Flood vulnerability assessment of residential buildings by explicit damage process modelling - DTU Orbit (09/11/2017)

Flood vulnerability assessment of residential buildings by explicit damage process modelling

The present paper introduces a vulnerability modelling approach for residential buildings in flood. The modelling approach explicitly considers relevant damage processes, i.e. water infiltration into the building, mechanical failure of components in the building envelope and damage from water contact. Damage processes are modelled at a building component level, utilising engineering models where possible. The modelling approach is presented in general terms, which should be applicable to a large variety of building types. The paper illustrates the implementation of the approach for a 2-storey masonry building. Results are presented in terms of a parameter study for several building parameters and hazard characteristics, as well as, in terms of a comparison with damage data and literature vulnerability models. The parameter study indicates that hazard characteristics and building characteristics impact damage ratios as expected. Furthermore, the results are comparable to vulnerability models in literature. Strengths and shortcomings of the model are discussed. The modelling approach is considered as a step towards the establishment of vulnerability models that can serve as a basis for engineering decision-making for flood risk management for residential buildings.

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