EUCEET GROUP H

DEVELOPING SYNERGIES BETWEEN THE ACADEMIC AND PROFESSIONAL WORLDS

THE STATE OF THE ART, JANUARY 2009

This is based on a literature survey of the reports, articles, etc produced in the past three years assessing the state of the interactions between industry and academe and what they need to do to work together better. The idea is not to conduct more surveys on this topic, but to understand and disseminate the information we already have.

SKILLS SHORTAGES

One of the key issues facing the Industry is a shortage of numbers (NCE 17 Jan 2008). In the UK, the Industry has loads of work (Olympics, Crossrail, etc) and is struggling to find staff for all the potential infrastructure projects we need to undertake. The problem is widespread, but particularly notable in ground engineering, which is central to almost all construction and building projects (NCE 27 Nov 2007). Other areas of shortage include project management (ICE State of the Nation Report Jan 08) At present, we are taking workers and engineers from abroad. In the long term, this is neither sustainable nor morally justifiable. We need to expand the intake into university courses, but there is a key problem here, namely preparation in schools.

CIC BEPS Survey 03/04 identifies problems with shortages in management, communications, literacy, problem solving and client handling. On the technical side, IT, agreeing design schemes, design development, procurement strategy and controlling construction operations are shortage issues. However, are these things best taught on the job? Can universities teach these, or simply create some awareness.

Somehow, both companies and young professionals, coming up through the university training and education system must become more committed to the profession. Hence there is a role for both to excite and inspire young people.

Visibility is a problem. Universities and Industry could collaborate much more to influence the general public and young people about the importance of civil engineers in providing our living environment

Skills Shortages:	not enough people
Skills Gaps:	existing people not having the right skills

THE SKILLS PIPELINE

One of the key problems we face is the level and type of preparation in schools. Getting pupils to make the right subject choices early is essential if we are to have a good supply of students coming forward for university study. This is a big issue in the UK and industry is trying to increase its influence so that school pupils think about possibilities of working in civil engineering at an early age, so that they stand more chance of making the correct choices of subjects to study at school, giving them the correct preparation for entry to University. In the UK, there are also discussions about how to give pupils a second chance if they have not taken the correct school subjects, by having foundation courses and other means of entry. There is also the development of new school programmes in vocationally orientated studies, the aim of which is to give pupils better preparation for entry to engineering and science at University and thence to the workforce. At the time of writing, nobody, including Universities, it too clear how these courses in schools will develop, so it is not yet possible to say if they will be successful in increasing the number of students coming forward.

QUALITY AND STANDARDS

Many employers say that the quality in the UK is pretty good (get the reference), though some feel that this is not uniform and that standards are falling in some disciplines (IStructE Dec

07), with particular problems in building services engineering. However, it is clear to all that there are not enough people of sufficient quality, both at operative and engineer level. UK Industry currently needs 12000 new recruits per year in civil engineering, architecture and surveying, and is finding it very difficult to achieve this. Some answers include…..

Certain sectors, notably girls/women and ethnic minorities are poorly represented in the profession. Why should this be? If we could interest more of these people we could overcome some of the shortages we face.

Buddy schemes. Keep on 65 year olds, many of whom wish to continue working, or have to secure their pensions, so buddy them up with the youngsters. They will provide wisdom and the youngsters will provide the effort and enthusiasm.

THE ROLE OF GOVERNMENT

Both Universities and Industry are not helped by the attitude of Government to the profession. Government is the biggest single commissioner of infrastructure and what industry needs most of all to deliver Government requirements is a stable planning structure, which will encourage long term investment. Universities increasingly complain about the way that funding for civil engineering education has fallen, both for undergraduates, where the unit of resource is below the cost of delivery (RAEng submission to the HoC Education and Skills Committee, Dec 06) and for Masters Programmes where the amount of funding for expert specialisation has also dropped and Industry is increasingly expected to pay for this.

There seems to be an important role for Universities and Industry to work together to persuade Government of the importance of long term investment and planning for the built environment. For example, in recent times, courses have closed; perhaps some should be opened, or existing ones should be given the scope to expand. Perhaps there could (should) be earmarked funding for civil engineering, just as there now is for chemical engineering and materials.

THE NEW ENGINEER (Educating Engineers for the 21st Century, RAEng, June 07 and Skills for the Built Environment, ICE, 2004?)

To a large extent, Industry and Academe both know what needs to be done and by working together with Government and Professional Bodies, can achieve change. The first point is to allow for students to continue to receive a sound theoretical training, but to be able to apply it to the solution of real, practical engineering problems. This will require closer collaboration between the two sectors, for example, by course content reflecting better the needs of industry and for industry to provide more opportunities for students to gain practical experience. The second overcome the problem of stagnation or output, by training more people to cater for the skills shortage. The third is to train the new engineer to deal with current programme. There is a view that courses have not changed in a significant way for many years and that they need to do so in order to be able to produce graduates who can understand and service Industry's current and future requirements. The key issue is for Universities to offer courses which inspire and motivate graduates and produce a strong supply of them, equipped with the understanding, attitudes and abilities necessary to apply their skills in the industrial and business environment. This means graduates well prepared in two broad areas: technical skills, including disciplinary fundamentals, mathematics, creativity and innovation, along with the ability to apply these in practice; and enabling skills, such as communication, teamworking, and business awareness of the implication of engineering decisions and investments.

A number of steps need to be taken to achieve these aims. These include:

- Getting things right in schools, by enhancing the understanding of what engineers to and why this is important, and by preparing pupils properly in mathematics and physical sciences.

- Getting the approach right in government, by the provision of adequate funding for university engineering courses and a stable planning framework for infrastructure investment and development.
- Getting the accreditation process to act as a driver for change rather than simply as an audit of quality
- Getting more industrial input into undergraduate programmes, via more industrially relevant projects, visiting lecturers, industrial placements and case studies
- Making undergraduate courses more inspirational, so that graduates are encouraged to remain in the sector
- Readdressing the balance between research and teaching in universities to ensure that while research excellence is maintained, the importance of teaching is not neglected.
- Recognising the importance of specialist postgraduate training for Industry, including both Masters and PhD programmes
- Enhance and re-structure continuing professional development more towards the needs of industry, and make it easier for people to retrain
- Attract engineers from a wider cross-section of the population, many sectors of which, such as girls/women and ethnic minorities are currently very under-represented

The Engineer as Specialist: deals with technical stuff
The Engineer as Integrator: operates across boundaries in a complex business environment
The Engineer as Change Agent: focuses on innovation, creativity and leadership

Have a look at www.constructionskills.net/pdf/research/outputss/UK_LMI.pdf

Dealing with skills gaps and shortages, mobility, diversity, sustainability and modern construction methods

THE CURRENT ECONOMIC CRISIS

This is necessarily a short and brief note at this stage, January 2009, but the interaction between Industry and Academe will be greatly affected by the current world economic downturn. It is perhaps too early to say how things will work out, but the following are likely:

- Jobs are likely to be hit hard, so there will be increased unemployment in the construction and building sectors
- This may have an impact on how young people perceive civil engineering as a career and therefore whether they are likely to apply for places at university
- However, the economic crisis covers many sectors, not civil engineering alone
- Some staff who are made redundant may take the opportunity to re-train and re-specialise, which could lead to a boost for university entrance
- Governments are likely to make cuts in education budgets, which may well affect the operation and staffing levels in university Departments
- On a more positive note, the crisis might give scope for new developments and technologies, including sustainable construction, introduction of sensor technology in building, new materials, etc
- In addition, public investment, in infrastructure, housing and so on, may be seen as a way out of the economic crisis.

OTHER POINTS TO INCLUDE

Skills shortages are also problems for some existing staff, raising the whole question of CDP and retraining. The big problem here is companies not having the time to release people and the workload of exsisting staff going up all the time because of difficulties of recruitment and retention.

Industry must value its staff, especially the unsung heroes, the technical types who design water treatment plants and maintain the underground (NCE Jan 2007)

More industrialists should go into schools and universities to show that engineering is exciting. Get to the schools Careers Advisors (NCE, Jan 2007)

Are salaries still a problem? (NCE June 2006)

Skills shortages are also due to talent leaving, due to low pay, low esteem, too much work and not enough respect

BILIOGRAPHY

The above was based on the following articles:

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b) The skills shortage - can the Industry deliver? Keith Graham, New Civil Engineer, 27 November 2007.
c) Quality and number of professional recruits in decline, wards Construction Industry Council. http://www.istructe.org/news/article.asp?NID=354 10 October 2007
d) The State of the Nation - Capacity and Skills 2007 ice.org.uk/stateofthenation
e) Educating Engineers for the 21st Century, Royal Academy of Engineering, June 2007, ISBN 1-903-496-35-7, www.raeng.org.uk
f) Skills for the Built Environment - Team Effort. Institution of Civil Engineers, www.ice.org.uk/downloads//skillseffort.pdf
g) Broader Skills Base Needed for engineers to Solver Water Crisis, New Civil Engineer, 1 January 2007
h) House of Commons Education and Skills Commmittee. Call for Evidence: The future sustainability of the higher education sector - purpose, funding and structure. Submission by the Royal Academy of Engineering, December 2006. http://www.raeng.org.uk
i) Construction Skills Network: Blueprint for UK Construction Skills 2007-11
j) Engineering firms not engaging with students, says academic. New Civil Engineer, 1 January 2007
k) Universities not producing enough engineers, warns Royal Academy of Engineering, New Civil Engineer, 19 June 2007.
l) Engineers to play key role in UK's future says Treasury Report. New civil Engineer, 28 November 2006.
m) 28 year old project managers pick up £75,000 salaries. New Civil Engineer, 28 January 2007
n) Built Environment Professional Services Skills Survey 2003/04, Construction Industry Council, www/cic.org.uk/services/SurveyFindingsImplications.pdf
o) Educating Industry for the 21st Century - The Industry View. Royal Academy of Engineering/Henley Management College, March 2006.
p) Rules of Attraction: How Should We Tackle the Skills Crisis in Civil Engineering? New Civil Engineer, 11 January 2007
q) Half of all engineers looking for a new job and more cash. New Civil Engineer, 1 June 2006

Also see:

JBM/Laing O'Rourke review of what universities are presenting to Industry (DLS).
Mike Devreindt (Arup) paper for June Geotechnics conference (IM). Information from thse is not yet included (as at August 2008).