



# UTC Spotlight

## University Transportation Centers Program

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# Strikes on Low Clearance Bridges by Over-Height Trucks in New York State

Recent research conducted by the University Transportation Research Center at the City College of New York, shows that bridges in New York State have been experiencing approximately 200 strikes annually by over-height trucks.<sup>1</sup> This study, *Bridge-Vehicle Impact Assessment*, revealed that a majority of these strikes occur on low-vertical clearance bridges over parkways or other local roadways prohibited to truck traffic. Although New York State has approximately 20,000 bridges, a majority of strikes are on a significantly smaller number of bridges. These bridges are struck multiple times. For example, a bridge carrying King Street in Rye Brook, New York (Westchester County in New York State) has been struck more than 100 times during the last 10 years. While some of these strikes have been seen to cause serious damage to bridges, a majority of bridge strikes create significant threat to public safety and cause severe congestions because of the truck being stuck under the bridge or cargo littering over the roadway.



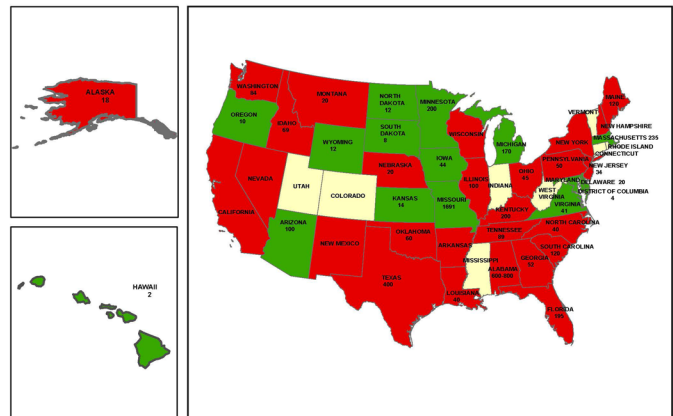
Richard Kotecki, NYSDOT

### Truck Stuck Under a Buffalo Area Bridge

A detailed survey of all states was carried out to identify the bridge strike problem across the Nation and successful mitigation approaches. Figure 1 shows the responses of state DOTs regarding the seriousness of the bridge strike problem in their state, where red and green colors

<sup>1</sup> A.K. Agrawal, X. Xu, and Z. Chen, *Bridge-Vehicle Impact Assessment. Final Report* to the New York State Department of Transportation, January 2012. Available at [https://www.dot.ny.gov/divisions/engineering/technical-services/trans-r-and-d-repository/C\\_07\\_10\\_final%20report.pdf](https://www.dot.ny.gov/divisions/engineering/technical-services/trans-r-and-d-repository/C_07_10_final%20report.pdf).

Figure 1: Bridge Strike Problem Across Country



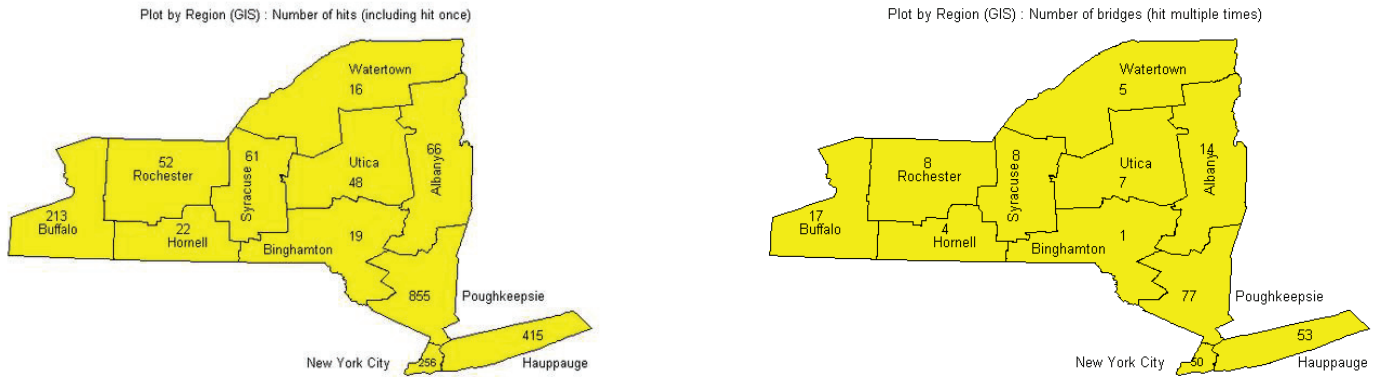
Anil K. Agrawal

**Red = major problem. Green = minor problem. Yellow = no response.**

represent bridge strikes as major or minor problems, respectively (yellow represents no response from the state DOT). It is observed that a majority of the states consider bridge strikes to be a major problem. In the Northeast, all responding states, except Massachusetts and Virginia, consider bridge strikes to be a major problem. Figure 1 also shows the total number of bridge strikes during 2005 to 2008. Some states, such as Louisiana, perceive bridge strikes to be a major problem even though there have only been 40 instances of strikes causing serious damages to bridges. On the other hand, engineers in Missouri don't perceive bridge strikes as a serious problem even though there have been 1,691 impacts to bridges.

For operational purposes, New York State Department of Transportation (NYSDOT) has been divided into 11 regions. Figure 2(a) shows bridge strikes in different regions of NYSDOT. Figure 2(b) shows the total number of bridges hit multiple times in different regions of NYSDOT. It is observed that the NYSDOT regions 8 (Poughkeepsie), 10 (Hauppauge), 5 (Buffalo) and 11 (New York City) have the highest occurrence of bridge strikes in the state. In fact, 197 bridges in these 4 regions have been struck at least 1,484 times during last 10 years, i.e., on average, 7.5 strikes per bridge in these 4 regions. It has also been observed that multiple

**Figure 2: NYSDOT Multiple Bridge Strike Demographics:**



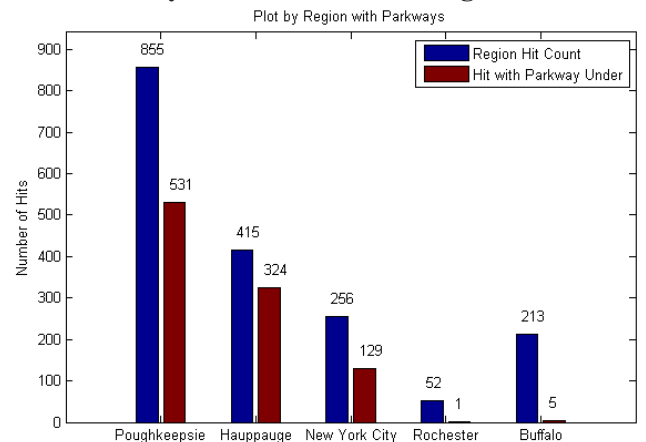
**(a) Total number of multiple strikes on bridges in NYSDOT regions**

**(b) Total number of bridges in regions of NYSDOT with multiple strikes**

strikes on bridges (i.e., one bridge being struck multiple times) account for 85 percent of all bridge strikes in the state. Among the counties in New York State, Westchester, Erie, Nassau, Suffolk and Rockland counties have the highest incidents of bridge strikes. In fact, only 32 bridges contribute to 595 strikes (44 percent of total strikes in the New York State) out of a total of 815 bridge strikes in Westchester, Erie and Nassau counties. Figure 3 shows histograms of total bridge strikes for NYSDOT Regions 4 (Rochester), 5 (Buffalo), 8 (Poughkeepsie), 10 (Hauppauge) and 11 (New York City). This plot also shows bridge strikes on bridges over parkways in the NYSDOT regions. It is observed from figure 3 that a majority of strikes in these 5 NYSDOT regions have been on bridges over parkways. In fact, 324 out of 415 strikes in Region 10 (Hauppauge) are on bridge over parkways. Hence, among the factors contributing to increased bridge strikes are the roadway under the bridge (i.e., parkway) and the maximum vertical clearance of the bridge. However, it also has been noted from more recent data that a majority of trucks that struck a bridge had a consumer GPS, which is not programmed to avoid low clearance bridges over parkways.

a few devices at selected locations may not be effective without determination and monitoring of entrance ramps that truck drivers use to enter parkways. Still, the cost of installing laser-based over-height detection systems at all identified locations may be very high, considering that the installed cost of these systems at a particular location may be up to \$10,000 or higher. Hence, mitigation measures need to be regulatory (e.g., enforcement), technological (e.g., prohibiting the usage of consumer GPS by truck drivers) and educational (e.g., continuing education course related to bridge strikes).

**Figure 3: Total Bridge Strikes and Strikes on Bridges Over Parkway in Five Worst Hit Regions of NYSDOT**



It has been noted from the nationwide survey that laser-based over-height detection systems have been used effectively by many state DOTs for mitigating bridge strikes at specific locations. The problem in New York State is widespread over the entire state and so the installation of

**About The Author**

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