Auszug aus: Final Programme of the 12th SRA Europe Annual Meeting “Integrated Risk Management”, ID28, p. 25, July 21st – 24th, Berlin, 2002

Risk Analysis within Integrated Coastal Zone Management

Stephan Mai, Nicole von Lieberman
Prof. Dr.-Ing. C. Zimmermann, Franzius-Institut, University of Hannover

The most essential hazard for the coastal zone of Germany is the storm surge. Thus an analysis of the risk is the basic part of Integrated Coastal Zone Management (ICZM). Within this framework risk is defined as the product of the probability of a storm surge and its consequences for the coastal zone (see e. g. PLATE AND DUCKSTEIN, 1988). This paper will focus on the direct economic consequences in the hinterland in case of failure of the coastal defence system, e. g. dike breaches. The probability of storm surges and subsequent failure of the coastal defence system is derived on the basis of the statistics of water levels and winds recorded approximately since 1850. These statistics are transformed using numerical models of tide and wave hind-casting in order to derive the statistics of loads on the coastal defence system (MAI AND VON LIEBERMAN, 2000). Comparing the loads with the resistance of the coastal defence system, e. g. parameterised by the geometry of the different defence elements, like dikes, storm surge barriers or quay walls, the probability of failure is calculated.

In order to determine the economic consequences the area flooded in case of failure of the coastal defence system is calculated by numerical modelling (MAI AND VON LIEBERMAN, 2001). Using the digital landscape model of the Institute for Land Survey of Lower Saxony, Germany, the uses affected from flooding are estimated. The economic value of the different land uses are derived disaggregating county statistics on dwellings, livestock, industry, and agriculture. The paper to be presented will put focus on the city of Bremen as well as on the city of Brake, both located at the Weser estuary.

The results on failure probability and economic consequences as well as the maps of risk zones are included in the interactive Risk Information System Coast – RISC (VON LIEBERMAN ET AL., 2001). Thus RISK provides a tool for decision makers within Coastal Zone Management.

References

VON LIEBERMAN, N., MAI, S., ZIMMERMANN, C. (2001): A Storm Surge Management System for the German Coast, Proceedings of the World Water & Environmental Resources Congress, Orlando, Florida (CD-ROM).

MAI, S., VON LIEBERMAN, N. (2000): Risk Assessment for Coastal Defences, Proceedings of the International Symposium on Flood Defences, 20. - 23. September 2000 in Kassel, S. G99-G108..

MAI, S., VON LIEBERMAN, N. (2001): Flood Risk in Coastal Regions, Proceedings of the 22nd International Conference on Hydroinformatics and Aerodynamics in Marine Engineering (HADMAR), Varna, Bulgaria, pp. 319-324.

PLATE, E.J., DUCKSTEIN, L. (1988): Reliability based Design Concepts in Hydraulic Engineering, Water Resources Bulletin, Am. Water Ass., Vol. 24, pp. 234-245.