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Editorial

To determine the hydrogen-embrittlement resistance of anchor rods in the new San Francisco-Oakland Bay Bridge in California, a series of tests were conducted on rods representing various sizes, different manufacturers, rolled and cut threads, different alloys, as well as galvanized and ungalvanized rods. Following slow-load hydrogen embrittlement tests, mechanical and chemical properties of the test rods were fully characterized, and fracture surfaces were examined by scanning electron and optical microscopy to establish modes of failure. In "Hydrogen Embrittlement Testing and Results of Full-size ASTM A354 Grade BD Rods in the SFOBB," Townsend et al. discuss the results, he cause of failure and implications on establishment of safe loads for rods currently in service on the bridge. The use of hysteretic dampers is now a growing practice in seismic protection of bridge structures. Dicleli and Milani present "An innovative hysteretic damper with adaptive post-elastic stiffness for seismic protection of bridges", in which multi-directional torsional hysteretic damper works based on torsional yielding of steel cylindrical cores. The damper provides a hyperbolic post-elastic stiffness as a result of its working mechanism, which produces geometric hardening effect. The authors conclude that the post-elastic stiffness is effective in limiting the lateral displacement of the seismic-isolated bridge deck in the near-fault zone. In "Structural characteristics of multi-span cable-stayed bridges with hybrid, RC and steel towers," Amiri and Nakamura study the static and seismic behaviors of a multi-span cable stayed bridge with three different types of tower, RC and steel/concrete hybrid and steel tower. The steel/concrete hybrid tower consists of a sandwich type double steel box section filled with concrete, the RC tower has a rectangular hollow section and the steel tower has a steel box section. The authors conduct static analysis with different live load patterns, and validate the assumed size and material strength by limit state design. The elastic and plastic seismic analysis is performed for the three towers, where medium strong and ultra-strong earthquakes according to the Japanese Seismic Codes for Highway Bridges were adopted. The paper concludes that RC and hybrid tower showed very good static features and energy dissipating behavior during earthquakes, whereas the steel tower had the largest displacement but the least bending moment. High-sided, lightly loaded vehicles are prone to accidents in strong, gusty winds. While wind related accidents may occur anywhere on roads, vehicles are more sensitive to wind while passing over bridges given the higher road elevations, exposure and possible speed-up effects at various bridge locations compared to ground level roads. In "Vehicle stability to roll-over in strong winds on long-span bridges," Stoyanoff et al. present an extended roll-over model for estimation of vehicle stability in strong, gusty winds. The study example is of a double-deck suspension bridge where four typical vehicles were investigated, including: a tractor-trailer truck; an intercity bus; a courier van; and a full-sized SUV. Using a sectional model of the bridge deck and vehicle models built in scale, six component force and moment coefficients were measured at various lanes for the full azimuth of wind directions. The effects of the road level were also investigated. Based on expected wind turbulence properties at the bridge site and measurements of wind flow modifications at various deck locations, vehicle stability against roll-over has been predicted for various wind and vehicle speeds. For calibration purposes, comparative tests and analyses on the same vehicles were carried out for the Confederation Bridge, PEI, Canada, and the results compared with the adopted policy for traffic control in strong winds on that bridge. Recommendations for traffic management in strong winds on tested bridges were drawn.

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