



## Hydraulic analysis of measures for flood mitigation in floodplain

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### Abstract

The question of possible flood control and flood mitigation measures and their effects is still challenging. While the effect of purely technical flood control measures such as dams or levees is sufficiently described by using any of widely spread or more specific models, the effectiveness of close-to-nature ones (river restoration, appropriate land use, landscape structure regeneration, etc.) is not adequately verified and quantified. On that account, the benefits and feasibility of integration of the natural potential of floodplains to absorb and transform flood wave is being discussed. In addition, there are many side benefits of close-to-nature measures which are hard to evaluate and include into decision making processes.

This contribution presents a part of the study related to river and floodplain restoration and revitalization measures in catchments and their flood-control effect. In the study the possibilities of using one-dimensional (HEC-RAS) and two-dimensional hydraulic mathematical models (FAST2D, DIFEM2D) of steady and unsteady flow for estimation of transformation effects of a floodplain were compared.

The comparison of used models was made with respect to computed results and also to the availability of input data, mathematical stability, processes and accuracy demands and time requirements.

The above mentioned methods of hydraulic modelling were applied to three case study localities in the Czech Republic. The parts of river channels and their floodplain differ in terms of morphology, river channel form and training situation and land-use. Case study areas were selected to represent the main types of floodplains within the Czech Republic for their further classification related to flood wave transformation potential. The transformation effect is compared not only for the natural state of the floodplain, but also for various theoretical scenarios in each locality.

### Keywords

Hydraulic modelling, flood control, floodplain, storage capacity, river restoration

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