

Risk Assessment of Structures Endangered by Fluvial Floods

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Abstract

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Over the last decade fluvial floods have caused significant economic losses and affected a number of civil engineering structures in the Czech Republic. Various protective measures have been considered to reduce adverse consequences of flooding in future. Decisions concerning expensive measures should be preferably based on risk optimisation, taking into account cost of measures, potential societal and economic consequences and losses of cultural and heritage values in case of historic structures.

In the present paper general framework of the risk assessment of structures endangered by floods is proposed considering recent findings by Holicky & Sykora [1, 2]. In a numerical example methods of probabilistic risk optimisation are applied to identify the most effective permanent and temporary measures to protect structures from fluvial floods. Risks of a building are analysed considering several types of flood actions, geotechnical conditions and structural properties including robustness. The total consequences are assessed using Bayesian networks supplemented by decision and utility nodes. Societal consequences are estimated using the concept of life quality index [3, 4].

It is shown that the risk assessment and probabilistic optimization of consequences provide valuable information enabling rational decisions on effective protective measures. Further investigations of relevant input data including societal and economic consequences of various hazard scenarios and losses of cultural and heritage values are needed.

References

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