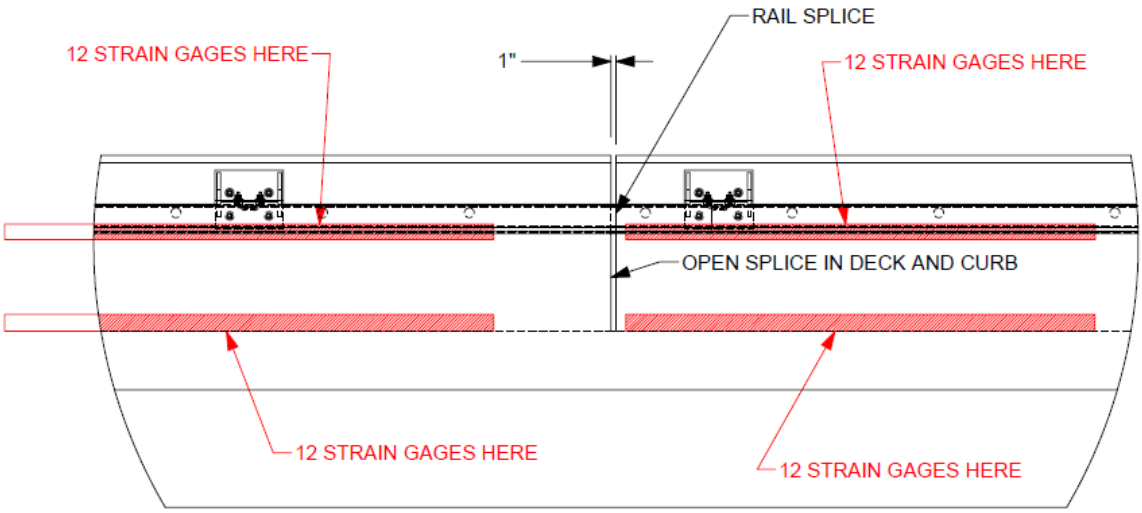
Roadside Safety Pooled Fund

Research Problem Statement

2020-02-BR

Project Title:	Instrumentation for Bridge Decks, Barriers, and Other Roadside Safety Components
Project Synopsis:	There is a need, during the course of normal MASH compliance testing or component testing with respect to MASH Requirements, to utilize instrumentation to measure and record stress and strain data in components for use in further research. This instrumentation typically is in the form of strain gages installed at strategic locations on components to measure stresses and strain in members/components at key locations for critical loading. The purpose of this problem statement is to establish a funding mechanism for adding instrumentation to a project for the collection/measurement of stresses and strains in test installation components.
Project Goal(s):	1. Provide a means for adding strain gages, load washers, and linear variable differential transformer (LVDT) instrumentation to roadside safety hardware, barriers, or other components to gather stress, strain, and/or deformation information in roadside safety or bridge components. This information could be used to provide information to optimize and design barrier and bridge components for future research. This information could also be used to better understand how crash impact forces are transmitted to bridge barriers and the supporting deck and bridge components. 2. Instrumentation will be added in key location(s) to provided stress and strain data as effectively and efficiently as possible. A typical use of strain gage instrumentation is shown in the photos that follow:  Instrumented Load Washers  Strain Gages on Transverse Deck Rebar

Project Background:	Allow designer to collect stress and strain data on projects funded by the pooled fund or from compliance testing or other. Instrumentation will be added after conferring with the project team and acceptance of the scope, testing plan and usefulness of the information. As an example, a Typical plan view of strain gages that could be added to transverse deck reinforcement that could provide useful information for future research on the forces imparted to a deck cantilever for MASH TL-4 impact loading is shown as follows:  IMPACT AREA FOR MASH TL-4 10000S VEHICLE
Proposed Work Plan:	**<u>Tasks:</u>** **1A. Confer with the project team and selection on instrumentation for selected project** **1B. Document instrumentation on Construction drawings** **1C. Install instrumentation and record data** **2. Report instrumentation results**
Deliverables:	<u>Report tabulated instrumentation results to the project team. These results will not be included in the final report for the original project.</u> Prepare a final yearly report for all instrumentation data obtained for the project year.

Urgency and Expected Benefit:	This research will provide valuable information for the design and testing of barriers, bridge decks, and roadside safety hardware.
Problem Funding and Research Period:	**Consider the following pricing schedule for 1, 5, and 10 tests installations using the following instrumentation.** **Work Schedule:** consider schedule on a case by case basis. If the number of strain gages added to a project is more than 5, project schedule likely to be impacted and further costs may be incurred

		5 Tests	10 Tests
Single Strain Gauge - on Steel	$4,275	$21,375	$42,750
Gauge on Steel x 5	$8,169	$40,845	$81,690
Gauge on Steel x 10	$9,215	$46,075	$92,150
Single LVDT	$4,822	$24,110	$48,220
LVDT x 3	$9,390	$46,950	$93,900
LVDT x 5	$10,902	$54,510	$109,020
LVDT x 10	$14,682	$73,410	$146,820
Single Load Washer	$4,646	$23,230	$46,460
Load Washers x 5	$12,050	$60,250	$120,500
Load Washers x 10	$16,977	$84,885	$169,770
Single Strain Gauge - 5 Bar +	$4,950	$24,750	$49,500
Strain Gauge - 5 Bar + x 5	$11,490	$57,450	$114,900
Strain Gauge - 5 Bar + x 10	$15,965	$79,825	$159,650
Single Strain Gauge - 4Bar & Sm	$5,166	$25,830	$51,660
Strain Gauge - 4 Bar & S + x 5	$12,624	$63,120	$126,240
Strain Gauge -4b & smaller x 10	$24,052	$120,260	$240,520
Task 2 Final Reporting	**$6,163**		

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