

AN ABSTRACT OF A THESIS

LATERAL DISTRIBUTION OF LIVE LOAD SHEAR IN HIGHWAY BRIDGE DESIGN

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The main objective of this study was to carefully reexamine the simplified method (Henry's method) for live load shear distribution factors in highway bridge design. The Henry's Equal Distribution Factor (EDF) method is a simplified method for calculating the distribution factor of live load moment and shear. To pursue this objective, a comparison study was conducted and the differences between the distribution factors in actual bridges calculated using Henry's method, the AASHTO Standard, the AASHTO LRFD methods and the finite element analysis (FEA) were investigated. Twenty-four actual bridges from the state of Tennessee were selected for detailed analysis and comparison. These bridges had six different types of superstructures. Finite element analysis was carried out to determine the shear distribution factors for each of these bridges. Based on the comparison and evaluation, it was found that the Henry's distribution factors were consistently unconservative for shear distribution factors compared to the FEA results. Therefore, modifications to Henry's method were necessary. In the comparison study, the effects of structural parameters to shear distribution factors were also studied. Two sets of modification factors to the Henry's method were proposed. In the first set, structure type modification factors for moment distribution factors were used along with a single shear factor. The second set of modification factor included the structure type factors as well as the skew correction formula to account for the effects of skew angle for skewed bridges. With proper modifications, Henry's EDF method could produce very reasonable and reliable distribution factors for live load shear. Along with that the modified Henry's method would also offer advantages in simplicity, flexibility, reliability and cost savings.