

Progress Report

October 2018

Following are progress report on the different tasks

- **Task 1- Developing Ideas for Extending the Maximum Length of FSPGBS to more than 100 ft. with capability to Incorporate Camber if needed:** The main approach to extend the maximum length of FSPGBS to more than 60 ft will be in the form of developing a splice detail that could be used to connect segments of the folded plate girders with maximum lengths of 60 ft.

Three different details are developed for extending the maximum length of the folded plate girders to about 100 ft. These details consists of welded and bolted types. Following figure shows the details

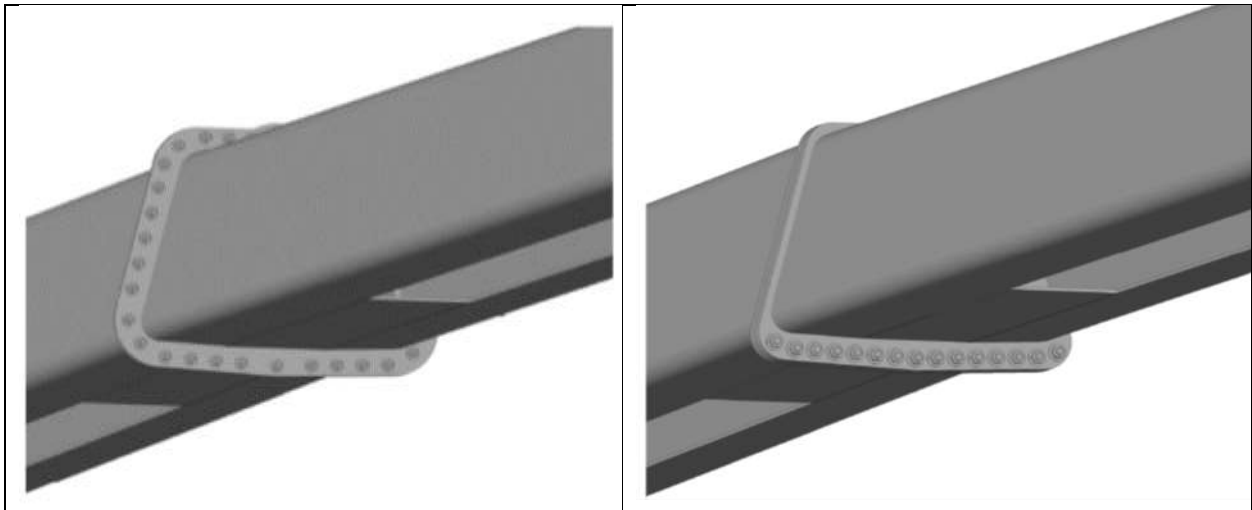
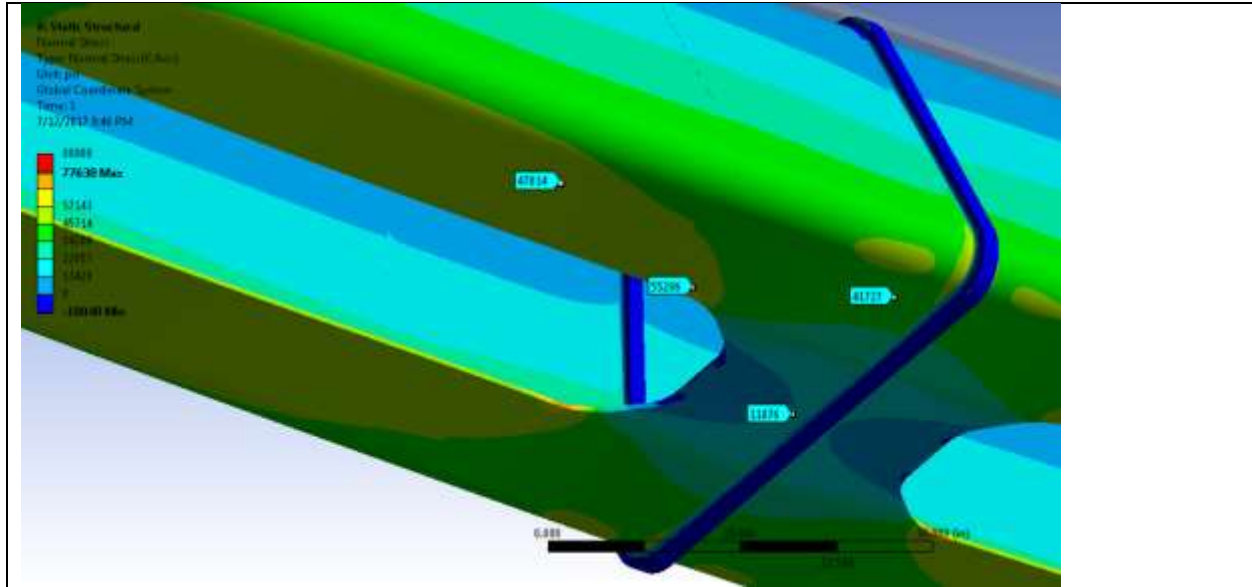


Figure above shows the bolted detail.

Figure below shows the welded detail, using stiffener

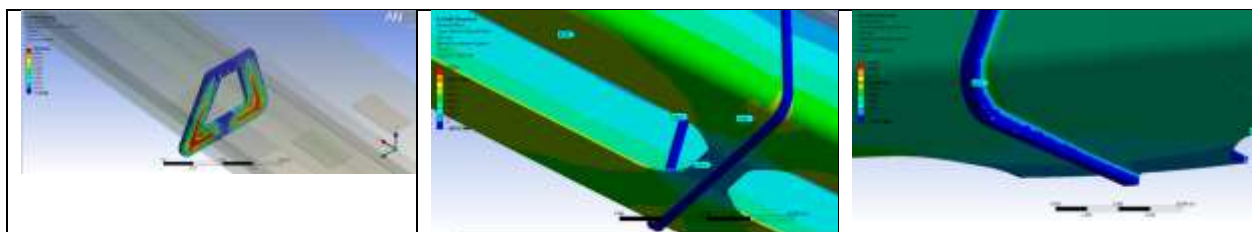


The third detail consists of direct welding two folded plate using full penetration weld.

- Task 2 – Conducting Non-Linear Finite Element Analysis to Comprehend Performance of Splice Connection:** The first step in the research project, following envisioning the connection detail, will be to carry out parametric studies using non-linear finite element analysis to fully comprehend the behavior and force transfer mechanism for the splice connection detail.

Detail non-linear finite element analysis has been conducted to comprehend the behavior of all three details. These analysis were then used to develop tentative design provisions and design of test specimens

Figure below shows some of the numerical analysis results



- Task 3 – Experimental Test:** Following completion of numerical work and finalizing the connection detail, an experimental work will be carried out to verify the adequacy of splice connection design and detail.

Two test specimens have been fabricated and are ready for testing. Additional two test specimens will also be tested following completion of testing the first two specimen. It is anticipated that all four tests to be completed by March of 2019

Figure below shows the two test specimens that uses welded detail using flange plate and direct welding. The additional two test specimens to be fabricated will be bolted types.



- **Task 4 – Development of Design Provisions:** Using the results of numerical and experimental work, complete design provisions for the splice connection and other aspects of FSPGBS will be developed.

Tentative design provisions for strength and fatigue limit states are developed based on results obtained from numerical analysis. However, these design provisions may be modified based on experimental test results

- **Task 5 – Development of ABC-UTC Guidelines for FSPGBS:** The project deliverable will be in the form of all the essential information that bridge owners and designers will need to utilize FSPGBS in practice.

This is an ongoing tasks and many of the needed information are already developed.

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