

## Physical measurements of the backward erosion piping process

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A novel laboratory device is presented, in which the process of backward erosion piping is observed in cylindrical sand samples oriented horizontally. The cylindrical shape of the testing device constrained the location of the erosion path to the top of the sample, thereby allowing pore pressure measurements to be made in both the eroded pipe and the surrounding soil. Additionally, the pipe depth and width were measured. From the measurements, the local hydraulic gradient upstream of the pipe tip and the critical shear stress in the bottom of the eroded pipe were calculated. Results indicate that the local critical hydraulic gradient measured over a distance of 10 cm upstream of the pipe is not influenced by experiment scale. Further, the measurements suggest that the sediment transport in the eroded pipe can be adequately modelled using classic sediment transport theory for open channel flow.