Roadside Safety Pooled Fund

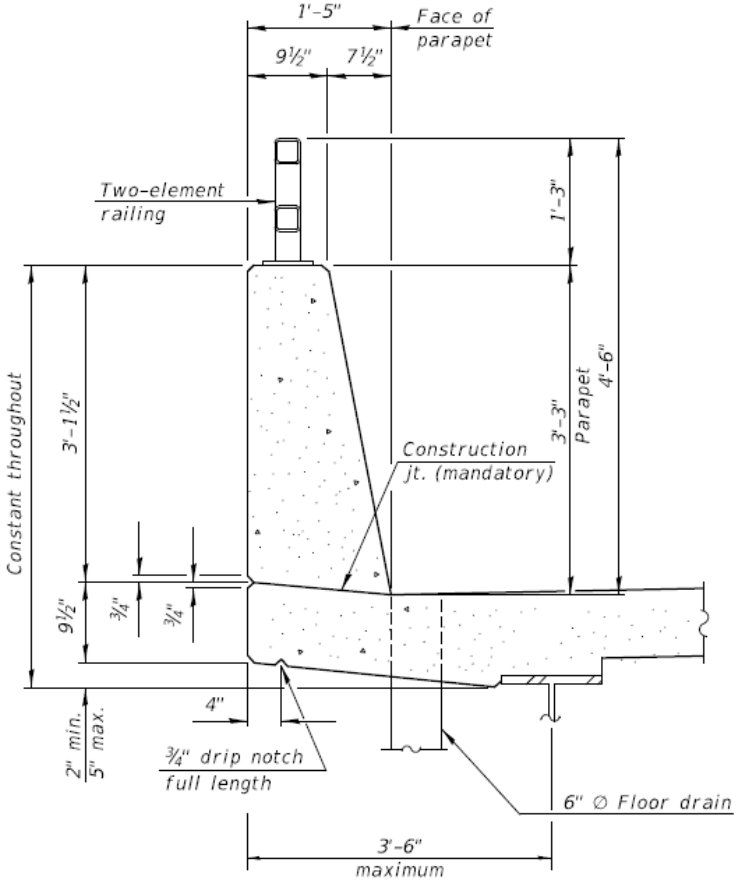
Research Problem Statement

2019-24-BR

Project Title:	MASH TL-4 Crash Testing of Bicycle Railing on Constant Slope Parapet
Project Synopsis:	The purpose of this project is to evaluate and test a combination barrier system that consists of a bicycle railing mounted on top of a standard Illinois Department of Transportation (IDOT) concrete parapet. The total height of the system is 54 inches including a 15-inch tall bicycle railing mounted on top of a 39-inch tall constant slope parapet (see attached figure). The testing is to be performed in accordance with MASH TL-4 criteria.
Project Goal:	The objective of this project is to evaluate the performance of a railing mounted on top of a standard IDOT constant slope parapet under MASH TL-4 criteria by performing MASH Test 4-12 and providing professional opinions for MASH Test 4-10 and MASH Test 4-11.
Project Background:	IDOT has a significant number of bridges that accommodate bicyclists throughout the state. The department utilizes a railing height of 54 inches as recommended in the early editions of the LRFD Bridge Design Specifications. MASH TL-4 compliant barrier systems are recommended on IDOT bridges whenever possible. Therefore, IDOT desires to develop and test a 15-inch tall railing mounted on top of a 39-inch tall standard IDOT parapet to accommodate bicyclist and traffic safety.
Proposed Work Plan:	**Tasks:** **1. Engineering Analysis and Drafting:** a. Evaluate the railing design details and make recommendations for modifications based on past crash testing of similar combination barrier systems. b. Develop detailed drawings of the combination barrier system with the suggested modifications and submit to the state representative for approval. c. Once approved, the research team will develop full-scale test installation drawings of the combination barrier system for construction and full-scale testing. **2. Construction and Demolition** **3. Full-Scale Crash Testing and Reporting:** a. Perform critical full-scale crash tests. (Budgeting for MASH Test 4-12) b. Provide final report summarizing the details of the test installation, final drawings, and our finding and conclusions c. Provide a professional opinion that indicates that tests not conducted are not critical due to successfully performed tests on similar systems in the past.

Deliverables:	A report providing details of the combination barrier system, documentation of the evaluation and crash tests performed, the crash test results, and the assessment of the performance of the combination barrier system according to MASH TL-4 specifications. Professional opinion for MASH crash tests not performed.
Urgency and Expected Benefit:	This project will benefit the member states by implementing MASH TL-4 compliant barrier systems that accommodate bicyclists while providing higher safety for the motoring public and meet the most recent barrier testing criteria.
Problem Funding and Research Period:	**Total Estimated Cost = $250,000** **Work Schedule:** (Expected Project Duration = 10 months from initiation of the project) • Task 1 = 3 months • Task 2 = 3 months • Task 3 = 4 months
Developer(s) of the Problem Statement:	Name: Kevin Riechers, IDOT; Carlos Torres, MDOT; Kenneth Shannon, MTO Email: Kevin.Riechers@illinois.gov Phone: 217-782-9109

Notes: All edges shall have ¾" chamfer.



Cross sectional area of parapet = 3.50 ft^2

39" CONSTANT-SLOPE CONCRETE PARAPET CONFIGURATION WITH TWO-ELEMENT RAILING