

Request for Research Funding for FY 2021-2022

Requesting Office	CO Structures Design	Priority	4 of 5
Proposed Title	Split-pipe Stiffeners for Skewed Steel I-Girders		
Justification	<p>The design team for the Wekiva Parkway Section 8 project recently proposed the use of split pipe stiffeners for connecting skewed cross-frames to longitudinal I-shaped steel girders. The split pipe stiffener was researched by TxDOT and UT-Austin and is allowed in TxDOT design standards. However, the research to establish a fatigue category for the split pipe stiffener included a very limited number of tests. For this recent project, the split pipe stiffener was allowed to be welded to the steel girder flanges only at simple end span bearings and compression flanges at continuous support bearings. Other locations required a bolted tab to join the stiffener to flange. A conservative assumption of the design fatigue category was made. This research would seek more data to support selection of an appropriate fatigue category for designers to use when a welded attachment is to be used for the split pipe stiffener at continuous tension flanges. In addition, the research will examine feasible methods to avoid corrosion of the split pipe stiffener, such as painting the interior before welding versus using weathering steel and whether sealing or venting provides better corrosion resistance.</p>		
Impact	<p>If this research is not completed, the appropriate fatigue category to use for split pipe stiffeners will be unknown and may be conservatively assumed, which would result in material waste and/or poor performance during service. In addition, corrosion protection needs to be studied to ensure adequate service life.</p>		
Affected Offices	Structures Design		
Existing Work	<p>Quadrato, C., Wang, W., Battistini, A., Wahr, A., Helwig, T., Frank, K., & Engelhardt, M. (2010). Cross-Frame Connection Details for Skewed Steel Bridges. Austin: Center for Transportation Research.</p> <p>TxDOT does not plan to fund any further research on this topic.</p>		
Keywords Used In Existing Work Search (Cannot leave blank)	Split-pipe stiffener		
Related Contracts (Give contract numbers)			
Funding Request	\$400k	Anticipated Duration	4 years
Project Manager	Will Potter, Christina Freeman	Contracting Method	RFP to all registered vendors
Urgency	4	This project scored fourth in a rating of research ideas by FDOT's Central and District Structures Design Offices.	
Implementability	1	This research would be implemented with guidance for the use of split-pipe stiffeners in the FDOT Structures Manual. Since split-pipe stiffeners have already been used with limitations for Florida bridges, quick implementation is likely.	

Project Benefits (Succinct, complete explanation)

This research will facilitate the use of split-pipe stiffeners on skewed I-girder bridges. Their use has already been requested by multiple designers and used with a conservative design for one bridge project.

Project Benefits (Select all that apply and explain)	Quantifiable Benefits (units, dollars, etc...if applicable)	Methodology or Data Sources Used to Determine Quantifiable Benefits. If not applicable, please give justification of project benefits
○ Materials Enhancement		Research into corrosion protection will ensure that the split-pipe detail has a service life consistent with that of the bridge itself and the design service life is realized.
○ Materials Savings		Understanding the fatigue category for the split pipe stiffener will allow properly designed welds to be specified at tension flanges, eliminating the added material and labor required to fabricate bolted tab plates. An understanding of corrosion protection requirements may mean that more expensive weathering steel or other corrosion protection is not required for the split pipe.
○ Time Savings		Labor savings will be realized in avoidance of the bolted tab plate.
○ Lives Saved/Injuries Prevented		
○ Other (Explain)		

*Comments should explain and support urgency, financial benefit, and implementability scores