A BASE STUDY OF THE BOX AND HOPPER CAR SUPPLY PROBLEM IN THE UNITED STATES

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Robert J. Tosterud
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ROBERT J. TOSTERUD
DAVID C. NELSON

UPPER GREAT PLAINS TRANSPORTATION INSTITUTE
NORTH DAKOTA STATE UNIVERSITY
P. O. BOX 5074
FARGO, NORTH DAKOTA 58105

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HIGHLIGHTS

A combination of secondary and primary data was used to satisfy the general objective of this study; to describe and give an economic interpretation to the national and district trends in boxcar and covered hopper car ownership. The specific objectives of this study were (1) to review boxcar and covered hopper car loadings, (2) to analyze and compare three railroad samples in respect to ownership and loading trends by geographic area, (3) to analyze the economics of current per diem rates, and (4) to describe the physical facilities for unloading boxcars and covered hopper cars at grain port terminal elevators.

A historical review of the boxcar supply revealed that current criticisms of the boxcar supply are not significantly different in nature to the criticisms of 1921.

There were approximately 1.5 million freight cars owned by Class I railroads in the United States in 1902, and 47 percent of this total freight car ownership consisted of boxcars. Class I railroads in 1966 owned approximately 1.5 million freight cars, and 31 percent of this total freight car ownership was composed of boxcars. Aggregate capacity of boxcars in service in 1902 was 19.0 million tons. Aggregate capacity of boxcars in service in 1966 was 23.5 million tons. With the innovation of the covered hopper car, the total capacity of railroad grain transport equipment in 1966 was 32.0 million tons. Over 25 percent of the total capacity of railroad transport equipment was covered hopper car capacity in 1966.

There has been a redistribution of plain boxcars among geographical regions of the United States. Eastern railroads owned 38.9 percent of all Class I railroad plain boxcars in 1956. By 1967, only 31.2 percent of Class I plain boxcars were owned by Eastern railroads. Centralwest railroads owned 21.2 percent of all Class I railroad plain boxcars in 1956. By 1967, 27.8 percent of all Class I plain boxcars were owned by Centralwest railroads. Ownership in covered hopper cars by Class I railroads in all geographic regions has increased since 1956.

Ownership of boxcars by Class I railroads declined by 19 percent during the period 1956 to 1967. Loadings of boxcars by Class I railroads declined 43 percent during the period 1956 to 1967. Ownership of covered hopper cars by Class I railroads increased by 151.5 percent during the period 1956 to 1967. Loadings of covered hopper cars by Class I railroads increased 125.1 percent during the period 1956 to 1967. Each boxcar owned by Class I railroads was loaded on the average 21.2 times in 1956. This boxcar loading per ownership ratio was 14.9 in 1967. Each covered hopper car owned by Class I railroads was loaded, on the average, 22.4 times in 1956. The covered hopper car loading per ownership ratio fell to 20.0 by 1967.

A sample of Eastern railroads owned 125,246 boxcars as of June 1968, but had available for loading purposes 158,701 boxcars; this

Eastern railroad sample had 126.7 percent of its boxcar ownership on-line in June 1968. Railroads in the Upper Great Plains owned 213,215 boxcars in June of 1968, whereas only 175,103 boxcars were available to Upper Great Plains shippers; Upper Great Plains' railroads had 82.1 percent of boxcar ownership on-line in June 1968. Northern Line railroads had 77.9 percent of boxcar ownership on-line and available to area shippers in June of 1968. A hypothetical relationship between on-line boxcar ownership and freight rates was presented.

The decision of direct buying or paying per diem to satisfy the objective of freight car control and maximizing loadings was analyzed. The solution was to either pay per diem when profitable or to buy a freight car and maintain control.

A BASE STUDY OF THE BOX AND HOPPER CAR SUPPLY PROBLEM IN THE UNITED STATES

Robert J. Tosterud and David C. Nelson*

INTRODUCTION

North Dakota farmers harvested 18.0 million acres of principal crops in 1966; an aggregate production of 10.7 million tons of consumable crops.[1] Cash receipts from the marketing of crops grown in North Dakota in 1966 totaled $461,049,000.[2]

North Dakota crops are marketed over a 12-month period. However, there are seasonal fluctuations. For example, 2.7 percent of the total 1966 income from crop marketing was realized in July, while 19.6 percent was realized in September.[3] About 81 percent of the total grain marketed in 1966 was moved to market by railroads.[4] This indicates a high dependency of the North Dakota grain marketing system on railroads.

During the period 1956 to 1967, Class I railroads retired without replacement 219,587 plain boxcars. This has a direct effect on the ability of railroads to haul grain. This deterioration in plain boxcar ownership was partially offset by the increase in covered hopper car ownership an increase of 63,271 units during the same period, 1956 to 1967. There are not only less units available to haul grain in the United States, but also less capacity.

The argument that the increase in covered hopper capacity has offset the decrease in plain boxcar capacity has no merit unless it is assumed that the capacity of the covered hopper car is three times that of the plain boxcar. However, Class I railroads have retired 3.47 plain boxcars for every 100 ton covered hopper car added.

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*Tosterud was a former graduate assistant, and Nelson is Director, Upper Great Plains Transportation Institute, North Dakota State University, Fargo, North Dakota.

[1] North Dakota Crop and Livestock Statistics, Annual Summary for 1967 Revisions for 1966, U. S. Department of Agriculture, Statistical Reporting Service, Fargo, North Dakota, May 1968, p. 14.

[2] Ibid., p. 68.

[3] North Dakota Crop and Livestock Statistics, Annual Summary for 1966, U. S. Department of Agriculture, Statistical Reporting Service, Fargo, North Dakota, May 1967. p. 74.

[4] North Dakota Crop and Livestock Statistics, Annual Summary for 1967 Revisions for 1966, op. cit., p. 73.

It is possible that good prices for grain are not available because of massive car shortages. This creates an income problem at the farm level and also creates an income problem at the country marketing level because a shortage of carrying capacity affects the amount transported at any particular time.

Objectives

The major objective of this study is to identify and analyze national and district trends in boxcar and covered hopper car ownership. The specific objectives of this study are:

1. To review boxcar and covered hopper loadings.
2. To analyze and compare three railroad samples in respect to ownership and loading trends by geographic area.
3. To analyze the economics of current per diem rates.
4. To describe the physical facilities for unloading boxcars and covered hopper cars at grain port terminal elevators.

Procedure

The availability and use of grain-hauling equipment will be analyzed by examining the supply and demand for this equipment by the Class I railroads. This analysis will be made on a national, regional, and district basis. The method used will be the formulating of hypotheses from the analysis of secondary and primary data.

The primary data, obtained from questionnaires, consist of railroad-management opinions on their own particular financial decision-making process and also the description of physical facilities for the unloading of grain boxcars and covered hopper cars at port terminal elevators. Secondary data were provided by the Interstate Commerce Commission and bulletins supplied by the Association of American Railroads and the United States Department of Agriculture.

Definition of Terms

Districts: The Eastern District is primarily that territory east of the Mississippi and north of the Potomac and Ohio rivers, whereas the Southern District covers the territory east of the Mississippi and south of the Potomac and Ohio rivers.

The territory west of the Mississippi is divided in approximately equal sections: North, Central, and South.

Class I Railroad: An Interstate Commerce Commission classification which includes railroads with average annual operating revenues of $5 million or more each, increase from $3 million in 1965.

The Code of Per Diem Rules: A specification of charges which must be paid for cars by the using line to the owning railroad. The accounting is on a time basis.

The Code of Car Service Rules: Prescribes when and in what manner cars will be sent to their home owners.

Plain Boxcar: A freight car capable of hauling grain. Lengths vary from 40 feet to 60 feet and longer, and may have different door characteristics. Normal capacity is 60 to 70 tons.

Equipped Boxcar: A freight car which is of the character of a plain boxcar but is mechanically equipped to carry a particular type of freight requiring individual transport needs. A car designed for special service.

Covered Hopper: A hard-covered hopper car capable of hauling grain. Capacity is up to 120 tons.

The Upper Great Plains: This territory includes the states of North Dakota, South Dakota, Montana, Nebraska, Kansas, Colorado, Wyoming, and Utah.

Revenue Freight Car Loading: These are loadings listed in Association of American Railroads statement CS 54-1B; loadings regardless of whether the freight car is loaded with revenue freight or with company material or other nonrevenue freight. This covers loadings in system cars, in foreign cars, or in privately owned cars.

HISTORICAL BACKGROUND

In the fall of 1921, the Joint Commission of Agricultural Inquiry was created by Senate Concurrent Resolution 4, and inquiry was directed into four major subject areas:

1. The condition of agriculture and the factors which caused it.

2. The adequacy and effectiveness of the credit machinery and resources of the country.

3. Transportation.

4. Marketing and distribution.

The relevance of the findings is found in the 31 recommendations of the Commission, specifically recommendations 8, 9, and 10:

8. Prompt consideration and adoption of a comprehensive plan for central control and distribution of freight cars---

   a. To meet currently and in full the requirements of shippers in each and every section of the country.

   b. To reduce empty car mileage except that made necessary to protect originating territory.

   c. To meet demands in originating territory currently by balancing movement of loaded and empty cars.

9. That railroads and shippers cooperate to secure the full utilization of the carrying capacity of cars wherever possible.

10. That the supply of boxcars, coal cars, stock cars, and refrigerator cars is inadequate to meet the demand during normal periods of activity and should be rapidly augmented.[5]

In 1953, William J. Hudson, transportation economist, Marketing and Facilities Research Branch of the U. S. Department of Agriculture, reported in his publication,"A Study of Conditions Affecting the Transportation of Grain by Railroad," that "the lack of any substantial increase in the supply of boxcars means that a tight boxcar situation with periodic shortages, particularly of the better class of equipment required for grain and grain products, will probably continue over the next several years."[6]

Statistics, such as total freight-car supply or total freight-car capacity, will not be considered because concern is directed toward agriculture and the demand for railroad transport services for agricultural products. Few tank cars, stock cars, flat cars, refrigerator cars, or rack cars are demanded by grain producers, although some or all of the above-mentioned may be employed by agriculture or agri-business directly or indirectly at some time for some purpose. The concern is directed toward the 6 to 7 billion bushels of grain produced during a year and

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[5] Transportation, Report of the Joint Commission of Agricultural Inquiry, House of Representatives, 67th Congress, First Session, Report 408, Part 3, October 15, 1921.

[6] William J. Hudson, A Study of Conditions Affecting the Transportation of Grain by Railroad, U. S. Department of Agriculture, June 1953, p. iii.

the resultant demand for adequate, available freight cars for the individual transport requirements of grain, types of cars such as covered hopper cars and especially boxcars are of prime importance. Not being considered, while often included in "total freight car carrying capacity in the United States," is that of the inaccessible freight-car ownership by private car lines. The grain producer in the Upper Great Plains is wholly dependent on the Class I railroad's supply of adequate grain hauling equipment. In summary, the statistics employed in this section describe the historical evolution of the railroad boxcar and covered hopper car supply in the United States, assuming that all boxcars and covered hopper cars within the continental boundaries of the United States are, in fact, available to grain producers and shippers (Table 1).

In 1921, there were 1,038,222 boxcars within the continental boundaries of the United States with an aggregate capacity of 38,884,927 tons (Table 2). As concluded by the Joint Commission of Agricultural Inquiry in 1921, these totals were deficient as to the present transportation needs. In 1966, Class I railroads reported a total boxcar ownership of 455,753 units and an aggregate carrying capacity of 23,554,478 tons.[7] Capacity per boxcar has substantially increased since 1921 but the increase has not been sufficient to offset the drastic decline in total ownership which amounts to about 600,000 units. During this 45-year period, the American economy's production of goods and services was not stagnating, let alone declining. If, in fact, the American Gross National Product had declined or even remained unchanged, there may have been a justification for the railroads to decrease the supply of freight-hauling cars due to the decline in demand for freight-hauling cars.

There is an interdependence between the Gross National Product and transportation services. As more and more goods are produced in the economy, there would be an increase in the demand for services to transport these goods from point of production to point of consumption. This increase in service demand upon the railroads is in turn reflected in the Gross National Product of the American economy. The increase in freight cars in service in the United States during the years 1902 to 1925, a change from 1.5 million to almost 2.4 million, fits in rather well with the above hypothesis. During the thirties, the American economy suffered through the Great Depression, and concurrently there was a "great depression" in freight-car ownership of Class I railroads, from almost 2.30 million in 1930 to 1.65 million in 1939. After a recovery during the years 1940 to 1944, the freight car situation in the United

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[7]Association of American Railroads. Freight Cars in Service in the United States, Railroads and Private Car Lines, 1939-1966, Economics and Finance Department, Washington, D. C., December 1967, pp. 5-10.

TABLE 1. TOTAL NUMBER, CAPACITIES AND PERCENTAGES OF GRAIN RAILROAD TRANSPORT EQUIPMENT -- BOXCARS AND COVERED HOPPER CARS, UNITED STATES, 1955 THROUGH 1966

Year	Total number of railroad grain transport equipment	Total capacity of railroad grain transport equipment	Percent of total freight-car ownership capable of hauling grain	Percent of total freight car capacity available for hauling grain
		(tons)	(percent)	(percent)
1955	703,803	34,989,678	41.43	38.35
1956	720,669	36,091,713	42.22	39.16
1957	739,897	37,342,330	42.39	39.27
1958	731,235	37,108,135	42.41	39.27
1959	716,597	36,489,393	42.75	39.54
1960	702,084	35,966,803	42.33	39.12
1961	674,253	34,739,068	42.03	38.90
1962	646,484	33,755,392	41.71	38.70
1963	618,967	32,534,350	40.93	37.85
1964	596,291	32,028,621	40.06	36.91
1965	569,707	31,178,611	38.54	35.34
1966	559,230	31,959,141	37.58	34.96

Source: Freight Cars in the United States, Railroads and Private Car Lines, 1955-1966, Association of American Railroads, Economics and Finance Department, December 1967, pp. 5, 10.

TABLE 2. TRENDS IN OWNERSHIP AND CAPACITY OF ALL FREIGHT CARS AND BOXCARS, CLASS I RAILROADS, 1902 THROUGH 1966

Year	Freight cars in service in the U. S.	Aggregate capacity of freight-carrying cars in service	Number of boxcars in service	Boxcars: Percent of total freight cars in service	Aggregate capacity of boxcars in service	Boxcar: Percent of total freight car capacity
		(tons)		(percent)	(tons)	(percent)
1902[a]	1,505,992	42,292,977	708,861	47.06	19,051,105	45.05
1903	1,650,615	48,530,281	765,802	46.39	21,209,679	43.70
1904	1,688,341	50,759,133	780,445	46.22	22,084,441	43.51
1905	1,727,620	53,255,083	802,964	46.47	23,220,055	43.60
1906	1,833,635	59,059,302	843,118	45.98	25,255,362	42.76
1907	1,986,017	67,033,324	904,821	45.55	28,179,073	42.04
1908	2,096,234	73,086,522	950,209	45.32	30,410,499	41.61
1909	2,071,338	73,137,546	941,533	45.45	30,505,607	41.71
1910	2,133,531	76,578,735	966,577	45.30	31,932,482	41.70
1911	2,195,331	81,077,028	990,313	45.11	33,246,623	41.00
1912	2,215,239	82,905,418	1,004,005	45.32	34,015,573	40.99
1913	2,273,289	86,978,145	1,032,585	45.42	35,607,134	40.94
1914	2,325,647	90,977,098	1,043,796	44.88	36,622,074	40.23
1915	2,327,562	92,237,691	1,041,030	44.72	36,978,004	40.10
1916	2,298,263	92,945,535	1,031,864	44.59	37,399,156	39.60
1917	2,301,947	95,467,054	1,040,818	45.21	38,127,110	39.94
1918	2,325,562	96,766,585	1,038,751	44.66	38,108,345	39.38
1919	2,361,002	99,001,041	1,059,296	44.86	39,099,471	39.49
1920	2,321,517	98,020,264	1,048,762	45.04	39,128,106	39.92
1921	2,315,692	98,504,017	1,038,222	44.83	38,917,057	39.51
1922	2,293,392	98,846,836	1,021,516	44.54	38,884,927	39.34
1923	2,315,612	101,318,213	1,048,231	45.27	40,191,841	39.67
1924	2,348,725	104,149,381	1,069,243	45.52	41,833,309	40.17
1925	2,357,234	105,569,670	1,078,004	45.73	42,525,506	40.28
1926	2,348,679	105,952,818	1,076,332	45.83	43,014,944	40.60
1927	2,324,834	105,845,568	1,066,365	45.87	42.907,966	40.54

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TABLE 2. (CONTINUED)

Year	Freight cars in service in the U. S.	Aggregate capacity of freight-carrying cars in service	Number of boxcars in service	Boxcars: Percent of total freight cars in service	Aggregate capacity of boxcars in service	Boxcar: Percent of total freight car capacity
		(tons)		(percent)	(tons)	(percent)
1928	2,297,589	105,321,832	1,056,736	45.99	42,933,607	40.76
1929	2,277,505	105,410,586	1,053,057	46.24	43,277,718	41.06
1930	2,276,867	106,179,768	1,059,604	46.54	44,014,103	41.45
1931	2,201,510	103,421,700	1,017,445	46.22	42,618,039	41.21
1932	2,144,730	100,901,484	987,184	46.03	41,494,359	41.12
1933	2,034,886	96,734,269	926,045	45.51	39,391,708	40.72
1934	1,938,362	92,968,503	870,801	44.92	37,401,256	40.23
1935	1,835,736	88,677,106	809,280	44.08	34,903,128	39.36
1936	1,758,192	85,721,064	767,648	43.66	33,402,211	38.97
1937	1,743,834	85,808,067	755,980	43.35	33,223,575	38.72
1938	1,699,689	84,032,035	733,314	43.14	32,399,032	38.56
1939	1,650,031	82,001,557	704,472	42.69	31,332,565	38.21
1940	1,653,663	82,722,361	705,366	42.65	31,618,745	38.22
1941	1,703,304	85,682,497	734,020	43.09	33,196,441	38.74
1942	1,745,495	88,186,516	754,322	43.22	34,321,096	38.92
1943	1,756,343	88,967,614	744,532	42.39	33,852,636	38.05
1944	1,769,578	89,960,375	745,465	42.13	34,139,334	37.95
1945	1,760,297	89,872,361	741,946	42.15	34,265,118	38.13
1946	1,743,056	89,391,388	728,463	41.79	33,772,301	37.78
1947	1,734,239	89,224,538	726,882	41.91	33,939,517	38.04
1948	1,759,561	91,294,223	734,872	41.76	34,588,090	37.89
1949	1,753,766	91,961,055	719,349	41.02	34,027,524	37.00
1950	1,721,269	90,464,729	714,568	41.51	33,980,075	37.56
1951	1,752,430	92,671,044	736,059	42.00	35,191,848	37.98
1952	1,758,968	93,543,700	735,123	41.79	35,330,731	37.77
1953	1,776,816	95,074,549	735,592	41.40	35,494,399	37.33
1954	1,736,057	93,196,281	719,918	41.47	34,841,909	37.39

-continued-

TABLE 2. (CONTINUED)

Year	Freight cars in service in the U. S.	Aggregate capacity of freight-carrying cars in service	Number of boxcars in service	Boxcars: Percent of total freight cars in service	Aggregate capacity of boxcars in service	Boxcar: Percent of total freight car capacity
		(tons)		(percent)	(tons)	(percent)
1955	1,698,814	91,229,260	661,194	38.92	32,069,290	35.15
1956	1,706,843	92,161,038	673,747	39.47	32,838,781	35.63
1957	1,745,721	95,083,869	685,330	39.26	33,554,083	35.29
1958	1,724,228	94,486,434	672,402	39.00	33,027,112	34.95
1959	1,676,386	92,264,509	654,718	30.06	32,231,700	34.93
1960	1,658,292	91,947,166	637,829	38.46	31,516,371	34.28
1961	1,604,241	89,292,229	608,367	37.92	30,131,570	33.74
1962	1,550,067	87,223,695	577,106	37.23	28,854,485	33.08
1963	1,512,306	85,942,901	545,751	36.09	27,256,508	31.71
1964	1,488,385	86,770,709	515,123	34.61	26,011,843	29.98
1965	1,478,005	88,231,291	479,201	32.42	24,309,441	27.55
1966	1,488,115	91,406,777	455,753	30.63	23,554,478	25.77

[a]1955 to 1966 excludes "special service" boxcars. These cars were not made, nor can perform, as grain carrying freight cars.

Sources: 1902 to 1920; Transportation, Report of the Joint Commission of Agricultural Inquiry, House of Representatives, 67th Congress, First Session, Report 408, Part 3, October 15, 1921, pp. 585-588.

1921 to 1963; Railroad Transportation, A Statistical Record, 1921-1963, Association of American Railroads, Bureau of Railway Economics, Washington, D. C., April 1965, p. 12.

1964 to 1966; Freight Cars in the United States, Railroads and Private Car Lines, 1955-1966, Association of American Railroads, Economics and Finance Department, December 1967, pp. 2, 5, 10.

States maintained a depressed status, and in 1966 there was a total freight car ownership of less than 1.49 million units.

The aggregate carrying capacity of Class I owned freight cars in service in the United States during the years 1902 through 1966 followed a similar pattern as that of the ownership totals for those years.

Generally, this is the situation that all producers of products and contributors to the United States' Gross National Product must face in order to ship products via rail. In many cases a product requires a special form of transport service. For example, if the product is oil and it appears that the railroads are reflecting a historically consistent tank car ownership program, there may be good cause for the oil industry to consider transporting oil by rail, assuming a competitive freight rate offer by the railroads.

If the oil producer has a decision to make concerning the transportation of oil, the North Dakota grain shipper also must make a decision. Never in the history of modern grain farming has there been more grain production and less railroad cars to ship it in. The transport innovation of the covered hopper car has supplemented the grain shippers' available transportation facilities but has not reversed the deteriorating trend in capacity available.

In 1902, out of a total of 1,505,992 freight cars in service in the United States, almost 50 percent were potential grain-hauling cars. In 1966 there were less freight carrying cars in service in the United States than in 1902, and the percentage of total freight cars that were capable of hauling grain to market composed only 37.58 percent of total Class I freight car ownership.

The railroads have evidently changed priorities in supplying certain industries with adequate transportation facilities while neglecting other industries. The neglected industry, as with all industries, has economic survival as the first and foremost priority. To cover costs a firm must take in revenue. In order to take in adequate revenue, a firm must present a product to the consuming portion of the society. The grain shipper must present grain to the market; if one mode of transportation is unavailable, inadequate, or noncompetitive, the grain shipper will divert transportation demands toward a competitior mode.

The trend in covered hopper car ownership since 1955 has been impressive. Class I railroads owned 42,609 covered hoppers in 1955 (Table 3). This ownership has climbed to 103,477 cars in 1966. Only 2.51 percent of total freight cars owned by Class I railroads were covered hopper cars in 1955. This percentage had increased to almost 7.0 percent by 1966.

TABLE 3. CLASS I RAILROAD AGGREGATE OWNERSHIPS AND AGGREGATE CAPACITIES OF COVERED HOPPER CARS, UNITED STATES, 1955 THROUGH 1966

Year	Number in service	Percent of total freight cars in service	Aggregate capacity	Percent of total freight car capacity
		(percent)	(tons)	(percent)
1955	42,609	2.51	2,920,388	3.20
1956	46,952	2.75	3,252,932	3.53
1957	54,567	3.13	3,788,247	3.98
1958	58,833	3.41	4,081,023	4.32
1959	61,879	3.69	4,257,693	4.61
1960	64,255	3.87	4,450,432	4.84
1961	65,886	4.11	4,607,498	5.16
1962	69,378	4.48	4,900,947	5.62
1963	73,216	4.84	5,277,842	6.14
1964	81,168	5.45	6,016,778	6.93
1965	90,506	6.12	6,869,170	7.79
1966	103,477	6.95	8,404,663	9.19

Source: Freight Cars in the United States, Railroads and Private Lines, 1955-1966, Association of American Railroads, Economics and Finance Department, December 1967, pp. 5, 10.

The average plain boxcar had a capacity of about 56 tons in 1966, whereas the average covered hopper car had a capacity of 81 tons. The addition of the covered hopper car to a railroad fleet means about a 33 percent increase in capacity per unit. Covered hopper cars accounted for about 25 percent of the total capacity available for hauling grain to market in 1966. This amounted to an additional 8,404,663 tons of carrying capacity. Thus the railroads could retire four plain boxcars for every three covered hopper cars added, and maintain the 1966 cumulative aggregate carrying capacity of 31,959,141 tons. If the carrying capacity per covered hopper car should increase in the future, the ratio will increase. Class I railroads could conceivably retire all 455,753 plain boxcars by adding about 355,000 covered hoppers with a carrying capacity equal to an average of 81 tons.

THE DISTRIBUTION OF PLAIN BOXCARS AND COVERED HOPPER CARS AMONG EASTERN, SOUTHERN, SOUTHWEST, CENTRALWEST, AND SOUTHWEST RAILROADS

Covered hopper cars can serve as a substitute for plain boxcars for hauling grain by railroad. An acceptable ratio of substitution of covered hopper car capacity for plain boxcar capacity is 2:1, one 120-ton covered hopper car could replace two 60-ton plain boxcars. Approximately 219,590 plain boxcars were retired without replacement by Class I railroads during the period 1956 to 1967. During the same period, 1956 to 1967, 63,271 covered hopper cars were added to Class I railroad freight car ownerships. For every covered hopper car added to the Class I railroad freight car fleet, 3.47 plain boxcars were retired during the period 1956 to 1967. For every 120 tons gained from the addition of a covered hopper car, 206 tons were lost from grain hauling capacity by the subsequent decline in plain boxcar capacity. When railroads in the Eastern district added one covered hopper car, ten plain boxcars were retired. Southern railroads retired two plain boxcars for each covered hopper car added. Northwest railroads retired three plain boxcars per covered hopper car added. For each covered hopper car added to Centralwest railroads, 0.60 plain boxcar was retired. Southwest railroads retired six plain boxcars for each added covered hopper car.

Class I Railroads in the Eastern District of the United States

The total plain boxcar ownership among Class I railroads in the Eastern district in 1956 was 258,558 or 38.9 percent of the entire Class I ownership in the nation.[8] This figure had fallen to 141,990

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[8]Prior to 1965, the Eastern district was divided into three districts: Eastern, Alleghany, and Pocahantas.

or 31.2 percent by 1967 (Table 4). Eastern railroad plain boxcar ownership reached a peak in 1958 at 268,787. There were 9,656 plain boxcars added to the total fleet of the Class I railroads in 1956, of which 65.6 percent were accounted for by the additions to the Eastern railroads. National Class I plain boxcar ownership declined by 31.6 percent from 1956 to 1967. Eastern railroads had a decline in plain boxcar ownership of 45.1 percent from 1956 to 1967. The national Class I railroad ownership of plain boxcars declined by 19,037 units in 1967. The percent attributable to Eastern railroads was 53.5 percent or a total decline in Eastern ownership of 10,177 units. The Eastern railroads' percent of the total national decline in plain boxcar ownership had exceeded its percent of national ownership for the entire period 1960 through 1967; for example, 65.5 percent of all Class I plain boxcars retired in the United States were retired from Eastern railroads whereas total Eastern ownership was only 33.2 percent of the entire national Class I ownership. There has been a change in covered hopper car ownership since 1956 in all five districts (Table 5). National Class I covered hopper car ownership was 41,756 units in 1956. In 1967, there was a percentage change from 1956 of 151.5 percent to 105,827 units. The Eastern district's ownership change reflects an increase of 64.6 percent. Eastern covered hopper car ownership totaled 17,715 in 1956 but by 1967 the ownership in covered hopper cars had increased to 29,166 units. While additions to the covered hopper car fleet have been consistently made to Eastern railroads, the ownership in covered hopper cars by Eastern railroads as a percent of national covered hopper car ownership has been on the decline since 1956: 42.43 percent of the entire Class I railroad covered hopper car fleet were under the ownership of Eastern railroads in 1956, while 27.77 percent of total Class I covered hopper cars were of Eastern railroad ownership in 1967.

Class I Railroads in the Southern District of the United States

Southern railroad ownership of plain boxcars in 1956 was 95,746. Plain boxcar ownership in the Southern district declined by 32.6 percent from 1956 to 1967. A total of 31,164 plain boxcars were retired from Southern railroads without replacement during the period 1956 through 1967 (Table 6). Southern railroads owned 14.4 percent of all Class I railroad plain boxcars in 1956. Eleven years later, in 1967, 14.2 percent of total Class I railroad plain boxcars were owned by Southern railroads.

Southern railroad ownership of covered hopper cars in 1956 was 9,469 or 22.7 percent of total Class I railroad covered hopper car ownership (Table 7). A total of 15,709 covered hopper cars was added to Southern railroads during the period 1956 to 1967, resulting in a percent change of 165.9 percent. Covered hopper cars owned by Class I Southern railroads composed 24.0 percent of the total Class I railroad ownership in covered hopper cars.

TABLE 4. OWNERSHIP TRENDS IN PLAIN BOXCARS, NATIONAL CLASS I VERSUS EASTERN, UNITED STATES, 1956 THROUGH 1967

Year	Eastern		National		Change in National attributable to Eastern	National ownerships which are Eastern
	Ownership	Change from previous year	Ownership	Change from previous year		
					(percent)	(percent)
1956	258,558		664,348			38.92
1957	264,888	+ 6,330	674,004	+ 9,656	65.56	39.30
1958	268,787	+ 3,899	685,276	+ 11,272	34.59	39.22
1959	265,075	- 3,712	674,792	- 10,484	35.41	39.28
1960	251,521	- 13,554	655,418	- 19,374	69.95	38.38
1961	241,139	- 10,382	639,200	- 16,218	64.02	37.73
1962	223,108	- 18,031	609,488	- 29,712	60.69	36.61
1963	203,539	- 19,569	578,834	- 30,654	63.84	35.16
1964	180,665	- 22,874	543,898	- 34,936	65.47	33.22
1965	164,712	- 15,953	508,713	- 35,185	45.34	32.38
1966	152,167	- 12,545	473,798	- 34,915	35.96	32.12
1967	141,990	- 10,177	454,761	- 19,037	53.46	31.22

Source: Association of American Railroads, Car Service Division, Semi-Monthly Revenue Freight Car Summary - Class I Railroads, CS-8A Statements.

TABLE 5. OWNERSHIP TRENDS IN COVERED HOPPER CARS, NATIONAL CLASS I VERSUS EASTERN, UNITED STATES, 1956 THROUGH 1967

Year	Eastern		National		Change in National attributable to Eastern	National ownerships which are Eastern
	Ownership	Changes from previous year	Ownership	Changes from previous year		
					(percent)	(percent)
1956	17,715		41,756			42.43
1957	19,352	+ 1,634	46,210	+ 4,454	36.75	41.88
1958	21,368	+ 2,016	54,113	+ 7,903	25.51	39.49
1959	22,452	+ 1,084	58,383	+ 4,270	25.39	38.46
1960	22,268	- 184	61,407	+ 3,024	6.08	36.26
1961	22,666	+ 398	63,910	+ 2,503	15.90	35.47
1962	22,851	+ 185	65,688	+ 1,778	10.40	34.79
1963	23,577	+ 726	69,106	+ 3,418	21.24	34.12
1964	24,201	+ 624	73,822	+ 4,716	13.23	32.78
1965	25,326	+ 1,125	81,573	+ 7,931	14.18	30.98
1966	27,571	+ 2,245	92,080	+ 10,327	21.74	29.94
1967	29,166	+ 1,595	105,027	+ 12,947	12.32	27.77

Source: Association of American Railroads, Car Service Division, Semi-Monthly Revenue Freight Car Summary - Class I Railroads, CS-8A Statements.

TABLE 6. OWNERSHIP TRENDS IN PLAIN BOXCARS, NATIONAL CLASS I VERSUS SOUTHERN, UNITED STATES, 1956 THROUGH 1967

Year	Southern		National		Change in National attributable to Southern	National ownerships which are Southern
	Ownership	Change from previous year	Ownership	Change from previous year		
					(percent)	(percent)
1956	95,746		664,348			14.41
1957	97,274	+ 1,528	674,004	+ 9,656	15.82	14.43
1958	100,277	+ 3,003	685,276	+ 11,272	26.64	14.63
1959	97,907	- 2,370	674,792	- 10,484	22.61	14.51
1960	96,204	- 1,703	655,418	- 19,374	8.79	14.68
1961	94,709	- 1,495	639,200	- 16,218	9.22	14.82
1962	91,879	- 2,830	609,488	- 29,712	9.52	15.07
1963	90,799	- 1,100	578,834	- 30,654	3.59	15.68
1964	87,173	- 3,603	543,898	- 34,936	10.31	16.03
1965	77,481	- 9,692	508,713	- 35,185	27.55	15.23
1966	70,920	- 6,561	473,798	- 34,915	18.79	14.97
1967	64,582	- 6,338	454,761	- 19,037	33.23	14.20

Source: Association of American Railroads, Car Service Division, Semi-Monthly Revenue Freight Car Summary - Class I Railroads, CS-8A Statement.

TABLE 7. OWNERSHIP TRENDS IN COVERED HOPPER CARS, NATIONAL CLASS I VERSUS SOUTHERN, UNITED STATES, 1956-1967

Year	Southern		National		Change in National attributable to Southern	National ownerships which are Southern
	Ownership	Change from previous year	Ownership	Change from previous year		
					(percent)	(percent)
1956	9,469		41,756			22.68
1957	9,979	+ 510	46,210	+ 4,454	11.45	21.59
1958	12,715	+ 2,736	54,113	+ 7,903	34.62	23.50
1959	13,147	+ 432	58,383	+ 4,270	10.12	22.52
1960	13,513	+ 366	61,407	+ 3,024	12.10	22.01
1961	14,649	+ 1,136	63,910	+ 2,503	45.39	22.92
1962	15,038	+ 389	65,688	+ 1,778	21.88	22.89
1963	16,363	+ 1,325	69,106	+ 3,418	38.77	23.68
1964	17,404	+ 1,041	73,822	+ 4,716	22.07	23.58
1965	19,876	+ 2,472	81,753	+ 7,931	31.17	24.31
1966	22,146	+ 2,270	92,080	+ 10,327	21.98	24.05
1967	25,178	+ 3,032	105,027	+ 12,947	23.42	23.97

Source: Association of American Railroads, Car Service Division, Semi-Monthly Revenue Freight Car Summary - Class I Railroads, CS-8A Statements.

Class I Railroads in the Northwest District of the United States

Retired without replacement from railroads serving the Northwest district of the United States during the period 1956 to 1967 were 19,283 plain boxcars. Northwest Class I railroads owned 108,945 plain boxcars in 1956 or 16.4 percent of the total Class I railroad ownership of plain boxcars (Table 8). Class I railroads in the Northwest district of the United States owned 89,662 plain boxcars in 1967 or 19.7 percent of all Class I railroad plain boxcars. The change in plain boxcar ownership of Northwest railroads for the period 1956 to 1967 was a decline of 17.7 percent. In this respect, railroads operating in the Northwest district compare favorably with railroads operating in other districts.

In 1959, Class I railroads retired 10,484 plain boxcars, 29.1 percent of this decline was retired from railroads serving the Northwest district. In 1967, Class I railroads retired 19,037 plain boxcars, 3.0 percent of which can be attributed to railroads serving the Northwest district.

All Class I railroads owned 41,756 covered hopper cars in 1956. About 6.4 percent of the total or 2,664 covered hopper cars were owned by Northwest railroads (Table 9). During the period 1956 through 1967, 6,557 covered hopper cars were added to railroad fleets serving the shippers of the Northwest district. During 1967, 13,000 covered hopper cars were added to Class I railroads and almost 2,000 of these were added to Northwest railroads. Covered hopper car fleets of Northwest railroads composed 8.8 percent of the total Class I railroad covered hopper car fleet in 1967.

Class I Railroads in the Centralwest District of the United States

Class I railroads serving the Centralwest district in 1956 had a fleet of 140,618 plain boxcars or 21.2 percent of total Class I railroad ownership in plain boxcars (Table 10). Ownership of plain boxcars by railroads in the Centralwest district of the United States totaled 126,296 or 27.8 percent of the total Class I railroad plain boxcar ownership in 1967. Retired without replacement from Centralwest railroads during the period 1956 to 1967 were 14,322 plain boxcars; a 10.2 percent decline since 1956. In 1962, Class I railroads retired 29,712 plain boxcars. In this same year, Centralwest railroads added 5,470 plain boxcars; the only railroad sample to make such an addition to a plain boxcar fleet.

Railroads serving the Centralwest district of the United States had a total fleet of 7,884 covered hopper cars in 1956 or 18.9 percent of the entire Class I railroad covered hopper car fleet (Table 11). Total covered hopper car ownership by Class I railroads was 105,027

TABLE 8. OWNERSHIP TRENDS IN PLAIN BOXCARS, NATIONAL CLASS I VERSUS NORTHWEST, UNITED STATES, 1956 THROUGH 1967

Year	Northwest		National		Change in National attributable to Northwest	National ownerships which are Northwest
	Ownership	Change from previous year	Ownership	Change from previous year		
					(percent)	(percent)
1956	108,945		664,348			16.40
1957	108,662	- 283	674,004	+ 9,656	2.93	16.12
1958	110,219	+ 1,557	685,276	+ 11,272	13.81	16.08
1959	107,172	- 3,047	674,792	- 10,484	29.06	15.88
1960	105,627	- 1,545	655,418	- 19,374	7.97	16.12
1961	104,302	- 1,325	639,200	- 16,218	8.17	16.32
1962	102,042	- 2,260	609,488	- 29,712	7.61	16.74
1963	99,894	- 2,148	578,834	- 30,654	7.01	17.26
1964	98,710	- 1,184	543,898	- 34,936	3.39	18.15
1965	97,069	- 1,641	508,713	- 35,185	4.66	19.08
1966	90,240	- 6,829	473,798	- 34,915	19.56	19.05
1967	89,662	- 578	454,761	- 19,037	3.04	19.72

Source: Association of American Railroads, Car Service Division, Semi-Monthly Revenue Freight Car Summary - Class I Railroads, CS-8A Statements.

TABLE 9. OWNERSHIP TRENDS IN COVERED HOPPER CARS, NATIONAL CLASS I VERSUS NORTHWEST, UNITED STATES, 1956 THROUGH 1967

Year	Northwest		National		Change in National attributable to Northwest	National ownerships which are Northwest
	Ownership	Change from previous year	Ownership	Change from previous year		
					(percent)	(percent)
1956	2,664		41,756			6.38
1957	3,191	+ 527	46,210	+ 4,454	11.83	6.91
1958	3,835	+ 644	54,113	+ 7,903	8.15	7.09
1959	4,852	+ 1,017	58,383	+ 4,270	23.82	8.31
1960	5,205	+ 353	61,407	+ 3,024	11.67	8.48
1961	5,405	+ 200	63,910	+ 2,503	7.99	8.46
1962	5,523	+ 118	65,688	+ 1,778	6.64	8.41
1963	5,696	+ 173	69,106	+ 3,418	5.06	8.24
1964	5,883	+ 187	73,822	+ 4,716	3.97	7.97
1965	6,661	+ 778	81,753	+ 7,931	9.81	8.15
1966	7,277	+ 616	92,080	+ 10,327	5.96	7.90
1967	9,221	+ 1,944	105,027	+ 12,947	15.02	8.78

Source: Association of American Railroads, Car Service Division, Semi-Monthly Revenue Freight Car Summary - Class I Railroads, CS-8A Statements.

TABLE 10. OWNERSHIP TRENDS IN PLAIN BOXCARS, NATIONAL CLASS I VERSUS CENTRALWEST, UNITED STATES, 1956 THROUGH 1967

Year	Centralwest		National		Change in National attributable to Centralwest	National ownerships which are Centralwest
	Ownership	Change from previous year	Ownership	Change from previous year		
					(percent)	(percent)
1956	140,618		664,348			21.17
1957	141,522	+ 904	674,004	+ 9,656	9.36	21.00
1958	145,258	+ 3,736	685,276	+ 11,272	33.14	21.20
1959	144,918	- 340	674,792	- 10,484	3.24	21.48
1960	142,412	- 2,506	655,418	- 19,374	12.93	21.73
1961	140,430	- 1,982	639,200	- 16,218	12.22	21.97
1962	145,900	+ 5,470	609,488	- 29,712	18.41	23.94
1963	142,397	- 3,503	578,834	- 30,654	11.43	24.60
1964	138,347	- 4,050	543,898	- 34,936	11.59	25.44
1965	133,481	- 4,866	508,713	- 35,185	13.83	26.24
1966	126,671	- 6,810	473,798	- 34,915	19.50	26.74
1967	126,296	- 375	454,761	- 19,037	1.97	27.77

Source: Association of American Railroads, Car Service Division, Semi-Monthly Revenue Freight Car Summary - Class I Railroads, CS-8A Statements.

TABLE 11. OWNERSHIP TRENDS IN COVERED HOPPERCARS, NATIONAL CLASS I VERSUS CENTRALWEST, UNITED STATES, 1956 THROUGH 1967

Year	Centralwest		National		Change in National attributable to Centralwest	National ownerships which are Centralwest
	Ownership	Change from previous year	Ownership	Change from previous year		
					(percent)	(percent)
1956	7,884		41,756			18.88
1957	9,186	+ 1,302	46,210	+ 4,454	29.23	19.88
1958	11,204	+ 2,018	54,113	+ 7,903	25.53	20.70
1959	12,732	+ 1,528	58,383	+ 4,270	35.78	21.81
1960	14,348	+ 1,616	61,407	+ 3,024	53.42	23.37
1961	14,991	+ 643	63,910	+ 2,503	25.69	23.46
1962	16,557	+ 1,566	65,688	+ 1,778	88.23	25.21
1963	17,485	+ 928	69,106	+ 3,418	27.15	25.30
1964	19,584	+ 2,099	73,822	+ 4,716	44.51	26.53
1965	22,389	+ 2,805	81,753	+ 7,931	35.37	27.39
1966	25,973	+ 3,589	92,080	+ 10,327	34.75	28.21
1967	31,075	+ 5,102	105,027	+ 12,947	39.41	29.59

Source: Association of American Railroads, Car Service Division, Semi-Monthly Revenue Freight Car Summary - Class I Railroads, CS-8A Statements.

in 1967; almost 30 percent of this total was owned by railroads in Centralwest district. Covered hopper car additions to Centralwest railroads serve as significant additions to the total Class I railroad covered hopper car fleet; 88.2 percent of total covered hopper car additions to Class I railroads were additions to Centralwest railroads in 1962.

Class I Railroads in the Southwest District of the United States

Railroads in the Southwest district of the United States owned 9.1 percent of the total Class I railroad plain boxcar fleet in 1956 (Table 12). Over 18,000 plain boxcars were retired from Southwest railroads during the period 1956 to 1967. Railroads operating in the Southwest district in 1967 owned 7.1 percent of the total Class I railroad ownerships in plain boxcars.

Railroads serving the shippers of the Southwest district made available to these shippers 4,025 covered hopper cars in 1956; 11 years later, in 1967, 10,387 covered hopper cars were available to Southwest shippers. Railroads in the Southwest district owned 9.6 percent of all covered hopper cars owned by Class I railroads in 1956 (Table 13). The total Class I plain boxcar fleet in 1967 was 454,761 units; 9.9 percent of this plain boxcar fleet was owned by railroads in the Southwest district of the United States.

Plain Boxcars and Covered Hopper Cars: a Cumulative Summation

Plain boxcars and covered hopper cars may be considered as potential grain hauling equipment; this equipment is capable of hauling grain but may be directed toward other services, temporary or permanently. During the period 1956 through 1967, the net decline in potential grain hauling freight cars owned by Class I railroads equalled 146,306. Of this net loss, 105,117 units were retired by Eastern railroads. Southern, Northwest, and Southwest railroads retired without replacement 15,455, 12,726, and 21,877 potential grain hauling freight cars, respectively. There has been a net addition of 8,869 grain freight cars to railroad fleets in the Centralwest district. While 14,322 plain boxcars were retired from Centralwest railroads during the period 1956 to 1967, 23,191 covered hopper cars were being added (Table 14).

TABLE 12. OWNERSHIP TRENDS IN PLAIN BOXCARS, NATIONAL CLASS I VERSUS SOUTHWEST, UNITED STATES, 1956 THROUGH 1967

Year	Southwest		National		Change in National attributable to Southwest	National ownerships which are Southwest
	Ownership	Change from previous year	Ownership	Change from previous year		
					(percent)	(percent)
1956	60,481		664,348			9.10
1957	61,658	+ 1,177	674,004	+ 9,656	12.19	9.15
1958	60,735	- 923	685,276	+ 11,272	8.19	8.86
1959	59,720	- 1,015	674,792	- 10,484	9.68	8.85
1960	59,654	- 66	655,418	- 19,374	.34	9.10
1961	58,620	- 1,034	639,200	- 16,218	6.38	9.17
1962	46,559	- 12,061	609,488	- 29,712	40.59	7.64
1963	42,225	- 4,334	578,834	- 30,654	14.14	7.29
1964	39,003	- 3,222	543,898	- 34,936	9.22	7.17
1965	35,970	- 3,033	508,713	- 35,185	8.62	7.07
1966	33,800	- 2,170	473,798	- 34,915	6.22	7.13
1967	32,231	- 1,569	454,761	- 19,037	8.24	7.09

Source: Association of American Railroads, Car Service Division, Semi-Monthly Revenue Freight Car Summary - Class I Railroads, CS-8A Statements.

TABLE 13. OWNERSHIP TRENDS IN COVERED HOPPER CARS, NATIONAL CLASS I VERSUS SOUTHWEST, UNITED STATES, 1956 THROUGH 1967

Year	Southwest		National		Change in National attributable to Southwest	National ownerships which are Southwest
	Ownership	Change from previous year	Ownership	Change from previous year		
					(percent)	(percent)
1956	4,024		41,756			9.64
1957	4,502	+ 478	46,210	+ 4,454	10.73	9.74
1958	4,991	+ 489	54,113	+ 7,903	6.19	9.22
1959	5,200	+ 209	58,383	+ 4,270	4.89	8.91
1960	6,073	+ 873	61,407	+ 3,024	28.87	9.89
1961	6,199	+ 126	63,910	+ 2,503	5.03	9.70
1962	5,719	- 480	65,688	+ 1,778	27.00	8.71
1963	5,985	+ 266	69,106	+ 3,418	7.78	8.66
1964	6,750	+ 765	73,822	+ 4,716	16.22	9.14
1965	7,501	+ 751	81,753	+ 7,931	9.47	9.18
1966	9,113	+ 1,612	92,080	+ 10,327	15.61	9.90
1967	10,387	+ 1,274	105,027	+ 12,947	9.84	9.89

Source: Association of American Railroads, Car Service Division, Semi-Monthly Revenue Freight Car Summary - Class I Railroads, CS-8A Statements.

TABLE 14. SUMMARY OF THE OWNERSHIP OF PLAIN BOXCARS AND COVERED HOPPER CARS AND THE CHANGE IN OWNERSHIP, BY DISTRICT, UNITED STATES, 1956 AND 1967

District	Plain boxcars	Covered hopper cars	Total
Eastern:			
1956	258,558	17,715	276,273
1967	141,990	29,166	171,156
Change			105,117
Southern:			
1956	95,746	9,469	105,215
1967	64,582	25,178	89,760
Change			15,455
Northwest:			
1956	108,945	2,664	111,609
1967	89,662	9,221	98,883
Change			12,726
Centralwest:			
1956	140,618	7,884	148,502
1967	126,296	31,075	157,371
Change			8,869
Southwest:			
1956	60,481	4,024	64,505
1967	32,231	10,387	42,618
Change			21,887

Source: Association of American Railroads, Car Service Division, Semi-Monthly Revenue Freight Car Summary - Class I Railroads, CS-8A Statements.

LOADING DISTRIBUTION OF ALL BOXCARS AND COVERED HOPPER CARS BY DISTRICTS

Loadings in boxcars have steadily declined[9] (Table 15). During the 12-year year period used in this study, total boxcar ownership reached a peak of 736,442 units in 1958 and, as in the case of boxcar loadings, has been on the decline since. The largest decline in loadings occurred in 1967 when loadings decreased from total 1966 loadings by 12.7 percent.

A utilization measure can be derived when total number of boxcar loadings is divided by total boxcar ownership.[10] The boxcar turnover rate for 1956 was 21.2; that is, on the average one boxcar was loaded 21.2 times. The turnover rate for 1956 was the highest of the 12 years under consideration. The turnover in 1967 was 14.9; the lowest of the 12-year period.

Eastern Railroad District : All Boxcars

Class I railroads in the Eastern district owned 40.1 percent of the national boxcar fleet in 1956 (Table 16). Boxcar loadings on Eastern railroads in 1956 were 41.1 percent of all boxcar loadings in the United States by Class I railroads. Eastern railroads reflected a loadings per ownership ratio of 21.7 in 1956. Throughout the period 1958 to 1965, the Eastern railroads' percent of national boxcar ownership has been greater than the Eastern railroads' percent of national boxcar loadings. Eastern railroad boxcar ownership in 1967 was 33.1 percent of national boxcar ownership, while the Eastern railroads' boxcar loadings was 34.4 percent of national boxcar loadings. The Eastern railroads' loadings per ownership ratio was 15.5 in 1967, second lowest of the 12-year period.

The greatest decline in Eastern railroad boxcar loadings occurred in 1958 when Eastern railroads experienced a decline of 843,000 loadings from the previous year 1957. However, during the same year, 1958, Eastern railroad ownership in boxcars increased by almost 4,000 units. Eastern railroads retired without replacement 5,000 boxcars while increasing boxcar loadings by 23,600 in the following year 1959. A similar situation occurred in 1965 when Eastern railroads retired, without replacement, 12,000 boxcars but increased boxcar loadings by over 48,000.

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[9] Total boxcar loadings are not segregated by "loadings in plain boxcars" and "loadings in special-service boxcars"; therefore the "loadings-boxcars" include loadings of all boxcars.

[10] Loadings per ownership ratio is a freight car turnover rate; on the average how many times one boxcar is loaded during a year.

TABLE 15. CLASS I RAILROAD BOXCAR LOADINGS, OWNERSHIP AND LOADINGS PER OWNERSHIP, 1956 THROUGH 1967

Year	Owner-ship	Loadings	Loadings: Change from previous year	Loadings per ownership (L/O)
1956	716,845	15,206,089		21.21
1957	725,477	13,984,004	- 1,222,085	19.27
1958	736,442	12,806,960	- 1,177,044	17.39
1959	722,732	12,911,605	- 104,645	17.86
1960	705,738	12,101,483	- 810,122	17.14
1961	692,565	11,304,629	- 796,854	16.46
1962	663,762	10,995,845	- 308,784	16.56
1963	637,775	10,569,690	- 426,155	16.57
1964	615,887	10,104,511	- 465,179	16.40
1965	596,602	10,088,427	- 16,084	16.90
1966	581,397	9,886,515	- 201,912	17.00
1967	580,652	8,632,572	- 1,253,943	14.86
Total change 1956-67	- 18.9%	- 43.2%		

Source: Association of American Railroads, Car Service Division, Summary of Weekly Equipment Loading Report, CS 54-1B Statements.

TABLE 16: EASTERN BOXCAR LOADINGS, OWNERSHIP AND LOADINGS PER OWNERSHIP, 1956 THROUGH 1967

Year	Ownership	Class I which are Eastern	Loadings	Class I which are Eastern	Loadings per ownership (L/O)
		(percent)		(percent)	
1956	287,539	40.1	6,253,944	41.1	21.74
1957	292,893	40.3	5,674,845	40.5	19.37
1958	296,540	40.2	4,831,725	37.7	16.29
1959	291,235	40.2	4,855,323	37.6	16.67
1960	278,233	39.4	4,666,232	36.9	16.05
1961	269,384	38.8	4,007,900	35.4	14.87
1962	250,678	37.7	3,895,662	35.4	15.54
1963	232,725	36.4	3,633,914	34.3	15.61
1964	217,560	35.3	3,384,674	33.4	15.55
1965	205,239	34.4	3,433,243	34.0	16.72
1966	197,827	34.0	3,368,812	34.0	17.02
1967	192,306	33.1	2,971,254	34.4	15.45
Total change 1956-67	-33.1%		-52.4%		

Source: Association of American Railroads, Car Service Division, Summary of Weekly Equipment Loading Report, CS 54-1B Statements.

Southern Railroad District: All Boxcars

Southern railroads have maintained a boxcar ownership between 94,000 boxcars to 103,000 boxcars throughout this 12-year period (Table 17). The peak of Southern railroad boxcar ownership occurred in 1958 and the low in 1966. Southern railroads owned 16.7 percent of all Class I railroad boxcars owned in 1967, an increase of 3 percent since 1956. In comparison, the Southern railroads' percent of national loadings in 1956 was 16.9 percent and in 1967, 18.8 percent, an increase during the period of only 1.9 percent. Throughout the period 1956 to 1967, the Southern railroads' percent of national boxcar loadings has exceeded the Southern railroads' percent of national boxcar ownership. Undoubtedly, one major cause of this "phenomenon" would be the excellent loadings per ownership ratio of the Southern district. When the loadings per ownership ratio is thought of as a utilization measure, the Southern railroads turned over an average boxcar 26.1 times in 1956--the highest ratio for any railroad district in any year. The Southern railroads' 1967 loadings per ownership figure was 16.8, a decline of 9.3 from 1956.

Southern railroads experienced an increase in loadings for the years 1959 and 1965, but during these same years there was a reduction in boxcar ownership.

Northwest Railroad District: All Boxcars

Railroads in the Northwest district owned 102,472 boxcars and had total boxcar loadings of 1,322,576 in 1967 (Table 18). Northwest railroad ownership was 17.6 percent of national ownership, and Northwest railroad loadings were 15.3 percent of national loadings in 1967. Throughout this 12-year period, Northwest railroads' percent of national ownership exceeded the Northwest railroads' percent of national loadings.

During two years of the 12-year period, 1963 and 1965, there was an increase in Northwest railroad loadings. Northwest railroads retired boxcars during the years 1963 and 1965. The largest decline in Northwest boxcar loadings occurred in 1967, a decline of 231,286. A net addition of boxcars was made to Northwest railroads during the year 1967.

The loadings per ownership ratio of boxcars for Northwest railroads in 1956 was 18.5, whereas the average national loadings per ownership ratio of boxcars was 21.2 in 1956. Railroads in the Northwest district had the lowest boxcar loadings per ownership ratio of all railroad districts during the period 1957 to 1967. Northwest railroads had a boxcar loadings per ownership ratio of 12.9 in 1967.

TABLE 17. SOUTHERN BOXCAR LOADINGS, OWNERSHIP AND LOADINGS PER OWNERSHIP, 1956 THROUGH 1967

Year	Ownership	Class I which are Southern	Loadings	Class I which are Southern	Loadings per ownership (L/O)
		(percent)		(percent)	
1956	98,590	13.7	2,571,936	16.9	26.08
1957	100,142	13.8	2,343,841	16.7	23.40
1958	103,189	14.0	2,095,903	16.3	20.31
1959	100,415	13.8	2,178,119	16.8	21.69
1960	99,177	14.0	2,085,714	17.2	21.03
1961	98,019	14.1	1,949,882	17.2	19.89
1962	95,926	14.4	1,901,406	17.2	19.82
1963	97,040	15.2	1,866,802	17.6	19.23
1964	95,643	15.5	1,820,080	18.0	19.02
1965	95,543	16.0	1,824,463	18.0	19.09
1966	94,651	16.2	1,782,684	18.0	18.83
1967	97,073	16.7	1,629,561	18.8	16.78
Total change 1956-67	-1.0%		-36.6%		

Source: Association of American Railroads, Car Service Division, Summary of Weekly Equipment Loading Report, CS 54-1B Statements.

TABLE 18. NORTHWEST BOXCAR LOADINGS, OWNERSHIP AND LOADINGS PER OWNERSHIP, 1956 THROUGH 1967

Year	Ownership	Class I which are Northwest	Loadings	Class I which are Northwest	Loadings per ownership (L/O)
		(percent)		(percent)	
1956	111,871	15.6	2,064,803	13.5	18.45
1957	111,437	15.3	1,932,765	13.8	17.35
1958	112,916	15.3	1,804,892	14.0	15.98
1959	109,679	15.1	1,776,142	13.7	16.19
1960	108,169	15.3	1,664,927	13.7	15.39
1961	106,914	15.4	1,590,476	14.0	14.87
1962	104,439	15.7	1,530,422	13.9	14.65
1963	102,568	16.0	1,558,306	14.7	15.19
1964	102,513	16.6	1,534,926	15.1	14.97
1965	101,710	17.0	1,561,697	15.4	15.35
1966	100,764	17.3	1,553,862	15.7	15.42
1967	102,472	17.6	1,322,576	15.3	12.90
Total change 1956-67	-8.0%		-35.9%		

Source: Association of American Railroads, Car Service Division, Summary of Weekly Equipment Loading Report, CS 54-1B Statements.

Centralwest Railroad District: All Boxcars

For the years 1964 through 1967, the Centralwest railroads' percent of national boxcar ownership has exceeded its percent of national boxcar loadings (Table 19). Centralwest railroads owned 25.2 percent of all boxcars owned nation-wide, whereas 22.5 percent of national boxcar loadings were loadings made on Centralwest railroads in 1967.

Railroads in the Centralwest district had the lowest boxcar loadings per ownership ratio of 18.4 in 1956. Centralwest railroads had the second lowest boxcar loadings per ownership ratio of the five railroad districts for the period 1957 to 1967. Centralwest railroads experienced a decline in boxcar loadings of 388,138 in 1967 or a drop of 16.6 percent from the previous year. Centralwest railroads' boxcar loadings per ownership ratio dropped from 16.0 in 1966 to 13.3 in 1967.

Southwest Railroad District: All Boxcars

Throughout the period 1956 to 1967, the Southwest railroads' percent of national boxcar loadings has exceeded Southwest railroads' percent of national boxcar ownership (Table 20). Railroads in the Southwest district owned 8.9 percent of all boxcars owned by Class I railroads and loaded 9.6 percent of all boxcars loaded by Class I railroads in 1956. Railroads in the Southwest district owned 7.2 percent of all boxcars owned and loaded 8.8 percent of all boxcars loaded in 1967. This would indicate that the Southwest railroads' percent of decline in national ownership was greater than its percent decline in national loadings during the period 1956 to 1967. Southwest district railroads had the highest boxcar loadings per ownership ratio (18.1) of all railroad districts for the year of 1967. Southwest railroads have not increased boxcar ownership since 1957.

The National Loading Situation: Covered Hopper Cars

Loadings in covered hopper cars more than doubled during the years 1956 to 1967: 933,000 in 1956 to 2,100,000 in 1967 (Table 21). National Class I railroad ownership in covered hopper cars also has more than doubled during this 12-year period: 42,000 in 1956 to 105,000 in 1967 (Table 22).

With the exception of rather modest declines in covered hopper car loadings during the years 1957 and 1960, there has been an annual increase in covered hopper car loadings of about 117,570. A covered hopper car loadings per ownership ratio of 22.4 was realized in 1956. This ratio fell to a low in 1961 of 17.3 and in 1967 covered hopper cars were turned over on the average of 20 times per year.

TABLE 19. CENTRALWEST BOXCAR LOADINGS, OWNERSHIP, AND LOADINGS PER OWNERSHIP, 1956 THROUGH 1967

Year	Ownership	Class I which are Centralwest	Loadings	Class I which are Centralwest	Loadings per ownership (L/O)
		(percent)		(percent)	
1956	154,921	21.6	2,852,634	18.7	18.41
1957	156,033	21.5	2,764,324	19.7	17.71
1958	159,676	21.6	2,849,440	22.2	17.84
1959	158,665	21.9	2,845,072	22.0	17.93
1960	157,660	22.3	2,682,487	22.1	17.01
1961	156,119	22.5	2,657,697	23.5	17.02
1962	163,010	24.5	2,726,244	24.7	16.72
1963	158,095	24.7	2,612,977	24.7	16.52
1964	154,545	25.0	2,508,170	24.8	16.22
1965	150,679	25.2	2,421,897	24.0	16.07
1966	145,498	25.0	2,331,216	23.5	16.02
1967	146,473	25.2	1,943,078	22.5	13.26
Total change 1956-67	-5.0%		-31.8%		

Source: Association of American Railroads, Car Service Division, Summary of Weekly Equipment Loading Report, CS 54-1B Statements.

TABLE 20. SOUTHWEST BOXCAR LOADINGS, OWNERSHIP, AND LOADINGS PER OWNERSHIP, 1956 THROUGH 1967

Year	Ownership	Class I which are Southwest	Loadings	Class I which are Southwest	Loadings per ownership (L/O)
		(percent)		(percent)	
1956	63,924	8.9	1,462,772	9.6	22.88
1957	64,972	8.9	1,268,229	9.0	19.51
1958	64,121	8.7	1,225,001	9.5	19.10
1959	62,738	8.6	1,256,949	9.7	20.03
1960	62,499	8.8	1,202,123	9.9	19.23
1961	62,129	8.9	1,098,674	9.7	17.68
1962	49,709	7.4	942,111	8.5	18.95
1963	47,347	7.4	897,691	8.4	18.95
1964	45,626	7.4	856,661	8.4	18.77
1965	43,431	7.2	847,127	8.3	19.50
1966	42,657	7.3	849,941	8.5	19.92
1967	42,328	7.2	766,103	8.8	18.09
Total change 1956-67	-33.7%		-47.6%		

Source: Association of American Railroads, Car Service Division, Summary of Weekly Equipment Loading Report, CS 54-1B Statements.

TABLE 21. CLASS I COVERED HOPPER CAR LOADINGS, OWNERSHIP, AND LOADINGS PER OWNERSHIP, 1956 THROUGH 1967

Year	Ownership	Loadings	Loadings change from previous year	Loadings per ownership (L/O)
1956	41,756	933,452		22.35
1957	46,210	931,983	1,469	20.16
1958	54,113	961,707	29,724	17.77
1959	58,383	1,103,152	141,445	18.89
1960	61,407	1,097,394	5,758	17.87
1961	63,910	1,105,330	7,936	17.29
1962	65,688	1,190,508	85,178	18.12
1963	69,106	1,313,685	123,177	19.00
1964	73,822	1,451,923	138,238	19.66
1965	81,753	1,657,668	205,745	20.27
1966	92,080	1,908,347	250,679	20.72
1967	105,027	2,101,947	193,600	20.01
Total change 1956-67	+151.5%	+125.1%		

Source: Association of American Railroads, Car Service Division, Summary of Weekly Equipment Loading Report, CS 54-1B Statements.

TABLE 22. COVERED HOPPER CAR OWNERSHIP BY DISTRICTS, 1956 THROUGH 1967

Year	Eastern	Northwest	South	Centralwest	Southwest	National
1956	17,715	2,664	9,469	7,884	4,024	41,756
1957	19,352	3,191	9,979	9,186	4,502	46,210
1958	21,368	3,835	12,715	11,204	4,991	54,113
1959	22,452	4,852	13,147	12,732	5,200	58,383
1960	22,268	5,205	13,513	14,348	6,073	61,407
1961	22,666	5,405	14,649	14,991	6,199	63,910
1962	22,851	5,523	15,038	16,557	5,719	65,688
1963	23,577	5,696	16,363	17,485	5,985	69,106
1964	24,201	5,883	17,404	19,584	6,750	73,822
1965	25,326	6,661	19,876	22,389	7,501	81,753
1966	27,571	7,277	22,146	25,973	9,113	92,080
1967	29,166	9,221	25,178	31,075	10,387	105,027

Source: Association of American Railroads, Car Service Division, Semi-Monthly Revenue Freight Car Summary - Class I Railroads, CS-8A Statements.

Eastern Railroad District: Covered Hopper Cars

Eastern railroads experienced three years in which there was a decline in covered hopper car loadings; 1957, 1958, and 1960 (Table 23). From 1956 to 1967, Eastern railroads increased ownership in covered hopper cars by 64.6 percent and covered hopper car loadings by 44.6 percent. Eastern railroads loaded 35.5 percent of all covered hopper cars loaded by Class I railroads in 1956. This percentage had declined to 22.8 percent by 1967. Eastern railroads owned 42.4 percent of all hopper cars owned by Class I railroads in 1956. This percentage had fallen to 27.8 percent by 1967.

The Eastern railroads' covered hopper car loadings per ownership ratio for each of the 12 years is the lowest of the five railroad districts. The national average covered hopper car loadings per ownership ratio was 22.4 in 1956, whereas the Eastern railroads' covered hopper car loadings per ownership ratio was 18.7. The Eastern railroads' covered hopper car loadings per ownership ratio has been approximately three points below the national average throughout this 12-year period.

Southern Railroad District: Covered Hopper Cars

Southern railroads have increased hopper car loadings throughout the period 1956 to 1967 (Table 24). The largest increase in Southern railroad covered hopper car loadings occurred in 1966 when 56,623 additional covered hopper car loadings were made over the previous 1965 total. Southern railroads owned 22.7 percent of covered hopper cars owned by Class I railroads in 1956. Southern railroads loaded 24.1 percent of the national loadings in covered hopper cars in 1956. Southern railroads owned 24.0 percent of all covered hopper cars owned by Class I railroads in 1967. Southern railroads loaded 25.8 percent of all covered hopper car loadings made by Class I railroads in 1967.

Southern railroads had a covered hopper car loadings per ownership ratio of 23.7 in 1956. In respect to the covered hopper car loadings per ownership ratio, the Southern railroads had a low in 1958 of 19.1 with corresponding ownership of 12.715 covered hopper cars and covered hopper car loadings of 242,730.

Northwest Railroad District: Covered Hopper Cars

Northwest railroads owned the least number of covered hopper cars in comparison with the other four railroad districts during the period 1956 to 1967 (Table 25). Covered hopper car ownership by Northwest railroads was 2,664 or 6.4 percent of the national Class I railroad covered

TABLE 23. EASTERN COVERED HOPPER CAR LOADINGS, OWNERSHIP, AND LOADINGS PER OWNERSHIP, 1956 THROUGH 1967

Year	Ownership	Class I which are Eastern	Loadings	Class I which are Eastern	Loadings per ownership (L/O)
		(percent)		(percent)	
1956	17,715	42.4	331,440	35.50	18.70
1957	19,352	41.8	318,769	34.20	16.47
1958	21,368	39.4	294,051	30.57	13.76
1959	22,452	38.4	337,029	30.55	15.01
1960	22,268	36.2	320,540	29.20	14.39
1961	22,666	35.4	325,018	29.40	14.33
1962	22,851	34.7	350,408	29.43	15.33
1963	23,577	34.1	374,098	28.47	15.86
1964	24,201	32.7	413,737	28.49	17.09
1965	25,326	30.9	449,571	27.12	17.75
1966	27,571	29.9	467,462	24.49	16.95
1967	29,166	27.7	479,357	22.80	16.43
Total change 1956-67	+64.6%		+44.6%		

Source: Association of American Railroads, Car Service Division, Summary of Weekly Equipment Loading Report, CS 54-1B Statements.

TABLE 24. SOUTHERN COVERED HOPPER CAR LOADINGS, OWNERSHIP, AND LOADINGS PER OWNERSHIP, 1956 THROUGH 1967

Year	Ownership	Class I which are Southern	Loadings	Class I which are Southern	Loadings per ownership (L/O)
		(percent)		(percent)	
1956	9,469	22.6	224,546	24.0	23.71
1957	9,979	21.5	227,740	24.4	22.82
1958	12,715	23.4	242,730	25.2	19.09
1959	13,147	22.5	279,884	25.3	21.28
1960	13,513	22.0	287,910	26.2	21.30
1961	14,649	22.9	291,908	26.4	19.92
1962	15,038	22.8	310,672	26.0	20.65
1963	16,363	23.6	351,142	26.7	21.45
1964	17,404	23.5	390,316	26.8	22.42
1965	19,876	24.3	444,865	26.8	22.38
1966	22,146	24.0	501,488	26.2	22.64
1967	25,178	23.9	542,026	25.7	21.52
Total change 1956-67	+165.8%		+141.3%		

Source: Association of American Railroads, Car Service Division, Summary of Weekly Equipment Loading Report, CS 54-1B Statements.

hopper car ownership in 1956. Northwest railroads loaded the least number of covered hopper cars in 1956. Covered hopper car loadings by Northwest railroads totaled 56,292 or 6.0 percent of the national Class I railroad covered hopper car loadings. By 1967, Northwest railroad ownership in covered hopper cars increased by 246.1 percent and covered hopper car loadings by 244.5 percent; this percent change in loadings for the period 1956 to 1967 was the largest increase by any railroad district. Northwest railroads loaded 9.2 percent of all loadings made in covered hopper cars owned by Class I railroads in 1967. Northwest railroads owned 8.8 percent of all covered hopper cars owned by Class I railroads in 1967. With a covered hopper car ownership of 9,221 and covered hopper car loadings of 193,979, the covered hopper car loadings per ownership ratio for the Northwest railroads in 1967 was 21.0. Covered hopper cars had a turn-over rate of 21.1 in 1956.

Centralwest Railroad District: Covered Hopper Cars

Centralwest railroads had modest declines in covered hopper car loadings for the year 1957 and 1960, while in other years additions were made to covered hopper car loadings in the range of 15,000 in 1958 to 108,000 in 1966 (Table 26). Centralwest railroads' covered hopper car loadings as a percent of national Class I railroad covered hopper car loadings has increased from 25.2 percent in 1956 to 31.1 percent in 1967. Since 1956, the Centralwest railroads have increased loadings in covered hopper cars by 176.2 percent and ownership of covered hopper cars by 294.1 percent.

Centralwest railroads had a loadings per ownership ratio of 30.0 in 1956, the highest ratio for any railroad district for any year. Centralwest railraods had a covered hopper car loadings per ownership ratio of 21.0 in 1967, second lowest of the five railroad districts.

Southwest Railroad District: Covered Hopper Cars

Ownership of covered hopper cars by railroads in the Southwest district increased 158.6 percent during the period 1956 to 1967, while loadings in covered hopper cars increased 175.6 percent. Southwest railroads had the second lowest covered hopper car loadings per ownership ratio in 1956 and the best covered hopper car loadings per ownership ratio in 1967 (Table 27).

TABLE 25. NORTHWEST COVERED HOPPER CAR LOADINGS, OWNERSHIP, AND LOADINGS PER OWNERSHIP, 1956 THROUGH 1967

Year	Ownership	Class I which are Northwest	Loadings	Class I which are Northwest	Loadings per ownership (L/O)
		(percent)		(percent)	
1956	2,664	6.3	56,292	6.0	21.13
1957	3,191	6.9	61,153	6.5	19.16
1958	3,835	7.0	77,316	8.0	20.16
1959	4,852	8.3	87,973	7.9	18.13
1960	5,205	8.4	94,773	8.6	18.20
1961	5,405	8.4	95,938	8.6	17.74
1962	5,523	8.4	94,111	7.9	17.03
1963	5,696	8.2	109,730	8.3	19.26
1964	5,883	7.9	124,657	8.5	21.18
1965	6,661	8.1	142,957	8.6	21.46
1966	7,277	7.9	158,491	8.3	21.77
1967	9,221	8.7	193,979	9.2	21.03
Total change 1956-67	+246.1		+ 244.5		

Source: Association of American Railroads, Car Service Division, Summary of Weekly Equipment Loading Report, CS 54-1B Statements.

TABLE 26. CENTRALWEST COVERED HOPPER CAR LOADINGS, OWNERSHIP, AND LOADINGS PER OWNERSHIP, 1956 THROUGH 1967

Year	Ownership	Class I which ar e Centralwest	Loadings	Class I which are Centralwest	Loadings per ownership (L/0)
		(percent)		(percent)	
1956	7,884	18.8	236,375	25.23	29.98
1957	9,186	19.8	234,672	25.17	25.54
1958	11,204	20.7	250,071	26.00	22.31
1959	12,732	21.8	285,826	25.90	22.44
1960	14,348	23.3	278,468	25.37	19.40
1961	14,991	23.4	281,149	25.43	18.75
1962	16,557	25.2	331,653	27.85	20.03
1963	17,485	25.3	360,021	27.40	20.59
1964	19,584	26.5	394,845	27.19	20.16
1965	22,389	27.3	470,803	28.40	21.02
1966	25,973	28.2	579,562	30.36	22.31
1967	31,075	29.5	652,871	31.06	21.00
Total change 1956-67	+294.1%		+176.2%		

Source: Association of American Railroads, Car Service Division, Summary of Weekly Equipment Loading Report, CS 54-1B Statements.

TABLE 27. SOUTHWEST COVERED HOPPER CAR LOADINGS, OWNERSHIP, AND LOADINGS PER OWNERSHIP, 1956 THROUGH 1967

Year	Ownership	Class I which are Southwest	Loadings	Class I which are Southwest	Loadings per ownership (L/O)
		(percent)		(percent)	
1956	4,024	9.6	84,799	9.0	21.07
1957	4,502	9.7	89,649	9.6	19.91
1958	4,991	9.2	97,539	10.1	19.54
1959	5,200	8.9	112,440	10.1	21.62
1960	6,073	9.8	115,703	10.5	19.05
1961	6,199	9.6	111,317	10.0	17.95
1962	5,719	8.7	103,664	8.7	18.12
1963	5,985	8.6	118,694	9.0	19.83
1964	6,750	9.1	128,368	8.8	19.01
1965	7,501	9.1	149,472	9.0	19.92
1966	9,113	9.8	201,344	10.5	22.09
1967	10,387	9.8	233,714	11.1	22.50
Total change 1956-67	+158.1		+175.6		

Source: Association of American Railroads, Car Service Division, Summary of Weekly Equipment Loading Report, CS 54-1B Statements.

LOADING AND OWNERSHIP TRENDS OF EASTERN AND UPPER GREAT PLAINS RAILROADS

A sample of railroads was drawn from all railroads serving the Eastern district of the United States. This sample was drawn with the objective of comparing the 1956 boxcar ownerships of the Eastern railroad sample and a sampling of railroads from the Centralwest district and the Northwest district; the common region is the Upper Great Plains of the United States. A total of 12 Eastern railroads with a 1956 ownership of 213,213 boxcars was decided upon; this sample of Eastern Class I railroads owned 74.1 percent in 1956 of all Eastern railroad boxcar ownership. Boxcar ownership for the railroads serving the Upper Great Plains region was 235,166 in 1956. The 1956 covered hopper car ownerships for the two railroad samples were also considered; the Eastern railroad sample owned 11,791 covered hopper cars or 66.5 percent of total Class I Eastern railroad district ownership in covered hopper cars. Covered hopper car ownership for the railroads serving the Upper Great Plains region was 10,072 in 1956.

A Sample of Eastern Railroads

This sample was responsible for 71.5 percent of all boxcar loadings made by Class I railroads in the Eastern district in 1967. In reference to covered hopper car loadings, 68.3 percent of the covered hopper car loadings made by Class I railroads Eastern railroads were made by this Eastern sample.

The Eastern railroad sample in 1956 had a total boxcar ownership of 213,213, and by 1967 ownership in boxcars had declined by 35.6 percent to an ownership level of 137,171 boxcars (Table 28). All freight cars owned by the Eastern sample declined by 22.4 percent during the time period 1956 to 1967. Covered hopper car ownership, on the other hand, increased by 63.1 percent during the years 1956 to 1967.

The Eastern railroad sample owned 189,418 plain boxcars in 1956 or 88.8 percent of the Eastern railroad sample all-boxcar ownership. This plain boxcar-all boxcar composition changed to 71.1 percent by 1967. Boxcars, whether special service or plain, composed 38.5 percent of the total freight car ownership of this Eastern railroad sample in 1956. By 1967, 32.0 percent of the total Eastern railroad sample freight car ownership were boxcars. Boxcar loadings were 37 percent of all freight car loadings were 37 percent of all freight car loadings in 1956; and in 1967, 26.7 percent of all freight car loadings were made in boxcars. Covered hopper car ownership was 2.1 percent of total freight car ownership in 1956; by 1967 this percentage changed to 4.4 percent (Table 29). Loadings in covered hopper cars as a percent of loadings in all freight cars changed from 1.6 percent in 1956 to 3.5 percent in 1967.

TABLE 28. TRENDS IN OWNERSHIP AND LOADINGS OF BOXCARS AND ALL FREIGHT CARS FOR THE EASTERN RAILROAD SAMPLE, 1956 THROUGH 1967

Year	Ownership			Loadings		All boxcars which are plain boxcars	All freight cars which are all boxcars	All freight car loadings which are all boxcar loadings	Loadings per ownership (L/O); all freight cars	Loadings per ownership (L/O); all boxcars
	Plain boxcars	All boxcars	All freight cars	All boxcars	All freight cars					
						(percent)	(percent)	(percent)		
1956	189,418	213,213	552,545	4,473,317	11,826,800	88.8	38.5	37.8	21.40	20.98
1957	193,883	217,069	559,078	4,030,808	11,645,796	89.3	38.8	34.6	20.83	18.56
1958	196,252	219,980	573,145	3,421,999	8,709,361	89.2	38.3	39.2	15.19	15.55
1959	193,693	216,675	565,999	3,466,189	8,980,300	89.3	38.2	38.5	15.86	15.99
1960	183,552	205,987	534,033	3,229,711	8,772,982	89.1	38.5	36.8	16.42	15.67
1961	175,072	198,915	528,265	2,875,843	7,967,961	88.0	37.6	36.0	15.08	14.45
1962	161,546	183,770	498,969	2,792,259	8,165,347	87.9	36.8	34.1	16.36	15.19
1963	147,445	170,987	469,389	2,598,975	8,216,532	86.2	36.4	31.6	17.50	15.19
1964	127,457	157,805	447,626	2,429,815	8,321,863	80.7	35.2	29.1	18.59	15.39
1965	112,722	144,289	428,545	2,522,075	8,799,138	78.1	33.6	28.6	20.53	17.47
1966	107,607	143,298	443,058	2,466,710	8,779,317	75.0	32.3	28.0	19.81	17.21
1967	97,620	137,171	428,557	2,203,723	8,224,333	71.1	32.0	26.7	19.19	16.06

Source: Association of American Railroads, Car Service Division, CS-8A and CS 54-1B Statements.

TABLE 29. TRENDS IN OWNERSHIP AND LOADINGS OF COVERED HOPPER CARS FOR THE EASTERN RAILROAD SAMPLE, 1956 THROUGH 1967

Year	Ownership	Loadings	All freight cars which are covered hopper cars	All freight car loadings which are covered hopper car loadings	Loadings per ownership (L/O)
			(percent)	(percent)	
1956	11,791	197,584	2.1	1.6	16.75
1957	12,391	218,788	2.2	1.8	17.67
1958	13,036	171,585	2.2	1.9	13.16
1959	13,936	203,306	2.4	2.2	14.58
1960	13,906	197,398	2.6	2.2	14.19
1961	14,380	201,747	2.7	2.5	14.02
1962	14,515	221,572	2.9	2.7	15.26
1963	14,943	240,271	3.1	2.9	16.08
1964	15,420	266,377	3.4	3.2	17.27
1965	16,194	283,125	3.7	3.2	17.48
1966	18,748	291,885	4.2	3.3	15.56
1967	19,242	289,613	4.4	3.5	15.05

Source: Association of American Railroads, Car Service Division, Statements CS-8A and CS 54-1B.

The loadings per ownership ratio for boxcars in 1956 was 20.9; for covered hopper cars, 16.8; and for all freight cars, 21.4. The loadings per ownership ratio for boxcars in 1967 was 16.1; for covered hopper cars, 15.1; and for all freight cars, 19.2.

In 1956, 40.6 percent of all freight cars owned by this Eastern sample were capable of hauling grain. Freight cars that were capable of hauling grain in 1967 composed 36.6 percent of the total freight car ownership of this Eastern railroad sample.

Ownership and Loading Analysis of Railroads Serving the Upper Great Plains

This analysis is concerned with 11 Class I railroads which serve shippers located in the Upper Great Plains region of the United States.[11]

Approximately 50 percent of the total freight car ownership of railroads in the Upper Great Plains consists of boxcars; and 95 percent of these boxcars are plain boxcars, boxcars capable of hauling grain. In addition to plain boxcars as a vehicle for hauling grain, the Upper Great Plains railroads owned some 40,000 covered hopper cars in 1967, comprising almost 9 percent of total freight car ownership. In 1956, 54.7 percent of all freight cars owned by railroads in the Upper Great Plains were capable of hauling grain; by 1967, 57.1 percent were capable of hauling grain.

Boxcar loadings were 45.4 percent of all freight car loadings in 1956 (Table 30). In 1967, 37.0 percent of total freight car loadings were made in boxcars. Combining percent loadings attributable to boxcars with those made in covered hopper cars, in 1956, 48.0 percent of all loadings were either made in boxcars or covered hopper cars; whereas in 1967, 47.7 percent of all freight car loadings were either made in boxcars or covered hopper cars. It is evident that in the case of ownership or loadings, the increase in covered hopper car ownership and loadings has offset the decline in boxcar ownership and loadings for the period 1956 to 1967.

The boxcar loadings per ownership ratio in 1956 was 17.8; this ratio declined to a low of 15.8 in 1964, and in 1966 a boxcar loadings per ownership ratio of 17.2 was realized. The boxcar loadings per ownership

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[11]Primary railroads serving the Upper Great Plains: 1) Soo Line; 2) Great Northern; 3) Northern Pacific; 4) Chicago, Milwaukee, St. Paul, and Pacific; 5) Chicago and Northwestern; 6) Chicago, Burlington and Quincy; 7) Union Pacific; 8) Chicago Rock Island, and Pacific; 9) Atchison, Topeka, and Sante Fe; 10) Missouri Pacific; and 11) Denver and Rio Grande Western.

TABLE 30. TRENDS IN OWNERSHIP AND LOADINGS OF BOXCARS AND ALL FREIGHT CARS FOR THE UPPER GREAT PLAINS RAILROADS, 1956 THROUGH 1967

Year	Ownership			Loadings		All boxcars which are plain boxcars	All freight cars which are all boxcars	All freight car loadings which are all boxcar loadings	Loadings per ownership (L/O); all freight cars	Loadings per ownership (L/O); all boxcars
	Plain boxcars	All boxcars	All freight cars	All boxcars	All freight cars					
						(percent)	(percent)	(percent)		
1956	220,860	235,166	447,245	4,189,111	9,214,742	93.9	52.5	45.4	20.60	17.81
1957	219,605	233,479	444,715	3,962,604	8,648,522	94.0	52.5	45.8	19.44	16.97
1958	222,048	235,119	449,371	3,972,687	8,154,283	94.4	52.3	48.7	18.14	16.89
1959	218,399	230,715	447,345	3,958,571	8,281,632	94.6	51.5	47.7	18.51	17.15
1960	217,105	229,798	444,768	3,777,212	8,199,380	94.4	51.6	46.0	18.43	16.43
1961	217,324	230,575	448,391	3,720,543	7,970,369	94.2	51.4	46.6	17.77	16.13
1962	212,783	225,742	442,844	3,608,041	7,866,486	94.2	50.9	45.8	17.76	15.98
1963	204,735	219,315	432,301	3,550,993	7,848,143	93.3	50.7	45.2	18.15	16.19
1964	199,410	216,191	427,522	3,420,848	7,877,862	92.2	50.5	43.4	18.42	15.82
1965	194,376	212,633	423,882	3,367,487	7,896,704	91.4	50.1	42.6	18.62	15.83
1966	186,764	214,188	434,420	3,693,621	8,309,832	87.1	49.3	44.4	19.12	17.24
1967	205,526	216,762	449,058	2,830,897	7,636,374	94.8	48.2	37.0	17.00	13.05

Source: Association of American Railroads, Car Service Division, CS-8A and CS 54-1B Statements.

ratio was 13.1 in 1967. The loadings per ownership ratio for covered hopper cars followed a similar trend although consistently higher than the figures representing the boxcar situation. A covered hopper car turned over at the rate of 24.6 times in 1956 (Table 31). The covered hopper car loadings per ownership ratio in 1961 was 17.2, lowest during the period 1956 to 1967, but made gains for the next five years, and in 1966 the second highest covered hopper car loadings per ownership ratio of 22.0 was attained. The covered hopper car loadings per ownership ratio of 20.5 in 1967 was a modest decline from the 1966 covered hopper car loadings per ownership ratio.

A Composite View: The Eastern Railroads Versus the Roads Serving the Upper Great Plains

The purpose of this composite view is to provide a 12-year trend analysis. The sample of Eastern railroads and the railroads serving the Upper Great Plains had relatively the same ownerships in boxcars and covered hopper cars in 1956. Both the railroads in the Eastern sample and those railroads in the Upper Great Plains reflect individual trends in ownership and loadings of boxcars and covered hopper cars.

The Eastern railroad sample ownership in boxcars, although equality is assumed, was slightly less than the boxcar ownership of railroads serving the Upper Great Plains region. However, loadings in all boxcars in 1956 revealed a 400,000 boxcar loadings difference in favor of the Eastern railroad sample. This is reflected in the boxcar loadings per ownership ratios of each of the samples, 21.0 for the Eastern railroad sample versus 17.8 for the Upper Great Plains railroads. The loadings per freight car ownership ratio (total freight car loadings divided by total freight car ownership) for the two samples are closer however. The loadings per freight car ownership for the railroads in the Eastern sample in 1956 was 21.4 and for the railroads in the Upper Great Plains, 20.6. It is logical in the sense that the railroads serving the Upper Great Plains had the lower of the two ownership totals and the lower of the two loading totals. The Eastern railroad sample had some 11.8 million freight car loadings in 1956 and ownership of 550,000 freight cars, whereas the railroads serving the Upper Great Plains had 9.2 million freight car loadings in 1956 with total freight car ownership of 450,000. The Eastern railroad sample claimed superiority in all freight car ownership, in boxcar loadings, and all freight car loadings, while the Upper Great Plains' railroads claimed superiority in boxcar ownership. However, by 1967 the situation of 1956 was almost completely reversed. In 1958 the Upper Great Plains' railroads overtook the Eastern sample in total boxcar loadings, and then in 1967 the railroads in the Upper Great Plains claimed superiority in all freight car ownership. By 1967 the Eastern railroad sample had maintained only the freight car loadings' superiority. However, even this superiority was not held during the entire 12-year period; in 1961, the railroads in the Upper Great Plains had 2,000 all freight car loadings greater than the Eastern railroad samples all freight car loadings. The superiority

TABLE 31. TRENDS IN OWNERSHIP AND LOADINGS OF COVERED HOPPER CARS FOR THE UPPER GREAT PLAINS RAILROADS, 1956 THROUGH 1967

Year	Ownership	Loadings	All freight cars which are covered hopper cars	All freight car loadings which are covered hopper car loadings	Loadings per ownership (L/O)
			(percent)	(percent)	
1956	10,072	248,195	2.2	2.6	24.64
1957	11,595	249,999	2.6	2.8	21.56
1958	13,816	277,996	3.0	3.4	20.12
1959	16,071	324,368	3.5	3.9	20.18
1960	17,896	325,531	4.0	3.9	18.19
1961	19,099	329,183	4.2	4.1	17.23
1962	20,179	350,532	4.5	4.4	17.37
1963	21,087	394,651	4.8	5.0	18.71
1964	22,894	441,223	5.3	5.6	19.27
1965	25,350	534,964	5.9	6.7	21.10
1966	32,602	717,076	7.5	8.6	21.99
1967	40,003	821,834	8.9	10.7	20.54

Source: Association of American Railroads, Car Service Division, Statements CS-8A and CS 54-1B.

in boxcar ownership was maintained by the railroads serving the Upper Great Plains throughout the 12-year period and was periodically increased until in 1967 there was a difference between the two railroad samples of 80,000 boxcars.

A characteristic of the railroads which serve the Upper Great Plains is the all boxcar ownership composition: in 1956, 93.9 percent of all boxcars owned by railroads in the Upper Great Plains were plain boxcars. Only 6.1 percent of the boxcars owned by the Upper Great Plains railroads were totally incapable of hauling grain in 1956. In 1967, 94.8 percent of the boxcar ownership was capable of hauling grain. Only 5.2 percent of boxcars owned by railroads in the Upper Great Plains were incapable of hauling grain in 1967. The Eastern railroad sample boxcar composition was 88.8 percent plain boxcars and the remainder, 11.2 percent, were incapable of hauling grain. Over the 12-year period the Eastern railroads' sample followed a trend quite different from the Upper Great Plains' railroad trend. The 12-year trend followed by the Eastern railroad sample was substituting special service boxcars for plain boxcars; the 1967 all boxcar composition for the Eastern railroad sample was 71.1 percent plain box and 28.9 percent special service boxcars.

Generally speaking, over the 12-year period, half of the Upper Great Plains railroads' total freight car ownership was devoted to the ownership of boxcars. The Eastern railroad samples fleet composition, in reference to boxcars, has changed over the 12-year period: 38.5 percent of total fleet ownership was ownership in boxcars in 1956, and in 1967, 32.0 percent of total freight car fleet were boxcars. This would indicate that while the railroads serving the Upper Great Plains have maintained a fleet composition similar to the fleet composition of 1956, the composition of the Eastern railroad freight car fleet has changed over the years by a substitution of other car types for boxcars. Railroads in the Eastern sample decreased boxcar ownership by 50.7 percent from 1956 to 1967. The Upper Great Plains' railroads, since 1956, have had a decline in boxcar ownership of 7.8 percent and have had a decline in boxcar loadings of 32.4 percent.

The nation's Class I railroads have had a decline in boxcar ownership of 23.4 percent from 1956 to 1967, while boxcar loadings decreased 43.2 percent during this same time period.

Taking the change in loadings between the years 1956 to 1967 and dividing it by the change in ownership for this same time period for the Eastern railroad sample, the railroads in the Upper Great Plains, and for all Class I railroads, a change in boxcar loadings per change in boxcar ownership measure can be derived. The Class I railroad ratio was for each boxcar retired without replacement; boxcar loadings decreased by 48.3. Each boxcar retired from the railroads in the Eastern sample decreased boxcar loadings by 29.8. Each boxcar retired from the railroads in the Upper Great Plains region decreased boxcar loadings by 73.8. This could mean that a railroad in the Eastern sample can retire a boxcar

without replacement and have the least effect on boxcar loadings in comparison to the effect on boxcar loadings if the railroads in the Upper Great Plains or the entire national Class I railroad system should retire a boxcar. This would be the case if all of the decrease in loadings could be attributed to the decrease in ownership. But there has also been a decrease in the boxcar loadings per ownership ratio which would indicate a yearly deterioration in the utilization of boxcars.

Two relationships can be considered when comparing freight car ownerships to freight car loadings and loadings per ownership ratio trends. Both can be stated as hypotheses:

1. Intermodal competition decreases railroad boxcar loadings which encourages railroad management to decrease ownership in boxcars. When the decrease in boxcar loadings is proportionately greater than the decreases in boxcar ownership, the boxcar loadings per ownership ratio or utilization decreases.

2. Railroad innovations in the area of fleet utilization encourage railroad management to decrease boxcar ownership. These innovations, however, are overestimated and the decline in boxcar ownership leads to shipper dissatisfaction which brings about decreased loadings. When the decrease in boxcar loadings is proportionately greater than the decrease in boxcar ownership, the boxcar loadings per ownership ratio utilization decreases.

The first hypothesis envisions a decline in boxcar loadings. A decline in boxcar loadings could occur for several reasons, such as competition from other modes (especially trucks), high freight rates, poor service, changing transport demand of shippers, shippers deciding on private or contract carriage. There has been a decline in boxcar loadings of 6.6 million since 1956. In reference to the first hypothesis, this decline in boxcar loadings encourages railroad management to retire, without replacement, a number of boxcars due to the decline in the demand for boxcars. The decline in boxcar loadings and boxcar ownership is disproportionate; boxcar loadings have been declining at a faster rate than ownership. This disproportionate decline leads to a decline in the boxcar loadings per ownership ratio or the utilization measure. Poor utilization has an effect on shippers in that during a shipper's peak loading period, his demand for boxcars cannot be met. This poor, unreliable service encourages shippers to transport in other modes yielding once again a decline in boxcar loadings, which encouarges railroad management to retire more and more boxcars yielding an even greater shortage, even during periods of less than peak loadings.

The second hypothsis is that railroad management decides to decrease ownership in boxcars, specifically plain boxcars. There is a

certain rationale behind this hypothesis also. The employment of computers in a "Perpetual Car Control System" was to lead to a more efficient utilization of the railroads' boxcar fleet, or an increase in the boxcar loadings per ownership ratio. It seemed probable that the railroad could actually decrease its ownership yet make the same total loadings because of the increase in turnover. The rise in private car ownership is another reason why railroad management may feel justified in retiring railroad owned freight cars. If it is assumed that railroad management did decide to decrease ownership, using the above rationale for doing so, but instead a decline in boxcar loadings resulted, the reverse of the first hypothesis is realized: a decline in ownership yields a decline in loadings.

Since 1956, 136,193 boxcars were retired without replacement by Class I railroads. This decrease in ownership has resulted in a loading decline of 6.6 million loadings, or a decline in loadings of 48.3 per boxcar retired. But, as was stated earlier, this is partially incorrect because it is attributing the entire decline in loadings to the decline in ownership. Also the deterioration, over time, of the boxcar loadings per ownership ratio or utilization must be considered. Some portion of the loss in loadings must be due to the poorer utilization of boxcars; after all, in 1956 boxcars turned over at a rate of 21.2 times per year, and in 1967 the boxcar turnover rate was 14.9.

It is possible to determine what proportion of the decline in loadings is attributable to the decline in ownership and also what proportion is the result of the declining boxcar loadings per ownership ratio. By adjusting the 1967 boxcar loadings per ownership ratio to the level of 1956, it can be concluded that out of the total Class I railroad decline of 6.6 million boxcar loadings during the period 1956 to 1967, 2.9 million loadings were due to the decline in boxcar ownership, and the decline in boxcar loadings per ownership ratio would account for the remainder, 3.7 million boxcar loadings. For the Eastern railroad sample, loss due to poor utilization would be 675,000 boxcar loadings, and the decline in boxcar ownership would be responsible for a loss of 1.6 million boxcar loadings. For the railroads serving the Upper Great Plains, a decline of 329,000 loadings would be attributable to the decline in boxcar ownership and a decline of 1.0 million boxcar loadings due to poorer utilization. Therefore, approximately 30 percent of the decline in the Eastern railroad sample boxcar loadings are due to poorer utilization and approximately 75 percent of the decline in boxcar loading of the Upper Great Plains railroads is due to the decline in boxcar utilization. This would indicate that railroads in the Eastern sample utilize boxcars more efficiently than the railroads serving the Upper Great Plains; the Eastern sample had a boxcar loadings per ownership ratio of 16.1 in 1967 compared with 13.1 for the railroads serving the shippers in the Upper Great Plains.

The ratio of loadings to ownership can be deceptive however. Of the total boxcar ownership of any particular railroad, it seldom happens that this railroad would have 100 percent of its boxcar ownership on-line at any particular time; a railroad boxcar fleet may be composed of

15 percent of ownership and 85 percent boxcars of foreign origin, or 80 percent of ownership, and 40 percent belonging to foreign railroads, or 40 percent of ownership and 40 percent composed of foreign boxcars. When a railroad has 110 percent of ownership on-line, it may be that a very small portion of these freight cars are actually owned by the controlling railroad. The loadings per ownership ratio is derived by dividing total revenue loadings made on a railroad's line, whether in an actually owned car or in a foreign car, by the actual freight car ownership of the railroad. To derive a more precise and correct loadings per ownership ratio, it would be necessary to know the actual number of boxcars on a railroad's line, whether direct ownership or foreign, and are available to be loaded. The only accurate loadings per ownership ratio would be the national situation. Total Class I railroad ownership divided into total Class I railroad loadings is an accurate loadings per ownership ratio.

A decline in boxcar ownership can take two forms: (1) boxcars retired without replacement, and (2) boxcars which are seldom on the owning railroad's line and thus not available to the railroad's on-line shippers. Both forms have an effect on on-line loadings. A direct decline in ownership, retirement without replacement, is beneficial to the loadings per ownership ratio; a decrease in the denominator of the loadings per ownership ratio increases the loadings per ownership ratio. A decline in ownership on-line, having less than 100 percent of ownership on-line, on the other hand, has a detrimental effect on the loadings per ownership ratio: Loadings decrease because of less than actual ownership on-line, while actual ownership remains constant.

As of January 1, 1950, the railroads representing the Eastern sample owned 198,199 plain boxcars but controlled 203,491 plain boxcars, or 102.6 percent of ownership on-line (Table 32). During this same year the Eastern railroad sample owned 220,225 boxcars and controlled 223,361 boxcars or 101.4 percent of ownership on January 1, 1950. As of June 1, 1968, the Eastern railroad sample owned 84,621 plain boxcars but controlled 106,938 plain boxcars, or 126.3 percent of ownership. All boxcar ownership for the Eastern railroad sample as of June 1, 1968, was 125,246 but controlled 158,701 boxcars, 126.7 percent of ownership.

Railroads in the Upper Great Plains as of January 1, 1950, owned 213,172 plain boxcars but controlled only 186,458 plain boxcars, or 87.4 percent of ownership (Table 33). In reference to all boxcars owned by railroads in the Upper Great Plains, 229,529 boxcars were owned as of January 1, 1950; however, only 202,794 boxcars were on Upper Great Plains railroad lines or 88.3 percent of ownership. As of June 1, 1968, plain boxcar ownership by railroads in the Upper Great Plains was 176,187 but on-line ownership totaled only 145,544, or 82.6 percent of actual ownership.

Between the dates January 1, 1950 and June 1, 1968, the Eastern railroad sample retired, without replacement, 113,578 plain boxcars. Between the dates January 1, 1950 and June 1, 1968, railroads in the

TABLE 32. EASTERN ON-LINE PLAIN BOXCAR AND ALL BOXCAR OWNERSHIP TRENDS, 1950 THROUGH JUNE 1968

Year	Plain boxcar		All boxcar		Percent on-line ownership; plain boxcars	Percent on-line ownership; all boxcars	Loadings per ownership on line; all boxcars
	Actual ownership	On-line ownership	Actual ownership	On-line ownership			
1950	198,199	203,491	220,225	223,361	102.6	101.4	23.98
1955	192,694	213,693	215,528	233,823	110.8	108.4	20.32
1960	183,552	198,686	205,987	221,764	108.2	107.6	14.56
1965	112,722	126,692	144,289	159,732	112.3	110.7	15.78
1966	107,607	115,789	143,298	154,011	107.6	107.4	16.01
1967	97,620	110,111	137,171	159,090	112.7	115.9	13.85
1968	89,342	106,742	129,868	155,721	119.4	119.9	a
June 1968	84,621	106,938	125,246	158,701	126.3	126.7	a

[a]Not available.

Source: Association of American Railroads, Car Service Division, Semi-Monthly Revenue Freight Car Summary - Class I Railroads, CS-8A Statements.

TABLE 33. UPPER GREAT PLAINS RAILROADS ON-LINE PLAIN BOXCAR AND ALL BOXCAR OWNERSHIP TRENDS, 1950 THROUGH JUNE 1968

Year	Plain boxcar		All boxcar		Percent on-line ownership; plain boxcars	Percent on-line ownership; all boxcars	Loadings per ownership on-line; all boxcars
	Actual ownership	On-line ownership	Actual ownership	On-line ownership			
1950	213,172	186,458	229,529	202,794	87.4	88.3	20.91
1955	221,577	205,121	236,355	218,965	92.5	92.6	18.92
1960	217,105	203,879	229,798	212,040	93.9	92.2	17.81
1965	194,376	178,992	212,633	192,638	92.0	90.5	17.48
1966	186,764	155,739	214,188	177,764	83.3	82.9	20.77
1967	205,526	164,889	216,762	191,788	80.2	88.4	14.76
1968	179,746	150,394	215,736	182,482	83.6	84.5	a
June 1968	176,187	145,544	213,215	175,103	82.6	82.1	a

[a]Not available.

Source: Association of American Railroads, Car Service Division, Semi-Monthly Freight Car Summary Report, CS-8A Statements.

Eastern sample had a decline in on-line control of plain boxcars of only 96,553. Because of the Eastern sample's tendency to acquire foreign cars for the use of Eastern on-line shippers, railroads in the Eastern sample are able to decrease ownership by 1.0 plain boxcar, while decreasing on-line ownership by only .85 plain boxcar. For the railroads serving the shippers in the Upper Great Plains, a reduction in actual ownership of 1.0 plain boxcar reduced on-line ownership by 1.1 plain boxcars. When the railroads in the Eastern sample decreased its all-boxcar ownership by one boxcar, the effect on on-line ownership was a reduction of only .68 boxcar. For railroads in the Upper Great Plains, a 1.0 drop in actual boxcar ownership resulted in a decrease of 1.69 boxcars in on-line ownership.

Adjusting the boxcar loadings per ownership ratio to on-line ownership, the Eastern sample railroads turned over on-line boxcars at the rate of 13.9 times in 1967. The railroads which serve the Upper Great Plains, on the other hand, turned over on-line boxcars at a rate of 14.8 times in 1967.

The Northern Lines, Serving the Shippers of North Dakota

Over half of the Northern Lines' freight car ownership is composed of highly versatile, widely used boxcars.[12] The geographic area served by the Northern Lines is a freight originating territory; commodities produced in this area are transported toward population centers and/or seaports. Due to the bulk characteristics of a large portion of this freight, especially lumber and grain, a large number of boxcars are required to transport any significant amount at any particular time. On the other hand, freight entering this region would be primarily manufacturing items, either inputs in the agricultural production process or consumer goods. When arriving via railroad, this type of freight generally requires fewer boxcars when volume, prices, and regional consumer demand is considered.

The conclusion is that the Northern Lines are an exporter of boxcars. The percent of ownership on-line would reflect this situation. As of January 1, 1968, the Northern Line railroads had 79.2 percent of boxcar ownership on-line and available to on-line shippers; almost 24,000 boxcars owned by the Northern lines were off-line (Table 34). Six months later, this situation had deteriorated. Northern Line railroads had 78.0 percent of plain boxcar ownership on-line as of June 1, 1968.

The Northern Line railroads owned 10.9 percent of all boxcars owned nationwide by Class I railroads and was responsible for 8.4 percent of all Class I railroad boxcar loadings in 1956. By 1967, the Northern Line

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[12] 1) Great Northern; 2) Northern Pacific; 3) Chicago, Milwaukee, St. Paul, and Pacific; 4) Soo Line.

TABLE 34. NORTHERN LINE RAILROADS ON-LINE PLAIN BOXCAR AND ALL BOXCAR OWNERSHIP TRENDS, 1950 THROUGH JUNE 1968

Year	Plain boxcar		All boxcar		Percent on-line ownership; plain boxcars	Percent on-line ownership; all boxcars	Loadings per ownership on-line; all boxcars
	Actual ownership	On-line ownership	Actual ownership	On-line ownership			
1950	79,833	64,992	82,692	67,706	81.4	81.8	18.93
1955	76,027	66,907	78,275	69,349	88.0	88.5	18.31
1960	71,661	64,517	73,544	65,603	90.0	89.2	16.16
1965	68,392	57,703	71,398	59,233	84.3	82.9	17.26
1966	61,289	43,865	70,072	49,669	71.5	70.8	20.45
1967	59,854	50,986	70,512	58,595	85.1	83.0	14.47
1968	58,554	46,414	70,081	57,520	79.2	82.0	[a]
June 1968	56,902	44,426	68,754	53,607	78.0	77.9	[a]

[a] Not available.

Source: Association of American Railroads, Car Service Division, Semi-Monthly Revenue Freight Car Summary - Class I Railroads, CS-8A Statements.

railroads owned 12.1 percent of the national Class I railroad boxcar ownership and loaded 9.8 percent of all boxcars loaded by Class I railroads. While the Northern Line railroads loadings in boxcars decreased absolutely since 1956, loadings in boxcars still compose 42.3 percent of all freight car loadings made by Northern Line railroads in 1967. Consequently, boxcar loadings represent a good portion of the Northern Line railroads' source of freight revenue and would reflect a critical dependency.

Freight Rates Versus On-Line Ownership; A Hypothesis

Assuming a railroad purchases a freight car to satisfy on-line shipper demands and the railroad expects remuneration in the form of freight revenue, 100 percent of ownership on-line in conjunction with adequate utilization and competitive freight rates would yield 100 percent shipper satisfaction. Thus, when less than 100 percent of ownership is on-line and available to on-line shippers, a shortage of freight cars causes a decrease in shipper satisfaction.

Assume that at some freight rate R a railroad is willing to supply X number of boxcars and that this freight rate R also appears competitive to area shippers; and they consequently demand X number of boxcars, an equilibrium is established. At this freight rate, the railroad will purchase X number of boxcars to satisfy shipper demands. At a freight rate lower than R, the demand of shippers for boxcars will exceed the supply of boxcars by railroads. At a freight rate higher than R, supply of boxcars would exceed the demand for boxcars (Figure 1).

A disequilibrium develops when less than X boxcars are on-line. For example, perhaps only 80 percent of X is really available to the shippers served by this railroad. This would cause the supply of boxcars curve to shift upward and to the left yielding a new equilibrium at point E'. The railroad attempts to maintain total freight revenue by increasing the freight rate to P. Less than 100 percent of ownership on-line could be a cause for higher freight rates. Freight rate P is uncompetitive, causing a decrease in the demand for boxcars by shippers, a decrease in the freight rate, and ultimately a lower railroad total freight revenue.

Conversely, if more than 100 percent of ownership is on-line, causing a downward shift in the supply curve, shippers would be justified in requesting a lower freight rate than R insisting on the actual new equilibrium freight rate P'.

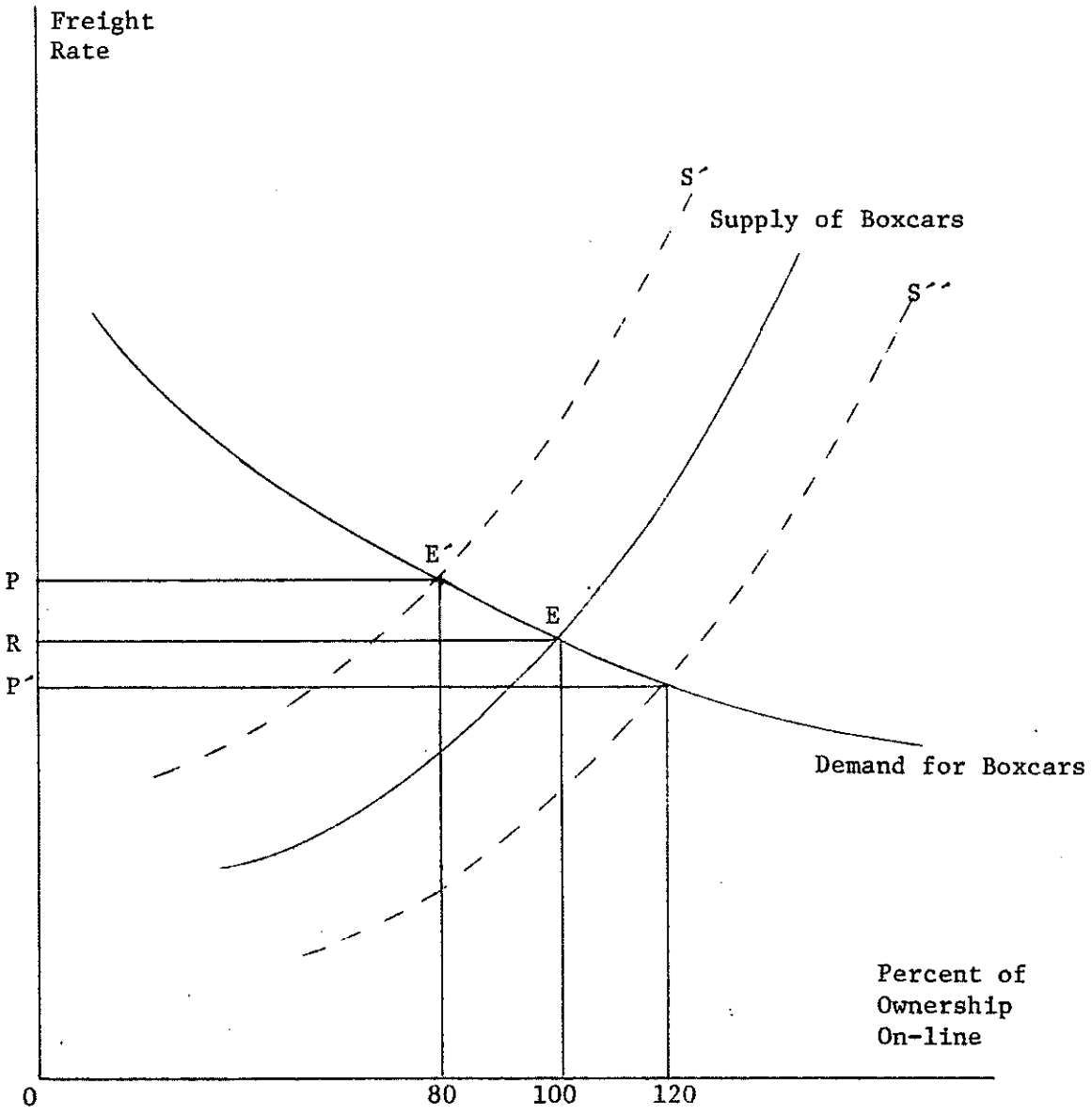

Figure 1. Hypothetical Demand for and Supply of Boxcars; On-line Boxcar Ownership Versus Freight Rates.

THE ECONOMICS OF FORCED COMPENSATION

A certain amount of prediction is required in decision making. The success of a prediction is dependent primarily on two factors: (1) How far in the future one is predicting, and (2) the quality and quantity of the data on which the prediction is based.

Depending on the quantity and quality of data available for the long-run prediction, a certain degree of risk and uncertainty is involved. By definition, the long-run is a period of time during which all factors of production can and do change; the direction and extent of these changes and the interrelationship between these many changing factors magnifies risk and uncertainty. Successful predictive capability, however, increases as the time period decreases; and in the short-run the problem of risk and uncertainty may be handled with reasonable success.

Railroad management must make decisions. Decisions made by railroad management must take into consideration large dollar costs and the extent of railroad market predictability. For example, a railroad management decision may involve the purchase of a $30,000 freight car with an expected life of 30 years. This decision is based upon current shipper demands and whether the railroad has the funds available for a purchase of this type. Railroad management is predicting 30 years into the future when purchasing a railroad freight car. This investment must not only be in usable condition for 30 years, but it must also satisfy shippers' demands 30 years from date of purchase. The predictable time element involves uncertainty in the decision making. Also the usable, available data employed in this decision-making process (the use of current shipper demands and the railroads' current financial situation) involves a certain amount of risk in this decision.

A very flexible decision-making procedure adaptable to the short-run is very conducive to decision making. A railroad cannot purchase a freight car during a period of peak loadings and when loadings fall off, cancel the debt to the car builder and send the car back. However, there is a rather unique method available to railroads to accomplish essentially this same objective, forced compensation in the form of per diem payments.

In January of 1964, the Association of American Railroads instituted a graduated scale of per diem rates; graduated in the sense that these rates were based on the "original cost per car depreciated" (Table 35). For example, a new $19,000 freight car could earn in rent $6.15 per car day. A new car valued at $35,000.01 and over could earn $12.18 in per diem payments.

Whether to directly buy a freight car or to pay per diem for a foreign freight car owned by a foreign railroad is a decision facing railroad management. The purchase of a freight car involves ownership of 30 years. Renting a freight car by paying per diem involves variable time control.

TABLE 35. PER DIEM RATES FOR THE USE OF RAILROAD OWNED FREIGHT CARS OPERATING IN THE UNITED STATES BETWEEN COMMON CARRIER RAILROADS, JANUARY 1, 1964

Original cost of car depreciated	Per diem group	Per diem rate per car day
1,000 and less	1	$ 2.16
1,000.01 to 5,000.00	2	2.79
5,000.01 to 10,000.00	3	3.58
10,000.01 to 15,000.00	4	4.50
15,000.01 to 20,000.00	5	6.15
20,000.01 to 25,000.00	6	7.11
25,000.01 to 30,000.00	7	9.00
30,000.01 to 35,000.00	8	10.18
35,000.01 and over	9	12.18

Assume that railroad management has decided to purchase a plain boxcar valued at $19,000, and a straight-line depreciation schedule is used (Table 36). At the end of 30 years this $19,000 plain boxcar will have been completely depreciated and its book value would be zero.

The costs of resources to a firm are their values in their best alternative uses. This is called the alternative cost doctrine or the opportunity cost doctrine.[13] If it is assumed that the best alternative use of this $19,000 would be as an investment at 6 percent compounded the value of this $19,000 at the end of 30 years would be $109,126.50.

One must consider, of course, the expected revenue earned by owning and loading the car with revenue freight. Revenue earned by car type is not collected by the railroads and is consequently unknown. However, it is possible to calculate the revenue needed per loading to offset the alternative cost of $109,126.50. Assume that this particular freight car type turns over at a rate of 10.4 times per year,[14] in 30 years this car will be loaded 312 times. To offset the alternative costs and make the decision to buy profitable, each loading of the freight car would have to bring in revenue greater than $288.87.[15] As the price of the freight

[13]Leftwich, Richard H., The Price System and Resource Allocation, 3rd edition, Holt, Rinehart, and Winston, New York, 1966, pp. 126-127.

[14]Divide total freight car revenue loadings by total freight car ownership.

[15]Divide the alternative cost by number of total freight car loadings.

TABLE 36. STRAIGHT-LINE DEPRECIATION SCHEDULE FOR A FREIGHT CAR ORIGINALLY PRICED AT $19,000

Year	Year end book value	Per diem rate	Years per diem paid	Total per diem paid
0	$19,000.00	$6.15		
1	18,367.90	6.15		
2	17,734.57	6.15		
3	17,101.24	6.15		
4	16,467.91	6.15		
5	15,834.58	6.15		
6	15,201.25	6.15	7	$ 15,713.25
7	14,567.92	4.50		
8	13,934.59	4.50		
9	13,301.26	4.50		
10	12,667.93	4.50		
11	12,034.60	4.50		
12	11,401.27	4.50		
13	10,767.94	4.50		
14	10,134.61	4.50	8	13,140.00
15	9,501.28	3.58		
16	8,867.95	3.58		
17	8,234.63	3.58		
18	7,601.30	3.58		
19	6,967.97	3.58		
20	6,334.64	3.58		
21	5,701.31	3.58		
22	5,067.98	3.58	8	10,453.60
23	4,434.65	2.79		
24	3,801.32	2.79		
25	3,167.99	2.79		
26	2,534,66	2.79		
27	1,901.33	2.79		
28	1,268.00	2.79	6	6,110.10
29	634.33	2.16		
30	0.00	2.16	1	788.40
			30 years	$ 46,205.35

car increases, the alternative costs increase, and necessarily the revenue earned per loading must increase proportionately. Some railroad shippers desire an extremely specialized freight car for the transport of a particular product. The railroad, to satisfy this demand, must build or have built this "one product car" at a very high cost realizing that the loadings may be extremely disproportionate.

The yearly depreciation cost of a $19,000 freight car is $633.33 when the straight-line depreciation method is used. Assuming that a $19,000.00 car will be loaded, on the average, 10.4 times a year, the depreciation cost per loading will be approximately $60.90.[16] To enable the railroad to replace this car after 30 years, it is mandatory that revenue per car loading not only offset its portion of the alternative cost, $288.87, but also the depreciation per load of $60.90, or a total of $349.77. In addition, maintenance costs per loading other variable costs, and a reasonable profit return must be added to obtain the total required revenue per load.

Assume that management of a second railroad in a different part of the country decides to pay per diem for a foreign freight car. For this railroad the yearly turnover rate of a $19,000.00 plain boxcar is, on the average, 15.5 times per year. This freight car on this line will be loaded 463.5 times in 30 years. The alternative cost doctrine applies here as well, and to recover this cost plus replacement, revenue per loading would have to equal or exceed $235.45.[17] Total required revenue could be calculated by adding to this maintenance costs other variable costs and a reasonable profit return.

In order to rent a $19,000.00 freight car, $6.15 per diem per car day is required. Without considering the depreciated cost of the foreign car and the related graduated per diem rate, total per diem payments at the end of 30 years would be $67,342.50.[18] Compare this with the expected return on $19,000.00 at 6 percent compounded at the end of 30 years, $109,126.50; and this alternative seems very attractive, what appears to be a clear profit of $41,784.00.

The purchase of a freight car by a railroad is considered a fixed cost; a cost which cannot be incurred in the short-run, only the long-run. A fixed cost is considered an "addition to the plant;" for a railroad the freight car fleet is considered as the "plant." The per diem payer has the ability to vary his "plant" in the short-run. During a peak or profitable loading period, the per diem payer will not incur the fixed cost of purchasing a new freight car. Using the method of freight car rental, the borrowing railroad will accomplish the objective of maximizing loadings and freight revenue. When this peak

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[16]This figure does not include maintenance costs.

[17]To recover opportunity cost, $194.45, depreciation per loading is $41.00

[18]Under real conditions, after depreciation, this per diem total is $46,205.35.

loading period ends, a simple release of the borrowed freight car back to the owning railroad stops per diem payments.

It is assumed that a borrowed freight car will turnover at the same rate as a freight car actually owned; in this case, 15.5. The cost per loading by owning is $41.00, the loading depreciation. If the freight car being held is new and valued at $19,000.00, the per diem would be $6.15 per car day. To make paying per diem profitable, this borrowed freight car must be loaded every 6.67 days (Figure 2).

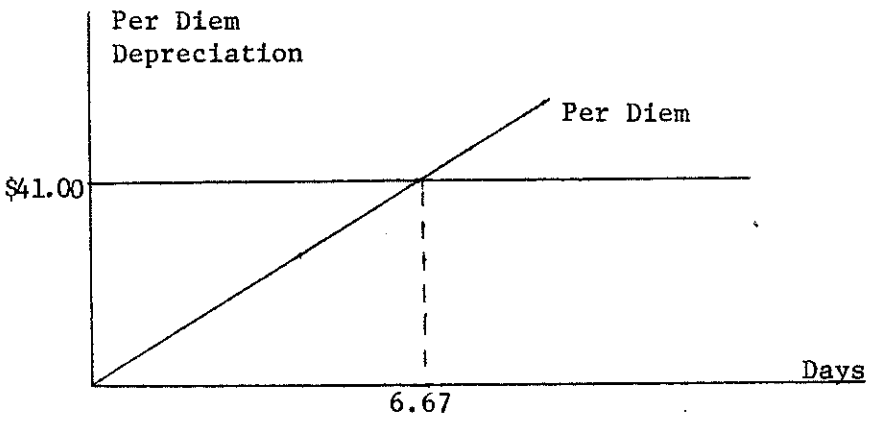

Figure 2. Depreciation Costs Versus Per Diem Payments.

A year's depreciation of a $19,000.00 freight car is $633.33. A borrowing railroad could conceivably hold a $19,000.00 foreign freight car for 103 days out of the year by paying per diem up to this yearly depreciation cost. If this $633.33 is invested at a rate of 6 percent and the per diem was payable at year end, the borrowing railroad has two alternatives: 1) hold the freight car for an additional six days for a total of 109 days; or 2) simply use the interest gained, $38.00, and hold the freight car for six days (Figure 3).

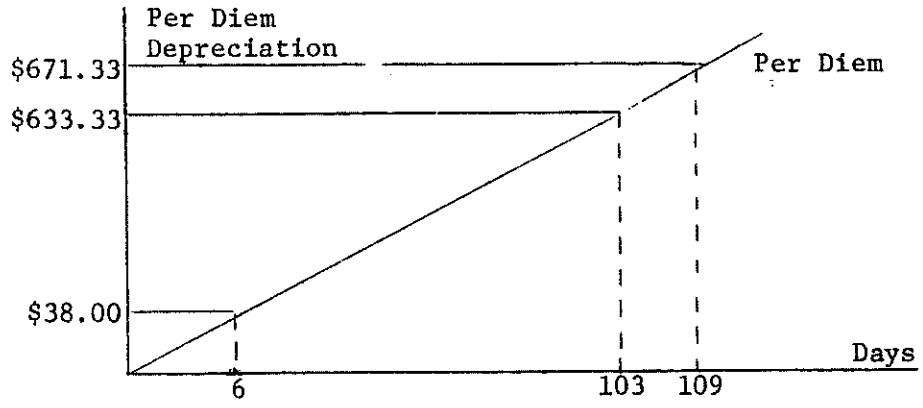

Figure 3. Depreciation Costs Versus Per Diem Payments.

A total per diem payment of $19,000 will rent a freight car for approximately eight years and three months (Figure 4). When $19,000 is invested at 6 percent compounded for eight years and three months, its value would be $30,282.20; interest alone could enable a railroad to hold a foreign freight car for about five years. The total, $30,282.20, could be used to pay per diem and the freight car could be held for 13 years. The per diem charge used in this example is that charge which would be associated with a new $19,000 freight car. To be more realistic, the freight car should be depreciated $633.33 per year; and after so many years, there would be an overall drop in the per diem charge. The effect on Figure 4 would be a downward movement of the per diem line, and the freight car could be held for additional days for the same total per diem cost.

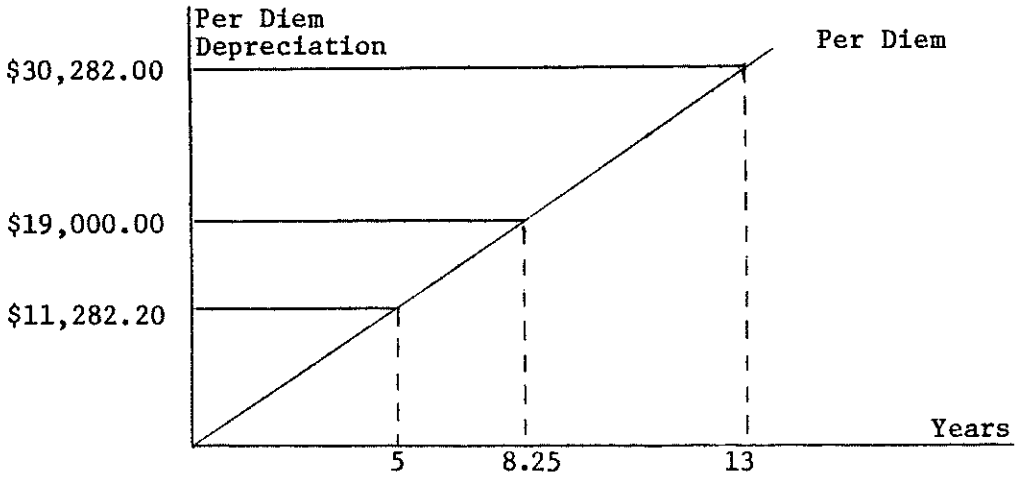

Figure 4. Depreciation Costs Versus Per Diem Payments.

The objective of operating a railroad is to maximize profits. The maximization of profits is closely dependent upon the maximization of loadings. Assume that a railroad has $1 million to spend on freight cars; approximately, 52 freight cars valued at $19,000 each can be purchased given this capital limitation. Assuming that each one of these freight cars will be loaded 15.45 times a year, total fleet loadings per year would be 813. These 52 freight cars would be loaded 24,390 times in 30 years. These revenue loadings will be realized whether the freight cars are purchased or acquired by paying per diem.

The second alternative for the use of the $1 million was as an investment at 6 percent compounded for 30 years. The value of $1 million compounded at 6 percent at the end of 30 years is $4,743,400. Assuming per diem payable at the end of 30 years, the total per diem cost for renting 52 freight cars for 30 years at an ungraduated per diem scale of $6.15 a day would be $3,544,235.78. By investing this $1 million at the beginning of the period, the cash value would be $5,743,400 at the end

of the 30-year period. It is, therefore, possible to pay off the per diem debt, maximize revenue freight car loadings, maintain shipper satisfaction, forego the expenses associated with maintenance, and reinvest the difference of $2,199,164.22. Using this method, it is possible to run a railroad on pure capital.

There are conditions, however, when a railroad must purchase a freight car, only two are listed here:

1. When the railroad is a large freight originator.

2. A good percentage of loadings is made in freight cars which can also be used extensively by shippers on foreign lines.

When a railroad has both of these characteristics, the railroad is usually a per diem creditor; a railroad which invests in rolling stock, pays the opportunity cost, foregoes revenue loadings, and in return receives forced compensation in the form of per diem payments.

In summary, using the graduated per diem scale, total per diem payments at the end of the 30-year life of a $19,000.00 freight car would be $46,205.35 (see footnote 18). For the original owner of the car, this yields a rate of return of 3 percent compounded and, of course, no revenue loadings. The investment of $19,000.00 at a guaranteed 6 percent compounded interest rate yields the investor about $109,000.00; $109,000.00 enables a railroad to borrow two $19,000.00 freight cars for 30 years, plus revenue loadings, plus approximately $17,000.00 to continue the cycle. Total out-of-pocket cost for the owner to accomplish these same objectives would be $44,000.00 plus maintenance costs.

A Brief Analysis of the Current Original Cost Depreciated Per Diem Schedule

As the freight car becomes more and more depreciated, less per diem is required to hold the freight car (Figure 5). For example, to hold a $19,000.00 freight car from year two to year four requires a per diem payment of $4,400.00. To hold this same car when it is 20 years old to when it is 22 years old requires a per diem payment of only $2,800.00.

Assuming a straight-line depreciation schedule is used ($633.33 per year) by the owning railroad and the car is held by a foreign railroad for the first seven years of the life of the car, depreciation costs incurred by the owning railroad would total $15,713.25; this is a rate of return for the owning road of 20 percent compounded (Table 37). If the freight car is held during the next eight years of its life instead of the first seven, the rate of return of per diem payments from depreciation cost would be 6.5 percent, 3.25 percent for the next eight years, 1.625 percent for the next six years, and 0.75 percent for the last year of the freight car's life.

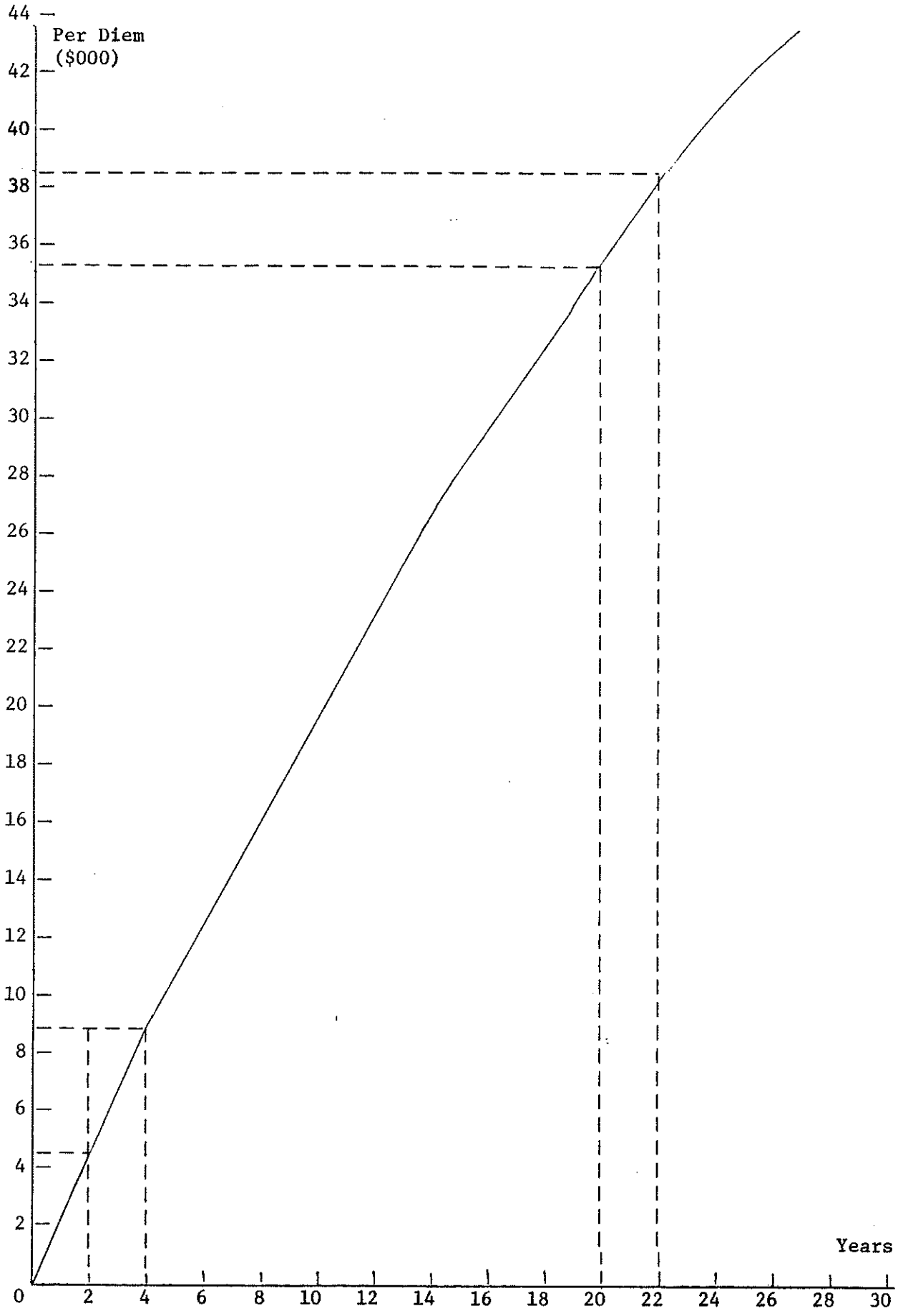

Figure 5. Diminishing Returns of Per Diem Payments.

TABLE 37. DEPRECIATION COSTS AND PER DIEM REVENUES

Holding period	Years held	Depreciation per holding period	Per diem payments per holding period	Rate of return
1	7	$ 4,433.31	$ 15,713.25	20.0%
2	8	5,066.64	13,140.00	6.50%
3	8	5,066.64	10,453.60	3.25%
4	6	3,799.98	6,110.10	1.625%
5	1	633.33	788.40	0.75%
	30	$ 19,000.00	$ 46,205.35	3.00%

AN EXPERIENCE IN QUESTIONNAIRES: FACT VERSUS OPINION

A questionnaire was sent to each Class I railroad serving the shippers of the entire United States in August of 1968. This questionnaire consisted of 22 pages requesting numerical facts about certain railroad operations. The general objective of the questionnaire was to provide data for the purpose of research. The methodology inherent in the questionnaire concerned a simple accounting procedure; revenue earned versus expenses paid. Realizing that the ultimate objective of this research was to gain some insight into the history and economics of the so-called grain shipping capacity problem which allegedly exists annually, the revenues versus expenses data asked for, centered solely around that type of railroad equipment which is capable of hauling grain; the plain boxcar and the covered hopper car.

It is admitted that this questionnaire was devised from an economist's point of view; the acquisition of certain information was essential to perform an analysis on trends in railroad grain carrying capacity, investments in suitable grain carrying freight cars, tendencies by rail district, maintenance expenses, revenue loadings, and control over foreign freight cars. It was envisioned that this data would enable a calculation of such basic accounting figures as a turn on investment, system revenue loadings, versus system investment, a return on investment in relation to per diem payments and conversely a return on investment with respect to per diem received, a correlation between maintenance costs and percent of ownership on line, and so forth.

Responses to the questionnaire were many but with slight variation. The responses were predominantly written returns commenting on how impossible the questionnaire was to fill out. Generally speaking, the responses made by railroad management fell into five broad categories: 1) too long and would be too expensive, time and money-wise, to fill out; 2) could not be determined, data necessary to calculate are not collected by this railroad; 3) we carry very little grain and wish not to distort your study; 4) suggestions that time would be better spent doing research in some other area; and 5) we cannot help but wish you much success in your endeavor.

A typical response would run something like this:

"Dear Sir:

Your letter dated August, 1968, enclosing a questionnaire asking for certain data for use in research into grain shipping capacity has been referred to me.

While your interest in doing research in this field is entirely understandable, our company must respectfully decline to attempt the task of assembling the data which you request because it would involve in part

at least information which we are informed is not compiled by the railroads, and also because it is intended to deal with per diem and car utilization and ownership issues which are now before the courts or the Interstate Commerce Commission for resolution. As you are doubtless aware, the voluminous evidence already accumulated in these proceedings is a matter of public record.

As an alternative, you may wish to examine the data produced by the ICC from its Waybill Sampling Program. From the sampled waybills, the Commission's staff produced a series of reports which includes information regarding type of car used by commodity, certain revenue information, and haul information.

We sincerely hope there will be enough Class I railroads in position to furnish the information requested so as to make your research study meaningful.

Your questionnaire is returned herewith.

Sincerely

CLASS I RAILROAD

A follow-up questionnaire was prepared to determine railroad management opinion on certain railroad financial aspects; it was evident that numerical facts were not readily available to railroad management but that an opinion may be. Again, all Class I railroads were contacted and a 62 percent return on this questionnaire was realized. Out of a total response of 42, 32 Class I railroads completed the questionnaire; 10 Class I railroads were either involved in current per diem litigation, merged with another railroad, considered themselves a too specialized carrier, or repeated the response they submitted in reference to the first questionnaire and felt they could not or should not complete the questionnaire.

The Association of American Railroads considered 68 railroads as being Class I in 1967; 26 operating in the Eastern district, 13 in the Southern district, 11 in the Northwest district, 12 in the Centralwest district, and 6 in the Southwest district. The percent return on the financial opinion questionnaire by districts was 46.1 percent for the Eastern district, 46.2 percent of the Southern district, 63.6 percent of the Northwest district, 41.7 percent of the Centralwest district, and 33.3 percent of the Southwest district.

Question 1: Which points do you consider when purchasing a railroad freight car? (Table 38)

Thirty respondents indicated that they consider the demand of shippers when deciding whether to purchase a freight car or not: It was

TABLE 38. WHICH POINTS DO YOU CONSIDER WHEN PURCHASING A RAILROAD FREIGHT CAR? RESPONSES IN EACH DISTRICT AND THE COMPOSITE SAMPLE

District	Yes	No	No response
Whether the railroad has funds available for this purchase:			
Eastern	8	4	14
Southern	4	2	7
Northwest	6	0	5
Centralwest	4	1	7
Southwest	2	0	4
Total	24	7	37
The demand of shippers:			
Eastern	12	0	14
Southern	6	0	7
Northwest	5	1	5
Centralwest	5	0	7
Southwest	2	0	4
Total	30	1	37
The rate of return on this investment:			
Eastern	10	2	14
Southern	5	1	7
Northwest	5	1	5
Centralwest	2	3	7
Southwest	1	1	4
Total	23	8	37
The price of the freight car:			
Eastern	5	7	14
Southern	2	4	7
Northwest	3	3	5
Centralwest	3	2	7
Southwest	2	0	4
Total	15	16	37
The life expectancy of the freight car:			
Eastern	5	7	14
Southern	2	4	7
Northwest	3	3	5
Centralwest	2	3	7
Southwest	1	1	4
Total	13	18	37
To collect per diem:			
Eastern	5	7	14
Southern	0	6	7
Northwest	0	6	5
Centralwest	1	4	7
Southwest	0	2	4
Total	6	25	37

indicated by one railroad in the Northwest district that shipper demands were not considered. Twenty-four railroads considered whether there were funds available and the rate of return of this investment as points considered. Six railroads, five of which are in the Eastern railroad district, considered buying freight cars for the purpose of collecting per diem. More than half of the railroads responding to the questionnaire indicated that neither the price of the freight car nor the life expectancy of the freight car were considered. When freight cars are considered as input into the freight transporting process. the insensitivity of railroads to freight car prices or freight car life expectancy does indicate that the railroads are price takers. The primary concern is to satisfy the demand of freight shippers and stay competitive in the transportation industry.

Question 2: In your opinion, which type of car contributes most to total freight revenue? (Table 39)

The plain boxcar was generally considered by those railroads responding as the freight car which generally contributed most to total freight revenue. The Eastern and Southern district railroads considered the plain boxcar as the second most freight revenue contributor; Southwest railroads considered the plain boxcar as the third freight car type which contributed the most to total freight revenue; railroads in the Northwest and Centralwest districts ranked the boxcar as the prime freight revenue contributor. Compiling all responses, the order of freight revenue contributions by car types were as follows: plain boxcar, hopper car, equipped boxcar, covered hopper car, and stock car. The stock car was generally thought of as contributing the least to total freight revenues by all respondent railroads.

Five railroads could not determine car type rankings in reference to car types contributing to total freight revenue.

TABLE 39. IN YOUR OPINION, WHICH TYPE OF CAR CONTRIBUTES MOST TO TOTAL FREIGHT REVENUE? RANKING OF RESPONSES BY RAILROADS IN EACH DISTRICT AND THE COMPOSITE SAMPLE

District	1	2	3	4	5	6	7	8	9[a]
Eastern	2	4	5	1	3	6	7	9	8
Southern	2	3	5	1	7	6	4	9	8
Northwest	1	3	2	2	5	4	6	7	5
Centralwest	1	2	3	4	5	5	7	8	6
Southwest	3	1	2	4	5	6	5	8	7
Total sample	1	3	4	2	5	6	7	9	8

[a]1 through 9 are car types: 1) Plain boxcar; 2) equipped boxcar; 3) covered hopper car; 4) hopper; 5) gondola; 6) flat car; 7) tank car; 8) stock car; and 9) refrigerator car.

Question 3: In your opinion, what type of car has the best ratio of revenue earned per dollar invested? (Table 40)

This question was designed to provide a partial check for question 1 in which the railroad was asked to consider the rate of return on freight car purchases. Eight railroads indicated that a rate of return on a freight car investment was not considered, while 10 railroads found it impossible to calculate the ratio of revenue earned per dollar invested.

The plain boxcar was considered the best investment when all responses were compiled. The equipped boxcar and covered hopper car were equally ranked as having the second best ratio of revenue earned per dollar invested. Plain boxcars were ranked first by Eastern, Southern, and Centralwest railroads. Southwest railroads expressed the opinion that the equipped boxcar turned the most revenue per dollar invested. Five of the railroads responding, which serve the Northwest district, could not determine the ratio by car type, but for those railroads which were able to, were of the opinion that the covered hopper car had the best ratio of revenue earned per dollar invested. Considering all usable responses, the ranking of car types was as follows: plain boxcar, equipped boxcar and covered hopper car, hopper, gondola, flat car, tank car, refrigerator car, and last, stock car.

TABLE 40. IN YOUR OPINION, WHAT TYPE OF CAR HAS THE BEST RATIO OF REVENUE EARNED PER DOLLAR INVESTED? RANGING OF RESPONSES IN EACH DISTRICT AND THE COMPOSITE SAMPLE

District	1	2	3	4	5	6	7	8	9
Eastern	1	5	4	2	3	6	7	9	8
Southern	1	2	4	3	6	6	5	8	7
Northwest	2	2	1	4	3	2	6	6	5
Centralwest	1	2	4	3	4	3	6	7	5
Southwest	3	1	2	4	5	6	5	8	7
Total sample	1	2	2	3	4	5	6	8	7

Question 4: In your opinion, which type of car requires the most maintenace? (Table 41)

The equipped boxcar was the unanimous choice of all railroads districts when necessary maintenace costs were considered. The next most

expensive car to maintain was the plain boxcar, the hopper car third, the covered hopper car fourth, gondola fifth, refrigerator car sixth, flat car seventh, tank car eighth, and stock car ninth. This ranking may be a reflection of car use or turn-over rate. Seven railroads indicated that maintenance costs by car types could not be determined.

TABLE 41. IN YOUR OPINION, WHICH TYPE OF CAR REQUIRES THE MOST MAINTENANCE? RANKING OF RESPONSES IN EACH DISTRICT AND THE COMPOSITE SAMPLE

District	1	2	3	4	5	6	7	8	9
Eastern	2	1	3	4	5	7	8	9	6
Southern	2	1	4	3	5	6	7	8	5
Northwest	2	1	4	5	3	6	9	8	7
Centralwest	2	1	3	2	5	6	7	8	4
Southwest	2	1	3	1	4	5	7	8	6
Total sample	2	1	4	3	5	7	8	9	6

Question 5: Are you a per diem creditor or debtor? (Table 42)

Of the 32 Class I railroads completing the questionnaire, 17 were creditors, 14 were debtors, and one road could not determine whether it was a creditor or debtor. The split between creditors and debtors within the railroad districts was rather even.

TABLE 42. ARE YOU A PER DIEM CREDITOR OR DEBTOR? RESPONSES IN EACH DISTRICT AND THE COMPOSITE SAMPLE

District	Creditor	Debtor
Eastern	8	4
Southern	3	3
Northwest	4	2
Centralwest	2	3
Southwest	0	2
Total	17	14

Question 6: If you are a creditor, in your opinion within a year's time which type of car do you receive the most per diem?

Of the 17 known per diem creditors, only one was unable to express an opinion about which type of car earned the most per diem. Eight railroads were of the opinion that plain boxcars contributed significantly to total annual per diem credits. Next to the plain boxcar, the hopper car was most desired by foreign railroads. Per diem creditors were of the opinion that the equipped boxcar was the third choice of foreign railroads. All known creditor railroads in the Northwest district felt that plain boxcars owned by Northwest railroads were most desired by foreign lines.

Question 6b: In your opinion, do these per diem payments offset the possible revenue freight loadings foregone from the car being off your line? (Table 43)

Four opinions, two from the Eastern district, were of the nature that these per diem payments did offset the loss in revenue freight loadings while the freight car was being held by a foreign railroad. Five Eastern railroads, when asked what points they considered when purchasing a freight car, expressed the opinion that they purchase cars to collect per diem (see Table 38). Thirteen railroads were of the opinion that the per diem payments received from foreign roads for the use of their cars did not offset the loss in possible revenue freight loadings.

TABLE 43. IN YOUR OPINION, DO THESE PER DIEM PAYMENTS OFFSET THE POSSIBLE REVENUE FREIGHT LOADINGS FOREGONE FROM THE CAR BEING OFF YOUR LINE?

District	Yes	No
Eastern	2	6
Southern	1	2
Northwest	1	3
Centralwest	0	2
Southwest	0	0
Total	4	13

Question 7: If you are a debtor, in your opinion within a year's time, which type of car do you pay the most per diem for? (Table 44)

The opinions expressed by the creditors in question 6 are largely confirmed by the opinions as expressed by per diem debtors in question 7: Seven railroads expressed the desire to supplement their plain boxcar ownership with foreign plain boxcars. Three per diem debtors desired equipped boxcars and two desired hoppers. Two per diem debtors could not determine which type of car they paid the most per diem for.

Question 7b: In your opinion, do the additional revenue freight loadings gained by the utilization of a foreign car offset the per diem you must pay for the use of that car? (Table 44)

With the exception of one railroad in the Southern district, the common consensus was that additional revenue freight loadings made in a foreign car does offset the per diem necessary to hold that car. One per diem debtor in the Northwest district could not determine whether the additional revenue freight loadings gained by using a foreign freight car did offset the per diem payments necessary to hold the foreign freight car.

TABLE 44. IN YOUR OPINION, DO THE ADDITIONAL REVENUE FREIGHT LOADINGS GAINED BY THE UTILIZATION OF A FOREIGN CAR OFFSET THE PER DIEM YOU MUST PAY FOR THE USE OF THAT CAR?

District	Yes	No
Eastern	4	0
Southern	2	1
Northwest	1	0
Centralwest	3	0
Southwest	2	0
Total	12	1

Question 8: Generally speaking, per diem charges should be: (Table 45)

None of the respondents felt that per diem payments should be abolished and only one railroad, in the Southern district, had the opinion that per diem charges should be decreased. Another railroad in the Southern district advocated greatly increasing per diem rates. Compiling all opinions, three railroads wanted per diem payments greatly increased, one in each of the Eastern, Southern, and Northwestern districts. Almost a majority of the railroads wanted to moderately increase per diem rates; nine railroads were satisfied with current per diem rates, two railroads suggested a complete change in the structure of per diem rates, and two railroads had no opinion.

TABLE 45. GENERALLY SPEAKING, PER DIEM CHARGES SHOULD BE: RESPONSE BY DISTRICT AND THE COMPOSITE SAMPLE

District	Greatly increased	Moderately increased	Remain the same	Decreased	Abolished	Changed	No opinion
Eastern	1	9	1	0	0	1	0
Southern	1	0	4	1	0	0	0
Northwest	1	3	0	0	0	1	2
Centralwest	0	2	3	0	0	0	0
Southwest	0	1	1	0	0	0	0
Total	3	5	9	1	0	2	2