Bridge Structures 7 (2011) 1
DOI:10.3233/BRS-2011-019
IOS Press

Editorial

On August 1, at 6:05 PM, the Interstate Highway I35 W Bridge in Minneapolis, Minnesota, collapsed suddenly. The 8 traffic-lane, 1000-foot-long (305 meters) deck of the 1907-foot-long (581 meters) bridge fell into the Mississippi River within seconds. The collapse claimed 13 fatalities and 145 injuries. Designed in 1964 and opened to traffic in 1967, the I35 W Bridge stretched from north to south over the Mississippi River in Hennepin County, Minneapolis, Minnesota. The major part of the bridge, which completely collapsed, is a 1000 foot (305 meters) long, 108 foot (32.92 meters) wide, three-span steel deck-truss superstructure. The bridge originally had six traffic lanes. After two major rehabilitations last century, it has been widened into eight lanes with two auxiliary lanes and its concrete deck has been reinforced from 6.5 inches (16.50 cm) to 8.5 inches (21.60 cm) thick. National Safety Transportation Safety Board (NTSB) official investigation indicates that, at the moment of the collapse, two lanes of the bridge were occupied by piled construction materials and heavy trucks; four lanes were opened to traffic; and the other two lanes were empty. In "I35 W Bridge collapse: Lessons learned and challenges revealed", Hao summarizes an independent investigation of this disaster based on material evidences and advanced computations. The author concludes that the lessons learned from the I35 W Bridge collapse may have certain significance for the safety assessments of similar steel bridges, scores of which are still in service throughout the United States. Serviceability cracking checks for circular columns and piers are critical for bridges of long span, mainly due to constrained expansion/contraction of the bridge superstructure. In "Serviceability cracking check of circular section piers", Ioannis et al. present an analytical investigation of circular sections piers. The authors propose two groups of diagrams for the checking of serviceability cracking. The vulnerability of bridges to blast hazards is an increasing concern for engineers, government agencies, and the public. Blast hazards on structures can be classified as either accidental hazards or intentional blast attacks. Therefore bridge structures should be protected to mitigate these hazards. Current bridge design codes do not account for blast loading and there is a need for guidelines for bridges to resist blast loads. In an attempt to address this issue, Tokal et al. present "Simplified design method for bridge piers subjected to unconfined blast hazards." Estimating blast loads on a member due to specific blast scenario is complex. To simplify the analysis, dynamic blast loads were transformed into equivalent static loads and simplified blast load response spectra were developed based on approximate blast pressure distributions. Simple-trunnion bascule bridges are an instrumental component to waterways around the world. These bridges operate by lifting a central section, or leaf, of its span to allow for marine. This central section of the bascule bridge pivots on large bearings that are fit onto what is equivalently a large pin or axle. This axle is commonly referred to as the Trunnion-Hub-Girder assembly, and serves as a fulcrum to lift the bridge. In their paper "Comparing two procedures for assembling steel fulcra in simple-trunnion bascule bridges," Garapati et al. present a study of the assembly procedures of the Trunnion-Hub-Girder assembly. Involving shrink fitting, two procedures for assembling steel fulcra of simple-trunnion bascule bridges are quantitatively compared for the likelihood of fracture during assembly. In one assembly procedure, the trunnion is shrink-fitted into a hub, followed by shrink fitting the trunnion-hub assembly into the girder of the bridge. In another assembly procedure, the hub is shrink-fitted into the girder, followed by shrink-fitting the trunnion in the hub-girder assembly. A formal design of experiments is conducted to find the influence of geometrical parameters such as the radial thickness of the hub, radial interference, and various shrink-fitting methods on the design parameter of critical crack length – a measure of likelihood of fracture.

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