Development of Live Load Distribution Factors for GBeam Highway Bridges

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Abstract

December 2020 marked the completion of the Hampden Grist Mill Bridge (HGMB) in Hampden, ME. HGMB was the first ever highway bridge utilizing the GBeam [1]. Since 2020 three other GBeam highway bridges have been constructed bringing the total to four. With the expansion of this technology and growing use the live load distribution within these structures is still not fully understood. Distribution factors quantify the amount of load applied to a single girder of the bridge so each girder can be designed as a single beam. Research from live load tests on HGMB show differences in live load distribution from the AASHTO type C concrete box girder bridge distribution factors used to-date for design [2]. The first step taken to develop live load distribution factors is verifying a finite element modeling technique that accurately predicts live load distribution compared to that measured in field tests. Once a modeling technique is adopted a suite of finite element models will be created by varying parameters such as span length, girder spacing, and deck thickness. The models will be subjected to multiple load cases to maximize moments and shears on a single girder. The simulation results will be used to develop distribution factors specific to GBeam bridges.

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References

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