THE SUPPLY CHAIN TO THE PROFESSION

CIBSE Presidential Address

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D R OUGHTON, CIBSE PRESIDENT

SUMMARY

It is no secret to anyone involved in building services in the UK that the industry is currently suffering a serious shortage of new blood. We are experiencing recruitment difficulties now, and trends in education make it inevitable that the current shortfall will worsen rather than improve in the coming decade.

Yet the failure to attract young people into our profession is something of a conundrum when we have so much to offer. Not only does a career in building services present a greater variety of work and experience than almost any other career, including great opportunities to travel, it is relatively well-remunerated and offers a wide range of other benefits. Perhaps greater than any other incentive to get involved is that fact that by doing so, young engineers can have a real and lasting impact on issues that we know concern them greatly; climate change, conservation of resources and environmental quality. Very few people can do much about climate change, but building services engineers can – the pity of it is that this message is not getting through to those who most need to hear it.

So whose fault is it that engineering and construction work is so unappealing to today's youngsters, and what can we do about it?

The address which follows; attempts to draw out the root causes of the difficulties currently being experienced in raising the profile of building services with young people and tries to come to some conclusions about the way forward. We may be able to learn valuable lessons from our colleagues in Hong Kong – who do not seem to be experiencing any of these difficulties at present. However, one certainty is that if current trends are not to result in an unsustainable UK building services industry, then something has to change, and we cannot expect anyone else to forge that change for us. We must each make a contribution, and we must make that contribution effective.

CIBSE and its Patrons are engaged in developing a number of strategic plans for increasing contact with schools and universities and for building on the efforts of other interested parties, but strategies alone are not enough. We need building services engineers and companies to play their part by taking the message out to schools and educational establishments in any way that they can and by ensuring that education and training is of sufficiently high quality to meet future needs of industry. It is my aim in my year as president to ensure that CIBSE provides the framework necessary to help individual engineers and companies make a positive and lasting contribution – and I'm asking each and every member do their bit to ensure that the supply chain for the profession, and for all our futures, is secured.

INTRODUCTION

At this time there are many key issues that are of importance to the interests and well-being of the Institution and its members; energy and the environment, Rethinking Construction; supply and design chain management, impact of IT and knowledge management are some examples. Since accepting the role of Education Champion two years ago, I have taken a keen interest in the issues surrounding education and it is perhaps of little surprise that it provides the thread for this address. My particular interest is not so much the structure of the education system and routes to registration but more the interfaces between industry, the Institution and the education sector and how these can work together to improve the supply of young people to the profession. My industry background in a firm in which student and graduate intake, their training and development has been the foundation upon which the firm has been successfully developed over the last thirty years or so, provides me with some insight for this address.

In the Building Services Journal April 2001, I had published a "CIBSE Special Report" on the current state of education in the building services sector. The opening paragraph argued that we are failing the next generation of building services engineers in terms of the numbers we are attracting into the profession and the education and training they receive. Clearly a sweeping generalisation, but, in the round, it is the reality. This address builds upon the themes from this article and develops a number of the important current issues to be addressed by the building services profession.

In parallel with this, a Discussion Forum was set up on the CIBSE Website with the title "The state of university education servicing the building services profession"; this is still open for contributions. Extremely useful feedback has been provided from these two sources, which has informed some of the matters dealt with in this paper. A selection of comments received as feedback is summarised below:

- There is a problem attracting people into the industry.
- Education is not providing quality or breadth of knowledge required by employers.

- Closure of courses reduces regional spread, making part-time attendance increasingly difficult.
- Image of building services needs improving.

- Information on courses for core and specialist disciplines needs to be improved.
- Co-ordination of courses and structure of training requires review.
- More practical training required.
- Improved commitment by industry to education and training required.
- Building services engineers should have a more senior role in construction and the education and training programme should provide the necessary skills

Brian Wilson, Minister of State for Industry and Energy, quoted recently "self interest is the biggest motivation …… and industry (read building services engineers in the context of this paper) must take responsibility for its own improvement." With this in mind I have attempted here to put into perspective some of the issues and to identify suggestions for a way forward to improve the supply of young people to the profession.

ROLE OF THE ENGINEER

Over the past 200 years or so engineers have had a major influence on the lifestyle that we presently enjoy. In doing so they have contributed to many of the global problems facing our society and will in due course, I believe, provide the solutions. On a global scale the issues include:

- Climate change
- Energy supply
- Environmental sustainability
- Water supplies

and at a national level:

- Energy conservation
- Flood protection
- Transportation infrastructure
- Environmental quality

The whole being under-pinned by achieving sustainable solutions; by simultaneously addressing the key issues of environment, resources, economy and social aspects.

A movement to raise awareness of ethical issues concerning energy and fresh water use has been addressed by the World Commission on the Ethics of Science and Technology, COMEST, and has produced its first detailed reports. In the longer term this may well influence policy in these areas and as a consequence raise the profile of the professions working therein.

There is little doubt that the engineering profession will face many challenges over the coming decades. Building services engineers will have the opportunity to directly influence some and have a significant role in others. Engineering as a profession has an opportunity to make a positive contribution in these important areas and improve its status in society.

From the perspective of building services in the UK, the 2002 Part L of the Building Regulations, Conservation of Fuel and Power, and Part J of the Building Standards for Scotland (hereinafter referred to as 'Part L') provide an immediate opportunity to raise the profile of building services engineers by taking a pro-active role in the design, construction and commissioning processes and in the aftercare of our buildings.

To enable a higher profile to be maintained, a sound engineering education system must be available to provide the foundation for development of engineers of the required quality and industry must provide the necessary training structure. Together we must work to make students aware of the opportunities that are offered by our industry.

REVIEW OF THE ENGINEERING PROFESSION

This review is based generally upon statistics recently published by the Engineering Council (1), (2).

Although public perceptions of professional engineering were favourable, young people may be less informed about engineering in 2000 than they were in the 1970's. In schools about 14% of pupils, but only 1% of girls, indicated they would select a career in engineering.

Statistics on engineering vocational training are somewhat unreliable, however, it would appear that numbers registering for HNC and HND courses are declining.

At the higher education level, the total number of undergraduate course entrants has approximately doubled over the last 10 years to about 38% (282,000) of the 18 year old population in 2000. Whilst the number of acceptances of UK students to engineering has reduced in the same period by about 6% standing at about 15,500 in 2000 that is about 5.5% of the total intake; of these only 15% or so are women, a percentage which has remained steady for the past 10 years or so. In recent years

some industrial sectors have seen an increase in student numbers, for example computing, and therefore the numbers available to mechanical, electrical and construction sectors have reduced further in proportion. Some sectors, namely electronic and aeronautical are able to attract more students to reflect the change in their market place, but there is no evidence that this is the case in the construction related disciplines.

The University and College Admissions Service stated that the number of construction related applications for the 2000 entry plummeted by 14% on the previous year to 7,260, with acceptances falling over the same period by 9% to 1,650. Since 1995 over a 5 year period the number of construction related applications has fallen by 60% overall, with acceptances down nearly 40%.

The Higher Education Statistics Agency reports that in 2000 70% of engineering graduates entered full-time employment within 6 months of graduating; this compares with 76% in computer sciences and only 61% of graduates overall. A higher proportion of these new engineering graduates, 53% were employed in professional positions which compares with only 27% overall. DTI figures for 2000 indicate 83% of all engineering graduates are likely to find permanent employment on leaving university compared with 64% of all graduates. It may be concluded that there are good opportunities available to new engineering graduates.

In terms of graduate starting salaries, the end of 2000 median for salaries was £18,500 per annum for engineering/construction and £21,000 for electronic, both well above the average graduate starting salaries; engineering graduates typically 20% more than graduates generally. The DTI/Barclays National Graduate Tracking Survey for 2001 reported that after 3½ years in employment engineering graduates earned a median of £24,000 per annum (£26,000 for electronic); 19% above the average for all graduates. Of all engineering graduates, 31% progress to take masters courses which is the highest proportion of all disciplines with the exception of natural sciences that attracts 33%.

Registered Engineers earn considerably more than the national average for the equivalent Standard Occupational Classification for other sectors. The median Chartered Engineer salary in 2001 was £41,000 per annum; for Incorporated Engineers £31,500 and Engineering Technicians about £26,600. There are, however, significant differences in salary levels between the different engineering disciplines.

The CIBSE Chartered Engineer median salary in 2001 was close to the median for all engineering disciplines at £40,000, a rise of over 14% in 2 years; in 1999 the median was £35,000. This rise is the second highest over the period, exceeded by only the British Computer Society. Refer to Table 1. If the same rates of change occur over the next two year period CIBSE Chartered Engineers would rise to be the fourth highest by earnings.

	1999	2001	%change in median earnings
British Computer Society	40,000	48,000	20.0%
Institute of Chemical Engineers	45,000	46,037	2.3%
Institute of Electrical Engineers	39,664	43,000	8.4%
Institute of Mechanical Engineers	36,975	40.525	9.6%
Royal Aeronautical Society	40,000	40,250	0.6%
CIBSE	35,000	40,000	14.3%
Institute of Materials	36,659	37,377	2.0%
Institute of Civil Engineers	35,000	36,000	2.9%
Institute of Structural Engineers	33,000	36,000	9.1%

Table 1 Chartered Engineer Median Earnings

There is currently low unemployment within the engineering profession indicating a high level of market demand. Recent government reports for engineering occupations in general have indicated supply more or less equal to demand, whilst in the electronics sector and construction there is a shortage of professional engineers.

In the last 10 years the number of registered engineers has fallen from 272,473 to 237,169 in 2000; the number of Chartered Engineers fell by 2.7% to 195,103, Incorporated Engineers fell by 12.4% to 48,799 and Engineering Technicians by 18.8% to 13,266 over the period. Of the Chartered and Incorporated Engineers, only about 1% were women; this proportion is increasing but slowly.

The engineers' role in the national economy is significant. In 2000, of the FTSE 100, sixteen top executives held a degree or professional qualification in science, engineering or technology (17 have accountancy qualifications); of the 112 University Vice-Chancellors or Principals, 50 had engineering or science qualifications and 16 were professional engineers. A study by the University of Warwick indicates that for

CEO's in UK manufacturing companies Chartered Engineers outnumber Accountants by 3 to 1. Engineering consultancies earned a surplus of £1,7 billion on the services account of the balance of payments in 2000, and 59% of exports were manufactured goods.

Technological change is likely to have a significant impact in the process of future economic growth. Studies of international competitiveness and skill levels indicate that the British engineering industry may have a greater skills shortage than that currently recognised by employers.

It may be concluded therefore that:

- there is significant scope to attract more young people, particularly women, into engineering professions;
- there are good work opportunities for engineers in construction in the short and longer term;
- salary levels for building services engineers compare favourably with most other disciplines.

COLLABORATION WITH HIGHER EDUCATION

Although the construction industry has enjoyed a relatively long period of stable workload, over the last 8 years or so, it is not easy to establish statistics on supply and demand for staff. What is clear, however, is that concerns have been expressed by employers, government and institutions about the shortage of skilled labour able to produce the quality of deliverable demanded by clients, to adopt efficient ways of working and to be capable of meeting the demands of ever changing technologies. Improvement in the quality of graduates produced by universities can be achieved by collaborative working principally between the universities, industry and institutions.

In July 2001, a meeting to address these issues, facilitated by the Construction Industry Training Board (CITB) in the Making Connections series, brought together representatives of higher education institutions vice chancellors, construction industry, the professional institutions, government and other interested bodies. The results clearly demonstrated the benefit that could be derived from closer collaboration. In summary, the key actions identified relevant to this paper included:

Actions for Higher Education

- To develop a strategy for recruitment.
- To work together to broaden the strategy to attract more students into engineering courses.
- To review course content to better reflect the needs of students and of the construction sector.
- To involve industry in the planning and delivery of courses, workplace learning.
- To give urgent attention to the provision of part-time courses to broaden access and improve progression routes.
- To collaborate regionally to avoid competition and maintain diversity.
- Provide levels of education that exceed demand.

The vice chancellors recognised what they could do to contribute to this process but had a clear message for the other stakeholders.

To government:

Start the process, by committing money and resources to demonstrate the national importance of the construction industry

To employers:

Industry is in the best position to encourage an increase in student numbers. Collaborate with higher education to help make the process effective.

To professional institutions:

Work with higher education to help raise the standards of professionals by providing them with the best and most appropriate education and training, without constraining access to courses.

To CITB:

The CITB can assist industry to improve its grave problem with image.

It is evident that all parties recognise the problems and are committed to working with one another to assist the process; the difficulty lies in the implementation. Referring again to Brian Wilson's quotation "….. industry must take responsibility for its own improvement", to my mind this means individuals in industry, the institution and in

the education sector taking initiatives to move forward in a co-ordinated way on a number of fronts.

The fundamental issue that must be addressed as a priority is getting the right message to schoolchildren to attract them into engineering, and into building services in particular. To facilitate this, however, many other issues must also be addressed. Those recurring are image of the industry, content of education courses, and structured training and career development. Once we move forward these issues the quality of students attracted into the industry must surely improve.

INDUSTRY LINKS WITH SCHOOLS AND CHILDREN

There are many and varied initiatives for industry and individuals to take engineering into schools. Some of the current examples include the following:

Neighbourhood Engineers Programme – A scheme promoted and co-ordinated by the Engineering Council to enable engineers to provide practical support to assist schools deliver the curriculum and enhance the learning of pupils in engineering.

Young Presenters – A Construction Industry Training Board scheme offering young engineers training in presentation skills and providing them with the information to take into schools to promote engineering. A scheme promoted by CIBSE to young engineers.

Engineering Education Scheme – Run by the Royal Academy of Engineering for school teams to work with companies on selected projects.

Science and Engineering Ambassadors Scheme – An initiative by the Department of Trade and Industry and the Department of Education and Skills to link schools with practicing engineers and scientists.

Planning into Practice – A scheme supported by CIBSE Patrons providing an aid for teaching engineering in the classroom for key stages 1 and 2.

Other schemes include Young Enterprise, Young Engineers, Insight into Construction, Rapid Response Challenge, Young Foresight and many more.

At a broader level, the Campaign to Promote Engineering (CPE) is a scheme run by the Engineering Council with objectives to make the public aware of the importance of engineering in quality of life and in national wealth, and to promote engineering as a career. The CPE is run on a regional basis and offers a means of co-ordinating approaches to schools through local Education Authorities.

Clearly there is no shortage of schemes to promote engineering in schools: too many perhaps, to be confusing both to industry and schools. One can only imagine the impact all this work would have if the effort, funding and enthusiasm could be channelled into a single fully co-ordinated initiative.

Individuals involved in such schemes find working with young people a rewarding experience and companies working with schools benefit by developing strong linkages with the community; all concerned gain something.

Young engineers and graduates in training should be encouraged to take a lead in this work as they are best placed to relate to school children and get across a credible message. Perhaps 'community engineering' should be a mandatory element of a training scheme, since it helps to develop their confidence and inter-personal skills and would contribute to an engineer's continued professional development (CPD).

DEGREE COURSES

There is a range of options available to people entering the qualification route in building services – graduate courses in building services and related disciplines (full and part-time), graduate courses in mechanical or electrical engineering, MSc courses (full-time and via final year matching sections), distance learning and foundation degrees.

The present active degree level courses in the UK accredited by CIBSE are run by these universities:

- South Bank University, London
- University of Nottingham
- Northumbria University
- UMIST
- University of Central Lancashire
- Ulster University
- Herriot-Watt University

- Strathclyde University
- Glasgow Caledonian University

It has been the case for some years that there has been a progressive decline in the number of building services degree courses available. Since 1995 six courses have closed and one new course started, with two IEng courses currently awaiting accreditation. The decline has been driven both by the lack of student applications coupled with increasing demands on universities to meet financial targets. Even with the reduction in the number of courses the student numbers generally on the remaining courses are still in decline over recent years.

This decline in course numbers is giving rise to poor national spread. Further decline would be undesirable, particularly in respect of serving the needs of part-time students.

Furthermore, there is criticism from some quarters that some building services graduates are not of adequate quality or technical breadth to meet the needs of industry. Such a statement is of course a sweeping generalisation included here only to attempt to reflect a perception that is openly aired. What is needed are graduates to meet the current industry needs, with leadership skills and intellectual capacity to enable and manage change and improve working efficiencies to meet the ever increasing demands of clients.

There is a trend, successfully applied by some companies, to take graduates with general engineering degrees (some take non-engineering graduates) and train them in the particular skills required within their chosen discipline; this has been the case in the building services electrical discipline for many years. Accepting graduates from the larger pool of students from the general engineering courses inherently gives the opportunity for higher quality graduates to be selected. There may be a place for this approach, but we must work to improve the standards of building services courses if these are indeed deficient. Industry can and should make it clear to the universities what its current needs are, recognising that these will change over time.

To meet the demands of our diverse and fast changing industry it may be argued that technological competence alone is no longer sufficient; the basic engineering analysis and calculations largely being done by computers. There is an increasing requirement for construction and building services engineers to have more broadly based multi-discipline skills, as demonstrated by the range of the current industry CPD

programmes. The additional skills required to broaden the scope of universities studies may include.

- people management
- project management
- communication skills
- construction methods
- business development
- health and safety
- construction law

Matching sections may be the appropriate route to offer a wide selection. To deal with these specialist areas visiting lecturers from industry may be able to provide additional skills. Equally, there may be a place for some integrated courses combining, for example, architecture and engineering; this may also have the benefit of attracting people who don't necessarily see a place for themselves in a pure engineering discipline.

It is also generally accepted that both oral and written communication skills need to be improved. Some training or at the very least 'encouragement' to achieve reasonable standard, would be desirable, with further development offered by industry.

A further shortcoming with the present system is the lack of practical knowledge of the construction process and experience in the workplace. This can probably best be overcome by work placement during the vacations and by employers offering structured training to address this during the first two years after graduation.

Feedback direct from graduates on the scope and quality of their education and training should be sought, which would provide invaluable information for improving the present systems.

BUILDING SERVICES TODAY

Building services is an important part of the worldwide construction industry and the facilities disciplines responsible for the maintenance and operation of buildings. In the UK construction is a £50bn plus industry employing about 7% of the national workforce. Within this, building services accounts for about one quarter of new construction and a higher proportion of many refurbishment and fit-out projects. The systems comprising building services consume about half of the total energy used in

the UK. Building services are also the major influence upon the comfort and general well-being of building occupiers. By any standards building services play a major role in an important industry and will have increasing influence in future over the design, construction and operation of buildings driven by the need to reduce carbon emissions and improve the quality of the environment in the workplace and in the home.

Like many other industries construction can be subject to cycles reflecting UK economy. There is some evidence in recent years that government is recognising the need to avoid the 'feast and famine' cycles of construction; the last 8 years or so have been relatively stable in this respect. The danger of downturn, however, will always exist, and may be a result of events outwith UK government control; 11th September 2001 being one such example.

It is important to bear in mind that even in times when the construction industry is in decline or recession there is likely to be on-going work available to the building services sector in refurbishment, up-grade and system replacement. Additionally, regardless of the state of construction, the quest for reducing carbon emissions is likely to be unaffected and will provide opportunities for those in the building services profession with appropriate skills.

I would contend that it is a rewarding and challenging career, open to all young people with a range of different talents. More specifically, what is it that building services as a career has to offer?

The Environmental Challenge – To be at the forefront of work to achieve carbon emissions reductions – possibly the greatest challenge the industry has ever faced. The new Part L is one part of the government's strategy to meet its Kyoto Protocol targets set for the UK (12½% reduction in greenhouse gas emissions based on 1990 levels within 2008/2012 and 20% reduction in CO_2 by 2010), in addition to which on the horizon is the EC Directive on Energy Performance of Buildings, the UK government's recent policy statement to reduce the energy consumption in existing buildings and the challenge of carbon emissions trading. These will demand new thinking by design teams, and a greater contribution from building services engineers to produce compliant designs; to monitor the higher standards of installation required; and to manage the operation and maintenance to achieve optimum performance. At another level, we should ensure that building services engineers are advising clients on their strategic approach to energy and carbon trading.

The Institution and its members are working with government in a number of areas to address the important issues arising from climate change. A major role was played in the successful drafting and launch of the new Part L which became effective in April 2002. Arising from the Meacher Challenge set in October 2000 the Institution's response entitled CIBSE Action Plan on Climate Change – A response to the Meacher Challenge, has given rise to the Institution's Carbon Task Group which plans to make a second report to Michael Meacher, Minister for the Environment. These are a few examples of the increasing profile of the building services engineering profession.

Water Supply Although not a problem in the UK, clean water supply is becoming a major problem in many parts of the world, and could become as significant in terms of international politics as oil. Engineers will provide the solutions in terms of water supply, conservation and recycling within communities and buildings; with a contribution by building services engineers.

Workplace environmental quality – There is increasing pressure by workers demanding safe and healthy places of work; in respect of environmental standards, air quality, and lighting are within the scope of building services. A safe place of work, in terms of effective fire/smoke detection and suppression, electrical safety and security are examples of the building services engineer's contribution.

Contribution to Society – The above are examples of the wide ranging activities that will make a real contribution to the wellbeing of society. The reduction of carbon emissions is perhaps the greatest contribution of all. The ethics of energy and water use will likely play a major role in the longer term objectives for a sustainable future.

Design Technologies – To assist the design process, increasing use is made of computer aided design and analysis, for example in thermal performance, lighting quality, smoke control and virtual building models. 3D modelling, standardised solutions and management programming, all continue to be developed to aid production and working efficiencies and IT technologies offer fast access and transfer of information. Computerised fluid dynamics is a technique increasing in application to prove and improve performance of buildings.

Technological Development – As an industry, perhaps because of the wide range of systems with which we work, there is continuous development with new ideas and challenges to embrace. Not many years ago, the refrigeration industry was faced

with changing regulations in respect of CFC and HCFC refrigerant phase out; this is still evolving but has been successfully communicated and implemented. More recently the integration of IT, communications and building management systems technologies provided opportunities for integrated and intelligent solutions; again this is still evolving but has been accommodated within the skills of building services engineers.

Current research and development is concentrating on low energy design solutions, including design solutions influencing the use of building mass, natural ventilation and window design and façade performance to optimise thermal and lighting performance. The new Part L requirements will demand higher design and installation performance of the building envelope, thus providing evidence that the building services engineer has over recent years and will in the future have an increasing influence on building fabric design and performance. This gives building services engineers the opportunity to take a much more pro-active role in the total lifecycle in terms of design, construction and aftercare.

To address the carbon emission challenge, the application of a wide range of evolving technologies including the use of renewables is being developed in terms of performance and viability; photovoltaics, fuel cells, use of wind turbines and micro-chp are examples. Although perhaps not at the cutting edge of technology, it is the appropriate application of such technologies integrated with the traditional systems that is the important role for the building services engineer.

Variety – Few other professions offer the wide range of opportunities available to construction professionals. The above sets out some of the technical challenges and opportunities where building services is already making major contribution. The traditional mechanical, electrical and public health engineers are being replaced by increasingly multi-skilled engineers embracing many of the specialisms that are becoming an integral part of building services.

There is considerable opportunity for travel within UK and overseas, and to relocate for a period to work internationally. Day to day work is also varied; for example in the design office, at project meetings, site inspections and witnessing equipment tests. There is the opportunity to learn about other industries as an integral part of the job; pharmaceutical, healthcare, retail, leisure are some examples. Without exception, every project is different.

The challenge of receiving the client brief for a new project giving the opportunity to test new ideas and work with a different design and contractor teams to see a project through to completion and to experience the satisfaction of handing over a tangible product to a satisfied client are the drivers for construction professionals.

Construction, in all its facets, is very much a people business where personal relationship, being a 'team player' and the ability to successfully communicate at all levels is critical; development of relationships with suppliers, contractors, designers, clients and other stakeholders in the construction industry and to embrace supply chain and design chain principles are a few examples. Improved ways of working, based upon trust and team-working, are helping to overcome the sometimes confrontational approach in construction. The CIBSE support of the Rethinking Construction initiative is a positive step to encourage improved working practices.

Stress – Construction is not always seen as an easy industry within which to work. From time to time it can be demanding of time and energy and sometimes stressful. From a survey reported in the Building Services Journal in May 2000, the main reasons for increased stress were commercial pressures, not changes in technology or people interfaces. Notwithstanding this aspect, overall it can be extremely rewarding. Additionally, the variety of the job enables flexibility in individuals' work patterns and with an increase in the amount of home-working, resulting from greater use of electronic transfer of information, reduces some of the causes of stress and improves quality of life.

The Rewards - these may be summarised as:

- making a contribution to society;
- varied work in a challenging industry;
- developing and working with new technologies;
- use high level modelling and analysis software;
- seeing tangible results of endeavours;
- team-working;
- good financial rewards.

The levels of financial reward have been summarised in an earlier part of this paper and are seen to be good compared to other disciplines. In addition it is an industry that offers opportunity for the high flyers to progress quickly to senior positions.

A CAREER IN BUILDING SERVICES

Our profession over the next few years has a "widening window of opportunity" where it can be at the forefront of technical development and innovation in the construction industry. We should not let this opportunity pass by.

Young people considering a career in building services will want to understand what they will be offered on entering the industry. The following should be made available:

- A structured training scheme, preferably accredited by the Institution;
- A clearly identified career path; this is an aspect that should be given more consideration by employers
- Clearly identified routes to Chartered and Incorporated status; available through the Institution
- A means of participating in activities within the industry. This is an important feature and the Regions should work towards setting up Young Engineers Groups (along the lines of the Scottish and Hong Kong branches) to enable young engineers to meet together and share experiences and to have some influence over the events; social and technical.
- Special Interest Groups within CIBSE would also be of interest to new entrants .
- Greater emphasis on management training is required to be provided by employers.
- Opportunities for continued professional development; the Institution and profession can demonstrate a strong programme in this area.
- Access to relevant publications to assist with their understanding of technical subjects. The CIBSE Guides, Lighting Guides, Technical Notes and other publications are of very high quality and up-dated on a regular basis. These, together with the quarterly BSER&T are said to be unique in addressing the full range of building systems. When viewed with the monthly Building Services Journal and the range of BSRIA documents offer a comprehensive and up to date set of relevant technical source material.

The ACE Young Engineers Group "Progress Network", open to young construction professional under 35 years, offers opportunities for engineers of all disciplines to meet together. Currently, the number of young building services engineers contributing is limited and employers should encourage wider participation.

Young engineers must be made to feel that they have a part to play in taking forward the profession for example by involvement in Regional committees and

events, groups' activities, central committees. Most of all they must be offered the opportunity.

Higher performing firms require higher skill levels and a greater breadth in knowledge and inter-personal skills. To source the required talent many firms are pro-active in attracting the better quality students by offering sponsorship through University, some unconditional, and in addition the valuable opportunity to gain work experience during summer vacation.

Starting salaries for graduates in engineering and construction are typically 20% higher than graduates generally.

Salaries for Chartered building services engineers are well placed within the league table of engineering disciplines and over the last two years have had an increase in earnings considerably higher than inflation and the average for the engineering profession as a whole. This rise may be simply a reflection of supply to demand over the period, but may also be recognition of the increasing importance of the role.

Overall, the building services profession can take an optimistic view that salaries are unlikely to be a bar to attracting young people into the industry.

THE WAY FORWARD

There is much work needed in many areas if the number of young people joining our industry is to be increased by any significant amount. Fundamentally, the message about engineering must be conveyed to school children and where appropriate the opportunities offered by building services must be communicated.

This final part of the address sets down some ideas for the Institution, industry, education and individuals in the sector to consider.

Communication with Schools

This may be achieved in a number of ways:

- Direct to children at school, careers fairs and other events. Face to face communication is likely to be the most effective, but is limited by the number of engineers prepared to offer their time.
- Via industry websites. This is increasingly important as the means of communicating a message to children.

- Via the CIBSE website. It is critical that the CIBSE website has an area that is targeted to the interests of children and exciting enough to attract their attention.
- Via material to schools, e.g. CD's and posters. Past experience indicates this method alone is not effective.
- Via material to teachers. Most effective if by face to face sessions offering them teaching aids to support the curriculum.
- Via parents. Apart from those in our industry and perhaps close friends, building services is not known to the general public. A concerted campaign to improve communication via the press and media. (A recent piece in the London Evening Standard on building services is an example of what can be achieved.)
- Via schools governors. Many building services engineers are school governors who are well placed to get the message direct into their schools.

Many young engineers have shown an interest in communicating with young students including at schools and careers fairs. It offers them an opportunity to contribute to the social infrastructure of the community and most importantly they are of an age best suited to conveying information about engineering to children and students with whom they can relate.

Promotion of Building Services

Building Services has been said to be strong on knowledge but weak on influence. We must work together to remedy this serious shortcoming. The increasing emphasis on energy and environmental related issues offers building services the opportunity to significantly raise its profile and its influence.

A concerted effort must be made to raise the profile of building services by whatever means available. This will include promotion through publications, the press, presentations and by personal contact. Students will be attracted to a successful and relevant industry. The CPE operates at a regional level which may offer an opportunity for CIBSE Regions to work with the scheme, and involve local firms, including Patrons, in the process.

To aid successful communication, the right tools conveying the right message must be available. This can be developed via HQ and made available to regions, to companies and individuals as and when required.

To aid the process of communication with the right message, the Institution should:

- produce a standard presentation pack, available in a range of media, for the purpose of presentations to children, with model text to assist delivery.
- ensure the website provides children with the best available information on a career in building services.
- produce model press releases about the industry to offer to the national and local press for careers editorial.
- make available a high quality and transportable backdrop for use by regions and others at careers fairs and the like.

This should complement the existing poster and brochure material to provide a consistent, high quality and co-ordinated message, and be refreshed regularly.

Of increasing importance is the availability of relevant information in an easily accessible form via web sites. Areas of the CIBSE web site should be dedicated to attracting young people, providing careers information and details of degree and other courses, entry qualifications etc. Most important of all is that it must be in a style towards which young people will be attracted. The Institution should also ensure that the site features high on relevant internet search engines.

It is important to improve the visibility of building services outside of the construction sector getting the message to the general public. This is another route for the message to get to children through their parents.

It is generally acknowledged that the name "Building Services" is not one that conveys what we do; outside of construction it is almost certainly not understood and is likely to convey an image of 'maintenance' in buildings. This should be on the agenda for review. A number of universities are changing the names of degree courses to make them more attractive to students by including "architecture" and "environment" in the titles. However 'CIBSE' is a strong brand which should be retained if possible, therefore some options for consideration would include –

- Chartered Institution of Building Systems Engineers (CIBSE)
- Chartered Institution of Building Systems and Environment (CIBSE)
- Chartered Institution of Building Systems and Environment Engineers (CIBSEE)

Improving the image of building services is the more important issue and a subject that must be given more attention both within the Institution and by those working within the industry at large.

Collaborations

The main thrust of this paper has addressed the need for close collaboration between

- Industry
- Education sector
- The Institution and its members

The Institution has a vital role to play and should be a catalyst for change within the profession and the industry.

The Institution must raise the profile and professionalism of construction as a whole by supporting and developing its relationship with a wide range of key organisations such as:

- Construction industry representative bodies
- Contractors' associations
- Manufacturers groups
- Research associations
- Government departments
- Other engineering Institutions
- RIBA, RICS etc

It is important to co-ordinate with other institutions in responding to government papers and other policy issues. It is also important to support key industry initiatives to maintain our improving profile in construction, such as Construction Best Practice and M4I.

This is a complex and demanding area requiring targeted effort to get the maximum benefit. The Institution should provide a framework to enable collaborative working by individuals, firms, universities, Patrons etc to be most effective. Many organisations have themselves similar objectives, particularly in working to attract school leavers to the industry, where such collaborative working will benefit all parties.

Government is supporting institutions adopting a modernising agenda. The CIBSE is making progress in this respect through work on Part L, its contribution to Rethinking Construction and its response and on-going work in promoting reduction in carbon emissions following the Meacher Challenge. We must continue this good work and do more in the future to improve our status and gain visibility and credibility.

We should also review the most important of all collaborations, namely that between the Institution and its members. Communication is improving through the Building

Services Journal, the website, the electronic newsletter and the members' CD ROM. General accessibility for members through headquarters is more open. Not withstanding these successes, further improvement should be targeted in all of these areas. In this respect, the work of the Regions is critical and ways to further their good work should be sought. Also, ways to improve the benefits from better communication with industry available through the Patrons company scheme should be investigated.

IN CONCLUSION

Engineering in general and building services in particular can be promoted in a positive way to young people, offering a challenging, rewarding and indeed an exciting career.

The increase in importance of engineers in resolving global and national problems, particularly those relating to environmental issues, will generate an interest for young people in engineering.

Building services engineers are able to contribute on an international scale to the environmental and wider sustainability agendas for the benefit of society as a whole, demonstrating that it is a worthwhile career with a social dimension.

The shortage of skilled people at all levels within the industry offers good employment and career opportunities.

There are too many initiatives promoting engineering in schools thereby diluting the impact, wasting valuable resources and presenting a confusing message. The Institution should argue for rationalisation, but above all should decide on the most appropriate schemes for building services and concentrate effort on those selected.

We must find a way to improve the collaboration with schools, children, teachers and parents to convey the message about engineering.

CIBSE must develop a suitable area on its website and a range of quality presentation material to assist with the communication of building services to schools and others. Involving children in the development process will ensure that the material is appropriate for a young audience.

The Institution and its members should take a lead in the process of improving the image of building services, assisted by industry, university departments and others.

The Institution, assisted by Regions in UK and overseas, should take every opportunity to promote and raise the awareness of building services in the press and media.

The regions should examine ways to encourage participation of young engineers in their activities. The Hong Kong and Scotland regions provide useful models.

Industry must commit to promote engineering in schools where appropriate participating in one of the national schemes.

Industry should commit to sponsoring students through university and provide structured training and a clear career development programme to enable high quality graduates to be attracted into building services.

Universities should work with industry to ensure that course content is wholly relevant to the industry needs.

Industry should support Universities making available engineers to assist course development in current engineering practice and construction methods.

Collaboration in all of these areas is key to taking forward this initiative. I would support the proposal for a CIBSE "Futures Group" to address the longer term issues affecting our members and the profession as a whole, including the supply chain of young people to the profession.

The Institution is working to ensure that there is a robust infrastructure to enable development of its education and training policies. This provides the framework within which to work, but alone is unlikely to be sufficient to reverse the current trends. If we are to reverse these trends and raise the standards within industry, our overall objective should be to aim high, to attract the best on to high quality courses, producing young people with skills to meet the needs of employers. It is important that this programme addresses all sectors and levels of the building services industry.

As a final comment, I was advised by some against trying to tackle big issues in this address and limit the objective to modest but achievable goals. I took the view that the supply of young people into the industry is a crucial topic and is so important that

the issues needed to be set down to enable a longer term programme to be established. Within this programme, however, there are a number of short term goals which I will endeavour to take forward and deliver, whilst at the same time working to develop a strategy for the longer term.

REFERENCES

1. Engineers for Britain, The State of the Profession towards 2002; Digest of Engineering Statistics, Engineering Council.
2. 2001 Survey of Registered Engineers, A Focus on Engineering Issues, Engineering Council.

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