

# A WAVELET-BASED BRIDGE WEIGH-IN-MOTION SYSTEM

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*Abstract- Bridge Weigh-in-Motion systems can be used to estimate vehicle parameters such as velocity, axle loads, or the distance between axles without affecting the traffic. These parameters and the classification of vehicles are necessary to determine vehicle overload and hence may help to reduce risks for road users and road infrastructure and allow optimized planning of maintenance work.*

*The Bridge Weigh-in-Motion system developed is based on a crack displacement sensor with intelligent data processing algorithms: In a first step, the number of axles, the distance between axles, and the velocity of the vehicle is obtained from the crack displacement signal by means of wavelet decomposition. In a subsequent step, the axle loads are found by means of optimizing the weights for axle loads that the measured crack displacement signal can be approximated by a superposition of (shifted and extended/compressed) 'Lines of Influence'. Intensive test runs have been performed to verify results of the Bridge Weigh-in-Motion system.*

**Index terms:** Bridge Weigh-in-Motion System, Wavelet Decomposition, Axle Load, Distance between Axles, Velocity Determination