Tackling the training gap in UK manufacturing: remaining competitive in rapidly changing times
Foreword

It’s well known there is an enormous shortfall in engineers, at all levels, in every sector of UK industry. There’s no quick or easy solution to this, although it is encouraging to see more people nearing retirement age willing to pass on their knowledge, experience and skills to those new to the sector.

We hear so much about foundation degrees and chartered status, but what about the development of technicians and hands-on employees? The benefits of automation are well-known - but we still need the skills to install, commission and maintain these devices throughout their working life. It may not always be glamorous, but there must be solid foundations in place to harness the technologies we so often take for granted.

We must therefore empower engineers by giving them basic skills first, then offer them the opportunities to develop their career as far as they are able.

To get the best from advanced technologies and concepts such as Industry 4.0, we must ensure the workforce of today and tomorrow are constantly educated so they are always equipped with the relevant skills, understanding and flexibility to deal with our ever-changing world.

By promoting continuous personal development through structured and targeted training, we will as a nation ensure our engineers are plentiful and “fit-for-purpose”.

Adrian Hudson,
Control Systems Manager,
National Fluid Power Centre (NFPC)
As technological developments continue apace and all industrial sectors face a constant battle to attract and retain the highest-calibre individuals, the need to offer continuous development opportunities to individuals is vital.

In any case it is almost universally accepted that companies need to invest in developing their staff if they wish to progress as a company and remain competitive, but alongside this there are challenges in dovetailing training needs with other day-to-day operational requirements.

**Methodology**

This white paper is based on the results of an online survey targeting those working within the manufacturing sector, covering a range of topics related to employer training provision, including: the structure of training, Industry 4.0, apprenticeships, links to academia, and maintenance. The survey received 117 responses, of which 93 (81%), were at manager level or above (the questions within the main part of the survey were subsequently only asked to the 93 respondents at manager level or above).
Section 1: Training provision and budgets

The first part of the survey set out to understand what levels of training are typically being provided in the manufacturing sector and whether organisations are planning to devote additional resources to this function.

Training adoption levels and budget allocation

Around a quarter of companies provide less than or equal to 10 hours of training to employees each year on average. However, it was very encouraging to see that only a tiny proportion of organisations are providing no training at all (2.2%), and that in nearly three-quarters of companies, training hours provided had either increased or remained the same over the course of the last five years.

The pattern seems set to continue for some, with training budgets anticipated to increase over the next five years in nearly a third of organisations – perhaps a reflection of the use of more complex equipment entailing greater training for operatives. However, 14% of those surveyed anticipate their organisations training budget decreasing over the course of the next five years. This may be because they already felt they were delivering enough, or because pressures on budgets do not facilitate additional investment. A further 52.7% are anticipating that training budgets will stay the same over the next five years, pointing to some degree of stagnation in this area.

Delivery of training and training challenges

When it came to the delivery of training, organisations are still undertaking the majority of their training onsite (59.1%). Despite the many excellent online training tools now being made available, only 22.6% of organisations use online methods for the majority of their training, perhaps due to the lack of resources (e.g. desk space) and the practical nature of many engineering tasks.

Respondents were asked to rank how often their organisation used e-learning training aids. This question indicated no real strong trend or extensive use (28% ranking 1 on the 1-5 scale, where 1 is not very often). However, those surveyed were then asked to identify the main barrier their organisation faces around the increased uptake of online training. Combined, more than half of respondents stated that either physical training is more appropriate given the nature of the work undertaken (24.2%), an internal preference for face-to-face training (22%), or that available online materials are inadequate (17.6%). Only one-fifth felt there are no barriers. One inference here could be that more attention should be paid by training providers to find ways to digitise their offerings, although it remains open to question as to whether this will ever be achievable in all areas of operations.

In terms of the biggest challenges respondents felt their organisation faced when it came to training employees, more than half cited that finding the right training courses to meet employee needs was an issue (52.7%), while the challenge of sufficient budget to provide the required training also ranked highly (43.0%). The problem of recouping time lost through training (i.e. lost man-hours) also featured prominently (33.3%), perhaps due to teams already being stretched and poorly placed to cope with absences.

E-training in the workplace is more difficult to focus on when work pressures are diverting. The trend is leaning towards e-learning but it is best in small units.

Gaps in training

The survey asked respondents to identify areas that their organisation faced gaps in training. More than 40% identified ‘automated production processes in general’, with just over a third seeing issues around modern automation techniques. This is arguably worrying given the rapid developments being made in many areas based on initiatives such as Industry 4.0. On a more positive note, it was refreshing to see that there were few gaps in areas such as hydraulics (6.7%) and pneumatics (6.7%), although this is perhaps because these are areas where the pace of innovation is slightly slower.

The other important area identified as a gap in the free response section was safety.
Industry 4.0 or the fourth industrial revolution has become an increasing reality in more industrial and engineering environments. The view widely held for British engineering companies to thrive, especially post-Brexit, is to embrace the principles of Industry 4.0. While it has been theoretically possible for a while now, the greater availability of cost-effective technologies to support the implementation will remove one of the main barriers to Industry 4.0 adoption.

It is, therefore, perhaps highly surprising that awareness of Training on Industry 4.0 among the respondents – and it must be remembered that respondents were at manager level or above – did not even reach one in three (30.4%).

The statistics are even more striking when observed that even amongst those who are aware of Industry 4.0, nearly two-thirds of organisations (64.3%) are not undertaking any specific training in preparation for it. Whether this is because such training is inaccessible or because it is felt to be unnecessary is open to question. The few that are involved in Industry 4.0-specific training are, in the main, focusing on IT and data systems – some recognition, at least, of the importance of data availability in shaping future manufacturing processes and management.

Respondents were then asked if their organisation was undertaking training on the latest automation techniques. Nearly two-thirds of companies are not currently training in this area and nearly one-fifth are unaware as to what progress was being made in this area within their own organisation.

“We are starting to get more involved and take an interest in this area (Industry 4.0).”
Section 3: Apprenticeships

For so many years the primary means of adopting a career in engineering (and many other trades), apprenticeships, largely went out of vogue until the Government refreshed the system in the 1990s with the introduction of Modern Apprenticeships.

As with most industrial sectors, it is broadly recognised that engendering an interest in engineering from a young age, and offering a varied and interesting career path, will help to attract high-calibre applicants and maintain and grow the talent pool needed to shape Britain’s industrial future.

Therefore, it was refreshing to see that nearly two-thirds of respondents stated that their company had an apprenticeship programme of some kind. However, of those whose companies have a scheme, just under half took on five or fewer apprentices annually. At the other end of the scale, 16.7% of respondents’ companies were taking on 21+ apprentices annually, representing a tangible commitment to the future of the sector and ‘growing their own’ when it comes to finding the future leaders of that business.

Those respondents whose organisations did take on apprentices were then asked what they believed to be the biggest barrier to their company taking on more apprentices. More than a quarter (27.1%) cited cost as the primary reason but nearly as many said there were no barriers at all (23.7%). However, it was welcome to see that ‘lack of applicants’ only accounted for 11.9% of the responses here – demonstrating that there is a clear appetite among school and college leavers for a career in engineering.

“"The lack of a retirement age means that you can’t plan for succession due to having too much capacity."
Section 4: Links with educational and training establishments

No matter how complete a company’s commitment is to training, it is generally accepted that not all training can be accommodated in-house and there is therefore a reliance on external partners and institutions to deliver at least some aspects of it.

Respondents were asked to rank their organisation’s links with local colleges and universities. This uncovered little in terms of consistency, apart from an inference that things could be better in some areas (23.7% ranked 1 on the 1-5 scale, with 1 being not very good).

The next question gave some perspective to this with respondents asked to rank how closely they thought teaching and training curriculum’s match the requirements of industry. More than a third of respondents (36.6%) ranked 1 or 2 on the 5 point scale (1 being not closely at all). Perhaps worryingly, only a tiny proportion felt there was a very close match between curriculum content and industrial needs (2.2% ranking 5 on the five-point scale, where 5 is ‘very closely’).

This is not really a surprise when more than half of companies are given no input into shaping college curriculums, with only 14.1% having any opportunity of this kind. Some of the respondents also had harsh words for educational establishments in terms of their relevance, professionalism, mentoring and discipline.

“Course titles look excellent but some colleges have a low quality of professionalism amongst staff such as low attendance by teachers and chaotic administration. However, this does not stop us taking apprentices.”
Only just over a third of respondents (34 individuals) stated that they had responsibility for maintenance in their organisation. Of these, the vast majority adopted a segmented approach to this function (70.6%). The use of traditional maintenance team models prevailed with more than three-quarters of respondents managing at least some of their maintenance in this way, with the operator model used in only just over 10% of instances, showing a clear preference for a generalist rather than a specialist approach. This demonstrates a lack of detailed understanding of individual machines among those who operate them on a day-to-day basis.

There was not much in it between companies where operators are trained to perform simple maintenance tasks and those where they are not, while again no conclusively clear pattern emerged when it came to the maintenance of highly complex machines, although there seems to be a slight preference for a mixed approach with simpler tasks undertaken in-house and more involved work consigned to the OEM.
There is little doubt that for UK manufacturing and engineering companies to remain competitive, every opportunity must be seized to optimise the performance of people and operations. And while at face value, the commitment to training seems to be present in most instances, this survey has uncovered some troubling gaps, which, if left unplugged, are likely to become a major barrier to competitiveness and profitability.

Most organisations undertake some training but in many instances it appears to be piecemeal and an activity which is squeezed in around day-to-day operational requirements rather than being seen as a core value-adding function which requires a strategic investment of time and resources. And of course it remains to be seen whether the increases in training budgets anticipated by some respondents will become a reality.

The story is similar in apprenticeships - while there is a commitment, it is by no means universal and there is little reason to believe that apprentice numbers are set to grow radically over the coming years.

The spectre of Industry 4.0 is not going to go away and arguably the most worrying statistic in the whole survey is around awareness and lack of preparation for Industry 4.0. When this is placed alongside the lack of relevant courses available from educational establishments, and in-house training methods which remain largely focused on traditional delivery methods, it is easy to see why there might be frustrations among those responsible for the availability of relevant training courses to support greater digitisation, data management, and the adoption of advanced manufacturing techniques.

What this would appear to indicate is that there is a requirement for industry leaders, training establishments, trade bodies, government and other interested parties to join forces to ensure the provision of technologically relevant courses geared to the changing needs of engineering companies to maintain and enhance their offerings in an ever-more competitive environment – something which will only intensify further as the impact of Brexit becomes clear.

The Rexroth survey revealed some perceived gaps in the overall training provision and relevance, largely in line with the recently published Government green paper ‘Building our Industrial Strategy’. This document identified issues with basic skills, and also highly-skilled technicians below graduate level, highlighting the need for specialist training to be addressed at these groups.

As a major provider of industry-specific training, we recognise the need for course content and delivery to be flexible enough to adapt to meet the rapidly changing needs of leading manufacturing companies and their employees.

Apprenticeships, for example, are central to overall industrial strategy and should combine practical and theoretical learning - but training should not end the moment an apprentice completes his or her course, and we welcome the Government’s commitment to creating a proper system of technical education, aimed at young people not attending university, and those already in the workforce.

While training content can and should be shaped by known commercial and market need, upskilling beyond basic standards on an ongoing basis can equip participants with the ability and confidence to challenge convention and take their company - and the UK manufacturing sector - to the next level.

Neil Fowkes, Head of Training, The Manufacturing Technology Centre (MTC)
"At Rexroth and indeed within Bosch Group as a whole, we recognise that any component or machine will only perform as well as those who install or operate it.

That means there is a constant requirement to reskill and upskill individuals at all levels. In manufacturing and engineering – and as the pace of development quickens further, especially as Industry 4.0 becomes even more widely adopted, that need is set to become even more pronounced.

Our survey, run in conjunction with the IET, was aimed at establishing clarity around the levels of training provision in the UK currently, how this is set to change and the factors influencing future training delivery. The responses were thought-provoking, particularly around the sector’s readiness for the challenges posed by Industry 4.0, where there are clearly gaps which all interested parties need to work together to address.

Training is an area where we at Bosch Rexroth are uniquely positioned to provide leadership, based on our unrivalled technical knowledge. Recognising the requirement for different learning styles and media, we have developed a highly flexible portfolio of training courses and materials.

The broad array of Rexroth training courses are suitable for participants at all stages of their development, and designed not just to enable individuals to extract the very best from our products, but to equip them with a broader understanding of technological issues and how knowledge and innovation can be applied to tackle complex engineering challenges."

Richard Chamberlain,
Service Product Manager,
Bosch Rexroth

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