

Report for ALERT Workshop in Aussios 2012

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October 18, 2012

1 Presentations

The presentations in ALERT workshop were divided into three topics.

1. Critical state line
2. Advanced measurements in laboratory for geomaterials
3. Energy related problems

Presentations which are interesting and related to my research area are reported herein

Critical state line

Critical state line is not unique (Yannis) has been solved by introducing a fabric tensor which take into account the fabric characterizes of soils. Thonton presents their recent works that use DEM models to reproduce the critical states and study its characteristics. An interesting finding for me is that he finds out the stress-strain curve after the pick is reached is not unique, i.e. they tend to split. That is also observed in the laboratory experiments. He also addressed that shear bands can be detected numerically by evaluating rotations of the particles. That implies that rotation is (one of) the main feature(s) in critical state of granular soils. David Masin showed that critical state line is a phenomenon of asymptotic soil behavior. DEM is used as a tool to study that asymptotic behavior. Limit of using DEM are also addressed such as unrealistic overlapping subject to extreme large stress. Bert Schädlich presents his simulations in clay, in which non-local strain regularization is used to solve the problem that dependency of shear band width and element size.

Advanced measurements in laboratory for geomaterials

Nowadays, X-ray tomography has been used to study the inner soil conditions during laboratory tests. This technique allows us to look into the physical behaviors of soil grains inside specimens. X-ray are shot in various angles and the images are combined to produce 3-D images of particles. Thus, tracking particle movements (Translation, rotation) is possible. This technique can be used to verify numerical simulations such as DEM, FEM, and particle based method. Some of the speakers (Edward and Viggiani) has published their works and can be used to understand the movements of particles in triaxial tests.

Energy This part is not related to my research. I did not participate in this day because I had to head back to Innsbruck due to university work

2 Presentation of PhD Prize

This year, the PhD prize winner conducted research in applying SPH in geomechanics. In his presentation, the idea of dealing with the hour glass deformation using special time integration are interesting. The examples used in his dissertation could be used for us to verify our simulation method too. After getting back, I have contacted him and got his PhD Dissertation.

3 Poster session

In the poster session, there is only one poster which is very interesting to me, which is the one working on the modeling of the 3-D subsidence deflection-convection problem above a trapdoor. Trapdoor problem is an interesting issue in geotechnics. Many effects are related to the trapdoor problem, such as the face failure and settlement assessment of shallow tunnels, silo problems, etc. This could help us to qualitatively understand the movements of the particles in the trapdoor problems and many can be simulated using our method. They have published their results in 'International Journal for numerical and analytical method in geomechanics.'

4 Meeting people

One of the important things of attending ALERT conference is meeting people. This time I met many people who work on different fields of geotechnical engineering. Especially, I have met some people and got some papers they published, which can be helpful in the verification of our simulation results. I also met Stéphane Bonelli and he gave me his book regarding geomaterial. I also discussed my research with Bert Schädlich who has experience in modeling shear bands using FEM. With Thonton we discussed the possible reason while the stress-strain curve after the peak is not unique. Meeting people working on different fields makes me realize the interests of the research topic in different parts of the world.

5 Summary

This ALERT workshop/conference helped me a lot, especially in keeping in touch with people who are working on state-of-the-art researches. I could meet people and get information which helps me in my research area. I could also discuss with people who work in the similar area but with different methods and, therefore, I have benefited a lot from this conference.