

Bridge Weigh In Motion Using Operational Strain Measurements

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A method for Bridge Weigh in Motion is developed for a 3-span continuous steel girder bridge to estimate unknown truck information using only a limited set of operational strain measurements. The information extracted from these strain measurements includes truck speed, path, axle configuration, and total truck weight. The truck path is estimated using a relation between the Girder Distribution Factors and truck paths. The truck speed and axle configuration are estimated from the second derivative of strains. The total truck weight is estimated using an influence line calibrated from a diagnostic load test performed with a known truck. Operational strains are used to identify the axle configuration. This information is combined with the calibrated influence line to build the relationship between axle load and strain measurement to determine the axle weights and the total truck weight. The method is successfully verified using operational measured strain data from daily truck traffic.