The Institute of Geotechnical Engineering (IGS) is offering a thesis with the topic:

Simulation of seismically induced failure in submarine slopes

Seismic stability of slopes is a topic of interest in geotechnical and environmental engineering. Saturated slopes of loose sand or silty sand, earth dams and embankments resting on cohesionless soil deposits are highly susceptible to liquefaction induced damage during strong earthquake, during which liquefaction induced damage may occur. Such failure behaviour involving large deformation can be studied employing the Material Point Method (MPM), and a suitable constitutive model to capture the effects of liquefaction in the soil.

Material Point Method (MPM) is a mesh based particle method, capable of simulating large deformation in soil. An advanced formulation of MPM, called CPDI (Convected Particle Domain Interpolation), a method in which the shape functions of the grid are replaced by an alternate set of shape functions is employed.

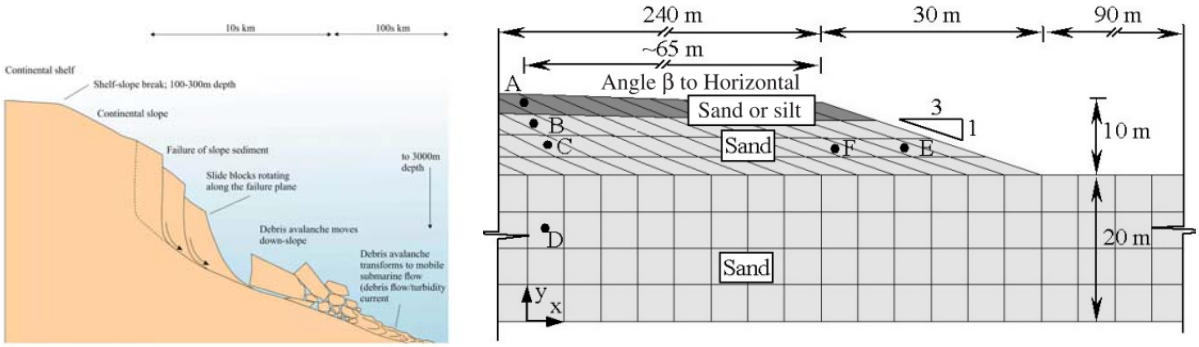

Figure 1: failure of a submarine slope in Australia [https://link.springer.com/chapter/10.1007/978-94-007-2162-3_4] (left), general form of mesh for simulating submarine slope (right)

Targets:

- Literature study on the submarine slope failure investigations.
- Simulating the slope failure under seismic loading using 2-Phase CPDI
- Validating results from published experimental data

Contact: Shreyas Giridharan, M.Sc.; E-Mail: shreyas.giridharan@igs.uni-stuttgart.de