Please Note:

Figures are rounded and do not always add to 100%
Multiple choice questions add to more than 100%
Means and averages are calculated in the data tables, therefore overall totals do not always add to 100%
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1. Executive summary

This is the fifth *Engineering and Technology: Skills and Demand in Industry* report from the IET, based on telephone interviews with representatives from 400 organisations in the UK.

The engineering workforce today:
- The proportion of engineering and technical staff who were under the age of 30 fell from 25% in 2008 to 20% in 2010.
- There was a significant gender gap amongst engineering and technical staff: in 2010, only 5% of the engineers and 4% of the engineering technicians employed by surveyed organisations were women.

Training and retaining the existing skills base:
- There has been a decline in availability of training, for example the proportion of organisations offering formal on-the-job training was only 59% in 2010, compared to 78% in 2009 and 79% in 2008.
- A significant minority (38%) of respondents said that, given the current economic climate, they were concerned about the loss of skills or knowledge due to restructuring.

Skills shortages amongst new recruits:
- In 2010, 37% of respondents said that their organisation was struggling to recruit senior engineers with five to ten years experience (compared to 22% in 2009 and 49% in 2008). Changes in difficulty recruiting reflect the state of the national economy, as typically recruitment is easier during a recession with more candidates available for a smaller pool of jobs.
- In 2010, 33% of respondents said that new engineering and technical recruits did not meet reasonable expectations for levels of skill.

Recruitment plans over the next 12 months:
- 41% of organisations were planning to recruit new engineering and technical staff over the next twelve months, up from 22% in 2009 and similar to the 2008 figure of 40%.
- There was a clear trend towards recruiting experienced staff (51% of planned new recruits were to be experienced staff, up from 45% in 2009 and 32% in 2008) and away from recruiting school leavers (9% in 2010 compared to 17% in 2009 and 16% in 2008).

Looking to the future:
- 20% of respondents were concerned that they would not be able to find suitable engineering and technical candidates to recruit in 4 – 5 years time, up from 14% in 2009 but still less than the figure of 29% in 2008.
- 38% of respondents thought that their organisation would employ more apprentices in 4 – 5 years time, compared to only 7% who thought they would employ fewer.

Addressing skill shortages:
- The most commonly cited action to address skills shortages was to improve the profile and image of engineering (32% of respondents) followed by improving engineering and technical degree content (22%) and improving the school curriculum (20%).
- Fewer than half of respondents believe the UK has the skills base to create a green economy.
2. Key trends

<table>
<thead>
<tr>
<th>The current workforce</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong> Proportion of engineers and technicians employed who are under 30</td>
<td>25%</td>
<td>23%</td>
<td>20%</td>
</tr>
<tr>
<td><strong>Gender</strong> Proportion of professional engineers who are women</td>
<td>5%</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>Proportion of engineering technicians who are women</td>
<td>5%</td>
<td>6%</td>
<td>4%</td>
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<table>
<thead>
<tr>
<th>Training and retaining the existing skills base</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
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<tbody>
<tr>
<td><strong>Training</strong> Proportion of organisations offering formal on-the-job training</td>
<td>79%</td>
<td>78%</td>
<td>59%</td>
</tr>
<tr>
<td>Proportion of organisations offering technical training</td>
<td>68%</td>
<td>53%</td>
<td>55%</td>
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<table>
<thead>
<tr>
<th>Retaining the existing skills base through the recession</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of organisations concerned about loss of skills due to restructuring</td>
<td>N/A</td>
<td>40%</td>
<td>38%</td>
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<table>
<thead>
<tr>
<th>Skills shortages amongst new recruits</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
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<tbody>
<tr>
<td><strong>Difficulty recruiting</strong> Proportion of organisations finding it difficult to recruit suitable senior engineers</td>
<td>49%</td>
<td>22%</td>
<td>37%</td>
</tr>
<tr>
<td>Proportion of organisations finding it difficult to recruit suitable graduate engineers</td>
<td>33%</td>
<td>16%</td>
<td>21%</td>
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<thead>
<tr>
<th>Skills shortages amongst new recruits</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of organisations reporting that engineering and technical recruits typically do not meet reasonable expectations for levels of skill</td>
<td>39%</td>
<td>36%</td>
<td>33%</td>
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</table>

<table>
<thead>
<tr>
<th>Recruitment plans over the next 12 months</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of organisations planning to recruit new engineering and technical staff</td>
<td>40%</td>
<td>22%</td>
<td>41%</td>
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<table>
<thead>
<tr>
<th>Anticipated recruitment challenges over the next 4-5 years</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of organisations not confident they will be able to recruit suitable engineers and technicians</td>
<td>29%</td>
<td>14%</td>
<td>20%</td>
</tr>
</tbody>
</table>
3. The engineering workforce today

3.1 Employment profiles

By sector

In 2010, 13% of staff at surveyed organisations held engineering or technical roles. Of this 13%, 8% were professional engineers (defined in the survey as Chartered Engineers or engineers operating at chartered level), 1% were IT professionals (individuals operating at a similar level to professional engineers), 2% were engineering technicians, 1% were engineering apprentices and <1% were IT Technicians. Figure 1 shows these results broken down by sector.

![Figure 1: "How many people do you estimate you currently employ in this country? How many Professional engineers, IT professionals, Engineering technicians, Engineering apprentices, IT technicians, IT apprentices do you currently employ in this country?" Results broken down by sector. Base: all respondents (400)]
Summary of 2010 Survey findings:
Engineering and Technology Skills and Demand in Industry

Figure 2: “How many people do you estimate you currently employ in this country? How many Professional engineers, IT professionals, Engineering technicians, Engineering apprentices, IT technicians, IT apprentices do you currently employ in this country?”
Results broken down by organisation function. Most organisations carry out more than one function, hence their answers are included in more than one of the categories in this graph. Base: all respondents (400)

By function
Figure 2 shows the results broken down by organisation function. Not surprisingly, a higher proportion of professional engineers were employed by organisations carrying out research (8%) or development and design (8%) compared to organisations carrying out manufacturing (5%). The highest proportion of professional engineers was found in consultancies (14%). A similar proportion of IT professionals and IT technicians were found across all functions.
3.2 Age profiles

Employers were asked to estimate the proportion of their engineering and technical employees in different age brackets. The results are shown in Figure 3, with comparisons to the results from previous years.

It is widely believed that the average age of the engineering and technical workforce is increasing. Future IET skills surveys may bear this out. Certainly, comparison between the 2008 and 2010 results suggest an ageing workforce. Between 2008 and 2010, there was a reduction in the proportion of engineering and technical staff under the age of 30 from 25% to 20%.

3.3 Gender

By role

As shown in Figure 4, the gender gap remained stark, with little improvement from previous years. Overall, 20% of employees at the surveyed organisations were women. The proportion of female staff in engineering and technical roles was fewer still: for example, only 4% of engineering technicians at the organisations were women. The only significant change since 2009 was in the proportion of engineering apprentices who were women, where there had been a rise from 5% to 10%.

Figure 3: “What percentage of your engineering and technical employees fall into the following age bands?” Comparison of answers in the 2010 survey to previous years. Base: all respondents (400)

Figure 4: “What percentage of your UK workforce is female? What percentage of your Professional engineers, IT professionals, Engineering technicians, Engineering apprentices, IT technicians, IT apprentices are female?” Comparison of answers in the 2010 survey to previous years (figures for IT technicians and IT apprenticeships not collected in 2009 and 2008; figures for engineering apprenticeships not collected in 2008). Base: all respondents (400)
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Figure 5 shows a breakdown of the findings by sector. In no sector was more than 10% of the engineering and technical workforce female.

Perceptions

Respondents were asked whether they thought that the proportion of women being recruited to engineering and technical roles had increased, decreased or stayed the same over the past five years. The results are shown in Figure 6. It is noticeable that perceptions appear to mirror confidence in the economy: in 2008, when the economy was still strong, 40% of respondents thought more women were being recruited; in 2009, when the economy was struggling, this dropped to 25%; in 2010, with some economic recovery, the figure had partially recovered to 30%. The significant fluctuations from year to year suggest people’s perceptions about recruitment of women need to be treated with caution.
4. Training and retaining the existing skills base

4.1 Training

Respondents were asked whether, given the current economic climate, they were putting more, less or about the same level of emphasis into training and development for engineering and technical staff. 26% of organisations claimed they were putting more emphasis into training (22% in 2009). 56% said they were putting about the same emphasis on training and development (59% in 2009). 18% said there was less emphasis (19% in 2009). Less than a fifth of organisations were prepared to concede that the recession had resulted in a reduction of employee training.

In addition, respondents were asked what type of staff training or development they were providing for engineers and technicians in their workforce. The results are shown in Figure 7 with comparisons to previous years.

Here, the results appear to indicate that levels of training have, in fact, reduced. There was a substantial drop in the proportion of organisations offering formal on-the-job training, a drop of 20% between 2008 and 2010. The proportion of organisations offering technical training dropped from 68% in 2008 to 53% in 2009 and 55% in 2010. There had also been reductions in training and development of ‘soft skills’ such as communication and leadership.
Respondents were asked whether, given the current economic climate, they were concerned about loss of skills or knowledge due to restructuring. 38% of respondents cited this as a concern, which was similar to in 2009 when the figure was 40%.

In previous recessions, engineering organisations lost skilled staff who they then found difficult to replace once the economy recovered. This survey suggests that a significant minority of organisations fear that the current recessionary cycle will follow a similar path.

Figure 8 shows the responses to this question broken down by sector. Sectors with higher than average levels of concern about loss of skills due to restructuring included transport (51%), energy (50%), building & construction (43%) and pharmaceutical & health technologies (43%).
5. Skills amongst new recruits

5.1 Level of difficulty recruiting

As in previous years, the survey asked respondents whether their organisation was facing difficulties recruiting staff. The results are shown in Figure 9. In 2008, organisations were struggling to recruit suitable staff at all levels. In 2009, the extent of skills shortages was significantly reduced. Presumably this was a result of the recession, with more potential candidates available to fill a reduced number of newly available positions.

In 2010, skills shortages had returned to some extent, which probably reflected the beginnings of economic recovery, but they had not yet reached the extent of 2008. In 2010, 37% of respondents reported difficulties in recruiting senior engineers, 22% difficulties in recruiting engineering management and 21% difficulties in recruiting graduate engineers. In contrast, only 13% of respondents reported difficulties recruiting technicians and 6% reported difficulties recruiting apprentices.

5.2 Skills shortages amongst new recruits

By career level

Respondents were asked whether new recruits to engineering and technical roles were typically meeting the organisation’s reasonable expectations for levels of skill. The results are shown in Figure 10. Across all engineering and technical recruits, there had been a reduction in the proportion of organisations saying that recruits do not meet expectations, from 39% in 2008 to 33% in 2010. Nonetheless, this still left a significant minority of organisations who were dissatisfied with the skills levels of new recruits.

**Figure 9:** “Are you currently experiencing problems in recruiting Engineering apprentices, Engineering technicians, Graduate engineers, Senior engineers with 5 to 10 years of experience, or Engineering management?” Comparison of answers in the 2010 survey to previous years. Base: all respondents (400)

**Figure 10:** “Do you find the typical school leaver recruit/graduate recruit/postgraduate recruit/experienced staff recruit does not meet your reasonable expectations for engineering and technology roles in any particular skill areas?” Comparison of answers in the 2010 survey to previous years. Base: all respondents (400)
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Figure 11 shows a breakdown of the particular skills which recruits were typically lacking. As can be seen, skills gaps mainly related to practical experience, especially amongst graduates (30%). This result supports the findings of the Royal Academy of Engineering’s report *Engineering Graduates for Industry* (2010), which suggested that degrees should include more practical experience and work placements.

Figure 11: “Do you find the typical school leaver recruit/graduate recruit/postgraduate recruit/experienced staff recruit does not meet your reasonable expectations for engineering and technology roles in any particular skill areas?” Base: all respondents (400)
6. Recruitment plans over the next twelve months

6.1 Recruitment plans

As shown in Figure 12, 55% of organisations were planning on recruiting staff over the next twelve months, and 41% of organisations were planning to recruit new engineering and technical staff. These recruitment plans probably reflected optimism about the state of the economy and economic prospects.

The results show a significant increase from 2009, when only 31% of organisations planned to recruit new staff and only 22% planned to recruit new engineering and technical staff. The 2010 figures were almost up to those seen in 2008, when 63% of organisations planned to recruit new staff and 40% planned to recruit new engineering and technical staff.

Figure 13 shows a breakdown of the result for 2010 by sector. As can be seen, a particularly high proportion of organisations in the energy, computing & IT and defence sectors planned to recruit in the next twelve months.

By sector

Figure 13 shows a breakdown of the result for 2010 by sector. As can be seen, a particularly high proportion of organisations in the energy, computing & IT and defence sectors planned to recruit in the next twelve months.
Summary of 2010 Survey findings:

Figure 14 shows the results broken down by organisation function. It is evident that organisations which manufacture would be recruiting less than organisations which carry out research or development and design.

By function

Figure 15 shows the proportion of organisations which were planning to recruit apprentices over the next twelve months broken down by sector.

Apprentices

Overall, only 5% of organisations were planning to recruit apprentices over the next twelve months, a similar level to that in 2009 (4%). Figure 15 shows the proportion of organisations which were planning to recruit apprentices over the next twelve months broken down by sector.
6.2 Reasons for recruiting

Respondents who planned to recruit new staff for engineering and technical roles were asked why they needed to recruit. As shown in Figure 16, the most commonly cited reasons were business expansion (68%) followed by staff turnover (49%).

It is notable that the number of organisations planning to recruit to replace retiring staff was substantially larger in 2010 (43%) and 2009 (41%) compared to 2008 (27%).

Between 2009 and 2010, the greatest change was in recruitment due to diversification and development into new areas. 30% of organisations cited this as a reason for recruiting in 2009 and this figure rose to 41% in 2010.

6.3 Career level of new recruits

The organisations which planned to recruit new staff for engineering and technical roles were asked what proportion of those that they planned to recruit would be school leavers, graduates, postgraduates and experienced staff. The results are shown in Figure 17. There was a clear trend towards recruiting experienced staff. In 2010, 51% of planned new recruits were to be experienced staff, up from 45% in 2009 and 32% in 2008.

26% of new recruits were to be graduates, a similar level to in previous years. 14% were to be postgraduates, which was a marginal increase on the previous year but still significantly less than in 2008. 9% of new recruits were to be school leavers, which was significantly less than in previous years.
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6.4 Anticipated recruitment challenges

As shown in Figure 18, there had been an increase in the “confidence factor” since the onset of the recession. In 2008 the confidence factor was only 18%. In 2009, the confidence factor had risen to 50% and in 2010 it was 57%. The increase in the confidence factor was probably due to awareness that there were more engineers on the job market because of the recession.

Figure 19 shows that, of those organisations (13%) who are not confident that they would be able to recruit suitable engineering and technical staff, the biggest cause for concern was lack of suitably qualified candidates on the job market (43% in 2010). Between 2009 and 2010, financial constraints had become less of a factor (34% in 2009 compared to 19% in 2010).

Figure 18: “Do you expect to be able to recruit sufficient suitably qualified engineers and technicians to meet your needs this year?” Comparison of answers in the 2010 survey to previous years. Base: all respondents (400)

<table>
<thead>
<tr>
<th>Reason</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confident</td>
<td>59%</td>
<td>75%</td>
<td>79%</td>
</tr>
<tr>
<td>Not confident</td>
<td>31%</td>
<td>19%</td>
<td>13%</td>
</tr>
<tr>
<td>Don’t know</td>
<td>10%</td>
<td>6%</td>
<td>8%</td>
</tr>
<tr>
<td>Confidence Factor</td>
<td>18%</td>
<td>50%</td>
<td>57%</td>
</tr>
</tbody>
</table>

Figure 19: “Why do you not expect to be able to recruit suitable candidates this year?” Comparison of answers in the 2010 survey to previous years. Base: respondents who do NOT expect to recruit sufficient engineers and technicians (2010: 53, 2009: 77, 2008: 125)
7. Looking to the future

7.1 Anticipated recruitment challenges over the next five years

Respondents were asked to anticipate what recruitment challenges their organisations would face over a longer period, the next four to five years. As shown in Figure 20, in 2008, 29% of respondents were not confident that they would be able to recruit suitably qualified candidates. In 2009 the figure had dropped to 14%, but in 2010 the figure had increased again to 20%. The increase between 2009 and 2010 was likely the result of increased confidence about the future of the economy, as a larger economy would mean greater competition for skilled engineers and technicians.

Those respondents who were not confident that they would be able to recruit suitable staff over the next 4 – 5 years were asked why they thought there would be problems (Figure 21). In 2008, before the recession set in, 36% of such respondents said that they thought there would be a lack of suitably qualified candidates on the job market. In 2009, this figure dropped to 26%. By 2010, the figure had jumped to 51%, more even than in 2008.
7.2 The future of apprenticeships

Organisations were also asked whether, over the next five years, they expected to employ more or less apprentices than they had in the past. The responses are shown in Figure 22. 38% of respondents said more, 48% about the same, 7% fewer and 7% said that they did not know.

Figure 22: “Over the next five years, do you think you will employ more or less apprentices than you have in the past?” Base: respondents who are planning to recruit for engineering and technology roles in the next 12 months (219)
8. Addressing skills shortages

8.1 Areas for improvement

Respondents were asked what actions by engineering institutions, the government, employers or other bodies could help to address skills shortages. The results are shown in full in Figure 23. As in previous years, the most commonly cited action was to improve the image and profile of engineering (32% of respondents). Perhaps surprisingly, the second most commonly cited action was to improve engineering and technical degree content (22%). Here we can cross reference against the results shown in Figure 11, which indicate that respondents felt graduates lacked practical skills.
8.2 The role played by respondents

Respondents were asked whether or not their organisation engaged with elements of the education and skills system. 62% said that they engaged with universities in some way, 53% with colleges and 49% with schools, whilst 18% had no engagement with universities, colleges or schools.

Respondents whose organisations did engage with elements of the education and skills system were additionally asked to provide further details. Their responses are shown in Figure 24.

8.3 Skills to meet UK ambitions

The government has ambitions to create a green economy. The Coalition: our programme for government states: ‘We will implement a full programme of measures to fulfil our joint ambitions for a low carbon and eco-friendly economy.’ The IET has already commented at length on the implications of this ambition for skills policy (consultation response 858 available at http://www.theiet.org/publicaffairs/submissions/index.cfm).

The government also intends to ‘re-balance the economy’ with a greater role for manufacturing, an ambition very much welcomed by the IET.

Respondents were asked whether they thought that the UK had the skills base to meet the government’s ambitions to create a green economy and re-balance the economy towards manufacturing. As is shown in Figure 25, 54% of respondents either said no or that they did not know.
9. Survey methodology and sample profile

9.1 Methodology

The report is based on a survey carried out by the independent research agency 2Europe Limited. The information was collected by computer assisted telephone interviews with representatives from 400 employers of engineers and technicians in the UK. The interviews took place in May and June 2010 using a twelve minute questionnaire.

Interviews were conducted with those within the organisation responsible for the recruitment of engineers and other technology staff; in most cases these were Engineering Managers/Directors or HR Managers/Directors.

Results for 2010 were compared to results for the 2009 and 2008 surveys, which followed the same methodology.

9.2 Our sample

Four hundred employers were interviewed. Respondents included IET business partners (n = 200) and other employers of engineers and technicians (n = 200). The majority, but not all, of the employers surveyed were from the private sector. The sample included mainly organisations for which engineering and technology form a central part of their work – for example, manufacturers and engineering consultants – but there were also some service sector organisations in the sample for which technical employees represent only a very small proportion of their total workforce (listed as “other” in cases where results are broken down by sector).

Figure 26 and Figure 27 show the size of employers surveyed, by number of employees and annual turnover respectively.
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Figure 28 shows the proportion of organisations from each industry sector. When carrying out the survey, a quota was applied so that a minimum of 20 interviews were conducted with employers from each sector. The designation of sectors was changed from last year.

For the 2010 survey, employers were also asked about the function(s) of their organisation. Their responses are shown in Figure 29. Most organisations carried out more than one function.

Surveyed employers were asked in which area of the country they employed most engineers. The responses are shown in Figure 30, demonstrating that the survey covered employers from all over the country.