Proceedings of the Institution of Civil Engineers
Management, Procurement and Law 160
May 2007 Issue MP2
Pages 61–62
doi: 10.1680/mpal.2007.160.2.61
Paper 2007267
Keywords:
business/management

Briefing: Engineering skills shortages in China – a personal view

G. Mills, *Sino Infrastructure Partnership, Shanghai, People's Republic of China*

Two challenges from history illustrate how to mobilise an industry to face a major challenge: the engineering infrastructure for the Normandy landings and the establishment of the UK's motorway network. China has already applied the lessons learned from these challenges to undergraduate education, but the focus is now moving to professional development. A group of leading firms, academics and ICE is cooperating to tackle this problem. This is a small step on an arduous journey but to those who judge Chinese engineers only by where they are today and not where they have come from it would be worth remembering the following Zhuang Zi quotation from the 5th century BC. 'When Heaven is about to place a great responsibility on a man, it always first frustrates his spirit and will, exhausts his muscles and bones, exposes him to starvation and poverty, harasses him by troubles and setbacks so as to stimulate his spirit, toughen his nature and enhance his abilities.'

I recall my early mentors sharing their experiences of mobilising an industry and profession to deal with two major challenges that the UK faced in the last century.

The first was for the engineering infrastructure required for the Normandy landings and the second was the establishment of our motorway network. For both challenges, successfully implemented, although with undeniable fragility in places, the issue was how to work from a foundation of limited appropriate experience to achieve a goal that would inevitably require the mobilisation and effective use of large numbers of people without that experience.

One aspect of the solution in both of my examples was the need for standardisation which, given the old but true adage of 'you can have it quick, cheap or clever–any two but not all three' meant that economy (and these days in particular that means resource utilisation) had to be sacrificed.

China faces many such challenges as these and on a vast scale. Hence it is not surprising that the same challenges that stretched our resources on those more modest endeavours are being faced by China as it rushes to overtake the US as the world's largest economy.

China started, some two decades ago, with the additional handicap of the major re-education programme known as the Cultural Revolution, which was aimed at improving its farming rather than engineering infrastructure (something of a simplification!). My Chinese engineering friends, visiting the UK, ask me, 'why are they growing that?' I reply that not only do I have no idea why, but I don't even know what 'that' is. I did not spend my formative years in a farming community. Those engineers who were left to practise their profession were encouraged to learn from the Russian experience and to learn that language.

Fortunately for China, Deng Xiao Ping implemented the reform programme that has led China to its present eminence and coming pre-eminence. One of the key reforms was the re-establishment and rapid expansion of China's schools and universities in the late 1970s/early 1980s. They were tough institutions and hardy students–some of our directors came through that process and from morning to night sat in ice cold classrooms writing with fingerless gloves and living in huge dormitories. Heating was not the only luxury not afforded to students–so was freedom of choice and of thought. The first standardisation programme was the curricula and indeed the very choice and allocation of subjects. Our Chairman wanted to be (and in fact now is) a philosopher but he was directed to study metallurgy and realised that he either had to do so or would not study at all. Media studies, jazz saxaphony (my son's choice!) and other recent western degree innovations were not on the menu and most remain absent still ('mei you'–don't have).

So in a little over 20 years China has through dint of clear focus and hard graft clawed its way up the academic ladder to the point reached today where we have some 25 Chinese universities with engineering degree programmes accredited by the UK Joint Board of Moderators to the same standards as the accredited UK programmes. There are another 275 universities (approximately) not so accredited but the Ministry of Construction is comfortable that it has the academic elite that it requires. These graduates, of whom we employ a good number, are skilled in the hard mathematical/scientific disciplines but lack the softer skills that British graduates increasingly focus on. If I ask one of our Chinese graduates to do something he does it, even if it is daft (which it rarely is). If I ask a British graduate, he asks 'why' and when I explain he tries to persuade me that he (or she) has a better way. Nine times out of ten he is wrong and wasted my time. We need both attitudes of mind and in fact for the moment we need both nationalities in the same team to complement each other.

So by the turn of the millennium China had largely solved its graduate skills problem. Challenges remain and adjustments to the programmes need to be and will be made but the big issue now is professional training and in particular multi-disciplinary management.

This is perhaps where the western experience is most required by China and the Chinese are not shy of learning from the best experience wherever they find it. Deng recognised that in his famous statement that 'it doesn't matter whether the cat is black or white, only that it can catch the mouse'.

The Chinese New Year holiday, in which I am writing this, is a traditional bridge between the old year and the new but this Year of the Pig marks a special bridge-building achievement between the British and Chinese engineering communities.

We all know that the world we will pass to the next generation is a world with some significant problems and that we will have created more than we have solved in our working lives. In the construction sector these are particularly challenging and their resolution will need not only new solutions but the ability to disseminate and apply these as broadly, rapidly and reliably as possible.

Traditional education, training and professional development structures work best over longer development time cycles. For good reasons, their focus has been more on the need to capture and codify established good practice than to encourage and spread innovation, which has a long record of being the cause of many failures if applied early in the development period. In physical bridges, for example, there have been spectacular failures in history in every continent—at least one having such an impact that the event is locked in the oral tradition of a popular children's song.

Uniquely in this sector a group of leading British and Chinese engineering companies are cooperating with Shanghai Jiatong University and the UK's Institution of Civil Engineers to provide a rolling continuous professional development (CPD) programme for young engineers in China. This is unique not only in relation to the bilateral cooperation aspect but even in the UK (and other western countries) I know of no CPD programme that links ongoing academic and industry experience so that young engineers can refresh their knowledge of, and thus be in a position to build on the latest research as well as having the opportunity to learn from best current practice in application by leading companies. It is to be applauded that this cooperation includes support from competing firms who are far-sighted enough to see the benefit arising from active support of this programme. That is indeed the cultural tradition of the best professional institutions in all sectors.

The British Consulate in Shanghai and the British Council have for some years been supporting the mutual cooperation activities of a number of British professional institutions in China through the activities of PI-UK (established under the Construction Industry Council) and this particular CPD programme has benefited from their long-term encouragement and support.

It is encouraging that in an increasingly competitive and difficult world a programme such as this which offers few if any immediate market advantages to any of the sponsoring organisations has in fact received such strong and effective support that the inaugural programme is scheduled to start early in the Year of the Pig. In fact it will be (and by the time you read this will have been) formally launched at the ICE Shanghai Branch Annual General Meeting on 1 March this year and the first group of young engineers will have enrolled on the programme.

Too often these days we hear and see only the results of the worst aspects of human nature. Here is an unsung (until now!) product of some of the better aspects and I am sure that we will all wish it well.