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Scour around a submerged cylinder and marine hydrokinetic (MHK) device in live-bed conditions MARIA LAURA BENINATI, MICHAEL VOLPE, Bucknell University, MICHAEL KRANE, ARNOLD FONTAINE, Penn State University — Experiments are presented to explore how sediment scour around a single Marine Hydrokinetic (MHK) turbine varies with flow speed. Three Reynolds numbers, based on support structure diameter were used to induce live-bed scour conditions. Based on results from previous studies on submerged cylinders, differences in scour patterns between a single cylinder and MHK device can be determined. In the case of MHK energy, many devices are submerged in the flow. Thus, it is important to analyze the impact of both the support structure and the addition of the rotating blades. The experiments were performed in the small-scale testing platform in the hydraulic flume facility at Bucknell University. For each test case, bed form topology was measured after a three-hour time interval using a traversing two-dimensional bed profiler. During the experiment, scour depth measurements at the front face of the cylindrical support structure were taken to estimate the scour rate. Measurements of the bed form were taken across the width of the test section. Results show that the scour hole dimensions increase in the presence of the MHK device. These dimensions also increase with increasing Reynolds number.

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