Geophysical Research Abstracts
Vol. 19, EGU2017-16977, 2017
EGU General Assembly 2017

Mechanics of Tsunami Induced Scour at Coastal Structures

David McGovern (1), David Todd (2), Richard Whiteshouse (2), John Harris (2), and Tiziana Rossetto (1)
(1) Department of Civil, Environmental and Geomatic Engineering, UCL, UK, (2) HR Wallingford, UK

Mechanics of Tsunami Induced Scour at Coastal Structures

Tsunami inundation of the built coastal environment have frequently generated scour at the foundations of coastal structures, leading to failure (see particularly EEFIT reports). As characteristically quasi-steady flows, in which both velocity and depth are functions of time, tsunami scour differentiates from relatively well-studied maritime and riverine scour. To further elucidate the mechanism of tsunami-induced scour at / around coastal structures, a series of large-scale laboratory tests are conducted using a pneumatic long wave or Tsunami Simulator in the Fast Flow Facility at HR Wallingford, U.K, see accompanying abstract from Chandler et al. This research is part of the URBANWAVES project lead by UCL in which HR Wallingford are partners. The flow, turbulence and scour at Perspex square cylinders of various dimensions are tested under quasi-steady inundation flows from Froude scaled tsunami with periods of 2.3 min - 18.9 mins at 1:50 prototype scale over a flat sediment bed. The scour time development is recorded using video imagery from cameras placed inside the transparent test structures. Additionally, Nortek Vectrino Profilers are used to record the near and far field velocity and turbulence profiles. The free surface profiles are recorded using wave gauges and the wave pressure on the structures is recorded using pressure transducers. The incident wave shape, period and height is varied. Additionally, the structure shape, angle of attack, and effect of additional rows on the scour development have all been investigated.

Additional supporting abstracts include Foster et al., on tsunami induced building loads; Chandler et al., on the tsunami simulation concept and McGovern et al., on the simulation of tsunami-driven scour and flow fields.