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| Project Title: | Multi-directional base design for steel beam non-proprietary large sign supports |
| Project Synopsis: | A multi-directional breakaway mechanism design for large sign assemblies is desired to be developed for installations near intersections. In order to minimize additional stock material inventory requirements on states, as a secondary objective it is proposed that consideration be given to developing a “unidirectional to multi-directional retrofit” design that allows the supports and ground stub base plates to be retrofitted in the field without requiring cutting of the base plates or welding. |
| Project Goal(s): | Develop a design for a multi-directional breakaway mechanism design for large sign assemblies for installations near intersections. |
| Project Background: | <p>The steel beam non-proprietary large sign support design commonly used among many states typically utilizes a unidirectional slip base design which allows the breakaway mechanism to activate when the support is struck from the front or rear. This system is described in Section 4.3.2 of the 2011 Roadside Design Guide and is shown in Figure 4-5. Although adequate in most cases, a multi-directional breakaway mechanism design for these type supports would be beneficial and warranted in cases where large assemblies must be placed within intersections resulting in an increased likelihood of multi-directional impacts. Such assemblies are typically placed on raised concrete islands within the intersection or at the top of T-intersections. There are currently some proprietary retrofit solutions to this need, as well as multi-directional mechanisms for smaller proprietary supports such as back to back u-channel and square tube; however, there is no known MASH compliant non-proprietary design. It is proposed that ongoing research and testing intended to demonstrate MASH compliance for a range of beam sizes utilizing the unidirectional design be completed and that this proposed research and testing be done as a follow-up.</p> |
| Proposed Work Plan: | <p><i>Task 1: Engineering Analysis</i> This task will review current standards regarding large sign assemblies which are installed near intersections. This task will also develop new and/or retrofit design(s) for mutli-directional release mechanisms.</p> <p><i>Task 2: Surrogate Vehicle Testing</i> This task will use surrogate vehicle test to verify release mechanisms of the designs developed in Task 1.</p> <p><i>Task 3: Full-Scale Testing</i> This task will crash test a critical design of multi-directional releasing mechanism for large sign assemblies.</p> |

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| Deliverables: | Compile summary report to document research effort, including CAD details, crash testing, and recommendations for further research in the event of the system failing testing criteria. |
| Urgency and Expected Benefit: | A MASH-compliant multi-directional breakaway mechanism design for large sign assemblies will provide states with a non-proprietary option for installing larger sign assemblies near intersections. This project will also aim to develop a retrofit option for existing unidirectional systems in order to minimize cost and maximize use of existing stock. |
| Problem Funding and Research Period: | \$350,000 and 18 months. |
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