

Evaluation of Damaged Prestressed Bridge Girders

Azam Nabizadeh

PhD Student, University of Wisconsin-Milwaukee, azam@uwm.edu

Habib Tabatabai

Professor, University of Wisconsin-Milwaukee, ht@uwm.edu

Over-height vehicle impact and deck removal operations can cause damage to bottom and top flanges of prestressed bridge girders, respectively. Girders impacted with over-height trucks (primarily at the bottom) have been studied extensively. However, evaluation of the service limit state stresses in impacted girders have not been addressed in the literature. A comprehensive software (PreBARS) has been developed to assess serviceability and strength of prestressed girders under undamaged, damaged, and repaired conditions. The software is capable of simulating damage in top and bottom flanges. The current software has been developed for standard prestressed girder sizes and details used by Wisconsin Department of Transportation. The PreBARS program, which has been coded using Visual Basic Application (VBA), calculates bridge dead loads, distribution factors, prestress losses, section properties, strength and service limit stresses for Wisconsin standard prestressed bridge girders. Section properties can be calculated for undamaged, damaged, and repaired girder sections. Available repair procedures include patching, strand splices, external carbon fiber reinforced polymer (CFRP) reinforcement (at web and/or bottom flange) as well as a combination of the available methods.

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