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EDITORIAL

The first paper in this issue of *Bridge Structures*, by Ozgur Bezgin *et al.*, presents 'Response of laterally loaded group shafts for bridge foundations in cohesionless soils using a 3D FE soil-structure model'. Parameters investigated include soil modulus, shaft slenderness, shaft–soil interface, soil effective zone, shear interaction, and support conditions at the bottom of the shaft. Results from this investigation provide criteria for the effective volume of soil that needs to be included in the FE analysis for single and group shaft analysis. It also showed that shaft spacing, soil weight, soil modulus, interface conditions, and support conditions are important factors that need to be included when modeling group shafts in cohesionless soils. In the past five decades, truck loads have increased significantly due to economic growth. As a result, bridge design loads have evolved to reflect the heavier truck loads. The current AASHTO Standard Specifications adopts the HL-93 live load model which was developed based on a probabilistic approach. Recent studies showed that AASHTO legal loads do not represent the newer configuration of multi-axle single-unit trucks. The studies also indicated that truck-weight frequency distributions by vehicle type (truck-weight histograms) are needed to estimate reliably the effects on remaining life and the costs caused by changes in legal and permit truck weights. In recent years, weigh-in-motion (WIM) systems have been extensively used to compile a reliable database with information on the type and density of traffic in a specific area. This information can then be used for statistical analysis of road usage, truck overloading, and vehicle configurations both for the planning of new roadways and for management of existing roadways, In "Enhancement of bridge live loads based on West Virginia weigh-in-motion data", Shoukry *et al.* present the development of two weigh-in-motion systems in West Virginia, USA, to provide site-specific traffic data that can be employed for bridge design and evaluation. The paper discusses the traffic spectra measured in both sites to evaluate the design live load trucks and discusses the possible enhancement of bridge live loads using the WIM data. The paper concludes that the current truck loads are heavier than the AASHTO specified loads. A fatigue design truck model has been developed based on the WIM data. The paper concludes that the WIM enhanced fatigue design truck loading is 31 percent heavier than the HL-93 AASHTO design truck. The importance of designing a structure to resist blast loading has become increasingly significant with the increase in violent events over the last decade. The analysis and design of protective walls have attracted the interests of structural and military engineers because numerous field experiments have shown that, in a blast event, it can provide an impressive level of shock wave attention.

In 'Analysis of a blast-loaded protective wall for bridge columns', Fang *et al.* present an analytical method to study the dynamic response of a protective wall subjected to blast loadings. Based on the deformation observations and analyses, the wall is treated as a shear-flexural plate, wherein the deformations in two orthogonal directions are assumed to be dominated by shear and flexure, respectively. The governing equation is derived, and a method for the blast response analysis is proposed. For a soil protective wall, the numerical results, including dynamic characteristics, structural response, and pressure-impulse (P-I) diagram are given based on the proposed shear-flexural plate model. Structural health monitoring (SHM) is becoming increasingly popular with bridge owners and administrators for bridge evaluation and management. At the same time, bridge security has recently emerged as an important consideration in managing transportation infrastructure. The role of SHM for bridge security aspects is not well understood or studied. Alampalli and Ettouney summarize the 'Role of structural health monitoring in bridge security'. The use of latex modified concrete deck overlay systems has become a common practice not only for repairing old bridge overlays but also as a wearing and protective surface of many new bridges in the USA. However, cracks due to diverse reasons have been observed many times in old and new bridges, so that reduction or even complete elimination of cracks is the subject of continuous research.

One way for reducing or eliminating cracks is by reinforcing the overlay material with short length

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randomly oriented carbon fibers. In 'Short carbon fiber reinforced latex modified concrete for crack resistant bridge deck overlays', Shoukry *et al*. show the results of the development of latex modified concrete reinforced with short carbon fibers. Two fiber lengths were introduced to typical latex modified concrete mix in order to evaluate different mechanical properties used as indicators of the performance improvement. The authors report that the resulting material tends to be less stiff than plain latex modified concrete, so that for the same load level, carbon fiber latex modified concrete is able to support more tensile strain without cracking.

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