

## Development of a coaxial cell for porosity measurements during contact erosion experiments

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The rearrangement of soil particles during erosion, which is basically a transient mixing of base and filter particles, is accompanied by changes in porosity, leading to overall settlements which frequently can be severe for geotechnical structures such as levees. Therefore, not only the geometric and hydraulic boundary conditions, but also porosity changes are an important parameter that has to be observed during experiments. Classical approaches, like layer-wise analysis after the test, are usually not sufficient to allow any upscaling to technical dimensions. Furthermore, numerical approaches are under development allowing the computational modelling of hydro-mechanical problems in general. A decisive parameter governing both, hydraulic processes as well as the mechanical reaction, is the porosity. Former experiments have shown that Spatial TDR (Time Domain Reflectometry) is a promising technology for real time and spatial monitoring of porosity distributions. In order to use this measuring principle, an erosion experiment has to be designed and built to meet the requirements of this technique. The erosion cell itself serves additionally as the TDR-probe. Glass beads are used as an idealisation of a granular soil in order to minimise the effects of the grain angularity and different compositions of natural soils of varying sources, and thus allowing a high rate of repeatability. The data obtained in these experiments will help to get a better understanding about the progress of the erosion process and can be used for the calibration of numerical simulations.