

Project Title:	MASH TL-4 Testing and Evaluation of Free-Standing F-shape Portable Concrete Barrier
Project Synopsis:	Evaluate and test a 42-inch tall, F-shape profile, pin-and-loop connection, free-standing Portable Concrete Barrier (PCB) in accordance with MASH. Perform the necessary steps to certify MASH compliance at Test Level 4 (TL-4), or TL-3, if TL-4 is not feasible.
Project Goal(s):	A Free-Standing Portable Concrete Barrier that is MASH TL-4 compliant
Project Background:	<p>Oregon Department of Transportation designed a 42-inch PCB that met NCHRP Report 350 TL-4 criteria. Several states use this design, or a similar design, and many miles are in-service today. This project would certify that this design or a similar design meets MASH TL-4 criteria.</p> <p>Under a PennDOT funded project, TTI is currently designing F-Shape PCB systems using a pin-and-loop connection keyed into asphalt to satisfy MASH TL-4 and TL-3 criteria. While the 42-inch barrier will be the most commonly used, PennDOT also is seeking similar MASH compliant barriers at 32-inch and 50-inch heights for MASH TL-3 and TL-4 compliance, respectively. PennDOT would like to use the same barriers in freestanding conditions for use in temporary conditions. Temporary conditions typically do not lend themselves to embedment, but pinning the barriers could work if traffic is allowed on both sides of the barrier. It would be beneficial for PennDOT to have MASH TL-4 and/or TL-3 compliant temporary PCB systems.</p>
Proposed Work Plan:	<p><u>Tasks:</u></p> <ol style="list-style-type: none"> 1. Literature Review and Engineering Analysis: <ol style="list-style-type: none"> a. Evaluate various current PCB designs from several states and determine which F-shape MASH design would likely to be used by most states. b. Determine if MASH TL-4 is feasible. If TL-4 is not feasible, evaluate the barrier for TL-3 compliance. c. Determine the most critical PCB design (minimum segment length, reinforcement, and critical height, etc.) d. Evaluate what is needed for MASH determination (i.e., professional opinion, simulation, and/or crash tests) e. If crash tests are needed, determine which crash tests are critical for MASH compliance. 2. Construction and Demolition 3. Full-Scale Crash Testing and Reporting: <ol style="list-style-type: none"> a. Perform critical full-scale crash tests determined in Task 1. (Budgeting for two crash tests) 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. d. Provide a professional opinion for MASH compliance of the other designs not selected for crash testing.

<p>Deliverables:</p>	<p>A report providing details of the free-standing PCB, documentation of the evaluation and crash tests performed, the results of each crash test, and the assessment of the performance of the PCB according to MASH specifications. Professional opinion for MASH compliance for similar, less critical, designs from various states which were not crash tested.</p>
<p>Urgency and Expected Benefit:</p>	<p>Several states use portable concrete barrier in a permanent installation. The major advantage of PCB is that, when used on a paved shoulder, or paved median with no embedment, it can be easily removed to accommodate pavement overlays and then replaced without damage. In Oregon, for example, PCB has been used as the standard barrier for narrow, paved medians. On facilities with high volumes and a high percentage of trucks, it is desirable to provide the additional protection of a TL-4 barrier.</p> <p>Freestanding PCB systems are oftenly used in temporary conditions. PennDOT has used their NCHRP Report 350 compliant PCB in both temporary and permanent conditions. The permanent PCB systems have been embedded, whereas the temporary PCB systems have been freestanding. PennDOT would like to do the same for its MASH PCB systems.</p>
<p>Problem Funding and Research Period:</p>	<p>Total Estimated Cost = \$245,000</p> <p>Work Schedule: (Estimated Project Duration = 10 months from initiation of the project)</p> <ul style="list-style-type: none"> • Task 1 = 3 months • Task 2 = 3 months • Task 3 = 4 months
<p>Developer(s) of the Problem Statement:</p>	<p>Name: Christopher Henson, Oregon DOT; Nina Ertel, P.E, PennDOT.; Josh Palmer, Colorado DOT; Josh Keith, Colorado DOT</p> <p>Email: christopher.s.henson@odot.state.or.us</p> <p>Phone: 503-986-3561</p>