



# Teach a man

Give a man a fish and you've fed him for today; teach a man to fish... Brian Tinham looks at the changing world of education and training, and opportunities for plant engineers

## Pointers

- We need to convince young people and junior engineers not only that it can be done, but that taking advantage of training is the best route to a rewarding career
- We also need to encourage time-served engineers and managers to recognise that there must be significant gaps in their knowledge
- Employers need to understand that training is not an avoidable cost – it's the only sustainable way to create a flexible, multi-skilled, competition-beating workforce that's independently-verified as competent

The Leitch Review of Skills, published in December 2006, warned that the UK must raise its game on training and education, if it is to sustain, never mind improve, its position in the global economy. Whether that study will turn out to have been the much-needed catalyst for finally turning around this country's long-term skills shortage, remains to be seen. However, one thing is certain: it spawned a veritable plethora of initiatives and schemes – some fancy, others down to earth – from government and non-governmental organisations, professional institutions, specialist training providers, manufacturers' service organisations, you name it.

New training and qualification frameworks, customised certification, multi-media, distance learning, on the job training, off-site training, Skills Pledges, Train to Gain and even apprenticeships – they're everywhere, and with some funding, to boot. Barely a subject has remained untouched and plant engineering is no exception, with all manner of newly focused courses, for everything from big plant installation to HVAC equipment commissioning, fluid power systems maintenance and plant condition monitoring – from awarding bodies such as EAL,

EdExcel, PAA/VQSET, City & Guilds, IOSH etc – hitting the headlines.

But the oxygen of publicity is one thing. Getting any of these to have the desired effect is quite another. First, employers and individuals at every level need to see them as worthwhile. So worthwhile that they're prepared to invest the time, money and effort it takes – where, hitherto, one or all of those was lacking.

### Young and old alike

For us in plant engineering, that's in large part about convincing young people and junior engineers not only that it can be done, but that taking advantage of what's now on offer is the best route to a more rewarding career. However, that's not all. It's absolutely also about encouraging time-served engineers and engineering managers to recognise that there must be gaps in their knowledge: gaps that need plugging, if they're to perform their roles properly or progress up the ladder. And, just as important, it's about helping employers to understand that professional training is not just an avoidable cost – it's the only sustainable way to create a flexible, multi-skilled,

competition-beating workforce that's independently verified as competent and fit for purpose.

If you're not persuaded, cop this. The 'Bridging the Skills Gap' study – published last month by Lifelong Learning UK to mark the launch of its 'Pass on Your Skills' teaching initiative – revealed that the number of unfilled vacancies in UK engineering now stands at 20,000, and that 71% of companies are facing problems hiring experienced engineering and technician staff. Yet, another recent report – this from the Department for Education and Skills – showed that less than 1% of employers would increase training to encourage staff retention – despite four in 10 that do train their staff stating that it works and 41% of employees saying they feel more valued, with 48% more motivated as a result.

Why the reticence? It's not just tight-fisted employers. Part of the problem (certainly with more mature engineers) is that, historically, too much training has been poorly conceived, poorly delivered, largely irrelevant and, as a result, widely regarded as a waste of time. Why? The truth is, much of the

But another problem relates to learning style and content. Peplow points out that training employees outside their roles and environment is much less effective than making it directly relevant – and that the best outcomes result from training delivered within a framework and customised both to an organisation's and its individuals' needs.

Interestingly, a study by Corus Northern Engineering Services (CNES) suggests that interactive training is the most effective route. Nick O'Hara, CNES training manager, describes it as 'andragogical' as opposed to 'pedagogical'. "This means having a learning environment that is active, student-centred and where the training is initiated by the individual's drive, not by an instructor," he says, adding that CNES' e-learning courses are exactly that, involving self-assessment right up to full-blown plant simulations.

But back to plant engineering – and if you're now wondering what's out there, the answer is more than you might think – and the other good

**Left: training at TTE Technical Training Group, which grew out of ICI and British Steel on Teesside. The organisation is working with local companies, but also large multi-nationals in the chemical, petrochemical and steel industries**

# to fish

problem is down to management ignorance, laziness and lip service. Speak to any of the reputable training consultants and they'll tell you the first job is to establish what you need – not jump to conclusions. Obvious, yes, but too often HR takes the easy way out and suggests a course, without properly considering what's actually required.

Beverly Hamilton, group business development director with training consultancy Total Flow, says that employers should think about 'learning pathways'. "Managers need to go back to what the organisation is trying to achieve and, from that, what's needed for a role – rather than what's wrong with a particular person and how do we fix them," she explains. "Technical competence courses may be needed, but the classic is sending someone on a time management course when they simply need to change some aspect of their behaviour."

Business consultancy Peplow Group says that frequently what's lacking is management skills, such as the ability to organise projects and staff, and think analytically around problem-solving.

And Ross on Wye-based consultancy Values Based Leadership also emphasises the vital importance of management training. Says chairman Simon Hollington: "All business decisions and choices are made by people. So as you progress up the ladder, your ability to understand and inter-relate with people grows in importance."

## Back to engineering basics

We all learn by our mistakes, but sometimes those mistakes can be costly – even life threatening. SETA (Southampton Engineering Training Association) trainer Peter Millington gives the example of abrasive wheels. "It's incredibly basic stuff, but because of 'knowledge fade', operators I see are no longer sure what to do. So, rather than adjusting the tool rest, for instance, they'll leave it until there's a massively dangerous situation."

And he mentions other failings, such as wheels torqued up so hard, there are bound to be stress cracks. "It's worrying, and it's worse with young people: you can't make assumptions about their hand tools skills, and as for basic health and safety, many haven't a clue."

More dangerous than that, though, are supposedly qualified safety engineers that quote the regulations, but have little idea about the processes or reasons behind them. "Chartered engineers that know their subject, simply aren't growing in fields, ready to be reaped – especially those that can straddle the disciplines. We see people passing emails with legislative quotes that have little bearing on the project," says Millington.

Even skilled plant engineers and engineering managers aren't getting basic risk assessments and method statements right, he adds. "The joined-up thinking isn't there. They're not considering the cross-related aspects, such as the proximity of gas mains, flammables, other subcontractors in the area with open solvent cans. It's management on the hoof."

What about plant engineering itself? Engineers rightly pride themselves on their abilities, but the fact is technology moves on and skills fade. It's the old adage, 'use it or lose it'. Mike Baker, technical development manager at gas and oil burners manufacturer Nu-way, makes the point that, although combustion involves conventional engineering, there's a growing range of equipment that requires different methods of installation, commissioning and even maintenance.

"Look at the controls on a boiler installation: you'll see everything from on/off controls to three-term modulating controllers with exhaust gas analysis and PLC controls. Part L Building Regulations have made a big difference, with the drive for efficiency and carbon emission reductions. And there are nuances with heat pumps and biomass boilers. Engineers today need electrical and electronic training, as well as mechanical."

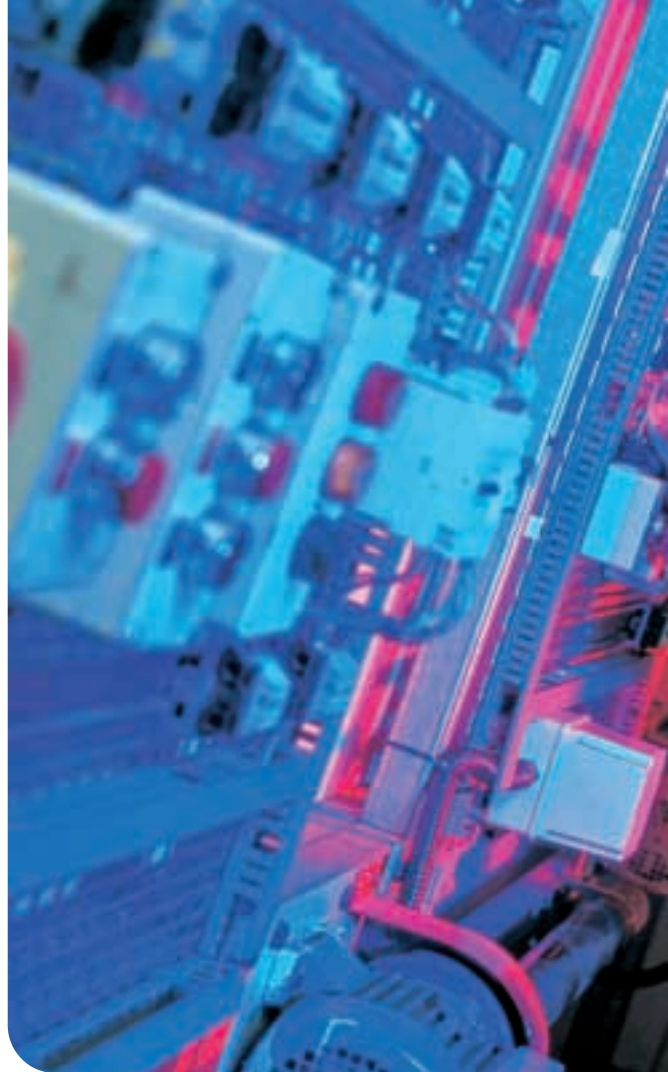
It's a similar story with steam systems: bread and butter, yes, but Spirax Sarco's training centre manager Roger Glassonbury says that, for example, boiler house supervision and maintenance are frequently not as good as they should be. "With the right instrumentation and equipment, plant engineers can reduce supervision, but most need to get back to basics. Then there's getting the steam distribution right, choosing the right steam traps, following best practice as we know it today, so that steam quality is the best it can be at the end of the line."

news is that take-up seems to be growing, both at the apprentice and continuing development levels. Phil Blewitt, commercial business director with TTE Technical Training Group, for example, says that his organisation – which grew out of ICI and British Steel on Teesside – is doing a lot more work with local companies, but also large multi-nationals in the chemical, petrochemical and steel industries.

“They’re increasingly using our training infrastructure to provide everything from four-year apprenticeships for electrical, mechanical, instrument, process and maintenance technicians, to off-the-job upskilling programmes that take mature technicians up to NVQ Level 3,” he says. “We’re also seeing increasing uptake in training engineers in areas such as industry-specific health and safety, and last year we introduced VRQs [vocationally-related qualifications], which work well for many of our young learners, because of their balance between practical and theoretical learning.”

### Critical competencies

Blewitt believes that demand for reskilling is growing, not least because of employers’ desire to develop and prove competence. “There’s a range of reasons, but they include health and safety, staff retention, plant performance – and being able to prove competence through qualifications,” he states. But there’s another reason, and it has to do with the impending retirement of ‘baby boomers’ from the 1950s and the looming gap being left by a whole generation of time-served engineers.



As Derry Carr, project engineer with facilities and energy management organisation Dalkia, says: “The average age of our ops team is about 48, because there are so few good youngsters coming through. What’s lacking is core skills: any ability to go back to basics and solve engineering problems.” For him, that’s because of successive governments’ ill-advised push for academic excellence above all else, only latterly re-introducing technical colleges. “In the old days, and certainly where I trained in the Navy, we didn’t just learn from our own mistakes – we gained experience working alongside older engineers, telling us what went wrong, when and why, and showing us better ways.”

David Bates, engineering director at plant services firm EMS Industries, agrees. “As an apprentice plant installation and maintenance fitter, I spent the first six months on basic bench fitting techniques, electrical appreciation, fabrication and pipe fitting and machine shop practices. Then there was another six months in the bench fitting department, but also covering hydraulics, pneumatics, fluids, engineering drawing, and slinging and lifting,” he explains.

His second year then covered everything from shaft alignment, to gear classification and alignment, gearboxes, clutches and brakes, steam turbines, pumps, seals and gaskets, machinery installation, lubrication... The list goes on. And then,

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## Getting training together

The world of training and education is changing – for the better. Government attention seems to have stimulated a new era of innovation and pragmatism, resulting in courses that much more closely match engineers’ real training and education requirements.

One of the best examples has to be the ETB’s (Engineering and Technology Board) pilot scheme, launched online last summer, and aimed at both initial and continuing professional development (IPD and CPD). It’s a collaborative venture, currently with six of the professional engineering institutions, ranging from the Institution of Gas Engineers and Managers, to the Royal Aeronautical Society and the Society of Environmental Engineers.

Hence its strength. ETB director of business development Adrian Talbot explains: “It’s a significant departure for the ETB, but these institutions have been helping us to develop the system, so that it matches what engineers across their communities need to maintain their competencies, and to develop towards EngTech, IEng or CEng. They started with different requirements and levels, but now we have one common process and it’s very much about mentored or unmentored learning, with evidence-based assessment according to learning outcomes, rather than certificates for attendance.”

Talbot concedes that, for now, the focus has been on supporting candidates seeking to achieve professional registration via the institution of their choice. But he suggests that the online framework lends itself to getting custom training that’s within the reach of individual engineers and small companies. “Our system has the ability to support unlimited numbers of competency frameworks, candidates and institutions, and others are more than welcome to join in.”





## New training opportunities

ISA (formerly the 'Instrument Society of America', now conveniently reinvented as 'Instrumentation, Systems and Automation') offers about 100 instructor-led courses on various aspects of automation systems, control and instrumentation design, installation, commissioning and maintenance. It also boasts an extensive library of distance learning and online programmes, as well as live and archive web seminars, leading to US (but highly regarded) certification.

Dale Lee, ISA director of conventions, education and certification, says the organisation is about to launch three more programmes dealing specifically with safety instrumented systems (SIS), based on ISA 84, which ties into IEC 61511. "We also carry out needs assessments of employees, with subject matter experts and screening tests, followed by customised training and certification. Costs can be as low as \$50 to \$1,200 for a three-day review course dealing with top-level engineering."

ASME (American Society of Mechanical Engineers) has also introduced CPD to Europe, with a series of five technical and managerial courses, starting in Italy in May. They're aimed at engineers involved in design, fabrication and maintenance of pressure vessels. ASME says its training will enable European engineers to get up to date with developments in its codes and standards.

ConstructionSkills is launching a Plant Managers Safety Training Scheme (PMSTS), specifically designed to help managers in the plant sector to improve health and safety across their workforces. It follows in the footsteps of the organisation's Site Management Safety Training Scheme (SMSTS) and Neil England, ConstructionSkills business performance manager, says it was developed with key federations, including the Construction Plant Association. PMSTS, which has been piloted at National Construction Colleges this year, aims to improve the management of health and safety on site and to explain managers' responsibilities.

Festo Didactic's new Training Needs Assessment Service provides organisations with a gap analysis of the hydraulics and pneumatics skills required to run their plants effectively. According to managing director Gary Wyles: "We can now ensure that every training course is delivered to maximum effect. This type of analysis is one that many organisations know they need, but either can't find the time for, or are too close to the working environment to carry out."

The company is also offering what it terms 'post course clinics': "The post course clinic is run by the trainer on the customer's site a few weeks after training. The objective is to ensure that skills and knowledge are implemented in the workplace. The service encompasses a number of activities, including a formal review, and provides a chance to visit participants at their workplace, answer any questions and coach them," explains Wyles.

Burner manufacturer Nu-way's training is focused around its own products, but technical manager Mike Baker says much of the combustion training is transferable. Courses range from blown gas burners to pressure jet oil burners and renewables, including heat pumps and biomass boilers – and the engineering issues around ash removal, mechanical auger equipment, as well as refrigeration cycle plant. A three-day gas course costs £386, while a subsidised renewable energy single-day course is £50.

Similarly, Spirax Sarco runs a range of training courses, now including a suite of free steam tutorials on its website. The firm also offers distance learning, as well as its in-house courses that stretch from a one-day introduction to the whole steam and condensate system, to three-day and five-day multi-skill maintenance courses, with practical fault-finding etc – the latter leading to City & Guilds. "You can't get too much of this kind of thing in colleges these days," observes training centre manager Roger Glassonbury, explaining that the company also runs courses for boiler operators to BOAS (boiler operative accreditation scheme), covering steam, safety, legal, energy and environmental issues, as well as Btech and custom courses on energy, clean steam and humidification.



years three and four were on Michelin's Stoke factory floor, with three-monthly assignments including planned and preventive maintenance, breakdown maintenance, machine improvements and machine replacement.

It's to be hoped that this September's introduction of the 14–19 Engineering Diploma will bring back a little of this and provide better engineering feedstock. SEMTA (Sector Skills Council for Science, Engineering and Manufacturing Technologies) project manager Bill Sutton expects the new initiative to "bring engineering to life in the classroom, celebrating the past, but also embracing the future for engineering". We'll see.

But, for now, there are only two ways to get that kind of core experience: backing youngsters through today's few apprenticeships, or reskilling existing engineers and technicians – either way, using organisations such as Blackburn College, CNES, ESR Technology, Horizon Training, Matthews Engineering Training, MCP Langset, Midland Group, SETA, TTE and West Anglia Training.

Meanwhile, Blewitt's advice: "Learning doesn't stop at school, or college, or when you've spent so many years doing a job in engineering. It's something you should do for life. People we see that go through structured learning programmes are the ones that go on to have successful, rewarding careers." **CE**