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Scour of Sand-Gravel Beaches in Front of Seawalls REGIS XHARDE, JANNETTE FRANDSEN, OLIVIER GAUVIN-TREMBLAY, INRS-ETE — Large-scale physical experiments were conducted in the 5m-wide, 5m-deep and 120m-long wave flume at the Quebec Coastal Laboratory of the national scientific research institute (INRS) to evaluate wave-induced scour depth (d_s) at vertical seawalls and on natural beaches. In the initial part of the study, the equilibrium beach profile of a mixed sand-gravel beach with a mean grain size diameter of 12 mm was studied for various beach slopes using regular and irregular waves with intermediate water depths ($h_0 \in [2.3; 3.8]$ m) and different wave heights. In the second part of the study, a vertical seawall fronted by a 1:10 sloping mixed sand-gravel beach was tested for more than 50 wave trains using regular and irregular waves with various water depths at the seawall (h_w), wave heights and wave periods. The scour depth at the toe of the seawall is highly dependent on the form of wave breaking onto the structure. Sea states where plunging breakers occur directly onto the wall generate jets of water that may penetrate to the seabed and cause a local scour hole immediately adjacent to the seawall. Scour depth is maximum when $H_b/h_w > 1$ and $X_b/H_b < 1$, where H_b is the breaker height and X_b the distance from the seawall of the breaking wave. Comparison with existing semi-empirically derived scour prediction equations was performed.

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