XVI ECSMGE 2015
TC 306 – WORKSHOP

Industry meets Academia: what should future geo-engineers be learning in school?

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Personal Background

Academia

- 1990 – 1991: Internship in the Soil Mech Lab of the university
- 1991: Graduation in Civil Engineering
- 1997: Msc Geotechnical Engineering
- 2002: PhD Geotechnical Engineering

Industry

- 1992-1995: engineer in big Design Company
- Since 1995: engineer / partner small geotech consultancy

PARTICULAR VIEW ABOUT ACADEMIA X INDUSTRY

Company Profile

- Specialized in geotechnical engineering
- Clients: owners, contractors, big design companies, insurers
- Team (years of experience):
  - 2 draftsman
  - 1 student (5th year)
  - 2 engineers and 1 geologist – 0 to 5
  - 2 engineers – 5 to 10
  - 1 engineer – 10 to 15
  - 2 engineer – 15 to 20
  - 1 engineer – 20 to 25
  - 1 engineer - +40 years
  - administation

What have I learned at the University?

- First two years: I don´t remember.... Physics? A lot of math? Fluid mechanics? Algebra? Termodynamics? => possibly some tools

- Next 3 years:
  - civil engineering
  - 3 semesters of “geo-engineering” – soil mechanics, earthworks and foundations.

What have I actually used?

- Big design company:
  - First year working: 3D FE dam model (in the early 90´s...) => I learned nothing about it!
  - Next 3 years: tunnel desing using 2D FD (Flac) and analytical methods

- Geotechnical consultancy:
  - Dams, tunnels, natural slopes, soft soils, soil treatment, foundations, ...

I feel lucky that I used almost everything that I learned during the geo-engineering courses!

What have I not learned?

- Reinforced soil – soil nailing, geosynthetics, etc.
- Non linear soil models
- Soil structure interaction
- Environmental geotechnics
- ???

- Non technical issues => a lot!

And what about our young engineers?

- Profile:
  - Almost all of them come from “my” university
  - Normally, they do their internship in the office.
  - We look for a certain “type”.

- What´s missing?
  - Geology => apparently they think it is a black box
  - Continuum modeling
  - Soil reinforcement (soil nailing, geosynthetics, etc)
  - Soil structure interaction.

What we want from the academia

- Basic soil mechanics (“Lambe & Whitman”?)
- Geology => Engineering Geology
- Laboratory and field testing (geophysics?)
- Modeling => create the simplest but representative model possible.
  - Limit Equilibrium
  - Continuum
    - Interaction between different materials => soil x structure; soil x reinforcement, etc
    - FE / FD
- Environmental (?)
- Case histories => interaction with industry

What we want from the academia

- Design => Limit State Design? ULS / SLS
- Safety concepts
- Interaction with other areas
- How to write reports => should it come from school?
- Organization / Planning / Costs
- Interaction with people

HOW MUCH CAN / SHOULD THE ACADEMIA PROVIDE?

What I look for

- When talking with a young candidate
  - He has to “like” geo-engineering
  - ***He needs to have the basic “tools”***
  - He has to show that he wants to learn
  - He has to show an open mind => be interested in learning all the time
- When working
  - He needs to understand a problem and find solutions => modeling (simple, FE 2D, 3D)
  - He needs to know his limitations and know how to proceed:
    - Look for literature and learn
    - Ask for help
- Other aspects not related to GEO


THANK YOU!