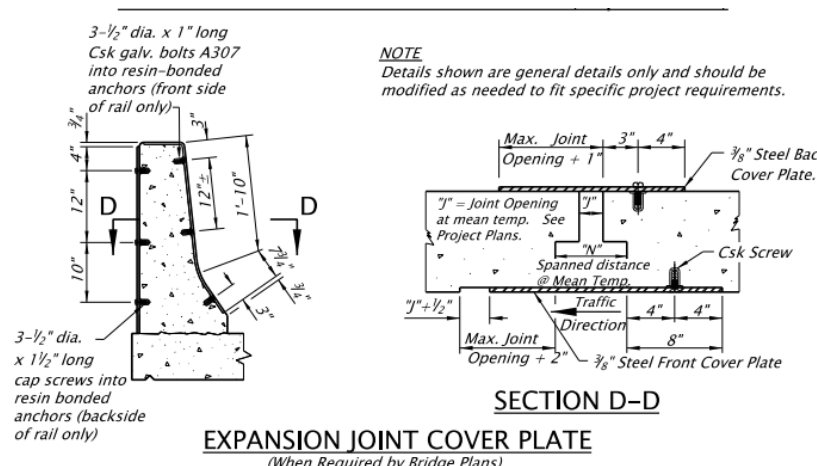


<p>Project Title:</p>	<p>Open Joints in Concrete Bridge Rail</p>
<p>Project Synopsis:</p>	<p>Guidance is needed for concrete bridge rail systems which have an open joint larger than 2 inches. If a cover plate is needed to cover these large open joints, an assessment for MASH compliance will be conducted.</p>
<p>Project Goal(s):</p>	<ol style="list-style-type: none"> 1. Determine when we can leave the joint "open"? 3in? 2. Determine if having compression joint material would prevent vehicle snagging for open joint from 3in to 6in? 3. Determine when we need a cover plate. 4. If a cover plate is needed, determine details of cover plate and attachment, and determine if full-scale crash testing is required to determine MASH compliance
<p>Project Background:</p>	<p>Several bridge rails with a 2-inch open joint have been successfully crash tested according to MASH. Since these systems have performed acceptably, any open joint of 2 inches or less would be acceptable without a steel cover plate. However, there is no "MASH approved" statement on this.</p> <p>Also, there is no guidance for open joints from 2" to 6". In general, we use a detail as shown for expansion joint larger than 2in. For expansion joints greater than 2", use expansion joint cover plates to prevent vehicle snagging:</p> <p>https://www.oregon.gov/ODOT/Engineering/202101/BR200.pdf</p> <div style="text-align: center;">  <p>EXPANSION JOINT COVER PLATE (When Required by Bridge Plans)</p> </div> <p>It would be helpful to perform a literature review and use computer simulation to determine when an open joint will cause vehicle snagging. Also, it might be worth including whether having compression joint material makes a difference.</p> <p>There is a MASH tested rail did by Midwest Roadside Safety Facility for barrier with 6 5/8" gap:</p> <p>https://www.roadsidepooledfund.org/wp-content/uploads/2017/04/TRP-03-356-16.pdf</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 current state standards for open joints in concrete bridge rails b. Review MwRSF bridge rail with open joint and cover plate 2. Computer simulations <ol style="list-style-type: none"> a. Develop 3D computer model of various concrete bridge rails (vertical, single slope, F-Shape, NJ-Shape) b. Determine critical shape configuration with open joint which leads to severe snagging of vehicle parts c. Perform simulations with various open joints d. Perform simulations with open joints and compression material 3. Engineering Analysis <ol style="list-style-type: none"> a. If cover plate is needed, review details of various cover plate designs. b. Determine if MASH compliance can be assessed based on computer simulations. If full-scale crash is required, recommend design details for future crash testing effort. 4. Report
<p>Deliverables:</p>	<ol style="list-style-type: none"> 1. Guidelines and recommendations for open joints in concrete bridge rails 2. Report documenting the literature review, engineering analysis, and computer simulations
<p>Urgency and Expected Benefit:</p>	<p>This research effort would provide states guidance when using concrete bridge rails with open joints larger than 2 inches.</p>
<p>Problem Funding and Research Period:</p>	<p>Total Cost Estimate = \$45,000</p> <p>Project Duration is 12 months.</p>
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