



October 14, 2013

Richard A. Davey
Secretary and Chief Executive Officer
Massachusetts Department of Transportation
10 Park Plaza, Suite 4160
Boston, MA 02116

Dear Secretary Davey,

I am writing to request information about the safety of the concrete longitudinal barriers on the ramps and roadways in the vicinity of the Leonard P. Zakim Bunker Hill Bridge and Leverett Connector in light of the results of federal crash tests showing that the rail heights of 32-inch barriers are inadequate to prevent trucks from rolling over them upon impact at certain angles and velocities.

Since 2007, three instances have occurred in which trucks have crashed into and rolled upon or over the top of concrete longitudinal barriers near the Zakim Bunker Hill Bridge.

During the first such accident, a truck crashed over a 32-inch barrier on a curved elevated entrance ramp leading from Route 1 South to I-93 South on April 3, 2007, landing on the Leverett Connector below. Following that accident, a spokesman for the Massachusetts Turnpike Authority said, "The barriers are designed to federal standards, and as long as drivers obey the rules of the road and use appropriate caution, they should be assured that the roadway is completely safe."

In August of 2013, two instances occurred in which trucks crashed into barriers 1/10th of a mile beyond the point on Route 93 North at which new 32-inch CA/T project barriers connect to older barriers built in 1972, directly alongside and above the newly constructed Leverett Connector, built during the CA/T project. In one instance, a truck catapulted over the barrier and landed on the Leverett Connector below. In the other, a truck rolled on top of the barrier and hung over the Leverett Connector. The accident locations are approximately 300-yards south of new 32-inch barriers built during the CA/T project on the road section leading from I-93 North through the off-ramp towards Sullivan Square.

I am including with this correspondence links to two reports funded by the Federal Highway Administration (FHWA) concerning crash-tests of trucks impacting 32-inch barriers.^{1 2} Tests conducted as early as 2008 demonstrated that 32-inch New Jersey barriers tested were unable to prevent the rollover of a single-unit truck of 10,000 kg at a speed of 90 km/hr at an angle of 15 degrees, whereas taller 42-inch concrete barriers were able to do so. As a result of this crash testing, the American Association of State Highway and Transportation Officials (AASHTO) promulgated new safety testing standards for concrete barriers in the 2009 *Manual for Assessing Safety Hardware* (MASH).

¹ <http://docs.trb.org/prp/12-4629.pdf>

² <http://www.ncac.gwu.edu/research/pubs/NCAC-2008-W-002.pdf>

We are cognizant that AASHTO and FHWA jointly adopted an implementation plan for MASH providing that all highway safety hardware accepted prior to the adoption of MASH is effectively "grandfathered in" and may continue to be used. Notwithstanding this grandfathering provision, the 32-inch barriers in and around the ramps of the Zakim Bunker Hill Bridge would not pass federal crash standards if they were proposed as new products today.

Pioneer Institute is committed to promoting transparency in government. In this case, the public deserves a fuller explanation than what it has been provided by MassDOT about crash-worthiness of these barriers with respect to truck roll-overs. A more transparent response by state officials following the two truck roll-overs in August, 2013 would have included two important facts that were not disclosed: first, that federal crash-tests had previously demonstrated the inadequacy of 32-inch barriers in preventing truck roll-overs; and second, that state transportation officials had previously recognized the safety advantages of taller 42-inch barriers and had begun installing them seven years before the Zakim Bridge ramps were constructed.

Matthew Amorello, former Chairman of the Massachusetts Turnpike Authority, told the *Boston Globe* in 2003 that the Turnpike had first began installing 42-inch tall barriers in 1993, in the Grafton, Millbury, and Auburn sections of the Turnpike. By contrast, the Zakim Bunker Hill Bridge and Leverett Connector ramps were constructed in 2000-2001, seven years later, using 32-inch barriers. The Massachusetts Highway Department spokesperson was quoted in the same article as saying "When we go in and reconstruct a limited access roadway, it's our practice to use the tall wall." At that point, tall barriers were already in place in segments of the median of Route 146, Interstate 290, Route 3 from the Braintree split to Weymouth, and Route 2 in the Leominster-Fitchburg stretch. Mr. Amorello said, "Anytime we do reconstruction, and next up is the Millbury-to-Framingham stretch, that's the profile you'll see." The commanding trooper of State Police Troop E, which is assigned to the Turnpike, said of the taller barriers, "They're stronger, and can take a crushing, high-speed impact much better. This barrier will really hold [vehicles] back into the lane. It's the scariest thing we see, when a vehicle gets over the barrier, and the driver in the other lane just has no idea. That's when you have the horrific fatalities."

The 1997 MassHighway Design Manual in effect at the time of the design of these ramps and roadways stated,

"In areas with heavy truck volume, poor roadway geometry, and a history of truck accidents, tall concrete barriers with heights of 1.070 meters [42-inches] or higher may be used."

In light of the fact that Massachusetts transportation and public safety officials had already recognized the safety benefit of using 42-inch barriers, why were 32-inch barriers instead used on the curved and elevated ramps and roads around the Zakim Bridge?

Accordingly, Pioneer Institute requests information from MassDOT about three topics. First, why were 32-inch barriers used on these sections of the CA/T project instead of 42-inch ones? More specifically, did the highway engineers who designed the ramps and roads around the Zakim Bridge recommend 42-inch barriers as they were authorized to do at the time by the MassHighway Design Manual and if so, was the design subsequently changed to include shorter 32-inch barriers as a quality-engineering cost-saving measure? Second, why weren't taller barriers constructed on the section of I-93 immediately north of the Zakim Bridge to prevent trucks from crashing onto the Leverett Connector? Third, given the results of federally-

sponsored truck crash-tests of 32-inch barriers and the history of truck roll-overs to date, should not the 32-inch barriers be replaced with 42-inch barriers, the current Massachusetts standard? Finally, we are requesting under the Massachusetts public records law all documents pertaining to the safety and design of the longitudinal barriers in and around the Leonard Zakim Bunker Hill Bridge and Leverett Connector from April 3, 2007 to the present.

Thank you for your attention.



Gregory W. Sullivan
Research Director
Pioneer Institute
85 Devonshire Street
Boston, MA 02110