CITB Skills Foresight Report
February 2002

CITB

Foreword

The construction industry plays a critical role in ensuring Britain's prosperity. Not only does it contribute significantly to the gross domestic product and is a substantial employer, but it also provides the infrastructure essential for the rest of the economy. The industry currently faces a significant range of challenges: to increase its productivity to international levels, to modernise its processes, to better serve its customers and to manage its human resources better.

This latter challenge demands a clear strategy to recruit, train and retain a more productive and highly skilled workforce. This report from CITB assesses the evidence regarding the industry's current and future skill needs. It tries to draw together the best available information and to provide an analysis which is shared by the industry. The picture shows the industry to be experiencing the greatest difficulties for a decade in meeting its demands for skills. If current levels of activity continue then the industry will struggle to meet its full potential. Keeping up with technological change and moving towards a fully qualified workforce represent a further challenge. The conclusions of the report provide a basis for all those involved in construction skill development – employers, the Learning and Skills Council and CITB itself – on which to plan the necessary activities and resources. This should enable them to bridge any gaps in skills which are anticipated in the future and to assist the industry in reaching higher levels of productivity.

Together with the CITB's Workforce Development Plan, this report represents an important stage in the process which I hope will prove useful to our partners and assist us in meeting our industry's needs.

Brian Wilson MP, Minister of State for Industry and Energy

Contents

Executive Summary

This report, which will be published on a regular basis, replaces CITB's annual *Construction Employment and Training Forecast*. It is a more comprehensive document, designed to satisfy the requirements on sector skills information as laid down by the National Training Organisations National Council (NTONC).

The NTONC defines Skill Foresight as 'a structured way of thinking about future skill needs to help meet them'. To achieve this aim, the report adopts a three-stage approach by:

1. Examining the current situation to establish the characteristics of the industry.
2. Evaluating the skill requirements in the short term (the next three to six months).
3. Considering the medium-term perspective to identify the skill requirements over the next five years (this being chosen as a suitable period for planning and implementing training in the industry).

The conclusions are presented in the Summary Assessment on page 68. The main message is that the industry needs to increase its training levels on four fronts: to meet the current shortfall against current demand, to account for growth, to fulfil its objective of a fully qualified workforce and to meet the need for occupational change.

The Current Situation

Section 1 starts by defining the scope of the current report. It then looks at output and employment in the industry, the key points of which include:

- Construction output in 1995 prices continued to increase steadily in the second half of the 1990s and, by 2000, was back to its 1990 level of approximately £58,000m, with Repair & Maintenance accounting for nearly 50% of the total.
- Construction employment, after declining sharply in the first half of the 1990s, stabilised around the 1.4 million mark in the second half of the decade. According to the Department of Trade and Industry revised figures, construction employment reached 1.5 million by 2000. At the same time, the share of self-employment declined to 35% from 47% in 1996.
- Nearly 96% of the directly employed workforce were employed in companies with fewer than 13 employees. This resulted in small companies accounting for approximately 50% of all employees (compared with 20% for large companies with 300 plus employees) and 34% of total construction output (compared with 44% for large companies).
- Within total construction employment, the largest occupational group was Carpenters & Joiners (approximately 200,000), followed by Managers, Electricians, Clerical and Bricklayers. The smallest occupational group was Glaziers (approximately 7,600).
- Over the last decade, there was some ageing of the workforce with a decline in the share of 16–24 year-olds and some increase in those aged 45 years and over.

The wider 'built environment' is also considered in this section since only 30% of all construction professionals in the sector are classified to the construction industry as narrowly defined in official statistics.

The skill levels of the current workforce complete the picture. The construction industry has 46% of all in employment qualified to NVQ Level 3 or above. This is higher than in Distribution (31%) but lower than in Energy and Water (61%).

Short-term Skill Requirements

A summary of the results from the CITB Employers' Skill Needs Survey, Spring 2001, is given in Section 2. These results confirm the continuing tightness of the construction labour market with 76% of participating employers reporting difficulties in recruiting skilled staff. Difficulties in recruitment were worse for Carpentry & Joinery and Bricklaying.

Results from surveys carried out by four main federations in the industry are also given and it is noted that the results of the five surveys are reassuringly similar, and all confirm increasing pressure on the construction labour market.

Medium-term Skill Requirements

For the medium-term (the five-year period from 2002 to 2006), Section 3 relies on the results of the CITB Employment Model, which has been used on a regular basis since the early 1990s.

Over the forecast period of 2002–2006, total construction output is expected to increase at an annual average growth rate of 2.6%, resulting in an increase in total construction employment of 40,000 (or less than 1% per year).

However, approximately 76,000 new recruits will be required each year between 2002 and 2006 (making 380,000 over the five-year period). This annual average requirement comprises 44,500 construction site operatives, 14,000 managerial and clerical staff, 4,500 construction professionals and 13,000 Building Services operatives.

The occupations with the largest annual requirement will be, in descending order: Carpenters & Joiners, Managers, Electricians, Clerical, Bricklayers and Plumbers.

The total of 76,000 can be further analysed to reveal that 65,000 recruits will be needed as replacements for the existing workforce and 11,000 for the increase in construction employment. This compares with the 2000 forecast of 74,000 per year over the period 2001–2005.

In terms of employment, non-manual occupations are expected to gain approximately 1.6% over the period 2002–2006 compared with an average increase for all occupations of 0.6%. The only occupation expected to show a significant decrease is Plastering (down by 1.6%).

These forecasts are based on expectations about technological and organisational change in the industry and their implications for skills. Research which helps inform these expectations is reported in the section entitled 'Technological Change and Innovation'.

The Regional Dimension

Section 4 compares construction output and employment in the regions. In 2000, there were considerable regional differences both in terms of output (from £2,535m in Wales to £10,707m in the South East) and employment (55,200 in the North East to 231,300 in the South East).

There were also considerable regional differences for the share of self-employment (from 16% in the North East to 39% in the Eastern region) and unemployment (from 3% in the East Midlands, Eastern region and South East to 11% in the North East).

For the short-term, Section 4 also gives details of major projects, reported skill shortages and provision of training. For the medium-term, the regional forecasts are fully compatible with the forecast for Great Britain as a whole.

Over the forecast period of 2002–2006, there are considerable differences in the expected growth rate in:

- construction output (from 3.7% in the Eastern region to 1% in the North West)
- employment (from 1.8% in the Eastern region to a decline of nearly 1% in Scotland)
- the level of the required intake (from 15,500 in the South East to 2,500 in the North East).

Training Supply

Section 5 gives the results of the Trainee Numbers Survey for 2000/2001, which measures the number of first-year trainees starting construction courses. Numbers are slightly higher than the previous year at just over 45,000 trainees, an increase of 6% compared with 1999/2000. This continues a three-year upward trend, and puts numbers of first-year trainees back to levels last seen in 1990.

This increase is not uniform across all qualifications. Of the main building trades, Carpentry & Joinery and Bricklaying account for over half of all new starts and have seen significant increases over last year, while Painting & Decorating and Plastering have both witnessed a slight drop in numbers.

Approximately 38% of first-year trainees, around 13,000 people in total, are serving some form of apprenticeship. This proportion is highest in the East, East Midlands and South West where nearly half of all first-years are serving an apprenticeship.

It is disappointing to note that there has been no increase in the share of females and ethnic minorities amongst first-year trainees, although some comfort can perhaps be drawn from the fact that the proportions have not declined either. Around 4% of all first-year trainees are female, while 5% are from an ethnic minority.

Recruitment and Training

Section 6 deals with recruitment into the industry and with training issues. The section distinguishes different sources of flows into employment, estimated at some 10% per year. Of these, new recruits into the labour supply are estimated at some 5% per year.

The section departs from previous practice and looks at qualified intake, i.e. the estimated numbers entering the industry with a formal qualification. The analysis reveals a considerable gap between required and qualified intake, a gap that will need to be filled if the industry is to move towards a fully qualified workforce.

Section 1:
The Current Situation

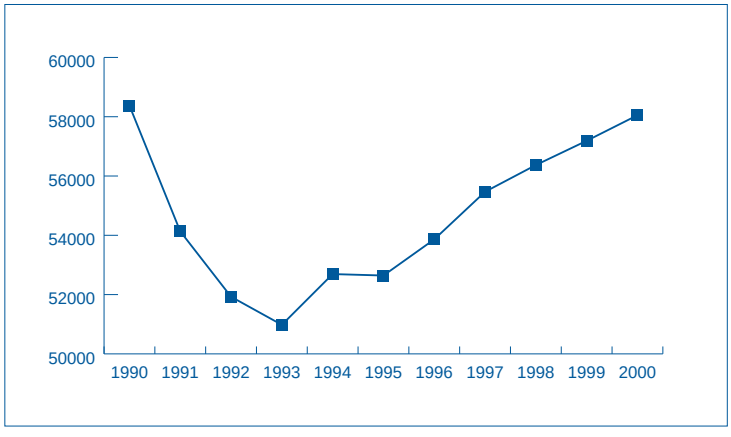
The construction industry is here defined as enterprises and individuals whose main activity is in the construction and maintenance of the 'built environment'. This equates broadly to Category 42 of the Revised 1992 Standard Industrial Classification. It does not include professionals involved in the design of buildings who are employed in private practice, nor does it include those whose occupation is construction but who work in other sectors (such as retailing).

According to the Labour Force Survey, the overall size of the construction sector is around 1.9 million individuals. Of these, approximately 1.5 million are covered by the employer-based quarterly survey carried out by the Department of Trade and Industry (DTI). Most of the following analysis is based on the narrower definition of the industry, because it is better accounted for in terms of output orders and growth statistics. However, it should be borne in mind that the overall labour market could be as much as 25% larger.

Construction Activity

After a sharp decline in activity in the early 1990s, construction output recovered in the second half of the decade and has been growing at a steady, albeit moderate, rate as shown in Chart 1.

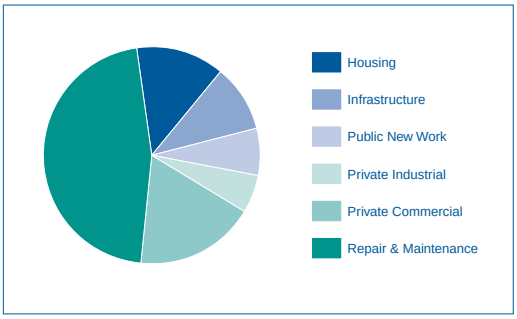
Chart 1
Construction Output in £m 1995 Prices: 1990 – 2000



Source: Department of Trade and Industry

Over the past two years, construction output increased at an annual growth rate of 1.5% reaching £58,000m in 2000. Chart 2 gives the breakdown of the 2000 total output by main sector. There has been very little change in the shares of each sector in total output between 1999 and 2000. Repair & Maintenance, including improvements in the Housing sector, still accounts for 46% of total output. Housing has increased by one percentage point to 13% from 12% while other sectors have remained practically unchanged.

Chart 2
Construction Output by Sector in 1995 Prices: 2000

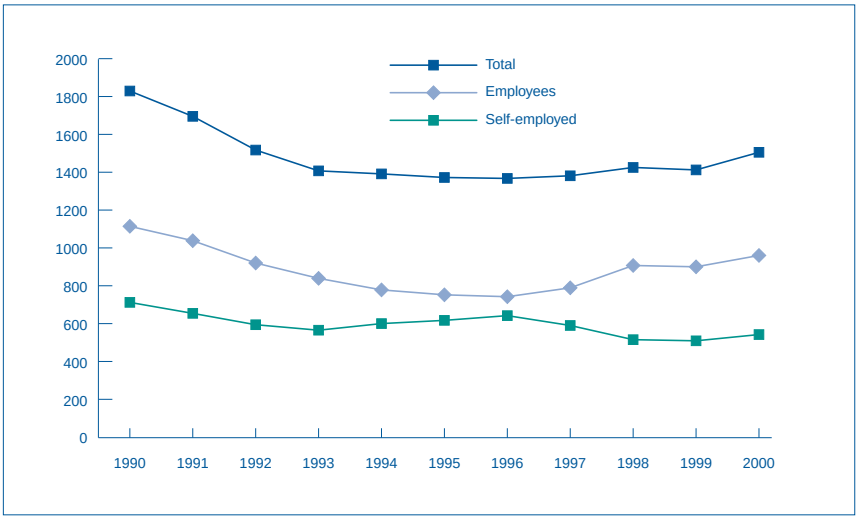


Source: Department of Trade and Industry

Construction Employment

Chart 3 shows total employment over the last decade. Following a sharp decline in the first half of the 1990s, employment stabilised around 1.4 million in the second half of the decade. Within this total, the share of the self-employed reached a peak in 1996, declined sharply over the next two years, followed by more moderate decline over the past three years. In 2000, self-employment accounted for 35% of total employment compared with 47% in 1996.

Chart 3
Construction Employment: 1990 – 2000
Employees and Self-employed (000s)



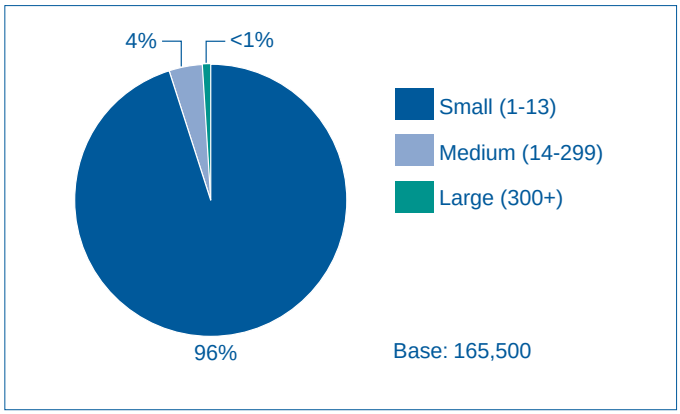
Source: Department of Trade and Industry
Please note in this diagram, the revised employment figure of 1.5 million for 2000 has been used.

A comparison of Chart 1 and Chart 3 shows that, while total construction output in constant prices was back to the same level in 2000 as in 1990, total employment at 1.5 million was well below the level it had reached in the early 1990s.

Structure of the Construction Industry

The construction industry is highly fragmented. By far the greater proportion of companies within the industry can be classified as small (13 or fewer employees), while only a minority employ 300 or more. This characteristic is illustrated in Chart 4.

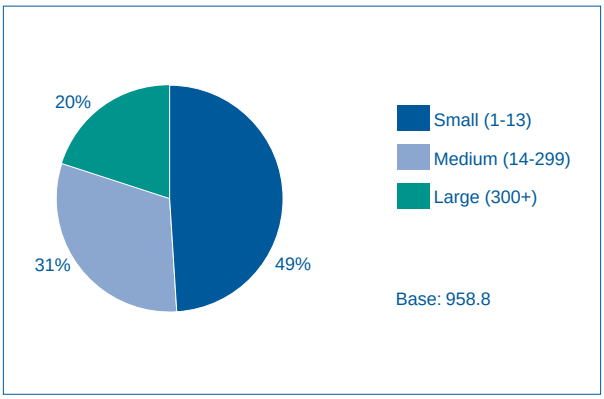
Chart 4
Number of Construction Companies by Size: 1999



Source: Department of Trade and Industry
The base figure refers to the total number of companies on the DTI register.

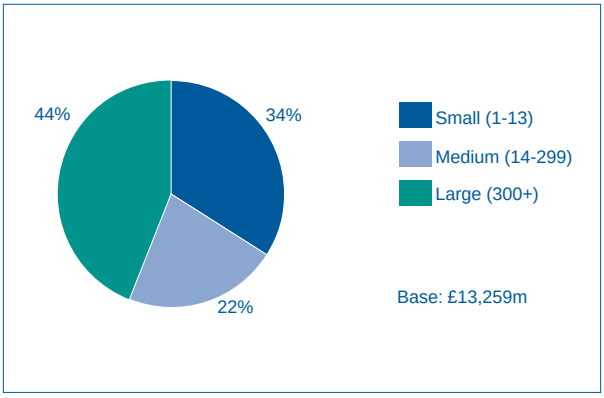
Total employment by company size presents a more even picture as illustrated in Chart 5. However, small companies (1–13 employees) still account for nearly 50% of direct employment and 34% of private contractors' output, while large companies account for 20% of direct employment but 44% of output. See also Chart 6. This is not surprising since large companies are more capital intensive, have a higher labour productivity and generally engage in high value projects.

Chart 5
Total Employment by Size of Company: 1999



Source: Department of Trade and Industry
The base figure refers to the total direct employment by contractors on the DTI register.

Chart 6
Output by Private Contractors by Size of Company: 1999, Quarter 3



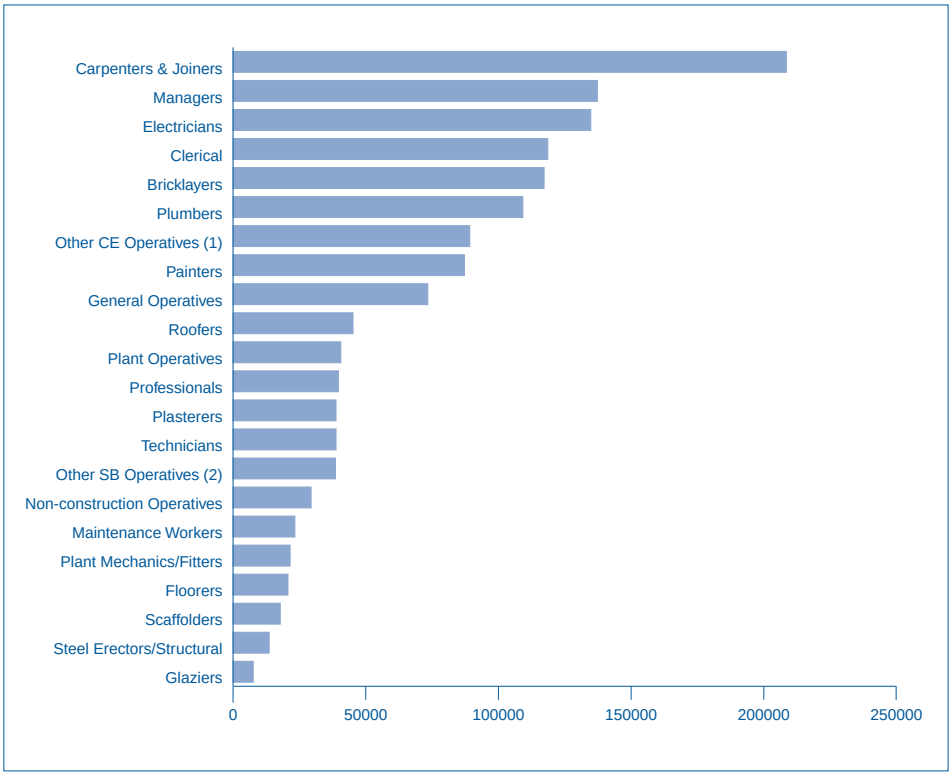
Source: Department of Trade and Industry
The base figure refers to the total construction output in 1999, Quarter 3.

Key Features of the Employed Workforce

From the Labour Force Survey, which is a quarterly employee-based survey, we can obtain information on the employment status of the construction workforce.

The construction industry covers a variety of occupations. Chart 7 shows total construction employment by main occupational category. The appendix gives further occupational breakdowns.

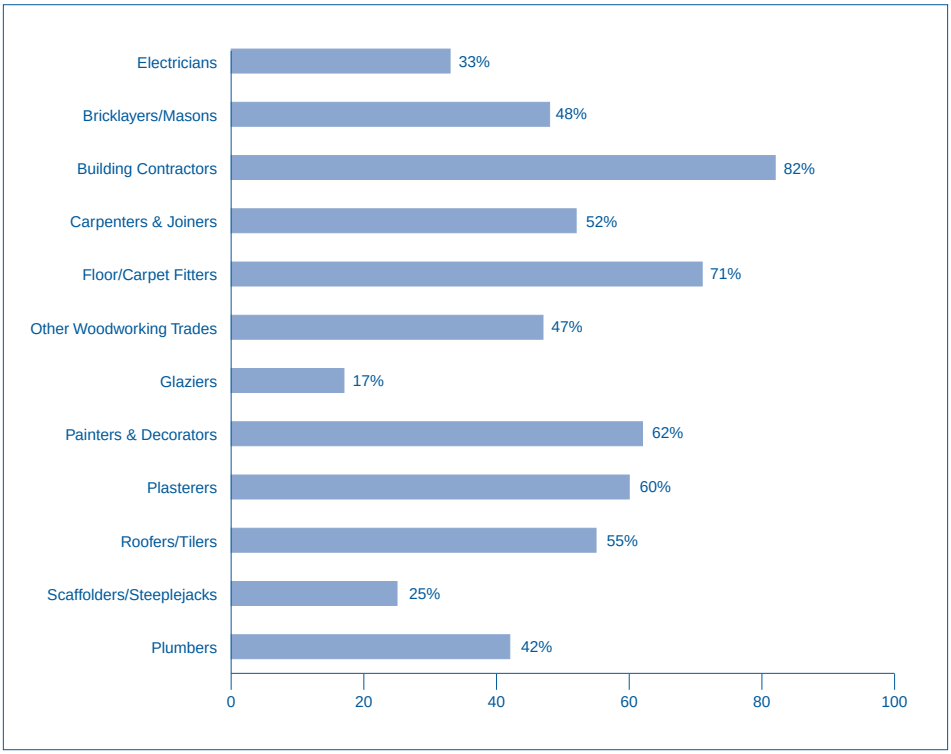
Chart 7
Construction Employment by Occupation, Great Britain: 2000



Source: Department of Trade and Industry; CITB Employment Model, 2001;
Strategic Forum of Construction NTOs: Survey of Employment by Occupation, Spring 1998
(1) Civil Engineering
(2) Specialist Building

According to results from the Labour Force Survey, self-employment in the construction industry as a whole accounts for 31% of total employment. This is slightly below the 35% figure estimated by the Department of Trade and Industry. There are, however, considerable variations for different occupations. Self-employment is lowest for professionals and managerial/administrative occupations. For selected occupations, Chart 8 shows the share of self-employment in Spring 2000.

Chart 8
Percentage of Self-employed by Occupation: Spring 2000

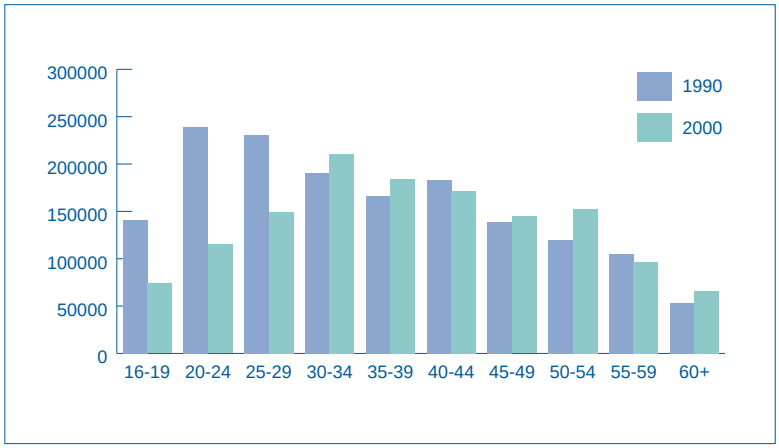


Source: Office for National Statistics: Labour Force Survey

Please note that the occupations given in the above chart are Standard Occupational Classification (1990) categories which differ, in some cases, from the occupational categories used in the CITB Employment Model (Chart 7).

The age profile of construction employment has also undergone some change over the past ten years. For both manuals and non-manuals in the industry, the distinguishing feature of Charts 9 and 10 is a sharp decline in the share of the younger age groups in total employment.

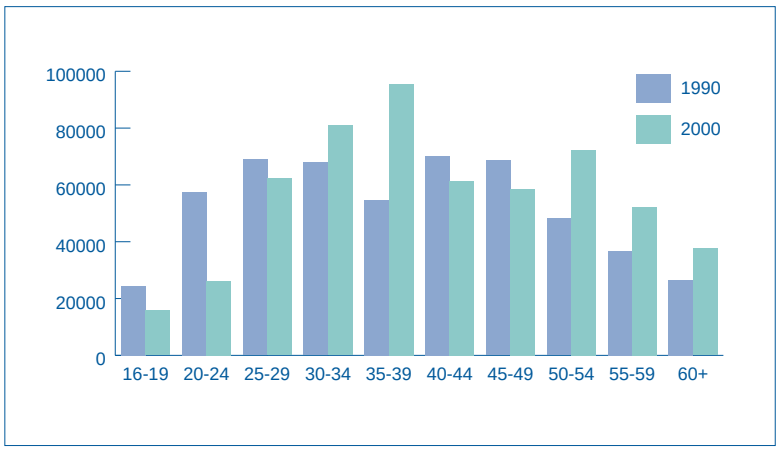
Chart 9
Age Profile of All Manuals in Construction: 1990 – 2000



Source: Office for National Statistics: Labour Force Survey

For non-manuals, Chart 10 shows a considerable increase in the 35–39 age group, some increase in the older age groups as well as some decline in the 16–19 age group.

Chart 10
Age Profile of All Non-manuals in the Construction Industry: 1990 – 2000

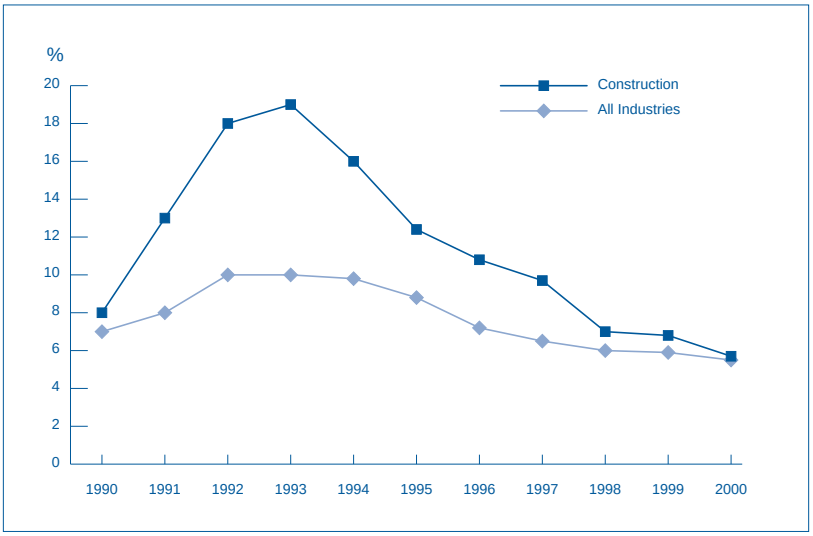


Source: Office for National Statistics: Labour Force Survey

The ageing of the workforce both for manuals and non-manuals can partly be attributed to the decline in recruitment during the early 1990s. However, demographic changes in terms of more young people staying on in full-time education after the age of 16 are also contributing causes. It is therefore unlikely that the age profile of the early 1990s will again be achieved and the industry will have to facilitate entry for older age groups.

Chart 11 shows that over the past ten years there have been considerable changes in the rate of construction unemployment. Following a rapid increase in the early 1990s, construction unemployment has declined sharply over the past five years, partly as a result of an outflow from the construction industry to other sectors. In 2000, the unemployment rate decreased to 5.7%, compared with 5.5% for the economy as a whole.

Chart 11
Unemployment Rate: 1990 – 2000
Construction and All Industries



Source: Office for National Statistics: Labour Force Survey

Construction has traditionally been seen as a white, male-dominated industry. Results from the Labour Force Survey confirm this image. During the 1990s, the ethnic composition of the workforce saw little change, with non-white employment in the industry barely rising from 1.5% in 1992 to 1.7% over the next eight years. These figures compare with increase in non-white employment in all sectors from 4.1% in 1992 to 5.6% in 2000.

As regards gender split, the proportion of women in the workforce has declined over the same period. In 1992, women accounted for 11.7% of total construction employment. By 2000, this percentage had decreased to 9.6%. Looking at the split between non-manual and manual, women accounted for 36.5% of all non-manual in 1992 and 31.4% in 2000, and for 1.7% of all manual in 1992 falling to 0.6% in 2000.

Construction Skills in Business Services

The construction industry, as defined in official statistics (Revised 1992 Standard Industrial Classification 42), only includes construction professionals employed by private contractors or by public authorities' direct labour organisations undertaking construction work. It does not include professionals working for partnerships. Table 1 shows the share of construction professionals working within, and outside of, the industry.

For all professionals, approximately 29% work in the construction industry. The lowest share is for Architects (6%) and the highest for Civil Engineering Technicians (67%).

Table 1
Construction Professionals, Average: Spring 1997 – 2000

	In Construction	In Other Industries	Total	% in Construction
All Professionals	91,706	224,521	316,227	29
Civil Engineers	34,296	37,738	72,034	48
Architects	2,058	34,453	36,511	6
Town Planners	2,984	13,279	16,262	18
Building Surveyors	14,562	47,690	62,252	23
Architectural Technicians	2,381	11,121	13,502	18
Civil Engineering Technicians (1)	5,914	2,854	8,768	67
Draughtspersons	5,149	53,120	58,269	9
Building Inspectors	2,262	2,394	4,656	49
Quantity Surveyors	22,102	21,873	43,975	50

Source: Office for National Statistics: Labour Force Survey
(1) Data relates only to Spring 2000 (only available for that year)
Please note that because some of the figures are below the 10,000 threshold for statistical significance, the average for three years has been used in the table.

Construction Skills in Other Industries

For Building Services, Table 2 shows that 20% of Plumbers (including Heating & Ventilating Engineers) and approximately half of all Electricians work outside the industry. Also approximately 23% of Carpenters & Joiners work in manufacturing.

In practice, this means that the construction sector will need to compete with other sectors for three key skills in the industry. This needs to be taken into consideration when comparing the numbers required to join the industry with the numbers being trained.

Table 2
Construction Skills in Other Industries, Average: Spring 1997 – 2000

	In Construction	In Other Industries	Total	% in Construction
Electricians	130,189	118,752	248,942	52
Plumbers, H & V Engineers	132,404	34,160	166,564	79
Carpenters & Joiners	185,462	56,100	241,562	77

Source: Office for National Statistics: Labour Force Survey

Skills Levels in the Industry

It is clear from CITB's forecasts that a substantial intake of new recruits will be required by the construction industry over the next five years. However, the majority (up to 80%) of the future workforce for this period are already employed within the industry. It is necessary, therefore, to examine their skills and to assess any additional requirements. Table 3 overleaf shows the make-up of the current workforce in terms of their skill levels. Overall, around two-thirds have a qualification at Level 2, one-half are at Level 3, and just 13% are at Level 4 or above.

Please note that Tables 3–5 take the wider definition of the construction workforce used by the Office for National Statistics.

Table 3
Proportion of Construction Employees with NVQs by Occupation, UK

	Base (000s)	At least NVQ Level 4 or equivalent	At least NVQ Level 3 or equivalent	At least NVQ Level 2 or equivalent
All Occupations	1,967	13%	46%	70%
Managers and Administrators	238	34%	63%	82%
Professional and Associate Professional	160	62%	78%	91%
Clerical, Secretarial Occupations	148	12%	27%	57%
Construction Trades	509	4%	39%	65%
Electricians	147	6%	58%	88%
Plumbers, H&V Engineers	132	5%	59%	86%
Carpenters & Joiners	192	2%	55%	82%
Plant and Machine Operatives	133	3%	28%	55%
Labourers	114	2%	13%	31%
Other Occupations	171	2%	14%	34%

Source: DfES estimates from the Labour Force Survey, Spring 2000

Table 4 shows how the construction industry workforce compares with sectors in other parts of the economy in terms of qualifications. It falls significantly below the public utilities and 'white collar' sectors, but has a higher proportion of workers at Level 3 than Transport, Agriculture and Distribution.

Table 4
Proportion of Construction Employees with NVQs by Sector, UK

Industrial Sector	At least NVQ Level 3
Energy and Water	61%
Public Administration	58%
Banking and Finance	57%
Construction	46%
Other Services	46%
Manufacturing	43%
Transport	37%
Agriculture	32%
Distribution	31%

Source: DfES estimates from the Labour Force Survey, Spring 2000

It should be noted that qualifications shown at the various levels include those obtained at school – GCSEs/A levels, etc. The proportion of employees holding NVQs is considerably lower in all industries. For construction, it is 5%. Other qualifications are not specifically 'vocational', and therefore not to be taken into consideration. However, as increasingly higher skills are demanded by the modern construction industry, it seems likely that higher levels of literacy, numeracy and general education will also be required as a base on which to increase productivity.

Construction has one special feature in that it has high levels of 'Trade Apprenticeships'. Table 5 shows that, overall, 41% of the construction workforce has completed an apprenticeship. This figure is higher for craft occupations, rising to 73% for woodworking trades, and is significant even for Managers and Administrators.

Table 5
Proportion of Completed Apprenticeships by Construction Occupation, UK

	Number Employed	Number Completed	Proportion Completed
All Employed in Construction Industry	1,967,000	871,000	41%
Major Occupation Group			
Managers and Administrators	238,000	97,000	41%
Professional Occupations	87,000	24,000	28%
Associate Professional and Technical Occupations	73,000	21,000	28%
Clerical, Secretarial Occupations	148,000	*	*
Craft and Related Occupations	1,088,000	649,000	60% (1)
Personal Protective Occupations	*	*	*
Sales Occupations	26,000	*	*
Plant and Machine Operatives	133,000	42,000	32%
Other Occupations	171,000	25,000	15%
Minor Occupation Group			
Production Managers – Manufacturing, etc.	145,000	71,000	49%
Specialist Managers	38,000	10,000	25%
Engineers and Technologists	58,000	18,000	31%
Construction Trades	509,000	250,000	49%
Metal Machining, Fitting Trades	26,000	16,000	62%
Electrical, Electronic Trades	187,000	128,000	68%
Metal Forming, Welding Trades	160,000	109,000	68%
Woodworking Trades	196,000	143,000	73%
Other Plant and Machine Operatives	65,000	27,000	42%
Other Construction Occupations	138,000	20,000	14%

Source: Office for National Statistics: Labour Force Survey, Spring 2000
* Sample size too small for a reliable estimate
(1) Includes individuals with formal qualifications

From these figures, it would appear that the construction workforce has significant levels of skills and that, at least for the craft workforce, these are relevant vocational skills acquired through apprentice-type training. However, there are several areas of concern:

- Outside the craft, technician and professional areas where vocational qualifications are required, it is not clear that relevant skills are in place. Little is known about vocational skills and qualifications for operatives, clerical and managerial groups.
- Although many workers claim to have experience and training (for example through trade apprenticeships), relatively few hold formal certificates of qualification. Registration and on-site assessment of workers will address this and help the industry move towards a 'fully-qualified workforce'.
- It is suggested by a number of commentators (Clarke L, *Blueprint for Construction: Report for Construction Industry Board 2000*) that, in general, skill levels in UK construction are significantly lower than those in our competitor countries (especially Germany), and that higher levels of skill are required to deliver higher productivity in the future. In particular, the UK lags in terms of qualifications at Level 2 (Germany has no workers below this level) and at Level 3.
- This perception that the UK construction workforce is significantly deficient in skills does not appear to be shared by the industry itself. Although many companies responding to the DfEE survey in 1999 reported difficulties in recruiting new staff, relatively few said they were unhappy with the skill levels of their existing workforce. This would suggest that the point about the need for higher skills needs reinforcing.

Section 2: Short-term Skill Requirements

Employers' skill needs have been monitored on a regular basis by other organisations in the industry. Notably, four major employers' federations in the industry report on skill shortages: the Federation of Master Builders (FMB), the Construction Confederation (CC), the Civil Engineering Contractors Association (CECA) and the House Builders Federation (HBF). It should be noted that their reports refer to their own members rather than to the industry as a whole.

In Spring 2000, CITB carried out its first employers' survey, mainly aimed at identifying the existence of skill shortages in the industry.

The term 'skill shortages' can be interpreted in a number of ways. The Government's Skills Task Force report distinguished between 'skills shortages' – defined as an absolute absence of people with the required skills in the workforce and 'recruitment difficulties' where employers could not attract workers at certain terms and conditions. A further category was described as 'skills gaps' – this is where members of the existing workforce lack the necessary skills to do the job.

For the short-term, an assessment of the industry's prospects and skill needs is best obtained from employers' surveys.

The CITB Employers' Skill Needs Survey

CITB's main concern in carrying out the survey is to monitor skill shortages in the industry.

The CITB Employers' Skill Needs Survey, Spring 2001, was designed to distinguish between the above concepts of skill shortages by drawing a distinction between difficulties in recruiting skilled staff (henceforth used to refer to both manual and non-manual staff) and an inability to tender for a contract due to a lack of skilled staff. The existence of 'skill gaps' was also investigated.

The survey was carried out by CITB Training Advisers. In total, 500 questionnaires were circulated, 50 for each Regional Development Agency area plus Wales and Scotland. Of these, 489 questionnaires were returned.

Of the respondents, 370 employers (or 76%) reported difficulties in recruiting skilled staff while 119 employers (or 24%) had not experienced any recruitment problems in the previous six months. When asked whether they had not been able to tender for a contract, the percentages were reversed. Thus only 24% of all employers interviewed said they were unable to tender for a contract because of skill shortages.

Difficulties in recruiting were worse for Carpentry & Joinery and Bricklaying (55% and 45% of all respondents respectively) followed by Professionals (22%), Plasterers and Plumbers (21%) and Managers (19%).

To ascertain the existence of skill gaps, employers were asked whether new employees, although trained and qualified for certain occupations, still lacked a variety of skills. Just over 50% of respondents said they had a problem with new employees. When asked a similar question for existing employees, the percentage reporting problems fell to 13% with the majority of employers being satisfied with their existing workforce.

Regarding prospects over the next six months, most employers (60%) expected their workload to increase, 36% expected their workload to remain the same and only 14% expected a decrease. At the regional level, the results varied from 56% of employers in Wales to 71% of employers in the East expecting a higher workload over the next six months.

Other Industry Surveys

The Federation of Master Builders

Results from the State of Trade Survey, April 2001 by the Federation of Master Builders (FMB) indicate an increase in both workload and employment during the first quarter of 2001. Enquiries regarding future work are also increasing. Overall, 71% of all employers reported difficulties in recruiting skilled operatives, compared with 64% in the fourth quarter of 2000. The worst affected trade was Carpentry & Joinery.

The Construction Confederation

A similar picture emerged from the May 2001 Construction Trends Survey by the Construction Confederation (CC) with employers reporting an increase in construction output in the first quarter of 2001 and a further rise in enquiries. At 61%, the proportion of companies (building contractors) working at between 90% and full capacity showed little change from the previous quarter (60%). Among civil engineering contractors, it rose to 55% from 45% the previous quarter.

Recruitment difficulties worsened in the first quarter with over 80% of employers reporting difficulties in recruiting skilled operatives. The greatest shortages continued to be for Carpenters & Joiners, Bricklayers and Plasterers followed by Plumbers, skilled Civil Engineering Operatives and Electricians.

The Civil Engineering Contractors Association

According to the Workload Trends Survey, April 2001 by the Civil Engineering Contractors Association (CECA), the increase in workload was more subdued in the first quarter while employment and orders continued to increase. The expectation over the next twelve months is for further growth.

As regards skill needs, the proportion of employers describing the supply of both skilled and other (semi or unskilled) civil engineering operatives as unsatisfactory is slightly lower than in the CECA January survey, 40% compared with 44%. However, for professional staff the percentage increased from 38% to 45%. For both skilled operatives and staff there are considerable regional differences. In southern regions, 50% of employers were dissatisfied with the labour supply for operatives and 69% for staff. In some northern regions, the shares fall to 8% for both operatives and staff.

The House Builders Federation

The House Builders Federation (HBF) reports that over 35% of house builders are currently experiencing shortages of site managers/supervisors and design/technical staff. There are also significant shortages of other professional staff in land, sales and marketing, and surveying. Over 20% of house builders report shortages of site operatives. A worrying 73% of companies say that the shortage of suitably skilled site operatives is already impacting on their activities. Shortage of professional staff is also affecting 57% of companies.

Expected recruitment problems are even more severe at site level. The percentage of respondents expecting minor or severe difficulties in recruitment ranges from 86–94% for Bricklayers, Carpenters & Joiners, Electricians, Plumbers and Roofers.

Comparison with the CITB Survey

The results of the employers' surveys considered in this section are similar to the CITB survey, particularly as regards recruiting problems. The percentage of employers reporting difficulties in recruitment varied from 71% according to FMB, to 80% according to CC with CITB at 76% as an average between the two.

Section 3: Medium-term Skill Requirements

TOP-DOWN APPROACH
The analysis starts at the national level with total construction employment and output and is subsequently broken down by occupation and region.

FRICTIONAL UNEMPLOYMENT
Is a measure of individuals in between jobs.

INTERNATIONAL LABOUR OFFICE (ILO) DEFINITION
The ILO definition of unemployment includes all actively looking for a job irrespective of their unemployment-related benefit entitlement.

MODERN APPRENTICESHIPS
Vocational training courses to achieve NVQ/SVQ Level 3.

NATIONAL TRAINEESHIPS
Vocational training courses to achieve NVQ/SVQ Level 2.

Medium-term skill requirements are based on the CITB Employment Model.

Methodology

The model is based on a **top-down approach**: total construction output, together with the price of capital (interest rate) and the price of labour (wage rate) are used to forecast total construction employment.

For the occupational shares, a historical series has been estimated back to 1980 and projected forward to the year 2006. The results have then been shared out among the nine Regional Development Agencies (RDAs) of England plus Scotland and Wales (henceforth referred to as the regions).

Labour demand is approximated by total employment plus 5% to take into account long run vacancies. Initial supply is given by total employment plus a percentage for the unemployed (deflated to take into account **frictional unemployment**) using the **International Labour Office (ILO) definition.** Changes in supply are estimated using a stock/flow approach, the main outflow being attributed to retirements and estimated as a percentage of total supply. New entrants are the main inflow, also estimated as a percentage of total supply.

At the national level, the forecast of total demand is subtracted from the forecast of total supply to obtain the shortage/surplus by occupation over a five-year period. At the regional level, separate submodels have been developed for each region using the same methodology as for the national model. On the supply side, regional differences in unemployment are taken into account. For both demand and supply, occupational shares reflect regional differences which can be considerable.

Training supply is derived from CITB's measures of formal training in annual surveys. This includes **Modern Apprenticeships, National Traineeships** and other formal long-duration training at craft and operative level leading to NVQ Level 2 or higher. Drop-out from training is estimated from CITB and Further Education Funding Council data.

The Forecast

In the medium-term, the five-year period from 2002 to 2006, the crucial variable for forecasting changes in construction employment is construction output.

Below are the forecasts from four major organisations:

- Cambridge Econometrics (CE)
- Business Strategies Limited (BSL)
- Construction Products Association (CPA)
- Construction Forecasting & Research (CFR)

CE and BSL publish long-term forecasts to 2010, while forecasts published by CPA and CFR only cover a two-year period.

Table 6
Construction Output in 1995 Prices, Great Britain: 1995 – 2006
Annual Growth Rate

Actual	%			
1995	-0.1			
1996	2.3			
1997	3.0			
1998	1.6			
1999	1.5			
2000	1.5			
Forecast	CE March 2001 %	BSL March 2001 %	CPA Winter 2001 %	CFR Winter 2001 %
2001	2.9	2.6	2.0	2.5
2002	1.4	5.4	3.0	2.5
2003	1.4	4.4	–	–
2004	1.6	3.1	–	–
2005	1.9	2.7	–	–
2006	2.0	2.2	–	–

Source: Actual: Department of Trade and Industry

The forecasts in Table 6 take into account the Government Spending Review 2000 (GSR2000). They do, however, make different assumptions regarding the effect of the Review on private spending in construction. CE assumes public spending will result in a decrease in private spending in the industry; while BSL assumes no displacement of private investment in the industry, hence the high growth rate in 2002. CPA and CFR take the view that GSR2000 will sustain activity in the industry but will not result in a short-lived boom.

For the current run of the model we have used the average growth rate for construction output (2.6%) of the two long-term forecasts, as agreed with industry representatives. The results for construction employment are shown in Table 7. Over the forecast period 2002–2006, construction output is expected to increase by 10% from just under £61,000m in 2002 to over £67,000m in 2006. Over the same period, construction employment is projected to increase by approximately 3% from 1,525,000 to 1,565,000.

Table 7
Total Construction Output and Employment, Great Britain: 1995 – 2006

	Year	Total Output Growth Rate	Total Output	Employment		Total Employment Direct and Indirect (1)
		%	£m 1995 prices	Direct	Indirect (3)	Number
Actual	1995	-0.1	52,643	753,000	631,000	1,384,000
	1996	2.3	53,863	745,000	630,000	1,375,000
	1997	3.0	55,468	792,000	578,000	1,370,000
	1998	1.6	56,370	910,000	474,000	1,384,000
	1999	1.5	57,190	903,000	512,000	1,415,000
	2000 (2)	1.5	58,050	990,000	510,000	1,500,000
Forecast	2001	2.5	59,501	993,300	511,700	1,505,000
	2002	2.6	60,989	1,006,500	518,500	1,525,000
	2003	2.6	62,514	1,013,100	521,900	1,535,000
	2004	2.6	64,076	1,019,700	525,300	1,545,000
	2005	2.6	65,678	1,026,300	528,700	1,555,000
	2006	2.6	67,320	1,032,900	532,100	1,565,000

Source: Actual: Department of Trade and Industry (DTI)
Forecast: CITB Employment Model, 2001

(1) The model currently uses the narrower DTI definition of construction employment which is employer-based. This is consistent with the measure of construction output. The estimate of construction employment from the Labour Force Survey (LFS), which is employee-based, is some 20% higher.

(2) Please note that, for forecasting changes in employment, the original employment figure for 2000 of 1,450,000 has been used since the revised figure is not consistent with the output figure. However, the forecast of employment in this table has been adjusted to take into account the higher starting figure of 1,500,000. This is not the case for Tables 8 and 9.

(3) Over the forecast period 2001 to 2006, the share of self-employment has been kept constant at the 2000 level.

To account for alternative scenarios, we have also run the model using the lower growth rate (1.6%) and a higher growth rate (3.6%). The consequences for employment and required intake are shown opposite.

Table 8
Alternative Scenarios, Employment and Trained Requirement: 2002 – 2006

Growth Rate of Output	Low Growth 1.6%	Base Case 2.6%	High Growth 3.6%
Total Employment in 2006	1,460,000	1,515,000	1,585,000
Annual Average Trained Requirement	66,000	76,000	90,000
Cumulative Trained Requirement	333,000	380,000	450,000

Source: CITB Employment Model, 2001

If the 3.6% growth rate were maintained over the five-year period (which seems unlikely), this would result in an additional annual skill requirement of 14,000. A 1.6% growth rate in output would result in a decrease in the required intake of 10,000. On balance, a growth rate between 2% and 2.6% seems more likely.

It is important to realise that the total labour requirement is normally made up of two elements:

- the number required to replace normal outflows (e.g. retirements) from the existing workforce
- the extra intake required by increases, if any, in total employment.

For the forecast period as a whole, approximately 65,000 each year are required for replacement of the existing workforce while the balance of approximately 11,000 is required for the increase in employment in the industry.

According to the CITB Employment Model, the forecasting period started off with an initial labour imbalance. Demand for labour in 2000 was higher than supply, resulting in some employers being unable to recruit staff (both manual and non-manual) in sufficient numbers and with the required mix of skills. This result is confirmed by the employers' surveys carried out by CITB in Spring 2000 and 2001 as outlined in Section 2.

Occupational Shares

Using the 2.6% base case forecast of output, Table 9 gives total construction employment analysed into 22 main occupational groups in 2002 and 2006, the last year in the current forecasting period. The third column shows the percentage change for each occupation over the forecast period. Further breakdown of each group is given in the appendix. The table also shows the average additional annual requirement over the period 2002–2006, as well as the cumulative requirement over the same period.

It should be noted that 'Managers' is a widely defined occupational category covering site managers and working proprietors, as well as company managers. The Carpenters & Joiners group is seen to be the single largest manual occupational category in the industry, followed by Electricians, Bricklayers and Plumbers (including Heating and Ventilating Engineers). The figures for Plumbers and Electricians only include operatives working in the construction industry as defined by the Department of Trade and Industry (DTI). They do not include plumbing and electrical operatives working in manufacturing.

Table 9

Total Construction Employment and Additional Requirement by Occupation, Great Britain: 2002 – 2006

	Total Employment		Average Annual Percentage Change	Average Annual Requirement	Cumulative Requirement
	2002	2006	(2002 – 2006)	(2002 – 2006)	(2002 – 2006)
Managers	141,600	149,800	1.4	7,700	38,500
Clerical	121,200	125,800	0.9	6,400	32,000
Professionals	41,000	44,000	1.8	2,200	11,000
Technicians	40,800	44,500	2.2	2,300	11,500
Carpenters & Joiners	212,300	217,800	0.6	11,200	56,000
Bricklayers	117,800	118,100	0.1	6,100	30,500
Painters & Decorators	88,100	89,400	0.4	4,700	23,500
Plasterers	37,000	34,000	-1.6	1,800	9,000
Roofers	46,200	47,200	0.5	2,500	12,500
Floorers	21,000	21,500	0.6	1,100	5,500
Glaziers	8,100	8,300	0.6	200	1,000
Other SB Operatives (1)	39,200	40,400	0.8	2,100	10,500
Scaffolders	18,000	18,500	0.7	1,000	5,000
Plant Operatives	41,200	42,100	0.5	2,200	11,000
Plant Mechanics/Fitters	22,000	22,600	0.8	1,100	5,500
Steel Erectors/Structural	13,800	14,100	0.5	900	4,500
Other CE Operatives (2)	90,600	93,100	0.7	4,800	24,000
General Operatives	72,600	70,300	-0.8	3,600	18,000
Maintenance Workers	23,300	23,600	0.3	1,000	5,000
Electricians	138,500	145,000	1.2	7,400	37,000
Plumbers	111,100	114,500	0.8	6,000	30,000
Non-construction Operatives	29,600	30,400	0.7	–	–
Total	**1,475,000**	**1,515,000**	**0.6**	**76,300**	**381,500**

Source: CITB Employment Model, 2001; Business Strategies
(1) Specialist Building
(2) Civil Engineering

The table shows that in numerical terms, the biggest annual requirements are expected to be, in descending order: Carpenters & Joiners, Managers, Electricians, Clerical Workers, Bricklayers and Plumbers. Employment levels in all occupations, except for Plasterers and General Operatives, are expected to increase. The fastest growth is in professional and electrical occupations. However, the figures in the table show that the changes in occupational mix are expected to be moderate over the forecast period 2002–2006.

A recent report by Moores Rowland Management Solutions, commissioned by CITB, supports the view of gradual technological and organisational change in the industry. In other words, construction is unlikely to be transformed into a high technology, low labour intense industry over the next five years. Thus, any expected technological change will have a moderate effect on the occupational mix in the industry.

In projecting changes in occupational shares, two sets of influences need to be taken into account: expected changes in technology and expected changes in output mix.

For example, the use of timber frames in housing results in fewer Bricklayers and Plasterers and more Carpenters, Joiners and Wood Machinists being required. Against a background of moderate growth in the housing sector, some decline in the share of wet trades and some increase in wood trades can be expected.

Electrical trades are likely to become more important as the increased use of information technology in buildings will result in a higher demand for Electricians to carry out electrical installation and maintenance.

Company Skills and Training

In 1999, CITB conducted a Skills Benchmarking exercise. This looked in detail at what construction companies needed to be good at in future years, and made an assessment of how well-equipped companies were in terms of skills.

Fifteen major contractors were looked at, including some international companies. A series of workshops were held to develop an agreed understanding of the main challenges faced by the industry in the next ten years and the kind of skills that companies would need to succeed. The results, which are summarised overleaf, highlighted the importance of strategic planning, business development and human resource planning. These were necessary to enable construction to improve its supply-chain management and productivity, and move into 'whole-life' maintenance and facilities management.

Following this, each of the fifteen companies took part in an intensive research programme designed to measure how well they performed in the areas that had been identified as the key to future success. Assessments were made on a range of qualitative and quantitative criteria in the form of key performance indicators, and the results which gave both the average, and how each company compared to it, were presented in a report*. Overall, the research showed that companies were strong in the traditional areas of managing the construction process and financial management, but still weak in the areas of human resource and management, business development and working in partnership with clients.

* *Managing Profitable Construction – The Skills Profile*, CITB 2000.

Technological Change and Innovation

Technological change within the construction industry will be shaped by a series of inter-related factors. This means change will apply not only to construction methods, but to the whole construction process – from procurement through design and planning to operations on site and, in some circumstances, management of the completed project.

These factors have been identified as:

- Client demands for improvements in value, predictability, performance and working relationships.
- The role of the Government as client, legislator and driver of social change and improvement.
- Increasing pressure caused by labour and skill shortages.
- Changes in site conditions driven by the need to improve working conditions, welfare and safety.

As a consequence of the pressures exerted by these industry-wide drivers, technological change and innovation will gain momentum within the construction process.

Progress will continue in the already familiar process areas, such as off-site prefabrication, modular construction and greater mechanisation. There is also likely to be further product innovation as a result of the assimilation of material technology and techniques from other manufacturing industries.

The overall impact of these changes will mean on-site construction becomes more of an assembly process of factory-produced elements. Maximum benefit will be gained where a fully integrated approach to fabrication is adopted, for example, the inclusion of services in prefabricated units.

As well as rationalising the building process via standardisation, technological change will see the adoption of new materials developed in other industries. Examples include specialist adhesives and fixing methods, and technical advances such as ‘wire free’ electrical installations.

As well as embracing technological change, the industry also needs to accept change and innovation within its relationships with clients and the supply chain.

There is evidence to suggest that the industry is currently focused on the challenge of changing working relationships to the detriment of actively pursuing technological change. However, it is expected that an acceleration of technological change will follow closely as collaborative working via integrated project teams becomes the norm.

The rate of technological change within construction will depend on how successful the industry is in moving away from adversarial, one-off contracts by developing long-term relationships with clients and suppliers. The whole building process is being reviewed, using the tools of business re-engineering, value management and process mapping. The aim is to design out cost and conflict, and design in quality, safety and predictability.

Advances in information communications technology (ICT) represent a major opportunity for the construction industry. Design, planning, procurement and monitoring can all benefit and contribute towards better quality, higher productivity and reduced costs. In 2001, it was estimated that only 10% of construction projects by value were being managed using the internet. There is considerable potential to extend usage beyond the large companies to the industry as a whole, providing the necessary skills are acquired.

Running parallel with these issues, and of equal importance, is the need to create a working environment that offers rewarding, long-term career prospects, encourages staff retention and leads to an efficient and flexible workforce. Technological change will offer the opportunity to redefine a number of existing roles within the industry, as well as offering opportunities in new areas.

Long-term trends towards a smaller, more highly productive operative and craft workforce will continue. Factory-based production will draw on traditional craft skills overlaid with an understanding of volume production processes. It may also offer employment prospects to individuals who may otherwise not have considered the construction industry as a potential employer.

Manufactured components will be designed for ease of installation, as well as performance and cost. However, site assembly of prefabricated elements will require a more stringent approach to quality and a greater understanding of the construction process as a whole. Logistics and planning will become more crucial as time is compressed and individual operations become more critical. Transport and handling will require higher skills.

The use of materials and products from other industries may see a crossover of employees bringing a new range of skills and knowledge into construction. As systems become more complex, there may be a move towards ultra-specialisation in niche markets.

Management and supervisory skills will become increasingly important. Improved business management, personnel and training will be required to support changes in industry structures and technology.

Many of these changes have, of course, already begun, and will continue in an evolutionary way to affect how tasks are performed on site and what skills are required of the workforce. However, there are now several more important drivers in respect of the whole construction process which will cause more radical change in how the industry works and what is required of its workforce.

A fuller account of these issues is contained in a report by Reading University called *The Future Skills Trend*, available from CITB.

Section 4:
The Regional Dimension

The following tables reveal considerable regional diversity for both output and employment in the construction industry. For construction output, the South East comes on top with £10,707m (current prices) in 2000 followed by London (£10,236m). In terms of employment, London (160,800) was well below the South East (231,300). However, the relatively low employment figure for London is misleading since a substantial amount of new construction work in London is carried out by firms and workers resident outside London.

At the other extreme are Wales (with £2,535m in current prices for output and 71,100 for employment) and the North East (with £2,837m in current prices for output and 55,200 for employment).

Table 10
Total Construction Output in Current Prices: 2000

	£m
Great Britain	66,475
South East	10,707
London	10,236
Eastern	6,412
Scotland	6,400
West Midands	6,361
North West	6,285
Yorkshire and The Humber	5,264
South West	5,184
East Midlands	4,253
North East	2,837
Wales	2,535

Table 11
Total Employment by Region: 2000

	Number
Great Britain	1,450,700
South East	231,300
London	160,800
North West	154,800
Scotland	143,600
Eastern	143,400
South West	143,300
Yorkshire and The Humber	124,500
West Midlands	123,600
East Midlands	99,100
Wales	71,100
North East	55,200

Source: Department of Trade and Industry; CITB Employment Model, 2001

Regional Labour Markets

The regional labour markets show considerable differences both regarding the share of the self-employed and the rate of unemployment.

Chart 12 shows that the share of self-employment tends to decrease as we move away from the South. It is highest in the Eastern region (39%) followed by London (38%), declining to 16% in the North East.

For the unemployment rate, the situation is reversed. It is highest in the North East (11%) decreasing to 3% in the South East, Eastern region and East Midlands. At 8%, it is surprisingly high in London.

Chart 12
Self-employment by Region: 2000

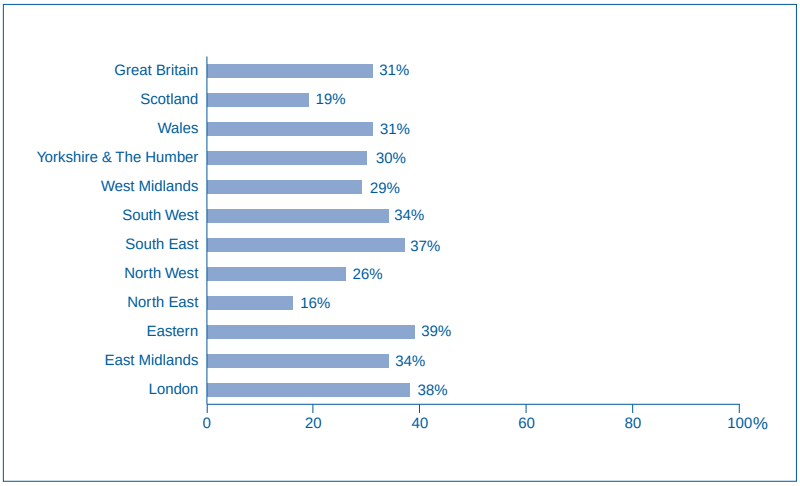
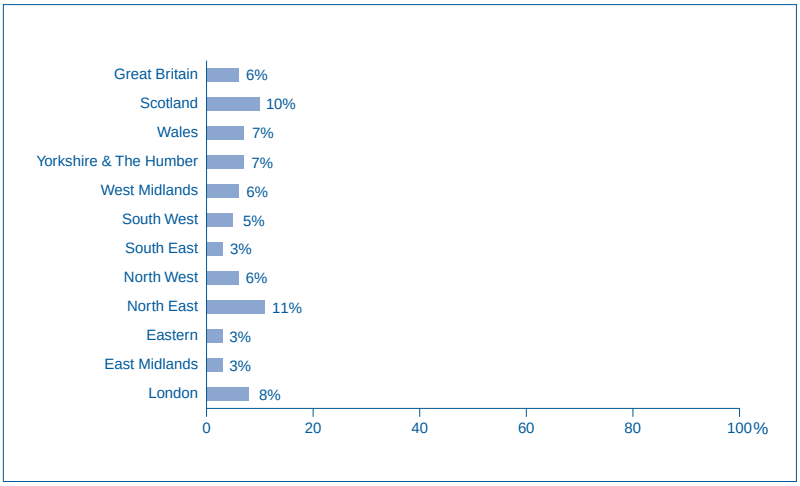


Chart 13
Unemployment by Region: 2000



Source: Office for National Statistics: Labour Force Survey

Regional Forecasts

For each regional forecast, we have included a brief commentary outlining key factors in the construction sector for each region. As far as possible, we have kept the information uniform across regions and each section includes information on:

- activity – this includes current and expected activity, of which only the top projects are listed based on information available up to Spring 2001
- reported skill shortages/gaps
- provision of training.

For each commentary, the approach is short-term in reporting the current situation, and that over the next six to twelve months. This is in contrast to the regional tables which are based on a medium-term perspective.

The regional forecasts are given in Tables 12 to 22. The figures in these tables are based on separate regional models consistent with the total employment and required intake forecast by the national model. For each region, the tables include:

- total employment by occupation in 2002 and 2006
- the annual average required intake over the forecasting period 2002–2006
- the cumulative required intake over the period as a whole.

As for the national table (Table 9), the total labour requirement consists of two elements:

- the number required to replace the existing workforce
- the extra intake required by increases in total employment, if any.

For each region, labour demand is related to expected changes in output, and labour supply to the unemployment rate in the region. The relationship between output and employment will vary from region to region because of differences in output mix and the structure of the industry. The **replacement ratio** will also vary from region to region since total employment is projected to increase (or decrease) at different rates across regions.

REPLACEMENT RATIO
This ratio gives the number of people required to keep total employment unchanged from the base year.

Construction is a relatively mobile industry. Major contracts are tendered for on a national basis and a site workforce is normally brought together from a large travel-to-work area. It is not, therefore, necessary (or wise) to try and balance construction labour markets on a local (say Learning and Skills Councils area) basis. It is more important to ensure that supply meets demand over a wider area (at least at national level), and it is for this deliberate reason that CITB's analysis is only taken down to the level of the regional development agencies (RDAs) as defined on the opposite page.

England
Regional Development Agency Areas

London:	All boroughs
South East:	Hampshire, West Sussex, East Sussex, Kent, Surrey, Berkshire, Oxfordshire, Buckinghamshire, Isle of Wight
Eastern:	Cambridgeshire, Norfolk, Suffolk, Essex, Hertfordshire, Bedfordshire
South West:	Cornwall, Devon, Somerset, Dorset, Avon, Wiltshire, Gloucestershire
East Midlands:	Northamptonshire, Leicestershire, Nottinghamshire, Derbyshire, Lincolnshire
West Midlands:	Hereford and Worcester, Warwickshire, West Midlands, Staffordshire, Shropshire
North West:	Lancashire, Greater Manchester, Cheshire, Merseyside, Cumbria
Yorkshire and The Humber:	North Yorkshire, Humberside, West Yorkshire, South Yorkshire
North East:	Durham, Tyne and Wear, Northumberland, Cleveland
Scotland:	All unitary council areas
Wales:	All unitary council areas

London

In the London area, construction output in 1995 prices is forecast to increase by an average yearly rate of 2.8% over the forecast period 2002 – 2006. This compares with the 2.6% growth rate for Great Britain as a whole. In 2000, the rate of construction unemployment at 8% was above the national average of 6%.

Current major projects

- **Infrastructure:** A £250m railway maintenance project of the East Coast main line between King's Cross and the Scottish border.

Proposed major projects

- **Infrastructure:** A £3bn project for the construction of a London regional metro; a £2½bn project for upgrading and maintenance of the Jubilee, Northern and Piccadilly lines; a £1.7bn provision of a new underground line; a £1.2bn project for a new terminal at Heathrow Airport.
- **Commercial:** A large number of projects are proposed in this area, including: a £600m project for a mixed development in Knightsbridge comprising a 19-storey tower with local infrastructure; a £500m redevelopment in Croydon and associated infrastructure; a £400m construction of a new 108-storey skyscraper above the Aldgate underground station including associated infrastructure; a £350m proposal for an office building (to be the tallest in Europe) situated at London Bridge Station.
- **Public:** A £260m project for the centralisation of hospital services and demolition of the existing building at Royal London Hospital; a £184m construction of a mixed health care and residential development in Leytonstone with local infrastructure.

Reported skill shortages

According to the Employers' Skill Needs Survey Spring 2001, 81% of employers in London experienced difficulties in recruiting skilled staff. The recruitment of Carpenters & Joiners was worst affected, followed by Bricklayers and Painters & Decorators.

Recruitment difficulties are unlikely to ease in the London area since approximately 62% of employers expect their workload to increase over the next six months and 38% expect their workload to stay the same.

Provision of training

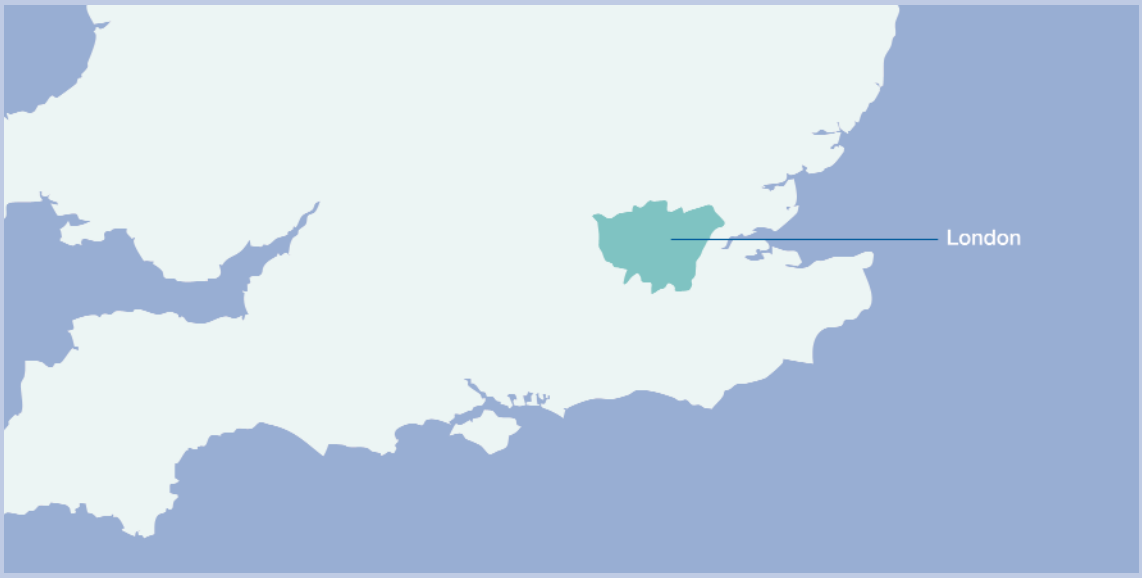
Since its official start in February 1999, **On-Site Assessment and Training (OSAT)** has been expanding rapidly in Great Britain as a whole. 50 candidates took part in the pilot scheme at the end of 1998 and, by Spring 2001, this had increased to approximately 12,000 candidates. London accounted for 911 candidates.

ON-SITE ASSESSMENT AND TRAINING (OSAT)
A CITB programme that gives workers the opportunity to gain formal qualifications through training and assessment in the workplace.

Table 12
London

	Total Employment		Average Annual Percentage Change	Average Annual Requirement	Cumulative Requirement
	2002	2006	(2002 – 2006)	(2002 – 2006)	(2002 – 2006)
Managers	15,400	15,900	0.8	800	4,000
Clerical	13,400	13,800	0.7	700	3,500
Professionals	4,600	4,900	1.8	200	1,000
Technicians	4,600	5,100	2.6	200	1,000
Carpenters & Joiners	24,800	25,700	0.8	1,300	6,500
Bricklayers	12,600	12,600	0.0	600	3,000
Painters & Decorators	9,400	9,500	0.2	500	2,500
Plasterers	4,000	3,600	-2.7	200	1,000
Roofers	4,900	5,000	0.6	300	1,500
Floorers	2,200	2,300	0.6	100	500
Glaziers	900	900	1.4	0	0
Other SB Operatives (1)	4,200	4,400	0.8	200	1,000
Scaffolders	1,900	2,000	0.5	100	500
Plant Operatives	4,700	4,900	0.6	200	1,000
Plant Mechanics/Fitters	2,500	2,500	0.6	100	500
Steel Erectors/Structural	1,300	1,300	0.6	100	500
Other CE Operatives (2)	10,400	10,800	1.0	500	2,500
General Operatives	8,300	8,000	-0.7	400	2,000
Maintenance Workers	2,800	2,900	0.7	100	500
Electricians	15,700	16,400	1.0	800	4,000
Plumbers	12,700	13,000	0.6	700	3,500
Non-construction Operatives	3,400	3,500	1.1	–	–
Total	**164,700**	**169,000**	**1.0**	**8,100**	**40,500**

Source: CITB Employment Model, 2001; Business Strategies
(1) Specialist Building
(2) Civil Engineering
Numbers rounded to the nearest hundred. Figures of zero indicate a number less than fifty.



South East

In the South East area, construction output in 1995 prices is forecast to increase by an average yearly rate of 3.6% over the forecast period 2002 – 2006. This compares with the 2.6% growth rate for Great Britain as a whole. Given that unemployment in the industry at 3% was half the national average (6%), employers may encounter difficulties in recruiting skilled staff.

Current major projects

- **Commercial:** A £300m redevelopment of Basingstoke town centre.
- **Infrastructure:** A £120m channel tunnel link in Kent.

Proposed major projects

- **Infrastructure:** Strong activity is proposed throughout the region, including a £700m reservoir in Abingdon, Oxfordshire; a £500m bridge crossing the River Thames in Gravesend; a £450m railway project in Reading to increase route capacity; a £400m power station construction in Rochester; a £300m shipping dock in Southampton with extensive infrastructure and a £300m underwater tunnel at Yarmouth, Isle of Wight.
- **Commercial:** Two competing projects for a shopping centre/civic centre in Bracknell, both costing £500m, with all associated infrastructures.
- **Housing:** A £600m residential development on a former RAF site in Bicester.

Reported skill shortages

According to the Employers' Skill Needs Survey Spring 2001, 81% of employers in the South East experienced difficulties in recruiting skilled staff. The recruitment of Carpenters & Joiners was worst affected, followed by Bricklayers, Plumbers and Painters & Decorators.

Recruitment difficulties in the South East are likely to worsen as 60% of employers expect their workload to increase over the next six months and 40% expect their workload to stay the same.

Provision of training

Since its official start in February 1999, **On-Site Assessment and Training (OSAT)** has been expanding rapidly in Great Britain as a whole. 50 candidates took part in the pilot scheme at the end of 1998 and, by Spring 2001, this had increased to approximately 12,000 candidates. The South East accounted for 2,220 candidates.

Projects

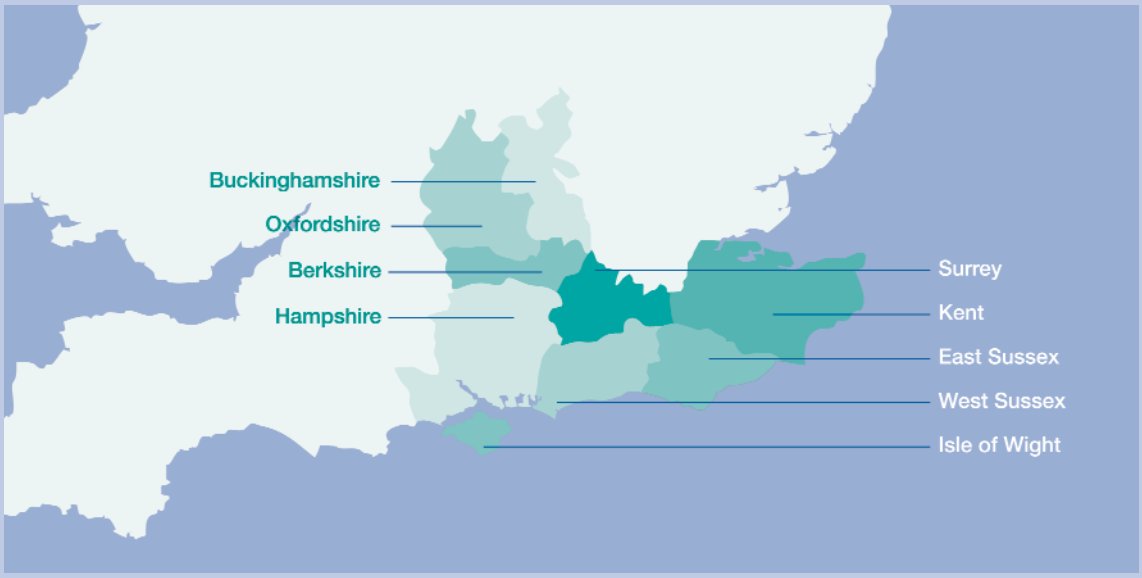
CITB is beginning research with the South East Regional Development Agency and Engineering Construction Industry Training Board (ECITB) to explore workforce mobility.

ON-SITE ASSESSMENT AND TRAINING (OSAT)
A CITB programme that gives workers the opportunity to gain formal qualifications through training and assessment in the workplace.

Table 13
South East

	2002	Total Employment 2006	Average Annual Percentage Change (2002 – 2006)	Average Annual Requirement (2002 – 2006)	Cumulative Requirement (2002 – 2006)
Managers	26,800	29,400	2.4	1,800	9,000
Clerical	23,000	24,800	1.9	1,500	7,500
Professionals	7,800	8,700	2.7	500	2,500
Technicians	7,700	8,600	2.7	500	2,500
Carpenters & Joiners	25,900	27,500	1.5	1,700	8,500
Bricklayers	20,200	20,700	0.7	1,300	6,500
Painters & Decorators	15,100	15,700	1.0	1,000	5,000
Plasterers	6,400	5,900	-2.0	400	2,000
Roofers	7,900	8,300	1.3	500	2,500
Floorers	3,600	3,800	1.3	200	1,000
Glaziers	1,400	1,500	2.1	100	500
Other SB Operatives (1)	6,700	7,100	1.6	400	2,000
Scaffolders	3,100	3,200	1.2	200	1,000
Plant Operatives	6,500	6,900	1.4	400	2,000
Plant Mechanics/Fitters	3,500	3,700	1.6	200	1,000
Steel Erectors/Structural	2,300	2,500	1.5	200	1,000
Other CE Operatives (2)	14,500	15,500	1.7	1,000	5,000
General Operatives	11,600	11,700	0.1	700	3,500
Maintenance Workers	3,800	4,000	1.2	200	1,000
Electricians	22,100	23,900	2.0	1,500	7,500
Plumbers	17,800	18,900	1.5	1,200	6,000
Non-construction Operatives	4,600	4,900	1.4	–	–
Total	**242,300**	**257,200**	**1.5**	**15,500**	**77,500**

Source: CITB Employment Model, 2001; Business Strategies
(1) Specialist Building
(2) Civil Engineering
Numbers rounded to the nearest hundred. Figures of zero indicate a number less than fifty.



Eastern

In the Eastern area, construction output in 1995 prices is forecast to increase by an average yearly rate of 3.7% over the forecast period 2002 – 2006. This compares with the 2.6% growth rate for Great Britain as a whole. Given that, in 2000, the rate of construction unemployment at 3% was half the national average (6%), employers may experience difficulties in recruiting skilled staff.

Current major projects

- **Commercial:** A £90m mixed development in Southend-on-Sea with local infrastructure.

Proposed major projects

- **Commercial:** A £127m project to construct a mixed development in Colchester with associated infrastructure; a £100m scheme for three leisure units in Grays, Essex.
- **Infrastructure:** A new £250m rail link between the east and west of England; a £200m extension to increase the capacity of a power station in King's Lynn, Norfolk; a £150m five-year highway maintenance work contract to various locations; a £140m construction project for a gas-fired, combined heat and power plant in Purfleet, Essex.
- **Public:** A £135m hospital reconfiguration in Peterborough with local infrastructure.

Reported skill shortages

According to the Employers' Skill Needs Survey Spring 2001, 88% of employers in the Eastern area experienced difficulties in recruiting skilled staff in a number of occupations. Amongst manual workers, recruitment of Carpenters & Joiners and Bricklayers was worst affected, followed by Plasterers and General Operatives. For non-manual staff, problems were reported in recruiting both Managers and Professionals.

Recruitment difficulties are unlikely to ease in the Eastern area since 71% of employers expect their workload to increase over the next six months and 20% expect their workload to stay the same.

Provision of training

Since its official start in February 1999, **On-Site Assessment and Training (OSAT)** has been expanding rapidly in Great Britain as a whole. 50 candidates took part in the pilot scheme at the end of 1998 and, by Spring 2001, this had increased to approximately 12,000 candidates. The Eastern area accounted for 784 candidates.

Projects

CITB has been working with the East of England Regional Development Agency on a work-based recording (WBR) project to help the industry become aware of the implications of the new construction NVQs. A video has been produced which has been distributed nationally.

ON-SITE ASSESSMENT AND TRAINING (OSAT)
A CITB programme that gives workers the opportunity to gain formal qualifications through training and assessment in the workplace.

Table 14
Eastern

	Total Employment 2002	Total Employment 2006	Average Annual Percentage Change (2002 – 2006)	Average Annual Requirement (2002 – 2006)	Cumulative Requirement (2002 – 2006)
Managers	16,900	18,100	1.8	1,000	5,000
Clerical	14,400	15,100	1.2	800	4,000
Professionals	4,900	5,300	2.1	300	1,500
Technicians	4,900	5,300	2.3	300	1,500
Carpenters & Joiners	20,500	21,500	1.1	1,200	6,000
Bricklayers	14,300	14,600	0.4	800	4,000
Painters & Decorators	10,700	11,000	0.6	600	3,000
Plasterers	4,500	4,100	-2.3	200	1,000
Roofers	5,600	5,800	1.0	300	1,500
Floorers	2,600	2,700	1.0	100	500
Glaziers	1,000	1,000	1.8	100	500
Other SB Operatives (1)	4,800	5,000	1.0	300	1,500
Scaffolders	2,200	2,300	0.9	100	500
Plant Operatives	4,400	4,500	0.8	300	1,500
Plant Mechanics/Fitters	2,300	2,500	1.4	100	500
Steel Erectors/Structural	1,500	1,600	1.1	100	500
Other CE Operatives (2)	9,700	10,200	1.2	600	3,000
General Operatives	7,800	7,700	-0.3	400	2,000
Maintenance Workers	2,500	2,500	0.2	100	500
Electricians	14,800	15,700	1.6	900	4,500
Plumbers	11,800	12,400	1.1	700	3,500
Non-construction Operatives	3,100	3,200	0.8	–	–
Total	**165,200**	**172,100**	**1.8**	**9,300**	**46,500**

Source: CITB Employment Model, 2001; Business Strategies
(1) Specialist Building
(2) Civil Engineering
Numbers rounded to the nearest hundred. Figures of zero indicate a number less than fifty.

South West

In the South West area, construction output in 1995 prices is forecast to increase by an average yearly rate of 3% over the forecast period 2002 – 2006. This compares with the 2.6% growth rate for Great Britain as a whole. In 2000, the rate of construction unemployment at 5% was below the national average of 6%.

Current major projects

- **Infrastructure:** A £55m refurbishment of Fairford airport, Gloucestershire.

Proposed major projects

- **Infrastructure:** Railway track work at Swindon for route capacity to accommodate projected demand is to be split into phases, with phase 3 being £915m and phase 2 costing £430m; a £500m drainage services project in the South West covering 1,250 sites (including Wales); a £200m project to construct a power station in Plymouth; a £120m upgrading of 10.8 km of the A303 due to start in 2004.
- **Public:** A £101m project to extend and refurbish Derriford Hospital, Plymouth.

Reported skill shortages

According to the Employers' Skill Needs Survey Spring 2001, 76% of employers in the South West experienced difficulties in recruiting skilled staff. The recruitment of Carpenters & Joiners and Bricklayers was worst affected, followed by Plasterers and General Operatives.

Recruitment difficulties are unlikely to ease in the South West since 57% of employers expect their workload to increase over the next six months and 39% expect their workload to stay the same.

Provision of training

Since its official start in February 1999, **On-Site Assessment and Training (OSAT)** has been expanding rapidly in Great Britain as a whole. 50 candidates took part in the pilot scheme at the end of 1998 and, by Spring 2001, this had increased to approximately 12,000 candidates. The South West accounted for 906 candidates.

Projects

CITB has been working on the 'Pageant Project' in partnership with 11 colleges and training providers in the South West to introduce the new construction NVQs to the industry. The project is supported by the European Social Fund.

ON-SITE ASSESSMENT AND TRAINING (OSAT)
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Table 15
South West

	Total Employment 2002	Total Employment 2006	Average Annual Percentage Change (2002 – 2006)	Average Annual Requirement (2002 – 2006)	Cumulative Requirement (2002 – 2006)
Managers	11,200	12,200	2.0	600	3,000
Clerical	9,500	10,100	1.4	500	2,500
Professionals	3,200	3,500	2.1	200	1,000
Technicians	3,200	3,600	2.5	200	1,000
Carpenters & Joiners	22,000	23,300	1.4	1,300	6,500
Bricklayers	12,800	13,100	0.7	700	3,500
Painters & Decorators	9,500	9,900	1.0	500	2,500
Plasterers	4,000	3,700	-2.0	200	1,000
Roofers	5,000	5,200	1.3	300	1,500
Floorers	2,300	2,400	1.3	100	500
Glaziers	900	900	2.1	0	0
Other SB Operatives (1)	4,200	4,400	1.1	200	1,000
Scaffolders	2,000	2,100	1.2	100	500
Plant Operatives	4,200	4,400	1.2	200	1,000
Plant Mechanics/Fitters	2,200	2,300	1.4	100	500
Steel Erectors/Structural	1,200	1,200	1.4	100	500
Other CE Operatives (2)	9,100	9,500	1.2	500	2,500
General Operatives	7,300	7,200	-0.2	400	2,000
Maintenance Workers	2,400	2,500	0.8	100	500
Electricians	14,000	15,100	1.9	800	4,000
Plumbers	11,200	11,900	1.4	600	3,000
Non-construction Operatives	3,000	3,200	1.8	–	–
Total	**144,400**	**151,700**	**1.5**	**7,700**	**38,500**

Source: CITB Employment Model, 2001; Business Strategies
(1) Specialist Building
(2) Civil Engineering
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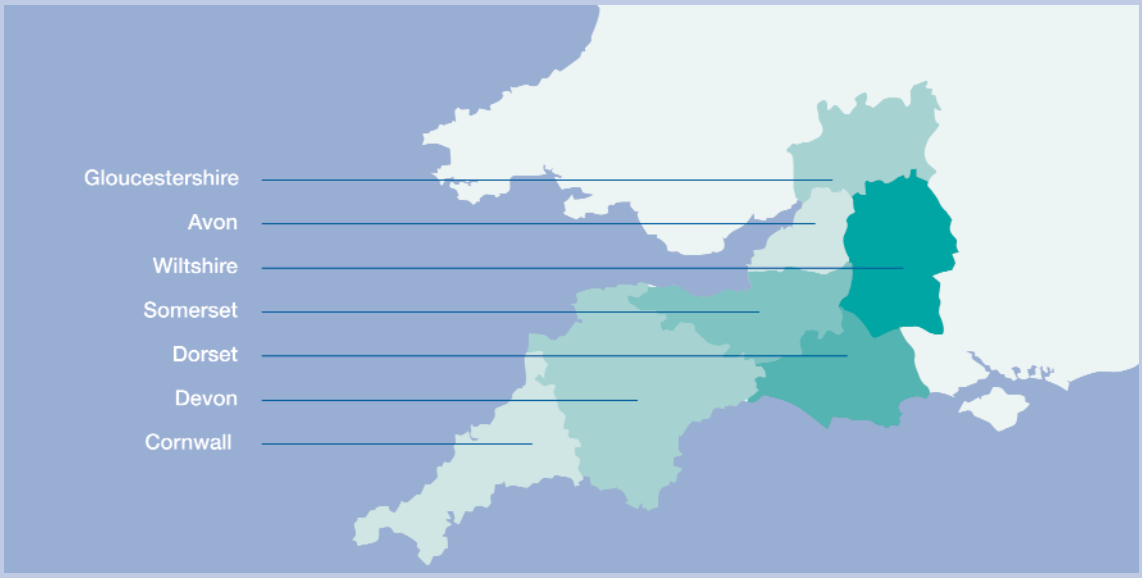

East Midlands

In the East Midlands area, construction output in 1995 prices is forecast to increase by an average yearly rate of 3% over the forecast period 2002 – 2006. This compares with the 2.6% growth rate for Great Britain as a whole. Given that, in 2000, the rate of construction unemployment at 3% was half the national average (6%), employers may experience difficulties in recruiting skilled staff.

Current major projects

- **Infrastructure:** A £56m project for the construction of approximately 19km of a two-lane dual carriageway covering three sections of the A43 in Northamptonshire, including local infrastructure.
- **Commercial:** A £54m project in Northampton to construct approximately 1,070 houses with community facilities and a new school with associated infrastructure.

Proposed major projects

- **Infrastructure:** A £500m project to construct a new gas-fired power station at Sleaford, Lincolnshire; three seven-year highway maintenance contracts are planned in the area comprising £175m in Agency Area 7, £175m in Agency Area 11, and £140m in Northampton.
- **Commercial:** A £200m project in Leicester town centre to extend and rebuild an existing shopping centre to include a hotel, cinema, retail and office units and local infrastructure.
- **Public:** A £200m project to demolish older buildings at Derby City Hospital and erect a new patient care centre with local infrastructure.

Reported skill shortages

According to the Employers' Skill Needs Survey Spring 2001, 63% of employers in the East Midlands experienced difficulties in recruiting skilled staff. The recruitment of Bricklayers was worst affected, followed by Carpenters & Joiners and Plasterers.

Recruitment difficulties are unlikely to ease in the East Midlands since 63% of employers expect their workload to increase over the next six months and 33% expect their workload to stay the same.

Provision of training

Since its official start in February 1999, **On-Site Assessment and Training (OSAT)** has been expanding rapidly in Great Britain as a whole. 50 candidates took part in the pilot scheme at the end of 1998 and, by Spring 2001, this had increased to approximately 12,000 candidates. The Midlands (East and West) accounted for 1,479 candidates.

Projects

CITB has begun discussion with partners about a research project to investigate the Construction Labour Market and the Construction Training Market in the East Midlands. This would mirror a similar project undertaken in the West Midlands in 2001. It is felt this is a key regional document and would be used to assist partners in determining the structure and level of construction training in the region.

ON-SITE ASSESSMENT AND TRAINING (OSAT)
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Table 16
East Midlands

	Total Employment 2002	2006	Average Annual Percentage Change (2002 – 2006)	Average Annual Requirement (2002 – 2006)	Cumulative Requirement (2002 – 2006)
Managers	9,700	10,400	1.9	600	3,000
Clerical	8,300	8,800	1.4	500	2,500
Professionals	2,800	3,100	2.4	200	1,000
Technicians	2,800	3,100	2.4	200	1,000
Carpenters & Joiners	13,000	13,900	1.7	800	4,000
Bricklayers	7,700	8,100	1.1	500	2,500
Painters & Decorators	5,900	6,200	1.4	300	1,500
Plasterers	2,200	2,100	-1.7	100	500
Roofers	3,100	3,300	1.7	200	1,000
Floorers	1,400	1,500	1.7	100	500
Glaziers	500	600	2.5	0	0
Other SB Operatives (1)	2,600	2,800	1.3	200	1,000
Scaffolders	1,200	1,300	1.6	100	500
Plant Operatives	3,100	3,300	1.5	200	1,000
Plant Mechanics/Fitters	1,600	1,700	1.5	100	500
Steel Erectors/Structural	1,100	1,100	1.8	100	500
Other CE Operatives (2)	6,500	6,900	1.4	400	2,000
General Operatives	5,200	5,300	0.2	300	1,500
Maintenance Workers	1,700	1,700	0.4	100	500
Electricians	10,200	11,100	2.2	600	3,000
Plumbers	8,200	8,800	1.8	500	2,500
Non-construction Operatives	2,100	2,200	1.5	–	–
Total	**100,900**	**107,300**	**1.5**	**6,100**	**30,500**

Source: CITB Employment Model, 2001; Business Strategies
(1) Specialist Building
(2) Civil Engineering
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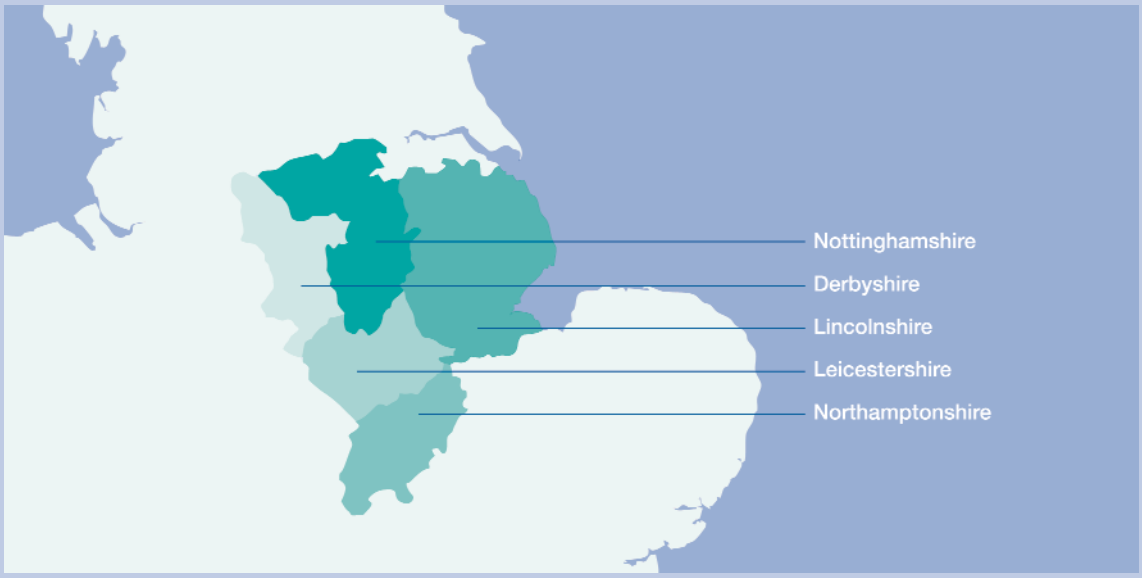

West Midlands

In the West Midlands area, construction output in 1995 prices is forecast to increase by an average yearly rate of 1.7% over the forecast period 2002 – 2006. This compares with the 2.6% growth rate for Great Britain as a whole. In 2000, the rate of construction unemployment at 6% was the same as the national average.

Current major projects

- **Commercial:** £180m for the design, construction and operation of a new traffic control centre in Birmingham.
- **Infrastructure:** A five-year £560m project for railway track maintenance in Birmingham; a £485½m project for the Birmingham Northern Relief road comprising 43km of dual, three-lane motorway and associated facilities.

Proposed major projects

- **Infrastructure:** A £150m, five-year project for construction and associated traffic management in Birmingham; a £100m five-year contract for station and platform works throughout the Midlands.
- **Public:** A £222m project for a new hospital in Coventry.
- **Commercial:** Major new projects are planned for Birmingham, including: a £300m new leisure/commercial Alpha tower providing cinema, hotel, entertainment and leisure facilities; a £200m extension to the National Exhibition Centre to provide dining, drinking and entertainment facilities.

Reported skill shortages

According to the Employers' Skill Needs Survey Spring 2001, 77% of employers in the West Midlands experienced difficulties in recruiting skilled staff. The recruitment of Carpenters & Joiners was worst affected, followed by Bricklayers, Plasterers and Managers.

Recruitment difficulties are likely to worsen in the West Midlands as 59% of employers expect their workload to increase over the next six months and 38% expect their workload to stay the same.

Provision of training

Since its official start in February 1999, **On-Site Assessment and Training (OSAT)** has been expanding rapidly in Great Britain as a whole. 50 candidates took part in the pilot scheme at the end of 1998 and, by Spring 2001, this had increased to approximately 12,000 candidates. The Midlands (East and West) accounted for 1,479 candidates.

Projects

CITB has been working with a number of partners (including Advantage West Midlands, Learning and Skills Councils, training providers and key employers) on a research project entitled 'Bridging the Gap'. The project involves analysing construction education and training skills in the West Midlands, with action plan recommendations following on from this. Details are available from www.citb.co.uk

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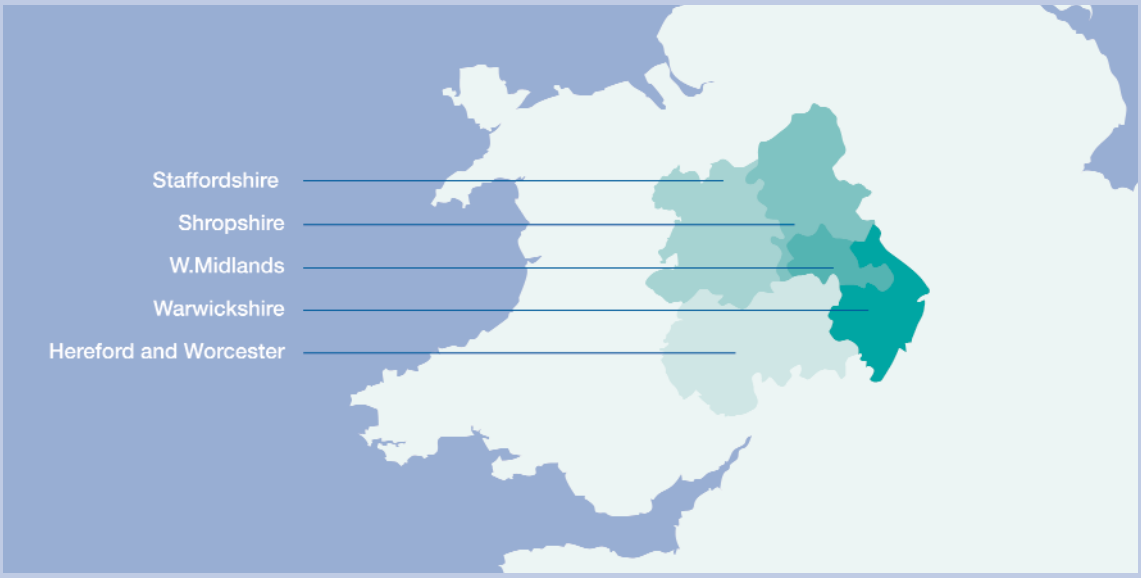
Table 17
West Midlands

	Total Employment 2002	Total Employment 2006	Average Annual Percentage Change (2002 – 2006)	Average Annual Requirement (2002 – 2006)	Cumulative Requirement (2002 – 2006)
Managers	11,100	11,500	0.9	500	2,500
Clerical	9,600	9,800	0.5	400	2,000
Professionals	3,200	3,300	0.7	100	500
Technicians	3,200	3,400	1.6	200	1,000
Carpenters & Joiners	16,700	16,600	-0.1	800	4,000
Bricklayers	8,700	8,500	-0.7	400	2,000
Painters & Decorators	6,500	6,400	-0.4	300	1,500
Plasterers	2,800	2,400	-3.4	100	500
Roofers	3,400	3,400	-0.1	200	1,000
Floorers	1,600	1,500	-0.1	100	500
Glaziers	600	600	0.7	0	0
Other SB Operatives (1)	2,900	2,900	0.0	100	500
Scaffolders	1,300	1,300	-0.1	100	500
Plant Operatives	3,900	3,800	-0.3	200	1,000
Plant Mechanics/Fitters	2,100	2,100	0.2	100	500
Steel Erectors/Structural	1,400	1,400	0.0	100	500
Other CE Operatives (2)	8,600	8,600	0.0	400	2,000
General Operatives	6,900	6,500	-1.5	300	1,500
Maintenance Workers	2,300	2,300	0.0	100	500
Electricians	13,200	13,400	0.5	600	3,000
Plumbers	10,500	10,500	0.0	500	2,500
Non-construction Operatives	2,800	2,800	0.2	–	–
Total	**123,300**	**123,000**	**0.0**	**5,600**	**28,000**

Source: CITB Employment Model, 2001; Business Strategies
(1) Specialist Building
(2) Civil Engineering
Numbers rounded to the nearest hundred. Figures of zero indicate a number less than fifty.



North West

In the North West area, construction output in 1995 prices is forecast to increase by an average yearly rate of 1% over the forecast period 2002 – 2006. This compares with the 2.6% growth rate for Great Britain as a whole. In 2000, the rate of construction unemployment at 6% was the same as the national average.

Current major projects

- **Public:** A £90m project in Manchester for the construction of the Millennium Sports Stadium and associated infrastructure in preparation for the 2002 Commonwealth games. There are two projects for schools in the area: a £80m scheme to construct three schools in Hyde, Greater Manchester and a £50m scheme in Wirral to construct and refurbish nine schools including local infrastructure.
- **Infrastructure:** There are two five-year railtrack contracts in this area, comprising a £200m rail maintenance contract on Merseyrail and a £125m contract for structures in the North West region including bridges and embankments.

Proposed major projects

- **Infrastructure:** A £513m project for the design and construction of a third phase for the Metrolink 2000 Public Transport Interchange in Manchester; a £100m project for a combined cycle power plant in Manchester.
- **Commercial:** A £400m mixed development in Chorley for housing, employment, shopping, leisure and commercial uses.
- **Public:** As part of the current NHS PFI project, there is a £210m project to redevelop both Whiston Hospital in Prescot and St Helens Hospital, St Helens; and a £114m scheme for new build and refurbishment work at Hope Hospital in Salford.

Reported skill shortages

According to the Employers' Skill Needs Survey Spring 2001, in the North West 77% of employers experienced difficulties in recruiting skilled staff. The recruitment of Carpenters & Joiners and Bricklayers was worst affected, followed by Plumbers and Professionals.

Recruitment difficulties are unlikely to ease in the North West since approximately 66% of employers expect their workload to increase over the next six months and 32% expect their workload to stay the same.

Provision of training

Since its official start in February 1999, **On-Site Assessment and Training (OSAT)** has been expanding rapidly in Great Britain as a whole. 50 candidates took part in the pilot scheme at the end of 1998 and, by Spring 2001, this had increased to approximately 12,000 candidates. The North West accounted for 2,730 candidates.

Projects

CITB has been working with seven other construction-related National Training Organisations on the 'Co-operation in Construction' programme. The programme has been supported by the North West Development Agency.

ON-SITE ASSESSMENT AND TRAINING (OSAT)
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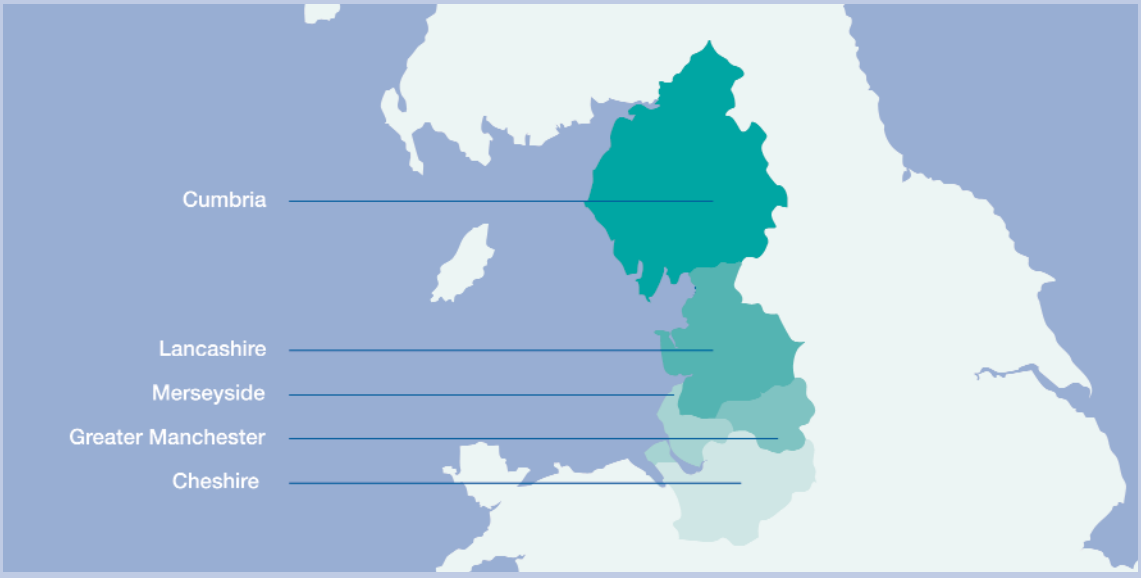
Table 18
North West

	Total Employment 2002	2006	Average Annual Percentage Change (2002 – 2006)	Average Annual Requirement (2002 – 2006)	Cumulative Requirement (2002 – 2006)
Managers	15,600	15,800	0.3	700	3,500
Clerical	13,400	13,400	-0.1	600	3,000
Professionals	4,500	4,700	0.8	200	1,000
Technicians	4,600	4,800	1.4	200	1,000
Carpenters & Joiners	30,300	29,700	-0.5	1,300	6,500
Bricklayers	11,700	11,200	-1.0	500	2,500
Painters & Decorators	8,800	8,500	-0.8	400	2,000
Plasterers	3,700	3,200	-3.7	100	500
Roofers	4,600	4,500	-0.4	200	1,000
Floorers	2,100	2,000	-0.4	100	500
Glaziers	800	800	0.4	0	0
Other SB Operatives (1)	3,900	3,800	-0.5	200	1,000
Scaffolders	1,800	1,800	-0.5	100	500
Plant Operatives	3,800	3,700	-0.9	200	1,000
Plant Mechanics/Fitters	2,000	2,000	-0.3	100	500
Steel Erectors/Structural	1,300	1,300	-0.3	100	500
Other CE Operatives (2)	8,300	8,100	-0.6	300	1,500
General Operatives	6,700	6,200	-2.0	300	1,500
Maintenance Workers	2,200	2,200	-0.6	100	500
Electricians	12,800	12,800	-0.1	500	2,500
Plumbers	10,300	10,200	-0.3	400	2,000
Non-construction Operatives	2,800	2,700	-0.5	–	–
Total	**156,000**	**153,400**	**-0.4**	**6,600**	**33,000**

Source: CITB Employment Model, 2001; Business Strategies
(1) Specialist Building
(2) Civil Engineering
Numbers rounded to the nearest hundred. Figures of zero indicate a number less than fifty.



Yorkshire and The Humber

In Yorkshire and The Humber, construction output in 1995 prices is forecast to increase by an average yearly rate of 1.7% over the forecast period 2002 – 2006. This compares with the 2.6% growth rate for Great Britain as a whole. In 2000, the rate of construction unemployment at 7% was above the national average of 6%.

Current major projects

- **Commercial:** A £100m project in Barnsley for the development of land to provide space for commercial use with associated local infrastructure.
- **Commercial:** A £60m project to construct a new army foundation college in Harrogate.

Proposed major projects

- **Commercial:** A £100m redevelopment of North Bay, Scarborough to provide an all-weather tourist attraction.
- **Infrastructure:** Two cable-laying projects, linking the east coast of England with the south-west coast of Norway, are proposed in the North Sea at Humberside – £400m to construct and install 860 kilometres of subsea cabling and a £200m scheme for an electrical power system. Other work includes a £300m road construction project on the A1 motorway and trunk roads in West Yorkshire, and a £300m project to construct a power station in Grimsby.
- **Public:** A £164m project involving refurbishment, new build and possible demolition at Pinderfield Hospital and Pontefract General Infirmary, Wakefield; a £140m new cancer centre at St James Hospital, Leeds.

Reported skill shortages

According to the Employers' Skill Needs Survey Spring 2001, 80% of employers in Yorkshire and The Humber experienced difficulties in recruiting skilled staff. The recruitment of Carpenters & Joiners was worst affected, followed by Bricklayers and Professionals.

Recruitment difficulties are unlikely to ease in Yorkshire and The Humber since approximately 64% of employers expect their workload to increase over the next six months and 34% expect their workload to stay the same.

Provision of training

Since its official start in February 1999, **On-Site Assessment and Training (OSAT)** has been expanding rapidly in Great Britain as a whole. 50 candidates took part in the pilot scheme at the end of 1998 and, by Spring 2001, this had increased to approximately 12,000 candidates. Yorkshire and The Humber accounted for 1,068 candidates.

Projects

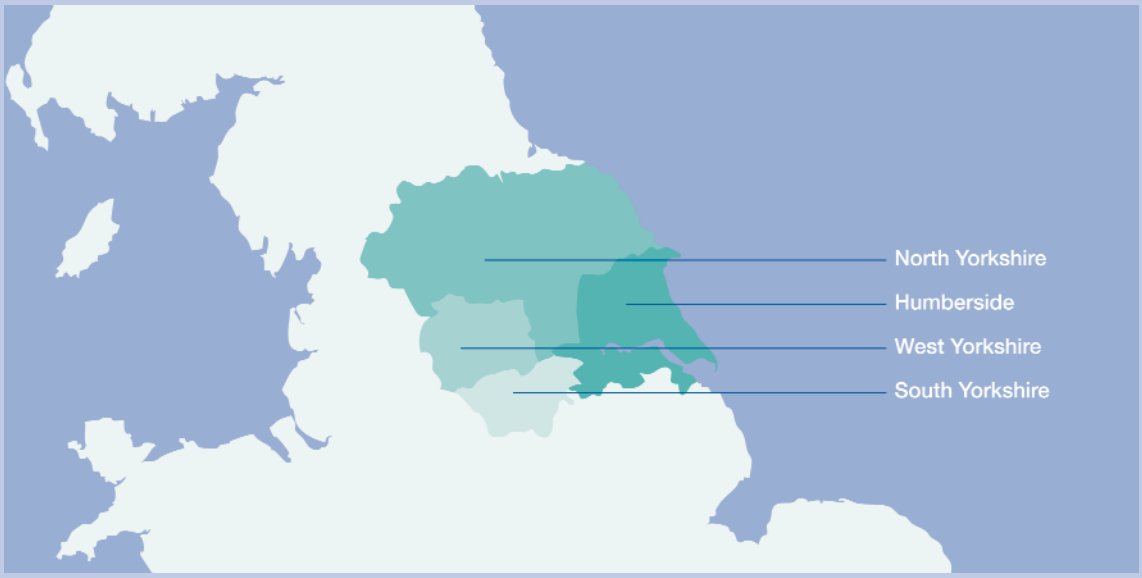
With the changes to the NVQs in November 2000, CITB has been asked to inform the industry of requirements for work-based evidence. Yorkshire and The Humber held a series of events involving seven colleges, with over 100 employer representatives attending. These events indicated an initial requirement of 182 training places, and all colleges in the area now offer the provision of work-based recorder training.

ON-SITE ASSESSMENT AND TRAINING (OSAT)
A CITB programme that gives workers the opportunity to gain formal qualifications through training and assessment in the workplace.

Table 19
Yorkshire and The Humber

	Total Employment 2002	Total Employment 2006	Average Annual Percentage Change (2002 – 2006)	Average Annual Requirement (2002 – 2006)	Cumulative Requirement (2002 – 2006)
Managers	12,600	13,500	1.7	700	3,500
Clerical	10,600	11,000	1.1	600	3,000
Professionals	3,600	3,900	1.9	200	1,000
Technicians	3,600	4,000	2.5	200	1,000
Carpenters & Joiners	19,700	20,700	1.2	1,100	5,500
Bricklayers	9,700	9,900	0.5	500	2,500
Painters & Decorators	7,200	7,500	0.8	400	2,000
Plasterers	3,100	2,800	-2.2	200	1,000
Roofers	3,800	3,900	1.1	200	1,000
Floorers	1,700	1,800	1.1	100	500
Glaziers	700	700	1.9	0	0
Other SB Operatives (1)	3,200	3,300	0.9	200	1,000
Scaffolders	1,500	1,500	1.1	100	500
Plant Operatives	3,300	3,400	0.9	200	1,000
Plant Mechanics/Fitters	1,800	1,900	1.4	100	500
Steel Erectors/Structural	1,200	1,200	1.2	100	500
Other CE Operatives (2)	7,300	7,700	1.2	400	2,000
General Operatives	5,900	5,800	-0.5	300	1,500
Maintenance Workers	1,800	1,800	0.1	100	500
Electricians	11,200	12,000	1.6	600	3,000
Plumbers	9,000	9,500	1.3	500	2,500
Non-construction Operatives	2,400	2,500	1.1	–	–
Total	**124,900**	**130,300**	**1.1**	**6,800**	**34,000**

Source: CITB Employment Model, 2001; Business Strategies
(1) Specialist Building
(2) Civil Engineering
Numbers rounded to the nearest hundred. Figures of zero indicate a number less than fifty.



North East

In the North East area, construction output in 1995 prices is forecast to increase by an average yearly rate of 2% over the forecast period 2002 – 2006. This compares with the 2.6% growth rate for Great Britain as a whole. In 2000, the rate of construction unemployment at 11% was well above the national average of 6%.

Current major projects

- **Commercial:** A £58m extension of a shopping centre in Gateshead; a £31.4m project to construct an entertainment and leisure centre with retail units including local infrastructure and a £30m office development with associated infrastructure in Newcastle upon Tyne.
- **Public:** A £50m project comprising construction and refurbishment works to South Cleveland Hospital, Middlesbrough.

Proposed major projects

- **Commercial:** A £75m development in Darlington of a new community area; a £59m mixed development in Middlesbrough comprising housing, business, hotel, leisure units and associated infrastructure.
- **Infrastructure:** A £300m drainage project in Newcastle upon Tyne; a £100m project for the provision of a light rail system in Middlesbrough to Stockton Four; a £100m project in Newcastle upon Tyne for a tunnel to ease congestion on the A19.

Reported skill shortages

According to the Employers' Skill Needs Survey Spring 2001, 64% of employers in the North East experienced difficulties in recruiting skilled staff. The recruitment of Bricklayers was worst affected, followed by Carpenters & Joiners and Managers.

Recruitment difficulties are unlikely to ease in the North East since 58% of employers expect their workload to increase over the next six months and 36% expect their workload to stay the same.

Provision of training

Since its official start in February 1999, **On-Site Assessment and Training (OSAT)** has been expanding rapidly in Great Britain as a whole. 50 candidates took part in the pilot scheme at the end of 1998 and, by Spring 2001, this had increased to approximately 12,000 candidates. The North East accounted for 770 candidates.

Projects

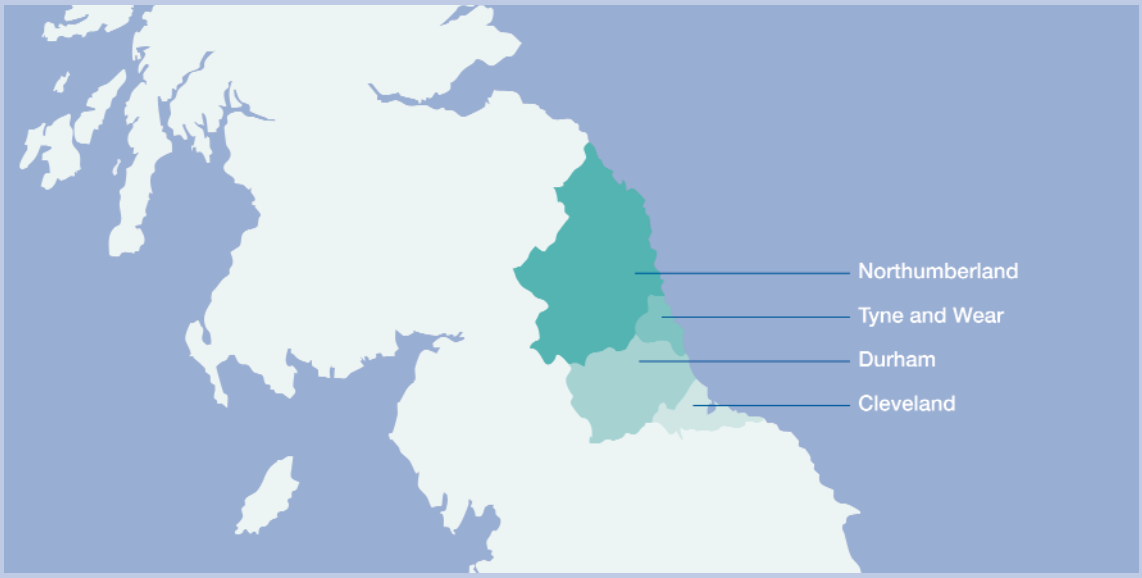
CITB is involved in a national partnership project addressing workforce development with, amongst others, Tyne and Wear Learning and Skills Council.

ON-SITE ASSESSMENT AND TRAINING (OSAT)
A CITB programme that gives workers the opportunity to gain formal qualifications through training and assessment in the workplace.

Table 20
North East

	Total Employment 2002	2006	Average Annual Percentage Change (2002 – 2006)	Average Annual Requirement (2002 – 2006)	Cumulative Requirement (2002 – 2006)
Managers	5,200	5,400	0.9	200	1,000
Clerical	4,400	4,400	0.2	200	1,000
Professionals	1,500	1,500	1.0	100	500
Technicians	1,500	1,600	1.3	100	500
Carpenters & Joiners	9,200	9,000	-0.5	400	2,000
Bricklayers	4,800	4,600	-0.7	200	1,000
Painters & Decorators	3,600	3,500	-0.5	200	1,000
Plasterers	1,500	1,300	-3.4	100	500
Roofers	1,900	1,900	-0.1	100	500
Floorers	800	800	-0.2	0	0
Glaziers	300	300	0.7	0	0
Other SB Operatives (1)	1,600	1,600	-0.3	100	500
Scaffolders	700	700	-0.2	0	0
Plant Operatives	1,700	1,700	-0.6	100	500
Plant Mechanics/Fitters	900	900	0.0	0	0
Steel Erectors/Structural	600	600	-0.4	0	0
Other CE Operatives (2)	3,700	3,600	-0.5	200	1,000
General Operatives	3,000	2,800	-1.8	100	500
Maintenance Workers	900	900	-1.2	0	0
Electricians	5,700	5,700	0.2	200	1,000
Plumbers	4,500	4,400	-0.4	200	1,000
Non-construction Operatives	1,200	1,200	-0.3	–	–
Total	**59,200**	**58,400**	**-0.3**	**2,500**	**12,500**

Source: CITB Employment Model, 2001; Business Strategies
(1) Specialist Building
(2) Civil Engineering
Numbers rounded to the nearest hundred. Figures of zero indicate a number less than fifty.



Scotland

In Scotland, construction output in 1995 prices is forecast to increase by an average yearly rate of 1.5% over the forecast period 2002 – 2006. This compares with the 2.6% growth rate for Great Britain as a whole. In 2000, the rate of construction unemployment at 10% was well above the national average of 6%.

Current major projects

- **Infrastructure:** A £180m waterfront rejuvenation of the northern area in Granton; a £120m trunk road maintenance contract for the south-west of Scotland.

Proposed major projects

- **Infrastructure:** A £307m motorway extension in Glasgow; a £300m drainage project at various sites in Scotland; a £135m project for the construction of a container terminal in Stromness.
- **Housing/Commercial:** A £600m mixed scheme in Glasgow comprising a large leisure, retail, office and housing development with associated local infrastructure; a £150m commercial development of land in Perth to provide 2,500 houses, transport infrastructure, commercial facilities and schools.
- **Housing/Infrastructure:** A £500m mixed project in Edinburgh for the construction of 5,800 houses with school provision and transport infrastructure.

Reported skill shortages

According to the Employers' Skill Needs Survey Spring 2001, 75% of employers in Scotland experienced difficulties in recruiting skilled staff. The recruitment of Carpenters & Joiners was worst affected, followed by Bricklayers and General Operatives.

Recruitment difficulties are unlikely to ease in Scotland since approximately 60% of employers expect their workload to increase over the next six months and 37% expect their workload to stay the same.

Provision of training

Since its official start in February 1999, **On-Site Assessment and Training (OSAT)** has been expanding rapidly in Great Britain as a whole. 50 candidates took part in the pilot scheme at the end of 1998 and, by Spring 2001, this had increased to approximately 12,000 candidates. Scotland accounted for 803 candidates.

ON-SITE ASSESSMENT AND TRAINING (OSAT)
A CITB programme that gives workers the opportunity to gain formal qualifications through training and assessment in the workplace.

Table 21
Scotland

	Total Employment 2002	2006	Average Annual Percentage Change (2002 – 2006)	Average Annual Requirement (2002 – 2006)	Cumulative Requirement (2002 – 2006)
Managers	12,300	12,600	0.6	500	2,500
Clerical	10,500	10,400	-0.2	400	2,000
Professionals	3,500	3,700	0.8	100	500
Technicians	3,600	3,700	1.3	100	500
Carpenters & Joiners	18,700	18,100	-0.8	700	3,500
Bricklayers	9,200	8,700	-1.3	300	1,500
Painters & Decorators	6,900	6,600	-1.1	300	1,500
Plasterers	2,900	2,500	-4.0	100	500
Roofers	3,600	3,500	-0.7	100	500
Floorers	1,600	1,600	-0.8	100	500
Glaziers	600	600	0.1	0	0
Other SB Operatives (1)	3,100	3,000	-0.8	100	500
Scaffolders	1,400	1,400	-0.8	100	500
Plant Operatives	3,600	3,400	-1.0	100	500
Plant Mechanics/Fitters	1,900	1,900	-0.7	100	500
Steel Erectors/Structural	1,200	1,200	-0.8	0	0
Other CE Operatives (2)	8,000	7,700	-0.9	300	1,500
General Operatives	6,300	5,700	-2.3	200	1,000
Maintenance Workers	2,000	1,900	-1.8	100	500
Electricians	12,000	11,900	-0.1	500	2,500
Plumbers	9,600	9,300	-0.7	400	2,000
Non-construction Operatives	2,700	2,600	-1.3	–	–
Total	**125,200**	**122,000**	**-0.7**	**4,600**	**23,000**

Source: CITB Employment Model, 2001; Business Strategies
(1) Specialist Building
(2) Civil Engineering
Numbers rounded to the nearest hundred. Figures of zero indicate a number less than fifty.

Wales

In Wales, construction output in 1995 prices is forecast to increase by an average yearly rate of 2.3% over the forecast period 2002 – 2006. This compares with the 2.6% growth rate for Great Britain as a whole. In 2000, the rate of construction unemployment at 7% was above the national average of 6%.

Current major projects

- **Industrial:** A £34m project in Swansea to construct a silicon wafer reclamation facility with associated local infrastructure.
- **Commercial:** A £70m project to construct a new Millennium Centre for the Arts in Cardiff Bay.
- **Infrastructure:** A £300m project to construct a new gas-fired power station that will form the centre of an energy park in Swansea.

Proposed major projects

- **Infrastructure:** A £55m construction of a distributor road in Newport; a £40m project to widen the M4 motorway to a three-lane dual carriageway in Cardiff.
- **Commercial:** Two projects for sports/football stadia are proposed in Wales: a £105m project to construct a mixed development in Merthyr Tydfil, Mid Glamorgan comprising a sports stadium, cinema, hotel, retail park and local infrastructure; a £50m project in Swansea to construct a leisure development including a sports stadium, cinema, leisure facilities and hotel with associated infrastructure.

Reported skill shortages

According to the Employers' Skill Needs Survey Spring 2001, 65% of employers in Wales experienced difficulties in recruiting skilled staff. The recruitment of Carpenters & Joiners was worst affected, followed by Bricklayers.

Recruitment difficulties are unlikely to ease in Wales since 55% of employers expect their workload to increase over the next six months and 44% expect their workload to stay the same.

Provision of training

Since its official start in February 1999, **On-Site Assessment and Training (OSAT)** has been expanding rapidly in Great Britain as a whole. 50 candidates took part in the pilot scheme at the end of 1998 and, by Spring 2001, this had increased to approximately 12,000 candidates. Wales accounted for 461 candidates.

Projects

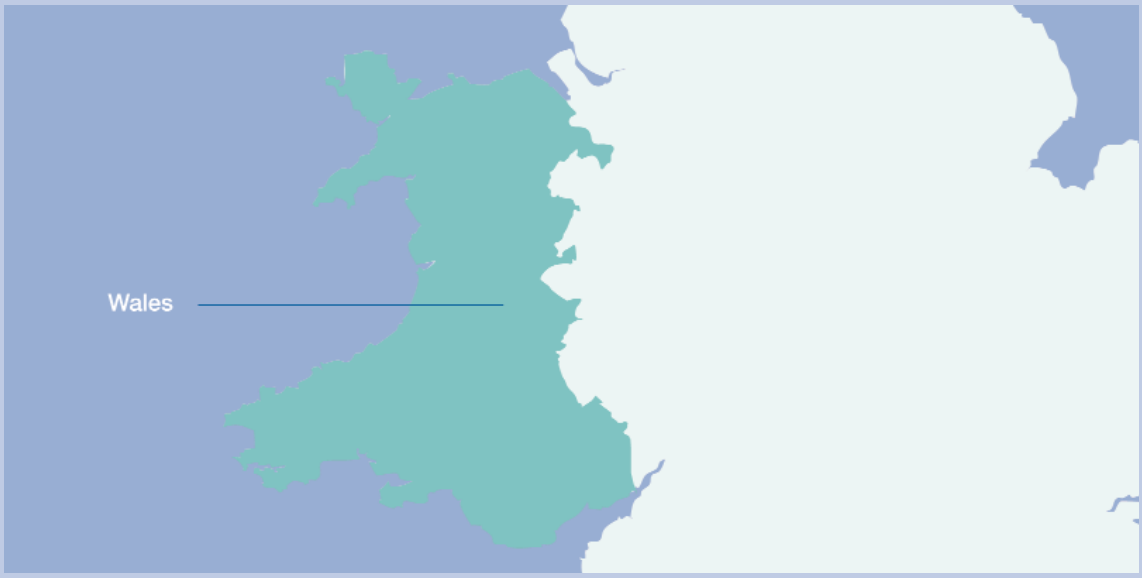
CITB Wales has been working with Gwalia Housing Association and construction employers in order to qualify construction workers throughout Mid and South Wales.

ON-SITE ASSESSMENT AND TRAINING (OSAT)
A CITB programme that gives workers the opportunity to gain formal qualifications through training and assessment in the workplace.

Table 22
Wales

	Total Employment 2002	2006	Average Annual Percentage Change (2002 – 2006)	Average Annual Requirement (2002 – 2006)	Cumulative Requirement (2002 – 2006)
Managers	4,800	5,000	1.2	300	1,500
Clerical	4,100	4,200	0.6	200	1,000
Professionals	1,400	1,400	0.9	100	500
Technicians	1,100	1,300	2.6	100	500
Carpenters & Joiners	11,500	11,800	0.7	600	3,000
Bricklayers	6,100	6,100	0.0	300	1,500
Painters & Decorators	4,500	4,600	0.2	200	1,000
Plasterers	1,900	1,700	-2.7	100	500
Roofers	2,400	2,400	0.6	100	500
Floorers	1,100	1,100	0.6	100	500
Glaziers	400	400	1.4	0	0
Other SB Operatives (1)	2,000	2,100	0.3	100	500
Scaffolders	900	900	0.5	0	0
Plant Operatives	2,000	2,100	0.3	100	500
Plant Mechanics/Fitters	1,100	1,100	0.4	100	500
Steel Erectors/Structural	700	700	0.4	0	0
Other CE Operatives (2)	4,500	4,500	0.3	200	1,000
General Operatives	3,600	3,400	-1.1	200	1,000
Maintenance Workers	900	900	-1.2	0	0
Electricians	6,800	7,000	0.7	400	2,000
Plumbers	5,500	5,600	0.5	300	1,500
Non-construction Operatives	1,500	1,600	0.7	–	–
Total	**68,800**	**69,900**	**0.4**	**3,500**	**17,500**

Source: CITB Employment Model, 2001; Business Strategies
(1) Specialist Building
(2) Civil Engineering
Numbers rounded to the nearest hundred. Figures of zero indicate a number less than fifty.



Section 5: Training Supply

Craft and Technician Training

So far, this report has looked at the likely skill demands for the construction industry between 2002 and 2006, and put this in the context of current training levels. This section looks more closely at training and how it is measured, as well as some of the detail behind the headline numbers.

Each year, CITB undertakes a national survey of construction training providers: The Trainee Numbers Survey. The survey measures the number of trainees who start a training course each academic year, with the results used to project the number of skilled workers who will enter the industry.

There are several advantages in using this method to gauge training levels over other sources of information. Primarily, it is used because the information is available quickly – if numbers are to be used for forecasting purposes, then a key requirement has to be that they are up to date. With the Trainee Numbers Survey, initial results are available within a matter of weeks. The survey also allows information to be analysed at local and regional levels, pinpointing potential skill shortage 'hot spots', as well as areas of possible oversupply of training.

A recent introduction to the survey has been the collection of equal opportunities information. This move is particularly relevant given the present demand for skilled workers, and it has supported initiatives designed to encourage more women and ethnic minorities to consider a career in construction.

Training Establishments

Around 290 colleges, training centres and private training providers across the country are approached to complete the questionnaire. The survey relies on the goodwill of training providers to complete it, and nationally this gives a response rate high enough to give a good indication of training levels. Where training providers do not respond, their student intake is estimated based on previous responses. The actual response rate was 65%.

The vast majority of establishments are colleges of further education (75%), and these carry out some 90% of all training. Around 10% of establishments are training centres (industry and CITB), and 15% are private training providers.

Numbers in Training

The following table shows the number of first-year trainees by construction course at NVQ/SVQ Levels 1 to 3, and technicians studying for National Certificates and National Diplomas at both Higher and Ordinary levels. It covers a broader range of occupations than analysed so far in this report by looking beyond the Building Craft trades.

As can be seen from Table 23, around one-third of construction courses account for over 90% of all construction training, with Carpentry & Joinery and Bricklaying together accounting for over half.

Table 23
Number of First-year Starters on Construction Courses at FE Colleges and Training Centres, Great Britain: 2000/2001

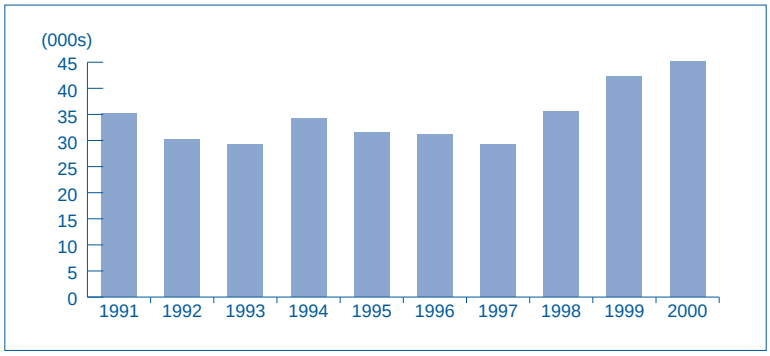
	Trainees			
Occupation	NVQ/SVQ Level 1	NVQ/SVQ Levels 2 and 3 (excluding CITB Trainees)	NVQ/SVQ Levels 2 and 3 CITB Trainees	Total
Technicians	0	6,350*	70*	6,420
Carpenters & Joiners	4,290	7,780	3,370	15,440
Bricklayers	3,050	4,280	1,420	8,750
Painters & Decorators	1,800	1,940	850	4,590
Plasterers	0	690	270	960
Roofers	50	155	185	390
Floorers	30	155	125	310
Glaziers	20	190	20	230
Other Specialist Builders	0	245	35	280
Scaffolders	200	295	225	720
Plant Operatives	10	150	10	170
Plant Mechanics	0	35	95	130
Steel Erectors/Structural	0	20	0	20
Other Civil Engineers	0	80	0	80
General Operatives	1,320	370	30	1,720
Maintenance Workers	0	0	15	15
Mechanical Engineering	0	4,735	135	4,870
Total	10,770	27,470	6,855	45,095

Source: CITB Trainee Numbers Survey, 2000/2001
* These numbers refer to National Certificates and National Diplomas at both Higher and Ordinary levels.
CITB Trainees refer to CITB's role as a managing agent.

Chart 14 illustrates the trend in levels of training across all craft and technician qualifications over the last ten years.

Throughout the early 1990s, the number of first-year construction trainees fluctuated between 30,000 and 35,000. After reaching a low point of just over 29,000 in 1997, numbers have since increased strongly, with 1999 seeing numbers climb above 40,000 for the first time since the late eighties. Growth has continued into 2000, though at a reduced rate of increase.

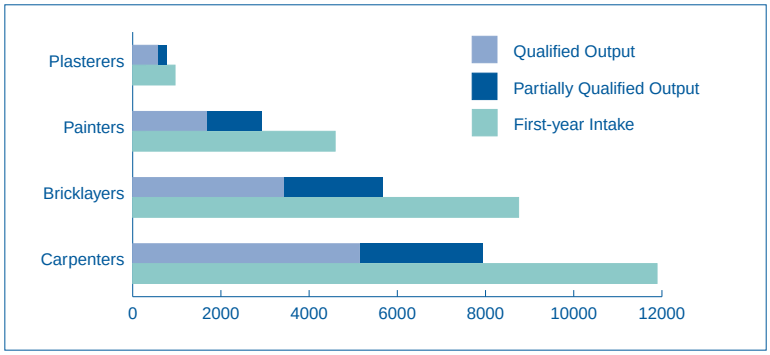
Chart 14
Numbers of First-year Starters on Construction Courses: 1991 – 2000



Source: CITB Trainee Numbers Survey, 2000/2001

Chart 15 illustrates the difference between the total first-year intake and the proportion of the first-year intake that is estimated will become qualified or partially qualified construction workers. For the main Building Trades, around 40% of trainees will leave the course before qualifying. Around half of these will leave the construction industry entirely; the remainder, along with many of those who complete an NVQ/SVQ Level 1, will continue to work in construction as partially qualified workers. The number of Carpenters is reduced further to reflect the fact that only just over 75% of Carpenters & Joiners work in the construction industry.

Chart 15
Comparison of First-year Intake and Qualified Output to the Construction Industry by Trade



Source: CITB Trainee Numbers Survey, 2000/2001

School Leavers

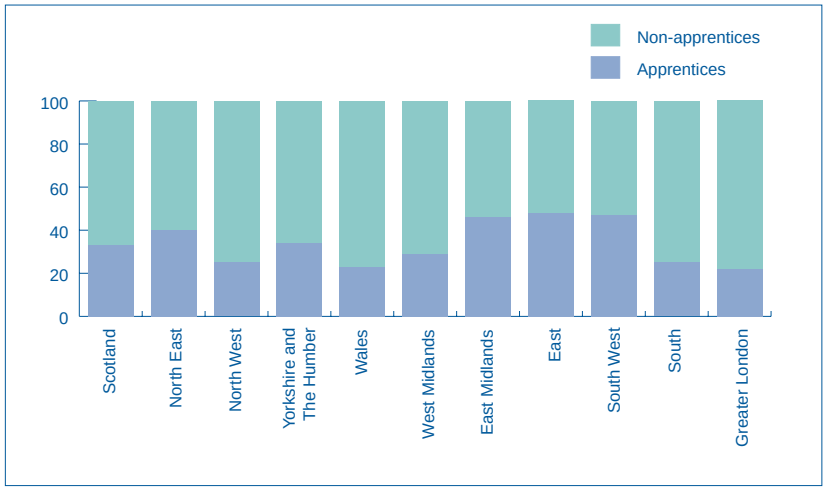
One of the main areas of supply for construction training courses is Year 11 school leavers. The Careers Service publishes figures for England on the destination of Year 11 pupils. Of those in this age group who entered training or work in 1999, 8.7% went into skilled construction jobs or training. As would be expected, the majority of these are male; just over 13% of males entering training or work went into skilled construction jobs or training, compared with 1% of females. A further 6% of males became plant or machine operatives (although clearly not all in construction), with around 16% entering labouring or other elementary occupations, again not all in construction. When analysed in conjunction with the Labour Force Survey, it would be reasonable to assume that, overall, of the Year 11 males entering training or work, around 20% enter the construction industry.

Apprentices

The Trainee Numbers Survey also asked training providers to identify the proportion of their first-year trainees who are on apprentice-type training. The term 'apprentice' is used here in its widest sense, covering not only those on Modern Apprenticeships, but any person who is both new to and employed in the construction industry.

The results show wide variations between one training provider and another, and between one area and another. Areas where apprentice-type training predominates are the South West, East and East Midlands, where just under half of all trainees fit this category. Overall, however, the proportion of first-year trainees in Great Britain on an NVQ/SVQ Level 2 course or higher and pursuing some form of apprenticeship is 38%, or 13,000 individuals.

Chart 16
Proportion of First-year Trainees who are Undertaking an Apprenticeship by Country and Region



Source: CITB Trainee Numbers Survey, 2000/2001

Destinations of Early Leavers and Completers

Previous research provides some idea of the initial destinations of those who leave their courses, either after completion, or after having left early.

Looking at both Early Leavers and Completers together, just over 60% either go on, or continue, to work in construction, with 40% leaving the industry altogether. It should be noted that this is probably the upper end for such estimates, with an actual figure of between 20% to 40% leaving the industry, dependent upon the course.

Table 24
Immediate Destinations of those Leaving Construction Training

Destination	Early Leavers	Completers	Weighted Average
Unemployed	18.1%	1.7%	8.3%
Staying with Current Employer	11.6%	60.5%	41.0%
Starting a New Job in Construction	13.3%	10.5%	11.6%
Starting a New Job in Another Industry	24.6%	1.7%	10.9%
Starting Another Training Course	11.9%	6.3%	8.6%
Starting a Further Education Course	10.2%	7.8%	8.8%
Self-employed in Construction	7.2%	9.5%	8.6%
Self-employed in Another Industry	<1%	<1%	<1%
Looking to Finish Course	2.0%	0.0%	<1%
Armed Forces	<1%	<1%	<1%
Working Abroad	<1%	<1%	<1%
Other	2.0%	1.3%	1.6%

Source: CITB Trainee Exit Questionnaire
The weighted average assumes 60% of starters will complete their course.

It must be remembered that, when looking at these figures, they refer to immediate destinations only; there will be considerable churn amongst the workforce, with people moving into or dropping out of construction over time.

Equal Opportunities

The proportion of women and ethnic minorities in training at craft and technician levels are higher than the proportions in employment. Of the approximate 45,000 first-year trainees, around 4% were female (1,910) which is about the same as in 1999/2000. Small though this number is, it compares well with the proportion of women employed at craft level in construction, which stands at under 1% of total craft employment.

Around 5% of first-year trainees are from an ethnic minority (2,380) which is again the same proportion as 1999/2000. This also compares well with the proportion in employment, where just 2% of workers in construction are from an ethnic minority.

Comparison with FEFC Numbers and NVQ Registrations

The Further Education Funding Council (FEFC)* produces what is probably the most comprehensive record of student numbers available. However, as has already been mentioned, there are several reasons why the Trainee Numbers Survey is favoured over this source.

The first of these relates to having timely information with which to forecast the supply of skilled workers. The Trainee Numbers Survey provides initial data on trainee starts within a few weeks, which forms the basis for the estimated supply of skilled workers who will join the industry upon completion of training.

There is potential for double counting in any survey of trainee numbers. Students may be enrolled on more than one course, or they may achieve a Level 1 qualification on the way to gaining a Level 2 or 3. The Trainee Numbers Survey tries to avoid this as far as possible by being a head count of trainees within an establishment. All students are counted only once, regardless of the number of qualifications they are expected to achieve.

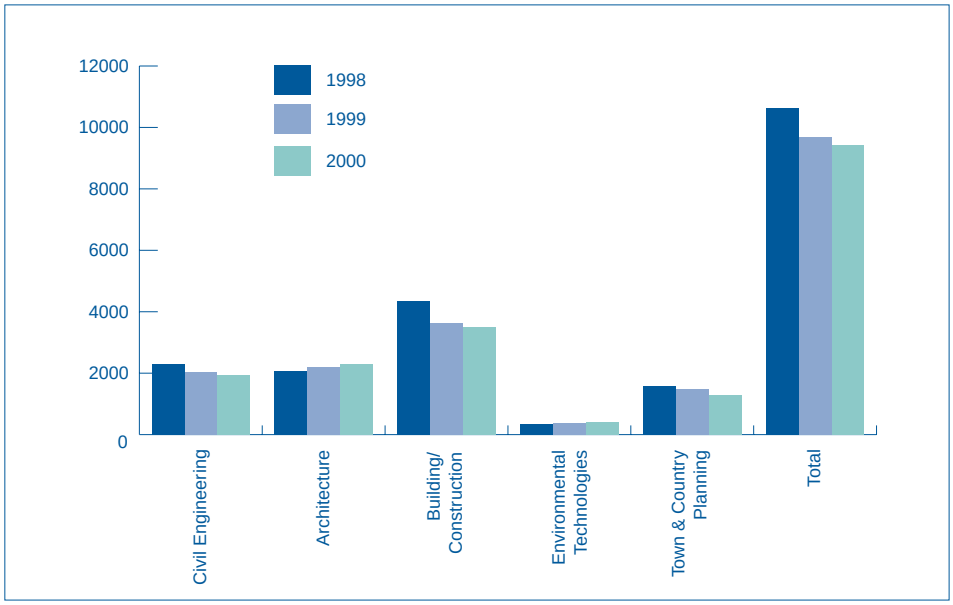
Finally, the FEFC has a much wider definition of construction training that goes beyond the traditional craft and trade occupations covered in this report, giving numbers significantly higher than those of the Trainee Numbers Survey.

* **Note:** The FEFC's work on measuring training supply has been taken over by the Learning and Skills Council.

Degree Qualifications

The Higher Education Statistics Agency (HESA) collects figures for people attending construction-related courses at degree level. The numbers, reproduced in the chart below, show a continuing downward trend in the total number of UK-based, first-year undergraduates, with only Architecture and Environmental Technologies showing a slight increase.

Chart 17
Comparison of First-year Intake onto Construction-related Degree Courses: 1998/99 – 2000/01 (UK-based Students)



Source: Higher Education Statistics Agency

There has been little real change in the number of women entering construction training at degree level – down from 2,160 in 1998/99 to 2,140 in 2000/01. However, when set against the decline in total numbers, the proportion of women entering training compared with the proportion of men has actually increased from 20% in 1998/99 to 23% in 2000/01.

Numbers of first-year students from non-white ethnic minorities have fallen slightly from 1,100 in 1998 to 970 in 2000. This group accounts for around 10% of all first-year construction undergraduates, a proportion which has remained unchanged over this time given the overall fall in student numbers.

Training Capacity

Concern has been raised this year about the ability of the education and training system to meet the demands of the construction industry. The 2001 research report on staff shortages in Construction Education by David Neve, of the University of Huddersfield, highlighted the concerns.

In a survey of FE colleges that are members of the British Association of Construction Heads, difficulties were highlighted in the recruitment of teaching staff. In particular:

- Vacancies had risen, with full-time posts being particularly hard to fill.
- Plumbing, wood trades and brickwork were worst affected, with professional and technical areas being less of a problem.
- Some colleges had closed courses due to lack of staff.
- There was significant regional variation.
- Low pay (particularly in comparison with rates in the industry itself) was cited as a problem.
- Retention was becoming more of a problem.
- Colleges had moved to replace lecturer posts with instructors, but there was concern that, in the long-term, terms and conditions would need to be improved to compete with other jobs.

There would appear to be several challenges facing the industry's training capacity:

- Recruiting and retaining teaching staff, especially during periods of high industry activity.
- Ensuring that training systems continue to be up to date and to meet industry's needs.
- Ensuring that training systems are accessible and flexible to attract learners.

Section 6: Recruitment and Training

Flows into the Industry

Labour mobility for the construction industry is high. Results from the Labour Force Survey show that, in recent years, the total turnover in construction employment has been approximately 10% of total employment.

The gross losses from the industry can be broken down as follows:

- 3.1% become unemployed
- 2.7% become economically inactive, i.e. leave the workforce
- 4% go to other industries.

The gains are:

- 4.6% from other industries
- 2.7% from the unemployed
- 3.5% from the economically inactive.

Thus, total losses are estimated at 9.8% and total gains at 10.8% resulting in an approximate annual average increase of 1% in total employment.

Within the 10% total turnover quoted in the opening paragraph, we need to distinguish intake into employment from the existing labour supply and intake from outside the construction labour supply. In other words, this 10% turnover cannot all be regarded as new intake into the industry since, at any one time, the supply of labour to the construction industry includes individuals who already have construction skills but who are currently unemployed, working in other industries or are economically inactive.

The Labour Force Survey provides the basis for estimates of construction unemployment. The Household Survey, carried out by the Office for National Statistics, allows us to identify the percentage of employees from other sectors who have previously worked in construction and who can, therefore, be assumed to have construction skills. For the economically inactive, the breakdown into different categories again allows us to arrive at an estimate of the percentage already having construction skills.

By combining these three inflows into supply of labour to the industry, we arrive at a figure of 5% (i.e. around half of the total annual turnover). This represents the demand of new skills in the industry each year and it is used in the 2001 run of the CITB Employment Model. Further details on the methodology used are available on request.

Required Intake, Training and Qualifications

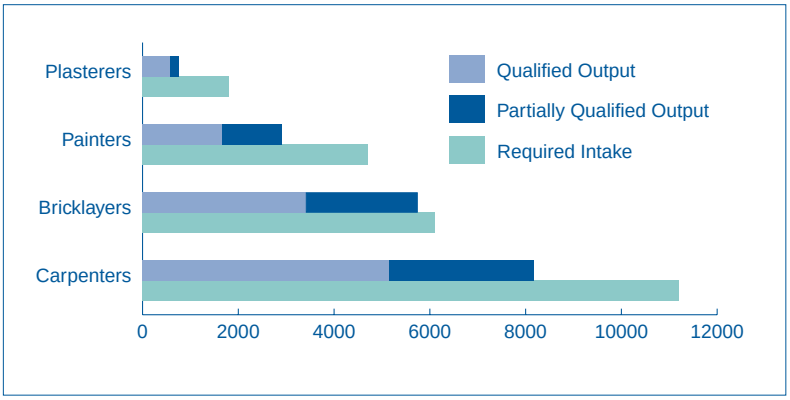
In this section, we compare the required intake as forecast by the CITB Employment Model with the numbers achieving qualifications. Training in the industry was covered in Section 5.

When considering the trained output available to the industry, the traditional approach has been to allow for the fact that skills in the construction industry are acquired in a variety of ways, such as on-the-job training and conversion training of operatives transferring from other industries.

Such an approach is misleading if the aim is to achieve a fully qualified workforce in the industry. We therefore need to distinguish between qualified and partially qualified workers joining the industry. The following charts show this comparison for the main occupational groups in construction.

For Building Trades, Chart 18 reveals a considerable gap between the number of craftspeople required and the estimated number achieving qualifications. The percentage of the required intake covered by fully qualified craftspeople varies from 56% for Bricklayers to 32% for Plasterers. The percentage decreases but is not eliminated by the inclusion of partially qualified craftspeople.

Chart 18
The Building Trades: 2002 – 2006
Annual Average Required Intake Compared with Trained Output

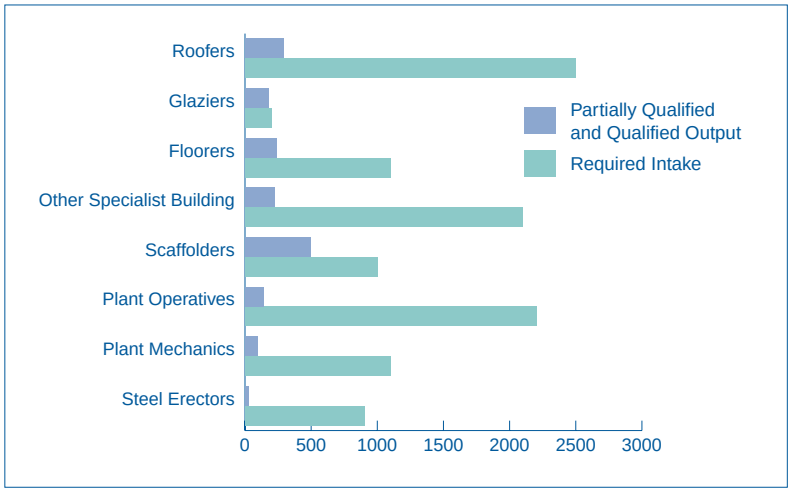


Source: CITB Employment Model, 2001; CITB Trainee Numbers Survey, 2000/2001

Please note that the fully qualified output includes only those with a minimum of NVQ/SVQ Level 2 (the industry's required standard). Also, it assumes that only 60% of those beginning training will achieve a qualification. The partially qualified output includes those at Level 1 and assumes that a further 20% of those beginning training will join the industry.

For Civil Engineering and Specialist Building trades, Chart 19 shows that, except for Scaffolders and Glaziers, less than 20% of the required intake is met by qualified and partially qualified craftspeople (the latter being relatively few). At present, the majority of the intake only receives short-duration, informal or on-the-job training.

Chart 19
Civil Engineering and Specialist Building Trades: 2002 – 2006
Annual Average Required Intake Compared with Trained Output



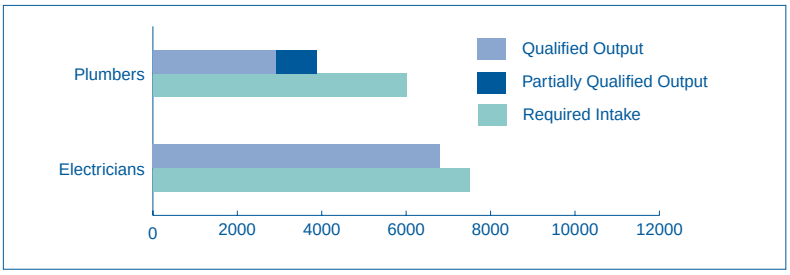
Source: CITB Employment Model, 2001; CITB Trainee Numbers Survey, 2000/2001
For Steel Erectors, only 12 are in training.

For Specialist Building trades, in terms of formal, off-the-job training, Roofing trades are the worst off with a qualified intake of approximately 200 compared with an annual required intake of 2,500. However, training in roofing has traditionally been on-the-job. A report by the Roofing Industry Alliance (RIA), published in 1999, recommended that the bulk of training in the Roofing trades should be on-site training as this was considered the most cost-effective method for these trades.

CITB's On-Site Assessment and Training (OSAT) programme, introduced in 1999, is designed to allow the existing workforce to become qualified through on-the-job training. By Spring 2001, approximately 12,000 candidates had passed through the scheme. Further expansion is planned over the next few years.

Chart 20 for Building Services presents a mixed picture. For Plumbers, including Heating & Ventilating Engineers, approximately 60% of the required intake is met by qualified craftspeople which increases to 70% if partially craftspeople are added. For Electricians, because of strict regulations within the sector, only qualified craftspeople are shown and this covers approximately 95% of the required intake. The qualified output has been deflated by 50% for Electricians and 20% for Plumbers to take into account operatives in these trades working outside the construction industry.

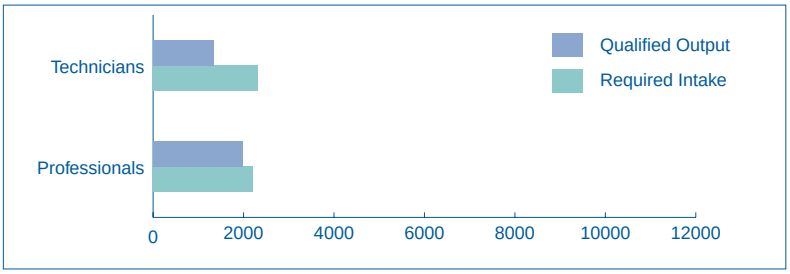
Chart 20
Building Services: 2002 – 2006
Annual Average Required Intake Compared with Trained Output



Source: CITB Employment Model, 2001; CITB Trainee Numbers Survey, 2000/2001; Measuring the Supply of New Entrants to the Construction Industry, Consultation Paper by ECOTEC, 2001

Chart 21 shows the required intake for professional and technical staff in the construction industry. For supply, it is assumed that only 70% of those starting courses qualify and become practising professionals. It is further assumed that only 30% of the qualified output is available to the construction industry, with the remainder going to work in organisations (such as consultancies) which are outside the industry as defined here. This results in a shortfall of approximately 40% for Technicians, and approximately 10% for Professionals.

Chart 21
Professional and Technical Staff: 2002 – 2006
Annual Average Required Intake Compared with Trained Output



Source: CITB Employment Model, 2001; HESA Student Record, 2000

The figures presented in this section show a substantial gap in the provision of training if the aim is to achieve a fully qualified workforce. This is due to:
a) an over-reliance on informal, uncertificated training
b) drop-out from courses
c) loss to other industries.

As has been noted in previous reports (CITB's Construction and Employment Training Forecast, 1997, 1998, 1999 and 2000), a shortfall has been reported in previous years. This has had the effect of gradually eroding the skill base of the industry and is consistent with the skill shortages reported by employers. Thus, although training levels have increased in recent years, they are still insufficient to meet the needs of a qualified workforce.

Summary Assessment

The aim of this section is to set out the main points of this assessment, which can then form the basis for priority areas for action to be addressed in the Sector Workforce Development Plan.

- Overall levels of activity in the UK construction industry are likely to show moderate growth in the next five years. However, growth in construction is dependent on prospects for the rest of the economy, and on the fulfilment of Government plans for public expenditure over the next five years. There are likely to be regional and sectoral variations within the whole.
- The construction labour market is expected to continue to be 'tight'. This will mean a low level of unemployment, difficulties in recruitment, and earnings growth above the rate of inflation. There is likely to be variation between regions and subsectors, with 'hot spots' occurring in certain locations (especially London and the South East) and around large new developments.
- The industry is likely to experience difficulties in meeting its skill requirements. Contributory factors are: competition for workers from other industries, insufficient people coming through training, and a gap in the workforce which occurred during low levels of recruitment in the early 1990s. Although levels of training have been increasing in recent years, there continues to be a major shortfall in terms of properly qualified recruits joining the industry. According to employers, skill shortages are most acute in London and the South East; and for Carpenters and Bricklayers. These shortages create pressure for mobility of labour between regions and the employment of unqualified workers.
- Construction is expected to undergo significant changes in process and technology in the next 5–10 years. Some, notably the transfer of activity off site and the move towards manufactured and standardised components, will be continuations of existing trends. Others, notably improvements in supply chain management, quality assurance and partnering with clients, represent a change in direction for the industry and are expected themselves to create a climate of more innovation. Together, these changes are necessary to increase productivity and enable the industry to compete internationally.
- Industry changes will have consequences for the workforce in terms of different skill requirements – in particular, the trend away from manual labour and towards white-collar workers/technicians will continue. On site there will be a need for higher-level assembly skills. Business management generally will become more critical for company success. In particular, through the adoption of new ICT systems. The move towards a fully qualified workforce, driven by demands for quality assurance, will represent a significant extra training requirement for the industry.
- There is currently a persistent decline in applications and acceptances for higher education courses in all construction and built environment-related disciplines (apart from architecture). The situation is made all the more acute by forecasts of the number of professionals and managers that will be needed to deliver the Government's ambitious programme of school, health, house building and infrastructure improvement. The sector needs to better understand the reasons for this decline, to reverse its current image with young people and their influencers, and to attract more graduates from a range of disciplines and backgrounds.

In conclusion, the industry needs to increase its training levels on four fronts:

- to meet the current shortfall against demand
- to account for growth
- to fulfil the objective of a fully qualified workforce
- to meet the need for higher-level skills and occupational change.

Priorities for Workforce Development

Three main priority areas for construction workforce development can be identified from the Skills Foresight Report as follows:

1. **Maintaining the new intake of skills**

   Actions that will contribute towards this priority include:

   - improving the image of the industry
   - working with schools and young people (careers guidance)
   - improving the accessibility and flexibility of training programmes
   - involving employers in the support and delivery of training programmes
   - improving retention and qualification rates, including reducing 'drop-out' from courses and 'leakage' outside construction
   - improving recruitment and retention of graduates into the industry.

2. **Raising skill levels in the existing workforce**

   - assessment and certification of existing skills
   - upskilling
   - changing employer and employee perceptions of skill needs
   - improving the accessibility of training programmes
   - improving basic skills.

3. **Enabling modernisation and growth in the industry**

   - reaching higher level skills
   - moving to a higher level intake into training
   - better human resource management
   - improving quality assurance
   - embedding 'life-long learning'.

Appendix: Detailed Occupational Breakdown

The following tables give further occupational breakdown of the numbers employed in Great Britain for most groups in Chart 7. The more detailed occupation categories given here mirror, as far as possible, NVQ categories. These figures refer to 2000.

Table A1:

Wood Trades	Number
Carpenters & Joiners (Sitework)	161,118
Carpenters & Joiners (Benchwork)	36,522
Shopfitters	5,723
Formworkers	1,928
Wood Machinists	3,609
Total Wood Trades	**208,900**

Table A2:

Trowel Trades	Number
Bricklayers	111,520
Cavity Wall Tie Installers	502
Facade Maintenance/Cleaning	1,410
Stonemasons	3,567
Plasterers (Fibrous)	7,555
Plasterers (Solid)	27,092
Dry Liners	4,154
Total Trowel Trades	**155,800**

Table A3:

Roofing Trades	Number
Thatchers	257
Slaters and Tilers	28,254
Built-up Felt Roofers	6,303
Sheeters and Cladders	6,214
Single Ply Roofers	1,617
Liquid Applied Roofers	278
Mastic Asphalters	2,177
Total Roofing Trades	**45,100**

Table A4:

Flooring Trades	Number
Floorcoverers, including Carpet Fitters	8,271
Wall and Floor Tilers	12,429
Total Flooring Trades	**20,700**

Table A5:

Other Specialist Building Trades	Number
Ceiling Fixers	8,561
Demountable Partition Erectors	8,329
Demolition Operatives	18,366
Steeplejacks/Lightning Conductor Engineers	3,444
Total Other SB Trades	**38,700**

Table A6:

Steel Trades	Number
Steel Erectors/Riggers	6,734
Structural Steel Workers	7,066
Total Steel Trades	**13,800**

Table A7:

Plant Operating Trades	Number
Crane Drivers	2,186
Plant Operators	38,414
Total Plant Operating Trades	**40,600**

Table A8:

Other Civil Engineering Trades	Number
Asphalters	8,388
Bar Benders/Steel Fixers	1,076
Public Utilities Distribution Operatives	21,665
Mason Paviors	5,984
General CE Operatives	51,987
Total Other Civil Engineering Trades	**89,100**

Table A9:

Maintenance Trades	Number
Maintenance Operatives	6,874
Thermal Insulation Engineers	16,426
Total Maintenance Trades	**23,300**

Table A10:

Plumbing Trades	Number
Plumbers	28,741
Heating and Ventilating Engineers	73,005
Refrigeration and Air-conditioning Engineers	7,554
Total Plumbing Trades	**109,300**

Table A11:

Administrative Staff	Number
Managers	137,300
Supervisors	39,177
Clerical Staff	67,508
Sales Staff	11,815
Total Administrative Staff	**255,800**

Table A12:

Professional Functions	Number
Planning Services	2,591
Architectural and Design	5,270
Engineering and Design	9,437
Surveying	22,402
Technical	38,800
Total Professional Functions	**78,500**

Source: Office for National Statistics: Labour Force Survey, Spring 2000
CITB/ESTTL's Survey of Employment by Occupation, Spring 1998
CITB Employment Model, 2001

Tables A11 and A12 give further occupational breakdown for non-manual occupations in the construction industry. For professional and technical functions, it should be noted that between 70% and 80% of construction professional and technical staff work for professional partnerships and are not therefore included in total construction employment as defined by DETR.

CITB Research Department Publications

CITB is responsible for helping the construction industry meet its skill requirements. In order to do this, CITB aims to develop a comprehensive understanding of the industry and its future prospects, as well as an analysis of its skill needs and how those needs are to be met. To inform this, CITB maintains a programme of research and labour market information comprising a range of qualitative and quantitative projects. These include surveys of employers, training establishments and trainees as well as evaluations of particular activities in which CITB is involved.

This report, setting out the industry's future skill needs, is a key part of CITB research and labour market information work. The forecasts contained in it are used as a basis for planning training provision, the allocation of resources and the development of new qualifications and other training products. CITB has a policy of publishing its work in this area, to share the information with those partners in training who might benefit from it.

CITB's research and labour market information can be found at:
www.citb.co.uk

CITB would like to thank the Department for Education and Skills for their help in this work.

Details of other CITB research and labour market information are available from:

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