ACESSIBILLITY DISRUPTIONS IN URBAN AREAS CAUSED BY EXTREME RAINFALL EVENTS

Nuno Melo [1], Bruno F. Santos [2], João P. Leitão[3], Helena Ramos[4], and Jorge Leandro[5]
[1]UDI – Research Unit for Inland Development, Polytechnic Institute of Guarda, Guarda, (Portugal)
[2]FCTUC – Faculty of Science and Technology of University of Coimbra, Coimbra, (Portugal)
[3]LNEC – Laboratório Nacional de Engenharia Civil, Department of Hydraulics and Environment, Urban Water Section, Lisbon, (Portugal)
[4]IST – Instituto Superior Técnico, Technical University of Lisbon, Lisbon, (Portugal)
[5]IMAR – Institute of Marine Research – Marine and Environmental Research Centre, University of Coimbra, Coimbra (Portugal)
[1]nuno_melo@ipg.pt, [2]bsantos@dec.uc.pt, [3]jpleitao@lnec.pt, [4]hr@civil.ist.utl.pt, [5]leandro@dec.uc.pt

Abstract

Due to the increased frequency of extreme events caused by climate change, flooding in urban areas are becoming increasingly frequent. The village of Agualva, located in Terceira Island (Azores, Portugal), suffered a severe flood on the early morning of 15th of December 2009 caused by a short-duration and extreme intensity rainfall event. This village lies on the downstream part of the basin of the Ribeira da Agualva, with the majority of buildings and main roads located in the water course floodplain which together with several bridges reduce the water stream cross-section. During the flood event several areas were momentarily cut-off by the excessive water on the roads and collapse of some bridges. The reproduction of this event is of upmost importance in order to understand their dynamics and consequently develop emergency plans for future similar situations, such as accessibility maps and evacuation routes. This paper presents a methodology to calibrate a model to reproduce the scenario of flooding cited above based on measured rainfall in a nearby rain-gauge and observed maximum water-depths, and presents accessibility maps and evacuation routes. The Storm Water Management Model (SWMM) was used to obtain the water depths along the road-network and water course.

Keywords
Flood modelling, calibration models, accessibility, evacuation routes.