

Comparative Study of Granular Soil Models using Particle and Mesh-based Schemes

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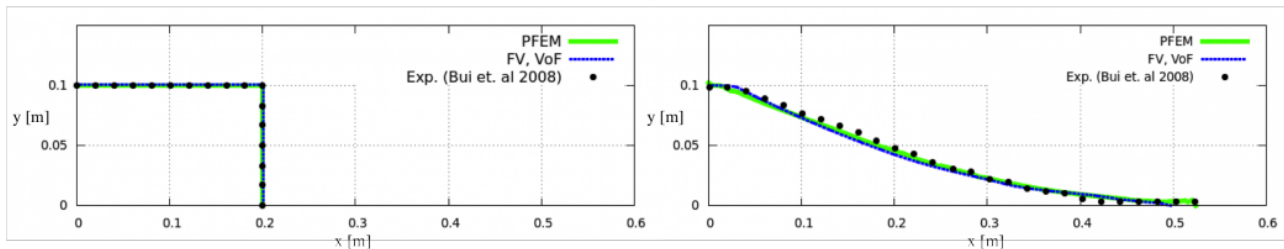
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ABSTRACT

The paper is devoted to the predictive performance of different numerical approaches for modelling the behaviour of granular soils. The study aims to advocate the benefits of a simple soil description using a non-Newtonian model depicting perfect plasticity, which does not display spurious soil creeping.

Validation studies refer to classical granular dam break problems as well as more complex fluid-soil interaction. Results are obtained from a classical multiphase Finite-Volume method using a Volume-of-Fluid (VoF) approach and a particle based (single-phase) PFEM solver. Predictions display an encouraging agreement with experimental data provided that conceptual disadvantages of the VoF method are compensated by a specific approximation of the material properties.

Reported applications are concerned with a seepage induced progressive embankment failure and the simulation of granular cargo inside bulk carrier vessels exposed to seaways.



References

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