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The Shift to Larger Railcars for the Shipment of Grain

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Summary

Since 1994, the lower operating costs of larger railcars (C-114 covered hopper cars) for the shipment of grain have encouraged their increased use. Most of these cost savings have accrued to the major railroads, but some of the savings have been passed on to shippers. As their use has increased, the amount of grain shipped by smaller railcars (C-113 covered hopper cars) has decreased. This shift has prompted changes in the dynamics of railroad economics, including the need for track and bridge upgrades in order to handle the heavier cars and the costs associated with those upgrades. Short-line and regional railroads are at a disadvantage compared to major railroads because they have fewer financial resources available for rail line upgrading. Nevertheless, they have been systematically upgrading their track for the movement of C-114 hopper cars. Some researchers have indicated that State subsidies to assist in upgrading rail branch lines could be used to bring more of the savings from larger cars to more farmers and to reduce maintenance costs on rural roads caused by farmers trucking grain to main-line elevators.

C-114 covered hopper car

C-113 covered hopper car

The Shift to Larger Grain Cars[1]

The use of larger hopper cars results in reduced costs for railroads. C-114 hopper cars, which weigh 286,000 pounds when loaded, can hold 10 percent more grain than C-113 hopper cars, which weigh 263,000 pounds when loaded. This means that fewer cars are needed to move the same volume of grain, resulting in labor efficiencies. Other effects of the increased volumes handled by C-114 railcars include a reduction in the number of railcars in use, which results in reduced rail congestion and fewer cars requiring repair and eventual replacement. The better load-to-tare ratio also makes the larger cars more efficient in fuel usage and locomotive power than smaller railcars.[2]

1 The findings and data presented in this paper come from a USDA analysis of the Surface Transportation Board's Confidential Waybill Sample. Total tonnage shipped by C-113 and C-114 covered hopper cars were aggregated for each year from 1994-2011.

2 Babcock, Michael W. and James Sanderson, The Impact of Jumbo Covered Hopper Cars on Kansas Shortline Railroads, K-Tran report No. KSU-04-3, September 2004, and Bitzan, John D. and Denver D. Tolliver, Heavier Loading Rail Cars, Mountain-Plains Consortium Report No. 01-127.4, October 2001.

Figure 1. Grain Tonnages Moved by Type of Covered Hopper Railcar

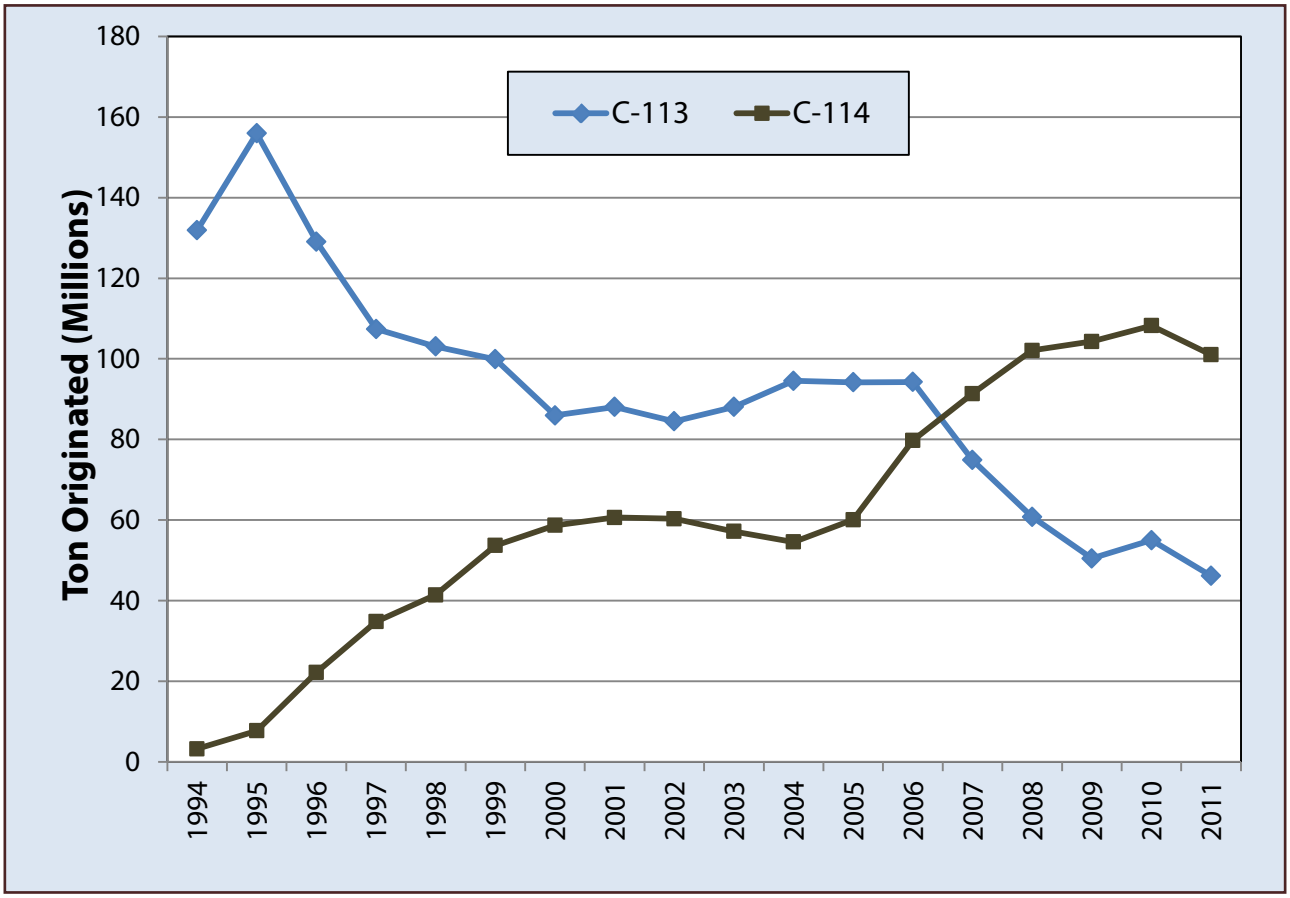
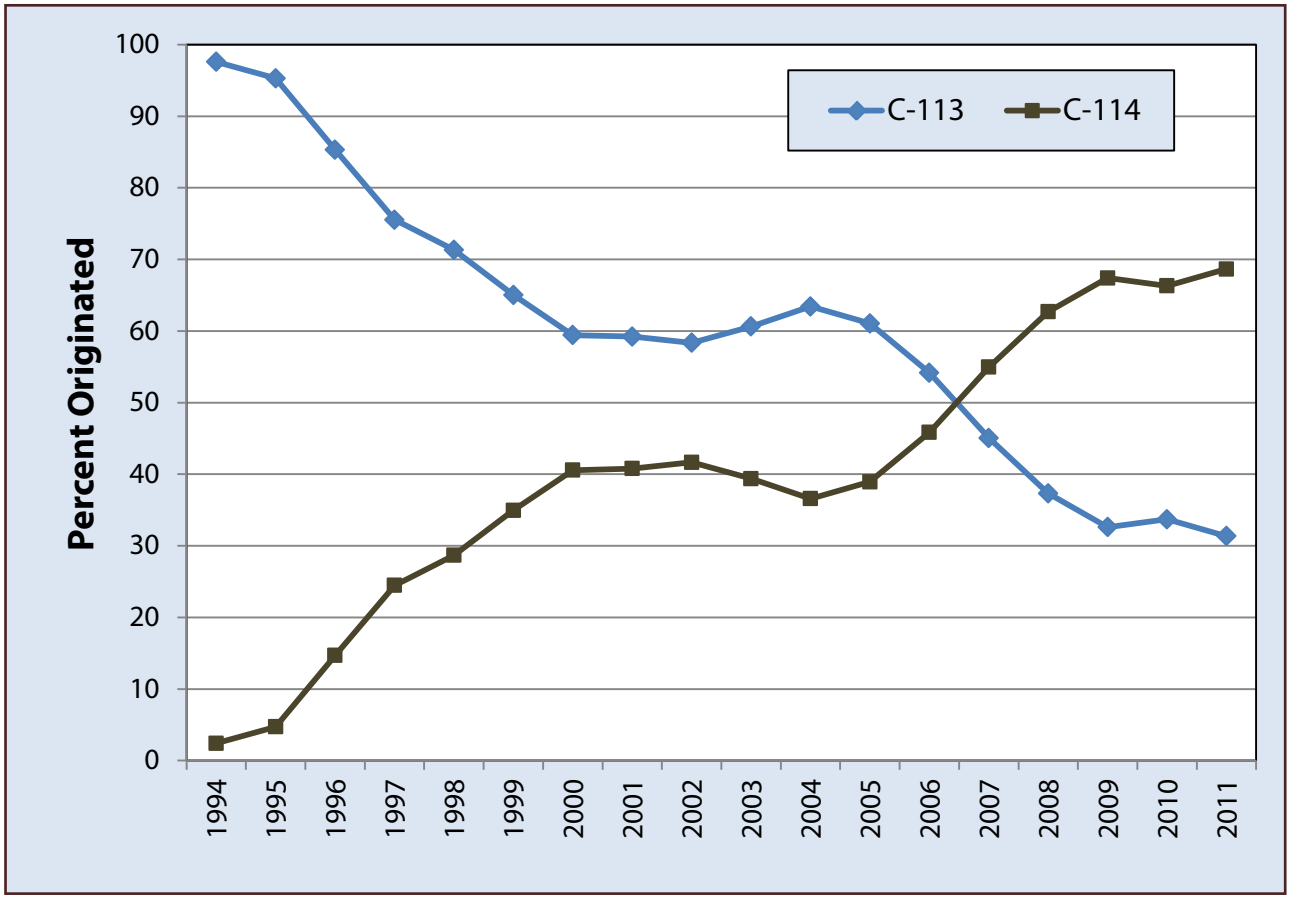


Figure 2. Percentage of Grain Moved by Type of Covered Hopper Railcar



The shift to C-114 covered hoppers has occurred quite rapidly. In 1994, 3.3 million tons (2.4 percent) of grain and oilseeds moved in C-114 railcars (figs. 1, 2). By 2011, 100 million tons (68.6 percent) moved in the larger railcars. Over the entire period, tonnages shipped using larger railcars increased steadily, while use of C-113 hopper cars decreased. Grain tonnages and percentages hauled in the larger cars have been increasing since 1994, with only a small exception in 2003 and 2004. The dip in C-114 tonnages during 2003 and 2004 shown in figure 1 is probably due to rail congestion. Rail congestion affects the quickly turning C-114 cars, which are normally used in shuttle movements, more than C-113 cars, which are used in carload movements.

Cost of Upgrading Rail Lines

The shift to larger railcars has a greater impact on the short-line and regional railroads serving grain producers than it does on the major railroads because they have fewer financial resources to upgrade their rail lines. In 2011, short-line and regional railroads operated 43,131 miles of the U.S. rail network and had $4 billion in revenue.[3] In contrast, major railroads operated more than 95,387 miles and had revenues of $65 billion during 2011. The major railroads averaged $681,434 in revenue per route mile in 2010, but short-line and regional railroads averaged only $92,741.[4]

The cost of upgrading the track of smaller railroads to handle larger railcars varies. In a study completed in 2000, the cost of upgrading railroad tracks and bridges was estimated to be $6.8 billion—more than $137,000 per mile.[5] In 2001, a Washington State study estimated that upgrading branch lines to handle heavier railcars would cost $250,000 to $300,000 per mile, exclusive of bridge rehabilitation costs.[6] A 1998 Iowa report concluded it would cost $250,000 per mile to upgrade branch lines to handle larger railcars.[7] However, many short lines concluded that the use of C-114 hopper cars would result in savings larger than the costs of upgrading the lines by reducing the cost of crew and equipment. In 2002, 18,091 route miles, or 39 percent, of short-line route miles were capable of handling C-114 hoppers, but by 2010, 30,009 route miles, or 57 percent, of short-line route miles were able to handle them.[8]

Some researchers and analysts have suggested that movement to heavier rail hopper cars has a public policy dimension. It has been suggested that in order to bring the savings from larger cars to more farmers and to reduce the costs of rural road maintenance caused by increased farmer trucking of grain, States should consider subsidizing the upgrading of rural branch lines. They argue that public subsidies could be justified if they reduce total costs, both public and private.

Conclusion

Since 1994, the use of C-114 hopper cars has increased steadily while the use of C-113 hopper cars has declined. Although several older studies concluded that the shift to larger railcars would result in the abandonment of some route miles by short-line railroads,[9] this has not happened. In fact, the ability of short-line railroads and bridges to handle larger C-114 hopper cars has gradually increased. Although the costs of upgrades are high, the possible benefits are even greater. These upgrades are occurring at a slower pace among short-line railroads, but they are nonetheless occurring. Some researchers have stated that public subsidies may be needed to assist in upgrading rail branch lines.

3 AAR, *Railroad Facts,* 2012 edition.

4 Ibid.

5 Zeta-Tech Associates, Inc., *An Estimation of the Investment in Track and Structures Needed to Handle 286,000 lb. Rail Cars,"* May 26, 2000.

6 Casavant, Ken, and Denver Tolliver, for the Washington State Department of Transportation, *Impact of Heavy Axle Loads on Light-Density Lines in the State of Washington,* March 2001.

7 Iowa Department of Transportation, *286,000# Upgrading Report for Iowa Branchlines,* July 1998.

8 American Short Line & Regional Railroad Association, *Short Line and Regional Railroad Facts and Figures*, 2012 edition.

9 Martens, Bobby Joel, *An Economic Analysis of Heavy Axle Loads: The Effects on Short Line Railroads and the Tradeoffs Associated With Heavy Cars,* a thesis, North Dakota State University, March 1999 and Casavant, Ken and Denver Tolliver, op cit.

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