

INTERSTATE COMMERCE COMMISSION

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

FISCAL YEAR ENDED
JUNE 30, 1955



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

SEPTEMBER 30, 1955.

To the Interstate Commerce Commission:

In compliance with section 7 of the act of February 17, 1911, as amended, the Forty-Fourth Annual Report of the Director of Locomotive Inspection, covering the work of the fiscal year ended June 30, 1955, is respectfully submitted.

Summaries are given, by railroads, of all accidents which resulted in serious injury or death to one or more persons, due to the failure of parts and appurtenances of locomotives, as reported and investigated under section 8 of the Locomotive Inspection Act. Accidents which occurred as a result of failure of parts and appurtenances of locomotives, which resulted in damage to property or equipment but not serious injury or death, are not included in this report. For additional information concerning railroad accidents, see Accident Bulletin, prepared by the Bureau of Transport Economics and Statistics.

Tables contained in the report show the results of inspection of locomotives, the number of accidents and resultant casualties caused by failure of some part or appurtenance of individual locomotives, and the parts and appurtenances which caused accidents and casualties. The tabulated inspection data cover the number of locomotives for which reports were filed, the number inspected, the number and percentage found defective, the number for which written notices for repairs were issued in accordance with section 6 of the act, and the total number of defects found and reported. Tables are included to show, by railroads, all locomotive defects found by our inspectors. Data for preceding years are given where possible for comparative purposes.

Results of locomotive inspections made by our district inspectors in performance of duties prescribed under section 6 of the act are shown in table I. The decrease in the number of locomotives for which reports were filed, which has occurred from year to year since 1950, has resulted, in the major part, from replacement of steam locomotives by locomotives other than steam, most of which were of the Diesel-electric type. The higher availability of the Diesel units placed in service has been responsible for displacement of a greater number of steam locomotives.

Funds appropriated for travel in the past 3 years have not been sufficient to permit our inspectors to travel throughout their respective

districts with the same frequency as in former years for the purpose of properly performing duties assigned under the law. The number of units inspected per inspector has remained approximately constant for this period but, because of their inability to cover outlying terminals in the respective districts with frequent regularity, uniform inspection of locomotives throughout the various inspection districts has not been possible.

The number of locomotives found defective and the number of defects found were approximately comparable with the preceding year but, due to decrease in number of locomotives inspected, the percentage of inspected found defective increased from 9.7 to 10.1 percent. As the age of Diesel power recently placed in service increases, more maintenance attention will be required if defects are to be avoided.

TABLE I.—Reports and inspections—Steam locomotives and locomotive units other than steam

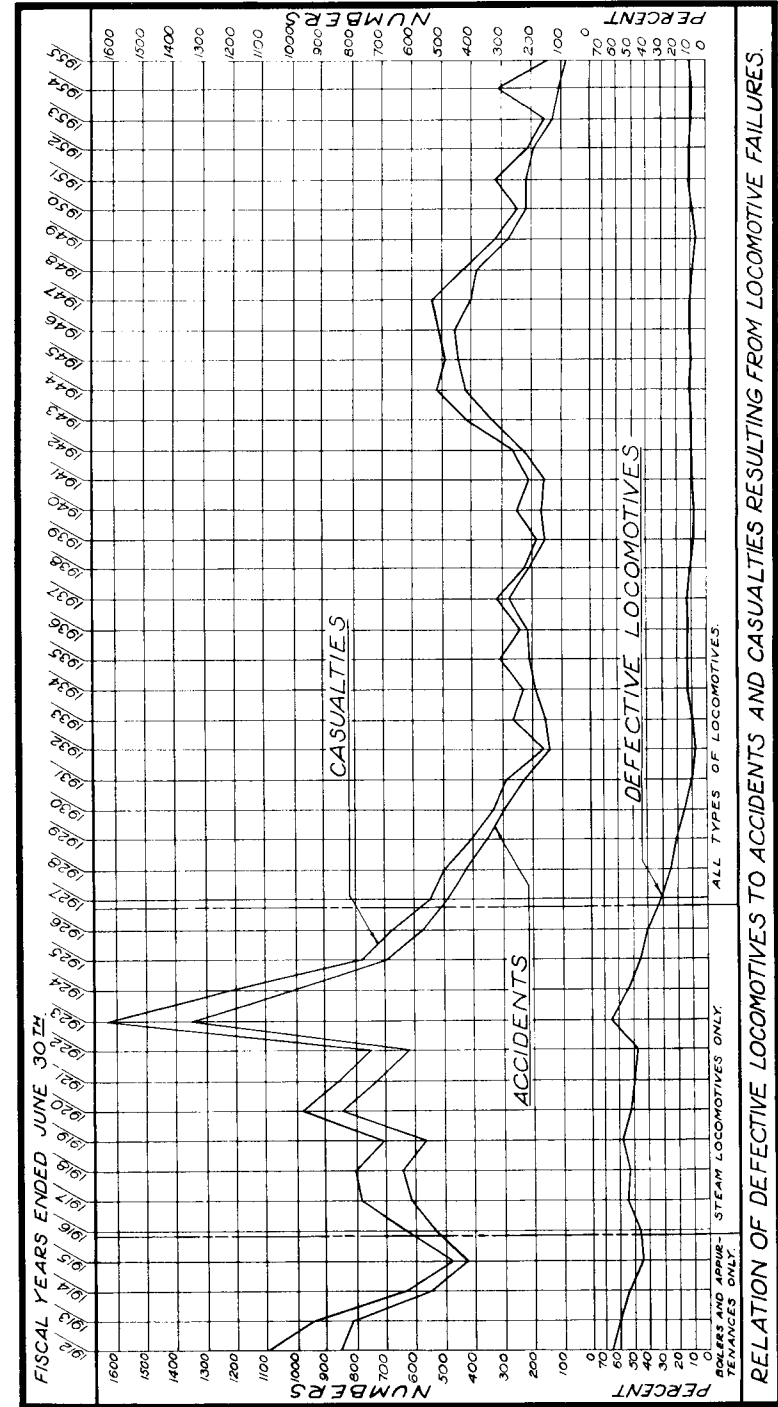
	Year ended June 30—					
	1955	1954	1953	1952	1951	1950
Number of locomotives for which reports were filed...	36,992	39,270	41,172	43,206	45,915	45,462
Number inspected.....	98,025	103,337	104,069	110,483	115,061	109,312
Number found defective.....	9,913	9,994	10,154	12,321	12,370	9,488
Percentage of inspected found defective.....	10.1	9.7	9.8	11.2	10.8	8.7
Number ordered out of service.....	223	257	281	505	614	441
Number of defects found.....	29,968	29,403	30,143	41,351	46,592	34,829

INVESTIGATION OF ACCIDENTS AND GENERAL CONDITION OF LOCOMOTIVES

All accidents reported under requirements of the law and rules were carefully investigated and appropriate action taken to prevent recurrence so far as possible. Copies of published reports of accident investigations were distributed to interested parties, and all inspectors were advised of details and causes of unusual accidents to better assist them in their educational contacts with railroad personnel. The dissemination of pertinent information concerning fundamental causes of locomotive accidents and resultant casualties has been an important adjunct to our basic enforcement activities. Such public information combined with the active enforcement of the requirements has been effective in promotion of locomotive safety and has resulted in a decreasing accident trend. To promote further accident reduction, activity of all members of the Locomotive Inspection Section will be continued in our effort to bring about additional improvement in locomotive safety.

ACCIDENTS

Eighty-three accidents occurred in connection with all types of locomotives and resulted in 3 deaths and 142 injuries. Compared



with the preceding year there was a decrease of 22 accidents and 160 injuries. Three fatalities occurred in each year.

The chart on page 3 shows the relation between the percentage of defective locomotives, the number of accidents and casualties resulting from defective parts and appurtenances, and illustrates the effect of operating locomotives in defective condition.

The advancement of locomotive safety is emphasized by the significant fact that, for the first time in the 44 years since passage of the act, a full fiscal year has elapsed without the occurrence of a steam locomotive boiler explosion.

Tables II, III, and IV which follow show details of accidents which occurred in the past year and are prepared to show their distribution among personnel and responsible parts and appurtenances. If advantage is taken of information contained in these tables, if proper inspections and repairs are made, and if equipment is maintained in compliance with the standards of condition established by the requirements of the law and rules, many accidents may be prevented.

Tables V and VI show details of defective parts and appurtenances of steam locomotives and locomotives other than steam reported, inspected, found defective, and ordered out of service. If the distribution of reported defective parts shown by the tables is considered, those parts which may be expected to require most maintenance will be indicated and inspection and repair programs may be set up on the emphasized basis.

Detailed results of our inspections of steam locomotives and locomotive units other than steam are shown in tables VII and VIII, respectively.

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

	Year ended June 30—					
	1955	1954	1953	1952	1951	1950
Number of accidents.....	83	105	134	196	221	220
Percent increase or decrease from previous year.....	21.0	21.6	31.6	11.3	10.5	20.6
Number of persons killed.....	3	3	12	4	16	10
Percent increase or decrease from previous year.....		75.0	200.0	75.0	160.0	234
Number of persons injured.....	142	302	150	203	299	234
Percent increase or decrease from previous year.....	53.0	101.3	26.1	32.1	27.8	24.5

¹ Increase.

TABLE III.—Number of casualties classified according to occupation—steam locomotives and locomotive units other than steam

	Year ended June 30—									
	1955		1954		1953		1952		1951	
	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured
Members of train crews:										
Engineers.....	1	26	1	37	4	37	1	51	2	62
Firemen.....	1	34		39	4	57	2	76	4	92
Brakemen.....		10		11	3	20	1	31	1	24
Conductors.....		4		4		8		7		6
Switchmen.....		4		3		4		10	1	13
Maintenance employees.....	1	4	2	12		8		24	4	17
Other employees.....		18		2		2		2		16
Nonemployees.....		42		194	1	14		2	4	69
Total.....	3	142	3	302	12	150	4	203	16	299

TABLE IV.—Accidents and casualties resulting from failure of steam locomotives' tenders, locomotives other than steam, and their appurtenances

Part or appurtenance which caused accident	Year ended June 30, 1955		
	Accidents	Killed	Injured
Air compressors.....	2		2
Axles, axle journals and journal boxes.....	2		60
Boiler:			
Blow-off cocks.....	1		2
Flues and tubes including superheater, arch and water.....	2		2
Fuel explosions in firebox.....	1		1
Grate shakers and mechanism.....	1		1
Injectors, pumps, and connections.....	3		4
Squirt hose.....	2		2
Steam valves, piping and blowers.....	1		1
Brakes and brake rigging.....	1		1
Cab:			
Doors or windows.....	4		4
Seats.....	8		8
Control equipment—mechanical, electrical, pneumatic or electro-pneumatic.....	2		2
Electrical equipment:			
Insulation, short circuits or electrical flashes.....	7	1	6
Pantographs, trolleys, or third rail shoes.....	1	1	1
Switches and gear.....	4	1	4
Fans and shutters.....	1		1
Floors, steps, and passageways.....	20		20
Footboards.....	1		1
Handholds.....	2		2
Internal-combustion engines and turbines:			
Crankcase or air-box explosions.....	2		3
Exhaust and cooling systems.....	1		1
Fuel injectors and connections.....	2		2
Governors and mechanism.....	1		1
Machinery—steam locomotive:			
Lubricators, glasses and connections.....	2		2
Valve and reversing gear.....	1		1
Miscellaneous.....	8		8
Total.....	83	3	142

TABLE V.—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—					
	1955	1954	1953	1952	1951	1950
1 Air compressors	229	304	351	671	897	719
2 Arch tubes	5	4	5	12	17	9
3 Ashpans and mechanism	17	24	36	59	64	59
4 Axles	3	3		1	4	1
5 Blow-off cocks	105	121	185	299	262	220
6 Boiler checks	84	158	182	356	477	386
7 Boiler shell	43	79	94	174	226	211
8 Brake equipment	636	835	1,038	1,955	2,453	1,845
9 Cabs, cab windows, and curtains	241	298	354	694	1,173	802
10 Cab aprons and decks	100	133	179	295	395	364
11 Cab cards	19	27	40	53	83	97
12 Coupling and uncoupling devices	11	22	30	42	54	41
13 Crossheads, guides, pistons, and piston rods	256	398	478	1,035	1,363	1,100
14 Crown bolts	7	20	27	38	52	53
15 Cylinders, saddles, and steam chests	387	364	455	908	1,437	1,160
16 Cylinder cocks and rigging	130	132	136	328	474	376
17 Domes and dome caps	20	20	45	85	131	90
18 Draft gear	133	150	168	313	441	368
19 Draw gear	69	79	108	189	297	280
20 Driving boxes, shoes, wedges, pedestals, and braces	226	258	345	681	1,145	1,037
21 Firebox sheets	20	37	55	141	203	181
22 Flues	27	32	49	121	184	152
23 Frames, tail pieces, and braces, locomotive	100	151	225	368	486	451
24 Frames, tender	11	14	10	26	47	34
25 Gages and gage fittings, air	42	47	61	136	173	116
26 Gages and gage fittings, steam	61	89	112	228	325	272
27 Gage cocks	116	120	211	337	495	386
28 Grate shakers and fire doors	107	90	121	282	339	326
29 Handholds	110	146	196	353	420	439
30 Injectors, inoperative	35	33	18	34	60	45
31 Injectors and connections	406	674	843	1,615	2,190	1,767
32 Inspections and tests not made as required	26	24	53	68	121	122
33 Lateral motion	65	98	137	274	465	389
34 Lights, cab and classification	35	39	26	44	118	60
35 Lights, headlight	34	56	42	100	108	131
36 Lubricators and shields	47	63	81	160	222	157
37 Mud rings	33	65	78	149	153	145
38 Packing nuts	233	240	294	552	638	558
39 Packing, piston rod and valve stem	122	154	220	494	765	510
40 Pilots and pilot beams	39	52	48	102	124	126
41 Plugs and studs	16	22	50	91	117	104
42 Reversing gear	151	170	216	429	631	404
43 Rods, main and side, crankpins, and collars	221	315	459	990	1,511	1,213
44 Safety valves	22	15	19	39	45	34
45 Sanders	155	277	324	552	806	641
46 Springs and spring rigging	551	834	1,322	2,424	3,340	2,848
47 Squirt hose	27	39	41	69	90	74
48 Stay bolts	55	108	144	254	280	229
49 Stay bolts, broken	27	55	125	159	282	193
50 Steam pipes	58	87	161	232	342	302
51 Steam valves	33	69	68	146	181	131
52 Steps	157	255	321	561	805	680
53 Tanks and tank valves	269	340	466	980	1,304	1,205
54 Telltale holes	6	13	6	15	33	28
55 Throttle and throttle rigging	179	228	327	608	927	664
56 Trucks, engine and trailing	153	171	263	427	700	580
57 Trucks, tender	129	152	219	474	710	540
58 Valve motion	114	174	195	437	673	486
59 Washout plugs	73	79	138	266	325	289
60 Stokers	58	55	133	253	306	261
61 Water glasses, fittings, and shields	218	282	357	651	858	907
62 Wheels	94	107	151	340	536	394
63 Miscellaneous—Signal appliances, badge plates, brakes (hand)	194	263	339	569	774	652
Number of defects	7,350	9,763	12,980	24,738	34,657	28,504
Locomotives reported	8,892	12,135	15,798	20,490	26,595	29,743
Locomotives inspected	12,128	19,999	28,899	45,220	62,113	66,809
Locomotives defective	1,784	2,599	3,583	6,234	7,995	6,740
Percentage of inspected found defective	14.7	13.0	12.4	13.8	12.9	10.1
Locomotives ordered out of service	96	117	163	370	508	399

TABLE VI.—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—					
	1955	1954	1953	1952	1951	1950
1 Air compressors	419	326	210	206	146	99
2 Axles, truck and driving	7	4	7	3	2	2
4 Batteries	83	82	40	39	85	20
5 Boilers	203	175	103	69	43	46
6 Brake equipment	2,790	2,126	1,898	1,450	1,166	673
8 Cabs and cab windows	1,073	858	679	813	672	377
9 Cab cards	150	135	128	139	100	75
10 Cab floors, aprons and deck plates	1,677	1,703	1,589	1,694	1,281	726
11 Clutches	2	5	9	5	4	1
12 Controllers, relays, circuit breakers, magnet valves, and switch groups	802	454	424	222	166	61
13 Coupling and uncoupling devices	204	139	95	76	35	32
14 Current collecting apparatus	15	12	6	5	9	18
16 Draft gear	336	291	218	202	141	91
17 Draw gear	140	55	42	28	46	27
18 Driving boxes, shoes, and wedges	249	154	128	98	38	51
20 Frames or frame braces	14	32	22	33	27	9
22 Fuel system	1,833	1,951	1,853	1,751	1,082	483
23 Gages or fittings, air	226	136	138	110	70	29
24 Gages or fittings, steam	48	56	44	11	14	14
25 Gears and pinions	27	12	13	26	9	15
26 Handholds	219	230	121	127	97	70
28 Inspections and tests not made as required	183	185	175	159	143	116
29 Insulation and safety devices	188	105	77	102	64	48
30 Internal-combustion engine defects, parts and appurtenances	5,035	4,848	4,564	4,768	3,270	1,456
32 Jack shafts	2	1	1	1	5	8
33 Jumpers and cable connectors	214	178	156	191	190	86
35 Lateral motion, wheels	39	5	7	8	11	2
36 Lights, cab and classification	198	232	109	49	23	7
37 Lights, headlight	33	28	42	22	16	9
39 Meters, volt and ampere	43	40	27	41	14	7
40 Motors and generators	880	813	655	674	314	106
42 Pilots and pilot beams	71	71	46	53	36	29
43 Plugs and studs			3	3	3	
44 Quills	22	11	6	15	26	10
46 Rods, main, side, and drive shafts	7			15	2	6
48 Sanders	1,492	1,200	1,224	1,202	902	356
49 Springs and spring rigging, driving and truck	306	241	178	153	108	103
51 Stay bolts, broken or defective				1		1
53 Steam pipes	177	154	119	89	24	32
54 Steps, footboards, et cetera	737	622	505	480	377	284
55 Switches, hand-operated, and fuses	38	34	17	18	15	9
56 Transformers, resistors, and rheostats	3	6	3	2	9	9
57 Trucks	1,054	503	439	390	234	182
59 Water tanks	31	34	31	47	33	20
60 Water glasses, fittings, and shields	16	11	14	38	11	27
61 Warning signal appliances	152	121	122	117	83	21
62 Wheels	282	257	212	230	215	95
63 Miscellaneous	898	1,005	864	638	574	377
Number of defects	22,618	19,640	17,163	16,613	11,935	6,325
Locomotive units reported	28,100	27,135	25,374	22,716	19,320	15,719
Locomotive units inspected	85,897	83,338	75,170	65,263	52,948	42,503
Locomotive units defective	8,129	7,395	6,571	6,087	4,375	2,748
Percentage of inspected found defective	9.5	8.9	8.7	9.3	8.3	6.5
Locomotive units ordered out of service	127	140	118	135	106	42

LOCOMOTIVE ACCIDENTS

Derailment of 2 locomotive units and 9 cars of a passenger train caused by the broken journal of an axle in the first truck of the third unit of a 4-unit Diesel-electric locomotive resulted in injury of 40 passengers, 18 dining car employees, and 1 train service employee. Investigation of the accident disclosed that the failed axle had been first placed in service by the operating railroad in 1949 and had

made 1,312,142 miles at time of failure. The failed journal had been built up by use of a metal spraying process which extended into the fillet. A progressive fracture had developed near the wheel end of the inner bearing race, and failure occurred through this fracture. The published report discussed the relationship of the failure to the endurance limit of the axle material and commented that application of metalizing precluded discovery of defects in the journal metal.

Twenty accidents occurred because of defective condition of floors, steps, and passageways. Accumulation of oil upon walking surfaces was responsible for the majority of these accidents. Because each oil leak, whereby oil is deposited on steel walkways, is a potential source of a disabling accident, our inspectors have been instructed to give particular attention to this type of defect which is prevalent on some railroads.

Eight accidents resulted from defective cab seats, which frequently have been found in dangerously defective condition by our inspectors.

Accidents involving floors, steps, passageways, cab seats, doors, and windows, which represented 38 percent of all locomotive accidents during the year, generally resulted from what might be termed "poor housekeeping". Emphasis has been placed upon action necessary to avoid continuation of accidents of this type, and such defective conditions as are found by our inspectors are actively handled with responsible carriers.

One serious accident, in which an employee suffered the loss of an eye, occurred when defective cab-signal equipment caused a sudden and severe brake application. An engine service employee was thrown forward and his eye struck a thin metal hood over a cab signal indicator lamp. As a result of this accident, the carrier instituted a program for removal of cab signal indicator hoods from all classes of locomotives other than steam.

SPECIFICATIONS AND ALTERATION REPORTS

Under rule 54 of the Rules and Instructions for Inspection and Testing of Steam Locomotives, 28 specification cards and 899 alteration reports were filed, checked, and analyzed. These reports are necessary in order to determine whether or not the boilers represented were so constructed or repaired as to render safe and proper service and whether the stresses were within the allowed limits. Corrective measures were taken with respect to numerous discrepancies found.

Under rules 328 and 329 of the Rules and Instructions for Inspection and Testing of Locomotives Other Than Steam, 2,346 specifications and 664 alteration reports were filed for locomotive units and 245 specifications and 360 alteration reports were filed for boilers mounted on locomotive units other than steam. These were checked

and analyzed and corrective measures were taken with respect to discrepancies found.

EXTENSION OF TIME FOR REMOVAL OF FLUES

Three hundred and eighty-four applications were filed for extension of time for removal of flues, as provided in rule 10. Our investigations disclosed that in 25 of these cases the condition of the locomotives or other circumstances were such that extensions could not properly be granted. Two were in such condition that the full extensions requested could not be authorized, but extensions for shorter periods of time were allowed. Twelve extensions were granted after defects disclosed by our investigations were required to be repaired. Fourteen applications were canceled for various reasons. Three hundred and thirty-one applications were granted for the full period requested.

APEALS

No formal appeal from the decision of an inspector was filed by any carrier during the year.

BETTERMENT OF SERVICE

In order that all inspectors be kept currently informed on the latest improvements in construction and design of Diesel-electric locomotives, arrangements were effected whereby all inspectors were given specialized instructions at a builder's plant for periods of 1-week duration. At that time, all inspectors were assembled for a 1-day conference for the purpose of discussing policies with officers of the Bureau and in the interest of uniformity of understanding with respect to enforcement of the requirements of the Act.

RECOMMENDATION

Review of tabulated data contained in this report and the accident and casualty chart on page 3 shows a noticeable improvement in accident trend since the war years, which may be attributed in large extent to the conversion to Diesel-electric locomotives. However, a corresponding improvement is not shown in data for percentage of inspected locomotives that were found defective. Since the effectiveness of our work is related to the mobility of our inspectors, satisfactory compliance with the requirement that each inspector see that proper inspections are made by railroads within his district is not practicable when inadequate travel funds restrict the time available for inspection at outlying terminals.

It is therefore recommended that the necessity for adequate travel funds be stressed to the end that sufficient funds be appropriated to properly discharge specified inspection duties.

ACKNOWLEDGMENT

All organization personnel are commended for their cooperative efforts and satisfactory performance of their duties despite the increase in work load during the period covered by this report.

JOHN A. HALL,
Director of Locomotive Inspection.

ACCIDENTS AND CASUALTIES RESULTING FROM THE FAILURE OF STEAM LOCOMOTIVES, TENDERS, LOCOMOTIVES OTHER THAN STEAM AND THEIR APPURTENANCES DURING THE FISCAL YEAR ENDED JUNE 30, 1955, BY ROADS

[A double star (**) indicates accidents not properly reported, as required by rules 55, 162, and 335. Complete investigations therefore, could not be made, inasmuch as the Bureau was not apprised of the accidents in sufficient time after they occurred to permit them to be properly investigated.]

ATCHISON, TOPEKA & SANTA FE RAILWAY:

**August 25, 1954, unit 2210, El Paso, Tex. Ammeter in control panel exploded; excessive slipping caused by oil leaking from journal boxes to wheel treads; No. 1 traction motor was grounded; one injured.

**September 2, 1954, unit 17-B, Albuquerque, N. Mex. Oil and water had accumulated on engineroom floor; one injured.

**September 13, 1954, unit 206, near Perea, N. Mex. Oil on engineroom floor; one injured.

September 22, 1954, unit 31-A, near Orwood, Calif. Axle on a Diesel-electric unit broke through fracture in journal at point near wheel end of inner roller bearing race, resulting in derailment of passenger train; old fracture in journal extended through approximately 80 percent of cross-sectional area; journal had been built up by the metal spraying process which extended into fillet; 59 injured.

October 19, 1954, unit 2350, San Bernardino, Calif. Front platform was obstructed by a brakeman's club; one injured.

February 26, 1955, unit 112, Aikman, Kans. Fireman slipped on oil on engineroom floor while going to manually adjust the shutters; shutters were reported not working properly on January 18 (two times) and 26, February 4 and 11, and March 2; one injured.

Six accidents; 64 injured.

BALTIMORE AND OHIO RAILROAD:

November 5, 1954, locomotive 4548, Blaine Mine, Ohio. Insufficient clearance between cab gangway handhold and gangway ladder when on curve; one injured.

March 31, 1955, locomotive 4425, near Hardies, Pa. Suspension spring supporting drop type cab seat failed through old fracture and seat collapsed; one injured.

June 25, 1955, unit 458, Hazelwood, Pa. Wood screws which fastened cab seat pedestal to floor pulled out, permitting seat to fall; one injured.

Three accidents; three injured.

CHESAPEAKE & OHIO RAILWAY:

**April 14, 1955, unit 7523, between Jett, Ky., and Cliffside, Ky. Disconnected dynamic brake cable caused heavy electrical arc at brake contactors; one injured.

One accident; one injured.

CHICAGO & NORTH WESTERN RAILWAY:

January 31, 1955, locomotive 633, Melrose Park, Ill. Injectors failed to supply water to the boiler, necessitating stopping the train and dumping the fire to avoid a serious accident; a normal brake application was initiated and subsequently an undesired emergency brake application occurred which resulted in injury to passengers; locomotive was dispatched without proper cab lights and without proper tests, including test of injectors, water glasses, gage cocks, and brakes; two injured.

One accident; two injured.

CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC RAILROAD:

January 14, 1955, unit 2312, Samoa, Iowa. Nipple in engine lubricating oil line broke off at globe valve; single-strength iron nipple was flawed for approximately 80 percent of circumference at point of failure; one injured.

One accident; one injured.

CHICAGO RIVER & INDIANA RAILROAD:

**July 9, 1954, unit 9800, Chicago, Ill. Right cab seat pedestal bearing mounting plate broke loose from weld which attached it to pedestal; "Repair Engrs seat" was reported on July 7; one injured.

One accident; one injured.

CHICAGO, ROCK ISLAND & PACIFIC RAILROAD:

July 12, 1954, unit 377, Mason City, Iowa. Battery compartment door did not latch properly; door was warped and latch handle was bent so that true position of latch was not evident; latch was located behind panel and was not seen easily; one injured.

**October 4, 1954, unit 426, Sayre, Okla. Trap door in cab floor became displaced; one injured.

April 19, 1955, unit 603, Blue Island, Ill. Metal plate covering fuel oil supply pipe on engineroom floor at passageway shifted from position, causing employee to fall; plate was loose, smooth, and had film of oil on it; one injured.

June 28, 1955, unit 1216, West Ober, N. Mex. Cab door would not remain closed due to defective latch; one injured.

Four accidents; four injured.

DULUTH, SOUTH SHORE & ATLANTIC RAILROAD:

March 16, 1955, unit 204, west of Baraga, Mich. Broken pin worked out of load regulator linkage, nullifying operation of load regulator; one killed.

One accident; one killed.

ERIE RAILROAD:

November 8, 1954, unit 1404, near Secaucus, N. J. Oil vapor explosion in combustion space of steam generator type of train heating boiler, resulting from excessive spark plug electrode gap and defective outfire relay; one injured.

One accident; one injured.

GREAT NORTHERN RAILWAY:

**February 17, 1955, unit 5017, Skykomish, Wash. Pantograph-lowering solenoid inoperative on unit 5016, which was electrically and mechanically coupled with unit 5017; one killed.

One accident; one killed.

GULF COAST LINES:

October 9, 1954, unit (St. L. B. & M.) 4329, Hubert, Tex. Oil on left running board; "Engine throwing oil on left running board" was reported on October 7 and "Clean oil off both running boards" was reported on October 9 (after accident); one injured.

One accident; one injured.

HOUSTON BELT & TERMINAL RAILWAY:

September 23, 1954, unit 25, Houston, Tex. Sand box filling hole cover fell from closed position; latches for holding cover in closed position were bent and defective; one injured.

One accident; one injured.

LEHIGH VALLEY RAILROAD:

November 26, 1954, unit 587, Caledonia, N. Y. Steam generator water pump plunger packing was leaking due to being excessively worn, permitting water to flow over engineroom floor; "Clean oil off engine room floor" was reported on October 31 and November 4, 8, 14, 20, and 23 and "Bad water leak around steam heat boiler, examine and repair as water is plenty on floor of unit" was reported on November 25; one injured.

One accident; one injured.

NEW YORK CENTRAL RAILROAD:

August 2, 1954, unit 657, Chicago, Ill. Tubular metal frame of cab seat back rest broke where previously repaired by fusion welding; cab seat was reported broken on July 31; one injured.

August 8, 1954, unit 1613, Archbold, Ohio. Employee fell when cab seat box cushion tilted from position; two of the four securing bolts had pulled from seat box pedestal and remaining bolts were very loose; one injured.

September 10, 1954, unit 1068, near Dunkirk, N. Y. Flash occurred in high voltage cabinet when attempt was made to use dynamic brake; braking switch contacts were burned, stationary side contacts were loose on contact bars, and spacing sleeves at ends of two contacts were burned; one injured.

October 20, 1954, unit 5740, near Carman, N. Y. Automatic train control motor-generator set stopped due to an open circuit in motor starting switch, resulting in an undesired service brake application; a load side contact in motor starting switch was burned off causing an open circuit; two injured.

**January 20, 1955, unit 7300, New York, N. Y. Wood screws which fastened cab seat pedestal to floor pulled out, permitting seat to fall; one injured.

April 17, 1955, unit 1075, Cleveland, Ohio. Back rest of engineer's cab seat unexpectedly tilted backward; end of back rest adjustment spring-loaded locking pin and spring were missing; locking pin was worn through at cotter key hole; "Repair engineer's seat back rest" was reported on April 14; one injured.

April 30, unit 5005, near Jordan, N. Y. Number 8 cylinder liner cracked and leaking engine cooling water into crankcase contaminating lubricating oil, shutting down engine. Undesired automatic train control brake application due to low voltage in train control circuit when attempting to start the stalled engine; one injured.

May 7, 1955, unit 819, Collinwood, Ohio. Leaking cab heater core inlet; reported April 1, 6, 23, 25, and May 2; one injured.

May 25, 1955, unit 1611, Dorset Junction, Ohio. Flash-over occurred in high voltage cabinet; defective magnet valve prevented proper transition; one injured.

June 29, 1955, locomotive 1327, Code, Ind. Swivel collar on lubricator oil pipe broke; one injured.

Ten accidents; eleven injured.

NEW YORK, NEW HAVEN & HARTFORD RAILROAD:

July 19, 1954, unit 0709, Needham Junction, Mass. Oil on engineroom floor; crack in No. 1 engine turbo-charger drip pan; hardened and leaking turbo-charger foot bracket gaskets; engineroom floor reported to be cleaned on July 1, 2, 6, 8, 9, 12, 13, and 16; one injured.

**August 31, 1954, unit 305, New Haven, Conn. Cab window retaining strip pulled off, permitting window sash to fall outside the storage recession in side wall and strike employee's foot; retaining strip was not properly applied; one injured.

October 6, 1954, unit 0422, Plainfield, Conn. Oil on engineroom floor; engineroom floor to be cleaned and/or oil leaks in engineroom were reported 8 times since September 19; one injured.

October 30, 1954, unit 0424, Sound View, Conn. Cab window was stuck in lowered position and cab seat broke from supporting post while employee was attempting to close window; spiral spring in window clutch box was broken and wedged between clutch and clutch box housing; cab seat bottom plate was not properly secured to seat post; one injured.

**November 29, 1954, unit 44, between Avery, Mass., and Boston, Mass. Fumes in operating cab of rail Diesel unit; accumulation of rainwater in air cleaner raised the oil level and blocked passage of air with result that air compressor drew contaminated air from its crankcase and an engine crankcase and discharged it into the airbrake system from which it entered the cab; one injured.

December 28, 1954, unit 467, Boston, Mass. Oil on engineroom floor; oil leaks reported 12 times since December 6; one injured.

December 28, 1954, unit 0927, Boston, Mass. Fuel tank filling pipe cap fell off, striking employee; cap was loose fit and was not properly secured; safety chain ring was missing and cap was not attached to safety chain; one injured.

February 7, 1955, unit 0609, Hartford, Conn. Oil on footboard; fuel oil return pipe was found broken through old fracture at connection to fuel tank on February 9; running boards, engineroom and/or footboards were reported to be cleaned on February 4, 7, 8, and 9; one injured.

March 28, 1955, unit 314, New Haven, Conn. Stanchion on walkway at No. 1 end of unit broke at base connection through old fracture which extended through approximately 72 percent of cross-sectional area; one injured.

Nine accidents; nine injured.

NORFOLK AND WESTERN RAILWAY:

May 5, 1955, locomotive 2170, Buchanan, Va. High pressure union link failed at old fraction in bottom section of eye at crosshead connection resulting in breakage of main rod; one end of main rod entered firebox and punctured side sheet; one injured.

**May 27, 1955, locomotive 241, Columbus, Ohio. Sprinkler hose blew off nipple; one injured.

Two accidents; two injured.

NORTHERN PACIFIC RAILWAY:

September 28, 1954, locomotive 1714, Cabin Creek, Wash. Hot water and steam discharged from open end of steam heat pipe at rear of tender; steam heat valves were leaking and automatic drain not provided in heat line; seat of regulating valve of steam heat valve was cut; one injured.

**December 29, 1954, locomotive 5136, Laurel, Mont. Connecting rod pin came out of ash pan dump lever; one injured.

February 13, 1955, locomotive 5148, Lind, Wash. Union in fuel line above front burner was leaking badly; union connection threads were loose fit; one injured.

Three accidents; three injured.

PENNSYLVANIA RAILROAD:

December 16, 1954, locomotive 4435, Enola, Pa. Superheater flue broke off near front flue sheet where flue wall was wasted away to approximately $\frac{1}{2}$ inch in thickness; one injured.

December 24, 1954, unit 9012, Wissinoming, Pa. Ammeter exploded due to short circuit, scattering broken glass in the cab; one of the cap screws holding magnet to bracket inside the ammeter worked out and in falling made contact with internal circuit and short circuited to ground through ammeter case; no protection provided from shattered glass in case of ammeter breakage; one injured.

February 3, 1955, unit 4803, Perryville, Md. Undesired operation of automatic train speed control apparatus; defective grease seal in speed control governor prevented low speed contacts in governor from making up; one injured.

February 13, 1955, unit 9788-A, Columbus, Ohio. Crankcase explosion resulting from overheated main bearings and a connecting rod bearing; oil passages from lube oil manifold to five main crankshaft bearings were stopped up; shreds of a cleaning rag were found in lube oil manifold above the crankshaft and in oil holes to several main bearings; two injured.

March 19, 1955, unit 9202, Altoona, Pa. Cab heater was inoperative on account of defective heater fan motor; one commutator brush was worn and mating terminal tensioning spring was weak, causing improper commutation; cover was missing from commutator end of motor; one injured.

April 3, 1955, unit 4730, Midway, N. J. Hooks holding reverser cabinet cover worn and loose; cover contacted electrical parts causing ground and short circuit; one injured.

April 12, 1955, locomotive 3703, Enola, Pa. Superheater flue broke through prosser groove at flue sheet; flue wall was wasted away on water side and reduced to near knife-edge thickness at prosser groove; one injured.

April 14, 1955, unit 9522-B, Chicago, Ill. Excessive engine speed resulting from defective overspeed control caused failure of pistons and connecting rod assemblies; inspection ramp not properly secured; one injured.

April 23, 1955, unit 5815, Altoona, Pa. Seat disengaged from fastenings to seat column due to repairs made not in accordance with carrier's standard; one injured.

May 5, 1955, unit 2011-A, Altoona, Pa. Defective internal connections caused failure of cab signal equipment which resulted in speed control service application of automatic air brake which was immediately followed by an emergency brake application; one injured.

June 28, 1955, unit 4867, Bryn Mawr, Pa. Chafing of motor leads against lifting lug caused short circuit and resultant fire; one killed.

Eleven accidents; one killed; eleven injured.

READING COMPANY:

July 22, 1954, unit 561, near Bingen, Pa. Diesel-electric unit did not load properly due to movement of F-2 fan contactor into closed position while reverser was stuck in opposite position to direction of movement; some tangs on reverser piston packing expander were damaged and leather packing was distorted, permitting air pressure to blow through at times; reverser was reported sticking on July 9 and 19; one injured.

One accident; one injured.

SEABOARD AIR LINE RAILROAD:

July 4, 1954, unit 4005, Monroe, N. C. Oil on engineroom floor; defective gasket between engine base and handhole cover plate; "Check oil leaks and wipe off engineroom floor" was reported on June 25, and "Oil leaking around base of engine" was reported on July 3; one injured.

January 21, 1955, unit 4020, Wake Forest, N. C. Oil on engineroom floor, resulting from a crankcase explosion which occurred about 3 hours previously; one injured.

Two accidents; two injured.

SOUTHERN RAILWAY:

September 29, 1954, unit 2238, Atlanta, Ga. Engine had been overheating; shutter operating mechanism bound in last quarter of quadrant; roughening on running board had worn smooth; one injured.

October 19, 1954, unit 2226, Spencer, N. C. Fuel injection pump was leaking, resulting in oil on front platform, steps, and running board; one injured.

October 31, 1954, unit 2009, Charlotte, N. C. Hook for holding cab door in open position was not properly secured when not in use; one injured.

**December 31, 1954, unit 2951, Atlanta, Ga. Hand brake failed to release properly; pin had worked out of latch spring; cotter pin had lodged in teeth of gear in hand brake; one injured.

March 1, 1955, unit 6801, Gainesville, Ga. Engineroom floor was very dirty and greasy and engineroom steps were oily and greasy; engineroom floor was reported dirty on February 26 and 28; one injured.

Five accidents; five injured.

SOUTHERN PACIFIC—LINES EAST:

July 27, 1954, unit (T. & N. O.) 377, near Shumla, Tex. Air compressor discharge pipe pulled out of elbow union at top of oil separator; no trace of solder found in the union; one injured.

May 9, 1955, locomotive (T. & N. O.) 745, Houston, Tex. Resultant discharge from break at old defect in blow-off discharge line extinguished fire. Vaporized oil was ignited by hot brickwork and caused firebox explosion; two injured.

Two accidents; three injured.

SOUTHERN PACIFIC—LINES WEST:

July 27, 1954, locomotive 4473, Fresno, Calif. Employee tripped on squirt hose which was lying on cab deck; one injured.

**August 25, 1954, locomotive 2524, Alvarado, Calif. Oil on top of tender fuel oil tank; manhole cover was not properly secured on oil tank; one injured.

September 24, 1954, locomotive 3807, Alturas, Calif. Employee was burned by overflow discharged from defective injector; one injured.

**September 29, 1954, unit 6260, Klamath Falls, Oreg. Oil on engineroom floor and steps between engineroom and cab; engineroom floor to be cleaned reported 7 times since September 12; one injured.

November 26, 1954, locomotive 4340, San Jose, Calif. Oil on top of tender fuel oil tank; one injured.

December 31, 1954, unit 5361, near Galt, Calif. Defective ground relay; one injured.

January 30, 1955, unit 1518, Pasadena, Calif. Outside edge of step was not properly roughened; one injured.

February 7, 1955, unit 1418, Los Angeles, Calif. Right front footboard was $\frac{1}{4}$ inch below minimum prescribed height; one injured.

February 17, 1955, unit 6314, Roseville, Calif. Steps between cab and nose of unit were missing; steps not replaced after removal during inspection of the unit; one injured.

May 23, 1955, unit 6349, El Paso, Texas. Removable steps in engineroom at cab entrance not properly secured; one injured.

June 4, 1955, unit 6248, San Luis Obispo, Calif. Steps leading from cab of locomotive not properly roughened; one injured.

June 11, 1955, locomotive 4501, West Oakland, Calif. Employee fell from running board; leak at compressor steam pipe connection; 2 bolts missing from cylinder head-steam end; oil cups on air end of compressor had not been filled; one injured.

Twelve accidents; twelve injured.

SPOKANE, PORTLAND & SEATTLE RAILWAY:

August 5, 1954, unit 866, near Fisher, Wash. Diesel engine turbo-charger air filter element fell from position and struck employee's head; filter element locking device was inadequate; one injured.

One accident; one injured.

UNION PACIFIC RAILROAD:

August 8, 1954, locomotive 3838, Lupton, Colo. Hot driving box (left No. 5); rods and/or boxes reported pounding on July 21, 26, and 29 (two times), driving boxes reported warm on July 29 (two times), and left No. 5 driving box reported burned out on July 31; one injured.

March 2, 1955, unit 1639, near Egbert, Wyo. Crankcase explosion resulted from a failed piston; piston ring lands were disintegrated and missing from one side of piston; compression rings were stuck and broken, resulting in blowby which ignited vapor in crankcase; one injured.

Two accidents; two injured.

TABLE VII.—*Number of steam locomotives inspected,*

Parts defective, inoperative or missing, or in violation of the rules	Allegheny & Southern	Atchison, Topeka & Santa Fe	Baltimore & Ohio	Boston & Maine	Canadian National	Canadian Pacific	Central Railroad New Jersey	Central Vermont	Chesapeake & Ohio	Chicago & Illinois & Midland
	1			9						3
2			1							
3										
4										
5										
6			3	2						
7			4							
8		3	29	3			5		2	1
9			1	3						2
10			6							
11			1							
12										
13			12				8			
14										
15			25	2					4	2
16			4							
17										
18			1				1		2	
19			3							
20			13							
21				1						
22										
23			1							
24			9							
25			3							
26			1				1			
27			2					2		
28			3				1			
29			4							
30			2							
31		2	23	2			10		2	2
32			1							
33			2							
34										
35			2							
36			1					1	1	
37			1	3			1			
38			7				4			
39			2					2	1	1
40							2			
41								1		
42			6	2					1	
43			3	3			2			
44										
45										
46			30					4		
47										
48			4	1			2			
49										
50							1			
51								1	1	
52			11				5		1	
53			11	1			5			
54										
55			9				4		2	1
56			6							
57			7							
58			3				2			
59			5				2			
60			1							
61			12				1		1	
62			5				6			
63			3	1					5	1
Number of defects.....										
Locomotives reported.....										
Locomotives inspected.....										
Locomotives defective.....										
Percentage of inspected found defective.....										
Locomotives ordered out of service.....										

1 Atchison, Topeka & Santa Fe.

found defective, and ordered from service, et cetera—by carriers

Chicago & North Western	Chicago, Burlington & Quincy	Chicago, Milwaukee, St. Paul & Pacific	Chicago, St. Paul, Minneapolis & Omaha	Clinchfield	Colorado & Southern	Denver & Rio Grande Western	Detroit, Toledo & Ironton	Duluth, Missabe & Iron Range	Fort Worth & Denver	Grand Trunk Western	Great Northern	Gulf, Colorado & Santa Fe	Illinois Central	Lake Superior & Ishpeming	Long Island	Louisville & Nashville
34	4	9	18		1	2		1		3	1		4			
1																
2																
3																
4		1														
5																
6			8													
7		4	4			1										
8			2													
9		6	10			3	5	1		10	20	4				
10		4	6			1		1		1						
11			2													
12																
13			1													
14																
15		10	8										6			
16		15	4					1		1	10	4				
17		6	8							1	5	2				
18																
19																
20																
21																
22			1													
23			1													
24			9													
25			1													
26			2													
27																
28			1													
29			2													
30			4													
31			2													
32			1													
33			4													
34			15													
35			1													
36			1													
37			1													
38			4													
39			2													
40			1													
41			1													
42			1													
43			15													
44			2													
45			2													
46			4													
47			7													
48			1													
49			4													
50			1													
51			4													
52			1													
53			2													
54			4													
55			9													
56			1													
57			1													
58			5													
59			3													
60			6													
61			1													
62			3													
63			2													
Number of defects.....																
Locomotives reported.....																
Locomotives inspected.....																
Locomotives defective.....																
Percentage of inspected found defective.....																
Locomotives ordered out of service.....																

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

	Chicago River & Indiana	Chicago, Rock Island & Pacific	Chicago, St. Paul, Minneapolis & Omaha	Chicago South Shore & South Bend	Cincinnati Union Terminal	Cleveland Union Terminals	Clinchfield	Colorado & Southern	Colorado & Wyoming	Conemaugh & Black Lick	Delaware & Hudson	Delaware, Lackawanna & Western
1 Air compressors		39						1			4	1
2 Axles, truck and driving		1	1									
4 Batteries		1										
5 Boilers		9	2									
6 Brake equipment		353	19				1	2			6	4
8 Cabs and cab windows		87	10								6	7
9 Cab cards		15	1				1					2
10 Cab floors, aprons and deck plates		121	12				1	1			17	8
11 Clutches		2										
12 Controllers, relays, circuit breakers, magnet valves and switch groups		59	3				1					1
13 Coupling and uncoupling devices		33	4								1	2
14 Current collecting apparatus												
16 Draft gear		36	5					1			4	
17 Draw gear		4									15	
18 Driving boxes, shoes and wedges		13	4									
20 Frames or frame braces		1	1									
22 Fuel system		95	18					1			33	5
23 Gages or fittings, air		13					3					4
24 Gages or fittings, steam		5										4
25 Gears and pinions		2	1									
26 Handholds		20	2								8	6
28 Inspections and tests not made as required		15	2									
29 Insulation and safety devices		26					1					2
30 Internal-combustion engine defects, parts and appurtenances		241	25				9	2			159	26
32 Jack shafts												
33 Jumpers and cable connectors		20					1				1	3
35 Lateral motion, wheels		6										
36 Lights, cab and classification		5										
37 Lights, headlight		4										
39 Meters, volt and ampere		3										
40 Motors and generators		54	6								5	7
42 Pilots and pilot beams		4										
43 Plugs and studs												
44 Quills												
46 Rods, main, side, and drive shafts												
48 Sanders		180	6				1				10	6
49 Springs and spring rigging, driving and truck		7	16									
51 Stay bolts, broken or defective												
53 Steam pipes		26										
54 Steps, footboards, et cetera		61	3								4	7
55 Switches, hand-operated, and fuses											1	
56 Transformers, resistors and rheostats		1					1					
57 Trucks		72	32				1				1	2
59 Water tanks		5										
60 Water glasses, fittings and shields												
61 Warning signal appliances		20	1									
62 Wheels		10	1								1	2
63 Miscellaneous		83	4								11	3
Number of defects		1,752	179				22	8			287	103
Locomotive units reported	27	531	69	20	14	27	64	31	19	27	181	215
Locomotive units inspected	44	2,462	306	48	9	97	187	318	53	40	1,064	555
Locomotive units defective		500	43				9	2			166	38
Percentage of inspected found defective		20.3	14.1				4.8	0.6			15.6	6.8
Locomotive units ordered out of service		8									1	1

1 Atchison, Topeka & Santa Fe.

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

Denver & Rio Grande Western	Detroit & Toledo Shore Line	Detroit Terminal	Detroit, Toledo & Ironton	Donora Southern	Duluth, Missabe & Iron Range	Duluth, South Shore & Atlantic	Elgin, Joliet & Eastern	Erie	Florida East Coast	Fort Dodge, Des Moines & Southern	Fort Worth & Denver	Georgia & Florida	Georgia	Grand Trunk Western	Great Northern	Green Bay & Western	Gulf Coast Lines	Gulf, Colorado & Santa Fe
2		1					1	1				1	2		1			1
4								7						1	2			4
25		4					1	1	27	1		1		44	43	4	1	6
13					2	1	1	5	3	1	5	3		30	19		3	8
1								1	1	1	1			1	1			9
11								21	2	1	1			4	14	1	4	10
								7										
13											1	1		1	8			11
1									3	1	4			1	3			13
7								1	1					3	5			16
												1		2	16			20
									13					10	25			22
26		2				3	6	34	2		2	1		1	7			23
3								2						1	7			24
1										3				2	3			25
3		1				1	2	2			3	1		2	3			26
								2						2	2			28
2								40	1					3	1			29
44							4	4	32	8		1		10	36	1	1	30
4								1	1						8			32
16								1			2				2			35
																		36
														2				37
																		39
14							1	3	12	3				7	9		1	40
								1	1									42
																		43
																		44
																		46
12											9			11	11		1	48
1								1				12		1	8			49
2											4				2			51
15								5	1		1	6		1	11			53
1															3			54
																		55
																		56
7												6		1	3	55		57
																		59
																1		60
3											2							61
1												2			33			62
18								6	1						4	8		63
250	2	6												150	330	6	12	10
229	16	15	38	13	29	24	146	480	100	16	35	12	31	93	627	17	92	(1)
1,767	65	29	66	7	33	54	1,306	247	30	118	27	92	253	1,666	101	280	609	
56	1	1			4	4	16	108	21	4	10	9	6	30	140	3	5	6
3.2	1.5	3.4					8.3	8.5	13.3	8.5	33.3	6.5	11.9	8.4	3.0	1.8	1.0	

