

INTERSTATE COMMERCE COMMISSION

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FORTY-SECOND ANNUAL REPORT  
OF THE  
DIRECTOR  
BUREAU OF LOCOMOTIVE INSPECTION  
TO THE  
INTERSTATE COMMERCE COMMISSION

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FISCAL YEAR ENDED  
JUNE 30, 1953



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

SEPTEMBER 30, 1953.

*To the Interstate Commerce Commission:*

In compliance with section 7 of the act of February 17, 1911, as amended, the Forty-second Annual Report of the Director of the Bureau of Locomotive Inspection, covering the work of the Bureau during the fiscal year ended June 30, 1953, 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.

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 locomotive units other than steam.

TABLE I.—*Reports and inspections—Steam locomotives*

	Year ended June 30—					
	1953	1952	1951	1950	1949	1948
Number of locomotives for which reports were filed...	15,798	20,490	26,595	29,743	33,866	37,073
Number inspected.....	28,899	45,220	62,113	66,809	85,353	93,917
Number found defective.....	3,583	6,234	7,995	6,740	7,035	9,417
Percentage of inspected found defective.....	12.4	13.8	12.9	10.1	8.2	10.0
Number ordered out of service.....	163	370	508	399	436	654
Number of defects found.....	12,980	24,738	34,657	28,504	28,642	38,855

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

	Year ended June 30—					
	1953	1952	1951	1950	1949	1948
Number of accidents.....	59	122	167	169	228	341
Percent increase or decrease from previous year.....	51.6	26.9	1.2	25.9	33.1	5.3
Number of persons killed.....	12	3	14	7	10	15
Percent increase or decrease from previous year.....	1300.0	78.6	1100.0	30.0	33.3	6.3
Number of persons injured.....	62	126	170	184	243	361
Percent increase or decrease from previous year.....	50.8	25.9	7.6	24.3	32.7	22.2

<sup>1</sup> Increase.

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

	Year ended June 30—							
	1953	1952	1951	1950	1949	1948	1915	1912
Number of accidents.....	18	35	51	59	81	104	424	856
Number of persons killed.....	10	2	3	4	9	14	13	91
Number of persons injured.....	19	36	59	70	94	108	467	1,005

<sup>1</sup> 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—									
	1953		1952		1951		1950		1949	
	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured
Members of train crews:										
Engineers.....	4	23	1	36	2	51	2	64	3	75
Firemen.....	4	21	2	45	3	62	2	64	3	92
Brakemen.....	3	8		19	1	20	2	29	1	30
Conductors.....		3		3		6		4		7
Switchmen.....		2		2		1		5		6
Roundhouse and shop employees:										
Boilermakers.....				2		2		2		2
Machinists.....		1		2		1		2		4
Foremen.....		1		2		2		1		2
Inspectors.....				2		2		2		2
Watchmen.....				2		1		4		1
Boiler washers.....										
Hostlers.....				8		1		4		1
Other roundhouse and shop employees.....		2		2		2		2		1
Other employees.....				1		3		4		6
Nonemployees.....	1	1		2		4		6		9
Total.....	12	62	3	126	14	170	7	184	10	243

TABLE V.—Reports and inspections—Locomotive units other than steam

	Year ended June 30—					
	1953	1952	1951	1950	1949	1948
Number of locomotive units for which reports were filed.....	25,374	22,716	19,320	15,719	12,692	9,803
Number inspected.....	75,170	65,263	52,948	42,503	30,684	20,798
Number found defective.....	6,571	6,087	4,375	2,748	1,238	853
Percentage of inspected found defective.....	8.7	9.3	8.3	6.5	4.0	4.1
Number ordered out of service.....	118	135	106	42	20	21
Number of defects found.....	17,163	16,613	11,935	6,325	2,804	1,745

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

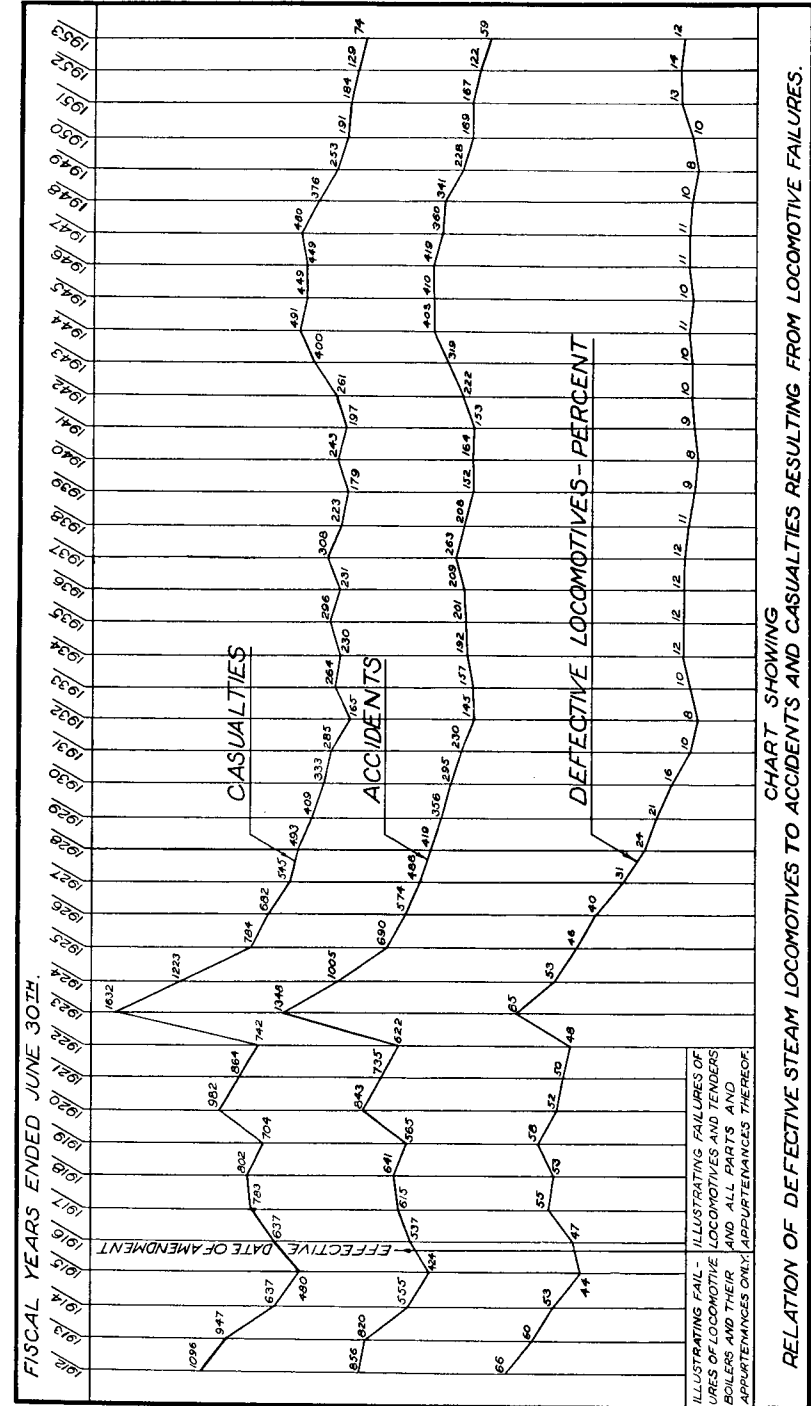
	Year ended June 30—					
	1953	1952	1951	1950	1949	1948
Number of accidents.....	75	74	54	51	49	41
Number of persons killed.....		1	2	3		
Number of persons injured.....	88	77	129	50	67	50

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

	Year ended June 30—									
	1953		1952		1951		1950		1949	
	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured
Members of train crews:										
Engineers.....		14		15		11		15		12
Firemen.....		36		31	1	30		21		14
Brakemen.....		12	1	12		4		3		6
Conductors.....		5		4				4		
Switchmen.....		2		8		5		1		4
Maintenance employees.....		4		6	1	3		3		8
Other employees.....		2		1		13	1	2		13
Nonemployees.....		13				63		1		10
Total.....	88	1	77	2	129	3	50			67

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—														
	1953			1952			1951			1950			1949		
	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured
Air reservoirs.....				1		1									
Aprons.....							1		1	1		2			3
Arch tubes.....							1		1	1		2			3
Ashpan blowers.....															
Axles.....	1		1	1		1						1			1
Blow-off cocks.....				2		2			2	2		2		5	1
Boiler checks.....				3		3			3	3		3		4	4
Boiler explosions:															5
A. Shell explosions.....															
B. Crown sheet; low water; no contributory causes found.....	3	10		3	1	5	5	3	8	8	4	12	4	6	13
C. Crown sheet; low water; contributory causes or defects found.....	1		2	1		1	1		5	1		2	1	1	1
D. Miscellaneous firebox failures.....															
Brakes and brake rigging.....	2		2	2		2	3	3	2	2		2	3	3	4
Couplers.....	2		2	2		2	2	2	4	1	2	4	3	3	4
Crank pins, collars, etc.....							2	2	2	2	1	2	3	3	4
Crossheads and guides.....	2	2	4	1		1	1	1	1	1	1	1	1	1	1
Cylinder cocks and rigging.....							1	1	1	1	1	1	1	1	1
Cylinder heads and steam chests.....	1		1												
Dome caps.....															
Draft appliances.....												3			3
Draw gear.....							1		1	1		1			3
Fire doors, levers, etc.....	2		2	3		4	2	2	2	2		2	3	3	3
Flues.....	3	6	1	1		3	2	3	6	9	9	9	3	3	3
Flue pockets.....	2	2	9	9	8	8	8	8	8	8	10	10	10	10	10
Footboards.....															
Gage cocks.....															
Grease cups.....															
Grate shakers.....	4	4	3	3	7	7	7	1	6	11	11	13	1	1	12
Handholds.....															
Headlights and brackets.....															
Injectors and connections (not including injector steam pipes).....	3	3	9	1	8	3	3	7	7	7	12	12	12	12	12
Injector steam pipes.....															
Lubricators and connections.....				1		1	4	2	2	4	4	4	4	4	4
Lubricator glasses.....															
Patch bolts.....															
Pistons and piston rods.....															
Plugs, arch tube and washout.....							2		2	1		1			
Plugs in firebox sheets.....															
Reversing gear.....	1		1	5		7	5		5	9	1	8	6		6
Rivets.....															
Rods, main and side.....				3		3			1			2	2		2
Safety valves.....															
Sanders.....				3		3	1		1	4		4	4		4
Side bearings.....															
Springs and spring rigging.....				1		1	2		2	3		3	1		1
Squirt hose.....				4		4	6		6	9		9	14		14
Stay bolts.....															
Steam piping and blowers.....	2		2	1		1	3		3	3		6	4		3
Steam valves.....	2		2	2		2	3		3	3		3	3		3
Studs.....															
Superheater tubes.....															
Throttle glands.....				1		1	1		1	1		1	1		6
Throttle valves.....															
Throttle rigging.....	1		1	5		5	5		5	5		5	3		4
Trucks, leading, trailing, or tender.....	1		1	1		1	2		2	7		11	1		11
Valve gear, eccentrics, and rods.....	1		1	1		1	2		2	2		3	3		3
Water glasses.....	2		2	2		2	1		1	3		3	5		5
Water-glass fittings.....	1		1	1		1	1		1	3		3	3		4
Wheels.....	23		23	45		45	61		61	46		49	74		75
Miscellaneous.....															
Total.....	59	12	62	122	3	126	167	14	170	169	7	184	228	10	243



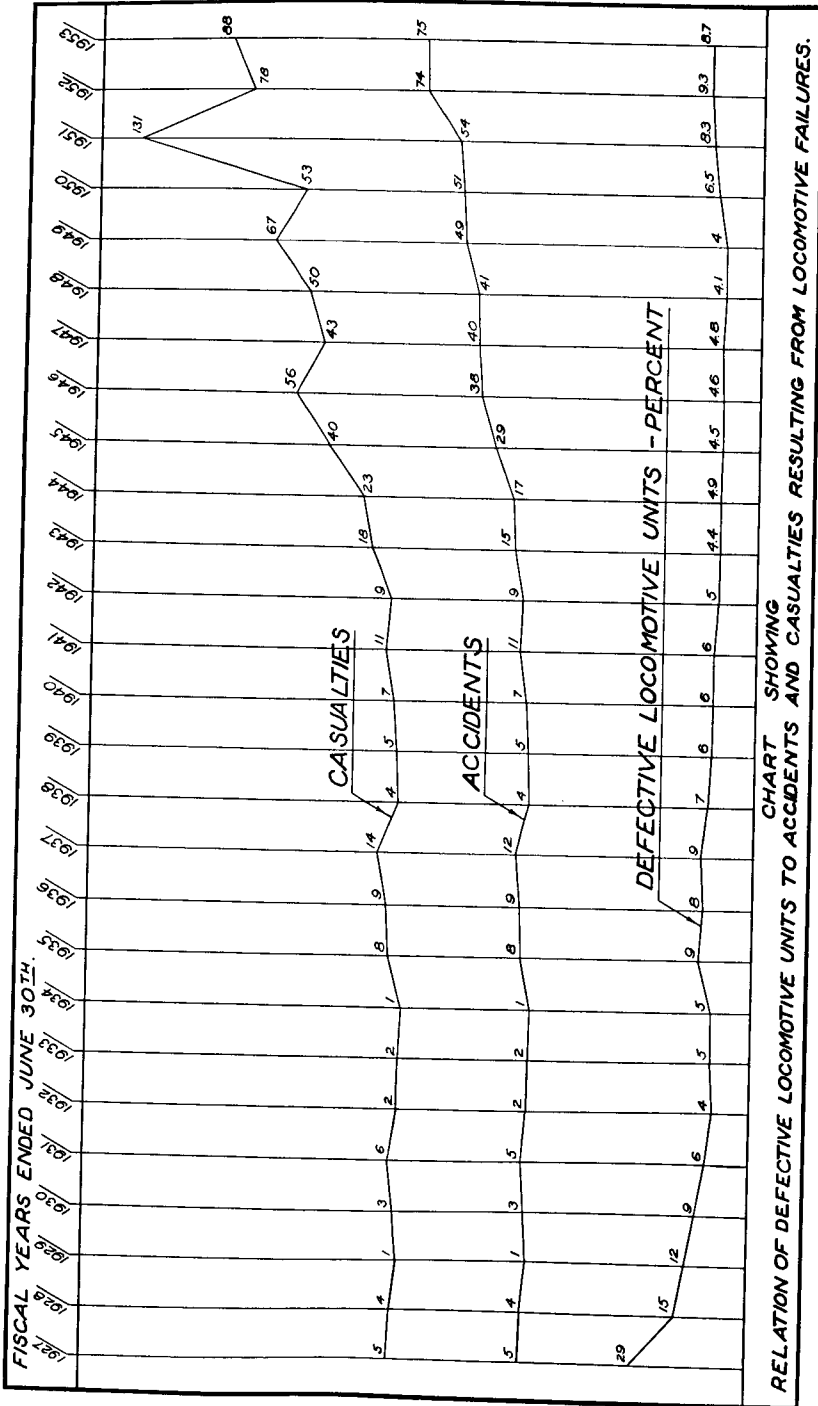


TABLE IX.—Accidents and casualties resulting from failures of locomotive units other than steam, and their appurtenances

Part or appurtenance which caused accident	Year ended June 30—														
	1953			1952			1951			1950			1949		
	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured
Brakes and brake rigging	3		3	5		6	2		3	4		4	4		5
Carburetors															
Couplers	2		3	2		2	1		1	1		1	1		1
Crank pins and connecting rods															
Fires due to overflowing or leakage of fuel, crankcase explosions, back-firing, etc.	13		24	7		8	9		10	4		4	8		9
Generators and starting devices	1		1				2		2	1		1	1		1
Insulation							1		1			1			1
Pantographs and trolleys	1		1				1		1			1			1
Short circuits	9		9			11	9		9			2			6
Miscellaneous	46		47	51	1	50	29	1	103	38	2	38	27		43
<b>Total</b>	<b>75</b>		<b>88</b>	<b>74</b>	<b>1</b>	<b>77</b>	<b>54</b>	<b>2</b>	<b>129</b>	<b>51</b>	<b>3</b>	<b>50</b>	<b>49</b>		<b>67</b>

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

	Year ended June 30—					
	1953	1952	1951	1950	1949	1948
Parts defective, inoperative or missing, or in violation of the rules						
1 Air compressors.....	351	671	897	719	693	1,007
2 Arch tubes.....	5	12	17	9	11	15
3 Ashpans and mechanism.....	36	59	64	50	52	72
4 Axles.....	1	4	1	1	4	8
5 Blow-off cocks.....	185	299	262	220	220	274
6 Boiler checks.....	182	356	477	386	337	424
7 Boiler shell.....	94	174	226	211	208	298
8 Brake equipment.....	1,038	1,955	2,453	1,845	1,806	2,617
9 Cabs, cab windows, and curtains.....	354	694	1,173	862	781	1,049
10 Cab aprons and decks.....	179	295	395	364	355	414
11 Cab cards.....	40	53	83	97	95	109
12 Coupling and uncoupling devices.....	30	42	54	41	42	55
13 Crossheads, guides, pistons, and piston rods.....	478	1,035	1,363	1,100	1,147	1,611
14 Crown bolts.....	27	38	52	53	46	78
15 Cylinders, saddles, and steam chests.....	455	908	1,437	1,160	1,155	1,617
16 Cylinder cocks and rigging.....	136	328	474	376	356	494
17 Domes and dome caps.....	45	85	131	90	82	142
18 Draft gear.....	168	313	441	368	370	461
19 Draw gear.....	108	189	297	280	300	413
20 Driving boxes, shoes, wedges, pedestals, and braces.....	345	681	1,145	1,037	1,070	1,582
21 Firebox sheets.....	55	141	203	181	191	302
22 Flues.....	49	121	184	152	156	201
23 Frames, tail pieces, and braces, locomotive.....	225	368	486	451	451	576
24 Frames, tender.....	10	26	47	34	30	72
25 Gages and gage fittings, air.....	61	136	173	116	118	185
26 Gages and gage fittings, steam.....	112	228	325	272	268	354
27 Gate shakers and fire doors.....	211	337	495	386	375	474
28 Handholds.....	121	282	339	326	286	455
29 Injectors, inoperative.....	196	353	420	439	421	513
30 Injectors and connections.....	18	34	60	45	39	66
31 Inspections and tests not made as required.....	843	1,615	2,190	1,767	1,795	2,329
32 Lateral motion.....	53	68	121	122	104	148
33 Lights, cab and classification.....	137	274	465	389	507	821
34 Lights, headlight.....	26	44	118	60	58	132
35 Lubricators and shields.....	42	100	108	131	118	183
36 Mud rings.....	81	160	222	157	157	236
37 Packing nuts.....	78	149	153	145	147	186
38 Packing, piston rod and valve stem.....	294	552	638	558	474	456
39 Pilots and pilot beams.....	220	494	765	510	511	658
40 Plugs and studs.....	48	102	124	126	73	132
41 Reversing gear.....	50	91	117	104	99	169
42 Rods, main and side, crankpins, and collars.....	216	429	631	404	405	649
43 Safety valves.....	459	990	1,511	1,213	1,408	1,998
44 Sanders.....	19	39	45	34	45	45
45 Springs and spring rigging.....	324	552	806	641	608	597
46 Squirt hose.....	1,322	2,424	3,340	2,848	3,177	4,124
47 Stay bolts.....	41	69	90	74	63	93
48 Stay bolts, broken.....	144	254	280	229	227	292
49 Steam pipes.....	125	159	282	193	196	258
50 Steam valves.....	161	232	342	302	256	435
51 Steps.....	68	146	181	131	133	150
52 Tanks and tank valves.....	321	561	805	680	652	767
53 Telltale holes.....	466	980	1,304	1,205	1,228	1,757
54 Throttle and throttle rigging.....	6	15	33	28	33	60
55 Trucks, engine and trailing.....	327	608	927	664	709	923
56 Trucks, tender.....	263	427	700	580	545	812
57 Valve motion.....	219	474	710	540	471	652
58 Washout plugs.....	195	437	673	486	484	676
59 Stokers.....	138	266	325	289	268	384
60 Water glasses, fittings, and shields.....	133	253	306	261	216	270
61 Wheels.....	357	651	858	907	920	1,039
62 Miscellaneous—Signal appliances, badge plates, brakes (hand).....	151	340	536	394	455	779
63	339	569	774	652	626	707
Number of defects.....	12,980	24,738	34,657	28,504	28,642	38,855
Locomotives reported.....	15,798	20,490	26,595	29,743	33,866	37,073
Locomotives inspected.....	28,899	45,220	62,113	66,809	85,353	93,917
Locomotives defective.....	3,583	6,234	7,113	6,740	7,035	9,417
Percentage of inspected found defective.....	12.4	13.8	12.9	10.1	8.2	10.0
Locomotives ordered out of service.....	163	370	508	399	436	654

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

	Year ended June 30—					
	1953	1952	1951	1950	1949	1948
Parts defective, inoperative or missing, or in violation of the rules						
1 Air compressors.....	210	206	146	90	26	32
2 Axles, truck and driving.....	7	3	2	2	1	3
3 Batteries.....	40	39	85	20	13	8
4 Boilers.....	103	69	43	46	9	30
5 Brake equipment.....	1,698	1,450	1,166	673	299	204
6 Cabs and cab windows.....	679	813	672	377	159	90
7 Cab cards.....	128	139	100	75	46	37
8 Cab floors, aprons, and deck plates.....	1,589	1,694	1,281	726	234	134
9 Clutches.....	9	5	4	1	2	2
10 Controllers, relays, circuit breakers, magnet valves, and switch groups.....	424	222	166	61	35	24
11 Coupling and uncoupling devices.....	95	76	35	32	15	12
12 Current collecting apparatus.....	6	5	9	18	20	11
13 Draft gear.....	218	202	141	91	66	36
14 Draw gear.....	42	28	46	27	13	8
15 Driving boxes, shoes, and wedges.....	128	98	38	51	33	16
16 Frames or frame braces.....	22	33	27	9	5	2
17 Fuel system.....	1,853	1,751	1,082	483	191	136
18 Gages or fittings, air.....	138	110	70	29	11	11
19 Gages or fittings, steam.....	44	11	14	14	2	2
20 Gears and pinions.....	13	26	9	15	6	9
21 Handholds.....	121	127	97	70	53	32
22 Inspections and tests not made as required.....	175	159	143	116	90	59
23 Insulation and safety devices.....	77	102	64	48	36	10
24 Internal-combustion engine defects, parts and appurtenances.....	4,564	4,768	3,270	1,456	602	241
25 Jack shafts.....	1	1	5	8	11	5
26 Jumpers and cable connectors.....	156	191	190	86	8	7
27 Lateral motion, wheels.....	7	8	11	2	7	18
28 Lights, cab and classification.....	109	49	23	7	5	5
29 Lights, headlight.....	42	22	16	9	3	3
30 Meters, volt and ampere.....	27	41	14	7	3	3
31 Motors and generators.....	655	674	314	106	46	26
32 Pilots and pilot beams.....	46	53	36	29	16	23
33 Plugs and studs.....	3	3	3	3	3	3
34 Quills.....	6	15	26	10	9	16
35 Rods, main, side, and drive shafts.....	1	15	2	6	1	5
36 Sanders.....	1,224	1,202	902	356	151	106
37 Springs and spring rigging, driving and truck.....	178	153	108	103	43	44
38 Stay bolts, broken or defective.....	1	1	1	1	1	1
39 Steam pipes.....	110	89	24	32	17	10
40 Steps, footboards, et cetera.....	505	480	377	284	213	116
41 Switches, hand-operated, and fuses.....	17	18	15	9	1	3
42 Transformers, resistors, and rheostats.....	3	2	9	9	2	6
43 Trucks.....	430	390	234	182	84	65
44 Water tanks.....	31	47	33	20	2	1
45 Water glasses, fittings, and shields.....	14	38	11	27	2	18
46 Warning signal appliances.....	122	117	83	21	9	7
47 Wheels.....	212	230	215	95	98	72
48 Miscellaneous.....	864	638	574	377	109	39
Number of defects.....	17,163	16,613	11,935	6,325	2,804	1,745
Locomotive units reported.....	25,374	22,716	19,320	15,719	12,692	9,803
Locomotive units inspected.....	75,170	65,263	52,948	42,503	30,684	20,798
Locomotive units defective.....	6,571	6,087	4,375	2,748	1,238	853
Percentage of inspected found defective.....	8.7	9.3	8.3	6.5	4.0	4.1
Locomotive units ordered out of service.....	118	135	106	42	20	21

#### 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

Fifty-nine accidents occurred in connection with steam locomotives resulting in 12 deaths and 62 injuries. This represents a decrease of 63 accidents; an increase of 9 in the number of persons killed, and a decrease of 64 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 12.4 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 decrease of 1.4 percent from the results of the preceding year. One hundred and sixty-three 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 207 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

Four boiler explosions occurred in the fiscal year; all were caused by overheating of the crown sheet due to low water. Ten persons were killed and 2 were injured in these accidents. The number of boiler explosions was the same as in the preceding year; there was an increase of 9 fatalities and a decrease of 4 in number of injuries compared with the preceding year.

Three of the explosions occurred on locomotives in freight-train service and one on a locomotive used in switching service. All explosions were caused by overheated crown sheets due to low water.

One locomotive used in freight service was equipped with a low water alarm in which a fusible metal element was designed to function in case of low water and cause a warning whistle to blow. Examination of the boiler subsequent to the accident disclosed that the fusible metal was missing, indicating that the alarm had functioned, and that the water level at time of the explosion as shown by sheet discoloration

was approximately 5½ inches below the highest part of the crown sheet.

Examination of a second locomotive after the accident disclosed that a leak at the top of an eroded water glass resulted in maintenance of a visible water level that was materially higher than the actual water level in the boiler. No defects were found on the remaining two locomotives which would have contributed to the accidents.

Fourteen boiler and appurtenance accidents other than explosions resulted in injuries to 17 persons. This is a decrease of 17 accidents, a decrease of 1 in number of persons killed and a decrease of 13 in number of persons injured as compared with the preceding year.

## EXTENSION OF TIME FOR REMOVAL OF FLUES

Six hundred and thirty-two applications were filed for extension of time for removal of flues, as provided in rule 10. Our investigations disclosed that in 47 of these cases the condition of the locomotives or other circumstances were such that extensions could not properly be granted. Two were in such condition that the full extensions requested could not be authorized, but extensions for shorter periods of time were allowed. Seventeen extensions were granted after defects disclosed by our investigations were required to be repaired. Forty-one applications were canceled for various reasons. Five hundred and twenty-five applications were granted for the full period requested.

## LOCOMOTIVE UNITS PROPELLED BY POWER OTHER THAN STEAM

Seventy-five accidents, resulting in injuries to 88 persons occurred in connection with locomotive units propelled by power other than steam. This represents an increase of 1 in the number of accidents, a decrease of 1 in the number of persons killed and an increase of 11 in the number of persons injured compared with the preceding year.

During the year 8.7 percent of the locomotive units inspected by our inspectors were found with defects or errors in inspection that should have been corrected before the units were put into use; this represents a decrease of 0.6 percent compared with the results obtained in the preceding year. One hundred and eighteen locomotive units were ordered withheld from service by our inspectors because of the presence of defects that rendered the units immediately unsafe; this represents a decrease of 17 units compared with the preceding year.

The chart on page 6 shows the relation between percentage of defective locomotive units and the number of accidents and casualties resulting from failures thereof, and illustrates the effect of operating locomotives other than steam in defective condition.

Detailed results of our inspection of locomotive units other than steam are shown in table XIII.

## SPECIFICATION CARDS AND ALTERATION REPORTS

Under rule 54 of the Rules and Instructions for Inspection and Testing of Steam Locomotives, 48 specification cards and 1,879 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, 2,880 specifications and 805 alteration reports were filed for locomotive units and 678 specifications and 294 alteration reports were filed for boilers mounted on locomotive units other than steam. These were checked and analyzed and corrective measures taken with respect to discrepancies found.

## RECOMMENDATION

In our annual report for fiscal year 1952 it was recommended that the position of inspector of locomotives, grade GS-11, be allocated to the next higher grade, GS-12, because of greatly increased responsibility of these positions and the more stringent qualification requirements resulting from the introduction of diesel-electric locomotives as sources of motive power. This transition has continued to a point where only approximately 38 percent of all locomotives are now propelled by steam.

I renew the recommendation that the position of inspector of locomotives be allocated to the next salary grade above that presently designated.

## APPEALS

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

## ACKNOWLEDGMENT

The Bureau personnel is commended for cooperation and effective discharge of the duties of their respective positions under adverse circumstances resulting from inadequate appropriated funds and resultant increased workload.

CHAS. H. GROSSMAN,  
*Director.*

## ACCIDENTS AND CASUALTIES RESULTING FROM THE FAILURE OF STEAM LOCOMOTIVES AND TENDERS AND THEIR APPURTENANCES DURING THE FISCAL YEAR ENDED JUNE 30, 1953, BY ROADS

[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 &amp; SOUTHERN RAILROAD:

November 18, 1952, locomotive 217, Aliquippa, Pa. End of tender frame coping strip was deteriorated and splintered; employee's jacket sleeve caught on the splintered end, causing him to fall; one injured.

One accident; 1 injured.

## ATCHISON, TOPEKA &amp; SANTA FE RAILWAY:

February 14, 1953, locomotive 3779, near Morris, Kans. Cab window drop sash fell from supporting brackets and top rail of sash frame struck employee's fingers which were on inner cab wall at bottom of window opening; inadequate provision for securing drop sash in raised position and insufficient clearance between top rail of sash frame and cab inside wall at window opening when drop sash was at lowest position in recess between outer and inner cab walls; one injured.

One accident; 1 injured.

## BALTIMORE &amp; OHIO RAILROAD:

\*\*August 3, 1952, locomotive 4428, Martinsburg, W. Va. Employee was burned by steam and hot water while removing feed water supply hose from injector; injector starting valve was not fully closed; starting valve extension rod was free to move backward to "ON" position and no means provided to hold valve in desired position or to indicate whether it was fully open or closed; one injured.

June 23, 1953, locomotive 621, Glenwood, Pa. Top of tender back of coal space was obstructed by three empty nail kegs; one injured.

Two accidents; 2 injured.

## BOSTON &amp; MAINE RAILROAD:

September 5, 1952, locomotive 1428, Somerville, Mass. Bonnet of water-glass cock blew off while being tightened under pressure; threads on body of cock were badly worn and bonnet union nut was stretched; one injured.

One accident; 1 injured.

## CENTRAL OF GEORGIA RAILWAY:

August 29, 1952, locomotive 629, McIntyre, Ga. Crown sheet failure caused by overheating due to low water; water glass was defective and indicated a water level materially above that which existed in the boiler; two injured.

One accident; 2 injured.

## CENTRAL RAILROAD OF NEW JERSEY:

\*\*November 9, 1952, locomotive 756, Jersey City, N. J. Wooden top of drop seat in cab became detached from metal frame; screws for holding seat to frame were missing; screw holes in wooden seat showed indications that wood screws had worked and pulled out; one injured.

One accident; 1 injured.

## CHESAPEAKE &amp; OHIO RAILWAY:

June 9, 1953, locomotive 1642, Hinton, W. Va. Crown sheet failure caused by overheating due to low water; three killed.

One accident; 3 killed.

## CHICAGO, BURLINGTON &amp; QUINCY RAILROAD:

\*\*September 4, 1952, locomotive 6108, near Oriva, Wyo. Crosshead wrist pin worked loose and was struck by a side rod; two killed, three injured.

One accident; 2 killed, 3 injured.

## CHICAGO, MILWAUKEE, ST. PAUL &amp; PACIFIC RAILROAD:

June 4, 1953, locomotive 1481, Spokane, Wash. Flames entered the cab when explosion occurred in firebox; approximately 20 gallons of water was found in the diesel fuel-oil tank; excessive openings around firebox door; one injured.

One accident; 1 injured.



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

July 18, 1952, locomotive 5026, near Okarche, Okla. Crown sheet failure caused by overheating due to low water; three killed.  
One accident; 3 killed.

**DENVER & RIO GRANDE WESTERN RAILROAD:**

October 19, 1952, locomotive 3703, Louviers, Colo. Crown sheet failure caused by overheating due to low water; four killed.  
One accident; 4 killed.

**FLORIDA EAST COAST RAILWAY:**

July 23, 1952, locomotive 702, Miami, Fla. Insufficient clearance between handle of damper rod and cab seat foot rest; one injured.  
One accident; 1 injured.

**HUNTINGDON & BROAD TOP MOUNTAIN RAILROAD & COAL CO.:**

October 3, 1952, locomotive 37, Saxton, Pa. Tender truck axle broke through progressive fracture; one injured.  
One accident; 1 injured.

**LONG ISLAND RAIL ROAD:**

October 15, 1952, locomotive 28, Huntington, N. Y. Flue broke off through prosser groove at back flue sheet; flue wasted away and reduced to a maximum thickness of  $\frac{1}{2}$  inch at point of failure; two injured.  
One accident; 2 injured.

**LOUISVILLE & NASHVILLE RAILROAD:**

December 10, 1952, locomotive 1254, Paris, Ky. Central part of front cylinder head blew out; one injured.  
One accident; 1 injured.

**MISSOURI PACIFIC RAILROAD:**

September 19, 1952, locomotive 1257, Kinder, La. Driver brake hanger post broke flush with main frame fit at fillet of reduced section; one injured.  
One accident; 1 injured.

**NEW YORK CENTRAL SYSTEM:**

July 12, 1952, locomotive 2998, Lynn, Ind. Hot water spurting intermittently from train heat connector at rear of tender; train heat fountain valve was leaking; one injured.

July 15, 1952, locomotive 4909, Danville, Ill. Excessive flow of hot water from injector overflow pipe when water valve was set in open position; heavy coating of scale on combining tube restricted tube openings, reducing the flow of water into combining tube; one injured.

August 8, 1952, locomotive 7826, Columbus, Ohio. Employee slipped on gangway step and fell to the ground; roughening applied to treads of top two gangway steps was badly worn; one injured.

October 28, 1952, locomotive 3050, Marion, Ohio. Employee's head contacted whistle hand lever; whistle lever latch was missing, permitting lever to drop below usual position near top of cab; one injured.

November 11, 1952, locomotive 2848, Hartsdale, Ind. Vertical cab handhold fouled tender step while on curve; one injured.

January 9, 1953, locomotive 7464, Cleveland, Ohio. Piece of board was broken and missing from cab-seat platform; board was worn thin; one injured.

January 24, 1953, locomotive 2838, Worcester, Ill. Binding injector steam ram extension handle caused employee's hand to slip from handle; insufficient clearance around injector extension handles in cab; one injured.

March 20, 1953, locomotive 5449, Tivoli, N. Y. Loose and working eccentric crank on main pin resulted in valve gear failure which caused the Precision reverse gear handwheel to spin into full forward motion. Rollers and springs in self-locking clutch were heavily coated with lubricant. Rollers and springs in self-locking clutch were heavily coated with lubricant. Pertinent defects had been reported 7 times in the 30 days preceding accident; one injured.

April 27, 1953, locomotive 7349, Elkhart, Ind. Bracket of lever shaft broke through top bolt hole while uncoupling lever was being used, resulting in violent movement of the lever; bracket casting was defective; one injured.

Nine accidents; 9 injured.

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

April 20, 1953, locomotive 2339, New York, N. Y. Oil and water on running board of locomotive; one injured.  
One accident; 1 injured.

**NORTHERN PACIFIC RAILWAY:**

August 25, 1952, locomotive 1609, McGregor, Minn. Steam hose blew from siphon cock nipple on auxiliary steam dome cover; improper fittings in hose for use with high pressure steam; one injured.

\*\*April 18, 1953, locomotive 5004, Hopper's, Mont. Water column steam pipe sleeve broke at flange fillet; one injured.

April 30, 1953, locomotive 5106, Springdale, Mont. Flue ruptured through approximately one-half of circumference near back flue sheet; flue wall at point of failure was worn thin due to cinder cutting; two injured.

Three accidents; 4 injured.

**NORTHWESTERN PACIFIC RAILROAD:**

January 15, 1953, locomotive (S. P.) 2541, South Fork, Calif. Cab handhold fouled gangway step while on curve; one injured.

One accident; 1 injured.

**PENNSYLVANIA RAILROAD:**

July 18, 1952, locomotive 5406, Little Silver, N. J. Flue broke off at front flue sheet; flue was deteriorated on water side and overworked at flue sheet; flue hole had sharp edge; excessive openings between fire door and frame; two injured.

August 16, 1952, locomotive 8424, Fort Wayne, Ind. Mechanically operated fire door did not respond to pressure on operating pedal; fire door, pins and mechanism not properly lubricated; one injured.

September 13, 1952, locomotive 6413, near Seward, Pa. Throttle was hard to operate due to cut and worn throttle main steam valve balancing pistons and balancing-piston guide bushings; throttle was reported hard to operate 17 times since August 1; one injured.

September 25, 1952, locomotive 4323, Pittsburgh, Pa. Knuckle pin missing from coupler on rear of tender; one injured.

December 27, 1952, locomotive 6439, Conway, Pa. Unsuitable design of storage bracket for grate shaker bar; one injured.

\*\*January 29, 1953, locomotive 1122, Pittsburgh, Pa. Arm rest at cab side window pulled loose from 1 of 2 supporting hinges and fell from position, causing employee to fall against side of cab at window opening; one injured.

February 28, 1953, locomotive 6740, Huntingdon, Pa. Blower pipe in front end broke at connection to union; thickness of pipe wall at point of failure was greatly reduced due to cinder cutting; cylinder exhaust nozzle in front end was loose; one injured.

\*\*March 26, 1953, locomotive 8306, Terre Haute, Ind. Fireman's shovel struck a raised place on tender shoveling sheet; shoveling sheet, applied on the previous day, was made of used material and contained several rivets and numerous rivet holes from which rivets had been burned or driven out, leaving raised places on the sheet; one injured.

Eight accidents; 9 injured.

**PITTSBURGH & LAKE ERIE RAILROAD:**

\*\*September 5, 1952, locomotive 213, West Economy, Pa. Guard plate of brake pipe emergency valve broke away from welded connection to cab side wall; one injured.

One accident; 1 injured.

**SOUTHERN PACIFIC—LINES EAST:**

November 1, 1952, locomotive (S. S. W.) 814, Houston, Tex. Cab vertical handhold fouled tender gangway ladder when on curve; one injured.

One accident; 1 injured.

**SOUTHERN PACIFIC—LINES WEST:**

July 14, 1952, locomotive 2727, Rawson, Calif. Insufficient clearance above cab deck apron and no guard provided to prevent a person's foot from being placed under the overhanging back portion of the cab; one injured.

August 4, 1952, locomotive 3274, near Colfred, Ariz. Alligator type crosshead failed at old fracture which extended through the inside plate between the front top gib bolt hole down into the fit for crosshead pin; one injured.

August 19, 1952, locomotive 4117, Cayley, Calif. Cab window stuck in frame; dirt in window slides; one injured.

August 22, 1952, locomotive 4176, Dry Camp, Calif. Locomotive rode rough; "Set up #2 and 6 wedges" was reported on August 22 prior to the accident and "Engine pounds and vibrates bad" was reported after the accident; one injured.

September 3, 1952, locomotive 4152, near Frazier, Oreg. Automatic safety cutout valve on tender fuel oil tank tripped because of short slack in valve cable between locomotive and tender, extinguishing the fire in firebox; one injured.

November 14, 1952, locomotive 3263, Klamath Falls, Oreg. Fire and smoke were escaping between firebox door frame and boiler head; door ring studs were loose; "Put gasket around fire door. Gasket is gone and causes fire and gas to come into cab. Point of burner too high" was reported on November 13; one injured.

November 22, 1952, locomotive 4158, Dunsmuir, Calif. Water leaks in firebox of oil-burning locomotive extinguished the fire; flame from gas explosion flashed through open fire door; one injured.

November 28, 1952, locomotive 4199, Newhall, Calif. Flow of oil to burner could not be controlled, resulting in excessive smoke and gas fumes while train was stopped in tunnel; one injured.

December 4, 1952, locomotive 5015, Shinn, Calif. Arm rest broke away from cab wall; bolts under one supporting bracket were rusted away and the other bracket broke through weld; one injured.

December 8, 1952, locomotive 4443, El Paso, Tex. Bonnet blew out of car steam heat throttle at turret on top of boiler, filling cab with steam; threads of bonnet nut and valve body were badly worn and deteriorated; bonnet nut was battered and distorted due to use of improper tools in tightening; one injured.

February 10, 1953, locomotive 2361, Los Angeles, Calif. Brakeman's cab seat fell from elevated storage position; one injured.

February 24, 1953, locomotive 4185, Mons, Calif. Driving wheels slipped violently, apparently due to treadworn tires; employee was injured while attempting throttle movements to avoid excessive slack action in train; "Throttle is very hard to open fully" was reported on February 23; one injured.

April 16, 1953, locomotive 4344, Gridley, Calif. Insufficient clearance between cab handhold and front tender deck; handhold was not carrier's standard for the locomotive; one injured.

June 11, 1953, locomotive 3695, Famoso, Calif. Accumulation of oil on top of tender fuel-oil tank around manhole cover; one injured.

June 29, 1953, locomotive 2804, Yuma, Ariz. Outer board of cab floor gave way, causing employee to fall; floor boards were inadequately secured and floor boards and nailing strips were badly deteriorated; one injured.

Fifteen accidents; 15 injured.

#### UNION PACIFIC RAILROAD:

August 20, 1952, locomotive (L. A. & S. L.) 5093, Centerville, Utah. Failure of locomotive lighting system; water-glass light circuit shorted and headlight globe burned out, resulting in excessive load on the generator armature; one injured.

\*\*May 10, 1953, locomotive 3988, Laramie, Wyo. Reverse lever was hard to operate due to improper lubrication; employee slipped and fell while assisting in operation of reverse lever; four hose, all having loose outer ends, were lying on cab floor near reverse lever; one injured.

Two accidents; 2 injured.

#### VIRGINIAN RAILWAY:

\*\*July 31, 1952, locomotive 242, Norfolk, Va. Water-glass gasket was leaking; one injured.

One accident; 1 injured.

### ACCIDENTS AND CASUALTIES RESULTING FROM THE FAILURE OF LOCOMOTIVES OTHER THAN STEAM AND THEIR APPURTENANCES DURING THE FISCAL YEAR ENDED JUNE 30, 1953, BY ROADS

[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:

\*\*July 6, 1952, unit 112, Nepesta, Colo. Fuel oil on engine room floor plate; one injured.

July 9, 1952, unit 303-B, Clovis, N. Mex. Bonnet blew out of end valve on train steam heat line; one injured.

\*\*November 23, 1952, units 242-A and 242-C, near Dalies, N. Mex. One cab heater in A unit and both heaters in C unit were inoperative; switch to heater in A unit was disconnected due to being in bad order; heaters were reported on November 23 (two times), 24 (prior to accident), and 25; one injured.

March 5, 1953, unit 2228, Argentine, Kans. Fire started at No. 1 traction motor due to defective lead cable connections to traction motor and oil accumulations on cables and top of traction motor case; one injured.

May 29, 1953, unit 338, near Revere, Mo. Unit became deenergized due to grounded lead to electrohydraulic governor solenoid relay; one injured.

Five accidents; 5 injured.

#### ATLANTIC COAST LINE RAILROAD:

\*\*October 5, 1952, unit 396-A, Waycross, Ga. Floor of control compartment was wet and slippery; one injured.

One accident; 1 injured.

#### BALTIMORE & OHIO RAILROAD:

September 19, 1952, unit 582, Newark, Ohio. Employee's hand was injured by contact with defective equipment box in cab; corner of box and lid were bent and welded seam at corner of box was torn; box was open though not being used while the unit was in operation; one injured.

One accident; 1 injured.

#### BUTTE, ANACONDA & PACIFIC RAILWAY:

\*\*June 10, 1953, unit 47, Butte, Mont. Pantograph would not raise properly due to defective air valve; pantograph air valve was reported blowing two times on June 10, prior to departure on trip on which the accident occurred; one injured.

One accident; 1 injured.

#### CHICAGO & NORTH WESTERN RAILWAY:

October 13, 1952, unit 4061-A, near Colo, Iowa. Cushion part of cab seat broke away from seat pedestal, due to all screws having pulled out of wood base of cushion; one injured.

One accident; 1 injured.

#### CHICAGO, INDIANAPOLIS & LOUISVILLE RAILWAY:

October 6, 1952, unit 5, New Albany, Ind. Deck of unit and steps from deck were not properly roughened; one injured.

One accident; 1 injured.

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

\*\*October 9, 1952, unit 1696, St. Paul, Minn. Swivel pin of cab seat broke through old weld at center boss of spider supporting the seat; one injured.

October 25, 1952, unit 40-C, Jerome, Iowa. Crankcase explosion, resulting from an overheated connecting rod; drilled oil passage from main bearing to connecting rod bearing was practically closed; one injured.

Two accidents; 2 injured.

#### CHICAGO, ROCK ISLAND & PACIFIC RAILROAD:

October 9, 1952, unit 633-B, Topeka, Kans. Engine cooling radiator shutters did not open properly, resulting in hot engine; shutters were reported October 2 and 16 (three times); one injured.

\*\*January 29, 1953, unit 623, Spring Valley, Ill. Air compressor crankshaft oil seal was defective, permitting oil to accumulate on floor of passageway in engine compartment; safety tread on floor plates was worn smooth; conditions responsible for the accident were reported 15 times since January 1; one injured.

\*\*June 11, 1953, unit 45, Plymouth, Nebr. Seat cushion and attached back rest of brakeman's cab seat fell from supporting standard; cushion was inadequately secured to standard by four wood screws which came out of screw holes in wood bottom of cushion; one injured.

Three accidents; 3 injured.

#### DENVER & RIO GRANDE WESTERN RAILROAD:

\*\*December 31, 1952, unit 5642, Provo, Utah. Oil on floor of unit in walkway; one injured.

One accident; 1 injured.

**ERIE RAILROAD:**

October 5, 1952, unit 737-D, Latimer, Ohio. Undesired emergency application of brakes caused by defective bearings in overspeed governor; defective gasket in wiring conduit cover permitted water to enter overspeed governor while unit was on wash rack, destroying the lubrication; one injured.

\*\*November 22, 1952, unit 711-A, Adrian, N. Y. Cab seat fell over backward due to failure of welding at base of pin at top of inner sleeve of seat; failure occurred through old fracture; one injured.

Two accidents; 2 injured.

**FLORIDA EAST COAST RAILWAY:**

May 16, 1953, unit 1051, Jacksonville, Fla. Bonnet blew out of train heat line end valve; threads on bonnet were badly worn and bonnet could be inserted in valve body to one thread of complete joint without being turned; one injured.

One accident; 1 injured.

**GREAT NORTHERN RAILWAY:**

February 13, 1953, unit 3, Hillyard, Wash. Hood door latch disconnected due to cotter key being missing; one injured.

One accident; 1 injured.

**GULF COAST LINES:**

April 17, 1953, unit (St. L. B. & M.) 9149, Velasco, Tex. Employee tripped on loose electric water-cooler cable on cab floor and fell through cab rear doorway; one injured.

May 1, 1953, unit (I.-G. N.) 556, Kingsville, Tex. Oil on floor of cab passage-way; lubricating oil can in unit was leaking; "Oil can in rear of engine room has hole" was reported on April 27; one injured.

Two accidents; 2 injured.

**INTERNATIONAL-GREAT NORTHERN RAILROAD:**

July 21, 1952, unit 4121, near Kilgore, Tex. Door stop for left front cab door was missing, resulting in insufficient clearance between door in open position and handrail along outside edge of walkway; one injured.

One accident; 1 injured.

**KANSAS CITY SOUTHERN RAILWAY:**

February 15, 1953, unit (L. & A.) 62-C, near Eve, Mo. Crankcase explosion due to overheated lower main crankshaft bearings; lube oil filling hole cover had been removed to permit observation of parts by a traveling employee; one injured.

One accident; 1 injured.

**LEHIGH VALLEY RAILROAD:**

January 17, 1953, unit 542, Burdett, N. Y. Oil on engineroom floor; "Mop oil from floor" was reported on January 16. When unit was inspected on February 12, lubricating oil and fuel oil leaks were noted which permitted oil to drop on engineroom floor; one injured.

One accident; 1 injured.

**LONG ISLAND RAIL ROAD:**

January 4, 1953, unit 2402, Flowerfield, N. Y. Opening on front side of exciter-auxiliary generator belt guard was not properly protected, permitting employee's hand to pass through opening and be caught between the belts and pulley driving the exciter-auxiliary generator unit; one injured.

One accident; 1 injured.

**LOUISVILLE & NASHVILLE RAILROAD:**

February 7, 1953, unit 512, Georgiana, Ala. Improperly secured drinking water cooler box in operating cab fell from stand; cooler box was not mounted in accordance with the carrier's standard practice; one injured.

One accident; 1 injured.

**MISSOURI-KANSAS-TEXAS RAILROAD:**

March 17, 1953, unit 151-A, Parsons, Kans. Pilot coupler was hard to move to retracted position; one injured.

One accident; 1 injured.

**MISSOURI PACIFIC RAILROAD:**

August 3, 1952, unit (St. L. B. & M.) 548-A, Etta, Ark. Crankcase explosion, resulting from an overheated main journal bearing; bearing was cut and scored and had turned with crankshaft sufficiently that oil port in upper part was partly blocked, preventing sufficient lubricating oil to flow to the bearing; one injured.

One accident; 1 injured.

**NEW YORK CENTRAL SYSTEM:**

February 1, 1953, unit 3313, near Yosts, N. Y. Hose between diesel engine cooling water outlet and radiator inlet headers burst; hose was badly deteriorated; one injured.

May 23, 1953, unit 1661, Nokomis, Ill. Employee was burned by flash from power contactor in high voltage electrical cabinet when attempt was made to open cabinet door while engine was under load; one injured.

June 3, 1953, unit 1786, near Cleveland, Ohio. Undesired operation of automatic train control; apparently the height of receiver was below carrier's standard minimum height above the rails; one injured.

June 12, 1953, unit 1010, Westboro, Mass. Traction motor generator armature grounded several times en route; employee slipped in oil accumulation while going back to set the relay; oily floors and oil leaks reported 12 times since May 24; one injured.

Four accidents; 4 injured.

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

July 18, 1952, unit 543, Hill's Grove, R. I. Motor generator commutator brushes were sticking; one injured.

September 14, 1952, unit 0903, New Haven, Conn. Oil on running board; "clean oil off deck" was reported on September 4, 11, 12, 13, and 15; one injured.

December 3, 1952, unit 0706, Hingham, Mass. Fire at engine exhaust manifold caused by an accumulation of fuel oil around manifold due to a defective exhaust valve rocker; one injured.

December 3, 1952, unit 0749, near Mansfield, Mass. Fire at engine exhaust manifold caused by accumulation of fuel oil due to manifold expansion joint leaking; openings around door between engineroom and cab permitted exhaust fumes to enter cab freely; fumes in cab reported on November 9 and 25, and manifold leaks reported on November 18 and December 2 (two times) and 3 (prior to accident); one injured.

\*\*December 16, 1952, unit 74, Milford, Conn. Main motor grounded, starting a fire in switch group; one injured.

December 20, 1952, unit 0908, New Haven, Conn. Oil on deck of unit caused by leaky fuel oil pressure pipe between transfer pump and filter; "Check oil leaks" was reported on December 15; one injured.

December 26, 1952, unit 0733-A, Providence, R. I., to Boston, Mass., and return. Engine exhaust manifolds leaked account of defective expansion joints; exhaust leaks were reported on December 24, 26 (two times), 27, and 30; one injured.

January 4, 1953, unit 0723-A, Kingston, R. I. Fire at engine exhaust manifold resulting from defective manifold pipes; exhaust manifold was reported leaking 11 times in the 30 days preceding the accident; one injured.

March 5, 1953, unit 0406, near Waterford, Conn. Crankcase explosion caused by a broken piston in right No. 2 cylinder; piston and related parts had been overheated; "Engine goes and stays in low lube" was reported on March 4; unit was returned to service on March 4 after repairs following a similar explosion on February 24 which involved right No. 4 cylinder and piston; one injured.

March 6, 1953, unit 0989, New Haven, Conn. Oil on rear deck; one injured.

March 8, 1953, unit 323, Woodlawn, N. Y. Grounded Nos. 3 and 4 traction motors caused fire on unit; one injured.

June 25, 1953, unit 0451, Newington, Conn. Defective control jumper contact; flash at high voltage cabinet when attempt made to determine cause of loss of power; oil from leaking fuel pump had accumulated on engineroom floor; oil leaks reported 15 times from June 8 to 22, inclusive; one injured.

Twelve accidents; 12 injured.

**PENNSYLVANIA RAILROAD:**

September 26, 1952, unit 9468-A, Outville, Ohio. Nut was missing from lower terminal of negative control circuit breaker, resulting in penalty emergency applications of the brakes; one injured.

\*\*October 2, 1952, unit 4913, New York, N. Y. Fire on electric unit while hauling a passenger train in tunnel burned brake equipment and resulting air leakage caused stoppage of the train in the tunnel; 12 injured.

October 4, 1952, unit 9491-A, near Irwin, Pa. Diesel engine exhaust manifold inspection cover became displaced, deflecting flames and gases; 1 of 3 securing studs was missing, nut was missing from 1 stud, and nut on remaining stud had backed out until it engaged only 1 thread; stud hole for the missing stud was filled with carbon; sealing gasket between cover and manifold face was missing; one injured.

November 4, 1952, unit 9135, Philadelphia, Pa. Diesel engine compartment door latch was difficult to operate; one injured.

January 1, 1953, unit 4814, New York, N. Y. Fuse box door opened unexpectedly due to defective door latch; one injured.

January 22, 1953, unit 3913, New York, N. Y. Hand brake latch became disengaged and brake handle struck employee; brake ratchet gear teeth and ratchet latch were badly worn; one injured.

February 21, 1953, unit 9602-A, near Huntingdon, Pa. Fuel oil transfer pipe between cylinder banks of diesel-electric engine broke at union at generator end; one injured.

March 10, 1953, unit 4860, Paoli, Pa. Pipe forming cab seat support column broke at seat base, causing employee to fall from seat; inside of pipe wall was badly corroded and wasted away at point of failure; pipe was open at top end and closed at bottom end by cab floor, permitting dirt and moisture to accumulate inside the pipe; one injured.

May 22, 1953, unit 2014-A, Mansfield, Ohio. Cap of tank for carbon dioxide fire extinguisher on engineroom passageway deck; no proper storage provided for the cap; one injured.

Nine accidents; 20 injured.

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

October 2, 1952, unit 5228, Billings, Mo. Crankcase explosion caused by an overheated main bearing resulting from lubrication failure; main bearing cross frame broke loose and resulting vibration of the bearing caused oil pipe to the bearing to break off at bearing cap; one injured.

February 13, 1953, unit 5, Cape Girardeau, Mo. Engine cooling water fan belt was partially broken and parted ends separated from the unbroken back part for approximately 3 inches, resulting in unusual noise as the loose ends passed around the sheaves; employee's fingers were caught and mangled between a fan belt and sheave while he was searching for the cause of the noise; no shield provided for fan belts or back of fan when the housing door was open; one injured.

Two accidents; 2 injured.

#### SEABOARD AIR LINE RAILROAD:

March 10, 1953, unit 1659, Tallahassee, Fla. Approximately one-half of exhaust stack screen blew off; fulcrum pin in one of the hinges which fastened screen to casing around stack had been cut in two, permitting movement of part of screen which finally broke the screen and freed part of it; screen was of smaller mesh than carrier's standard and was not properly applied to stack; one injured.

One accident; 1 injured.

#### SOUTHERN RAILWAY:

October 3, 1952, unit 4120, Birmingham, Ala. Main air reservoir explosion caused by defective brazing at reservoir head and excessive air pressure in reservoir resulting from improper arrangement of reservoir piping and an inoperative safety valve; two injured.

November 20, 1952, unit 6069, Birmingham, Ala. Shutters of engine water-cooling system were inoperative account of shutter blades being disconnected from operating bar due to connecting bolts being missing; "Shutters on front end bad order" was reported on November 18. Employee fell from front end of unit while attempting to close the shutters; safety chain was missing from between sections of front walkway guard rails; one injured.

March 24, 1953, unit 6053, Cincinnati, Ohio. Vertical handhold at right front corner of unit was badly bent; one injured.

May 15, 1953, unit 4359, Boyce, Tenn. Crankcase explosion resulting from overheated main rod and connecting rod bearings; "Smoke coming from around

inspection covers" was reported at end of previous trip; hot oil alarm was defective; one injured.

Four accidents; 5 injured.

#### SOUTHERN PACIFIC—LINES WEST:

July 16, 1952, unit 1395, Los Angeles, Calif. Cab seat back rest gave way; 1 of 2 bolts for securing back rest to cab seat was missing and nut was missing from the remaining bolt; one injured.

July 31, 1952, unit 1409, Jovista, Calif. Rear cab gangway was wet and slippery; improper piping at bottom of drinking water cooling box caused water to drain onto gangway instead of into drain tray; one injured.

October 1, 1952, unit 6138, Sentinel, Ariz. Fire on top of engine of D-E unit resulting from oil leakage that became ignited from heat of the exhaust manifold; one injured.

\*\*December 8, 1952, unit 6424, South Fontana, Calif. Coupler failed due to coupler pivot pin being missing; pivot pin was not replaced after semiannual inspection on December 7; two injured.

\*\*January 8, 1953, unit 8051, Mojave, Calif. Flash from high voltage cabinet. The ground relay, P-4 contactor terminal block, and dynamic brake contactors were found to be badly burned; one injured.

April 30, 1953, unit 6180, Niland, Calif. Oil on engineroom floor; "Clean oil up off the floors" was reported 15 times in the 30 days prior to accident; one injured.

May 19, 1953, unit 6158, Los Angeles, Calif. Steps between cab and engineroom were not in place; one injured.

May 25, 1953, unit 5115, near Patagonia, Ariz. Employee's hand was caught between diesel engine radiator fan and fan shroud while fan was revolving at high speed; rear of fan shroud unguarded; one injured.

Eight accidents; 9 injured.

#### TEXAS & PACIFIC RAILWAY:

September 29, 1952, unit 1517-A, near Fort Worth, Tex. Short circuit occurred at dynamic braking contactors when attempt was made to determine the cause of power failure on the D-E unit. Power failure was later found to have been caused by a defective switch part in the "K" interlock; one injured.

One accident; 1 injured.

#### UNION PACIFIC RAILROAD:

March 29, 1953, unit 1512-B, Georgetown, Idaho. Lubricating oil on floor of engine compartment; "Clean oil off engineroom floor" was reported on March 24; one injured.

May 29, 1953, unit 57, Bly, Calif. Flash explosion in engine compartment of gas-turbine locomotive unit recently converted to use of propane gas; partly blown gasket in main fuel line to turbine midframe permitted accumulation of combustible gas in engineroom which ignited when attempt was made to light a cigarette; one injured.

Two accidents; 2 injured.

#### WABASH RAILROAD:

\*\*September 28, 1952, unit 1202, near Maysville, Ill. Excessive smoke and gas in operating compartment of D-E unit; cracks in shroud of engine exhaust system permitted smoke leakage; one injured.

One accident; 1 injured.

#### WESTERN PACIFIC RAILROAD:

September 15, 1952, unit 907-A, Midway, Calif. Oil on floor of engine compartment caused by oil leaks from nearby parts of the engine; "Clean oil from decks" was reported on September 13 and 15 (prior to accident); one injured.

November 10, 1952, unit 912-B, Valpico, Calif. Ground in high voltage cabinet; horn fiber back of micarta block for wheel slip relay contact in high voltage cabinet swelled and bulged outward above top of metal frame, forming a pocket in which sufficient dirt and moisture accumulated to cause a ground to a screw securing the block in cabinet; one injured.

Two accidents; 2 injured.





TABLE XII.—Number of steam locomotives inspected, found

	St. Louis-San Francisco	St. Louis Southwestern	Seaboard Air Line	Southern Pacific, lines east	Southern Pacific, lines west	Southern
1 Air compressors.....				1	61	2
2 Arch tubes.....						
3 Ashpans and mechanism.....					6	2
4 Axles.....					91	
5 Blow-off cocks.....				3	27	2
6 Boiler checks.....				1	29	
7 Boiler shell.....				8	155	7
8 Brake equipment.....				1	58	4
9 Cabs, cab windows, and curtains.....					28	4
10 Cab aprons and decks.....					4	
11 Cab cards.....					7	
12 Coupling and uncoupling devices.....				4	104	
13 Crossheads, guides, pistons, and piston rods.....					8	
14 Crown bolts.....				4	123	3
15 Cylinders, saddles, and steam chests.....				1	21	
16 Cylinder cocks and rigging.....					13	
17 Domes and dome caps.....				3	29	3
18 Draft gear.....					16	
19 Draw gear.....				1	41	6
20 Driving boxes, shoes, wedges, pedestals, and braces.....					14	2
21 Firebox sheets.....					14	
22 Flues.....				4	41	2
23 Frames, tail pieces, and braces, locomotive.....					4	
24 Frames, tender.....				2	4	
25 Gages and gage fittings, air.....				10	24	1
26 Gages and gage fittings, steam.....				1	59	1
27 Gage cocks.....				3	7	
28 Grate shakers and fire doors.....				3	43	1
29 Handholds.....					5	
30 Injectors, inoperative.....				6	201	7
31 Injectors and connections.....				2	3	
32 Inspections and tests not made as required.....					4	1
33 Lateral motion.....					2	
34 Lights, cab and classification.....					4	
35 Lights, headlight.....					7	
36 Lubricators and shields.....				1	33	1
37 Mud rings.....					14	
38 Packing nuts.....					125	6
39 Packing, piston rod and valve stem.....				2	25	
40 Pilots and pilot beams.....					6	
41 Plugs and studs.....					10	
42 Reversing gear.....				1	40	3
43 Rods, main and side, crankpins, and collars.....					43	1
44 Safety valves.....	1			13	52	3
45 Sanders.....				8	238	1
46 Springs and spring rigging.....					7	
47 Squirt hose.....				1	23	1
48 Stay bolts.....					9	
49 Stay bolts, broken.....					39	3
50 Steam pipes.....					13	1
51 Steam valves.....				2	75	3
52 Steps.....					98	2
53 Tanks and tank valves.....				6	52	2
54 Telltale holes.....				2	56	2
55 Throttle and throttle rigging.....				3	17	
56 Trucks, engine and trailing.....				2	31	
57 Trucks, tender.....					9	2
58 Valve motion.....					1	
59 Washout plugs.....				2	60	3
60 Stokers.....					27	2
61 Water glasses, fittings, and shields.....				3	85	1
62 Wheels.....						
63 Miscellaneous—Signal appliances, badge plates, brakes (hand).....						
Number of defects.....	1			99	2,445	80
Locomotives reported.....	57	30	103	253	833	202
Locomotives inspected.....	8	39	4	482	2,911	169
Locomotives defective.....	1		4	28	751	20
Percentage of inspected found defective.....	12.5			5.8	25.8	11.8
Locomotives ordered out of service.....	1				25	1

defective, and ordered from service, et cetera—Continued

Spokane, Portland & Seattle	Terminal R. R. Association of St. Louis	Union Pacific	Union Railway	Utah	Virginian	Wabash	Western Maryland	Western Pacific	Roads with less than 10, and industrial locomotives	Total defects
		23							16	351
		2							1	5
		7						1	2	185
		16						1	9	182
		13						4	1	94
	4	114	1	5	4	1		4	55	1,038
		36			7				11	354
		10			1				11	179
		1			1				13	40
	1	1		1					2	30
	1	46	2						23	478
									1	27
		43	1	1	1				13	455
		22							9	136
		7		1					1	45
		9		1					14	108
		8			3	2			5	345
		3			1				4	55
		3							10	49
		19	3						2	225
		6		1	1				4	61
		16			1				1	112
		3			1				18	211
		13			3				6	121
		16				1			11	196
		3							2	18
	3	80	2		5				38	843
	1	11		1					12	53
		10	2			1			7	137
		9							1	26
		7								42
		7	1		1				5	81
		6							3	78
		18	2						30	294
		8							11	220
		8							3	48
		2				1			1	50
		30		1	1				21	216
		40	2		3				29	459
		29	3						1	19
		78			7	1		6	55	1,322
		4	1						2	41
	1	10							9	144
		16							60	125
		15	1						9	161
		5							6	68
		18							26	321
		32			2	2			22	466
		20		1	2				1	6
		14				1			13	263
		3							11	219
		20		2				1	6	195
		10							7	138
		11							3	133
		23			3				24	357
		13							14	151
	3	35		1				1	6	339
	4	18	1,041	23	14	47	10	15	721	12,980
	27	31	899	11	11	107	82	113	760	15,798
	36	82	2,135	60	17	226	73	111	885	28,899
	3	8	268	3	2	17	5		7	165
	8.3	9.8	12.6	5.0	11.8	7.5	6.8	14.3	18.6	12.4
		1	14	1					24	163









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

	Long Island	Louisiana & Arkansas	Louisville & Nashville	Maine Central	Manufacturers Ry.	Minneapolis & St. Louis	Minneapolis, St. Paul & S. S. Marie	Minnesota Transfer	Mississippi Central	Missouri-Kansas-Texas	Missouri Pacific	Monessen South-western	Monongahela Connecting	Montour
1			6							1	10			
2											1			
3											4			
4											4			
5											4			
6											4			
7											4			
8											4			
9											4			
10											4			
11											4			
12											4			
13											4			
14											4			
15											4			
16											4			
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46											4			
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52											4			
53											4			
54											4			
55											4			
56											4			
57											4			
58											4			
59											4			
60											4			
61											4			
62											4			
63											4			
Number of defects	27	69	209	22	7	10	16	3		54	466	4	14	
Locomotive units reported	80	26	462	83	12	82	133	18	10	214	557	11	34	12
Locomotive units inspected	99	196	1,389	187	33	103	255	49	8	746	1,903	13	80	16
Locomotive units defective	13	19	69	15	4	5	6	1		29	182	2	6	
Percentage of inspected found defective	13.1	9.7	5.0	8.0	12.1	4.9	2.4	2.0		3.9	9.6	15.4	7.5	
Locomotive units ordered out of service			2								3			

found defective, and ordered from service, et cetera—Continued

Nashville, Chattanooga & St. Louis	Newburgh & South Shore	New Orleans Public Belt	New York Central	New York, Chicago & St. Louis	New York, New Haven & Hartford	New York, Ontario & Western	New York, Susquehanna & Western	Niagara Junction	Norfolk Southern	Northern Pacific	Northern Pacific Terminal	Northwestern Pacific	Pacific Electric	Pataasco & Back Rivers	Pennsylvania	Pennsylvania-Reading Seashore Lines	Peoria & Pekin Union	Philadelphia, Bethlehem & New England	Piedmont & Northern	Pittsburgh & Lake Erie	Pittsburgh & West Virginia	
2			22		5										12							1
1			4		1										2							2
34			73		36										6							4
4			88		61										6							5
14			132		34										68							6
2			13		10										46							8
7			3		1										4							9
1			16		99										136							10
1			3		1										17							11
7			1		13										7							12
1			12		5										4							13
14			3		2										6							14
2			33		3										20							15
2			6		6										5							16
1			91		2										186							17
14			16		7										1							18
2			1		2										2							19
1			5		1										8							20
1			6		2										9							21
53			6		3										11							22
6			508		4										597							23
3			14		12										37							24
1			2		1										2							25
1			3		1										2							26
1			1		1										1							27
1			2		1										1							28
3			28		29										82							29
4			1		1										1							30
7			41		38										45							31
2			21		14										3							32
3			8		39										4							33
27			29		6										37							34
2			24		13										50							35
1			4		3										4							36
1			2		1										2							37
1			5		1										1							38
2			10		2										14							39
2			62		82										30							40
191			61,515		22										1,469							41
132			14,896		167										39							42
528			5,626		354										48							43
58			582		11										488							44
11.0			30.8		3.1										10.7							45
7			4		6										6							46

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

found defective, and ordered from service, et cetera—Continued

Parts defective, inoperative or missing, or in violation of the rules	Portland Traction	Reading	Richmond, Fredericksburg & Potomac	Rutland	Sacramento Northern	St. Louis-San Francisco	St. Louis Southwestern	Savannah & Atlanta	Seaboard Air Line	South Buffalo	Southern Pacific, lines east	Southern Pacific, lines west
Air compressors		1	2	2		6	1		3			13
Axles, truck and driving												
Batteries						2	1					11
Boilers				1								
Brake equipment		3	1	2		43	9	2	43		9	57
Cabs and cab windows						7	5		15		7	35
Cab cards						1	2		2			9
Cab floors, aprons and deck plates		2		2		14	11		21		5	105
Clutches												
Controllers, relays, circuit breakers, magnet valves and switch groups		3	1			25	1		6			14
Coupling and uncoupling devices						2			3			12
Current collecting apparatus												
Draft gear		1	1	1		4	1		3			14
Draw gear						1			1			2
Driving boxes, shoes and wedges							4					8
Frames or frame braces												
Fuel system		3	7			46	4		19	1		119
Gages or fittings, air							2		8			5
Gages or fittings, steam		2				5						1
Gears and pinions												
Handholds		1							9			1
Inspections and tests not made as required		1				2	1		4			12
Insulation and safety devices		1				1			1			
Internal-combustion engine defects, parts and appurtenances		2	4	19	2	128	20		89	1	10	246
Jack shafts												
Jumpers and cable connectors						2	1					2
Lateral motion, wheels												
Lights, cab and classification											1	14
Lights, headlight												9
Meters, volt and ampere			1						2			2
Motors and generators		4	5	1		5	1		7		4	43
Pilots and pilot beams						1	1		5			
Plugs and studs												1
Quills												
Rods, main, side, and drive shafts												
Sanders			1	5		31	6		61		15	40
Springs and spring rigging, driving and truck						1			7			1
Stay bolts, broken or defective												
Steam pipes			1			1						
Steps, footboards, et cetera		2		2		7	2	1	28			7
Switches, hand-operated, and fuses												4
Transformers, resistors and rheostats												
Trucks			3			2	3		16		1	6
Water tanks						1						
Water glasses, fittings and shields									6			1
Warning signal appliances						2						
Wheels						3			4		1	14
Miscellaneous				2		12	4		23			45
Number of defects		29	27	37	2	355	80	3	386	2	53	858
Locomotive units reported	11	327	67	16	24	412	128	10	492	55	256	992
Locomotive units inspected	18	765	256	105	35	1,583	482	14	1,562	182	456	3,673
Locomotive units defective		17	19	18	2	101	33	2	139	2	27	387
Percentage of inspected found defective	2.2	7.4	17.1	5.7	6.4	6.8	14.3		8.9	1.1	5.9	10.5
Locomotive units ordered out of service					1				3			2

Southern	Spokane, Portland & Seattle	Steelton & Highspire	Tennessee Central	Tennessee Coal & Iron Div.	Terminal R. R. Association of St. Louis	Texas & Pacific	Texas Mexican	Toledo, Peoria & Western	Toledo Terminal	Union Pacific	Union Railroad	Virginian	Wabash	Washington Terminal	Waterloo, Cedar Falls & Northern	Western Maryland	Western Pacific	Youngstown & Northern	Roads with less than 10, and industrial locomotive units	Total defects			
17	1			2	1					13	1						1			3	210	1	
2										8								2				40	2
9										1												103	5
93	11			9	7		2			106	6		5				5			83	1,698	6	
25			1	12	1	2				19	6		1				7			28	679	8	
3										9			1							1	17	128	9
54	2		2	3	7	4				67	1		10				4			31	1,589	10	
20				1	5					62	2		11							9	424	12	
1										2								2		2	95	13	
18			4	1						23									1	14	218	16	
4										3										2	42	17	
6			2							4											128	18	
70	1			7	6					128	4		4				15			22	1,853	22	
8				1						8							1			5	138	23	
7													2								44	24	
3										2			2								13	25	
8										12			3				2			19	121	26	
6										5							1			30	175	28	
198	17		8	32	19	7				342	3		13				15			57	4,564	30	
1										8							2			4	1	32	
1			2																		7	35	
6										50							4			2	109	36	
24				1						24											42	37	
2										53	5						5			6	655	40	
2										2											3	43	
84				4	3					53			7				5			29	1,224	48	
9										4										13	178	49	
33	1			4	2					3			1				1				119	53	
1										8	3						2			56	505	54	
29										7											17	55	
9										1											3	56	
3	2									14							4			8	439	57	
32	1		7	3	2					1											31	59	
										30											14	60	
										14											122	61	
										165			4							40	212	62	
																	10			12	864	63	
796	36		26	82	63	18				1,251	32		64				89	1	494	17,163			
874	91	23	19	45	99	205	18	15	11	733	144	44	277	26	14	93	166	14	1,189	25,374			
2,920	301		92	27	253	581	28	17	44	3,490	92	65	1,326	12	15	111	575	11	1,927	75,170			
275	24		10	9	48	7				407	8		37				41	1	202	6,571			
9.4	8.0		10.9	33.3	19.0	1.2				11.7	8.7		2.8				7.1	9.1	10.5	8.7			
3				6	2	2				4										19		118	