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Cast Iron Wheel Records.

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Practically all railways have abandoned any form of cast iron wheel record which follows the history of each individual wheel. Apart from the enormous amount of work in reporting and entering the movements of several hundred thousand wheels which are in service in a large system, it is practically impossible to avoid incorrect numbers being reported. The difficulty of straightening out the errors that arose, errors which frequently were not disclosed for years after they actually occurred, and the correspondence involved in the attempt, were sufficient reasons for discarding a system that did not furnish sufficient useful information to justify its expense. The writer has not investigated methods used on other roads to describe them with accuracy in this paper, but believes that apart from the records maintained for guarantee purposes, the only systems in general use are those in which the average life of wheels removed from service for various causes, is determined in various ways. It is usual to show a figure for the average life of 12 to 18 years to be shown for wheels, when as a matter of fact they are lasting about 5 or 6.

The figures showing the life of the actual wheels removed can be obtained with considerable accuracy and with simple reports and records. Each wheel is marked with its number, the date cast, etc., so that no complications are introduced by recording the date put into service and the date removed. While no record is usually kept of any time the wheel may be out of service, or the movements of the car under which it has been placed, these factors are relatively unimportant on a large number of wheels, and the average life of the wheels removed is a figure of sufficient importance on any road to justify the records and statements required. It should properly be kept by weight of wheels, so that any alteration that occurs in the life of wheels under the same weight of equipment may be distinguished from the changes due to the introduction of a greater proportion of heavier equipment or similar causes.

known, the number removed in each year's life for each cause may be expressed as a percentage of the number made and this percentage may be compared year by year to determine the comparative service obtained from the different wheels.

As the records are compiled in the C. P. R., no attention is paid to the date the wheel is put into service. For wheels made in any one year, the number removed in that year are taken as being removed in the first year of their life, those removed in the next year, as in the second year of their life and so on. This introduces an inaccuracy in the case of any particular wheels placed in service towards the end of the year, but the error becomes unimportant after a year or so and the labor of compiling the record is greatly reduced. The statement obtained by this system is shown in fig. 1—which gives the results for 600 lb. wheels cast by the C. P. R. in 1902, the first year for which this statement was prepared. Similar statements have been made up for the same weight of wheel with its subse-

FIG. 1—RECORD OF SERVICE GIVEN BY C. P. R. 600-LBS., 33-INCH "CAST IRON WHEELS," A & B SERIES

Year Cast, 1902.   Number of Wheels, 30288.   Serial Numbers, A 84889-106990, B 1-8177

Year	Worn Flange			Slid Flat			Broken or Chipped Flange			Broken Wheel			Total Operating Defects			Total Manufacturers' Defects			Removed from Tenders			Total Number Removed		
	Number	Percent	Total Percent	Number	Percent	Total Percent	Number	Percent	Total Percent	Number	Percent	Total Percent	Number	Percent	Total Percent	Number	Percent	Total Percent	Number	Percent	Total Percent	Number	Percent	Total Percent
1902	6	0.02	0.02	149	0.49	0.49	8	0.03	0.03				163	0.54	0.54	14	0.04	0.04	118	0.39	0.39	295	0.97	0.97
1903	139	0.46	0.48	503	1.66	2.15	38	0.13	0.16				699	2.31	2.85	332	1.09	1.13	814	2.69	3.08	1845	6.09	7.06
1904	362	1.20	1.68	535	1.77	3.92	41	0.14	0.30				958	3.17	6.02	670	2.21	3.34	264	0.87	3.95	1892	6.25	13.31
1905	915	3.02	4.70	408	1.35	5.27	36	0.12	0.42				1382	4.56	10.58	780	2.58	5.92	82	0.27	4.22	2244	7.41	20.72
1906	1081	3.57	8.27	254	0.84	6.11	21	0.07	0.49				1391	4.59	15.17	816	2.70	8.62	21	0.07	4.29	2228	7.36	28.08
1907	961	3.17	11.44	231	0.76	6.87	46	0.15	0.64				1262	4.16	19.33	676	2.23	10.85	17	0.06	4.35	1955	6.45	34.53
1908	771	2.55	13.99	159	0.52	7.39	21	0.07	0.71				983	3.25	22.58	734	2.42	13.27	12	0.04	4.39	1729	5.71	40.24
1909	641	2.12	16.11	100	0.33	7.72	15	0.05	0.76				785	2.59	25.17	539	1.78	15.05	12	0.04	4.43	1336	4.41	44.65
1910	465	1.53	17.64	88	0.29	8.01	10	0.03	0.79	3	0.01	0.01	579	1.91	27.08	413	1.36	16.41	2	0.01	4.44	994	3.28	47.93
1911	223	0.74	18.38	39	0.13	8.14	7	0.02	0.81	2	0.01	0.02	289	0.95	28.03	294	0.97	17.38	1		4.44	584	1.93	49.86
1912	138	0.45	18.83	30	0.10	8.24			0.81			0.02	175	0.58	28.61	188	0.62	18.00	1		4.44	364	1.20	51 06

wheels obtained by dividing the number in service by the number removed per year, but this figure is not of much value, as it depends more on the rate at which the number of wheels in service increases than on the actual life of the wheels removed. Thus if the number of wheels in service remained stationary for a period of years, while the number of wheels removed increased 25%, it would indicate a decrease in the average life of the wheels of 20%, while if during the same period the wheels in service had increased 50%, the same increase in the number of wheels removed would indicate an increase in the average life of 20%. Now if the increase in the wheels in service had taken place in two or three years, it would have had comparatively little influence on the wheels removed, so that an increase in the life of the wheel might be shown by these figures, while a reduction had actually occurred. In addition reports of wheels removed on foreign lines are not obtained correctly, especially for wheels removed on handling companies account and in general it is not uncommon for a life of

While the average life of wheels removed affords valuable information over a period of years, it does not enable the result of any variation in the quality or service of the wheels to be detected until considerable time has elapsed, and then only in a general way. When the wheel foundry methods of the C. P. R. were revised in 1908, it became desirable to introduce some system by which it could be determined whether better service results were being obtained or not, without the complications of the old individual records. This was accomplished in a satisfactory and simple manner by comparing for each years make of wheels, of the same weight and manufacture, the number removed for various classes of defect in each year of their life. This system does not require any additional reports over those commonly used. The only information needed is the make of the wheel, weight, date cast, maker and cause of removal, items that are likely to be reported accurately and which are those required for a record of any kind. As the number of wheels of any group cast in each year is

quent modification to 645 lbs. and 625 lbs. up to 1912, one of the advantages of this system being that with the records that had been kept it was possible without too much work to go back as many years as necessary to compare the results with those of previous years.

This statement, fig. 1—while giving all the information that is obtained for the wheels it refers to, does not enable any comparison to be made easily, and for that purpose a series of such statements for wheels made in successive years are combined as shown in fig. 2. This statement shows the number of the wheels of the weight it relates to made in each year, and the percentage removed in each year of their life for all causes, except worn flange, slid flat and removed from tenders. A similar statement, fig. 3, shows the percentage removed each year for worn flange and slid flat and similar statement, fig. 4, shows the percentage of broken wheels and broken and chipped flanges for the same series. It is evident that similar statements may easily be prepared for any cause of remov-