



Floodplains as Part of Flood Prevention and Conservation System

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Abstract

Same as in most of last years, there were serious flood events observed in the Czech Republic and all around the world also in 2010 year, which makes questions of possible flood control measures and their effects more and more actual. Together with purely technical flood control measures implementation, the feasibility of integration of natural potential of floodplains to absorb and transform flood wave is being discussed. With this importance, the natural floodplain could become an integral and desired part of a complex basin flood control system with many side benefits mainly in economy, ecology, and other soft ways of landscape exploitation. However, in contrast to technical measures, the effect of close-to-nature ones is not well described and especially quantified.

The paper is therefore focused on the presentation of research study related to river and floodplain restoration and revitalization measures in catchments add their flood-control effect.

Several mathematical modelling methods were applied for selected localities and river floodplains parts to compare possibilities of using one-dimensional and two-dimensional hydraulic mathematical models of steady and unsteady flow for an estimation of transformation effects of a floodplain. Their applicability has been tested from point of view of availability of input data, mathematical stability, processes and accuracy demands and time and man power requirements.

Investigated methods were applied to three case study localities in the Czech Republic, length ca 5 – 7 km each. The parts of river channels and their floodplain differ concerning of morphology, river channel form and training situation, land-use and also necessity of flood protection, which has to be provided according to urban structures. Case study areas were selected to represent main types of floodplains within the Czech Republic for their further classification, related to flood wave transformation potential. The retention capacity and transformation of flood wave is further estimated and compared; not only for a current state of floodplains, but also for various hypothetical scenarios of changes in floodplain and channel geometry and land use.

Very interesting results, bringing improving realistic assessment of the potential of floodplains as part of integrated flood prevention and flood control system were produced. These results show that such potential has often been underestimated or overestimated. For certain types of river channels, floodplains and land-use patterns the effect can be very essential and revitalization measures are therefore very effective and highly desirable. However, in other cases their effect is negligible, or measures cannot be applied at all.

Keywords

Flood control, floodplain, storage capacity, revitalization, hydraulic modelling

Acknowledgement

This paper was created within the project NIVA “Water Retention in Floodplains and Ways of Increasing Water Retention” QH82078, and within Research Project No. MSM6840770002 „Revitalization of water system of the landscape and urban areas under heavy anthropogenic changes” and supported by the Grant Agency of the Czech Technical University in Prague, grant No. SGS10/240/OHK1/3T/11.