

PENNDOT e-Notification

Bureau of Business Solutions and Services
Highway/Engineering Applications Division



PSLRFD

No. 013

December 26, 2013

Eliminating the web strands at mid-depth of the adjacent box beams due to the mid-depth post-tensioning duct per BC-775M, Change No. 2

An issue has been identified in PSLRFD v2.7.0.0 when the strand pattern for adjacent box beams is obtained from a design run. Specifically, the web strand rows at the mid-depth, if any, obtained from a design run will interfere with the mid-depth post-tensioning duct in adjacent box beams per BC-775M, Change No. 2.

BACKGROUND

Previously for adjacent box beams the transverse tendon hole/pocket for post-tensioning was located within the shear key. Therefore, there was no interference between the tendon and the web strands, and no special consideration was needed for the tendon location when determining the strand pattern.

Change No. 2 to BD-600M Series (Pub. 218M – September 2010 Edition) and Change No. 2 to BC-700M Series (Pub. 219M – October 2010 Edition) of Bridge Design and Construction Standards were released on November 26, 2013, and are to be implemented on all applicable bridges with T. S. & L. submissions after January 3, 2014. Full depth grout will now be provided for adjacent box beams per BC-775M, since the transverse tendons have been moved down to the mid-depth of the beams to create a uniform compressive pressure on the grout. The location and quantity requirements of tendons and diaphragms along adjacent box beam have also been revised and specified on BD-651M.

As a result, prestressing strand rows at mid-depth of adjacent box beams will interfere with the transverse tendon duct. Up to four (4) strand rows at the mid-depth of each web of the adjacent box beam will need to be eliminated to incorporate the tendon hole/pocket in either or both interior and exterior beams. PSLRFD utilizes beam tables with dimensions and properties for standard beam sections including strand patterns with the available strand locations. The standard strand patterns do not account for the interference with the new transverse tendon location, and therefore, may result in unusable design strand patterns. This can lead to problems at the shop drawing phase if the design strand pattern is used without consideration of the transverse tendon locations.

WORKAROUND

The temporary workaround is to run PSLRFD in design mode to obtain a preliminary strands pattern for adjacent box beam.

- If the design strand pattern has no strands at mid-depth of the beam, only an analysis run with this pattern needs to be performed for the verification.

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- If the design strand pattern has any mid-depth strands, the strand pattern needs to be adjusted by moving strands up or down along the beam web to avoid the tendon hole /pocket and adding additional strands. An analysis run with the new strand pattern should be completed for the verification. Alternately, the design run can be edited to use SCD parameters 8 and 9 to specify the available strand locations at midspan, entering zero strands in the mid-depth rows.
- If no vertical space in the beam web is available for the adjustment or addition, a deeper beam should be considered.
- Draped strands should be checked manually for interference with tendons in the draping zone.

This is the temporary approach for adjacent box beam design until the next PSLRFD revision is released.

PERMANENT RESOLUTION

The next release of PSLRFD will implement the changes on BD-651M and BC-775M. The beam tables for standard adjacent box beams will be revised to remove any strand locations that interfere with the new transverse tendon location. The program will also design the end/draped strand considering possible tendon interference. The new PSLRFD release is scheduled for April 2014 pending successful beta testing of the revisions.

Direct any questions concerning the above issue to:

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