DOTTORATO DI RICERCA INTERATENEO

"GESTIONE SOSTENIBILE DEL TERRITORIO"

Ciclo XXXVII

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Titolo del Progetto di ricerca	Hydrodynamics of vegetated channels: sustainable development
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Riassunto del Progetto di ricerca

Understanding the hydrodynamic structure of vegetated channels is still a challenging task (Ben Meftah and Mossa, 2016). The presence of vegetation in water bodies, i.e., rivers, floodplains, streams, lakes, ponds, wetlands, provides high resistance to the flow, affecting its hydrodynamic structure (Nepf,1999; Tanino and Nepf, 2008) and can enhance the channel stability and reduce bank erosion. The objective of this study will be to better understand the dynamic of flow-vegetation interaction to improve the reliability of conveyance capacity prediction in compound channels. Experiments will be conducted in a very large channel at the Coastal Engineering Laboratory (L.I.C.) of the Department of Civil, Environmental, Building Engineering and Chemistry at the Polytechnic University of Bari, Italy. The channel is 15 m long, 4 m large and 0.4 m deep. Different scenarios can be implemented: i) partially covered channel with emergent vegetation and underwater grasses, ii) channel with emergent lush shrubs and bed of the main channel covered by underwater grasses, iii) vegetated channel with a rough bed consisting of rocks and pebbles, iv) channel with lateral emergent lush shrubs and bed of the main channel covered by rocks and pebbles, and v) trapezoidal active channel of rough bed, emergent lush shrubs on the banks, and floodplains covered by synthetic grass. Sophisticated instruments will be used to measure the flow field features.

References:

Ben Meftah M. and Mossa M., 2016. Prediction of channel flow characteristics through square arrays of emergent cylinders. Physics of Fluids, Vol. 25, 045102.

Nepf H.M., 1999. Drag, turbulence, and diffusion in flow through emergent vegetation. Water Resources Research, Vol. 35 (2), 479-489.

Tanino Y. and Nepf H.M., 2008. Laboratory investigation of mean drag in a random array of rigid, emergent cylinders. Journal of Hydraulic Engineering, Vol. 134(1), 34-41.

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