Engineers Australia

Australian Rainfall and Runoff
Project 15

People and Vehicle Stability in Floods

Speaker: Grantley Smith, UNSW Water Research Laboratory (WRL)

Abstract:

The safety of people in floodways or on flooded streets is of major concern in urban stormwater design and floodplain management. Human activity in floodways is inevitable with much development already in flood prone areas. The safety of people can be compromised when exposed to flows which exceed their ability to remain standing or traverse a waterway or cause vehicles in which they are travelling in to loose traction.

Over the last four decades, a number of numerical and laboratory-based experimental studies have been undertaken within Australia and internationally to define the limits of human and vehicle stability within differing flow regimes. Human stability has been found to be influenced by numerous factors, however, the two most important parameters are flow depth and velocity, with depth dictating whether loss of stability is by sliding (friction) or tumbling (moment) failure. Vehicle stability depends on similar flow depth and velocity parameters, though is simplified by the lack of 'training' and body positioning parameters which affect human stability.

This presentation reviews the early work, collates and discusses subsequent experimental testing, empirical expressions and safety guidelines derived from these studies. The entire data-set of relevant experimental results is re-analysed and tolerable flow conditions related to human and vehicle safety and safe working conditions are presented.

Speaker bio:
Grantley Smith is a Senior Engineer at the University of New South Wales Water Research Laboratory. He has over 20 years' experience in hydrological processes as they relate to flow forecasting floodplain hydraulics, and floodplain management. Prior to joining the WRL in 2009, Grantley was NSW State Manager for DHI Water and Environment where he helped pioneer the use of 2D hydrodynamic models for floodplain inundation. He is currently Chair of the Water Panel for the Sydney Division of Engineers Australia.

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