Mandated Twin 33 Trailers Produce Costly Shifts in Freight Movement
Roger D. Mingo\textsuperscript{1} and Mark L. Burton\textsuperscript{2}, August 2015

Summary of Findings

Changing Federal law to allow twin-33-foot trailer combinations on Interstates and other national network highways will result in significant substitution of these combinations in place of existing 53-foot single trailers in the movement of existing highway freight and the diversion of freight traffic from rail-truck intermodal carriage to all-truck highway routings. Our estimates suggest this will directly lead to pronounced safety and environmental impacts (200 additional annual fatalities) and similarly striking pavement and bridge costs ($5.5 - $10.5 billion, annually).

A single 33-foot trailer has 18\% more cubic capacity than existing 28-foot units, and a twin-33-foot combination provides 24\% more cubic capacity than a single 53-foot trailer or domestic container – all without significantly increasing fuel and driver costs. As a consequence, in response to achievable cost reductions, 33-foot trailers will be adopted by both 28-foot users and 53-foot users for whom more trailer space is valuable. Moreover, because the 33-foot trailers are incompatible with existing railroad intermodal equipment, many intermodal shipments will be diverted to all-highway routings. These outcomes are not speculations on our part, but are instead the conclusions openly voiced by a variety of truckload carriers and rail intermodal providers (frequently one and the same), who are reluctant to embrace twin-33 combinations.\textsuperscript{3}

Calculating Diversions and Damages

Existing U.S. Department of Transportation data lead to the inescapable conclusion that double-trailer combinations impose more fatalities among motorists and produce more extensive damage to pavement and bridges. Therefore, measuring the probable outcomes attributable to the widespread adoption of twin-33-foot trailer combinations involves only two steps – (1) estimating the volume of new 33-foot and twin-33 combinations used in place of existing equipment and (2) applying what we already understand about increased risk and damages to the additional traffic volumes

There are four groups likely to use 33-foot trailers extensively. These include –

- Those who currently use 28-foot trailers, either as singles or as twins in all-highway routings;
- Those who currently use 28-foot trailers in rail-truck intermodal service who abandon the intermodal alternative in order to capture the savings provided by the 33-foot trailers,
- Current users of 53-foot single trailers that substitute twin-33 combinations in response to lower costs in all-highway routings; and
- Those who currently use 53-foot trailers or containers in rail-truck intermodal service who abandon the intermodal alternative in order to capture the savings provided by the 33-foot trailers

Concerning the conversion of 28-ft trailer operations to 33-ft operations, nearly all of the current 28-ft users will opt for the 33-ft trailers, as the majority of the shippers can take advantage of the extra cubic capacity. Proponents of abandoning the current 28 foot limit argue that doing so will reduce the number of double-trailer combinations used by existing shippers. This conclusion is only valid, however, if lower transportation costs fail to generate additional freight volumes. That seems unlikely. Instead, simple economics suggests that, offered lower costs, users of 28-ft trailers will respond by increasing freight volumes or attempting to extend their market reach. Either way, the effect could be to increase total vehicle-miles, not reduce them as advocates claim.

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\textsuperscript{3} See attached letter from truckload carriers.
For current truck-load users of 53-foot trailers or containers, the only constraints on abandoning single trailer shipments in favor of cheaper twin-33 combinations are (1) whether they can benefit from the additional trailer space and (2) whether they can handle twins at the facilities where they load and unload freight. Regarding the first issue, existing data suggest that more than 60% of truck-load shippers “cube-out” before they reach weight maximums, so that additional trailer space will have value. Regarding additional terminal costs, both trucking companies and independent logistics experts indicate that incidental costs, such as the need to reposition trailers (to park or unload), are minor, and will not detract from the improved economics of 33-foot trailers. Thus, the volume of truck-load traffic diverted to twin-33s may be extensive.

Next, the adoption of the 33-foot trailers could measurably reduce rail-truck intermodal movements. The issue is the dimensions of rail equipment used in intermodal service. Currently, most 28-ft trailers (also called “pup trailers”) move aboard three unit articulated spine cars designed to carry two 28-foot trailers per platform. The platform length cannot accommodate two 33-foot trailers, nor can it be modified to do so. Thus, today, at least, moving 33-foot trailers would require twice as many platforms for the same amount of traffic, with corresponding increased costs. Finally, while 28-foot trailer traffic constitutes a relatively small segment of rail-truck intermodal, the movement to twin-33s could also reduce the use of 53-foot domestic containers, an intermodal traffic segment that continues to grow rapidly.

Fifteen of the nation’s largest trucking companies sent a letter to the Congress on June 16, 2015, opposing the longer, 33-foot trailers. Not only do these firms understand trucking operations, but these same companies are also among the largest intermodal providers, who fully understand the impact that 33-ft trailers will have on intermodal operations. These firms know firsthand the consequences of increasing 28-ft trailers to 33-ft. Firms recall that before the introduction of 53-ft trailers, many truckload carriers operated twin 28-ft trailers since that combination afforded more cubic capacity than other large truck configurations at the time (namely the 48-ft single trailer). After the introduction of the 53-ft single trailer, truckload firms adopted the 53-ft units as standard and discontinued the use of 28-ft trailers (since one 53-ft trailer offers nearly the same cubic capacity as twin 28-ft trailers). These same truckload carriers have indicated they will revert to twin trailer operations if 33-ft trailers are allowed.

Moreover, empirical analysis confirms that increasing the cubic capacity of the pup trailers will likely alter trucking costs and change the way goods are shipped. As an example, comparing 20 years of changes in truck costs (using data from trucking companies’ financial statements) with changes in rail volume (using data from the Intermodal Association of North America and the Association of American Railroads), “cross-price elasticity of demand” coefficients can be developed. The “cross-elasticity” simply measures if one type of product or service is a substitute for another and the coefficient measures the degree the goods or services compete with each other.

For all types of intermodal traffic combined, the coefficient is -0.461 (which means that for every 1% decrease in truck costs, rail intermodal volume declines by slightly less than ½ of a percent). Given the competitive nature of these two transportation modes, this is a very reasonable result that is completely consistent with other available elasticity estimates. Cross-elasticity measures for specific intermodal market segments also produce reasonable results; for 53-ft container traffic, the estimated coefficient is -0.587, trailers, -0.504, and international containers, -0.293.

Over 13 million intermodal loads originated on the U.S. Class 1 railroads in 2014. Thus, nearly one million intermodal loads could divert, to all-highway routings, assuming trucking costs decline 16% based on the 24% increase in cubic capacity. Further, as some trucking firms believe, if trucking rates decline at the same rate that cubic capacity is gained (i.e. 24%) then the diversion estimate increases to nearly 1.5 million loads annually.
In theory, policy-makers have no particular reason to be concerned about modal diversion, but these same policy-makers have evidenced tireless concerns over pavement and bridge damage and highway safety. Twin trailers cause significantly more pavement damage than the singles they would replace, according to FHWA’s published estimates, and have 11% higher fatal accident involvement rates. Thus, shifting as few as 30% (almost surely an underestimate) to as many as 80% (probably an upper limit) of 53-foot singles to 33-foot doubles create significant negative impacts in term of safety and pavement damage throughout the entire range of potential shifts, as shown in the table below.

**Range of Likely Impacts Based on 53-foot Single to 33-foot Double Diversion Rates**

(Tavel estimates in Billions of Miles per Year)

<table>
<thead>
<tr>
<th>Single to Doubles Diversion Rate</th>
<th>30%</th>
<th>40%</th>
<th>50%</th>
<th>60%</th>
<th>70%</th>
<th>80%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change in Singles Travel</td>
<td>-38.48</td>
<td>-51.31</td>
<td>-64.14</td>
<td>-76.96</td>
<td>-89.79</td>
<td>-102.62</td>
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<tr>
<td>Added Doubles Travel from Singles</td>
<td>34.3</td>
<td>46.06</td>
<td>57.83</td>
<td>69.6</td>
<td>81.36</td>
<td>93.13</td>
</tr>
<tr>
<td>Added Doubles Travel from Rail</td>
<td>8.1</td>
<td>8.1</td>
<td>8.1</td>
<td>8.1</td>
<td>8.1</td>
<td>8.1</td>
</tr>
<tr>
<td>Net Change in Large Truck VMT</td>
<td>3.91</td>
<td>2.85</td>
<td>1.79</td>
<td>0.73</td>
<td>-0.33</td>
<td>-1.39</td>
</tr>
<tr>
<td>As Percentage of Large Truck VMT</td>
<td>2.50%</td>
<td>1.70%</td>
<td>1.00%</td>
<td>0.20%</td>
<td>-0.60%</td>
<td>-1.40%</td>
</tr>
<tr>
<td>Pavement Damage Change (X$1B)</td>
<td>$5.52</td>
<td>$6.52</td>
<td>$7.51</td>
<td>$8.51</td>
<td>$9.50</td>
<td>$10.49</td>
</tr>
<tr>
<td>Increase in Large Truck Fatalities</td>
<td>5.90%</td>
<td>6.10%</td>
<td>6.30%</td>
<td>6.50%</td>
<td>6.60%</td>
<td>6.80%</td>
</tr>
</tbody>
</table>

Note that 42 to 101 billion miles of travel would shift to doubles, resulting in the equivalent of up to approximately 1.4 million additional doubles operating on the nation’s highways. The net result of this shift in travel could result is a net 6% to 7% increase in combination truck fatalities (about 200 truck-related fatalities per year) and a $5.5 to $10.5 billion annual increase in pavement costs.