



**11th International Conference on Hydrosience & Engineering
"Hydro-Engineering for Environmental Challenges"
September 28th - October 2nd 2014
Hamburg, Germany**

Keynote

Flood risk – a global problem

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Water is responsible for most natural hazard losses in the world, and flood catastrophes are increasing in both number and intensity. This is creating challenges that must be tackled by governments, people, communities, companies and the financial sector.

Flooding comes from extreme precipitation, or may be a secondary hazard of windstorms and tropical cyclones (storm surges), high or low temperatures (snowmelt, ice jam), earthquake (tsunami) or technical failures (breaching of dams or embankments). The three main causes of flooding are river floods resulting from widespread, often basin-wide and long-lasting rainfall; flash floods and off-plain floods produced by intense precipitation; and storm surges caused by onshore winds blowing towards the coast. This variety of causes as well as the different extent, propagation and impact of floods must be reflected in risk reduction efforts, ranging from hazard identification and modelling to financial preparation and general awareness.

Extreme floods do not happen in a stationary environment. Initial conditions vary and flow paths are not strictly defined as water interacts with and changes channel and valley geometries, dykes fail and new, unforeseeable systems of pathways are created. Additionally, flood defence activities have a major influence. Nowadays, it is no longer enough to predict and forecast discharges, hydrographs, water levels, inundated areas and flow velocities (i.e. perform hydrologic and hydraulic modelling). Flooding eventually creates losses which need to be assessed in advance. This leads from hazard modelling to risk modelling.

The term "risk" encompasses hazard, values at risk and their vulnerability. The flood risk is changing continuously as each of its components is changing. Hazard is influenced by measures taken in the catchment area and by climate change, values at risk by development of flood plains, and vulnerability by the rising sensitivity of modern goods and building materials, but also by flood control measures.

The flood risk can be reduced by appropriate measures better than any other natural hazard. Flood prevention and flood control are highly cost-efficient. Each euro spent on flood control yields a much greater benefit in prevented loss. But awareness and preparedness on all levels are also crucial as the following examples show.

In 2011, a rare flood happened along the Mississippi. The United States was prepared for the event thanks to flood control efforts made over a period of several decades, and the flood

waters were successfully managed to minimise losses. In the same year, a flood hit Thailand. This event not only overwhelmed practically all control devices but created huge losses because large industrial value concentrations had been developed in a careless and negligent way in areas prone to flooding.

Three coastal floods also revealed differences. Typhoon Haiyan's storm surge (Philippines, 2013) was surprising, huge and hit an area that was unprepared, and probably not even "preparable" at all. The scenarios of Hurricanes Katrina (US Gulf Coast, 2005) and Sandy (New York, 2012) were known, but the risk downplayed or ignored. Japan, in contrast, was quite well prepared for tsunamis, but not enough for an event like the one in 2011. However, the death toll of 16,000 would have been a great deal higher if there had been no programme of coastal protection and civil preparedness.

We will not be able to erase the flood risk. We have to live with it – and manage it. Managing the flood risk means we have to share it, refrain from exposing values to risk, erect and reinforce protection works, respond appropriately as a potential victim, and prepare for catastrophe financially, i.e. by taking out insurance cover. In doing so, flood losses cannot be completely prevented, but large catastrophes can be.