Roadside Safety Pooled Fund

Research Problem Statement

Project Title:	**Bridge Rail End Treatments Guidance for Constrained Sites (Project Category: 2024-01-BR)**
Project Synopsis:	There are certain circumstances that prevent the installation of existing MASH-compliant transition rail and end treatment systems at bridge railing ends. This limitation is dependent on the site constraints, including roadway geometry, adjacent perpendicular driveways, steep slopes, etc. Many of these sites have low speed and low volume traffic and/or sidewalks. Hence, practitioners must decide whether to do without any protection or install a product in an untested configuration. This project fills in the gap for sites under such constraints. With this project, we propose to develop guidance to assist practitioners in determining whether a “do nothing” approach is sufficient. Furthermore, we’d like to develop and simulate a short, simple, non-proprietary end treatment or attenuator that directly connects to the bridge rail end. A simple, short attenuator might provide some safety benefit to sites when a MASH attenuator does not fit.  *Figure 1: “Do-nothing approach” due to steep slope; is there a better way?*

	 *Figure 2: Steep slopes and short-radius turn resulted in improvised transition.*
Project Goal(s):	1.) Develop guidance for bridge end attenuation at sites constrained by physical context. 2.) Develop an attenuator-style end treatment for applications where transition rails are prohibited due to length or installation impediment.
Project Background:	There are certain circumstances that have prevented installation of transition rail or end treatments at bridge railing ends. Limitations are highly site dependent, including roadway geometry and impediments such as an adjacent perpendicular driveway or steep slopes, etc. These locations are not necessarily high speed or high volume, and thus this effort is needed to optimize the allocation of the resources to maximize the safety benefit of using specialty hardware.  *Figure 3: Bollard end treatment; low-speed parking lot application.*

	 *Figure 4: Another example of the "do-nothing" approach at a short-radius turn.*	
Proposed Work Plan:	1.) Task 1 – Literature review (may include RDG, NHTSA, NCHRP reports, and DOT standard plans, etc.). 2.) Task 2 – Outreach to the pooled fund states (via survey or other means) to identify and categorize high priority situations (e.g., layout, geometry, ADT, exposure, or other pertinent features). 3.) Task 3 – Using analytical tools (e.g., RSAP), identify the key factors that would trigger some level of attenuation, even lacking an approved MASH device that would fit under various constraints. 4.) Task 4 – Use non-linear finite element analysis to develop a simple, non-proprietary bridge end attenuator appropriate for at least some targeted situations. 5.) Task 5 – Deliverables: Site analysis guidelines or flowchart; attenuator design.	
Deliverables:	Bridge Rail End Treatment Guidance for Constrained Bridge End Sites A Simple Bridge End Attenuator Design for Low-Speed Applications	
Urgency and Expected Benefit:	The enhanced safety of the roadway features is the expected benefit of this project. Also, it is expected that the implementation of this project will help state DOT's optimize their resources given the analyses and the simplicity of the attenuator to be developed during the execution of this project.	
Problem Funding and Research Period:	**Total Estimated Cost = $153,901** **No testing, just literature review , analyses, state of practices and simulations**	
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