Presentation Preference: Oral

Flow and Scour Around Round Head Vertical Wall Breakwater Under Random Waves

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In this study, wave induced flow and scour around round head vertical wall breakwater are investigated via physical model experiments. Physical model tests are performed in the irregular wave flume of Coastal and Ocean Engineering Laboratory, Department of Civil Engineering, METU. The flume is 26.9m in length, 6.0m in width and 1.0m in depth. The experiments are held in an inner channel of 1.5 m in width. The setup has a 1/10 inlet slope, and 10.0m long 0.2m deep false bottom. As a first step in the experiments, random wave series of various Keulegan-Carpenter numbers (1.5, 3.6 and 5.4) and wave steepness's (H/L = 0.01, 0.02, 0.03 and 0.04 for KC = 5.3) are determined. The wave conditions in case of no structure are measured via 9 wave gauges placed at various locations in the flume and an Acoustic Doppler Velocimeter located at 5 cm above the bed at the location of the structure. After the wave conditions are determined, flow investigation experiments are performed with a *B=6cm* wide and *l=9B=54cm* long round head acrylic made structure that fixed on the false bottom and to one side of the flume. To investigate the blockage effect, velocity distributions between the head and the inner flume wall are obtained (Figure 1). In scour experiments, false bottom will be removed and d_{50}*=0.2mm* sand will filled up between inlet and outlet slopes. Morphological changes around the structure due to random waves will be measured by a laser bed scanner. The equilibrium scour depths around the structure will be obtained. The evolution of these depths against number of waves will be obtained by the underwater camcorders.

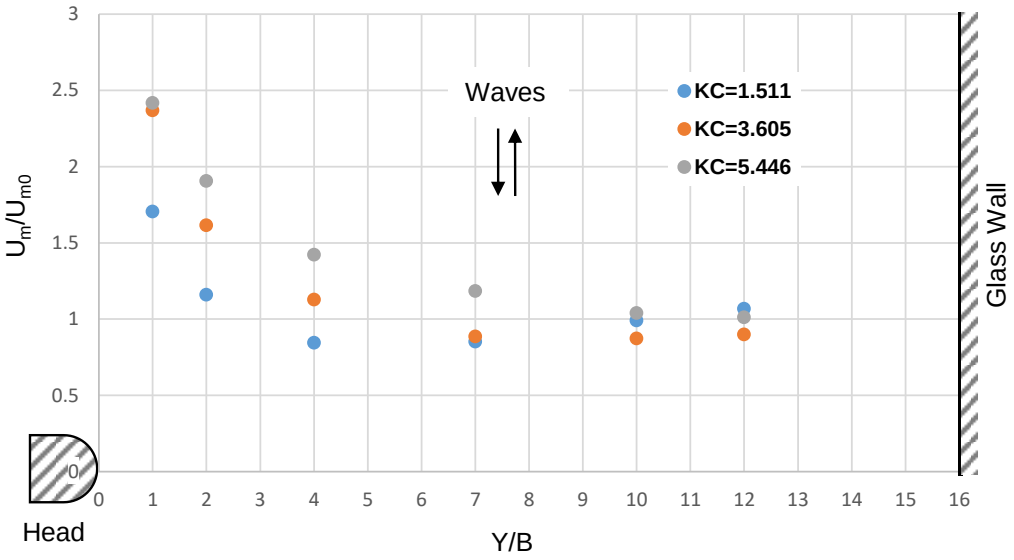

Figure 1 – Velocity distribution

This study has been funded by the METU Scientific Research Projects Coordination. (Grant No. YÖP-303-2018-2674)