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K-Force WP3

Improvement of teaching skills and methodology

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Personal background:

- Education from DtH (now DTU)
 - M.Sc. In Applied Mechanics
 - Ph.D. in Structural Stability
- Professional
 - Teaching/research at DtH and AAU.
 - Consulting work for companies and organizations.
- Technical areas
 - Structural mechanics, Structural design, Geotechnics, Materials
 - Mechanical Engineering, dynamics, fluid mechanics.
 - Finite Element Simulation, Computer Aided Design

Developing educations

Within a well-known field – fairly simple

Incremental steps:

- Introducing Finite Element in undergraduate courses
- Introducing Computer Aided Design
- Non-linear FEM in graduate course
 - Compromise between theory and numerical methods.
 - How to exploit the new technologies in practise.
- The student should still be an expert within a relative well-defined area.

Developing education

As a supplement to another field - Architecture & Design

Structural Design is now only a tool – not easy at all for the teacher

- Students have a more superficial knowledge
- Understanding have several dimensions
- Explanations have to be more physical
- Mathematics should be handled with care
- Do the students know their own limitations.
- Multi-disciplinary !?

Developing the Risk education at AAU

Prime aspect:

Job function

Potential companies:

Reputation of the education should be build up. Projects.

Attract students:

More than just offshore

Offshore sector plays a central role for a great part of industry in Esbjerg. Risk and Safety is often in focus.



Actors within Risk and Safety in Esbjerg

Operators

- *Mærsk Oil & Gas*
- *Vattenfall*
- *DONG*

Consultants

- *Atkins global*
- *Rambøll*
- *ISC*
- *NIRAS*
- *DNV*

Companies

- *Viking*
- *Esvagt*
- *Falck Nutec*
- *Maersk Training Center*
- *Danbor*
- *Semco Maritime*
- *AM-Gruppen*
- *Maersk Drilling*

Centre and authorities

- *Offshore Center Danmark*
- *Sikkerhedsstyrelsen*

Layout of Education

Semester	Projekt Modul	Kursus Modul 1	Kursus Modul 2	Kursus Modul 3	Kursus Modul 4
1	Industry standards and legislation	Applied statistics and probability theory	Systems engineering	Risk management	
2	Risk analysis and management	Risk analysis	Decision making	Health and safety management ¹⁾	Risk and reliability in engineering ¹⁾
3	Operational risk management in projects	Emergency management	Simulation of emergencies	Maintenance management ¹⁾	Risk communication ¹⁾
4	Master's thesis				

Every semester consists of a project modul of 15 ECTS and 3 course modules of each 5 ECTS.

1) Optional modules.

Challenges

Students have very different backgrounds

The Aalborg model i.e. Problem Based Learning and the Project oriented system is new to non-Aalborg students. Social skills have to be learned.

Engineering aspects are hard to teach

Focus on the output of projects – specific with reference to theory.

Productive teaching

Constant improvements in teacher effectiveness. In DK the teachers production has increased approximately 35 % over the last 15 years.

The project-oriented teaching requires relative many teaching ressources compared to traditional lectures i.e. many qualified teachers with a good overview and not only specialists.

PBL teaching requires much more than Example Based Learning.

ICT based solutions are mandatory.

Conclusion

We do not have all the answers, but we have some experiences.

Combined we have a very good network within the area.

The project is a Process not a fix of a specific problems

Our hope is that we will have an interesting travel and enlarge our connections