



Micro-mechanics of the interaction between a granular matter and a soft geogrid under complex loading - Experimental and numerical investigation

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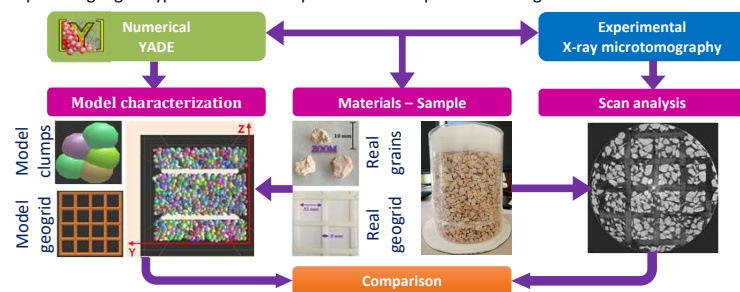
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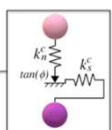
Objectives:

- Identify the complex mechanisms involved in the interaction between granular medium and geogrid during the applied loadings at the local scale.
- Optimize geogrid type reinforcement products and improve the design of reinforced soil structures



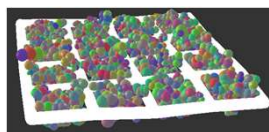
Contact law

Classic linear elasto-plastic model by Cundall and Strack (1979)



Conclusions

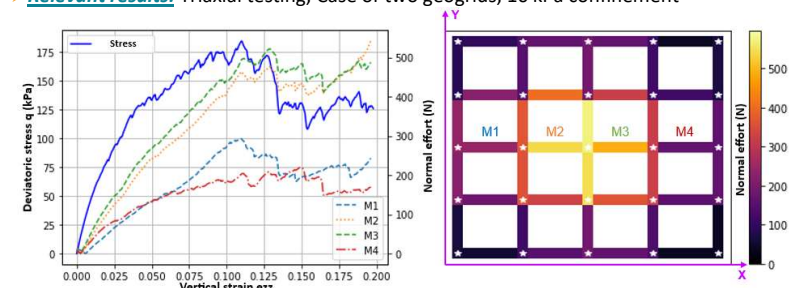
- Inside the geogrid ribs, mobilized tensile forces are significantly higher than frictional forces indicating that geogrids interact with the soil mainly through particle interlocking in the geogrid apertures, and less through friction along the rib surface.
- The concentration of contacts along the x and y axes, indicate grain interlocking within the geogrid apertures.
- The zone of influence is found around 40 mm on either side thanks to horizontal stress distribution



2.b) Plan view around the geogrid

Relevant results:

Triaxial testing, Case of two geogrids, 10 kPa confinement

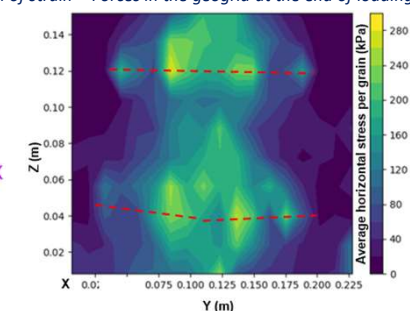


1. Variation of geogrid normal forces as a function of strain - Forces in the geogrid at the end of loading

Angle in the horizontal plane



2.a) Orientations of local contacts between grains and the lower geogrid



3. Distribution of horizontal particle stress in the YZ plane at the end of loading