

## **“Y’ canna change the laws of physics”<sup>1</sup>**

### **Reflections on 30 Years in Professional Engineering bodies**

Engineering is generally taken for granted in modern society. Despite our best efforts, most of the population does not wish to know the extraordinary - to us - developments in design, manufacture and project management that underpin their blissful expectation that their aeroplane will arrive at its destination and their mobile will connect seamlessly with a new network.

My entry in 1979 into the professional staff community was in building services engineering - an obscure discipline even to other engineers. When they do think about it, most connect the idea of heating, ventilating, lighting and air-conditioning with their own DIY efforts and wonder how practitioners could ever achieve professional status.

A refugee from the rapidly privatising electricity supply industry, I was also bemused to discover a thriving sector of the economy, grappling with the problems of architect designed buildings that behaved like greenhouses, developments in theatre design, and ensuring shoppers and staff were comfortable and safe in giant retail centres.

Their institution, CIBSE, was a campaigning institution. Long used to underdog status, the institution had taken on ministers, lawmakers, the Privy Council and the engineering establishment – and generally won. The battle I engaged in, almost immediately, was the fight to gain CEng recognition for the undoubtedly competent core of the profession. This involved a lawyerly series of arguments with the newly formed Engineering Council, a public relations campaign, demonstration of rigour and fearless engagement with key opponents.

There I learned the nuances and defects of the professional standards of the day – SARTOR – eventually gaining a sufficient reputation for unwillingness to compromise that I was invited to become, in turn, the first CEO of the Construction Industry Council, and then the “Convenor” of the Group of 12 – the CEOs of the biggest PEIs of the day. This latter group helped needle the ponderous Engineering Council into a complete reorganisation – but not a happy one, unfortunately.

Nevertheless, perhaps over-impressed with my own achievements, I accepted in 1997 a job as Director for Engineers’ Regulation at the newly reformed body, and hence began another long journey to lead, eventually, one of the more successful creations of the engineering profession (although there were times when this would have seemed a most unlikely outcome).

### **Changes**

The biggest changes I have seen have been in attitudes and influence. Certainly I have lived through a period when the Engineering Council could do nothing right. The professional community saw it as an external imposition, a diversion from the business of promoting engineering properly, coddling tiny learned societies (forgetting where most had started), and generally creating unnecessary bureaucracy. Somehow we have become for the profession a source of added value, of pride, and of wisdom – I am not foolish enough to believe this is all my own work as I have been privileged to work for a sensitive and intelligent Board and supported by a thoughtful, dedicated and experienced

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<sup>1</sup> Scotty - Star Trek: The Original Series *The Naked Time* first broadcast 29 September 1966

staff.

These changes have arrived at a good time for the profession. I believe that UK society is starting to rediscover the contribution the professions make to our national wellbeing – not particularly in economic terms (though the £2bn surplus on trade in engineering services is quite handy) - but rather in making sense of the miasma of qualifications and courses, providing external verification of their value, ratified by the willingness of employers and clients to trust the results.

Not only that, but we are now in the era of the NGO. Lobbying has got a bad name, but modern democracy thrives on the research and advice that professional bodies can provide. Untainted by profit, but crucial to economic and social progress, the professional societies are recovering from a period when they were seen by both major political parties as self-interested rent-seeking private groupings. I sense in recent actions and pronouncements by governments (the Fair Access to the Professions inquiry, the creation of a Technician Council), a grudging acceptance that the professions have a key role to play in the skills agenda.

Another great sea change I have seen is the widespread acceptance of outcome-based standards. In the UK the engineering profession led much of the development. The National Council for Vocational Qualifications tried to embed the changes, but met huge resistance, apathy, and – it had to be said – caused many expensive, painful and ultimately unsuccessful experiments to be visited on particularly the Further Education community during the 1980s and 1990s. The ill-fated professional engineering standard, SARTOR 3, got it right, but was shot down because, lacking the courage to promote this, the Engineering Council got involved in an ultimately self-destructive attempt to influence university admissions.

It was part of the new Engineering Council's success to recognise this and draw out of the bonfire the attractively slim UK-SPEC – which hit the spot so successfully that it has formed the basis for professional standards in allied professions.

Nobody born after 1970 would recognise the changes that IT has caused in the utility and significance of professional bodies. Always the recipients and co-ordinators of developments related to practice, professional bodies were restricted in what they could readily disseminate. Everything centred on the library, the conference and the evening lecture – demanding physical presence, or at least delay, and often constraining valuable developments because of the difficulty of identifying who might be interested. The world wide web broke open those boundaries, and introduced today's professions to the role of providing authority to information ubiquitously available in ways our forefathers could not conceive. My belief is that we have only started on a journey where the sourcing and sharing of knowledge becomes a more and more important part of the work of professional societies.

If sex was discovered in the 1960s (according to Philip Larkin), globalisation was the discovery for the engineering profession in the noughties. Engineers from the British Isles had built factories, ports and railways all over the world from Victorian times, but this was a globalisation built on the ease of purchasing components and designs from all over the world, and assembling or creating finished products somewhere else. Purchasers, employers and governments suddenly needed reassurance about the credentials of the professionals involved – and then to demonstrate their own people measured up. The cosy Washington Accord and FEANI agreements needed to become more

rigorous – not only to show they worked, but also to provide meaningful criteria to be met by the orderly queue of national engineering bodies seeking recognition. The UK engineering profession, with its newly restated standard, UK-SPEC, has been in a good position to profit from these developments.

For many years the profession paid lip-service to the role of the technician. The three tiered hierarchy was good in theory, unless you were in the bottom tier. Besotted by status considerations, the profession spent more time worrying about their chartered members and regarded engineering technicians as, at best, “chartered engineer-lite”, mainly looked after by the smaller societies who had - in the eyes of the bigger ones - no status anyway.

2002 saw a resolution by the new Board of the Engineering Council (UK) to address this issue. A separate, and refocused standard within the UK-SPEC was published, and the more conservative PEIs urged to look carefully at the importance of the technician. A separate political campaign was waged to persuade DTI (now BIS) to recognise the deficit in recognition compared with our competitor nations. 2009 was a culmination of our efforts – with all but two PEIs licensed for EngTech, and a White Paper calling for “recognition of a technician class”. There is a long way to go, but the new government has reiterated the call, and the former Science Minister, Lord Sainsbury has indicated that creation of a Technician Council to promote this has the backing of his substantial Gatsby Foundation. After years of decline, the Engineering Technician register has experienced five straight years of growth.

### **Things that still need fixing**

It is perhaps inevitable that social organisations built on pride, commitment and companionship find sharing with other similar organisations quite hard. And of course much engineering is practised in a very competitive environment. Nevertheless one of the greatest frustrations in working for this great profession has been unwillingness on the part of the PEIs to co-operate for the good of the profession, and the concomitant lack of leadership within the profession. During 2008/9 the imminence of public castigation for the lack of co-ordination on policy matters resulted in a rare flash of recognition that this might be a disadvantage. Nevertheless the agreement to support the Royal Academy of Engineering as a representative body for the profession, welcomed by the Select Committee of Inquiry looking into Engineering and Engineers, remains delicate. In addition to publishing a joint manifesto under the ‘Engineering the future’ banner, the profession also published multiple overlapping “manifestos” for the May 2010 election, and is still having difficulty finding common ground on the great issues of the day – energy, environment, and skills.

Equally frustrating has been the reluctance of PEIs to recognise publicly the importance of registration of engineers and technicians. This is not just a private gripe for the Engineering Council, but undermines the standing of their own members, by suggesting that membership is unreferenced to any national standard, and introduces a hurdle for those seeking registration, who can search PEI websites in vain for the doors marked CEng, IEng or EngTech. We have worked hard at the Engineering Council over the past couple of years to address the previous poor marketing of our national standards for engineering, and I am hopeful that PEI promotion of these valuable assets is improving.

Development of the profession faces another threat in the slow demise of employer-sponsored “initial professional development”. The UK's traditional strengths of the guilds, which became the apprenticeship system, and eventually graduate training schemes and sandwich courses, is gradually evaporating with the changing structure of UK industry. SMEs and profit centres within major corporations have no incentive to invest in training – it is almost always cheaper to poach experienced engineers and technicians. Perhaps accelerated by the privatisations of the 70s and 80s, and reinforced by globalisation releasing UK-based companies from the restrictions of local recruitment, the assumption of employer commitment on which the UK formation processes are based is looking decidedly threadbare. While there remain a large number of organisations that do still train, we need to recognise that it is increasingly up to the individual to seek relevant experience and training. That is the reason I have been committed to developing work-based higher education that links with PEI mentoring and employer interests - our Engineering Gateways scheme. Although still small scale, it has the potential to restore the balance.

Relationships with IT and science are a third concern. Both sectors have found it necessary to redefine their relationship with engineering, but in differing, and possibly damaging ways. IT has developed a gung ho anything-is-possible approach to projects that is far removed from the risk-based evaluations of engineers. It has become almost de rigueur for IT “professionals” not to belong to a professional body, and the consequences are all around us (and documented by the Royal Academy of Engineering and the Public Accounts Committee, amongst others). We very much need to bring the IT profession back into register with the engineering profession, who after all make great use of its products and ideas.

Science is different. The UK has been enormously successful in developing much of the science on which our lives and industries depend. Science consumes large amounts of public money and constantly needs to demonstrate the value everyone gains from its output. Engineered products are easy examples to illustrate this. However, in recent years science has increasingly sought to suggest that engineering is a subset of science. This is nowhere better illustrated than in the Government's own organisation of science and engineering advice – led by a single “Head of Profession”, with no acknowledgement of the differing approaches of the scientist and engineer to problem-solving, or indeed the differing training and development needs of scientists and engineers. The concern is that the cheerleaders for science are distorting the public understanding of engineering – and the perception of engineering careers. There is no space between the blue collar artisan and the white-coated theoretician. This leads on to my next point.

### **Things that never change**

The past 30 years have demonstrated to me that engineers hunger after public acknowledgement to an enormous extent. The most constant feature of my postbag over the years has been the accusation that the PEIs or the Engineering Council (usually both) are involved in a conspiracy to suppress statutory regulation of the profession and other forms of public recognition of engineers. Countless inquiries, reviews and reports have had professional recognition as a theme. My personal view is that this will never change. Notwithstanding the views of my correspondents, the lack of acknowledgement is probably inevitable. The first President of the Institution of Civil Engineers, Thomas Telford, wrote....

“It is unnecessary to remark to you on the business of an Engineer; all admit the difficulties of it, and the indefinite character of it; and that by the want of definition its respectability is less than its due, that public confidence which is indispensable is much weakened by the presumption of unskilful and illiterate persons taking upon themselves the name.”<sup>2</sup>

The number of PEIs is a second complaint. This has reinforced a view that the effectiveness of the profession has been hindered by the existence of multiple bodies with overlapping claims to expertise and influence. The creation of the CEI was a response to this, but failed to distinguish between current strength and future clout. Who, today, would challenge the likelihood that the Nuclear Institute will grow in size and influence, or be surprised that the two Institutes concerned with mining had coalesced and joined the Institute of Materials. The Engineering Council currently licenses 36 PEIs – rather fewer than the 44 originally “nominated” by the Engineering Council, but commensurate with the 31 members of the Accreditation Board for Engineering and Technology (USA), or the 42 members of the French Conseil National Des Ingénieurs et des Scientifiques de France (CNISF) that are not schools of higher education.

Engineering will generate further new societies as new technologies and economic engines emerge. Our current structure of 30+ licensed bodies, 20 professional affiliate societies, and, probably, 30 more aspiring societies seems fairly stable and allows for growth and redistribution of emphasis as time goes by. Any lack of a coherent voice for engineering must be placed fairly and squarely on the leadership of the major institutions, the Royal Academy and the Engineering Council.

The third complaint is the difficulty of gaining registration. This falls into two categories – firstly those who suddenly realise the value of registration and expect to achieve it instantaneously. I have little sympathy with them – a volunteer-fuelled organisation must operate at the pace of committees and individuals within them, who usually have many other calls on their time. The second category is about the bureaucracy of membership processes. Here there is scope for change – and a real wish on the part of CEOs to do more. Some of the processes lend themselves to IT solutions: more could. Others require modern management techniques to wrestle the obstacles to the ground.

### **Things I will miss**

The thousands of volunteers who populate our profession, giving their time freely to assess, mentor, share and promote engineering good practice are the profession’s greatest asset. Working with them has made coming to work a joy and a privilege. Hopefully my relationship with them will not change too much as I join their ranks in the future.

I will miss working with the staff of the organisations I have served: sharing many of my quotidian satisfactions and frustrations. The esprit de corps and goodwill will be difficult to replace. We have shared common enemies, guilty pleasures, but most of all a belief that what we are doing is valuable, misunderstood and right.

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<sup>2</sup> **Thomas Telford’s letter of acceptance of the office of first President of the Institution of Civil Engineers. 1820**

Our contributions to society as a profession are immense. The unique nature of engineering requires regular breakthroughs and checks to the natural decay of an essentially hostile universe.

As engineers we learn early on that entropy (a.k.a chaos) is our natural enemy. Our profession fights to create order and value out of the materials and resources we have. Being part of the struggle has been important to me.

Maybe Scotty was too pessimistic. Engineers can't change the laws of physics, but we can for a time at least deny their supremacy.

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