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Experimental Investigation on Tsunami Acting on Bridges

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Abstract : Two tragic tsunamis that devastated the west coast of Sumatra Island, Indonesia in 2004 and North East Japan in 2011 had damaged bridges to various extents. Tsunamis have resulted in the catastrophic deterioration of infrastructures i.e. coastal structures, utilities and transportation facilities. A bridge structure performs vital roles to enable people to perform activities related to their daily needs and for development. A damaged bridge needs to be repaired expeditiously. In order to understand the effects of tsunami forces on bridges, experimental tests are carried out to measure the characteristics of hydrodynamic force at various wave heights. Coastal bridge models designed at a 1:40 scale are used in a 24.0 m long hydraulic flume with a cross section of 1.5 m by 2.0 m. The horizontal forces and uplift forces in all cases show that forces increase nonlinearly with increasing wave amplitude.

Keywords : tsunami, bridge, horizontal force, uplift force
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