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Editorial

Thorough aerodynamic studies are essential for the design of long-span bridges. Various measures have been proposed and applied to raise the flutter resistance of bridges, that is, their critical wind speed for flutter onset (flutter speed). In "Eccentric-wing flutter stabilizer for long span bridges", Starossek presents an aerodynamic device for preventing bridge flutter, which consists of wings positioned along the sides of, and fixed relative to, the bridge deck. Flutter suppression efficiency is high provided the lateral eccentricity of the wings is large. It is a passive device that does not contain moving parts. The paper provides a numerical study, which determines the critical wind speed for flutter onset of a bridge without wings and with wings mounted in various configurations. The performance of bridge decks under heavy traffic loads represents one of the important aspects in bridge design and construction. In "Fatigue assessment of a lightweight steel-concrete bridge deck concept", De Corte et al. present results of a constant amplitude fatigue test on a lightweight steel-concrete deck concept, in which a network of longitudinal and transverse concrete ribs transmit shear forces between thin top and bottom steel plates. The authors describe a constant amplitude fatigue test on a full-scale bridge deck test panel (3.60 m $\times$ 1.50 m) up to 6 million cycles. During this dynamic test, the deflection of the bridge deck, and steel and concrete strains are recorded on predetermined intervals in order to evaluate the fatigue behavior of the sandwich deck as a function of the number of cycles. The paper concludes that the lightweight steel-concrete sandwich bridge deck concept offers the necessary fatigue resistance to traffic loads. Bridge cable wire deterioration takes different forms ranging from depletion of the zinc coating, embrittlement, to cracking, which eventually leads to wire breaks. In "Experimental and analytical study on fatigue strength and stress concentration of corroded bridge wire", Miyachi and Nakamura present the results of fatigue tests, conducted on corroded galvanized steel wires. The authors conclude that the corrosion pit shape is a dominant factor to lower fatigue strength. Stress concentration factor at the sharp edge of pits were obtained by strain gauge measurements and 3D FEM analysis. Both methods show that strain was almost the same value, while the stress concentration is larger for sharper pit shapes, indicating that this is the major cause for the reduction of fatigue strength. Monitoring could play an important role in mitigating the risk of distress during the rehabilitation of bridge structures. Currently, visual inspection during construction or rehabilitation is utilized to ensure that the structure is functioning properly. Complex structures like movable bridges may benefit from additional oversight beyond visual inspection because of the elevated risks. Structural health monitoring of critical elements can help reduce these risks. In "Monitoring of a bascule bridge during rehabilitation", Yarnold and Weidner present a case study for monitoring effort of a rolling lift bascule bridge under rehabilitation. During an opening of the span for ship traffic, a significant shift in strain response was measured in the truss lower chord. To identify the root cause of this behavior, a detailed investigation was performed including field studies, interviews and model-experiment correlation. The paper concludes that a connection slip occurred at a partially completed repair. The primary impact of the monitoring was a change to the construction sequence allowed by the contractor. This investigation shows the potential benefit of instrumentation and monitoring in conjunction with traditional visual assessment methods, specifically during construction and retrofit of a movable bascule bridge. Several bridge collapse cases have occurred in the last few decades. Determination of the underlying cause of each collapse is of paramount importance toward enhancing both design and construction techniques. In "Assessment of disproportionate collapse behavior of cable stayed bridges", Das et al. present numerical modeling and analysis of a typical cable stayed bridge through a nonlinear static procedure using SAP 2000. The authors discuss the response of the structural model for multiple types of cable loss cases to identify a definite progressive collapse pattern. The paper investigates the impact ratios for different structural properties through a dynamic analysis to recognize the lack of robustness in the structure.

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