

INTERSTATE COMMERCE COMMISSION

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TWENTY-FIFTH ANNUAL REPORT

OF THE

CHIEF INSPECTOR  
BUREAU OF LOCOMOTIVE INSPECTION

TO THE

INTERSTATE COMMERCE COMMISSION

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FISCAL YEAR ENDED  
JUNE 30, 1936



UNITED STATES  
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**ANNUAL REPORT OF THE CHIEF INSPECTOR  
BUREAU OF LOCOMOTIVE INSPECTION**

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OCTOBER 1, 1936.

*To the Interstate Commerce Commission:*

The past fiscal year marked the completion of a quarter of a century of Federal locomotive inspection and a brief statement of the reasons for the law and the accomplishments during that period are given below.

Because of frequent explosions and other accidents due to the use of defective locomotive boilers and appurtenances thereto resulting in loss of life and injuries to employees and others there was a movement among the railway employees toward the enactment of a Federal law requiring that the railroads maintain their locomotive boilers in safe and serviceable condition.

The Locomotive Boiler Inspection Act was approved on February 17, 1911, after having been given consideration by committees of the Senate and the House for a period of 2 years.

The act, which became effective on July 1, 1911, set up a general safety standard and made provision for formulation and promulgation of rules and regulations which, after a specified procedure, became obligatory upon the carriers.

Authentic records as to the number of casualties caused by defective boilers and their appurtenances prior to the enactment of the Locomotive Boiler Inspection Act are not available, but table A shows a comparison of the number of persons killed and number of persons injured as a result of failure of some part or appurtenance of the locomotive boiler for the first year in which the act was operative and for the year ended June 30, 1936.

TABLE A

Boiler and its appurtenances only	Year ended June 30—	
	1912	1936
Number of persons killed.....	91	10
Number of persons injured.....	1,005	80

The total number of persons killed as a result of failures of locomotive boilers and their appurtenances in the period shown was 717, and the total number of injured was 8,771. If the casualties had occurred at the same rate throughout the period as they occurred in the first year in which the act was effective, there would have been 2,275 persons killed and 25,125 injured.

The defective condition in which many locomotive boilers and their appurtenances were being operated when the act became effective was disclosed by our inspections. Cracks in boiler shells; improperly designed patches which greatly reduced the strength and safety of the boiler; excessive pitting and grooving; broken, loose, and defective braces; numerous broken and defective stay bolts and crown stays; firebox sheets cracked and leaking; and excessive accumulations of mud and scale on crown sheets and in firebox water legs due to improper washing of the boilers were some of the existing conditions.

During the first year there were 3 boiler shell explosions in which 27 persons were killed and 41 injured and 94 crown sheet and firebox failures in which 54 persons were killed and 168 injured. The number of locomotives ordered from service by our inspectors for necessary repairs was 3,377. In addition, the following locomotives were required to be strengthened or changed to comply with the requirements of the law or permanently removed from service:

Number having pressure reduced to insure a proper factor of safety.....	699
Number having seams reinforced by welt plates to insure a proper factor of safety.....	327
Number permanently removed from service on account of defective condition.....	698
Number having lowest reading of water glass raised to comply with the law.....	992
Number having the lowest gage cock ordered raised to comply with the law.....	408
Number ordered strengthened by having braces of greater sectional area applied.....	351
Number requiring additional support for crown sheet.....	116

It will thus be seen that during the first year a total of 6,968 locomotives were either held out of service for repairs or changed and strengthened to conform to the requirements of the law or permanently removed from service.

Due to the necessity of maintaining their boilers and appurtenances in better condition than heretofore the railroads thereafter concentrated their efforts on conditioning their boilers, with resultant neglect of other parts of the locomotives. Accidents caused by failures of parts of the locomotive other than the boiler and its appurtenances began to increase, with resultant loss of life and injury to employees and others. The employees, through their various organizations, again appealed to Congress for relief, and the Boiler Inspection Act

was amended to include the entire locomotive and tender and later was amended to include all locomotives regardless of the source of power.

When the machinery rules became effective, the need was apparent. These rules are almost an exact copy of the rules filed with the Commission by more than 170 of the leading railroads of the country who certified that they were the rules then in force on their respective roads.

The general attitude was to subordinate the making of needed repairs to the requirements of convenience. Although the railroads had inspection rules that were adequate for the purpose, little if any attempt was made to make immediate repairs if any inconvenience would be caused thereby, and as with the boiler, locomotives in known bad condition were continued in use until application of needed repairs seemed to be more convenient, or until failure occurred which often resulted in deaths or injuries. The attitude at that time is well illustrated by the following excerpt from a letter from the receiver of an important railroad to a then assistant chief inspector of this Bureau:

It is a very different thing for an association to adopt rules or standards to which the railroads shall work, or for railroads themselves to adopt rules from which they may themselves vary, and having a law which the Federal Government at Washington may enforce literally and absolutely.

The expressions "That's good enough", "Hurry up and get her out", "We will get that next trip", and kindred expressions were very common at that time and were responsible for many accidents caused by defects in the locomotives.

Our endeavor has been to have necessary repairs made promptly and properly, and the wisdom of this policy is illustrated in the improved condition of the locomotives, enabling them to make longer runs, reduction in the number of killed and injured due to failures, and greatly increased mileage per engine failure.

During the fiscal year 1917, the first full year after the law was extended to include the entire locomotive and tender, there were 616 accidents resulting in 62 killed and 721 injured while in the fiscal year ended June 30, 1936, there were 209 accidents resulting in 16 persons being killed and 215 injured.

The results obtained by this Bureau in the quarter of a century of its existence in promoting the safety of the employees and travelers on the railroads, due largely to regular and more thorough inspection and repairs, speaks well for the framers of the law and the insight of those who secured its enactment. Due credit is also given to the tireless and conscientious attention to their duty of our corps of inspectors throughout the life of the locomotive boiler inspection law and amendments.

Plates illustrating some of the boiler explosions and failures of parts of locomotives which resulted in deaths or injuries and investigated by this Bureau in the earlier years of enforcement of the law are shown on pages 71 to 88, and illustrations of accidents and defective parts for the fiscal year ended June 30, 1936, are shown on pages 47 to 67.

In compliance with section 7 of the act of February 17, 1911, as amended, the Twenty-fifth Annual Report of the Chief Inspector, covering the work of the Bureau during the fiscal year ended June 30, 1936, is respectfully submitted.

Summaries are given, by railroads, of all accidents, showing the number of persons killed and injured due to the failure of parts and appurtenances of locomotives, as reported and investigated under section 8 of the locomotive inspection law, and those reported to the Bureau of Statistics under the Accident Report Act of May 1910 and not reported to this Bureau in accordance with the requirements.

The tables showing the number of accidents, the number of persons killed, and number injured have been arranged to permit comparison with previous years as far as consistent. These tables also show the number of locomotives inspected, the number and percentage of those inspected and found defective, the number for which written notices for repairs were issued in accordance with section 6 of the law, and the total defects found and reported. The data contained therein cover all defects on all parts and appurtenances of locomotives found and reported by our inspectors, arranged by railroads.

Summaries and tables show separately accidents and other data in connection with steam locomotives and tenders and their appurtenances and accidents and other data in connection with locomotives other than steam.

TABLE I.—Reports and inspections—Steam locomotives

	Year ended June 30—					
	1936	1935	1934	1933	1932	1931
Number of locomotives for which reports were filed.....	49,322	51,283	54,283	56,971	59,110	60,841
Number inspected.....	97,329	94,151	89,716	87,658	96,024	101,224
Number found defective.....	11,526	11,071	10,713	8,388	7,724	10,277
Percentage inspected found defective.....	12	12	12	10	8	10
Number ordered out of service.....	852	921	754	544	527	688
Total number of defects found.....	47,453	44,491	43,271	32,733	27,832	36,908

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

	Year ended June 30—					
	1936	1935	1934	1933	1932	1931
Number of accidents.....	209	201	192	157	145	230
Percent increase or decrease from previous year.....	14.0	4.7	22.3	18.3	36.9	22
Number of persons killed.....	16	29	7	8	9	16
Percent increase or decrease from previous year.....	44.8	314.3	12.5	11.1	43.7	123
Number of persons injured.....	215	267	223	256	156	269
Percent increase or decrease from previous year.....	19.5	19.7	12.9	64.1	42	15.9

<sup>1</sup> Increase.

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

	Year ended June 30—							
	1936	1935	1934	1933	1932	1931	1915	1912
Number of accidents.....	75	68	63	53	43	91	424	856
Number of persons killed.....	10	24	4	3	8	15	13	91
Number of persons injured.....	80	119	77	55	46	122	467	1,005

<sup>1</sup> The original act applied only to the locomotive boiler.

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

	Year ended June 30—									
	1936		1935		1934		1933		1932	
	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured
Members of train crews:										
Engineers.....	4	75	7	65	1	57	2	58	3	59
Firemen.....	6	72	4	70	1	73	1	48	4	49
Brakemen.....	3	28	2	26	1	32		17	2	18
Conductors.....		13		10	1	17		10		7
Switchmen.....		2		3		6		8		3
Roundhouse and shop employees:										
Boiler makers.....				6		2		1		1
Machinists.....		4	1	3		5		2		1
Foremen.....		3		2						
Inspectors.....		2		1		3		1		
Watchmen.....	1	1	1	1	1	4	2	3		1
Boiler washers.....								1		
Hostlers.....		3		3	1	5				5
Other roundhouse and shop employees.....		3		6		1		3		4
Other employees.....		5	14	49	1	4		2		2
Nonemployees.....	2	4		22		14	3	102		6
Total.....	16	215	29	267	7	223	8	256	9	156

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

	Year ended June 30—				
	1936	1935	1934	1933	1932
Number of locomotive units for which reports were filed.....	2,361	1,911	1,288	1,349	1,274
Number inspected.....	3,118	1,620	1,436	1,368	1,411
Number found defective.....	252	146	69	74	67
Percentage inspected found defective.....	8	9	5	5	4
Number ordered out of service.....	11	5	4	4	6
Total number of defects found.....	674	447	158	176	126

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

	Year ended June 30—				
	1936	1935	1934	1933	1932
Number of accidents.....	9	8	1	2	2
Number of persons killed.....					
Number of persons injured.....	9	8	1	2	2

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

	Year ended June 30—									
	1936		1935		1934		1933		1932	
	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured
Members of train crews:										
Engineers		7		3						
Firemen				1				2		1
Brakemen		1		1						
Roundhouse and shop employees:										
Inspectors										
Other roundhouse and shop employees				2		1				
Other employees		1								1
Nonemployees				1						
Total		9		8		1		2		2

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—														
	1936			1935			1934			1933			1932		
	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured
Air reservoirs	1		1	1	1	1	1		1	1		1			
Aprons	1		1	3	1	3	6		6	1		1	1		1
Arch tubes			1			1			1			1			1
Asban blowers	1		1				2		2						
Axles				3		20	1		1	5	3	16			1
Blow-off cocks	4		4	6		6	5		5	8		8			
Boiler checks	3		3	2		2	4		4						
Boiler explosions:															
A. Shell explosions															
B. Crown sheet; low water; no contributory causes found	6	8	5	6	17	52	6	4	18	5	2	6	5	5	6
C. Crown sheet; low water; contributory causes or defects found	2		3	5	4	8	1		3				1	3	3
D. Miscellaneous firebox failures	1			2	1	3	1		1				2		2
Brakes and brake rigging	13		2	13	8	1	8		11	5		5	10		11
Couplers	8		11	6	1	7	9		10	5		5	4		4
Crank pins, collars, etc.	4		4	6		6	3		3	3		3	3		3
Crossheads and guides	1		2			2	2		2	3		3	1		1
Cylinder cocks and rigging				2		2	2		2	3		3	3		3
Cylinder heads and steam chests				2		2	3		3	4		4	5		5
Dome caps										1		1	1		1
Draft appliances			1			1	1		1	1		1	1		1
Draw gear							1		1	1		1	1		1
Fire doors, levers, etc.	1		1	1		1	4		4	3		3	2		2
Flues	5		7	3		3	4		4	5		5	4		4
Flue pockets	1		1				6		6	6		6	4		4
Footboards	3		3	6		6	3		3	2		2	2		2
Gage cocks	1		1	1		1	1		1	1		1	1		1
Grease cups	1		1	4		4	4		4	1		1	1		1
Grate shakers	7		7	7		7	5		5	4		4	7		7
Handholds	8		8	7		7	7		7	6		6	4		4
Headlights and brackets	3		3	1		1	1		1	2		2	2		2

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

Part or appurtenance which caused accident	Year ended June 30—														
	1936			1935			1934			1933			1932		
	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured
Injectors and connections (not including injector steam pipes)	4		4	1		1	2		2	1		1	4		4
Injector steam pipes	2		4	6		6	3		3	3		3	1		1
Lubricators and connections				1		1				2		2	2		2
Lubricator glasses													1		1
Patch bolts	1		1				2		2	2		2	2		2
Pistons and piston rods	1		1				2		2	2		2	3		3
Plugs, arch tube and washout	1		2	1		1				2		2	3		3
Plugs in firebox sheets	19		19	17		17	13		13	14		14	6		6
Reversing gear	1		1							1		1	12		12
Rivets	1		1	2		2	3		3	3		3	8		8
Rods, main and side	4	1	5	5		5	10		10	3		3	3		3
Safety valves	1		1	1		1	1		1	1		1	1		1
Sanders	2		2	1		1	3	1	2	2		2			
Side bearings				2		2	3		3	2		2	3		3
Springs and spring rigging	6		6	2		2	9		9	4		4	4		4
Squirt hose	4		4	12		12	9		9	4		4	10		10
Stay bolts	7		7	1		1	1		1	4		4	2		2
Steam piping and blowers	1		1	7		7	4		4	1		1			
Steam valves	3		3	1		1	1		1	1		1	1		1
Studs	1		1	1		1	1		1	5		5	3		3
Superheater tubes				1		1	1		1	3		3	2		2
Throttle glands	1		1	1		1	1		1	1		1			
Throttle leaking	1		1	1		1	1		1						
Throttle rigging	1		1	1		1	2		2						
Trucks, leading, trailing, or tender	1		1	1		1	2		2	1		1	1		1
Valve gear, eccentrics and rods	1		1	5		5	2		2	4		4	4		4
Water glasses	17		17	8		8	11		11	11		11	7		7
Water-glass fittings	2		2	1		1	1		1	4		4	1		1
Wheels	2		2	4		4	2		2	1		1	1		1
Miscellaneous	46	1	45	47	2	45	46		46	47	33	32	20		20
Total	209	16	215	201	29	267	192	7	223	157	8	256	145	9	156

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

Part or appurtenance which caused accident	Year ended June 30—														
	1936			1935			1934			1933			1932		
	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured
Fires due to overflowing or leakage of fuel	4		4												
Insulation				1		1	1		1						
Pantographs and trolleys				1		1							1		1
Third-rail shoes															
Miscellaneous	5		5	6		6	6		6	1		1			
Total	9		9	8		8	8	1	1	2		2	2		2



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

Parts defective, inoperative or missing, or in violation of rules	Year ended June 30—					
	1936	1935	1934	1933	1932	1931
Air compressors	2	5	3	2	3	4
Axles	6	1				
Batteries	7					
Boilers	5	3				
Brake equipment	66	46	15		13	23
Cabs and cab windows	30	33	9	14	6	10
Cab floors, aprons, and deck plates	10	6	1	1	2	1
Controllers, relays, circuit breakers, and switch groups			5			3
Current-collecting apparatus	16	3	3	2	7	
Draft gear	24	21	8	8	13	11
Draw gear	1				2	
Driving boxes, shoes, wedges, pedestals, and pedestal braces	5	5	7		4	6
Frames, tail pieces, and braces	15	4	6	2		2
Fuel tank, its piping and valves	44	15	4	1	3	3
Gages and gage fittings, air	6	4		2	3	1
Gears and pinions			1			
Handholds	8	3				
High-tension equipment not properly guarded against accidental contact	20	7			2	4
Inspections and tests not made as required	186	124	52	58	23	41
Insulation		8	2	2		
Internal-combustion engine defects, including parts and appliances	23	4	4	18		1
Jack shafts	1					2
Lateral motion, wheels	2		3	1	2	1
Lights, cab and classification	6	1			4	3
Lights, headlight	4	2		3	1	3
Meters, volt and ampere	2					2
Motors and generators	14	5	4	8	1	10
Pilots and pilot beams	6	5		4		2
Quills						1
Rods, motor, main and side, drive shafts	2	10	4	2		1
Sanders	25	21	2			4
Springs and spring rigging, driving and truck	29	20	4	8	9	10
Steam pipes	2					1
Switches, hand-operated, and fuses	2	2	1	4		1
Transformers, resistors, and rheostats		1	1		2	
Trucks	42	46	3	7	5	11
Water glasses, fittings, and shields	4	6			1	
Wheels	26	6	8	5	11	12
Whistles, bells, and train-signal system	1					2
Miscellaneous	39	25	7	7	9	16
Total defects	674	449	158	176	126	192
Locomotive units reported	2,361	1,911	1,288	1,349	1,274	1,242
Locomotive units inspected	3,118	1,620	1,436	1,368	1,411	1,256
Locomotive units defective	252	146	69	74	57	75
Percentage inspected found defective	8	9	5	5	4	6
Locomotive units ordered out of service	11	5	4	4	6	3

STEAM LOCOMOTIVES

There was an increase of 8 in the number of accidents occurring in connection with steam locomotives, a decrease of 13 in the number of persons killed, and a decrease of 52 in the number of persons injured compared with the previous year.

The chart on page 8 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. If the information contained in this table is taken advantage of and proper inspections and repairs made in accordance with the requirements of the law and rules, many accidents will be avoided.

During the year 12 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 percentage has remained the same during the past 3 years. There was a reduction of 7.5 percent in the number of locomotives ordered withheld from service by our inspectors because of the presence of defects that rendered the locomotives immediately unsafe.

Detailed results of our inspections of steam locomotives of each railroad are shown in table XII, and a comparison of the condition of locomotives of each railroad over a period of years is shown in table XIII.

CROWN SHEET FAILURES AND OTHER BOILER ACCIDENTS

Boiler explosions caused by crown sheet failures continue to be the source of most of the fatal accidents. There was a decrease of 3 accidents, a decrease of 13 in the number of persons killed, and a decrease of 52 in the number of persons injured from this cause, as compared with the previous year. Eight persons were killed in such failures; this represents 50 percent of all fatalities that occurred during the year. Eight persons were injured in accidents caused by crown sheet failures; this represents 3.7 percent of all injuries that occurred during the year.

Other boiler and appurtenance accidents, including the failure of a side sheet due to overheating caused by negligence in not washing the boiler as often as water conditions required, resulted in the death of 2 persons and the injury of 72 persons.

INVESTIGATION OF ACCIDENTS AND GENERAL CONDITION OF LOCOMOTIVES

All accidents reported to the Bureau as required by the law and rules were carefully investigated and appropriate action taken to prevent recurrence as far as possible. Copies of accident investigation reports were furnished to parties interested when requested, and otherwise used in our effort to bring about a diminution in the number of such accidents.

Compared with the first year in which the Boiler Inspection Act was effective there was a reduction of 91 percent in the number of accidents, a reduction of 89 percent in the number of persons killed, and a reduction of 92 percent in the number of persons injured.

#### EXTENSION OF TIME FOR REMOVAL OF FLUES

One thousand one hundred and fifteen applications were filed for extensions of time for removal of flues, as provided in rule 10. Our investigations disclosed that in 92 of these cases the condition of the locomotives was such that extensions could not properly be granted. Seventy-five were in such condition that the full extensions requested could not be authorized, but extensions for shorter periods of time were allowed. One hundred and twenty-four extensions were granted after defects disclosed by our investigations were required to be repaired. Twenty-eight applications were canceled for various reasons. Seven hundred and ninety-six applications were granted for the full periods requested.

#### LOCOMOTIVES PROPELLED BY POWER OTHER THAN STEAM

There was an increase of one in the number of accidents occurring in connection with locomotives other than steam and an increase of one in the number of persons injured as compared with the previous year. No deaths occurred in either year.

During the year 8 percent of the locomotives inspected by our inspectors were found with defects or errors in inspection that should have been corrected before the locomotives were put into use as compared with 9 percent in the previous year. There was an increase of 6 in the number of locomotives ordered withheld from service by our inspectors, because of the presence of defects that rendered the locomotives immediately unsafe.

Changes or modifications in some of the rules for inspection and testing of locomotives other than steam became effective on May 1, 1936. These changes were designed to clarify the applicability of certain rules to the various types of heating equipment involved and to reduce the fire hazard incident to the use of liquid fuels, particularly the fuels used in internal combustion engines.

Special hazards accompany the use of internal-combustion engine driven equipment due to the volatility and inflammability of the liquid fuels. Eight fires from this cause have been recorded in the past year; four of the fires caused personal injuries, but all may have resulted in major disasters had it not been for fortunate circumstances.

The principal causes of these fires are overflowing through fuel reservoir vent pipes or carburetors when the reservoirs are being filled due to lack of proper means to indicate the height of fuel in the

reservoirs or to inattention on the part of persons performing the filling operation, flooding of carburetors when the engines are in operation, and inability to control the engine speed due to unsuitable throttle mechanism or defective speed governors.

If fires are to be avoided, it is incumbent upon the carriers to see that all practical mechanical safeguards are provided and maintained in good operating condition, and that all who are charged with the duty of filling the reservoirs be fully informed as to the proper and safe procedure and the results that may accrue through inattention or carelessness.

#### SPECIFICATION CARDS AND ALTERATION REPORTS

Under rule 54 of the Rules and Instructions for Inspection and Testing of Steam Locomotives, 164 specification cards and 3,732 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, 578 specifications and 96 alteration reports were filed for locomotive units and 538 specifications and 182 alteration reports were filed for boilers mounted on locomotives other than steam. These were checked and analyzed and corrective measures taken with respect to discrepancies found.

#### APPEALS

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

JOHN M. HALL, *Chief Inspector.*



**ACCIDENTS AND CASUALTIES RESULTING FROM THE FAILURE OF  
STEAM LOCOMOTIVES AND TENDERS AND THEIR APPURTENANCES  
DURING THE FISCAL YEAR ENDED JUNE 30, 1936, BY ROADS**

[A star (\*) indicates accidents taken from records of the Bureau of Statistics of the Interstate Commerce Commission. A double star (\*\*) indicates accidents not properly reported, as required by rules 55 and 162. A complete investigation, therefore, could not be made, inasmuch as the Bureau was not apprised of the accidents in sufficient time after they occurred to permit them to be properly investigated.]

**ALIQUIPPA & SOUTHERN RAILROAD:**

April 11, 1936, locomotive 213, Aliquippa, Pa. Spring hanger broke; one injured.

One accident; one injured.

**ALTON RAILROAD:**

September 20, 1935, locomotive 4332, Roodhouse, Ill. Injector overflow valve bonnet blew out; threads on bonnet and in injector body were badly worn; one injured.

April 8, 1936, locomotive (B. & O.) 1, Chicago, Ill. Steam drum manhole cover gasket blew out along the bottom of cover plate for a distance of 10 inches; gasket made of a folded asbestos strip which was molded with the fold toward the pressure side, permitting the pressure to separate the folds; cover plate inside of the shoulder did not approximately fill the manhole area; one injured.

Two accidents; two injured.

**ATCHISON, TOPEKA & SANTA FE RAILWAY:**

August 4, 1935, locomotive 4115, Ethel, Mo. Raked off side of cab by a water crane while going to front end to oil a hot guide; guide overheated account of lubrication washed away by a leak from crack in elbow under boiler check; "Spanner nut under left boiler check leaks" was reported at end of previous trip; one injured.

August 5, 1935, locomotive 3412, near Carrollton, Mo. Latch to grate shaker post was broken, permitting shaker lever to unexpectedly move backward and catch employee's finger between post and back stop; one injured.

\*August 20, 1935, locomotive 3705, Pan, Ariz. Blow-off cock pipe became disconnected at union with muffler, allowing pipe to drag; one injured.

\*\*August 27, 1935, locomotive 2513, near Mulvane, Kans. Squirt hose burst; hose defective; one injured.

\*\*October 12, 1935, locomotive 3704, Winslow, Ariz. Steam-heat throttle valve locked while operating handle was being turned; "Steam heat valve does not open wide" was reported on October 14; one injured.

November 27, 1935, locomotive 804, Barstow, Calif. Tank step turned, due to being loose, causing employee to fall; step supported by only one bolt; one injured.

\*February 3, 1936, locomotive 3403, Ormonde, Ill. Driving wheel tire broke; one injured.

February 20, 1936, locomotive 3162, near Emporia, Kans. Undesired emergency application of brakes caused by defective brake pipe vent valve on tender; one injured.

\*\*February 29, 1936, locomotive 4082, near Argyle, Iowa. Drain cock lost off nipple in bottom of main air reservoir; one injured.

May 1, 1936, locomotive 3166, near Davenport, Okla. Top rung of tender end ladder failed through old fractures where secured to side frames; one injured.

May 17, 1936, locomotive 1039, Pampa, Tex. Crown sheet failure caused by overheating due to low water; one killed.

\*\*May 28, 1936, locomotive 597, Los Angeles, Calif. Tender truck brake beam truss rod failed; one injured.

\*\*June 30, 1936, locomotive 3247, Gallup, N. Mex. Vertical cab handhold at gangway fouled on steel support to tender deck when locomotive was backed on a curve, crushing employee's finger; one injured.

Thirteen accidents; one killed, 12 injured.

## ATLANTA, BIRMINGHAM &amp; COAST RAILROAD:

August 26, 1935, locomotive 210, near Chelsea, Ala. Injector steam pipe pulled out of improperly applied collar at connection to fountain throttle; bracket supporting injector was broken which permitted injector to work on boiler and the movement of injector caused the 10-foot steam pipe which was not provided with a clamp to vibrate and break away from the collar; three injured.

April 16, 1936, locomotive 75, Waycross, Ga. Top section of coal gate slipped from guide provided to hold it in position, causing employee to fall; coal gate too short to fit in guides located on water legs each side of tender; one injured.

May 22, 1936, locomotive 207, near Union City, Ga. Crown sheet failure caused by overheating due to low water; one injured.

Three accidents; five injured.

## ATLANTIC COAST LINE RAILROAD:

July 13, 1935, locomotive 479, Tampa, Fla. Wrench slipped off grease plug to main rod; old grease plug in grease cavity made unusual exertion necessary to force the grease to pin; corners of wrench slightly worn; one injured.

December 18, 1935, locomotive 1543, Winokur, Ga. Steam pipe broke off at top flange. Pipe had apparently been unduly stressed when making the joint at the superheater header; one injured.

\*\*January 30, 1936, locomotive 1699, Homerville, Ga. Driving box running hot; one injured.

February 11, 1936, locomotive 1731, near Mount Holly, S. C. Wrist pin worked out of crosshead and the disconnected main rod punctured outside and inside throat sheets of firebox; cotter keys securing wrist pin nut were too small and not located close enough to nut to serve their purpose; two killed.

\*\*March 20, 1936, locomotive 433, Gainesville, Fla. Automatic bell ringer did not operate properly; bell ringer not properly lubricated and a long cotter pin in actuating cylinder of ringer fouled on bell yoke causing cylinder to stick; one injured.

Five accidents; two killed, four injured.

## BALTIMORE &amp; OHIO RAILROAD:

July 25, 1935, locomotive 7537, Stanley, Pa. Employee stepped in front of a moving train on adjacent track when he went to open sand pipes which were stopped up due to heavy rainfall. Locomotive was slipping very badly; locomotive riding on trailing truck frame at the back end on both sides; "Adjust the weight on the low pressure engine; cannot keep from slipping" was reported by engineers on July 16 and 17, and inspector reported "Engine is down on trailer frame at back end, both sides" on July 17, 19, 20, and 25; one killed.

\*\*September 14, 1935, locomotive 4253, Hamden, Ohio. Leading locomotive separated from locomotive 4253, due to pin which held drawbar on pilot of locomotive 4253 working up, account of cotter key missing, causing drawbar to raise and permit drawbars to pass; one injured.

\*\*October 13, 1935, locomotive 5044, Niles Junction, Ohio. Clear vision window frame turned over in door frame, causing glass to fall out and strike employee; the top screws for securing window frame in door were missing; screw holes badly worn; one injured.

\*November 6, 1935, locomotive 5229, Athens, Ohio. Tool box on top of tender cistern located 12 inches back of coal space, permitting employee's foot to drop between wall of coal space and tool box and cause him to fall over the tool box; one injured.

\*February 19, 1936, locomotive 2609, Zanesville, Ohio. Hose missing from steam line at rear of tender; one injured.

Five accidents; one killed, four injured.

## BOSTON &amp; ALBANY RAILROAD:

April 23, 1936, locomotive 44, Worcester, Mass. Fire tube broke off at front flue sheet; tube had been excessively rolled in the sheet and was badly pitted; one injured.

June 29, 1936, locomotive 1445, Allston, Mass. Water glass broke; one injured.

Two accidents; two injured.

## BOSTON &amp; MAINE RAILROAD:

January 27, 1936, locomotive 936, Smith's Ferry, Mass. Driving spring hanger broke at slot for the gib, due to old fracture covering approximately 60 percent of cross-sectional area; one injured.

\*February 14, 1936, locomotive 1428, Hudson, Mass. While assisting to handle reverse lever, the lever came back quickly and caught employee's arm between lever and back of cab; one injured.

Two accidents; two injured.

## CENTRAL RAILROAD OF NEW JERSEY:

\*\*December 5, 1935, locomotive 11, Elizabethport, N. J. Injured account of unusual effort necessary to change position of reverse lever; locomotive reported very hard to reverse on December 3, 4, 5, 6, and 11; one injured.

\*\*December 29, 1935, locomotive 139, Jersey City, N. J. Grate shaker bar fouled on rear wall of cab; shaker bar improper fit on post and was 8 inches longer than company's standard for this locomotive; one injured.

Two accidents; two injured.

## CHESAPEAKE &amp; OHIO RAILWAY:

July 18, 1935, locomotive 134, Walbridge, Ohio. Blow-off pipe union disconnected; one injured.

February 28, 1936, locomotive 3006, near Marion, Ohio. Low coupler at rear of tender permitted separation of train, resulting in emergency application of the brakes; two injured.

Two accidents; three injured.

## CHICAGO &amp; EASTERN ILLINOIS RAILWAY:

February 19, 1936, locomotive 1023, Hillsdale, Ind. Side rod broke through defective weld and end of broken rod punched hole through outside throat sheet and back flue sheet; one killed, one injured.

One accident; one killed, one injured.

## CHICAGO, BURLINGTON &amp; QUINCY RAILROAD:

\*September 5, 1935, locomotive 7005, Merino, Colo. Union link broke near crosshead connection; old fracture covered approximately 75 percent of cross-sectional area; one injured.

\*\*December 21, 1935, locomotive 704, Ashland, Nebr. Reverse gear difficult to operate, due to counterbalance spring out of adjustment and link block too close fit in the link; one injured.

December 29, 1935, locomotive 7006, Crawford, Nebr. Employee's foot caught on grate lever, causing him to fall; grate lever and fulcrum casting improperly located; one injured.

\*\*January 25, 1936, locomotive 5238, near Anselmo, Nebr. Eccentric rod broke due to old fracture extending through 40 percent of cross-sectional area; one injured.

\*\*June 14, 1936, locomotive 4973, Downer's Grove, Ill. Tank-box door worked open and struck employee's arm while he was shoveling coal; catch on tank-box door defective; one injured.

Five accidents; five injured.

## CHICAGO GREAT WESTERN RAILROAD:

August 30, 1935, locomotive 858, Hayfield, Minn. Grate shaker bar slipped off post due to improper fit; shaker post burred, preventing shaker bar from going on it properly; one injured.

October 11, 1935, locomotive 757, Harlan, Iowa. Ashpan tumbling shaft broke through defective weld at tumbling shaft fulcrum arm; one injured.

\*\*December 29, 1935, locomotive 932, Oelwein, Iowa. Union in injector overflow pipe, located about 12 inches above cab deck, failed when boiler check stuck open; threads on overflow pipe and in union connection defective and overflow pipe not clamped; one injured.

January 20, 1936, locomotive 870, Oelwein, Iowa. Flue pocket blew out of front flue sheet; one injured.

Four accidents; four injured.

## CHICAGO, INDIANAPOLIS &amp; LOUISVILLE RAILWAY:

\*January 28, 1936, locomotive 285, Lafayette, Ind. Tender handhold broke off in threads between nut and top of tank sill; one injured.

One accident; one injured.

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

\*\*July 14, 1935, locomotive 6161, Elmwood Park, Ill. Brake rod safety hanger became detached from locomotive, due to nuts coming off the bolt securing it to binder, and struck crossing watchman; one injured.

\*\*November 28, 1935, locomotive 7044, near Garrison, Mont. Coupler knuckle on locomotive opened allowing locomotive to part from train, resulting in emergency application of the brakes; cotter key improperly spread and protruded beyond the lock block lifter, preventing lock block from dropping into proper position; two injured.

Two accidents; three injured.

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

October 6, 1935, locomotive 850, Havana, Ark. Reverse lever moved violently to front end of quadrant due to broken valve ring catching in port; left front valve bull ring and two valve rings broken; one injured.

One accident; one injured.

#### CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA RAILWAY:

September 26, 1935, locomotive 505, South Range, Wis. Main steam pipe in front end failed; minimum thickness of steam-pipe wall not more than three-sixty-fourths inch; one injured.

\*\*May 14, 1936, locomotive 386, near Fairchild, Wis. Reverse lever unlatched and moved suddenly to front end of quadrant, crushing employee's leg between lever and air pipes; stop pin missing from quadrant, and insufficient clearance around reverse lever when in extreme forward position; one injured.

Two accidents; two injured.

#### CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS RAILWAY:

\*February 22, 1936, locomotive 7422, Connersville, Ind. Insufficient clearance between handhold on cab and bumper plate on tank step; one injured.

One accident; one injured.

#### CLINCHFIELD RAILROAD:

December 4, 1935, locomotive 304, Johnson City, Tenn. Defective bull's-eye blew out of water gage; one injured.

One accident; one injured.

#### COLORADO & SOUTHERN RAILWAY:

January 13, 1936, locomotive 70, Golden, Colo. Crown sheet failure caused by overheating due to low water; gage cock dripper almost entirely stopped up with loose scale; one injured.

One accident; one injured.

#### DELAWARE, LACKAWANNA & WESTERN RAILROAD:

August 28, 1935, locomotive 24, Bloomfield, N. J. Employee slipped and fell from pilot beam account of oil on pilot beam; one injured.

\*\*December 2, 1935, locomotive 1103, near Rockaway, N. J. Employee's eye injured by glass from broken cab window; one injured.

December 18, 1935, locomotive 1137, Tobyhanna, Pa. Fire tube broke off at safe end weld; overheated in welding; two injured.

March 24, 1936, locomotive 1101, Oxford Furnace, N. J. Fire tube failed at defective safe end weld; two injured.

May 7, 1936, locomotive 1225, near North Alexander, N. Y. Crown sheet failure caused by overheating due to low water; three killed.

May 17, 1936, locomotive 373, Binghamton, N. Y. Cotter keys in throttle lever and throttle lever latch pins too long and sharp points on ends of keys; one injured.

Six accidents; three killed, seven injured.

#### DENVER & RIO GRANDE WESTERN RAILROAD:

August 31, 1935, locomotive 1401, Detour, Utah. Driving-wheel tire slipped inward, causing derailment. Tire was insecurely applied. Lateral motion device worn to such extent that it permitted in excess of 2 inches free lateral movement of wheels; one killed, one injured.

\*September 11, 1935, locomotive 478, Farmington, N. Mex. Nut worked off bolt securing inspirator operating lever; one injured.

October 3, 1935, locomotive 955, Salt Lake City, Utah. Bell rope broke; bell rope had become tightly wound around the bell crank and prevented bell from ringing; one injured.

\*\*March 7, 1936, locomotive 1519, La Veta, Colo. Driving-box journal ran hot. "Engine pounding both sides; adjust driving-box wedges; examine packing in left front and both main driving-box cellars" was reported on March 6; one injured.

June 8, 1936, locomotive 1212, Roper, Utah. Pilot beam handhold gave way at one end; handhold not properly secured; one injured.  
Five accidents; one killed, five injured.

#### DULUTH, SOUTH SHORE & ATLANTIC RAILWAY:

\*\*December 5, 1935, locomotive 716, Humboldt, Mich. Headlight and lights in cab failed while en route. After attempting repairs to headlight, employee fell from running board due to his hold on handrail on side of cab being broken by coming in contact with center supporting bracket; one injured.

One accident; one injured.

#### ERIE RAILROAD:

September 17, 1935, locomotive 3360, Gulf Summit, N. Y. Power reverse gear wheel spun when force was applied; gear stuck due to bolt which secured inside radius bar to reverse yoke working outward and fouling on gear connecting rod; cotter, nut, and collar missing from the bolt; threads on bolt in poor condition; one injured.

November 16, 1935, locomotive 2454, Pompton Lakes, N. J. Spark arrester fell from smokestack of locomotive; one injured.

\*\*December 22, 1935, locomotive 3397, Shenango, Pa. Two grate carrier bars broke at trunnions and dropped out of position causing grates to bind; grate side frames not properly secured in brackets, allowing frames to tip towards center and cinders filling in between frames and side sheets wedged frames towards center, eliminating clearance between grate carrier bars and side frames; one injured.

December 24, 1935, locomotive 4123, Maplewood, Pa. Sliding plate at front end of tender trough stuck in grooves and could not be moved to cover the opening above stoker conveyor screw at main crusher. While attempting to open another slide, while stoker was in operation, slide hook slipped out of hole in slide and caused employee to step back into this opening, resulting in fatal injury; one injured.

January 8, 1936, locomotive 2915, near Susquehanna, Pa. Left front side rod broke through main crank-pin eye, causing both back side rods to break and broken back rod punctured outside and inside throat sheets; front rod broke through dowel hole at bottom of crank-pin eye due to old fracture comprising approximately 90 percent of cross-sectional area; two injured.

February 20, 1936, locomotive 3159, near Brockway, Pa. Headlight generator failed; mica insulation between the bars of commutator too high; top brush not properly surfaced to fit contour of commutator; surface of commutator badly worn and heavily coated with carbon; "Lights are out; won't burn" was reported on February 15; one injured.

March 19, 1936, locomotive 3013, Cortland, Ohio. Valve gear connecting rod broke; metal in rod defective; one injured.

Seven accidents; eight injured.

#### FLORIDA EAST COAST RAILWAY:

\*October 14, 1935, locomotive 445, Daytona Beach, Fla. Engine truck box running hot; one injured.

One accident; one injured.

#### GEORGIA & FLORIDA RAILROAD:

\*September 27, 1935, locomotive 408, Midville, Ga. Crank arm failed through old fracture near main crank pin; one injured.

One accident; one injured.

#### GREAT NORTHERN RAILWAY:

August 6, 1935, locomotive 2513, St. Paul, Minn. Extension handle of injector steam operating valve became disconnected, due to cotter key missing from fitting connecting the operating valve stem to extension handle. When employee leaned out cab window to determine cause of injector failure he was struck by a semaphore signal stand and fell to the ground; one injured.

\*November 15, 1935, locomotive 1192, Coteau, N. Dak. Injured while attempting to straighten drain pipe from water glass so that water would drain through the hole in deck; one injured.

\*February 7, 1936, locomotive 2181, Nickerson, Minn. Brake rigging broke; one injured.

March 31, 1936, locomotive 2054, Havre, Mont. Automatic bell ringer inoperative, and bell very difficult to ring by hand; bell crank at front of engine not applied according to company's standard; one injured.

May 13, 1936, locomotive 86, Fargo, N. Dak. Reverse lever slipped out of quadrant and moved suddenly to back end of quadrant, crushing employee's foot between lever and seat box platform; one injured.

June 20, 1936, locomotive 1709, near Carlisle, Minn. Driving spring hanger broke in two places at slot for spring gib; old fractures at points of failure; one injured.

Six accidents; six injured.

#### GULF, COLORADO & SANTA FE RAILWAY:

April 18, 1936, locomotive (A. T. & S. F.) 1973, DeRidder, La. Insufficient clearance between wooden strip to which cab awning was attached and horizontal cab handrail; two center bolts for securing awning strip to angle iron were missing, permitting the wooden strip to bow out in the center; one injured.

One accident; one injured.

#### GULF, MOBILE & NORTHERN RAILROAD:

\*February 1, 1936, locomotive 111, Mantee, Miss. Whistle cord broke; one injured.

One accident; one injured.

#### ILLINOIS CENTRAL RAILROAD:

July 25, 1935, locomotive 7005, Gilman, Ill. Eccentric rod broke; injured while attempting to operate reverse gear after rod was removed; one injured.

August 3, 1935, locomotive 3001, Centralia, Ill. Water glass burst; one injured.

August 14, 1935, locomotive 1189, Terry, Miss. Employee who was standing along the side of track was struck by a driving box flange liner which was thrown from passing locomotive; flange liner broke off account of defective welding; one injured.

December 3, 1935, locomotive 1567, Lyle, Minn. Water glass broke; one injured.

December 20, 1935, locomotive 315, Cedar Rapids, Iowa. Insufficient clearance between cab handhold and corner of tender deck when on sharp curve; one injured.

January 6, 1936, locomotive 1839, near West Frankfort, Ill. Water glass burst, breaking both glasses in water-glass shield; top water-glass cock inoperative due to not being properly packed; one injured.

February 28, 1936, locomotive 366, Memphis, Tenn. Handle of air-compressor steam valve came off, causing employee to fall from running board; handle not properly secured. Piston packing to air cylinder to front compressor was leaking and employee went to running board to tighten packing nut; one injured.

May 12, 1936, locomotive 674, Selma, Miss. Front cross-equalizer hanger broke, due to old fractures on both sides at root of threads, letting locomotive down on front driving boxes and resulting in derailment; one injured.

June 10, 1936, locomotive 1529, near Effingham, Ill. Right back section of grates became disconnected; cotter key missing from pin at bottom end of shaker post, permitting pin to work out; one injured.

Nine accidents; nine injured.

#### LEHIGH VALLEY RAILROAD:

October 16, 1935, locomotive 4020, Standing Stone, Pa. Locomotive separated from moving train, causing severe application of the brakes; one injured.

\*\*April 6, 1936, locomotive 371, Allentown, Pa. Gage cock packing nut worked off; one injured.

Two accidents; two injured.

#### LOUISVILLE & NASHVILLE RAILROAD:

December 17, 1935, locomotive 1449, Latonia, Ky. Blow-off cock leaking; coil spring in blow-off cock for securing valve on seat was broken; one injured.

\*December 29, 1935, locomotive 2065, Jemison, Ala. Coupler pulled from front of locomotive; one injured.

March 12, 1936, locomotive 2148, Louisville, Ky. Main crank pin broke through fillet between side-rod and main-rod bearings; old fracture covering approximately 90 percent of cross-sectional area; rods reported on February 8, 13, 23, and March 4, 7, 10, and 11; one injured.

June 17, 1936, locomotive 979, Theodore, Ala. Driving brake adjusting screw worked loose; one injured.

Four accidents; four injured.

#### MICHIGAN CENTRAL RAILROAD:

\*\*September 4, 1935, locomotive 7873, South Lansing, Mich. Handhold missing from back of tender coal space; one injured.

One accident; one injured.

#### MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE RAILWAY:

August 22, 1935, locomotive 2442, near Ladysmith, Wis. Employee's hand injured by sliver from cab window frame; window frame worn and splintered; one injured.

January 29, 1936, locomotive (C. P.) 2648, Thief River Falls, Minn. While closing cylinder cocks, employee's hand struck on cotter key protruding from part of screw type reverse gear; one injured.

February 2, 1936, locomotive 2437, Noyes, Minn. Safety valve had excessive blow-back; one injured.

\*\*March 3, 1936, locomotive 1005, Owen, Wis. Snow flanger operating shaft arm bent, causing flanger to be too low; one injured.

\*\*May 30, 1936, locomotive 2447, Glenwood, Minn. Stepped on a nail which protruded above cab roof; improper repairs made to light bracket at cab roof; one injured.

Five accidents; five injured.

#### MISSOURI & ARKANSAS RAILWAY:

\*January 9, 1936, locomotive 40, Elk Ranch, Ark. Loose driving wheel tire slipped, causing derailment; one injured.

One accident; one injured.

#### MISSOURI-KANSAS-TEXAS LINES:

\*February 12, 1936, locomotive 528, Love Field, Tex. Water glass burst; one injured.

\*\*April 1, 1936, locomotive 13, Oklahoma City, Okla. Water glass burst; one injured.

April 10, 1936, locomotive 44, Parsons, Kans. Water glass burst; one injured.

May 10, 1936, locomotive 635, Coffeyville, Kans. Water glass burst; one injured.

Four accidents; four injured.

#### MISSOURI PACIFIC RAILROAD:

\*December 23, 1935, locomotive 6612, Nebraska City, Nebr. Tender truck spring broke, causing derailment of locomotive, tender, and three cars; nine leaves in spring showed whole or partial old breaks; one injured.

One accident; one injured.

#### MOBILE & OHIO RAILROAD:

February 4, 1936, locomotive 470, near Columbia, Ill. Boiler check stuck open due to excessive lift; one injured.

One accident; one injured.

#### NASHVILLE, CHATTANOOGA & ST. LOUIS RAILWAY:

\*February 28, 1936, locomotive 356, Maxwell, Tenn. Nozzle of fire hose worked loose and fell off, striking employee's head; one injured.

One accident; one injured.

#### NEW YORK CENTRAL—LINES EAST:

March 1, 1936, locomotive 2771, near Fullers, N. Y. Rivet blew out of patch on boiler back head; rivet head broken off; one injured.

One accident; one injured.

#### NEW YORK CENTRAL—LINES WEST:

November 4, 1935, locomotive 2483, Wick, Ohio. Headlight wire broke near fuse connection in terminal box; one injured.

\*\*November 9, 1935, locomotive 2842, Mina, Ohio. Undesired application of the brakes, caused by failure of forestalling appliance; one injured.

\*\*May 23, 1936, locomotive 417, Cleveland, Ohio. Reverse gear crept forward, catching employee's hand between reverse lever handle and latch handle; air reverse cylinder piston rod packing blowing; one injured.

Three accidents; three injured.

## NEW YORK, CHICAGO &amp; ST. LOUIS RAILROAD:

July 10, 1935, locomotive 910, North Creek, Ohio. Injector steam pipe parted at union at top of injector as threads in spanner nut stripped off threads in adapter connection on injector body; spanner nut out of round and threads reduced, causing a loose fit; union had been reported leaking on July 7 and 8; injector bracket broken off through top stud hole; one injured.

One accident; one injured.

## NEW YORK, NEW HAVEN &amp; HARTFORD RAILROAD:

August 30, 1935, locomotive 389, Roxbury, Conn. Driving-spring hanger broke at slot where cross equalizer was attached; old flaw covered about 50 percent of cross-sectional area; one injured.

October 14, 1935, locomotive 1318, Naugatuck, Conn. Tender-truck brake-beam head broke through old fracture covering approximately 75 percent of cross-sectional area; one injured.

May 5, 1936, locomotive 3240, Hopewell Junction, N. Y. Front coupler pocket pulled off; one injured.

Three accidents; three injured.

## NEW YORK, ONTARIO &amp; WESTERN RAILWAY:

July 18, 1935, locomotive 254, Middletown, N. Y. Water glass burst; top water-glass cock was leaking badly and water-glass shield had been removed while attempting repairs; one injured.

\*January 29, 1936, locomotive 404, Trout Brook, N. Y. Employee's arm was pierced by a piece of wire used to hold stoker operating lever which would not stay up; one injured.

Two accidents; two injured.

## NORFOLK &amp; WESTERN RAILWAY:

November 8, 1935, locomotive 2091, Charles Town, W. Va. Employee's arm was struck by handle of rapidly revolving reverse-gear wheel; valve gear radius trunnion bolt broke through cotter-key holes, permitting bolt to work out and foul gear connecting rod or bell crank temporarily preventing further movement of reversing piston; bolt had been improperly drilled for cotter key and had old fracture at point of failure; one injured.

December 21, 1935, locomotive 2072, Portsmouth, Ohio. Throttle-stem packing blew out; one injured.

January 7, 1936, locomotive 2088, East Radford, Va. Valve-gear radius bar trunnion bolt worked out of position and fouled valve-gear connecting rod, resulting in reversing-gear wheel spinning and its handle striking employee's arm; retaining nut, washer, and cotter key missing from bolt and threads on bolt badly worn; one injured.

January 29, 1936, locomotive 2033, Phoebie, Va. Reversing gear stuck in central position, then released suddenly and handle of the spinning hand wheel struck employee; low-pressure valve-gear radius-bar trunnion bolt worked out of position and fouled valve-gear connecting rod; nut, washer and cotter key missing from trunnion bolt and threads on bolt badly worn; one injured.

\*\*May 15, 1936, locomotive 1407, Marion, Va. Reversing gear or valve gear caught and then released suddenly, causing the reversing hand wheel to spin rapidly; one injured.

\*\*June 6, 1936, locomotive 2004, Vulcan, W. Va. Reversing gear or valve gear caught and then released suddenly, causing the reversing hand wheel to spin rapidly; "Clean and oil air reverse cylinder, reverse hangs and hard to reverse" was reported at end of previous trip; one injured.

Six accidents; six injured.

## NORTHERN PACIFIC RAILWAY:

\*\*July 16, 1935, locomotive 1748, Yakima, Wash. Check valve in blower fitting leaking; 1 injured.

\*\*July 21, 1935, locomotive 1838, Furlong, Mont. Trailer-truck-wheel tire came off; one injured.

\*\*September 15, 1935, locomotive 2606, Jamestown, N. Dak. Classification lamp difficult to reach account of being 6 feet 2 inches above step; one injured.

October 18, 1935, locomotive 1550, Mandan, N. Dak. Ashpan-door hinges broke off through fusion welds securing them to ashpan door, permitting door to fall on employee's foot; one injured.

October 28, 1935, locomotive 1386, Attalia, Wash. Reverse gear difficult to operate, caused by eccentric strap blades being slightly cocked; one injured.

\*\*November 23, 1935, locomotive 2385, Gary, Minn. Water glass burst, breaking glass panels in water-glass shield; one injured.

\*\*November 29, 1935, locomotive 1839, Benz, Mont. Hook broke off water-spout rod; one injured.

\*\*December 18, 1935, locomotive 2610, Martin, Wash. Fire rake fell from the top of coping on tender; notches in device for holding fire rake not deep enough to safely secure the rake; one injured.

March 4, 1936, locomotive 5010, near New Salem, N. Dak. Water glass burst, breaking guard glasses; insufficient clearance between sheet-iron extension-rod bracket plate and upper water-glass fitting, permitting fitting to receive vibration from the plate; new water glasses applied on February 10, 20, and March 3; one injured.

May 12, 1936, locomotive 253, Morris, Minn. Fire hook became dislodged from its position on tender and fell out of gangway, striking employee; one injured.

Ten accidents; 10 injured.

## PENNSYLVANIA RAILROAD:

August 18, 1935, locomotive 389, Philadelphia, Pa. Steam-heat starting valve leaked after being closed; sleeve very loose and improperly applied. Employee contacted high-voltage trolley line when he went out on boiler, apparently to trace out the pipe line and assure himself that the proper valve had been closed as the operating wheel in cab was not marked for identification; one killed.

August 29, 1935, locomotive 3094, Enola, Pa. Employee's grip on cab-roof handhold was broken when it came in contact with a cab-window awning rod which fouled the handhold, causing him to fall from the locomotive; awning rod had become disconnected at its front end and had been hooked up over the cab-roof handhold; one injured.

November 17, 1935, locomotive 6750, near Port Deposit, Md. Ashpan-operating lever broke off shaft, due to defective weld, permitting ashpan slides to open, and ashpan rigging fouled on track, then some part struck and broke brake pipe which caused emergency application of the brakes. Apparently ashpan slides were applied backward which permitted them to extend below the rails when in open position; one injured.

December 11, 1935, locomotive 4508, Hanlin, Pa. Fire tube failed at defective safe-end weld; one injured.

December 30, 1935, locomotive 3471, Glynden, Pa. Crank pin came out of the hole in main-driving-wheel hub due to having been improperly applied; crank pin was three-sixty-fourths inch smaller than hole in wheel hub; one injured.

February 13, 1936, locomotive 7769, Fort Wayne, Ind. Firebox side sheet pulled from 55 stay bolts, caused by overheating due to heavy deposits of scale and mud on sheet and stay bolts; two injured.

February 20, 1936, locomotive 4571, Woodville, Ohio. Driving-wheel tire failed causing derailment of locomotive and part of the train; old flaw or crack in tire; one killed.

April 9, 1936, locomotive 6879, Smithville, Ohio. Crown sheet failure caused by overheating due to low water; starting of exhaust-steam injector with live steam was unreliable due to live-steam relay valve being loose on valve stem account of threads worn; injector reported on March 31 and April 6 and 7; two injured.

May 4, 1936, locomotive 4312, Black Run, Ohio. Front ashpan door and part of operating rigging dropped on track and some of the flying parts struck and parted air hose between engine and tender, setting the brakes in emergency; cotter key in strap for securing operating lever failed; one injured.

\*\*May 21, 1936, locomotive 3846, Lewistown, Pa. Burned by hot water which spurted from steam-heat line connection at rear of tender; steam-heat end valve leaking and the metallic flexible coupling formed a trap where the leakage accumulated until trap became full and the hot water was ejected; one injured.

May 30, 1936, locomotive 6913, near Thompsettown, Pa. Train separated between tender and first car of train, causing undesired emergency application of the brakes; one injured.

Eleven accidents; two killed, eleven injured.

## PERE MARQUETTE RAILWAY:

\*\*January 17, 1936, locomotive 323, Port Huron, Mich. Arm rest pulled from cab-window sill causing employee to fall to enginehouse floor; arm rest insecurely fastened; one injured.

One accident; one injured.

## READING COMPANY:

September 22, 1935, locomotive 204, Reading, Pa. Washout plug blew out; threads on plug and in plug hole in barrel sheet defective; plug heavily shouldered with graphite. Locomotive had just received monthly inspection and repairs; however, it was evident from the condition of the washout plugs that they did not receive proper inspection at this time; two injured.

November 30, 1935, locomotive 1606, Shamokin, Pa. Crown sheet failure caused by overheating due to low water; two killed.

December 14, 1935, locomotive 1701, Tamaqua, Pa. Fell from locomotive while attempting to locate the source of a sand leak; action of the sand had cut through wall and threads of sander-pipe nipple and had worn a hole in the Y pipe fitting; one injured.

\*April 24, 1936, locomotive 2030, Birdsboro, Pa. Fell from running board while attempting to adjust blower valve; one injured.

Four accidents; two killed, four injured.

## RICHMOND, FREDERICKSBURG &amp; POTOMAC RAILROAD:

June 27, 1936, locomotive 44, Potomac Yard, Va. Water-glass gasket blew out; bolts supporting glass became loose; one injured.

One accident; one injured.

## ROSCOE, SNYDER &amp; PACIFIC RAILWAY:

\*\*September 26, 1935, locomotive 2, Roscoe, Tex. Radial stay blew out; attempted to tighten while under steam pressure; old fracture covered 75 percent of cross-sectional area of bolt; one injured.

One accident; one injured.

## RUTLAND RAILROAD:

January 27, 1936, locomotive 63, Leicester Junction, Vt. Water glass burst; one injured.

\*\*April 3, 1936, locomotive 54, Rutland, Vt. Water glass burst, breaking guard glasses; one injured.

Two accidents; two injured.

## ST. LOUIS-SAN FRANCISCO RAILWAY:

\*November 15, 1935, locomotive 830, West Tulsa, Okla. Pilot beam pulled off; one injured.

February 19, 1936, locomotive 1270, Kansas City, Mo. Boiler check valve stuck open after injector was operated; tolerance of fit of valve guide wings in sleeve was insufficient and valve wings stuck in sleeve, holding valve away from seat; one injured.

June 6, 1936, locomotive 4020, Parsons, Kans. Air bell ringer inoperative due to improper adjustment; bell rope defective; one injured.

Three accidents; three injured.

## ST. LOUIS SOUTHWESTERN RAILWAY:

July 28, 1935, locomotive 782, Illmo, Mo. Water glass burst; one injured.

One accident; one injured.

## SEABOARD AIR LINE RAILWAY:

\*\*November 7, 1935, locomotive 321, Wildwood, Fla. Sand pipe stopped up; "Clean out sander" was reported on November 6; one injured.

January 3, 1936, locomotive 203, Cross Hill, S. C. Bottom rod of tender brake rigging came down and was hurled against switch stand by movement of train, demolishing switch stand and freeing switch points which resulted in derailment of the rear of the train; apparently bottom rod pins lost out due to cotter keys missing or improperly applied; one injured.

March 6, 1936, locomotive 328, Big Indian, Fla. Grate shaker bar slipped off post; grates very hard to operate account of fouling each other; one injured.

\*\*April 23, 1936, locomotive 259, Raleigh, N. C. Stepped into grate shaker bar hole in cab deck; shaker bar holes improperly located; one injured.

Four accidents; four injured.

## SOUTHERN RAILWAY:

\*\*August 25, 1935, locomotive 1403, Spartanburg, S. C. Burned by hot grease while removing grease-cup plug from wrist pin account of main rod bearing running hot; bearing keyed up too tight; one injured.

\*\*September 6, 1935, locomotive 3841, Selma, Ala. Front end of right main rod broke through old fracture at key way; "RFMR key loose" was reported

on August 5, 29, September 3, and 5. While changing engines on this train, employee was injured while attempting to reverse the locomotive which was on one side; one injured.

October 2, 1935, locomotive 4630, near Shellmound, Tenn. Vertical cab handhold at gangway broke near the top, causing employee to fall to the ground; old fracture through top end which had been flattened and bent for bolting to cab corner post; one injured.

November 26, 1935, locomotive 6922, Meridian, Miss. Engineer fell while returning from top of tank after springing top cab curtain rod in an attempt to prevent curtain from working open; no catch or other provision for holding the curtain closed; one injured.

December 11, 1935, locomotive 5073, Buena Vista, N. C. Pilot sill step broke off, causing employee to fall from locomotive going 20 to 25 miles per hour; step bracket failed due to old defect at lower bolt hole at pilot beam and brace broke at its lower end; pilot step reported loose twice on December 7; one injured.

\*\*December 14, 1935, locomotive 599, Canton, N. C. Safety hanger of left main driving brake beam broke; one injured.

February 14, 1936, locomotive 1710, East St. Louis, Ill. Reverse gear difficult to operate due to lack of lubrication, caused by oil furnished being too heavy to flow; reverse gear reported on February 13, 14, and 15; one injured.

April 29, 1936, locomotive 4831, McDonough, Ga. Burned by hot water and steam escaping from ashpan blower pipe; plug in T connection of ashpan blower missing; one injured.

\*May 27, 1936, locomotive 751, Duncan Tunnel, Ind. Due to an undetermined cause, automatic brake applying device designed to be actuated by displacement of truck applied the brake, resulting in train being stalled in tunnel for 45 minutes; one injured.

\*June 20, 1936, locomotive 5079, Barber, N. C. Crank pin very hot, causing applied grease to explode and burn employee; one injured.

June 25, 1936, locomotive 1668, Richmond, Va. Fire hose burst; hose defective; one injured.

June 29, 1936, locomotive 6293, Ludlow, Ky. Tender cistern manhole cover handle broke off, causing employee to fall from top of tank; old fractures at both ends of handle; one injured.

Twelve accidents; 12 injured.

## SOUTHERN PACIFIC—LINES EAST:

June 27, 1936, locomotive (T. & N. O.) 162, Houston, Tex. Water glass burst; one injured.

One accident; one injured.

## SOUTHERN PACIFIC—LINES WEST:

July 1, 1935, locomotive 3717, North, N. Mex. Conveyor chain of mechanical stoker broke and fouled in conveyor trough, causing stoker to stop; links of chain badly worn at point of failure; one injured.

July 5, 1935, locomotive 2943, Albany, Ore. Blower valve bonnet blew out; bonnet loose in threads of valve body and bonnet seat damaged, allowing the bonnet to be screwed out when valve was opened; one injured.

\*July 19, 1935, locomotive 3314, Wellton, Ariz. Air hose blew off tender; fabric of hose deteriorated, allowing upper connection to pull out; one injured.

\*July 31, 1935, locomotive 2792, Mikon, Calif. Insufficient clearance between reverse lever and boiler back head and foot plate attached thereto; one injured.

\*\*August 8, 1935, locomotive 2835, Overland, Ore. Whistle rope became untied from whistle lever, permitting employee's arm to strike on cab window sill; one injured.

August 15, 1935, locomotive 3695, Vevay, N. Mex. Flue burst at safe end weld; overheated in welding; one injured.

\*\*September 15, 1935, locomotive 4029, Cascade Summit, Ore. Undesired emergency application of the brakes, caused by defective vent valve on locomotive; one injured.

\*May 26, 1936, locomotive 3678, Red House, Nev. Emergency application of brakes, caused by pipe connection to distributing valve on locomotive breaking; one injured.

June 13, 1936, locomotive 3658, Mount Hebron, Calif. Vertical shaft supporting brakeman's cab seat was lifted out of bottom bracket when attempting to lower the seat from elevated storage position and shaft then slipped through seat frame strap hinges and fell to cab floor, striking employee's foot; shaft not properly secured in brackets; one injured.

June 28, 1936, locomotive 3269, Santa Margarita, Calif. Step missing from left back corner of tender; step had been removed by roundhouse force at San Luis Obispo on the previous day; one injured.  
Ten accidents; 10 injured.

**SPOKANE, PORTLAND & SEATTLE RAILWAY:**

\*\*August 21, 1935, locomotive 350, Astoria, Oreg. Piston rod broke off inside of crosshead fit; old fracture extended half way through piston rod; one injured.  
One accident; one injured.

**TENNESSEE, ALABAMA & GEORGIA RAILROAD:**

\*June 14, 1936, locomotive 302, Pigeon Mountain, Ga. Mechanically operated fire door inoperative; valve stuck; one injured.  
One accident; one injured.

**TEXAS & PACIFIC RAILWAY:**

\*July 11, 1935, locomotive 615, Baird, Tex. Insufficient clearance between blow-off cock lever and booster latch; one injured.

September 8, 1935, locomotive 668, Dallas, Tex. Water glass burst; one injured.

\*\*May 30, 1936, locomotive 307, Fouke, Ark. While attempting to hook reverse lever up, the lever jerked forward causing injury to the employee; boiler foaming; one injured.

Three accidents; three injured.

**UNION PACIFIC RAILROAD:**

December 30, 1935, locomotive 352, Kansas City, Kans. Rung in gangway ladder gave way; old fracture at ladder upright; one injured.

January 15, 1936, locomotive (O. W. R. & N.) 3210, near Hooper, Wash. Insufficient clearance between reverse lever and piping to straight air reducing valve; one injured.

\*\*February 8, 1936, locomotive 2243, Cheyenne, Wyo. Tank hose burst near connection to right feed pipe; hose defective and inner layers appeared to have been burned; right boiler check reported on January 22 (two times), 23, 24 (three times), 25 (two times), 26, 27 (two times), 28, 30, February 2, 6, and 7; one injured.

Three accidents; three injured.

**WABASH RAILWAY:**

August 29, 1935, locomotive 2803, near Brunswick, Mo. Prong of hook being used in adjusting conveyor slide in bottom of coal bunker straightened out, allowing the hook to slip out of hole in slide; one injured.

December 3, 1935, locomotive 2801, North Kansas City, Mo. Feed water heater pump throttle valve bonnet blew out of valve body, due to improper fit; bonnet too small for fit and had 16 threads per inch while valve body had 14 threads per inch; one injured.

December 7, 1935, locomotive 2901, Peru, Ind. Carrier iron hanger at rear of tender broke, permitting coupler head to lower and locomotive to separate from the train, resulting in undesired emergency application of the brakes; old fracture at the base of the boss of hanger; two injured.

June 1, 1936, locomotive 2900, Lafayette, Ind. Bell rope became wrapped around bell crank and stopped the operation of bell by air bell ringer. Employee fell or was knocked from step along side of the cab when he went out to free the bell rope; one injured.

Four accidents; five injured.

**WESTERN MARYLAND RAILWAY:**

January 15, 1936, locomotive 708, Security, Md. Ashpan would not dump properly; ashpan not standard, and ashpan opening reduced from 14 inches to 10 inches due to bolts applied through slides to act as stops; one injured.  
One accident; one injured.

**WESTERN PACIFIC RAILROAD:**

August 27, 1935, locomotive 22, Quartz, Calif. Crown sheet failure caused by overheating due to low water; one injured.

March 20, 1936, locomotive 19, Silver Zone, Nev. Crown sheet failure caused by overheating due to low water; two killed, three injured.

March 25, 1936, locomotive 76, Gerlach, Nev. Reverse lever difficult to operate account of defective latching device; one injured.

May 29, 1936, locomotive 80, near Marysville, Calif. Steam-heat pipe coupling nut became disconnected from regulating valve in cab; one killed, one injured.  
Four accidents; three killed, six injured.

**ACCIDENTS AND CASUALTIES RESULTING FROM THE FAILURE OF LOCOMOTIVES OTHER THAN STEAM AND THEIR APPURTENANCES DURING THE FISCAL YEAR ENDED JUNE 30, 1936, BY ROADS**

[A double star (\*\*) indicates accidents not properly reported, as required by rule 335. A complete investigation, therefore, could not be made, inasmuch as the Bureau was not apprised of the accidents in sufficient time after they occurred to permit them to be properly investigated.]

**ATCHISON, TOPEKA & SANTA FE RAILWAY:**

November 20, 1935, unit 1-A, near Dilco, N. Mex. Fire occurred in engine room of Diesel-electric locomotive unit caused by overflow from fuel reservoir vent pipes which discharged into engine room; one injured.

One accident; one injured.

**CHICAGO & NORTH WESTERN RAILWAY:**

\*\*January 18, 1936, unit 9905, Leigh, Nebr. Fire occurred at rear of engine room caused by flooding of the carburetor. Engine hot and idling too fast due to accumulation of ice and snow on throttle rigging which prevented closing the throttle; operator's cab not properly weatherproofed and there was about one inch of water on the cab floor, some of which passed down along throttle lever shaft where it froze and part of throttle rigging was located underneath the cab floor where it had no protection from ice and snow; one injured.

April 4, 1936, unit 9929, Mason City, Iowa. Fire occurred in engine room of gas-electric unit caused by ignition of gasoline overflowing from carburetors and vent pipe into engine room while refueling; gage on gasoline tank on left side of unit, the side next to fueling station, was inoperative; vent pipe discharged on cab roof; one injured.

Two accidents; two injured.

**ERIE RAILROAD:**

February 19, 1936, unit 5006, Thiells, N. Y. Main reservoir supply pipe to automatic control valve broken off at the main air reservoir connection; one injured.

One accident; one injured.

**GREAT NORTHERN RAILWAY:**

\*\*June 25, 1936, unit 2316, LaBolt, S. Dak. Gasoline engine overheated due to overloading in hot weather; employee burned by steam and boiling water from cooling system when he removed radiator cap to refill the radiator; one injured.

One accident; one injured.

**NEW YORK CENTRAL—LINES WEST:**

October 5, 1935, unit M-209, Lily Dale, N. Y. Exhaust valve stuck open; injured while attempting to seat valve while engine was running; one injured.

One accident; one injured.

**NORFOLK & WESTERN RAILWAY:**

\*\*August 30, 1935, unit 18, Coaldale Tunnel, W. Va. Coupler knuckle failed through pin hole section, causing emergency application of the brakes; old fracture extended 20 percent through cross-sectional area at point of failure; one injured.

One accident; one injured.

**PENNSYLVANIA RAILROAD:**

October 9, 1935, unit 4713, Potomac Yard, Va. Drop-type cab window fell on employee's hand; screw missing from rubber stop bracket on bottom of window which allowed bracket to work out of position and this had bent and scored the aluminum vertical sill preventing locking rim on bottom of sash from engaging the vertical sill to secure the sash in place; aluminum retaining or locking ledges easily bent; one injured.

One accident; one injured.

**UNION PACIFIC RAILROAD:**

June 14, 1936, unit M-13, Willard, Utah. Gasoline-distillate unit was destroyed by fire which broke out under partition separating engine and baggage compartments; one injured.

One accident; one injured.













TABLE XII.—Number of steam locomotives inspected,

	Parts defective, inoperative or missing, or in violation of the rules					
	Tremont & Gulf	Utah	Union Pacific	Union	Upper Merion & Plymouth	Utah
1 Air compressors.....			15	1		
2 Arch tubes.....			2			
3 Ashpans and mechanism.....						
4 Axles.....						
5 Blow-off cocks.....			6			
6 Boiler checks.....			9			
7 Boiler shell.....			4	2	1	
8 Brake equipment.....			41			
9 Cabs, cab windows, and curtains.....			31		4	
10 Cab aprons and decks.....			11			
11 Cab cards.....			3			
12 Coupling and uncoupling devices.....			1			
13 Crossheads, guides, pistons, and piston rods.....			64		3	
14 Crown bolts.....			2	1		
15 Cylinders, saddles, and steam chests.....			50		2	
16 Cylinder cocks and rigging.....			1		2	
17 Domes and dome caps.....			2			
18 Draft gear.....			13		4	
19 Draw gear.....			4			
20 Driving boxes, shoes, wedges, pedestals, and braces.....			91			
21 Firebox sheets.....			3	1		
22 Flues.....			1			
23 Frames, tail pieces, and braces, locomotive.....			44		1	
24 Frames, tender.....			2			
25 Gages and gage fittings, air.....			5	2		
26 Gages and gage fittings, steam.....			12	1		
27 Gage cocks.....			6		2	
28 Grate shakers and fire doors.....			8		3	
29 Handholds.....			15			
30 Injectors, inoperative.....			1			
31 Injectors and connections.....			40	1	4	
32 Inspections and tests not made as required.....			184	2	26	
33 Lateral motion.....			15			
34 Lights, cab and classification.....						
35 Lights, headlight.....						
36 Lubricators and shields.....			13			
37 Mud rings.....			1			
38 Packing nuts.....			5		3	
39 Packing, piston rod, and valve stem.....			28			
40 Pilot and pilot beams.....			8		2	
41 Plugs and studs.....			6			
42 Reversing gear.....			6			
43 Rods, main and side, crank pins, and collars.....			67		6	
44 Safety valves.....			11			
45 Sanders.....			1			
46 Springs and spring rigging.....			17		6	
47 Squirt hose.....			98		2	
48 Stay bolts.....			1		1	
49 Stay bolts, broken.....			3			
50 Steam pipes.....			15	2	5	
51 Steam valves.....			5			
52 Steps.....			13		4	
53 Tanks and tank valves.....			37			
54 Telltale holes.....			1			
55 Throttle and throttle rigging.....			10		6	
56 Trucks, engine and trailing.....			33			
57 Trucks, tender.....			21		4	
58 Valve motion.....			26		3	
59 Washout plugs.....			10		1	
60 Train-control equipment.....						
61 Water glasses, fittings, and shields.....			23		12	
62 Wheels.....			12		6	
63 Miscellaneous—Signal appliances, badge plates, brakes (hand).....			31	1		
Number of defects.....			1,180	15	112	
Locomotives reported.....	10	10	1,445	153	11	16
Locomotives inspected.....	12	19	2,173	43	72	36
Locomotives defective.....			277	3	26	
Percentage of inspected found defective.....			13	7	36	
Locomotives ordered out of service.....			14	2	10	

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

	Parts defective, inoperative or missing, or in violation of the rules										Roads with less than 10, and industrial locomotives	Total defects	
	Virginian	Wabash	Washington Terminal	Western Maryland	Western Pacific	Wheeling & Lake Erie	Wichita Falls & Southern	Winston-Salem South-bound	Wrightsville & Tennessee				
1											87	740	1
2	2	2			2	3		1			2	74	2
3	5	1									7	79	3
4				1							3	13	4
5				2							13	236	5
6					1						44	356	6
7				2							41	383	7
8	5	1	1			1				1	41	383	7
9		1	1								348	2,480	8
10	18	1	1	1	9	2		1		1	214	1,638	9
11	9	2		3			1				64	450	10
12	4	2	1	2			1			1	66	166	11
13				2							25	65	12
14	6				3		3				66	1,056	13
15	1			1							2	63	14
16	40	4	1	5	1	5					158	1,717	15
17	3	1		2				2			59	605	16
18			1						2		10	114	17
19	3			1	1						97	513	18
20	4			1	5			1		4	84	451	19
21	8							2			113	1,712	20
22				3	1			1			35	295	21
23	2		1	1		1					37	178	22
24	8			1							70	997	23
25	2			1	1						18	113	24
26	2			1							29	257	25
27	2			1							43	350	26
28	1	1		2							57	579	27
29	4			1		1		1		1	30	400	28
30	2		3					2			115	502	29
31											4	40	30
32	9	4	1	3	4	1	1			5	241	2,085	31
33	53	8	5	29	21	11		5	3	5	842	9,005	32
34	5	1									51	404	33
35											8	78	34
36											42	251	35
37	1	1		1							12	255	36
38	1					2					21	237	37
39	12	1		1							85	508	38
40	10	4		2	1	2					185	1,133	39
41	1	4									19	178	40
42	2										15	236	41
43	5			1							26	463	42
44	11	1		5	1	1					276	2,093	43
45	1			1							19	125	44
46	3	2		1							80	678	45
47	29	1	2	4	5	1	4	2			287	3,008	46
48	1										12	134	47
49	1									1	25	279	48
50	1										188	520	49
51	1			2							41	526	50
52	2										13	227	51
53	2										138	615	52
54	2										100	877	53
55								1			49	127	54
56	12	2		3	1		1				90	760	55
57	3	1					1	1			75	861	56
58	13										251	1,108	57
59	5										59	824	58
60											67	714	59
61	6			1	2			2			126	1,118	61
62	4			1	11					2	154	790	62
63	4			1	1						38	608	63
	329	39	27	92	71	52	30	12	26		5,576	47,453	
	123	497	21	244	170	173	10	11	10	10	1,980	49,322	
	149	837	18	449	306	271	15	17	20	20	3,107	97,329	
	70	13	6	30	26	11	6	3	5	5	997	11,526	
	47	1.6	33	7	8	4.1	40	18	25	25	32	12	
	12	1	1		5	2	2	2			160	852	

TABLE XIII.—Summary of comparison of the percentage of steam locomotives inspected and found defective, with the number ordered out of service for the years ended June 30, on roads reporting on 10 or more locomotives

Road	Percentage inspected defective							Ordered out of service						
	1936	1935	1931	1929	1927	1925	1923	1936	1935	1931	1929	1927	1925	1923
Akron, Canton & Youngstown	2.9	7	14	47	42	56	38	0	0	1	12	1	5	0
Alabama, Tennessee & North-ern	50	39	28	37	56	53	78	4	2	3	1	2	1	1
Aliquippa & Southern	15	0	0	31	26	69	0	0	0	0	0	0	0	0
Alton	7	1.3	0	3	14	35	75	1	0	0	0	3	5	9
Ann Arbor	9	2	0	9	25	71	97	0	0	0	0	2	15	24
Atehison, Topeka & Santa Fe	12	15	8	14	24	32	49	8	14	9	14	40	30	84
Atlanta & West Point	12	10	4	6	9	23	27	0	0	0	0	1	4	1
Atlanta, Birmingham & Coast	15	6	4.3	27	40	54	78	2	0	0	2	8	12	6
Atlantic & Yadkin	7	10	6	10	16	100	—	0	0	0	1	0	0	0
Atlantic Coast Line	21	14	14	10	30	35	58	27	17	7	2	4	15	45
Baltimore & Ohio, lines east	13	10	4.1	15	30	52	62	37	20	3	10	32	113	153
Baltimore & Ohio, lines west	8	9	4.7	17	49	—	—	5	10	8	17	72	—	—
Bangor & Aroostook	9	5	3	31	43	28	50	0	0	1	1	3	1	6
Belt Railway of Chicago	31	27	4.3	35	54	51	66	1	1	0	4	5	4	6
Bessemer & Lake Erie	13	11	12	22	21	63	43	3	3	1	6	1	1	2
Birmingham Southern	0	17	0	14	100	0	0	0	1	0	0	0	0	0
Boston & Albany	8	11	15	16	26	47	54	0	0	0	0	10	7	0
Boston & Maine	11	15	13	16	23	36	67	6	13	6	3	13	23	191
Buffalo Creek	10	9	0	0	18	0	0	0	0	0	0	0	0	0
Burlington-Rock Island	14	45	9	18	41	61	58	0	0	0	0	2	4	2
Camas Prairie	31	53	47	16	—	—	—	0	2	0	0	0	0	0
Canadian National	24	32	37	34	50	50	84	1	1	5	7	30	24	4
Canadian Pacific	18	12	25	32	44	56	76	1	1	2	1	4	0	5
Carolina & Northwestern	12	—	—	—	—	—	—	2	—	—	—	—	—	—
Central of Georgia	19	16	20	19	30	37	33	8	7	10	5	10	8	10
Central Railroad of New Jersey	6.4	6	13	42	38	47	77	0	0	2	14	20	46	139
Central Vermont	8	6	11	12	11	27	47	4	3	1	1	1	2	4
Charleston & Western Carolina	22	29	16	28	58	63	68	1	5	1	2	2	2	1
Chesapeake & Ohio	7	6	9	17	28	49	68	3	4	5	5	26	29	58
Chicago & Eastern Illinois	22	15	12	28	38	64	75	15	3	3	3	25	31	77
Chicago & Illinois Midland	0	0	0	14	83	—	—	0	0	0	0	29	—	—
Chicago & Northwestern	17	13	7	12	19	35	67	17	11	5	8	18	29	193
Chicago & Western Indiana	33	29	25	43	22	86	67	0	0	0	3	0	2	0
Chicago, Burlington & Quincy	7	6	14	21	46	60	6	6	4	18	39	185	176	—
Chicago Great Western	22	14	26	11	20	40	52	10	8	23	2	0	10	20
Chicago, Indianapolis & Louis-ville	21	21	11	26	29	45	57	6	3	1	2	14	7	13
Chicago, Milwaukee, St. Paul & Pacific	8	8	4.5	9	13	27	48	1	2	2	5	9	12	58
Chicago River & Indiana	22	23	0	5	0	70	62	0	1	0	0	0	5	0
Chicago, Rock Island & Pacific	14	19	11	17	29	55	76	35	44	17	13	49	124	367
Chicago, St. Paul, Minneapolis & Omaha	16	13	9	17	30	46	70	7	2	2	6	12	20	54
Chicago Short Line	10	5	0	44	38	—	—	0	0	0	3	0	—	—
Chicago, West Pullman & Southern	11	11	7	47	53	100	58	0	0	0	5	1	7	0
Cincinnati Union Terminal	5	0	—	—	—	—	—	1	0	—	—	—	—	—
Cleveland, Cincinnati, Chicago & St. Louis	9	8	6	24	34	44	67	5	7	3	16	37	47	77
Cinchfield	31	30	9	38	25	76	68	5	14	1	5	0	1	10
Colorado & Southern	19	22	8	43	40	76	81	12	11	2	10	4	52	71
Colorado & Wyoming	12	56	0	21	27	15	14	0	2	0	1	3	2	0
Columbus & Greenville	26	19	17	25	21	26	44	3	3	1	0	0	0	0
Conemaugh & Black Lick	9	0	16	58	0	0	0	0	0	0	2	0	0	0
Copper Range	0	12	18	28	84	59	75	0	0	1	1	7	7	0
Cumberland & Pennsylvania	0	12	12	29	13	20	25	0	1	0	1	0	0	0
Delaware & Hudson	.5	1.3	2.7	2.6	9	24	62	0	0	0	0	1	2	52
Delaware, Lackawanna & West-ern	12	14	11	21	22	36	62	6	7	3	17	4	3	47
Denver & Rio Grande Western	11	21	10	36	54	58	92	8	11	7	32	88	72	174
Denver & Salt Lake	0	0	0	19	44	68	93	0	0	0	2	7	39	8
Detroit & Mackinac	30	22	41	33	36	82	26	0	1	0	0	0	2	0
Detroit & Toledo Shore Line	0	2.8	0	8	33	51	78	0	0	0	0	1	5	3
Detroit Terminal	37	38	18	31	46	72	76	1	1	0	1	0	7	0
Detroit, Toledo & Ironton	6	2.6	3.8	5	15	28	29	1	1	0	0	3	4	7
Donora Southern	52	17	5	0	0	0	0	0	3	0	0	0	0	0
Duluth, Missabe & Northern	12	1.2	4.2	1	12	37	74	0	0	0	0	0	1	2
Duluth, South Shore & Atlantic	10	14	10	24	29	35	69	0	0	1	4	2	5	3

1 Atlanta, Birmingham & Atlantic prior to 1927.  
 2 Includes Buffalo & Susquehanna and Buffalo, Rochester & Pittsburgh, 1933-36.  
 3 Statistics prior to 1927 included in Baltimore & Ohio east.  
 4 Trinity & Brazos Valley prior to 1931.  
 5 Includes Grand Trunk Western, 1925-27.  
 6 Includes former Hocking Valley, 1931-36.  
 7 Includes Peoria & Eastern prior to 1931.

TABLE XIII.—Summary of comparison of the percentage of steam locomotives inspected and found defective, with the number ordered out of service for the years ended June 30, on roads reporting on 10 or more locomotives—Continued

Road	Percentage inspected defective							Ordered out of service						
	1936	1935	1931	1929	1927	1925	1923	1936	1935	1931	1929	1927	1925	1923
East Tennessee & Western	44	32	33	30	45	82	17	1	3	0	1	2	1	0
North Carolina	7	8	1.7	4.7	13	68	50	0	1	0	0	1	58	1
Elgin, Joliet & Eastern	10	8	13	45	30	39	70	21	17	17	137	41	26	100
Erie	22	9	1.4	7	21	22	22	4	0	0	0	0	0	0
Florida East Coast	15	24	71	49	60	62	87	0	1	29	5	5	2	2
Fort Smith & Western	10	13	5	13	23	36	27	3	8	2	2	3	8	4
Fort Worth & Denver City	10	31	57	47	55	62	46	9	3	5	2	2	3	1
Georgia & Florida	46	31	1.1	11	12	34	28	1	3	0	3	0	2	5
Georgia	6	8	7	28	—	—	—	61	1	2	0	4	—	26
Grand Trunk Western	9	6	8	31	—	—	—	33	46	76	10	7	5	42
Great Northern	15	16	13	45	47	67	59	0	0	2	1	1	9	0
Green Bay & Western	17	17	3	7	58	59	70	1	0	0	0	15	26	7
Gulf Coast Lines	3.8	2.2	1	7	19	47	45	—	—	—	—	—	—	—
Gulf, Colorado & Santa Fe	10	12	18	22	23	38	62	3	6	0	1	2	7	6
Gulf, Mobile & Northern	16	25	1.4	8	—	—	—	1	0	0	0	—	—	—
Houston Belt & Terminal	2.7	0	—	—	—	—	—	—	—	—	—	—	—	—
Huntingdon & Broad Top	13	12	0	36	44	78	67	0	0	0	3	4	0	0
Mountain	9	10	12	10	14	30	43	16	19	22	14	35	30	48
Illinois Central	0	0	32	29	40	12	—	0	0	4	1	0	0	0
Illinois Terminal	3.4	0	9	1	14	52	68	0	0	0	0	0	18	4
Indiana Harbor Belt	0	0	13	30	26	36	0	0	0	0	0	4	0	2
Indianapolis Union	9	5	7	5	27	29	66	1	1	1	0	11	9	16
International-Great Northern	2.8	5	7	60	83	94	78	2	1	1	4	6	6	3
Interstate	26	17	42	0	50	0	0	0	0	0	0	0	0	0
Jacksonville Terminal	3.8	7	1.9	7.9	26	52	92	0	1	0	1	12	11	121
Kansas City Southern	4.8	12	0	24	24	80	88	0	0	0	0	0	2	3
Kansas City Terminal	4	0	1.3	1	43	50	0	0	0	0	1	—	1	0
Kansas, Oklahoma & Gulf	0	8	3.7	3	6	0	79	0	0	0	0	1	0	10
Kentucky & Indiana Terminal	0	0	0	—	—	—	—	0	0	0	0	0	0	0
Lake Erie & Eastern	4.5	6	17	52	39	46	59	0	0	1	7	1	2	3
Lake Superior & Ishpeming	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Lake Superior Terminal & Transfer	37	25	0	10	21	44	67	0	0	0	0	0	1	2
Lake Terminal	3.6	4.8	10	56	20	50	0	0	0	1	1	0	0	0
Lehigh & Hudson River	19	12	14	25	20	14	60	1	0	0	1	0	1	0
Lehigh & New England	11	12	12	21	28	65	70	2	1	0	4	2	5	19
Lehigh Valley	5	6	10	39	26	36	71	2	2	8	42	14	26	219
Long Island	7	2.8	10	59	48	35	66	0	0	0	2	3	1	10
Los Angeles & Salt Lake	3.8	3.9	7	24	26	51	80	0	0	0	3	1	14	35
Louisiana & Arkansas	3.2	3.8	15	—	—	—	—	0	2	3	—	—	—	—
Louisiana & North West	16	48	17	50	—	—	—	36	75	0	1	0	4	8
Louisiana, Arkansas & Texas	19	38	26	—	—	—	—	2	8	2	—	—	—	—
Louisville & Nashville	7	6	9	33	41	57	68	6	4	6	32	54	94	136
McCloud River	0	0	0	29	25	63	46	0	0	0	0	0	0	0
Macon, Dublin & Savannah	31	20	9	24	56	64	60	1	2	0	0	10	0	0
Maine Central	16	17	12	27	42	41	68	2	2	4	1	6		

TABLE XIII.—Summary of comparison of the percentage of steam locomotives inspected and found defective, with the number ordered out of service for the years ended June 30, on roads reporting on 10 or more locomotives—Continued

Road	Percentage inspected defective							Ordered out of service						
	1936	1935	1931	1929	1927	1925	1923	1936	1935	1931	1929	1927	1925	1923
New Orleans Public Belt.....	4.8	22	11	13	5	28	57	0	0	1	1	0	2	2
New York Central, lines east....	6	12	10	14	25	43	60	2	16	8	6	19	27	78
New York Central, lines west <sup>14</sup>	11	14	7	25	41	66	61	13	20	7	22	55	59	53
New York, Chicago & St. Louis.....	7	11	10	24	31	48	70	3	1	10	30	14	47	36
New York, New Haven & Hartford.....	12	16	14	12	23	39	73	4	3	2	0	5	12	131
New York, Ontario & Western.....	21	23	36	38	38	44	71	9	0	3	16	10	6	7
Norfolk & Portsmouth Belt.....	25	5	6	23	44	48	53	2	0	0	0	0	1	1
Norfolk & Western.....	12	5	9	23	42	49	78	5	0	2	9	24	24	163
Norfolk Southern.....	10	3	16	24	45	45	57	3	0	3	2	4	5	10
Northern Pacific.....	23	26	16	13	29	37	61	9	13	22	6	50	28	113
Northern Pacific Terminal.....	6	30	20	12	22	12	32	0	0	0	0	0	0	0
Northwestern Pacific.....	2	2	6	8	1	6	5	0	0	0	0	0	0	12
Oregon Short Line <sup>15</sup> .....	13	6	11	22	27	42	61	0	1	4	0	2	3	13
Oregon-Washington Railroad & Navigation <sup>16</sup> .....	17	14	16	12	17	11	35	2	1	2	2	4	6	13
Pataasco & Back Rivers.....	6	0	0	50	47	44	60	0	0	0	1	1	0	1
Pennsylvania.....	11	11	10	33	44	61	76	58	71	33	153	335	573	687
Pennsylvania-Reading Seashore Lines.....	13	19	.....	.....	.....	.....	.....	0	3	.....	.....	.....	.....	.....
Peoria & Eastern <sup>17</sup> .....	15	26	30	.....	.....	.....	.....	1	2	5	.....	.....	.....	.....
Peoria & Pekin Union.....	0	4	5	14	23	31	54	0	0	0	0	0	1	1
Pere Marquette.....	4.7	8	12	21	38	57	83	0	0	3	8	14	21	68
Philadelphia, Bethlehem & New England.....	11	24	21	65	74	76	67	1	6	1	16	14	2	2
Pittsburgh & Lake Erie.....	10	12	1.9	6	12	10	27	1	4	0	0	0	0	10
Pittsburgh & Shawmut.....	3.7	0	4	4	0	47	52	0	0	0	0	0	0	2
Pittsburgh & West Virginia.....	33	42	32	57	39	0	33	10	27	4	30	8	0	0
Pittsburgh, Shawmut & Northern.....	14	3.9	3.6	8	25	53	86	0	0	0	1	2	0	0
Quebec Central.....	67	20	0	100	.....	.....	.....	0	1	0	0	0	0	0
Reading.....	11	14	13	33	42	48	59	7	10	5	31	22	26	12
Richmond, Fredericksburg & Potomac.....	21	21	14	18	30	43	58	3	2	0	1	1	2	3
Rio Grande Southern.....	73	46	0	0	70	62	100	1	0	0	1	8	8	2
River Terminal.....	29	33	0	71	43	70	0	0	3	0	5	1	0	0
Rutland.....	4.7	7	6	6	12	44	54	0	2	0	0	1	3	1
St. Johnsbury & Lake Champlain.....	2	4	8	16	.....	.....	.....	1	0	0	0	0	1	1
St. Joseph & Grand Island <sup>18</sup> .....	6	13	21	11	36	38	43	0	0	0	0	0	1	1
St. Louis-San Francisco.....	3.8	4	3	3.9	14	22	49	88	2	4	1	7	12	65
St. Louis Southwestern.....	12	13	8	4.3	22	47	86	3	10	4	2	22	14	54
San Diego & Arizona Eastern.....	14	9	13	38	30	55	44	1	0	2	4	3	0	1
Savannah & Atlanta.....	44	7	19	80	67	73	68	5	0	0	0	0	2	3
Seaboard Air Line.....	8	3	9	37	56	51	55	10	8	2	24	43	33	23
Sierra Railway of California.....	0	4	0	.....	.....	.....	.....	0	0	0	0	0	0	0
South Buffalo.....	9	5	39	23	29	75	0	0	0	8	0	1	0	0
Southern Pacific, lines east.....	4.6	6	3.3	5	13	30	47	4	4	1	3	10	37	28
Southern Pacific, lines west.....	13	13	11	24	27	33	38	14	12	13	47	50	51	24
Southern Pacific of Mexico.....	60	22	0	30	100	100	.....	3	1	0	2	3	1	.....
Southern.....	14	7	9	12	24	36	59	75	20	15	13	38	56	177
Spokane International.....	7	30	9	13	28	0	37	0	1	0	0	0	0	2
Spokane, Portland & Seattle.....	17	33	22	22	33	32	60	0	2	1	1	2	4	13
Steelton & Highspire.....	26	23	19	24	48	.....	.....	0	0	1	0	2	.....	.....
Tennessee, Alabama & Georgia.....	0	.....	.....	.....	.....	.....	.....	0	.....	.....	.....	.....	.....	.....
Tennessee Central.....	31	24	14	47	65	74	89	3	2	0	14	40	23	63
Tennessee Coal, Iron & R. R. Terminal R. R. Assn. of St. Louis.....	33	17	7	38	67	40	50	0	0	0	0	0	0	0
Texas & Pacific.....	36	36	32	41	44	62	76	11	44	4	0	3	1	6
Texas-Mexican.....	4	8	21	0	12	16	62	1	31	0	1	3	1	91
Texas Pacific-Missouri Pacific of New Orleans.....	7	11	27	43	50	33	50	0	0	0	0	1	0	1
Tionesta Valley.....	20	13	0	4	10	57	83	0	2	0	0	0	2	0
Toledo, Peoria & Western.....	0	0	100	38	17	80	100	0	0	0	2	2	7	0
Toledo Terminal.....	0	0	25	65	88	87	93	0	0	2	4	7	2	4
Toronto, Hamilton & Buffalo.....	0	0	5	45	35	3	41	0	0	0	0	0	0	3
Tremont & Gulf.....	67	0	0	0	0	0	0	0	0	0	0	0	0	0
Uintah.....	0	0	0	0	20	58	0	0	0	0	0	2	3	0

<sup>14</sup> Includes Ohio Central Lines, 1927-1936.  
<sup>15</sup> Included in Union Pacific, last 6 months 1936.  
<sup>16</sup> Included in Union Pacific, last 6 months 1936.  
<sup>17</sup> Included in Cleveland, Cincinnati, Chicago & St. Louis prior to 1931.  
<sup>18</sup> Included in Union Pacific, last 6 months 1936.

TABLE XIII.—Summary of comparison of the percentage of steam locomotives inspected and found defective, with the number ordered out of service for the years ended June 30, on roads reporting on 10 or more locomotives—Continued

Road	Percentage inspected defective							Ordered out of service						
	1936	1935	1931	1929	1927	1925	1923	1936	1935	1931	1929	1927	1925	1923
Union Pacific <sup>19</sup> .....	13	9	9	17	20	30	41	14	2	2	8	17	19	26
Union.....	7	0	11	9	29	80	10	2	0	1	2	0	0	2
Upper Merion & Plymouth.....	36	39	28	60	62	.....	.....	10	7	0	7	8	.....	.....
Utah.....	0	0	0	11	4	26	19	0	0	0	0	0	0	0
Virginian.....	47	23	17	22	50	58	75	12	4	1	0	2	5	45
Wabash.....	1.6	7	0	1.5	6	47	82	1	0	0	1	2	21	89
Washington Terminal.....	33	24	0	10	43	40	89	1	1	0	0	1	1	2
Western Maryland.....	7	8	13	26	42	54	76	0	1	1	3	13	22	90
Western Pacific.....	8	7	16	25	19	36	37	5	1	5	9	1	13	9
Wheeling & Lake Erie.....	4.1	8	8	42	55	67	74	2	2	1	7	10	20	31
Wichita Falls & Southern.....	40	33	18	4	0	87	100	2	1	1	1	0	6	1
Winston-Salem Southbound.....	18	0	22	33	50	56	77	2	0	0	0	0	1	1
Wrightsville & Tennille.....	25	5	3.2	12	24	54	29	0	0	0	0	0	3	0
Less than 10, discontinued roads, and industrial locomotives.....	32	31	32	40	51	56	56	160	186	213	335	563	583	331
All roads.....	12	12	10	21	31	46	65	852	921	688	1,490	2,539	3,637	7,075

<sup>19</sup> Includes Los Angeles & Salt Lake, Oregon Short Line, Oregon-Washington R. R. & Navigation, and St. Joseph & Grand Island, last 6 months 1936.  
 Fractional percentages not shown unless percent defective is less than 5, otherwise nearest whole number is given.

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