Skills &
Demand in
Industry

2016 Survey

Engineering and Technology
Skills and Demand in Industry

Overview of issues and trends
from 2016 survey

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FOREWORD

Welcome to the 11th *Engineering and Technology Skills and Demand in Industry* report produced by The Institution of Engineering and Technology (IET) – our annual review of issues facing UK employers of engineering and IT staff.

This year's report is based on research undertaken in the period before and just after the EU referendum. We have been able to gauge the views of engineering employers on Brexit and how it may impact on recruitment. Generally we have found that many employers were pessimistic about the future, although in the immediate aftermath the mood appears to be 'business as usual' in terms of recruitment, training and wider organisational business.

The good news is that this report points to continued strong high demand for new engineering and technology staff and greater optimism amongst employers that they will be able to recruit sufficiently qualified staff. However, there is deeper concern than in previous years around the skills, knowledge and experience of the future workforce – postgraduates, graduates, school leavers and apprentices.

One of the biggest challenges appears to be in recruiting candidates with sufficient work experience. Many employers are reporting that the content of engineering and technology degrees does not suit the needs of their organisation because the courses don't develop practical skills or provide opportunities for students to obtain relevant work experience.

We investigate whether employers are offering work experience and what role this should play in growing the pool of engineering talent. We also ask employers about the forthcoming apprentice levy and, worryingly, over half say they don't know how the apprentice levy can benefit their organisation.

The benefits of the right kind of work experience and the need for an inclusive engineering workforce come through very clearly in this report. Women still only account for a very small proportion of all engineering and technology employees and gender diversity remains a huge challenge for the sector. Six in ten employers agree that better targeting of diverse groups would increase the pool of potential engineers available, so the appetite to do more to recruit people from a range of different backgrounds is there.

As we enter an uncertain future following Brexit, it is more important than ever that we develop the next generation of 'home grown' engineering talent. This includes putting greater emphasis on offering quality work experience and continuing professional development - and having clear plans to create a more diverse workforce as set out in the recommendations on page 40 of the report.

Nigel Fine,
Chief Executive and Secretary,
IET

Professor John Perkins,
Chairman,
IET Education and Skills Policy Panel

EXECUTIVE SUMMARY

The IET carries out an annual survey of engineering employers in the UK to gauge the state of skills in the engineering and technology sector. The survey covers current and planned levels of engineering recruitment, difficulties in recruiting engineers and employer perceptions of the engineering skills gaps. This year we have collated our research findings around issues relating to Brexit; recruitment trends and skills shortages; work experience and bridging the skills gaps; and diversity. We have also drawn comparisons with findings from previous years where possible.

This report is based on qualitative research commissioned by the IET and conducted by market research agency 2Europe. Telephone interviews were undertaken with 403 employers of engineering and technology staff, representing a range of engineering sectors and sizes, and drawn from across the UK in June 2016. Our research is supplemented by additional in-depth interviews with individual organisations undertaken in July 2016.*

The main findings presented in this report are:

Brexit – initial perspectives

1 Just over 4 in 10 (42%) of employers surveyed before the EU referendum were concerned about the negative impact of Brexit on their recruitment over the next four to five years. Many employers (35%) surveyed post-referendum continue to be pessimistic about the impact of Brexit on their recruitment over the next four to five years.

2 Only 4% of those surveyed before the referendum considered that their recruitment would be impacted positively over the next four to five years as a result of Brexit, compared to 5% of those surveyed post-referendum.

3 In the short term, the mood amongst employers following the referendum outcome appears to be 'business as usual' in terms of recruitment, training and wider organisational business – however, the medium to longer term picture is unclear.

Recruitment trends and skills shortages

1 UK firms report a strong demand for new engineering and technology staff – 52% of employers are currently seeking new recruits, which is consistent year-on-year (53% in 2015) – and a 5% increase on the overall recruitment picture five years ago.

2 The aerospace, communications**, defence*** and transport sectors are experiencing higher than average recruitment levels – but there are significant shortfalls in planned recruitment by organisations specialising in electrical (-17%) and electronics (-16%) compared to 12 months ago. However, this apparent fall in recruitment of engineers in the traditional electrical and electronics sectors may be misleading as many electrical and electronics engineers are now working in other engineering fields, such as transport and construction, as engineering becomes increasingly interdisciplinary.

3 Organisations are showing greater optimism in recruiting the employees they do need – 69% report they expect to be able to recruit sufficient suitably qualified engineering and technology staff to meet their needs over the next 12 months. This rises to 75% for employers being able to recruit sufficiently qualified engineering and technology staff over the next four to five years.

4 Businesses still have the greatest difficulty recruiting senior engineers with 5-10 years' experience – but there is an improved picture on recent years. Employers are facing fewer issues with recruitment compared to the last four years in all areas except apprentices where there is no significant change.

5 The biggest concern of employers when recruiting new candidates remains their skills, knowledge and experience.

*Within the report figures are rounded and do not always add to 100%, multiple choice questions add to more than 100%. With a sample size of 403 data accuracy is ±4% or 0.2 on a scale of 1 to 5. A breakdown of sample sizes relevant to data used within this report can be found within the appendix.
**Note low sample = 28.
***Note low sample = 26.

Work-ready employees – bridging the gap

1   Half of the organisations surveyed say that typical new engineering and technology recruits do not meet their reasonable expectations – graduates are the biggest challenge (62%), and all types of recruit except experienced staff are perceived to have greater skills gaps than in previous years.

2   Some 31% of employers that are, or have recently, experienced problems recruiting engineering and technology graduates feel that attracting candidates with sufficient work experience is a key problem in graduate recruitment.

3   Among those that feel the content of engineering and technology degrees does not suit the needs of their organisation, the main reasons are because they don't develop practical skills (59%) or provide opportunities for students to obtain practical work experience (43%).

4   91% agree that to improve the supply of engineers and technicians more employers need to provide work experience for those in education or training. Over three quarters (76%) of employers agree that compelling all engineering and technology companies to provide work experience would improve the pool of engineering talent.

5   Some 68% of employers say they are concerned that the education system will struggle to keep up with the skills required for technological change – but just 51% report that their organisation takes steps to influence the content of degrees and the technical training engineers undertake.

6   Over half of employers (53%) don't know how the apprentice levy can benefit their organisation – and even where companies were able to identify any benefit, the benefit was only identified by 7% of the sample or less.

Diversifying the workforce

1   Women still only account for 9% of all engineering and technology employees in the UK. Gender diversity remains a huge challenge for the sector.

2   Some 63% of businesses do not have gender diversity initiatives – up from 57% last year – and nearly three quarters (73%) do not have lesbian, gay, bisexual, and transgender (LGBT) or ethnic diversity initiatives in place.

3   40% of employers agree that their organisation could do more to recruit people from diverse backgrounds – and 60% agree that better targeting of diverse groups would ultimately increase the pool of potential engineers available.

WHAT EMPLOYERS ARE REPORTING

Facts and figures about engineering employers in the UK

52% Are currently recruiting for new engineering and technology staff

57% Are currently, or have recently experienced problems recruiting senior engineers with 5-10 years' experience

68% Are concerned that the education system will struggle to keep up with the skills required for technological change

62% Are concerned about graduate skills

63% Don't have gender diversity initiatives in place

9% Of engineering and technology staff are female

53% Of those that are, or have recently experienced problems recruiting engineering and technology graduates, say there is a lack of available graduate candidates in industry

50% Find that a typical new engineering and technology recruit does not meet their reasonable expectations

73% Don't have LGBT/ ethnic diversity initiatives in place

40% Of employers agree they could do more to recruit people from diverse backgrounds

42% Of respondents (asked pre-referendum) were concerned about the negative impact that the UK leaving the EU could have on their recruitment over the next four to five years*

35% Of respondents (asked post-referendum) think that the UK leaving the EU will have a negative impact on their recruitment over the next four to five years**

53% Of employers don't know what benefits the apprentice levy will bring to their organisation

15% Find that motivation/interest is the biggest concern when recruiting school leavers and apprentices

59% Of those that feel the content of engineering and technology degrees do not suit the needs of their organisation say it's because they don't develop practical skills

31% Of those that are, or have recently experienced problems recruiting engineering and technology graduates, feel that attracting candidates with sufficient work experience is is a key problem in graduate recruitment

*Based on those responding to the question 'If the UK ended up leaving the EU, do you think this would have a positive or negative impact on your recruitment over the next four to five years?' asked before the EU referendum (sample = 293)

**Based on those responding to the question 'Do you think the UK leaving the EU will have a positive or negative impact on your recruitment over the next four to five years?' following the result of the EU referendum (sample = 110)

1.
BREXIT – INITIAL PERSPECTIVES

In this section we explore:

- Initial views of UK employers of engineering and technology staff on the impact of Brexit on their future ability to recruit.
- Perspectives on the anticipated wider issues facing engineering organisations post-Brexit.
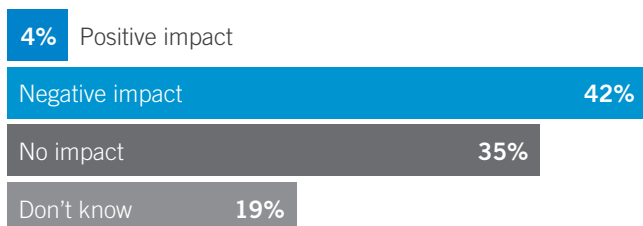
1.1   Expected impact on recruitment

Many UK employers of engineering and technology staff believe the UK leaving the European Union (EU) will have a negative impact on their recruitment over the next four to five years.

Just over 4 in 10 (42%) of employers surveyed before the EU referendum were concerned about the negative impact of Brexit on their recruitment over the next four to five years.* Overall, 35% of respondents (surveyed post-referendum) expect their recruitment to be negatively impacted over the next four to five years following the referendum outcome.**
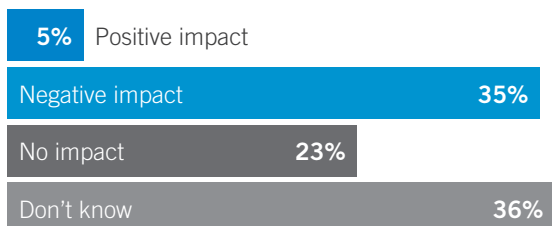
Only 5% of those surveyed following the referendum feel that their recruitment will be impacted positively over the next four to five years as a result of June's 'leave' result. However, 23% of respondents foresee no impact, while a further 36% are simply unsure.

Expected impact on recruitment pre-referendum

4%	Positive impact
Negative impact	**42%**
No impact	**35%**
Don't know	**19%**

Q: If the UK ended up leaving the European Union, do you think this would have a positive or negative impact on your recruitment over the next four to five years (sample = 293)

Expected impact on recruitment post-referendum

5%	Positive impact
Negative impact	**35%**
No impact	**23%**
Don't know	**36%**

Q: Do you think the UK leaving the European Union will have a positive or negative impact on your recruitment over the next four to five years (sample = 110)

Andy Taylor, Chief Engineer – Mechanical at Amec Foster Wheeler, says that whilst in the short term Brexit won't bring about change there is likely to be a longer term consequence: "We haven't done anything different since the vote to leave the EU and are unlikely to do anything differently until it's clear what is going to happen. We would always advertise for roles and anyone can apply because we want to attract people from as wide a base as possible. However, I can see that if we get to a situation where we don't have freedom of movement, we may not be able to recruit from Europe."

Michelle Hynes, HR and Recruitment Manager at Cotoplaxi Energy, adds: "We will adopt a suck-it-and-see approach. However, we will probably not invest in recruitment until we see some clear direction on our strategy regarding Europe. Training shouldn't be affected – but we are almost forced to train up our own staff because we struggle to recruit telemetry engineers and networking engineers at an affordable rate."

Gillian Walker, Business Manager at Crouch Waterfall, agrees: "I don't believe that leaving the EU will impact on our training plans but we will certainly need to take stock regarding recruitment and pay close attention to our forward order books accordingly. We understand that some structural development plans have already been impacted and anticipate further reticence for structural development projects to proceed."

*Based on those responding to the question 'If the UK ended up leaving the EU, do you think this would have a positive or negative impact on your recruitment over the next four to five years?' asked before the EU referendum (sample = 293)

**Based on those responding to the question 'Do you think the UK leaving the EU will have a positive or negative impact on your recruitment over the next four to five years?' following the result of the EU referendum (sample = 110)

1.2   Expected wider organisational impact

Initial reactions from UK employers of engineering and technology staff to the anticipated impact of leaving the EU on their organisation are generally cautious at this early stage.

Robert White, Senior Manager - Electronic Systems at Elekta Ltd, says:

> *No immediate change is expected here. We do have a relatively large number of EU citizens working in our business, and whilst I am confident their right to remain working in the UK will be unaffected, it's possible that a small minority may decide to move to work within the European Union.*

Amec Foster Wheeler's **Taylor** adds: "We have projects that require the free movement of our people to EU assignments. If it becomes harder to send people to non-UK sites then we may have to do things differently."

However, one business has already spoken out about – and immediately taken action in response to – the impact of Brexit. "We have already made changes to our business in the wake of the decision to leave the EU," says **Keith Wells**, Chief Executive Officer of Scientific Management Associates. "I was with a customer in France who was concerned about what the vote would mean for us as a key supplier to them for one of their contracts. Because this is an important customer for our business over the coming years our response was to remove any doubt about our position as a supplier by opening an office in Paris. This means that however we withdraw from Europe, we are in control of our situation as a business: it's not an option for us to wait and see what happens. The question for us now is what other roles we want to create in that office to work with our clients."

1.3　In summary

- Many employers of engineering and technology staff (35%) say that their recruitment will be negatively impacted over the next four to five years now that Britain is to leave the EU.

- Only 5% of all respondents feel that their recruitment will be positively impacted over the next four to five years as a result of June's 'leave' result. However, 23% of employers surveyed foresee no impact, while a further 36% are simply unsure.

- In the short term, the mood amongst most employers following the referendum outcome appears to be 'business as usual' in terms of recruitment, training and wider organisational business – however, the medium to longer term picture is unclear.

2.
RECRUITMENT TRENDS AND SKILLS SHORTAGES

In this section we explore:

- Recruitment trends among UK employers of engineering and technology staff.
- The make-up of the existing workforce.
- Anticipated recruitment needs over the next 12 months.
- Specific organisational challenges.
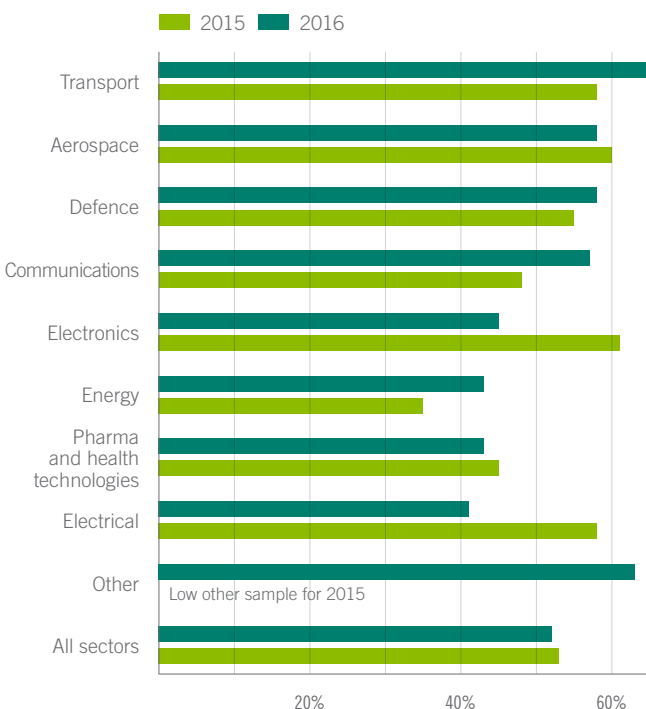- Action plans for recruitment.

2.1   Confidence in recruitment

The latest recruitment trends among UK employers of engineering and technology staff show that 52% are currently seeking new engineering and technology staff – which is consistent year-on-year (53% in 2015) – and a 5% increase on the overall recruitment picture five years ago.

Firms specialising in aerospace (58%), communications* (57%), defence** (58%) and transport (65%) are experiencing higher than average recruitment levels. Additionally – when compared to last year's survey – there has been a jump in the proportion of employers in communications (+9%), transport (+7%) and energy (+8%) who are currently recruiting engineering and technology staff.

There are, however, significant shortfalls in current recruitment by organisations employing engineering and technology staff in electrical (-17%) and electronics (-16%) sectors when compared to last year's survey. Construction, last year's 'top' sector for current recruitment activity, is not included in this year's report as it has been incorporated into 'Other' along with manufacturing and sectors with representation.
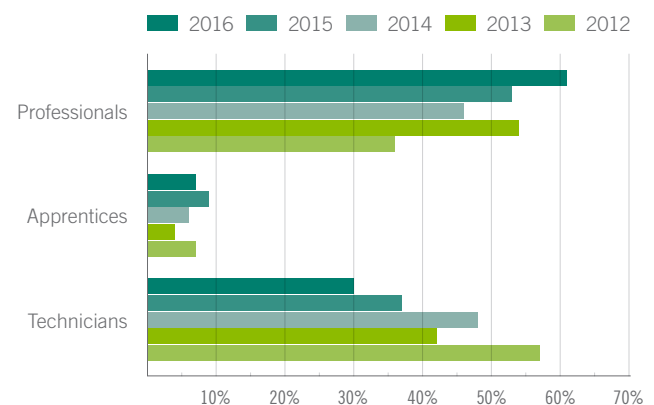
Current recruitment activity (by sector)

The make-up of the existing workforce shows that 61% of the current UK engineering and technology workforce surveyed are categorised as professionals. The proportion of engineering and technology professionals in the workforce has increased by 8% compared to 12 months ago, but the proportion of technicians has dropped by 7%, while the proportion of apprentices has fallen slightly (2%).

Current UK engineering and technology workforce

The percentage of employers who say they are currently planning to recruit new roles within the next 12 months (across the organisation as a whole) has risen from 51% in 2015 to 57% this year – a significant increase on the rolling average of 51% over the last eight years.

Additionally, 33% of all organisations are planning to recruit engineering, IT or technical roles within the next 12 months. This reflects the rolling average for technical recruitment of 33% over the last eight years.

*Note low sample = 28. **Note low sample = 26.

Recruitment plans in the next 12 months

Legend: 2016 | 2015 | 2014 | 2013 | 2012

All roles
Technical staff

10% 20% 30% 40% 50% 60% 70%

Q: In addition to current recruitment, across the organisation as a whole are you planning to recruit for any new roles over the next 12 months? (2016 sample = 403) **and What percentage of those new recruits do you consider will be engineering and technology roles?** (2016 sample = 230)

Overall, 69% of businesses say they are confident of being able to recruit sufficient, suitably qualified engineers and technology staff to meet their needs over the next 12 months, compared to 68% in 2015 and 63% in 2014. That figure rises to 75% for employers being able to recruit sufficiently qualified engineering and technology staff in the next four to five years.
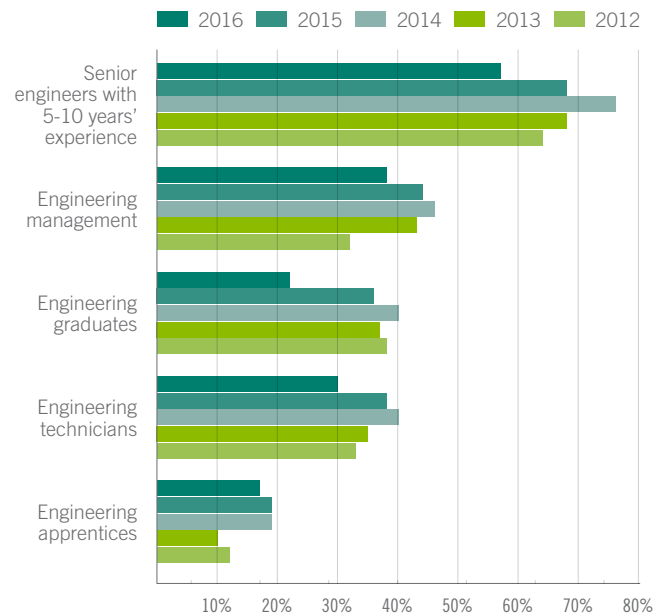
Business expansion in the UK is the main reason for short and long-term planned recruitment. Just under half of businesses surveyed (47%) have a long-term corporate plan in place for their recruitment and skills needs for engineering and technology staff, down from 53% last year. Aerospace (61%) and defence* (58%) are the main sectors which have long-term recruitment and skill development plans.

*Note low sample = 26.

2.2   Experience and specialist requirements

UK employers still have the greatest difficulty recruiting senior engineers with 5-10 years' experience – but the proportion of businesses noting this has dropped to 57%, down from 68% in 2015. Generally – employers are facing fewer issues with recruitment compared to the last four years in all areas except apprentices where there is no significant change.

Issues with recruiting staff

Legend: 2016 | 2015 | 2014 | 2013 | 2012

Senior engineers with 5-10 years' experience
Engineering management
Engineering graduates
Engineering technicians
Engineering apprentices

10% 20% 30% 40% 50% 60% 70% 80%

Q: Are you currently or have you recently experienced problems in recruiting…? (2016 sample = 403)

"We don't see big skills shortages – we are known in our sector and we tend to get inundated with applications," reveals Amec Foster Wheeler's Chief Engineer – Mechanical, **Andy Taylor**. "Overall, we don't see general level engineering skills and training as being a problem. The exception might be some niche roles such as mechanical handling engineers. Where we do have an issue, however, is with engineers at the beginning of their careers and the extent of their industry and practical experience. This is about being able to relate the real-life issues we face. The reduction of large-scale manufacturing in the UK has also contributed to the general lack of of experience in the next generation."

A more common issue facing employers is finding candidates who can deliver specific company requirements. Giving a personal perspective on the issue for this report, **Adrian Griffiths**, Head of Engineering – Engine Control Systems at UTC Aerospace Systems says this a challenge he has witnessed. "I work in a niche market serving a very specific area of the aerospace industry," says **Adrian Griffiths**, "Because of that, I expect to find a knowledge and experience gap when it comes to recruiting as there are few people who are geared to the aftermarket as opposed to design and manufacture. There is a greater chance of finding mechanical engineers with right sort of qualifications and the right experience. Electronics is always more difficult."
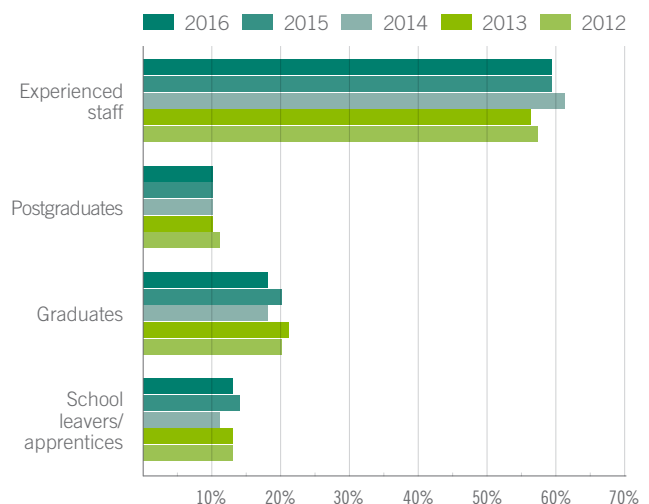
Crouch Waterfall's Business Manager, **Gillian Walker** agrees:

> **"** *We really struggle with rail engineer candidates of a certain level, which I believe is where the recession of 2008 impacted on the industry when younger engineers actually left to find new careers, leaving the current gap for senior engineers with eight years-plus experience. Agents are currently our main source when recruiting and more often it is engineers from other European countries that fill the gaps.* **"**

Others are more realistic on the calibre of recruit that is out there. "We are quite specialised so we understand we will not get the exact candidate, but as long as they have a good work ethic and the ability to fit in, coupled with the commitment by the company to train, then it's not too much of a problem finding the right people," says **Owen Williams**, Engineering Manager at WT Henley.

2.3   Identifying the next generation

Recruitment plans in the next 12 months

Q: Considering those new engineering and technology roles you plan to recruit for, what percentage do you consider will be…? (2016 sample = 209)
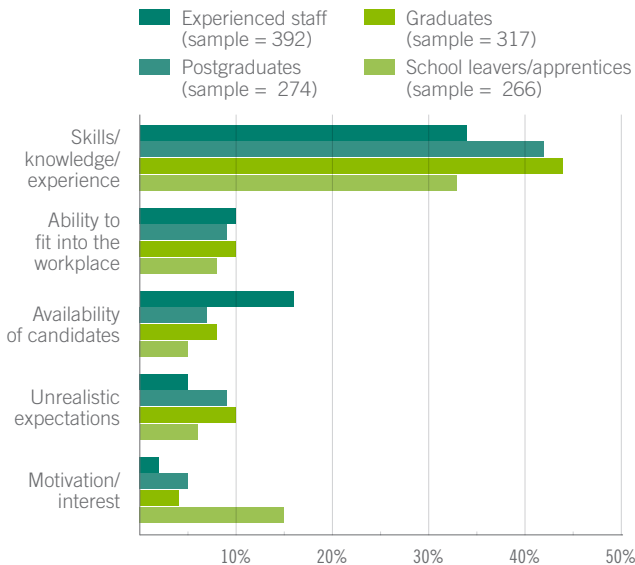
Respondents to this survey are continuing to make efforts to look beyond experienced staff, with 18% of new engineering and technology recruits to the workforce expected to be graduates and 13% school leavers/apprentices over the next 12 months – reflecting previous years.

However, from last year's survey, there has been a 16% increase in concern among employers when recruiting new candidates around the skills, knowledge and experience of postgraduates, and similar rises for graduates (+13%) and school leavers/apprentices (+9%). "We struggle when hiring graduates because on paper they look good but lack work experience and have a poor work ethic because of this," admits **Williams** from WT Henley.

Concerns about the younger generation's ability to fit into the workplace have also risen significantly over the past 12 months, whilst 15% of employers have cited that their biggest concern when recruiting school leavers and apprentices is their motivation and interest. Employers say that the main factor behind the overall skills shortage is the lack of awareness of, interest in and attitude towards the engineering industry (25%). There are perceived issues with the education system (18%) and poor perceptions of engineering/manufacturing as a career (18%).
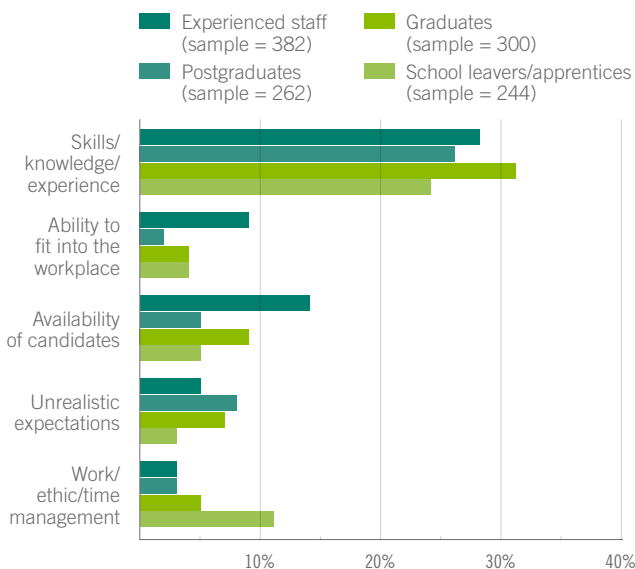
Biggest concern with new candidates

2016

Legend:
- Experienced staff (sample = 392)
- Postgraduates (sample = 274)
- Graduates (sample = 317)
- School leavers/apprentices (sample = 266)

Categories (y-axis):
- Skills/knowledge/experience
- Ability to fit into the workplace
- Availability of candidates
- Unrealistic expectations
- Motivation/interest

(x-axis: 10%, 20%, 30%, 40%, 50%)

Q: What is the biggest concern when recruiting new candidates?
(unprompted, single response) Graph displays common responses across different types of candidate. It is not exhaustive of all responses given in the question.

2015

Legend:
- Experienced staff (sample = 382)
- Postgraduates (sample = 262)
- Graduates (sample = 300)
- School leavers/apprentices (sample = 244)

Categories (y-axis):
- Skills/knowledge/experience
- Ability to fit into the workplace
- Availability of candidates
- Unrealistic expectations
- Work/ethic/time management

(x-axis: 10%, 20%, 30%, 40%)

Q: What is the biggest concern when recruiting new candidates?
(unprompted, single response) Graph displays common responses across different types of candidate. It is not exhaustive of all responses given in the question.

Based on his own experience, **Adrian Griffiths** says it is important to make efforts to bridge these gaps and one vehicle for this is creating industrial placements for students.

"My experience is there is a real challenge in electronics where it's hard to find people who are confident in logic, reasoning and understanding of circuitry," **Griffiths** explains. "I find some people who have had some experience through a module at university but what is required is much more: deep knowledge and the right thinking skills. If companies get in early enough, they can spot the right people. The challenge is not attracting applicants but ensuring we get the right quality."

For **Lindsay MacDonald**, Senior Manager for Engineering and Technology at Proserv, external factors have also played a part in his organisation's recruitment and development strategy. "The position in the oil and gas sector has already slowed our planned investment significantly in external training, and recruitment has been limited to apprentices and graduates due to the weak oil price," he says. "We have an internal training academy where we can train our young technicians and engineers. We have also recently engaged with an establishment in India where we are setting up a centre of excellence to support our international locations. This selection was assisted by the vast potential community of engineering capabilities that India could offer."

SPTS Technologies is also adopting its own innovative strategies (see Network75 case study on page 16). "Finding manufacturing engineering expertise is hard," admits Production Engineering Director, **Huw Williams**. "You can put people through business courses and then develop skills in logistics and supply chain but some of the courses – like the Masters degree I did in ops management – don't exist anymore. What we find is we have to take on engineers and apprentices and grow our own. Despite that we find the talent pool is an issue and when we recruit at graduate level we only have a couple of people we want to look at."

Network75 LEADING THE WAY:

'Network75': 100% employability from the University of South Wales scheme

Finding a way to ensure graduate engineers are 'work-ready' is one of the biggest skills issues raised by businesses surveyed each year.

One scheme helping to address this issue is the 'Network75' initiative which is run by the University of South Wales. It gives students of engineering and other disciplines the opportunity to combine study for a degree with work experience. The idea is to ensure that trainees graduate with academic and practical training which increases their employability.

Under the terms of the scheme, the students complete their studies over five years. They work three days per week with an employer, spending two at the University whilst working through their holidays. Each student gets a bursary and the tuition fees are paid in addition to time off for holiday and study leave. Many get additional pay from their employer.

There are 42 companies participating in the scheme ranging in size from SMEs to business units of multinational companies. One which has benefitted from the scheme is Newport-based engineering company SPTS Technologies.

University of South Wales
Prifysgol De Cymru

We have several Network75 students currently in the company and one in my department. The scheme has been very beneficial for the company and we have been able to build up their confidence in using their skills and progress onto bigger projects. When students and graduates come into the workplace it can be a huge wake-up call and you can't really expect people who have been in full-time education to be fully ready for the workplace. This kind of grounding in business from the age of 18 is invaluable and it gives you a great idea of what it takes to succeed in the workplace.

says SPTS Technologies' Production Engineering Director **Huw Williams**.

The scheme boasts a 100% employability record for students who have participated so far.
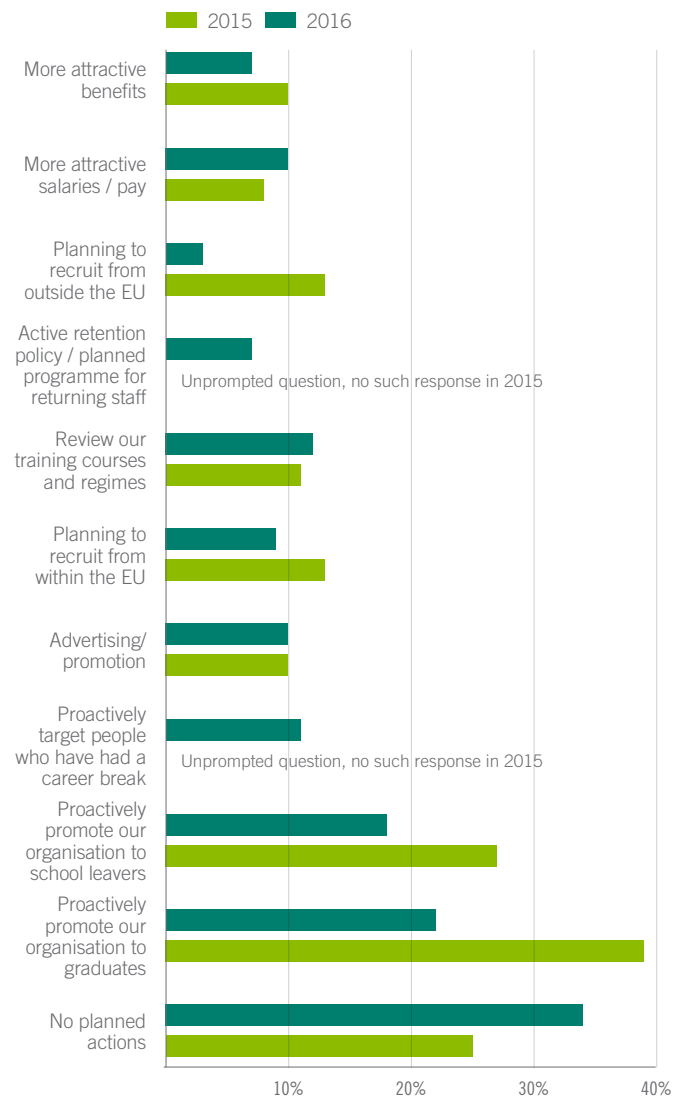
2.4   Action plans for recruitment

Despite the challenges around bringing in experienced and specialist staff and work-ready graduates, fewer employers say they have action plans to recruit staff in the next four to five years.

Compared to the 2015 survey, 9% more companies claim to have 'no planned actions' and activities to proactively promote the organisation to graduates and school leavers are down, as are strategies to recruit from overseas.

However, 11% of employers say they will be targeting people who have had a career break and 7% say they have an active retention policy or planned programme for returning staff.

Actions planned to recruit staff in the next four to five years

Q: What actions are you planning to take to recruit the people you need over the next four to five years?
(2016 sample = 102; unprompted, multiple responses - those who do not expect to recruit sufficient suitably qualified staff in 4 to 5 years)

2.5   In summary

- UK organisations report ongoing – and comparable – strong demand for recruiting new engineering and technology staff.
- The proportion of employers with plans to recruit new roles within the next 12 months (across the organisation as a whole) has increased by 6% compared to last year.
- Aerospace, communications, defence and transport are currently the largest recruiters.
- Senior, experienced roles remain the most difficult to recruit for – though issues in recruitment across the board have improved significantly compared to last year.
- Businesses continue to express confidence in recruiting the employees they need – but have greater concern about the skills, knowledge and experience of school leavers/ apprentices, graduates and postgraduates.

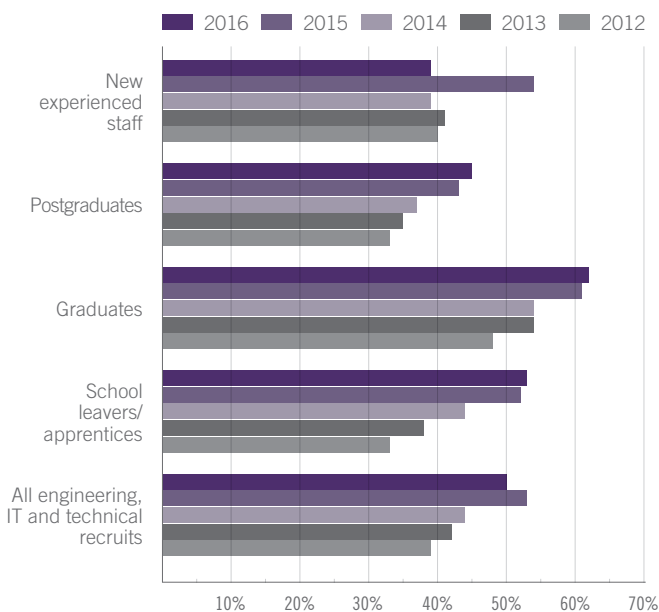# 3. WORK-READY EMPLOYEES – BRIDGING THE GAP

In this section we explore:

- Employer expectations around new recruits.
- The perceived skills gaps among school leavers, apprentices and graduates (as well as experienced staff working in industry).
- The value of work experience.
- The impact of apprenticeships.

3.1 Employer expectations

Half of the organisations surveyed say that a typical new recruit to an engineering, IT or technical role does not meet their reasonable expectations. Graduates are the biggest concern (62%), followed by school leavers/apprentices (53%) and postgraduates (45%). In fact, all types of recruit except experienced staff are perceived to have greater skills shortages than in past years.
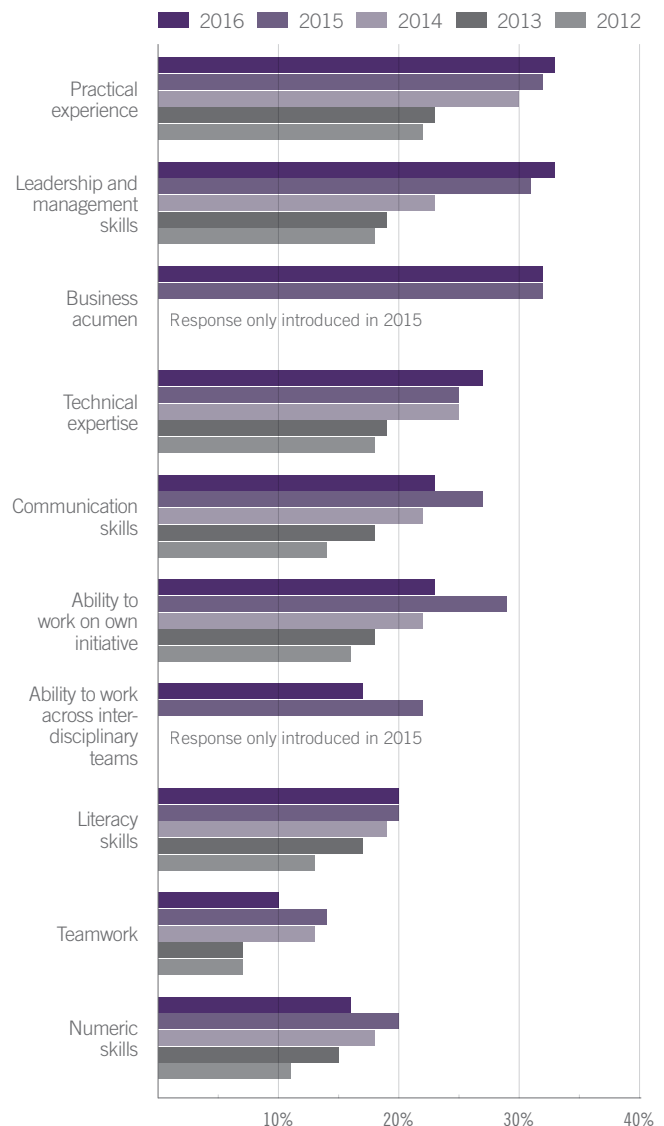
Do you find that a typical recruit to an engineering, IT or technical role does not meet your reasonable expectations?

Q: Do you find that the typical … recruit to an engineering, IT or technical role does not meet your reasonable expectations in any of the following particular skill areas? (2016 sample = 403)
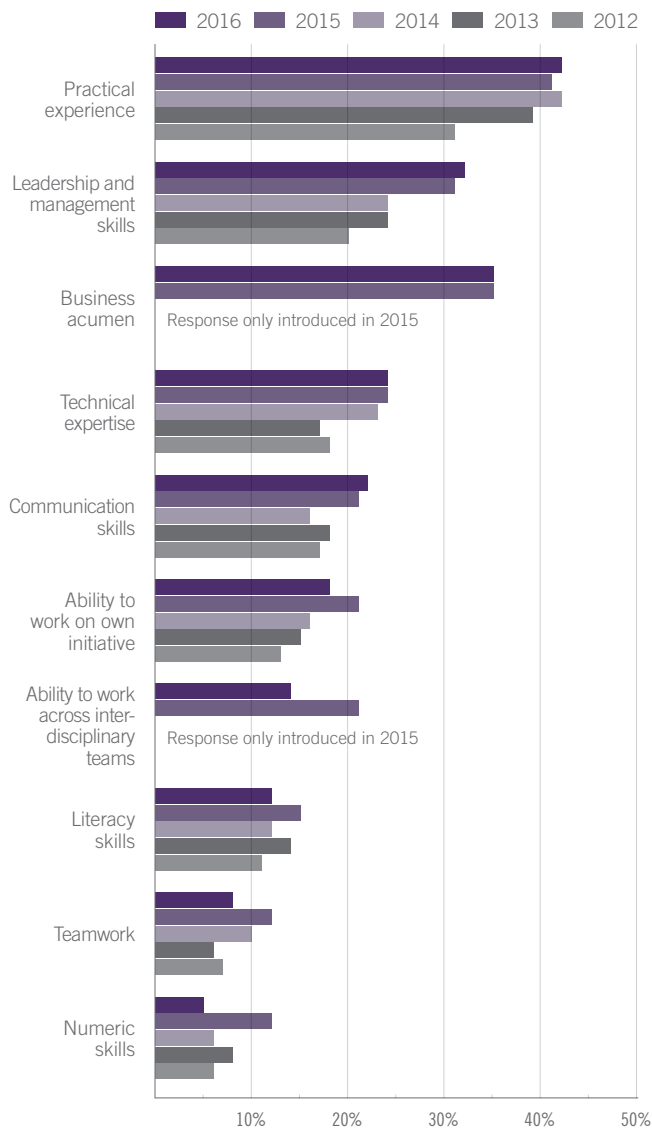
Across all candidates the main perceived skills gaps are considered by employers to be practical experience, leadership and management skills, and business acumen. There have, however, been some strong progress indicators. According to employers, graduates have demonstrated significant improvements in their ability to work across inter-disciplinary teams and in their numerical skills, whilst postgraduates are perceived to be better at working across inter-disciplinary teams and teamwork, and to have stronger literacy and numeric skills.

Skills gaps in recruits – school leavers/apprentices

Q: Do you find that the typical new…recruit to an engineering, IT or technical role does not meet your reasonable expectations in any of the following particular skill areas? (2016 sample = 403; prompted)

Skills gaps in recruits – graduates

Legend: 2016, 2015, 2014, 2013, 2012

- **Practical experience**
- **Leadership and management skills**
- **Business acumen** — Response only introduced in 2015
- **Technical expertise**
- **Communication skills**
- **Ability to work on own initiative**
- **Ability to work across inter-disciplinary teams** — Response only introduced in 2015
- **Literacy skills**
- **Teamwork**
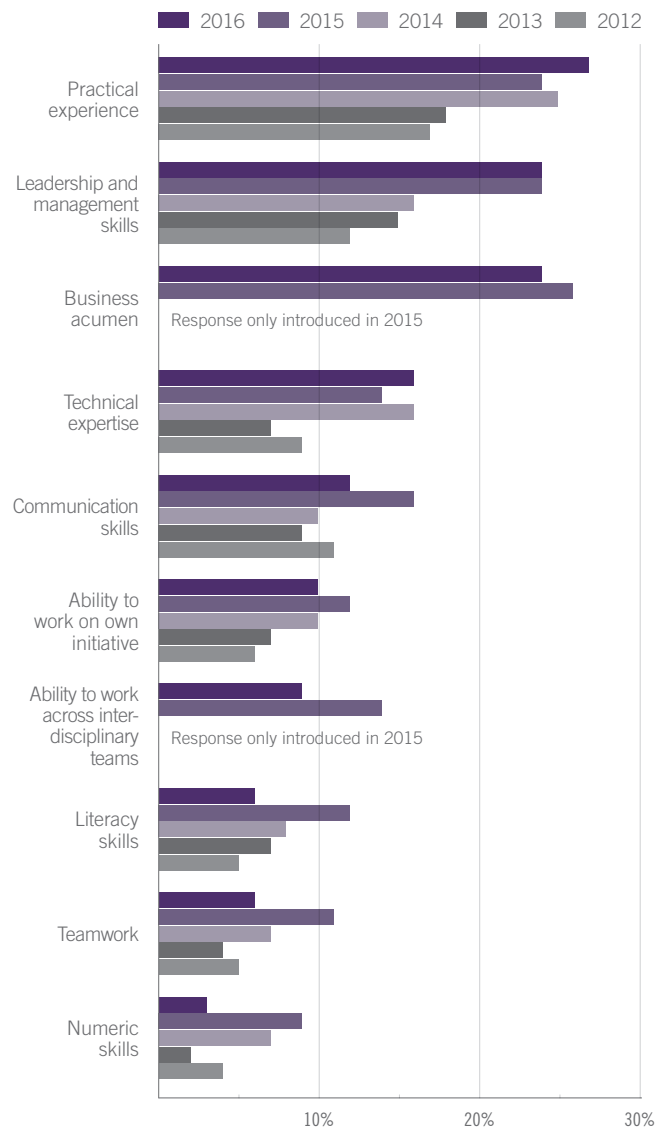- **Numeric skills**

(Horizontal axis: 10% 20% 30% 40% 50%)

Q: Do you find that the typical new…recruit to an engineering, IT or technical role does not meet your reasonable expectations in any of the following particular skill areas? (2016 sample = 403; prompted)

Skills gaps in recruits – postgraduates

Legend: 2016, 2015, 2014, 2013, 2012

- **Practical experience**
- **Leadership and management skills**
- **Business acumen** — Response only introduced in 2015
- **Technical expertise**
- **Communication skills**
- **Ability to work on own initiative**
- **Ability to work across inter-disciplinary teams** — Response only introduced in 2015
- **Literacy skills**
- **Teamwork**
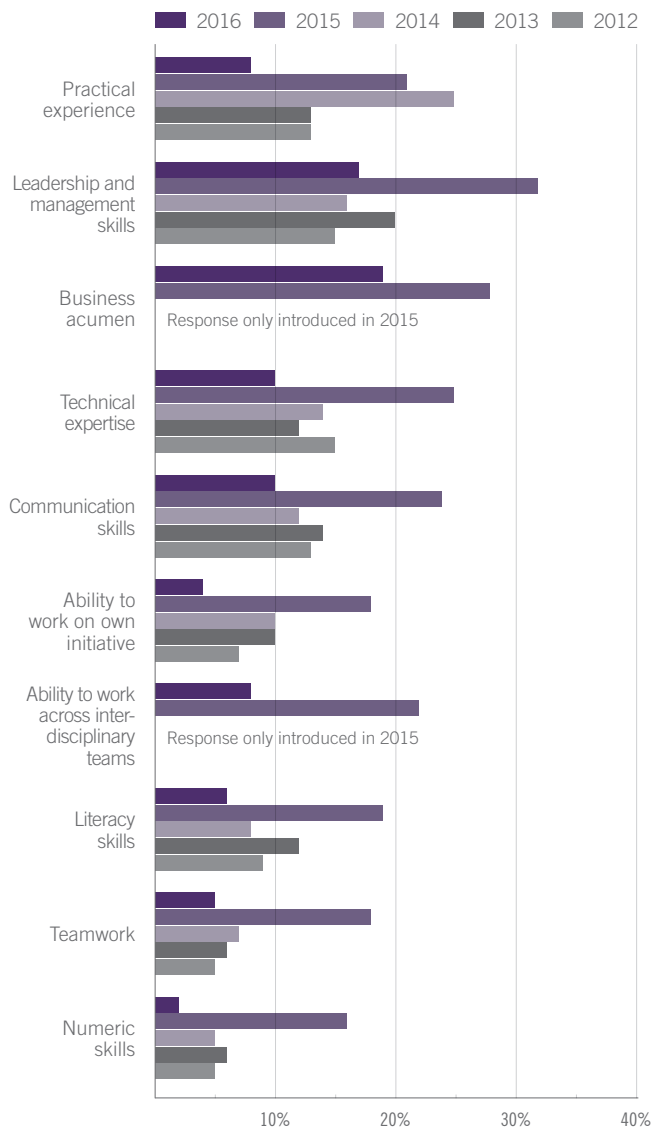- **Numeric skills**

(Horizontal axis: 10% 20% 30%)

Q: Do you find that the typical new…recruit to an engineering, IT or technical role does not meet your reasonable expectations in any of the following particular skill areas? (2016 sample = 403; prompted)

Skills gaps in recruits – new experienced staff

Legend: 2016, 2015, 2014, 2013, 2012

Categories:
- Practical experience
- Leadership and management skills
- Business acumen — Response only introduced in 2015
- Technical expertise
- Communication skills
- Ability to work on own initiative
- Ability to work across inter-disciplinary teams — Response only introduced in 2015
- Literacy skills
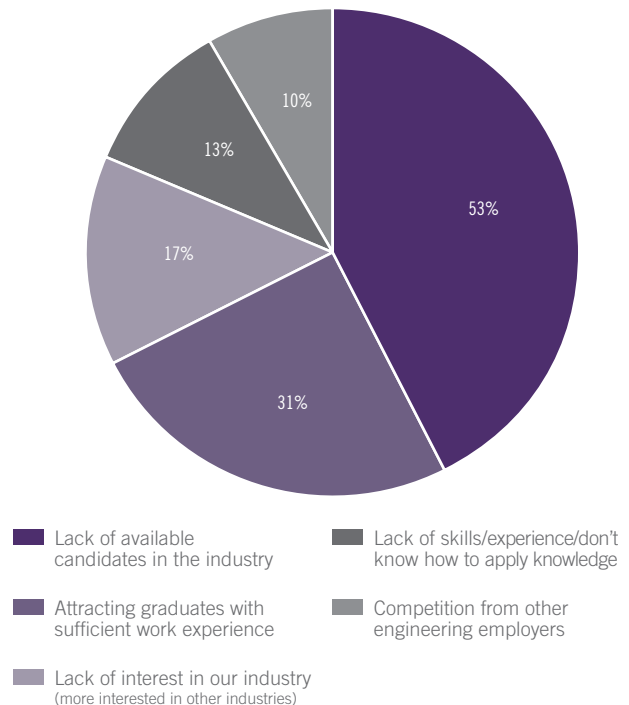- Teamwork
- Numeric skills

Axis: 10% 20% 30% 40%

Q: Do you find that the typical new…recruit to an engineering, IT or technical role does not meet your reasonable expectations in any of the following particular skill areas? (2016 sample = 403; prompted)

However, despite 68% of UK employers reporting they are concerned that the education system will struggle to keep up with the skills required for technological change, just 51% claim that their organisation takes steps to influence the content of degrees and the technical training engineers undertake. So what initiatives are in place, what is working well, and what opportunities are there for development?
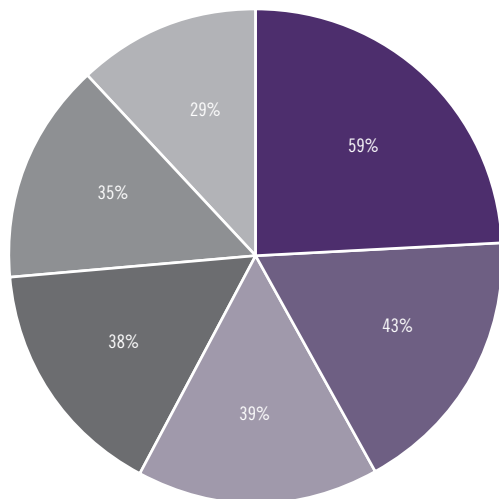
3.2   Work experience

Some 31% of employers state that a key problem they face in recruiting engineering and technology graduates is attracting candidates with sufficient work experience. The main reasons degrees fail to meet expectations are because they don't develop practical skills (59%) and offer a lack of opportunities for students to develop practical work experience in companies (43%).

Problems faced when recruiting graduates

- Lack of available candidates in the industry — 53%
- Attracting graduates with sufficient work experience — 31%
- Lack of interest in our industry (more interested in other industries) — 17%
- Lack of skills/experience/don't know how to apply knowledge — 13%
- Competition from other engineering employers — 10%

Q: What problems do you face when recruiting engineering and technology graduates? (2016 sample = 89; unprompted, multiple responses)

Reasons why technical degrees don't suit requirements

- ■ Does not develop practical skills
- ■ Does not provide opportunities for students to obtain practical work experience in companies
- ■ Courses not up-to-date with industry
- ■ Insufficient depth of content
- ■ Insufficient breadth of content
- ■ Absence of soft skills

Q: Which of the following are reasons for engineering and technology degrees not suiting the needs of your organisation? (2016 sample = 120; unprompted, multiple responses)

The majority (97%) of employers agree that businesses need to help the transition from education and training to the workplace if they are to ultimately get people with the right skills. Additionally – 91% also agree that to improve the supply of engineers and technicians, more employers need to provide work experience for those in education or training.

Conversely, just under eight in ten (78%) of employers surveyed say they are offering work experience to future engineers and students looking to enter or advance in the industry, with the main opportunities arising in the communications* (89%), transport (82%) and defence** (81%) sectors.

I believe businesses should accept they need to help the transition from education and training to the workplace, in order to get people with the right skills

Yes	97%
3%	No

Q: Please state whether you agree with each statement or not: I believe businesses should accept they need to help the transition from education and training to the workplace, in order to get people with the right skills (2016 sample = 403)

To improve the supply of engineers and technicians, more employers need to provide work experience for those in education or training.

Yes	91%
9%	No

Q: Please state whether you agree with each statement or not: To improve the supply of engineers and technicians, more employers need to provide work experience for those in education or training (2016 sample = 403)

However, it is not clear what quality of work experience they offer and there appears to be a 'gap' in employer perceptions around the merit of old-fashioned work experience versus new forms of getting people to understand the world of engineering. "A few years ago we took a student for a week, but in a week you are very limited in what you can do," says SPTS Technologies' Production Engineering Director **Huw Williams**. "They need context and training. We now offer work experience where they do half a day in different departments, which is a snapshot. But you have to ask yourself even then: 'Do they get a real picture?' Even for experienced engineers it takes a while for people to get to grips with what is being talked about and what it means."

*Note low sample = 28. **Note low sample = 26.

"I have changed my opinion on the issue of work experience and work readiness," says **Adrian Griffiths**, Head of Engineering at a company operating in the aerospace sector. "Five years ago I would have said the right type of experience isn't there among young people coming out of school – they had no idea of what a working environment was like. That hasn't changed but I've come to live with the situation and if you think about it realistically: why should they have experience and knowledge of the workplace? We address this with placements. Each year we offer work experience to one or two people who are still at school. Although we are more than happy to support them, it is not something which is widely sought after by schools. Requests tend to come through employees who already work in the company."

Crouch Waterfall's Business Manager **Gillian Walker** says her own experience has also been mixed. "We have always tried to engage the individuals in specific projects and assign them to a relevant engineer. Our main reticence is ensuring that we have suitable mentors with the time available during the candidates' spell with us. I would suggest that there is no point in a school leaver joining us unless they have a genuine interest at the outset that we can endeavour to enhance. But it would be helpful to have some guidelines as to what the agencies and candidates expect from the experience."

Three quarters of employers (76%) agree that compelling engineering and technology companies to provide work experience will improve engineering talent. However, 38% said making it compulsory to offer work experience would be damaging and 11% said they would not advocate that their organisation provides work experience.

Williams from SPTS Technologies says:

There is certainly more that could be done between businesses and schools to ensure young people are work-ready. You have to look at the right solution for the right company. I think the combination of the apprenticeship scheme and university scheme we participate in (Network75) has been very beneficial for the company. You can't expect people straight out of education to be ready for the workplace, particularly when you bring in someone at the age of 15/16. You could mandate work experience but that would only work if it is a big enough firm – not every small business is in a position to give the right type of experience.

Andy Taylor, Chief Engineer – Mechanical at Amec Foster Wheeler, concurs:

> *In terms of getting the right people, I think that largely companies should help themselves. Education institutions should seek more help from business. They should get people like me to go into college and lecture on the application of what they are learning and the practical stuff which makes up the job. This will help narrow the gap between practice and theory.*

Adrian Griffiths, however, does make a call for compulsory work experience. "I can see the pressure on schools to improve results is to bring about closer interaction between industry and education," he says. "In terms of a mandatory requirement for work experience – I would push for this. Someone would need to take the initiative and I could see a role for a membership body here."

Lindsay MacDonald, Senior Manager for Engineering and Technology at Proserv, says that his company is committed to engaging with education institutions to encourage young people to consider the options within engineering, including work experience: "More is required to expose young people to engineering as a profession. Practical experience is also lacking in graduates – in the past we have been very supportive of engaging with academia to give employment opportunities, but in recent times, the type of courses/skills have shifted focus and we have struggled to see what we could offer. We would be supportive of a mandatory requirement as there are a multitude of engineering companies who do not support these initiatives but have the clout to financially attract key engineers once they have been trained/gained experience elsewhere."

Robert White, Senior Manager - Electronic Systems at Elekta Ltd, agrees: "We would have no problem with mandatory work experience placements provided there was flexibility in terms of numbers, duration and timing."

WT Henley's Engineering Manager **Owen Williams** adds:

> *We take on work experience people every year. People often say they enjoyed working in the engineering department over many other departments that we have here and hopefully this will lead to them taking engineering up as a career.*

3.3   Apprenticeships

Over half (53%) of employers do not know what benefits the apprentice levy can bring their organisation – even where companies were able to identify any benefit, the benefit was only identified by 7% of the sample or less.

Employer understanding of the government's apprenticeships policy, particularly the benefits to employers, therefore appears to be low. That said, employers were able to cite some positive experiences of apprentices to date.

Williams from SPTS Technologies says:

> *We take apprentices each year – between 2 and 5 across Operations. The government's focus on apprenticeships has helped us – it is changing the profile of the workforce, and bringing in younger people where previously we had a problem of an ageing skills base.*

UTC Aerospace Systems is another beneficiary of apprenticeships and takes "some apprentices each year on site". However, the company's Head of Engineering – Engine Control Systems offered a personal perspective on their future direction. "Broadly speaking I am very much in favour of measures which get them off the ground at every level of someone's career," **Griffiths** says. "They aren't just something for school leavers. I think the age range should be extended if they have the interest and the right kind of experience. Higher degree apprenticeships are a step in the right direction in this regard. This means people who haven't been through the apprenticeship or degree route but are interested in engineering have a route into the workplace."

Whilst Crouch Waterfall is pleased with the opportunities

created by the apprenticeships scheme, there is room for improvement admits Business Manager **Walker**:

" *The scheme has assisted us with one excellent technical candidate but she was not easy to find. I think more should be done to motivate the apprenticeship candidates and improvements made in the communication between the apprenticeship agencies and the companies they supply. Such placements should not be because the candidate cannot think of anything else to do, they need to be interested and engaged. Our candidate is excellent, but the bar set by the agency in general was not high enough.* "

Others were more critical of their experience to date. "I'm not sure what help it has been," says **MacDonald** from Proserv. "We do recruit usually between 3-5 apprentices but I think the issue is how schools prepare the school leavers and help them with career selections. At the last apprentice open day, we were absolutely stunned by the lack of interview skills, knowledge, engagement and reality. A few were glued to their mobile phones during the breaks. Most hadn't even researched the company to see who we are and what we do. When we asked questions about why they wanted to be an engineer they had no real idea: 'My Dad is an offshore engineer. What does he do? Oh, I don't know!' So I think more focus is required at grass-roots level to educate, both in terms of what the profession is about but also how to present yourself at interviews. I don't think the school leavers we saw really understood what they wanted to do or what they could do."

DEVELOPING YOUNG ENGINEERING TALENT: HOW I SEE IT

" *Engineering companies have a critical role in getting more people interested in careers in engineering.* **"**

Mark Goudie

"I didn't have any interaction with an engineering company until I was at high school. However, it is in the years before young people choose their GCSEs that it is most important to get them interested in the profession.

If you leave it until the point where they have chosen their A-levels - or in my case, Scottish Highers – it is already too late because you have missed out on the opportunity to explain the relevance of their subject choices to a future engineering career.

More and more companies are targeting young people earlier in their education, through schemes like Primary Engineer, which aim to inform primary school children around the role engineering plays in our lives.

This is positive but there is much more that could be done to have an even greater impact on inspiring the next generation of engineers. With more collaboration between companies across the sector, the energy and efforts dedicated to STEM outreach and student engagement could be very powerful.

Not only does engineering offer a huge variety of career choices, but these jobs are rewarding and fulfilling. They offer flexibility and a work/life balance – which can't be said of many well-paid careers. Industry and education

need to work more closely together to sell these messages.

From the work I have done in schools and from my own experience it is clear that meeting with engineers allows young people to ask the questions that their parents or careers advisors don't know how to answer about the profession.

Taking my own career as an example: I was originally on course to do a degree in law – in line with the careers advice I got from my school – but it was the opportunity to do a Year In Industry with EDF Energy which changed my ambition to become an engineer, prompting me to change my UCAS application to an engineering degree.

During the course of my degree, the financial support and the work experience with Atkins - gained through the IET Power Academy - helped me complete my engineering degree and start my engineering career.
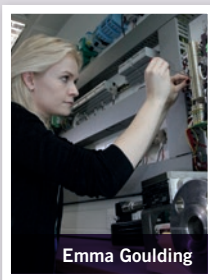
To get more engineers, large and small engineering employers need to make sure career decisions aren't down to chance but a product of first hand knowledge about the potential for a career in engineering."

Mark Goudie graduated from the University of Strathclyde in Electrical and Mechanical Engineering in 2015. He is currently an Electrical and Mechanical Engineer in the Future Energies team at Atkins.

ENGINEERS ARE BEST PLACED TO BRING ALIVE THE VARIETY OF CAREER OPTIONS

" I believe the best person to describe what it's like to work in engineering is an engineer. First-hand experience can provide the best detail on what it's like working within this industry. "

Emma Goulding

"Allowing people to really see the variety of exciting careers that are available helps to dispel current, outdated beliefs that engineering is only suited to certain types of people. Talking to people working in a specific field of engineering and undertaking work experience with a company in that area allows children to form their own opinions about what the work is really like. Speaking to children just before they choose their options, or just before they leave school is the ideal time to influence them.

It's really important to make sure that younger people are fully aware of the options available to them, and by having the opportunity to interact with those in industry through Careers Fairs or dedicated STEM days is really important. It's natural for children to seek their parents' advice on available careers, particularly if that parent is working in a field the child is interested in. However, the ways in which careers have changed over the years, particularly in engineering, might mean that some of the information parents are telling their children is slightly inaccurate. Schools are important too. In the ones I have visited as part of my STEM ambassadorship, it is pleasing to see that most are fully supportive of showcasing the vast range of careers that are available to their students under the

umbrella of engineering. There definitely seems to be an upward force of support from teachers asking those in industry to come and visit their schools and to interact with their students, which is great! From a company perspective, I believe that increasing the availability of work experience placements to more children could allow more young people to understand the types of engineering fields they can get involved with, and help them to gain an understanding into the type of varied work that is available. A lot of people have misconceptions about what working in engineering is really like. Often people imagine all engineers are men who work in workshops, and need to wear overalls all the time. However, in reality, I've come to realise this isn't the case. I work in an office-based environment with both male and female engineers, where the majority of my time is spent performing tests in an electrical lab using computers. Engineering is a lot more universal in terms of the range of careers that are available, and I think making this information available to students is key to removing outdated stereotypes."

Emma Goulding joined Siemens as a Technical Apprentice in 2012. She is now a Controls Engineer, supporting customers globally with controls-related technical support. She is currently studying for a degree in Mechanical Engineering at Birmingham City University.

3.4   In summary

- **Half of employers say that a typical new recruit does not meet their 'reasonable expectations' – and all types of recruit except experienced staff are perceived to have greater skills gaps than in previous years.**
- **Around a third of employers say the biggest problem they face in recruiting graduates is a lack of candidates with sufficient work experience.**
- **Over two thirds of employers are concerned that the education system will not keep up with skills required for technological change.**
- **Only half of organisations take steps to influence the content of degrees and technical training.**
- **Over half of employers do not know how the apprentice levy can benefit their organisation.**

4.
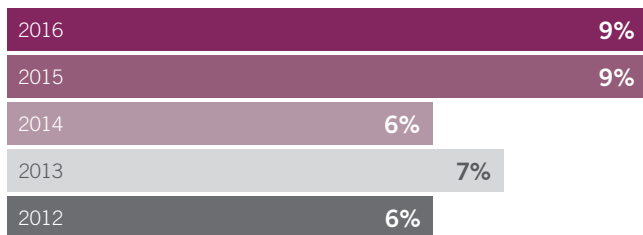# DIVERSIFYING THE WORKFORCE

In this section we explore:

■ Recruitment and development of female employees.

■ The prevalence of gender, ethnic and wider diversity programmes.

■ In-house development for all employees.
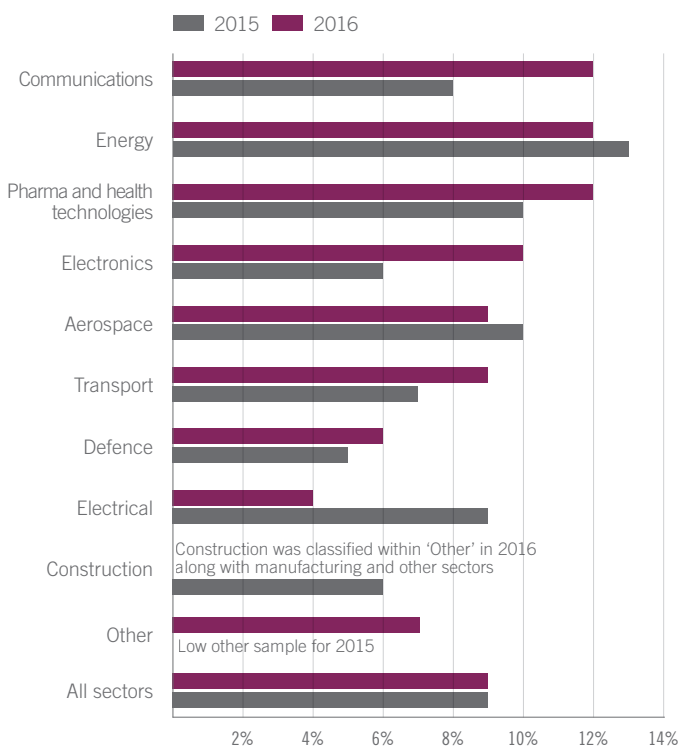
4.1   Female recruitment and support

Women still only account for 9% of all engineering and technology employees. Gender diversity remains a huge challenge for the sector.

Current female engineering workforce (all staff)

Q: Of the overall engineering and technology staff you employ, what % are female? (2016 sample = 355)

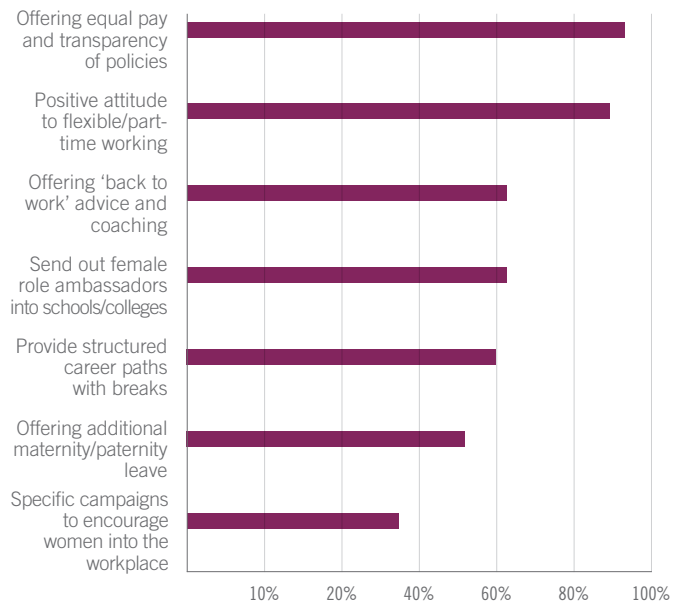### Current female engineering workforce (by sector)

Q: Of the overall engineering and technology staff you employ, what % are female? (2016 all sectors sample = 355. See Appendix for sector sample sizes). **Note** – *communications (27), pharma and health technologies (29), electronics (29) and defence (24) all have low samples.*

The scale of the challenge is shown by 63% of businesses not having gender diversity initiatives in place – up from 57% last year. Where they are in place, they consist mainly of equal pay policies and positive attitudes towards flexible and part-time working.

Actions taken to improve gender diversity

(Graph is among the 34% of organisations with gender diversity initiatives in place. Note, 63% don't have gender diversity initiatives in place, 3% don't know)

Q: Which of the following actions has your organisation undertaken to improve the gender diversity of your engineering, IT and technical workforce? (2016 sample =136; prompted, multiple responses)

Andy Taylor, Chief Engineer – Mechanical at Amec Foster Wheeler, says "Work to directly address this issue needs to begin in schools and continued throughout eduction."

We do a lot on diversity in our business and our company is very committed to this agenda. I think the real issue is there aren't enough women going into engineering in the education system. I have discussed this with a female colleague who gets involved in diversity promotion to schools around women in engineering. The main problem we see is not enough people going in at undergraduate level.

"We try to do our best but have to have the raw materials to work with and I can't see how we can bring in more women without getting closer to a 50:50 balance of engineering students at universities – otherwise companies would effectively be going down a route of preferential hiring. There is certainly work to do in schools. My daughter was at an all-girl school and it is was clear that both the careers people and teachers were unaware of engineering as a profession."
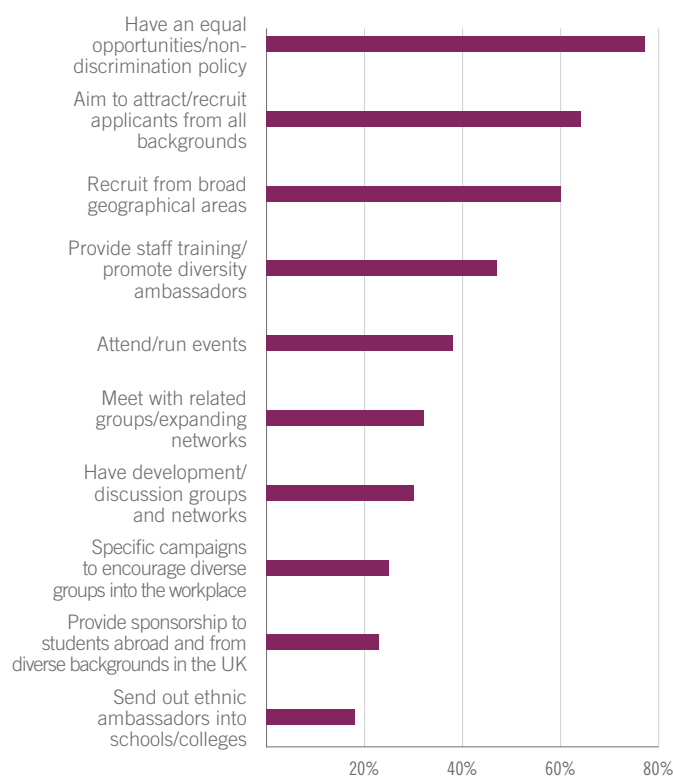
4.2   LGBT/ethnic diversity initiatives

While 22% of firms surveyed currently have LGBT (lesbian, gay, bisexual, and transgender) or ethnic diversity initiatives in place the majority – nearly three quarters (73%) – say they don't (5% don't know).

Among those organisations with LGBT/ethnic diversity initiatives in place, the majority (77%) have an equal opportunities/non-discrimination policy in place. Nearly two thirds (64%) aim to attract/recruit applicants from all backgrounds and just under half (47%) are providing staff training and promoting diversity ambassadors.

Actions taken to improve LGBT/ethnic diversity

(among the 22% of organisations with LGBT/ethnic diversity initiatives in place)

Q: What actions has your organisation undertaken to improve the diversity of your engineering, IT and technical workforce? We are now talking about ethnicity and LGBT topics (2016 sample = 87; unprompted, multiple responses)

Four in ten employers agree that their organisation could do more to recruit people from diverse backgrounds, and 60% agree better targeting of diverse groups would increase the pool of potential engineers available.

Michelle Hynes, HR and Recruitment Manager at Cotoplaxi Energy, says: "We have always recruited on the basis of ability and we do not see gender, race, creed, disability or sexuality as a barrier to employing anybody. However, we do not get many applicants from these areas. In fact, we have had none this year."

Gillian Walker, Business Manager at Crouch Waterfall, agrees:

> *As a small company our main aim is to recruit the candidates most suitable to undertake the work irrespective of gender or LGBT/ethnic diversity and by the law of averages we have achieved a suitably diverse team.*

"We adhere to the principle of our diversity and equality policy and have not experienced any problems within our team. I believe that if there is a problem in increasing the diversity in the workplace it stems from the lack of diversity in graduates coming out of university."

Proserv's Senior Manager for Engineering and Technology, **Lindsay MacDonald**, adds: "We are an equal opportunity employer and have clear guidelines within our global business and ethics policy with the aim of ensuring all employees regardless of gender, race, sexual orientation, disability, religious beliefs feel part of the team and have equal employment opportunities. Locally, we have a real good mix within our team and promotion opportunities are based on performance criteria. Based on an observation that there is a lack of strategy to break down barriers/perceptions that the engineering profession as a whole has lots to offer all groups within the community, then I feel more needs to be done at an earlier stage within the educational arena."

Diverse background brings diversity of thinking for Amec Foster Wheeler

Amec Foster Wheeler is a business that has put diversity and inclusion at the heart of its people strategy.

> *We want everyone in our business, whatever their background, to have a real sense of belonging and work collaboratively. We believe this is important in order for everyone to feel they have value to add and they can bring their own unique ideas to the table,*

says Project Delivery Director, **Nicky Mason**. "Ultimately, what we want to do is encourage and enable diversity of thought so that we can deliver more creative solutions for our customers." Over the past three years, a new global strategy has ensured that across the company, from top to bottom, meaningful action is taken to drive greater diversity and inclusion. "Diversity has always been part of our values but now there is much more substance to our approach. We have a group of over 20 senior leaders, from across our business units and global offices, who champion the agenda, each responsible for an action plan tailored specifically for their part of the business."

As a result of this, a number of activities now support diversity and inclusion in the fullest sense, throughout the business. Within the Northern Europe and former CIS business unit this has included a diversity and inclusion survey attracting over 2,000 employee responses, the results of which informed the action areas for this year, including the need to raise awareness of unconscious bias among line managers and recruiters and promoting visible, diverse role models across the business.

Additionally, three network groups have been established to help employees connect over common issues: 'Pride', for LGBT employees and allies; 'Clear Minds' centred on awareness of mental health issues; and 'We Care' for employees who balance working with care responsibilities. "Through our two recruitment-for-diversity programmes, focussed on Oil and Gas and Nuclear we have brought in a new cohort of 74 employees".

In order to assess progress on this agenda, every business unit will ultimately have to adopt Balanced Team Indicator (BTI) reporting which is used as an indicator for how the business is doing. "It is very difficult to report on all the visible and invisible differences but the BTI recognises that what gets measured gets done and it provides us with something simple which we can use for monitoring and action." she says. "Even starting to measure straightforward things like nationality has proved challenging but doing this provides a platform for us to further develop our reporting."
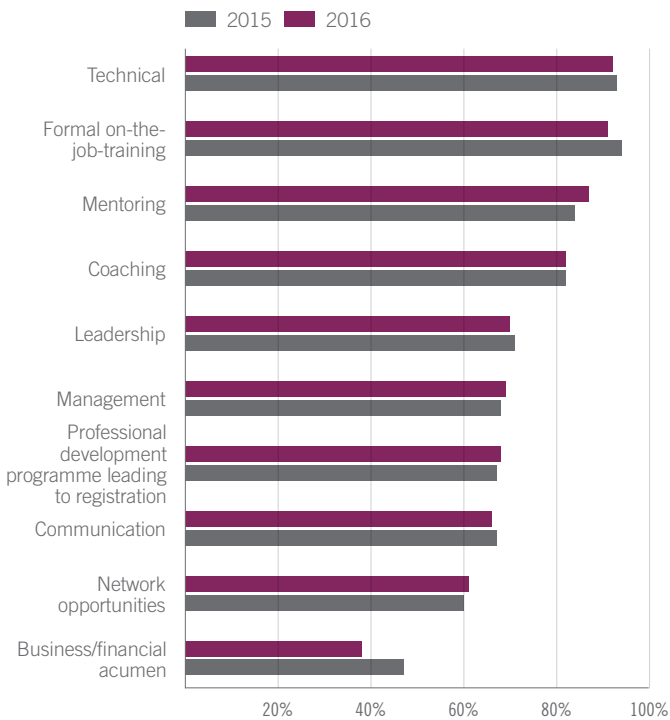
A dedicated week in June this year, provided a global focal point for activity to champion diversity and inclusion – specifically centred around 'thinking differently, together'. This saw the company encourage employees to share when diversity of thought has contributed to new ideas and creativity which has benefited the business by using the hashtag #dot (diversity of thought). It also supported employees walking in the Pride in London Parade as well as other initiatives to support National Women in Engineering Day, National Armed Forces Day and UK Carers Week.

The agenda has already made a difference in the way Amec Foster Wheeler works. With some customers such as EDF it has adopted a partnership approach to diversity and inclusion, the kind of supply chain alignment which is increasingly expected in the sector.

4.3   In-house development

Technical training, formal on-the-job training and mentoring continue to be the most common methods of development on offer to staff as firms seek to increase retention and development. Some 88% of employers state that they are proud of their company's approach to skills development and training.
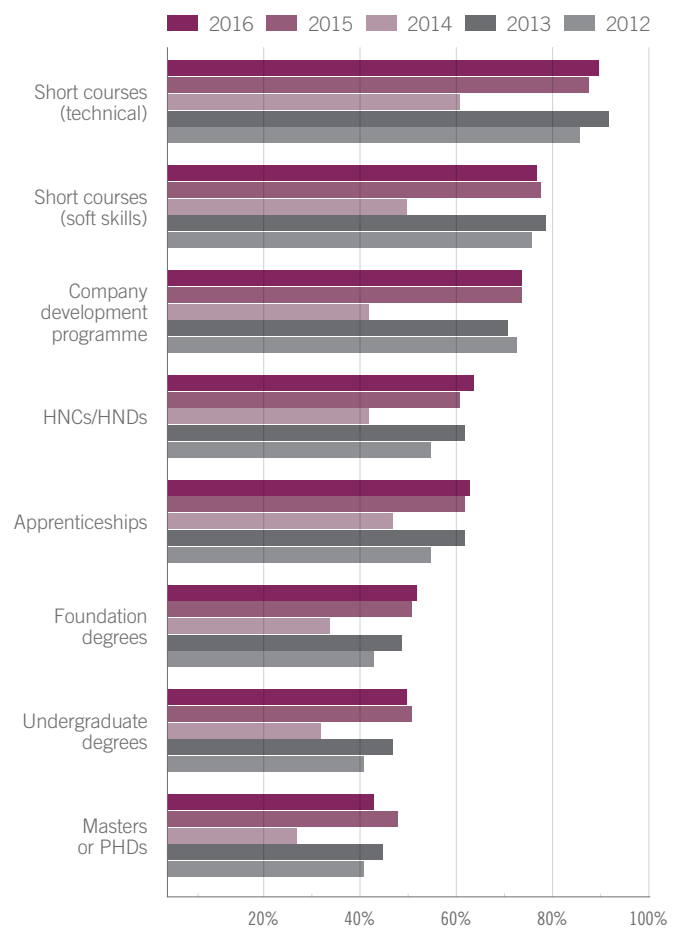
Training and development provided to technical staff

Q: What type of staff training or development are you providing for engineering and technology employees? (2016 sample = 401; prompted, multiple responses)

Meanwhile, in terms of academic support for employees, short courses (technical and soft skills) and company development programmes remain the most commonly provided support.

Support provided to technical staff

Q: Which of the following do you offer/support for engineering and technology employees? (2016 sample = 401; prompted, multiple responses)

NURTURING TALENT WITHIN THE LOCAL COMMUNITY

"As a company we have always believed in the importance of growing our own talent. This approach means we can bring in school leavers and provide the training they need to progress through the company."

"A good example of this is one of our partners, who has been with us since the age of 18, whom we sponsored through a degree and is now a partner."

"We have been involved in supporting careers events in schools for some time but we find that they can be too late – particularly for the young women we need to encourage into the engineering workforce – and that convincing people to choose a career in engineering after they have done their GCSEs is nigh on impossible."

Laura Mansel-Thomas

"In the past year I've spent time helping expand the relationship we have with schools around our offices in the eastern region. As part of this, we have supported a scheme called 'Design Engineer Construct' in Clacton Coastal Academy, which delivers a curriculum which helps students from Year 9-11 get STEM knowledge and skills and apply them to the real-life industry challenges we face today. Our involvement is in helping with student projects, talking to students about careers in our industry and offering work experience. We already have clear evidence of the scheme's success in the outstanding performance of the first cohort who have gone through and exceeded expectations in terms of the results they will achieve. We now plan to extend our involvement to support students from level two (GCSE equivalent) to a level three qualification this September. This will involve two students working with us two days a week and spending three days in school. We know we will get someone enthusiastic and knowledgeable as part of our team while they will receive valuable work experience. We also plan to extend our work in the region to a second school in Ipswich, where we will be the direct company sponsor".

"From my experience of working with schools and colleges, it is clear that if companies want to make schemes like this work you need a senior and technical member of staff to drive the scheme rather than simply leaving it to HR to manage. This is because you need to understand where the students can be useful and also because the schemes can't work without the pro-activity and drive to make the partnership happen, something which my PA has helped me with. In working with schools you have to be realistic that however well-intentioned they may be, teachers and heads of department are under incredible pressure and have very little spare time to take schemes forward without employer support. Our involvement with schools proves you can make a difference: in the case of Clacton, they have shifted from a pure academic approach to one of meeting skills in demand in the local area."

Laura Mansel-Thomas is the Building Services Engineering Partner at Ingleton Wood LLP, a company which specialises in property and construction consultancy. She leads a partnership with Clacton Coastal Academy, which helps young students learn and apply knowledge relevant to careers in engineering.

4.4   In summary

- **Women still account for only 9% of all engineering and technology staff so gender diversity remains a major challenge in the sector.**
- **Large proportions of businesses – a greater number than 12 months ago – still do not have initiatives in place to ensure gender, ethnic and wider diversity in the workplace.**
- **Employers generally recognise that they could do more to recruit people from diverse backgrounds.**
- **The majority of businesses state they are proud of their company's approach to skills development and training.**

CONCLUSION

This report highlights the need to develop 'home grown' talent to deliver the engineering and technology workforce that is sought by employers.

Whilst there is continued strong demand for new engineering and technology staff and greater optimism amongst employers that they will be able to recruit the employees they need, there are serious question marks about the 'work readiness' of those entering industry.

There is deeper concern than in previous years around the skills, knowledge and experience of the future workforce – postgraduates, graduates, school leavers and apprentices – and one of the major challenges appears to be in recruiting candidates with sufficient work experience who are better prepared for industry.

Many employers are reporting that the content of engineering and technology degrees, as one of the main routes for young people into industry, does not suit the needs of their organisation because the courses don't develop practical skills or offer practical work experience.

For employers, there are also questions about the extent to which they are 'talking' to universities about their requirements. Just 51% report that their organisation takes steps to influence the content of degrees and technical training.

At the other end of the spectrum, employers continue to have the greatest difficulty recruiting experienced engineers. If there is a shortage of experienced recruits, this is, of course, part of the bigger picture around the need to create a more stable workforce. However, this also suggests there is an opportunity for employers to place greater emphasis on their in-house retention and development strategies.

What is also highlighted in this report is that more work needs to be done to deliver a diverse engineering and technology workforce. Women still only account for 9% of all engineering and technology employees, 63% of businesses do not have gender diversity initiatives, and 73% do not have lesbian, gay, bisexual and transgender (LGBT) or ethnic diversity initiatives in place. It is critical for UK businesses to proactively seek ways to diversify their workforce.

More encouragingly, the report highlights two potential areas of encouragement which must now translate into firm action plans that are seen as absolutely critical, not 'nice to have', by employers over the next 12-18 months and beyond:

Firstly, there is widespread recognition of the importance of work experience. An encouraging 91% of engineering employers agree that to improve the supply of engineers and technicians more employers need to provide work experience for those in engineering and training. Although nearly 8 in 10 (78%) surveyed say they are offering some kind of work experience to future engineers and students, evidence from subsequent conversations with some of the respondents - and from other sources - suggests that this work experience is not always of the quality needed to address the skills gaps identified in this report. A priority must be to improve the quality of work experience to ensure it helps to produce engineers who have both the appropriate skills, and a genuine understanding of and enthusiasm for a career in engineering.

Secondly, 40% of employers agree that their organisation could do more to recruit people from diverse backgrounds – and 60% say that better targeting of diverse groups would ultimately increase the pool of potential engineers available. Whilst these figures are nowhere near as high as they should be given wider society demographics, it does show that there is an appetite amongst many employers to do more to reach groups where the talent potential is huge but untapped. We now need to identify more examples of the good work that is being undertaken and to promote this throughout the sector to encourage all employers to follow suit.

Further challenges to engineering recruitment are expected to arise from the UK's decision to leave the EU. This makes the challenge of attracting, educating, training and developing the 'home grown' engineering and technology workforce even more crucial.

Stephanie Fernandes,
Principal Policy Advisor,
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IET recommendations

■ Government and industry need to work together to create a long-term strategy to develop 'home grown' engineering talent and to ensure that any future immigration policy will support growth of the UK's engineering industry.

■ Businesses should put greater emphasis on Continuing Professional Development (CPD). Given that experienced engineers are the most difficult to recruit and the rapid pace of change within the engineering industry, creating a clear CPD plan and having an agile approach to delivering CPD is vital.

■ It is widely agreed that work experience benefits the student and the employer – and is an important way of giving young people a better idea of what an engineering career involves, as well as helping to equip them with some of the practical and technical skills many employers currently feel are lacking. Employers and educators must continue to strengthen their working relationships in order to ensure that the work experience they offer is designed with some of the skills gaps identified in this research in mind.

■ Employers need to recognise they have a vital role to play and have clear and sustainable plans to enable them to attract and retain a more diverse pool of engineers. Not having such plans is compounding the engineering skills shortage.

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APPENDIX

Sector sample sizes

2. Recruitment trends and skills shortages

Current recruitment activity (by sector)

	2016		2015	
	Sample size	% Recuiting (n)	Sample size	% Recuiting (n)
Transport	51	65% (33)	48	58% (28)
Aerospace	36	58% (21)	57	60% (34)
Defence	26*	58% (15)	22*	55% (12)
Communications	28*	57% (16)	23*	48% (11)
Electronics	31	45% (14)	46	61% (28)
Energy	69	43% (30)	62	35% (22)
Pharma and health technologies	35	43% (15)	33	45% (15)
Electrical	41	41% (17)	57	58% (33)
Other**	54	63% (34)	11	45% (5)
All sectors	403	52% (210)	400	53% (211)

Q: Are you currently recruiting engineering and technology staff?

Do you have a long-term corporate plan for recuirtment anf skill development (by sector)

	2016	
	Sample size	% Yes (n)
Aerospace	36	61% (22)
Defence	26*	58% (15)
Electrical	41	51% (21)
Energy	69	51% (35)
Transport	51	45% (23)
Communications	28*	43% (12)
Electronics	31	42% (13)
Pharma and health technologies	35	40% (14)
Other **	54	44% (24)
All sectors	403	47% (190)

Q: Do you have a long-term corporate plan for recruitment and skill development of your engineering and technology staff?

*Caution needed, low sample. We have only reported on figures in the 2016 report with a sample size greater than 20.
**'Other for 2016' includes sectors such as: Construction and manufacturing, Food and drink packaging, Government services.

3. Work-ready employees – bridging the gap

Do you offer work experience opportunities for future engineers and students looking to enter or advance in the industry?

	2016	
	Sample size	% Yes (n)
Communications	28*	89% (25)
Transport	51	82% (42)
Defence	26*	81% (21)
Energy	69	80% (55)
Aerospace	36	78% (28)
Electronics	31	77% (24)
Pharma and health technologies	35	77% (27)
Electrical	41	76% (31)
Other**	54	78% (11)
All sectors	403	78% (316)

Q: Are you offering work experience opportunities to future engineers and students looking to enter or advance in the industry?

4. Diversifying the workforce

Current female engineering workforce (by sector/function)

	2016		2015	
	Sample size	% female engineering and technology staff (n)	Sample size	% female engineering and technology staff (n)
Communications	27*	12%	21*	8%
Energy	61*	12%	55	13%
Pharma and health technologies	29*	12%	29*	10%
Electronics	29*	10%	40	6%
Aerospace	32	9%	47	10%
Transport	42	9%	40	7%
Defence	24*	6%	21*	5%
Electrical	39	4%	52	9%
Construction***	-	-	5*	6%
Other**	45	7%	11*	14%
All sectors	355	9%	348	9%

Q: Of the overall engineering and technology staff you employ, what % are female?
(All organisations which stated they employed women in their workplace and knew the proportion - excluding those who state 0% or 'Don't know')

*Caution needed, low sample. We have only reported on figures in the 2016 report with a sample size greater than 20.
**'Other for 2016' includes sectors such as: Construction and manufacturing, Food and drink packaging, Government services.
***Construction was classified within 'Other' in 2016 along with manufacturing and other sectors.

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