



FOLLOW THE YELLOW BRICK ROAD: A PERSONAL EXPERIENCE OF ACHIEVING CENG THROUGH IPEM

Scott Brown (Royal Cornwall Hospitals NHS Trust, Truro) continues the CEng theme from the previous issue of *Scope* and describes his route to accreditation

My father was a Chartered Engineer (CEng) in mechanical engineering at a time when a HNC was the academic standard for CEng; times have changed! With a family background in engineering I aspired to this, although my area of interest was electronics rather than

mechanical engineering. I began my career as an apprentice for British Telecommunications Plc; at that time it was still the General Post Office (GPO), long before privatisation in the mid 1980s. I worked my way up through the ranks starting with Eng. Tech., then moving to Incorporated Engineer (IEng) as I progressed my career. After 10 years with BT I moved into the NHS to broaden my



physics department I studied through the National Extension College for the Engineering Council Part II examinations. The Engineering Council Part II examinations provide an alternative route for those who do not go to university. The examination was divided into three Parts, A to C. Part 2A covered five topic areas:

- fields and circuits;
- electrical supply and distribution;
- electronic systems engineering;
- computer systems engineering;
- communications systems engineering.

There was also a compulsory topic (Part 2B) entitled 'The engineer in society', which covered mainly management skills. My practical project for the examination (Part 2C) was an ECG arrhythmia simulator, which the medical physics department did not have at the time and was relatively new in the field. The waveform timing was based on a programmable crystal oscillator producing a square pulse waveform which was then modified by a series of LM555 timers (for those of you who can remember them) to produce variants on the classic P, QRS and T wave shapes that make up a normal electrocardiogram waveform.

Switching between waveforms was achieved by a membrane keyboard that controlled electronic switches (anyone who would like further details please feel free to get in touch). I was fortunate to have one of the consultant cardiologists at the time to sign off that the waveforms produced were an accurate representation of a true electrocardiogram.

I sat the examinations in 1994 and then registered for the CEng Stage 1. This is an important lesson as the academic requirements are continually being raised so as soon as you meet the standard I recommend that you register the Stage 1.

WORK EXPERIENCE

I applied at the time for CEng but was advised by the Registrar that I did not meet the level of responsibility in my role. Although this was a disappointment he gave me guidance on how I might achieve this in the future.

In 1996 I set up my own training and education business. My principal contract was with Hewlett Packard Ltd as a sub-contract Consultant Lecturer delivering their biomedical

engineering courses and writing student manuals for the courses. Working for Hewlett Packard, Agilent Technologies and Philips Medical I delivered biomedical courses across the country, as well as providing some bespoke training to different medical companies. At the time I was also a regional moderator and examinations committee member of the Electronics Examinations Board (EEB). I also undertook some contract engineering projects including designing an emergency lighting switching panel and diagnostic engineering tools for biomedical engineering.

Whilst working in the NHS I also designed the interface circuitry for our linear accelerators and planning simulator which are still in use today, as well as specifying a CCTV system to remotely monitor the drawing-ups of drugs into a syringe in a category 3 pharmacy clean room. I also completed a project for an anaesthetist to look at the effects of using very long administration lines so that a syringe driver could be used outside of the MRI setting; principally this was looking at the effects on occlusion pressure, flow rate and times to occlude comparing theoretical calculations using the Hagen-Poiseuille formula $Q = \left(\frac{P_1 - P_2}{128\mu l} \right)$ with practical experimentation. These are just a few of the interesting projects that I was involved with.

ENGAGING IN IPEM ACTIVITIES

I have gained a huge amount of personal satisfaction from being involved in IPEM activities as well as this contributing to my CPD and career. I joined IPEM in 1996, having previously being a member of the Biological Engineering Society (BES). As a member I sat on the Clinical Engineering Special interest Group (CESIG) for 4 years, during which time I presented at several scientific meetings, organised and chaired a scientific meeting and was an author and editor of IPEM Report 95.¹ Presentations and publications always look good on a CV and there are plenty of opportunities available through the SIG scientific meetings and annual conference.

Having completed my term on the CESIG I then served on the Engineering Group Board as a CEng member for 3 years, during which I

experience; my time with BT rewarded me with a Higher BTEC in Communications Engineering and a thorough grounding in engineering, although not enough to meet the Stage 1 CEng requirements.

MEETING THE ACADEMIC STANDARD

Whilst working as a Senior Medical Technical Officer in a medical



▲ Scott Brown
M.Ed C.Eng C.Sci
MIPEM RICR MCGI

wrote chapters for the forthcoming IPEM report *Quality Control in Clinical Engineering*.² I now sit on the IPEM Council as a CEng member.

THE CENG APPLICATION PROCESS

Having already satisfied the academic requirements for CEng Stage 1 and gained further experience/responsibility, I once more contacted the IPEM office in York to obtain the necessary documentation and guidance. The office was very efficient and provided the necessary information quickly by post. Technology has improved and these documents are now available on the new website.

“CEng is also recognition that you have achieved the highest practical experience within the industry”

PREPARING THE DOCUMENTATION

The requirement was to produce an Individual Professional Development Report which I accompanied with a table produced in Microsoft Word®. Whilst this was not mandated it did give the opportunity to provide evidence in an easily digestible format for the registrars. This table was divided up into columns for competency descriptors and the evidence to support this. Each of the competency descriptors, e.g. B1: Identify projects, and opportunities was given a separate row. This could have been provided equally well with a Microsoft Excel® spreadsheet. The key advantage for this approach is that it gives the registrars the evidence against which they need to assess the criteria in a simple format; remember the registrars are volunteers who, whilst on your side, do this for the benefit of the industry/IPEM rather than personal gain.

SUPPORT

The registrars

The registrars are there to support applicants and are happy to act as mentors and discuss your application with you. They will give you a realistic appraisal of your initial application and provide you with guidance to submit a successful application.

A ‘critical friend’

I found it particularly valuable to gain the support of a senior colleague, not only to support my application as a referee, but also as a confidant to review my evidence. I firmly believe that the guidance given by my ‘critical friend’ was what turned my application from a report of evidence into a successful application. This is not to say that my application was not accurate, but, like many in engineering, I am not accustomed to promoting my skill set. Engineers are by their very nature a conservative bunch, with a small ‘c’, and we often need support for self-promotion.

THE INTERVIEW AND DISCUSSION

Interviews are an unnatural situation for both the interviewers and the interviewee. That said, I found the interview more of a discussion

amongst peers rather than a conflict. The two Registrars gave me the time I needed to discuss the evidence I was presenting and were supportive rather than critical. They needed to understand the engineering element of my work and how it evidenced the criteria for CEng. The Registrars report their interview scores to the Engineering Board where a discussion takes place amongst the committee members, and a final decision is made.

CENG: WHAT DOES IT MEAN FOR A CAREER?

Whilst CEng is not linked to the NHS KSF framework, it is now increasingly becoming a desirable criterion for senior NHS posts. The recent IPEM newsletter states that the ‘Engineering Advisory Board reported that the Modernising Scientific Careers learning outcomes will be compared with the requirements for CEng in order to determine a career pathway for registration’.³ CEng is also recognition that you have achieved the highest practical experience within the industry. Whilst academic qualifications undoubtedly have their place, they do not replace practical experience but should be seen as supportive.

Having gained the CEng qualification, I have been spurred on to attain Health Professions Council (HPC) registration as a Clinical Scientist and I am looking forward to Eur.Ing. status in the future. My current post is as a Research Manager where I am still applying my engineering skills equipping a sample preparation room with the necessary freezers and refrigerators and complying with the British Standards for the centrifuge bench as well as ensuring the laboratory is MHRA compliant. Having completed the PRINCE 2 practitioner course I am also engaging in some consultancy work which will require work within the UK and potentially throughout Europe, and I have no doubt that this has been supported by my achievement of CEng.

My final message to all engineers is to apply for the most appropriate grade of Engineering Council to your work and then aspire to CEng; it can only be a bonus and is really worth the extra effort. ■



▲ ECG arrhythmia simulator.



▲ Alaris IVAC P7000 syringe driver.

REFERENCES

- 1 Blache L, Robbins P, Brown S, Jones P, Liu T, LeFever J. *Report 95: Risk Management and its Application to Clinical Engineering*. York: IPEM, 2008.
- 2 Clarkson, DG (ed.). *Quality Control in Clinical Engineering*. York: IPEM, in preparation.
- 3 IPEM. *IPEM Newsletter* 2010; 188.