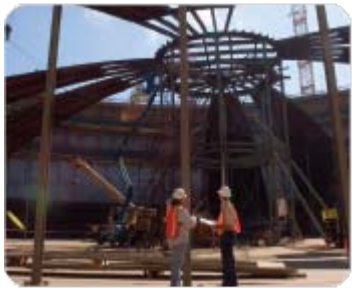
BUILDING A WORLD OF DIFFERENCE®

BLACK & VEATCH





IStructE

Association of Civil Engineering Departments

ice
Institution of Civil Engineers

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What is being done well?

- Graduates often have good interpersonal skills
- Confident in analysis but not necessarily in engineering principles
- Civil graduates typically have a good understanding of environmental matters. M&E graduates not so good
- Graduates better focused on career structures
- Graduates better understanding of employer requirements
- Lecturers now have some ‘teacher training’

What does industry require?

- Numeracy
- Literacy
- Sound understanding of engineering principles
- Ability to learn and question
- Inquisitiveness
- Ability to think through a problem
- Analytical thinking
- Critical assessment
- Understanding concept of lifetime learning
- Ability to develop a cogent argument
- Recognition of importance of collaboration, mutual understanding and working together

Areas of concern

- Overall course quality
- Engineering principles
- Design and implementation
- Field and vacation experience
- Literacy
- Personal skills
- Links with industry
- Professional qualification
- Breadth of interests
- Future requirements
- Industry’s challenge to universities

Overall course quality

- Few lecturers with quality industrial experience
- Change of mindset is required to recruit staff with such experience
- Reflects through whole undergraduate experience
- Inappropriate course funding
  - Huge emphasis on research
  - Needs re-appraising
  - Joint (university/industry/professional) lobby to government
  - Funding to reflect practical nature of engineering

Overall course quality cont'd

- Insufficient focus on quality of teaching
- Insufficient attention to practical nature of subject
  - theory and principles supported by practical examples
  - laboratory work
  - field work
  - industrial experience
- 'Thick' sandwich courses should be encouraged
- Vigorously explore opportunities for lecturers to spend time in industry
- Proper industrial experience amongst lecturers will result in resolution of many of the issues we are addressing today

Engineering principles

- Absolutely fundamental
- Too much variability
  - some have a good grasp
  - some have a poor grasp
- Several major contractors and consultants find that graduates don't have basic understanding – therefore don't employ them
- Some companies now carry out tests at recruitment – is this a good reflection on the teaching?
- Graduates MUST HAVE a sound understanding of engineering principles

Design and Implementation

- Confusion over what constitutes design
- Not just aesthetics or layout or visual appeal or ability to use AutoCAD
- It is combination of dimensional layout, analysis, application of engineering principles, understanding of materials, health and safety, environmental issues, visual acceptability and collaboration with other disciplines
- Need to develop appreciation of the basics at university. Industry can put ‘flesh on the bones’

Design and Implementation cont'd

- Need to have a sense of scale and 'feel' for structures they are designing or constructing. Get some basics in lectures, develop through vacation work
- Some understanding of basic plant types
- Understanding of planning and programming, consequences of falling behind the critical path
- Application of engineering standards (Eurocodes, BS, ASTM etc) and CIRIA documents
- Awareness of interfaces with public organisations, other disciplines

Field and vacation experience

- Insufficient practical work
  - Field trips
  - Vacation experience in industry
- Vacation experience should be strongly encouraged and facilitated through university/industry links (lecturers with industrial experience will help)
- Site experience is invaluable
- Properly arranged vacation experience including site experience can be included as satisfying initial professional development objectives

Literacy

- Far too variable
- Graduates must be able to compose reports, e-mails, letters in clear, unambiguous, well argued, grammatically correct, well punctuated English
- Weaknesses must be identified in first term
- Remedial classes compulsory

Literacy cont'd

- Written assignments must be properly marked for quality of composition, argument etc as well as technical quality
- Use of appropriate language, person, tenses etc
- Develop ability to reason an argument
- Laboratory and field work exercises, project reports are good opportunity to develop literacy skills
- Must be able to express themselves clearly

Personal skills

- Varying experiences reported
- Needs better assessment at university entry
- Function of natural aptitude, upbringing, participation in team/group activities (sports, outdoor pursuits etc), quality work experience
- Graduate needs to be able to:
  - express himself or herself clearly
  - listen to and respect other view points
  - get on with people
  - analyse an argument
- Tutors need to identify weaknesses in first year and plan remedial action

Links with industry

- Some good examples
- Sometimes weak and fragmented
- Much stronger, consistent, long term relations required particularly at undergraduate level
- Needs major effort across full spectrum of engineering departments
- Industry is not a ‘pot of gold’ but will respond to determined long term initiatives

Professional qualification

- How many lecturers are professionally qualified?
- Within 5 years every civil engineering department to have programme in place whereby:
  - 50% of all existing staff are professionally qualified
  - All new staff will be required to become professionally qualified within 4 years of appointment
- How many undergraduates join a professional body in their first year?

Professional qualification cont'd

- Within 3 years every undergraduate strongly encouraged to join a professional body as a student member in their first term
- Will encourage commitment to industry, focus on employment requirements and recognition that professional qualification (C Eng) is a benchmark of competence
- Plenty of choice – ICE, I Struct E, I Mech E, IET (formerly IEE), CIWEM, Geological Society and others
- Recognise requirements for professional development
- Satisfy initial stages of development objectives through vacation work, industrial experience (sandwich course)
- Likely to help with meeting Bologna requirements

Breadth of interests

- The best are excellent
- The rest need encouragement
- Need to develop wider interests beyond purely technical
- Attend occasional lectures or short courses in non engineering subjects
- Explore cultures of Asia, Middle East or elsewhere
- Take an interest in current affairs, economics, history, politics
- Do they regularly read a quality newspaper?
- Do they read any quality material?
- Develop language skills, European, Mandarin, Arabic
- The global economy and market are here, undergraduates need to understand it

Future requirements

- Basic work already being undertaken overseas
- Need to train for high value work
- Need to be capable of handling complex problems
- Need to develop breadth and depth of skills to be tomorrow's leaders
- Universities need strong engagement with industry to agree future requirements
- Some professional bodies are seeking to facilitate such discussions
- Pace of change is rapid and foresight and strong action needed to implement continuing change to curriculum

Industry's challenge to universities

- Within 5 years
  - 10% of all lecturing staff to have, individually, a minimum of 5 years quality industrial experience
  - At least 2 lectures per module, on average, to be given by visiting engineers from industry
- We hope the Board of Moderators will be challenging you to meet this.

Thank you