

## **RIVER FLOW INTERACTION WITH ENGINEERING CONSTRUCTION: CITY BRIDGES STABILITY DURING THE FLOOD.**

UPES ŪDENS PLŪSMAS IETEKME UZ TILTA KONSTRUKCIJAS NOTURĪBU PLŪDU LAIKĀ APDZĪVOTAJĀS VIETĀS.

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City bridge destruction usually happens because of scour and can be a reason for significant environmental damages and losses. Reconstruction requires substantial efforts and spending.

The problem was to predict and determine depth of scour near abutments on plain rivers during a flood under changing flow conditions. Scour at abutments starts when floodplain was flooded and flow become contracted by approach embankment. In tests at the corner of the abutment we found streamline concentration, water level drop, local increase of velocity and scour hole. According to experimental data local velocity with complex vortex system was forming scour hole. Differential equation of the bed sediment movement for clear water conditions used to work out new method describing scour process in time and during the flood. Flow characteristics were changing from step to step due to flood and velocities near abutment also because of scour. Tests were made for one and two steps of hydrograph in flume and method was confirmed by experimental data.

In this method hydrograph of the flood we divided in time steps (6 and more) and each time step in time intervals (in tests – 20). Depth of scour was determined at the end of each time interval within time step was computed. In next time step we have new flow parameters and velocities  $V_i$  and  $V_o$ , but they were changed by scour for previous time step. In tests with two time steps of hydrograph with duration for 7 hours depth of scour was less than sum of scour depth for separate test with duration 7 hours each. Scour development in time in tests and computed by this method was the same. Comparison experimental and computed data gave good results.

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