

R. B. CARNEAL

INTERSTATE COMMERCE COMMISSION

---

TWENTY-FIRST ANNUAL REPORT

OF THE

CHIEF INSPECTOR  
BUREAU OF LOCOMOTIVE INSPECTION

TO THE

INTERSTATE COMMERCE COMMISSION

---

FISCAL YEAR ENDED  
JUNE 30, 1932



UNITED STATES  
GOVERNMENT PRINTING OFFICE  
WASHINGTON : 1932

For sale by the Superintendent of Documents, Washington, D. C. - - - - - Price 5 cents

ANNUAL REPORT OF THE CHIEF INSPECTOR  
BUREAU OF LOCOMOTIVE INSPECTION

OCTOBER 1, 1932.

*To the Interstate Commerce Commission:*

In compliance with section 7 of the act of February 17, 1911, as amended, the Twenty-first Annual Report of the Chief Inspector, covering the work of the bureau during the fiscal year ended June 30, 1932, 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—					
	1932	1931	1930	1929	1928	1927
Number of locomotives for which reports were filed.....	59, 110	60, 841	61, 947	63, 562	65, 940	67, 835
Number inspected.....	96, 924	101, 224	100, 794	96, 465	100, 415	97, 227
Number found defective.....	7, 724	10, 277	16, 300	20, 185	24, 051	29, 995
Percentage inspected found defective.....	8	10	16	21	24	31
Number ordered out of service.....	527	688	1, 200	1, 490	1, 725	2, 539
Total number of defects found.....	27, 832	36, 968	60, 292	77, 268	85, 530	112, 008

## REPORT OF CHIEF INSPECTOR OF LOCOMOTIVES

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

	Year ended June 30—					
	1932	1931	1930	1929	1928	1927
Number of accidents.....	145	230	295	356	419	488
Per cent increase or decrease from previous year.....	36.9	22	17.1	15	14.1	14.9
Number of persons killed.....	9	16	13	19	30	28
Per cent increase or decrease from previous year.....	43.7	123	31.6	36.6	17.1	127.3
Number of persons injured.....	156	269	320	390	463	517
Per cent increase or decrease from previous year.....	42	15.9	17.9	15.8	10.4	21.6

<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—							
	1932	1931	1930	1929	1928	1927	1915	1912
Number of accidents.....	43	91	105	119	150	185	424	856
Number of persons killed.....	8	15	12	14	26	20	13	91
Number of persons injured.....	46	122	113	133	174	205	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—									
	1932		1931		1930		1929		1928	
	Killed	In-jured	Killed	In-jured	Killed	In-jured	Killed	In-jured	Killed	In-jured
Members of train crews:										
Engineers.....	3	59	5	73	4	100	7	128	8	151
Firemen.....	4	49	5	75	4	123	7	128	11	161
Brakemen.....	2	18		39	4	32	1	45	4	54
Conductors.....		7		21		10		24		16
Switchmen.....		3		8		10		11		15
Roundhouse and shop employees:										
Boilermakers.....		1		3		1		5		5
Machinists.....		1		4		3		2		4
Foremen.....				2		3		1		1
Inspectors.....						3		1		1
Watchmen.....		1		5		2		3		2
Boiler washers.....						2		1		
Hostlers.....		5		4		3		1		10
Other roundhouse and shop employees.....		4		6		1		3		8
Other employees.....		2		6		6		2		12
Nonemployees.....		6		22		16		23		23
Total.....	9	156	16	269	13	320	19	390	30	463

## REPORT OF CHIEF INSPECTOR OF LOCOMOTIVES

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

	Year ended June 30—				
	1932	1931	1930	1929	1928
Number of locomotive units for which reports were filed.....	1,274	1,242	1,135	1,071	1,034
Number inspected.....	1,411	1,256	1,306	1,099	1,119
Number found defective.....	57	75	120	131	169
Percentage inspected found defective.....	4	6	9	12	15
Number ordered out of service.....	6	3	6	4	9
Total number of defects found.....	126	192	289	329	411

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

	Year ended June 30—				
	1932	1931	1930	1929	1928
Number of accidents.....	2	5	3	1	4
Number of persons killed.....		1			1
Number of persons injured.....	2	5	3	1	3

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

	Year ended June 30—									
	1932		1931		1930		1929		1928	
	Killed	In-jured	Killed	In-jured	Killed	In-jured	Killed	In-jured	Killed	In-jured
Members of train crews:										
Engineers.....		1		1		2				2
Firemen.....				1		1		1		
Brakemen.....				2						
Roundhouse and shop employees:										
Inspectors.....										
Other roundhouse and shop employees.....				1					1	1
Other employees.....		1								
Total.....		2		5		3		1	1	3



REPORT OF CHIEF INSPECTOR OF LOCOMOTIVES

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

Table with columns for Year ended June 30- (1932, 1931, 1930, 1929, 1928) and rows for Part or appurtenance which caused accident (Circuit breakers, Insulation, etc.)

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

Table with columns for Year ended June 30- (1932, 1931, 1930, 1929, 1928, 1927) and rows for Parts defective, inoperative or missing, or in violation of rules (Air compressors, Arch tubes, etc.)

REPORT OF CHIEF INSPECTOR OF LOCOMOTIVES

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

Table with columns for Year ended June 30- (1932, 1931, 1930, 1929, 1928, 1927) and rows for Parts defective, inoperative or missing, or in violation of rules (Steam pipes, Steam valves, etc.)

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

Table with columns for Year ended June 30- (1932, 1931, 1930, 1929, 1928) and rows for Parts defective, inoperative or missing, or in violation of rules (Air compressors, Axles, Boiler, etc.)

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

Parts defective, inoperative or missing, or in violation of rules	Year ended June 30—				
	1932	1931	1930	1929	1928
Water glasses, fittings, and shields.....	1				1
Wheels.....	11	12	5	6	17
Whistles, bells, and train-signal system.....		2	1	1	1
Miscellaneous.....	9	16	26	20	45
Total defects.....	126	192	289	329	411
Locomotive units reported.....	1,274	1,242	1,135	1,071	1,034
Locomotive units inspected.....	1,411	1,256	1,306	1,099	1,119
Locomotive units defective.....	57	75	120	131	169
Percentage inspected found defective.....	4	6	9	12	15
Locomotive units ordered out of service.....	6	3	6	4	9

#### INVESTIGATION OF ACCIDENTS AND GENERAL CONDITION OF LOCOMOTIVES

All accidents reported to the bureau as required by the law and rules were carefully investigated and appropriate action taken to prevent recurrences 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.

During the year 8 per cent of the steam locomotives inspected by our inspectors were found with defects or errors in inspection that should have been corrected before being put into use. However, the drastic economies now being practiced by the carriers, together with increasing traffic, will require energetic action on our part if the current conditions are to be maintained.

The decrease in accidents and casualties brought about by decrease in defective locomotives, and the converse, are illustrated graphically by the chart on page 5.

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 inspection and repairs made in accordance with the requirements of the law and rules many accidents will be avoided.

Detailed results of our inspections of steam locomotives of each carrier are shown in Table XII, and a comparison of condition of locomotives over a period of years is shown in Table XIII. It will be noted from Table XIII that some of the carriers are maintaining their locomotives in such condition as to meet the requirements of the law and the rules, while others were found to be seriously delinquent.

#### BOILER EXPLOSIONS OR CROWN-SHEET FAILURES

There was a decrease of 46.1 per cent in the number of crown-sheet failures, a decrease of 46.6 per cent in the number of persons killed, and a decrease of 75 per cent in the number of persons injured from this cause as compared with the previous year.

#### EXTENSION OF TIME FOR REMOVAL OF FLUES

Six hundred and forty-four applications were filed for extensions of time for removal of flues, as provided in rule 10. Our investigations disclosed that in 31 of these cases the condition of the locomotives was such that extensions could not properly be granted. Fifty-seven were in such condition that the full extensions requested could not be authorized, but extensions for shorter periods of time were allowed. Fifty-three extensions were granted after defects disclosed by our investigations had been repaired. Forty-nine applications were canceled for various reasons. Four hundred and fifty-four applications were granted for the full periods requested.

#### SPECIFICATION CARDS AND ALTERATION REPORTS

Under rule 54 of the Rules and Instructions for Inspection and Testing of Steam Locomotives, 343 specification cards and 4,753 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, 50 specifications and 6 alteration reports were filed for locomotive units and 25 specifications and 13 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.

#### SUITS FOR PENALTIES—CASES PENDING AT THE BEGINNING OF THE YEAR AND DISPOSED OF DURING THE YEAR

*U. S. v. Chicago, Springfield & St. Louis Railway Co.*, southern district of Illinois, involved 30 counts for use of locomotives while defective and in violation of rules. Judgment on 6 counts for \$600; 24 counts dismissed.

#### APPEALS

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

A. G. PACK, *Chief Inspector.*

### ACCIDENTS AND CASUALTIES RESULTING FROM THE FAILURE OF STEAM LOCOMOTIVES AND TENDERS AND THEIR APPURTENANCES DURING THE FISCAL YEAR ENDED JUNE 30, 1932, 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.]

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

August 12, 1931, locomotive 3287, near Dallas City, Ill. Piston rod broke at old fracture; 1 injured.

\*October 7, 1931, locomotive 3146, Knightsen, Calif. Pin lost out of cylinder cock rod connection, permitting rod to drop and catch on ties, causing cylinder cock lever in cab to move back suddenly and strike engineman; 1 injured.

Two accidents; 2 injured.

#### ATLANTIC COAST LINE RAILROAD:

October 19, 1931, locomotive 1011, Lakeland, Fla. Employee's eye injured by piece of wire protruding from water cooler fastening; water cooler was not secured according to company's standard; 1 injured.

One accident; 1 injured.

#### BALTIMORE & OHIO RAILROAD:

August 13, 1931, locomotive 4558, McCool, Ind. Insufficient clearance between grate shaker lever and left back wing of cab; grate shaker fulcrum bracket holes worn and fulcrum pin diameter less than company's standard; 1 injured.

\*\*October 5, 1931, locomotive 1054, Baltimore, Md. Power reversing gear operated violently when main reservoir cut-out cock was opened, resulting in injury to an employee; reverse gear slide valve was leaking and had 1/8-inch lost motion on stem; 1 injured.

October 9, 1931, locomotive 864, near Polk, W. Va. Reverse lever unlatched and went to forward corner; teeth on reverse lever latch and quadrant worn; 1 injured.

\*\*October 29, 1931, locomotive 5219, Grafton, W. Va. Handrail on side of locomotive broke at bend near front end fastening, caused by old fracture comprising approximately 95 per cent of cross-sectional area; 1 injured.

\*\*November 5, 1931, locomotive 7211, near Connellsville, Pa. Lubricator did not work properly; employee injured while attempting to oil right high pressure cylinder through relief valve; 1 injured.

January 10, 1932, locomotive 4103, Dayton, Ohio. Drifting valve rod was bent, causing rod to be difficult to operate; 1 injured.

\*\*May 28, 1932, locomotive 1156, Wheeling, W. Va. Injured while replacing burned-out headlight bulb; 1 injured.

June 20, 1932, locomotive 5037, Allison Park, Pa. Crown sheet failure caused by overheating due to low water; 2 killed.

Eight accidents; 2 killed, 7 injured.

#### BOSTON & ALBANY RAILROAD:

\*\*July 22, 1931, locomotive 41, Chatham, N. Y. Teeth on throttle lever latch and quadrant worn and would not hold lever in desired position; throttle reported on July 3, 6, 10, 11, 14, 18, and 19; 1 injured.

\*\*February 18, 1932, locomotive 602, Pittsfield, Mass. Cover over injector in front of cab not fastened, permitting cover to interfere with engineer's vision through front window; 1 injured.

Two accidents; 2 injured.

#### BOSTON & MAINE RAILROAD:

July 16, 1931, locomotive 3651, Deerfield, Mass. Struck by valve stem guide oil cup which was thrown from locomotive; oil cup not properly applied; 1 injured.

August 9, 1931, locomotive 3600, Durham, N. H. Reverse lever unlatched and moved into forward gear a few notches at a time; valves very dry; 1 injured.

September 26, 1931, locomotive 3243, Boston, Mass. Air compressor reversing valve rod broke; 1 injured.

October 7, 1931, locomotive 3001, North Adams, Mass. Fire tube failed inside of front flue sheet; tube had been heavily rolled and reduced in thickness; tube was practically stopped up with soot and dirt; flues reported leaking on October 3 and 4; 1 injured.

May 5, 1932, locomotive 4018, Nashua, N. H. Power reverse gear hand wheel spun when attempt was made to adjust cut-off; 1 injured.

Five accidents; 5 injured.

#### CENTRAL OF GEORGIA RAILWAY:

May 9, 1932, locomotive 331, Savannah, Ga. Section of dome cap broke loose and was blown from locomotive; old fracture in cast-iron dome cap extending approximately five-eighths inch downward from top face of casting and 60 per cent of circumference at inner edge of gasket seat; 1 injured.

\*June 18, 1932, locomotive 472, Gold Ridge, Ala. Whistle valve spring broke, permitting whistle to blow continuously; 1 injured.

Two accidents; 2 injured.

#### CENTRAL RAILROAD OF NEW JERSEY:

November 5, 1931, locomotive 611, Jersey City, N. J. Rod supporting drop seat in cab broke; metal at point of failure of inferior quality; 1 injured.

One accident; 1 injured.

#### CHESAPEAKE & OHIO RAILWAY:

\*September 24, 1931, locomotive 1521, Powellton, W. Va. Cylinder head blew out; 1 injured.

\*\*January 19, 1932, locomotive 3010, Marion, Ohio. Train parted between tender and first car; coupler at rear of tender only 30 1/4 inches high; 1 injured.

February 9, 1932, locomotive 1304, Cincinnati, Ohio. Fire tube broke off next to front flue sheet due to being badly grooved; 1 injured.

Three accidents; 3 injured.

#### CHICAGO & NORTH WESTERN RAILWAY:

February 24, 1932, locomotive 1657, near Chemung, Ill. Main rod broke, due to old fracture, and broken rod punctured outside and inside fire-box sheets; 1 injured.

One accident; 1 injured.

#### CHICAGO, BURLINGTON & QUINCY RAILROAD:

\*\*January 22, 1932, locomotive 5350, Red Cloud, Nebr. Grate shaker bar broke at old fracture covering approximately 75 per cent of cross-sectional area; 1 injured.

May 24, 1932, locomotive 5140, Jacksonville, Ill. Arm rest gave way due to not being securely attached to brackets; 1 injured.

Two accidents; 2 injured.

#### CHICAGO GREAT WESTERN RAILROAD:

\*July 30, 1931, locomotive 859, Oelwein, Iowa. Valve stuck in valve chamber due to tight fit of bull rings; 1 injured.

\*\*November 1, 1931, locomotive 758, Clarion, Iowa. Shaker bar slipped off post; shaker bar loose fit on post; 1 injured.

\*\*February 8, 1932, locomotive 729, Almorat, Iowa. Locomotive was dispatched with tender brake pull rod disconnected from front truck lever; 1 injured.

\*\*April 22, 1932, locomotive 867, Arispe, Iowa. Vertical handhold at right back corner of cab broke through bolt hole; handhold reported cracked on April 20 and proper repairs not made; 1 injured.

\*\*May 14, 1932, locomotive 458, Waterloo, Iowa. Right front driving spring hanger broke at old fracture extending outward from gib hole; 1 injured.

June 13, 1932, locomotive 715, Sumner, Iowa. Locomotive moved ahead while employee was standing on eccentric rod to adjust the power reverse piston rod packing, causing his foot to be caught between eccentric rod and crank; power reverse piston rod packing leaking; 1 injured.

Six accidents; 6 injured.

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

\*\*September 12, 1931, locomotive 2663, Enid, Okla. No clearance between operating handle of ash pan slides and ash pan when slides were closed; employee's hand injured while closing ash pan slides; 1 injured.

September 26, 1931, locomotive 939, near Coburn, Mo. Squirt hose burst; 1 injured.

\*October 2, 1931, locomotive 253, Topeka, Kans. Spring hanger broke; 1 injured.

Three accidents; 3 injured.

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

December 9, 1931, locomotive 144, near Wayne, Neb. Side rod broke; material defective, resulting in progressive fracture on bottom side of rod; 1 injured. One accident; 1 injured.

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

April 11, 1932, locomotive 6073, near Keensburg, Ill. Reverse lever got away from engineman and jerked forward catching his leg between lever and automatic brake valve; insufficient clearance between lever and brake valve; 1 injured. One accident; 1 injured.

## COLORADO &amp; SOUTHERN RAILWAY:

\*\*July 21, 1931, locomotive (C. B. & Q.) 6158, Pueblo, Colo. Insufficient clearance between grate shaker lever and back board of cab due to excessive wear of the fulcrum lever on shaft; 1 injured. One accident; 1 injured.

## DELAWARE &amp; HUDSON RAILROAD:

February 14, 1932, locomotive 95, Mechanicville, N. Y. Injector steam pipe spanner nut broke while being tightened, due to having been mutilated by use of a sharp tool; 1 injured.

April 11, 1932, locomotive 1052, Morrisonville, N. Y. Air hose between locomotive and tender burst where worn thin; 1 injured.

\*\*June 1, 1932, locomotive 999, near Plattsburg, N. Y. Squirt hose valve opened due to valve stem packing nut being loose; 1 injured.

June 23, 1932, locomotive 898, near Plymouth Junction, Pa. Insufficient clearance between cab overhang and handhold on tender; 1 injured.

Four accidents; 4 injured.

## DELAWARE, LACKAWANNA &amp; WESTERN RAILROAD:

July 2, 1931, locomotive 324, Jersey City, N. J. Squirt hose burst; hose badly worn at point of failure; 1 injured.

July 17, 1931, locomotive 2122, Kingsland, N. J. Squirt hose pulled off defective nipple; 1 injured.

\*January 10, 1932, locomotive 2230, Moscow, Pa. Main rod strap bolts broke permitting strap to loosen and main rod to drop; 1 injured.

Three accidents; 3 injured.

## DENVER &amp; RIO GRANDE WESTERN RAILROAD:

July 17, 1931, locomotive 1169, Salt Lake City, Utah. Fire hose blew off at branch pipe connection; 1 injured.

\*\*November 5, 1931, locomotive 962, Salida, Colo. Reverse gear difficult to operate; reversing gear reported on November 3, 4, 5 (two times), 6, and 7; 1 injured.

May 25, 1932, locomotive 3606, Roper, Utah. Insufficient clearance between tender locker door, when open, and back of cab when locomotive moved around curve; 1 injured.

Three accidents; 3 injured.

## ERIE RAILROAD:

\*\*July 4, 1931, locomotive 2943, Cleveland, Ohio. While standing on apron at left gangway employee's toe was fractured due to being caught between apron and cab floor as locomotive moved around curve; 1 injured.

September 16, 1931, locomotive 3026, Graham, N. Y. Crown sheet failure caused by overheating due to low water; top end of water glass closed by rubber gasket, due to water glass not being properly assembled; 3 killed, 3 injured.

\*September 17, 1931, locomotive 2745, Passaic, N. J. Whistle rope broke; 1 injured.

October 5, 1931, locomotive 3315, Susquehanna, Pa. Main crank pin worked loose, bending eccentric rod and causing damage to reversing gear; valves were reported out of square on day prior to accident; 1 injured.

March 23, 1932, locomotive 3321, Secaucus, N. J. Power reverse wheel spun when forced while reverse gear was being moved into backward motion; bolt that secured upper end of inside radius bar to reverse yoke, left side of locomotive, had worked out and fouled on gear connecting rod; cotter, nut, and collar missing from bolt; reversing gear reported working hard on February 21, 29, March 3, 5, 16, 21, and 22; 1 injured.

May 30, 1932, locomotive 3003, Huntington, Ind. Tubular water glass burst; 1 injured.

Six accidents; 3 killed, 8 injured.

## FLORIDA EAST COAST RAILWAY:

April 20, 1932, locomotive 818, Dania, Fla. Air hose at rear of tender burst, applying brakes in emergency; hose defective; 1 injured.

One accident; 1 injured.

## GREAT NORTHERN RAILWAY:

\*September 15, 1931, locomotive 3030, Fergus Falls, Minn. Grate shaker bar slipped off post, due to improper fit; 1 injured.

\*\*September 25, 1931, locomotive 3392, Trego, Mont. Vestibule separated from cab rubbing surface while locomotive was on a curve, allowing employee's hand to be placed between them and injured when they closed; 1 injured.

\*\*March 20, 1932, locomotive 2512, Shelby, Mont. Injured by steam leaking from a broken stay bolt; 1 injured.

Three accidents; 3 injured.

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

\*\*July 30, 1931, locomotive (A. T. & S. F.) 1903, Longview Junction, Tex. Driving brake beam hanger pin broke due to defective metal in pin; 1 injured.

\*\*January 26, 1932, locomotive (A. T. & S. F.) 3533, Milano, Tex. Bell cord broke; 1 injured.

\*\*June 8, 1932, locomotive (A. T. & S. F.) 3917, Heidenheimer, Tex. Driving wheel brake beam broke; 1 injured.

Three accidents; 3 injured.

## HOUSTON BELT &amp; TERMINAL RAILROAD:

November 17, 1931, locomotive 1, Houston, Tex. Crown sheet failure caused by overheating due to low water; 2 injured.

One accident; 2 injured.

## ILLINOIS CENTRAL RAILROAD:

\*July 8, 1931, locomotive 2456, Hayes, Ill. Locomotive tire broke; old fracture under flange; 3 injured.

\*\*September 19, 1931, locomotive 426, Water Valley, Miss. Water glass burst; 1 injured.

\*February 9, 1932, locomotive 1726, McComb, Miss. Water glass burst; 1 injured.

February 16, 1932, locomotive 1096, Memphis, Tenn. Cab apron did not provide for clearance between the apron and tank while moving around a curve; 1 injured.

\*February 16, 1932, locomotive 3530, Markham, Ill. Water glass burst; 1 injured.

\*\*April 9, 1932, locomotive 582, Louisville, Ky. Employee's toes were caught between cab apron and running board due to running board extending over apron and having an angle iron on its edge which reduced the clearance between running board and cab apron; 1 injured.

Six accidents; 8 injured.

## INTERNATIONAL-GREAT NORTHERN RAILROAD:

July 5, 1931, locomotive (M. P.) 1312, Palestine, Tex. Fire door did not close properly on account of fire-door foot-valve leaking and both packing leathers in operating cylinders defective; 1 injured.

March 27, 1932, locomotive (N. O. T. & M.) 935, Fort Worth, Tex. Employee's leg caught between reverse lever and seat box account of no clearance between top edge of seat box and reverse lever; 1 injured.

May 18, 1932, locomotive 1110, Mertens, Tex. Employee burned while removing fallen brick from fire box; brick arch reported defective on May 5, 8, 9, 12, 15, and 18; 1 injured.

Three accidents; 3 injured.

## LEHIGH VALLEY RAILROAD:

September 1, 1931, locomotive 850, Port Bowkley Pa. Driving brake hanger pin broke at old defect comprising approximately 20 per cent of cross-sectional area; 1 injured.

September 30, 1931, locomotive 2050, East Buffalo, N. Y. Broken reduced-body radial stay blew out of crown sheet while being calked under pressure. The



stay broke at fillet at wrapper-sheet end at old fracture covering approximately 75 per cent of cross-sectional area; threads on tapered head were badly worn and head of bolt had been heavily hammered in attempts to stop leakage; 1 injured.

\*\*February 29, 1932, locomotive 4003, Newark, N. J. Top rung of rear-end ladder failed causing employee to fall to the ground; one end of rung showed old fracture through fillet joining reduced section to tread and the other end showed old fracture covering approximately 30 per cent of cross-sectional area of fillet; ladder rung reported loose on February 15; 1 injured.

Three accidents; 3 injured.

#### LOS ANGELES & SALT LAKE RAILROAD:

December 19, 1931, locomotive 5509, Cima, Calif. Superheater flue broke off near back flue sheet due to having been grooved to less than one-sixteenth inch in thickness for its entire circumference; 1 injured.

One accident; 1 injured.

#### LOUISVILLE & NASHVILLE RAILROAD:

July 25, 1931, locomotive 403, Verona, Ky. Fusion welded reinforcing on conveyor screw failed, preventing stoker from operating properly; stoker reported on July 20, 21, 22, 23, and 24, the report for July 24 stating "Stoker in bad shape, will hardly run at all." Condition of stoker was also verbally reported to foreman at Louisville, Ky., when en route on this trip, but locomotive was permitted to leave this terminal without repairs being made; 1 injured.

April 17, 1932, locomotive 1869, near Dudley, Ky. Crown sheet failure caused by overheating due to low water; 2 injured.

Two accidents; 3 injured.

#### MAINE CENTRAL RAILROAD:

\*\*May 13, 1932, locomotive 373, Bangor, Me. Grate shaker lever slipped off post due to improper fit; 1 injured.

One accident; 1 injured.

#### MICHIGAN CENTRAL RAILROAD:

March 29, 1932, locomotive 8212, Detroit, Mich. Superheater flue broke at safe end weld due to having been overheated in welding; 1 injured.

One accident; 1 injured.

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

January 13, 1932, locomotive 9, Drake, N. Dak. Clevis pin in operating mechanism of coupler on front end of locomotive broke or lost out; 1 injured.

April 19, 1932, locomotive 701, Rogers, N. Dak. Right go-ahead eccentric blade pin failed. On previous trip the eccentric strap bolt failed and proper repairs were not made, resulting in improper alignment of blade pin with link, which caused pin to heat excessively and seize in bushing; 1 injured.

Two accidents; 2 injured.

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

September 4, 1931, locomotive 391, Paris, Tenn. Bolt lost out of front end of cylinder cock slide rod connecting link, permitting link to drop and catch on ground or ties, causing cylinder cock lever in cab to fly back and strike engineer when engine made backward movement; 1 injured.

November 1, 1931, locomotive 555, near Wartrace, Tenn. Air compressor failed, causing application of brakes; air compressor reversing valve worn; 1 injured.

Two accidents; 2 injured.

#### NEW YORK CENTRAL—LINES EAST:

November 27, 1931, locomotive 800, near Rome, N. Y. Loss of water in closed boiler circuit caused overheating and failure of tubes in fire box; 1 injured.

April 25, 1932, locomotive 5202, Palmyra, N. Y. Reverse gear wheel did not operate valves in the usual manner, and when forced the operating wheel kicked back, causing injury to the engineman; left front cylinder packing ring broken into many pieces and apparently a piece of ring lodged in the steam port and obstructed the valve movement; 1 injured.

\*\*May 19, 1932, locomotive 2735, Geneva, N. Y. Undesired emergency application of brakes, caused by defective vent valve; 1 injured.

June 12, 1932, locomotive 2768, Utica, N. Y. Train line pipe broke off at the base of ball in flexible joint connection between locomotive and tender, causing emergency application of the brakes; pipe not of sufficient thickness; 2 injured.

Four accidents; 5 injured.

#### NEW YORK CENTRAL—LINES WEST:

\*October 9, 1931, locomotive 2494, Toledo, Ohio. Locomotive derailed due to badly worn flange on engine truck wheel; 3 injured.

One accident; 3 injured.

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

December 10, 1931, locomotive 60, Cleveland, Ohio. Floor board broke off; board was of yellow pine and failed about flush with extension over edge of steel cab floor; 1 injured.

June 26, 1932, locomotive 910, near Sims, Ind. Drawbar pin broke, due to defective material, and safety chains failed due to improper welding of links; 1 killed.

Two accidents; 1 killed, 1 injured.

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

February 6, 1932, locomotive 2405, Cranston, R. I. Gauge glass of bull's-eye lubricator broke; lubricator gauge glass gaskets badly deteriorated, and nut tightened in attempt to stop leakage, causing gauge glass to be held rigidly between brass parts; "Sight glass leaks bad at lubricator" was reported on February 5 and proper repairs were not made; 1 injured.

March 17, 1932, locomotive 3341, New Haven, Conn. Fire tube failed at defective safe end weld; 1 injured.

Two accidents; 2 injured.

#### NORFOLK & WESTERN RAILWAY:

October 19, 1931, locomotive 1715, near Max Meadows, Va. Fire tube broke off at safe end weld; overheated in welding; 1 injured.

February 13, 1932, locomotive 1715, near Narrows, Va. Union ell nut in brake pipe between high and low pressure engines worked loose, allowing brake pipe to become uncoupled, causing emergency application of brakes which resulted in derailment and damage to cars; part of brake pipe clamp was missing rendering clamp inoperative, which permitted brake pipe to vibrate and loosen union nut; 1 injured.

Two accidents; 2 injured.

#### NORFOLK SOUTHERN RAILROAD:

\*\*July 30, 1931, locomotive 542, near Colon, N. C. Back end strap of left main rod broke through grease cup and grease hole of top leg of strap and also through keyway of bottom leg of strap; top of strap showed old crack; "Both back ends knocking bad" was reported on July 21 and "Left back end running hot" was reported on July 23 and 26; 1 injured.

One accident; 1 injured.

#### NORTHERN PACIFIC RAILWAY:

October 16, 1931, locomotive 1702, Duluth, Minn. Tubular water glass burst, breaking two glass panels in water-glass shield; 1 injured.

March 28, 1932, locomotive 1127, Spokane, Wash. Engineman fell from top of tender while attempting repairs to rear headlight which was inoperative when he reported for service at 10.30 p. m., though this defect had been reported eight hours previous; 1 injured.

Two accidents; 2 injured.

#### OREGON-WASHINGTON RAILROAD & NAVIGATION CO.:

August 29, 1931, locomotive 4913, Portland, Oreg. Fire hose burst; 1 injured.

One accident; 1 injured.

#### PENNSYLVANIA RAILROAD:

\*\*July 1, 1931, locomotive 6962, near Marysville, Pa. Brakes applied suddenly due to defective train control equipment on locomotive; 1 injured.

July 31, 1931, locomotive 5338, near South Elizabeth, N. J. Right front end main rod lateral liner failed and a piece of lateral liner was thrown from the rapidly moving locomotive and struck the fireman on a locomotive on parallel track; 1 injured.

August 8, 1931, locomotive 6892, Stelton, N. J. Rear pin in stoker conveyor flexible drive shaft missing, causing stoker to fail; "Examine stoker, engine very hard to keep working" was reported on August 7; excessive wear in joints of conveyor drive shaft and blocks should have been detected during monthly inspection made on August 7; 1 injured.

August 10, 1931, locomotive 6600, Cleveland, Ohio. Lubricator throttle valve bonnet blew out; threads on bonnet did not properly fit threads in valve body; bonnet was defective and was distorted and cracked when applied; 1 injured.

October 19, 1931, locomotive 840, Bowie, Md. Reverse gear difficult to operate; nut to regulate end play in reverse gear screw and lock nut for same had worked loose; 1 injured.

October 24, 1931, locomotive 6754, Enola, Pa. Defective squirt hose failed; hose had been burned; 1 injured.

December 8, 1931, locomotive 3763, Kinzer, Pa. Side rod broke due to old fracture; 1 injured.

December 16, 1931, locomotive 6744, Enola, Pa. Broken and galled link block pin fouled movement of link block when attempt was made to reverse locomotive, causing reverse gear wheel to suddenly release and spin around, striking employee; oil hole in link block was stopped up with grease and dirt which prevented link block pin from getting any lubrication; 1 injured.

December 18, 1931, locomotive 5483, Terre Haute, Ind. Air compressor lubricator choke plug too small for cage permitting steam to pass into lubricator, making it difficult to fill lubricator and blowing oil out onto the deck; lubricator reported on December 15 and 16; 1 injured.

January 1, 1932, locomotive 4421, Bolivar, Pa. Back end of main rod came down causing derailment of locomotive, tender and 14 cars; set screws in key block at back end of main rod loosened; resulting in key, bolt, key block, and brasses losing out; threads in bottom set screw hole were defective; defects which may have some bearing on the accident were reported on December 3, 5, 11, 14, 15, 20 (two times), 23, 24, 25, 26, 27, 30 (two times), and 31; 2 injured.

February 14, 1932, locomotive 6958, near Norristown, Pa. Crank pin broke due to old fracture; initial fracture started in tool mark in fillet of pin; fillet was  $\frac{3}{16}$ -inch radius instead of  $\frac{1}{4}$ -inch radius as provided in company's blue print; locomotive riding rough account of tires having flat spots, spring rigging not properly equalized, side rod bushing broken, wedges sticking, and numerous pounds; 1 injured.

\*\*April 14, 1932, locomotive 2885, Lemoyne, Pa. Headlight and cab lights went out account of generator brush spring slipping off brush; 1 injured.

April 21, 1932, locomotive 3807, Philadelphia, Pa. Engine truck journal broke, due to excessive overheating, causing derailment of locomotive, tender, and first three cars (Pullman) of passenger train; 1 injured.

Thirteen accidents; 14 injured.

#### PERE MARQUETTE RAILWAY:

\*October 6, 1931, locomotive 196, Rosymound, Mich. Main crank pin broke inside wheel fit due to old fracture; 1 injured.

One accident; 1 injured.

#### PITTSBURGH & WEST VIRGINIA RAILWAY:

\*September 16, 1931, locomotive 911, New Alexandria, Ohio. Main rod strap broke, due to defective material in strap; 1 injured.

One accident; 1 injured.

#### READING CO.:

\*\*July 23, 1931, locomotive 130, Ocean City, N. J. Handhold on No. 2 air compressor broke off near front and rear connections to compressor head, due to old fractures; 1 injured.

\*January 28, 1932, locomotive 920, Wayne Junction, Pa. Packing in steam end of air compressor leaking; 1 injured.

June 30, 1932, locomotive 112, Westfield, N. J. Flange oiler reservoir filling cap was thrown from rapidly moving locomotive; 1 injured.

Three accidents; 3 injured.

#### RICHMOND, FREDERICKSBURG & POTOMAC RAILROAD:

January 27, 1932, locomotive 325, near Guinea, Va. Main crank pin broke off inside of driving wheel pin fit, due to old fracture which extended over approximately 70 per cent of diameter of crank pin, resulting in locomotive being stripped on left side and broken side rod puncturing outer and inside throat sheets; 1 injured.

One accident; 1 injured.

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

September 2, 1931, locomotive 1263, Afton, Okla. Stop pin in quadrant missing, allowing reverse lever handle to strike pipe on boiler head; employee's finger caught between reverse lever handle and pipe; 1 injured.

November 8, 1931, locomotive 4211, Paola, Kans. Whistle valve remained stuck slightly open after each operation; whistle reported on October 22, 25, 28, 29, November 5, 6, 8, 9, and 10; 1 injured.

\*\*February 4, 1932, locomotive 959, Springfield, Mo. Finger injured by heater rod spring while attempting to operate injector; heater rod spring out of notch of heater rod; 1 injured.

\*\*February 29, 1932, locomotive 1505, Oklahoma City, Okla. Handrail failed at old defect in the bend adjacent to bolt hole at back end; 1 injured.

June 8, 1932, locomotive 1060, near Vinita, Okla. Valve motion combination lever failed and locomotive was continued in service with loose parts swinging until valve oiling step was loosened and thrown from locomotive, striking track employee; combination lever defective around point of failure, having been overheated and contained two progressive cracks, one of which was in the fracture; 1 injured.

Five accidents; 5 injured.

#### SEABOARD AIR LINE RAILWAY:

December 18, 1931, locomotive 828, near Marietta, Fla. Reverse lever latch slipped out of quadrant allowing reverse lever to suddenly go to forward corner, caused by excessive vibration of reach rod together with oily condition of reverse lever latch; guide provided to control vibration of reach rod was ineffective; 1 injured.

One accident; 1 injured.

#### SOUTHERN RAILWAY:

\*\*July 21, 1931, locomotive 1478, Asheville, N. C. Fire door closed unexpectedly due to air valve leaking; 1 injured.

\*\*August 3, 1931, locomotive 1682, Chattanooga, Tenn. Squirt hose valve leaking; 1 injured.

\*\*October 16, 1931, locomotive 1650, Bristol, Va. Hand wheel pulled off stem of air compressor throttle valve, allowing employee to fall from running board; hand wheel loose on throttle stem and its vibration on stem had worn the riveted end of stem so thin that hand wheel easily pulled off; 1 injured.

October 19, 1931, locomotive 1337, Herbert, S. C. Valve stem guide broke off, due to old fracture comprising 75 per cent of back valve chamber head casting, and fell from locomotive breaking into three pieces, one of which rebounded and struck track employee; 1 injured.

October 31, 1931, locomotive 8372, Valdosta, Ga. Fire hose burst; 1 injured.

December 1, 1931, locomotive 4828, Manassas, Va. Employee fell from top of tender while taking water; footboard on top of tender cistern defective; 1 injured.

\*\*June 28, 1932, locomotive 4621, Spencer, N. C. Squirt hose valve leaking at packing nut due to not being properly packed; 1 injured.

Seven accidents; 7 injured.

#### SOUTHERN PACIFIC—LINES WEST:

July 24, 1931, locomotive (C. P.) 5038, near Mescal, Ariz. Nipple in pressure line to feed water pump gauge in cab broke through threads; pressure line not of double strength pipe with extra heavy fittings, as required by rule 116 (c); lost motion in blow-off cock lever, together with offset in lever, permitted lever to strike on pressure line when blow-off cock was operated; nipple which caused accident was applied just previous to this trip, replacing a broken nipple; 1 injured.

\*\*August 5, 1931, locomotive (E. P. & S. W.) 3308, Esmond, Ariz. Valve gear reach rod on left side fouled union nut on  $1\frac{1}{2}$ -inch discharge pipe leading from air compressor to main air reservoir, causing it to break and lose off, permitting the joint to separate so the air pressure was lost from the main reservoirs. The locomotive was equipped with E. T. brake equipment and air reverse gear; loss of the main reservoir air pressure caused loss of control of the locomotive while it was moving backward on a heavy descending grade which resulted in a collision with its train; 3 injured.

October 2, 1931, locomotive (C. P.) 3634, near Ogden, Utah. Crown sheet failure caused by overheating due to water foaming and defective stays in the pocketed area; door sheet was also overheated; locomotive left Sparks, Nev., on September 29 for trip to Ogden, Utah, and while en route, "Change water in

boiler," was reported at Carlin, Nev., on October 1 and "Eng. very dirty" was reported at Montello, Nev., on October 2, but water was not changed or boiler washed after leaving Sparks; 1 injured.

December 25, 1931, locomotive 4402, near Richvale, Calif. Crown sheet failure caused by overheating due to low water; 2 killed.

Four accidents; 2 killed, 5 injured.

#### TERMINAL RAILROAD ASSOCIATION OF ST. LOUIS:

August 24, 1931, locomotive 118, St. Louis, Mo. Water glass burst; injured while closing water glass cocks; 1 injured.

October 22, 1931, locomotive 172, East St. Louis, Ill. Pin worked out of driving brake rigging; 1 injured.

April 1, 1932, locomotive 304, East St. Louis, Ill. Water glass burst, breaking glass panel in water-glass shield; 1 injured.

Three accidents; 3 injured.

#### WABASH RAILWAY:

January 5, 1932, locomotive 612, Jacksonville, Ill. Tender cistern manhole cover fell on employee's foot; back stop for manhole cover was bent down allowing insufficient clearance between the handle on cover and top of tank; 1 injured.

January 10, 1932, locomotive 2418, near Truesdale, Mo. Crown sheet failure caused by overheating due to low water; 1 killed, 2 injured.

\*\*April 10, 1932, locomotive 1528, Detroit, Mich. While alighting from right front footboard, employee's glove caught on rough bronze weld securing pilot beam handrail at flagstaff, causing him to lose his balance and fall to the ground; 1 injured.

Three accidents; 1 killed, 4 injured.

#### WESTERN MARYLAND RAILWAY:

May 31, 1932, locomotive 917, Thurmont, Md. Grate shaker bar slipped off post (left side); bar too large for proper fit on post and was so bent as to strike cover plate when it was down on deck, causing bar to slip off post when attempt was made to shake grates. Right grates could not be shaken properly due to bar striking cover plate which did not fold down as intended; 1 injured.

One accident; 1 injured.

#### WESTERN PACIFIC RAILROAD:

\*October 1, 1931, locomotive 12, Clive, Utah. Spring hanger broke; 1 injured.

March 15, 1932, locomotive 330, Portola, Calif. Employee fell from roof of first car in train due to his vision being impaired by steam from defective booster throttle valve and steam pipe; booster could not be cut out by means of air-operated booster valve due to valve travel regulating nut on throttle stem being improperly adjusted causing valve to cock on valve seat and this permitted steam to enter the steam pipe where it escaped through defective packing in bottom ball joint of pipe; 1 injured.

Two accidents; 2 injured.

#### ACCIDENTS AND CASUALTIES RESULTING FROM THE FAILURE OF LOCOMOTIVES OTHER THAN STEAM AND THEIR APPURTENANCES DURING THE FISCAL YEAR ENDED JUNE 30, 1932, BY ROADS

[A double star (\*\*) indicates accident 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 accident in sufficient time after it occurred to permit it to be promptly investigated.]

#### PENNSYLVANIA RAILROAD:

\*\*July 29, 1931, locomotive unit 3930, Shawmont, Pa. Injured while attempting to raise pantagraph; pantagraph sprung and would not raise when operating button was pushed; 1 injured.

February 9, 1932, locomotive unit 7809, Kearny, N. J. Third-rail contact shoe broke and a piece of shoe was thrown from rapidly moving locomotive, striking track employee; old fractures entirely through outside and inside of ribs of contact portion of shoe; 1 injured.

Two accidents; 2 injured.









TABLE XII.—Number of steam locomotives inspected,

Table with columns for 'Parts defective, inoperative or missing, or in violation of the rules' and regional categories (Lake Superior Terminal & Transfer, Lake Terminal, Lehigh & Hudson River, etc.) and rows for various locomotive parts like Air compressors, Arch tubes, Ash pans, etc.

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

Table with columns for regional categories (Louisiana & Arkansas, Louisiana & North-west, etc.) and rows for various locomotive parts, including a summary row for 'Number of defects' and a final row for 'Locomotives reported', 'Locomotives inspected', etc.



TABLE XII.—Number of steam locomotives inspected,

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

Parts defective, inoperative or missing, or in violation of the rules	Number of steam locomotives inspected							
	Mississippi Central	Missouri & North Arkansas	Missouri-Illinois	Missouri-Kansas-Texas	Missouri Pacific	Mobile & Ohio	Monongahela Connecting	Monongahela
Air compressors		6			8	3		
Arch tubes		8						
Ash pans and mechanism								
Axles		1						
Blow-off cocks					11	2		
Boiler checks		2			3			
Boiler shell		1			1			
Brake equipment		24			10	5		
Cabs, cab windows, and curtains		1			3	1	1	
Cab aprons and decks		2			2			
Cab cards		6			1			
Coupling and uncoupling devices								
Crossheads, guides, pistons, and piston rods					6	4	2	
Crown bolts					1			
Cylinders, saddles, and steam chests		1			5		1	
Cylinder cocks and rigging					5	3		
Domes and dome caps					1			
Draft gear					2		2	
Draw gear		2			3	1		
Driving boxes, shoes, wedges, pedestals, and braces					4	4		
Fire-box sheets		4			3	1		
Flues			2					
Frames, tailpieces, and braces, locomotive					2	1		
Frames, tender		2						
Gauges and gauge fittings, air		1					1	
Gauges and gauge fittings, steam		2						
Gauge cocks					1	1		
Grate shakers and fire doors								
Handholds		1						
Injectors, inoperative					1			
Injectors and connections		7			9	9		
Inspections and tests not made as required		19	2		32	20	3	1
Lateral motion								
Lights, cab and classification								
Lights, headlights		2						
Lubricators and shields								
Mud rings		1			1	1		
Packing nuts	1	11			8	3		
Packing, piston rod and valve stem		3			2	5		
Pilot and pilot beams		1						
Plugs and studs		1			2	1	1	
Reversing gear		2			2		2	
Rods, main and side, crank pins, and collars		4			9	4	3	
Safety valves								
Sanders		2			1			
Springs and spring rigging			1		13	5		
Squirt hose				1				
Stay bolts		1			2			
Stay bolts, broken								
Steam pipes		1			3			
Steam valves		1			3	2		
Steps		4			3	1		
Tanks and tank valves		3			3	1		
Telltale holes		1			1			
Throttle and throttle rigging					1	5	2	
Trucks, engine and trailing		2			2	2		
Trucks, tender		2			3			
Valve motion		2			1	5		
Washout plugs		3			1	7	8	
Train-control equipment								
Water glasses, fittings, and shields		1	2		11	2		
Wheels		5			6		2	1
Miscellaneous—Signal appliances, badge plates, brakes (hand)		6			1	2		
Number of defects	4	148	6	7	199	102	20	2
Locomotives reported	19	32	21	425	1,135	219	30	69
Locomotives inspected	34	99	71	1,007	2,712	334	32	145
Locomotives defective	4	31	3	3	77	41	3	1
Percentage of inspected found defective	12	31	4.2	.3	2.8	12	9	.7
Locomotives ordered out of service		5			6	1	1	

Parts defective, inoperative or missing, or in violation of the rules	Number of steam locomotives found defective, and ordered from service, etc.—Continued																
	Montour	Montpelier & Wells River	Nashville, Chattanooga & St. Louis	Nevada Northern	Newburgh & South Shore	New Orleans-Great Northern	New York Central Lines East	New York Central Lines West	New York, Chicago & St. Louis	New York, New Haven & Hartford	New York, Ontario & Western	Norfolk & Portsmouth Belt Line	Norfolk & Western	Norfolk Southern	Northern Pacific	Northern Pacific Terminal	
Air compressors			4				4	14	4	3	1				23	1	
Arch tubes			1				1	3		1					1	7	
Ash pans and mechanism								2		4							
Axles																	
Blow-off cocks							4	17	6	1					1		
Boiler checks			3				14	5	5	4			6	5	1		
Boiler shell							10	3	3	3					1		
Brake equipment							10	5	10	4			3	2	56		
Cabs, cab windows, and curtains			4				12	10	12	5			6	1	26		
Cab aprons and decks			4				4	4	3	5			3		5		
Cab cards			3				1	1	2	1			2		5		
Coupling and uncoupling devices																	
Crossheads, guides, pistons, and piston rods			1				13	3	5	5			3		3		
Crown bolts							1	1	1	1			8		26		
Cylinders, saddles, and steam chests			12				2	14	6	3			7	1	14		
Cylinder cocks and rigging			2					7	5	2			2		7		
Domes and dome caps								1	3	3			1		1		
Draft gear			1					6	2	3			3	2	1		
Draw gear		2						3	3	4			2	2	2		
Driving boxes, shoes, wedges, pedestals, and braces			12					12	6	7			8		16		
Fire-box sheets		4						2	4	3			2		3		
Flues								1	1	3			2				
Frames, tailpieces, and braces, locomotive			13					17	9	1			8		12		
Frames, tender			1					1	1	1					3		
Gauges and gauge fittings, air								1	2	2			1		4		
Gauges and gauge fittings, steam								4	4	2			3		6		
Gauge cocks								3	3				5		7		
Grate shakers and fire doors			4					2	4	1			4		4		
Handholds			2					5	1				2		21		
Injectors, inoperative										1					1		
Injectors and connections			6					16	9	17			18	8	26		
Inspections and tests not made as required			48					65	35	61			28		14		
Lateral motion			1					4	3	3			1		2		
Lights, cab and classification								1	3	3							
Lights, headlights								3	5				1		11		
Lubricators and shields													1		2		
Mud rings			2					10	8	5			2	1	5		
Packing nuts	1		1					3	3	8			3	2	12		
Packing, piston rod and valve stem			1					1	1	1			3		13		
Pilot and pilot beams			1					1	1	1			3		1		
Plugs and studs			1					9	2	1			5		1		
Reversing gear			2					3	3	2			2				
Rods, main and side, crank pins, and collars			5					26	15	7			7	1	17		
Safety valves													6				
Sanders								3	3	2			4		16		
Springs and spring rigging			17					42	22	10			8	1	52		
Squirt hose								1	1	2			1		2		
Stay bolts								6	4	2			3	6			
Stay bolts, broken								1					2		8		
Steam pipes								10	6	7			2		4		
Steam valves								1	3	2			1	1	2		
Steps			2					6	2	4			5		26		
Tanks and tank valves			8					1	1	3			2		51		
Telltale holes			1					7	2	3			4		52		
Throttle and throttle rigging															10		
Trucks, engine and trailing			2					11	4	8			1	3	3		
Trucks, tender			6					7	2	10			5	1	8		
Valve motion			7					9	4	5			7		21		
Washout plugs			4					11	5	9			7		18		
Train-control equipment			3					1	14	10			7	2	10		
Water glasses, fittings, and shields																	
Wheels								42	10	13			6		30		
Miscellaneous—Signal appliances, badge plates, brakes (hand)								17	5	7			4		11	1	
Number of defects								13	13	3			10	1	11		
Locomotives reported			217				9	481	295	265	229	187	7	240	51	602	2
Locomotives inspected	22	14	240	17	30	33	1,689	1,200	444	808	177	22	770	99	997	13	
Locomotives defective	31	26	471	5	9	29	1,853	1,196	887	860	343	63	1,175	226	1,496	12	
Percentage of inspected found defective			58			6	139	65	77	91	53	6	94	30	174	2	
Locomotives ordered out of service			1			21	9	5	9	11	15	10	8	13	12	17	







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

Table with columns: Road, Percentage inspected defective (1932-1923), Ordered out of service (1932-1923). Lists various railroad lines and their corresponding statistics.

See footnotes at end of table.

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

Table with columns: Road, Percentage inspected defective (1932-1923), Ordered out of service (1932-1923). Continuation of the previous table, listing more railroad lines.

See footnotes at end of table.

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

Table with columns: Road, Percentage inspected defective (1932-1923), Ordered out of service (1932-1923). Rows include various railroad lines like New York Central Lines, Western Pacific, etc.

See footnotes at end of table.

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

Table with columns: Road, Percentage inspected defective (1932-1923), Ordered out of service (1932-1923). Rows include Western Maryland, Western Pacific, etc., and a summary for 'All roads'.

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.

- 1 Atlanta, Birmingham & Atlantic prior to 1927.
2 Statistics prior to 1927 included in Baltimore & Ohio, East.
3 Trinity & Brazos Valley prior to 1931.
4 Includes Grand Trunk Western, 1925-1927.
5 Includes former Hocking Valley, 1931-32.
6 Includes Peoria & Eastern prior to 1931.
7 Included in Canadian National, 1925-1927.
8 Included in Atchison, Topeka & Santa Fe, 1923.
9 Includes Alabama & Vicksburg, Gulf & Ship Island, Vicksburg, Shreveport & Pacific, and Yazoo & Mississippi Valley, 1927-1932.
10 Includes Portland Terminal, 1932.
11 Includes Ohio Central Lines, 1927-1932.
12 Included in Cleveland, Cincinnati, Chicago & St. Louis prior to 1931.
13 Included in New York Central Lines East last 5 months, 1932.

Fractional percentages not shown unless per cent defective is less than 5, otherwise nearest numeral is given.