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Experiments of hydraulics mechanics through different arrangement of submerged bending vegetation

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Laboratory experiments are used to explore the effect of different arrangement of submerged bending vegetation in the fixed bed on flow field around vegetation and area downstream. The two simulated bending vegetation were composed of pipe curved to 90 degree for stems and P.P.C films for blades. The two bending vegetation were arranged in alignment and paralleled with flow direction. The test arrangement was distinguished by different overlap rate of vegetation. Overlap rate of vegetation were defined that percentage of blades of bending vegetation overlap the other one. Overlap rate is greater than zero and it means that vegetation overlap the other one. On the other hand, overlap rate is smaller than zero and it means that two plants were separated in percentage of total length of vegetation The experiments were carried out 10 test in forms of overlap rate of vegetation (50%, 25%, 0%,-25%,-50%) by blades of 20cm and 25cm.Velocity and turbulence intensity around the vegetation (u, v, w and urms, vrms, wrms) were acquired by Ultrasound Velocity Profiler (UVP). Furthermore, to elaborate variation of the flow field, the swinging motion of vegetation was recorded by digital camera. Three arrangement types (overlapped, continuous and isolated) were concluded from the 10 tests. In case of isolated vegetation, it could be observed that there was a better effect on slowing flow velocity in x direction in case of the tests with -25% overlap rate due to a discontinuous shear layer between two plants which induced wake interference. It also showed that turbulence intensity was significant between two plants. Two plants disturbed rarely each other in the tests of isolated vegetation with -50% overlap rate .Flow was disturbed by swinging of blades only and returned to stable quickly. In 25% and 50% tests, two plants were overlapped and their behavior was similar to a longer blades plant. Its blades swinging were not obvious result as low effect on slowing velocity in x direction. It means that the characteristic of overlapped vegetation is good for stabilizing the flow field. The research helped to realize influence between two plants on flow field in order to apply river system management strategies.