

Abstract

This thesis deals with the retention capacity of Berounka during the hydrological extremes. Flood prevention and flood condition are main subjects of this thesis. Two selected river areas of Berounka are analysed by the passive retention volume and by the transformation of the flood wave. The first area is situated on the lower course of Berounka near the Černošice, and this area is significantly anthropogenically influenced. The second area which has nature character is located on the middle course of Berounka near Křivoklát. This thesis contains an evaluation of the hydromorphological state of flow in both areas. The results of passive retention indicate negligible influence of the flood situations. 1D hydraulic model HEC-RAS displays the transformation of the flood wave. The results of the transformation are flow velocity and depths of the river valley in 100-year-old and 20-year-old flows. The transformation of the flood wave in the first area is on the minimum level and did not reach its potential retention capability. The culmination flow in the second area is reduced because of a geomorphological shape of the river. Moreover, the near natural flood protection precautions are proposed in this thesis. Mean flow velocity in 100-year floods could be reduced by $1 - 1,6 \text{ m.s}^{-1}$ by forestation of agriculture lands. It is a reduction of 70 - 77 % compared to normal. The increase of the floodplain retention capacity plays an important role in flood protection.

Keywords: flood, retention, passive retention capacity, flood wave transformation, HEC-RAS, hydromorphology, Berounka