Ohio's Research Initiative for Locals Program
PROJECT FACT SHEET

EVALUATION AND DESIGN OF A TL3 BRIDGE GUARDRAIL SYSTEM MOUNTED TO STEEL FASCIA BEAMS

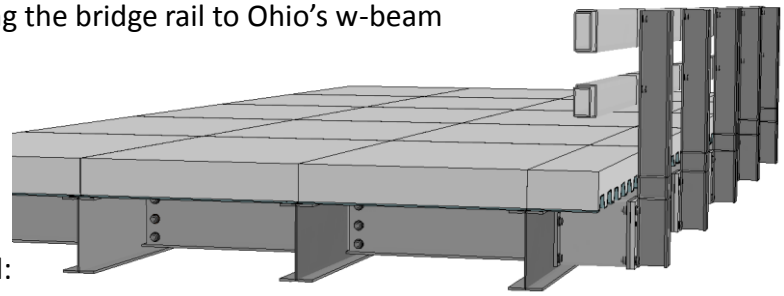
Research Conducted by: Chuck A. Plaxico and T. Olaf Johnson of RoadSafe LLC

PROBLEM

Bridges on Ohio's local road system are typically steel-stringer-beam designs supporting various deck types. Because of the different deck options, the bridge rail is often mounted directly to the steel fascia beams of the bridge superstructure. These existing fascia mounted designs have not been crash tested and are not eligible for federal-aid reimbursement on federal-aid projects.

OBJECTIVE

The objective of this project was to develop a steel fascia beam post-mount design for an existing TL3 bridge rail system (i.e., Illinois Two-Tube Bridge Rail) and to identify applicable TL3 transition systems for connecting the bridge rail to Ohio's w-beam guardrail systems.



RESEARCH ACTIVITIES

The research was carried out using a combination of engineering calculations, dynamic impact testing and finite element analysis (FEA). The research activities included:

1) Determining the force-deflection response of the post for the baseline deck-mounted design,
2) Developing a fascia-mounted design that provides equivalent stiffness to the baseline case,
3) Verifying the stiffness response for the new fascia-mount design,
4) Ensuring that loads transferred into the bridge superstructure during crashes do not result in excessive damage to the bridge superstructure,
5) Performing vehicle crash simulations according to NCHRP Report 350 and the AASHTO *Manual for Assessing Safety Hardware* (*MASH*) to verify that the modifications do not adversely affect crash performance.

RESULTS

- A new post-mount was developed for the Illinois Two-Tube bridge rail for attachment to steel-bridge fascia beams.
- The new fascia-mount was shown through dynamic impact testing to provide equivalent stiffness for the bridge rail compared to the original deck-mounted design.
- This system is eligible for use on federal-aid reimbursement projects as an NCHRP Report 350 TL3 system and may be installed on steel bridges with fascia beams of size W14x30 and larger.

KEY ADVANTAGES

- Provides the option for building steel bridges with lower-cost bridge decks
- Avoids having to build excess deck width to accommodate anchorage for a top-mounted bridge rail.

To access the final report, visit: http://oril.transportation.ohio.gov ***April 2017***