Effects of a vegetated river bank on the flow field

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Riparian vegetation is an omnipresent feature of the riverine landscape which must be taken into account in hydraulic engineering. It affects the hydraulic impact on the flow resistance and the conveyance capacity. In the last decades a lot of studies on physical models have been conducted. Most of these experiments used highly simplified vegetation models usually simulating plants as rigid homogeneous elements. However the riparian forest as a living system of the riverine system changes the hydraulic behaviour from time to time according to the stage of succession.

At the river Wien, an innovative open air test flume was constructed and used for hydraulic measurements during flood conditions. The test flume has been installed in 1998 using three different soil bioengineering measures to initiate a natural riparian river bank. The length of the test flume has been 170 m and the width of the cross section has been 7 m. A special measurement facility is available to mount instruments to measure the flow velocity. Over several years measurements have been performed during both artificial and natural floods at different water levels. Vertical and horizontal velocity profiles have been measured by using an Acoustic Doppler Profiler (ADP).

The current presentation focuses on the results of the velocity measurements and analysis. The vertical velocity distribution from different zones of the section (non-vegetated main channel and vegetated bank zone) will be discussed. The velocity data sets were used to generate isoline-maps for estimating the discharge capacity separately for the main channel and the vegetated bank area.