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TOPIC: BOLTED SPLICE PLATES: WHAT MIGHT WE BE DOING WRONG? (Bridge Analysis, Design and Assessment)

ABSTRACT:

Recent versions of the American AASHTO LRFD Bridge Design Code present an elective semi-empirical design method for bolted splice connections in girders and box beams. The semi-empirical method allows the designer to ignore the polar moment of inertia of the bolt group which joins the web plate.

This paper references the construction convenience sometimes adopted in Australia whereby one of the two web splice plates is split into multiple pieces to facilitate steelwork handling. This approach is analogous to the similar approach to split splice plates to allow the passage of longitudinal stiffeners.

This paper presents worked solutions to illustrate the different strengths predicted using the following design approaches:

- 1. Elastic method utilizing polar moment-of-inertia of the bolt group.
 - a. Recognizing the effect of splitting one of the two web plates.
 - b. Ignoring the effect of splitting one of the two web plates.
- 2. Strength calculation using the semi-empirical design method of AASHTO LRFD.
- 3. Finite element method.

This paper also discusses allowances currently available in the AASHTO LRFD around the buckling resistance and fatigue performance of a web panel (or flange) at the location of a bolted splice for the different conditions of a continuous longitudinal stiffener and a longitudinal stiffener that is curtailed before or at a bolted splice.