



## Challenges and solutions in flood risk assessment

Yizhong Qu

FM Global Research, 1151 Boston-Providence Turnpike, Norwood, MA 02062, USA (yizhong.qu@fmglobal.com)

In the aftermath of extreme floods (e.g. Europe flood in 2002 and 2005 and the UK flood in 2007), risk of flooding has been an increasing concern. Consequently, property hazard characterization and loss prevention measures become more and more important due to the rising vulnerabilities of properties. Based upon engineers' on-site evaluation and scientific view of the hazards, practical loss control solutions and physics-based cost-effective engineering systems can be established to reduce losses and ensure business continuity for large industrial and commercial facilities. This study will illustrate the challenges and discuss possible solutions for site-specific and aggregate flood risks.

Elevation data remains a challenge in large scale flood inundation mapping. High resolution surveyed data is often not available at a large scale. Therefore, DTM derived from data collected through satellites and aerial flights are used. Currently, the uncertainty associated with the DTMs is arguably the largest of the entire inundation mapping process. The pluvial flood caused by excessive rainfall overwhelming the drainage network is a significant source of risk. According to Federal Emergency Management Agency (FEMA), more than 25% of the losses occur out of FEMA Special Flood Hazard Areas (SFHA). The UK 2007 flood, for example, had more than 50% of surface flooding incidents. It becomes absolute necessary to account for the off floodplain risk. Flood defense play an important role in mitigating flooding risk. However, the possible failure of the defense could lead to more devastating consequences. In this study, the data availability of European countries is summarized and high-level feasible solutions in handling flood defense modeling are discussed.

The clear scientific view from flooding risk assessment allows underwriters to better manage exposures. Furthermore, reduced losses that result from loss-prevention engineering efforts will lead to policies of more capacity, broader coverage, competitive terms and conditions, and eventually premium discounts.