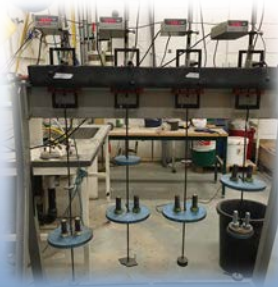
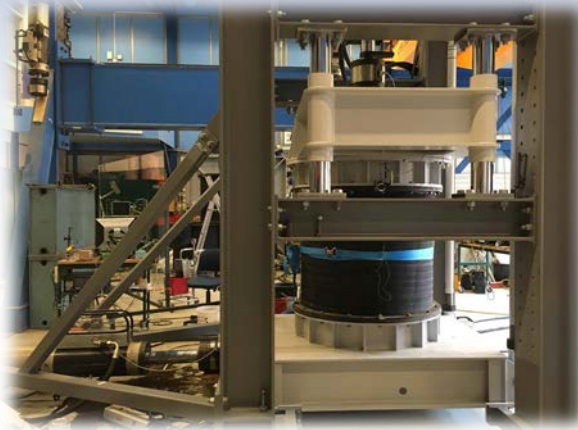


Geolab-LTU soil mechanics



Research group soil mechanics

Chaired professor: Jan Laue

- 3 professors
- 2 adjunct professors
- 1 associate professor
- 2 lecturers
- 2 adjunct lecturers
- 2 postdoc
- 1 senior research engineer
- about 17 Ph.D students





Geolab contact persons

Jan Laue

- Chaired professor

Qi Jia

- Lab coordinator and developer
- External projects

Thomas Forsberg

- Maintenance of lab equipment and help with special lab setup
- Lab tests for external projects



Geotechnical lab tests

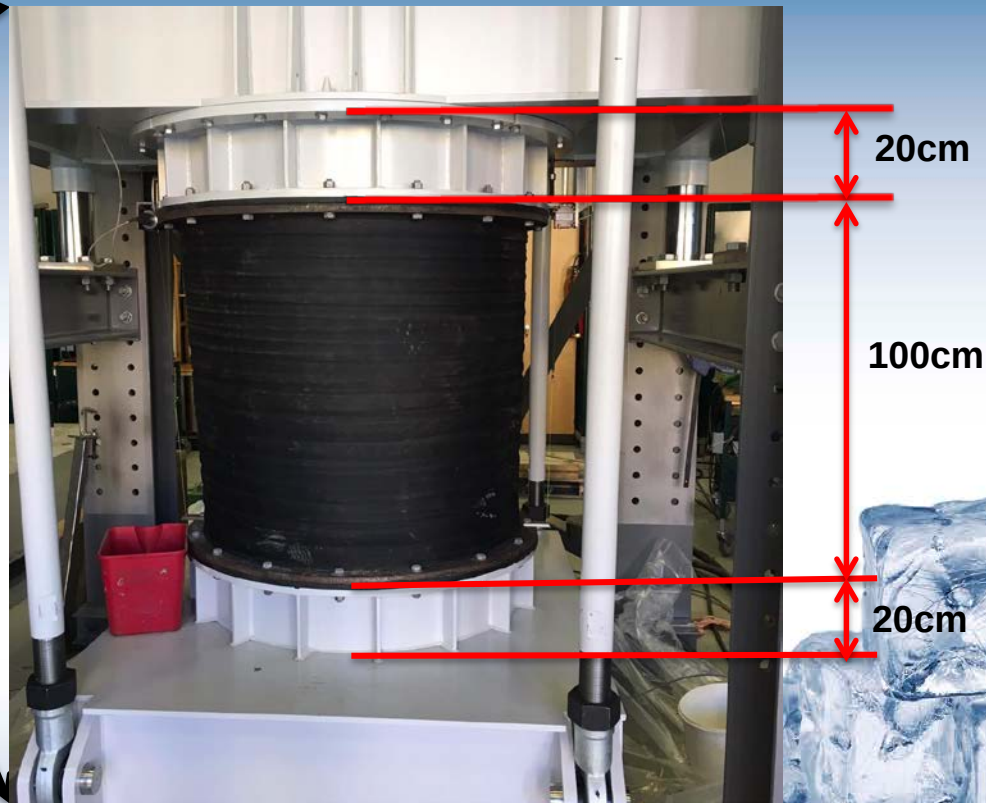
- Water content
- Density (bulk density, particle density, dry density)
- PSD (wet sieving, dry sieving, sedimentation test or hydrometer test)
- Loss of ignition
- Atterberg limits (plastic limit, liquid limit)
- Proctor compaction
- Permeability
- Oedometer test
- UCS test
- Shear test (standard direct shear and **large scale shear test**)
- Triaxial test (traditional triaxial, true triaxial and **dynamic triaxial**)
- **LTU Centrifuge**
- Special lab tests



Sample size:
 $\Phi = 5\text{cm}, 8\text{cm}$
 $h = 2\text{cm}$



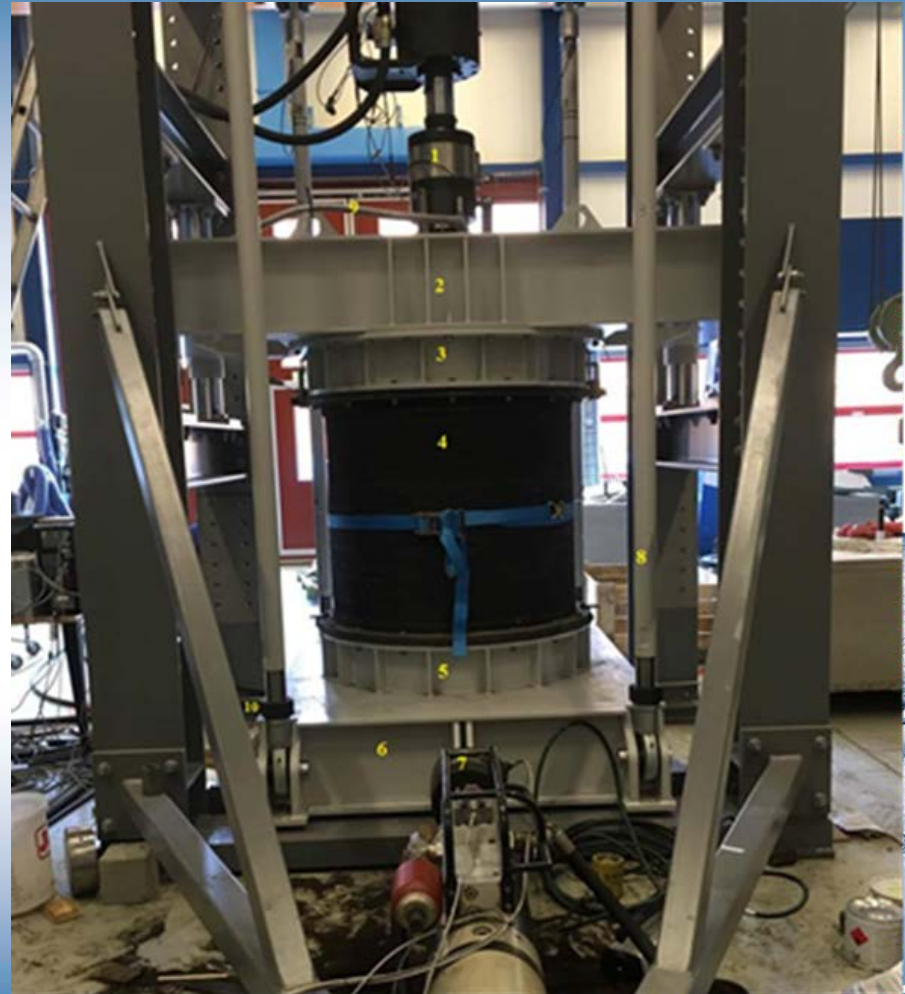
Rockfill
material
 $\Phi_{\text{max}} = 100$
mm



$\Phi = 100\text{cm}$

The large scale shear apparatus Designed 2015 at LTU goelab

The vertical loading cell (1), the top stamp(2), the upper ring(3), the steel wire reinforced rubber membrane (4), the bottom ring (5), the bottom stamp (6), the horizontal loading cell (7), rod (8), the upper water tube and the lower water tube (9, 10).

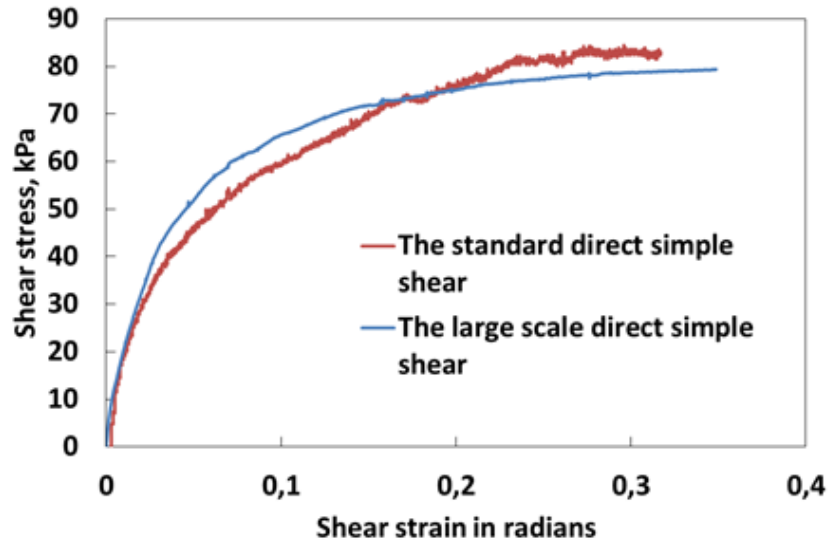


Technical specification

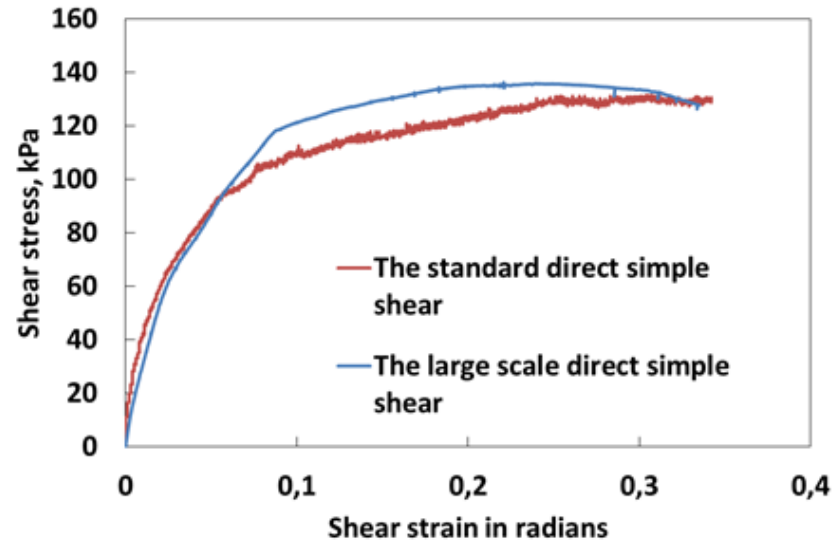
Specimen Diameter:	1000 mm steel cylinder and concrete plate diameter, with the deformable shear box consisting of a flexible steel wire reinforced rubber membrane.
Specimen Height:	500mm-1000mm
Maximum Axial Force:	1 MN, representing a maximum vertical effective stress of 1.273 MPa, with a maximum stroke capacity of 250 mm.
Maximum Shear Force:	270 kN, representing a maximum shear stress of approximately 350 kPa. The maximum horizontal deformation is ± 200 mm.
Shear Displacement Rate:	The maximum shear rate can be up to 10 mm/s

Calibration tests on 0.5m's membrane

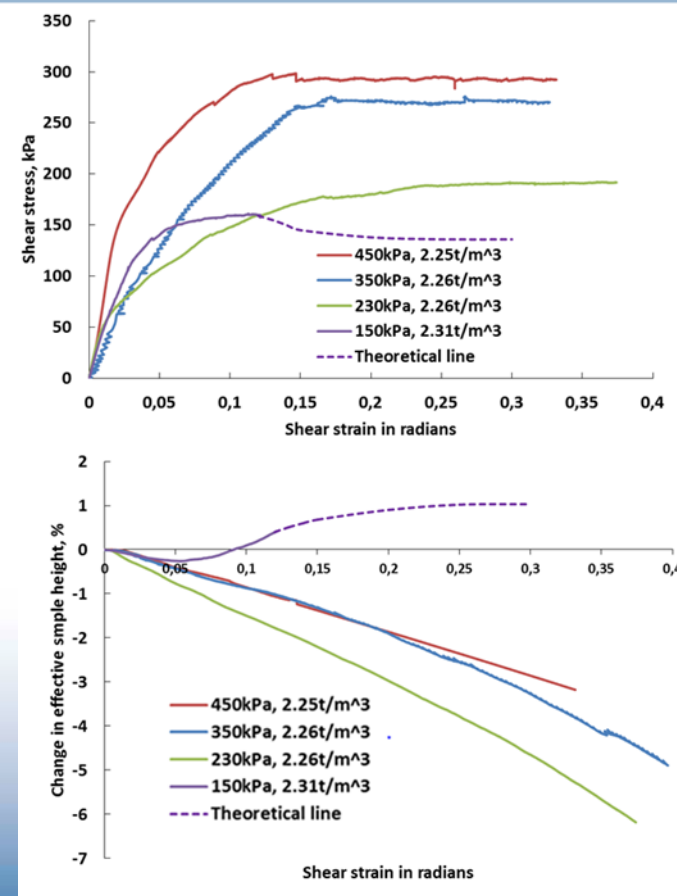
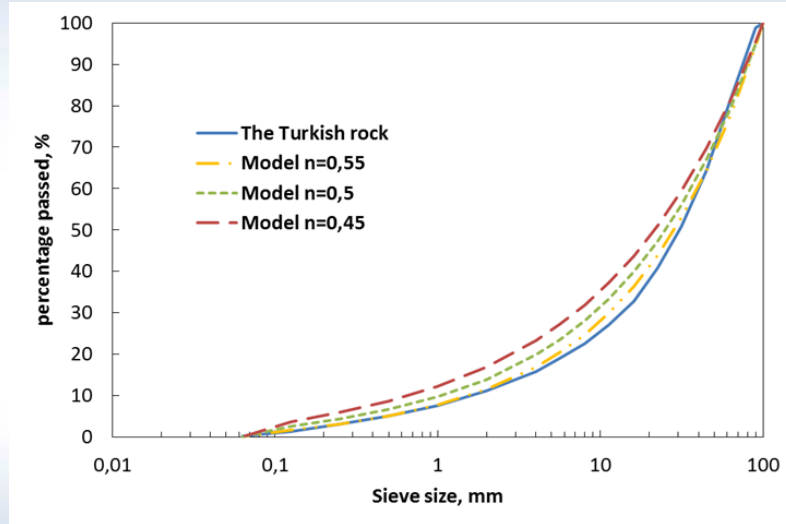
Normal stress 150kPa



Normal stress 230kPa



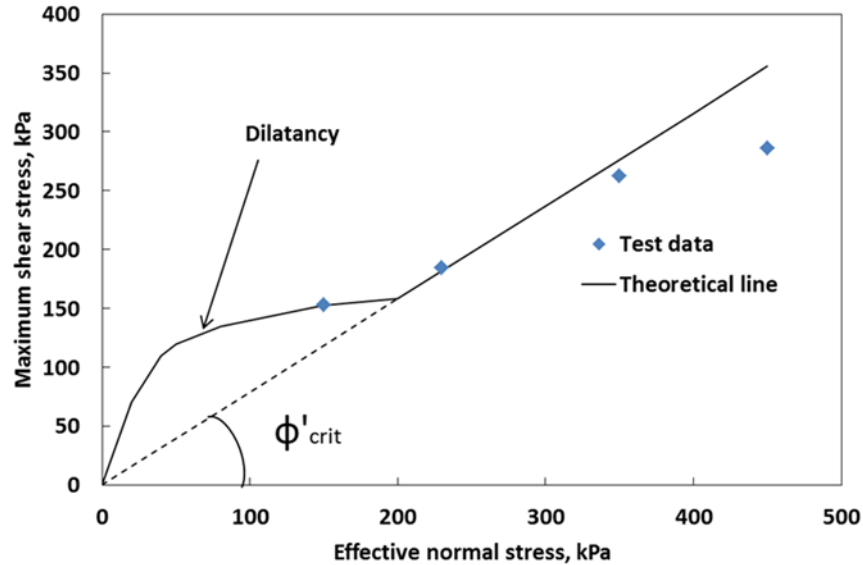
Large scale shear tests on a rockfill material



Before



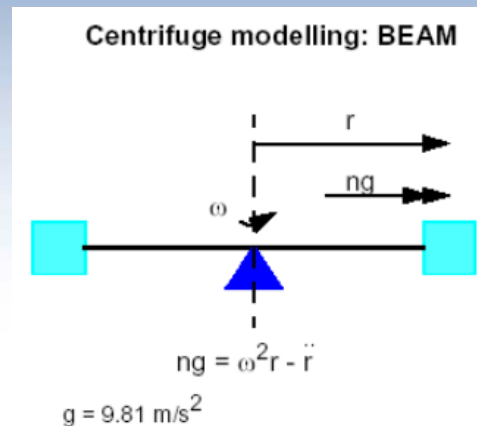
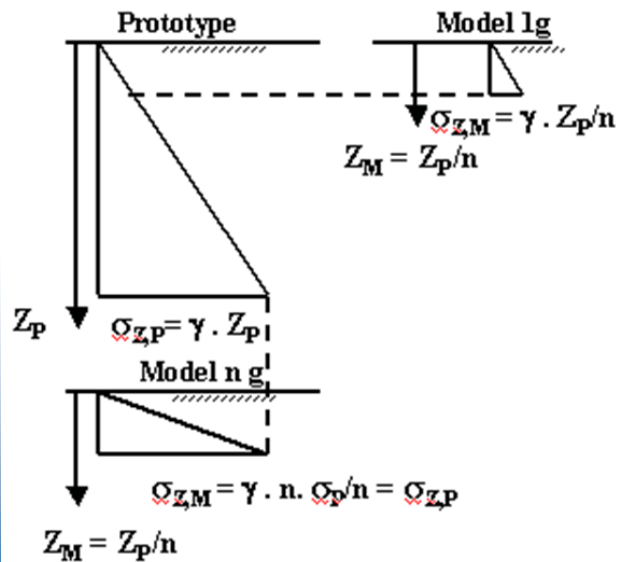
After



Jia Q. et. al., 2017, The large scale shearing tests on a rockfill material, SGF GD 2017

LTU Centrifuge

Radius 1.80 m
Max. g-level 200
Payload: 400 kg
Capacity 40 gton





Welcome to visit the lab!

