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**TO:** **Structures Division Engineers, Managers & Consultants**

**FROM:** **Ted A. Kniazewycz, P.E., F.ASCE**
**Civil Engineering Director – Structures Division**

**DATE:** **July 31, 2020**

**RE:** **Structural Design Memorandum SDM 20-01**
**Steel Tension Flange Stress Limited to Yield Stress**

When designing steel girders, bolt holes are in tension flanges for various connections including tab plates, field splices, and occasionally lateral bracing. TDOT Structures Division Design Policy is to use bolted tab plates for connections to girder flanges to benefit from an improved fatigue detail category.

When applicable, straight composite steel girder sections may be designed using AASHTO 6.10.7.1 in positive moment regions, which is for compact sections. Compact section design permits tensile stresses exceeding the yield stress of the flange under certain cases. However, because of the holes in the tension flanges, AASHTO 6.10.1.8 must also be satisfied for positive and negative moment regions of all girders. This provision limits the stress in tension flanges to the lesser of yield stress or a calculated stress value based on the specifics of the design.

The benefit of higher allowable stresses for compact section design in Article 6.10.7.1 is negated by Article 6.10.1.8 which limits the maximum allowable stress. Commercial design programs use AASHTO 6.10.7.1 for composite sections in positive moment areas for straight steel bridges. However, these programs may not check AASHTO 6.10.1.8. It is possible to satisfy 6.10.7.1 and not be flagged by the program but still be in violation of AASHTO 6.10.1.8.

All designers must make this Code check on their own using either hand calculations or a spreadsheet. No stresses exceeding the limits given in AASHTO 6.10.1.8 are allowed.

This directive is effective as of the date of this Structural Design Memorandum.

CC: SDG-01