

INTERSTATE COMMERCE COMMISSION

FORTIETH ANNUAL REPORT

OF THE

DIRECTOR

BUREAU OF LOCOMOTIVE INSPECTION

TO THE

INTERSTATE COMMERCE COMMISSION

FISCAL YEAR ENDED

JUNE 30, 1951



UNITED STATES

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ANNUAL REPORT OF THE DIRECTOR BUREAU OF LOCOMOTIVE INSPECTION

OCTOBER 1, 1951.

To the Interstate Commerce Commission:

In compliance with section 7 of the act of February 17, 1911, as amended, the Fortieth Annual Report of the Director of the Bureau of Locomotive Inspection, covering the work of the Bureau during the fiscal year ended June 30, 1951, 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 locomotive units other than steam.

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

	Year ended June 30—					
	1951	1950	1949	1948	1947	1946
Number of locomotives for which reports were filed . . .	26,595	29,743	33,866	37,073	39,578	41,851
Number inspected	62,113	66,809	85,353	93,917	94,034	101,869
Number found defective	7,995	6,740	7,035	9,417	10,248	11,337
Percentage inspected found defective	12.9	10.1	8.2	10.0	10.9	11.1
Number ordered out of service	508	399	436	654	708	690
Number of defects found	34,657	28,504	28,642	38,855	41,250	56,541

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

	Year ended June 30—					
	1951	1950	1949	1948	1947	1946
Number of accidents.....	167	169	228	341	360	419
Percent increase or decrease from previous year.....	1.2	25.9	33.1	5.3	14.1	12.2
Number of persons killed.....	14	7	10	15	16	10
Percent increase or decrease from previous year.....	1100	30.0	33.3	6.3	160.0	50.0
Number of persons injured.....	170	184	243	361	464	439
Percent increase or decrease from previous year.....	7.6	24.3	32.7	22.2	15.7	12.3

¹ Increase.

TABLE III.—Accidents and casualties caused by failure of some part or appurtenance of the steam locomotive boiler¹

	Year ended June 30—							
	1951	1950	1949	1948	1947	1946	1915	1912
Number of accidents.....	51	59	81	104	116	156	424	856
Number of persons killed.....	3	4	9	14	12	10	13	91
Number of persons injured.....	59	70	94	108	124	165	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—									
	1951		1950		1949		1948		1947	
	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured
Members of train crews:										
Engineers.....	2	51	2	64	3	75	3	109	6	126
Firemen.....	3	62	2	64	3	92	6	155	6	159
Brakemen.....	1	20	2	29	1	30	3	43	1	37
Conductors.....		6		4		7		5		10
Switchmen.....	1	8		5		6		10		9
Roundhouse and shop employees:										
Boilermakers.....		2		2		2		4		3
Machinists.....	1	2		1		4	1	2	1	
Foremen.....		2		1		1		1		
Inspectors.....		2		2						1
Watchmen.....	1		1	4	1		2	1		2
Boiler washers.....										
Hostlers.....	1	4		1	1	8		8		6
Other roundhouse and shop employees.....		2		2	1	4		5		8
Other employees.....		3		4		6		12	2	21
Nonemployees.....	4	6		1		9		6		82
Total.....	14	170	7	184	10	243	15	361	16	464

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

	Year ended June 30—					
	1951	1950	1949	1948	1947	1946
Number of locomotive units for which reports were filed.....	19,320	15,719	12,692	9,803	7,805	6,616
Number inspected.....	52,948	42,503	30,684	20,798	13,115	10,908
Number found defective.....	4,375	2,748	1,238	853	633	499
Percentage inspected found defective.....	8.3	6.5	4.0	4.1	4.8	4.6
Number ordered out of service.....	106	42	20	21	19	17
Number of defects found.....	11,935	6,325	2,804	1,745	1,442	1,385

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

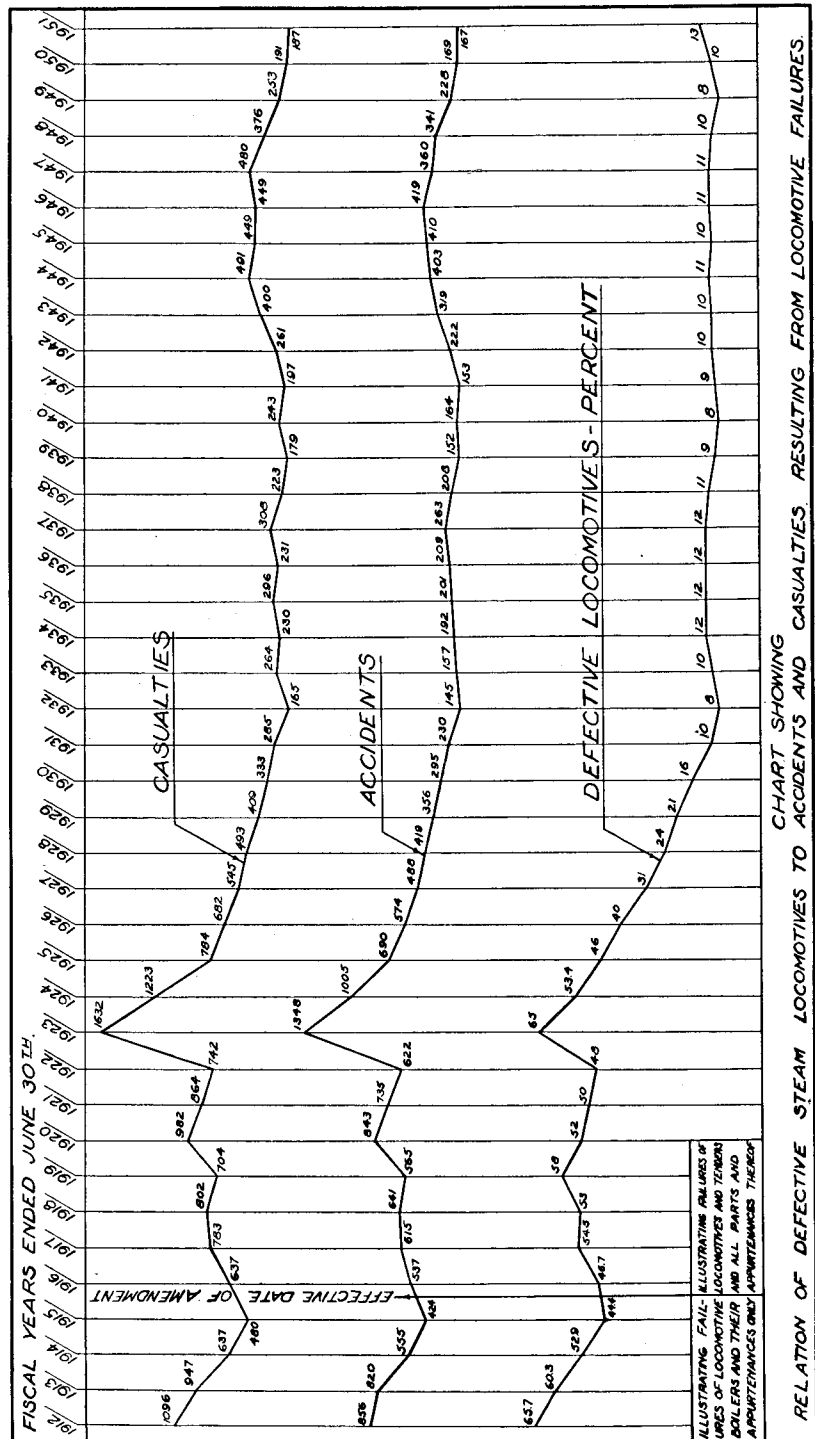
	Year ended June 30—					
	1951	1950	1949	1948	1947	1946
Number of accidents.....	54	51	49	41	40	38
Number of persons killed.....	2	3			2	
Number of persons injured.....	129	50	67	50	41	56

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

	Year ended June 30—									
	1951		1950		1949		1948		1947	
	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured
Members of train crews:										
Engineers.....		11		15		12		7	1	9
Firemen.....	1	30		21		14		24		21
Brakemen.....		4		3		6		1		5
Conductors.....				4				2		1
Switchmen.....		5		1		4		2		1
Maintenance employees.....	1	3		3		8			1	2
Other employees.....		13	1	2		13		2		2
Nonemployees.....		63	2	1		10		12		
Total.....	2	129	3	50		67		50	2	41

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—														
	1951			1950			1949			1948			1947		
	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured
Air reservoirs															
Aprons	1		1	2		2	3		3		3	1		1	1
Arch tubes	1		1	1		1						5		5	4
Ashpan blowers							1		1						
Axles												3		3	1
Blow-off cocks	2		2	2		2	5		4		5	5		5	8
Boiler checks	3		3	3		3	4		5		7	1		6	7
Boiler explosions:															
A. Shell explosions															
B. Crown sheet; low water; no contributory causes found	5	3	8	8	4	12	4	6	13	10	12	8	11	7	16
C. Crown sheet; low water; contributory causes or defects found	1		5	1		2	1	1	1	3		7	2	4	3
D. Miscellaneous firebox failures															
Brakes and brake rigging	3	3	3	2		2	3		4	11	24	8		8	12
Couplers	2		2	4		4	3		4	4	4	6		6	6
Crank pins, collars, etc	2	1	1	1		1	1		2	2	3	3		3	3
Crossheads and guides	1		1	1		1	1		1	1	2	2		2	2
Cylinder cocks and rigging										3	3	3		3	3
Cylinder heads and steam chests										1	1	2		2	2
Dome caps															
Draft appliances							3		3						
Draw gear	1		1	1		1						1		1	1
Fire doors, levers, etc	2		2	2		2	3		3	10	10	2		2	2
Flues	3		3	6		9	3		3	8	9	4		4	4
Flue pockets															
Footboards	8		8	8		8	10		10	15	15	15		15	15
Gage cocks							1		1						
Grease cups				1		1						1		1	1
Grate shakers	7		7	6		6	11		11	15	15	20		20	20
Handholds	14		14	11		11	13		13	12	12	18		18	18
Headlights and brackets	1	1	1	1		1	1		1	3	3	2		2	2
Injectors and connections (not including injector steam pipes)	3		3	7		7	12		12	10	10	14		14	14
Injector steam pipes	1		1							4	4	5		5	4
Lubricators and connections	4		4	2		2	4		4	2	2	4		4	4
Lubricator glasses				1		1	1		1						
Patch bolts															
Pistons and piston rods										2	2	1		1	1
Plugs, arch tube and washout	2		2	1		1				3	3	1		1	1
Plugs in firebox sheets															
Reversing gear	5		5	9	1	8	6		6	12	12	13		13	13
Rivets										1	1	1		1	1
Rods, main and side				1		2	2		2	5	5	7		7	3
Safety valves															
Sanders	1		1	4		4	4		4	4	4	5		5	5
Side bearings										1	1	1		1	1
Springs and spring rigging	2		2	2		2	1		1	4	4	4		4	77
Squirt hose	6		6	9		9	14		14	5	5	19		19	19
Staybolts	2		2	1		1				4	4	2		2	2
Steam piping and blowers	3		3	3		3	6		6	13	13	13		13	4
Steam valves	3		3	3		3	3		3	6	6	8		8	8
Studs				1		1	1		1	2	2	2		2	2
Superheater tubes	1		1	3		3	3		3	6	6	3		3	2
Throttle glands										4	4	1		1	
Throttle leaking	5		5	2		2	1		1	1	1	2		2	2
Throttle rigging	5		5	7		7	11		11	10	10	16		16	17
Trucks, leading, trailing, or tender	2		2	2		2	3		3			2		2	20
Valve gear, eccentrics, and rods	2		2	1		1	1		1	3	3	4		4	4
Water glasses	1		1	3		3	5		5	4	4	8		8	8
Water-glass fittings										3	3	3		3	3
Wheels	1		1							3	3	2		2	
Miscellaneous	61	6	59	46		49	74		75	121	122	117		117	117
Total	167	14	170	169	7	184	228	10	243	341	15	361	360	16	464



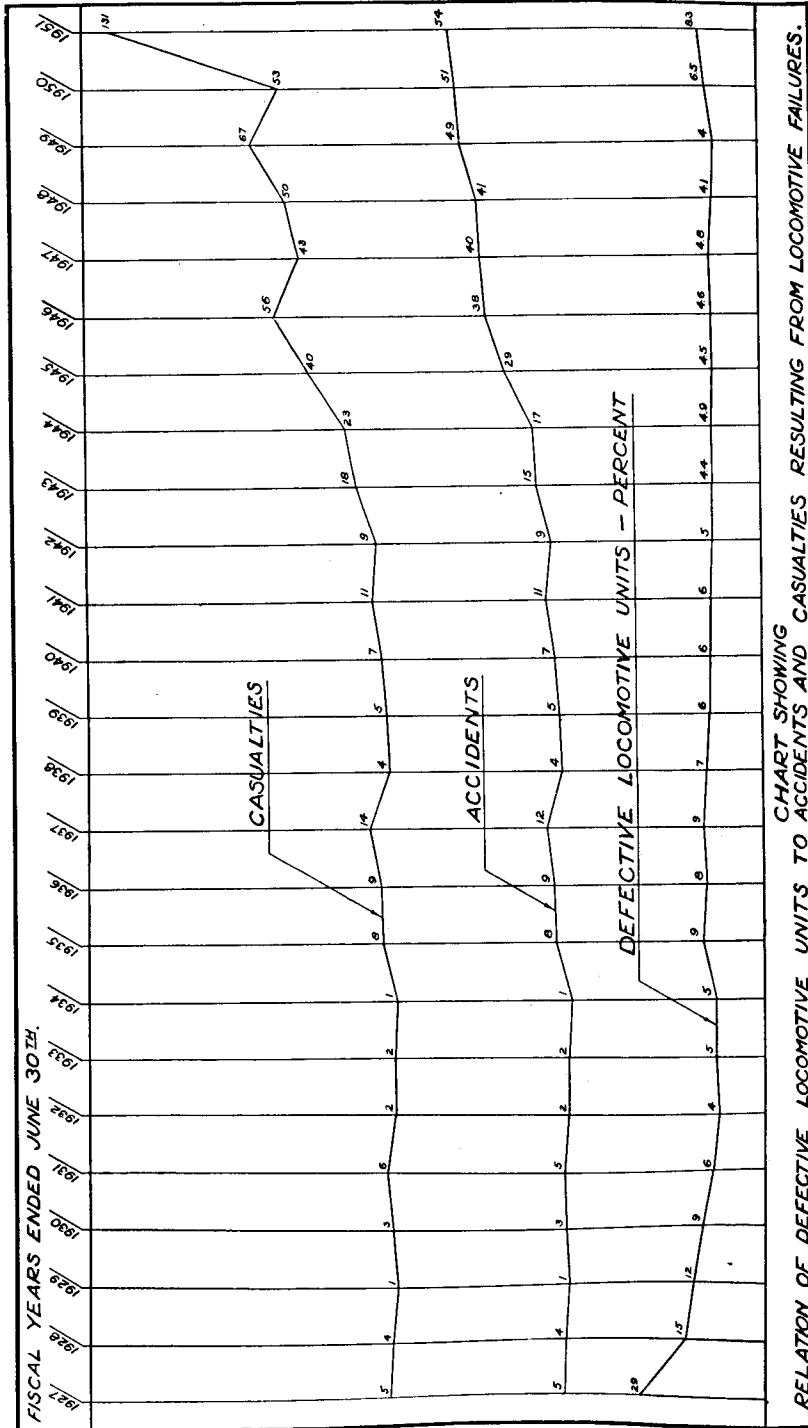


CHART SHOWING RELATION OF DEFECTIVE LOCOMOTIVE UNITS TO ACCIDENTS AND CASUALTIES RESULTING FROM LOCOMOTIVE FAILURES.

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—														
	1951			1950			1949			1948			1947		
	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured
Brakes and brake rigging	2		3	4		4	4		5	3		6	2		2
Carburetors															
Couplers	1		1	1		1	1		1				2		2
Crank pins and connecting rods															
Fires due to overflowing or leakage of fuel, crankcase explosions, back firing, etc.	9		10	4		4	8		9	3		3	7		8
Generators and starting devices	2		2	1		1	1		1	1		1	1		1
Insulation	1		1				1		1				4		5
Pantographs and trolleys	1	1		1	1		1	1					1	1	
Short circuits	9		9	2		2	6		7	7		7	2		2
Miscellaneous	29	1	103	38	2	38	27		43	27		33	22		22
Total	54	2	129	51	3	50	49		67	41		50	40	2	41

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

Parts defective, inoperative or missing, or in violation of the rules	Year ended June 30—					
	1951	1950	1949	1948	1947	1946
1 Air compressors	897	719	693	1,007	944	1,044
2 Arch tubes	17	9	11	15	19	27
3 Ashpans and mechanism	64	59	52	72	87	93
4 Axles	4	1	4	8	6	7
5 Blow-off cocks	262	220	220	274	308	388
6 Boiler checks	477	386	337	424	428	526
7 Boiler shell	226	211	208	298	342	462
8 Brake equipment	2,453	1,845	1,806	2,617	2,512	2,992
9 Cabs, cab windows, and curtains	1,173	862	781	1,049	1,347	1,501
10 Cab aprons and decks	395	364	355	414	428	469
11 Cab cards	83	97	95	109	91	120
12 Coupling and uncoupling devices	54	41	42	55	58	46
13 Crossheads, guides, pistons, and piston rods	1,363	1,100	1,147	1,611	1,683	1,941
14 Crown bolts	52	53	46	78	98	88
15 Cylinders, saddles, and steam chests	1,437	1,160	1,155	1,617	2,004	2,217
16 Cylinder cocks and rigging	474	376	356	494	650	679
17 Domes and dome caps	131	90	82	142	130	164
18 Draft gear	441	368	370	461	449	536
19 Draw gear	297	280	300	413	453	462
20 Driving boxes, shoes, wedges, pedestals, and braces	1,145	1,070	1,070	1,582	1,580	1,922
21 Firebox sheets	203	181	191	302	257	333
22 Flues	184	152	156	201	197	253
23 Frames, tail pieces, and braces, locomotive	486	451	451	576	820	1,003
24 Frames, tender	47	34	39	72	63	88
25 Gages and gage fittings, air	173	116	118	185	135	185
26 Gages and gage fittings, steam	325	272	268	354	358	370
27 Gage cocks	495	386	375	474	404	495
28 Grate shakers and fire doors	339	326	286	455	444	555
29 Handholds	420	439	421	513	469	540
30 Injectors, inoperative	60	45	39	66	39	50
31 Injectors and connections	2,190	1,767	1,795	2,329	2,369	2,750
32 Inspections and tests not made as required	121	122	104	148	350	8,885
33 Lateral motion	465	389	507	821	791	862
34 Lights, cab and classification	118	60	58	132	155	161
35 Lights, headlight	108	131	118	183	143	168
36 Lubricators and shields	222	157	157	236	228	351
37 Mud rings	153	145	147	186	217	238
38 Packing nuts	638	558	474	456	575	691
39 Packing, piston rod and valve stem	765	510	511	658	691	776
40 Pilots and pilot beams	124	126	73	132	156	153
41 Plugs and studs	117	104	99	169	236	262

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 the rules	Year ended June 30—					
	1951	1950	1949	1948	1947	1946
Reversing gear	631	404	405	649	528	482
Rods, main and side, crank pins, and collars	1,511	1,213	1,408	1,998	2,136	2,581
Safety valves	45	34	45	45	70	72
Sanders	806	641	608	597	569	784
Springs and spring rigging	3,340	2,848	3,177	4,124	4,622	5,195
Squirt hose	90	74	63	93	79	120
Stay bolts	280	229	227	292	318	360
Stay bolts, broken	282	193	196	258	283	268
Steam pipes	342	302	256	435	356	551
Steam valves	181	131	133	150	146	203
Steps	805	680	652	767	778	914
Tanks and tank valves	1,304	1,205	1,228	1,757	1,558	1,570
Telltale holes	33	28	33	60	33	60
Throttle and throttle rigging	927	664	709	923	1,026	979
Trucks, engine and trailing	700	580	545	812	1,005	1,261
Trucks, tender	710	540	471	652	795	1,101
Valve motion	673	486	484	676	778	1,080
Washout plugs	325	289	268	384	441	740
Stokers	306	261	216	270	208	275
Water glasses, fittings, and shields	858	907	920	1,039	1,318	1,100
Wheels	536	394	455	779	583	840
Miscellaneous—Signal appliances, badge plates, brakes (hand)	774	652	626	707	870	1,337
Number of defects	34,657	28,504	28,642	38,855	41,250	56,541
Locomotives reported	26,595	29,743	33,866	37,073	39,578	41,851
Locomotives inspected	62,113	66,809	85,353	93,917	94,034	101,869
Locomotives defective	7,995	6,740	7,035	9,417	10,248	11,337
Percentage of inspected found defective	12.9	10.1	8.2	10.0	10.9	11.1
Locomotives ordered out of service	508	399	436	654	708	690

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

Parts defective, inoperative or missing, or in violation of the rules	Year ended June 30—					
	1951	1950	1949	1948	1947	1946
Pilots and pilot beams	36	29	16	23	15	8
Plugs and studs	3					
Quills	26	10	9	16	18	52
Rods, main, side, and drive shafts	2	6	1	5	6	11
Sanders	902	356	151	106	82	57
Springs and spring rigging, driving and truck	108	103	43	44	63	42
Stay bolts, broken or defective		1				
Steam pipes	24	32	17	10	4	1
Steps, footboards, et cetera	377	284	213	116	68	29
Switches, hand-operated, and fuses	15	9	1	3	1	
Transformers, resistors, and rheostats	9	9	2	6	2	3
Trucks	234	182	84	65	45	52
Water tanks	33	20	2	1	2	1
Water glasses, fittings, and shields	11	27	2	18		15
Warning signal appliances	83	21	9	7	8	2
Wheels	215	95	98	72	48	54
Miscellaneous	574	377	109	39	40	31
Number of defects	11,935	6,325	2,804	1,745	1,442	1,385
Locomotive units reported	19,320	15,719	12,692	9,803	7,805	6,616
Locomotive units inspected	52,948	42,503	30,684	20,798	13,115	10,908
Locomotive units defective	4,375	2,748	1,238	853	633	499
Percentage of inspected found defective	8.3	6.5	4.0	4.1	4.8	4.6
Locomotive units ordered out of service	106	42	20	21	19	17

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

One hundred and sixty-seven accidents occurred in connection with steam locomotives resulting in 14 deaths and 170 injuries. This represents a decrease of 2 accidents, an increase of 7 in the number of persons killed, and a decrease of 14 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.

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

Parts defective, inoperative or missing, or in violation of the rules	Year ended June 30—					
	1951	1950	1949	1948	1947	1946
Air compressors	146	99	26	32	9	15
Axles, truck and driving	2	2	1	3	2	
Batteries	85	20	13	8	1	2
Boilers	43	46	9	30	5	11
Brake equipment	1,166	673	299	204	178	102
Cabs and cab windows	672	377	159	90	97	46
Cab cards	100	75	46	37	29	24
Cab floors, aprons, and deck plates	1,281	726	234	134	130	72
Clutches	4	1	2			2
Controllers, relays, circuit breakers, magnet valves, and switch groups	166	61	35	24	14	16
Coupling and uncoupling devices	35	32	15	12	13	6
Current collecting apparatus	9	18	20	11	3	9
Draft gear	141	91	66	36	30	18
Draw gear	46	27	13	8	4	3
Driving boxes, shoes, and wedges	38	51	33	16	38	44
Frames or frame braces	27	9	5	2	7	10
Fuel system	1,082	483	191	136	66	57
Gages or fittings, air	70	29	11	11	10	7
Gages or fittings, steam	14	14	2	2	5	
Gears and pinions	9	15	6	9	1	
Handholds	97	70	53	32	22	18
Inspections and tests not made as required	143	116	90	59	78	357
Insulation and safety devices	64	48	36	10	11	12
Internal-combustion engine defects, parts and appurtenances	3,270	1,456	602	241	254	145
Jack shafts	5	8	11	5	3	4
Jumpers and cable connectors	190	86	8	7	1	8
Lateral motion, wheels	11	2	7	18	7	18
Lights, cab and classification	23	7	5	5	1	2
Lights, headlight	16	9	3	3	2	
Meters, volt and ampere	14	7		3	3	4
Motors and generators	314	106	46	26	16	15

During the year, 13 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 an increase of 3 percent from the results of the preceding year. Five hundred and eight locomotives were ordered withheld from service by our inspectors because of the presence of defects that rendered the locomotives immediately unsafe; this is an increase of 109 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

Six boiler explosions occurred in the fiscal year; all were caused by overheating of the crown sheets due to low water. Three persons were killed in these accidents and 13 were injured. There was a decrease of three in the number of boiler explosions and a decrease of one each in the number of persons killed and injured compared with the preceding year.

Four of the explosions occurred on locomotives in freight-train service, one on a locomotive in switching service, and one on a locomotive in charge of a watchman. One of the locomotives used in freight service was equipped with a low water alarm which was badly damaged by the explosion that caused the death of the engineer and fireman. Evidence could not be developed to show whether or not the alarm functioned prior to the accident. The top water glass connection was defective on another locomotive and caused a false high indication of water level in the boiler which deceived the engine crew; resulted in an overheated crown sheet and subsequent explosion. Absence of a safe water level was known to employees on two of the locomotives prior to the explosions.

Forty-five boiler and appurtenance accidents other than explosions resulted in injuries to 46 persons. This is a decrease of 5 accidents and a decrease of 10 injuries compared with the preceding year.

EXTENSION OF TIME FOR REMOVAL OF FLUES

Eight hundred and eighteen applications were filed for extension of time for removal of flues, as provided in rule 10. Our investigations disclosed that in 57 of these cases the condition of the locomotives or other circumstances were such that extensions could not properly be granted. Nine were in such condition that the full extensions requested could not be authorized, but extensions for shorter periods of time were allowed. Thirty extensions were granted after defects disclosed by our investigations were required to be repaired. Twenty-

one applications were canceled for various reasons. Seven hundred and one applications were granted for the full period requested.

LOCOMOTIVE UNITS PROPELLED BY POWER OTHER THAN STEAM

Fifty-four accidents, resulting in 2 deaths and injuries to 129 persons, occurred in connection with locomotive units propelled by power other than steam. This represents an increase of 3 in the number of accidents, a decrease of 1 in number of persons killed and an increase of 79 in the number of injured compared with the preceding year.

During the year, 8.3 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 an increase of 1.8 percent compared with the results obtained in the preceding year. One hundred and six locomotive units were ordered withheld from service by our inspectors because of the presence of defects that rendered the units immediately unsafe; this represents an increase of 64 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 inspections 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, 117 specification cards and 3,072 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, 3,828 specifications and 716 alteration reports were filed for locomotive units and 692 specifications and 271 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.

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.

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, 1951, 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.]

ATCHISON, TOPEKA & SANTA FE RAILWAY:

July 12, 1950, locomotive 1139, Purcell, Okla. Oil on top of tender fuel-oil tank; one injured.

July 27, 1950, locomotive 3420, Shopton, Iowa. Gases in firebox of oil-burning locomotive became ignited and flashed from firebox door while fire was being lighted and a fire broke out in pit under the cab caused by blazing oil from draft pan dropping on waste oil in pit; channel of automatized oil from burner toward flash wall at back of draft pan was obstructed by a carbon deposit on floor of draft pan; one killed.

October 15, 1950, locomotive 2903, Brink, Okla. Drop-type cab window frame worked from catches provided to hold it in raised position and dropped downward, catching employee's head which was protruding through window sliding-sash opening; one injured.

November 28, 1950, locomotive 1962, Wellington, Kans. Oil on top of tender fuel-oil tank; one injured.

December 6, 1950, locomotive 3142, near Dalies, N. Mex. Squirt hose blew off; no clamp provided to secure hose on squirt-valve nipple; one injured.

January 5, 1951, locomotive 3852, Summit, Calif. Employee stumbled over marker box on top of tender cistern and fell; marker box was located in the direct route from cab to marker bracket at rear of tender, 36½ inches from the step on back wall of fuel-oil tank; one injured.

February 24, 1951, locomotive 3749, San Bernardino, Calif. Oil on steps at front end of tender fuel-oil tank; "Clean off top of tank" was reported on February 12 and 18; one injured.

March 1, 1951, locomotive 803, Winslow, Ariz. Employee was burned by steam and hot oil which were discharged from lubricator when steam was turned into it; lubricator had not been refilled nor filling plug replaced when locomotive was turned over to engine crew; one injured.

March 30, 1951, locomotive 3763, Cassoday, Kans. Throttle was leaking. Employee fell from front end of locomotive while inspecting throttle mechanism; "Clean grease off steps on front end" was reported after the accident; one injured.

April 1, 1951, locomotive 1805, Canadian, Tex. Crown sheet failure caused by overheated crown sheet due to low water; one killed.

Ten accidents; two killed, eight injured.

ATLANTIC COAST LINE RAILROAD:

December 8, 1950, locomotive 1138, Palatka, Fla. Crown sheet failure caused by overheating due to low water; two injured.

**June 13, 1951, locomotive 426, near Dunnellon, Fla. Door to supply box in leg of tender opened unexpectedly; no effective means provided to hold door in closed position; one injured.

Two accidents; three injured.

BALTIMORE & OHIO RAILROAD:

September 14, 1950, locomotive 5240, Green Spring, W. Va. Insufficient clearance between cab handhold at gangway and tender deck when on curve; one injured.

**November 14, 1950, locomotive 1186, Cleveland, Ohio. Insufficient clearance between cab gangway handhold and tender step when on sharp curve; one injured.

December 9, 1950, locomotive 7617, Keyser, W. Va. Cab gangway handhold broke at top connection through old fracture which originated at tool mark; one injured.

**December 16, 1950, locomotive 7606, near Tunnelton, W. Va. Employee stepped into stoker conveyor trough and his foot was caught by the turning conveyor screw; passageways at sides of conveyor trough were greatly restricted when coal gates were latched back and location of safe footing in passageways was obscured by poor visibility caused by inadequate lighting facilities provided and by steam leaks from locomotive and stoker engine and steam pipe on tender; one injured.

March 16, 1951, locomotive 4576, Ivorydale, Ohio. Low water alarm whistle sounded continuously due to insufficient contact of taper fits of fusing chamber plug and fusing cage assembly; large diameter of taper fit of fusing chamber plug was less than manufacturer's specifications; two injured.

May 8, 1951, locomotive 4604, Collingdale, Pa. Front headlight failed; bulb burned out; one killed.

Six accidents; one killed, six injured.

BOSTON & MAINE RAILROAD:

May 11, 1951, locomotive 434, Gardner, Mass. Employee slipped on defective tender end sill and fell to the ground; roughening on right side of sill plate was worn, sill plate sloped toward front end, and right front corner was bent downward so that sill plate at this corner was about 2 inches lower than at rear end; one injured.

One accident; one injured.

CENTRAL RAILROAD OF NEW JERSEY:

October 21, 1950, locomotive 23, Jersey City, N. J. Protruding portion of a tender cistern supporting plank, on which employee was standing, broke off through anchor bolt hole; one injured.

April 2, 1951, locomotive 172, Elizabeth, N. J. Flue failed at back flue sheet; flue had been excessively rolled; one injured.

Two accidents; two injured.

CHESAPEAKE & OHIO RAILWAY:

**December 20, 1950, locomotive 1609, Handley, W. Va. Throttle lever flew back when latch was released; valves were ground following the accident; one injured.

One accident; one injured.

CHICAGO & NORTH WESTERN RAILWAY:

April 23, 1951, locomotive 1644, Chicago, Ill. Valve gear combination link broke through progressive crack in each jaw at junction to link body; force applied to steam trapped in cylinder caused cylinder head to be blown out; one injured.

One accident; one injured.

CHICAGO, BURLINGTON & QUINCY RAILROAD:

March 20, 1951, locomotive 5618, Stockholm, Wis. Grate shaker lever reach rod-grate arm connecting pin worked out; cotter key was missing; one injured.

One accident; one injured.

CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC RAILROAD:

**July 10, 1950, locomotive 1163, Aberdeen, S. Dak. Injector was inoperative; injector extension handle did not have sufficient clearance at front wall of cab; injector was reported on July 4, 7 (two times), and 8; one injured.

July 27, 1950, locomotive 102, Edgebrook (Chicago), Ill. Rear pin of actuating link of mechanical lubricator lost out which interrupted lubricating oil supply to crosshead guides; caused subsequent overheating of crosshead which broke, dropped from guide, resulting in extensive damage to driving gear and motion work; lubricator was reported on July 22 and 24; one injured.

November 5, 1950, locomotive 461, Rondout, Ill. Grate shaker bar slipped off post due to improper fit; one injured.

November 22, 1950, locomotive 1206, Waupun, Wis. Boiler check stuck open, caused by a piece of hard scale between valve and seat; valve seat was badly worn and had been excessively reamed; "Both boiler checks stick up" was reported 14 times since November 1; one injured.

January 25, 1951, locomotive 30, Des Moines, Iowa. Air compressor low

pressure steam cylinder drain pipe valve broke while pipe was being used as a handhold; one injured.

Five accidents; five injured.

CHICAGO, ROCK ISLAND & PACIFIC RAILROAD:

November 21, 1950, locomotive 2609, Dubach, La. Oil on top of tender fuel-oil tank; oil on top of oil tank was reported on November 1, 8, 10, 11, 14, and 15; one injured.

June 27, 1951, locomotive 1557, Ringwood, Okla. Engine foaming. Reverse lever hard to operate; one injured.

Two accidents; two injured.

DELAWARE & HUDSON RAILROAD:

December 28, 1950, locomotive 93, Oneonta, N. Y. Flue separated at safe end weld; metal at weld was not properly fused; one injured.

March 26, 1951, locomotive 1517, Colonie, N. Y. Crown stay broke through old fracture and blew out of firebox sheet while being calked under pressure; stay had been worked excessively and threads on stay end in firebox sheet were almost obliterated; one injured.

Two accidents; two injured.

DELAWARE, LACKAWANNA & WESTERN RAILROAD:

May 15, 1951, locomotive 257, Taylor, Pa. Fire hose burst; one injured.

One accident; one injured.

DENVER & RIO GRANDE WESTERN RAILROAD:

August 17, 1950, locomotive 3713, Helper, Utah. Employee was burned by discharge from blow-off line side discharge outlet while opening discharge valve; globe valve used was not the carrier's standard and location of valve and outlet did not provide necessary protection; one injured.

August 17, 1950, locomotive 1518, Littleton, Colo. Locomotive electric lighting system failed due to an excessively worn commutator brush in the turbo-generator and the locomotive was continued in service without proper lights until it collided with an automobile at a street crossing; four killed.

March 6, 1951, locomotive 3607, Helper, Utah. Washout cap blew out of body in boiler throat sheet; threads on cap were badly worn; one injured.

Three accidents; four killed, two injured.

DULUTH, MISSABE & IRON RANGE RAILWAY:

November 15, 1950, locomotive (B. & L. E.) 629, Proctor, Minn. Handle came off air compressor throttle valve; handle was not properly secured on valve stem; one injured.

April 23, 1951, locomotive 220, Two Harbors, Minn. Throttle could not be closed, resulting in collision with a standing locomotive; a 1-inch nut was found lodged under the small main valve in upper steam chamber of the multiple valve throttle; one injured.

Two accidents; two injured.

FLORIDA EAST COAST RAILWAY:

March 14, 1951, locomotive 808, West Palm Beach, Fla. Steam leaked through train heat throttle at main turret due to valve and seat being steam cut; one injured.

April 4, 1951, locomotive 815, Lake Worth, Fla. Crown sheet failure caused by overheating of the crown sheet due to low water; water-glass top connection to water column was defective which caused a false indication of the water level in the boiler; five injured.

April 11, 1951, locomotive 821, Fort Pierce, Fla. Glass in window of brakeman's cabin was broken; one injured.

Three accidents; seven injured.

FORT WORTH & DENVER CITY RAILWAY:

** December 10, 1950, locomotive 304, Fort Worth, Tex. Oil on cab apron; one injured.

One accident; one injured.

GULF COAST LINES:

May 15, 1951, locomotive (N. O. T. & M.) 1038, New Iberia, La. Employee was injured while leaning from cab window to observe signals; tender was 2¼

inches wider than cab and leaned ¾ inches out of vertical alinement; semicircular liner in front tender truck lower center casting was in improper position; "Line tank up with right side of cab. Engineer cannot see around side of tank. Check left back spring" was reported on May 14; one injured.

One accident; one injured.

GULF, COLORADO & SANTA FE RAILWAY:

March 29, 1951, locomotive (A. T. & S. F.) 3861, between Cameron and Buckholts, Tex. Glass blew out of cab window sash and shattered when it struck boiler; glass was not properly secured in sash; one injured.

One accident; one injured.

HARBOR BELT LINE RAILROAD:

June 26, 1951, locomotive (S. P.) 2367, Thenard, Calif. Roughening applied on tender gangway stirrup step was worn smooth; one injured.

One accident; one injured.

HOUSTON BELT & TERMINAL RAILWAY:

May 5, 1951, locomotive (A. T. & S. F.) 3715, Houston, Tex. Insufficient clearance between cab handhold and tender deck when on curve; handhold was bent rearward; one injured.

One accident; one injured.

ILLINOIS CENTRAL RAILROAD:

January 12, 1951, locomotive 2501, near Richton, Ill. Crown sheet failure caused by overheating due to low water; three injured.

January 12, 1951, locomotive 335, Greenwood, Miss. Cab ventilator slide stuck in open position; one killed.

February 13, 1951, locomotive 2602, Effingham, Ill. Undesired application of train air brakes when locomotive entered a restricted speed zone; automatic train stop warning whistle was inoperative due to loose whistle tube adjusting lock nut; one injured.

March 29, 1951, locomotive 2421, Alworth, Ill. Front sanders were inoperative account of wet sand in sand traps; unions in feed pipes to sand traps were leaking; one injured.

Four accidents; one killed, five injured.

INTERNATIONAL-GREAT NORTHERN RAILROAD:

September 1, 1950, locomotive 1478, Taylor, Tex. Fuel oil on top of tender fuel-oil tank; one injured.

June 28, 1951, locomotive 1066, Kilgore, Tex. Packing blew out of throttle; one injured.

Two accidents; two injured.

KANSAS CITY SOUTHERN RAILWAY:

October 14, 1950, locomotive 492, Panama, Okla. Locomotive deck sheet was worn smooth and tender deck was covered with film of oil; one injured.

May 19, 1951, locomotive 1029, Kansas City, Mo. Oil on lid of sand box which was used as step from deck to cab seat; one injured.

Two accidents; two injured.

LOUISIANA & ARKANSAS RAILWAY:

November 20, 1950, locomotive 556, Lawhon, La. Handrail on top of tender pulled apart at three connections; handrail connections were in defective condition; one injured.

One accident; one injured.

LOUISVILLE & NASHVILLE RAILROAD:

** August 29, 1950, locomotive 1526, Greenville, Ala. Stoker elevator ratchet pawl pin broke; one injured.

** September 9, 1950, locomotive 1907, East Bernstadt, Ky. Union in feed water pump exhaust steam pipe became disconnected; locomotive had been reported riding rough repeatedly in the 30 days preceding the accident; tires on left driving wheels and on left trailing truck wheel were worn; one injured.

October 12, 1950, locomotive 1803, Birmingham, Ala. Insufficient clearance between cab right vertical handhold at gangway and tender deck support bracket; handhold was bent 2½ inches toward tender deck bracket; "R cab grab iron bent out of line" was reported on October 6; one injured.

December 6, 1950, locomotive 1910, near Mitchellsburg, Ky. Crown sheet failure caused by overheating due to low water; three injured.

January 5, 1951, locomotive 1223, Mt. Pleasant, Tenn. Cab gangway handhold broke through old crack at bolt hole in bolting foot of bottom connection; one injured.

Five accidents; seven injured.

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

March 9, 1951, locomotive 5002, Des Plaines, Ill. Two small flues failed at defective safe end welds; one injured.

One accident; one injured.

MISSOURI PACIFIC RAILROAD:

September 23, 1950, locomotive 5311, Austin, Ark. Main crank pin broke through old fracture flush with wheel hub which extended through approximately 55 percent of cross-sectional area; one injured.

February 8, 1951, locomotive 2104, Glen Park, Mo. Displaced and broken main driving wheel tire caused derailment of 10 cars of passenger train; one injured.

Two accidents; two injured.

NEW YORK CENTRAL SYSTEM:

July 25, 1950, locomotive 2341, Denton, Mich. Guide yoke bracket broke through old fracture which extended through approximately 40 percent of cross-sectional area; one injured.

August 11, 1950, locomotive 6831, Connersville, Ind. Drop seat in cab collapsed when seat supporting rod slipped from a supporting wooden block on seat deck; supporting rod was too short to hold the seat level when rod rested on seat deck; one injured.

September 1, 1950, locomotive (P. & E.) 40, Indianapolis, Ind. Handrail above cab window broke at bend at front end through old fracture which extended through approximately 70 percent of cross-sectional area. Handrail was being used by employee when returning to cab after making repairs to loose packing nut on feed water heater operating valve; one injured.

September 22, 1950, locomotive 1467, near Brimfield, Ind. Union stud pulled from discharge port of air compressor; stud had been screwed into compressor not more than one-fourth of its 1-inch length with only four badly worn threads engaged; "S" portion of discharge pipe was too short, resulting in strain in installation. Movement of locomotive occurred during attempted repairs. Throttle had been reported leaking seven times in the 30-day period prior to accident; one injured.

October 18-19, 1950, locomotive 2909, en route Mattoon to East St. Louis, Ill. Precision reverse gear was hard to operate; one injured.

December 2, 1950, locomotive 2795, Wheatville, N. Y. Handwheel of Precision reverse gear came off screw shaft; boiler was foaming badly, causing valves to lose lubrication; reverse gear valve was defective; adjusting plate on end of screw shaft failed due to having been improperly repaired, forcing handwheel off end of shaft; one injured.

**December 3, 1950, locomotive 1440, Blissfield, Mich. Four of the six bolts securing front coupler pocket casting broke, permitting coupler and pocket casting to drop to hanging position; "Front drawbar bolts loose" was reported on November 2, 4, 6, 13, 22, and 24 and December 1 and 3 (prior to trip on which accident occurred); one injured.

January 8, 1951, locomotive 1477, Kendallville, Ind. Locomotive derailed while backing on a curve; locomotive had excessive vertical motion at front end of trailing truck frame and king bolt of trailing truck was worn. While assisting to rerail the locomotive, employee was burned by steam escaping through a progressive fracture in cylinder 31 inches in length; one injured.

January 9, 1951, locomotive 5403, Moulton, Ill. Drain valve and pipe nipple were missing from cold-water pump. Employee was injured while attempting to close tank valve to stop loss of feed water; tank valve was hard to operate due to improper repairs made after threaded end at top of operating shaft had broken off; one injured.

February 18, 1951, locomotive 7821, Toledo, Ohio. Left front footboard was bent back under buffer beam, causing employee to fall to ground; front steps were reported low on January 9, 15, and 22, and February 17 and 25 (7 days after accident); "L. F. step bent and broken" was reported on February 18; front

footboards were found below the minimum prescribed standard when investigation of the accident was made on March 31; one injured.

March 21, 1951, locomotive 2990, Syracuse, N. Y. Throttle was hard to operate, due to worn cam and valve lifting collar; throttle was reported on February 27 and March 2, 3, 4, 7, and 21 (after accident); one injured.

April 28, 1951, locomotive 6369, Selkirk, N. Y. Undesired closing of fire door, due to air supply shut-off valve leaking; one injured.

**April 28, 1951, locomotive 7393, Albany, N. Y. Insufficient clearance between cab handhold and tender steps when on curve; one injured.

**May 12, 1951, locomotive 5246, Mina, Ohio. Steam was discharged from sprinkler hose; sprinkler throttle valve seat was steam cut and valve could not be closed; one injured.

**May 26, 1951, locomotive 2999, Wayneport, N. Y. Throttle was hard to operate due to worn cams, valve lifting collars, and valve balancing pistons; throttle was reported on May 6 (two times), May 9 (two times), 16, 20, 25, and 26 (12 hours before departure); one injured.

June 12, 1951, locomotive 1526, Shelbyville, Ind. One-half inch extra heavy pipe nipple broke off flush with the air reversing valve housing; old flaw in nipple; one injured.

June 16, 1951, locomotive 7406, Yonkers, N. Y. Top half of fire door became disconnected from operating arm; one injured.

June 24, 1951, locomotive 7841, Wesleyville, Pa. Throttle stem packing blew out; one injured.

Eighteen accidents; 18 injured.

NEW YORK, NEW HAVEN & HARTFORD RAILROAD:

**April 24, 1951, locomotive 3600, New Haven, Conn. Grates stuck account of pin in mechanism fouling; one injured.

One accident; one injured.

NORFOLK & PORTSMOUTH BELT LINE RAILROAD:

**February 7, 1951, locomotive 16, Norfolk, Va. Drain cock blew out of lower cylinder head of compound air compressor due to improper fit; air compressor so located that it obstructed 24 inches of running board tread for its entire width; one injured.

One accident; one injured.

NORFOLK & WESTERN RAILWAY:

August 23, 1950, locomotive 2114, near Eastwood, Ohio. Crown sheet failure caused by overheating due to low water; two killed.

September 9, 1950, locomotive 2129, near Elkton, Va. Spark arrester fell from smokestack; bolts provided to secure arrester on stack were not properly adjusted; one injured.

Two accidents; two killed, one injured.

NORTHERN PACIFIC RAILWAY:

November 29, 1950, locomotive 1919, Dickinson, N. Dak. Cylinder liner was loose; one injured.

One accident; one injured.

NORTHWESTERN PACIFIC RAILROAD:

February 26, 1951, locomotive (S. P.) 2535, Sausalito, Calif. Driving spring hanger pin broke; one injured.

May 9-10, 1951, locomotive (S. P.) 2564, between Santa Rosa and Tiburon, Calif. Throttle stem packing was leaking; "Repack throttle valve" was reported on April 26; one injured.

June 6, 1951, locomotive (S. P.) 2855, Petaluma, Calif. Injector steam spindle packing nut was leaking. Employee fell from running board while attempting repairs; accumulation of oil and dirt on running board; one injured.

Three accidents; three injured.

PENNSYLVANIA RAILROAD:

July 15, 1950, locomotive 6741, Midland, Pa. Squirt-hose valve worked open; insufficient packing in squirt-hose valve; one injured.

July 22, 1950, locomotive 6170, Latrobe, Pa. Valve motion eccentric rod broke; main steam valve was stuck in valve chamber due to insufficient lubrication; mechanical lubricator and terminal check were not properly maintained; one injured.

**July 26, 1950, locomotive 4686, Elrama, Pa. Hydrostatic lubricator steam valve packing nut was leaking; packing nut was loose; steam valve spindle was slightly bent; one injured.

August 6, 1950, locomotive 4572, Steubenville, Ohio. Arch tube ruptured for approximately 2 inches on lower side; tube wall at point of failure was reduced to knife-edge thickness and edges of rupture were bulged downward for $1\frac{1}{8}$ inch; inside surface of lower part of tube was coated with hard scale; one injured.

August 14, 1950, locomotive 6753, Middletown, Pa. Crank pin collar broke through old fracture which extended through approximately 80 percent of cross-sectional area at fillet of flange; one killed.

September 7, 1950, locomotive 6728, Coshocton, Ohio. Right No. 2 engine truck bearing ran hot; "R. B. engine truck hot" and "R. #2 engine truck journal scored" were reported on September 6; one injured.

**January 4, 1951, locomotive 7088, Mt. Holly, N. J. Tender truck brake beam hanger broke; tender brakes had been reported for adjustment 13 times in the 34 days preceding the accident; one injured.

**January 7, 1951, locomotive 3713, near Woods Run, Pa. Employee tripped on an electric wire lead to headlight at rear of tender and fell into an open manhole of tender water tank; wire lead had excessive length that was looped and lying on top of tender; one injured.

January 23, 1951, locomotive 5464, Pittsburgh, Pa. Grate shaker reach rod connecting pin worked out, permitting shaker post to disconnect from reach rod while grates were being shaken; cotter pin was missing from connecting pin; one injured.

February 7, 1951, locomotive 6801, near Carrothers, Ohio. Icy condition of tender coal space caused employee to lose footing and fall while attempting to close stoker conveyor slide; one injured.

March 22, 1951, locomotive 7239, Toledo, Ohio. Shovel caught on rough edge around hole in shoveling sheet; shoveling sheet was excessively worn; one injured.

March 27, 1951, locomotive 4631, Wilmington, Del. Superheater flue partially collapsed and ruptured at back flue sheet and broke partly away from flue sheet; flue had been excessively worked and was deteriorated and thinned; one injured.

April 4, 1951, locomotive 6427, Truxall, Pa. Locking nut on air compressor governor regulator screw worked loose and screw backed off, releasing tension on regulating spring with consequent reduction of main reservoir pressure; one injured.

May 10, 1951, locomotive 1121, Ebenezer, N. Y. Pins missing from hinges of tender cistern manhole cover; one injured.

May 13, 1951, locomotive 6744, near Frankstown, Pa. Locomotive uncoupled from leading locomotive due to anti-creep feature of front drop coupler not functioning; coupler was defective; one injured.

June 6, 1951, locomotive 4315, Erie, Pa. Insufficient clearance between cab overhang and top of left tender gangway handhold; left side of locomotive was low on driving boxes; one injured.

**June 30, 1951, locomotive 6199, Ft. Wayne, Ind. Ashpan door rigging dropped and lodged in rail frog, causing rough jar when tender wheels struck the obstruction; pin was missing from front end of ashpan door adjusting rod; one injured.

Seventeen accidents; 1 killed, 16 injured.

READING COMPANY:

November 24, 1950, locomotive 1649, Pottstown, Pa. Grate shaker box cover dropped to open position due to not being properly latched in closed position; cover did not latch properly account of fouling on pipes on each side; one injured.

April 5, 1951, locomotive 2102, Bound Brook, N. J. Two loose boards at center of cab deck worked backward, leaving a large opening in deck floor in front of stoker elevator conveyor; bolts for securing the floor boards were missing; one injured.

Two accidents; two injured.

RICHMOND, FREDERICKSBURG & POTOMAC RAILROAD:

March 30, 1951, locomotive 616, Fredericksburg, Va. Front cab door and clear vision window glasses were dirty; one injured.

One accident; one injured.

ST. LOUIS-SAN FRANCISCO RAILWAY:

July 10, 1950, locomotive 1519, near Carrollton, Tex. Steam whistle valve stuck open; air-operated whistle blower piston became fouled in cylinder due to cylinder head being disconnected and piston return spring broken in several pieces, one of which was lodged between piston and cylinder wall; whistle blower push rod was worn excessively; whistle air valve seat was reported leaking on July 1, 5, and 9; one injured.

One accident; one injured.

SEABOARD AIR LINE RAILROAD:

December 22, 1950, locomotive 534, Great Falls, S. C. Employee's foot was crushed between cab apron and tender water leg; center of tender deck under apron was approximately $1\frac{3}{8}$ inches higher than the sides which held ends of the apron above the deck; one injured.

March 5, 1951, locomotive 221, Whitmire, S. C. Coal on platform on top of tender behind coal space; one injured.

June 14, 1951, locomotive 353, Merry Oaks, N. C. Power reverse gear disengaged from quadrant due to failure of a valve rod; both lugs of fork of valve rod were broken off through old fracture at pin holes; one injured.

June 29, 1951, locomotive 1138, Birmingham, Ala. Coal was spilling from top of tender fuel space; one injured.

Four accidents; four injured.

SOUTHERN RAILWAY:

**October 8, 1950, locomotive 6370, Akron, Ala. Grates were hard to operate; grates were reported hard to shake on October 8, 9, 10, and 13; grate lever was bent downward, resulting in handle of shaker bar being only about 18 inches above deck floor; one injured.

November 2, 1950, locomotive 6293, Danville, Ky. Main steam pipe burst through old crack; interior of steam pipe at point of failure was badly steam cut; thickness of pipe wall at crack was $\frac{3}{8}$ inch and minimum thickness around the broken section was $\frac{1}{16}$ inch; one injured.

December 12, 1950, locomotive 4897, McDonough, Ga. Foreign object on top of tender cistern caused employee to fall; one injured.

January 14, 1951, locomotive 6030, Oakdale, Tenn. Improperly adjusted feeds on mechanical lubricator; one injured.

February 17, 1951, locomotive 788, Morristown, Tenn. Boiler check valve was leaking; one injured.

February 21, 1951, locomotive 1887, Atlanta, Ga. Insufficient clearance between cab vertical handhold at gangway and tender firing deck while on sharp curve; one injured.

June 4, 1951, locomotive 1862, Knoxville, Tenn. Blow-off cock valve stuck open; one injured.

**June 23, 1951, locomotive 8333, Gaillard, Ga. Coal on top of tender behind fuel space; one injured.

Eight accidents; eight injured.

SOUTHERN PACIFIC—LINES EAST:

August 18, 1950, locomotive (T. & N. O.) 901, Hearne, Tex. Flames flashed into cab from around fire door due to defective oil burner and excessive openings around fire door; burner bracket was bent and burner was not level or in proper alignment; atomizer opening in burner was worn excessively; burner was reported on August 13 (two times) and August 17 (two times); one injured.

February 2, 1951, locomotive (T. & N. O.) 936, Waxahachie, Tex. Insufficient clearance between cab gangway handhold and tender deck when on curve; one injured.

Two accidents; two injured.

SOUTHERN PACIFIC—LINES WEST:

**July 6, 1950, locomotive 4235, Carter, Oreg. Oil on tender steps and handholds; one injured.

July 10, 1950, locomotive (U. P.) 5517, Wendel, Calif. Fuel oil on tender deck; one injured.

July 18, 1950, locomotive 3616, Anapra, N. Mex. Squirt-hose valve worked open, due to insufficient packing on stem packing nut; one injured.

July 25, 1950, locomotive 1279, Tracy, Calif. Reflex type water glass burst; water glass was worn to less than one-half its original thickness; one injured.

August 10, 1950, locomotive 2367, Jamesan, Calif. Crown bar bolt in patch in firebox crown sheet broke at crown-bar fit and blew out of crown sheet; threads in crown-sheet bolt hole were badly worn and had no holding power; one injured.

August 15, 1950, locomotive 3237, Tehachapi, Calif. Short circuit in cab lighting system resulted in ignition of cab ceiling; insulation of wires in a flexible conduit of lighting system near the ceiling had deteriorated; short circuit occurred and the conduit overheated; fuse socket in fuse box was defective and fuse did not function to protect the wiring; one injured.

August 21, 1950, locomotive 3671, Livingston, Calif. Valve in steam pipe to operating valve of blow-off cock was in a practically inaccessible location between the boiler and side of cab and between blower and blow-off cock operating pipes which were not properly protected with insulating material; one injured.

September 1, 1950, locomotive 2745, Ogden, Utah. Injector steam pipe broke off through old fracture in sleeve at connection to injector; sleeve was applied flush with end of steam pipe and pipe was not rolled or flared over end of sleeve; one injured.

September 2, 1950, locomotive 4175, Emigrant Gap, Calif. Wooden plug applied to stop a bad leak in boiler feed water pump delivery pipe blew out; nipple of fire hose connection to delivery pipe was broken off and delivery pipe was cracked for $4\frac{1}{2}$ inches where nipple was welded into it; nipple was pitted and corroded; defects reported repeatedly in the 20 days preceding accident indicate that feed water pump had excessive vibration; one injured.

September 2, 1950, locomotive 2781, Bayshore, Calif. Pilot beam handrail was broken; failure occurred through old fracture originating at inside of bend near one end of handrail; locomotive was reported pounding and riding rough numerous times immediately preceding and following the accident; one injured.

September 11, 1950, locomotive 2562, Doon, Calif. Fuel-oil burner was out of line, throwing fire to one side of firebox and causing carbon to accumulate; "Engine throwing sparks" was reported on September 5, 7, and 8; employee was injured while attempting to remove the carbon with a water tank spout hook account of proper tool not being provided; one injured.

**September 28, 1950, locomotive 4313, Hugo, Oreg. Squirt-hose valve worked open; packing nut on squirt-hose valve was reported loose at end of the trip; one injured.

October 20, 1950, locomotive 4211, San Miguel, Calif. Oil on top of tender fuel-oil tank; one injured.

**October 26, 1950, locomotive 1273, Mococo, Calif. Brackets supporting one section of front footboard were bent and tread was not level; one injured.

**November 11, 1950, locomotive 4314, Yuma, Ariz. Head of a machine bolt protruded approximately $\frac{3}{4}$ inch above the surface of running board and handrail above running board was 12 inches above the maximum prescribed height at this point; one injured.

November 20, 1950, locomotive 1288, San Francisco, Calif. Iron facing along edge of tender running board projected $\frac{1}{4}$ to $\frac{1}{8}$ inch above surface of running board for entire length; facing had not been trimmed off in accordance with carrier's standard drawing; one injured.

**December 24, 1950, locomotive 4387, Gridley, Calif. Fuel oil sprayed from around tender tank measuring rod; one injured.

December 31, 1950, locomotive 3308, Schellville, Calif. Cab gangway handhold fouled corner of tender deck when on curve; one injured.

**January 8, 1951, locomotive 4145, Oakridge, Oreg. Oil on ladder steps on front end of tender fuel-oil tank; emergency automatic cut-out valve stuffing box was loose in top sheet of oil tank, permitting oil spray to leak past stuffing box and form oil deposit on top of oil tank above the ladder steps; lock nut on bottom end of stuffing box was loose; one injured.

January 11, 1951, locomotive 2834, Paso Robles, Calif. Mud and oil on gangway and gangway steps; one injured.

**January 12, 1951, locomotive 1723, El Centro, Calif. Throttle lever latch spring was broken which prevented throttle from holding closed, resulting in hard coupling; one injured.

January 16, 1951, locomotive 4261, Canby, Calif. Ice on top of tender water tank near filling hole; one injured.

January 20, 1951, locomotive 4405, Phoenix, Ariz. Stud which secured marker lamp bracket to pilot beam broke through old fracture at root of thread at point of entry into bracket and bracket pulled loose, causing employee to fall from pilot step; one injured.

January 25, 1951, locomotive 1617, Phoenix, Ariz. Cab inside window slide gave way due to supporting screws working out; one injured.

February 22, 1951, locomotive 1186, Yuma, Ariz. Part of a defective board in cab deck gave way; deck board had been split from drawbar pin hole to rear end for a long time; one injured.

**February 28, 1951, locomotive 2756, Eugene, Oreg. Flash explosion in firebox caused by leakage from defective fuel-oil firing valve; one injured.

**March 1, 1951, locomotive 4267, San Fernando, Calif. Excessive carbon in firebox; one injured.

March 26, 1951, locomotive 4210, Gerber, Calif. Oil and dirt on top and front end of tender fuel-oil tank and on tank steps and handholds; tank reported to be cleaned on March 1, 3, 14, 21, 22, and 26 (after accident); one injured.

March 27, 1951, locomotive 4365, Sacramento, Calif. Insufficient clearance between cab handhold at gangway and tender deck when on curve; driving spring rigging was worn and locomotive deck was about $2\frac{1}{2}$ inches lower than tender deck; one injured.

April 22, 1951, locomotive 4129, Paunina, Oreg. Extension rod to sliding type cab roof ventilator became disconnected at universal joint and dropped downward, striking employee; universal joint was worn and safety pin in rod had not been applied according to standard drawing; universal joint was binding account of parts applied at too great an angle; one injured.

May 23, 1951, locomotive 4276, Akela, N. Mex. Bottom bolt of right back vertical handhold at gangway missing and handhold was loose; one injured.

**June 20, 1951, locomotive 2714, Klamath Falls, Oreg. Throttle lever stuck in wide open position and was hard to move; throttle lever latch guide box bolt was loose, allowing latch teeth to drag on quadrant; one injured.

Thirty-two accidents; 32 injured.

SPOKANE, PORTLAND & SEATTLE RAILWAY:

**September 28, 1950, locomotive 397, Orville, Oreg. Locomotive steamed poorly; "Clean out front end. Flue leaking over burner" was reported on September 26; one injured.

March 19, 1951, locomotive 623, Wishram, Wash. Undesired opening of injector overflow; one injured.

Two accidents; two injured.

TEXAS & PACIFIC RAILWAY:

October 19, 1950, locomotive 275, near Ledoux, La. Left boiler check stuck open; "Face and grind in left boiler check" and "Left injector does not work" were reported on October 17; one injured.

One accident; one injured.

UNION PACIFIC RAILROAD:

August 3, 1950, locomotive 820, Cheyenne, Wyo. Locomotive, standing unattended on descending main line, started forward and continued on the descending main line until it struck a switching locomotive unit; a hidden defect in distributing valve resulted in release of the brakes; three killed, one injured.

September 9, 1950, locomotive 2294, Bushnell, Nebr. Blow-off cock stuck open; blow-off cock valve stem was rough and pitted; one injured.

November 7, 1950, locomotive 3967, Green River, Wyo. Cotter key was missing from bottom end of grate shaker lever, permitting excessive movement of shaker bar; one injured.

Three accidents; three killed, three injured.

VIRGINIAN RAILWAY:

October 11, 1950, locomotive 429, Princeton, W. Va. Air hose burst near coupling fitting; inner rubber lining was broken and hose weakened at point of failure; one injured.

One accident; one injured.

WABASH RAILROAD:

June 27, 1951, locomotive 534, Ft. Wayne, Ind. Bottom end of cab seat supporting rod became displaced, permitting seat to drop suddenly; deck plate for securing bottom end of rod was missing; one injured.

One accident; one injured.

WESTERN PACIFIC RAILROAD:

August 4, 1950, locomotive 308, Sacramento, Calif. Drawbar pin at front end of tender fell out, permitting locomotive and tender to separate; drawbar keeper plate was missing; apparently keeper plate had been improperly applied; one injured.

**March 2, 1951, locomotive 210, Portola, Calif. Washout plug broke; plug was cracked and leaking; 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, 1951, 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:

September 24, 1950, unit 231, Powell, Ariz. Employee was burned by flash from grounded shunt relay; one injured.

One accident; one injured.

ATLANTIC COAST LINE RAILROAD:

December 16, 1950, unit 336-A, near Stony Creek, Va. Unit did not load properly due to pilot valve of load regulator being improperly adjusted; employee was injured by a heavy flash from high voltage contactors while making inspection to determine cause of the unit not loading; unit was reported not loading properly on November 28 and December 2, 3, and 5; one injured.

One accident; one injured.

BOSTON & MAINE RAILROAD:

**October 4, 1950, unit 4224-B, Somerville, Mass. Cabinet door over starter contactor fell when unlatched account of improper repairs having been made to strip that secured bottom of door in place; one injured.

One accident; one injured.

CHICAGO & NORTH WESTERN RAILWAY:

December 5, 1950, unit 4053-C, near Belle Plaine, Iowa. Crankcase explosion caused by an overheated crank shaft throw journal; No. 4 connecting rod bearing basket had an old break through inside rear bolt hole; one injured.

June 23, 1951, unit 4057-A, near Round Grove, Ill. Fire at oil separator on air compressor and compressor discharge pipe pulled from incompletely brazed fitting to after-cooler radiator; oil separator was fouled; "Air compressor does not always load. Had to block magnet valve down" was reported on June 22; one injured.

Two accidents; two injured.

CHICAGO, BURLINGTON & QUINCY RAILROAD:

September 30, 1950, unit 9209, Harmon, Ill. Traction motor series circuit power contactor failed to function due to loose contact in control stand which resulted in failure of contact finger to complete the circuit to series contactor magnet valve; reports indicate that difficulty had been experienced in operation of contactor for several days prior to the accident; one injured.

One accident; one injured.

CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC RAILROAD:

November 7, 1950, unit 20-B, Lone Rock, Wis. Cover plate of inspection hole in radiator cooling air duct was out of place; cover plate was not properly secured in position; air intakes of radiator cooling air ducts were restricted due to heavy accumulation of oil, dust, and foreign matter; one injured.

November 17, 1950, unit E29-C, Harlowton, Mont. Circuit breaker would not reset by use of reset button due to an over-voltage relay for motor generator having kicked out. Employee was injured when he reached into circuit-breaker compartment and attempted to reset circuit breaker while pantograph was raised; one injured.

November 25, 1950, unit E78, Deer Lodge, Mont. Employee contacted an energized pantograph; one killed.

December 28, 1950, unit 43-B, Lake, Wis. Crankcase explosion caused by an overheated piston; a cracked cylinder liner wall permitted water to enter the cylinder, destroying the lubrication; one injured.

Four accidents; one killed, three injured.

CHICAGO, ROCK ISLAND & PACIFIC RAILROAD:

August 3, 1950, unit 632-A, near Alta Vista, Kans. Air scoops on roof of unit were set for position reverse to direction of travel which prevented sufficient air from circulating through cooling system and caused engine to overheat; employee was killed while attempting to increase the draft through ventilating cooling fans; adjustment of air scoops could not be made with safety while engine was running; engine was reported using too much cooling water 13 times since July 19; one killed.

February 11, 1951, unit 95, Missler, Kans. Crankcase explosion caused by overheated main bearings; one injured.

March 1, 1951, unit 801, Blue Island, Ill. Engine cooling water radiator shutter did not operate properly; drain cock to shutter control air system was difficult to open; shutter control mechanism air supply cut out cock handle was broken off and right double-acting shutter cylinder head joint was leaking; shutters were reported not working properly on February 15 and March 1, 2, 8 (two times), 9, and 10; one injured.

Three accidents; one killed, two injured.

GREAT NORTHERN RAILWAY:

March 17, 1951, unit 352-B, St. Paul, Minn. Employee's hand was caught in steam generator blower drive belt; door panel of cabinet around front or devices side of generator was not replaced after being removed for inspection and servicing of generator; one injured.

April 16, 1951, unit 365-C, near Cut Bank, Mont. Axle of Diesel-electric locomotive unit broke, resulting in derailment of passenger train; failure occurred through a progressive fracture in the journal of a motor support bearing; three injured.

Two accidents; four injured.

GULF COAST LINES:

January 9, 1951, unit (St. L. B. & M.) 613, Tyrone, La. Steam generator was inoperative account of carbon accumulation on tip of fuel spray nozzle; one injured.

One accident; one injured.

GULF, MOBILE & OHIO RAILROAD:

August 16, 1950, unit 272, en route New Orleans, La. to New Albany, Miss. Section of exhaust manifold of a Diesel engine broke at flanged connection at one end, then broke at expansion joint at opposite end, and subsequently became displaced, permitting excessive gas fumes to enter the cab; one injured.

One accident; one injured.

KANSAS CITY SOUTHERN RAILWAY:

**January 30, 1951, unit 1101, Kansas City, Mo. Front platform steps were slippery due to accumulation of ice; one injured.

June 6, 1951, unit 52-D, Mena, Ark. Employee slipped on oily passageway floor; excessive lubricating oil leakage at various engine connections ran down on floors of engine room passageways; one injured.

Two accidents; two injured.

LEHIGH VALLEY RAILROAD:

December 25, 1950, unit 526, Phelps, N. Y. Electric flash occurred at B-1 dynamic brake contactor while employee was inspecting electrical equipment to determine the reason for failure of engine to load; shunt field circuit was inoperative because of broken resistor; one injured.

One accident; one injured.

LONG ISLAND RAILROAD:

September 26, 1950, unit 1503, Central Islip, N. Y. Crankcase explosion resulting from an overheated and broken piston and an overheated bearing; crankcase vent pipe was improperly located and a hole was worn through pipe where it fouled stiffening member of rear hatch cover; cover to lubricating oil sump filler opening was not properly secured; two injured.

April 20, 1951, unit 455, Glendale, N. Y. Crankcase explosion resulting from contaminated oil and a defective piston; one injured.
Two accidents; three injured.

NEW YORK CENTRAL SYSTEM:

July 22, 1950, unit 538, New York, N. Y. Air compressor motor fuse functioned as result of flashover from top brush holder to armature rim. When attempt was made to renew the blown fuse while circuit was energized another short circuit accompanied by a severe electrical flash occurred. Stenciled voltage was not legible on wooden guard bars in cab; one injured.

November 13, 1950, unit 1029, Linden, Pa. Oil on engine room floor; right No. 1 fuel injection pump discharge nut was leaking; one injured.

December 24, 1950, unit 282, Ludlow, N. Y. Union nut in train steam heat line broke; one injured.

April 26, 1951, unit 1031, near Fort Plain, N. Y. Fire in control cabinet of Diesel-electric unit resulting from resistance overheating of battery charging circuit due to defective reverse-circuit relay; one injured.

June 10, 1951, unit 4112, near Muncie, Ind. Driving wheel of Diesel-electric unit broke through progressive fracture in plate section, resulting in derailment of passenger train; 73 injured.

Five accidents; 77 injured.

NEW YORK, NEW HAVEN & HARTFORD RAILROAD:

December 4, 1950, unit 0911, South Boston, Mass. Handle was missing from cab heater switch and when employee opened switch box to attempt to stop the heater he was burned by an electric flash at the switch, caused by ground between heater switch lever and a bolt which secured switch box to cab wall; heater switch or switch handle was reported missing or broken on November 4, 12, 22, 23, and 28; one injured.

**January 27, 1951, unit 0770, Pawtucket, R. I. Oil on engine room floor; one injured.

February 5, 1951, unit 0781, Wallingford, Conn. Oil on engine room floor; oil leak at steam generator nozzle pressure gage; "Clean engine room floor" was reported on January 27, 30, and February 1; one injured.

February 22, 1951, unit 358, Bridgeport, Conn. Main steam valve bonnet blew out; threads in union nut which secured bonnet in valve were badly deteriorated; two injured.

April 21, 1951, unit 0507, Waterville, Conn. Oil from engine exhaust was smeared on front cab window and oil on running board; one injured.

Five accidents; six injured.

NORTHERN PACIFIC RAILWAY:

August 18, 1950, unit B-24, near Pillager, Minn. Spring hanger broke through old fracture in body section at junction of top pin hole section; one injured.

One accident; one injured.

PENNSYLVANIA RAILROAD:

July 30, 1950, unit 9136, Philadelphia, Pa. Tread of step on front end of unit was broken at connection to side member, allowing it to bend downward when used; "Step on front end left side broken" was reported on July 28; one injured.

**September 5, 1950, unit 4884, near Eddystone, Pa. Quill drive cup, cap, and bolts were thrown from rapidly moving locomotive unit while it was passing a passenger train, breaking windows in both trains; bolts for securing quill cup were broken; one injured.

October 5, 1950, unit 5916, Newark, N. J. Crankcase explosion caused by failure of bearing metal in Nos. 3 and 6 connecting rod bearings which permitted the bearings to overheat and ignite the vapor in crankcase; one injured.

November 26, 1950, unit 4731, Knickerbocker, Pa. Failure of insulation on a preventive coil resulted in short circuit of the coil turns; one injured.

**February 14, 1951, unit 9711-A, Danville, Ohio. Retractable pilot coupler had been equipped with both top lock lift and rotary bottom lock assemblies. Top lock lift assembly conflicted with pilot doors and fouling of uncoupling rods and levers prevented normal movement of coupler from operating to retracted position. "Coupler fouling, will not go down" was reported on February 13; one injured.

May 8, 1951, unit 8865, New Lexington, Ohio. Lubricating oil gage pipe was broken at connection to tee fitting, permitting oil to leak on running board.

Employee fell from running board after making repairs to the pipe; one injured.

May 16, 1951, unit 9328, Washington, Pa. Throttle lever latch disengaged and lever suddenly moved from fully open to idling position; throttle lever latch was reported on April 17 (two times), 25, and 27; one injured.

June 7, 1951, unit 9524-A, near Westville, Ohio. Short circuit occurred between wheel slip relay stud nuts on rear of panel in high voltage cabinet of Diesel-electric unit. Top of cabinet had a 1¼ by 4 inch opening in wall near top; a loose and shallow open-top box containing metal electrical fittings was found adjacent to opening; one injured.

Eight accidents; eight injured.

ST. LOUIS-SAN FRANCISCO RAILWAY:

January 24, 1951, unit 5307, Springfield, Mo. Uncoupled Diesel-electric B unit moved from standing position on descending grade and ran until it collided with another unit; hand brake was defective; two injured.

One accident; two injured.

SEABOARD AIR LINE RAILROAD:

December 5, 1950, unit 4109, near Bogart, Ga. Grounded electrical system caused repeated operation of ground relay; one injured.

June 30, 1951, unit 1434, Hialeah, Fla. Employee fell while alighting from running board; running board had oil on it and iron grille steps to running board were worn smooth; accumulation of oil under radiators in fan compartment, some of which apparently was washed on running board by rain; one injured.

Two accidents; two injured.

SOUTHERN RAILWAY:

December 24, 1950, unit 2124, Hazlehurst, Ga. Crankcase explosion caused by an overheated main crank shaft bearing; a wiping rag had become tightly lodged in lube oil pipe to the bearing, restricting the flow of oil to the bearing; one injured.

January 23, 1951, unit 4100, near Temple, Ga. Swivel type cab seat became disconnected from its base, causing employee to fall; cap screws which secured swivel center locking ring had worked out; one injured.

Two accidents; two injured.

SOUTHERN PACIFIC—LINES WEST:

**August 9, 1950, unit 6267, Davis, Calif. Front cab windows were smeared with cleaning compound and right window had a scratch approximately ¼ inch in width in arc corresponding to movement of window wiper; cab windows were reported to be cleaned on July 16, 20, 27, 28, and 30; one injured.

**August 29, 1950, unit 8026, between Bon and Casa Grande, Ariz. Explosion occurred in crankcase of Diesel engine caused by overheated crank shaft and connecting rod bearings; water leaks in unit and unit using excessive water were reported numerous times in the 30 days preceding the accident; one injured.

October 3, 1950, unit 1015, East Oakland, Calif. Employee slipped on slippery deck of unit and fell; deck was worn smooth and drinking water cooler was so located that it interfered with use of the deck and handhold; drip pan and drip pan drain pipe under water cooler were leaking which permitted water to run onto the deck; one injured.

November 1, 1950, unit 1333, Stockton, Calif. Employee stumbled over hand lanterns carried on locomotive deck and fell; no suitable storage place provided for the lanterns; one injured.

**November 11, 1950, unit 6191, Sparks, Nev. Sliver of metal from brake handwheel entered employee's hand; one injured.

March 26, 1951, unit 6312, near Norden, Calif. Engine of Diesel-electric unit became overheated; one injured.

May 15, 1951, unit 8104, Winnemucca, Nev. Unit would not make automatic transition, and an electrical flash occurred when manual operation of the "M" traction motor field shunting contactors was attempted while unit was on line and train moving at speed of 25 miles per hour; an "M" contactor interlock block was loose; one injured.

Seven accidents; seven injured.

UNION PACIFIC RAILROAD:

September 1, 1950, unit 1364, Kelso, Calif. Crankcase explosion caused by a broken top No. 8 piston and an overheated top No. 2 piston; one injured.

One accident; one injured.

TABLE XII.—Number of steam locomotives inspected,

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 Coast Line	Baltimore & Ohio	Bangor & Aroostook	Belt Ry. Co. of Chicago	Bessemer & Lake Erie
1 Air compressors		4		48	1	10	27			
2 Arch tubes						1	1			
3 Ashpans and mechanism						1	4			
4 Axles										
5 Blow-off cocks				23			4			
6 Boiler checks				14		6	9			
7 Boiler shell				2			5			
8 Brake equipment	1			103	5	45	78			
9 Cabs, cab windows, and curtains				34	3	18	41			
10 Cab aprons and decks				14	1	5	18			
11 Cab cards				2			4			
12 Coupling and uncoupling devices				2	1	1	3			
13 Crossheads, guides, pistons, and piston rods	4	1		50	1	8	64			
14 Crown bolts				7			4			
15 Cylinders, saddles, and steam chests				88		10	95			
16 Cylinder cocks and rigging				11		3	12			
17 Domes and dome caps				1		1	7			
18 Draft gear				9		3	14			
19 Draw gear				5		5	14			
20 Driving boxes, shoes, wedges, pedestals, and braces			1	51		4	43			
21 Firebox sheets				2		3	7			1
22 Flues				27			1			
23 Frames, tail pieces, and braces, locomotive		1		22	2	2	48			
24 Frames, tender				1			3			
25 Gages and gage fittings, air				19		3	5			
26 Gages and gage fittings, steam				17			10			
27 Gage cocks	4			31		10	18			
28 Grate shakers and fire doors				13			11			
29 Handholds	2			9		2	13			
30 Injectors, inoperative				1		1	1			
31 Injectors and connections	2			157	3	33	54			
32 Inspections and tests not made as required				4			4			
33 Lateral motion				24		2	20			2
34 Lights, cab and classification		3		7	1	1				
35 Lights, headlight				7			2			
36 Lubricators and shields				19		2	5			
37 Mud rings				8			5		1	
38 Packing nuts	8			42	1	11	24			
39 Packing, piston rod and valve stem	6			6		5	11			
40 Pilots and pilot beams				6		1	3			
41 Plugs and studs				17			7			
42 Reversing gear				21	1	9	34			1
43 Rods, main and side, crankpins, and collars	3			37	2	3	78			
44 Safety valves				1			6			
45 Sanders	1			38		4	10			
46 Springs and spring rigging		1		77	4	60	167			
47 Squirt hose				4	1	6	2			
48 Stay bolts				18		1	6			
49 Stay bolts, broken				16			5			
50 Steam pipes				26	1	3	16			
51 Steam valves	1			9			5		1	
52 Steps	1			55	8	3	30			
53 Tanks and tank valves	1			50	5	17	49			
54 Telltale holes				2			1			
55 Throttle and throttle rigging	4			36		5	50			2
56 Trucks, engine and trailing		2		48		6	31			
57 Trucks, tender	1			38	1	4	59			
58 Valve motion	2			39		6	43			
59 Washout plugs				23			9			
60 Stokers						4	23			
61 Water glasses, fittings, and shields	1			25	1	12	43			
62 Wheels	2			14		14	27			
63 Miscellaneous—Signal appliances, badge plates, brakes (hand)				59	8	7	30			
Number of defects	49	9	1,536	51	363	1,423	2	5	7	
Locomotives reported	10	24	19	1,112	37	472	1,419	32	16	65
Locomotives inspected	29	66	15	2,357	62	911	3,725	18	28	140
Locomotives defective	10	3	381	7	93	393	1	1	4	
Percentage of inspected found defective	15.2	20.0	16.2	11.3	10.2	10.6	5.6	3.6	2.9	
Locomotives ordered out of service	1			10		5	16			

found defective, and ordered from service, et cetera

Boston & Maine	Camas Prairie	Canadian National	Canadian Pacific	Central of Georgia	Central Railroad of New Jersey	Central Vermont	Charleston & Western Carolina	Chesapeake & Ohio	Chicago & Illinois Midland	Chicago & North Western	Chicago, Burlington & Quincy	Chicago, Milwaukee, St. Paul & Pacific	Chicago, Rock Island & Pacific	Chicago, St. Paul, Minneapolis & Omaha	Chicago, West Pullman & Southern	Cincinnati Union Terminal	Clinchfield
1		1		4		1		6		43	13	31	61	11			4
2													1				2
3				1						5		3	2				3
4																	4
5																	5
6	4		1	1				2		18	1	18	15	9			6
7				2						10	3	22	22	2			7
8	4		3	1	24	1	1	2		6	1	13	13	2			8
9	3		1	6	6	8	8	2		108	17	60	163	17	4		9
10				1	5	1	1	2		38	10	36	75	12			10
11	1		4	1	2					16	2	13	12	10			11
12				2				1		1		1	2				12
13	15		3	4	10			17		98	14	62	61	34	1		13
14											1	1	2				14
15	3			44	25	5		26		31	23	46	110	19			15
16				1	1	2		7		31	9	11	25	15			16
17	1			1	2			4		3	1	5	4	1			17
18		1		1				3		24	2	22	20	13			18
19	2			4				3		19	2	12	17	6			19
20	7		8	23				19		106	8	38	107	17			20
21	3							2		6		6	15	1			21
22				1						3		5	21	1			22
23	1			12				7		16	3	28	39				23
24																	24
25				3	1			4		6	1	1	7	1			25
26				19	9			4		4	4	3	36				26
27	4		2	9	2	1		11		4		13	43	12			27
28				4				2		10	1	3	28	4			28
29				6				5		19	6	14	16	1			29
30				1				1		1		1	2				30
31	6		4	16	5	3	2	30	1	55	25	46	137	24	2		31
32				2				1		3		4	9	1			32
33	1		2	2	3	2	1	6		40	3	6	39	6			33
34				1				3		3		2	7	3			34
35				1						3		1	7	1			35
36	4			2				3		6	2	5	14	1			36
37	3			1				2		8	3	5	17	1			37
38				3				5		12	6	16	50	11			38
39	3			22				3		55	8	42	36	48			39
40				1				1		5		9	5				40
41				1				1		6		2	7	6			41
42	3			7	1	1		10		21	3	4	42	1			42
43	7			14	1	5	1	12		84	9	43	126	14	2		43
44				1				1		1		1	8				44
45	1	1		7	1	1		30		19	11	9	30	13			45
46	8		8	55	6	7	3	30	1	175	16	125	204	31	1		46
47				3				3		3		1	1	3			47
48	4			5				1		4	3	12	18	3			48
49				2				8		7		5	2	2			49
50	1			1		2				4		1	9	21	6		50
51				3				1		2		15	17	1			51
52	2			6				9	1	27	5	26	67	3			52
53	6			17				4		63	9	43	112	12	1		53
54				4				1		2		1	1				54
55	2			1				7		11		65	56	19			55
56	6			3				1		6	1	65	40	38			56
57	1			7				9		21	11	7	19	6			57
58	3			1				4		31	5	30	49	2			58
59	7			1				5		11	3	13	35	11			59
60	2			2				3		3	1	2	3	13	1		60
61	1			6				15		12	5	17	63	5			61
62	1			8				3		35	1	4	18	15	1		62
63				10				3		14		7	20	85	6		63
122	1	67	29	445	45	40	27	375	8	1,488	277	2,277	481	14			81
231	18	257	91	162	212	47	28	1,045	33	739	628	1,791	383	149	12	13	70
559	14	120	76	465	575	200	40	1,789	77	2,252	1,459	2,260	1,372	677	22	21	145
75	1	26	21	93	19	16	9	107	2	306	71	250	419	131	3		19
Percentage of inspected found defective	13.4	7.1	21.7	27.6	20.0	3.3	8.0	22.5	6.0	2.6	13.6	4.9	11.0	30.5	19.4	13.6	13.1
Locomotives ordered out of service				3	</												

TABLE XII.—Number of steam locomotives inspected, found

Parts defective, inoperative or missing, or in violation of the rules	Colorado & Southern	Colorado & Wyoming	Conemaugh & Black Lick	Cuyahoga Valley	Dayton, Rock Island & North Western	Delaware & Hudson	Delaware, Lackawanna & Western	Denver & Rio Grande Western	Detroit & Toledo Shore Line
1 Air compressors.....	4					4	3	5	
2 Arch tubes.....									
3 Ashpans and mechanism.....									
4 Axles.....									
5 Blow-off cocks.....		1					2	2	
6 Boiler checks.....						3		3	
7 Boiler shell.....	1					5			
8 Brake equipment.....	5					6	24		
9 Cabs, cab windows, and curtains.....	1					7	14		
10 Cab aprons and decks.....	1					11	5		
11 Cab cards.....								1	
12 Coupling and uncoupling devices.....									
13 Crossheads, guides, pistons, and piston rods.....	1					10	2	11	
14 Crown bolts.....						3			
15 Cylinders, saddles, and steam chests.....								13	
16 Cylinder cocks and rigging.....								7	
17 Domes and dome caps.....								1	
18 Draft gear.....	1					2		1	
19 Draw gear.....								1	
20 Driving boxes, shoes, wedges, pedestals, and braces.....	1					2	2	32	
21 Firebox sheets.....						4	1		
22 Flues.....						3			
23 Frames, tail pieces, and braces, locomotive.....							2	3	
24 Frames, tender.....								1	
25 Gages and gage fittings, air.....							1	1	
26 Gages and gage fittings, steam.....							1	2	
27 Gage cocks.....							1	1	
28 Graft shakers and fire doors.....	1					1	1	1	
29 Handhlds.....							1	4	
30 Injectors, inoperative.....						1		1	
31 Injectors and connections.....	6		3			7	3	12	
32 Inspections and tests not made as required.....							1	8	
33 Lateral motion.....			2			3	5	8	
34 Lights, cab and classification.....								2	
35 Lights, headlight.....								5	
36 Lubricators and shields.....			1			3		7	
37 Mud rings.....	1					7		2	
38 Packing nuts.....								10	
39 Packing, piston rod and valve stem.....							4	6	
40 Pilots and pilot beams.....									
41 Plugs and studs.....									
42 Reversing gear.....	2						1	8	
43 Rods, main and side, crankpins, and collars.....	3					4		25	
44 Safety valves.....									
45 Sanders.....						3		15	
46 Springs and spring rigging.....	3		3			18	14	19	
47 Squirt hose.....								1	
48 Stay bolts.....						12		1	
49 Stay bolts, broken.....	2								
50 Steam pipes.....	2								
51 Steam valves.....								8	
52 Steps.....						1		1	
53 Tanks and tank valves.....	1					3	3	8	
54 Telltale holes.....									
55 Throttle and throttle rigging.....	3		1			2		14	
56 Trucks, engine and trailing.....	1						1	4	
57 Trucks, tender.....	1						7	4	
58 Valve motion.....		1						7	
59 Washout plugs.....						2	1	5	
60 Stokers.....						3		2	
61 Water glasses, fittings, and shields.....		1	1			3	1	6	
62 Wheels.....						23		1	
63 Miscellaneous—Signal appliances, badge plates, brakes (hand).....	1						1	3	7
Number of defects.....	42	3	11			153	77	348	
Locomotives reported.....	62	20	14	17	10	235	139	208	23
Locomotives inspected.....	238	64	24	18	39	511	551	746	17
Locomotives defective.....	11	1	2			39	20	71	
Percentage of inspected found defective.....	4.6	1.6	8.3			7.6	3.6	9.5	
Locomotives ordered out of service.....			1			1		3	

defective, and ordered from service, et cetera—Continued

	Detroit, Toledo & Ironton	Duluth, Missabe & Iron Range	Duluth, South Shore & Atlantic	Erie	Florida East Coast	Fort Worth & Denver City	Georgia & Florida	Georgia	Grand Trunk Western	Great Northern	Gulf Coast Lines	Gulf, Colorado & Santa Fe	Gulf, Mobile & Ohio	Houston Belt & Terminal	Illinois Central	International-Great Northern	Interstate	Kansas City Southern	Kansas, Oklahoma & Gulf		
				7		5			3			5		2	8		2	1			
				1		3			1						1						
				3		2	1			9		3		3	3	1		5			
				29	4	4	2	2	21	8		10		2	5		1	6			
				2		9			11	8		1		1	17			1			
				1			1		2	2		1		1	10						
												1						1			
				9	4	6			11	11				2	13	3	6	1			
				1	4	4			2	2				2	2						
				7	1	2			2	2		1		1	13	3	7	2			
				2		5			5	1				1	4						
				1		2			1			1		2	6			3	1		
									4		1	2		2	2	3	2	3			
				1	1	1			2	1	1	1		2	13		3	5	20		
				2		2			1					1	4			1	4	21	
				6		4			2			1		1	6			4	1	22	
				1		1			2					2	4		1	2		23	
																				24	
				2		1			1			3		2				1		25	
						1			1			1		2	5			1		26	
				1		1			1	3		2		2	4					27	
				1		3			1			1		2	2			3		28	
				2		3			4	3				2	3					29	
									4					1	1					30	
				9		17			2	1	14			4	15	4	3	7	3	31	
				3	1				1	1		5		1	2			1		32	
									3					1	5					33	
									1											34	
									1											35	
									1											36	
									2						1			3		37	
				2		3			7			10		2	9			1	2	38	
						3			3			2		2	30			6		39	
									3	1		3		2	4					40	
									2			2		2	4					41	
									5			3		7	4			4		42	
									1			3		1	2					43	
									3			3		2	10	5		1		44	
									5			2		3	43	4	3	14	1	45	
									6					3	2					46	
														1	1					47	
										2										48	
																				49	
										1										50	
										1										51	
										2										52	
										2		5		1	13	1	3	2	2	53	
										2		5		1	22		1	5	1	54	
										1										55	
										6		4		4	6	2		4		56	
										5		7		2	8	3	2	1		57	
										1		1		3	3					58	
										3		2		1	3		1	2		59	
										5		1		5	5					60	
										9		6		2	5		2	4		61	
										4				5	6					62	
										1				2	6					63	
										2		8									
										1											
										8											
										5											
										2											
										1											
										14											
										564	64	(*)	21	14	1,123	67	16	75	12		
										814	151	264	1	66	2,041	117	77	178	40		
										42	11	36	5	3	49	50	2	21	10	21	2
										6.0	10.1	26.1	19.2	5.7	17.3	6.1	1.3	8.0			
										1											

*Atchison, Topeka & Santa Fe.

TABLE XII.—Number of steam locomotives inspected, found

Parts defective, inoperative or missing, or in violation of the rules	Pittsburgh & Lake Erie	Pittsburgh & West Virginia	Quebec Central	Reading	Richmond, Fredericksburg & Potomac	River Terminal	Rutland	St. Louis-San Francisco	St. Louis Southwestern
1 Air compressors	2						9	10	
2 Arch tubes		1					1		
3 Ashpans and mechanism									
4 Axles									
5 Blow-off cocks	1	1	1				4	5	
6 Boiler checks	3	1		3			6	3	1
7 Boiler shell		1		4			4		
8 Brake equipment	6	1		1	2		34	29	3
9 Cabs, cab windows, and curtains	1		1				4	5	1
10 Cab aprons and decks				2			6	3	
11 Cab cards							1	1	
12 Coupling and uncoupling devices	1								
13 Crossheads, guides, pistons, and piston rods	5	2		2			12	2	
14 Crown bolts		1					1		
15 Cylinders, saddles, and steam chests		1					12	8	
16 Cylinder cocks and rigging							3	13	3
17 Domes and dome caps							2		
18 Draft gear							5	2	
19 Draw gear							10	3	
20 Driving boxes, shoes, wedges, pedestals, and braces							15	1	
21 Firebox sheets							5	4	
22 Flues	1	1					14	5	
23 Frames, tail pieces, and braces, locomotive	1	1	1				2	2	
24 Frames, tender							2		
25 Gages and gage fittings, air							2	1	
26 Gages and gage fittings, steam				1			1	3	1
27 Gage cocks	6			1			2	4	4
28 Grate shakers and fire doors		1		2			2	2	
29 Handholds							1	2	1
30 Injectors, inoperative	1						1		
31 Injectors and connections	2	1		4	1		16	23	7
32 Inspections and tests not made as required							2	1	
33 Lateral motion			1				2	3	3
34 Lights, cab and classification							1	2	
35 Lights, headlight				1			2	2	
36 Lubricators and shields							2		
37 Mud rings				1			11	4	
38 Packing nuts	1						3	17	5
39 Packing, piston rod and valve stem	1	1			1		2	1	3
40 Pilots and pilot beams	1	1					1	1	
41 Plugs and studs							1	1	
42 Reversing gear		1	1	1			4	1	1
43 Rods, main and side, crankpins, and collars	3	2		2			20	12	
44 Safety valves							1	4	3
45 Sanders				1			1	3	
46 Springs and spring rigging		6	1	8	2		39	29	4
47 Squirt hose	1	1		1			1		
48 Stay bolts		1					7	3	5
49 Stay bolts, broken									
50 Steam pipes	1						6	2	1
51 Steam valves							1	1	
52 Steps	1	1		1			1	6	1
53 Tanks and tank valves	1		1				30	10	4
54 Telltale holes									
55 Throttle and throttle rigging	4	4		2	1		4	6	3
56 Trucks, engine and trailing				1			7	5	1
57 Trucks, tender			1	3			7	6	2
58 Valve motion	3						12	2	
59 Washout plugs							3	1	
60 Stokers							7		
61 Water glasses, fittings, and shields	1	1		1			4		
62 Wheels		5		1			4	4	4
63 Miscellaneous—Signal appliances, badge plates, brakes (hand)	1	1		4			18	4	4
Number of defects	47	36	8	52	7		363	269	77
Locomotives reported	164	23	12	265	48	12	42	357	103
Locomotives inspected	300	44	3	788	18	22	267	659	359
Locomotives defective	11	13	3	19	2		78	62	18
Percentage of inspected found defective	3.7	29.5	100.0	2.4	11.1		29.2	9.4	5.0
Locomotives ordered out of service		1					1	7	1

defective, and ordered from service, et cetera—Continued

Seaboard Air Line	Southern Pacific, lines east	Southern Pacific, lines west	Southern	Spokane, Portland & Seattle	Tennessee Central	Terminal R. R. Association of St. Louis	Texas & Pacific	Union Pacific	Union Railroad	Utah	Virginian	Wabash	Western Maryland	Western Pacific	Roads with less than 10, and industrial locomotives	Total defects
12	2	59	9		5		1	38	1		12	2			46	897
		13	2													17
																4
																262
	1	1	46	2	1		4	6			1				1	477
	8	7	50	12	1		25	10			2				2	226
	2	1	11				10	4			1				5	2,453
	35	14	138	84	1	10	8	140		1	22	9		4	123	1,173
	13	2	78	18		4	34	34			13	2			45	3,395
	6	2	44	13		1	15	7			1	1		1	24	83
	1		10				7				1				12	54
	2		7												6	1,363
	10	5	128	5	4	4	2	57			7	8		4	69	52
			15	1				1							60	1,437
	6	8	197	15		6	6	48		1	20	6			15	474
	10	1	51	19		4	4	16		1	9	9		1	2	131
	2		6			1		5							2	441
		2	64	5				12			1	1		6	41	28
		1	13	5	1	3		9			1				28	203
	17	49	21	8	9		4	49			8	5		1	38	1,145
	10	16	2	8											6	184
	4	15	3	3				3							1	23
	12	49	2	2	5			15			3			1	8	486
	1	16	2	1				1							4	47
		7	2	2				16			1				12	173
	6	8	36	7		1		13			6				17	325
	3		97	8				14		5	3				35	495
	1	2	18	2				22			1	3			12	339
	1	1	74	4	1		1	26			1	3			38	420
	1	15	1		1		4	4							5	60
	33	22	235	26	3	2	6	115	2	1	14	5		2	106	2,190
	2	1	15					13							18	121
	1	7	16	2				15	2		4	2		1	17	465
			5					2							2	118
			9					1							6	108
		33	3					12				2			7	222
	1	12	1					5			1				11	153
	2	1	55	5		2		21	2	1	1			1	49	638
	2	2	71	11		6		20			10	3			52	765
	2	5	9	2				12							11	124
			16					2							4	117
	3	2	68	5				28			1	1			28	631
	12	10	91	34		1	1	39			7	7		1	103	1,511
	1		3					2			2				6	45
	11	16	172	8				51	2		6	2			28	806
	29	19	198	75	1	7		6			36	9		3	96	3,340
	1		9	2				6							3	90
	1	10	34	7	5	1		6	1						9	280
	13	8	21					7							62	282
	7	2	42	3		2		11							11	342
			17	3		1		2	4		4				6	181
	6	1	74	5		3	1	3			3	7			1	52
	8	17	177	19	2	3		51			15	2		4	66	1,304
			1					3							5	33
	4	7	86	8		3		26	2		5	3			43	927
	1	7	40	3	1	1		16			5				28	700
	8	1	32	4		1		9			5	3		1	28	710
	11	5	57	5		5		27			2				31	673
			7	4		3		2	9	1		4		1	17	325
	3		12					24			1	1			1	306
	20	4	84	18		2		15	6		1	7		1	55	858
	2		21	3	2	3		10	6			3			45	536
	3		87	7	1	2		37		1	2	1			30	774
	303	250	3,119	519	35	115	7	72	1,339	35	9	240	113		44	1,727
																34,657
	320	381	1,159	890	48	18	55	135	966	35	13	117	252	169	89	1,063
	490	833	2,565	1,698	81	43	80	287	2,627	48	63	302	627	397	77	1,719
	60	48	730	128	12	23	5	22	295	13	3	52	36		16	308
	12.2	5.8	28.5	7.5	14.8	5.3	6.2	7.7	11.2	27.1	4.8	17.2	5.7		20.8	17.9
	4		47	6	1	3		3	13		2	3			43	508

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

	Chicago, Rock Island & Pacific	Chicago, St. Paul, Minneapolis & Omaha	Chicago, South Shore & South Bend	Cleveland Union Terminals	Clinchfield	Colorado & Southern	Conemaugh & Black Lick	Delaware & Hudson	Delaware, Lackawanna & Western	Denver & Rio Grande Western
Parts defective, inoperative or missing, or in violation of the rules										
1 Air compressors	11							2		2
2 Axles, truck and driving										
4 Batteries		1								5
5 Boilers	2									
6 Brake equipment	68	7			3			7		10
8 Cabs and cab windows	45	4						4		5
9 Cab cards	13									3
10 Cab floors, aprons and deck plates	114	11			4	7			2	6
11 Clntches	1									1
12 Controllers, relays, circuit breakers, magnet valves and switch groups	6				2			1		5
13 Coupling and uncoupling devices	6									
14 Current collecting apparatus										
16 Draft gear	11	2			1					3
17 Draw gear	1									1
18 Driving boxes, shoes and wedges	2									
20 Frames or frame braces	3									
22 Fuel system	72	11				4		2		10
23 Gages or fittings, air	6									
24 Gages or fittings, steam	2									
25 Gears and pinions	4									1
26 Handholds	5									
28 Inspections and tests not made as required	14									2
29 Insulation and safety devices	4							1		4
30 Internal-combustion engine defects, parts and appurtenances	206	9			5			14	1	20
32 Jack shafts										
33 Jumpers and cable connectors	22	14				2				
35 Lateral motion, wheels										
36 Lights, cab and classification	1									1
37 Lights, headlight	1									1
39 Meters, volt and ampere										
40 Motors and generators	52	1			2	1				3
42 Pilots and pilot beams	4									
43 Plugs and studs										
44 Quills										
46 Rods, main, side, and drive shafts										
48 Sanders	154	2		4		2		3		10
49 Springs and spring rigging, driving and truck	6			4						
51 Stay bolts, broken or defective										
53 Steam pipes	5									
54 Steps, footboards, et cetera	24	1							4	5
55 Switches, hand-operated, and fuses	1									1
56 Transformers, resistors and rheostats										
57 Trucks	22									1
59 Water tanks	2									
60 Water glasses, fittings and shields	2									
61 Warning signal appliances	8									3
62 Wheels	10				1			9		
63 Miscellaneous	18	3								10
Number of defects	928	66		8	21	16		43	7	113
Locomotive units reported	384	43	19	21	28	20	30	106	154	170
Locomotive units inspected	1,712	183	38	13	106	142	42	411	352	985
Locomotive units defective	334	31		3	8	10		17	4	28
Percentage of inspected found defective	19.5	16.9		23.1	7.5	7.0		4.1	1.1	2.8
Locomotive units ordered out of service	2				1			1		1

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

Detroit Terminal	Detroit, Toledo & Ironton	Donora Southern	Duluth, South Shore & Atlantic	Elgin, Joliet & Eastern	Erie	Florida East Coast	Ft. Dodge, Des Moines & Southern	Fort Worth & Denver City	Georgia	Grand Trunk Western	Great Northern	Green Bay & Western	Gulf Coast Lines	Gulf, Colorado & Santa Fe	Gulf, Mobile & Ohio	Houston Belt & Terminal
					7						1			1	1	1
					1										1	4
											1				1	5
	3	1		24	12				1	10	14			1	59	6
	1			10	5					6	3			3	18	8
					5		1				7				1	9
				9	47			1		8	20			4	24	10
																11
	8			1	2					6					6	12
																13
																14
																16
									1	1	2				9	17
															3	18
					3	2										20
																22
					5	27				1	10	7		1	14	23
															3	24
																25
																26
					2	9	6								2	28
					1										1	29
																30
					46	1		2		13	35			12	75	3
																32
																33
																35
																36
																37
																39
																40
																42
																43
																44
																46
																48
																49
																51
																53
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																55
																56
																57
																59
																60
																61
																62
																63
	14	4	2		66	205	6	10	4	5	73	120		33	282	6
	15	14	13	21	154	405	44	16	24	18	59	509	15	(*)	257	12
	56	28	36	26	243	1,417	131	55	106	38	129	1,011	87	318	1,013	33
	11	2	1		18	85	6	4	4	3	27	79		14	70	3
	19.6	7.1	2.8		7.4	6.0	4.6	7.3	3.8	7.9	20.9	7.8		4.4	6.9	9.1

*Atchison, Topeka & Santa Fe.

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

Parts defective, inoperative or missing, or in violation of the rules	Illinois Central	Illinois Terminal	Indiana Harbor Belt	International-Great Northern	Kansas City Southern	Kansas City Terminal	Kentucky & Indiana Terminal	Lake Terminal	Lehigh & Hudson River	Lehigh & New England
1 Air compressors.....						1				
2 Axles, truck and driving.....										
4 Batteries.....										
5 Boilers.....	1	1	2	1	22					1
6 Brake equipment.....	1	1		15	3	1				
8 Cabs and cab windows.....				3						
9 Cab cards.....				4	13					
10 Cab floors, aprons and deck plates.....	2		1					1		
11 Clutches.....										
12 Controllers, relays, circuit breakers, magnet valves and switch groups.....	1	2								
13 Coupling and uncoupling devices.....										
14 Current collecting apparatus.....					1					
16 Draft gear.....										
17 Draw gear.....										
18 Driving boxes, shoes and wedges.....										
20 Frames or frame braces.....										
22 Fuel system.....	5		1	1	30					1
23 Gages or fittings, air.....					1					
24 Gages or fittings, steam.....										
25 Gears and pinions.....										
26 Handholds.....										
28 Inspections and tests not made as required.....				1						
29 Insulation and safety devices.....					1					
30 Internal-combustion engine defects, parts and appurtenances.....	4			7	35			2		
32 Jack shafts.....										
33 Jumpers and cable connectors.....				1	10					
35 Lateral motion, wheels.....										
36 Lights, cab and classification.....				1						
37 Lights, headlight.....										
39 Meters, volt and ampere.....										
40 Motors and generators.....	1		1	1	12			1		
42 Pilots and pilot beams.....	1			1						
43 Plugs and studs.....										
44 Quills.....										
46 Rods, main, side, and drive shafts.....										
48 Sanders.....	1	1	1		10	3				
49 Springs and spring rigging, driving and truck.....					2					
51 Stay bolts, broken or defective.....										
53 Steam pipes.....					2					
54 Steps, footboards, et cetera.....	1			2	4					
55 Switches, hand-operated, and fuses.....										
56 Transformers, resistors and rheostats.....										
57 Trucks.....			2		13					
59 Water tanks.....										
60 Water glasses, fittings and shields.....										
61 Warning signal appliances.....			1							
62 Wheels.....										
63 Miscellaneous.....					6					
Number of defects.....	17	8	6	22	180	5			4	2
Locomotive units reported.....	163	62	119	59	148	17	21	24	11	33
Locomotive units inspected.....	266	42	218	245	289	45	17	39	54	198
Locomotive units defective.....	4	4	2	13	63	2			3	2
Percentage of inspected found defective.....	1.5	9.5	0.9	5.3	21.8	4.4			5.6	1.0
Locomotive units ordered out of service.....										

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

Lehigh Valley	Long Island	Louisville & Nashville	Maine Central	Manufacturers Ry.	Minneapolis & St. Louis	Minneapolis, St. Paul & S. S. Marie	Minnesota Transfer	Missouri-Kansas-Texas	Missouri Pacific	Monongahela Connecting	Nashville, Chattanooga & St. Louis	Newburgh & South Shore	New Orleans Public Belt	New York Central	New York, Chicago & St. Louis
9	1	2							2		3			18	1
		1												8	2
		9							2					1	4
		8							3		1			33	5
12	1	2	1					7	18		21			40	6
15	4	11	1		1	2		4	14	2	17		1	61	8
1								1	4					6	9
43	2	10	4			3		9	29		17			2	10
														2	11
3	1	3									1			6	12
														1	13
4	1	3		1				1	2	2	1			1	14
									1						16
															17
	1	18	4			1		3	21		6		1	85	18
16	1	3									3			2	22
		1									1			2	23
		3									3			2	24
		1									1			4	25
2								1						3	26
2		2							2			1		3	28
1		1							2					3	29
60	2	85	6			1		15	31		16		3	193	30
	2													9	32
	2														33
	3							2	6						35
								1							36
											1				37
2									1						39
6	1	6				1			14		1			8	40
														4	42
															43
															44
															46
17		9	1					13	36		18			19	48
														3	49
														1	51
														27	54
11	3	4	1					3	2		11				55
	1								2						56
		3							7		6			2	57
	1													4	59
															60
1									1					4	61
1	2										1	1	1	7	62
3	1	9	1						8		1		5	52	63
209	33	190	19	1	1	9		62	209	4	127	2	11	609	12
213	94	281	72	11	77	106	16	144	401	27	128	17	14	1,080	117
727	143	782	237	15	147	387	13	403	1,183	49	395	5	27	1,394	229
70	10	52	13	1	1	7		29	81	2	37	1	2	195	4
9.6	7.0	6.6	5.5	6.7	0.7	1.8		7.2	6.8	4.1	9.4	20.0	7.4	14.0	1.7
		1									1		1	14	

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

	South Buffalo	Southern Pacific, lines east	Southern Pacific, lines west	Southern	Spokane, Portland & Seattle	Steelton & Highspire	Tennessee Central	Tennessee Coal, Iron & Railroad
1 Air compressors.....			5	7	2		1	
2 Axles, truck and driving								
4 Batteries.....			23	4				1
5 Boilers.....				2				
6 Brake equipment.....		6	35	32	5			2
8 Cabs and cab windows.....		2	12	17				4
9 Cab cards.....			9					
10 Cab floors, aprons and deck plates.....		7	19	39			4	3
11 Clutches.....								
12 Controllers, relays, circuit breakers, magnet valves and switch groups.....			4	2	1			
13 Coupling and uncoupling devices.....			4					
14 Current collecting apparatus.....								
16 Draft gear.....			2	11				4
17 Draw gear.....			1	3				
18 Driving boxes, shoes and wedges.....				1				
20 Frames or frame braces.....								
22 Fuel system.....		9	26	24			2	5
23 Gages or fittings, air.....		2	1	8	1			
24 Gages or fittings, steam.....				2				
25 Gears and pinions.....								
26 Handholds.....			1					
28 Inspections and tests not made as required.....			20	2				
29 Insulation and safety devices.....			1	5				
30 Internal-combustion engine defects, parts and appurtenances.....		20	126	81	5		21	11
32 Jack shafts.....								
33 Jumpers and cable connectors.....			2	4				
35 Lateral motion, wheels.....								
36 Lights, cab and classification.....				2				
37 Lights, headlight.....			1					
39 Meters, volt and ampere.....				1				
40 Motors and generators.....		4	6	12				
42 Pilots and pilot beams.....				4				
43 Plugs and studs.....								
44 Quills.....								
46 Rods, main, side, and drive shafts.....								
48 Sanders.....		1	9	36				
49 Springs and spring rigging, driving and truck.....			1	1				
51 Stay bolts, broken or defective.....								
53 Steam pipes.....								
54 Steps, footboards, et cetera.....				5				1
55 Switches, hand-operated, and fuses.....								
56 Transformers, resistors and rheostats.....			1					
57 Trucks.....		1	3	3				
59 Water tanks.....			1	1				
60 Water glasses, fittings and shields.....			2					
61 Warning signal appliances.....			1	4				
62 Wheels.....				4			6	1
63 Miscellaneous.....		1	27	27				
Number of defects.....		53	343	344	14		24	32
Locomotive units reported.....	45	137	719	701	70	19	15	44
Locomotive units inspected.....	26	325	2,315	2,218	177	27	54	14
Locomotive units defective.....	24	176	124	13	11		11	3
Percentage of inspected found defective.....	7.4	7.6	5.6	7.3			20.4	21.4
Locomotive units ordered out of service.....		3	1	1			3	1

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

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
					5		1							8	146
												13		1	85
					6									1	43
							6	11				2		80	1,166
					80									86	672
					22							6		13	100
	1	1	1		5			10						59	1,281
					62										4
	1				28		1					2		14	166
					3									6	35
															9
	1				6									15	141
					14									5	46
								3						2	38
														2	27
	1				87			3				7		56	1,082
	1	1			4							1		8	70
														1	14
														1	9
	2				3									22	97
					9			2						24	143
					3			1				1		1	64
	1	2	2		315			17				29		130	3,270
					9			1							5
								1							190
								5							11
					5										23
					5										16
														3	14
								1						2	39
								1						9	314
														1	36
															3
															26
														1	46
	3	5			40			16				1		61	902
														8	108
															24
															377
															15
															9
															254
															33
															11
															60
															83
															215
															574
	16	22	3					2	38				5	749	11,935
	82	135	18	13	10			130	44	180	26	67	13	1,130	19,320
	75	301	43	21	42			49	123	782	20	8	19	1,941	52,948
	10	6	1					1	16	31				5	234
	13.3	2.0	2.3					11.0	2.0	13.0		6.9	26.3	12.1	8.3
								2						24	106