lever; reverse lever jerking account of valves being dry; 1 injured.

One accident; 1 injured.

MICHIGAN CENTRAL RAILROAD

*September 29, 1932, locomotive 364, Niles, Mich. Broken vent valve ring in brake equipment caused emergency application of brakes; 1 injured.

*November 26, 1932, locomotive 243, Wayne, Mich. Sand leaking from sand pipe due to hole in pipe near sand box; 1 injured.

Two accidents; 2 injured.

MINNEAPOLIS & ST. LOUIS RAILROAD

*July 2, 1932, locomotive 461, Terril, Iowa. Superheater flue failed at defective safe end weld; 1 injured.

**March 5, 1933, locomotive 602, Oskaloosa, Iowa. Piece of defective running board broke off, causing employee to fall to ground; 1 injured.

Two accidents; 2 injured.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE RAILWAY

**September 25, 1932, locomotive 2441, Ladysmith, Wis. Blower pipe check valve leaking; valve seat defective; 1 injured.

May 13, 1933, locomotive 803, Hankinson, N.Dak. Fell from rear end ladder when top rung pulled out of vertical side piece; top rung had been loose for some time; attempt had been made to tighten the rung by the application of fusion welding; 1 injured.

Two accidents; 2 injured.

MISSOURI-KANSAS-TEXAS LINES

*October 5, 1932, locomotive 930, Muskogee, Okla. Engineer's eye injured due to sand leaking from hole worn through lid of sand trap; 1 injured.

**October 15, 1932, locomotive 706, Baden, Mo. Cylinder head blew out; 1 injured.

Two accidents; 2 injured.

MISSOURI PACIFIC RAILROAD

*July 16, 1932, locomotive 9779, Kansas City, Kans. Driving box saddle broke; 1 injured.

June 28, 1933, locomotive 2393, Lexa, Ark. Crown sheet failure caused by overheating due to low water while in charge of engine watchman. The locomotive was fired with fuel oil. The watchman ordinarily worked shifts of 18 hours each, with 6-hour rest periods intervening, but had been required to perform other service during his rest period and had been working about 36 hours when the accident occurred; 1 killed.

Two accidents; 1 killed, 1 injured.

MOBILE & OHIO RAILROAD

June 6, 1933, locomotive 478, Humboldt, Tenn. Steam heat hose between locomotive and tender uncoupled or was disconnected when train was dispatched, and coupling caught in switch point, pulling coupling off hose and breaking pipe nipples at both ends of governor and the escaping steam blew governor backward, striking employee on head; 1 injured.

One accident; 1 injured.

MONONGAHELA CONNECTING RAILROAD

*August 18, 1932, locomotive 65, Pittsburgh, Pa. Locomotive derailed, caused by loose tire; 2 injured.

One accident; 2 injured.

NASHVILLE, CHATTANOOGA & ST. LOUIS RAILWAY

**May 7, 1933, locomotive 656, Kingston, Ga. Injured while attempting repairs to stoker; stoker inoperative account of badly worn condition of gears and bearings at bottom of stoker elevator shafts and the bearing surface of elevator driving rack; 1 injured.

One accident; 1 injured.

NEW YORK CENTRAL—LINES EAST

February 18, 1933, locomotive 2895, Buffalo, N.Y. Fire tube broke off at flue sheet due to having been badly cut by prosser lip and thinned to $\frac{1}{32}$ inch for entire circumference at point of failure; 1 injured.

**April 9, 1933, locomotive 399, Buffalo, N.Y. Injured while giving attention to locomotive brakes which were sticking; application slide valve of distributing valve was dry on seat; 1 injured.

**April 23, 1933, locomotive 317, Newberry, Pa. Air compressor starting valve stem broke off. While attempting repairs, starting valve bonnet which had defective threads blew out when attempt was made to tighten it; main turret valve was defective and would not shut off; 1 injured.

**May 12, 1933, locomotive 5226, Schenectady, N.Y. Stoker inoperative account of stoker elevator catch spring and pins worn; 1 injured.

May 15, 1933, locomotive 5328, Syracuse, N.Y. Reverse gear wheel started back suddenly due to bolt working out of reversing gear yoke; cotter pin and nut were missing, permitting bolt to work out; head of bolt was badly mutilated and threaded portion badly worn, showing that bolt had been loose and pounding for some time; 1 injured.

**May 16, 1933, locomotive 2787, Oakfield, N.Y. Reverse gear radius bar pin plate bolt worked out, causing gear to bind; cotter key was missing from nut applied to plate bolt, permitting the nut to work off and the bolt to work out; 1 injured.

Six accidents; 6 injured.

NEW YORK CENTRAL—LINES WEST

July 22, 1932, locomotive 3288, Derby, N.Y. Guide yoke bracket bolt came out of left link frame and was thrown through cab storm window, resulting in injury to fireman; "Tighten front end link frame" was reported on July 6, 7, and 8; 1 injured.

**August 4, 1932, locomotive 301, Collinwood, Ohio. Shovel caught on rough edge around hole worn in shoveling sheet; shoveling sheet was reported on July 31 and August 3, and in both instances repairs were signed for and the reports approved; 1 injured.

December 1, 1932, locomotive 3106, Chicago, Ill. Fire tube broke off at front flue sheet due to being badly grooved; 2 injured.

*February 7, 1933, locomotive 3892, Rocky Ridge, Ohio. Right piston rod on locomotive broke due to flaw in keyway; 1 injured.

Four accidents; 5 injured.

NEW YORK, NEW HAVEN & HARTFORD RAILROAD

August 1, 1932, locomotive 1357, Grove Beach, Conn. Valve chamber peep-hole plug blew out and escaping steam broke windows in the cars of an excursion train on adjacent track; 84 injured.

One accident; 84 injured.

NEW YORK, ONTARIO & WESTERN RAILWAY

June 2, 1933, locomotive 213, Scranton, Pa. Water glass burst; injured while attempting to close water-glass cock; 1 injured.

One accident; 1 injured.

NORFOLK & WESTERN RAILWAY

**May 7, 1933, locomotive 2028, Blaine, Va. Elbow in pipe line between blow-off cock and muffler broke while blow-off cock was open; old crack at inside of threads in cast-iron elbow and metal very brittle; 1 injured.

May 17, 1933, locomotive 1481, near Petersburg, Va. Reach rod connecting valve motion of high- and low-pressure engines broke through old crack at rivet hole where rod had previously been repaired; the other rivet for securing the pipe reach rod to the inserted rod was missing; 1 injured.

Two accidents; 2 injured.

NORTHERN PACIFIC RAILWAY

August 3, 1932, locomotive 1649, Miles City, Mont. Water glass burst, breaking glass in water-glass shield; 1 injured.

September 18, 1932, locomotive 2170, East Auburn, Wash. Injector delivery pipe burst for a distance of 10 inches at longitudinal seam; at another point the seam had been fusion welded for a distance of 16 inches, indicating that seam was defective; guides in boiler check cage badly worn; line check secured to injector inside of cab and single strength iron pipe used for delivery pipe inside of cab instead of double strength pipe as required; 1 injured.

September 19, 1932, locomotive 2601, near Missoula, Mont. Main driving axle broke, causing derailment of locomotive, tender, and three cars; old fracture covered approximately 60 percent of cross-sectional area at point of failure; 1 injured.

October 15, 1932, locomotive 2236, Athol, Idaho. Eccentric crank arm broke through old fracture at eccentric rod connection; 1 injured.

*November 8, 1932, locomotive 2239, Missoula, Mont. Water glass burst; injured while closing water-glass cocks; 1 injured.

January 28, 1933, locomotive 1737, Marstonmoor, N.Dak. Crown sheet failure caused by overheating due to low water; 2 injured.

February 8, 1933, locomotive 2404, Pembina, N. Dak. Lubricator bullseye packing nut blew out, permitting hot oil to strike employee's face; threads in lubricator packing nut connection were badly worn and damaged and packing nut was poor fit; 1 injured.

**May 7, 1933, locomotive 1545, Moorhead, Minn. Air hose on rear of leading locomotive burst, causing emergency application of brakes; 1 injured.

May 20, 1933, locomotive 1368, Fort Lewis, Wash. Water glass burst, breaking all glass panels of water-glass shield; 1 injured.

**May 20, 1933, locomotive 1847, Missoula, Mont. While oiling chafing casting between locomotive and tender, employee's glove and sleeve caught on protruding end of cotter key in pin in stoker conveyor drive shaft universal joint, drawing him around the moving stoker drive shaft; cotter key of improper length; 1 injured.

May 31, 1933, locomotive 2249, Parkwater, Wash. Prongs of fire rake broke off when caught on grates; 1 injured.

Eleven accidents; 12 injured.

PENNSYLVANIA RAILROAD

**August 30, 1932, locomotive 7972, Middletown, Ind. Tender truck axle broke causing derailment of tender and three cars of passenger train; 3 injured.

**December 12, 1932, locomotive 1218, Brownsville, Pa. Injured while attempting to close mechanically operated fire door which stuck in open position; fire door was reported on December 6, 7, 8, 9, 10, and 12; 1 injured.

*December 17, 1932, locomotive 3316, Oil City, Pa. Shovel struck on protruding bolthead in shovel sheet. A bolt with square head had been applied in shovel sheet instead of a countersunk bolt or rivet; 1 injured.

**January 4, 1933, locomotive 5395, Waverly, N.J. Track employee was struck by driving box cellar face plate which was thrown from rapidly moving locomotive; "R. no. 2 driving box outside cellar bolt missing" was reported at engine house 2 hours prior to accident; 1 injured.

January 5, 1933, locomotive 4611, Altoona, Pa. Reflex type water glass burst; front and back sections of water-glass case were distorted; 1 injured.

January 8, 1933, locomotive 5361, Gary, Ind. Piece of broken spring leaf from engine truck on right side of leading locomotive was thrown through storm window on left side of second locomotive of the train and struck the fireman in the face; engine truck spring on right side of leading locomotive had four short leaves broken inside the band; 1 injured.

February 13, 1933, locomotive 6914, Atglen, Pa. Water scoop engaged frog point of a bridge guard rail, resulting in derailment of rear tender truck and 36 cars; 1 killed.

February 21, 1933, locomotive 1151, Buttonwood, Pa. Reflex type water-glass burst; imperfections in glass and frame improperly clamped; 1 injured.

March 15, 1933, locomotive 8904, Logansport, Ind. Fire door pedal bracket jaw broke off, permitting pedal to slip under fireman's foot and cause fire door to close unexpectedly; 1 injured.

May 5, 1933, locomotive 8022, Logansport, Ind. Two fire tubes broke off at edge of prosser grooves at front flue sheet; tubes had been thinned and wasted away to approximately $\frac{1}{4}$ inch in thickness at points of failure; flues reported leaking on April 14, 15, 16, 18, and 19; 1 injured.

*June 8, 1933, locomotive 6772, Columbus, Ohio. Cylinder head casing fell from locomotive due to nut working off stud; 1 injured.

June 16, 1933, locomotive 4373, South Charleston, Ohio. Arch tube burst caused by overheating due to accumulation of mud and scale resulting from improper cleaning and inspection; the remaining arch tubes were also found to contain scale and slight bulges; 1 injured.

Twelve accidents; 1 killed, 13 injured.

PITTSBURGH & LAKE ERIE RAILROAD

October 23, 1932, locomotive 9354, Stobo, Pa. Foot pedal of mechanically operated fire door was loose on valve-operating ratchet, causing fireman to fall against boiler back head; fire door pedal clamps too large for valve-operating ratchet; 1 injured.

One accident; 1 injured.

PITTSBURGH & WEST VIRGINIA RAILWAY

*October 15, 1932, locomotive 1000, Bridgeville, Pa. Locomotive derailed, caused by rough spot on fusion-welded flange of left front driving wheel; 1 injured.

One accident; 1 injured.

READING CO.

**July 12, 1932, locomotive 959, Mahanoy Plane, Pa. Employee tripped on broken drawbar pinhole cover; hole in tender floor plate for the cover was too large, permitting his shoe to catch on broken part of the cover; 1 injured.

October 20, 1932, locomotive 1914, Shamokin, Pa. Injector steam pipe collar failed with circumferential fracture at edge of shoulder; collar not properly brazed to pipe; 1 injured.

Two accidents; 2 injured.

RICHMOND, FREDERICKSBURG & POTOMAC RAILROAD

* June 6, 1933, locomotive 13, near Alexandria, Va. Reverse lever unlatched from quadrant and moved back suddenly; 1 injured.
One accident; 1 injured.

ST. LOUIS-SAN FRANCISCO RAILWAY

August 2, 1932, locomotive 3805, Tulsa, Okla. Water glass burst; 1 injured.
April 30, 1933, locomotive 1104, Valley Park, Mo. Crown sheet failure caused by overheating due to low water while in charge of engine watchman. The locomotive was fired with fuel oil. The watchman was working on a tour of duty of 40 consecutive hours and the accident occurred at about the 14th hour of duty; 1 killed.

Two accidents; 1 killed, 1 injured.

SEABOARD AIR LINE RAILWAY

* November 7, 1932, locomotive 533, Lumberton, N.C. Tool-box lid was missing, causing employee to fall when he stepped on tool box; 1 injured.
February 22, 1933, locomotive 2407, Bostic, N.C. Superheater flue broke at defective safe end weld; all superheater flues worn thin due to long service; superheater flues last removed March 1924; 1 injured.
Two accidents; 2 injured.

SOUTHERN RAILWAY

August 29, 1932, locomotive 6143, Elihu, Ky. Bolts lost from cab apron hinge bracket which allowed apron to work out of position, causing employee to fall from gangway; 1 injured.

September 28, 1932, locomotive 1365, Louisville, Ky. Reflex type water glass burst; 1 injured.

October 3, 1932, locomotive 1605, Richmond, Va. Cab window arm rest gave way when engineman leaned from cab to observe signals, causing him to fall to the ground; arm rest insecurely attached to cab; 1 injured.

* October 14, 1932, locomotive 1669, Macon, Ga. Fire hose nozzle blew off; 1 injured.

** December 1, 1932, locomotive 5245, Knoxville, Tenn. Engine truck radius bar broke in two places, causing derailment of locomotive and two cars; radius bar broke in defective weld; 1 injured.

January 9, 1933, locomotive 2505, Harriman, Tenn. Nuts missing from bolt securing outer end of rear-end handhold, permitting handhold to come loose when employee stepped on it; 1 injured.

** January 13, 1933, locomotive 773, East St. Louis, Ill. Insufficient clearance between gangway handhold on locomotive and deck of tender; 1 injured.

February 5, 1933, locomotive 1380, Yadkin, N.C. Left bottom crosshead shoe lost out account of bolts being loose and broken. Locomotive was continued in service for 34 miles after the shoe lost out, causing back end of left guide step to loosen and disengage from guide and strike platform railings on river bridge, breaking off a piece of the step and disengaging the back bracket from the step, and the piece of step, or the step bracket, was thrown back and struck the fireman. Crossheads were reported on January 15, 18, 20, 21, 25, and February 1 (two times); 1 killed.

March 10, 1933, locomotive 5044, Knoxville, Tenn. Arch tube plug blew out when attempt was made to tighten it while under steam pressure; plug not properly cleaned and tightened after boiler wash; 1 injured.

March 23, 1933, locomotive 1216, Riverton, Va. Main rod strap broke due to old fracture; 1 injured.

** May 6, 1933, locomotive 5207, Loudon, Tenn. Air compressor stopped suddenly caused by broken exhaust piston valve rings, one of which had dropped down into a porthole in the bushing causing valve to lodge; 1 injured.
Eleven accidents; 1 killed, 10 injured.

SOUTHERN PACIFIC—LINES EAST

December 17, 1932, locomotive (T. & N. O.) 358, Southdown, La. Headlight generator failed and engineer fell as he returned to his position in cab in the darkness after placing a lighted lantern in headlight cage; a small piece of cast iron was found lodged in the governor valve of headlight generator; 1 injured.

April 16, 1933, locomotive (T. & N. O.) 179, Houston, Tex. Insufficient clearance between tender deck and vertical cab handhold; 1 injured.

June 22, 1933, locomotive (T. & N. O.) 879, Luling, Tex. Marker box on top of tender between end of fuel-oil tank and manhole of tender cistern turned over when employee stepped on it, causing him to fall; 1 injured.
Three accidents; 3 injured.

SOUTHERN PACIFIC—LINES WEST

* July 8, 1932, locomotive 4121, Russ, Calif. Brakeman's cab seat collapsed due to bolt missing from plate securing the seat in position; 1 injured.

September 15, 1932, locomotive 3323, Wellton, Ariz. Injector steam throttle valve bonnet blew out of cage, due to not being properly tightened. While working, injector lost a large amount of water at overflow and employee was on running board making examination of throttle valve at fountain in an endeavor to find the cause of the injector trouble when the bonnet blew out with such force that he was knocked from running board; examination showed opening in injector delivery nozzle was obstructed by a piece of steel chipping; 1 injured.

October 29, 1932, locomotive 3228, Montello, Nev. Driver brake safety hanger came down, causing train line between locomotive and tender to break, applying brakes in emergency; 1 injured.

December 14, 1932, locomotive 4404, Portland, Oreg. Squirt hose valve worked open; hose connected to high pressure hot water pipe and carried, when not in use, in hole in left running board near fireman's feet; 1 injured.

* December 29, 1932, locomotive 5005, Willcox, Ariz. Main rod strap broke due to old defect at inside fit; 1 injured.
Five accidents; 5 injured.

TERMINAL RAILROAD ASSOCIATION OF ST. LOUIS

** December 21, 1932, locomotive 123, East St. Louis, Ill. Blow-off cock packing nut leaking badly due to packing having blown out; 1 injured.
One accident; 1 injured.

TOLEDO, PEORIA & WESTERN RAILROAD

* December 24, 1932, locomotive 14, Seville, Ill. Valve stem broke; 1 injured.
One accident; 1 injured.

VIRGINIAN RAILWAY

July 18, 1932, locomotive 455, near Page, W.Va. Vertical handhold at corner of tender pulled loose at bracket, causing employee to fall from locomotive; handhold badly deteriorated in bracket fit; 1 injured.

** September 3, 1932, locomotive 425, Roanoke, Va. Washout plug blew out of wrapper sheet when attempt was made to tighten it while under steam pressure by direction of the roundhouse foreman; threads in boiler sheet and on plug were badly worn and plug had been applied with threads crossed; 2 injured.

* November 1, 1932, locomotive 718, Killarney, W.Va. Main rod broke; 1 injured.

Three accidents; 4 injured.

WABASH RAILWAY

* January 31, 1933, locomotive 663, New Haven, Ind. Locomotive derailed account of trailer tire coming loose; 1 injured.

** June 1, 1933, locomotive 2824, Decatur, Ill. Fell from step on side of cab after closing defective drifting valve; an improvised awning hook over handrail on side of cab turned when grasped; drifting valve piston and drifting valve graduating valve broken; drifting valve had been reported approximately 10 hours previous to accident; 1 injured.

June 11, 1933, locomotive 2911, near Shadeland, Ind. Locomotive broke away from train causing emergency application of brakes; rear coupler was 30½ inches above top of rail; coupler was reported as 30½ inches above rail on June 6 and 8, and locomotive was continued in service without repairs being made; 2 injured.

Three accidents; 4 injured.

WESTERN MARYLAND RAILWAY

January 25, 1933, locomotive 728, Porters, Pa. Storm window glass broke and fell out; glass improperly applied or insecurely held in frame; 1 injured.
One accident; 1 injured.

WESTERN PACIFIC RAILROAD

December 21, 1932, locomotive 18, Luke, Nev. Broken eccentric strap bolt permitted strap to spread and set up severe vibration of reverse lever which flew into back motion and crushed engineer's foot against seat box; engineer's seat box did not allow proper foot clearance from reverse lever; 1 injured.
One accident; 1 injured.

H.W. Duke

**ACCIDENTS AND CASUALTIES RESULTING FROM THE FAILURE OF
LOCOMOTIVES OTHER THAN STEAM AND THEIR APPURTEN-
ANCES DURING THE FISCAL YEAR ENDED JUNE 30, 1933, BY
ROADS**

[A double star (**) indicates accident 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 accident in sufficient time after it occurred to permit it to be properly investigated.]

NEW YORK CENTRAL—LINES EAST

**March 29, 1933, locomotive unit 1525, New York, N.Y. Short circuit in third-rail disconnecting switch; 1 injured.

One accident; 1 injured.

PENNSYLVANIA RAILROAD

September 4, 1932, locomotive unit 3979, Secaucus, N.J. Crank pin failed causing jack shaft to drop, derailing locomotive and one car of passenger train; an old and concealed fracture covered approximately 55 percent of cross-sectional area of metal at point of failure; 1 injured.

One accident; 1 injured.

TABLE XII.—Number of steam locomotives inspected,

Table with 10 columns for railroad lines and 63 rows of locomotive parts. Includes summary rows for 'Number of defects', 'Locomotives reported', and 'Percentage of inspected found defective'.

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

Table with 10 columns for railroad lines and 63 rows of locomotive parts. Includes summary rows for 'Number of defects', 'Locomotives reported', and 'Percentage of inspected found defective'.

TABLE XII.—Number of steam locomotives inspected,

	Northern Pacific Terminal	Northwestern Pacific	Oregon Short Line	Oregon - Washington Railroad & Navigation	Pataasco & Beck Rivers	Pennsylvania	Peoria & Eastern	Peoria & Pekin Union	Pere Marquette	Philadelphia, Bethlehem & New England	Pittsburgh & Lake Erie	Pittsburg & Shawmut	Pittsburgh & West Virginia
1 Air compressors.....			6	1		34	2		5				
2 Arch tubes.....						5							3
3 Ash pans and mechanism.....							2						
4 Axles.....													
5 Blow-off cocks.....						8							
6 Boiler checks.....			2	4		17			2		1		
7 Boiler shell.....			1	3		3							
8 Brake equipment.....			41	21	1	119	3		2	3			1
9 Cabs, cab windows, and curtains.....			31	9		57	3		2		1		5
10 Cab aprons and decks.....			5	2		23							1
11 Cab cards.....			3	3		3							
12 Coupling and uncoupling devices.....			2	4		4							
13 Crossheads, guides, pistons, and piston rods.....			7	7		70	2		1				2
14 Crown bolts.....			5	5		5	1						
15 Cylinders, saddles, and steam chests.....			6	4	1	73			1	1			
16 Cylinder cocks and rigging.....			1	1		21				1			
17 Domes and dome caps.....			2	2		7							
18 Draft gear.....			2	2		8	1		1				
19 Draw gear.....			5	5		27	4		2				
20 Driving boxes, shoes, wedges, pedestals, and braces.....			21	44		156	1		2				5
21 Fire-box sheets.....	1		4	1		30	3						1
22 Flues.....			4	1		4							1
23 Frames, tailpieces, and braces, locomotive.....			17	6	1	23	1		1				1
24 Frames, tender.....			1	1		1							
25 Gages and gage fittings, air.....			3	3		12			1				1
26 Gages and gage fittings, steam.....			13	3		14							
27 Gage cocks.....			14	2		17	1		1				
28 Grate shakers and fire doors.....			8	3		44			2				
29 Handholds.....			20	8		11	4		1				
30 Injectors, inoperative.....			2	2		2							
31 Injectors and connections.....			22	11		150	3		3	1			
32 Inspections and tests not made as required.....			80	70	3	352	21		25	17		7	4
33 Lateral motion.....			10	1		21							2
34 Lights, cab and classification.....			2	2		2							1
35 Lights, headlights.....			3	1		6			2	1			1
36 Lubricators and shields.....			2	2		12							
37 Mud rings.....			1	1		9	1		1				1
38 Packing nuts.....			5	5		10	4		11	2			
39 Packing, piston rod and valve stem.....			2	5		29			3	4			1
40 Pilot and pilot beams.....			8	8		3			1				
41 Plugs and studs.....			1	2		14			1				
42 Reversing gear.....			2	2		18			2				
43 Rods, main and side, crank pins, and collars.....			16	4	2	102			1				6
44 Safety valves.....						3							
45 Sanders.....			5	4		4			4				
46 Springs and spring rigging.....			40	4		142	2		6	1			5
47 Squirt hose.....			2	2		2							
48 Stay bolts.....			4	4		18	1		1				
49 Stay bolts, broken.....						20			2	23			
50 Steam pipes.....			3	4		36			2				1
51 Steam valves.....			1	1		15			3				
52 Steps.....			9	11		24	1						1
53 Tanks and tank valves.....			19	4		27	3		1				
54 Telltale holes.....			8	2		2				1			
55 Throttle and throttle rigging.....	1		2	3		43	2		4				
56 Trucks, engine and trailing.....			5	5		43							
57 Trucks, tender.....		1	6	1		24	7		7				2
58 Valve motion.....			4	1		55	1						2
59 Washout plugs.....			1	10		45	3		8				
60 Train-control equipment.....						1							
61 Water glasses, fittings, and shields.....			5	1		33	3		12	5			2
62 Wheels.....			4	3		37	1		1				2
63 Miscellaneous—Signal appliances, badge plates, brakes (hand).....			9	8		10				1			2
Number of defects.....	1	2	404	331	8	2,164	94		114	78	30		49
Locomotives reported.....	13	64	312	260	28	5,082	44	25	362	38	231	24	30
Locomotives inspected.....	14	44	405	485	29	8,673	110	16	332	43	333	43	82
Locomotives defective.....	1	1	90	89	3	502	23		27	17	11		7
Percentage of inspected found defective.....	7.2	2.3	22	18	10	6	21		9	40	3.3		9
Locomotives ordered out of service.....			3	3		24	2						2

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

Pittsburgh, Chartiers & Younglenny	Pittsburgh, Shawmut & Northern	Public Boat Railroad of New Orleans	Reading	Republic Steel Corporation of Ohio	Richmond, Fredericksburg & Potomac	Rio Grande Southern	River Terminal	Rutland	St. Johnsbury & Lake Champlain	St. Joseph & Grand Island	St. Louis & Hannibal	St. Louis-San Francisco	St. Louis Southwestern	San Antonio, Uvalde & Gulf	San Diego & Arizona Eastern	Sandy River & Rangeley Lakes	San Joaquin & Eastern	Savannah & Atlanta	Seaboard Air Line	Sierra Railway of California	Sloss-Sheffield Steel & Iron	South Buffalo	Southern Pacific, Lines East	Southern Pacific, Lines West	
			2	1							1		1	4					2						
			1																						
			1																						
			1																						
			9										1	1											
			14			2							10	32											
			23										3	3											
			7										4	4		1									
			1										1	2											
			16										6	6											
			1										1	1											
			10										2	18											
			2										11	11											
			1										2	2											
			3										3	3											
			6										2	1											
			26										22	22											
			3										1	2											
			4										2	2											
			19										4	8											
			2										2	2											
			4										2	2											
			13										1	6											
			4										1	1											
			24										6	17											
			5										25	60											
			2										1	2											
			1										3	3											
			1										1	1											
			1										1	1											
			1										1	1											
			1										1	1											
			1										1	1											
			1										1												

TABLE XIII.—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						
	1933	1932	1931	1929	1927	1925	1923	1933	1932	1931	1929	1927	1925	1923
	Akron, Canton & Youngstown.....	8	16	14	47	42	56	38	1	1	1	12	1	5
Alabama, Tennessee & Northern.....	39	30	28	37	56	53	78	1	3	3	1	2	1	1
Alliuppa & Southern.....	0	0	0	31	26	69	0	0	0	0	0	0	0	0
Alton.....	1.7	0	0	3	14	35	75	0	0	0	3	5	9	29
Ann Arbor.....	6	0	0	9	25	71	97	0	0	0	0	0	0	0
Atchison, Topeka & Santa Fe.....	9	7	8	14	24	32	49	9	4	9	14	40	30	84
Atlanta & Yadkin.....	4	1	4	6	9	54	78	0	0	0	0	1	4	1
Atlanta, Birmingham & Coast ¹	2.1	4.3	4.3	27	40	53	77	0	0	0	0	1	4	1
Atlantic & Yadkin.....	3.4	3.7	6	10	16	100	—	0	1	0	0	2	8	12
Atlantic Coast Line.....	10	13	14	10	30	35	58	3	9	7	2	4	15	45
Baltimore & Ohio, Lines East ²	6	5	4.1	15	30	52	62	13	4	3	10	32	113	153
Baltimore & Ohio, Lines West ³	8	5	4.7	17	49	—	—	11	6	8	17	72	—	—
Bangor & Aroostook.....	4.8	3.9	3.1	43	28	50	0	1	1	1	1	3	1	6
Belt Railway of Chicago.....	20	18	4.3	35	54	51	66	1	2	0	4	5	4	6
Bessemer & Lake Erie.....	8	2.2	12	22	21	63	43	1	1	1	6	1	1	2
Birmingham Southern.....	0	0	0	14	100	0	—	0	0	0	0	0	0	0
Boston & Albany.....	13	13	15	16	23	47	54	0	3	0	0	0	0	0
Boston & Maine.....	10	10	13	16	23	36	67	0	5	6	3	13	23	191
Buffalo Creek.....	11	0	0	0	18	0	—	1	0	0	0	0	0	0
Burlington-Rock Island ⁴	22	22	9	18	41	61	58	0	0	0	0	2	4	2
Camas Prairie.....	47	40	47	16	—	—	—	0	1	0	0	0	0	0
Canadian National ⁵	22	23	37	34	50	50	84	2	1	5	7	30	24	4
Canadian Pacific.....	18	29	25	32	44	56	76	0	4	2	1	4	0	5
Carnegie Steel.....	3.2	0	1.4	15	34	48	0	0	0	0	0	1	5	3
Carolina & Northwestern.....	12	12	20	19	30	50	36	0	0	0	0	1	0	1
Central of Georgia.....	11	12	20	19	30	37	33	7	1	10	5	10	8	10
Central Railroad of New Jersey.....	17	13	13	42	38	47	77	0	0	2	14	20	46	139
Central Vermont.....	8	4	11	12	11	27	47	0	1	1	1	1	1	4
Charleston & Western Carolina.....	14	8	16	28	58	63	68	0	1	1	2	2	2	1
Chesapeake & Ohio ⁶	7	7	9	17	28	49	68	1	3	5	5	26	29	58
Chicago & Eastern Illinois.....	10	5	12	28	38	64	75	3	0	3	3	25	31	77
Chicago & Illinois Midland.....	9	0	0	14	83	—	—	0	0	0	0	29	—	—
Chicago & Northwestern.....	9	4.9	7	12	19	35	67	4	1	5	8	18	29	193
Chicago & Western Indiana.....	16	8	25	43	22	86	67	0	0	0	3	0	2	0
Chicago, Burlington & Quincy.....	6	3.5	6	14	21	46	60	4	3	4	18	39	185	176
Chicago Great Western.....	27	29	26	11	20	40	52	25	27	23	2	0	10	20
Chicago, Indianapolis & Louisville.....	12	6	11	26	29	45	57	8	0	1	2	14	7	13
Chicago & Eastern Illinois & Pacific.....	6	4.6	4.5	9	13	27	48	4	1	2	5	9	12	58
Chicago River & Indiana.....	11	8	0	5	0	70	62	1	0	0	0	0	5	0
Chicago, Rock Island & Pacific.....	14	12	11	17	29	55	76	33	31	17	13	49	124	367
Chicago, St. Paul, Minneapolis & Omaha.....	11	9	9	17	30	46	70	2	1	2	6	12	20	54
Chicago Short Line.....	27	32	0	44	38	—	—	0	0	0	3	0	0	0
Chicago, West Pullman & Southern.....	0	0	7	47	53	100	58	0	0	0	0	5	1	7
Cincinnati Union Terminal.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cleveland, Cincinnati, Chicago & St. Louis ⁷	13	4	6	24	34	44	67	5	1	3	16	37	47	77
Clinchfield.....	27	20	9	38	25	76	68	4	1	1	5	0	1	10
Colorado & Southern.....	16	4.4	8	43	40	76	81	0	0	2	10	4	52	71
Colorado & Wyoming.....	36	6	0	21	27	15	14	0	1	0	1	3	2	0
Columbus & Greenview.....	27	14	17	25	21	26	44	0	0	1	0	0	0	0
Conemaugh & Black Lick.....	0	14	16	58	0	0	—	0	0	0	2	0	0	0
Copper Range.....	8	13	18	28	84	59	75	0	0	1	1	7	7	0
Cumberland & Pennsylvania.....	33	19	12	29	13	20	25	0	0	0	1	0	0	0
Davenport, Rock Island & Northwestern.....	0	3.4	3	19	—	—	—	0	0	0	2	—	—	—
Delaware & Hudson.....	1.3	1.5	2.7	2.6	9	24	62	0	0	0	0	1	2	52
Delaware, Lackawanna & Western.....	16	10	11	21	22	36	62	9	6	3	17	4	3	47
Denver & Rio Grande Western.....	3.6	5	10	36	54	58	92	0	0	7	32	88	72	174
Denver & Salt Lake.....	0	0	0	19	44	68	93	0	0	0	0	7	39	8
Detroit & Mackinac.....	24	12	41	33	36	82	26	0	0	0	0	0	2	0
Detroit & Toledo Shore Line.....	0	7	0	8	33	51	78	0	0	0	0	1	5	3
Detroit Terminal.....	10	21	18	31	46	72	76	0	0	0	1	0	7	0
Detroit, Toledo & Ironton.....	5	1.3	3.8	5	15	28	29	0	0	0	0	3	4	7
Donora Southern.....	0	46	5	0	0	0	0	0	7	0	0	0	0	0
Duluth & Northeastern.....	60	60	27	37	—	—	—	0	0	0	0	—	—	—
Duluth, Missabe & Northern.....	5	1.6	4.2	1	12	37	74	0	0	0	0	0	1	2
Duluth, South Shore & Atlantic.....	7	9	10	24	29	35	69	1	1	1	4	2	5	3
East Broad Top Railroad & Coal.....	10	9	13	25	46	44	67	0	0	2	0	1	0	1
East St. Louis Junction.....	29	17	17	27	46	59	100	0	0	0	0	0	0	0
East Tennessee & Western North Carolina.....	88	42	33	30	45	82	17	4	5	0	1	2	1	0
Elihu, Joliet & Eastern.....	4	7	7	4.7	13	68	50	0	0	0	0	1	1	1
Erie.....	5	3.8	13	45	30	39	70	5	7	17	137	42	58	100
Florida East Coast.....	0	0	1.4	7	21	22	22	0	0	0	0	0	0	0
Fort Smith & Western.....	4.2	16	7	49	60	62	87	0	0	29	5	8	0	2

TABLE XIII.—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						
	1933	1932	1931	1929	1927	1925	1923	1933	1932	1931	1929	1927	1925	1923
	Fort Worth & Denver City.....	5	3.8	5	13	23	36	27	0	2	2	2	3	8
Galveston, Houston & Henderson.....	0	0	0	0	8	0	22	0	0	0	0	0	0	0
Georgia & Florida.....	12	52	57	47	55	62	46	1	3	5	2	2	3	5
Georgia.....	2	0	1.1	11	12	34	28	0	0	0	0	3	0	2
Grand Trunk Western ⁸	8	8	7	28	—	—	—	61	0	0	0	4	—	—
Great Northern.....	11	4.9	8	31	33	46	76	9	4	5	42	27	31	262
Green Bay & Western.....	10	8	13	45	47	67	59	0	2	2	1	1	9	0
Gulf Coast Lines.....	1.4	2.3	1	7	58	59	70	0	1	0	0	15	26	7
Gulf, Colorado & Santa Fe ⁹	8	9	7	19	47	45	—	3	3	3	6	31	32	—
Houston, Belt & Terminal.....	13	20	18	22	23	38	62	1	8	0	1	2	7	6
Huntingdon & Broad Top Mountain.....	10	15	18	33	—	—	—	0	0	0	0	—	—	—
Illinois Central ¹⁰	0	0	1.4	8	—	—	—	0	0	0	0	—	—	—
Illinois Terminal.....	3.7	3	0	36	44	78	67	0	0	0	3	4	0	0
Indiana Harbor Belt.....	17	11	12	10	14	30	43	25	26	22	14	35	30	48
Indianapolis Union.....	14	15	32	29	40	12	—	0	0	4	1	0	0	0
International Great Northern.....	3	8	0	1	14	52	68	0	0	0	0	0	18	4
Interstate.....	12	0	14	13	30	26	36	1	0	1	0	4	0	2
Jacksonville Terminal.....	6	1.1	7	5	27	29	66	1	1	1	0	11	9	16
Kansas City Southern.....	26	68	42	60	83	94	78	1	4	1	4	6	6	3
Kansas City Terminal.....	0	0	0	50	0	—	—	0	0	0	0	0	0	0
Kansas, Oklahoma & Gulf.....	2.5	2.1	1.9	7.9	26	52	92	0	0	0	0	12	11	121
Kentucky & Indiana Terminal.....	0	0	0	24	24	80	88	0	0	0	0	0	0	3
Lake Erie & Eastern.....	0	0	0	1	—	—	—	0	0	0	0	1	0	0
Lake Superior & Ishpeming.....	0	9	3.7	8	6	0	79	0	0	0	0	0	0	10
Lake Superior Terminal & Transfer.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lake Terminal.....	0	19	17	52	39	46	59	0	0	1	7	1	2	3
Lehigh & Hudson River.....	20	22	0	10	21	44	67	0	0	0	0	0	0	1
Lehigh & New England.....	0	6	10	56	20	50	0	0	0	1	1	0	0	0
Litchfield & Madison.....	14	12	14	25	20	14	60	0	0	0	1	0	1	0
Long Island.....	8	5	12	21	26	65	70	1	0	0	4	2	5	10
Los Angeles & Salt Lake.....	2.9	8	10	39	26	36	71	1	4	8	42	14	26	219
Louisiana & Arkansas.....	14	33	20	75	84	55	—	0	0	0	3	8	4	—
Louisiana, Arkansas & Gulf.....	1.1	0	10	59										

TABLE XIII.—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						
	1933	1932	1931	1929	1927	1925	1923	1933	1932	1931	1929	1927	1925	1923
Northern Pacific Terminal	7	17	20	12	22	12	32	0	0	0	0	0	0	0
Northwestern Pacific	2.3	3.4	8	1	6	6	57	0	0	0	0	0	0	12
Oregon Short Line	22	15	11	22	27	42	61	3	4	4	0	2	3	13
Oregon-Washington Railroad & Navigation	18	18	16	12	17	11	35	3	4	2	2	4	6	13
Patapsco & Back Rivers	10	0	0	50	47	44	60	0	0	0	1	1	0	1
Pennsylvania	6	4.8	10	33	44	61	76	24	13	33	153	335	573	687
Peoria & Eastern ¹²	21	12	30					2	3	5				
Peoria & Pekin Union	0	6	40	14	23	31	54	0	0	0	0	1	1	1
Pere Marquette	9	11	12	21	38	57	83	0	1	3	8	14	21	68
Philadelphia, Bethlehem & New England	40	34	21	65	74	76	67	2	7	1	16	14	2	2
Pittsburgh & Lake Erie	3.3	0	1.9	6	12	10	27	0	0	0	0	0	0	10
Pittsburgh & Shawmut	0	3.9	4	4	0	47	52	0	0	0	0	0	0	2
Pittsburgh & West Virginia	9	17	32	57	39	0	33	2	4	4	30	8	0	0
Pittsburgh, Chartiers & Youghiogeny	0	0	0	0	17	0					0	0	0	
Pittsburgh, Shawmut & Northern	0	4.1	3.6	8	25	53	86	0	0	0	1	2	0	0
Public Belt of New Orleans	15	6	11	13	5	28	57	0	0	1	1	0	2	2
Reading	9	8	13	33	42	48	59	6	3	5	31	22	26	12
Republic Steel of Ohio	0	0	12	67	100	82	62	0	0	3	10	9	3	0
Richmond, Fredericksburg & Potomac	6	9	14	18	30	43	58	0	0	0	1	1	2	3
Rio Grande Southern	0	0	0	0	70	62	100	0	0	0	0	8	8	2
River Terminal	0	10	0	71	43	70	0	0	1	0	5	1	0	0
Rutland	3.6	3.8	6	6	12	44	54	0	0	0	0	1	3	1
St. Johnsbury & Lake Champlain	0	16	16					0	0	0				
St. Joseph & Grand Island	9	9	21	11	36	38	43	0	0	0	0	0	1	1
St. Louis & Hannibal	80	69	51	43	57	100	100	1	3	7	1	0	5	2
St. Louis-San Francisco	2.5	3.6	3.9	14	22	49	88	3	4	1	7	12	65	345
St. Louis Southwestern	14	7	8	4.3	22	47	86	10	5	4	2	22	14	54
San Antonio, Uvalde & Gulf	2.7	0	0	0	36	59	72	0	0	0	0	5	5	4
San Diego & Arizona Eastern	6	7	13	38	30	55	44	0	0	2	4	3	0	1
Sandy River & Rangeley Lakes	0	9	10	0	62	7					0	1	1	
San Joaquin & Eastern	0	0	0	0	20			0	0	0	0	0	0	
Savannah & Atlanta	17	28	19	80	67	73	68	0	0	0	0	0	2	3
Seaboard Air Line	4.6	7	9	37	56	51	55	3	3	2	24	43	33	23
Sierra Railway of California	8	0	0					0	0	0		0		
Sloss-Sheffield Steel & Iron	29	0	75	88	86			0	0	0	0	1		
South Buffalo	8	14	39	23	29	75	0	0	1	8	0	1	0	0
Southern Pacific, Lines East	4	6	3.3	5	13	30	47	0	4	1	3	10	37	28
Southern Pacific, Lines West	11	10	11	24	27	33	38	6	10	13	47	50	51	24
Southern Pacific of Mexico											0	2	3	1
Southern	4.6	8	9	12	24	36	59	7	15	15	13	35	56	177
Spokane International	25	0	9	13	28	0	37	0	0	0	0	0	0	2
Spokane, Portland & Seattle	11	10	22	22	33	32	60	0	0	1	1	2	4	13
Steelton & Highspire	0	36	19	24	48			0	0	1	0	2	4	13
Tennessee Central	36	14	14	47	65	74	89	8	4	0	14	40	23	63
Tennessee Coal, Iron & Railroad	0	0	7	38	67	40	50	0	0	0	0	0	0	0
Terminal Railroad Association of St. Louis	37	36	32	41	44	62	76	6	4	4	0	3	1	6
Texas & Pacific	.2	.2	0	1	12	16	62	0	0	0	1	3	1	91
Texas-Mexican	17	33	27	43	50	33	50	0	0	0	0	1	0	1
Texas Pacific-Missouri Pacific of New Orleans	0	0	0	4	10	57	83	0	0	0	0	0	2	0
Tionesta Valley			100	38	17	80	100				2	2	7	0
Toledo, Peoria & Western	2.4	7	25	65	88	87	93	0	0	2	4	7	2	4
Toledo Terminal	0	4.2	5	45	35	3	41	0	0	0	0	0	0	3
Toronto, Hamilton & Buffalo	0	0	0	0				0	0	0	0	0		
Tremont & Gulf	0	11	0	67	20	58	0	0	0	0	0	2	3	0
Uintah	0	0	0	0	0	75		0	0	0	0	0	0	
Union Pacific	15	9	9	17	20	30	41	7	5	2	8	17	19	26
Union	0	0	11	9	29	80	10	0	0	1	2	0	0	2
Upper Merion & Plymouth	23	13	28	60	62			2	0	0	7	8		
Utah	0	0	0	11	4	26	19	0	0	0	0	0	0	0
Virginian	10	6	17	22	50	58	75	0	1	0	2	5	45	
Wabash	1.1	.1	0	1.5	6	47	82	1	0	0	1	2	21	89
Washington Terminal	9	4	0	10	43	40	89	0	0	0	0	1	1	2
Western Maryland	8	9	13	26	42	54	76	0	4	1	3	13	22	90
Western Pacific	5	17	16	25	19	36	37	0	5	5	9	1	13	9
Wheeling & Lake Erie	9	9	8	42	55	67	74	2	2	1	7	10	20	31
Wheeling Steel	45	50	35	50	87	100		3	0	3	0	4	0	
Wichita Falls & Southern	64	21	18	4	0	87	100	2	1	1	1	0	6	1
Winston-Salem Southbound	0	0	22	33	50	56	77	0	0	0	0	0	1	1

See footnotes at end of table.

TABLE XIII.—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						
	1933	1932	1931	1929	1927	1925	1923	1933	1932	1931	1929	1927	1925	1923
Woodward Iron Company				75	29	60	57	50			0	0	0	0
Wrightsville & Tennille	0	5	3.2	12	24	54	29	0	0	0	0	0	3	0
Less than 10 locomotives, discontinued roads, and miscellaneous	28	29	32	40	51	56	56	123	160	198	318	527	559	371
All roads	10	8	10	21	31	46	65	544	527	688	1,490	2,539	3,637	7,075

- ¹ Atlanta, Birmingham & Atlantic prior to 1927.
 - ² Includes Buffalo & Susquehanna and Buffalo, Rochester & Pittsburgh, 1933.
 - ³ Statistics prior to 1927 included in Baltimore & Ohio East.
 - ⁴ Trinity & Brazos Valley prior to 1931.
 - ⁵ Includes Grand Trunk Western, 1925-27.
 - ⁶ Includes former Hocking Valley, 1931-33.
 - ⁷ Includes Peoria & Eastern prior to 1931.
 - ⁸ Included in Canadian National, 1925-27.
 - ⁹ Included in Atchison, Topeka & Santa Fe, 1923.
 - ¹⁰ Includes Alabama & Vicksburg, Gulf & Ship Island, Vicksburg, Shreveport & Pacific, and Yazoo & Mississippi Valley, 1927-33.
 - ¹¹ Includes Portland Terminal, 1932-33.
 - ¹² Includes Ohio Central Lines, 1927-33.
 - ¹³ Included in Cleveland, Cincinnati, Chicago & St. Louis prior to 1931.
- Fractional percentages not shown unless percent defective is less than 5, otherwise nearest numeral is given.

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