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TYPICAL DISCHARGE HYDROGRAPH FOR DETERMINING DESIGN FLOODS

Key words: Cracow method, design wave, formula for volume, Hydroprojekt method, reduced volume, rising time, typical hydrograph

Summary

There are several methods used in our country for determining design waves in the gauged catchments. The least popularised is the Hydroprojekt method, which was developed within the Central Programme for Research and Development CPBR 11.10 Water Management in 1989. The method assumes that the design waves are to be determined based on the actual registered flood waves in the water-gauged cross-section. It uses the random number generator from the range of \([-0.1; 0.2]\) for rising and declining phases of the flood that are treated independently of each other. It enables to obtain different time courses for the design floods to be determined. This article assesses the results obtained with this method compared to the values received from the Cracow's method, assuming that the standard hydrograph in the Hydroprojekt method is the so-called typical hydrograph.

The comparative analyses were conducted for the reduced volume i.e. for wave volume at the discharges exceeding the \(Q_{50}\) discharge. The comparisons were done for 24 water gauges located in the Upper Vistula catchment in areas of different size and character: mountain, sub-mountain, upland and lowland. The analyses were unfavourable for the Hydroprojekt method. As with other methods, where the design wave is determined based on one flood wave, the design wave volume and the rising times were different from the average conditions determined with the Cracow method in most cases. The Hydroprojekt method using the standard hydrographs may be applied providing the hydrographs of this type were recorded in a given water gauge. One of the criteria may be the application of the “formula for volume” for non-gauged catchment developed in the Institute of Water Engineering and Water Management at the Cracow University of Technology.