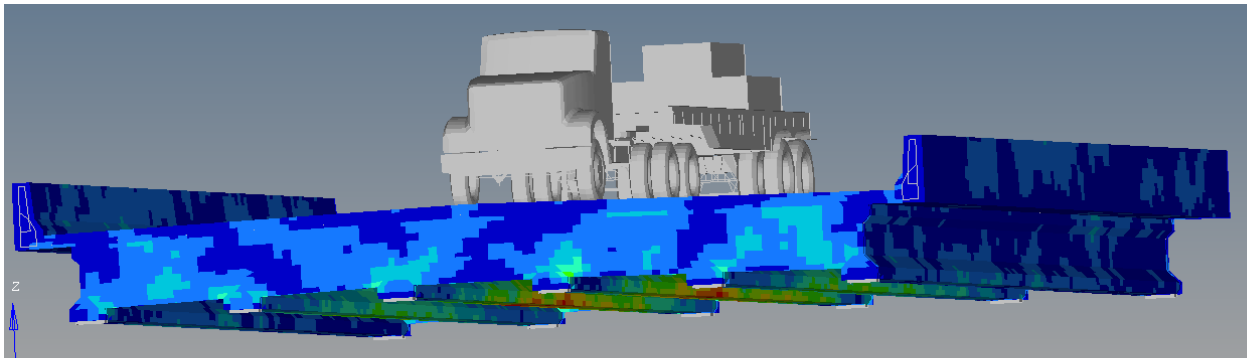


Next-Generation Wireless Bridge Weigh-in-Motion (WIM) System Incorporated with Nondestructive Evaluation (NDE) Capability for Transportation Infrastructure Safety

---- funded by US Department of Transportation

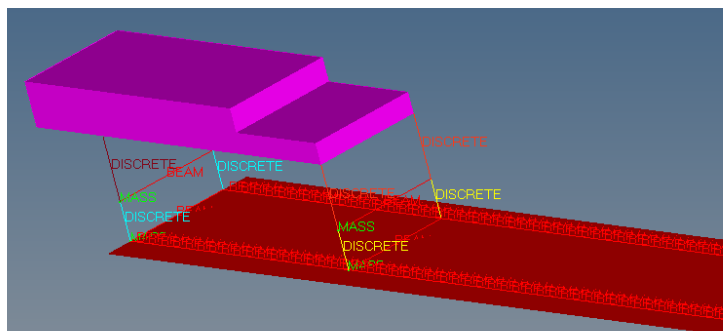
Advanced wireless BWIM system with NDE capability is developed for this project. Off-the-shelf sensors are selected and hardware interfacing is designed. Data are filtered with signal processing technique. The BWIM system is implemented by University of Alabama at Birmingham, while the wireless technology, hardware design and NDE technique are handled by the Georgia Institute of Technology.



The 3D FE model (modified from work of Jerry Wekezer, FSU) of vehicle-bridge interaction based on the field data of the calibration truck and the two-lane bridge US78 is developed to provide mass and stiff matrices for further weight calculation.

$$[M_g]_{n \times n} \{\ddot{y}\} + [C_g]_{n \times n} \{\dot{y}\} + [K_g]_{n \times n} \{y\} = [L(t)]_{n \times f} \{g(t)\}$$

The inverse calculation method – Moving Forcing Identification (MFI) theory – is used to solve for the vehicle gross weight and axle weight (Hua Zhao, UAB).



The simplified 2D FE model (modified from work of Jerry Wekezer, FSU) of vehicle-bridge interaction is developed to enable fast computing and real time monitoring

Further development about this can see the work of my previous colleague Rahul Kalyankar (http://nctspm.gatech.edu/sites/default/files/u60/Kalyankar_NCTSPM%20Conference%20GATech%20203-24-14.pdf).