

FLOOD PROTECTION KÖTSCHACH/MAUTHEN COMPARISON OF STREAMBED STABILIZATIONS IN THE RIVER GAIL

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In a PHYSICAL MODEL EXPERIMENT 3 different types of streambed stabilizations were tested for a sensitive part of the river Gail through a populated area. On one hand these types have to be stable at a very high unit discharge, on the other hand flood safety in this area must be guaranteed. The tested methods- River bottom sills, Open bed covering and Structured block ramps- all turned out as stable and practicable.

COMMON FACTS

The project area is located in the municipality of Kötschach/Mauthen (Gail km 78.5), which is in Western Carinthia/ Austria. In the river maintenance programme (Donau Consult, 1996) a insufficient flood protection and streambed stability was shown for this area. The river Gail is also running in a very strict regulated river bed with some bed steps, which can't be conquered by fish anyways. The requirements for restructuring this project area, beginning with the improvement of flood protection and streambed stability as well, and ending with recovering the possibilities for fish to pass the whole length of this part of the river, should be seen under the best possible ecological aspects. To recover the fish pass in the project area there should be chosen only methods of streambed stabilizations like River bottom sills, Open bed covering and Structured block ramps, which are passable for fish. For testing these various types of bed stabilizations and proving the discharge capacity at the same time, a Physical model experiment was seen as the best method for 2 reasons:

- The project area is a very sensitive part of the river Gail through a populated area with a high potential of protection requirements.
- The spillway section displays a comparatively high hydraulic gradient and high specific discharge, so that we have no experience with these unusual parameters used with conventional calculation methods for these types of bed stabilizations till yet.

So the model experiment was therefore a method to increase the scope of dimensioning these bed stabilizations, especially Open bed covering (Knauss, 1995; Hartlieb, 1999) and Structured block ramps as well (Vogel, 2002; Semadeni et al., 2004).

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RESULTS AND PROSPECTS

In the model experiment, scale 1:30, the three different types of bed stabilizations- River bottom sills, Open bed covering and Structured block ramps- were tested for feasibility. And all types turned out as stable and feasible and can be combined as modules with each other. In terms of realizing the project, the stabilization with River bottom sills turned out as not practical because of the uncertain amount of bed load in this area combined with possibly high scour depths in the streambed. Most notably a Structured block ramp is very hard to realize at a river section in such a sensitive populated area which demands a great deal of flood protection, because the ramp crest, which is mostly situated higher than the existing bed, causes high flood levels. Therefore measures like expansions of the river channel or dams would be necessary for compensation. On the opposite Open bed covering has a high tolerance on variable bed loads and is comparatively easy to realize in this sensitive part of the river Gail, so that it was classified to be the most convenient solution. But to ecologically revitalize the very straight and monotonously part of the river it is planned to combine Open bed covering with Structured block ramps. Additionally the river will be widened up and gets various broads and bank structures, which causes a higher diversity of structures and definitely a ecological upvaluation for the future.

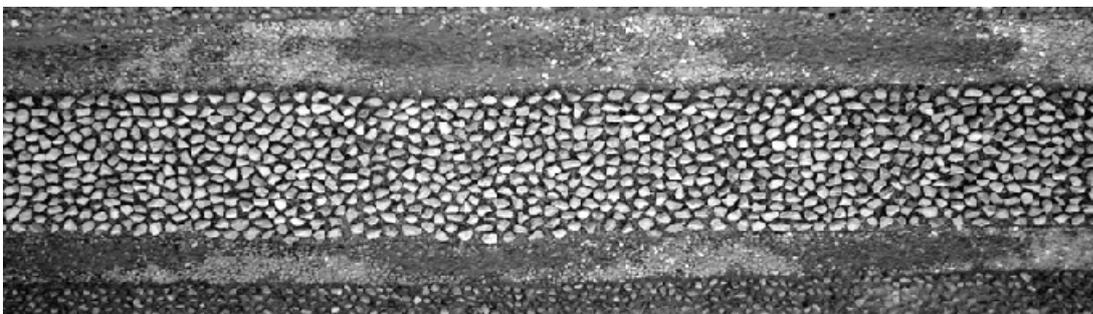
Fig.1: River Gail



Fig. 2: Structured block- ramp



Fig. 3: Open bed covering



Keywords: Flood protection, Physical model experiment, Open bed covering