ISPE of NETC Steel Bridge Railings

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ABSTRACT

The predominate bridge railing used in the New England States are two-, three-, and four-bar steel post-and-beam designs developed and crash tested under the auspices of the New England Transportation Consortium (NETC). These bridge rail systems have been used in the New England states for more than 20 years. Establishing that these long-standing bridge railing designs are performing well in the field provides further confidence that the current, as well as the improved, NETC bridge railing designs adequately meet the performance criteria of MASH without the need to perform additional full-scale testing.

NCHRP Project 22-33 developed a four-step ISPE methodology which was applied to this research. The assembled data were assessed using the standard evaluation measures.

This ISPE has shown that the studied systems demonstrate similar or better field performance than other similar systems across all three performance outcomes. This exemplary field performance demonstrates the crashworthiness of the studied systems and supports the continued use.

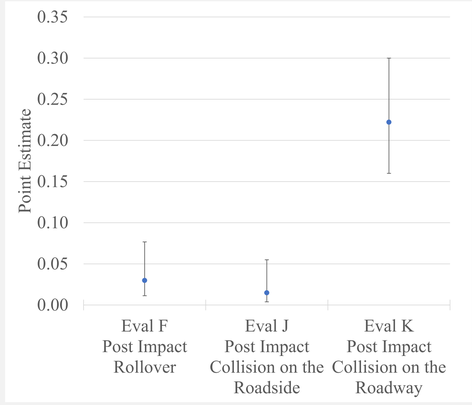
DATA

The research team coordinated with the NETC member states to obtain available bridge inventory data and worked with the individual member states to mine the data to identify and isolate the locations of NETC steel bridge railings and transitions. The result was an inventory of NETC bridge railing and associated AGT locations in the six New England states.

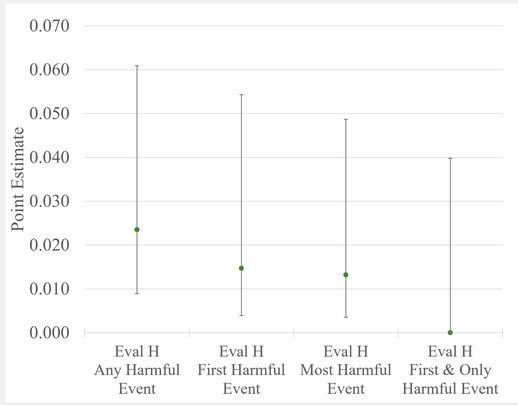
A minimum of five years of crash data was collected from each state and linked to the bridge inventory data to identify all crashes that occurred within close proximity to a bridge with a NETC bridge rail or AGT system. The state partners provided the available crash data and, when requested, the available police reports. Crashes with the NETC rails and AGTs were then identified by the research team and compiled in the standard ISPE Dataset as outlined in the NCHRP 22-33 ISPE Guidance Document.

ANALYSIS

Proportion of NETC bridge rail and AGT crashes that breach the barrier (left); Effect Size for breaching the barrier (right) – full dataset.



Proportion of crashes with a harmful event following the interaction with an NETC bridge rail or AGT – full dataset.



Proportion of KA crashes for Evaluation Measure H (vehicle mix) at PAL1 for the AHE, FHE, MHE, and FOHE datasets.

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CONCLUSIONS

The ISPEs conducted under this research project found the containment of vehicles impacting the studied NETC rails and AGTs is similar or better than other studied bridge rails. This study also found the risk of post impact secondary collisions on the roadway with NETC bridge rails and AGTs is considerably lower than other rigid barriers. While MASH crash testing acceptance criteria has removed secondary roadway collisions as an evaluation factor, this hardware has demonstrated a reduced risk of post-impact secondary collisions on the roadway when compared to other rigid longitudinal barriers. This study also found the risk of a serious or fatal injuries when the studied hardware was impacted is lower than the risk found previously for rigid barriers. This studied hardware has demonstrated a reduced occupant risk when compared to other rigid longitudinal barriers. This ISPE shows that the studied systems have demonstrated similar or better field performance than other similar systems across all three performance outcomes. This exemplary field performance demonstrates the crashworthiness of the studied systems and supports the continued use.