

Changes of hydrodynamic parameters on mountain stream bed within the block ramp influence and possibility of their use for integrated river management

Artur Radecki-Pawlak (1,2) and Karol Plesiński (1)

(1) Department of Hydraulics Engineering and Geotechnique, University of Agriculture, Cracow, Poland
(rmmadeck@cyf-kr.edu.pl), (2) Institute of Technical Sciences, Podhale State College of Applied Sciences in Nowy Targ, Nowy Targ, Poland

In modern river management practices and philosophy one can notice coming more into use ecological friendly hydraulic structures. Those, which are especially needed for river training works, as far as expectation of Water Framework Directive is concerned, are block ramps which are hydraulic structures working similar to riffles known very well from fluvial geomorphology studies and are natural features in streams and rivers. What is important well designed block ramps do not stop fish and invertebrates against migrating, provide natural and esthetical view being built within the river channel, still working as hydraulic engineering structures and might be used in river management in different river ecosystems.

The main aim of the research was to describe changes of values of hydrodynamics parameters upstream and downstream of the block ramps and to find out their influence on hydrodynamics of the stream. The study was undertaken on the Porębianka River in the Gorce Mountains, Polish Carpathians. Observed hydrodynamic parameters within the reach of the block ramps depend on the location of measuring point and the influence of individual part of the structure. We concluded that: 1. Hydrodynamic parameters close to block ramps depend on the location of the measurement points in relation to particular elements of the structure; 2. The highest value of velocities don't cause the highest force values, which acting on the bed of the watercourse, because they are rather related to the water level of the channel; 3. The values of mean velocities, shear velocities and shear stresses were similar upstream and downstream the block ramps, which means that the structures stabilize the river bed.

This study was performed within the scope of the Science Activity money from Ministry of High Education and Young Scientist's Activity Money of Department of Hydraulics Engineering and Geotechnique, University of Agriculture, Cracow, Poland