INTERSTATE COMMERCE COMMISSION

THIRTY-EIGHTH ANNUAL REPORT

OF THE

DIRECTOR
BUREAU OF LOCOMOTIVE INSPECTION

TO THE

INTERSTATE COMMERCE COMMISSION

FISCAL YEAR ENDED
JUNE 30, 1949

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ANNUAL REPORT OF THE DIRECTOR
BUREAU OF LOCOMOTIVE INSPECTION

OCTOBER 1, 1949.

To the Interstate Commerce Commission:

In compliance with section 7 of the act of February 17, 1911, as amended, the Thirty-eighth Annual Report of the Director of the Bureau of Locomotive Inspection, covering the work of the Bureau during the fiscal year ended June 30, 1949, 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 Act and those reported to the Bureau of Transport Economics and Statistics under the Accident Reports 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 the number of persons injured have been arranged to permit comparison with previous years as far as consistent. Tables are also given showing the number of locomotives inspected, the number and percentage of those inspected found defective, the number for which written notices for repairs were issued in accordance with section 6 of the law, and the total number of 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—					
	1949	1948	1947	1946	1945	1944
Number of locomotives for which reports were filed	33,866	37,073	39,578	41,851	43,019	43,297
Number inspected	85,353	93,917	94,034	101,869	115,979	117,334
Number found defective	7,035	9,417	10,248	11,337	11,975	12,710
Percentage inspected found defective	8	10	11	11	10	11
Number ordered out of service	436	654	708	690	506	630
Number of defects found	28,642	38,855	41,250	56,541	53,367	56,617

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

	Year ended June 30—					
	1949	1948	1947	1946	1945	1944
Number of accidents	228	341	360	419	410	403
Percent increase or decrease from previous year	33.1	5.3	14.1	[1] 2.2	[1] 1.7	[1] 26.3
Number of persons killed	10	15	16	10	20	25
Percent increase or decrease from previous year	33.3	6.3	[1] 60.0	50.0	20.0	7.4
Number of persons injured	243	361	464	439	429	466
Percent increase or decrease from previous year	32.7	22.2	[1] 5.7	[1] 2.3	7.9	[1] 24.9

[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—							
	1949	1948	1947	1946	1945	1944	1915	1912
Number of accidents	81	104	116	156	141	141	424	856
Number of persons killed	9	14	12	10	13	17	13	91
Number of persons injured	94	108	124	165	154	194	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—									
	1949		1948		1947		1946		1945	
	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured
Members of train crews:										
Engineers	3	75	3	109	6	126	4	142	5	117
Firemen	3	92	6	155	6	159	4	184	9	183
Brakemen	1	30	3	43	1	37	------	46	2	61
Conductors	------	7	------	5	------	10	------	7	1	11
Switchmen	------	6	------	10	------	9	------	10	1	10
Roundhouse and shop employees:										
Boilermakers	------	2	------	4	------	3	------	1	1	10
Machinists	------	4	1	2	1	------	------	6	------	6
Foremen	------	------	------	1	------	------	------	3	------	6
Inspectors	------	------	------	------	------	1	------	1	1	------
Watchmen	1	------	2	1	------	2	2	4	------	1
Boiler washers	------	------	------	------	------	------	------	1	------	------
Hostlers	1	8	------	8	------	6	------	10	------	5
Other roundhouse and shop employees	1	4	------	5	------	8	------	3	------	4
Other employees	------	6	------	12	2	21	------	13	------	5
Nonemployees	------	9	------	6	------	82	------	8	------	10
Total	10	243	15	361	16	464	10	439	20	429

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

	Year ended June 30—					
	1949	1948	1947	1946	1945	1944
Number of locomotive units for which reports were filed	12,692	9,803	7,805	6,616	6,094	5,139
Number inspected	30,684	20,798	13,115	10,908	9,888	7,711
Number found defective	1,238	853	633	499	447	378
Percentage of inspected found defective	4.0	4.1	4.8	4.6	4.5	4.9
Number ordered out of service	20	21	19	17	16	9
Number of defects found	2,804	1,745	1,442	1,385	1,212	1,026

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

	Year ended June 30—					
	1949	1948	1947	1946	1945	1944
Number of accidents	49	41	40	38	29	17
Number of persons killed	------	------	2	------	1	------
Number of persons injured	67	50	41	56	40	23

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

	Year ended June 30—									
	1949		1948		1947		1946		1945	
	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured
Members of train crews:										
Engineers	------	12	------	7	1	9	------	8	------	4
Firemen	------	14	------	24	------	21	------	14	------	14
Brakemen	------	6	------	1	------	5	------	3	------	1
Conductors	------	------	------	2	------	1	------	2	------	1
Switchmen	------	4	------	2	------	1	------	2	------	2
Maintenance employees	------	8	------	------	1	2	------	4	1	3
Other employees	------	13	------	2	------	2	------	5	------	8
Nonemployees	------	10	------	12	------	------	------	18	------	7
Total	------	67	------	50	2	41	------	56	1	40

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—														
	1949			1948			1947			1946			1945		
	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured
Air reservoirs				1		2	1		1	1		1	1		1
Aprons	3		3	5		5	4		4	2		2	8		8
Arch tubes															
Ashpan blowers	1		1							1		1	2	1	1
Axles				3		3	1	2	1	1		1	2		5
Blow-off cocks	5	1	4	5		5	8		8	15		16	7		7
Boiler checks	4		5	7	1	6	7		7	8		8	6		6
Boiler explosions:															
A. Shell explosions															
B. Crown sheet; low water; no contributory causes found	4	6	13	10	12	8	11	7	16	15	7	20	7	9	11
C. Crown sheet; low water; contributory causes or defects found	1	1	1	3		7	2	4	3	3	3	2	1		1
D. Miscellaneous firebox failures							2		4	1		1	1		1
Brakes and brake rigging	3		4	11		24	8		12	10		12	10		10
Conplers	3		4	4		4	6		6	5		5	5		6
Crank pins, collars, etc				2		2	3		3	5		5	5	1	4
Crossheads and guides	1		1	1		1	2		2	3		5	2		2
Cylinder cocks and rigging				3		3	3		3	1		1	1		1
Cylinder heads and steam chests				1		1	2		2	1		1	2		3
Dome caps															
Draft appliances	3		3							2		2	2		3
Draw gear							1		1	1		1	2		2
Fire doors, levers, etc	3		3	10		10	2		2	2		2	8		8
Flues	3		3	8		9	4		4	10		12	5		6
Flue pockets															
Footboards	10		10	15		15	15		15	12		12	13	1	12
Gage cocks	1		1										1		1
Grease cups							1		1	1		1	1		1
Grate shakers	11		11	15		15	20		20	25		25	17		17
Handholds	13	1	12	12		12	18		18	20		20	26	1	25
Headlights and brackets	1		1	3		3	2		2	2		2	7		7
Injectors and connections (not including injector steam pipes)	12		12	10		10	14		14	14		14	12		12
Injector steam pipes				4		5	4	1	4	2		2	1		1
Lubricators and connections	4		4	2		2	4		4	5		5	4		4
Lubricator glasses	1		1							2		2	1		1
Patch bolts															
Pistons and piston rods				2		2	1		1				2	1	1
Plugs, arch tube and washout				3		3	1		1	1		1	5	2	6
Plugs in firebox sheets										1		1			
Reversing gear	6		6	12		12	13		13	11		11	13		13
Rivets	1		1										1		1
Rods, main and side	2		2	5		7	3	1	2	7		7	7		11
Safety valves															
Sanders	4		4	4		4	5		5	4		4	8		8
Side bearings	1		1												
Springs and spring rigging	1		1	4		4	3		77	6		7	5	1	4
Squirt hose	14		14	5		5	19		19	14		15	23		25
Staybolts				4		4	2		2	1		1	4		4
Steam piping and blowers	4	1	3	13	1	13	4		4	15		15	12		14
Steam valves	3		3	6		6	8		8	13		13	7		7
Studs	1		1				2		2	1		1	1		1
Superheater tubes	3		6	2		3	2		2	2		2	4		6
Throttle glands	3		4	1		1				1		1	2		2
Throttle leaking	1		1	1		1	2		2	1		1	2		3
Throttle rigging	11		11	10		10	16		17	15		16	6		6
Trucks, leading, trailing, or tender	3		3				2		20	10		12	5		5
Valve gear, eccentrics, and rods	1		1	3		3	4		4	7		7	7		7
Water glasses	5		5	4		4	8		8	12		13	10		10
Water-glass fittings	3		4	3		3	3		3	2		2	1		1
Wheels				3	1	2				1		1	1		1
Miscellaneous	74		75	121		122	117	1	117	124		127	124	3	126
Total	228	10	243	341	15	361	360	16	464	419	10	439	410	20	429

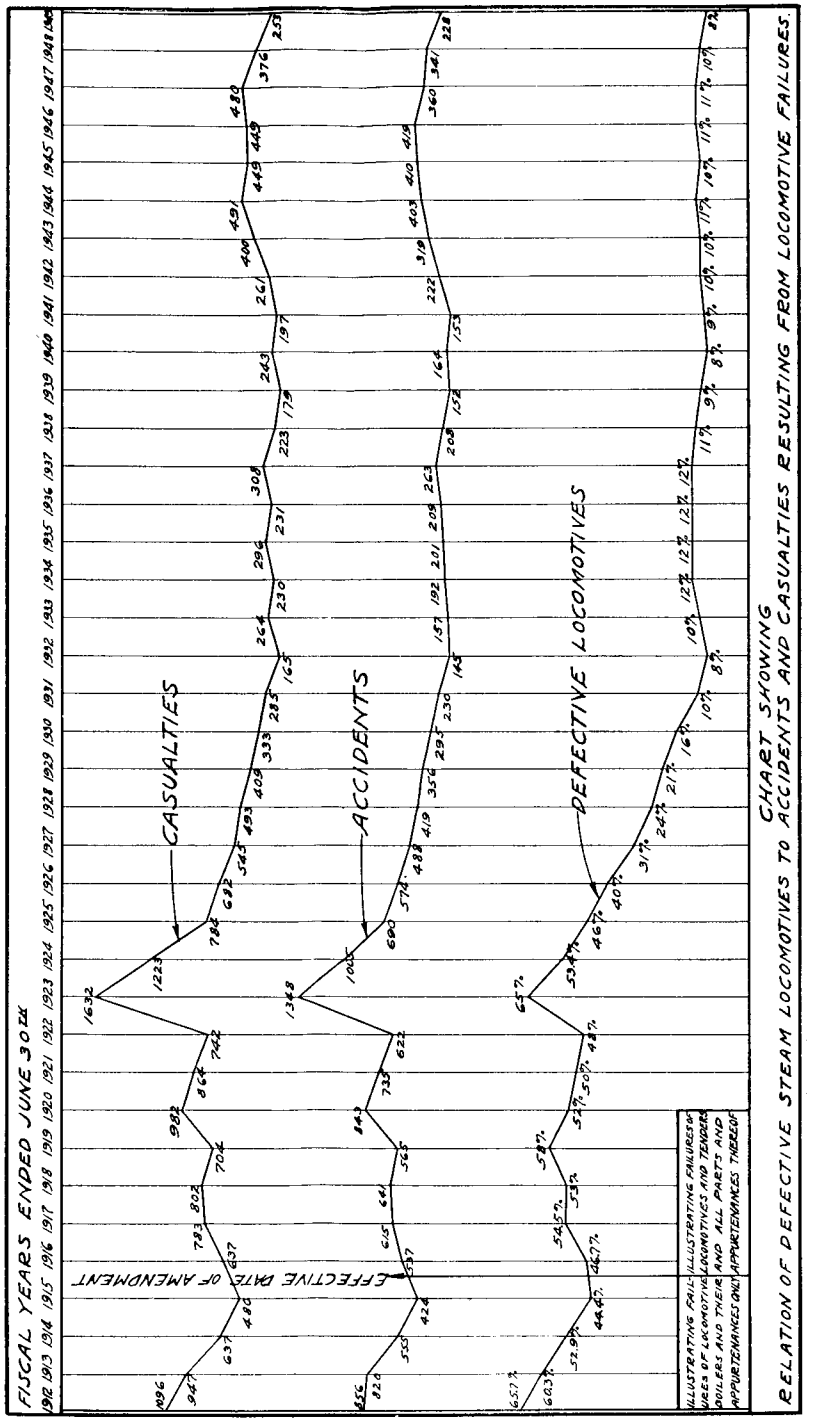

TABLE IX.—*Accidents and casualties resulting from failures of locomotives other than steam, and their appurtenances*

Part or appurtenance which caused accident	Year ended June 30—														
	1949			1948			1947			1946			1945		
	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured
Brakes and brake rigging	4		5	3		6	2		2	2		3	3		8
Carburetors															
Couplers	1		1												
Crank pins and connecting rods							2		2				1		4
Fires: due to overflowing or leakage of fuel, crankcase explosions, back firing, etc													2		2
Generators and starting devices	8		9	3		3	7		8	4		5	6		6
Insulation	1		1	1		1									
Pantographs and trolleys	1		1				4	1	5	1		1	1		1
Short circuits	6		6	7		7	1	1		2		2	2	1	1
Miscellaneous	27		43	27		33	2		2	2		2	2		2
Total	49		67	41		50	40	2	41	38		56	29	1	40

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

	Parts defective, inoperative or missing, or in violation of rules	Year ended June 30—					
		1949	1948	1947	1946	1945	1944
1	Air compressors	693	1,007	944	1,044	1,054	1,146
2	Arch tubes	11	15	19	27	17	45
3	Ashpans and mechanism	52	72	87	93	81	93
4	Axles	4	8	6	7	11	15
5	Blow-off cocks	220	274	308	388	361	289
6	Boiler checks	337	424	428	526	511	533
7	Boiler shell	208	298	342	462	416	406
8	Brake equipment	1,806	2,617	2,512	2,992	2,755	2,914
9	Cabs, cab windows, and curtains	781	1,049	1,347	1,501	1,057	1,169
10	Cab aprons and decks	355	414	428	469	426	381
11	Cab cards	95	109	91	120	91	104
12	Coupling and uncoupling devices	42	55	58	46	57	65
13	Crossheads, guides, pistons and piston rods	1,147	1,611	1,683	1,941	2,079	2,149
14	Crown bolts	46	78	98	88	90	105
15	Cylinders, saddles, and steam chests	1,155	1,617	2,004	2,217	1,801	2,133
16	Cylinder cocks and rigging	356	494	650	679	454	624
17	Domes and dome caps	82	142	130	164	187	189
18	Draft gear	370	461	449	536	486	576
19	Draw gear	300	413	453	462	447	515
20	Driving boxes, shoes, wedges, pedestals, and braces	1,070	1,582	1,580	1,922	1,803	2,026
21	Firebox sheets	191	302	257	333	319	347
22	Flues	156	201	197	253	260	274
23	Frames, tail pieces, and braces, locomotive	451	576	820	1,003	852	1,019
24	Frames, tender	39	72	63	88	97	126
25	Gages and gage fittings, air	118	185	135	185	151	158
26	Gages and gage fittings, steam	268	354	358	370	353	328
27	Gage cocks	375	474	404	495	449	532
28	Grate shakers and fire doors	286	455	444	555	558	539
29	Handholds	421	513	469	540	527	464
30	Injectors, inoperative	39	66	39	50	41	46
31	Injectors and connections	1,795	2,329	2,369	2,750	2,553	2,867
32	Inspections and tests not made as required	104	148	350	8,885	9,067	9,565
33	Lateral motion	507	821	791	862	977	898
34	Lights, cab and classification	58	132	155	161	167	243
35	Lights, headlight	118	183	143	168	222	268
36	Lubricators and shields	157	236	228	351	306	257
37	Mud rings	147	186	217	238	257	301
38	Packing nuts	474	456	575	691	654	746
39	Packing, piston rod and valve stem	511	658	691	776	845	879
40	Pilots and pilot beams	73	132	156	153	171	193
41	Plugs and studs	99	169	236	262	245	281

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

	Parts defective, inoperative or missing, or in violation of rules	Year ended June 30—					
		1949	1948	1947	1946	1945	1944
42	Reversing gear	405	649	528	482	439	454
43	Rods, main and side, crank pins and collars	1,408	1,998	2,136	2,581	2,569	3,230
44	Safety valves	45	45	70	72	84	77
45	Sanders	608	597	569	784	658	609
46	Springs and spring rigging	3,177	4,124	4,622	5,195	4,734	4,625
47	Squirt hose	63	93	79	120	98	94
48	Stay bolts	227	292	318	360	351	400
49	Stay bolts, broken	196	258	283	268	308	232
50	Steam pipes	256	435	356	551	416	435
51	Steam valves	133	150	146	203	157	161
52	Steps	652	767	778	914	681	872
53	Tanks and tank valves	1,228	1,757	1,558	1,570	1,215	1,400
54	Telltale holes	33	60	69	60	78	69
55	Throttle and throttle rigging	709	923	1,026	979	948	948
56	Trucks, engine and trailing	545	812	1,005	1,261	1,151	1,155
57	Trucks, tender	471	652	795	1,101	974	928
58	Valve motion	484	676	778	1,080	991	1,021
59	Washout plugs	268	384	441	740	820	845
60	Stokers	216	270	208			
61	Water glasses, fittings, and shields	920	1,039	1,318	1,190	1,328	1,323
62	Wheels	455	779	583	840	899	759
63	Miscellaneous—Signal appliances, badge plates, brakes (hand)	626	707	870	1,337	1,213	1,172
	Total number of defects	28,642	38,855	41,250	56,541	53,367	56,617
	Locomotives reported	33,866	37,073	39,578	41,851	43,019	43,297
	Locomotives inspected	85,353	93,917	94,034	101,869	115,979	117,334
	Locomotives defective	7,035	9,417	10,248	11,337	11,975	12,710
	Percentage of inspected found defective	8	10	11	11	10	11
	Locomotives ordered out of service	436	654	708	690	506	630

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—					
	1949	1948	1947	1946	1945	1944
Air compressors	26	32	9	15	14	7
Axles, truck and driving	1	3	2			
Batteries	13	8	1	2		1
Boilers	9	30	5	11	8	
Brake equipment	299	204	178	102	114	85
Cabs and cab windows	159	90	97	46	59	40
Cab cards	46	37	29	24	25	21
Cab floors, aprons and deck plates	234	134	130	72	60	54
Clutches	2			2	2	1
Controllers, relays, circuit breakers, magnet valves and switch groups	35	24	14	16	18	14
Coupling and uncoupling devices	15	12	13	6	6	3
Current collecting apparatus	20	11	3	9	10	
Draft gear	66	36	30	18	14	14
Draw gear	13	8	4	3	8	
Driving boxes, shoes and wedges	33	16	38	44	29	12
Frames or frame braces	5	2	7	10	12	12
Fuel system	191	136	66	57	45	33
Gages or fittings, air	11	11	10	7	7	6
Gages or fittings, steam	2	2	5			2
Gears and pinions	6	9	1			1
Handholds	53	32	22	18	13	6
Inspections and tests not made as required	90	59	78	357	297	278
Insulation and safety devices	36	10	11	12	17	8
Internal-combustion engine defects, parts and appurtenances	602	241	254	145	133	86
Jack shafts	11	5	3	4	6	8
Jumpers and cable connectors	8	7	1	8	9	2
Lateral motion, wheels	7	18	7	18	20	9
Lights, cab and classification	5	5	1	2		1

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

Parts defective, inoperative or missing, or in violation of rules	Year ended June 30—					
	1949	1948	1947	1946	1945	1944
Lights, headlight	3	3	2		1	2
Meters, volt and ampere		3	3	4	2	2
Motors and generators	46	26	16	15	12	14
Pilots and pilot beams	16	23	15	8	1	2
Plugs and studs					1	
Quills	9	16	18	52	29	18
Rods, main, side, and drive shafts	1	5	6	11	3	10
Sanders	151	106	82	57	50	59
Springs and spring rigging, driving and truck	43	44	63	42	38	44
Steam pipes	17	10	4	1	6	3
Steps, footboards, etc	213	116	68	29	28	25
Switches, hand-operated, and fuses	1	3	1		7	2
Transformers, resistors and rheostats	2	6	2	3		
Trucks	84	65	45	52	42	47
Water tanks	2	1	2	1	2	1
Water glasses, fittings and shields	2	18		15	2	4
Warning signal appliances	9	7	8	2		2
Wheels	98	72	48	54	46	74
Miscellaneous	109	39	40	31	16	13
Total number of defects	2,804	1,745	1,442	1,385	1,212	1,026
Locomotive units reported	12,692	9,803	7,805	6,616	6,094	5,139
Locomotive units inspected	30,684	20,798	13,115	10,908	9,888	7,711
Locomotive units defective	1,238	853	633	499	447	378
Percentage of inspected found defective	4.0	4.1	4.8	4.6	4.5	4.9
Locomotive units ordered out of service	20	21	19	17	16	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 published reports of accident investigations were distributed to interested parties and otherwise used in our effort to bring about a diminution in the number of such accidents.

STEAM LOCOMOTIVES

Two hundred and twenty-eight accidents occurred in connection with steam locomotives, resulting in 10 deaths and 243 injuries. This represents a decrease of 113 accidents, a decrease of 5 in the number of persons killed, and a decrease of 118 in the number of persons injured compared with the preceding year.

The chart on page 5 shows the relation between the percentage of defective steam locomotives and the number of accidents and casualties resulting from failures thereof, and illustrates the effect of operating locomotives in defective condition.

Table VIII shows the various parts and appurtenances of steam locomotives and tenders which through failure have caused serious and fatal accidents in the past 5 years. 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.

During the year 8 percent of the steam locomotives inspected by our inspectors were found with defects or errors in inspection that should have been corrected before the locomotives were put into use; this is a reduction of 2 percent from the results obtained in the preceding year. Four hundred and thirty-six locomotives were ordered withheld from service by our inspectors because of the presence of defects that rendered the locomotives immediately unsafe; this is a decrease of 218 locomotives compared with the preceding year.

Detailed results of our inspections of steam locomotives of each railroad are shown in table XII.

EXPLOSIONS AND OTHER BOILER ACCIDENTS

Five boiler explosions occurred in the fiscal year; all were caused by overheating of the crown sheets due to low water. Seven employees were killed in these accidents and 14 were injured. There was a reduction of eight in the number of boiler explosions, a decrease of five in the number of employees killed, and a reduction of one in the number of employees injured compared with the preceding year.

One of the explosions occurred on a locomotive in passenger-train service, three on locomotives in freight-train service, and the remaining one on a locomotive in charge of an engine watchman. Absence of a safe water level was known to employees on one of the locomotives prior to the explosion. This boiler was equipped with fusible plugs which had functioned but it could not be determined whether any action had been taken to dump the fire, because all members of the engine crew were killed in or died as a result of the accident. The other four boilers were not equipped with either fusible plugs or low-water alarms. Detailed accounts of the explosions which occurred on the locomotive in passenger-train service and the three locomotives in freight-train service are contained in individually published accident reports.

Seventy-six boiler and appurtenance accidents other than explosions resulted in the death of 2 employees and injuries to 80 employees. This is a decrease of 15 accidents and a decrease of 13 injuries compared with the preceding year.

EXTENSION OF TIME FOR REMOVAL OF FLUES

Two hundred and ninety-nine applications were filed for extension of time for removal of flues, as provided in rule 10. Our investigations disclosed that in 29 of these cases the condition of the locomotives or other circumstances were such that extensions could not properly be

granted. Seven were in such condition that the full extensions requested could not be authorized, but extensions for shorter periods of time were allowed. Eight extensions were granted after defects disclosed by our investigations were required to be repaired. Seven applications were canceled for various reasons. Two hundred and forty-eight applications were granted for the full period requested.

LOCOMOTIVES PROPELLED BY POWER OTHER THAN STEAM

Forty-nine accidents, resulting in injuries to 67 persons, occurred in connection with locomotives propelled by power other than steam. This represents an increase of 8 in the number of accidents and an increase of 17 in the number of injured compared with the preceding year.

During the year 4 percent of the locomotives inspected by our inspectors were found with defects or errors in inspection that should have been corrected before the locomotives were put into use; this represents a decrease of 0.1 percent compared with the results obtained in the preceding year. Twenty locomotives were ordered withheld from service by our inspectors because of the presence of defects that rendered the locomotives immediately unsafe; this represents a decrease of one locomotive compared with the preceding year.

SPECIFICATION CARDS AND ALTERATION REPORTS

Under rule 54 of the Rules and Instructions for Inspection and Testing of Steam Locomotives, 187 specification cards and 4,382 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, 2,915 specifications and 409 alteration reports were filed for locomotive units, and 437 specifications and 270 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.

LEGAL

One case of violation of the rules and instructions for inspection and testing of steam locomotives and tenders and their appurtenances, which was pending in the district court, was dismissed upon motion.

APPEALS

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

Edward H. Davidson,
Director.

ACCIDENTS AND CASUALTIES RESULTING FROM THE FAILURE OF STEAM LOCOMOTIVES AND TENDERS AND THEIR APPURTENANCES DURING THE FISCAL YEAR ENDED JUNE 30, 1949, BY ROADS

[A star (*) indicates accidents taken from records of the Bureau of Transport Economics and Statistics of the Interstate Commerce Commission. A double star (**) indicates accidents not properly reported, as required by rules 55 and 162. Complete investigations, 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.]

ALIQUIPPA & SOUTHERN RAILROAD:

January 22, 1949, locomotive 219, Aliquippa, Pa. Water in boiler foamed badly; one injured.

One accident; one injured.

ATCHISON, TOPEKA & SANTA FE RAILWAY:

July 8, 1948, locomotive 2568, Slaton, Tex. Explosion in firebox caused by accumulation of fuel oil gas becoming ignited; one injured.

**September 10, 1948, locomotive 3885, San Bernardino, Calif. Water-glass drain pipe discharged on engine deck; bottom end of drain pipe was not applied in accordance with the carrier's standard; one injured.

September 20, 1948, locomotive 3911, Thorn, Calif. Employee's finger was crushed between fire door and fire door lock; fire door lock held in fouling position by grease gun suspended from back head oil tray; one injured.

March 11, 1949, locomotive 2921, Hesperia, Calif. Corner of tender truck frame broke off and became lodged in track switch, resulting in derailment of 12 cars of passenger train; failure occurred through old fracture in wall section which was exceptionally thin because of manufacturing defect; one injured.

April 2, 1949, locomotive 1989, Bakersfield, Calif. Flashback from firebox of oil-burning locomotive, caused by explosion of gases in the firebox, burned employee who was attempting to relight the fire; fireman's manifold was improperly stenciled, the word "Blower" being shown above the atomizer valve; one injured.

June 5, 1949, locomotive 3139, Serra, Calif. Crown-sheet failure caused by overheating due to low water; one killed.

June 9, 1949, locomotive 3764, Larkspur, Colo. Oil on top of tender cistern; rear oil tank manhole cover was not locked in closed position; one injured.

June 26, 1949, locomotive 2919, Dean Lake, Mo. Employee slipped and fell from top gangway step; grease or oil on the step; one injured.

Eight accidents; one killed, seven injured.

ATLANTIC COAST LINE RAILROAD:

**August 14, 1948, locomotive 1762, Wilsons Mill, S. C. Squirt hose came off nipple; opening at outer end of hose was reduced by a piece of wood, causing pressure build up; one injured.

March 15, 1949, locomotive 1635, Enfield, N. C. Bell would not ring; bell ringer was inoperative and bell cord was defective; one injured.

May 28, 1949, locomotive 1613, Lake Harbor, Fla. Engine truck box ran hot; one injured.

Three accidents; three injured.

BALTIMORE & OHIO RAILROAD:

**July 3, 1948, locomotive 4512, Wolf Summit, W. Va. Stoker hook pulled from hole in front end of conveyor trough slide; slide was bent and battered and a piece was broken out in front of the front hole; stoker hook was bent; one injured.

July 10, 1948, locomotive 5562, Oakdale, Ill. Flue broke in safe end; safe end was badly cinder cut and was reduced to $\frac{1}{64}$ inch in thickness at the point of failure; one injured.

*July 17, 1948, locomotive 1084, Pittsburgh, Pa. Electric light bulb worked loose in socket over cab deck; one injured.

*July 18, 1948, locomotive 4077, Youngstown, Ohio. Reverse lever stuck; top clevis pin of arm to reverse gear operating valve was tight; one injured.

August 5, 1948, locomotive 668, Cumberland, Md. Feed water tank hose blew off tender connection; a piece of waste left on seat of repaired injector starting valve permitted steam to leak into tank hose, causing pressure to build up in the hose; one injured.

August 7, 1948, locomotive 6222, Pittsburgh, Pa. Insufficient clearance between vertical handhold and gangway ladder; handhold was not applied according to carrier's specifications; one injured.

**August 30, 1948, locomotive 7150, Bell Siding, Pa. Insufficient clearance between handle on cab ventilator cover and stops provided on opening in cab roof; handle on cab ventilator cover was bent; one injured.

**August 31, 1948, locomotive 611, Glenwood, Pa. Employee fell from top of tender; tender not equipped with handrail; one injured.

November 5, 1948, locomotive 6177, near Troy, Ohio. Stoker slide hook slipped out of stoker trough sliding plate; hook did not conform with carrier's standard; one injured.

December 11, 1948, locomotive 6212, Sand Patch, Pa. Improper clearance between vertical handhold on back of cab and tender deck; tender was not standard for this class of locomotive and handhold was not applied in accordance with the carrier's design standards; one injured.

**February 21, 1949, locomotive 389, Hamilton, Ohio. Bell ringer was inoperative; employee fell from cab ledge while giving attention to the bell; width of cab ledge was less than carrier's standard, and locomotive was not equipped with a handhold above the cab side window as provided in carrier's print; one injured.

March 13, 1949, locomotive 6157, Lima, Ohio. Boiler check valve stuck open; one injured.

April 18, 1949, locomotive 4614, near Eder, Md. Extension handle to injector overflow valve became disconnected, due to cotter key in intermediate universal joint working out, leaving overflow valve in open position; threads on upper part of extension handle and in top of universal joint were badly worn and cotter key hole was worn; one injured.

Thirteen accidents; 13 injured.

BOSTON & MAINE RAILROAD:

**August 20, 1948, locomotive 3662, between Boston, Mass., and Dover, N. H. Throttle worked hard, due to hard pressed and dry packing in stuffing box; "Throttle works very hard" was reported on August 19; one injured.

December 3, 1948, locomotive 3671, between Nashua, N. H., and Boston, Mass. Throttle worked hard due to throttle rod packing being dry and hard; one injured.

January 27, 1949, locomotive 3640, Lisbon, N. H. Air compressor stopped, due to crack in reversing head; one injured.

April 12, 1949, locomotive 3657, Everett, Mass. Headlight resistor burned out; one injured.

May 4, 1949, locomotive 3686, near North Billerica, Mass. Section of cab sheathing with cab card frame attached fell from position and struck employee; cab sheathing was loose and engine rode rough; one injured.

May 20, 1949, locomotive 1481, Manchester, N. H. Inside vertical frame board of back cab window split through old crack when used as a handhold, causing employee to fall from cab deck to locomotive deck; one injured.

June 29, 1949, locomotive 2731, Somerville, Mass. Bonnet blew off bottom water-glass valve; threads on valve and bonnet were defective; attempted to stop leak at the fitting while it was under pressure; two injured.

Seven accidents; eight injured.

BURLINGTON-ROCK ISLAND RAILROAD:

August 13, 1948, locomotive (C. R. I & P.) 2658, near Streetman, Tex. Boiler stud for securing left cab bracket blew out; one injured.

November 26, 1948, locomotive (C. R. I & P.) 1941, Teague, Tex. Blow-off cock operating rod broke at coupling; one injured.

Two accidents; two injured.

CENTRAL OF GEORGIA RAILWAY:

January 4, 1949, locomotive 628, Maddox, Ga. Retaining ring on engine truck hub liner failed at a weld then broke adjacent to the weld on the opposite side, permitting the hub liner to come off wheel of the rapidly moving locomotive and one-half of liner was thrown outward and struck a track employee; one injured.

January 8, 1949, locomotive 204, Columbus, Ga. Link block fouled link saddle, preventing valve gear from being placed in forward motion; part of the wire securing cap screws which held outside link block plate to link block was missing and both cap screws were loose, one of which had backed out of hole ⅝ inch allowing link block to move inward and foul on top of link saddle; one injured.

Two accidents; two injured.

CHARLESTON & WESTERN CAROLINA RAILWAY:

November 18, 1948, locomotive 853, near Clarks Hill, S. C. Crown-sheet failure caused by overheating due to low water; two killed, one injured.

One accident; two killed, one injured.

CHESAPEAKE & OHIO RAILWAY:

June 28, 1949, locomotive 387, Erie, Mich. Water glass burst; gasket was missing between glass safety panel and protector case of water-gage glass, allowing hot water to spray on employee when water glass burst; one injured.

One accident; one injured.

CHICAGO & ILLINOIS MIDLAND RAILWAY:

**December 8, 1948, locomotive 654, near Taylorville, Ill. Grease on footboard; one injured.

One accident; one injured.

CHICAGO & NORTH WESTERN RAILWAY:

May 6, 1949, locomotive 4003, near Woodbine, Iowa. Power reverse lever unexpectedly moved to full forward position, stripping teeth on the quadrant; latch teeth did not engage on portion of quadrant which had been blocked out to limit valve movement; one injured.

June 19, 1949, locomotive 2805, Proviso, Ill. Injector was inoperative due to annular nozzle having loosened at threaded connection to steam valve seat casting and dropped to a position which shut off the flow of water from water passage to combining tube; one injured.

Two accidents; two injured.

CHICAGO, BURLINGTON & QUINCY RAILROAD:

October 11, 1948, locomotive 723, Rushville, Ill. Injector overflow valve stuck in open position; one injured.

**March 15, 1949, locomotive 5359, Plattsmouth, Nebr. Stoker stopped; stoked engine cylinder bolts were loose; one injured.

Two accidents; two injured.

CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC RAILROAD:

August 10, 1948, locomotive 941, Waukesha, Wis. Flange of boiler check stop valve blew off threaded connection to valve body when attempt was made to stop leak at the joint while it was under pressure; threads on valve body and valve flange were defective; two injured.

October 22, 1948, locomotive 433, Appleton, Minn. Flue failed at safe en[d] butt weld; one injured.

October 28, 1948, locomotive 1359, Morton Grove, Ill. Front end of g[uide] separated from connection at back cylinder head and dropped to the gro[und]; front end guide bar bolts were loose fit in bar and cotter keys were missing [which] permitted nuts to work off. Bolts in back end of guide bar were also [loose]; one injured.

December 30, 1948, locomotive 399, Lemmon, S. Dak. Throttle stuck [in open] position due to tight packing gland; one injured.

December 30, 1948, locomotive 53, near Hillsdale, Wash. Locomo[tive separated from train due to defective coupler at rear of tender; stand[ard 11-inch coupler knuckle had been replaced by a 9¼-inch car knuckle; inside [wearing face of knuckle was badly worn, cored hole in knuckle was distorted, an[d casting was cracked; coupler was below the minimum standard prescribed heigh[t]; two injured.

December 31, 1948, locomotive 53, near Thrift, Wash. Locomotive separated from train due to defective coupler at rear of tender; standard 11-inch coupler knuckle had been replaced by a 9¼-inch car knuckle; inside wearing face of knuckle was badly worn, cored hole in knuckle was distorted, and casting was cracked; coupler was below the minimum standard prescribed height. A similar accident occurred on this locomotive 5½ hours previously; one injured.

**February 5, 1949, locomotive 220, Harlowton, Mont. Ashpan swipe cap blew off, evidently due to cap being loose; one injured.

June 11, 1949, locomotive 1356, Chicago, Ill. Train-line steam heat valve at fountain was leaking, due to valve and stem being steam cut; steam heat hose between locomotive and tender formed a water trap, 24 inches deep, in which the leakage accumulated and was later discharged at the rear of tender; one injured.

Eight accidents; 10 injured.

CHICAGO, ROCK ISLAND & PACIFIC RAILROAD:

August 13, 1948, locomotive 2647, Okarche, Okla. Safety squirt coal sprinkler did not operate properly and steam issued from squirt hose; sprinkler drain valve was stuck due to formation of scale; squirt hose was reported on August 12, 13, and 14; one injured.

September 7, 1948, locomotive 1994, Council, Okla. Squirt hose valve worked open; valve opened easily due to valve stem packing nut not being properly tightened; packing in gland was hard and dry and packing nut threads on valve bonnet were filled with a hard substance which prevented packing nut from being properly tightened; one injured.

**September 8, 1948, locomotive 2623, Clay Center, Kans. Oil on top of tender fuel oil tank; one injured.

October 13, 1948, locomotive 2625, South Chicago, Ill. Absence of stop on steam whistle lever linkage permitted uncontrolled overtravel of the lever; one injured.

**November 3, 1948, locomotive 2708, near Haileyville, Okla. Employee scalded while attempting to start stalled boiler feed water pump; one injured.

**December 2, 1948, locomotive 2686, Belleville, Ark. Large piece broken out of cast iron steam pipe in smoke box; initial failure, which occurred in oval mid-section where wall thickness was 5/16 inch, started at point where a groove had been cut by electric arc; groove was 15 inches in length and had maximum depth of 3/16 inch; one injured.

**December 4, 1948, locomotive 254, Little Rock, Ark. Tender tank fuel oil heater pipes at front of the tank were not insulated in accordance with the carrier's standard; one injured.

**December 10, 1948, locomotive 2022, near Dover, Okla. Accumulation of carbon on floor of firepan in oil burning firebox; "Clean carbon out firebox" was reported on December 4, 5, and 7; one injured.

March 22, 1949, locomotive 250, Oklahoma City, Okla. Nonlifting type injector broke while being operated with overflow valve closed and steam and hot water forced from telltale nozzle in the cab struck employee; screens were missing from tank wells, strainers were missing from tank hose, and swash plates were loose; one injured.

Nine accidents; nine injured.

DELAWARE & HUDSON RAILROAD:

January 17, 1949, locomotive 1520, Starrucca, Pa. Seat of folding chair in cab dropped; bolt for securing side of seat to chair leg was missing; one injured.

One accident; one injured.

DELAWARE, LACKAWANNA & WESTERN RAILROAD:

**January 3, 1949, locomotive 235, Scranton, Pa. Cab sliding window stuck in groove; one injured.

One accident; one injured.

DENVER & RIO GRANDE WESTERN RAILROAD:

September 2, 1948, locomotive 1527, Minturn, Colo. Steam trapped in blow-off cock discharge pipe blew out when discharge valve was opened; reach rod in blow-off cock rigging was too short, tending to lift the valve off its seat; one injured.

One accident; one injured.

DETROIT, TOLEDO & IRONTON RAILROAD:

January 30, 1949, locomotive 107, Oakwood Junction, Mich. Squirt hose burst; lining of hose was defective and metal protective covering was missing at the point of failure; one injured.

One accident; one injured.

ERIE RAILROAD:

February 15, 1949, locomotive 234, Jersey City, N. J. Insufficient clearance between coal saving device and cab apron due to coal saving device being bent; one injured.

**March 6, 1949, locomotive 3176, Buffalo, N. Y. Grate shaker bar slipped off post; shaker bar socket fouled on shaker post lock due to post being of insufficient length above the lock to permit shaker bar to be properly applied; one injured.

March 26, 1949, locomotive 2701, Galion, Ohio. Cover of water jug compartment on tender fell from position, due to failure of the hinges; hinges were of insufficient strength and both had old fractures in hinge-pin eye sections; one injured.

Three accidents; three injured.

FLORIDA EAST COAST RAILWAY:

February 28, 1949, locomotive 437, Melbourne, Fla. Top of tender water tank was obstructed by protruding ends of pipes, left after brakeman's cab was removed from the tender; pipe ends had been bent downward, forming roughly triangular loops in the path between top of fuel tank and water tank manhole; one injured.

March 25, 1949, locomotive 709, Miami, Fla. Water glass burst, shattering glass plates in water-glass shield; one injured.

Two accidents; two injured.

FORT WORTH & DENVER CITY RAILWAY:

. January 2, 1949, locomotive 460, Channing, Tex. Fuel oil on top of tender water tank; one injured.

One accident; one injured.

GRAND TRUNK WESTERN RAILWAY:

April 15, 1949, locomotive 2667, Detroit, Mich. Supply pipe leading to air operated bell ringer broke through old defect. While giving attention to the inoperative bell ringer, employee was knocked from the running board by a fixed object which had only 14 inches clearance with the side of cab; one injured.

One accident; one injured.

GREAT NORTHERN RAILWAY:

*July 17, 1948, locomotive 3249, Basin, Mont. Low water alarm whistle valve stuck open; employee slipped on oil on top of tender fuel oil tank while returning to cab after closing the whistle valve; one injured.

August 12, 1948, locomotive 3076, Breckenridge, Minn. Bell cord broke; one injured.

August 30, 1948, locomotive 3387, Colfax, N. Dak. Left front blow-off cock stuck open; small piece of metal in blow-off cock; left front blow-off cock discharge pipe gate valve was improperly located, rendering both left blow-off cocks inoperative when the valve was closed; one injured.

Septmber 13, 1948, locomotive 1438, Willow City, N. Dak. Hopper of tender coal pusher stuck in raised position due to top ring in operating piston being broken and part of it stuck in by-pass channel; hopper dropped suddenly when piston was struck with bar account of low steam pressure and valve missing from automatic drain valve; one injured.

October 5, 1948, locomotive 3247, Dalton, Minn. Stoker failed; wood block had become wedged in elevator; one injured.

Five accidents; five injured.

GULF COAST LINES:

January 3, 1949, locomotive (St. L. B. & M.) 1242, Kingsville, Tex. Oil on top of tender fuel oil tank; one injured.

June 2, 1949, locomotive (St. L. B. & M.) 1222, Kingsville, Tex. Employee slipped on cab apron which was in tilted position; apron had been secured in raised position during enginehouse repairs and had not been restored to proper position at the time the locomotive was ordered moved; one injured.

June 16, 1949, locomotive (St. L. B. & M.) 1021, Kingsville, Tex. Blow-off cock stuck open; loose scale was found in body of blow-off cock and on mud ring behind blow-off cock; one injured.

Three accidents; three injured.

GULF, COLORADO & SANTA FE RAILWAY:

February 19, 1949, locomotive (A. T. & S. F.) 1132, near Pulliam, Tex. Employee slipped on oil on deck; fuel oil leaked from around automatic safety oil cut-out valve stem, and ran down the front of tank, over the top of deck sand box, and onto the deck; one injured.

May 23, 1949, locomotive (A. T. & S. F.) 909, Bragg, Tex. Delivery pipe spanner nut was loose and leaking at boiler check connection; one injured.

Two accidents; two injured.

HOUSTON BELT & TERMINAL RAILWAY:

August 31, 1948, locomotive 6, Houston, Tex. Gas explosion in firebox of oil-burning locomotive; two injured.

One accident; two injured.

INDIANA HARBOR BELT RAILROAD:

February 28, 1949, locomotive 417, Blue Island, Ill. Ashpan of locomotive on enginehouse out-bound track could not be dumped because of frozen slide; one injured.

One accident; one injured.

INTERNATIONAL-GREAT NORTHERN RAILROAD:

July 10, 1948, locomotive 1124, near Palestine, Tex. Glass fell from window in brakeman's cabin; cabin was very loose on top of feed water tank due to bolts being loose and supporting blocks deteriorated; one injured.

October 4, 1948, locomotive 1059, Round Rock, Tex. Locomotive separated from tender, caused by tender frame center sills breaking at rear of draw casting and subsequent failure of rivets in side sill angle irons; center sills and rivets in side sill angle irons were badly deteriorated; one injured.

**June 8 and 9, 1949, locomotive 9313, Houston, Tex. Cab seat box was loose; "L. seat box loose from deck" was reported on June 12; one injured.

Three accidents; three injured.

KANSAS CITY SOUTHERN RAILWAY:

August 5, 1948, locomotive 904, Pittsburg, Kans. Squirt hose burst; one injured.

March 17, 1949, locomotive 1024, Kansas City, Mo. Explosion in firebox of oil-burning locomotive opened firebox door, which was not secured in closed position, permitting flames to enter the cab; firebox door latch did not engage slot in door frame lug; one injured.

Two accidents; two injured.

LONG ISLAND RAILROAD:

September 12, 1948, locomotive 42, Cold Spring Harbor, N. Y. Throttle worked hard due to throttle stem packing gland not being properly adjusted. Employee was injured while attempting to close throttle, due to cab seat tilting; cab seat was not fastened in place; one injured.

September 16, 1948, locomotive 303, Auburndale, N. Y. Grate shaker bar came off post when front end of grate shaker reach rod became disconnected; metal at bottom of pin hole at lower end of projecting arm of grate shaker connecting rod had broken due to pin hole being badly worn; shaker bar did not fit properly on post due to accumulation of dirt and other foreign matter in shaker-bar socket; one injured.

Two accidents; two injured.

LOUISIANA & ARKANSAS RAILWAY:

September 8, 1948, locomotive 559, Stamps, Ark. Bricks fell from table plate above oil burner into the firepan in front of oil burner; one injured.

One accident; one injured.

LOUISVILLE & NASHVILLE RAILROAD:

August 29, 1948, locomotive 1788, Decatur, Ala. Blow-off cock blow down pipe blew off; blow down pipe nipple had been applied with only 2½-thread engagement in blow-off cock and pipe bracket broke through old fractures at frame bolt hole; pipe nipple was pitted and wasted away and threads on nipple and in blow-off cock were defective; one killed.

**September 24, 1948, locomotive 406, Nortonville, Ky. Pin was missing from trailer centering device; one injured.

**September 27, 1948, locomotive 1890, Minooka, Ala. Engine not steaming properly; employee fell from locomotive when attempting to make repair at smoke box; one injured.

November 19, 1948, locomotive 2410, De Coursey, Ky. Throttle was hard to operate; one injured.

November 26, 1948, locomotive (N. C. & St. L.) 412, Nashville, Tenn. Arm rest attached to cab window ledge gave way when employee leaned out window; arm rest was not properly secured; cab seat box was 5½ inches higher than carrier's standard and employee's feet did not touch cab floor while he was seated; one injured.

**December 31, 1948, locomotive 1576, Mount Vernon, Ind. Air compressor stopped, apparently caused by insufficient lubrication, resulting in rough coupling; engine reported raising the water numerous times in the 30 days preceding the accident; one injured.

Six accidents; one killed, five injured.

MAINE CENTRAL RAILROAD:

November 4, 1948, locomotive 459, Lewiston, Maine. Reversing gear stuck in forward motion account of valve motion binding; left link lifter was ⅜ inch out of alinement, resulting in radius rod binding on link cheek plate and link block binding at end of the link; one injured.

One accident; one injured.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE RAILROAD:

November 15, 1948, locomotive 452, Fond du Lac, Wis. Front of cab apron was sprung upward in mid section to a maximum of ⅜ inch above the engine deck; one injured.

One accident; one injured.

MISSOURI-KANSAS-TEXAS RAILROAD:

August 28, 1948, locomotive 594, Denison, Tex. Water glass burst; one injured.

August 29, 1948, locomotive 846, near Taylor, Tex. Oil on cab floor; one injured.

November 7, 1948, locomotive 510, Campbell, Mo. Crown-sheet failure caused by overheating due to low water; left injector was inoperative, due to broken collar at inner end of steam spindle; one killed, one injured.

February 2, 1949, locomotive 847, Franklin, Mo. Undesired emergency application of the brakes caused by a leak at union in emergency brake valve line on tender; union was loose and open ¾ turn; two undesired emergency applications occurred during terminal air tests and, although the cause was not determined by carmen, the air brake system was reported to the enginemen to be in satisfactory condition before the locomotive departed on the trip on which the accident occurred; two injured.

March 13, 1949, locomotive 39, Houston, Tex. Water glass burst; one injured.

March 23, 1949, locomotive 853, Franklin, Mo. Employee accidentally stepped on damper chain handle which was lying on cab floor, spraining his ankle; no provision for holding the damper chain and handle out of the way when the damper was wide open; one injured.

March 31, 1949, locomotive 396, St. Louis, Mo. Main throttle rod packing compression screw and packing blew out, apparently due to the screw not having been properly applied; two injured.

Seven accidents; one killed, nine injured.

MISSOURI PACIFIC RAILROAD:

**January 6, 1949, locomotive 1545, Gurdon, Ark. Dead grate broke; one injured.

**March 3, 1949, locomotive 141, Lake Charles, La. Throttle was hard to operate; one injured.

Two accidents; two injured.

NASHVILLE, CHATTANOOGA & ST. LOUIS RAILWAY:

**September 8, 1948, locomotive 422, Cowan, Tenn. Reverse lever was hard to move from back position account of reach rod to power reverse gear binding; one injured.

September 13, 1948, locomotive 656, Camden, Tenn. Throttle lever latch would not hold in quadrant due to weak latch spring; throttle reported on May 30, June 25, July 12 and 21, and September 9, 13, 28, and 29; one injured.

Two accidents; two injured.

NEW YORK CENTRAL SYSTEM:

**July 11, 1948, locomotive 2374, Toledo, Ohio. Hole in sand pipe; one injured.

July 18, 1948, locomotive 2961, between Whitesboro and Oriskany, N. Y. Main throttle was hard to operate; throttle valves and cams were worn; throttle was reported working hard on June 30 and July 5, 14, and 18; one injured.

July 21, 1948, locomotive 1557, Spafford, Ohio. Squirt hose valve worked open; valve was leaking due to packing being worn; "Squirt hose valve leaking" was reported on July 19; one injured.

August 10, 1948, locomotive 2964, Selkirk, N. Y. Roughening on catwalk on side of cab had worn smooth; one injured.

**August 29, 1948, locomotive 830, Adams, N. Y. Injector did not prime properly; injector was reported on August 19, 21, 28, and 29 (after accident); employee was burned when he contacted hot steam pipe in cab while attempting to start the injector; one injured.

September 4, 1948, locomotive 2391, Detroit, Mich. Insufficient clearance between grip of main steam throttle handle and valve-pilot instrument case, due to accumulated wear in throttle mechanism and lack of a stop to insure hand clearance; one injured.

September 15, 1948, locomotive 7347, Rensselaer, N. Y. Front coupler opened, permitting cars to run free and collide with standing cars; coupler had been heavily piled; one injured.

September 23, 1948, locomotive 7359, Campbell, Ohio. Lubricator steam valve bonnet blew out due to not having been properly tightened; one injured.

October 3, 1948, locomotive 3018, Natick, Mass. Hard riding locomotive caused employee to fall; one injured.

**November 22, 1948, locomotive 7456, Utica, N. Y. Front tender frame beam which was used as top gangway step was badly worn; one injured.

**December 19, 1948, locomotive 2101, Chicago, Ill. Injector overflow and water valves were stuck in closed position; injector was hot, due to locomotive having been left on ready track with overflow and water valves closed; one injured.

December 24, 1948, locomotive 2892, Galion, Ohio. Eye was broken out of ashpan hopper slide and rod which connected the slide to dump lever arm was missing, causing sudden movement of slide operating lever when attempt was made to open ashpan; one injured.

December 30, 1948, locomotive 7882, Detroit, Mich. Boiler check valve stuck in open position; check valve was worn; "Right boiler check leaking bad" was reported approximately 8 hours before the accident and report did not show that repairs were made; one injured.

January 13, 1949, locomotive 2091, near Urbana, Ohio. Throttle valve case failed; one injured.

January 27, 1949, locomotive (B. & A.) 401, Riverside, Mass. Grate-shaker bar became stuck, causing sudden stoppage of the movement of the bar; one injured.

**January 28, 1949, locomotive 5401, Valley Junction, Ohio. Flagging equipment box, located in cab near cab roof, worked from retaining bolts at one end and fell, striking employee; part of one of the two bolt holes at that end was broken out; one injured.

March 1, 1949, locomotive 3023, Elkhart, Ind. Train steam heat valve was hard to operate; excessive packing in stuffing box and packing nut was screwed down with force, causing packing to grip valve stem; valve stem threads were worn; wheel handle on end of valve extension rod was loose; one injured.

March 3, 1949, locomotive 2253, Pendleton, Ind. Water-glass steam pipe pulled from Parker water-glass fitting, due to not having been properly flared when applied; one injured.

April 20, 1949, locomotive 4695, Collins, Ohio. Cab arm rest broke off when employee leaned from cab window to ascertain the source of a steam leak on top of the boiler, causing him to fall to the ground; wooden part of arm rest split longitudinally through bolt holes where it was fastened to the side of cab; one injured.

**May 16, 1949, locomotive 2242, Westville, Ill. Employee was injured while attempting repairs to gage cock; gage cock packing nut, bonnet nut, and valve seats were leaking and discharge nozzle was out of alinement with dripper; nozzle joint was too tight to be moved and cock would not shut off on emergency seat; other two gage cocks were also defective and leaking; one injured.

**May 18, 1949, locomotive 5395, near Avon, Ind. Multiple-valve front end throttle stuck in open position, apparently due to throttle rods being out of alinement and pins in throttle rigging inside of cab being too tight; throttle was reported on May 16, 17, 18, 20, 21, and 25; one injured.

Twenty-one accidents; 21 injured.

NEW YORK, NEW HAVEN & HARTFORD RAILROAD:

July 16, 1948, locomotive 1373, Boston, Mass. Cab vertical handhold at gangway broke through old fracture at bolt hole at top connection to the cab; one injured.

August 13, 1948, locomotive 3347, Cranston, R. I. Tender handhold at gangway broke at rivet hole at top connection; metal was badly corroded and less than ¼ inch thick at the point of failure; one injured.

November 25, 1948, locomotive 3415, Worcester, Mass. Calking tool went through boiler back head while mud ring rivet was being calked; this and six other mud ring rivets in back head had been heavily calked and inside of back head was deteriorated above the mud ring; one injured.

Three accidents; three injured.

NORFOLK & WESTERN RAILWAY:

October 3, 1948, locomotive 2134, near Singer, Va. Flue failed at defective safe end weld; one injured.

March 6, 1949, locomotive 2134, near Burkeville, Va. Superheater flue broke off at back flue sheet; flue had been excessively rolled and expanded; flues and stays were leaking badly; one injured.

Two accidents; two injured.

NORFOLK SOUTHERN RAILWAY:

July 7, 1948, locomotive 527, Raleigh, N. C. Top step to sand dome became disconnected from boiler bracket, causing employee to fall to the ground; step supporting bolt and nut were missing; left front sander was inoperative; one injured.

One accident; one injured.

NORTHERN PACIFIC RAILWAY:

December 9, 1948, locomotive 1779, Rush City, Minn. Stoker failed; stoker elevator screw was obstructed by a foreign piece of metal; one injured.

January 19, 1949, locomotive 2223, Oberon, N. Dak. Manually operated reverse lever was hard to operate account of snow and ice being packed around valve guides and eccentric links; one injured.

**April 8, 1949, locomotive 1911, Chehalis, Wash. Hydrostatic lubricator filler pot burst; one injured.

Three accidents; three injured.

NORTHWESTERN PACIFIC RAILROAD:

September 29, 1948, locomotive 140, Eureka, Calif. Filling plug of hydrostatic lubricator in cab was not properly tightened; one injured.

December 31, 1948, locomotive 2806, Tiburon, Calif. Right injector was inoperative; injector heater valve was closed; "Grind in R & L boiler checks. Grind in steam ram valve to right injector" was reported about 13 hours prior to the accident; one injured.

Two accidents; two injured.

OREGON ELECTRIC RAILWAY:

March 15, 1949, locomotive (S. P. & S.) 359, near River Junction, Oreg. Sanders were inoperative; one injured.

One accident; one injured.

PENNSYLVANIA RAILROAD:

*July 9, 1948, locomotive 8693, Trotwood, Ohio. Grease on locomotive footboard; one injured.

July 15, 1948, locomotive 7286, Terre Haute, Ind. Grate shaker lever broke through defective weld; lever had been electrically welded after a previous break; one injured.

July 16, 1948, locomotive 8109, Colehour, Ind. Main throttle valve was difficult to close; throttle was reported leaking on July 2, 4, 5, 10, 12, 13, 15, and 16; one injured.

September 11, 1948, locomotive 4487, Cresson, Pa. Sanders were inoperative due to an accumulation of gravel in sand traps which blocked sand from sand pipes; one injured.

September 19, 1948, locomotive 4643, Pine, Pa. Squirt hose burst; hose was badly worn; "Renew sprinkling hose" was reported on September 12, and locomotive received monthly inspection on September 15; one injured.

September 24, 1948, locomotive 4403, near Dewart, Pa. Squirt hose valve worked open and hose came out of storage receptacle in cab floor and whipped around, discharging hot water in the cab; valve stem packing was defective and proper means not provided to secure the hose in receptacle; one injured.

October 1, 1948, locomotive 8928, Bringhurst, Ind. Air operated power reversing gear did not operate properly; ratchet was loose on reverse lever; ratchet on rotary valve had excessive lost motion due to retaining pin being broken; reach rod from reverse lever to air reverse gear was ⅜ inch too short which permitted piston of air reverse gear to travel too far forward and cover the front port in cylinder; "Reverse lever sticks in forward motion" was reported on September 27, and report shows that temporary repairs were made; one injured.

October 2, 1948, locomotive 3881, near Casey, Ill. Front end of main rod broke through old fracture which extended through approximately 60 percent of cross-sectional area; one injured.

**October 19, 1948, locomotive 3724, Blakeley, N. Y. Spring hanger broke through old fractures at slot where it engaged the equalizer; metal crystallized at point of failure; hanger was scarred where it had fouled on main frame; one injured.

November 25, 1948, locomotive 735, Larimer, Pa. Lubricator pipe to stoker engine broke through threads at steam pipe connection; one injured.

December 15, 1948, locomotive 6992, Frazeysburg, Ohio. Grate-shaker bar slipped off lever due to improper fit; shaker bar socket was burred and partially filled with packed coal; one injured.

December 17, 1948, locomotive 5544, near South Fork, Pa. Lip of tender water scoop dipper was bent upward approximately 1½ inches which prevented water from being taken from track pans; water scoop dipper was reported bent on December 1, 5, 9, 12, and 14; one injured.

January 3, 1949, locomotive 6717, Morgan Run, Ohio. Weld attaching upper section of tender truck side bearing to water bottom frame failed and side bearing section fell from position which resulted in lurching and rough riding tender; one injured.

**January 25, 1949, locomotive 1644, Mingo Junction, Ohio. Reflex type water glass burst; water glass and back gasket were deteriorated; one injured.

February 6, 1949, locomotive 4546, Sizerville, Pa. Grate-shaker bar slipped off post due to improper fit; sides of shaker bar socket were bent inward, end of socket was badly burred, and socket was filled to a depth of approximately 2 inches with fine coal and other matter; one injured.

May 25, 1949, locomotive 6572, Cleveland, Ohio. Tender shoveling sheet was badly worn; one injured.

Sixteen accidents; 16 injured.

PITTSBURGH & LAKE ERIE RAILROAD:

September 12, 1948, locomotive 7294, Campbell, Ohio. Insufficient clearance between cab vertical handhold and tender deck while on curve; one injured.

One accident; one injured.

PITTSBURGH & WEST VIRGINIA RAILWAY:

September 3, 1948, locomotive 1101, near Chaintown, Pa. Superheater flue broke at safe end weld; overheated in welding; three injured.

One accident; three injured.

RICHMOND, FREDERICKSBURG & POTOMAC RAILROAD:

January 15, 1949, locomotive 267, Cherry Hill, Va. Stoker trough slide stuck in slots; slots had excessive openings, permitting the slide to work forward under another slide and become wedged in the slots; one injured.

One accident; one injured.

ST. LOUIS-SAN FRANCISCO RAILWAY:

July 12, 1948, locomotive 4027, near Winslow, Ark. Employee's hand was caught between the handle of sliding cover of ventilator in cab roof and wall of the ventilator while closing ventilator; suitable stops not provided for the sliding cover; one injured.

November 19, 1948, locomotive 1262, Henryetta, Okla. Stem and bonnet threads stripped on blower valve; blower valve was reported on November 14, 16, 18, and 19 (two times prior to the accident); one injured.

December 18, 1948, locomotive 4411, Columbus, Kans. Grate shaker bar handle contacted cab-seat back rest while grates were being shaken; one injured.

February 26, 1949, locomotive 4409, near Niangua, Mo. Crown-sheet failure caused by overheating due to low water; 12 injured.

Four accidents; 15 injured.

SEABOARD AIR LINE RAILROAD:

October 7, 1948, locomotive 520, Fernandina, Fla. Insufficient clearance between tank step and grab iron; one injured.

December 14, 1948, locomotive 377, Hawthorne, Fla. Smoke stack flared extension in smoke box became displaced; smoke and gases forced from firebox into cab; two of five bolts used to secure the extension were missing and nuts were missing from remaining bolts; one injured.

April 6, 1949, locomotive 442, Lynah, S. C. Stoker was inoperative; stoker engine piston and valve stem packing were leaking and excessive openings at sliding plates of stoker trough permitted unusual amount of coal in the conveyor; stoker was reported on March 5, 7, 8, 22 (two times), 23, 24, and 26; one injured.

Three accidents; three injured.

SOUTHERN RAILWAY:

September 19, 1948, locomotive 784, Princeton, Ind. Injector did not operate properly; one injured.

October 25, 1948, locomotive 1894, East St. Louis, Ill. Brake hanger failed through eye at frame support; brake beam, brake head and brake shoe dropped and fouled switch point protector, causing derailment of the locomotive; one injured.

February 5, 1949, locomotive 4022, Stanton, Ala. Section of grates was hard to shake, due to being blocked by a clinker or other foreign matter; one injured.

**April 29, 1949, locomotive 1384, Greenville, S. C. Front end of cab arm rest pulled loose and swung outward, causing employee to fall from foot rail on side of cab to the ground; nut was missing from bolt which secured front end of arm rest to bracket attached to cab wall; one injured.

May 16, 1949, locomotive (A. G. S.) 6603, Birmingham, Ala. Grate-shaker bar struck the mechanically operated fire door air valve pedal bracket while grates were being shaken; grate-shaker bar was not the carrier's standard; one injured.

June 14, 1949, locomotive 4596, Huntingburg, Ind. Pilot beam handrail broke off through old fractures at both ends; one killed.

Six accidents; one killed, five injured.

SOUTHERN PACIFIC—LINES EAST:

**February 19, 1949, locomotive 3723, between El Paso and Valentine, Tex. Locomotive rode very rough; excessive slack between locomotive and tender; adjusting screw to slack wedge could not be turned account of screw bracket having been applied out of alinement; one injured.

June 26, 1949, locomotive (T. & N. O.) 750, San Antonio, Tex. Lining of fuel oil feed hose collapsed, resulting in irregular fire in firebox and sudden burst of flames into the cab; one injured.

Two accidents; two injured.

SOUTHERN PACIFIC—LINES WEST:

July 14, 1948, locomotive 3689, Belleview, Oreg. Brakeman's cab seat fell from elevated storage position, due to not having been properly secured to bracket near the top of cab; one injured.

July 26, 1948, locomotive 4301, El Casco, Calif. Water spout hook slipped from pull nob of spout, due to insecure connection; one injured.

**July 26, 1948, locomotive 2905, Albany, Oreg. Main throttle would not stay closed; throttle quadrant anchor bolts were loose which permitted quadrant to move away from latch teeth; "Throttle lever will not latch in quadrant" was reported on July 24; one injured.

August 6, 1948, locomotive 1267, Sacramento, Calif. Flames flashed through firebox-door damper and peephole openings; carbon accumulation in firebox; "Clean out firebox" was reported on August 5; one injured.

September 10, 1948, locomotive 1129, Sacramento, Calif. Opening (9⅜ x 38¼ inches) on top of tender between fuel oil tank and feed water tank near water-tank manhole; one injured.

September 13, 1948, locomotive 4147, Frazier, Oreg. Boiler check tailpiece in feed water pump delivery pipe broke; delivery pipe bracket was missing and the weight of the pipe was being carried principally by the boiler check. At time of the failure, employee was on running board near the boiler check after making repairs to the feed water pump which had become inoperative; feed water pipe strainer was restricted by waste; feed water pump was reported on August 20, 21, 22 (two times), 28 (two times), and September 8; one injured.

September 16, 1948, locomotive 1820, Freeport, Calif. Sand box lid fell from open position; no means provided to secure the lid in open position; one injured.

September 24, 1948, locomotive 2743, San Jose, Calif. Water spout hook was bent; one injured.

September 30, 1948, locomotive 2586, Ripon, Calif. Cab handhold fouled the top of gangway ladder when on a curve; one injured.

October 4, 1948, locomotive 2346, Isleton, Calif. Pilot beam handrail broke through old fracture at one end; one injured.

October 5, 1948, locomotive 4200, Oakridge, Oreg. Fire door liner was badly burned and warped and liner fouled fire-door hole; one injured.

October 22, 1948, locomotive 2379, Dutch Flat, Calif. Injector water valve stuck shut, evidently caused by boiler check leaking and causing injector to become hot. Employee was struck by a mail crane when he leaned from cab to observe the overflow from injector; overflow spreader was so located that it was necessary to lean far out of cab to see the overflow; one injured.

December 15, 1948, locomotive 2840, Dunsmuir, Calif. Fuel oil on top of tender fuel oil tank; one injured.

January 11, 1949, locomotive 3322, near Toltec, Ariz. Drinking water cooler fell from pedestal on tender; nut on retaining bolt missing and bolt worked out; one injured.

January 14, 1949, locomotive 1275, Sacramento, Calif. Oil on top of tender fuel oil tank and on tender deck; one injured.

January 18, 1949, locomotive 2703, Timber, Oreg. Employee slipped while turning around in gangway and fell to the ground; oil on cab deck and apron; "Lubricator glass on bulls eye on sight glass leaking very bad" was reported after the accident; similar reports were made on January 12 (two times) and January 13 (two times); gangway width was 1 inch less than minimum prescribed by rule 152 (c); one injured.

January 25, 1949, locomotive 2598, Gerber, Calif. Oil on handhold on front of tender; one injured.

January 25, 1949, locomotive 4420, West Oakland, Calif. Gas explosion in firebox of oil-burning locomotive; one injured.

January 27, 1949, locomotive 4410, Phoenix, Ariz. Front end netting was stopped up with soot, resulting in gas explosion in the firebox of oil burning locomotive; one injured.

February 4, 1949, locomotive 3745, Imlay, Nev. Oil on deck apron and handholds and steps of gangway ladder; one injured.

February 4, 1949, locomotive 3700, Watsonville Junction, Calif. Mud on pilot sill step caused employee to slip; one injured.

February 5, 1949, locomotive 4134, Chemult, Oreg. Handle of tender brake-pipe angle cock broke through 75 percent old fracture; one injured.

February 16, 1949, locomotive 4169, Wellton, Ariz. Oil on top of tender fuel oil tank; one injured.

February 16, 1949, locomotive 1100, Phoenix, Ariz. Employee slipped and fell on smooth metal top of tender oil tank; one injured.

February 22, 1949, locomotive 5024, Albany, Oreg. Top step on face of tender oil tank broke through old fracture at bend near side connection; old fracture extended through approximately 95 percent of the cross-sectional area; one injured.

February 22, 1949, locomotive 2355, Woodbridge, Calif. Vertical handhold at rear corner of cab fouled gangway ladder when on sharp curve; one injured.

March 18, 1949, locomotive 3638, Newark, Calif. Grease on rung of ladder on locomotive; one injured.

May 19, 1949, locomotive 2565, Fall Creek-Lowell, Oreg. Coil spring for reseating steam whistle valve was broken and part of the spring lodged between whistle valve and its seat when the valve was opened, causing continuous whistle blast; one injured.

May 20, 1949, locomotive 4134, Crescent Lake, Oreg. Employee fell from step near front corner of cab; passageway on step was obstructed by a classification lamp which was located 3 inches above the step and extended outward 7 inches in front of the step; one injured.

June 4, 1949, locomotive 2308, Stockton, Calif. Fire flashed out of firebox when employee attempted to light a fire, probably caused by blow back valve being opened instead of the atomizer valve; markings on all valves on blower manifold were covered with asbestos wrapping; one injured.

June 18, 1949, locomotive 3705, Golconda, Nev. Left front side rod came off front crank pin and right front side rod broke through old fracture near center; left front crank pin collar was missing; "L front side rod collar loose" was reported on May 25, and "L No. 1 side rod collar gone" was reported on May 30; one injured.

June 25, 1949, locomotive 2771, Tucson, Ariz. Explosion and flash back from firebox of oil burning locomotive; heavy accumulation of carbon on floor of firebox; carbon in firebox was reported 15 times in the 30 days preceding the accident; one injured.

Thirty-two accidents; 32 injured.

SPOKANE, PORTLAND & SEATTLE RAILWAY:

July 2, 1948, locomotive 501, Sinamox, Oreg. Locomotive did not steam properly; 15 small flues were plugged and several others partially plugged; several superheater and small flues were leaking; air leak at bottom of smoke box door ring; honeycomb on back flue sheet; flues leaking and carbon in firebox were reported numerous times in the 30 days preceding the accident; one injured.

July 20, 1948, locomotive 501, near Northdalles, Wash. Superheater flue failed at defective safe end weld; weld leaking; flues reported leaking on June 26, 28, 29, 30, and July 7 and 19; two injured.

Two accidents; three injured.

TEXAS & PACIFIC RAILWAY:

March 4, 1949, locomotive 804, Gladewater, Tex. Tender water tank was leaking through floor crack on inside of an equipment locker which was built in leg of the tank; while employee was observing the leak, his hand was caught between the open locker door and back wall of cab when the locomotive moved on curve; one injured.

**May 20, 1949, locomotive 478, El Paso, Tex. Fire hose burst; one injured.

Two accidents; two injured.

UNION BELT OF DETROIT:

July 11, 1948, locomotive (P. M.) 1401, Detroit, Mich. Squirt hose burst; failure occurred where hose had been damaged and repairs attempted; "Squirt hose leaking" was reported on July 5; one injured.

One accident; one injured.

UNION PACIFIC RAILROAD:

August 2, 1948, locomotive 9010, North Platte, Nebr. Ashpan wing broke off hinges and dropped to the ground, striking employee's foot; hinges were badly deteriorated and cracked through bolt holes; one injured.

October 16, 1948, locomotive 4003, near Wilcox, Wyo. Cap worked off enginehouse blower connection, allowing steam from blower line to escape and obscure vision; one killed.

October 20, 1948, locomotive 9018, near Upland, Kans. Crown-sheet failure caused by overheating due to low water; three killed.

**January 8, 1949, locomotive 7018, Idaho Falls, Idaho. Boiler check was leaking and sticking open at times, resulting in tank hose becoming heated and blowing off connection; boiler check valve seat was cut and there was considerable scale on valve wings which caused check to stick; one injured.

March 12, 1949, locomotive (O. S. L.) 2546, Wamsutter, Wyo. Handle missing from tank hose shut off valve stem; one injured.
Five accidents; four killed, three injured.

WABASH RAILROAD:

**September 1, 1948, locomotive 1550, Decatur, Ill. Packing nut on squirt hose valve was leaking; one injured.
**February 25, 1949, locomotive 2917, Chicago, Ill. Oil on cab apron; one injured.
**June 13, 1949, locomotive 2815, Fort Wayne, Ind. Dump grate dropped unexpectedly when employee attempted to shake the right front section of the grates; location of dump-grate levers had been changed to standard location of front section levers; one injured.
Three accidents; three injured.

WESTERN PACIFIC RAILROAD:

July 9, 1948, locomotive 174, Elko, Nev. Squirt hose burst; one injured.
**August 8, 1948, locomotive 207, Keddie, Calif. Cab handrail broke through old fracture at bolt hole; one injured.
October 26, 1948, locomotive 201, Bieber, Calif. Fuel oil and sand on top of tender fuel oil tank; one injured.
April 6, 1949, locomotive 210, Almanor, Calif. Cab handhold at gangway broke through flaw at bolt hole at lower end; one injured.
Four accidents; four injured.

WHEELING & LAKE ERIE RAILWAY:

July 8, 1948, locomotive 6804, Huron, Ohio. Superheater units and exhaust pipe gasket were leaking; one injured.
May 17, 1949, locomotive 5120, Brewster, Ohio. Throttle lever latch spring failed to disengage when attempt was made to close throttle, due to excessive tension on latch spring; accident occurred on first trip after a class 3 repair, at which time a new latch spring had been applied; one injured.
Two accidents; two injured.

ACCIDENTS AND CASUALTIES RESULTING FROM THE FAILURE OF LOCOMOTIVES OTHER THAN STEAM AND THEIR APPURTENANCES DURING THE FISCAL YEAR ENDED JUNE 30, 1949, BY ROADS

[A star (*) indicates accidents taken from records of the Bureau of Transport Economics and Statistics of the Interstate Commerce Commission. A double star (**) indicates accidents not properly reported, as required by rule 335. Complete investigations, 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.]

ATCHISON, TOPEKA & SANTA FE RAILWAY:

August 8, 1948, unit 2–A, Planada, Calif. Gasses in crankcase of Diesel-electric unit exploded after No. 2 engine had been shut down account of pounding and hot piston; bottom end was broken off fuel injector in cylinder of No. 2 engine and embedded in the top of piston, scoring cylinder head, liner, and piston and causing fuel oil dilution in the crankcase; one injured.
**September 15, 1948, unit 112, San Bernardino, Calif. Lug in height adjusting device of engineer's cab seat was broken; one injured.
September 17, 1948, unit 107–A, Java, Calif. Cable lug on wheel slip relay cam switch was broken, causing faulty operation of the relay; one injured.
October 11, 1948, unit 2346, San Bernardino, Calif. Employee fell from crouched position on running board while attempting to clean oil strainer; handle for operating the cleaner was located about 6 inches above the running board; one injured.
**October 30, 1948, unit 22, Yampai, Ariz. Main contactor opened uncontrolled while under load; one injured.
January 26, 1949, unit 58–L, Barstow, Calif. Cab window stuck in groove while being closed; cab window was reported sticking before and after the accident; one injured.
Six accidents; six injured.

BOSTON & MAINE RAILROAD:

*July 27, 1948, unit 1207, Boston, Mass. Angle-cock stop was broken off which permitted the handle to turn completely around and reopen angle cock, resulting in sudden air blast which uncoupled air hose; one injured.
February 3, 1949, unit 1202, Boston, Mass. Cab heater fan blades were bent and both end sections of grill around fan were missing; one injured.
February 20, 1949, unit 1551, Gloucester, Mass. Insufficient clearance between door handle and door jamb of engine compartment; one injured.
April 28, 1949, unit 3806, Hoosick, N. Y. Employees slipped on engine-room floor which was wet due to water supply tank for toilet in engine room leaking; "Toilet water tank leaking" was reported by carrier's inspector about 8 hours prior to the accident; one injured.
**June 11, 1949, unit 3814, Bellows Falls, Vt. Oil on engine room floor; one injured.
Five accidents; five injured.

CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC RAILROAD:

**October 15, 1948, unit 1632, Milwaukee, Wis. Coupler knuckle fell out; coupler knuckle pin was missing; knuckle pin was found brokeu about 4 hours prior to the accident; one injured.
One accident; one injured.

CHICAGO, ROCK ISLAND & PACIFIC RAILROAD:

**January 4, 1949, unit 9071, Little Rock, Ark. V-type belts were slipping on air starter unit for Diesel engine; one injured.
One accident; one injured.

DULUTH, SOUTH SHORE & ATLANTIC RAILWAY:

December 17, 1948, unit 106, Marquette, Mich. Injured while adjusting train line steam heat valve to reduce the amount of steam escaping; one injured.
One accident; one injured.

ERIE RAILROAD:

August 16, 1948, unit 703–D, Port Jervis, N. Y. Employee slipped when getting off cab seat, apparently due to his foot sliding on smooth metal molding which bound floor covering at edge of the raised deck; one injured.
One accident; one injured.

GRAND TRUNK WESTERN RAILWAY:

June 8, 1949, unit 7968, Grand Rapids, Mich. Footboard was bent; one injured.
One accident; one injured.

GREAT NORTHERN RAILWAY:

**August 12, 1948, unit 2333, near Plentywood, Mont. Brush holder spring in fuel pump motor broke; one injured.
October 12, 1948, unit 195, near Lewistown, Mont. Employee in cab was injured by flying glass from broken cab window; one injured.
Two accidents; two injured.

GULF COAST LINES:

April 15, 1949, unit (St. L. B. & M.) 540, Vanderbilt, Tex. Oil on engine-room floor, due to leakage around cut-out cocks in the air box drain pipe lines on both sides of the engine; one injnred.
One accident; one injured.

GULF, MOBILE & OHIO RAILROAD:

May 17, 1949, unit 730, New Orleans, La. Handle on rim of handwheel of hand brake became unscrewed from handwheel while being used to apply the brake; handle was not carrier's standard and had not been properly tightened in the handwheel; one injured.
One accident; one injured.

MINNESOTA WESTERN RAILWAY:

September 15, 1948, unit 51, Parkers Lake, Minn. Crankcase explosion caused by overheating and breaking of a piston; two injured.
One accident; two injured.

MISSOURI-KANSAS-TEXAS RAILROAD:

April 15, 1949, unit 1026, Fort Worth, Tex. Hook provided to hold cab door in open position was displaced and fouled the door; spring latch intended to secure the door hook when not in use was missing; one injured.

One accident; one injured.

NEW YORK CENTRAL SYSTEM:

September 29, 1948, unit 1002, near Chatham, N. Y. Engineer's adjustable cab seat broke off vertical adjustment column of pedestal assembly, due to column being insecurely welded to bottom of seat frame; one injured.

November 11, 1948, unit 138, Mount Vernon, N. Y. Third rail shoe broke off and was thrown from moving locomotive; one injured.

February 8, 1949, unit 1601, Danbury, Ohio. Crankcase explosion resulting from an overheated bearing; one injured.

Three accidents; three injured.

NEW YORK, NEW HAVEN & HARTFORD RAILROAD:

March 26, 1949, unit 0504, Winsted, Conn. Train line steam valve at rear of unit was leaking; one injured.

One accident; one injured.

NORFOLK SOUTHERN RAILWAY:

September 3, 1948, unit 1501, Butts, Va. Explosion in crankcase caused by ignition of lubricating oil vapors by overheated main or connecting rod bearings; one injured.

One accident; one injured.

NORTHERN PACIFIC RAILWAY:

December 27, 1948, unit 6503–C, near Fishtrap, Wash. Electric flash from high tension contactor compartment of Diesel-electric unit, probably caused by failure of automatic transition to complete change from No. 2 to No. 3 circuit; control would not shift to No. 3 circuit automatically at prescribed speed; upper latch to compartment door was unlatched and door was slightly open; one injured.

One accident; one injured.

PENNSYLVANIA RAILROAD:

July 31, 1948, unit 5751–A, Mifflin, Pa. Undesired emergency application of brakes caused by failure of insulation of the lubricating oil pressure relay; one injured.

November 2, 1948, unit 5847–A, Harrisburg, Pa. Front end door was out of alinement and difficult to latch, due to improper application of door hinge; one injured.

December 15, 1948, unit 4840, Philadelphia, Pa. Fires around the base of steam heat boiler; one injured.

January 13, 1949, unit 4752, near Wayne, Pa. Short circuit and flash over occurred in switch group compartment behind operating cab of electric locomotive, caused by break down of the supporting insulation on motor switch; one injured.

January 30, 1949, unit 5776–A, Chicago, Ill. Cover blew off steam-generator water-treatment tank while frozen generator and pipes to generator were being thawed, caused by high pressure steam from train steam heat line, which was being used in reverse to thaw generator, entering the tank; apparently the check valve in cold water feed line which had been frozen was damaged or inoperative, permitting the steam under pressure to enter the water-treatment tank; one injured.

March 15, 1949, unit 5771–A, Torrance, Pa. Derailment caused by a broken axle in an overheated traction motor suspension bearing; 17 injured.

May 30, 1949, unit 5778–A, Indianapolis, Ind. Failure of Diesel-electric locomotive air-brake system resulting from improper functioning of an independent brake valve caused by a spring cage top which became unscrewed; two injured.

June 27, 1949, unit 4805, New Brunswick, N. J. Cap of flexible spring drive assembly worked off, due to deterioration of screw threads in cap screw holes in the spider casting, and parts of the assembly were thrown from the rapidly moving locomotive unit; one injured.

Eight accidents; 25 injured.

SEABOARD AIR LINE RAILROAD:

October 3, 1948, unit 3041, near Whitmire, S. C. Sliding rear end door swung shut when unit lurched; one injured.

One accident; one injured.

SOUTHERN RAILWAY:

July 28, 1948, unit 6825, Accotink, Va. Traction motor field lead became loose in connector; one injured.

**November 5, 1948, unit 4324, Birmingham, Ala. Ten-gallon glass cylinder on Diesel unit for collecting return hot water broke; one injured.

January 11, 1949, unit 6112, Dry Ridge, Ky. Screws for securing swivel-type cab seat to supporting frame pulled out of the wood bottom of the seat, permitting the seat to fall backward; one injured.

**June 1, 1949, unit 2289, Spencer, N. C. Cab sheathing was torn near back corner and a projecting piece of the sheathing obstructed the use of cab handhold; one injured.

Four accidents; four injured.

SOUTHERN PACIFIC—LINES WEST:

October 28, 1948, unit 6103, Indio, Calif. Front end door swung shut violently, catching employee's hand; one injured.

November 7, 1948, unit 6100–C, Durmid, Calif. Employee slipped on floor of Diesel unit; "Lub. oil pump on C unit leaking oil around outlet" was reported on November 6, and "Clean oil from around air pumps and walks in all units" was reported on November 10; one injured.

December 21, 1948, unit 6002–B, San Luis Obispo, Calif. Door of unit closed unexpectedly; "Front door latch screws missing and latch loose" was reported after the accident; one injured.

Three accidents; three injured.

UNION BELT OF DETROIT:

December 25, 1948, unit (F. S. U. D.) 1, Detroit, Mich. Air brake train line hose burst near joint; hose bore well defined impressions of hose clamps at the point of failure; one injured.

One accident; one injured.

UNION PACIFIC RAILROAD:

August 7, 1948, unit 1426, Pico, Calif. Explosion in crankcase and related air box blew off air box cover; connection between fuel oil pump line and injector had not been properly tightened; fuel oil leakage entered the crankcase where fumes from the heated oil became ignited by flash from a cylinder; one injured.

January 2, 1949, unit 984–BJ, East Portland, Oreg. Explosion in an engine air box of Diesel-electric unit resulted from defective compression rings and a defective piston; a piece of the piston land was broken out between Nos. 1 and 2 compression rings and several small pieces were broken from upper edge of No. 1 piston; numerous compression rings in Nos. 1, 2, 3, 4, 6, 8, and 10 cylinders were broken and/or stuck in their grooves which permitted unburned fuel oil to enter the air box and form an explosive mixture which became ignited by flame blowing by the defective piston; one injured.

January 2, 1949, unit 984–BJ, Hinkle, Oreg. Explosion in an engine air box of Diesel-electric unit resulted from defective compression rings and a defective piston; a piece of the piston land was broken out between Nos. 1 and 2 compression rings and several small pieces were broken from upper edge of No. 1 piston; numerous compression rings in Nos. 1, 2, 3, 4, 6, 8, and 10 cylinders were broken and/or stuck in their grooves which permitted unburned fuel oil to enter the air box and form an explosive mixture which became ignited by flame blowing by the defective piston. A similar accident occurred on this unit 4½ hours previously; one injured.

Three accidents; three injured.

VIRGINIAN RAILWAY:

July 21, 1948, unit 3, Pepper, Va. Main bus line lead failed at joint back of transformer entrance bushing on unit 1, and when attempt was made to disconnect the control jumpers between units 1 and 3 a flash to ground occurred between the cap of the roof entrance bus line bushing and the roof of unit 3; one injured.

One accident; one injured.

TABLE XII.—*Number of steam locomotives inspected, found defective, and ordered from service, etc.*

	Parts defective, inoperative or missing, or in violation of the rules	Akron, Canton & Youngstown	Aliquippa & Southern	Ann Arbor	Atchison, Topeka & Santa Fe	Atlanta & West Point	Atlantic & Yadkin	Atlantic Coast Line	Baltimore & Ohio	Bangor & Aroostook	Belt Ry. Co. of Chicago	Bessemer & Lake Erie	Boston & Maine	Canadian National	Canadian Pacific	Central of Georgia	Central Railroad of New Jersey	Central Vermont	Charleston & Western Carolina	Chesapeake & Ohio	Chicago & Eastern Illinois	Chicago & Illinois Midland	Chicago & North Western	Chicago & Western Indiana	Chicago, Burlington & Quincy	Chicago Great Western	Chicago, Milwaukee, St. Paul & Pacific	Chicago River & Indiana	
1	Air compressors				25	4		10	13				4							8			19	1	10		15	2	1
2	Arch tubes				2																		4				2		2
3	Ashpans and mechanism				1				1																				3
4	Axles																												4
5	Blow-off cocks				16			3	2						2			1		7			5				5		5
6	Boiler checks				11			5	11							1			1				5		1		4		6
7	Boiler shell				6				2					1	3								8		1	1	9		7
8	Brake equipment	3			67	1		23	64				2	1	1	11	7	3	2	4	3	2	48		28	5	70		8
9	Cabs, cab windows, and curtains				34		1	5	22				1		2		3			2			18		11		14		9
10	Cab aprons and decks				14			1	5				5				1			1	1		16		8		11		10
11	Cab cards				1				9						1					3							3		11
12	Coupling and uncoupling devices				1				1						3		1						3				1		12
13	Crossheads, guides, pistons, and piston rods				31			9	51				7		7	7	2	2	1	9	1		35		3	2	49		13
14	Crown bolts				4				2							1	1			4			1						14
15	Cylinders, saddles, and steam chests				54			4	77				9			4	2			45	1		23		18		27		15
16	Cylinder cocks and rigging				7				14							1				6			8		9		10		16
17	Domes and dome caps				4				1				2				1			2			1		1		1		17
18	Draft gear				2			1	9				2			7	3			5			22		4	2	9		18
19	Draw gear				3			5	26														9		1	3	14		19
20	Driving boxes, shoes, wedges, pedestals, and braces	1			52			4	58				7			4	1	2	1	1			46	2	18		46		20
21	Firebox sheets				5			2	3				3			3				2	3	1					4		21
22	Flues				16			1	1							1				4			2				4		22
23	Frames, tail pieces, and braces, locomotive				14			6	24				4		2		1			1	1		12		9	1	19		23
24	Frames, tender				1				1					2		1									2				24
25	Gages and gage fittings, air				7			3	6														4				1		25
26	Gages and gage fittings, steam				7			2	9					1		1				3			1		2		1		26
27	Gage cocks				21			4	14				1			1	3			1		1	8		8	1	2		27
28	Grate shakers and fire doors				11			5	5				2	1			2			4			7		5	1	6		28
29	Handholds				13		1	1	12				1		2			1		6			16	1	7	1	8		29
30	Injectors, inoperative								1																1				30
31	Injectors and connections				81	1		20	56				6	1	8	6	14	3		9			36		20	2	25	1	31
32	Inspections and tests not made as required				2			1	9											1			1				4		32
33	Lateral motion				8			2	24					2		4	2	3	1	10	2		10		6		7		33
34	Lights, cab and classification				1				2																		2		34
35	Lights, headlight				4			1							1		1			1			1		1		2		35
36	Lubricators and shields				9			1	3											1			2		6		1		36
37	Mud rings				3				3	1			3		2					2			2				3		37
38	Packing nuts				32			4	15	1				1		3				1	1	1	7		6		1		38
39	Packing, piston rod and valve stem				10			1	12								1			2	1		7		17		17		39
40	Pilots and pilot beams				4			2	2														3			1			40
41	Plugs and studs				11				1											3			5		1		7		41
42	Reversing gear				24			6	10						1	4	3			1			8		3	1	7		42
43	Rods, main and side, crankpins, and collars				34			5	55				4	5	6	9	1	2	4	11		1	42		14		28		43
44	Safety valves				1				1											2									44
45	Sanders				42			4	16				2					1					19		7		5		45
46	Springs and spring rigging				93		1	31	178				15	6	3	11	8	1		29	3		111		28	4	90		46
47	Squirt hose				2			1	1														1						47
48	Stay bolts				19				4								1			2		1	4		2		6		48
49	Stay bolts, broken				5																		1				3		49
50	Steam pipes				26			3	4					2	1					3			8	1	1		2		50
51	Steam valves				17			1	3				1							6			3		1		5		51
52	Steps				27			3	13				4	1	1		1	2		5			25		5		19		52
53	Tanks and tank valves	1			43		3	13	50				1	2	7	2	16	3		6	1	1	32		13	2	24		53
54	Telltale holes				1			2					1							1			1						54
55	Throttle and throttle rigging				30			7	16		1		2	3		4	1	2		3	2		45		3		22		55
56	Trucks, engine and trailing				30			6	31				3		1			2		5			35	1	8	1	20		56
57	Trucks, tender				22			14	17				10	1	5	10	1			1			5		3	4	6		57
58	Valve motion				11			4	20				7	3	4	2	2	1	1	4	1		21		9		8		58
59	Washout plugs				24	2			9					1		1	1	4		1			4		2		5		59
60	Stokers				2			1	8							1				1	1		2		5		13		60
61	Water glasses, fittings, and shields				24	1		5	36				1	1	3	1	1			12			7	1	5	1	6		61
62	Wheels				12			7	20				2		1		3	2		1			7		5		14		62
63	Miscellaneous—Signal appliances, badge plates, brakes (hand)				51			3	8				1	3			1	2		6			11		5		3		63
	Number of defects	5			1,135	9	6	242	1,071	2	2		114	37	65	103	86	37	11	247	20	9	787	7	323	33	690	3	
	Locomotives reported	17	23	33	1,340	41	12	595	1,780	61	46	104	297	289	156	183	249	53	40	1,159	91	30	857	17	736	39	994	35	
	Locomotives inspected	78	52	49	3,431	60	26	1,208	4,561	42	74	201	877	111	153	390	324	190	54	2,561	192	76	2,624	31	1,934	301	2,627	44	
	Locomotives defective	1			294	3	2	78	302	1	2		72	11	35	32	42	14	4	88	10	4	200	2	78	9	198	2	
	Percentage of inspected found defective	1.3			9	5	8	6	7	2.4	2.7		8	10	23	8	5	7	7	3.4	5	5	8	6	4	3	8	4.5	
	Locomotives ordered out of service				7			3	7					1	2	1			1	1			6		1		4		

TABLE XII.—*Number of steam locomotives inspected, found defective, and ordered from service, etc.*—Continued

	Parts defective, inoperative or missing, or in violation of the rules	Chicago, Rock Island & Pacific	Chicago, St. Paul, Minneapolis & Omaha	Chicago, West Pullman and Southern	Cincinnati Union Terminal	Clinchfield	Colorado & Southern	Colorado & Wyoming	Conemaugh & Black Lick	Cuyahoga Valley	Davenport, Rock Island & North Western	Delaware & Hudson	Delaware, Lackawanna & Western	Denver & Rio Grande Western	Detroit & Toledo Shore Line	Detroit, Toledo & Ironton	Donora Southern	Duluth, Missabe & Iron Range	Duluth, South Shore & Atlantic	Elgin, Joliet & Eastern	Erie	Florida East Coast	Fort Worth & Denver City	Georgia & Florida	Georgia	Grand Trunk Western	Great Northern	Gulf Coast Lines	
1	Air compressors	52	2			2	3						1	7				3			4		10				1	3	1
2	Arch tubes					1															1								2
3	Ashpans and mechanism						1																						3
4	Axles	1																											4
5	Blow-off cocks	16	1																		2		3			1	7	1	5
6	Boiler checks	18				3	1					3		3							2						2		6
7	Boiler shell	4					1					4	2	2									1				12		7
8	Brake equipment	119	11			17	3					3	2	21			1	4			11		11	4			4	1	8
9	Cabs, cab windows, and curtains	49	1				6					1	2	13			1	4		1	3		9				3	2	9
10	Cab aprons and decks	12	3			2	2					8		4			1	1	1				3			1	8		10
11	Cab cards	1											1																11
12	Coupling and uncoupling devices	1																											12
13	Crossheads, guides, pistons, and piston rods	40	8			3	6	3				5	3	13			2	2			9		3	1		2	6		13
14	Crown bolts	4																			1								14
15	Cylinders, saddles, and steam chests	122	4			4	9		5					24			1	1			2		2			1			15
16	Cylinder cocks and rigging	11				1							1	15				1			4		2					2	16
17	Domes and dome caps		1										1																17
18	Draft gear	8					3					1		5				1	1		1			1				1	18
19	Draw gear	23	1											5				1			1		2				1	2	19
20	Driving boxes, shoes, wedges, pedestals, and braces	76	5			4	10						2	27									2			1	1		20
21	Firebox sheets	20				1															4		4						21
22	Flues	20				2						2	1	1				2					1				1		22
23	Frames, tail pieces, and braces, locomotive	24	3			1	11		1			1	2	4							5		7	1		1	1		23
24	Frames, tender												1	1							1								24
25	Gages and gage fittings, air	9	1														1						4				2		25
26	Gages and gage fittings, steam	24											1	3							1						4		26
27	Gage cocks	29	4				1							1						2	7		2				3	1	27
28	Grate shakers and fire doors	25					4							6							2							2	28
29	Handholds	10	2				1					1	1	4						1	2		1						29
30	Injectors, inoperative	1				1															2		1						30
31	Injectors and connections	113	3	3		6	8	1				3	2	21			2	1			11		12	1	1		16	5	31
32	Inspections and tests not made as required	1												4							1						1		32
33	Lateral motion	18	1			9						3	2	14						2	7		3	2				3	33
34	Lights, cab and classification	5												1															34
35	Lights, headlight	8	1														1						2						35
36	Lubricators and shields	24												3							1		1						36
37	Mud rings	12					1					2									2		1				2		37
38	Packing nuts	16	6			3	1						1	3			1				6					1			38
39	Packing, piston rod and valve stem	35	2			3	2	1						7				1		2	2		3				1	2	39
40	Pilots and pilot beams	4					2																				1	1	40
41	Plugs and studs	2	2											1								1	2				1	2	41
42	Reversing gear	33				2																						3	42
43	Rods, main and side, crankpins, and collars	63	6				16					5	2	5						2	3		3						43
44	Safety valves	6										2	6	26			4	2			7		11			2	1	2	44
45	Sanders	57	1																		1					1			45
46	Springs and spring rigging	207	11			6	6					8		15						1	2		11				1	4	46
47	Squirt hose	6										10	9	31			2	6			12	5	11	5			12		47
48	Stay bolts	9					1							1							2								48
49	Stay bolts, broken	6					2					2	3	2							2		2						49
50	Steam pipes	12	1				1																				7		50
51	Steam valves	5												10							2		1				1		51
52	Steps	35				3	1	2						1													2		52
53	Tanks and tank valves	108	5				4	1				1	2	8			1				1		1				5		53
54	Telltale holes	1										1	3	4				3			12		3			2	14	4	54
55	Throttle and throttle rigging	62						2													1								55
56	Trucks, engine and trailing	23	3			1	3							10					1	1	6		1			1	6	6	56
57	Trucks, tender	19	1	1			6	1					1	7							3		1				1		57
58	Valve motion	22	2			4	1	1	1				6	5			2							1						58
59	Washout plugs	23	1				2							16			1				4						4		59
60	Stokers	4				2	2						1	2				1			3		2			1	3		60
61	Water glasses, fittings, and shields	57	4			3	1							1															61
62	Wheels	12	1			6		1				1	3	3						1	9		4			2	4		62
63	Miscellaneous—Signal appliances, badge plates, brakes (hand)	66				3	1					3	1	5							2		4	1			4		63
	Number of defects	1,793	98	4		104	123	13	7			77	65	380			21	35	3	13	5		4			1	5	3	
	Locomotives reported	541	180	12	19	85	68	20	39	11	11	263	226	269	25	47	17	154	26	52	172	6	147	17	1	18	148	50	
	Locomotives inspected	1,916	521	49	24	187	217	40	74	34	41	924	782	891	65	131	19	151	50	63	509	76	56	28	43	138	637	84	
	Locomotives defective	370	25	2		26	22	4	2	1,653	172	166	74	80	291	1,164	251												
	Percentage of inspected found defective	19	4.8	4.1		14	10	10	2.7			44	3	28	6	1	9	61	7										
	Locomotives ordered out of service	12	1			5	2	1				24	17	8	1	2	4	6	2.7	1.7	17	8	1.2	3.1	5	2.8			
												2.6	3.1	9			21	11	4	6	2.7	1.7	17	8	1.2	3.1	5	2.8	
														2				1					3	1			2	1	

TABLE XII.—*Number of steam locomotives inspected, found defective, and ordered from service, etc.*—Continued

	Parts defective, inoperative or missing, or in violation of the rules	Gulf, Colorado & Santa Fe	Gulf, Mobile & Ohio	Houston Belt & Terminal	Illinois Central	Illinois Terminal	Indiana Harbor Belt	Indianapolis Union	International-Great Northern	Interstate	Jacksonville Terminal	Kansas City Southern	Kansas, Oklahoma & Gulf	Kentucky & Indiana Terminal	Lake Superior & Ishpeming	Lake Terminal	Lehigh & Hudson River	Lehigh & New England	Lehigh Valley	Long Island	Louisiana & Arkansas	Louisville & Nashville	McCloud River	Macon, Dublin & Savannah	Maine Central	Midland Valley	Minneapolis & St. Louis	Minneapolis, St. Paul & S. S. Marie	
1	Air compressors	1	4	----	3	----	3	----	----	1	----	2	----	----	----	----	----	4	2	3	3	18	----	----	----	----	1	1	1
2	Arch tubes	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	----	----	----	----	----	----	2
3	Ashpans and mechanism	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	3	----	----	2	----	----	----	----	----	----	3
4	Axles	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	4
5	Blow-off cocks	2	----	----	2	----	1	----	----	----	----	----	----	----	----	----	----	1	2	----	----	1	----	----	----	----	----	----	5
6	Boiler checks	----	1	----	1	----	1	----	----	----	----	1	----	----	----	----	----	1	5	2	1	7	----	----	----	----	----	----	6
7	Boiler shell	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	2	----	----	----	----	----	----	----	----	----	7
8	Brake equipment	9	4	----	6	----	2	----	----	4	----	2	----	----	----	1	----	4	7	18	8	54	----	----	4	----	6	----	8
9	Cabs, cab windows, and curtains	2	2	----	4	----	1	1	----	----	----	----	1	----	----	1	----	1	7	1	4	19	----	----	2	----	----	----	9
10	Cab aprons and decks	1	1	----	2	1	1	1	----	1	----	----	1	----	----	----	----	----	2	3	----	7	----	----	----	----	----	1	10
11	Cab cards	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	11
12	Coupling and uncoupling devices	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	----	1	1	----	----	----	----	----	----	12
13	Crossheads, guides, pistons, and piston rods	7	4	----	3	----	1	----	----	6	----	----	1	----	----	----	----	3	10	2	6	25	----	----	2	----	2	3	13
14	Crown bolts	----	----	----	1	----	----	----	----	----	----	----	----	----	----	----	----	----	1	----	----	----	----	----	----	----	----	----	14
15	Cylinders, saddles, and steam chests	1	3	----	6	----	----	----	----	18	----	5	1	----	----	----	----	1	4	4	8	15	----	----	----	----	2	3	15
16	Cylinder cocks and rigging	----	----	----	----	----	----	----	----	----	----	1	----	----	----	----	----	----	----	----	----	2	----	----	----	----	3	----	16
17	Domes and dome caps	----	1	----	----	----	----	----	----	1	----	----	----	----	----	----	----	----	----	----	----	5	----	----	----	----	----	----	17
18	Draft gear	2	3	----	5	----	----	----	----	2	----	5	----	----	----	----	----	1	----	2	4	10	----	----	1	----	2	2	18
19	Draw gear	----	2	----	1	----	----	----	----	----	----	----	----	----	----	----	----	----	2	3	----	8	----	----	----	----	1	----	19
20	Driving boxes, shoes, wedges, pedestals, and braces	4	3	----	11	----	1	----	----	21	----	----	----	----	----	----	----	----	8	6	5	23	----	----	1	----	----	----	20
21	Firebox sheets	----	----	----	1	----	1	----	----	4	----	1	1	----	----	----	----	1	----	2	2	2	----	----	----	----	----	----	21
22	Flues	----	2	----	1	----	2	----	----	1	----	1	----	----	----	----	----	1	----	----	3	7	----	----	----	----	----	----	22
23	Frames, tail pieces, and braces, locomotive	3	2	----	9	----	1	----	1	8	----	1	----	----	----	----	----	----	3	4	2	8	----	----	2	----	1	1	23
24	Frames, tender	----	----	----	1	----	----	----	----	----	----	----	----	----	----	----	----	----	1	----	----	----	----	----	----	----	----	----	24
25	Gages and gage fittings, air	2	----	----	----	----	----	----	----	----	----	1	----	----	----	----	----	----	----	----	2	7	----	----	----	----	----	----	25
26	Gages and gage fittings, steam	1	3	----	4	----	----	----	----	----	----	1	----	----	----	----	----	----	4	----	2	10	----	----	----	----	----	----	26
27	Gage cocks	----	2	----	----	----	3	----	----	2	----	1	----	----	----	----	----	7	2	----	3	9	----	----	----	----	----	----	27
28	Grate shakers and fire doors	1	2	----	----	----	1	----	----	----	----	1	----	----	----	----	----	----	1	6	2	2	----	----	1	----	1	----	28
29	Handholds	1	----	----	----	2	1	----	----	----	----	1	----	----	----	----	----	----	2	3	----	2	----	----	----	----	2	----	29
30	Injectors, inoperative	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	----	----	----	----	----	----	30
31	Injectors and connections	12	3	----	5	----	4	1	----	6	----	5	3	----	----	1	----	15	16	25	5	31	----	----	3	----	3	----	31
32	Inspections and tests not made as required	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	----	----	4	----	----	----	----	1	----	32
33	Lateral motion	3	1	----	3	----	5	----	----	16	----	4	----	----	----	4	----	----	1	6	5	6	----	----	----	----	----	----	33
34	Lights, cab and classification	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	----	1	2	----	----	----	----	----	----	34
35	Lights, headlight	1	----	----	1	----	----	----	----	----	----	1	----	----	----	----	----	7	2	1	1	2	----	----	----	----	----	----	35
36	Lubricators and shields	----	1	----	1	----	1	----	----	----	----	----	----	----	----	----	----	----	1	1	----	3	----	----	1	----	----	----	36
37	Mud rings	1	----	----	2	----	----	----	----	----	----	----	----	----	----	----	----	2	2	2	3	2	----	----	----	----	----	----	37
38	Packing nuts	1	2	----	4	----	2	----	----	----	----	----	----	----	----	----	----	3	4	----	----	16	----	----	----	----	----	----	38
39	Packing, piston rod and valve stem	1	2	----	10	----	2	----	----	14	----	1	----	----	----	----	----	----	----	----	1	2	----	----	----	----	----	2	39
40	Pilots and pilot beams	----	----	----	----	----	1	----	1	----	----	----	----	----	----	----	----	----	1	----	----	1	----	----	----	----	1	----	40
41	Plugs and studs	1	1	----	----	----	----	----	----	----	----	1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	41
42	Reversing gear	1	1	----	5	----	1	----	----	----	----	----	----	----	----	----	----	----	1	1	1	3	----	----	1	----	1	----	42
43	Rods, main and side, crankpins, and collars	3	7	----	16	----	5	----	----	18	----	6	4	----	----	----	----	2	9	6	7	40	----	----	----	----	1	----	43
44	Safety valves	----	2	----	1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	44
45	Sanders	1	----	----	1	----	7	----	----	1	----	1	1	----	----	----	----	1	2	6	5	1	----	----	----	----	----	----	45
46	Springs and spring rigging	3	5	----	9	----	5	----	2	6	1	11	1	----	----	2	----	3	20	29	7	52	----	----	8	----	----	----	46
47	Squirt hose	----	----	----	----	----	2	----	----	1	----	----	----	----	----	----	----	----	----	----	----	1	----	----	----	----	----	----	47
48	Stay bolts	----	----	----	4	----	1	----	----	2	----	----	----	----	----	----	----	----	3	1	2	5	----	----	----	----	----	----	48
49	Stay bolts, broken	2	----	----	----	----	----	----	----	14	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	49
50	Steam pipes	----	----	----	----	----	2	----	----	----	----	----	----	----	----	----	----	----	1	4	----	10	----	----	----	----	----	----	50
51	Steam valves	----	----	----	----	----	----	----	----	----	----	2	----	----	----	----	----	----	1	2	----	2	----	----	----	----	----	----	51
52	Steps	----	1	----	5	----	2	----	----	7	----	3	7	6	13	----	----	----	1	3	7	6	13	----	----	----	3	----	52
53	Tanks and tank valves	2	5	----	6	----	6	----	----	3	----	2	----	----	----	----	----	7	14	10	6	27	----	----	2	----	----	----	53
54	Telltale holes	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	2	----	----	1	----	----	----	54
55	Throttle and throttle rigging	3	4	----	4	----	1	----	----	1	----	1	----	----	----	----	----	5	8	4	6	19	----	----	1	----	2	1	55
56	Trucks, engine and trailing	1	2	----	3	----	1	----	----	3	----	1	----	----	----	----	----	1	2	5	1	8	----	----	----	----	----	----	56
57	Trucks, tender	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	6	----	2	----	----	3	----	----	----	57
58	Valve motion	3	----	----	2	----	----	----	1	3	----	----	1	----	----	----	----	9	3	1	----	8	----	----	2	----	----	1	58
59	Washout plugs	1	----	----	3	1	1	----	----	1	----	----	1	----	----	----	----	----	3	2	----	6	----	----	----	----	----	----	59
60	Stokers	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	3	----	----	4	----	----	----	----	----	----	60
61	Water glasses, fittings, and shields	1	2	----	2	----	2	----	----	2	----	5	----	----	----	1	----	1	13	2	5	18	----	----	2	----	1	----	61
62	Wheels	2	----	----	----	----	----	----	----	1	----	----	----	----	----	----	----	----	17	3	----	11	----	----	1	----	----	----	62
63	Miscellaneous—Signal appliances, badge plates, brakes (hand)	2	----	----	----	----	1	----	----	1	----	2	----	----	----	----	----	3	6	8	2	8	----	----	----	----	1	----	63
	Number of defects	82	78	----	148	4	72	3	5	164	----	70	16	----	----	10	----	86	207	191	120	555	----	----	38	----	35	15	
	Locomotives reported	(*)	92	10	1,212	14	108	15	108	16	14	82	12	15	30	10	20	23	196	73	42	788	14	12	104	13	40	237	
	Locomotives inspected	391	214	22	3,060	25	233	34	206	58	16	209	59	9	51	18	70	144	715	155	96	2,023	16	43	301	28	75	630	
	Locomotives defective	17	16	----	44	1	21	1	3	21	----	16	5	----	----	5	----	22	59	38	25	138	----	----	24	----	8	8	
	Percentage of inspected found defective	4.3	7	----	1.4	4	9	2.9	1.5	36	----	8	8	----	----	28	----	15	8	25	26	7	----	----	8	----	11	1.3	
	Locomotives ordered out of service	1	1	----	----	----	----	----	----	8	----	2	----	----	----	----	----	4	3	3	----	14	----	----	----	----	----	----	

*Atchison, Topeka & Santa Fe.

TABLE XII.—*Number of steam locomotives inspected, found defective, and ordered from service, etc.*—Continued

Parts defective, inoperative or missing, or in violation of the rules	Minnesota Transfer	Mississippi Central	Missouri-Illinois	Missouri-Kansas-Texas	Missouri Pacific	Monongahela Connecting	Monongahela	Montour
Air compressors	1	3			8			
Arch tubes								
Ashpans and mechanism					1			
Axles								
Blow-off cocks					6			
Boiler checks					6			
Boiler shell					1			
Brake equipment	1	2	1	2	39			
Cabs, cab windows, and curtains	1		1	1	16			
Cab aprons and decks	1				6			
Cab cards					1			
Coupling and uncoupling devices								
Crossheads, guides, pistons, and piston rods	1				13			
Crown bolts								
Cylinders, saddles, and steam chests				5	36	5		
Cylinder cocks and rigging	1				13			
Domes and dome caps								
Draft gear					6			
Draw gear					4			
Driving boxes, shoes, wedges, pedestals, and braces		8		5	7			
Firebox sheets					5			
Flues								
Frames, tail pieces, and braces, locomotive					11			
Frames, tender								
Gages and gage fittings, air		1						
Gages and gage fittings, steam				1	7			
Gage cocks	2				7			
Grate shakers and fire doors					3			
Handholds					1	1		
Injectors, inoperative					1			
Injectors and connections	1				34			
Inspections and tests not made as required								
Lateral motion					6	2		
Lights, cab and classification								
Lights, headlight					1			
Lubricators and shields					2			
Mud rings					1			
Packing nuts					2			
Packing, piston rod and valve stem					5			
Pilots and pilot beams				1	3			
Plugs and studs					2			
Reversing gear					4	1		
Rods, main and side, crankpins, and collars	5			4	29	3		
Safety valves					2			
Sanders					10			
Springs and spring rigging		2		3	39			
Squirt hose					4			
Stay bolts	1				2			
Stay bolts, broken	2				2			
Steam pipes				2	2			
Steam valves					3			
Steps			1		11			
Tanks and tank valves	1	1			29			
Telltale holes					1			
Throttle and throttle rigging				1	9			
Trucks, engine and trailing		1		1	6			
Trucks, tender		1			5			
Valve motion				1	7			
Washout plugs					9			
Stokers					6			
Water glasses, fittings, and shields	1	2		1	31			
Wheels	2			2	2			
Miscellaneous—Signal appliances, badge plates, brakes (hand)					13			
Number of defects	21	21	3	30	480	12		
Locomotives reported	12	13	19	258	679	14	54	20
Locomotives inspected	23	36	58	760	1,939	29	69	38
Locomotives defective	9	6	2	12	133	2		
Percentage of inspected found defective	39	17	3.4	1.6	7	7		
Locomotives ordered out of service	1				5			

Nashville, Chattanooga & St. Louis	New York Central	New York, Chicago & St. Louis	New York, New Haven & Hartford	Norfolk & Portsmouth Belt Line	Norfolk & Western	Norfolk Southern	Northern Pacific	Northern Pacific Terminal	Northwestern Pacific	Pennsylvania	Pennsylvania-Reading Seashore Lines	Peoria & Pekin Union	Pittsburgh & Lake Erie	Pittsburg & Shawmut	Pittsburgh & West Virginia	Quebec Central	Reading	Richmond, Fredericksburg & Potomac	
8	64				5		9		2	147			3				1	4	1
	2									1									2
2	2								1	14									3
	1									1									4
3	30				1					39									5
12	86						1			31				1					6
	26		1				4		1	68									7
14	157	4	3		8	1	14		1	351			2	4	1		1	4	8
6	90	2			4		14		4	171							4		9
2	42				1		4	1		58									10
	8		1		1		1			7								1	11
	4									12									12
16	127		2		10		18		1	288	2		6	1	2		1	1	13
	6	1								4									14
16	53	1			10		11			186				1				1	15
18	16						4		5	51				4					16
	28				1					11									17
9	32						1		2	75							2		18
1	31						4		1	78	1						1	1	19
18	64		1		9		4		2	306					2				20
	8		1						1	59								1	21
6	7				1				2	14							2		22
10	47				6		1			41				1					23
	2									8									24
	10				1				1	22								3	25
11	46				2		1			50							1		26
10	22				2		7			64			1	1	1		2		27
1	32		2		1		1			83							1		28
4	52				1		3	1	3	65				1	1				29
	3									3									30
9	189	1	2		6		13		8	376			2	2				4	31
1	2						2		1	9								1	32
13	67		3		2		2			116									33
	3									16								1	34
	4								1	23			1						35
	19				3		2			21			1		1				36
4	12									18	1		1						37
5	68						10		2	38			1				1		38
10	17				2					143			1						39
1	5				2	1	2			9									40
2	5									14				1					41
7	42	1	2		6		3		1	89			1						42
60	132				4		3		2	321				1			1	2	43
	5									4									44
	72	1			4		6			93			1	1			2	2	45
48	315		1		9	2	20		6	981							3	5	46
1	5									20								1	47
3	28				1					49				1					48
3	1									44									49
3	25						5			42								1	50
1	5				1				2	22								1	51
7	84						4		6	104	1		1		2			2	52
16	126		6		2		10		6	179	1		1				2		53
1										2									54
12	108				1	1	6		4	126			1						55
6	84	1	1		3		1		4	133			1				2		56
5	121		2		1		5		3	69			5				1		57
2	39				7		2		6	98				1			1	2	58
9	26	1					2			39							1		59
3	28				2		1			76								1	60
9	128	1			3		7		5	160				7	2		4	3	61
7	49		1		3	2	5			118							3		62
1	104				1		11		3	55			1		1		2	5	63
416	3,016	14	29		127	7	224	2	87	5,915	6		31	28	13		39	47	
117	2,930	273	179	24	512	30	694	10	50	3,242	44	11	205	21	25	17	319	79	
444	6,924	1,059	310	56	979	25	1,246	30	182	8,579	50	9	356	61	74		939	100	
74	830	5	22		38	2	87	2	22	1,093	3		5	6	4		15	13	
17	12	0.5	7		3.9	8	7	7	12	13	6		1.4	10	5		1.6	13	
17	31						1			123					1				

TABLE XII.—*Number of steam locomotives inspected, found defective, and ordered from service, etc.*—Continued

Parts defective, inoperative or missing, or in violation of the rules	River Terminal	Rutland	St. Louis-San Francisco	St. Louis Southwestern	Seaboard Air Line	Southern Pacific, lines east	Southern Pacific, lines west	Southern
Air compressors		9	9		7		35	12
Arch tubes								
Ashpans and mechanism					2		8	1
Axles							1	
Blow-off cocks				1		2	30	
Boiler checks		6	1	1	1		32	10
Boiler shell		10				1	16	
Brake equipment		14	28	5	23	9	71	38
Cabs, cab windows, and curtains		4	5		8	1	44	4
Cab aprons and decks		10	6	1	1	1	13	4
Cab cards				1			28	
Coupling and uncoupling devices		1					5	
Crossheads, guides, pistons, and piston rods		14	5		2	1	90	7
Crown bolts						2	11	
Cylinders, saddles, and steam chests		2	15	9	3	1	111	13
Cylinder cocks and rigging		2	4	12			31	2
Domes and dome caps		7					4	2
Draft gear		2	2	1	1	1	16	6
Draw gear		5	1				7	
Driving boxes, shoes, wedges, pedestals, and braces		18	6	1	1	1	48	5
Firebox sheets		15				4	13	3
Flues		5				3	21	
Frames, tail pieces, and braces, locomotive		5	8		6		49	3
Frames, tender			1		1		10	2
Gages and gage fittings, air			2			1	11	2
Gages and gage fittings, steam			2	1	6	2	19	6
Gage cocks			3		4	2	28	4
Grate shakers and fire doors		2	2			2	20	3
Handholds		5			6	2	63	5
Injectors, inoperative					1		10	1
Injectors and connections		12	14	3	11	2	148	17
Inspections and tests not made as required			1		1		12	2
Lateral motion					1	1	11	6
Lights, cab and classification		1	1				14	
Lights, headlight		3	2				29	
Lubricators and shields		1	1	1		1	16	
Mud rings		20					7	3
Packing nuts		7	9	3	2	1	41	7
Packing, piston rod and valve stem			1	3	1	1	21	2
Pilots and pilot beams					4	1	5	3
Plugs and studs		1				2	21	
Reversing gear		5	6		9		26	3
Rods, main and side, crankpins, and collars		11	8	4	4	4	76	19
Safety valves		2					1	4
Sanders		5	5	1	1	2	69	9
Springs and spring rigging		41	21	11	15	1	130	38
Squirt hose							5	2
Stay bolts		7	1			2	25	2
Stay bolts, broken						4		
Steam pipes		1	2				38	8
Steam valves		2	3				28	3
Steps		2	3	1	3		72	3
Tanks and tank valves		22	4	5	5	3	165	7
Telltale holes					1		6	
Throttle and throttle rigging		6	7	3	4	1	15	5
Trucks, engine and trailing		5	3	1	2		12	2
Trucks, tender		6	2		3		25	2
Valve motion		6	3			1	50	10
Washout plugs		2					9	7
Stokers		14	2		1			1
Water glasses, fittings, and shields		4	2	2	11	5	116	11
Wheels		7	1		1		28	3
Miscellaneous—Signal appliances, badge plates, brakes (hand)		8	19	2	2	3	74	9
Number of defects		337	221	73	155	71	2,140	321
Locomotives reported	13	55	450	126	442	395	1,341	1,153
Locomotives inspected	22	248	1,215	520	987	804	4,414	2,424
Locomotives defective		62	68	24	36	18	648	86
Percentage of inspected found defective		25	6	4.6	3.6	2.2	15	3.5
Locomotives ordered out of service		5	1		2		35	2

Spokane International	Spokane, Portland & Seattle	Tennessee Central	Tennessee Coal, Iron & R. R.	Terminal R. R. Association of St. Louis	Texas & Pacific	Toledo, Peoria & Western	Toronto, Hamilton & Buffalo	Union Pacific	Union Railroad	Union Railway	Utah	Virginian	Wabash	Western Maryland	Western Pacific	Wheeling & Lake Erie	Roads with less than 10, and industrial locomotives	Total defects
	2	4	2					40	6			10	4			1	52	693
	2																1	11
			1										2		1		2	52
																		4
	1	3						11				2	1				9	220
	1				1			27				1	2		1		25	337
		1		1				10	1				1				7	208
	8	12	13		1			109	2			1	6		7	4	159	1,806
	4	2	2					49	4			1	3			1	81	781
	11	3	1					28				1	5		3		20	355
								13					1		1		12	95
								2									3	42
	2	11						47	3			3	2		2	4	68	1,147
									1								1	46
	3	16	2					69	1			11	2		2	4	56	1,155
		1	2					31					7		2		52	356
								4	1								2	82
		1	4		1			13					1		3	1	63	370
	2	1						16	1			2	3			1	25	300
	3	20			1			39	2			6	6			6	22	1,070
	2							3	3			1					6	191
	3							1									15	156
	4	16		1				19				3			2		16	451
2								1										39
								7				2			1		4	118
	1	1		1				16									9	268
		3						19	1			3				1	44	375
		1						10				1	1			1	13	286
	2			1				32	2				2			2	60	421
								5					1				6	39
1	5	10	1	2	4			159	10			1	9		5	7	91	1,795
	2	3						12							1		23	104
		31			3			11	2			1	3		2	7	18	507
								3							1		3	58
								5				1	1				7	118
	3		1					13					1		1		5	157
		3						16	2				1				5	147
			1					73	2				1				58	474
		9	1					43	2			8	6			2	69	511
		2						3								1	5	73
								4				3					2	99
		5	1					19				3	1				28	405
	3	48			5			29	2			8	17		1	2	96	1,408
		1						3	2			1					5	45
		1		1				68	2			1					28	608
2	12	17	2		5			167	3			27	23		5	9	106	3,177
								2					1				4	63
	2	1						8				4	3		1		8	227
			2					3									95	196
	1	4						10					1		1	1	13	256
								6					2				2	133
	1	4	1					27				2	6		2	3	85	652
1	1	6	4		2			79				3	3		6	2	56	1,228
								1							1		10	33
	4	1	5	1	1			24				1	2			2	61	709
	1	10			1			19				3	2			1	25	545
1	1	1	1					9				3	3		4	2	38	471
	1	7			1			9				1	2		4	2	33	484
		3		1				32	1				6		2		7	268
1		1						26										216
	3	2	4					47	3			1	2		3	3	79	920
	1	11		2				20			2	2	4			2	32	455
	1	16	1					31	2			2			1		28	626
8	93	293	52	11	26			1,602	61		2	124	150		66	72	1,958	28,642
13	74	27	26	69	210	10	14	1,015	82	10	13	108	331	195	154	157	1,319	33,866
31	178	106	19	145	529	15	3	2,775	101	27	64	213	1,061	425	387	396	2,167	85,353
6	34	61	8	7	7			359	13		2	26	51		32	27	355	7,035
19	19	58	42	4.8	1.3			13	13		3.1	12	4.8		8	7	16	8
	2	24	3	2				9	1				4			1	65	436