

Model Shear Box

This in-class laboratory aims to familiarise you with the shear box test by using a simplified, manual 3D-printed shear box. The objectives are to make you manipulate different materials with different behaviour, rationalise these behaviour using the stress/strain concepts introduced in class and the models that will be discussed over the next couple of weeks, and introduce you to the challenges that arise in carrying out experiments. Beyond taking measurements, you should record your observations on how the materials behave, how the experiments are carried out, what aspects you need to be careful about, etc.

Please record your data in the shared spreadsheet below, so we can discuss them together and compare them in the following classes.

1. Identify how the load is applied on the specimen, and what measurements can be made:
 - How is the normal load applied?
 - How is the tangential load applied
 - How are the stresses measured?
 - How are the strain measured?

I brought a range of materials:

- Dry sands
- “Wet” sand
- Hydrogels
- Clay

Choose one material. For your material:

2. Discuss the behaviour of this material upon normal and/or tangential loading.
3. Choose a normal load. For that load, take measurement and extract the shear stress vs. shear strain law.
4. For various normal load, measure the shear stress at failure.