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Scour, Deposit and Mass Flux Directionality Induced by a Vertical Yawed Permeable Wall JIYONG LEE, MICHELE GUALA, University of Minnesota, TURBULENT BOUNDARY LAYER PLUS RESEARCH TEAM — Experiments were conducted to quantify local scour and deposit induced by a rectangular vertical permeable wall in critical mobility condition with the ultimate goal to design hydraulic structures inducing mass flux directionality and controlling fluvial bathymetry. Theoretical scaling for the maximum scour depth is derived from the phenomenological theory of turbulence, based on modeled scour volume and key assumptions on the large-scale velocity in the scour hole, and on the drag force induced by the wall. The theoretical prediction shows satisfactory agreement with experimental results in various installation configurations, e.g. wall porosity, angle, and size. Particular attention is devoted to the asymmetry of the local bathymetry to identify the most effective wall configuration to steer sediment deposit along a desired direction. The installation angle is shown to affect the geometry and maximum depth of the scour and deposit volumes, as well as the spanwise location of the deposit peak and centroid.

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