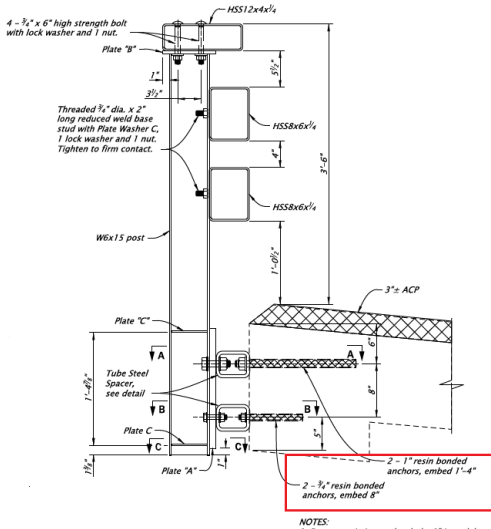


Project Title:	BR Post installed resin bonded anchor for the side mounted bridge rail (2024-06-BR)
Project Synopsis:	<p>State transportation agencies will need bridge rail retrofit option for MASH TL-4 Side-Mounted Beam and Post Bridge Rail with post installed resin bonded anchors.</p> <p>Ohio and Illinois DOTs paid for research and testing of a MASH TL-4 Steel Side-Mounted Beam and Post Bridge Rail with cast-in-place anchors. However, we cannot use this rail to upgrade existing side mounted bridge railing with post installed resin bonded anchors as this type of connection has not been crash-tested. The current design equations for post installed resin bonded anchors in the AASHTO LRFD Bridge Design Specifications (LRFD) and American Concrete Institute (ACI) design manuals are overly conservative and do not support the use of post installed connections. The following study attempted to refine the design equations to obtain actual capacity of the post installed anchors and show that the capacity is much higher than the capacity obtained from ACI equations: https://mwrsl.unl.edu/researchhub/files/Report14/TRP-03-264-12.pdf. To use the equations in this report, we will need actual testing of post installed bridge rail connections to confirm the modified equations for designing post installed resin bonded connections.</p>
Project Goal(s):	<ol style="list-style-type: none"> 1.) Provide a retrofit option to attach tested bridge rail to bridge. 2.) Further collect test data to support the use of the modified equations for post installed resin bonded anchors shown in TRP-03-264-12.
Project Background:	<p>Provide a retrofit option to attach tested bridge rail to bridge with post installed resin bonded anchors.</p>  <p>RAIL SECTION Scale: 1"=1'-0"</p> <p>Design resistance shown in https://mwrsl.unl.edu/researchhub/files/Report14/TRP-03-264-12.pdf is much higher if compared to the ACI equations, however, the results shown are for vertically</p>

	<p>installed anchor and there are only limited tests in the report. Thus, we need actual test on a side mounted rail with impact load to confirm the design resistance and to support the use of the modified equations.</p>
<p>Proposed Work Plan:</p>	<p><u>Tasks:</u></p> <ol style="list-style-type: none"> 1. Literature Review <ol style="list-style-type: none"> a. Review TRP-03-264-12 Report for the applicability of the modified equation to the post installed resin bonded anchors for side mounted bridge rail. 2. Construction, Testing, and Demolition <ol style="list-style-type: none"> a. Construction of a small section of bridge deck edge b. Fabricate and install a rigid post for static and dynamic testing of adhesive anchors. These anchors will be installed in the size of a deck design typically used for anchoring side mounted bridge rail systems. Several embedment depths and edge distances from the top of the deck to the centerline of the anchors will be considered for this project. A single anchor diameter and adhesive will be used for this study. c. Performing as many surrogate vehicle (bogie) impact tests and static tests as needed (possibly 3-5 days testing) to compare these tested results to previous analytical results from past projects d. Demolition and removal of test article e. Documentation and reporting of test findings 3. Engineering Analysis <ol style="list-style-type: none"> a. Correlate test data to selected modified equations for post installed resin bonded anchors. 4. Report
<p>Deliverables:</p>	<p>A published report with a refined design approach and equations for post installed resin bonded anchor connections for side mounted bridge rail replacement.</p>
<p>Urgency and Expected Benefit:</p>	<p>Many states have large number of substandard side mounted bridge rails in the bridge inventory that need to be upgrade. The research and testing outcome will produce design procedures for retrofitting bridge rail with post installed resin bonded anchors.</p>
<p>Problem Funding and Research Period:</p>	<p>Total Estimated Cost = XXX,XXX</p> <p>Work Schedule: Project Duration = 12 months from initiation of the project</p>
<p>Developer(s) of the Problem Statement:</p>	<p>Name: Alex Lim, Oregon DOT Email: alex.k.lim@odot.oregon.gov Phone: 971-283-5518</p>