

Truck Side Guard Technical Overview

Safety and Operational Considerations

April 23, 2015

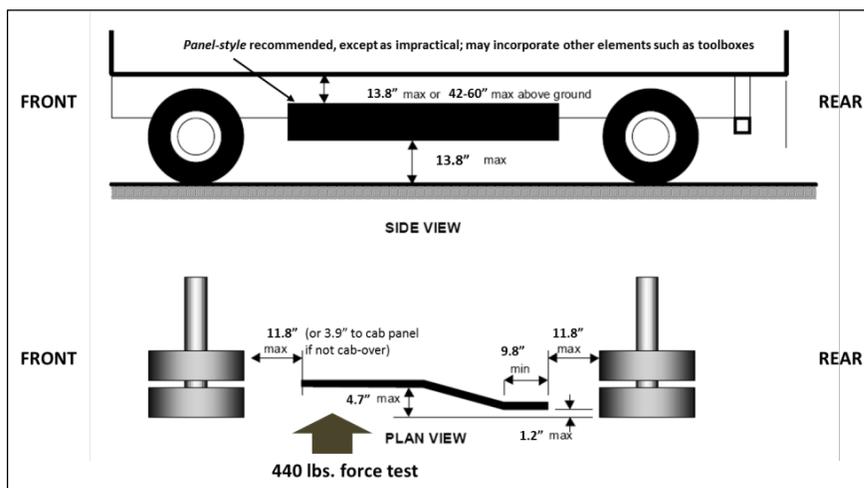
Truck **side guards** are devices designed to keep pedestrians, bicyclists, and motorcyclists—known as vulnerable road users (VRUs)—from being run over by a large truck's rear wheels in a side-impact collision. This technology works by physically covering the cavity between the front and rear wheels of a truck.

Side guards have been required standard equipment since the 1980s in the European Union and Japan, and more recently in Brazil. Canada conducted research for a national side guard standard from 2009 to 2013 and also began evaluating the viability of using aerodynamic **side skirts** for VRU safety. Reports from that effort and from [Dutch research](#) suggest that certain side skirts may provide comparable protection while also potentially reducing fuel consumption by reducing air drag.

Side collisions with large trucks were associated with 111 pedestrian and bicyclist fatalities annually in the U.S., based on 2005-2009 data on [single-unit trucks](#) and [tractor-trailers](#). **Of the 75 fatal bicyclist crashes per year with large trucks, approximately 50 percent were side impacts.**

Based on studies conducted in the United Kingdom, side guards are an effective technology for reducing the number of VRU fatalities and the severity of injuries, especially for bicyclists.

For example, in the UK, a 61 percent reduction in cyclist fatalities and 20 percent reduction in pedestrian fatalities were [reported](#) in side-impact collisions with trucks following the national side guard mandate.



Volpe-recommended side guard specifications developed for NYC's Vision Zero program. ([Volpe/U.S. DOT](#))





Truck side guards, both rail-style and panel-style, are shown installed on single-unit as well as combination trucks. At top right, an aerodynamic side skirt installed on a trailer. (Top right: [Walmart Flickr](#), ©2010. All others: Alexander Epstein, ©2012-2015.)

Rail-style side guards cost an average of [\\$847](#) and add between [6 and 73 pounds](#) to the weight of the truck. (It is important to differentiate lightweight VRU side guards from the much heavier and stronger guards that would be necessary to protect car occupants, like those explored in a 2014 NHTSA UMTRI study.) VRU side guards could potentially be [built even lighter](#) and still meet the minimum strength requirements of European regulations, which specify a maximum ground clearance of 550 mm (21.7 in) and a minimum 1 kN (220 pounds) impact force that must be resisted.

There has been limited but growing side guard adoption in the United States that includes municipal truck fleets in Portland, OR, and Washington, D.C., and recently Boston and [New York City](#), which partnered with Volpe to develop [recommended specifications](#). Boston's [ordinance](#) is the first to require both city-owned and city-contracted fleets to install side guards.

At the same time, aerodynamic truck side skirts (or **underbody fairings**), which are primarily designed to save fuel for trucks by decreasing air drag but may also protect VRUs in side-impact collisions, have been voluntarily

installed over the last decade on many North American tractor trailers and some [straight trucks](#). This trend is being driven by rapid payback from [fuel savings](#) and by medium- and heavy-duty vehicle fuel efficiency standards. For a long-haul tractor trailer, the fuel savings from installing a rigid skirt can reach \$5,000 per year, or several months to breakeven, depending on mileage and speed. EPA SmartWay verified that side skirts provide [4 to 7 percent](#) fuel economy improvement.



EPA SmartWay has verified that trailer side skirts provide 4-7 percent fuel economy improvement. (Adapted from DOE)

Even for city vehicles, limited fuel economy benefits may still be realized, depending on overall drive cycle. A dual-purpose side guard/skirt may therefore potentially offer both VRU safety and fuel ROI.

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