

Skills Needs Analysis for the Construction Industry

ConstructionSkills has been chosen to be one of the four Pathfinder Sector Skills Councils charged with developing Sector Skills Agreement (SSA) for their sector.

The development of the SSA is a five-stage process that starts with a Skills Needs Analysis (SNA). The purpose of the analysis is to provide the evidence base to demonstrate what the industry skills needs are and whether or not current education and training provision, learning and qualification frameworks and funding models across the UK are satisfactorily meeting them.

The Skills Needs Analysis (SNA) for Construction is built on a well-respected research programme and work with the industry over a long period. It has involved a major exercise to bring together all relevant sector intelligence and forecasting to provide a rationale for adopting agreed priorities for action and a basis for bringing about change in the way the industry goes about developing its workforce.

The current draft of the document [attached] represents the main body of the SNA that underpins the development of the proposed SSA. Alongside providing partners with the evidence base we would also welcome comments on the usefulness of the document. Clearly a version will need to be published as a companion to the SSA but we see this as a living document that we will keep reviewed and updated, as further and better intelligence becomes available. The exercise to bring together all of this research has revealed a number of areas of work that are either lacking or in need of further work. It is our intention to tackle these as part of our research programme in 2005.

In addition to the UK wide approach we also have regional breakdowns for all devolved administrations and Regional Development Agencies. Details of these are available from Lee Bryer (lee.bryer@citb.co.uk)

1 Executive Summary

Introduction

The purpose of the Skills Needs Analysis is to provide the evidence base to demonstrate what the industry skill needs are and whether or not they are being satisfactorily met by current education and training provision, learning and qualifications frameworks and funding models across the UK.

This is a summary of the main findings. Greater detail, including data for the English regions, Scotland, Northern Ireland and Wales, can be found in the full report that will be published in December 2004.

1.1 The Construction Industry

ConstructionSkills covers a wide range of sectors in the development and maintenance of the built environment. It represents about 8% of the national economy in terms of GDP and includes:

In the UK as a whole, the sector employs 2.1 million people, has 201,100 enterprises, generates £149bn of turnover (GDP) and nearly £52bn of value added. Excluding electrical wiring and fitting (SIC 45.31) and plumbing (SIC 45.33) just over 1.8 million people work in the construction contracting sector (SIC 45). A further 225,000 are employed in professional consultancies (SIC 74.2). The industry is the second highest in terms of the proportion of its workforce composed of SMEs and self-employment (80%)

The construction process is a complex one starting with design and planning through production to ongoing maintenance and refurbishment. Construction work is almost entirely done on a project by project basis, whereby contractors will draw together teams of people who often work for quite a short period of time and then move on to another location or disperse. Much of the work is managed by a main contractor who deals with the client but who subcontracts part of it to smaller firms who specialise in a particular aspect of the process.

The level of fragmentation in the construction sector can be seen as both a strength and a weakness: on the positive side, it is likely that it has the flexibility to deal with the highly variable workloads linked to changes in economic cycles; on the negative side the extensive use of sub-contracting has brought contractual relationships to the fore and hindered team-working, supply chain integration and strategic management.

Analysis undertaken for DTI demonstrates that the UK construction sector, in productivity terms, is far nearer the performance of the US, France and Germany than other areas of the UK economy. In labour productivity the UK is within 15% of the performance of the best (USA) and in total factor productivity it is comparable with the three economies stated in the study.

1.2 Current Skills Profile

The industry has seen sustained growth over the last 10 years – both output and total employment have increased by 30% over that period. Initially the industry had considerable excess capacity, with over 50% of companies reporting that lack of demand was restricting output in the mid 90s, but lack of demand has halved to around 20% and is now almost balanced by those citing labour shortages as restricting output.

Although the situation has improved, all sectors, but particularly professional services firms are concerned that there are insufficient graduates with the appropriate knowledge, skills

and understanding entering the industry. Through the recent CIC survey practices have also voiced a more general concern about the skills gaps of their existing workforce.

The industry appears to face strong demand over the next five to ten years, with prospects underpinned by Government aspirations for health, education, housing, transport and other infrastructure. This has translated into sustained growth albeit with variations across subsectors; substantial increases in output for public and private housing and public work being balanced by decreases in infrastructure and commercial work.

In addition to the quite distinct sectoral outputs there are also considerable differences in the contribution of each country and region to construction output within the UK, ranging from 15% in London and the South East to 3% in Northern Ireland.

Typically, major contractors and house builders manage projects and do not employ craftspeople or workers in specialist trades. These skills are provided by sub-contractors, usually on short-term contracts. With extensive sub-contracting the industry is the second highest in terms of the proportion of its workforce composed of SMEs and self-employment (over 80%). Overall, estimates are that 37% of the industry's workforce is self-employed. The self-employment is at all levels and is just as prevalent amongst professional consultancy practices as it is for trade occupations. However self-employment is particularly high in the main craft trades where it averages over 60% of the workforce. A major piece of research has been commissioned to better understand this significant group and the findings should be available in the first quarter of 2005.

With this fragmented and short-term, project-based structure, the majority of site workers have entered the industry through informal routes and temporary work opportunities. Even today, with a tight labour market, formal job vacancies as a proportion of employment range from only 1% in England, Northern Ireland and Scotland to 3% in Wales. Informal entry routes have tended to rely on learning on the job and have neither required nor generated formal qualifications. As a result the industry has a low proportion of its workforce qualified.

Currently women account for approximately 10% of the total employment in the industry, but only 1% of manual employment and 30% of non-manual employment. This makes the manual portion of the sector amongst the most gender imbalanced in the UK economy.

The proportion of ethnic minorities in construction employment has nearly doubled from a low of 1.5% in 1994 to 2.8% in spring 2004. However, this is still significantly lower than the 6.9% present in the total working population.

For both of these groups the representation at professional level is higher than that for manual workers but is still an under-representation compared with the workforce as a whole. A major workforce mobility study¹ piloted in partnership with SEEDA and ECITB in London and the South East produced findings which, if proven to be representative of the industry in other regions, would provide evidence to support the widely held assumption that the construction workforce is indeed very mobile and to that end flexible.

Whilst there is much anecdotal evidence of the increasing use of migrant workers in particular areas of the UK there is a general paucity of data in official statistics. What data is there only represents legal migrant workers and the issue of illegal migrant workers is an even more complex one. A quick survey undertaken in 2004 by the Construction Confederation across some 300 construction sites across the UK suggested that '1 in 10 builders are migrants'. Clearly this is an urgent issue requiring further understanding and work is already underway to tackle it.

1.3 Drivers of Change

A number of factors are driving the future size and skill mix of the industry. The five most significant drivers based on evidence from employer surveys, econometric models and expert witness are:

The economy – This is the prime driver for change and across the industry is the most significant by far. Continuing demand for good quality housing, hospitals, schools, commercial premises, roads and infrastructure has characterised the last four years and is set to grow in the next six. Over the next decade, the industry, like the economy as a whole, is likely to experience less volatility than in previous decades. Looking forward the predictions of a stable economy with steady growth will allow construction companies to plan workforce recruitment and development with far more certainty.

Pressure to improve performance by changing the structure and modus operandi of the industry – Numerous studies of the industry have identified the reasons for late delivery, overspending projects and poor quality leading to demand from clients of all sizes to improve its quality, predictability and reliability and from shareholders (institutional or owner managers) to improve returns. Major drives to deal with the problem by changing the way the industry operates have been successful in a limited band of best practice companies but there is still much to do to achieve a broader and sustainable impact. This has had, and will have, implications for managers in the supply chain who will have to adapt their skills set to deal with greater risk, wider involvement in the whole construction cycle and a partnering culture.

Innovation and new technology – Whilst slow to adopt technology the industry has a number of new approaches available to it that are being driven into the industry by suppliers and welcomed by clients. Some of these are micro-innovations that impact on individual occupational skills. Macro-innovations in the whole process, such as the offsite manufacture of buildings, require new skills of design, assembly and project management. Currently the structure of the industry acts as a barrier to innovation which impedes and slows change.

Sustainability – The impact of the Government's new UK Sustainable Development Strategy, the Sustainable Communities Plan, the Egan report on Skills for Sustainable Communities, the new Sustainable Buildings Code and the Sustainable and Secure Buildings Act 2004 will all need to be factored into how we support future industry skills development. This policy drive of the Government for sustainable development is slowly taking hold in the minds of the consumer, requirements of clients and the practices of some of the larger industry players. When fully embraced sustainable construction will impact on the way that the industry builds and what it builds. As with innovation there are structural barriers to change however sustainability is enforced by legislation and so the industry will be forced to act.

Legislation – Government policy around quality of work (working time directive, parental rights, minimum wage, health and safety) and reducing damage to the environment (planning legislation, aggregate tax) raises operating costs and changes the way the industry works.

Whilst these drivers act on the majority of construction companies in the same way, there are exceptions where one driver may have greater impact than the others. Examples of this are

In some areas of the housing market (notably that of social housing) the adoption of offsite manufacture is serving to move jobs from site to the factory thus innovation is a stronger factor.

Specialist commercial building sectors are heavily influenced by new technologies particularly energy management and communications systems.

The large public sector projects are more influenced by government policy on sustainability and changes in procurement practices e.g. Private Finance Initiative or Strategic Partnering.

1.4 Moving Forward – Future Skills Needs

These five main drivers will obviously have an impact on the size and skill mix of the construction industry over the next five years. The degree of change is to some extent in the hands of clients particularly the government as major client. Whilst the industry can drive through changes in terms of quality, time and cost it currently has little control over economic cycles, management of the market and client demand.

The future skills mix can be viewed under three headings:

- ▶ Size and occupational share based on the most likely scenario
- ▶ Requirement for qualified new entrants
- ▶ Skills gaps associated with improved performance and productivity and innovation allied to new work practices, processes, materials and technologies

1.4.1 Size and occupational share

The current forecast is that the industry needs to recruit and train 88,000 entrants per annum for the next five years with 30,000 in the four main trades, 15,000 specialists and civil engineering occupations, 7,000 in professional and technical roles and 13,000 in electrical, plumbing and related trades.

1.4.2 Skill mix and skills gaps

The evidence from work undertaken as part of the Skills Needs Analysis is that employer skills requirements are in many cases structured by their existing business strategies; this approach will equip the sector with the workforce for today but does not address the future. Some skills gaps may not be recognised as such until the organisation tries to improve its position in terms of growth or market position.

One possible risk is that the industry adopts a low skills equilibrium: the industry does not embrace the innovations in working practices, technologies and materials available and so requires no new skills; its lack of new skills in turn prevents it from adopting these innovations.

In particular,

- ▶ Research with best practice construction has revealed that whilst their managers have good technical and legal skills, they are weaker in the soft skills needed for successful partnering.
- ▶ There is a lack of understanding of the impact of the Government's wide-ranging sustainability agenda on what and how the industry builds.
- ▶ Amongst professional services firms there is evidence of a growing concern as to the skills of both their existing staff and new recruits. These centre particularly on the technical skills associated with design and the management of projects.

In summary, the evidence is that there is no case for believing that there is going to be a radical switch in either the size or skill mix of the workforce over the next five years but that work does need to be done to provide the skills mix that will exploit the innovations as they become available. However the future projections for the industry need to be kept under constant review. Work is underway to set up an industry wide Skills and Productivity Observatory to monitor and advise on the impact of future trends.

1.5 Meeting the Challenge – Review of Provision

The key question is to what extent the current education and training provision, learning and qualifications frameworks and funding models across the UK are in a position to meet the current and future skills needs of the sector. Taking these in turn:

1.5.1 Education and training provision

The provision is that supplied by schools, further and higher education colleges, private training providers and the industry itself. The provision can be segmented into two main streams – initial skills formation and continuing development.

While the full report looks at each of these in more detail the key messages that emerge are:

- ▶ The programme of activities aimed at school students has been very successful in increasing the numbers of white males applying for craft courses at FE colleges. There is still a need to address the number of applications from women and ethnic minorities and also those applying for construction related courses in higher education.
- ▶ Significant numbers of young people in England (and Wales) are unable to become qualified as there is a lack of placements available for them to obtain the necessary work based experience
- ▶ For this and other reasons the completion rate for apprenticeships in England (and Wales) is unacceptably low. The rates in Scotland and Northern Ireland are much better.
- ▶ There is a need to increase the amount of site-based provision
- ▶ Concern from professional services firms that there are insufficient graduates coming into the construction marketplace with the right mix of knowledge, skills and understanding
- ▶ Due to its relatively high cost there is a lack of publicly funded specialist provision. This applies particularly to plant occupations
- ▶ There are good examples of manufacturer training being adapted to support the training of new entrants
- ▶ Aside from the Qualifying the Workforce initiative there is currently not much evidence of any substantive planned investment in training by construction companies and professional services firms
- ▶ The mobility of the workforce is proving to be a barrier to learning due to lack of accessible knowledge as to availability of relevant provision across the UK

1.5.2 Learning and Qualifications Frameworks

Consultation with employers, unions and providers have indicated that:

- ▶ The current apprenticeship framework is not perceived as meeting needs of either the industry or the individual
- ▶ Current structure of N/SVQs is seen to be too inflexible – there is a great deal of support for a more unitised approach
- ▶ Assessment regimes need to be more flexible and user friendly without losing the necessary rigour
- ▶ There is a lack of a clear, flexible education-career ladder from school based programmes through initial skills formation at FE and HE level to ongoing continuous professional development – to support lifelong learning in construction

1.5.3 Funding models

The main message to emerge from the research was the sheer complexity of the funding regimes available to support education and training. The overwhelming need is to rationalise and package a clear and sensible employer offer. More specifically

- ▶ To achieve “employability” at vocational level 2 sufficient Government funding should be made available across the UK for on-site assessment and training
- ▶ There needs to be flexibility in the funding models used to support the achievement of apprenticeship frameworks including for adults where, to encourage diversity, funding for adults needs to be at the same rate as for 16-18 year olds

- ▶ Allowance should be made for the higher unit costs for specialist provision
- ▶ Funding for Higher Education should support the full range of construction industry requirements with particular reference to the large number of part-time students on construction-related courses

1.6 Research Methodology

This work underpinning this summary was developed building on a well-respected research programme and work with the industry over a long period. We undertook a major exercise to bring together all relevant sector intelligence and forecasting to provide a rationale for adopting agreed priorities for action and a basis for bringing about change in the way the industry goes about developing its workforce.

The exercise had three major strands:

- ▶ To bring together all the research undertaken by the three partners along with an extensive body of sector intelligence work carried out by other industry bodies and in partnership with other stakeholders. This includes a number of significant national and regional reports that have already led to jointly developed and agreed skills action plans for construction.
- ▶ To commission research on specific topics where we needed to either validate less robust data or begin to fill gaps in our knowledge base. Both of these programmes are ongoing and include assessor capacity and capability, the link between skills and productivity, total investment in training, training and the self-employed.
- ▶ To review the ConstructionSkills current research programme in the light of the demands that have been put on it by the SSA process and draw up a plan to improve it in the short to medium term. This has included an in-depth and independent review of the CITB-ConstructionSkills Employment Forecasting model overseen by a reference group of industry experts. The outcome has been very rewarding with the setting up of an industry wide Skills and Productivity Observatory to co-ordinate, validate and agree the sector intelligence for the construction sector built around an enhanced econometric model.

2 Demand Side

Skills demand

In this section we examine the factors that are shaping the demand for skills in the UK construction industry, including the impact of:

- ▶ The economy
- ▶ Pressure to improve performance
- ▶ Innovation and new technology, and
- ▶ Sustainability

2.1 Current Activity

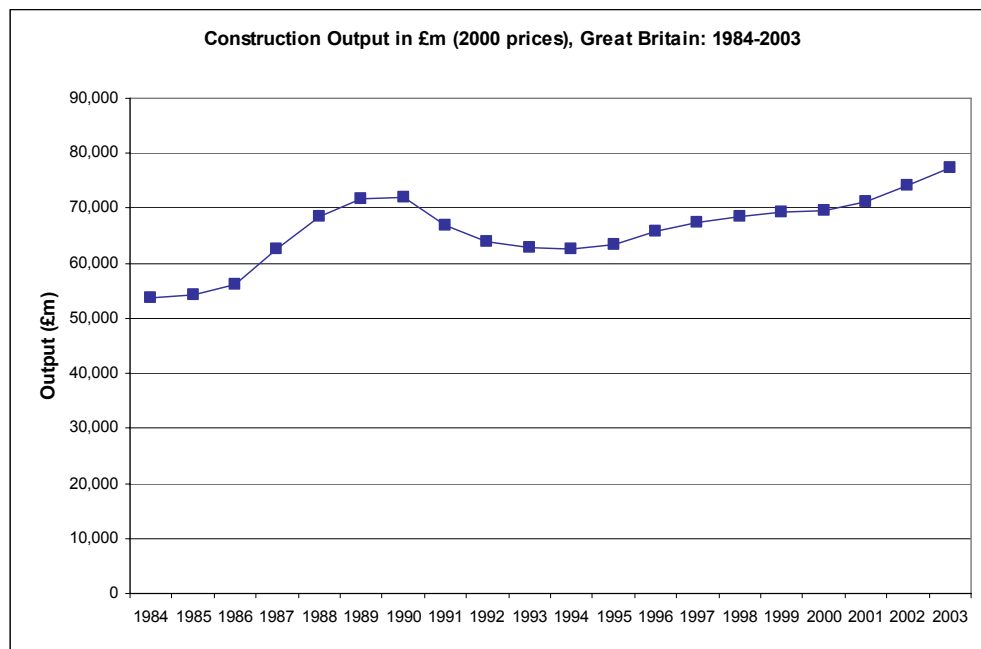
The construction industry has enjoyed a period of strong demand, which has translated into sustained growth.

The construction industry is a major constituent of the UK economy:

- ▶ employing 2.1 million people²
- ▶ with an output of £77 billion (at constant 2000 prices)³
- ▶ representing 8% of the UK GDP
- ▶ with a GVA per head comparable with other similar sectors in the UK
- ▶ and a level of productivity which compares favourably against international construction sectors.

Following steady but moderate increases in construction activity, the expectation in 2002 was for further growth in 2003. The forecasts ranged from 2.6% (Cambridge Econometrics) to 5.0% (Experian Business Strategies).

The actual increase of 4% was towards the most optimistic forecast, resulting in a total construction output in 2000 prices of over £77,000m in 2003.

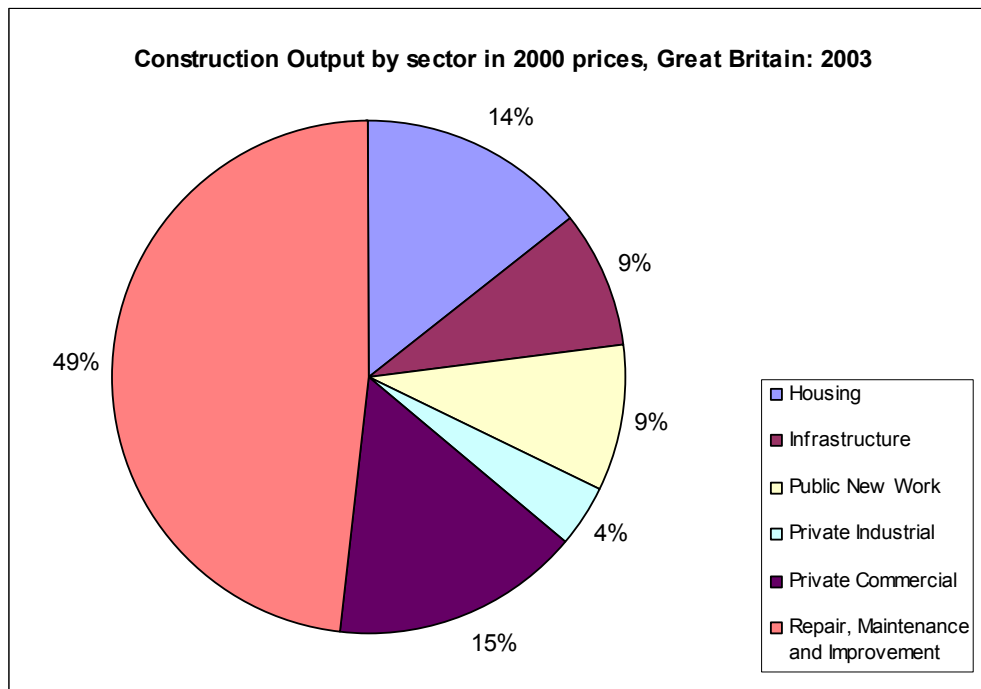


Source: Department of Trade and Industry

Within subsectors of the industry, growth was even more sharply pronounced. According to the Department of Trade and Industry (DTI)⁴, between 2002 and 2003:

- ▶ Total construction output increased by 4%
- ▶ New private housing increased by 12%
- ▶ New public housing increased by 10%
- ▶ Infrastructure decreased by 11%
- ▶ Other public work increased by 20%
- ▶ Commercial work decreased by 6%
- ▶ Industrial work decreased by 6%
- ▶ Total repair, maintenance and improvement increased by 7%

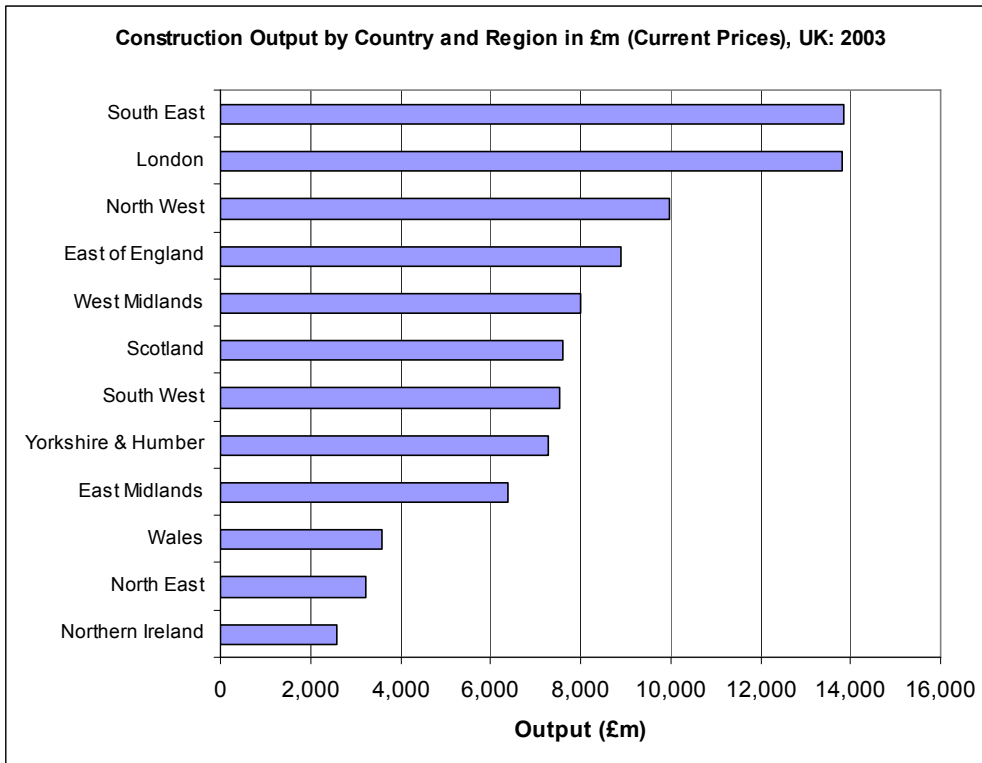
Regarding the shares of each sector in total output, there has been some change since 2002 with repair, maintenance and improvement (+3%), housing (+1%) and public new work (+1%) gaining at the expense of private commercial (-4%) and infrastructure (-1%). Private industrial remained unchanged at 4%. These movements in the sector shares are not surprising when set against the buoyant housing market, including an increase in the spending on domestic improvements, and the recession that has blighted the commercial office market.



Source: Department of Trade and Industry

Notes: Half of total repair, maintenance and improvement is on housing.

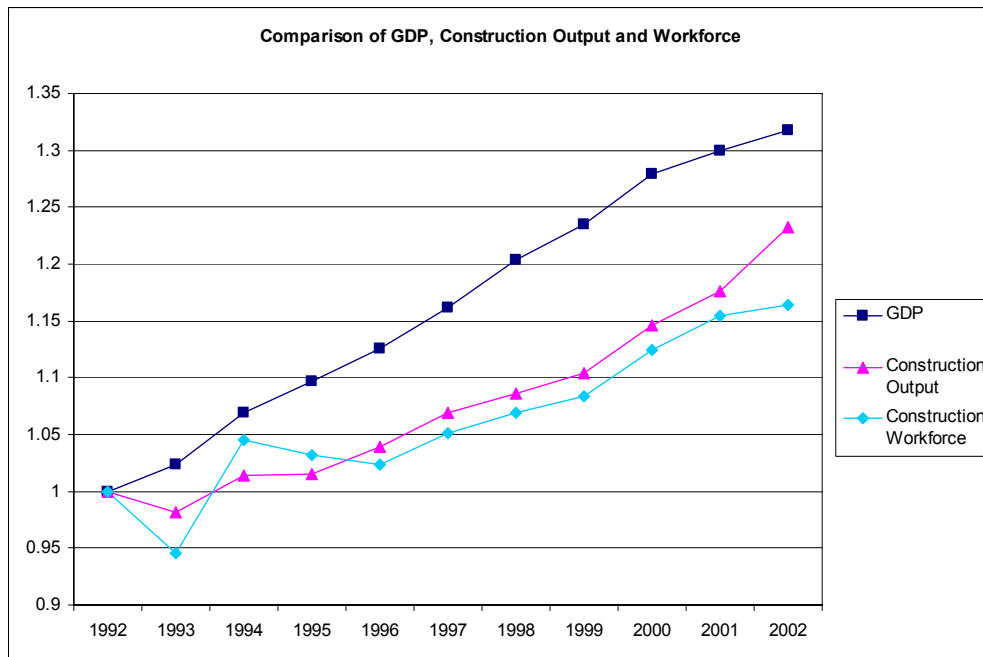
In addition to the quite distinct sectoral characteristics there are also considerable differences in the contribution of each county and region within the UK to total construction output, ranging from 15% in London and the South East to 3% by Northern Ireland.



Source: Department of Trade and Industry

As a significant contributor to the UK economy in terms of GDP the construction industry is, and has been over the last ten years, a leading employer (on average around 2 million people). Since 1996 the employment trend has been positive with a growth of 14%. This is in direct response to a generally more stable macro-economic climate.

By mapping the construction workforce against GDP one can see the link between economy and the numbers of people employed.



Source: Office for National Statistics; Department of Trade and Industry

The graph shows the variables of UK GDP, UK construction output and UK construction workforce all normalised to 1992 levels (i.e. 1992=1). After instability of 1992-1996, when the recession caused much of the industry to shift to self employment and back again the three lines have followed broadly similar patterns. Interestingly in 2002 the labour line began to level as the output continued to grow. This could reflect a move back to self employment, a saturation of the labour pool (i.e. it is becoming more difficult to recruit) and increases in output per employee. There is insufficient data to determine if this is a genuine departure from the 15 year trend or a statistical blip.

2.2 The Drivers of Change

The key change drivers on the industry are:

- 1 The economy** – This is the prime driver for change and across the industry is the most significant by far. Demand for large numbers of good quality housing, hospitals, schools, commercial premises, roads and infrastructure have characterised the last four years and are set to grow in the next six. Looking back further at economic data one can see that the slump of the early Nineties is reflected in the construction workforce which fell at this time. Looking forward the predictions of a stable economy with steady growth will allow construction companies to plan workforce development with far more certainty.
- 2 Pressure to improve performance by changing the structure and modus operandi of the industry** – Numerous learned studies of the industry have identified the reasons for late delivery, overspending projects and poor quality. There has been over the last four years a major drive to fix the problems by changing the way the industry operates. This has had, and will have, implications for the managers in larger companies who have to adapt their skills set to deal with greater risk, wider involvement in the whole construction cycle and a partnering culture.
- 3 Innovation and new technology** – Whilst slow to adopt technology the construction industry has a number of new approaches available to it that are being driven into the industry by suppliers and welcomed by clients. Micro innovations in some operations for example push fit plumbing, will require some change (often downgrading) in trade skills. Macro innovations in the whole process such as off site manufacture of buildings will require new skills in design, assembly and programme management. There are however structural barriers to innovation in the sector that will impede and slow change.
- 4 Sustainabilityⁱ** – The policy drive of government for sustainable development (enforced by legislation) is slowly taking hold in the minds of the consumer, requirements of clients and the practices of some of the larger industry players. When fully embraced sustainable construction will impact on the way the industry builds and what it builds and potentially it could have a high impact on the skills of the industry. There are innovation structural barriers to change however sustainability is enforced by legislation and so the industry will be forced to act. The skills factors depend upon the extent to which the industry acts. For some companies sustainability will demand new skills to design and build thus affecting professional and trade skills. For many the skills change will be around understanding and acting within legislation.

In addition

ⁱ Sustainability is the 'goal' of meeting human needs globally without overwhelming nature.

5 Legislation – Government policy around improving the quality of work (working time directive, parental rights, minimum wage, health and safety) and reducing damage to the environment (planning legislation, aggregate tax) is increasing the operational cost and changing the way the industry works. Legislation could have a positive impact on the workforce as the better employment conditions it tends to promote may make the industry more attractive to new starters.

Whilst these drivers act on the majority of construction companies in the same way, there are exceptions where one driver may have greater impact than the others. Examples of this are:

- ▶ In some areas of the housing market the adoption of offsite manufacture is serving to move jobs from the site to the factory thus innovation is a stronger factor.
- ▶ Specialist commercial building sectors are heavily influenced by new technologies particularly in energy management and communications systems.
- ▶ The large public sector projects are influenced more by government policy on sustainability and changes in procurement practices e.g. the introduction of Private Finance Initiative or Strategic Partnering.

We will now look at each of these in more detail.

2.3 The Economy

2.3.1 Trends in economic growth and their impact on demand

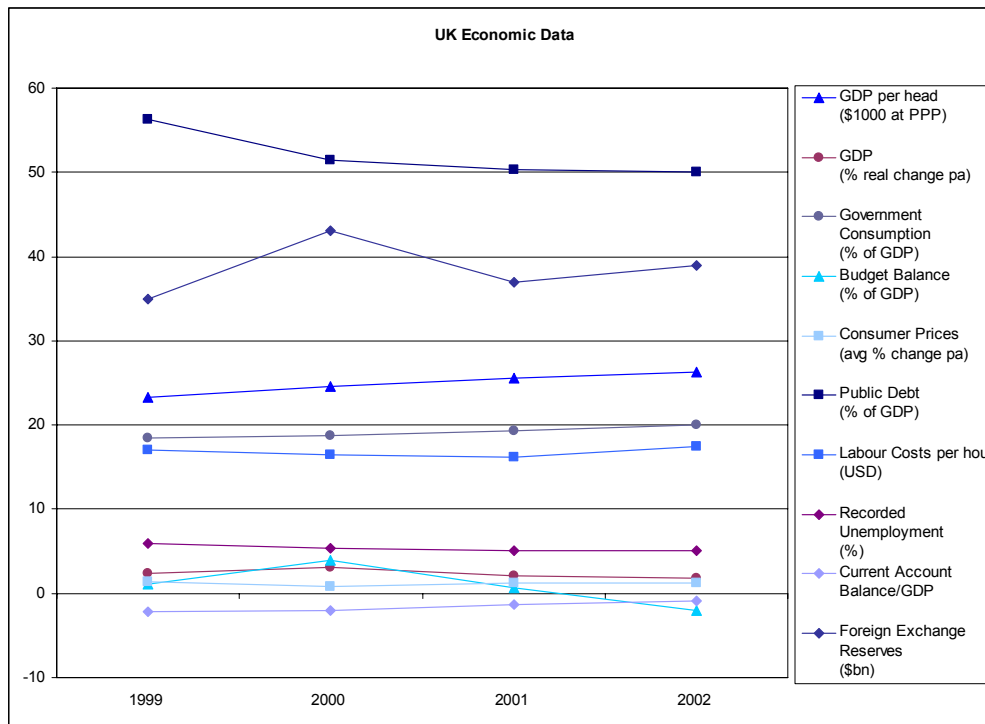
The economy is shown and is predicted for stable growth over the next five years.

Recent economic performance

The Organisation for Economic Co-operation and Development (OECD) review of the UK economy⁵ stated:

“The UK economy has proved remarkably resilient during the recent downswing with output falling only a little below potential. At the same time inflation has remained close to the target and the unemployment rate is among the lowest in the OECD. More recently the economy has been gaining considerable momentum, well ahead of the Euro area.”

This statement is underpinned by data on a range of macro economic indicators which as the chart below shows the major economic indicators over the last three years have shown stability (see below) and the forecast is for consistent growth over the next four years.



Source: Economist Intelligence Unit June 2003

Predicted future economic performance and its impact on construction output

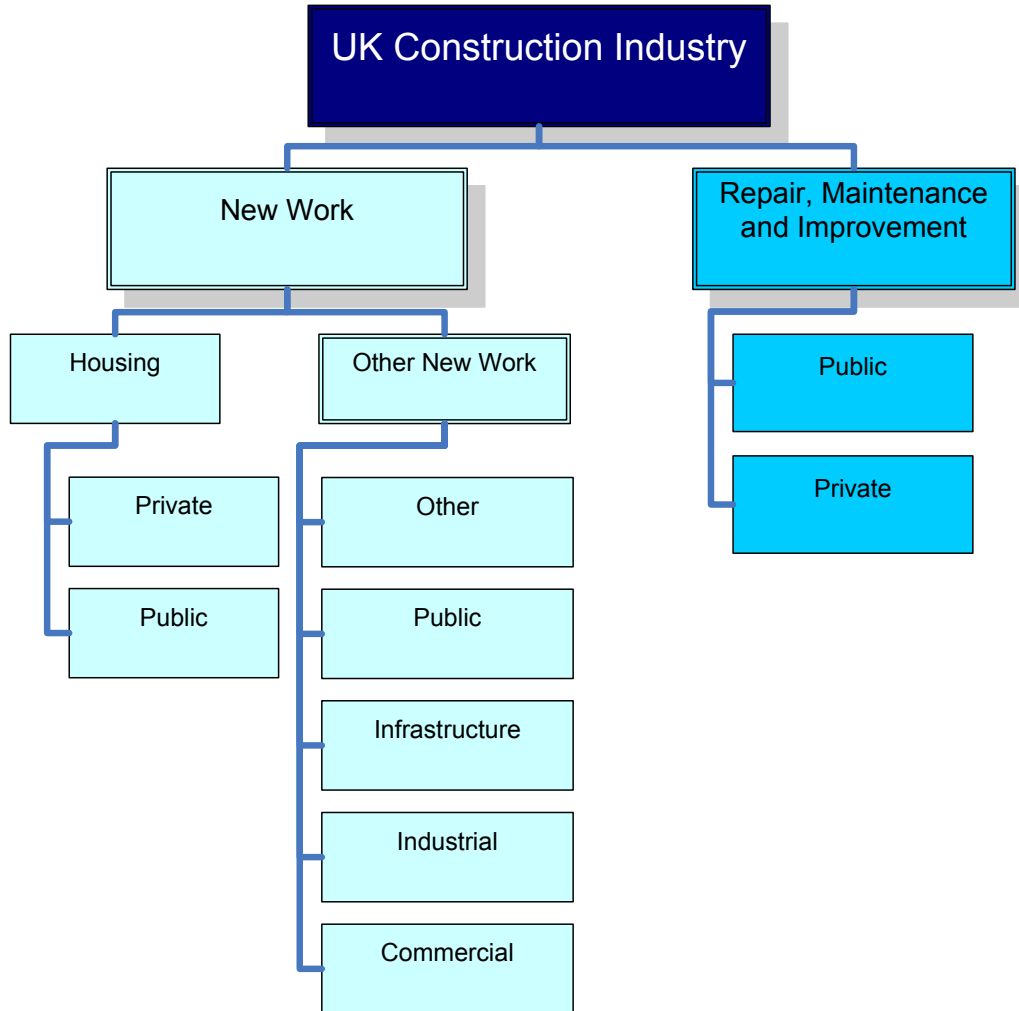
To describe how the construction industry (and its workforce) will be shaped by the economy we need to understand what the future economic forecast is and how that translates to the construction industry output. In the table below we draw data from 15 economic forecasters (as reported by HM Treasury) and data from the Construction Products Association, CPA, to predict the growth in output of the construction industry. This table shows the future demand and how the economy shapes it.

Growth Metric	2003	2004	2005	2006	2007	2008
GDP Based on the average of forecasts published by HMT	2%	3.0%	2.7%	2.4%	2.4%	2.5%
Construction output						
Public Sector Inc PFI - CPA	10.2%	7.5%	3.1%	2.5%	No data	
Private Sector - CPA	0.8%	-1.5%	-2.8%	0.8%		
All work – CPA	3.8%	1.5%	-0.7%	1.4%		
All work – Cambridge Econometrics		4.2%	3%	1.7%	1.1%	1.4%
All work – Experian Business Strategies		4.0%	2.4%	1.6%	1.2%	0.5%
All work Construction Forecast Research		3.2%	2.6%	3.3%	NA	NA
All work Hewes and Associates		2.1%	1.4%	1.9%	NA	NA

Source: Growth Metric: HM Treasury

2.3.2 Predictions of demand side growth

The construction industry serves a wide range of markets (see diagram below) the majority of which are set to grow.



The recent performance of each of these market segments is described below, together with predictions of how this will change over time.

New Work - Housing

The conflict between the need for additional housing (to accommodate people, underpin economic growth and create stability in the private housing sector) and the shortage of development land is a concern of government evidenced by its commissioning of the Barker Report⁶. The Report, published in March 2004 aimed to examine the issues affecting housing supply in the UK, and concluded that in order to deliver long-term stability and slow house-price inflation, a substantial increase in housing supply of between 70,000 and 120,000 extra homes per year would be required. As such, the Government is promoting pre-fabrication and off-site manufacturing techniques, looking to methods such as steel and timber frame and modular construction to help solve the housing shortfall.

Off-site manufacture of housebuilding components currently has the capacity to produce around 30,000 homes a year, but currently accounts for just 3% of housebuilding, far short of the figure needed to meet official housing projections.

The House Builders Federation (HBF) is calling for government subsidies to encourage housebuilders to adopt off-site manufacturing methods and to justify the extra costs involved in pre-fabrication. Subsequently, the Government has committed to providing 4,000 off-site homes for the social housing sector in 2003/04 with an investment of £250m, with further investment likely in 2004/5⁷.

It seems likely that off-site manufacturing techniques for housing will be largely limited to the public sector and reduced times on site will make it easier for developers of social housing schemes to finish and hand over complete schemes earlier than if traditional methods are used⁸.

The Barker Review also highlighted problems with regional and local planning policy, and stressed the need for planning authorities to allocate more land for development to redress the balance of homes built in certain areas. Since the introduction of PPG3 in 2000, which requires 60% of new housing to be situated on brown-field sites by 2008, the development process has become more complex⁹.

Whatever government policy on this matter it is clear that the housing output is likely to grow.

Public housing £1.5bn in 2002 rising to £2.1bn in 2006¹⁰

The market is dominated by Registered Social Landlords who manage vast numbers of existing stock whilst investing in new government-funded build programmes. However, demand in the social housing market remains unfulfilled and major policy shifts by the current government are aimed at addressing shortages of affordable housing for key workers particularly in the South East of England.

Funding allocated by the Government in its Sustainable Communities Plan has been aimed at the provision of affordable housing in four key growth areas of the South East. This funding includes £1 billion for key worker housing, over the three years to 2005-06 - double the level in 1997. The government has predicted a requirement to build an estimated 200,000 homes in London and the South East by 2016, to avoid a future housing shortage, which this sustainable communities plan will help to fund¹¹. However, the impact of planned funding increases may be absorbed by higher costs of development (particularly in London and the South East).

The Registered Social Landlords that dominate are committed to the partnership route to procurement and must, to qualify for funding, adhere to the principles set out in the Egan Report¹². This has implications for skills, in that construction companies will need to focus far more on developing teams, managing partnerships and construction in a partnering environment.

Private Housing £7.1 billion in 2002 rising to 8.4bn in 2006

Given the buoyant housing market, underpinned by low interest rates and rising income, the increase in new housing volumes over the last three years has been modest. Completion levels have increased marginally to 173,500 in 2003, but with no indications of any significant upturn in output¹³. This is in part due to limited land supply and a restrictive planning regime which has served to dampen the number of new starts particularly in the South East. These conditions are less onerous in regions outside of the South East where activity is greater.

The private housing market segments by size of project:

- ▶ **Small local developers.** These firms tend to develop plots of land with less than five dwellings. There is no standard rule here but most will call upon a number of small local building firms for the construction work; these construction firms will

move between new build and repair and maintenance as the market requires. There is a propensity for the entrepreneurial developer/builder where the construction firm will find the site and develop it with its own small workforce.

- ▶ **Medium-sized and regional developers.** These tend to be “opportunistic” seeking larger sites from across a region and choosing builders competitively or acquiring and developing the site.
- ▶ **Large national developers.** These tend to be development companies who will have either a project management or construction business. Typically they will have either a land bank or an acquisitions business that sources land which they subsequently develop using either direct or subcontracted labour.

The implication for skills is predominantly flexibility and mobility. Even the large housing developers will rely on a transient workforce made up of local specialist contractors. This workforce will move from site to site following demand.

Other new work £28bn in 2002 rising to £29bn in 2006

The market for other new work is made up of:

Commercial and Industrial: a sector that is under pressure falling by 5% in 2003 as manufacturing weakened, poor world trade deterred investment and office occupancy rates fell. The shining star in this sector is retail where strong consumer spending is funding growth.

Public non-housing: Increased Government funding has fuelled a strong rise in new orders for education and health related work over the last two years and supported a 25% jump in sector output during 2002.

Building schools for the Future is the Government's new approach to capital investment in school buildings. The first wave commencing in 2005/6 will see 180 schools in fourteen local education authorities across England benefit from over £2 billion of investment into their buildings.

It is expected to reach every school in the country within 15 years, encouraging LEAs to work with private sector partners to form Local Education Partnerships that will construct, maintain and operate the new facilities.

The 2005 election will undoubtedly have an impact on the number of new starts in this sector with output set to stabilise post-2006.

Infrastructure: Strong growth in 2002 fuelled by investments i.e. road and rail infrastructure is expected to fall back. In contrast the water industry is set to deliver investment ahead of the five-year regulatory review.

Contractors operating in this market tend to be large firms with national coverage and access to large scale and diverse resources. The critical skills are technical – design of complex structures and resource management – effective control of large budget, risk-based projects. Many of them will assemble a supplier team for a project; this team will comprise many smaller subcontractors who effectively supply the labour force for the large contractors.

Repair and maintenance £35bn in 2002 rising to £37bn in 2006

The private housing repair, maintenance and improvement market is characterised by one-off purchases often following a house move or equity release. Hence it is dependent on the level of sales and percentage increase in this sector. As interest rates rise and the general housing market slows then this sub-sector is expected to slow. Public sector housing repair is a function of government spending and policy;

current policy to regenerate housing stock is expected to fuel some of the growth in this sub-sector.

Typically contractors operating in this market are either small jobbing contractors serving the private consumer or larger firms with long term maintenance agreements with housing associations and landlords.

Indeed, of the 15,300 firms registered in 2002 as housebuilders only around 5,400 were involved in the construction of one or more new homes, with the remainder concentrating on repair, maintenance and improvement work¹⁴.

The interior refurbishment market experienced strong growth up to 2001/02, but has since experienced a tougher climate, particularly in the office sector. Whilst demand for interior refurbishment in the office sector will be restrained, due to the continuing over-supply of office space across the UK continued strength in construction activity levels are likely to underpin the sector in the medium term¹⁵.

The retail market has proved to be relatively resilient in spite of the late 1990s slowdown in out-of-town developments. It is expected that demand in the retail market will be sustained due to the large number of urban regeneration scheme being rolled out across the UK over the next 10-15 years¹⁶.

Government as a client

The public sector spending plans for expansion of schools, hospitals and transport means that growth of public sector new build and maintenance is underpinned by the policy ambitions of the industry's largest client the UK government.

There are concerns amongst government procurement that the large-scale demand may cause overheating in the supply side and lead to price increases as demand exceeds supply.

In December 2003 the Office for Government Commerce (OGC) working with HM Treasury published an action plan to improve the procurement process by:

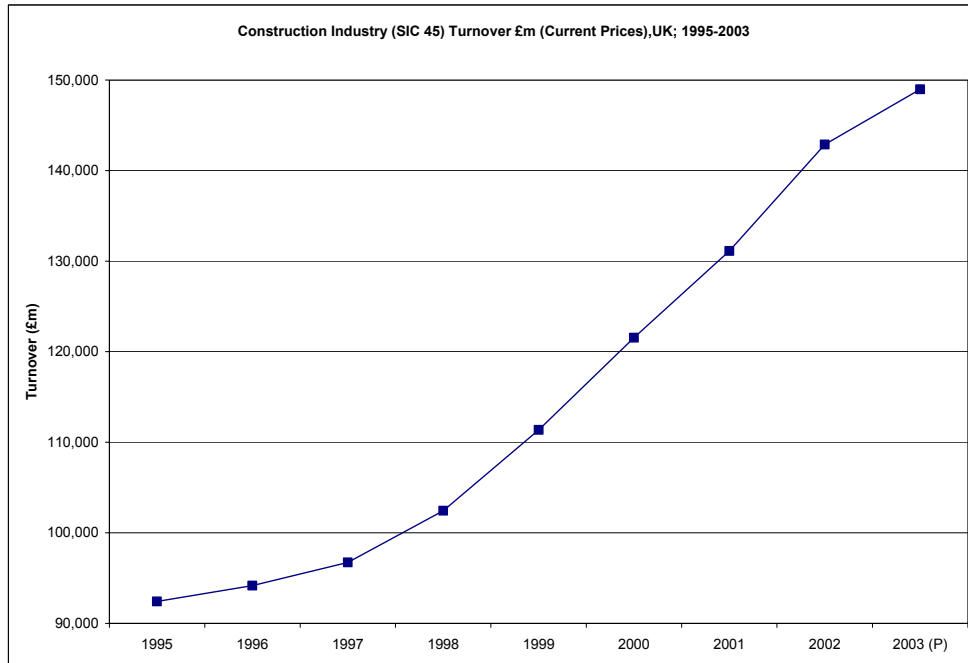
- ▶ Ensuring a stronger lead is given on procurement issues to the wider public sector;
- ▶ Engaging early with suppliers throughout the supply chain and take their needs into account in business planning and to provide clear information on future requirements commensurate with industry lead times;
- ▶ Collating and analysing supply and demand information so that the public sector can take a more systematic and strategic approach to the major markets in which it operates – enabling more effective and innovative responses from industry;
- ▶ Further improve client capability in public sector procurement in order to secure improved delivery of programmes and projects; and
- ▶ Reduce red tape in procurement, speed up procurement timescales between Official Journal of the European Communities (OJEC) notice and contract award and make them more predictable, and improve the attractiveness of the Government marketplace to all suppliers.

▶ These actions, if successful, should reduce the peaks in government demands on the construction industry and moderate the demands for rapid expansions and contractions of the construction industry workforce.

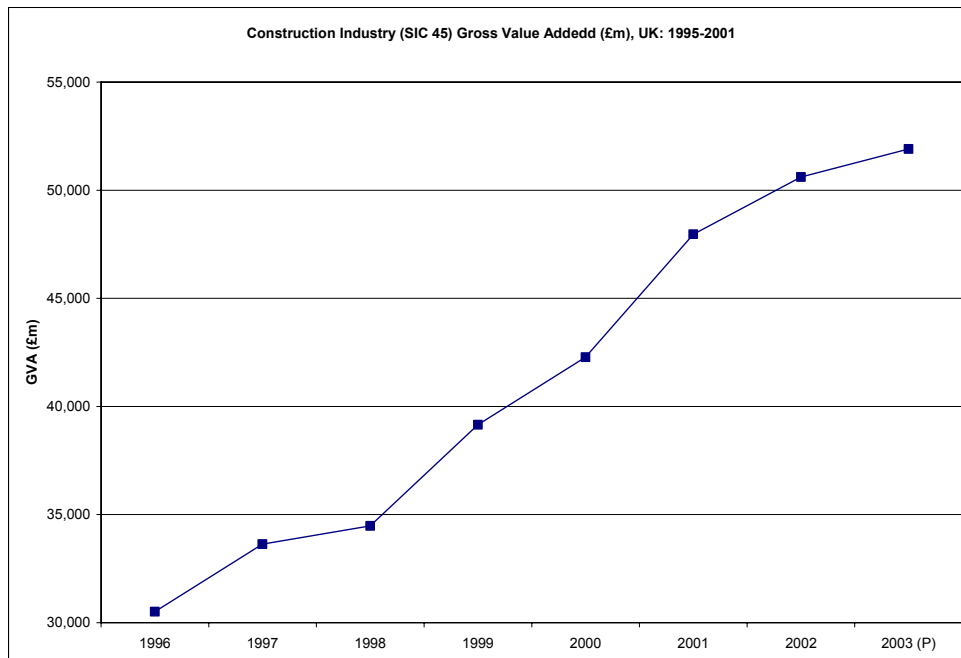
2.4 Pressure to Improve Performance

2.4.1 Industry Performance - recent trends

The charts below show trends for the major economic indicators for the sector. To understand how the industry arrived at this performance requires a brief analysis of the trends in performance over recent years.



Source: Annual Business Inquiry, 2003



Source: Annual Business Inquiry, 2003

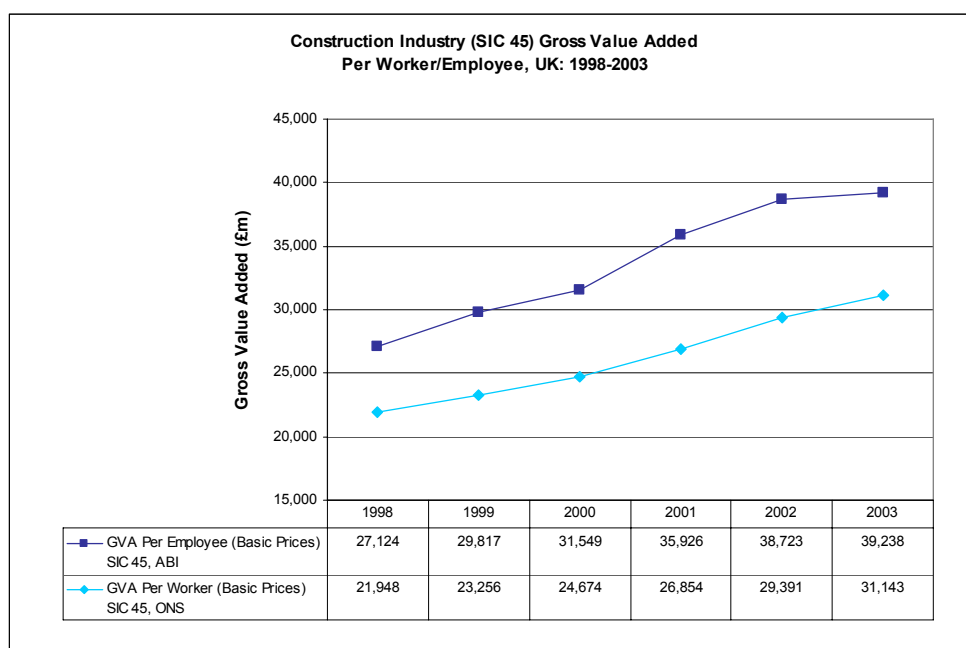
2.4.2 Gross Value Added

Research¹⁷ shows that there are significant differences in the performance measures reported by Government, company accounts and those used by companies at an operational level. The relationship between the different measures is complex and incomplete. The data that is easily collectable tends to offer least insight into the

links between skills and productivity and data that offers the most insight is not widely available.

A favoured statistic of Government is Gross Value Added (GVA)ⁱⁱ. Two published sources exist for construction value added. One comprises national censuses of production, such as the Annual Business Inquiry¹⁸ (ABI). The other is National Accounts¹⁹ value added (Blue Book), published after reconciling three sources of data: factor incomes data; aggregate final expenditure data; and output (production) data. I've et al²⁰ conclude that the ability to subject production-inquiry-based data to cross-checks with expenditure, income and input/output data for other industries gives National Accounts industry value added estimates a considerable advantage in terms of likely accuracy.

The ABI provides data coverage for the period 1996-2003 for most variables, however some (in particular total employment) are only available from 1998 onwards, and analysis is therefore constrained. Whilst it also permits disaggregation of Standard Industrial Classification (SIC) codes into sub-sectors, so in principle it is possible to provide analysis for both SIC 45 and SIC 74.2, the major drawback of using ABI data is that the figures for total employment are enterprise-based. By this we mean that the survey data is based mainly on firms employing no less than 20 persons. Incompleteness in the ABI database of construction firms, and the prevalence of self-employed within the construction industry mean that the National Accounts (Blue Book) data, which uses Labour Force Survey (LFS) data sets for total employment, is the more reliable.



Source: Office for National Statistics – United Kingdom National Accounts (The Blue Book), 2004; Annual Business Inquiry, 2003

Over the past five years the GVA per employee (as calculated by the ABI) has been steadily increasing, and in 2003 was 32% higher than its 1998 level. This however may have less to do with operational improvement and more to do with the

ⁱⁱ Gross Value Added (GVA) is a measure of the contribution to the economy of each individual producer, industry or sector. GVA is basically output (goods or services), less the value of inputs used in that output's production process. The benefit of GVA as a measure of productivity is that it excludes subsidies and taxes.

incompleteness of the ABI database, increased demand and inflating land prices that have predominated over the period.

The challenge, therefore, is to relate skills improvement to improvement in 'higher level' government measures where other factors such as market conditions, the general economy, size of company etc. become more prevalent and potentially outweigh the influence of skills. There is no single influence. Consequently, it is difficult to identify the true relationship between cause and effect. Evidence collected as part of the (SSDA-funded) CITB-ConstructionSkills project 'The Skills for Productivity' suggests that such a link will be, at best, only implied.

The real priority within employers is given to the operational measures that relate the performance of the individual, department and function. These operational measures relate to quality, delivery and financial performance with some (although limited) reference to productivity. They do not directly relate to GVA per employee. Yet it is at this level where the CITB-ConstructionSkills operates and where skills have the most impact: a highly capable site manager will have significant impact on the delivery performance of a project so increasing the skills of site managers should improve the delivery performance of the business.

In general, we can assume (with a degree of confidence) that a company with a high skills base would be more productive than one without, although this is by no means the norm. A company with a very high skills base working in a low return sector or depressed market might still report low profit and turnover per employee. Typical of a situation where other factors outweigh the influence of skills.

The intervention of CITB-ConstructionSkills is likely to have most influence on the operational measures of a company, therefore any measure of CITB-ConstructionSkills' impact on the sector should logically report at this level. The DTI and Constructing Excellence Key Performance Indicators are the nearest published approximation to operational performance measures and are therefore perhaps the most complete and accessible measure at this point in time.

2.4.3 The Key Performance Indicator (KPI) Programme

The DTI and Constructing Excellence collect information on the operational performance of the sector against a number of key performance indicators (KPI). This data is collected via surveys of thousands of construction firms, their clients and employees; collation of official statistics and analysis of published accounts. It is the most comprehensive study of performance of the sector as it is based on real data about real projects collected specifically for the purpose of setting industry benchmarks and improving performance.

The work by the DTI and Constructing Excellence on the KPI programme is the most practical and available data source to begin any investigation linking skills with productivity. KPIs have the recognition of many within the industry and provide a standard set of benchmarks for comparison. Companies can relate to these measures as they reflect their own operational measures, are based on samples of performance and are nearest to the unpublished operational measures used more widely by the industry. They also allow data collection (in an organised fashion) from smaller companies, which is notoriously difficult to achieve.

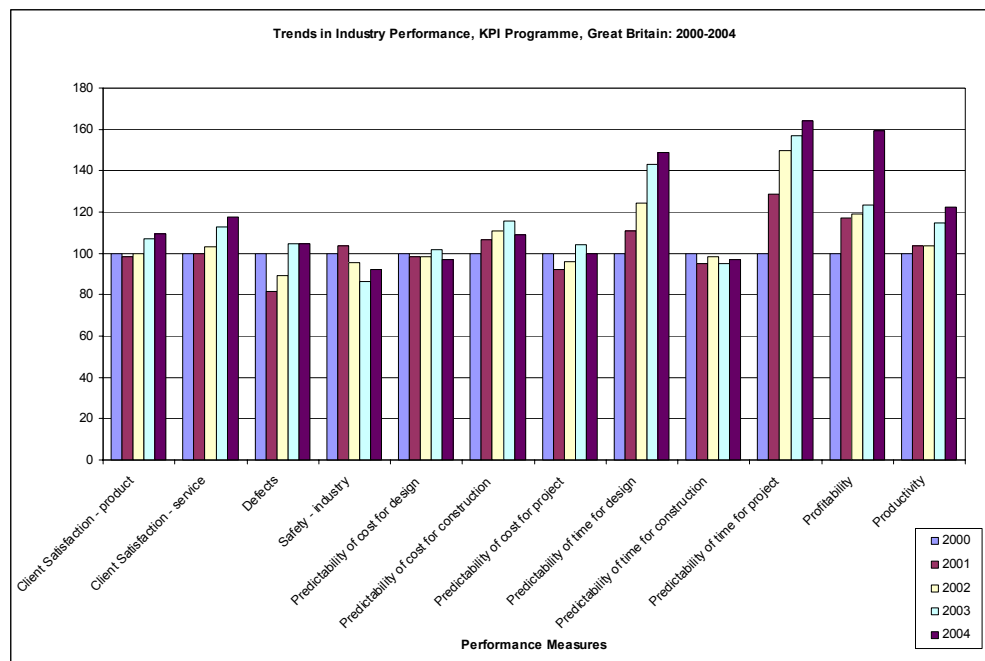
Whilst the KPIs do not include GVA per employee as a productivity measure and are only based on a sample of the industry, links between the KPIs and productivity can be implied. It is likely that good performance in each KPI would be easier with a highly productive workforce; or that an unproductive workforce could not improve its performance against all of the industry KPIs. Therefore, as CITB-ConstructionSkills

increases its intervention with companies there should be an increase in the company operational performance which will flow through into improvements in the KPIs tracked by Constructing Excellence.

At an operational level competitiveness is measured against a range of factors, which show an industry that is improving.

- ▶ They show a general increase in performance across the industry, most notably that:
- ▶ In the quality indicators (client satisfaction and defects) there is an upward trend in performance.
- ▶ In predictability indicators (the difference between planned and actual time and cost) there is improvement in all but the predictability of design cost.
- ▶ In efficiency indicators (profit and crude productivity) there is a significant upward trend in performance.
- ▶ In safety indicators there is a generally downward (improving) trend in the number of accident incident rates.

More detail of the KPI data is contained in the Appendix.



Source: Department of Trade and Industry

Notes: Trend information with 2000=100

However, while the industry shows improvement over time in most key performance indicators, in absolute terms it demonstrates significant under-performance compared with other sectors.

The absolute performance of the construction sector is generally poor. Consider the client measures reported below:

- ▶ 48% of projects exceed their design budget.
- ▶ 51% of projects exceed their construction budget.
- ▶ 50% of projects exceed their overall budget.
- ▶ 45% of designs are late.
- ▶ 40% of constructions are late
- ▶ 44% overall of projects are late.

- ▶ 26% of clients rated service at less than 8/10.
- ▶ 32% of clients rated quality (defects) at less than 8/10.
- ▶ Investor returns languish at 7.5%.

Few other industries would tolerate such performance. In the automotive sector quality is measured in defects per million; in the electronics sector delivery performance is direct to production lines with margins of error measured in minutes; in the pharmaceutical sector traceability and service are written into legislation and standards.

The evidence suggests that the construction industry is in a “low performance equilibrium” where because clients have little choice – they cannot outsource their construction to more efficient economies - there is little motivation to improve performance. Bodies like Constructing Excellence, The Strategic Forum for Construction et al are calling for improvement but the sector continues in surveys to deny skills gaps in the existing workforce.

2.5 The Market Demands Better

2.5.1 Client action

Clients and markets influence skills by their demands for better delivery performance and value for money. Their continuing and growing intolerance of late delivery and over spending is driving clients to seek different forms of contract, and contractors to generate more accurate plans and adopt more predictable construction techniques; each of which requires new and higher level skills.

Their demands should be seen in the context of massive public spending on construction much of which is on projects that are delivered late and over budget. The National Audit Office calculates that £600m could be saved from the public spend by reforming the industry. Extrapolating this across the private sector suggests that reforms, if widely adopted, could save the nation between £1bn and £2bn each year in wasted construction costs.

To accept the recommendations of the various studies by learned groups will require additional skills particularly in the way companies, clients and projects are managed.

2.5.2 Industry action – competitiveness and productivity

Whilst the construction industry cannot be off-shored (like say IT or certain parts of manufacturing) the capital it requires can be shifted by investors to more profitable sectors and countries. Productivity and competitiveness drive skills change because executives in the sector are continually under pressure from shareholdersⁱⁱⁱ to deliver better returns.

Understanding the factors that make a construction company competitive and productive, can give us an indication of how the desire of industry for better performance will impact on its demand for skills.

2.5.3 Primary factors required for competitiveness

The three common factors that have the greatest impact on the market competitiveness of a construction firm are:

- 1 The cost of the job;** all clients have budget limits and achieving lowest cost (even if expressed as value) plays a major role in making a company competitive.

ⁱⁱⁱ In this respect the term “Shareholder” is used to represent the owners of a business. At one end of the spectrum there is an owner managers and at the other an institutional investor.

Construction companies work to cut bid costs by managing their suppliers (often in an adversarial way), creating the most efficient way to build and in some instances taking advantage of poorly specified jobs.

- 2 The quality of delivery;** second to cost is the company's ability to deliver the desired quality in the time allowed. This is achieved in two ways firstly through ensuring that the right built methods are selected and secondly ensuring the best supply chain is brought to the project.
- 3 Access to resources;** the third factor is the company's ability to muster and control the resources required to do the job (to the required quality within the specified cost). This is achieved through careful selection and management of suppliers and subcontractors.

These three are the major focus of all construction companies and hence the skills development plans they may have. Any programme based on improving the industry must play to these three common "wishes" of employers.

2.5.4 The drive for productivity

Productivity is largely about the efficiency with which the firm adds value to the goods it buys. It contributes to competitiveness as the more productive a company is the more successful it is likely to be at winning jobs and attracting investment.

The key drivers of productivity for a construction company are:

- 1 The efficiency with which it creates and converts opportunities into firm contracts.** The aim is the lowest possible sales effort generating the maximum value and volume of potentially profitable projects. In a construction business (like any project based industry) it is possible to win contracts by offering an uncompetitive price and when short of work many firms do just this. Typically industry will have a planned profit for each bid underlining at this early stage the focus on profit by the sector. The typical "output per head" indicator of productivity works for sales.
- 2 The accuracy with which it creates programmes and plans.** The critical point at which the profitability of a job is determined by the programme design. Correct quantification of the time and cost of each part of the programme, the sequencing of activities and the application of labour can make the difference between a job turning a profit or not. It also influences the productivity of the job; over-resource the job and it will automatically lose money and be inefficient, however under resourcing a job means that work is not finished and subsequent trades people are left waiting for work.
- 3 The quality with which the client specification is turned into a design.** Similar to planning (above) the quality of design and its fitness for purpose is key to the profitability of the job. Working closely with the supply chain to ensure designs are 'buildable' and achieve the client brief is critical to ensuring the profitability of the project and the productivity of the subsequent work. Again here employers report the importance of effectiveness of output rather than efficiency of the design process.
- 4 The efficiency with which the design is built.** The critical factors for efficiency of build are typically determined by the way the site is managed and the competence of the team. On traditional build sites the two aims are to eliminate waiting for either materials or access to a job and re-work. These wastes will outweigh any efficiency improvements brought about by increasing the micro-

productivity (square metres per hour etc) achieved by brick layers, plasterers and carpenters. Hence the productivity gains are around effective delivery of a programme by ensuring materials and labour are managed on a “just in time” basis. For non-traditional build i.e. off-site manufacture these skills are heightened; when a whole house turns up on an articulated lorry the ground work has to be complete.

Each of these factors has a direct link to the skills and competence of the management team not least because the sale, planning, design and management of a large project are done by people aided by technology as opposed to for example mass producing a car which is done by machines aided by people. Continuing this theme the construction industry generally is one that is not substantially automated beyond basic “lift and shift” type plant so increasing the importance of skills. The table below links skills with productivity for the four key processes undertaken by most companies in the sector.

2.5.5 Productivity Skills Map

Process name and measure	The most productive companies will....	The least productive companies will....	The skills that influence this process ^{iv}
Sales and bidding Key measures: Hit Rate on Bids Sales per employee	Have high hit rate on bids because they Target clients who have a need and will buy from them. Develop longer-term relationships under framework or partnering agreements. Develop efficient knowledge based systems that ensure quotes are based on past costs.	Have a low hit rate on bids because they: Randomly respond to tenders. Undertake little repeat work for clients. Re-cost every single quotation.	Estimating Programme planning Creating opportunities Client understanding Option appraisal Risk management Presenting bids Contract law Market understanding
Programme planning/Estimating Key measures: On time completion On budget completion	Have control over build times and estimate correctly because they: Understand the construction process Plan with high degrees of resolution Use a range of different construction technologies.	Have little control over build times or the estimate because they: Leave planning to chance. Use inappropriate construction approaches Focus only on end dates and not completing intermediate stages.	Project management Project design Construction techniques Option appraisal
Design management Key measures: % of designs completed on time % of total cost spent on design	Use standard products and systems within the design. Develop buildings that are fit for function and designed to be buildable. Design and model with sufficient detail to predict difficult areas.	Design everything from scratch. Design components for which units are readily available. Under spend on design omitting details required for lean construction.	Design control Design management Construction techniques Managing design constraints Environmental assessment Design handover Option appraisal Value engineering Safety management Legal skills
Construction Key measures: On time completion On budget completion Achieved mark up	Build to time and quality with little re-work because they: Schedule tasks correctly. Plan ahead. Procure from competent suppliers. Manage labour correctly. Manage plant correctly.	Overrun and under deliver because they: Waste time waiting for supplies or labour. Undertake rework. Damage work already completed. Delay other contractors leading to claims.	Construction skills Site safety Programme management Site set up Contract variation Managing suppliers Procurement Logistics Cost management

Source: CITB-ConstructionSkills and MRM Solutions: The Skills for Productivity, Unpublished

^{iv} These skills were selected in consultation with a group of major contractors and CITB-ConstructionSkills have measured them amongst a sample of practitioners.

2.6 Barriers to Productivity

As part of a continued dialogue with employers CITB-ConstructionSkills, working in partnership with MRM Solutions, established a consultation panel (consisting of 50 senior managers and 50 site managers from 100 employers) to explore the barriers to productivity²¹.

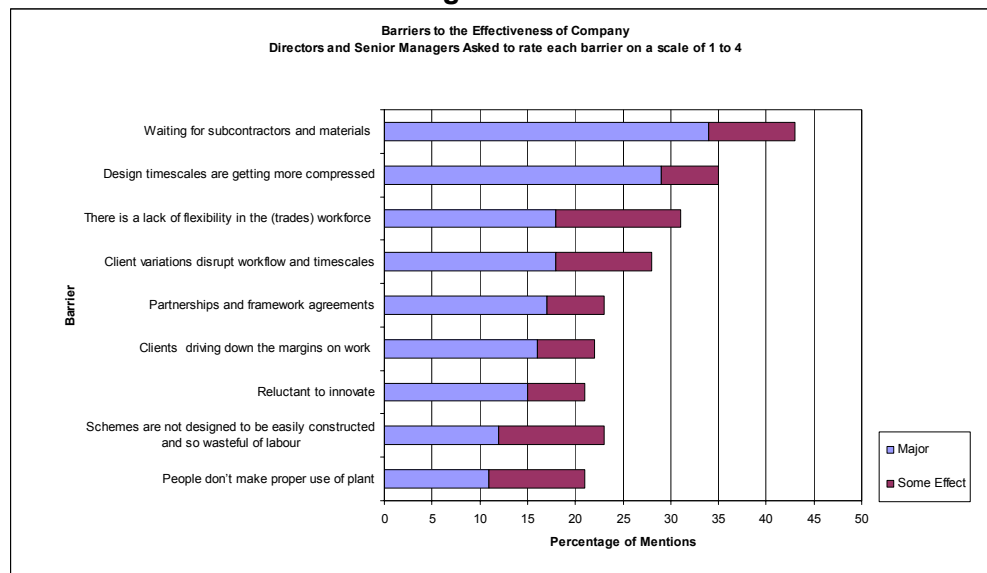
With a view to finding out what both senior and site managers thought were getting in the way of them improving productivity each were asked to discuss the barriers to effectiveness.

Together they suggest that the main barriers to effectiveness are:

- ▶ The supply chain not acting as a supply chain and not integrating client requirements, design and construction.
- ▶ An insufficiently large and insufficiently flexible workforce.

The skills that make a difference are programming, communication and design. Companies that get these three skills right will be more productive.

2.6.1 The view of senior managers

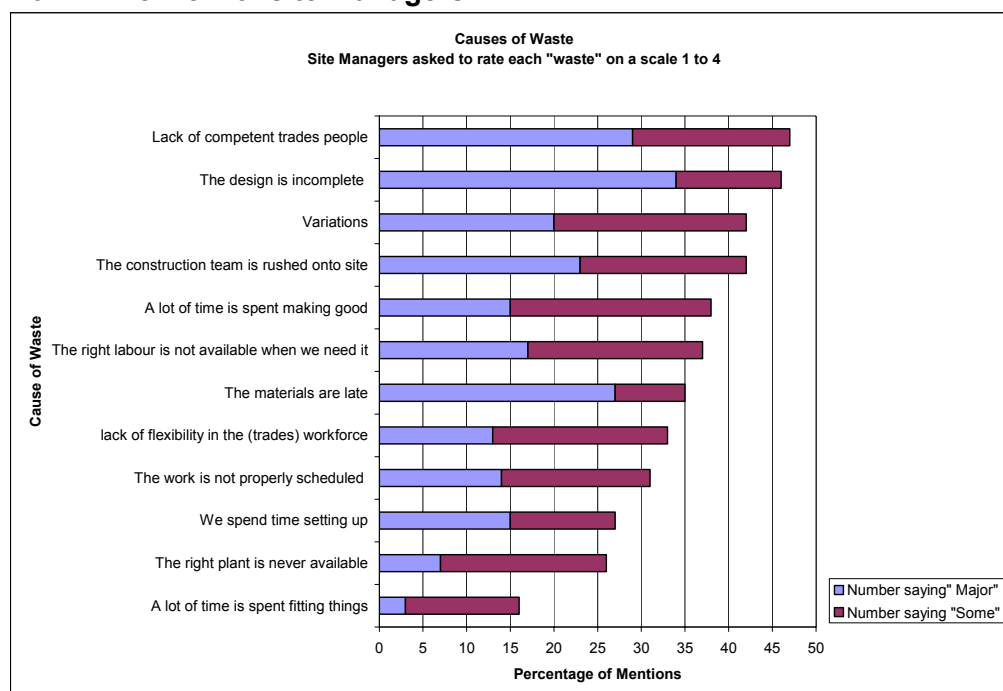


Source: CITB-ConstructionSkills and MRM Solutions – The Skills for Productivity, Unpublished

Notes: Graph reports those scoring 1 and 2

The view of senior managers appears to be one which places the barriers outside their organisation and onto subcontractors, designers, trades, and clients (variations). What this suggests is that the supply chain is not operating as such – or is not being managed as a supply chain.

2.6.2 The view of site managers



Source: CITB-ConstructionSkills and MRM Solutions – The Skills for Productivity, Unpublished

Notes: Graph reports those scoring 1 and 2

Site managers again focus on the supply chain. Insufficient people to get the job done, poor design and late materials are at the top of the major causes of waste list. Factors such as variations, rushing the team to site and time spent making good are specific site based issues.

2.6.3 The view from other sectors

A review of 1,440 consultancy projects published by Proudfoot Consulting²² across all sectors revealed the following reasons for losses in productivity over the three years 2001-2003.

Reasons for Productivity Losses

	2001	2002	2003
Insufficient management planning and control	43%	43%	41 %
Inadequate supervision	22%	23%	26%
Poor working morale	14%	12%	11%
Inappropriately qualified workforce	6%	7%	9%
IT-related problems	8%	8%	7%
Ineffective communication	7%	7%	6%

Source: Proudfoot Consulting

2.6.4 Inter sector comparisons

Inter sector comparisons show the size of construction's contribution to the economy and also its heavy reliance on labour input compared with others. The following industries were selected as they are manufacturing as opposed to service; reasonably labour intensive and reasonably traditional.

Sector Comparison of Gross Value Added, UK: 2003

Industry	Enterprises	Turnover (£m)	Approx GVA (£m)	GVA/head (£thou)
Construction	201,122	148,974	51,912	39.24
Manufacturing of food, beverages and tobacco	7,282	78,245	21,502	43.88
Automotive Manufacturing	5,534	63,606	16,001	43.25
Utilities (note highly capital intensive)	544	46,975	16,756	137.34
Computer and Related Activities	113,527	52,336	31,300	53.14
Land Transport	46,016	37,299	16,883	29.57
Agriculture, Farming and Forestry	19,107	3,151	1,674	22.93

Source: Annual Business Inquiry, 2003

Notes: Data for 2003 is provisional and has been collected under SIC (2003)

To the extent that comparisons between industries on crude economic measures are valid, the above table suggests that construction is around mid- point in GVA/head for those industries selected, yet overall it is making almost twice the contribution to the economy as Computer and Related Activities and over 30 times that of Agriculture, Farming and Forestry.

2.6.5 International comparisons of productivity

Analysis by Davis Langdon Consultancy and University College London²³ undertaken for DTI demonstrates that the UK construction sector, in productivity terms, is comparable with US, France and Germany or at least far nearer than other areas of the economy.

Relative levels of construction productivity, 1996 and 1999

Levels (UK = 100)	Labour Productivity (1)			Total Factor Productivity		
	US	France	Germany	US	France	Germany
Total economy, 1996	121	132	129	112	118	109
Total economy, 1999	126	124	111	115	102	100
Construction, 1996	84	96	84	84	78	70
Construction, 1999	114	108	101	102	98	85
Manufacturing, 1996	171	130	126	142	103	108
Manufacturing, 1999	155	132	129	143	110	121

Source: National Institute of Economic and Social Research (NIESR)

Notes: (1) Output per hour worked

In Labour Productivity (LP) the UK is within 15% of the performance of the best (US) and in Total Factor Productivity (TFP) it is comparable with the US, France and Germany. Compare this with UK manufacturing which is 29% below the worst and 55% below the best.

The implication of this finding is that productivity may not be the right focus for the UK construction sector; it is performing near to or better than other comparable sectors from other countries. Other indicators of operational performance around quality, predictability and cost may be more appropriate.

2.7 Innovation and New Technology

Innovation and technology drive skills change because they make new processes and products available to the sector, which require either a modification to existing skills or the addition of new skills.

Some parts of the sector are highly responsive to technological change and innovation while others demonstrate more caution. As a consequence the

widespread uptake of new technologies and process innovations has been gradual, and despite a compelling case for industry-wide change, highlighted in part by the skills shortage, much of the construction industry uses building techniques that are based on traditional methods and materials that have remained fundamentally unchanged over the last 100 years. Indeed, this is reflected in the report Innovation, Skills and Productivity²⁴. It is clear from this report that the rate and scope of change is very much structured by individual companies and their existing business strategies; an approach that whilst enabling these companies to operate in the short-term does not always address the long-term future of the industry as a whole. The report suggests that industry needs to be more innovative to deal with the changes demanded by clients and specifiers; take advantage of the opportunities presented by suppliers; and deal with external pressures such as demographics and legislation.

The Innovation, Skills and Productivity²⁵ consultation identified four broad areas why innovation is required:

- ▶ To improve the performance of the industry
- ▶ To integrate the construction industry supply chain
- ▶ To address external pressures on the workforce including skill shortages, demographics and legislation
- ▶ To introduce new management styles that deal with external pressures and accommodate the workforce of the future.

Having identified these areas of need, and in order to gain an understanding of the skills requirement, the consultation looked at areas where innovation, and technological change, is occurring. Three areas were identified:

1. **Design and build methods** – the way people design and construct buildings.
2. **Construction products** – the products people use to fabricate buildings and equip them for use.
3. **Business management** – the way people run construction companies

The accepted view that innovation is the successful commercial exploitation of new ideas translates into two strategies: doing things better and doing things differently (although, innovation often involves both). For the construction industry, innovation is in the approach to the job and the technology used, and thus features both products and processes.

1. Design and build methods

The main areas where innovation is having an impact is in:

- ▶ **Computer aided design, modelling and costing** – the use of computer based technology ranges from computer drafting systems to integrated design packages that will simulate the operation of the building.
- ▶ **e-building** – the use of electronic data interchange over public and private networks to share project, materials and commercial information relating to a project.
- ▶ **Plant and equipment** – the use of conveyor and handling systems to speed and ease the movement of materials onto and around a site.
- ▶ **Framed construction** – the use of timber, steel and concrete frames is not new technology but its application in lower cost high volume markets is new.
- ▶ **Factory manufactured units** – the off-site manufacture of components for constructions, structural panels and volumetric units, for example, are now proven and applied in a number of construction sectors.

2. Construction products

The sort of products that dominate fall into two classes, firstly those that deskill and simplify such as push-fit plastic plumbing, thin joint masonry and low voltage power supplies, and secondly those that bring new features to a building such as electronic condition monitoring, air management systems and specialist materials. Many relate to the fixtures and fittings within the building rather than the construction method.

Examples of these are:

- ▶ Glazing products such as Warm Edge Technology (WET) and self-cleaning glass.
- ▶ Electronic products such as wireless networking, condition monitoring and environmental control systems.
- ▶ Lighting products such as energy saving luminaires and white light emitting diodes (LEDs).
- ▶ Materials such as lightweight aggregates, Autoclaved Aerated Concrete (AAC), and plastics and composites including Fibre Reinforced Polymers (FRPs).
- ▶ Factory-made service modules or easy-fit windows, doors and other hardware.
- ▶ Cladding and structural products such as mortarless brick facings, polymer concretes and self-finish interior panels.

3. Business Management

The changes to business management differ with the size of company. For the small player, all of the management effort is focussed on winning and delivering contracts using traditional techniques. For the more innovative (and typically larger) company, the sort of innovation is in:

- ▶ **Procurement** – both the way clients procure construction services and the way that contractors procure specialist services. Whilst much of the talk is of value-based partnerships, there is still a great deal of price-based procurement on both client and supplier sides.
- ▶ **New forms of contract** – particularly for large contractors offering design/build/manage contracts through programmes like PFI and PPP, where risk is shared between client and contractor.
- ▶ **Design management** – the design responsibility expanding to other members of the supply chain.
- ▶ **Resource management** – managing an increasingly diverse resource and expanding the recruitment pools to ensure a consistent supply of people.
- ▶ **Supply chain management** – integrating the skills and abilities of a disparate supply chain with the needs of contractors and clients.
- ▶ **Project management** – dealing with complicated constructions in shorter times with less uncertainty and using multidisciplinary teams.

2.7.1 Innovation – a spectrum not a single point of light

Reviewing much of the literature on the subject we conclude that the spectrum of innovation available today is extremely broad. The figure below illustrates the range of innovation in methods, products and management. The extremes of this spectrum are in some respects wider than the diagram suggests and there are many firms that operate to the left of 'Low' and a few that operate to the right of 'High'.

The Spectrum of Innovation

Low	Medium	High
Thin joint masonry Design for price Computer-aided drafting Management by objectives Directory procurement Multiple quotations Power handling Email	Manufactured systems Design for whole life cost Computer-aided design Team work Supplier involvement Occasional partnering Materials handling plant Project extranets	Factory-built units Design for value Computer-aided modelling Matrices of professionals Supply chain management Joint ventures Logistics Virtual teams

Much of the construction industry essentially falls into the 'low innovation' category, with building techniques based on traditional methods and materials. On balance, many constructors, particularly smaller companies operating locally on one-off projects, remain untouched by the innovations and changes illustrated in the figure as 'medium' and 'high innovation'. Different levels of innovation manifest themselves differently at an operational level, and what appears innovative to one can be perceived as conventional to another.

However, parts of the sector are highly innovative. In airports and shopping centres the technology applied to moving people and services is as sophisticated as anything found in other sectors. Flexible warehousing and distribution centres, retail and office space integrated with multi-purpose leisure and events stadia, are all types of building that have emerged in the last twenty years. Today's new buildings have environmental control, data-networking and security systems that were not invented ten years ago. Houses feature highly efficient heating and reliable services. Civil engineering has brought substantial increases to the capacity of the transport infrastructure. On the commercial front the type of risk sharing contracts associated with the Private Finance Initiative are ground breaking.

A fairly well explored example of an integrated approach to technological and process innovation would be in the housing sector, where it is possible to generate a three-dimensional model of a building and, using virtual reality, 'walk' the client through it. From this model, cost and performance data is created to prove the business case, a build schedule is drawn up and a programme defined. Working with the off-site manufacturer, the design can be translated into the machining instructions to fabricate the panels. A date is given for the erection on site and, using e-commerce, the components are ordered. The site manager tracks the progress of each component via an internet connection and ensures that the site is prepared for the delivery date. Once erected, the interior of the building is finished whilst bricklayers clad the exterior. The building is finished quickly and to a high specification.

Indeed, over the past decade significant developments have occurred in the off-site manufacture of structures and components to increase the speed and quality of the build process, these have occurred most notably within the housing sector. However, whilst several of the UK's national housebuilders have begun to experiment with off-site manufacturing techniques, few, as yet, have adopted them for volume production, thereby not producing the economies of scale to justify the extra costs involved in off-site manufacture²⁶.

Increasing levels of investment and government expenditure on health, education, and security protection and detection have driven much of the growth in off-site

manufacture, however, the chronic housing shortage highlighted in the Government-commissioned Barker Report²⁷ looks likely to ensure that off-site manufacture will continue to feature prominently in future housebuilding programmes.

From 2004-2007, the overall market for off-site manufacture is forecast to grow at a rate of around 10-11% per annum, reflecting growth in a range of end use sectors, increasing levels of government expenditure, and expansion in concrete, steel frame and pods²⁸. Growing penetration in the housebuilding sector may also provide some additional motivation in the medium term and represents a major area of opportunity for prefabrication and off-site manufacturing in general.

2.7.2 Distinguishing the possible from the probable

Having identified that a great deal of innovation, including new technology, is available, we set out to understand why the rate of innovation is perhaps less than it could be. The consultation with industry reveals the arguments for and against changing construction methods and adopting innovative approaches.

The arguments **for** change are:

- ▶ An ageing workforce together with recruitment and retention issues suggests that the people required to train the construction workforce are in short supply.
- ▶ The need for greater output from a smaller workforce.
- ▶ The need to improve standards and build quality.
- ▶ The need to create buildings with higher specifications in smaller spaces at lower costs with greater certainty of delivery.
- ▶ The time to train an increased workforce is longer than the time that the industry has to deliver the increased outputs.

The arguments **against** change are:

- ▶ Labour is perceived as always accessible, whether through re-training, migrant labour or simply paying more than the competition. Although, not immediately cost-effective, there are long- and short-term benefits if demand can be sustained.
- ▶ Alternative methods are too expensive and often perceived as high risk.
- ▶ Construction companies are able to compete and profit using traditional methods and materials, thus reducing the need to change (e.g. the repair, maintenance and improvement sector).
- ▶ In parts of the UK, land is the restricting factor not labour.

Source: CITB-ConstructionSkills and MRM Solutions – Innovation, Skills and Productivity, 2003

Each argument has its own validity and the case for change is finely balanced. The arguments **for** change hold true at an industry level and if addressed are good for the long-term future of the sector. This case for change is however, not as compelling for the individual company where the immediate risks to revenue and profit together with costs associated with innovation, outweigh the longer-term benefits.

To accelerate change and overcome the barriers of individual companies, a majority of the following factors are required:

- ▶ The supply of parts and assemblies must be as reliable as the current supply of “bricks and mortar”.
- ▶ The volume of demand makes manufactured units and new construction methods as cost effective as conventional methods.
- ▶ The local labour shortages are such that wage inflation increases the imperative to reduce labour requirement.
- ▶ The build quality required by the client cannot be achieved conventionally.
- ▶ The client specifically demands innovation.
- ▶ The shareholders and managers of construction firms take a longer-term view on issues relating to innovation and change.

Whatever route the construction industry takes, one certainty is that to continue to succeed economically, there remains a fundamental need to maintain, and wherever possible, maximise revenue and profit and minimise cost. The revenue will flow to the companies that have methods that meet the client demands for quality buildings. Profits will be made on sites that run to time and get the output right first time. Costs

will be lowest in those construction companies that operate lean principles and use their labour, plant and materials to the greatest effect. In an increasingly risk-averse society, construction companies will, in the short and medium term, strive to retain their existing business models, workforce and building methods. Only when it becomes impossible to achieve revenue, profit and cost targets with the current model will the majority of companies seriously consider adopting a more innovative approach to their business management, design and products.

2.7.3 The barriers to innovation

Consultation via the Innovation, Skills and Productivity²⁹ research revealed a number of significant barriers to change and innovation. These were grounded in the commercial reality of having to maximise the current profit in the current operating climate. One could argue that this business focus is wrong, but those we spoke to in the industry are not making this argument; perhaps a culture of denial and focus on short-term profit is the biggest barrier to innovation.

Business Case

Consultation revealed that the industry does not perceive that the business case for innovation and change is sufficiently well proven. Their comments include:

- ▶ Whilst many clients aspire to innovation and even pay for it in design few will translate this aspiration into build techniques.
- ▶ Clients won't let the contractor sufficiently near enough to the concept design and building procurement processes to allow them to bring new ideas to construction.
- ▶ The sector does not perceive that it needs innovation; those that are in business are (by definition) making a profit from what they do over the term that they are measured.
- ▶ The more profitable companies with higher value added cannot necessarily trace their success back to innovation.
- ▶ The use of lowest cost tendering forces the market to the cheapest approach; the cost of innovation both in developing and refining an idea will, in the short-term, increase costs. Whilst this cost increase may be only short-term it could mean that the company wins no jobs in that period.
- ▶ In a project-based environment where each job is a one-off there is little scope for or return on investment in research and development.

Market environment

The consultation revealed the perception that the market is not structured for innovation; comments included:

- ▶ Innovation, by definition, is the flow of new ideas into commercial practice. Such a flow of ideas requires time to develop each idea, a place to test it and then opportunities to refine it. Construction is largely a project environment where the lowest cost bid wins and there is little standardisation of product. This environment does not allow sufficient margin to fund the innovation process and has few opportunities for repetition over which to refine an idea.
- ▶ The large numbers of small companies that make up the sector do not have the type of work or business model that calls for innovation. One off projects, as stated above, are unsuitable for refining ideas. Many small and medium sized construction companies make money from keeping their fixed workforce on site and selling-on subcontract labour at a premium.
- ▶ The clients are risk averse and do not understand either the potential or scope for innovation. Most clients do not give the contractor sufficient continuity of business over which to develop and refine innovative approaches and techniques.

- ▶ For many clients and contractors, radical approaches to both construction and construction management carry too much uncertainty; the business case is not apparent and the perceived risk too high. Whilst the current methods work for them they won't "mend what isn't broken".
- ▶ The construction supply chain separates design, project management, build and materials supply with little continuity of companies or people from one project to another. Hence on completion of the project the team breaks up and often lose the learning points.

Market demand

The consultation revealed a belief that the market drivers for innovation are insufficient. People inferred through their comments that:

- ▶ There is no new market for the construction industry to create by being innovative unlike for example the electronics industry, which has not only invented a technology but also created a market for it in the last thirty years.
- ▶ The customer cannot go to an alternative approach; if the railway network fails then the consumer moves to the road. There is no major alternative to the construction industry.
- ▶ The current level of innovation is sufficient for most to make sufficient money.
- ▶ Employers suggested that the constraint on building land is the main driver of profit in the sector, especially in housebuilding. Any building in the correct location will sell, regardless of whether innovative features used in its construction or not. Thus innovation brings risk, yet is not required to maintain profit margins either through reduced cost or added value, so conventional methods are likely to continue to dominate.

Technical issues

The consultation revealed a risk averse culture; people inferred through their comments that:

- ▶ The conflict between innovation and predictability is not yet resolved. Although many of the technology and process innovations offered in the sector promise improved predictability they are not perceived to compete well with current methods that offer a high degree of predictability because they have undergone numerous iterations. The introduction of unknown variables into the construction process carries a risk that challenges the sector, even if the long-term benefits may outweigh these risks.
- ▶ A heritage of bad choices. – Participants in the consultation focused on some of the projects undertaken in the 1950 and 60s, particularly in schools and hospitals and high rise social housing. It was suggested that the era of comparative experimentalism has created a legacy of flawed, expensive to maintain buildings because little was known about the long-term performance of the materials and methods used. One example given was the widespread use of flat roofed designs. The failure of many 1960s technology innovations, it was suggested, is behind the need for current innovations to justify themselves far more positively and be approached with far more rigour than may have been the case previously.
- ▶ New products are typically produced on shorter production runs at higher cost. Economies of scale are likely to bring the cost down to enable the product to become widespread, but such products are unlikely to become commonplace until their price falls. Similarly until the tradespeople who have to install and implement the product are generally versed in its use, there may be higher labour costs, which means there is another layer to this 'chicken and egg' barrier.

- Strong first-mover disadvantages – Because mass market builders often do not possess the intellectual rights to the new technologies they may be using, they may effectively act as pilots for the industry, bearing all the costs of innovation, but unable to capitalise on its benefits, because the technique is un-patentable or the patent is owned by a supplier, who is only too keen to sell the technology to all comers after it has been proven.

Perhaps the biggest barrier to innovation within the construction industry is the struggle to accept the notion that, it can, and should, occur not out of necessity but as an integrated part of a business process. Wider still, the industry must fully realise that as a major contributor to economy and the infrastructure of the nation, it is also has a major stake in a wide array of social concerns from housing, education, and health through commerce and industry to leisure and the environment. This has to effect the way in which it operates.

2.7.4 The Missing Ingredients Required for Widespread Innovation

Whilst the focus of this analysis is the construction industry there is merit in looking more widely to understand the context of innovation and why the participants in the CITB-ConstructionSkills' programme of consultation report the barriers that they do. Our experience of a range of other sectors suggest that a number of ingredients are required for innovation; these are present in sectors like automotive, information technology and pharmaceutical but of secondary importance in the construction sector.

Ingredient	Why the construction sector lacks this ingredient.	Example from other market
Differentiation by innovation Adding innovative product and service features gives a company advantage.	There is no "must have" innovation that makes one construction company better than another.	Car manufacturers continually leapfrog each other by adding features. The Japanese started putting radios in cars – everyone followed. A car company could not sell cars in the UK without a radio. The same applies now to CD players, air conditioning and soon satellite navigation.
Customer choice There is intolerance in the market of the status quo and /or an alternative approach that gives the customer a choice.	Clients may not like the current performance of the construction sector but there is no real alternative. At the point of purchase the constructors that have made the short list promise performance; there is no way for the client to know in advance that they will deliver this.	If the rail industry "messes up" people will turn to their cars. If company number one does not provide the product then customers can buy from company number two. In other industries, the customer has some choice at the point of purchase.
Major research programmes Research drives innovation.	Innovation needs research and trials. The R&D spend of the construction industry is less than 0.4% of sales and it does not feature on the DTI R&D Scoreboard.	The proportion of sales spent on R&D by Pharmaceutical, IT Software, IT Hardware and Electronics industry is 13%, 10%, 9% and 5% respectively.
A commercial benefit from innovating. Nothing changes without either a threat or an opportunity.	The construction industry realises little commercial benefit from innovation; the majority of buildings are possible using brick, steel frame or some form of concrete structure. Many clients still equate lowest price to highest value.	The electronics industry maintains commercial benefit from innovation. If it had not increased the processing speed and functionality of integrated circuits, the computing and telecommunications markets would be limited to large corporations and not include the general public.

A global market The cost of research is so high that it requires a global market over which to spread the cost.	The construction industry has major global players but they tend to operate in national markets serving national clients. There are few clients who purchase globally.	The automotive sector is global with companies spreading the cost of a new engine across their global brands. This is one driver for the acquisition strategies of the large original equipment manufacturers (OEMs), as it helps to bring about the economies of scale required to develop new models.
An innovative supply chain Suppliers are the source of innovation and new technology.	The construction industry's barriers to innovation make it unattractive for suppliers to innovate for.	The software industry continually drives technology into its customers providing not only the products but the training required to apply and use them.
Continuity of work Each innovation requires a period of time before it makes a return.	The project-by-project nature of both procurement and supply in the construction industry does not allow for a stream of work over which to refine an idea.	The aerospace industry will often award twenty-year contracts with a supplier in return for commitments to research and cost reductions.

Source: CITB-ConstructionSkills and MRM Solutions – Innovation, Skills and Productivity, 2003

2.7.5 The view across other sectors

By contrasting the above factors across a range of industries we can again see why the participants held the views that they did.

Factor	Automotive	IT Software	IT Hardware	Pharmaceutical	Construction
Customer Choice	High: there are many marques and models available.	Medium: domination by several major players limits choice.	High – wide range of system assemblers and component makers	Low: at the leading edge companies innovate to gain a monopoly position	Low: location is more pressing than building features.
Major research programmes	Internationally 4% of sales are re-invested in R&D	10.2%	9.4%	13%	Below 1%
Commercial benefit that accrues from innovation	If a car maker does not innovate it is excluded from a segment of the market.	Software and hardware companies create markets by innovation.		The drug company with the newest product secures a monopoly position during the lifetime of the patent	Improved construction performance and build quality.
Global market to spread the costs	Yes	Yes	Yes	Yes	No
Innovative supply chain	Yes; but often only due to intense pressure from the OEM.	No	Yes	No	In places
Continuity of market	Yes, but consumer loyalties are fickle	Yes	Yes	Yes	No

Source: CITB-ConstructionSkills and MRM Solutions – Innovation, Skills and Productivity, 2003

The labour market in these other industries is fast moving as a result of the changes in consumer demand, globalisation and the application of science and technology.

2.8 Sustainability

2.8.1 Government Action: Sustainable Construction

The construction industry has a major impact on the environment; globally it accounts for:

- ▶ 10% of worldwide economic activity.
- ▶ 40% of the world's mineral based materials.
- ▶ 40% of energy use.
- ▶ 17% of fresh water use.

It is now widely accepted that the construction industry has a central role in delivering development which is sustainable. 'No change' is not an option.

Probably one of the biggest drivers for change is legislation. An ever increasing amount of regulations and taxes, coupled with Government action – both in policy and as a major client (e.g. schools, hospitals and defence and other procurement of building/infrastructure puts its share at almost half of all construction projects) – and strong financial sector pressures are placing sustainability at the centre of construction.

Alongside this, a series of Government and industry backed initiatives are raising the profile of sustainability in the built environment and the role of skills needed for delivery. Also the role of the client and those investing in building/infrastructure projects is increasingly seen as crucial to sustainable development.

2.8.2 Supply Chain Action – Sustainable Construction

To make sustainability a reality it will require everyone in the supply chain from investors and clients, through to designers, surveyors, contractors, craftsmen, operatives and end users (and many others in between) to know what their role is and to have the skills and knowledge to do it.

In early 2004 CITB-ConstructionSkills commissioned some initial research³⁰ to identify key drivers, barriers, players, practice and the change required of construction for sustainability together with recommendations for us on the way forward. The subsequent report concludes that achieving long term sustainability in the construction sector, requires changes to **what is built, how it is built and where it is built**.

- 1 **What is built** is largely dictated by the client and designer although contractors have to be able to understand and deliver what is asked. The current "state of the art", taken from the many case studies reviewed and summarised in the data source, is around reducing whole life costs and minimising the impact of the building on the environment.
- 2 **How a building** is built is largely dictated by the contractor and it is here that the traditional constituency of CITB-ConstructionSkills has greatest impact on sustainable development. The current focus, again derived from and documented in the larger literature review can be said to have approached the sustainability issue at three levels:
 - ▶ Complying with legislation – ensuring that planning, building and environmental regulations are fully complied with.
 - ▶ Technology – typically the adoption a single innovative technology such as contaminated soil remediation.

- ▶ Process – covering a new process or generalised approach in a specific project, for example re-processing of demolition waste for secondary aggregates.

Largely changes in “how a building is built” appear to draw upon good business sense of trading legally, reducing waste (of both materials and labour), minimising environmental impact and increasing output per person.

3 Where it is built is largely dictated by the investor^v and the planning authorities.

To move rapidly to a sustainable future requires co-ordination of the efforts of all in the supply chain.

2.8.3 Moving the construction industry towards a more sustainable future

The construction industry (like most) will change when four pressures become greater than the desire to remain the same. These pressures are:

- ▶ **A compulsion on the industry to comply.** Taxation, legislation, planning regulation and client demands will compel the industry to adopt more sustainable approaches.
- ▶ **Business pressures on the industry for capital and skilled labour.** As investors and potential employees understand and begin the pursuit of sustainable development then capital and skilled employees will migrate towards companies that share their values.
- ▶ **Increased understanding in the construction industry of the potential business benefit of sustainable development.** When the true cost of waste becomes apparent then the industry will act to reduce it. When the supply chain makes sustainable processes and products available and designers become more aware of the design advantages then contractors will be able to more easily adopt sustainable alternatives.
- ▶ **Consumer pressure.** As the elements of the green lobby increasingly become part of mainstream politics and gain greater acceptance amongst the general public then demands for construction companies to prove that they are operating sustainably will increase.

2.8.4 The change that is required of the industry

The change that is required can be classified into four discrete areas:

- ▶ **Enable the industry to build legally** – this is entirely in the control of the construction company is for it to adhere to current environmental law, planning guidelines and building regulations, to pay the necessary environmental based taxes and employ people within current employment legislation.
- ▶ **Enable the industry to build sustainably** – this again is entirely within the control of the construction industry is to ensure that the process of building is done with minimum waste, creating minimum pollution, with least environmental damage, using sustainable resources and recycling and re-using materials.
- ▶ **Enable the industry to build sustainable buildings/roads/infrastructure** – the third element is driven by the client, architect and designer and that is to build a structure that is itself sustainable.
- ▶ **Enable the industry to build sustainable communities^{vi}** – the fourth area is when all aspects of a development are considered sustainable i.e. the structure is built with least environmental damage and the resulting structure operates with low or renewable energy, limits emissions, creates wealth for the community and is socially inclusive.

^v Investor is a general term used to include direct beneficiaries of the building. This could be government (e.g. an infrastructure project such as road or hospital), a corporation (e.g. a shopping centre) or individual (e.g. a house).

^{vi} In this context “communities” could refer to industrial, commercial or residential developments.

Labour demand

In this section we model the likely impact of the skills drivers on the demand for labour in the construction industry.

2.9 The Future Demand for Labour

As we have seen, there are five key drivers that will affect the future demand for skills in the construction industry: the economy; pressure to improve performance; innovation and new technology; sustainability; and legislation. In themselves these are powerful drivers. However, we must not only consider what their impact will be, but also how this impact will be determined by the current state of the industry. The industry itself is after all the vehicle for change.

Perhaps the biggest single factor determining whether the industry is able to respond to the change is very simply the current and future supply (or not) of labour. This is not surprising in an industry with such a heavy reliance on labour input. Read another way, the state of the current workforce as well as the actual availability of labour (both now and in the future) will determine how and to what extent the five key drivers will take hold. The workforce is simultaneously both a cause of and a catalyst for change.

We will now look at how this relationship between current capabilities and future ambition will be reflected in demand for labour.

CITB-ConstructionSkills operates an econometric model³¹ of the construction industry workforce in Great Britain that is capable of converting economic and labour force information into projections of the workforce and its training requirements. The origins of the existing model date back to the early 1990's. It was originally developed to fulfil a demand for the use of more scientific methods when forecasting and analysing skills and employment issues. This the most recent iteration of the CITB-ConstructionSkills' construction employment and training forecasts has been widened to meet several aspects of the extended remit of ConstructionSkills. Utilising source data taken from the Labour Force Survey, and supplementary data relating to construction professionals (taken from a recent survey conducted by the CIC³²) and workforce mobility (taken from the British Household Panel Survey³³), it projects the future size of the workforce taking account of growth forecasts for output, inflows to construction and outflows due to retirement, sickness, career change etc. for a range of standard construction job roles. The model has been used to forecast the future employment and training requirements for the next five years. In this section we summarise the headline findings from this work.

2.9.1 The headline figures

It is safe to assume that, providing it can source sufficient labour, the construction industry will enjoy a period of sustained growth; all 15 forecasting organisations referred to by HM Treasury support a continued growth in the economy, which historically the construction sector has always followed. From this base assumption (which the team believe is the most likely) CITB-ConstructionSkills has modelled the impact of three growth scenarios on the need for trained labour.

Employment Growth Scenarios, Great Britain: 2004-2008

Scenario	Overall increase in total size of workforce, Great Britain 2004-2008
Most likely Growth = 2.3% per year	From 2,038,620 at the end of 2004 to 2,142,930 at the end of 2008. A net increase of 104,310.
Low growth Growth = 1.3% per year	From 2,014,660 at the end of 2004 to 1,977,440 at the end of 2008. A net decrease of 37,220.
High growth Growth = 3.3% per year	From 2,062,620 at the end of 2004 to 2,319,370 at the end of 2008. A net increase of 256,750.

Source: CITB-ConstructionSkills Employment Model

To put these figures in context, GB construction industry employment grew by about 177,000 during the five years 1999-2003, and we believe that future growth, at least in the medium-term, is likely to continue in a similar vein.

2.10 Detailed Figures

The table below shows how the three different scenarios, summarised above, impact on each of the occupations in the industry over the five years 2004 – 2008.

Construction Employment and Training Requirement Scenarios by Occupation
Great Britain 2004-2008

	Low Growth		Baseline Scenario		High Growth	
	2004	2008	2004	2008	2004	2008
Managers	229,295	233,338	232,023	252,866	234,755	273,685
Clerical	160,790	148,310	162,700	160,720	164,620	173,950
Professionals	116,060	118,650	117,440	128,580	118,820	139,160
Technicians	51,980	53,390	52,600	57,860	53,220	62,620
Wood Trades	282,090	276,840	285,440	300,010	288,800	324,710
Bricklayers	141,040	132,490	142,720	143,580	144,400	155,400
Painters	112,430	106,780	113,770	115,720	115,110	125,250
Plasterers	35,920	29,660	36,340	32,140	36,770	34,790
Roofers	56,420	55,370	57,090	60,000	57,760	64,940
Floorers	40,300	39,550	40,780	42,860	41,260	46,390
Glaziers	36,270	35,590	36,700	38,570	37,130	41,750
Other SB Operatives ⁽¹⁾	44,900	41,530	45,440	45,000	45,970	48,710
Scaffolders	24,180	23,730	24,470	25,720	24,750	27,830
Plant Operatives	51,180	51,410	51,790	55,720	52,400	60,300
Plant Mechanics/Fitters	30,220	29,660	30,580	32,140	30,940	34,790
Steel Erectors/Structural	21,760	23,730	22,020	25,720	22,280	27,830
Other CE Operatives ⁽²⁾	93,490	92,940	94,600	100,720	95,720	109,010
General Operatives	98,330	92,940	99,500	100,720	100,670	109,010
Maintenance workers	23,710	25,710	24,000	27,860	24,280	30,150
Electricians	175,300	172,040	177,380	186,430	179,470	201,790
Plumbers	146,680	152,260	148,430	165,010	150,180	178,590
Non-construction operatives	42,310	41,530	42,820	45,000	43,320	48,710
Total	2,014,660	1,977,440	2,038,620	2,142,930	2,062,620	2,319,370

Source: CITB Employment Model, September 2004; Experian Business Strategies - (1)Specialist Building, (2)Civil Engineering

Assumptions	
Baseline Scenario	4.45% growth in 2003 (actual) and then 2.3% after that
Low Growth	1.3% annual growth in construction output
High Growth	3.3% annual growth in construction output

It should be noted that Managers is a widely defined occupational category covering site managers and working proprietors as well as company managers. Wood trades are seen as to be the single largest manual occupation in the industry, followed by electricians, plumbers (including heating and ventilation engineers) and bricklayers. The figures for electricians and plumbers only include operatives working in the construction industry (SIC 45). Whilst they do not include electrical and plumbing operatives working in manufacturing, they do include operatives working in the electrical wiring and fitting sector (SIC 45.31) and the plumbing sector (SIC 45.33), which are in the construction industry, but outside scope. Approximately 60% (or 196,000 in 2004) of electrical wiring and fitting operatives and plumbing operatives work within building services.

2.10 Scenarios for Change

The construction industry is currently enjoying strong demand for its services, with turnover having increased by 4.6% from £142.5%bn in 2002 to £149.0bn in 2003³⁴, but there remains a high degree of pressure to improve its performance – particularly value and predictability.

Indeed, consultation with industry has highlighted repeated the well-rehearsed arguments for change that feature so prominently in the various sector initiatives born out of the Latham³⁵ and Egan^{36 37} reports. In summary:

- ▶ **Greater predictability** brought about by better planning, control and delivery of the construction process.
- ▶ **Higher build quality** brought about by fabricating more of the building in the controlled environment of the factory and so shifting the value adding processes away from site and into the factory.
- ▶ **Greater total value** meaning buildings that are designed for construction (and so reducing the build cost); designed for maintenance (and so reducing the whole life cost); and designed for adaptability (and so increasing the range of revenue earning opportunities from the structure).
- ▶ **A greater focus on form** The market has traditionally and predominately been driven by location rather than form and function. As locations become scarce form may become more important.

2.10.1 Expectation and ambition

Consultation with industry suggests that besides just changing the way buildings and structures are constructed, the focus moving forward is on changing relations up and down the supply chain. Relationships with clients and suppliers appear to be receiving the most interest at an operational level with slightly less progress on the methods of construction, and still less on organization and development of the workforce.

The employers we spoke with highlighted the need to better integrate the supply chain and regarded innovation in this area as leading to:

- ▶ Better integration of the design, management and realisation team – construction, it was argued, is one of the few industries where the design and implementation teams are not integrated and consulted throughout the design and build process. The integration of the team will, in future, encourage architects to build the practical experience of site managers and trades people into their designs, and help site managers and trades to understand better the rationale behind the plans and help them to implement them better. This fits with the need to make industry employees more multi-skilled, since working in an integrated team requires increased understanding of areas outside traditional demarcations. Additionally, there may be a need for a change in the way the sector qualifies and certifies its professionals, although it was argued that the professional institutes may be opposed to any dilution of content in their qualifying courses.
- ▶ Streamlined logistics – the twin incentives to improve logistics are environmental benefits (reduced waste) and improved predictability. Reliable logistics, enabled by new materials tracking technologies and integration between contractor and supplier systems will improve the industry's ability to deliver on time, to specification, as well as avoiding the scheduling mistakes that cause the industry to call upon the skills of containment and recovery skills associated with crisis management.

- ▶ Standardisation of product and process – the standardisation of both processes and materials was cited as a major potential boost to the efficiency of the building process. By not re-inventing the wheel on each project, there are significant savings in design, purchasing and labour. Because tradespeople do not constantly refer to diagrams and learn to install new components, a labour saving can be made. Because the contractor has standardised on an agreed method bulk discounts on components can be secured. Finally if this standardisation extends into the industry as a whole, all of construction may benefit from these savings. Possible resistance to this trend may come from architects, whose role may be somewhat diminished by the use of repetitive designs and standardised components. Equally clients seeking unique buildings may also resist standardisation.

With this in mind a key area for change and innovation is how the sector is managed. The consultation suggested a significant shift in the style of management from ‘fire-fighting’ to planning and strategy. A significant problem in the industry is the emphasis of cure over prevention. Managers are respected and rewarded for working around problems but not for ensuring they don’t happen. For example if a critical component is ordered late and compresses schedules at the end of the job, a manager who uses expensive overtime and drives the workforce to complete the job on time wins kudos that a manager who placed the order on time and ran an uneventful, competent build might not. Employers also cited that there was a certain excitement associated with retrieving jobs that have not gone to plan. Finally there may even be a financial incentive for contractors to come up against unexpected circumstances, particularly if the costs of rectifying them fall on their clients. It was argued that the industry needs to move away from this culture, to one where delivery on time and to specification is scheduled and realised as a matter of course.

A higher calibre of leadership will be required. The people we spoke with questioned if the leadership of the industry was up to the challenge of understanding, responding to, implementing and profiting from the changes that the industry will experience over the medium to long-term. Better scheduling, planning and strategy are demanded by new technologies and processes, and perhaps a reduced labour pool. Companies that fail to grasp these chances may find themselves left behind.

The workforce and availability of people to join it in the future will drive change. The age of some of the industry’s most skilled people is a concern, as it has been for a number of years now. Although the levels of new entrants have been increasing in recent years, partly in response to a series of successful recruitment campaigns, there continues to be a shortfall in terms of adequately qualified individuals coming out of training. This low achievement rate is of particular concern, with the current national focus on higher academic education rather than vocational qualification, and the aspiration to achieve a fully qualified workforce. The gradual retirement of the industry’s skills base may not be a serious worry over the five year foresight period, but over the next ten to twenty years it poses some serious questions about the future viability of the sector without new innovation.

It is widely speculated, amongst those consulted, that external changes in the availability of labour and a proliferation of innovation and technology within construction will lead to polarisation of the industry skills profile, with an increase in multi-skilling and a concurrent growth of niche skills.

Assuming the future trend is one towards a much tighter labour market (as is being suggested), followed by a correspondent rise in the application of labour-saving technology, the industry will almost certainly find itself having to more carefully manage the human resources that are available to it. Although an increase in labour-

saving technologies could create a situation where the skills and knowledge base of the existing workforce become free to be deployed in a more strategic role. As an increasing amount of construction activity utilises technologies that require fewer skills, and can be performed by comparatively less skilled general employees, those with higher-level skills could be redeployed to supervisory roles, training roles, or encouraged to specialize. Indeed, as some systems utilise new technologies and non-construction materials there may be a significant trend towards some ultra specialisation in niche markets.

The weight of evidence suggests that the long-term and single most goal of the industry should be a stabilisation, or even reduction, in the size of the workforce allied with a commensurate rise the skills level of those working within the industry. This would, it is speculated, boost the productivity of the industry, resulting in enhanced performance measurement at a macro level, perhaps even flowing through to better GVA per worker.

The shift from strictly demarcated trades towards a more generalist or multi-skilled approach to the construction process is a current and ongoing issue for the industry, and is well illustrated by the very different needs of many sub-sectors. On the one hand quite specific traditional skills are required to service the massive market for refurbishment and maintenance, but on the other hand a broader set of skills are required to enable the site assembly of prefabricated components with more and more tasks being performed by one individual, who has a proportion of the skills of each of these specialists. From the other side, such tasks are becoming increasingly easy for less skilled people to perform thanks to innovations like push fit connectors.

In a larger project environment, the emphasis is on building a skilled multidisciplinary team with the ability to sort out any problem that confronts them.

It is thought that one way of increasing this multidisciplinary approach to construction would be through improving external recruitment. The industry is perceived as resistant to recruiting and developing people from other industries, yet newcomers could and do bring new ideas and improve construction. It is probable that this attitude may change over time as demographic pressures are felt.

Legislatively the construction industry remains under pressure, particularly with regards Health and Safety.

The modern construction industry receives governance from several bodies with varying degrees of interest and authority, including:

- ▶ European Government, particularly in employment legislation
- ▶ UK Government, particularly in the improvement of public services
- ▶ Devolved and regional governments in economic redevelopment
- ▶ Local government, particularly in planning.

The policy priorities that are likely to have the most impact on the construction industry are broadly summarised as:

- ▶ The focus on improving public services
- ▶ The introduction of procurement frameworks and measurement of best value
- ▶ Employment legislation such as the working time directive, health and safety law, and corporate manslaughter
- ▶ Procurement directives and laws relating to open tendering, planning regulations, sustainability and environmental impact
- ▶ Consultation with employees and works councils.

There is little doubt that the construction industry has suffered from both a poor public image and a poor safety record. Provisional figures from the Health and Safety Executive show that there were 70 fatal injuries to workers in the construction industry in 2003/04³⁸, the same level as in 2002/03. However, the industry has experienced a 33% reduction in fatal injuries, from a 12 year high of 105 fatalities in 2000/01.

The rate of fatal injury to workers generally fell in the 1990s until 1998/99 but rose substantially in the two years to 2000/01. Since then, the rate of fatal injury to workers has fallen and in 2003/04 is at 3.55 deaths per hundred thousand workers. This is the lowest level seen in the last 12 years.

The falling rate of fatal injury to workers is a particularly positive trend, especially in light of the fact that over the same 12 year period total employment has grown by over 20%. Whilst it is difficult to attribute the decreasing rate of fatal injury to any one cause, it has almost certainly been influenced by an increased awareness of the risks. A series of high profile health and safety campaigns, and preventive legislation such as corporate manslaughter has served to illustrate the roles and responsibilities of both the employer and employee.

However, even with this positive (falling) trend in actual fatalities and the rate of fatalities, the construction industry still accounts for nearly a third of all worker fatalities across all industries. Consequently, health and safety remains a key theme for both the Government and the construction industry.

Further health and safety legislation will lead to a greater demand for tactical skills to deal with site safety and strategic skills to design and operate safer sites. Site managers will increasingly require better skills in ensuring each operative is aware of the dangers and is capable of avoiding and minimising them. Professionals will need to gain a greater appreciation of health and safety issues to ensure that sites are designed to remove the risks.

With regards environmental issues, the introduction of the climate change levy in 2001 and associated changes to the building regulations to improve the environmental performance of materials and structures, has affected the nature of many construction products and processes. Regulatory drivers of change have played a central role in improving the energy efficiency of materials, increasing the elimination of waste from the construction process and estimating the 'whole-life' cost of structures. Also, the introduction of the landfill tax in 1996 and the aggregates levy in 2002 has placed particularly stringent requirements on the disposal and recycling of materials.

A principal skills change required in dealing with regulations will be the ability to predict, understand and interpret legislation. The construction industry and its constituent companies will need to be more aware of law, how to monitor it and when to act on it. It is likely that this will result in the companies having to gain skills in, and knowledge of, environmental and employment legislation. The increased need for legal skills in the management of a construction business will also have to be filtered down to site level, through construction managers and site managers, to ensure the correct interpretation and practical implementation of more complex regulations.

2.10.2 The Probable Future

So, some specialist sectors are making good use of innovation, but the majority are still using the same methods as 20 years ago. Sustainable construction is an ambition rather than a common practice and the sector is adapting to increased employment legislation.

Based on our consultations with clients, manufacturers, suppliers, employers and industry experts we have developed the three scenarios and their impact on the size and shape of the construction industry workforce. Here we describe in full the scenario that we consider to be the most likely. Details of the alternative high growth and low growth scenarios can be found in the Appendix. Throughout we use a star rating to indicate the likelihood of any particular circumstance occurring: *** = most likely; ** = a realistic possibility; * = a slight chance and 'No stars' = highly unlikely. These views, whilst subjective, are based on our experience of working in the sector.

The Probable Future: Baseline Scenario 2004-2008

Driver	Current situation
The economy Star rating **	Buoyant and set to remain so. Fluctuations of the economy have been less severe in the last five years than they were in the preceding 25 years, and the stated aim is for longer-term steady growth. However, the optimism of long-term growth is tempered with the reality that the economy is variable across the country. Not all markets or all regions of the UK are good. The intended spend of Government in the UK is high, and the construction industry is central to delivering social improvements.
Pressure to improve performance Star rating ***	Moderate; whilst much is spoken of the need to change the operations of the industry few companies are actively involved in radical change. Those that are seeing the benefit evidenced by the Constructing Excellence Demonstration Programme. There is a perception that many contractors and clients are trading the need to improve performance in favour of the need to get the job done.
Innovation and new technology Star rating ***	In terms of construction products there is a moderate flow of new products entering the market some of which are adopted by some construction firms. The majority of workers are currently seeing little impact of new technology. Innovation in what is built varies by sub-sector. In the infrastructure sub-sectors (commercial premises, hospitals and schools) there are highly specified and flexible buildings, which require highly technical fittings. In housing some contractors are adopting framed and offsite construction but they are still in the minority. Innovation in the way buildings are built is moderate. The plant manufacturers are offering ever more efficient ways of moving materials at lower prices (e.g. concrete pumps; satellite tracked movers, physically larger and physically smaller plant). IT plays an increasing role in communication and is encroaching more into project management and information sharing.
Sustainability Star rating **	Currently more a policy ambition than practice. The industry is at the start of a journey in sustainability with a few leading companies partly engaged and the rest being forced via the existing limited legislation. There is conflict amongst government departments and their differing policy ambitions; most spending departments want infrastructure to deliver services and housing for key workers whilst Treasury, Environment Agency and Local Authorities are putting constraints on how the industry builds. An example of this is a housing developer who seeks to reuse demolition waste (so reducing the use of aggregates) on a brownfield site but is prevented from doing so by the Environment agency that would seek to then reclassify the site as landfill which degrades its value to the point of being uneconomical to develop.
Legislation Star rating ***	Moderate impact on employment, planning and build methods.

*** = Most likely;

** = A realistic possibility

* = A slight chance

No stars = highly unlikely

2.10.3 Impact on the shape of the workforce

This, the most likely scenario, is based on a moderate to strong growth in the economy, which will generally see higher levels of employment. Although pressure to improve performance will remain high only a few contractors will adopt it. Innovation will take the form of new products, which have additional features, are easier to fit or both. Sustainability will be the focus of legislation and planning consents.

Driver and summary of likely scenario	Impact on workforce
The economy	The overall size of the workforce will increase in similar proportions to the current workforce.
Strong to moderate growth	There will be a temptation to fill vacancies with less than fully qualified staff.
Pressure to improve performance	The desire for better motivated and able trades may encourage some firms to train more particularly in multiskilling of the workforce.
Adopted by a few but not the majority	An increase in the accuracy of planning and the ability to better deal with problems will drive up the importance of management skills in surveyors and site managers. There will be an increase in the skills around procurement and handling of materials (logistics).
Innovation and new technology	Increased need for product awareness amongst designers and architects.
Greatest progress on products and fitting out; least progress on build methods.	Professionals in the industry will need new skills in product selection. Mechanical and Electrical Engineering skills will increase in both number required and depth of competence.
Sustainability	Some, but limited technical skills change. The interpretation and implementation of appropriate legislation is within the remit of many in the sector.
Driven through legislation on planning, waste and re-use of materials.	
Legislation Moderating.	Some, but limited technical skills change. The interpretation and implementation of appropriate legislation is within the remit of many in the sector.

2.10.4 Impact on the size of the workforce

This assessment is based upon industry output growth rates in 2003 of 4.45 % (actual) and thereafter 2.3% per annum.

Replacement ratio (the number of people needed to stand still) is assumed at 3% per annum.

Of the 5% of people who join the industry from other sectors we assume (from data provided by the BHPS³⁹) that 38% are sufficiently skilled from previous training or experience with industry that they are able to enter the workforce with relatively few training needs.

**Most Likely Scenario
Construction Employment and Training Requirement by Occupation
Great Britain 2004-2008**

	Total Employment		Average Annual Requirement (2004-2008)	Current Qualified Output 2003	Surplus/Deficit (2004-2008)
	2004	2008			
Managers	232,023	252,866	9,790	DK	DK
Clerical	162,700	160,720	6,510	DK	DK
Professionals	117,440	128,580	4,970	3,302	-1,668
Technicians	52,600	57,860	2,230	4,258	2,028
Wood Trades	285,440	300,010	11,810	4,983	-6,827
Bricklayers	142,720	143,580	5,770	2,791	-2,979
Painters	113,770	115,720	4,620	1,304	-3,316
Plasterers	36,340	32,140	1,370	443	-927
Roofers	57,090	60,000	2,360	311	-2,049
Floorers	40,780	42,860	1,690	183	-1,507
Glaziers	36,700	38,570	1,520	46	-1,474
Other SB Operatives ⁽¹⁾	45,440	45,000	1,820	287	-1,533
Scaffolders	24,470	25,720	1,010	302	-708
Plant Operatives	51,790	55,720	2,170	1,187	-983
Plant Mechanics/Fitters	30,580	32,140	1,270	225	-1,045
Steel Erectors/Structural	22,020	25,720	970	53	-917
Other CE Operatives ⁽²⁾	94,600	100,720	3,940	342	-3,598
General Operatives	99,500	100,720	4,030	2,205	-1,825
Maintenance workers	24,000	27,860	1,050	155	-895
Electricians	177,380	186,430	7,340	DK	DK
Plumbers	148,430	165,010	6,340	2,592	-3,748
Non-construction operatives	42,820	45,000	1,770	DK	DK
Total	2,038,620	2,142,930	84,350	24,969	-33,971

Source: CITB Employment Model, September 2004; Experian Business Strategies - (1)Specialist Building, (2)Civil Engineering

Note: Numbers rounded to the nearest ten - totals may not add up due to rounding

Current qualified output excludes those completing S/NVQ Level 1

	Average annual figure (2004-2008)
Requirement due to expansion	34,420
Requirement due to Supply	49,930
Side Factors	

Source: CITB Employment Model, September 2004

The large requirement in the managerial occupations forecast against a previous and almost entirely ascendant trend is due almost entirely to the shift in focus towards a process driven industry that requires much more control. Indeed, this increasingly process oriented view of construction is almost entirely responsible for the relatively high in professional and technical occupations. The move to integrate planning, design and procurement seamlessly into the construction process has necessarily placed more emphasis on the inputs as well as the outputs. The need for contractors to understand the concepts of value, quality and risk has required a greater ability to monitor, measure and analyse the construction process. This knowledge and experience can then be used to aid the allocation of resources more effectively, and to pre-empt and prevent problems. Consequently, this has resulted in an increased investment in the non-manual workforce both in terms of their level of involvement and the numbers employed.

2.11 Conclusions Relating to the Demand Side

The construction industry overall is enjoying and will continue to enjoy over the next five years a period of strong demand. This offers an opportunity (and need) to invest in the workforce required to create a future where the service, productivity and predictability of the industry can approach that achieved by sectors such as retail, automotive and others. Realising this opportunity will ensure that the industry workforce is sufficient in size (which in many areas it currently is not) and able to meet the expectations of shareholders and clients (which in many cases it currently is not).

The UK economy is the greatest factor impacting the future size of the construction sector, and the level of activity in the economy drives the numbers of people employed in the construction workforce. Factors such as innovation (in construction

process and products), pressure for sustainable construction^{vii}, and an overall need to improve productivity will further add to the pressure on the workforce to acquire new skills.

Competitiveness is measured against a range of factors and whilst there is evidence of improvement over time this is from a low base of performance compared with other UK sectors. This underperformance will, if companies can be motivated to address it, demand more and higher level skills at all levels.

Clients and markets influence skills by their demands for better delivery performance and value for money – something that has been ongoing for the last ten years at least. Their continuing and growing intolerance of late delivery and over spending is driving clients to seek different forms of contract, and contractors to generate more accurate plans and adopt more predictable construction techniques – for example modular construction where components are assembled in a factory before being brought to site; each of which requires new and higher level skills. The difficulty facing clients in demanding this change is that the UK industry can (and many have) ignored them. The clients have few levers (other than not to build) as they cannot import construction.

Whilst the construction industry cannot be off-shored (like say IT or certain aspects of manufacturing) the capital it requires can be shifted by investors to more profitable sectors and countries. Productivity and competitiveness drive skills change because executives in the sector are continually driven by shareholders^{viii} for better returns. Innovation and technology drive skills change because they make new processes and products available to the sector each which requires either a modification to existing or the addition of new skills. The adoption of innovation by many of the sub sectors in the industry is slow.

Adopting sustainable construction techniques drives skills change in the industry because for companies to be more sustainable they must change both what is built and how it builds. As this is highly dependent on the availability of sustainable products and materials and clients who are specifying sustainable designs, progress is slow and usually only when enforced by legislation.

The most likely scenario going forward is:

- ▶ The economy will show strong to moderate growth creating a demand for 172,000 additional people over the five year period 2004–2008, or 34,000 per year.
- ▶ Demand for trained construction workers will increase further beyond the capacity of the current supply, and even if that supply is increased challenges remain in attracting the right calibre of people.
- ▶ Pressure to improve performance will continue but (because of under capacity in the market) will only be adopted by a few companies.
- ▶ The greatest progress in innovation will be in the construction products (particularly in mechanical and electrical fittings) and the least in construction processes and management.
- ▶ Sustainability will be limited to that which is legislated for and cover mainly planning consents, waste handling/disposal and re-use of materials.
- ▶ Legislation will moderate.

^{vii} Sustainable construction is the creation of buildings and infrastructure in a way that sustains the environment, generates wealth over the long term and enhances the quality of life of people.

^{viii} In this respect the term “Shareholder” is used to represent the owners of a business. At one end of the spectrum there is an owner managers and at the other an institutional investor.

In order to achieve its aspirations and meet these expectations the industry requires a sustained improvement in the skills mix of managers in the construction sector and a growth in the number of competent trades people would create a number of opportunities for the UK as a whole:

- ▶ The public service ambitions of the current government will be realised faster and at lower cost if there was an adequate supply of construction labour.
- ▶ A better supply of housing would improve the quality of life for many (particularly in the South East of England) and provide greater stability in the housing market.
- ▶ The construction process could become far more predictable and the industry more productive with better skills in planning, procurement, risk management and design.
- ▶ The construction industry could achieve greater quality and reliability with more and more competent trades people.
- ▶ The sustainability agenda could be adopted far quicker and the industry make a net contribution to the quality of environment and use of energy.
- ▶ The opportunities to innovation could be better exploited to drive up the productivity and profitability of companies.

Without action, employers may respond by hiring unsuitably skilled labour, which will reduce the quality of outputs, impede productivity gains and reduce the value received by clients (of which UK government is the largest). Alternately they may work to improve the productivity of their workforce. Actually they will do a combination of the two.

A “low performance” equilibrium (where contractors can ignore pressure for improvement, innovation and change) will persist with many companies particularly the small ones. As they are busy (in growth markets clients cannot be as selective) many do not see the need for improvement and so the motivation to improve the skills mix will be lower than in other sectors where international competition is more dominant.

3 SUPPLY-SIDE

Labour Supply

In this section of the report we set out the vital statistics of the industry and its workforce, specifically:

- ▶ The number of people work in the sector
- ▶ Who employs them
- ▶ What they do
- ▶ How much they get paid
- ▶ Demographics, and
- ▶ Where they work

3.1 The Workforce

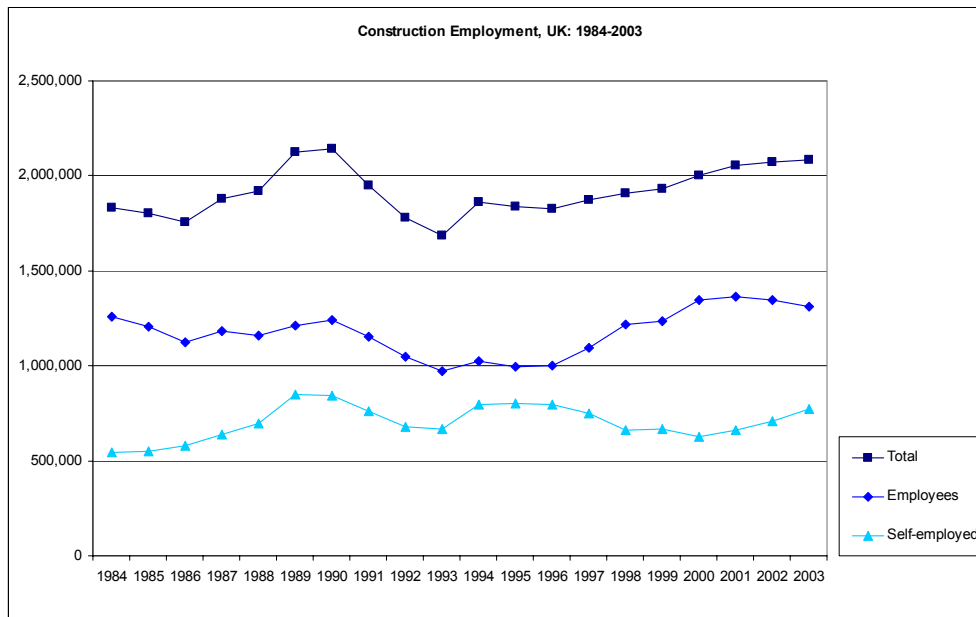
3.1.1 Number of employees

The construction industry is, and has been over the last ten years, a significant employer. Since 1996 the employment trend has been positive with a growth of 14%.

In the UK as a whole, the sector employs 2.1 million⁴⁰ people, has 201,100 enterprises, generates £149bn of turnover⁴¹ (GDP) and nearly £52bn of value added⁴². Excluding electrical wiring and fitting (SIC 45.31) and plumbing (SIC 45.33), just over 1.8 million people are employed in the construction contracting sector (SIC 45). A further 225,000⁴³ are employed in professional consultancies (SIC 74.2).

The below graph shows the change over time in the number of people working in construction. Its most prominent feature is the rapid increase in employment between 1986 and 1990, and the equally rapid decline to 1993. Overall employment in construction rose and fell by over 20% during this seven year period, driven by a number of factors most notably the boom in demand and prices for houses, factories and office space, and the expansion of the road building programme.

The period since 1996 has seen another increase in employment, although on a much smaller scale to that of the late 1980s, with overall numbers rising steadily by 14% in seven years. Unlike the previous construction employment cycle, this has created a climate where it is much easier to predict demand for skilled workers, and to respond to this demand by correctly matching training places. This is a vital part of ConstructionSkills' future role.



Source: Office for National Statistics – Labour Force Survey

3.1.2 Self-employment

Recent articles published in the Office for National Statistics Labour Market Trends^{44 45} journal discuss the increase of self-employment in recent years across the UK. Both articles credit the UK construction industry as being a ‘major driver’ to this expansion, although it is also noted that the “increase in construction is a longer-term trend” which “generally fits with the expansion of the sector”.

Overall the incidence of self-employment in the construction sector has increased more quickly than that of direct employment. For example between 2002 and 2003 self-employment in the UK construction industry increased by 11% whereas direct employment only increased by 2%.

In addition to highlighting the contribution the UK construction industry as a whole makes to the UK self-employment population, analysis by occupation also attributes “trades consistent with construction (for example, carpenters and joiners)” as having a large part to play.

Evidence of this is provided by analysis of the four main craft trades (wood trades, bricklaying, plastering and painting & decorating) employment status⁴⁶. Self-employment in these main craft trades accounts for 60% of their total employment across the UK. Regional analysis of the main trades shows an even higher proportion are self-employed in southern areas of the UK - East of England 71%, South West 70%, South East 69%, and London 67% - consistent with the high proportion of their overall regional share of self-employment compared to other areas – see The Regional Split.

3.1.3 Who employs the two million

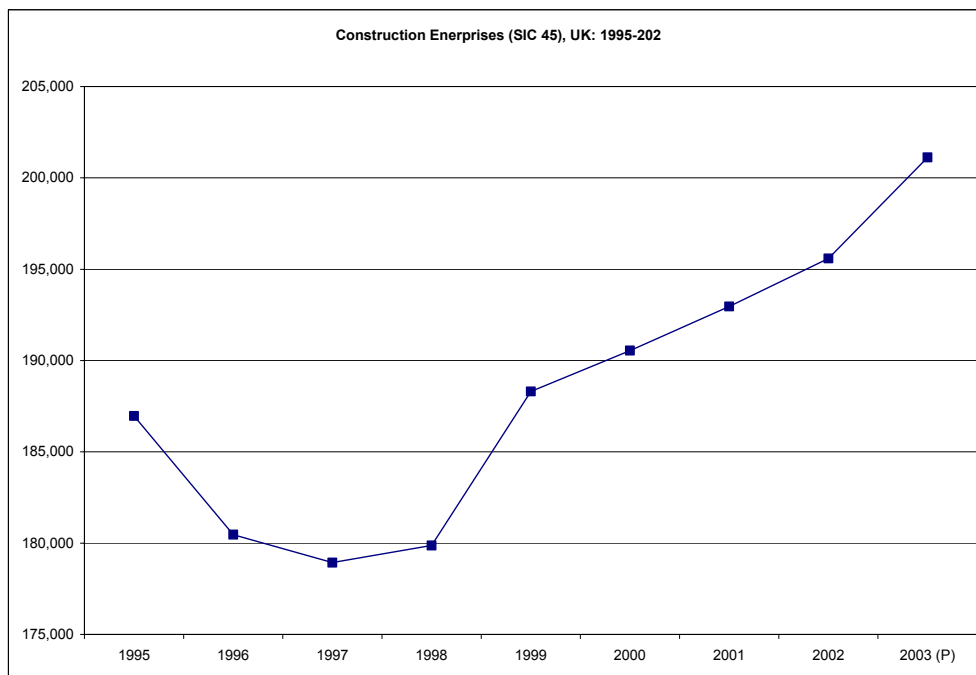
In terms of the construction sector and its constituent and related industries, The below table shows that within the principal industries related to construction activity, construction contracting dominates the sector.

Composition of the Construction Sector and its Constituent and Related Industries, by Number of Firms, UK: 2003

Sub-sector	ABI Count (% of total firms in sector)
Construction (SIC 45)	69%
Professional services (SIC 74.2)	19%
Manufacture of construction products	7%
Sale of construction products	4%
Mining and quarrying of construction materials	>1%

Source: Annual Business Inquiry, 2003

The majority of employees (i.e. those in direct employment) working within the construction contracting part of the sector (SIC 45) work for mid-sized (11-250 employees) companies yet most companies are small; over 90% of companies employ less than 10 employees and over a third of the total labour is self-employed.



Source: Annual Business Inquiry, 2003

When analysed against other similar labour intensive sectors, the construction industry is the second highest in terms of the proportion of the workforce employed in SMEs (<250 employees) and the sector with the largest share of “one man bands”.

Construction Companies by Size of Company, UK: 2003

	All Industries		Agriculture, Hunting and Forestry, Fishing		Construction		Manufacturing		Transport, Storage & Communication	
	F	E	F	E	F	E	F	E	F	E
With no employees 1	71.3%	14.6%	69.3%	40.0%	85.5%	39.7%	62.5%	6.2%	82.5%	13.6%
1-4	18.9%	10.3%	25.3%	32.4%	10.1%	12.4%	18.0%	4.7%	10.4%	4.7%
5-9	5.0%	6.6%	3.7%	10.9%	2.3%	7.1%	7.5%	4.5%	3.4%	3.7%
10-19	2.6%	6.8%	1.3%	7.3%	1.2%	7.1%	5.2%	6.2%	1.9%	3.9%
20-49	1.4%	7.8%	0.3%	3.1%	0.6%	8.2%	3.7%	9.9%	1.0%	4.9%
50-99	0.4%	5.2%	0.1%	1.7%	0.1%	4.2%	1.4%	8.7%	0.3%	3.4%
100-199	0.2%	5.2%	0.0%	1.3%	0.1%	4.0%	0.8%	9.6%	0.2%	3.8%
200-249	0.0%	1.6%	0.0%	*	0.0%	0.9%	0.2%	3.4%	0.0%	1.2%
TOTAL SME	99.8%	58.1%	99.9%	96.7%	99.9%	83.6%	99.4%	53.2%	99.8%	39.2%
250-499	0.1%	4.9%	0.0%	*	0.0%	3.3%	0.3%	10.4%	0.1%	4.3%
500 or more	0.1%	36.9%	0.0%	*	0.0%	13.3%	0.3%	36.4%	0.1%	56.5%

Source: Small Business Service Analytical Unit

Notes: F = Proportion of Firms
E = Proportion of Employment

1 "With no employees" comprises sole proprietorships and partnerships comprising only the self-employed owner-manager(s), and companies comprising only an employee director.

A * symbol replaces data that is deemed to be disclosive. In "With no employees", * denotes that the Labour Force Survey sample size used is too small for a reliable estimate.

The contracting part of the construction industry relies heavily on a large number of sub-contractors, over a third of whom are self-employed. The Labour Force Survey 2003 states that of the 2,081,000 people working in the industry 771,000 are self-employed⁴⁷. At 37% this figure represents a drop from 40% in 1997 but is still one of the highest in Europe. The flexibility of such a large pool of self-employed labour and the avoidance of employers' National Insurance contributions are significant financial advantages to prime contractors. The disadvantage is the lack of investment in skills and qualifications by those who are self-employed and migrate from job to job with little security of income and few of the advantages of direct employment.

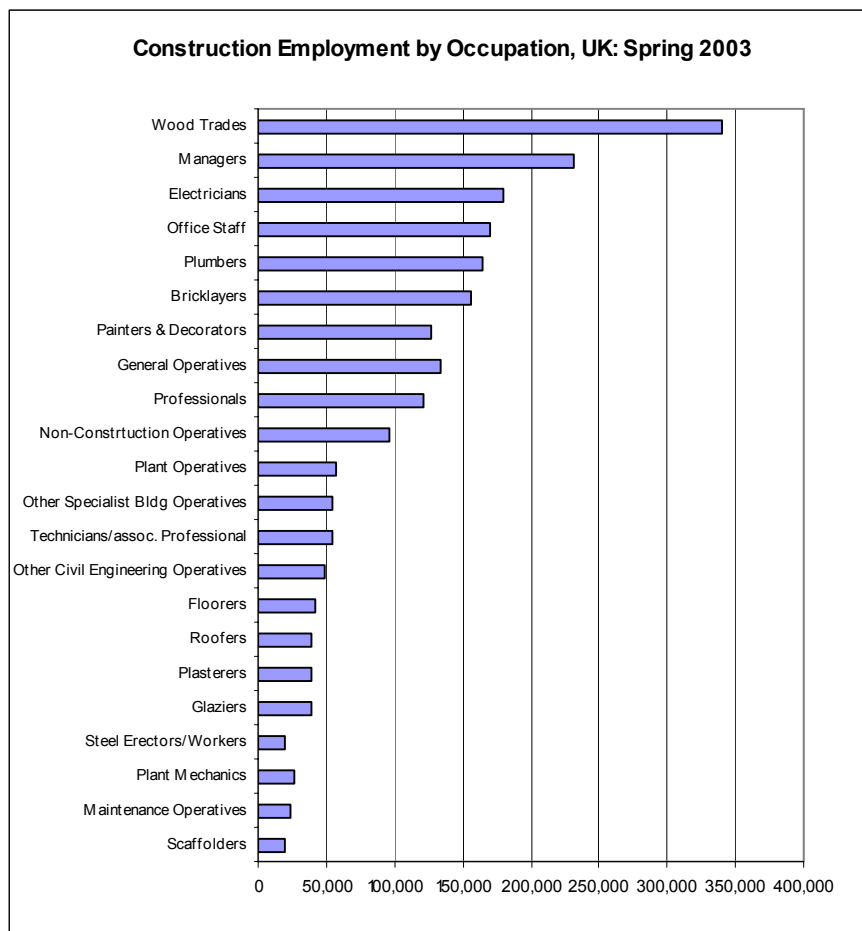
The types firm and the work that they are likely to be involved in can be described, in general terms, as:

Size of Company	Type of Company	Sphere of operation
<13 employees	Self-employed	Local usually as a subcontractor to a larger firm.
	"Lifestyle firm"	Local and largely outside of the mainstream industry.
	Small jobbing builder	Local, predominantly domestic jobs. Will work as a subcontractor on larger sites.
	Specialist firm	National bringing expertise to larger contractors and assignments

14-59 employees	Small contractor	Usually working in a region on medium sized (<£10m) projects for developers, private individuals or speculatively. Can act as subcontract resource to larger contractors.
60 – 299 employees	Medium contractor	Often working in an extended region on medium sized projects. Will be large enough to pick up local authority work and larger development projects. May work with larger contractor as a specialist supplier or undertake design and build type assignments.
300+	Large contractor	Often combining some form of development arm looking opportunistically at land deals. Could be involved in large public contracts and likely to be taking on larger roles (design and build or PFI or Facilities Management). Will both buy labour through subcontractors and sell work as a subcontractor.

3.1.4 What the two million do

In terms of occupational structure⁴⁸, manual workers dominate and they represent 73% of the total (including carpenters & joiners, bricklayers, painters & decorators). The remaining 27% are non-manual workers (including managers, professionals and office staff).

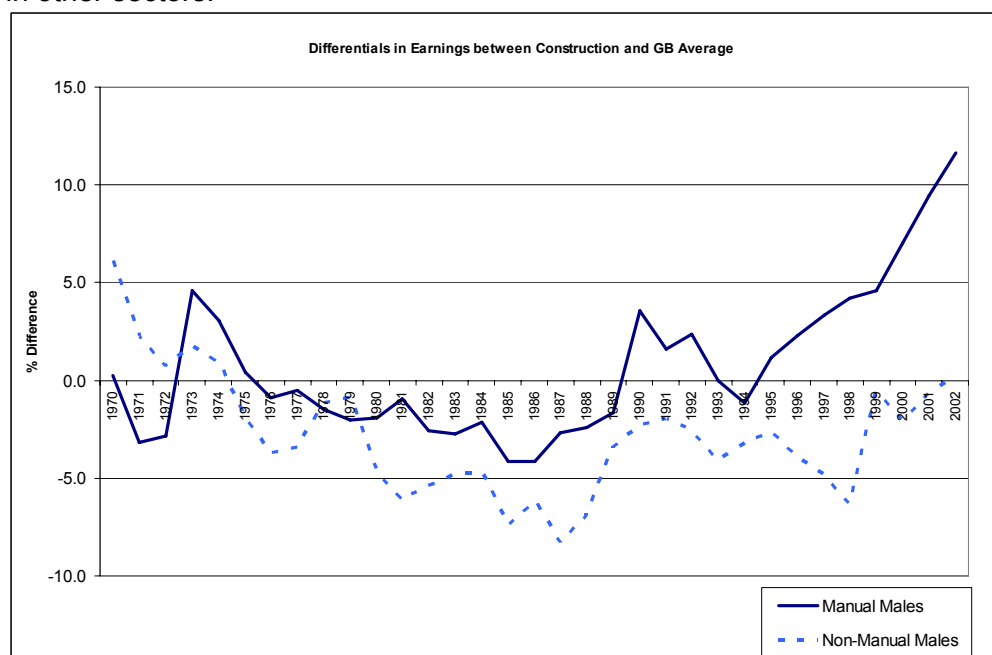


Source: Office for National Statistics – Labour Force Survey; CITB Employment Model 2003

The figures for electricians and plumbers only include operatives working in the construction industry (SIC 45). Whilst they do not include electrical and plumbing operatives working in manufacturing, they do include operatives working in the electrical wiring and fitting sector (SIC 45.31) and the plumbing sector (SIC 45.33), which are in the construction industry, but outside scope. Approximately 60% (or 196,000 in 2004) of electrical wiring and fitting operatives and plumbing operatives work within building services.

3.1.5 How much do they get paid

Manual workers are better paid in the construction sector than the national average. Only recently have non-manual workers in construction gained parity with their peers in other sectors.



Source: Department of Trade and Industry: New Earnings Survey

The Earning Differentials Chart⁴⁹ shows the differential between average construction industry remuneration and the national average^{ix}. The salaries in non-manual roles have, over the long term, underperformed national norms, only attaining equality in 2002. Manual roles, however, are comparatively better paid, having risen some 12% above expected norm since 1995.

Wage inflation can be a symptom of high demand for employees due to a great deal of economic activity, or it can be a symptom of poor supply of people, arising due to a low entry to the sector, or limited number of people with the appropriate skills. Currently in the construction industry both operate i.e. increased demand and skills shortages.

3.2 Demographics

Population characteristics – such as size, growth, density, distribution, age, gender, and ethnicity – drive supply and demand. Demographic changes shape the expectations of customers, as well as influencing the ability of industry to meet their demands.

^{ix} Males alone are shown because accurate data for females is not available.

3.2.1 Workforce Demographics

The age profile of the construction industry like that of many UK industries is mature and has undergone significant change over the past 10 years. For both manual and non-manuals in the industry, the workforce has been distinguished by a sharp decline in the share of the younger age groups in total employment and an analogous rise in those aged 45 years and over.

The construction industry age profile, taken from the Labour Force Survey 2004⁵⁰, is shown in the below table.

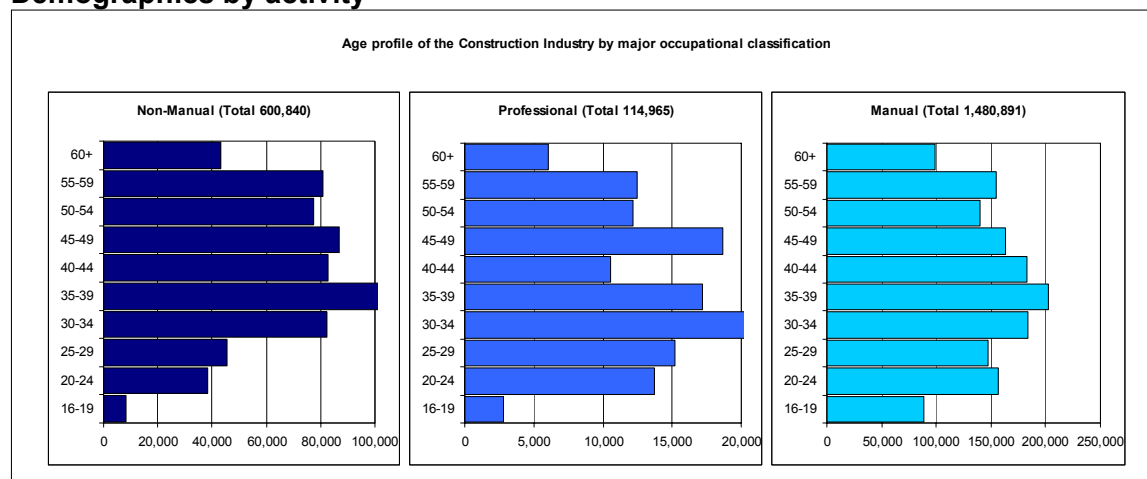
Age Group	Construction Industry	All UK Industries
16-29	22%	24%
30-44	39%	38%
45-59	32%	31%
60-74	7%	6%

Source: Office for National Statistics – Labour Force Survey

Whilst the construction industry will, over the next 20 years lose around 30% of its workforce it has an age profile that is significantly biased towards the 30-44 age bracket compared with the UK population.

Assuming that all over 60 in 2004 will retire in the next five years, and that the construction industry age profile matches that of the UK, the industry will loose 13% of its workforce.

Demographics by activity



Source: Office for National Statistics – Labour Force Survey

3.2.2 Diversity

Currently women account for approximately 10% of total employment in the industry, but only 1% of manual employment and 30% of non-manual employment⁵¹. This makes the manual portion of the sector amongst the most gender imbalanced in the UK economy.

Within the non-manuals there is a marked concentration of women in administrative, clerical and secretarial occupations. Whilst, these occupations have traditionally attracted women, it is interesting to note that over the past decade these occupations

have experienced marked fluctuations in the numbers in employment, relating to a long-run decline in the size of their occupational share. This is primarily due to changing working practices, including the tendency for more office-based staff to undertake their own administrative tasks and the proliferation of new technology (as part of the IT revolution)⁵². The result of this has been the gradual erosion of what might be considered the preserve of female employment within the construction industry. It also means the decline of an occupational area that has in effect masked the true nature of the gender imbalance.

Analysis by the Council for Administration (CfA) points towards more stability in the future proportions of these occupations within the workforce,⁵³ although how this will affect the share of women filling these roles within construction remains to be seen. On the evidence available it suggests that whilst the male to female ratio may remain stable, the numbers in employment will fall, thus further exposing the gender imbalance. Most signs point towards the need for greater emphasis on the situation of employment in manual occupations.

The proportion of ethnic minorities in construction employment has nearly doubled from a low of 1.5% in 1994 to 2.8% in spring 2004⁵⁴. However, this is still significantly lower than the 6.9% present in the total working population. Looking at the split between manual and non-manual occupations, ethnic minorities currently account for 2.5% of all manuals, and 3.6% of all non-manuals. The percentage of manuals has increased from a low of 1.3% in 1994 to a high of 2.5% in 2004 and the percentage of non-manuals from a low 1.9% in 1994 to a new high of 3.6% in 2004. With the exception of a brief dip in 2001 growth in both areas has remained relatively stable and encouragingly exhibited a long-term positive trend.

With more women than men in both the economically active and general populations, and ethnic minorities expected to account for half the growth in the workforce over the next ten years, these groups will form an increasingly important share of the labour force. Consequently, attracting new workers from these groups must remain a priority

3.2.3 The skills implications

The key demographic skills issues are the loss of key skills due to retirement, and the addition of new skills through recruitment in the lower age groups. In the industry as a whole, 338,450 people, or 15.4% of the industry are within ten years of the statutory retirement age. This is balanced by 490,629, or 22.3% in the 16-29 age groups, which might be identified as the industry's optimal entry age range. There is a dip in numbers in younger age groups, which has been attributed to a fall-off in recruitment in the early 1990s possibly due to the industry recession.

Also, supply of people in the 16-19 age group, traditionally the entry point into manual portions of the industry is a growing constraint due to the rise in uptake of post-16 education options. The size of this age-band in the manual sector in 1990 was over 145,000, compared to 92,000 in 2003; a decrease of more than a third. The increase in retention of pupils to AS and A level, and a similarly at degree level is reducing the recruitment pool of high quality candidates these ages, and because individuals with academic qualifications often have other aspirations than to work in manual trades, they may be lost to the industry for good. The increased popularity of higher education together with the Government's target of 50% participation will continue to reduce the available people for vocational training and direct employment. This will result in industry having to recruit from non-traditional labour pools such as those provided by women and ethnic minorities. A view highlighted in a





recent investigation by the Equal Opportunities Commission (EOC)⁵⁵. In its report the EOC concludes that there is a clear link between skills shortage sectors, such as construction, and the under-representation of women, and that widening recruitment pools to include more women offers a solution.

3.3 The Regional Split

Construction employment in the regions varies from 58,000 to 306,000. As a proportion of all regional employment across Great Britain^x, it is in the fairly narrow range of 5.8%-8.5%.









The pattern for contractors is far more irregular. Based on firms' registered addresses, the South East has the highest proportion, with some 30,000 companies, nearly a fifth of those in the UK. Clearly the region is a popular one in which to site a construction company HQ. Wales and the North East are the least popular locations for construction firms, although this may in part be a symptom of the lower populations in these regions and the generally lower level of economic activity.

Meanwhile, the picture of output has a larger regional skew still. Here, the South East and London dominate accounting for over a quarter of the industry's output. Significantly, these figures include work done outside the region by companies from within the region. The implication is that not only are companies disproportionately clustered in the South East and London, it also has a disproportionate share of high-earning companies' headquarters. Most other regions punch below or only slightly above their weight in terms of output.

	<p>Yorkshire and Humberside Regional Employment⁵⁶: 2,293,780 Construction Employment⁵⁷: 183,213 (8.0% of those employed) Self-employed within construction⁵⁸: 54,953 (30%) Private Construction Contractors⁵⁹: 13,156 (7.7% of GB) Construction Output^{xi 60}: £7,295m (8.1% of GB)</p>
	<p>West Midlands Regional Employment: 2,427,684 Construction Employment: 169,143 (7.0% of those employed) Self-employed within construction: 62,651 (37%) Private Construction Contractors: 15,093 (8.8% of GB) Construction Output: £7,994m (8.9% of GB)</p>
	<p>South West Regional Employment: 2,395,704 Construction Employment: 179,630 (7.5% of those employed) Self-employed within construction: 79,524 (44%) Private Construction Contractors: 18,397 (10.8% of GB) Construction Output: £7,548m (8.4% of GB)</p>
	<p>South East Regional Employment: 4,034,984 Construction Employment: 306,727 (7.6% of those employed) Self-employed within construction: 137,414 (45%) Private Construction Contractors: 30,949 (18.1% of GB) Construction Output: £13,854m (15.4% of GB)</p>

^x The equivalent statistics for all regions and countries in Great Britain have the same source.

^{xi} Current prices in 2003.

	<p>East</p> <p>Regional Employment: 2,673,127 Construction Employment: 204,322 (7.6% of those employed) Self-employed within construction: 89,845 (44%) Private Construction Contractors: 22,513 (13.2% of GB) Construction Output: £8,912m (9.9% of GB)</p>
	<p>North East</p> <p>Regional Employment: 1,054,832 Construction Employment: 89,461 (8.5% of those employed) Self-employed within construction: 19,243 (22%) Private Construction Contractors: 4,389 (2.6% of GB) Construction Output: £3,220m (3.6% of GB)</p>
	<p>London</p> <p>Regional Employment: 3,410,227 Construction Employment: 199,052 (5.8% of those employed) Self-employed within construction: 91,316 (46%) Private Construction Contractors: 17,578 (10.3% of GB) Construction Output: £13,796m (15.3% of GB)</p>
	<p>East Midlands</p> <p>Regional Employment: 2,014,096 Construction Employment: 152,978 (7.6% of those employed) Self-employed within construction: 53,207 (35%) Private Construction Contractors: 12,911 (7.5% of GB) Construction Output: £6,382 (7.1% of GB)</p>
	<p>North West</p> <p>Regional Employment: 3,078,183 Construction Employment: 232,599 (7.6% of those employed) Self-employed within construction: 83,168 (36%) Private Construction Contractors: 16,1851 (9.5% of GB) Construction Output: £9,990m (11.1% of GB)</p>
	<p>Scotland</p> <p>National Employment: 2,390,477 Construction Employment: 174,811 (7.3% of those employed) Self-employed within construction: 35,749 (20%) Private Construction Contractors: 12,092 (7.1% of GB) Construction Output: £7,618m (8.4% of GB)</p>
	<p>Wales</p> <p>National Employment: 1,305,945 Construction Employment: 102,658 (7.9% of those employed) Self-employed within construction: 34,633 (34%) Private Construction Contractors: 7,830 (4.6% of GB) Construction Output: £3,590m (4.0% of GB)</p>
	<p>Great Britain</p> <p>National Employment: 27,079,039 Construction Employment: 1,994,594(7.4% of those employed) Self-employed within construction: 741,703 (37%) Private Construction Contractors: 171,092 Sum of regional construction output: £90,199</p>



Northern Ireland^{xii}

Construction Employment⁶¹: 57,775
Self-employed within construction⁶²: 30,047 (34%)
Private Construction Contractors⁶³: - 7,265
Construction Output⁶⁴: £2,581m

There are some interesting trends hidden in the figures worthy of a brief acknowledgement. For example London, with its very high construction output, seems to not support a proportionately larger construction workforce. Part of the explanation for this is probably because it is the most populous region in the UK, so a high construction workforce is counterbalanced by a high number of other employees. But it is significant to note that LFS is based on region of residence, not region of employment. The number of manual workers living in and around the capital has declined due to high house prices, so it seems likely that there is some commuting to fulfil the capital's construction needs. This is borne out by the high proportion of construction employees living in the neighbouring Eastern region, which is home to the dormitory towns of Essex.

3.4 Workforce Mobility

ConstructionSkills are currently carrying out a significant piece of work on the geographical and occupational mobility of the construction industry workforce. A model for the research was piloted⁶⁵, in partnership with the Engineering Construction Training Board (ECITB) and South East England Development Agency (SEEDA), in London and the South East of England (hereafter 'LASER') between May to August 2003. This survey consisted of interviews with 3,252 construction workers employed across 133 sites. Fieldwork was conducted mainly on a face-to-face basis but includes a small number of self-completion responses (72).

Whilst the study was initially limited to London and the South East, it has produced some interesting findings which if proven to be representative of the industry in other regions would provide significant evidence to support the widely held assumption that the construction workforce is indeed very mobile and to that end flexible.

A very wide range of occupations was covered in the research, with only five making up more than 5% of our overall sample: labourer / general operatives (14%), carpenters / joiners (12%), bricklayers (10%), electricians (9%) and groundworkers (6%).

Half of the sample workers were employed directly by a company, 43% were self-employed and 6% worked for an agency. The level of self-employment varied enormously by occupation being particularly high among carpenters / joiners, plasterers and dry liners and bricklayers among whom two thirds or more are self-employed.

Agencies appear to be used mainly for labouring / general operative positions with 22% of labourers / general operatives being employed by an agency.

Two thirds (66%) of workers said they were employed on a permanent basis and approaching a third (29%) were working on a temporary basis (a small proportion, 4%, worked on some other basis or were unsure if it was permanent or temporary).

^{xii} As all figures for Northern Ireland are from different data sources they are not comparable to those for Great Britain.

Those working on a temporary basis said this was usually 'until the work dries up' or 'until the project finishes' rather than a specified period of time.

That the line between self-employment and direct employment can be somewhat blurred in the construction sector is evident in the fact that a significant minority (39%) of those saying they were self-employed also indicated that they were employed on a permanent basis. As many as one in five (19%) of the self-employed said they had been working for the current contractor or firm paying them for over five years.

The construction workforce in LASER draws in workers from a wide geographic area, especially in London. In the South East two thirds of those interviewed (66%) were originally from LASER, hence the construction sector in the region relies for a significant proportion (though a minority) of its workforce on attracting those originally from outside the area. Currently, this is roughly evenly split between those originally from other parts of England (18% of those interviewed in the South East) and those from elsewhere (16%). Those from further afield than England are evenly split between those drawn from other parts of the UK (8%) and those originally from outside the UK (9%). The proportion of construction workers in the South East from outside the UK closely matches the figure among all residents in the South East coming from outside the UK (8%).

Of those interviewed at London sites, a minority (40%) were originally from LASER. In total across London sites, two thirds (64%) were originally from England, 17% from other parts of the UK and one in five (19%) from outside the UK. Compared to 2001 Census information on residents, the construction workforce in the capital includes a much higher proportion of those from Ireland, Scotland and Wales, who make up only 5% of the London residents. There was also evidence of significant numbers of workers in London from Eastern Europe, 3% of those interviewed being from Romania and 2% from Lithuania.

Again confirming the high degree of mobility among the construction workforce in LASER, less than half (46%) say all their construction career has involved working on sites in London and the South East. This compares with 18% who say half or less of their construction careers has been spent on sites in LASER.

One in nine (11%) workers interviewed were travelling to work from a temporary address. This was much higher among those working at ECITB sites (36%), those in London (19%) and those working for an employer operating nationally.

Construction workers are highly mobile in that they travel much greater distances to work than other workers in the region. The average distance travelled is 24 miles each way, and in the South East over a third (36%) travel more than 25 miles to work, a figure that compares with 5% among other workers in the South East.

Findings indicate that:

- ▶ 12% of the LASER construction workforce travel in to LASER from an address outside the region
- ▶ 20% live outside LASER (i.e. their permanent address is outside the region, hence clearly nearly all those based in temporary accommodation have a permanent address outside the region). These workers are more likely to have a qualification than resident workers.

- ▶ These ‘imported’ workers (with a permanent address in the UK outside LASER) come from all regions of GB, though slightly higher among neighbouring regions (5% Eastern region, 4% from the South West and 5% from the East and West Midlands combined).

3.5 The Migration Factor - Migrant Workers in the UK Construction Industry⁶⁶

There is much anecdotal evidence suggesting that the issue of migrant workers in the UK construction industry requires further understanding. According to a recent survey ‘one in ten builders are migrants’ (Construction Confederation, 2004). The survey of some 300 construction sites across the UK found that 10% of workers spoke English as a second language with many workers coming from Central and Eastern Europe. The survey found that few of these workers have work permits although many pay tax because of an anomaly in the system (the issue of temporary Registration Cards (CIS 4) regardless of nationality).

The difficulty in establishing the real extent of the migrant labour issue is that on examining the official statistics it becomes apparent that there is general paucity of data and the significant time lag between data collection and publication. Furthermore, it should be noted that the official statistics represent legal migrant workers; the issue of illegal migrant workers is an even more complex one, although it’s probably fair to say that much of the anecdotal evidence refers to both legal and illegal migrants.

The Home Office suggests that there are an estimated one million illegal immigrants in the UK, but there are no official estimates of the numbers working in the construction industry. The one million represents 1.5% of the population and, say, 3% of the workforce. Anecdotal evidence, including media reporting, suggests that the main activities of illegal migrants include agriculture, tourism and construction. It seems plausible that the proportion of illegal migrants in the construction workforce could be 5% or more.

The table below shows the number of legal migrant workers in the UK construction industry for the years 2000 and 2001 (currently the only years available) according to Eurostat⁶⁷ (the EU Statistical Office). The figure for total migrant employment of 61,206 represented approximately 5% of the total UK construction (SIC 45) labour force in 2001⁶⁸.

Migrant workers in the UK construction industry (SIC 45)

2001	Employees	Self-employed	Total Migrant Employment
EU Migrants	18,626	11,718	30,344
Other Migrants	19,164	11,698	30,862
Total Migrants	37,790	23,416	61,206
2000	Employees	Self-employed	Total Migrant Employment
EU Migrants	21,008	9,737	31,287
Other Migrants	17,497	4,453	21,950
Total Migrants	38,505	14,190	53,237

Source: Eurostat NewCronos (2004)

Interestingly, the data suggests that, in 2001, there was a virtually equal share of both EU migrants and migrants from other countries entering the industry. While the numbers of EU migrants has remained relatively stable over the period the numbers of migrants from other countries has increased dramatically, by some 40%, although

how much of this is due to sampling errors remains to be seen. Furthermore, most of this increase seems to have occurred in the self-employed category.

These findings run counter to those reported by the Home Office (2001), which suggest that in 1999 migrant workers in the UK construction industry were predominantly EU nationals (what they call the 'Irish effect'), in fact they accounted for almost three quarters of foreign nationals employed. However, when the Irish are excluded non-EU nationals are more likely to work in the sector than EU nationals. More specifically, this source goes on to suggest that, of the other nationalities, those from the Indian sub-continent are more likely than other foreign groups to work in the sector.

This may be a daring assumption but given recent anecdotal evidence, in addition to the findings from this brief analysis, it seems reasonable to suggest that the make up of migrant workers in the UK construction industry is changing from predominantly EU nationals to those from non-EU countries. In other words, EU nationals represent a declining share of migrant labour in the UK construction industry. Generally what we would expect.

However, these estimates are based on 2001 data and given the recent accession of new member countries to the EU the picture may well be changing. It would seem that the evidence or lack thereof points to a need for a comprehensive study of migrant labour in UK construction 'as it presently is'. This should be both quantitative (numbers, geographic origins, levels of pay and productivity) and qualitative (formation, skill levels, terms of employment, employment relations, recruitment). CITB-ConstructionSkills is currently undertaking DTI Pil funded research into workforce mobility in the UK construction industry. This survey-based work asks both employers and employees about their geographic and occupational origins in an attempt to understand the true contribution and influence of migrant labour to the construction industry.

The survey asks about:

- ▶ The numbers of such workers and their nationalities
- ▶ Their level of English
- ▶ How they came to be employed and in what occupations
- ▶ The broad reasons as to why they were employed
- ▶ How health and safety operated among these workers.

It is anticipated this research could inform a comprehensive future study of the migrant labour issue in UK construction.

The construction industry has a long tradition of employing migrant labour. Given the current rate of growth in UK construction output with a demand scenario of around 3% growth rate, this implies either a massive step-change is achieved in labour productivity by greater and more efficient investment in human capital (a challenge for the Sector Skills Council), or it implies labour force growth of around 3% pa. Can the latter come from 'domestic' sources?

It seems unlikely, even with substantial increases in relative construction wages, salaries and conditions but that needs to be explored. The alternative is to 'import' labour on a large scale. Aside from political sensitivities to charges of 'swamping', this raises difficult questions about the impact on investment in human capital, skill levels, wages & salaries and LP. The danger is that the short term solution that

government and firms will adopt will be to imitate what has happened in the USA in the 1960s and 1970s - i.e. replace increasingly scarce, productive but high-paid labour by abundant, less skilled and less productive but much lower paid migrant labour. In the US this was the start of a subsequent long 'vicious circle' in which construction industry labour productivity and relative wage rates have chased one another downwards - with lower wages reducing incentive to invest in either fixed or human capital.

3.6 Skill Levels in the Construction Industry

The workforce is biased towards lower level qualifications than the overall UK workforce. Apprenticeships are common with, in some regions almost half of the workers being trained in this way.

The below table shows the qualifications of the construction industry workforce in England, the three devolved nations and UK overall⁶⁹.

Construction Industry Workforce Qualifications, UK: 2003

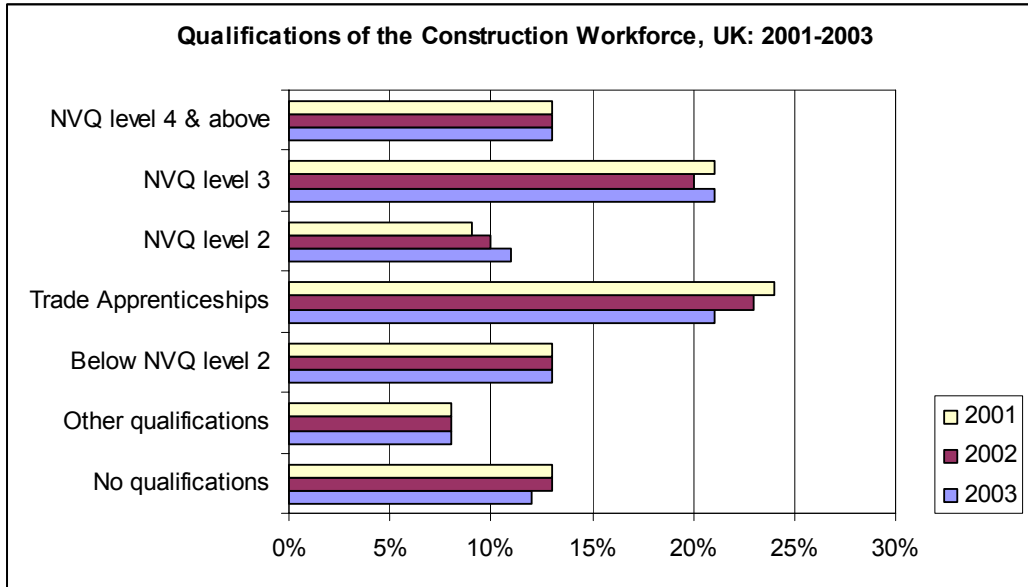
	England	Wales	Scotland	Northern Ireland	UK
S/NVQ level 4 & above	13%	15%	14%	9%	13%
S/NVQ level 3	21%	19%	27%	10%	21%
S/NVQ level 2	11%	12%	7%	14%	11%
Trade Apprenticeships	20%	17%	31%	45%	21%
Below S/NVQ level 2	15%	13%	7%	3%	13%
Other qualifications	9%	10%	5%	1%	8%
No qualifications	13%	14%	8%	17%	12%
	100%	100%	100%	100%	100%

Source: Office for National Statistics – Labour Force Survey

From the table it is evident that:

- ▶ Apprentice training is substantially more popular in Northern Ireland and Scotland than the rest of the UK.
- ▶ Wales has the highest proportion of S/NVQ level 4 and above.
- ▶ The proportion of S/NVQ level 3 and above for each of England, Scotland and Wales closely follows the UK position yet Northern Ireland lags significantly (19% vs. 34% for UK).

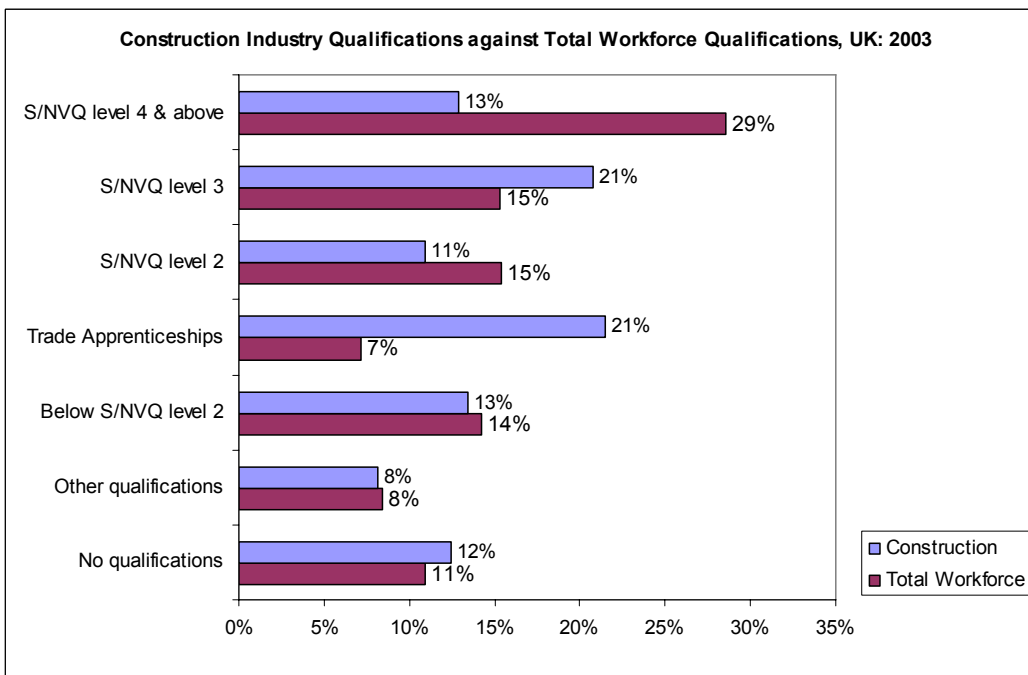
This position has remained consistent over the last three years as the chart below demonstrates⁷⁰.



Source: Office for National Statistics – Labour Force Survey

3.7 Construction Industry Skill Levels vs. Rest of UK

Taking the UK construction figures and comparing them to the UK total workforce qualifications also highlights some contrasts and comparisons, as shown in the following chart⁷¹.



Source: Office for National statistics: Labour Force Survey

Most notable are:

- ▶ The proportion of the workforce with a S/NVQ level 4 and above is much lower in Construction
- ▶ The proportion of the workforce with a trade apprenticeship is substantially higher in Construction

- ▶ The proportion of the workforce with either an S/NVQ level 2 and below and those with either other or no qualifications are comparable to the UK total workforce.

3.8 The Impact of the Construction Skills Certification Scheme (CSCS) and On-Site Assessment and Training (OSAT) on the Qualifications of the Workforce

3.8.1 Qualification Targets

The construction industry has suffered from both a poor public image and a poor safety record. Provisional figures from the Health and Safety Executive⁷² show that there were 70 fatal injuries in the construction industry for the period 2003/04. Whilst this represents an 11% reduction from 2001/02⁷³, the construction industry still accounts for over a third of all worker fatalities. Consequently, health and safety remains a key theme for both the Government and the construction industry. However, it has been the industry that has been instrumental in taking the lead. In addressing the challenge of improving site safety, the industry has proactively developed and supported health and safety testing and skills registration schemes, including the implementation of the Construction Skills Certification Scheme (CSCS). This requires those entering construction sites to hold a card showing they have the skills to operate safely on site. Further health and safety legislation will lead to a greater demand for tactical skills to deal with site safety and strategic skills to design and operate safer sites. Site managers will increasingly require better skills in ensuring each operative is aware of the dangers and is capable of avoiding and minimising them. Professionals will need to gain a greater appreciation of health and safety issues to ensure that sites are designed to remove the risks.

The drive towards a fully qualified workforce in the industry has already gathered momentum and acquired wide support amongst the main federations:

- ▶ The Major Contractors Group (MCG): 82% of MCG workforce hold a Construction Skills Certification Scheme (CSCS) card and 66% of workforce on MCG sites hold a CSCS card
- ▶ Civil Engineering Contractors Association (CECA): a fully qualified workforce on own sites by 2007
- ▶ National Federation of Builders (NFB) and Construction Confederation: a fully qualified workforce by 2010

However, the qualification of the workforce will continue to feature as a key component of issues relating to recruitment and retention.

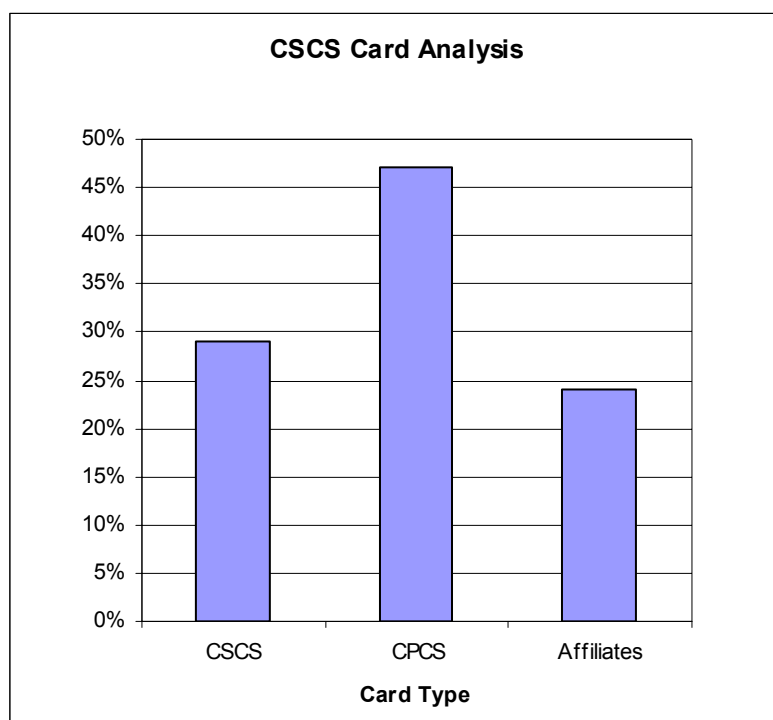
For craft trades this drive generally means qualification to S/NVQ Level 2 or above, or its equivalent (City & Guild certificates), and ownership of a Construction Skills Certification Scheme (CSCS) card.

3.8.2 Construction Skills Certification Scheme (CSCS)

CSCS aims to register every competent construction employee within the UK not currently on a skills registration scheme or a skills registration scheme affiliated to the same quality standard. The scheme is designed to assure clients that operatives' skills have been validated against national standards and they have the required knowledge to operate safely on site. The CSCS card also provides evidence that the holder has undergone health and safety awareness training or testing.

Registration for an S/NVQ together with a Health and Safety test pass is enough to gain an Experienced Worker card. This demonstrates an operative's experience and competency in a trade, but indicates that they have yet to achieve the S/NVQ qualification.

The CSCS card scheme has grown rapidly from 134,000 at the start of 2001 to 600,000 at the start of 2004⁷⁴. This rapid growth in overall numbers during the last three years is largely made up of affiliations and an amalgamation. The Table below shows the relationship, in percentage terms, of the original Scheme, the amalgamation of the Construction Plant Certification Scheme (CPCS), and affiliates. The original Scheme accounts for 29%, CPCS 47% and the affiliates 24% of the total numbers.



Source: CITB ConstructionSkills Records Office. Total Population January 2004: 600,000 card holders

The original Scheme, without affiliations and amalgamation has grown steadily from 1999 when there were 112,000 cardholders to 240,000 at the end of 2003. Table 2 illustrates the growth of the original Scheme without the Amalgamation with CPCS and Affiliates. However, the Table also shows that only 20% of the eligible workforce currently holds CSCS cards.

The growth of CSCS (excluding amalgamations and affiliations)

	1999	2000	2001	2002	2003
New Cards Issued	16,393	19,159	8,155	37,747	85,460
Total Number of Cards	112,497	133,613	140,068	172,312	240,189
Total Numbers in CSCS industry occupations (Oct 2003)*	1,176,030	1,176,030	1,176,030	1,176,030	1,176,030
Percentage of CSCS occupations holding cards	9.57	11.36	11.91	14.65	20.42
Annual percentage increase in occupations holding cards		1.80	0.55	2.74	5.77

Source: CSCS Records Centre
Based on the CITB-ConstructionSkills Training & Employment Forecast 2003

Any view that the upskilling and qualification of the workforce is likely to occur as a result of worker-led demand rather than an employer- or client-led demand is shown to be unlikely in the wake of results from the recent Workforce Mobility and Skills study of the Construction Sector in London and the South East⁷⁵. Whilst the study was limited in scope to London and the South East, it has produced some interesting findings which if proven to be representative of the industry as a whole would support current strategy towards qualifying the workforce. Results of the study show that:

- ▶ Although 12% of workers are currently working towards a qualification, most of these already have a qualification. Those working towards a qualification who do not already have one represent 4% of the overall workforce, clearly leaving a large number unqualified.
- ▶ Relatively few workers (12%) think they need more training to be able to do their current job. The figure was no higher (11%) among those with no qualifications or skill cards / certificates who might be deemed most in need of further training or qualifications
- ▶ As many as half (54%) those who had been in the industry less than a year felt they had all the skills needed for their current job.

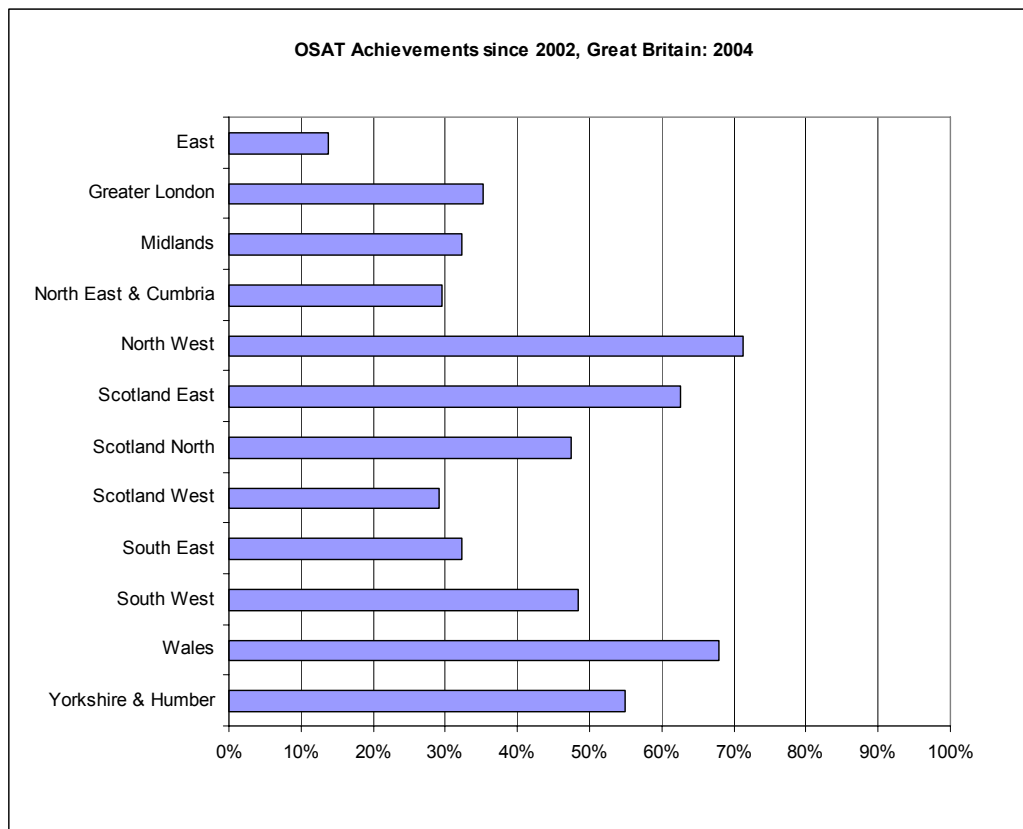
Hence it is clear that to increase the qualification levels of the overall construction workforce to any significant degree requires initiatives targeting companies rather than individuals, and the implementation of innovative and creative approaches to assessment that reach the workplace.

3.8.3 On-Site Assessment and Training (OSAT)

To meet this challenge of qualifying every member of the workforce, CITB developed the On-Site Assessment and Training (OSAT) programme. The aim of OSAT is to assess workers for S/NVQs in the workplace, helping experienced workers get the qualifications to prove they can do the job.

With OSAT, workers can turn their existing skills and experience into a nationally recognised qualification such as an S/NVQ. Having these qualifications also means that they will be eligible for a CSCS card. The whole process is carried out whilst the workforce is on site so workers don't have to take time off to go to college. Typically, the whole process takes four or five visits over a period of less than six months, and is available for most occupations in construction.

To date there have been 74,700 OSAT registrations, which have resulted in 26,300 S/NVQ achievements⁷⁶. However, the market for OSAT remains significant.



Source: OSAT Business Area Statistics, May 2004

Current forecasts put the potential size of the market for the people available to go through OSAT at between about 250,000 and 500,000 people, although this is very much dependent on the level of engagement that can be generated within sector groups representing SMEs and with individuals purporting to hold a trade apprenticeship. If all of those individuals currently working within construction who report having a trade apprenticeship are considered to be suitably qualified, or can be encouraged to convert their experience into an S/NVQ, it would leave a little under 225,000 individuals with a qualification or experience below S/NVQ level 2 that would need qualifying.

3.9 Skills Shortages and Gaps

In this section we analyse the skills deficits that the construction sector experiences. In doing so we use two definitions of skills gaps and skills shortages:

- ▶ **Skills shortages** are the inability to recruit people with the appropriate skills at an appropriate wage. The symptoms of skills shortage include long-term unfilled vacancies and understaffing. The knock-on effects of this can include long working-days and working-weeks and high overtime rates. Companies' performance can also be affected, including their capacity to bid for and fulfil new work.
- ▶ **Skills gaps** are defined as 'holes' in the knowledge and competence of existing staff. These gaps can lead to reduced performance, quality and safety. Skills gaps may consequently result lower profitability and productivity, reduced quality output and longer snagging, and an under-par health and safety record.

3.9.1 Key conclusions on skills shortages and skills gaps

The industry has significant skills shortages, and this does impact its performance and competitiveness.

- ▶ Shortages in trades and crafts people particularly affect short-term and project-based recruitment. Shortages can be highly acute but usually short-term, they can affect the performance of the company on specific projects particularly those requiring specialist skills.
- ▶ The key impact of short term skills supply issues is to increase wage rates. The data on Earning Differentials bears this out; manual wages in construction are currently running at more than 12% over national norms.

The matter of skills gaps in the industry is not perceived by employers as the main skills problem.

- ▶ Compared with other industry sections, construction employers are comparatively content with the skills levels of their employed staff. .
- ▶ There is a specific issue of under-skilled recent entrants to the sector, who employers identify as requiring considerable training and development to become work-ready. This includes chartered graduates and FE qualified tradespersons; health and safety and business sense are two skills often in short supply.
- ▶ Changes in technology, building methods and business processes often require a skill change, and the absence of key skills to implement and deliver them can mean that outdated methods persist past their sell-by-date.

3.9.2 Key issues raised by these findings

The industry requires a better flow of people particularly from under utilised recruitment pools (women, ethnic minorities and immigrant workers). It needs good information on demand so it can plan better its workforce of the future.

The industry requires training that is appropriate and affordable particularly:

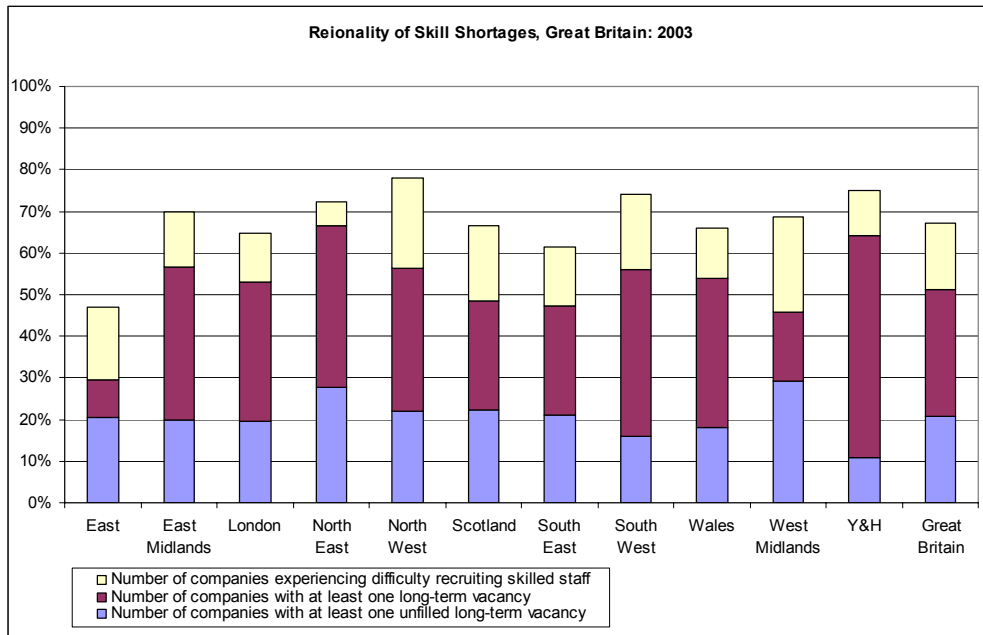
- ▶ For craft skills, on site assessment and training.
- ▶ For smaller companies, the ability to train “on the job” with their suppliers and main contractors.
- ▶ For managers, effective and relevant undergraduate courses that attract the best candidates, create the skills for the future and ensure that specialists are available.

3.10 Skills Shortages and Skill Gaps in the Trades Workforce

Each year ConstructionSkills, via the regional offices of CITB-ConstructionSkills asks approximately 500 construction companies from across Great Britain about their skill needs⁷⁷. The survey in Autumn 2003 revealed that:

- ▶ Difficulties in recruitment had eased again in 2003 but were still at a high level, affecting 67% of participating employers. In terms of unfilled vacancies, (a more strict definition of skill shortages), a lower value of 21% was reported.
- ▶ Overall employers were satisfied with their existing workforce but a considerable proportion (approximately 50%) felt new employees lacked certain skills.

3.10.1 The regionality of skills shortages

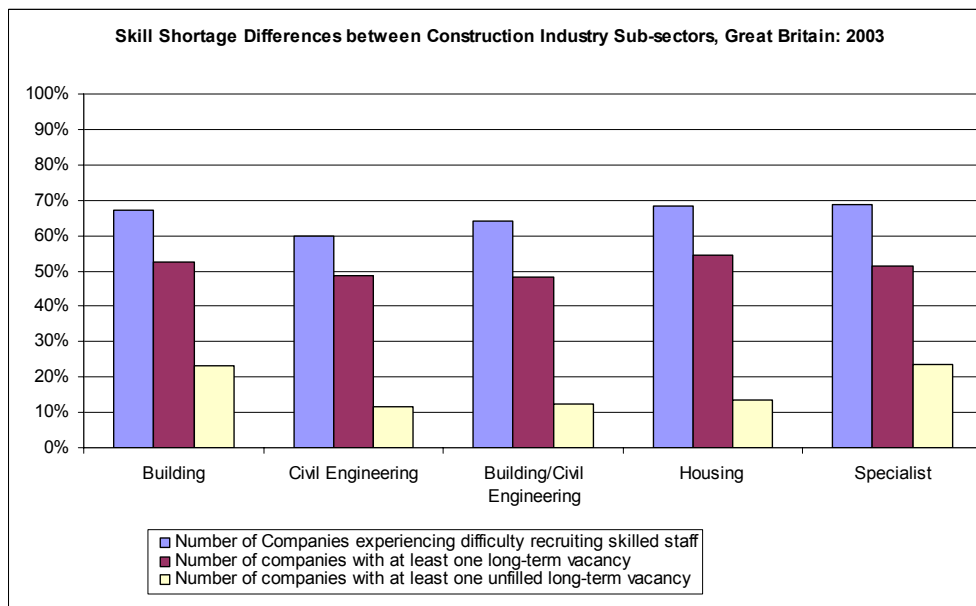


Source: CITB-ConstructionSkills: Employers' Skills Needs Survey, 2003

Notes: Regional analysis of areas with low response rates should be treated with caution

The highest percentage (78%) of employers experiencing difficulty recruiting skilled staff was in the North West, and the lowest was in the East (47%). However the highest percentage of employers reporting at least one unfilled long-term vacancy was in the West Midlands.

3.10.2 The differences between sub-sectors of the industry and size of firm



Source: CITB-ConstructionSkills: Employers' Skills Needs Survey, 2003

The above chart shows relative parity in the five sub-sectors at which the data is analysed.

In terms of size of firm, medium and larger sized companies (more than 50 employees) are having the most difficulty in recruiting skilled staff. However in terms of having at least one unfilled long-term vacancy, small firms with less than 50 employees were worst off

3.10.3 Skills shortages by occupation

In terms of difficulties in recruiting Wood Trades, Bricklayers, Plasterers, Managers and General Operatives/Labourers presented the most difficulties in 2003.

However in terms of having **long-term vacancies** the pattern is a little different. Managers, Plant Mechanics, Professional and Technical staff are highlighted, along with Clerical and Supervisors. Research shows these to be occupations which usually form part of a company's permanent workforce, as opposed to those who may normally be hired on a project by project basis.

Finally, looking at occupations where vacancies are remaining unfilled (arguably the most acute areas) the picture changes again to highlight Plant Mechanics, Plumbers, Roofers and Supervisors.

A possible pattern emerges as follows. If companies are asked which occupations present most recruitment difficulties they will typically mention Wood Trades and Bricklayers – because they are most numerous in the workforce. However when asked about vacancies (as opposed to normal project by project recruitment) they will refer to their core workforce members including Professional and Technical staff, Managers and Plant Mechanics.

These vacancies may not however be hardest to fill (for example Professional staff) whereas others including Plumbers, Roofers and Plant Mechanics are causing the most severe difficulties.

Generally in thinking about skill shortages it would be helpful to bear in mind differences between volumes of shortages, as opposed to intensity of difficulty. Also for construction companies how they recruit temporary as opposed to permanent staff.

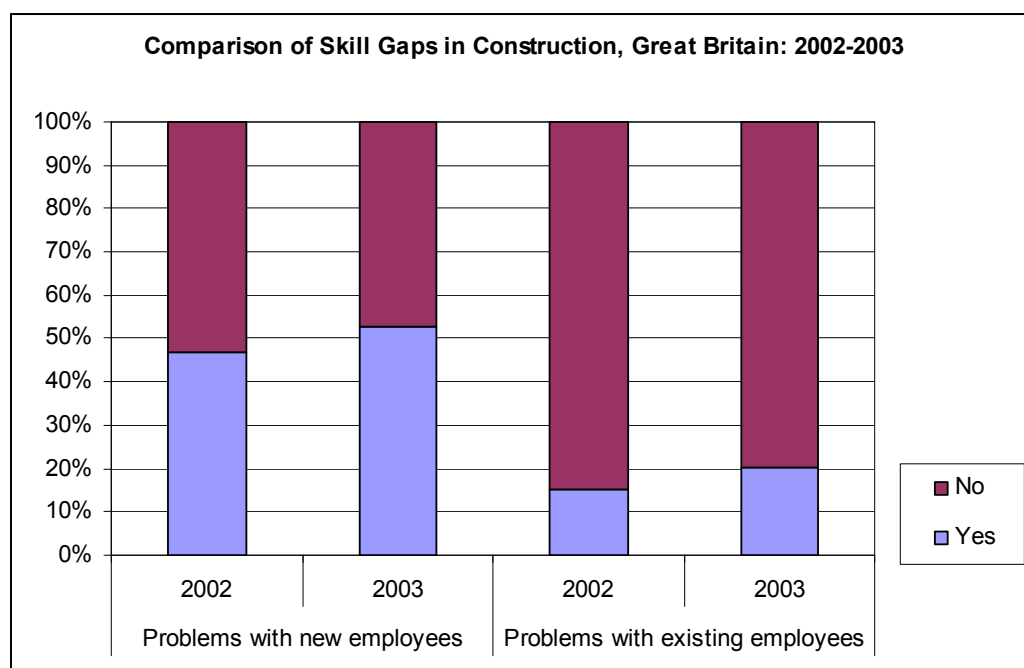
For Great Britain as a whole, approximately half reported that recruitment difficulties applied to both direct and indirect labour, with only a small proportion stating it applied to indirect only.

From these results it could be inferred that companies find recruitment of indirectly employed workers less of a problem than finding permanent staff. Other research shows indirect employment to be much more common for site-based skilled trades, whereas permanent staff are, in many firms, limited to head office white collar/clerical jobs. One possible interpretation is that recruitment of site-based workers is not seen as a problem for main contractors as long as they can rely on sub-contractors to manage it for them. However where the contractor wishes to recruit staff (site-based or office-based) into permanent direct employment, then difficulties arise.

3.10.4 Skills gaps

The majority of employers (80%) were satisfied that their existing employees were able to cope with current requirements, including dealing with new technology, new construction methods and/or new materials. However approximately 50% of participating employers reported problems with **new** employees who, although trained and qualified for certain occupations, still lacked a variety of skills required.

Both these results are directly comparable to those from a year ago as shown in the below chart.



Source: CITB-ConstructionSkills: Employers' Skills Needs Survey, 2003

In conclusion, although recruitment from outside the industry is still relatively rare, it had increased in the 2003 survey. But the majority of staff are being trained and promoted from within the company or sourced from other construction companies.

3.11 Skills Shortages and Gaps in the Professional Workforce

The first major skills survey focused on the UK construction professional services (CPS) sector was carried out by the Construction Industry Confederation (CIC) in 2003⁷⁸. In total 927 companies took part. The following sets out the key findings in relation to skills shortages and gaps:

- ▶ 65% of firms have experienced significant difficulties in recruiting staff with appropriate sets of skills in the last 12 months
- ▶ Few firms experience severe difficulties with the skills of their existing staff but 80% do experience moderate skills problems

3.11.1 Difficulties in recruiting staff by region

There are some variations in the data when viewed by region. In Yorkshire and Humberside 33% of firms have severe problems. The situation was similar in the North of England (33%), East Midlands (27%), Scotland (27%) and the South West (25%).

3.11.2 Difficulties in recruiting skilled staff by type of firm and region

The data suggest that engineering, project management and multidisciplinary firms have the most significant problems in recruiting staff with the appropriate skills. The situation with respect to architects, surveyors and others appears to be less dramatic.

3.11.3 Difficulties in recruiting skilled staff by size of firm

The evidence suggests that fewer small firms have significant problems in recruiting skilled staff than do larger firms. Of the 54 practices employing 3 or less people that responded to this question, 57% scored their problems as ranking a 0 or 1 (on a scale to 4 – 4 being highest). However 18% of the smallest firms experienced severe problems in recruiting new staff with the required skills.

The data for smaller practices contrasts with the larger firms, for which 87% rated their problems as scoring a 2 or above.

3.11.4 Occupations with skills gaps and skill shortages

Skills gaps and shortages among occupational groups, both observed and anticipated, map closely to type of firm. For example, architectural practices experience the majority of their skills gaps and shortages among architecturally qualified members of staff.

Multidisciplinary firms and the 'bell weather' sub sample are the general exception to this rule, as they tend to employ professionals from more than one core discipline. Perceived skills gaps and shortages in the management and technical occupations also tend to be more crosscutting and are more likely to occur in all types of firm – regardless of core discipline.

There is no evidence in the data to suggest that these results are affected directly by region or size of firm.

3.11.5 The skills they are missing

Technical and practical skills are the largest problems area. Approximately 30% of firms have significant problems in this area with existing staff – rising to 50% among applicants during recruitment.

IT skills are a problem for many firms but there is a difference between general and professional IT skills and between existing staff and applicants.

Client handling skills are an issue for many firms among their existing staff.

3.12 The skills needs of the managers in the sector

In the fourth quarter of 2003 MRM Solutions surveyed the skills of 263 managers within four large construction companies⁷⁹. The work was done to help both participants and CITB-ConstructionSkills understand where investment in training would create the greatest return.

3.12.1 The key findings

The study suggests that the strengths of the construction industry are in the core skills relating to construction management; namely programme management, managing the construction team, construction methods and project completion. These are the skills required to react to a tender and solve the problems associated with delivering that tender.

The study suggests that the weaknesses of the construction industry are in the skills that are required for the future; namely proactive business development, design management, option and risk appraisal and business development. These are the skills to identify, understand and realise an opportunity.

Collectively these two conclusions suggest that the investment of the industry on training and development has focused on getting better at what the industry does now, rather than broadening the skills to take on new challenges for the future. It may be the case that we are recruiting and developing a workforce that is able to react to the present rather than a workforce that creates the future.

3.12.2 The analysis

Information collected was to first identify the critical skills that make a difference between a good and a great construction manager.

The skills were in four areas:

- ▶ **General Management Skills** relating to business, finance and resource planning, people development, communication, information technology, and knowledge management.
- ▶ **Business Development Skills** relating to estimating, programme planning, option appraisal, client understanding, risk management, creating opportunities and presenting bid.
- ▶ **Design Management Skills** relating to design control, programme planning, design hand-over, value engineering, option appraisal, environmental assessment, and contract law.
- ▶ **Construction Management Skills** relating to construction techniques, programme management, team management, procurement, logistics, site set up and project completion.

Two factors were measured: the proportion of the sample with each skill and their competence in using that skill.

3.12.3 The results

The following box shows which skills fit into which segment and using the diagram above one can see the actions required to fix each skill.

<p><u>High penetration, low competence</u></p> <ul style="list-style-type: none"> Risk management Cost management Procurement Option appraisal (Business Development) Construction techniques (Design) Review a design Client understanding Market understanding Contract understanding 	<p><u>High penetration, high competence</u></p> <ul style="list-style-type: none"> Change management Project completion Managing suppliers Sourcing materials Project start
<p><u>Low penetration, low competence</u></p> <ul style="list-style-type: none"> Programme planning Option appraisal (Design) Safety management Dealing with design constraints Construction practices Presenting bids Legal skills Value Engineering Plant management Creating opportunities Environmental assessment Design handover 	<p><u>Low penetration, high competence</u></p> <ul style="list-style-type: none"> Management Site safety Construction skills Estimating Site set up Logistics Design control Design management

MRM Solutions, Skills Census: A Report on Management Skills Gaps in the Construction Industry, 2003

The results in skills linked with **business development** show that the industry is best at traditional “estimate and plan” approach to sales; no surprise given that this is the sales approach required by the majority of clients. The challenge comes as clients move towards negotiated partnerships and other forms of procurement. Skills in this area that allow construction companies to create and understand opportunities (such as market understanding, presenting bids, creating opportunities, applying different construction techniques and risk management) are areas where less than 60% of business developers team claim competence.

The results in skills linked with **design management** show a high proportion of the workforce is competent in the skills required to control and handover a design. A lower proportion of those managing design are competent in the skills required to add value to a design (applying different construction techniques, working around design constraints, option appraisal and value engineering). These skills will have greater importance as contractors take on more responsibility for design. The skills in which the lowest proportion of the design managers are competent impacts mainly on design for safety and the ‘buildability’ of designs.

The results in skills linked with **construction management** is the most encouraging area of the survey with a high proportion (>70%) of those using construction management skills assessing themselves as competent in 12 of the 16 skills measured. The areas of training need (which fall below this 70%) are cost management, plant management and procurement.

Additional analysis of the **general management** skills of the whole sample (not included in the matrix above) suggests that the industry needs to focus on forward planning: many (>50%) of the respondents rate themselves as less than competent in financial, resource and business planning. Similarly, there needs to be a focus on

the skills of the future namely knowledge management, IT and risk management where many in the industry (>40%) claim themselves less than competent.

3.13. A Summary of Other Significant Skills Surveys

Employers' skill needs have been monitored on a regular basis by organisations in the industry. The following extracts on skill shortages are taken from the most recent published reports of major employer federations.

3.13.1 Federation of Master Builders (FMB)⁸⁰

With workload and employment at a higher level in the first quarter of 2004 than in the closing three months of the previous year, and with further increases anticipated in the second quarter, it would be very surprising to find evidence of labour market conditions becoming easier.

However, the overall proportion of respondents experiencing difficulty in obtaining the services of skilled labour, to work either as direct employees or as sub-contractors, is, at 71%, no higher than last time. A breakdown of these shows that 49% reported difficulty finding new direct employees and 52% had difficulty in hiring sub-contractors. Compared with the unchanged overall figure, this indicates a rise in the proportion experiencing difficulty on both fronts (which were 45% and 50% respectively last quarter).

In most regions the 'overall' figure is changed relatively little from last time. However, it is more than 10 percentage points higher for the East Midlands and for Wales, and more than 10 points lower for the South East and West Midlands. The North East still shows the highest 'overall' figure, 92%, whilst Northern Ireland is the lowest at 45%.

For the country as a whole, relatively the largest change in respect of any individual trade is the increase (from 23%) to 30%, of the proportion reporting difficulty finding carpenters and joiners to work as direct employees. This is the highest 'difficulty' figure for an individual trade recorded by this survey. Otherwise, individual figures are higher for recruitment of bricklayers both as direct employees and as sub-contractors, and for employment of carpenters and joiners, and of electricians, as sub-contractors, but those for other trades are reduced. For the UK as a whole, those for roofers are back below 10% for the second survey in succession, but there are noticeably 'above-average' figures for Yorkshire & The Humber and for London.

3.13.2 National Specialist Contractors Council (NSCC)⁸¹

The balance of firms reporting difficulty in recruiting skilled labour has fallen from 33% to 28% and is also down from Quarter 1 2003. Nevertheless, labour shortages remain the biggest issue of the day. Painters have the largest number of reported vacancies closely followed by Carpenters/Joiners and Scaffolders. Also, a large number of vacancies are reported by tiling contractors and recorded in the 'Others' category. The low number of skilled applicants is again cited as the major cause of recruitment difficulty (64%). This quarter, however, 29% were unable to bid for work because of these shortages, a significant increase from the 20% reported last quarter. This is a developing trend. However, 27% expects employment to rise again compared with 21% last quarter and 16% for Quarter 1 2003.

3.13.3 Royal Institute of Chartered Surveyors (RICS)⁸²

Skill shortages increased slightly from the previous quarter with 43% of surveyors reporting a shortage of skilled tradesmen. This is up from 41% in the previous quarter. While no marked trend in skills shortages has been apparent over the last

year, the latest increase remains above the long run average of 40%. Labour availability was poorest for plumbers (53%) exceeding that of bricklayers (52%). Shortages also increased for plasterers (43%), while rising only slightly for carpenters (36%) and electricians (34%).

3.13.4 Civil Engineering Contractors Association (CECA)⁸³

Overall results for the labour market situation facing civil engineering contractors are little different from last time, despite the indications of a weaker trend in workload. The proportion describing as 'unsatisfactory' the supply of engineers and other staff has eased a little further, to 32%, which is its lowest level since July 2000. On the other hand, the proportion indicating difficulty recruiting skilled operatives has risen again, by two percentage points to 48%, higher than it was a year ago (43%). For the supply of semi- and unskilled operatives the 'unsatisfactory' figure is the same as in January (20%).

Recruitment difficulties throughout the CECA regions are relatively closely grouped apart from the very high figure for CECA South West (83%) which has the highest figures under both headings, at 50% and 44%. By comparison CECA North West has no respondent describing as 'unsatisfactory' the supply of semi- or unskilled operatives, whilst only 17% of CECA North East respondents indicate difficulty obtaining the services of engineers and other staff.

By size of firm it is not this time the largest that display the highest 'unsatisfactory' figures. Indeed, for the supply of semi- and unskilled operatives it is the largest firms, with over 600 operatives on their civil engineering sites that have the lowest proportion saying that supply is 'unsatisfactory', eight percentage points less than last time. By comparison, the smallest firms, with fewer than 115 operatives show a 10% increase in their 'unsatisfactory' figure for this category of personnel.

Meanwhile it is the smaller medium-sized contractors that show the highest 'unsatisfactory' figure for the supply of skilled operatives at 55% whilst the larger medium-sized ones have the highest figure for difficulty recruiting staff at 44%

3.13.5 Construction Industry Trade Surveys⁸⁴

The Construction Industry Trade Surveys brings together the results from the Construction Confederation's and the Construction Product Associations' individual surveys of building contractors and product suppliers to provide a single pan-industry assessment of the latest trends.

During the first quarter of 2004, 86% of building contractors had experienced recruitment difficulties. This represents a marked increase from 62% reporting difficulties in the previous survey.

In respect to site trades an exceptional 95% of contractors reported difficulties recruiting plasterers, followed by 83% facing difficulties with bricklayers. Significant shortages were also reported for carpenters and joiners (76%), plumbers (76%) and, to a less extent, electricians (57%).

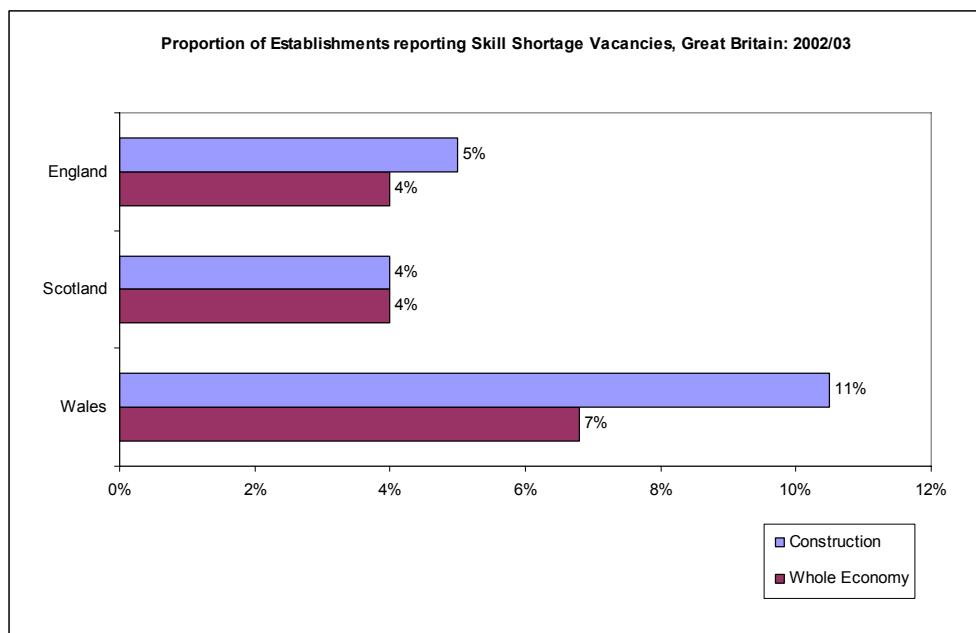
Collectively these results suggest that the inflow of people into the workforce is a greater concern than developing the skills of those employed.

3.14 Comparisons with Other Sectors

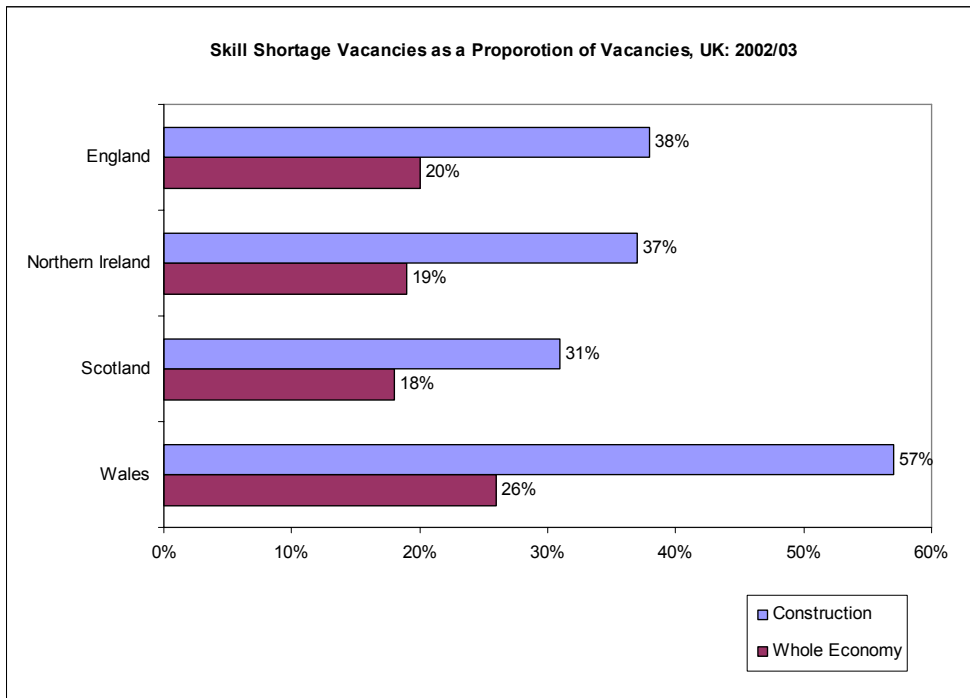
With the exception of Wales, the density of skills shortage vacancies (SSVs) and the proportion of establishments reporting SSVs are directly comparable to the rest of the economy. The measure which shows construction employers experiencing more difficulties than employers across the whole economy is SSVs as a proportion of all vacancies.

Using data from the National Employer Skills Survey's^{85 86 87 88} it is possible to compare the situation in construction with other major employers.

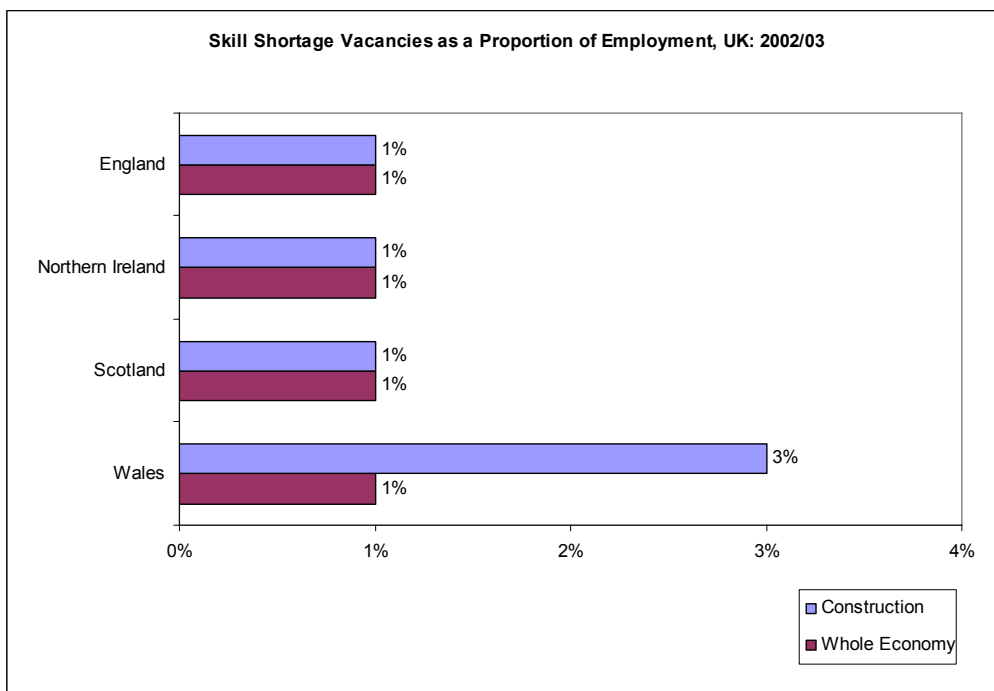
The data in the chart shows the country experiencing the most difficulty regarding SSVs is Wales. Although to be able to put these figures into context the data needs to be compared to the situation in the whole economy.



Source: LSC National Employers Survey 2003; Futureskills Scotland Skills in Scotland 2002: The Employers View 2002; Future Skills Wales 2003 Generic Skills Survey



Source: LSC National Employers Survey 2003; Department for Employment and Learning in Northern Ireland Skills Monitoring Survey 2002; Futureskills Scotland Skills in Scotland 2002: The Employers View 2002; Future Skills Wales 2003 Generic Skills Survey



Source: National Employers Survey 2003; Department for Employment and Learning in Northern Ireland Skills Monitoring Survey 2002; Futureskills Scotland Skills in Scotland 2002: The Employers View 2002; Future Skills Wales 2003 Generic Skills Survey

3.15 Current and Expected Skills Needs

The industry currently is enjoying growth in demand and output and so requires more people at most levels. This trend is set to continue and the existing problems with skills shortage vacancies are likely to expand.

Furthermore, the issue of career and occupational progression poses the additional challenge of ensuring recruitment and training is targeted at occupationally specific gaps.

Anecdotal evidence has previously suggested that Carpenters and Joiners have traditionally been targeted for progression through to management; and that their particular skills set has allowed a significant number move into the more specialist areas (i.e. Shopfitting, Ceiling Fixing, Dry Lining/Partitioning, Fitted Kitchen/Bedroom Installation, Formworking, etc). Whilst no empirical evidence exists to back this up, if it was, and still is the case there would be a need to consider more carefully occupational explicit flows.

Some observers have more recently noted⁸⁹ (again anecdotally) that this tradition of Carpenters and Joiners moving into management is becoming less prevalent, with construction/project managers increasingly being recruited from the professional side, although early findings from the recently completed Workforce Mobility and Skills study⁹⁰ suggests that some craft level workers do move up to become Supervisors/Managers, or move sideways into other craft occupations. However, the same study also suggests that some unskilled workers become craft level operatives, supporting the assumption that a significant proportion of those that begin training but do not complete, still find a way into the Industry. Obviously with the competency benchmark set at Level 2 (in relation to CSCS requirements) this informal entry creates further skills gaps within the workforce.

In managers there are skills gaps and the investment of the industry on management development has focused on getting better at what the industry does now, rather than broadening the skills to take on new challenges for the future.

The industry appears to lack skills to identify, create and realise an opportunity. They are less well equipped for the reform agenda being set by industry “think tanks” such as the Strategic Forum for Construction and Constructing Excellence than they are for conventional contracting.

3.15.1 Latent Skill Gaps

This evaluation of current skill needs has shown that skills have an impact on organisational performance. Both SSVs and skill gaps were reported by employers in the Construction Industry to have led to a loss of business/order to competitors, difficulties with customer service, increased operating costs, and so on.

From this evidence and work undertaken by ConstructionSkills it is clear that employer skills requirements are structured by their existing business strategies; this approach will equip the sector with the workforce for today but does not address the future. Some skill gaps may not be recognised as such until the organisation tries to improve its position in terms of growth or market position – referred to as latent skill gaps. If the average construction company were to adopt a more innovative approach and make better use of the technologies presented then skills gaps would become more apparent as an inhibitor to the business and the pressure on the company to address them would increase.

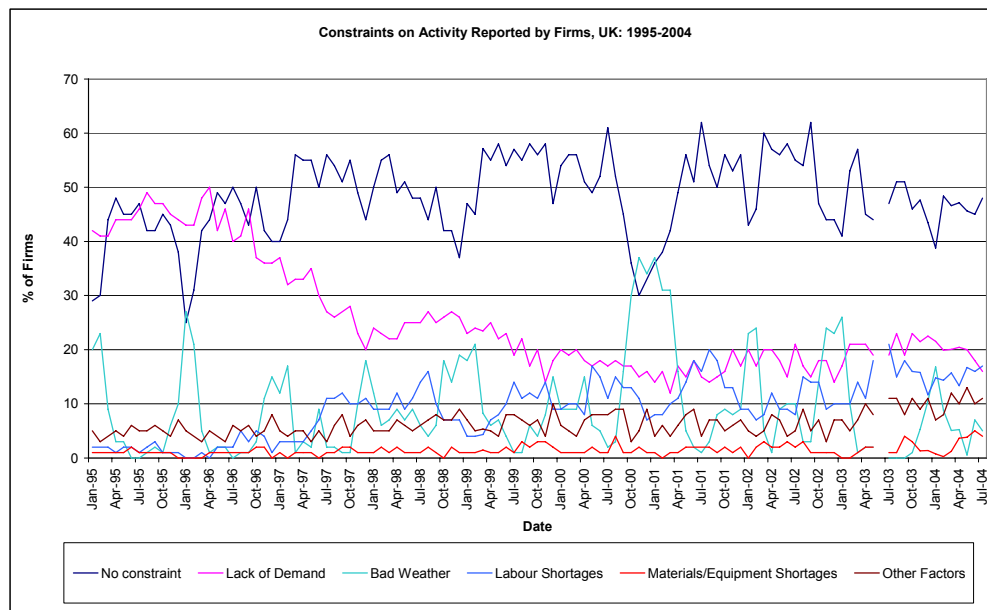
One possible risk is that the industry adopts a low skills equilibrium: the industry does not embrace the technical advances available and so requires no new skills; its lack of new skills in turn prevents it from adopting the technical advances available. Skills gaps do not emerge (apart from those due to people leaving the industry or increased economic demand) and the sector experiences a low skills equilibrium.

There is some evidence of this particularly in innovation, technology and sustainability although the picture is not simple. Large parts of the construction industry are slow to adopt these elements of change which is in part to do with skills but also to do with commercial reasons of availability of technology or lack of client demand for sustainable development.

3.15.2 Constraints on Construction Activity

Skill shortages are only one of a number of constraints faced by employers. Experian Business Strategies publishes a monthly survey of contractors' workloads entitled Construction Industry Focus⁹¹, which is sponsored by the European Commission as a unit in their Business Surveys series. As part of the survey, each month firms across the UK are asked to specify which of a number of factors has been a constraint on activity. The chart below shows this information over a nine-year period (1995–2004).

In July 2004, the proportion of firms reporting constraints on activity marginally fell from 55% to 52%. Whilst the problem of insufficient demand had eased to 16% of firms, the problem of labour shortages rose slightly to 17% of firms reporting it as a constraint on activity. As would be expected during the summer, bad weather had less effect on activity than during the winter months, 5% in July 2004 compared to 17% during January 2004.



Source: Experian Business Strategies: Construction Industry Focus

Learning and Training Supply

This section of the report looks at the provision of training for construction skills including that from:

- ▶ Schools
- ▶ Further Education
- ▶ On Site Assessment and Training
- ▶ Higher Education
- ▶ Public Investment in Training
- ▶ The CITB Levy, and
- ▶ Private Investment in Training

3.16 Education and Training

ConstructionSkills is currently engaged with young people at all levels of the education system from Primary through to Further Education and Apprenticeships, and on into Higher Education. In addition to managing 50,000 FE starts in 2003⁹² CITB-ConstructionSkills had interaction with over 40,000 Key Stage 4 Pupils during the 2003/04 academic year⁹³.

Respectively associated with Further and Higher Education CITB-ConstructionSkills and CITB Northern Ireland, and Construction Industry Council have worked hard to promote the construction industry at an increasingly formative level.

Working with National Construction Week (NCW), the UK wide not-for-profit campaign for construction industry awareness, ConstructionSkills has been able to promote the industry through enabling young people to gain first-hand experiences of the wide range of opportunities available in the modern construction industry.

Whilst NCW is instrumental in engaging young people at a fundamental level, providing valuable initial experience of the construction industry, CITB-ConstructionSkills has also been working with partners to build construction into the curriculum. This has most recently involved the development of a GCSE in Construction. As a vocational qualification this is intended to offer a route of entry into the industry that will equip students with a combination of academic and practical skills that will enable them to succeed in the work-based qualifications currently offered by Further Education.

3.17 Qualifications

CITB-ConstructionSkills fulfils three significant roles related to National Occupational Standards and National/Scottish Vocational Qualifications (NVQs/SVQs).

Firstly, CITB-ConstructionSkills acts as the Standards Setting Body (SSB) for the construction industry. This role involves it identifying where National Occupational Standards and NVQs/SVQs are required, developing them as appropriate in consultation with industry, and gaining approval of them into the National Framework of standards. This also includes their formal reaccreditation every five years to ensure they are kept up to date with working practices. CITB-ConstructionSkills is commissioned by the Governments Projects and Standards Approvals Group (PSAG) to carry out this role.

CIC is responsible as the Standard Setting Body for leading the development of higher level technical, managerial and professional Occupational Standards and NVQs/SVQs across the built environment. The higher level Occupational Standards

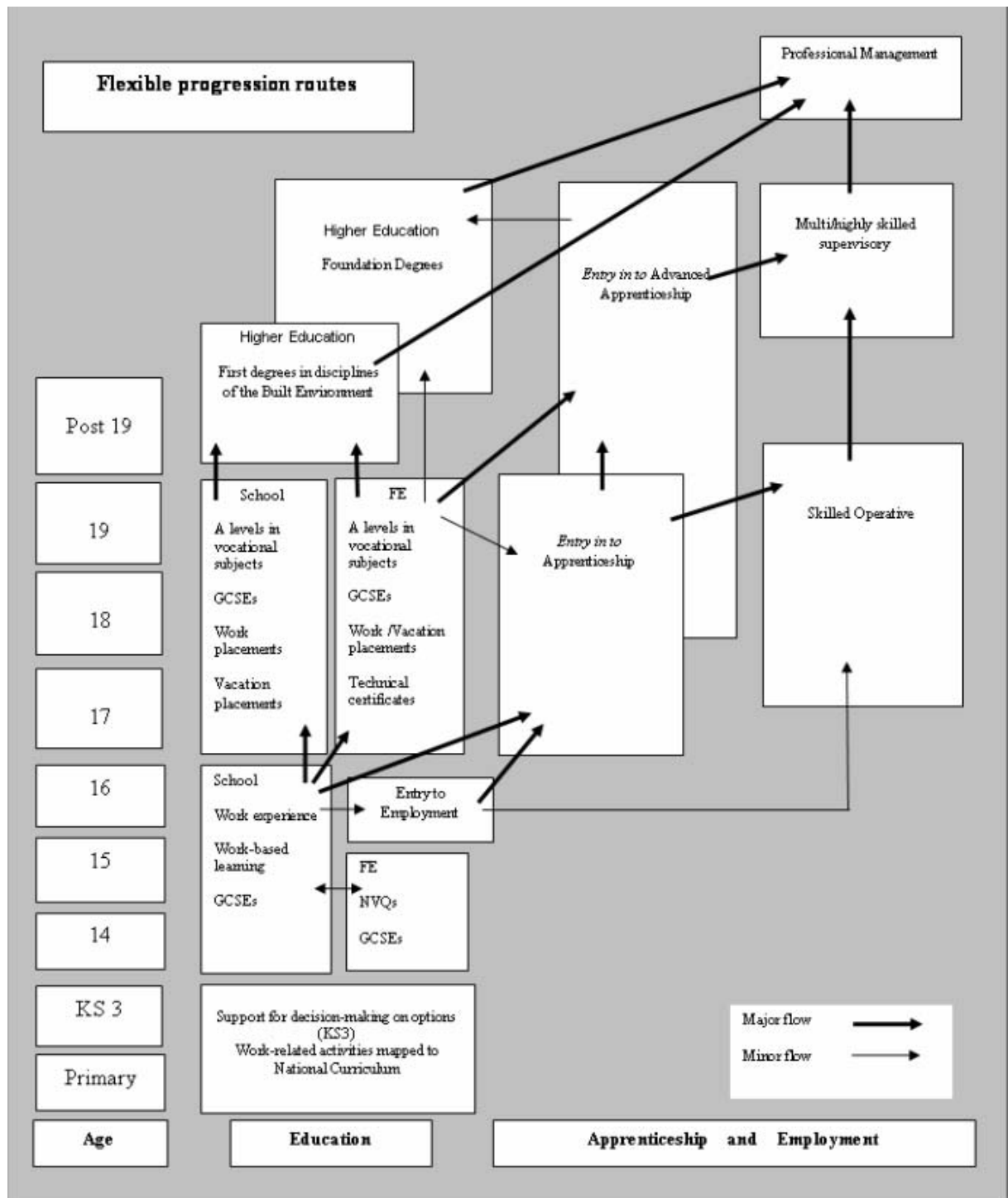
have been developed over 14 years through a process of functional analysis. The analysis describes the whole built environment sector and evolves from a description of the key purpose of the industry within the economy. The analysis then sets out the key areas, key roles, units and, ultimately, the individual generic Occupational Standards that, in descending order, support the achievement of the key purpose.

Using the Occupational Standards, CIC has developed a framework of NVQs/SVQs covering the higher level occupations in the built environment. Since 1994, around 50 NVQs/SVQs at Levels 3, 4 and 5 have been developed for the industry covering most of its main disciplines (including planning, transportation, design, building and civil engineering, building services engineering and property – see Appendix 9).

The Occupational Standards provide a powerful, multi-purpose tool for industry employers, individuals, professional institutions, learning and training providers, as well as being a potential strategic planning tool. There is a long-term strategy to introduce Occupational Standards into the life of the industry so that value is added by enabling the industry to use the Occupational Standards as a 'common currency'. This will provide a mechanism for forging progression links between academic, vocational and professional qualification systems, as well as providing individuals, employers and the industry at large with tools for developing and measuring the performance of people.

Secondly, in its role as an Awarding Body, CITB-ConstructionSkills works in partnership with City & Guilds in England and Wales and with the Scottish Qualifications Authority (SQA) in Scotland.

Lastly, CITB-ConstructionSkills produces a great deal of training support material to support craft and operative training. This includes technical literature, videos, etc.



3.18 Schools

3.18.1 Creative Spaces

During NCW 2003 a team based schools design competition for Key Stage 3 pupils was launched entitled "Creative Spaces". The competition, run by ConstructionSkills, offered 11-14 year olds the opportunity to experience the excitement and challenges of the construction industry by developing plans to improve their school's built environment. Teachers at nearly 400 schools helped deliver the Design and Technology curriculum in a new and exciting way, 100 schools entered the competition and there were 12 finalists.

CITB-ConstructionSkills in partnership with CABA (Commission for Architecture and the Built Environment) have developed the Creative Spaces competition resource into a brand new Design & Technology resource which aims to support students at KS3 & KS4 level.

3.18.2 Construction GCSE

During 2003 CITB-ConstructionSkills undertook research to determine the potential demand for a GCSE in Construction and the Built Environment⁹⁴ CITB-ConstructionSkills had been invited by the Qualifications and Curriculum Authority (QCA) to contribute to the development of a GCSE in Construction and the Built Environment. However, prior to this, research and development were required to ensure that a suitable qualification was constructed, with interest to an audience of sufficient size to warrant the investment. In 2002, initial work, undertaken by CEI found that there existed “... *substantial approval and support for the introduction of an Applied GCSE in Construction and the Built Environment ...*”

Findings from the research commissioned in 2003 indicated a similar response, with a significant level of interest in a GCSE in Construction and the Built Environment.

- ▶ 80% of schools and 84% of colleges registered an interest in a GCSE in Construction and the Built Environment.
- ▶ The principle reasons for this interest related to their desire to increase the number of vocational courses they offered to pupils/students.

The Department for Education and Skills (DfES) and Qualifications and Curriculum Authority (QCA) have approved the idea of piloting a GCSE in Construction and the Built Environment. QCA have invited Awarding Bodies to submit proposals for developing a qualification.

Two Awarding Bodies have expressed an interest and CITB-ConstructionSkills is working closely with both bodies to help them develop their proposals. Both bodies have different approaches and CITB-ConstructionSkills welcomes the possibility of having two different qualifications to offer schools and students.

The introduction of the GCSE will offer an important progression route into the industry and provide an opportunity for young people to make informed choices about the wide range of careers on offer in the sector. Simply by being a part of the curriculum, albeit an optional qualification for schools, it will introduce construction careers and the excitement of working in the industry, to a much broader range of pupils than the industry can currently reach.

Currently, CITB-ConstructionSkills are undertaking more in-depth work to identify what are the critical success factors for implementing a GCSE in Construction and the Built Environment. Specifically this will focus on what human resources, physical space and accommodation and any other resources which exist in favour or against putting on such a programme. This will include the issue of partnership working.

3.19 The contribution of Further Education

Further Education Establishments are attracting over 50,000 starters to building-related courses each year across the UK but only 30,000 attain qualifications. Quality assessments of courses at FE colleges suggest a need for improvement. The volume of training

Each year CITB-ConstructionSkills conducts a survey to measure the numbers of people entering long-term construction training: The Trainee Numbers Survey. Data is collected from colleges, private training providers, and construction industry training centres across Great Britain. In all, training for 17 different occupations is covered, with the results used to project the number of skilled workers who will enter the industry.

Numbers of Trainees Starting Construction Courses at S/NVQ Levels 1-3 and H/NDs and H/NCs. Great Britain 2003/04

Occupation	Scotland	Wales	England	Great Britain
Technical	1340	345	4866	6551
Wood Trades	1502	1066	11529	14097
Bricklayers	487	830	7268	8585
Painters	404	226	2493	3123
Plasterers	117	141	1049	1307
Roofers	81	76	557	714
Floorers	92	123	109	324
Glaziers	44	0	27	71
Other SB Operatives	22	131	327	480
Scaffolders	207	0	278	485
Plant Operatives	6	444	4123	4573
Plant Mechanics	86	28	235	349
Steel Erectors/Structural	0	0	82	82
Other CE Operatives	0	21	506	527
General Operatives	23	356	3705	4084
Maintenance Workers	0	123	115	238
Mechanical Engineering	584	237	3167	3988
Total	4,995	4,147	40,436	49,578

Source: CITB-ConstructionSkills Trainee Numbers Survey 2003/04

In the current academic year there are just over 49,500 new trainees on construction courses in Great Britain⁹⁵. To these can be added a further 2,700 trainees who started construction courses in Northern Ireland⁹⁶.

Construction Starts, Northern Ireland 2003/04 Cohort

Description of Occupational Classification	Traineeship	Modern Apprenticeship	
		MA1	MA2
Civil Engineering & Construction	33	3	4
Building Trades: Brick, Paving	336	88	35
Building Trades: Plumbing, Heating	402	186	55
Building Trades: Wood, Glazing	1163	386	77
Totals	1934	663	171

Source: Jobskills 2003/04

Approximately one-third of all new GB entrants are on Level 1 courses, although these tend to be far more popular in England and Wales than in Scotland where only 5% of trainees take a Level 1 SVQ.

More detail is available if these numbers are used in conjunction with LSC data on trainees. From this we see that in England 30% of all new entrants at Level 1-3 are Modern Apprentices (26% on Foundation Modern Apprenticeships and 4% on Advanced) with the rest either studying Level 1 courses or going through the normal FE route.

The Trainee Numbers Survey also asks colleges about the number of trainees who are female and who are from a minority ethnic background. The proportion of female first year trainees, whilst higher than the proportion of women working in craft occupations in construction, is still very low at just 3% of the total (a figure unchanged for the last three years and actually lower than in 2000/01). There are many reasons for this, not least the traditional view of construction as being a male preserve. Perhaps more worryingly, however, a recent report by the Equal Opportunities Commission⁹⁷ found as one of its conclusions that the Modern Apprenticeship system, rather than being a key focus for challenging occupational segregation actually reinforces and perpetuates gender stereotypes and traditional recruiting patterns.

The number of ethnic minority trainees starting construction courses at FE is more promising accounting for 5% of total starts (up from just 3% in 2001/02) although the proportion is still much lower than that achieved in the HE sector.

3.19.1 Destinations of Early Leavers and Completers

The CITB-ConstructionSkills Trainee Exit Survey⁹⁸ provides some idea of the initial destinations of those who leave their courses, either after completion or after having left training early.

Last carried out in 2001 the survey showed that when looking at both completers and early leavers 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 of such estimates, with the actual figure of between 20% to 40% leaving the industry, dependent upon the course.

It must also be borne in mind that these figures refer to immediate destinations only; there exists considerable churn amongst the workforce, with people moving into or dropping out of construction over time.

Immediate Destinations of those Leaving Construction Training, Great Britain (CITB Managing Agency Trainees): 2001

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%	8.6%
Self-employed in Construction	7.2%	9.5%	8.6%
Self-employed in Another Industry	<1.0%	<1.0%	<1.0%
Looking to Finish Course	2.0%	0.0%	<1.0%
Armed Forces	<1.0%	<1.0%	<1.0%
Working Abroad	<1.0%	<1.0%	<1.0%
Other	2.0%	1.3%	1.6%

Source: CITB-ConstructionSkills Trainee Exit Survey, 2001

The weighted average assumes 60% of starters will complete their course.

3.19.2 The quality of training

The task of appraising the quality of FE courses lies with the Adult Learning Inspectorate (ALI)⁹⁹. The table below gives ALI's overall inspection grades for the various courses that they monitored between 2002 and 2003. Their grading system is based on a five-point scale where Grade 1 is outstanding and Grade 5 is very weak; the mid-point Grade 3 is seen as satisfactory. It should be noted that the inspection is based on the nature of provision and not the relevance of the course.

Inspection Grades Awarded to FE Courses by Sector

Sector	Grades 1 & 2	Grade 3	Grades 4 & 5
Retailing, customer service and transportation	80%	20%	0%
Visual and performing arts and media	67%	29%	4%
English, languages and communications	62%	34%	4%
Humanities	54%	37%	9%
Business administration, management & professional	51%	43%	6%
Average (rounded)	50%	40%	10%
Sciences and mathematics	48%	40%	13%
Hospitality, leisure, sport and travel	46%	44%	9%
Health, social care and public services	46%	49%	5%
Foundation programmes	44%	42%	13%
Engineering, technology and manufacturing	44%	37%	20%
Hairdressing and beauty therapy	42%	50%	9%
Information & communications technology	39%	51%	11%
Land-based provision	37%	51%	12%
Construction	32%	51%	17%

Source: Adult Learning Inspectorate

As can be seen on average 50% of courses across all sectors are rated as being outstanding or good. (grades 1 and 2). Only five sectors are above average on this measure, with nine sectors falling below the average. Construction is at the bottom of the table with just under one-third of construction courses being rated as outstanding or good.

At the other end of the scale only 10% of courses across all sectors on average receive a grade of 4 or 5 (unsatisfactory or very weak). Construction has the second worst performance here with 17% of its courses being rated at grades 4 or 5. Looking in more detail at the construction qualifications being offered, we see that there are problems relating to how well construction courses prepare new entrants for the workplace. In response to the unwillingness of some employers to offer work-placements to Modern-Apprentices (see 'The capacity for training in FE' below), colleges are increasingly offering Construction Certificates as opposed to full vocational qualifications. Construction Certificates contain all the theoretical and practical elements of a vocational qualification, but lack the latter's inclusion of work experience. Given that the requirement for work experience was introduced into vocational qualifications in response to employer's criticisms of qualified but inexperienced new entrants, this can only be seen as a backward step in terms of quality of training.

There is one other criticism that can be levelled at all FE courses in general but construction training in particular, and that is the low demands placed on trainees by

Level 1 vocational courses. In Great Britain one-third of trainees undertake Level 1 VQs. However, a Level 1 Vocational Qualification does not meet the minimum requirements the construction industry expects of its New Entrants. Given the capacity restrictions that construction training is fast approaching, if not already facing (see below) it would be far more desirable to focus limited resources towards Level 2 and 3 courses, and cut back or abandon the Level 1 VQ altogether.

3.19.3 The capacity of construction training in FE

For some time now anecdotal evidence has suggested that the education and training system is struggling to meet the demand for training from the construction industry. In 2003 CITB-ConstructionSkills undertook research amongst 237 FE colleges in Great Britain designed to measure the difference between the demand for college places and their availability¹⁰⁰. The results of the research confirm that shortage of capacity is already a serious problem for plumbing and related trades, but is also a significant and growing restraint on the amount of training in construction craft occupations.

Around 75% of colleges expected their construction craft courses to be oversubscribed in the 2003/4 academic year. To give some idea of the scale of the problem, around one quarter of oversubscribed colleges said that they would probably have to turn away between 10% and 20% of applicants due to a lack of facilities or a shortage of instructors. More worryingly, 12% of over-subscribed colleges said that they would have to turn away over half of all applicants for construction courses as a result of limited capacity.

As already mentioned (see 'The quality of training' above) the lack of suitable work placements is placing severe restrictions on the ability of colleges to train new entrants to the standards required by the industry. When asked about the availability of work placements, 75% of colleges said that some of their trainees would fail to qualify to full S/NVQ level due to a lack of suitable employers willing to provide work placements. To illustrate the scale of the problem, over one-fifth of all colleges, expected between 10% to 20% of the students would fail to get a work placement, though again a significant proportion (5%) said that 60% or more of their students would fail to do this.

3.19.4 Framework Completions – reasons for low values

Given that the resources for construction training are finite, it is important to use the limited funds to maximum effect - the industry quite literally cannot afford waste. For this reason alone it is essential that the problem of low completion rates in Modern Apprenticeships is tackled.

Whilst everyone who leaves a course early will have their own reasons for doing so there are some common factors that crop up again and again, many of these relating to the expectations that apprentices have of construction and learning. The main focus of an NVQ or Technical Certificate will obviously be industry specific, providing the practical skills and experience a person will need for a career in their chosen sector. There are also generic skills - communication and numerical skills - that are common to all vocational qualifications, and which although essential in their own right are not always integrated into teaching the main industry specific themes. It is especially important in an industry such as construction, where one of the main attractions for new entrants is the chance to undertake practical work, that they see the value or use of what they are being taught, and how it can be applied to their future career. Concentrating on what are perceived to be irrelevant language skills or

complicated number work will lead to frustration and an increase in the likelihood of an apprentice leaving college for the lure of full-time, full-paid work.

There is also the issue that some employers report difficulties in providing all the work experience that the S/NVQ system demands. This is a problem that is most acute for certain skills within specific trades such as roofing skills for carpenters and joiners, rendering for plasterers, and paper hanging for painters and decorators. The problem arises from the inflexibility of the current vocational qualification system, although fortunately it is an issue that is being tackled by broadening the criteria for required experience, and better matching qualifications with the skills needed for a career in construction.

Related to this are difficulties with young new entrants achieving some aspects of Advanced Modern Apprenticeships. Some young apprentices have problems meeting the demands of Advanced Modern Apprenticeships, particularly the units relating to self-supervision. These require evidence that an apprentice can plan, organise, communicate, and co-ordinate their work with others, and demand a level of competence that is difficult for 16 year olds to reach in two and a half years. Efforts to overcome this dilemma, including the development of guidance for the sort of activities that can be used as evidence for coursework, have proved extremely helpful.

In order to quantify the scale of this problem figures from CITB-ConstructionSkills' Managing Agency show that, of starters on a Modern Apprenticeship (in England), 65% will achieve an NVQ (meaning a 35% drop out rate) but only around 20% will actually achieve the Modern Apprenticeship framework¹⁰¹. There is clearly much still to be done in order to solve these issues.

3.20 On-site Assessment and Training

To overcome capacity issues and meet the challenge of qualifying the workforce, CITB-ConstructionSkills developed the On-Site Assessment and Training (OSAT) programme. The aim of OSAT is to assess workers for S/NVQs in the workplace, helping experienced workers get the qualifications to prove they can do the job.

With OSAT, workers can turn their existing skills and experience into a nationally recognised qualification such as an S/NVQ without incurring some of the perceived disadvantages associated with off-the-job training.

The benefits of OSAT are that it:

- ▶ Helps workers achieve vital skills so workers achieve CSCS cards quickly and easily.
- ▶ Takes account of existing skills so workers only train towards the things they do not know how to do.
- ▶ Limits downtime because assessment and training are carried out on site.
- ▶ Is easier for employees who have difficulties with the basic skills.
- ▶ Results in a nationally recognized qualification that demonstrates an operative's experience and competence.

Current forecasts put the size of the market for potential OSAT candidates at between 250,000 and 500,000¹⁰². However, this is very much dependent upon the number of organisations and bodies that sign-up to the Qualifying the Workforce initiative, and the level of engagement that can be generated with individuals

purporting to hold trade apprenticeships. If a greater proportion of the industry were to sign up to Qualifying the workforce, the figure requiring assessment and qualification would be at the higher end of the range. Similarly, if those individuals currently purporting to hold a trade apprenticeship were not considered to be suitably qualified (i.e. to a level equivalent to an S/NVQ Level 2) or demonstrate their competence the potential market for assessment and qualification would be much larger still. As it stands the current level of engagement with industry and the significant proportion of the workforce holding a trade apprenticeship means that the number of individuals requiring assessment and qualification through OSAT is at least 250,000.

The forecasts for future OSAT requirements are based on the baseline industry forecast of 2.3% growth per annum, an average annual growth of 17% in OSAT registrations, and an annual average completion rate of about 70%. However, several key variables are seen to exert a strong influence on the success of the OSAT programme in qualifying the workforce, most notably the priority of work-based learning and assessment, and then the commensurate ability to improve capacity through the maintenance and/or recruitment of sufficient OSAT co-coordinators and assessors.

Research undertaken by Robert Bilbrough Associates on behalf of CITB-ConstructionSkills¹⁰³ concludes that the potential number of candidates to train via OSAT need to be turned into demand. This will require the support of the clients and employer organisations who have not yet demanded skill cards for their construction work. It will also require an ongoing discipline for rigorous card checks by existing skill card clients and employer organisations. Without client drivers the potential OSAT candidates are unlikely to come forward.

Given the rate of approvals for new assessors it is unlikely that there will be an assessor shortage in the trades and operative area in the short-term overall. Investing in training assessors is likely to improve efficiency and effectiveness.

It is more likely that there may be shortages in some of the specialist occupations where assessment is more costly due to the economies of scale. The role by the CITB-ConstructionSkills' National Specialist Assessment Centre is vital to bridge this gap.

The technical, supervisory and management area is most likely to experience assessor shortages after the close of the industry accreditation period.

The report recommends:

- ▶ Continued support for the development of assessors, internal verifiers and OSAT assessment centres in continuous quality improvement.
- ▶ Implementation of innovative and creative approaches to assessment that maintain and improve effectiveness and efficiency e.g. practical site assessment trials.
- ▶ Support for CSCS Ltd. in engaging clients and employer organisations to insist on skill cards for construction work.

3.21 Step into Construction (STEP)

STEP is part of CITB-ConstructionSkills' Image & Recruitment Diversity Strategy, whose importance can be gauged by its inclusion in the CITB-ConstructionSkills Business Plan¹⁰⁴ as one of the corporate targets, as highlighted in the following table.

	2003 forecast	2004 target	2005 target	2006 target	2007 target	2008 target
STEP into Construction outcomes	160	200	220	242	266	293

Source: CITB-ConstructionSkills Business Plan 2004-2008

Under STEP, CITB-ConstructionSkills Area Offices offer support to employers seeking to recruit job-ready adult ethnic minorities and women.

STEP is for:

- ▶ Construction companies large to small, including sole traders looking to recruit.
- ▶ Construction clients' employment schemes for their contractors.
- ▶ Major contractors' employment schemes for their own staff and those of sub-contractors.

STEP offers:

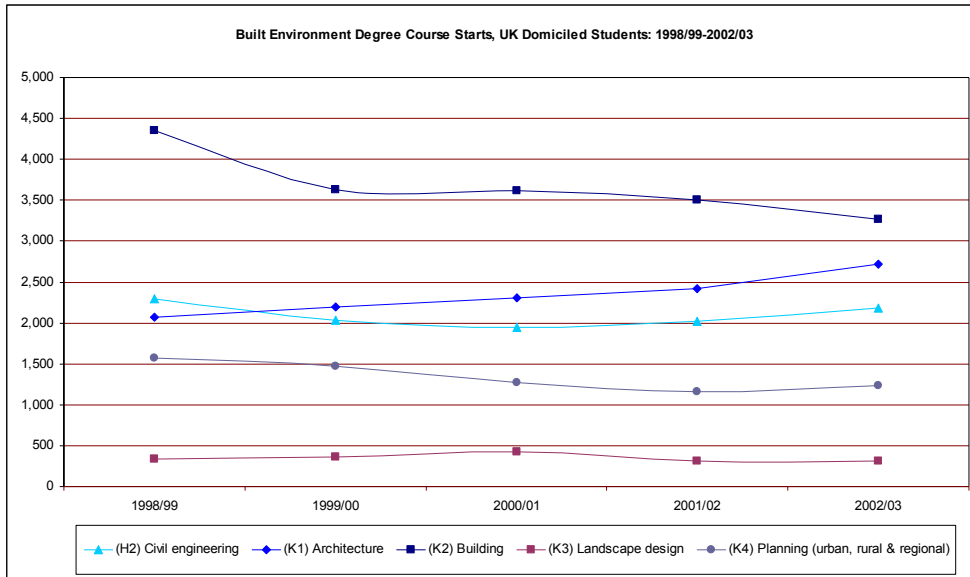
- ▶ If the employer guarantees an interview for a real vacancy, STEP will support a trial period for job-ready adult ethnic minority/ women candidates. Employer recruits at the end of the trial on merit alone.
- ▶ STEP can support associated costs such as short-term childcare, diversity training for staff and site supervisors, or equal opportunities recruitment campaigns.
- ▶ CITB-ConstructionSkills Area Offices work with local colleges, universities, and community organisations to help find the right candidates.

3.22 The Contribution of Higher Education

Higher Education establishments are attracting just under 10,000 starters to building related degree courses each year¹⁰⁵. The proportion of female candidates and UK domiciled black and Asian candidates is greater than the overall average for the workforce but, for the number of female candidates at least, is still less than the population as a whole.

3.22.1 The volume of training

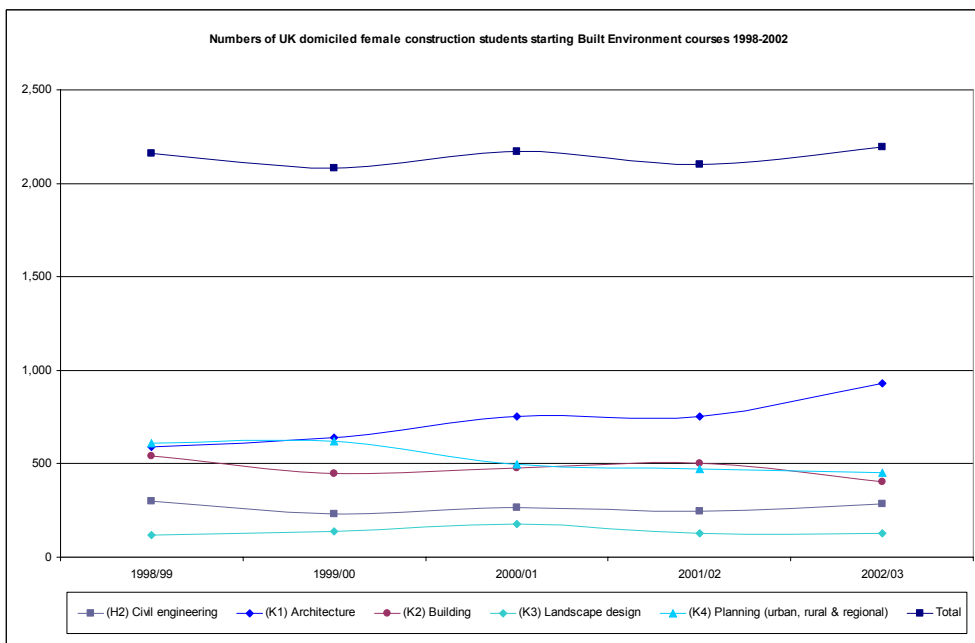
The Higher Education Statistics Agency is responsible for measuring the number of students who start Built Environment degree courses. Over recent years there has been a decline in the number of under-graduates on Built Environment courses from 10,630 in 1998/99 to 9,720 in 2002/03 - although this last figure was a 3% increase on the year before, suggesting the outlook may improve in the coming years. As the following chart illustrates this decline has not been uniform across all years, or indeed across all courses. Building has shown the steepest declines in student numbers, while over the same period Architecture has shown considerable increases.



Source: HESA

Recent data on applications to universities and colleges suggests that the increase in under-graduate starts has continued into the current academic year.

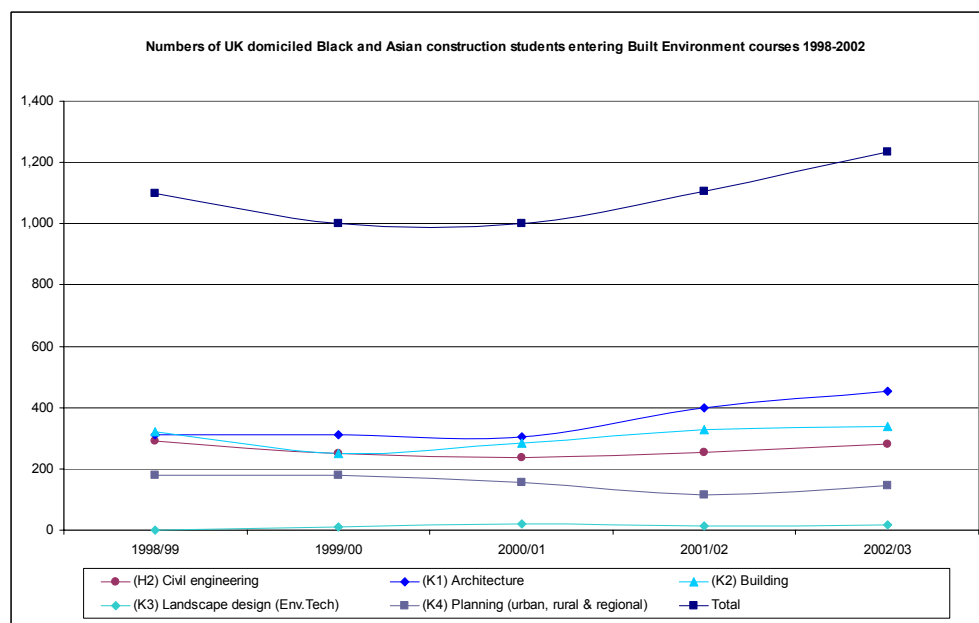
As with FE training, it is important to target those sections of the population that traditionally wouldn't consider a career as a construction professional if the decline in construction graduates is to be reversed. There is cause for some optimism here that Higher Education is being successful in targeting these groups for recruitment. The numbers of undergraduates by gender and background is shown on the following graphs.



Source: HESA

The number of women starting Built Environment courses has remained more or less static over the past four years, although when set against the general decline in Built Environment under-graduates as a whole this represents an increase in their proportion of total students. Overall the proportion of women is still low however.

Just under 25% of all Built Environment undergraduates are women, although the proportion varies from a respectable 40% on landscape design courses and 37% for planning, down to only around 12.5% for Building and Civil Engineering courses.



Source: HESA

As can be seen from the above graph the number of Black and Asian students on Built Environment courses is increasing, which when set against a decline in overall numbers of students represents a sharp increase in the proportion of ethnic minority students overall. Just under 13% of students are from an ethnic minority background, ranging from as high as 17% on architectural courses to as low as 5% on Landscape Design.

3.22.2 The quality of training

The last available assessment of the quality of HE training in Building and Civil Engineering was published in 1998 by the Quality Assurance Agency for Higher Education^{106 107}. Overall, the quality of education was approved in all but one of the 42 universities and colleges visited.

Several positive features were highlighted in the reports. A majority of the undergraduate programmes were accredited, usually by a chartered professional body, in a process that was recognised as beneficial to the programmes by giving them an industry focus. This was emphasised by the responses of employers who met the assessors, commenting favourably on the skills of building and civil engineering graduates in the workplace.

Examples of best practice mentioned in the reports included the use of research and industrial experience to inform curriculum innovation and teaching, giving work practice an integral place in the programmes.

Overall the report concluded that strengths outweigh weaknesses in the quality of teaching. In more than 75% of institutions visited, while over 75% of the observed sessions were awarded the higher grades (3 or 4). It should be explained that the grading system for HE is the opposite to that of FE, where grade 1 is the highest and grade 5 the lowest, grade 3 is seen as satisfactory. Initiatives to widen access to the

courses were singled out as having a beneficial impact on programmes in building and the proportion of students with non-standard entry qualifications and mature students had also increased.

The report mentioned that a majority of the programmes predominantly recruit white male students, despite efforts to increase applications from groups that are less well represented, although as can be seen from the HESA data on the volume of training this situation appears to be being successfully tackled at the Higher Education level.

3.22.3 The employers' view of effectiveness of HE

A separate survey by the Construction Industry Council,¹⁰⁸ CIC, of 927 professional services firms (who almost entirely recruit graduates) concluded:

There is a mixed picture with regard to the changing quality of recruits into the sector. A majority of firms believe the quality of recruits has improved or stayed the same over the past five years but over a third believe the quality has fallen. CPS [Construction Professional Services] firms are more positive with regard to the quality of recruits who already have their full professional qualifications, when compared to graduates and those who are part way towards full professional qualification. . . . The most significant problem for the largest firms when recruiting skilled staff is that the size of the available 'pool' is too small.

The below table below provides a detailed breakdown of these results.

Change in quality of new recruits, UK: 2003/04

	Fully qualified members of professional institutions	Graduate level / part qualified members of professional institutions	Trained to other levels (HNC, HND, BTEC, up to NVQ level 3)
Increased a great deal	2	2	2
Increased a little	13	15	15
Stayed the same	51	39	42
Decreased a little	26	28	24
Decreased a great deal	7	15	16
Balance (Increase less decrease)	-18	-26	-22

Source: Construction Industry Council: Built Environment Professional Services Skills Survey 2003/04

There are some variations between particular types of firms. For example:

- ▶ Architectural firms are more positive about the quality of professional recruits when compared to other types of firm;
- ▶ Engineering firms are less positive about the quality of graduate and other recruits when compared to other types of firm;
- ▶ Multidisciplinary firms are more positive about the quality of graduate employees when compared to other types of firm.

3.23 Public Investment in Training

3.23.1 Funding

At present it is not possible to put a figure on the amount of public investment in training. The largest single provider of funding is the LSC in England, with corresponding roles being filled by ELWA in Wales, Scottish Enterprise and the Highlands and Island Enterprise in Scotland. Work is still ongoing to come up with a definitive level of investment and it will probably be some time before a figure is arrived at. Unlike Great Britain, Northern Ireland has a relatively streamlined funding mechanism, which can be used to estimate the amount of investment required to

train a new entrant to NVQ standard across the whole country. Here, each trainee attracts funding of between £7,700 and £8,700 for a 78 week course, plus up to £40 a week per trainee for travel and expenses.

3.23.2 Centres of Vocational Excellence (CoVE)

The Centre of Vocational Excellence (CoVE) programme is one component of the Learning and Skills Councils (LSCs) strategy to meet the needs of employers locally, regionally, nationally and sectorally. It also seeks to give more people from all backgrounds access to the high quality, vocational training that they need to succeed in a modern economy, and to spread good practice throughout the post-16 training sector.

CoVEs will focus on enhancing the skills and careers of those already in work, enhancing the employability of new entrants to the labour market, and the employment prospects of those seeking work (including self-employment). They will enable providers to develop, maintain and deliver high quality, specialist provision across a range of new and traditional occupations. They will be innovative in delivering learning that develops both specialist and related general skills. CoVEs will work closely with business and industry to deliver industry-relevant, economically important provision of a high standard.

In summary, the programme addresses four operational and policy objectives:

- ▶ To ensure 400 CoVEs are established by 2006 which, as a network, create a strategic distribution of high quality centres, taking account of local, regional, national and sectoral needs;
- ▶ To encourage collaboration amongst providers and promote the concept of excellence in economically important vocational specialisms;
- ▶ To help secure enhanced vocational learning opportunities for all learners, with a focus on enhancing participation and career prospects, particularly of those from disadvantaged groups; and
- ▶ Increase proactive employer/provider engagement to underpin, develop and strengthen innovative and flexible approaches to meeting the nation's current and future skills needs.

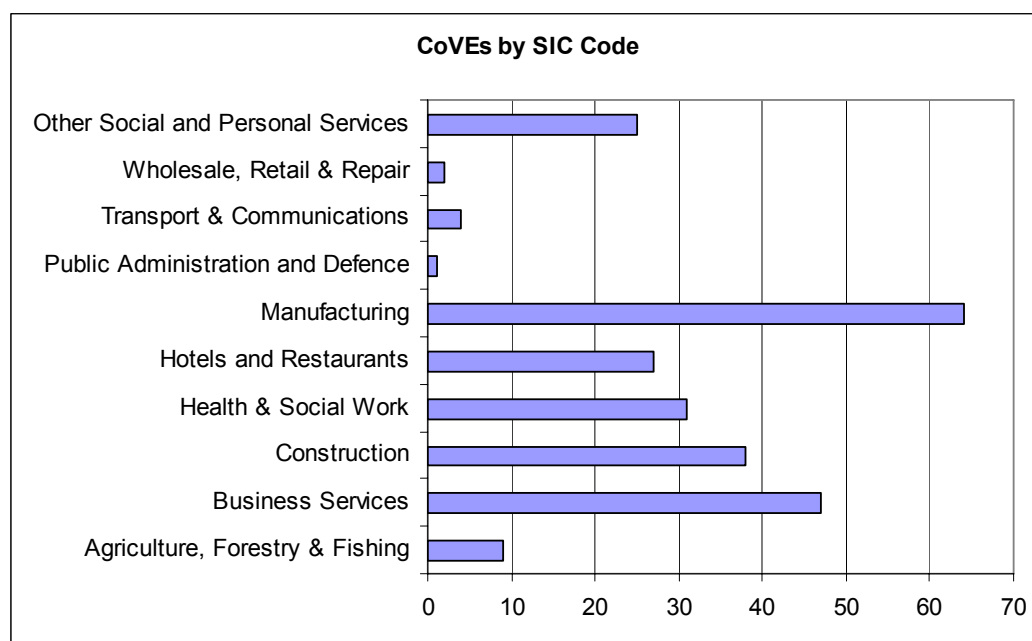
Progress to date is well ahead of schedule, and there are currently around 281 CoVEs in various stages of development, across all sectors. Thus it is anticipated that the target of 400 by 2006 will have been met, including 55-60 in Construction.

The CoVE programme has a key role in supporting the delivery of the Skills Strategy, particularly in relation to improving the capability and responsiveness of providers to employers. The mechanism by which this will happen is by strengthening regional and sectoral input into the roll out of the programme. The performance of the CoVE network is also one of the foremost measures of how effectively Theme 1 of the Success for All strategy is addressing the skills needs of learners, employers and the wider community.

CoVEs are crucial in the Construction sector since they contribute to the training of new entrants to the industry through the delivery of Apprenticeships.

There is also a big part for CoVEs to play in designing and delivering progression routes into Foundation degrees.

The current network is shown in below chart.



Aside from the Learning and Skills Council (LSC), Regional Development Agencies (RDAs) have been the primary players in planning the regional networks of CoVEs and each is represented on the regional CoVE groups, some of which are chaired by RDAs. Furthermore the skills priorities set out in the RDA-led Frameworks for Regional Employment and Skills Action (FRESAs) have been the key drivers in planning regional CoVE networks.

3.24 The CITB Levy

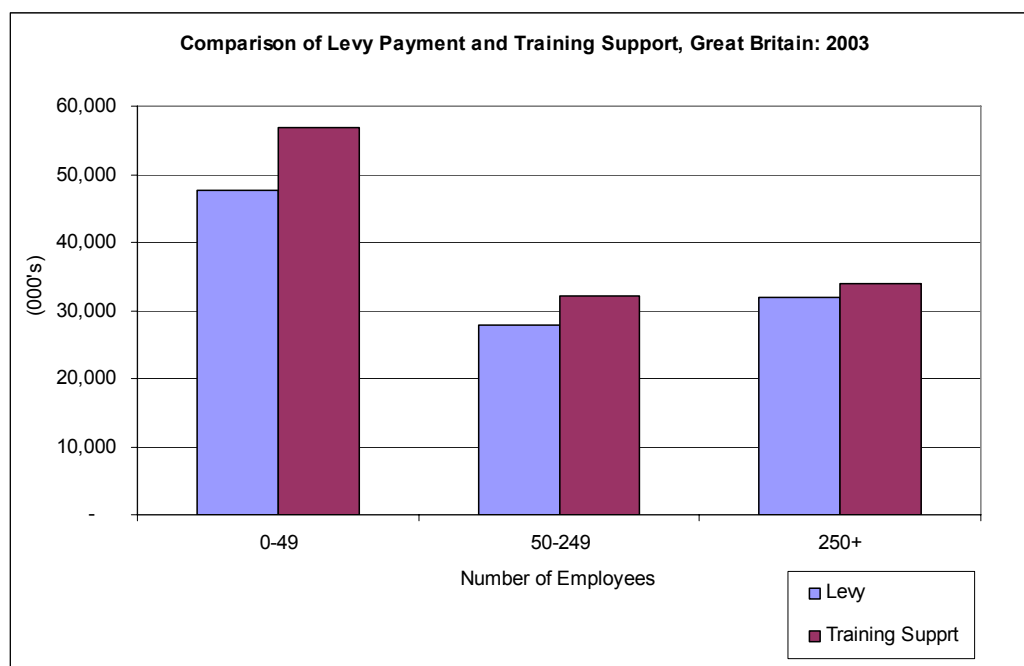
CITB-ConstructionSkills has retained the status of an Industry Training Board and as such is empowered by the Industrial Training Act 1964 to impose a levy on employers, whose activities fall within its scope; and to make grants to those employers whose training courses are approved by the CITB-ConstructionSkills.

All firms in the sector, excluding small firms with a wage bill of less than £61,000, pay an annual levy to CITB which is used to fund training of the sector's workforce. The levy rate is currently set at 0.5% of a company's wage bill for 'direct employees' and 1.5% of the net value of payments the firm makes to labour-only sub-contractors (LOSC).

During 2003 for each £1.00 of levy paid by registered employers, the construction industry received £1.69, as follows¹⁰⁹:-

	Statutory Accounts £	Third-party Contributions £	2003 Total £	2002 Total £
Grant	0.78	0.06	0.84	0.77
College fees	0.20		0.20	0.19
Trainee allowances	0.04		0.04	0.05
Total direct benefit	1.02	0.06	1.08	1.01
Training centres, recruitment of trainees, development of standards, careers and training advice etc	0.61		0.61	0.60
Total benefit	1.63	0.06	1.69	1.61

The relationship between the size of firm and the amount of Levy paid and training support received is shown in the following chart¹¹⁰.



Source: CITB Levy/Grant Business Area

As this highlights regardless of the number of employees all firms registered with CITB-ConstructionSkills benefit in terms of the training support they receive.

3.25 Private Investment in Training

3.25.1 Employers Contribution

CITB-ConstructionSkills undertook a scoping study¹¹¹ to explore the range of current information available on employer investment in training.

Information available on total employer training spend is limited enough even at a national, all-sector level, and the quality and consistency of the information is variable. In terms of consistency for example, different surveys include different elements within the training spend figure, and the question or series of questions to obtain their estimate of training spend is asked in very different ways.

Because of the variation at an all-sector level, it is not surprising that when it comes to sectoral disaggregation variation is similarly extensive. It should also be noted that for most of these surveys, when analysing within construction specifically, base sizes can be relatively low and this adds to the degree of caution needed in interpreting the results (or put another way, it increases the range within which statistics suggests the real figure lies). It should also be noted that where surveys report on the construction sector this is usually defined as SIC 45, which does not match the ConstructionSkills footprint [see Appendix]. (Other surveys merge construction with agriculture and mining, which adds another layer of difficulty).

Some other provisos are needed in terms of construction sector training spend figures obtained via surveys. Nearly all employer surveys ask employers about their full time and part time employees, excluding the self-employed or any outside

contractor or agency staff. This clearly impacts upon the construction sector more than most, where there are very high levels of use of such staff. Clearly the sub-contractors themselves will be included in the coverage of the employer surveys as will recruitment agencies, though the latter would not be classified within the construction sector. However, even if a sub-contractor on a site was interviewed, training given to their staff by the main contractor (such as health and safety training for the site) would not be covered by the main contractor nor by the sub-contractor. This suggests training figures may underestimate total spend by missing such training expenditure. The self-employed would not be included in any of the figures derived from employer surveys.

The importance of this is that it is known that the amount of training provided to employees is much higher than that to labour only sub-contractors, as work conducted by IFF Research¹¹² for CITB-ConstructionSkills has shown. One corollary of this is that if the average spend per employee is calculated and this applied to all those working in the industry (including agency workers and labour-only sub-contractors) this will overestimate training spend.

The other main proviso in interpreting construction spend from general employer surveys is that relatively few surveys take into account the levy or the grants available in an explicit way. The Learning and Training at Work 2000 (LTW 2000) study did ask questions on this issue; most other surveys ask about training spend and one has to make the assumption that employers have taken this into account when mentioning their training spend figure (i.e. it is their net spend).

With these provisos in mind, the following table details where an overall training figure was available via published sources, and how this figure breaks down.

Employer Spend on Training

Source	Area of coverage	Total employer spend (£)			Construction spend as a % of total figure
		Construction	Comparable sectors	All sectors	
LSC: National Employer Skills Survey 2003	England	£271m	M&Q ^{xiii} :£8m A ^{xiv} :£12m M ^{xv} :£501m	£4.5bn	6%
DfES: Learning and Training at Work 2000	England	£1.7bn	n/a	£23.5bn	7%
Futureskills Scotland: Skills in Scotland 2003	Scotland	£20m	A:£2m M:£50m	£326.3m	6%
DfEE: Continuing Vocational Training Survey 1993	UK	£424m	n/a	£10.6bn	4%

Source: CITB-ConstructionSkills and IFF Research: Measuring Private Investment in Training: Scoping Study, 2004
Comparable figures for the Agriculture, Manufacturing, and Mining & Quarrying sectors have also been provided where possible.

Notes: Figures need to be treated with some care. Their ostensible comparability masks some fairly key differences between the source surveys.

^{xiii} M&Q = Mining and Quarrying

^{xiv} A = Agricultural sector

^{xv} M = Manufacturing

No spend figures were found for Northern Ireland or Wales. (In the Future Skills Wales 2003 Generic Skills Survey a comparative question on training spend was asked (Do you invest more, less or about the same per employee on off the job training than you did 3 years ago?). 29% of Construction companies interviewed said they spent more compared to 32% at the all industry level.

The LSC National Employers Skill Survey 2003 (NESS 2003) spend figure is the most recent and based on the largest sample size. However, it is not strictly comparable with other surveys estimating survey expenditure for a number of reasons, and also, despite the size of the survey, caution is needed in terms of the reliability of the findings on this issue. This results in the main from the fact that training was just one relatively small part of the survey coverage (skill needs and gaps was the main focus), and training expenditure was just one component of that. Indeed the training expenditure figure is derived from one simple question asked of all employers who train:

“In the last 12 months how much has this establishment spent in total on training and development of staff? Please include only out of pocket expenses, not staff time (IF NECESSARY ADD: This can be any type of training, off or on-the-job)”

The nature of this question is such that it yields a very headline response, and there is no real attempt to ‘build up’ a picture of training spend through asking for spend on individual activities, and hence it is likely that there will be a wide variation in what different employers include or exclude in the answers that they give. In any case as Key Note’s Market Report on training (2003) notes “the majority of employers do not keep complete records relating to how much they spend on training”.

The definition of training is also quite restrictive. In asking for spend purely in terms of “out of pocket expenses” and excluding staff time, this is in essence excluding on-the-job training, and indeed only includes off-the-job training in as much as it incurs direct, out of pocket expenses. That said, it is interesting to see that the proportion of total training spend, however defined, accounted for by the construction sector is remarkably consistent across all the surveys, at between 4 and 7 per cent.

As a note to the possible effects of excluding on-the-job training, in LTW 2000 £9bn of the overall training expenditure of £23.5bn (or some 38% of total expenditure) was incurred through on job training. In the “broadly” defined construction sector (which included utilities, mining and agriculture) for that survey, 41% of the sectors total training spend of £1.7bn was on on-the-job training.

The complexity of collecting accurate information on training spend needs to be considered. In a report prepared by CITB-ConstructionSkills in 1992, “Training Costs and their Influence on Training Activity”, a formula for the net cost / benefit of training is defined as follows:

Costs	Benefits
a. Trainee payroll costs	e. Trainee productive contribution
b. Costs of off-site training	f. grants and subsidies
c. Costs of on-site supervision	
d. Administration costs	

Net cost / benefit of training is equal to the sum of items a-d minus the sum of items e-f

But even with a formula like this, as the report points out, some of its constituent parts (e.g. the output of trainees / apprentices) are unlikely to be the sort of things

Construction firms keep a reliable count of. And obtaining such detail of the constituent parts accurately is best suited to qualitative, face-to-face, in-depth discussions with employers, rather than quantitative studies aimed at generating a sector total spend figure.

The CIC Professional Services Skills Survey, 2003/2004 included findings on Training. Not surprisingly there is some variation, both regionally and by company type and size, in the level of training undertaken. Some caution must be used in interpretation of the findings as the sample included 'multidiscipline' firms and 'local authorities' as separate categories. In some areas these categories tended to produce individual results different to the admass of conventional architectural, engineering and surveying practices, which should be taken into account when considering the overall aggregated results.

The data showed a wide variation in training provision between types of firm. The larger firms have by far the largest adoption of documented and formal training and development strategies. However, over 50% of the respondents did not have a documented training and development strategy. These probably include the larger proportion of SMEs. The incidence of documented training and development policies rises by size of firm. Although 77% of the largest firms have such a policy, only 18% of the smallest firms do.

The most popular method of delivery provided by CPS firms is 'on the job' training, which is offered by 47% of all respondents. 39% of respondents provide 'off the job' in-house training and the same percentage provide 'time off for study'. 28% of firms cite no obstacles to training and of these 43% were multidiscipline firms. But, 25% of all firms feel that the intensity of their current workload results in insufficient time being available for effective training to take place. The cost of training also appears to be prohibitive and 20% of firms feel that this is a significant obstacle.

The mean of expenditure per employee is £643 per annum, although there are apparent differences in expenditure regionally. Firms in Wales, the South East, Northern Ireland, the North and East Anglia all spend above the mean whilst all other regions spend below. Expenditure on training appears to be particularly low in the West Midlands (£468) and Scotland (£484).

CIC also carried out a more detailed, smaller scale survey with CPS employers as part of their consultation on the priorities for the Sector Skills Agreement. The questionnaire focussed in particular upon training and education.

The findings from this second survey in August 2004 showed that although concerns regarding graduates and recruits lack of business readiness remained, over 90% considered that training by employers was essential. The majority also felt that employer led training was the most effective way of improving recruitment and retention of staff.

However, the majority of the respondents declared that their business plans had little influence on their CPD programme, and that they made little or no attempt to measure its value. Only 50% considered the encouragement of CPD activities to be 'quite effective' and over 50% made little use of Best Practice programmes.

3.25.2 Training spend per employee

In order to help explain (or model) employer spend it is beneficial to also look at further measures. The following table shows figures for average spend on training

per employee taken from a number of studies and how they compare with one another

Employer spend per employee (£s & no. of days per year)

Source	Area of coverage	Spend and average number of days training per employee per annum					
		Construction		Comparable sectors		All sectors	
		£	Days	£	Days	£	Days
LSC: National Employer Skills Survey 2003	England	£276	5.7	M&Q ^{xvi} :£278m A ^{xvii} :£142m M ^{xviii} :£161m	M&Q:1.7 A:3.5 M:3.3	£208	5.1
DfES: Learning and Training at Work 2000	England	£1,111	n/a	n/a	n/a	£1,024	n/a
Futureskills Scotland: Skills in Scotland 2003	Scotland	£200	n/a	A:£130 M:£170	n/a	£200	n/a
Continuing Vocational Training Survey 1993	UK	£555	n/a	n/a	n/a	£589	n/a
CIC: Built Environment Professional Services Skills Survey 2003/04	UK	£643	5.4				

Source: CITB-ConstructionSkills and IFF Research: Measuring Private Investment in Training: Scoping Study, 2004
Comparable figures for the Agriculture, Manufacturing, and Mining & Quarrying sectors have also been provided where possible.

Notes: Figures need to be treated with some care. Their ostensible comparability masks some fairly key differences between the source surveys.

In most cases (NESS 2003, LTW 2000) where there was data to compare the construction industry employer performance against employer performance overall, the Construction industry compared favourably with higher average spends (£) per employee. The exception to this was the Continuing Vocational Training Survey 1993, which is of course the oldest of the surveys.

Figures not included in the table have been generated from the 2003 annual KPI study carried out by the DTI. In 2003, the median annual number of days training provided for direct employees was 0.8 days.

3.25.3 Training Provision (On and Off-the-job)

Information about numbers / proportions of employers providing training (both on & off-the-job) was in greater supply within the surveys compared with actual figures for training spend. This information is useful for understanding construction sector training activity, and potentially for estimating / modelling training spend figures.

The table below details the findings of these studies in this respect as well as figures given in those reports already mentioned. (Where available, an all-sector figure is given in brackets).

^{xvi} M&Q = Mining and Quarrying

^{xvii} A = Agricultural sector

^{xviii} M = Manufacturing

Employer provision of on and off-the-job training

Source (Employer base given in brackets)	Area of Coverage	Employers providing on- the-job training (%)	Employers providing off- the-job training (%)	Employers providing any training (%)	Employees receiving training (%)
DfES: Learning and Training at Work 2002	England	67 (82)	63 (62)	83 (90)	33 (31)
LSC: National Employer Skills Survey 2003	England	N/A	N/A	52 (59) M&Q: 77 A: 58 M: 58	49 (56) M&Q: 55 A: 47 M: 46
The Northern Ireland Skills Monitoring Survey 2002	Northern Ireland	53 (60) M&Q: 42 M: 67	47 (37) M&Q: 33 M: 58	N/A	N/A
Futureskills Scotland: Skills in Scotland 2003	Scotland	41 (54) A :41 M: 50	44 (50) A :44 M: 41	52 (64) A :47 M: 62	40 (41) A :33 M: 32
Future Skills Wales Generic Skills 2003	Wales	N/A	49 (53)	N/A	N/A
CIC: Built Environment Professional Services Skills Survey 2003/04	UK	47	39	N/A	N/A
CITB-ConstructionSkills: Scottish Construction Skills Survey 2003	Scotland	36	44	51	47
CITB-ConstructionSkills Effect of Employment Status on Investment in Training 2003	UK	42	36	58	N/A

Source: CITB-ConstructionSkills and IFF Research: Measuring Private Investment in Training: Scoping Study, 2004

Notes: Comparable figures for the Agriculture, Manufacturing, and Mining & Quarrying sectors have also been provided where possible.

The consistent pattern is that between 50% and 60% of construction employers train (the higher figure for LTW 2002 can be explained because it is based on larger employers with 5 or more employees at the establishment.).

The figures in the last column need to be treated with care as they measure slightly different things. The figures for the NESS survey apply to all training (on and off-the-job) as does that for the CITB-ConstructionSkills Scotland study. However the figures for the other surveys (LTW 2002, Futureskills Scotland) are proportions receiving off-the-job training only. In addition, with the exception of the LTW 2002 study, these figures are based on total employees, not total no. of organisations

One general note on asking about training, which is a particular issue in construction, is that it needs to be made clear to respondents that we are referring to training in the broadest sense. This issue was highlighted in a 2002 report prepared for the DfES entitled "The Nature of Training and Motivation to Train in Small Firms" whose brief was to gauge the importance of formal and informal training in the context of training provision. One of its findings was that both employers and survey practitioners often refer to training in very narrow terms (e.g. formal courses) but this approach is likely to end up being unrepresentative for small employers who tend to rely more heavily on informal training. For the same reason, the report questions the accuracy of training spend figures, in particular those which give training costs / spend as a percentage of total sales – a measure which is of course most appropriate to training which has a measurable cost.

3.26 Manufacturers Contribution

Initially highlighted within research on the plant certification card scheme¹¹³ manufacturers are clearly a significant stakeholder in workforce training and skills acquisition. After all they are entirely responsible for the supply of materials and products to the industry, a market worth over £44billion¹¹⁴.

The development of new and innovative technology is entirely representative of the drive by manufacturers to develop products that minimise the need for both labour and skill requirements, whilst increasing industry productivity. Anecdotal evidence from several demonstration projects has indicated that the utilisation of new technologies and building systems, particularly in specialist occupations, is less labour intensive than traditional methods, potentially requires fewer traditional skills, and utilizes these skills in a different and sometimes more generalist way. The development of these various systems and technologies has prompted the emergence of skills sets specific to the individual manufacturer's systems.

Evidence from studies such as Innovation, Skills and Productivity¹¹⁵ suggests that if progress is maintained in Off-site Construction (OSC) - prefabrication, modular construction, mechanisation and standardisation - certain on-site processes will come to be seen as the assembly of components rather than construction per se. The projected growth of OSC, combined with inter-related innovation/product development (Glued Brickwork and Thin Joint Construction), suggests that the continued assimilation of product technology and construction techniques will increasingly impact upon skills requirements. And with manufacturers driving product development it is inevitably that they have a role to play. In some cases the manufacturers have opened entire specialist markets which they will service in sales, training and potentially maintenance

Innovation/product development attempts to provide some solutions to skills problems, but also provides a further dilemma if recruitment and training cannot keep pace with development. Unchecked, innovation in itself has the potential to widen the skills gap even further.

Innovation should be seen to support the re-skilling of Operatives, and never to the detriment of appropriate training. It is therefore imperative that ConstructionSkills is able to balance support for training in traditional construction techniques with training in new and emerging skills. The primary issue is to ensure that manufacturer training meets recognized quality standards (possibly through accreditation), fits within a learning and training framework, and is in accord with current legislation (such as health and safety requirements).

Evidence and experience indicates that a great deal of manufacturer training is related to, and will initially occur in the areas of OSC and plant.

3.27 Conclusions relating to the Supply Side

The construction industry is a large employer that is currently hindered by both skills shortages in the trades and skills gaps in its managers and professionals.

The construction industry is, and has been over the last ten years, a significant employer of labour (around 2 million people). Since 1996 the employment trend has been positive with a growth of 14%. The majority of employees work for mid sized (11-250 employees) companies, yet most companies are small (90% < 10 employees). In terms of occupational structure, manual workers dominate and they are likely to earn more than manual workers in other sectors – a condition that has applied since 1995 and could indicate that skills shortages are leading to wage inflation.

Construction employment in the regions varies from 58,000 to 306,000. As a proportion of all regional employment across Great Britain, it is in the fairly narrow range of 5.8%-8.5%.

The workforce is biased towards lower level qualifications than the overall UK workforce. Apprenticeships are common and in some regions of the UK almost half the workforce will be trained in this way.

The construction industry will, over the next 20 years lose around 30% of its workforce through retirement. It has an age profile that is significantly biased towards the 30-44 age bracket compared with the UK working population as a whole.

Demographic pressure and the increased popularity of higher education will reduce the pool of labour available to the sector forcing it to look to non-traditional pools which will in turn help to address the gender imbalance.

In the last year there have been nine surveys of skills shortages, skills shortage vacancies and skills gaps done across the sector. Each one of these has confirmed that skills shortages affect a wide number of companies and skills gaps affect a relative few. The trades that are most difficult to recruit are Wood Trades, Bricklayers, Plasterers, and General Operatives/Labourers. The picture varies by region (East is best, North West is worst) but is relatively consistent across different size of businesses and different sub sectors.

Whilst skills gaps are not perceived as a problem with the existing trades workforce they are amongst new starts, professionals and managers. A detailed assessment of management skills in the contracting industry showed gaps in those skills required for the future; namely proactive business development, design management, technical and practical skills, option and risk appraisal and business development.

Within the trades latent (hidden) skills gaps are preventing the industry from addressing the productivity and performance problems referred to elsewhere in this report.

The supply side challenge is to firstly provide employers with a reliable flow of suitably trained new entrants and to ensure that employers are maintaining and improving the skills of their workforce in line with the market forces that operate on the sector. The evidence presented suggests the UK is failing on the first part of this challenge and will continue to do so if growth continues.

Higher Education Establishments are attracting just under 10,000 starters each year. Inspections of Universities suggest good practice at most and the accreditation of courses by professional institutions confirms this. Employers are similarly supportive, however a recent survey of 927 firms by the Construction Industry Council found one third of respondents felt that the quality of recruits had fallen.

Further Education Establishments are attracting over 50,000 starters each year across the UK but only 30,000 attain qualifications. Quality assessments of courses at FE colleges suggest a need for improvement. Most FE courses are operating at capacity with 75% of colleges expecting construction courses in craft subjects to be oversubscribed.

The combined findings from the CIC surveys of Construction Professional Services companies give cause for concern that investment in training, by SMEs in particular, is low. Also, that although employer led training is held to be essential, the actual amount carried out as part of a well-structured programme is less than adequate. Related activities, such as CPD, Best Practice etc, feature only as a low priority.

As regards the quantity and nature of construction employer training, there is insufficient data on which to draw reliable conclusions for the overall sector. However the introduction of standards through the CSCS Scheme and the provision of OSAT is widely accepted by larger employers as a positive move and is proving an effective way of qualifying the workforce.

If the current capacity for training does not sustain the industry's projected growth then employers may make good the deficit in trained people by:

- ▶ Hiring untrained people and so further reducing the competence of the workforce, which will then affect quality, productivity and performance.
- ▶ "Poaching" trained staff from other firms thus increasing wage inflation.
- ▶ Improving productivity of the existing workforce to make good the short fall.
- ▶ A combination of the above.

Skills shortages (the inability to recruit people with appropriate skills) have a significant impact on the sector particularly amongst trades and manual labour. Overall this will reduce the ability of firms to win work and the capacity of the industry as a whole, reducing the speed with which government can deliver the infrastructure (schools, hospitals and housing) to the level of quality required to improve public services across the country.

The investment of the industry in management and leadership development needs to focus on preparing the industry for the future rather than just getting better at what the industry does now. The sector must focus on providing the skills to deliver the reform agenda being set by industry "think tanks" such as the Strategic Forum for Construction and Constructing Excellence.

The industry must be made aware of, and act upon the skills gaps in the existing workforce. A better trained and qualified workforce would improve the quality, performance and productivity of most companies in the sector.

80% of Professional Services employers experience problems within their existing workforce and the data suggests that a minority of firms experience severe problems in this respect. However, construction employers repeatedly report in surveys that their own workforce is suitably qualified and that the problem is entirely the inflow of people. This suggests that the skills gaps in the existing workforce are not apparent to employers or that employers are in denial.

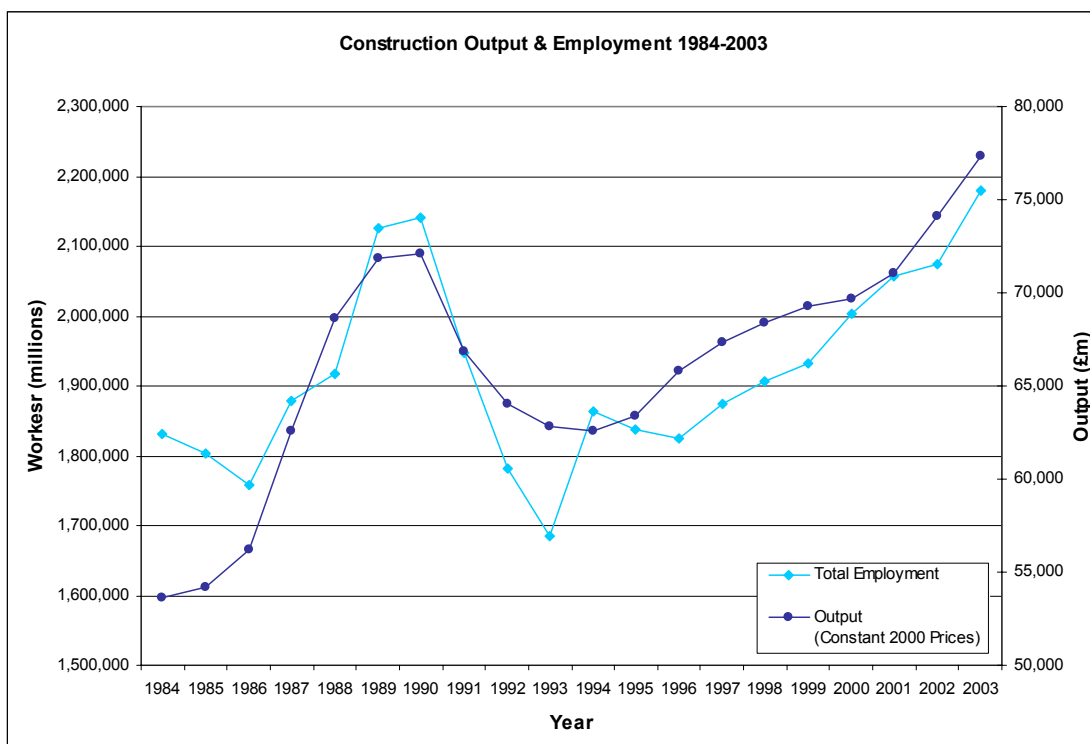
4 Gap Analysis

Gaps between demand and supply

In the last two chapters we examined the demand for and supply of skills and labour. In this chapter we draw some conclusions about the gaps between the two, and the implications for the industry.

4.1 The Challenge

The construction industry has seen sustained growth over the past 10 years with both output and employment increasing by 30% over that period. Yet the industry faces enormous challenges over the next five years if it is to meet Government targets for health, education, housing transport and other infrastructure. Construction activity is an essential prerequisite for growth and improvements in social inclusion and public services as a whole and as such, it occupies a position of critical economic and strategic importance.



Source: Office for National Statistics; Department of Trade and Industry

Although the industry can be justly proud of what has been achieved, particularly in terms of growth, it has a long way to go before it can say with confidence that it has recruited and retained the skills base needed to deliver the productivity and performance levels demanded by its clients.

It is also clear that we are reaching the limits of what can be achieved through the traditional approach to training. Research suggests that the current approach to training reaches only about 25% of the construction workforce. This is due in great part to the fact that the industry carries out much of its business through short-term contracts often utilising a significant numbers of self-employed on a labour-only sub contract basis.

Research commissioned by CITB-ConstructionSkills and the Department for Education and Skills¹¹⁶ indicated that whilst almost three in four (73%) employers had used Labour-only Sub-contractors (LOSCs) over the preceding 12 months, there was strong evidence that training was less likely to be provided to LOSCs.

Whilst 37% of firms who employ manual staff directly provided any off-the-job training to some of their manual staff over the last 12 months, only 20% of those using LOSCs had provided any off-the-job training to LOSCs.

More telling, overall a much higher proportion of directly employed staff received any off-the-job training. For example, 17% of those employing manual staff directly indicated that all their directly employed manual staff had received training over the previous 12 months compared with 8% who employed LOSCs saying they had provided off-the-job training to all their LOSCs.

Overall, a greater proportion of directly employed staff receive on-the-job training compared to that for LOSCs. For example, 17% of those with directly employed staff said all or nearly all these workers were given on-the-job training. This is twice the level found among employers with LOSCs in terms of the proportion of this type of staff given on-the-job training (9%).

The picture of those working towards any qualifications confirmed this. Overall 17% of workers indicated they were working towards a formal qualification, this much higher among those directly employed (22%) than those in self-employment (10%).

So, there is strong evidence from both employers and construction workers that less is invested in the training of staff who are employed on an LOSC basis. It is also the case that LOSC workers tend to receive their training and qualifications while directly employed.

Clearly this short-termist view of contracting together with the extensive use of the self-employed presents a significant barrier in any attempt to promote a training culture and qualify the workforce.

4.2 Implications and training needs

Firstly, a significant section of the industry considers skills shortages to be an issue, and that this will impact on its performance and competitiveness.

- ▶ Shortages in trades and crafts people particularly affect short-term and project-based recruitment. Shortages can be highly acute but usually short-term, they can affect the performance of the company on specific projects particularly those requiring specialist skills.
- ▶ The key impact of short-term skills supply issues is to increase wage rates. The data on Earning Differentials bears this out; manual wages in construction are currently running at more than 12% over national norms.

Secondly, the issue of skills gaps in the industry is not perceived by employers as the main skills problem.

- ▶ Compared with other industry sectors, construction employers are comparatively content with the skills levels of their employed staff.
- ▶ There is a specific issue of under-skilled recent entrants to the sector, who employers identify as requiring considerable training and development to become work-ready. This includes chartered graduates and Further Education qualified tradespersons; health and safety and business sense are two skills often in short supply.
- ▶ Changes in technology, building methods and business processes often require a skill change, and the absence of key skills to implement and deliver them can mean that outdated methods persist past their sell-by-date.

A skills shortage is defined here as the inability to recruit people with the appropriate skills at an appropriate wage; while skills gaps are the 'holes' in the knowledge and competence of existing staff. These gaps can lead to reduced performance, quality and safety.

The industry is currently enjoying growth in demand and output of a scale that requires more people at most levels. This trend is set to continue and the existing problems with skills shortage vacancies are more likely to expand.

Allowing for these factors, our current baseline forecast is that the industry needs to recruit and train some 88,000 entrants per year over the next five years, with 25,000 in the four main trades, 20,000 specialists and civil engineering occupations, 7,000 in professional and technical roles and 14,000 in electrical, plumbing and related trades.

Construction Employment and Training Requirement by Occupation, UK: 2004

Occupation	Total Employment	Average Annual Requirement
Management & Clerical	415,000	17,000
Technical & Professional	175,000	7,000
Main Trades	615,000	25,000
Specialists	217,000	9,000
Plant & Logistics	135,000	5,000
Civil Engineering	261,000	11,000
Plumbing & Electrical	348,000	14,000
Total	2,166,000	88,000

Source: CITB-ConstructionSkills Employment Model, CITB-Northern Ireland Employment Model

However, the requirement for electricians and plumbers can be deflated by about 8,400 in line with the assumption that approximately 60% of electrical wiring and fitting operatives (SIC 45.31) and plumbing operatives (SIC 45.33) work within building services, and are thus technically outside the scope of the ConstructionSkills' remit.

The headline results for three forecast scenarios, including the baseline option, are detailed in the table below.

Potential growth levels in the construction industry and their effect on demand for workers

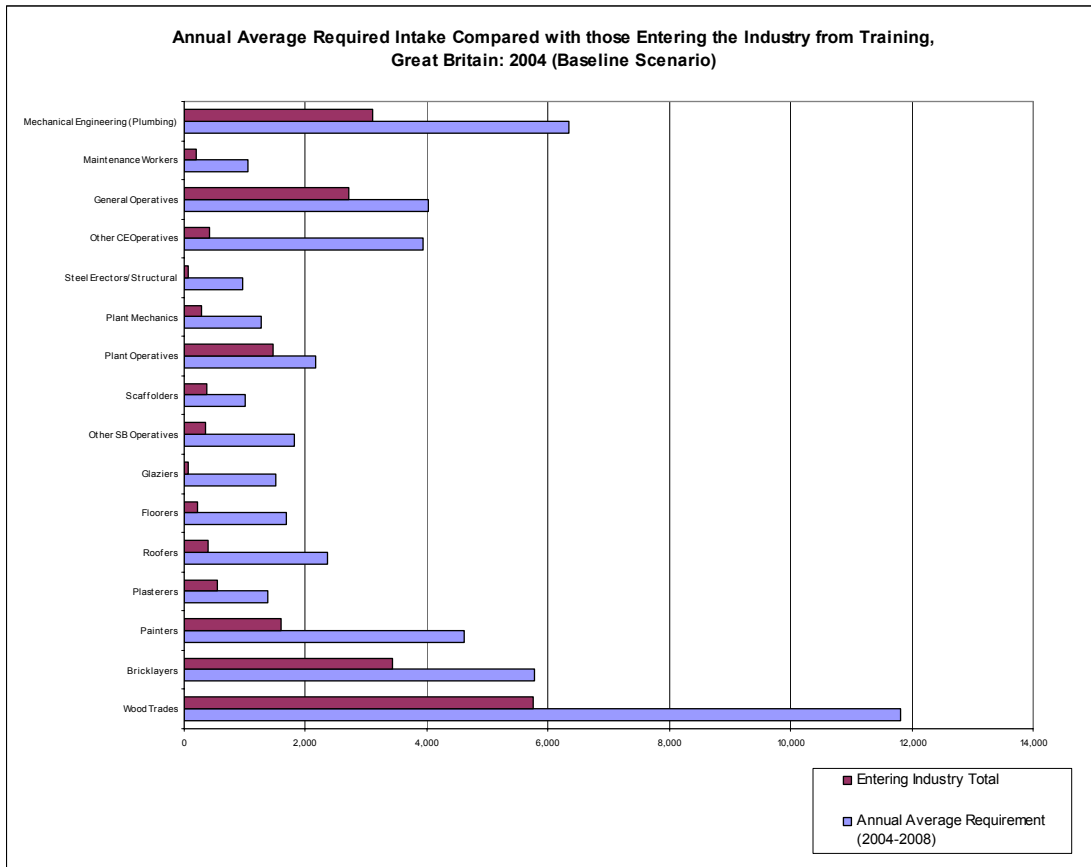
Scenario	Growth assumption	Average Annual Requirement	Annual shortfall in trained workforce
High growth	3.3% annual growth	119,800	58,740
Base line	2.3% annual growth	84,350	33,970
Low growth	1.3% annual growth	51,200	10,790

Sources: Cambridge Econometrics, Experian Business Strategies, CITB-ConstructionSkills Employment Model.

Evidence and opinion suggests that current training and education provision does not provide enough qualified routes of entry into the industry. The current capacity for training (which is already at high utilisation) will not sustain the industry's projected growth, even if growth is low. What may happen is that employers will make good the deficit in trained people by hiring untrained people and so further reduce the competence of the workforce with the knock on effects on quality, productivity and performance.

The below chart demonstrates that the number of people entering the industry from training currently falls far short of the forecast requirement. With demand modelled on the baseline scenario of 2.3% output growth per annum, and a replacement ratio (the number of people needed to stand still) assumed at 3% per annum, the shortfall measured across all occupations is on average about 68% of the total requirement,

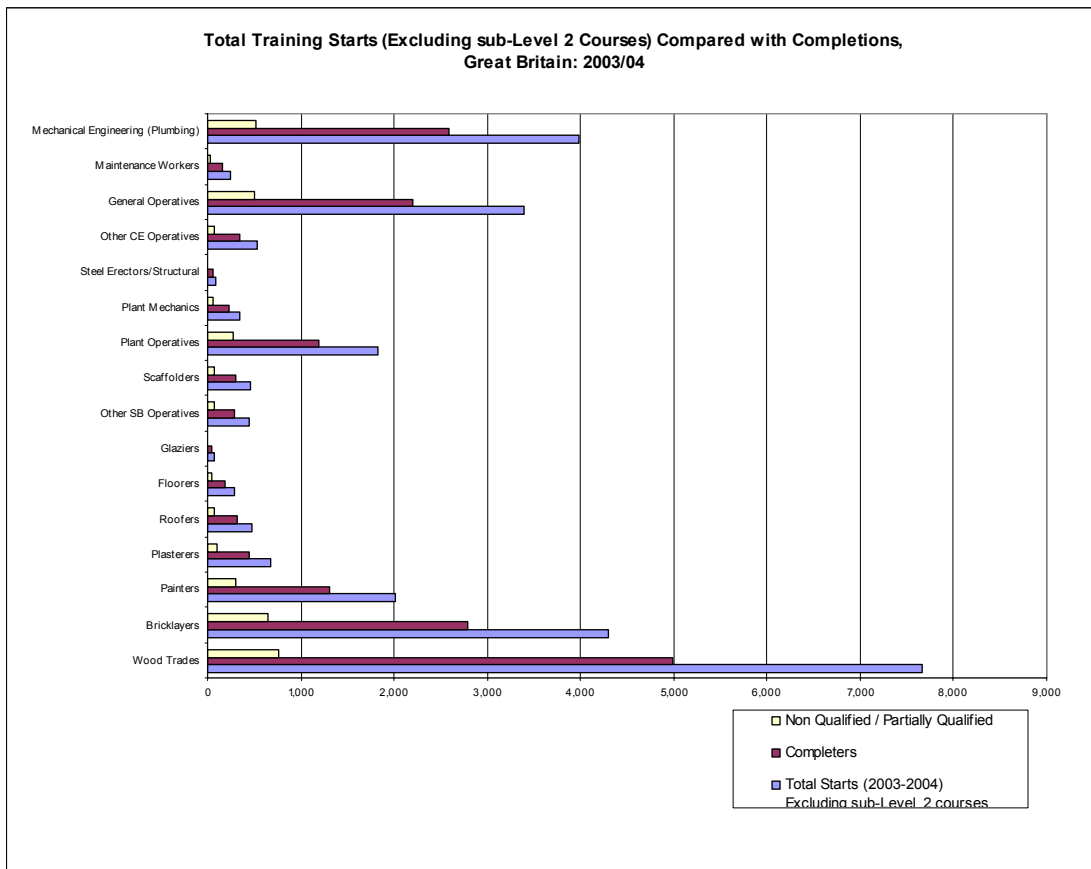
although in some cases such as specialist and civil engineering operatives it is over 90%.



Source: CITB ConstructionSkills: Employment Model 2004; CITB-ConstructionSkills: Trainee Numbers Survey 2003
Baseline Scenario is based on growth of 4.45% in 2003 and 2.3% for the period 2004-2008

Whilst the shortfall in the number of people leaving training and entering the industry poses a particular concern regarding the ability of the industry to meet quality and capacity challenges, especially when considering the figures for those entering the industry include both the non-qualified and those who did not complete their training, it further highlights a worrying gap between those entering and those completing training.

The below chart demonstrates the shortfall between those entering and those completing training in the highlighted occupations.



Source: CITB ConstructionSkills: Employment Model 2004; CITB-ConstructionSkills: Trainee Numbers Survey 2003 Baseline Scenario is based on growth of 4.45% in 2003 and 2.3% for the period 2004-2008

Whilst Further Education provision for the main trades appears to be almost sufficient, only about 55% of those starting training become qualified to Level 2 or above. Figures from CITB-ConstructionSkills' Managing Agency show that, of starters on a Modern Apprenticeship (in England), about 65% will achieve an NVQ (meaning a 35% drop out rate) and only around 34% will actually achieve the Modern Apprenticeship framework.

There also appears to be little Further Education provision for specialist or civil engineering occupations.

Occupation	Total Training Starts (2003-2004)	Total Starts (2003-2004) Excluding sub-Level 2 courses	Total Starts (2003-2004) Sub-Level 2 courses
Technical	6,551	6,551	0
Wood Trades	14,097	7,666	6,431
Bricklayers	8,585	4,294	4,291
Painters	3,123	2,006	1,117
Plasterers	1,307	682	625
Roofers	714	479	235
Floorers	324	282	42
Glaziers	71	71	0
Other SB Operatives	480	441	39
Scaffolders	485	464	21
Plant Operatives	4,573	1,826	2,747
Plant Mechanics	349	346	3
Steel Erectors/Structural	82	82	0
Other CE Operatives	527	526	1
General Operatives	4,084	3,392	692
Maintenance Workers	238	238	0
Mechanical Engineering (Plumbing)	3,988	3,988	0
Total	49,578	33,334	16,244

Source: CITB-ConstructionSkills: Trainee Numbers Survey 2000/01-2003/04

The apparent lack of provision for specialist occupations is a particular cause for concern given the increasingly specialist nature of many construction activities, especially those that are derivative of or utilise new and emerging technologies. This also raises the question as to whether or what proportion of specialist training should occur within the college environment. It can be argued that specialist training within Further Education is prescriptively too expensive, particularly when it necessitates large capital investment in specialist equipment and/or regular expenditure on in ensuring that equipment is suitably up-to-date. In such situations it is suggested that the training and assessment could occur on-site or in-house. This in itself presents a strong case for on-the-job training.

Average Annual Requirement 2004-2008 for Specialist and Civil Engineering Occupations Compared to Total Training Starts

Average Annual Requirement 2004-2008	High growth 3.3% annual growth	Base line 2.3% annual growth	Low growth 1.3% annual growth	Total Starts (2003-2004) Excluding sub-Level 2 courses
Specialist Occupations	12,000	9,000	5,000	1,740
Civil Engineering Occupations	15,000	11,000	7,000	4,240

Source: CITB-ConstructionSkills Employment Model.

One argument is that capacity could be significantly increased if Colleges moved away from providing Level 1 VQs, particularly when the minimum industry requirement is Level 2.

Whilst the trend data below shows that the proportion of Level 1 starts has fallen by almost a third (32%) since 2000/01, they still account for a significant percentage of the total number of trainees.

Year	Number of trainees starting S/NVQ Level 1 Qualification	As % of total number of trainees
2003/04	7,296	15%
2002/03	7,447	15%
2001/02	9,401	20%
2000/01	10,770	24%

Source: CITB-ConstructionSkills: Trainee Numbers Survey 2000/01-2003/04

Given the capacity restrictions that construction training is fast approaching, if not already facing it would be far more desirable to focus limited resources towards Level 2 and 3 courses, and cut back or abandon the Level 1 VQ altogether.

The restricted availability of trained people to the sector is likely to constrain growth, and hold back performance since skilled labour is perceived to be a prerequisite for productivity. It is also likely to restrict improvements. In the long-term, limited labour may drive the uptake of labour saving innovations such as IT, off-site manufacturing and mechanical handling. Although this will not happen if in the short-term management time is spent chasing temporary solutions. A lack of people with a broad range of skills will particularly slow the improvement and maintenance sector, one which is faced with ever larger and more sophisticated refurbishment and facilities management contracts.

In managers there are skills gaps and the investment of the industry on management development has focused on getting better at what the industry does now, rather than broadening the skills to take on new challenges for the future. The industry appears to lack skills to identify, create and realise an opportunity. They are less well equipped for the reform agenda being set by industry "think tanks" such as the Strategic Forum

for Construction and Constructing Excellence than they are for conventional contracting.

4.3 The skills issues of the industry drivers

In the analysis of demand we identified a number of key drivers of the future shape and size of the construction workforce. Here we outline those factors again and describe the skills issues that they raise.

The economy and the market

Predicted economic growth will, at least in the short-term, drive an increase in the size of the workforce. To ensure this growth is not met by recruiting unskilled or inappropriate staff requires better and more effective flows of people into the industry.

This can be achieved by:

- ▶ Better skills planning based on improved forecasts of demand. The work initiated by the Office for Government Commerce (OGC) following the 'Kelly Review' will be instrumental in improving the Government's procurement process. After all the Government is the single largest client for Construction.
- ▶ Expanding the diversity of the workforce to make better use of ethnic minorities, immigrant workers and women.

The desire of the clients and market to improve the quality of supply

The construction industry utilises vast amounts of public monies and so its performance is regularly scrutinised by government. The results of such scrutiny over the last 20 years have been highly critical and led to calls for reform and change, particularly where it is beneficial to both client and constructor. The response of industry, although slow to take hold, has been significant. The movement for change has been spearheaded by Rethinking Construction¹¹⁷, which aimed to improve the performance of the industry by highlighting areas for change by construction employers. It set out values for construction businesses to adopt and performance targets to aim at. More recently the Accelerating Change¹¹⁸ initiative was launched to reinvigorate the call for change by aiming to secure "buy in" from the sector to the Rethinking Construction targets and to ensure greater adoption of the reform agenda. The successful wider application of the Rethinking Construction agenda throughout the industry, and a greater degree of co-operation between clients, contractors and consultants, is essential to the effective delivery of 'best value' construction projects and increased industry performance in the future.

Skills play a key role in ensuring this reform is continued and accelerated, particularly:

- ▶ Ensuring that the right graduates are attracted to the industry and that these graduates are educated in modern and appropriate skills.
- ▶ Aligning and integrating the supply chain to create training opportunities that underpin the reform process.

The desire of the industry to improve performance

The construction industry is highly competitive. Each job (whether a domestic repair or a major road junction) has a set value to the client and a market price; it is the construction company that can deliver at a cost which is below both that wins the job. This is the key performance measure for most construction companies – can we deliver the job at a cost the client will pay?

Skills play a role in ensuring that companies remain competitive. The issues are:

- ▶ Persuading all construction and professional services companies, and not just the large ones, that investing in skills will drive up the competitiveness of the business.

- ▶ Making the right training available in the right media particularly engaging with the supply chain, creating opportunities for on site delivery/assessment and opening up training to the smaller businesses.

Innovation and technology

Innovation and technology certainly offers opportunities for the construction industry to improve performance and deliver better returns for both clients and stakeholders.

There are pockets of the industry that are highly innovative and technically advanced but most of the industry continues to use traditional techniques and materials (often for good economic reasons). Where it makes sound economic sense there should be greater use of innovation and technology in building but to do this requires new skills.

The issue here is how to create the skills for the future to ensure that alternative construction methods can be exploited by the industry.

Sustainable use of resources

The construction industry's consumption of natural resources through materials and energy usage places a heavy demand on the environment and makes it a key target for government action on sustainability. Clearly on an island with finite space and limited resources it is not sustainable to continue to construct energy inefficient buildings made from virgin materials on green-field sites.

The issue emerging here is how to create an industry with the skills to develop, design and build within increasingly tight environmental constraints that will surely be imposed on the sector.

In brief, therefore, the key issues raised by these findings are that:

- ▶ The industry requires a better flow of people particularly from under utilised recruitment pools (women, ethnic minorities and immigrant workers);
- ▶ It needs good information on demand so it can plan better its workforce of the future; and
- ▶ It requires training that is appropriate and affordable particularly:
 - 1 For craft skills, on site assessment and training.
 - 2 For smaller companies, the ability to train "on the job" with their suppliers and main contractors.
 - 3 For managers, effective and relevant undergraduate courses that attract the best candidates, create the skills for the future and ensure that specialists are available.

4.4 Themes for Change

From the evidence, we have drawn a number of themes relating to gaps in the current and future skills provision. These gaps will clearly require action.

4.4.1 Diversity

The construction workforce is 90% male compared with 54% for the whole workforce, and 98% white compared with 96% for the whole of the workforce.

Women account for only 1% of manual employment, making the sector amongst the most gender imbalanced in the UK economy. While the number of ethnic minority trainees starting construction courses at FE accounts for 5% of total starts (up from 3% in 2001/02) the proportion is still much lower than that achieved in the HE sector. And the proportion of female first year trainees in FE is still very low at just 3% of the total (a figure unchanged for the last 3 years and actually lower than in 2000/01).

More worryingly the Equal Opportunities Commission recently concluded that the Modern Apprenticeship system rather than being a key focus for challenging occupational segregation actually reinforces and perpetuates gender stereotypes and traditional recruiting patterns.

The industry is going to have to face the fact that demographic pressure and the increased popularity of higher education will reduce the pool of labour available to the sector forcing it to look to non- traditional pools (women and ethnic minorities) which will in turn help to address the gender imbalance.

4.4.2 Future Skills

Skills shortages have a significant impact on the sector particularly among trade and manual labour. Overall this will reduce the ability of firms to win work and the capacity of the industry as a whole, reducing the speed with which the government can deliver infrastructure required to improve public services across the country.

The industry must be made aware of and act upon the skills gaps in the existing workforce. A better-trained and qualified workforce would improve the quality, performance and productivity of most companies in the sector. However, employers are in denial of this.

To deliver change will require better use of existing skills (particularly the trades and first-line supervision where quality is delivered), and a host of new skills in management (particularly where predictability and profitability are delivered).

Management training in construction has tended to concentrate on the core skills required to react to a tender and solve tender delivery problems. The weaknesses are in proactive business development, design management, option and risk appraisal. These are the skills to identify, understand and realise an opportunity. This suggests that the investment of the industry on training and development has focused on getting better at what the industry does now, rather than broadening the skills to take on the new challenges for the future.

The shape of the workforce (the skills mix) will be determined by pressure on performance, innovation, sustainability and legislation. The minority that rise to these challenges and adopt change will create market advantage for themselves by standing out from their competitors.

For the majority of companies no-change (legislation excepted) is a real option and for many the future will be the same.

Only when it becomes impossible to achieve revenue, profit and cost targets with the current model will the majority seriously consider adopting a more innovative approach to their business management, design and products.

4.4.3 Graduates

In recent years there has been a decline in the number of undergraduates on Built Environment courses down from 10,630 in 1988/89 to 9,720 in 2002/03 – although this last figure was a 3% increase on the year before, suggesting the outlook may improve. Building has shown the steepest decline in students, while Architecture has shown considerable increases.

As with FE training, it is important to target those sections of the population that traditionally would not consider a career as a construction professional if the decline in construction graduates is to be reversed.

4.4.4 Investment in Training

The restricted availability of trained people is likely to constrain growth and hold back performance since a skilled workforce is a prerequisite for productivity.

However, a “low performance” equilibrium will persist with many companies, particularly the small ones. As they are busy (in growth markets clients cannot be as selective) many do not see the need for improvement and so motivation to improve the skills mix will be lower than in other sectors where international competition is more dominant.

Pressure to improve performance will continue but (because of under capacity in the market) will only be adopted by a few companies.

Without action, employers may respond by hiring unsuitably skilled labour, which will reduce the quality of outputs, impede productivity gains and reduce the value received by clients. Alternatively they may work to improve the productivity of their workforce. Actually they will do a combination of the two.

There is a need to instil a training culture in the sector and improve attitudes towards, and expenditure on training. The amount of training provided to employees is much higher than that to labour only sub-contractors. The self-employed who migrate from job to job with little security of income and few of the advantages of direct employment suffer from a lack of investment in skills and qualifications.

4.4.5 Supply chain

Clients and markets influence skills by their demands for better delivery performance and value for money. Their continuing and growing intolerance of late delivery and over spending is driving clients to seek different forms of contract, and contractors to generate more accurate plans and adopt more predictable construction techniques; each of which requires new and higher level skills.

The impact on the main business processes will be:

- ▶ Establish longer term relationships between clients and larger contractors to retain learning from each project
- ▶ Partnering
- ▶ Focus on sustainable construction
- ▶ Greater involvement of suppliers
- ▶ Just in Time construction
- ▶ Focus on logistics and workflows
- ▶ Focus on reduced waste
- ▶ Minimised environmental impact
- ▶ Better management of and integration with supply chains
- ▶ Better management of health and safety
- ▶ Develop a learning culture
- ▶ Improved performance measurement and reporting.

Managers in large companies will have to adapt their skills set to deal with greater risk, wider involvement in the whole construction cycle and partnering culture. Yet while much of the talk is of value-based partnerships there is still a great deal of price-based procurement on both client and supplier sides.

The policy drive of government for sustainable development (enforced by legislation) is slowly taking hold, especially in large public sector projects, and when fully embraced sustainable construction could have a high impact on the skills of the industry and on procurement practices.

But in the short-term, sustainability will be limited to that which is legislated for and will cover mainly planning consents, waste handling/disposal and re-use of materials. Only when the true cost of waste becomes apparent will the industry act to reduce it.

When the supply chain makes sustainable processes and products available and designers become more aware of the design advantages then contractors will be able to more easily adopt sustainable alternatives.

4.4.6 Placements for Work Based Experience

Part of the supply side challenge is to provide employers with a reliable flow of suitably trained new entrants. Opinion is that the UK is failing.

The lack of suitable work placements is placing severe restrictions on the ability of colleges to train new entrants to the standards required by the industry. Some 75% of colleges say that some of their trainees will fail to qualify to full S/NVQ level due to a lack of suitable employers willing to provide work placements. In some cases the failure rate is as high as 60%.

In response to the unwillingness of some employers to offer work placements to Modern Apprentices, colleges are increasingly offering Construction Certificates as opposed to full vocational qualifications. Construction Certificates contain all the theoretical and practical elements of a vocational qualification, but lack the work experience element.

Given that the requirement for work experience was introduced into vocational qualifications in response to employers' criticism of qualified but inexperienced new entrants, this can only be seen as a backwards step in terms of quality of training.

Similarly, the CIC CPS surveys have highlighted concerns by employers over a lack of work readiness and business awareness in many graduates. Though this is a real concern, it is only likely to be ameliorated by more widespread exposure to a real place of work as a regular and dependable part of Further and Higher Education courses. This is proving difficult as the number of annual work placements made available is often short of the desired number. Full time courses suffer more of a problem compared with mixed P/T or sandwich education that has a higher level of exposure to real businesses as a consequence.

4.5 Focus on Change

The evidence that is available strongly suggests that if the industry is to meet the challenging targets it has set itself with regards qualifying the workforce, whilst also improving industry performance in line with client expectations, a step change is required to engage sectors of the industry that, up until now, haven't been involved in training.

The industry must not only broaden its horizon with regards current needs, but must also lengthen its perspective with regards future possibilities. The reality is that the industry has consistently performed well in recent years, probably better than expected, outperforming its perceived limitations and doing so in spite of weaknesses in skills supply. However, it is extremely doubtful if this approach can sustain further significant growth.

We have established that the current project-based structure of the industry does not provide an easy business case for training, so there is a need to develop new methods of provision and funding which reflect the reality of the sector. We need to do things differently rather than seeing how current ways of doing things can be improved. The case for change is compelling. Driving it forward will require a strength and commitment from all stakeholders at every level. Because within the bounds of a

traditionally conservative industry any change in the status quo could quite easily be perceived as being too radical, and therefore potentially too greater a risk.

If the skills agenda cannot be promoted on any level other than increasing bottom line profit, it seems that a fundamental reason for change is one of opportunity cost; economically and societally. The industry has been able to increase turnover and output with the existing skills base, and relatively low levels of workforce development, but how much better could it have performed with increased investment in learning and training?

Almost impossible to answer, however, if the implied link between skills improvement and increased productivity truly exists then the opportunity to influence this in the future is one which the industry must not pass up. To not take this opportunity for change is to preclude the positive advancement of the industry at all levels.

4.6 Priorities for Change

In conclusion, a combination of research findings, analysis and consultation has identified three major areas of challenge; and within these 11 priorities for change, which if addressed will contribute significantly to the industry meeting the key challenges ahead.

- ▶ **Improving business performance** – bring about a step change in performance and productivity if it is to meet client expectations on quality, time and cost.
 - ▶ Increasing the number of companies in training
 - ▶ Developing management and leadership skills
 - ▶ Supporting lifelong learning in construction
 - ▶ Improving intelligence on skills for the future

- ▶ **Qualification and certification** – an assessment of the potential market for the On-site Training and Assessment (OSAT) programme suggests that the industry needs to qualify at least 250,000 people to achieve the Government’s stated minimum level for employability, and the industry’s own target of a fully qualified workforce by 2010.
 - ▶ Intensifying and widening the industry’s Qualifying the Workforce initiative
 - ▶ Developing flexible training and qualification structures for specialist occupations
 - ▶ Assisting the effective integration of immigrant workers

- ▶ **Recruitment and retention** - figures from the CITB-ConstructionSkills econometric model shows the industry needs to recruit and train around 500,000 people by 2008 if it is to replace those leaving the industry and to allow for projected growth
 - ▶ Improving understanding of career opportunities in construction
 - ▶ Increasing apprentice completions and widening opportunities for onsite practice
 - ▶ Promoting diversity through local employment and training projects
 - ▶ Increasing quality applications for construction-related degree courses

APPENDIX

Appendix 1: SIC Codes covered by the ConstructionSkills

SIC 45	Construction
SIC 45.1	Site Preparation
SIC 45.11	Demolition and wrecking of buildings; earth moving
SIC 45.12	Test drilling and boring
SIC 45.2	Building of complete construction or parts; civil engineering
SIC 45.21/1	Construction of commercial buildings
SIC 45.21/2	Construction of domestic buildings
SIC 45.21/3	Construction of civil engineering constructions
SIC 45.22	Erection of roof covering and frames
SIC 45.23	Construction of motorways, roads, railways, airfields and sport facilities
SIC 45.24	Construction of water projects
SIC 45.25	Other construction work involving special trades
SIC 45.3	Building Installation
SIC 45.32	Insulation work activities
SIC 45.34	Other building installation
SIC 45.4	Building Completion
SIC 45.41	Plastering
SIC 45.42	Joinery installation
SIC 45.43	Floor and wall covering
SIC 45.44	Painting and glazing
SIC 45.45	Other building completion
SIC 45.5	Renting of construction or demolition equipment with operator
SIC 74	Other Business Activities
SIC 74.2	Architectural and engineering activities and related technical consultancy
SIC 74.20/1	Architectural activities
SIC 74.20/2	Urban planning and landscape architectural activities
SIC 74.20/3	Quantity surveying activities
SIC 74.20/4	Engineering consultative and design activities
SIC 74.20/5	Engineering design activities for industrial process and production
SIC 74.20/6	Engineering related scientific and technical consulting activities
SIC 74.20/9	Other engineering activities

Source: UK Standard Industrial Classification of Economic Activities, 2003, Office for National Statistics.

Notes: Asset Skills (the SSC for Property and Facilities Management) has a peripheral interest in SIC 74.2 Architectural and engineering activities and related technical consultancy.

ConstructionSkills shares an interest in SIC 45.31 Installation of electrical wiring and fittings and SIC 45.33 Plumbing with SummitSkills (the SSC for the Mechanical and Electrotechnical Services)

Appendix 2: Sources of Information

Our key sources of information for this chapter are:

Source	Methodology
CITB-ConstructionSkills Foresight Study	A regional consultation exercise where sixteen employer workshops were held across the UK. The workshops brought together employers from clients, architects, construction companies and product suppliers and sought their opinions on the change factors in the sector
CITB-ConstructionSkills Innovation Report	A literature review followed by a consultation exercise comprising an panel of fifty employers, three half day employer workshops and ten in depth interviews with leading practitioners. The work was subjected to expert review by Professor David Gann of Imperial College.
CITB-ConstructionSkills Sustainability Report	A literature review supported by a consultation exercise comprising in depth interviews with practitioners and a workshop of those responsible for setting and delivering policy.
CITB-ConstructionSkills Productivity Review	Early findings from this work that include a literature review and consultation with 100 employers on the issues that drive productivity.
CPA Market Forecasts	An analysis of current and future output of the sector based on financial returns by construction companies.
DTI Construction Data	An analysis of the sector activity by the DTI Construction Unit.
Constructing Excellence KPI programme	An analysis of the operational performance of the sector collected by analysing data on thousands of construction projects supplied by hundreds of companies.
Davis Langdon Consultancy for DTI	Sector Competitiveness Analysis of the UK Construction Industry

We estimate that at least 300 employers have directly contributed to the opinions expressed in this chapter and around 1000 more have supplied data that is used to underpin the charts and tables.

Appendix 3: KPI data in detail

The KPI data is rich in detail and analysing trends in performance gives a clear picture of the industry's strengths and weaknesses. The table below describes each indicator and what that indicator means for skills and performance.

Indicator	Definition	Trend	Interpretation
Client Satisfaction - product	In a national survey clients are asked to rate their satisfaction with products, and service for projects completed in the year on a 1 – 10 scale.	80% of projects scored 8 or more out of 10 in 2004. The trend shows a 10% improvement since 2000.	Over time the proportion of clients that are generally satisfied with the building and the overall service from their builder has increased.
Client Satisfaction - service		74% of projects scored 8 or more out of 10. The trend shows a 17% improvement since 2000.	
Defects	A national survey of clients asked them to rate the impact of defects in the project at the point of completion. They used a 10 point scale where 10 represents zero defects.	68% of projects received a score of 8 or better. The trend shows a 5% improvement.	Whilst defects are still a problem to the industry (and far worse than consumer products) the majority of projects are delivered with a level of defects that only causes minor inconvenience to clients.
Safety	The measure of reportable accidents is provided by the Health and Safety Executive.	The incident rate is 1172 reportable accidents per 100,000 people employed. The general trend is improving although 2004 saw a dip.	Generally the industry is addressing safety by introducing better working practices. Construction sites however remain hazardous areas and effort is needed to mitigate risks. Much has been spent on safety training and equipment with (as the statistics suggest) some impact.
Predictability - cost	An annual survey of projects amongst a sample of contractors.	62% of project designs were completed within the design budget. 49% of buildings were built within the construction budget. 50% of projects overall were completed within their project budget.	The ability of the industry to build to cost is critical to both the profitability of the companies and the satisfaction of clients. There is work to do in this area with only half of projects finishing within time and budget.
Predictability - time		55% of projects were designed within the allotted design time. 60% of projects were constructed within the allotted build time. 44% of projects were constructed within the allotted time	The ability of the industry to build to time is critical to the client satisfaction and workflow for construction firms. Jobs that run late (as do around half) delay client occupation and prevent labour moving to other jobs so robbing the company of cash flow and income.
Profitability	Data on profit before interest and tax from annual accounts as filed with Companies House.	The median profitability per gross turnover was 7.5% compared with 5.8% in 2003. The trend on this data point is upwards by 60% on year 2000.	A significantly important indicator for share holders and managers of construction firms. This represents two factors: the increasing workload that is allowing firms to be more selective in the work they take and an increase in productivity (see below).
Productivity	Data on value added (gross turnover less all bought in suppliers) obtained from annual reports as filed with Companies House.	The median value added per employee was £33k compared to £31k in 2003. The trend in improvement is 20% on the year 2000.	As with productivity an important indicator for the industry. This method of calculating productivity is the "crude" approach of taking gross turnover less bought in goods and divided by the number of employees – which is why it is less than the figures from LFS.

Appendix 4: Details of the econometric model

The model takes statistics on the existing workforce and using econometric forecasts predicts the future need for trained people.

The latest year for the actual data (2003) is the starting point. Labour supply and labour demand are defined as follows:

Labour supply = employment + unemployment

Data on employment and unemployment are available from the Labour Force Survey

Labour demand = employment + vacancies

Data on employment available from the LFS as above plus 3% to take into account long run vacancies. The rate is based by a recent study carried out by the Department for Education and Skills reported in Labour Market Trends, October 2002.

Over the forecast period, labour supply will be determined by flows in and out of the labour force, retirements being the key variable.

Results from the LFS provide robust information on movements to and from the construction industry. Broadly “retirements” include a number of heterogeneous components, some of which are permanent and some of which are potentially temporary, although the distinction between the two is not always apparent. The new model identifies the following categories:

- ▶ Net transfers to other industries (in response to relative demand pressure changes)
- ▶ Retirements from the labour force
- ▶ Temporarily sick or injured
- ▶ School leavers/students entering construction
- ▶ Those on government training schemes entering the industry
- ▶ Permanently sick or injured
- ▶ Those transferring to home duties

Over time the model shows that, except for retirements from the workforce and transfers to other industries, losses due to the other factors are mainly covered by gains. These movements have therefore been ignored when calculating the replacement ratio.

Retirements from the labour force obviously need to be included in the calculation of the replacement ratio. Over recent years retirements have averaged just less than 1%. This percentage is not significantly different from the rest of the economy. The most important category is flows into and from other industries. Given that construction employment has been growing steadily over recent years, the gains from other industries have been greater than the losses.

For movements from other industries we need to identify what percentage of those joining construction employment are already part of the construction labour force, i.e. have the necessary skills although they may lack the necessary qualifications.

The British Household Panel Survey (BHPS) provides data to estimate the percentage of those joining employment that can be considered as part of the labour force and do not therefore need training. The BHPS has been running for 11 years.

Results show that 38% of people entering construction employment from other industries last worked in construction less than two years ago. The remaining 62% worked in the industry two or more years ago.

In running the model it is assumed that individuals who have worked outside the industry for less than two years can be counted as part of the construction labour force and do not therefore need training. Individuals who have not worked in the industry for more than two years are no longer counted as part of the construction workforce and are therefore treated as new entrants requiring training.

These assumptions result in a replacement ratio of approximately 3%. This is below the replacement ratio used in running the model prior to 2003. However it needs to be pointed out that the population has changed: the model is now based on the LFS estimates of construction employment, approximately 2 million, while the previous model was based on DTI estimates, approximately 1.5 million.

Appendix 5: The Maximum Change Scenario

In this scenario we describe the conditions for maximum skills change. For this to occur the economy would have to grow significantly and at the same time clients would demand greater performance. Government would convert its sustainability policy into legislation. To address these combined pressures the industry would need to adopt new technology and innovate far more than it is at present.

Driver	Maximum change conditions
The economy Star rating **	The economy grows significantly (>4% per year) with government, industry and housing sectors increasing demand over that which is forecast by the CPA.
Pressure to improve performance Star rating *	Government and other large clients become more performance orientated and increase the pressure on contractors. The best contractors respond well, capture the market but the reduced pool of quality contractors leads to price inflation. Clients are forced to choose between getting the job done by the best contractors at higher prices and having to wait for their "slot" or working with those that are available.
Innovation and new technology Star rating **	In terms of construction products, suppliers deliver an increased range of cost competitive alternatives to traditional construction. In parallel the suppliers offer product training in how to use the new innovations. These are then rapidly adapted by the trades. Clients become more prepared to accept innovation; mortgage lenders and insurers fully accept framed construction and encourage it, factories spring up making housing and building units. Both supply and demand for innovative buildings pressure the construction industry into adopting new approaches. Innovation in the way buildings are built accelerates. The plant manufacturers offer ever more efficient ways of moving materials that mimic the production line approach of automotive and aerospace companies. Just in time construction becomes a reality with better management of inventory. IT is widely accepted as a means of communication, information storage and processing. Wireless broadband links to site eliminate paper, virtual project teams and electronic supply chain management becomes the norm.
Sustainability Star rating *	The policy ambition of government is enshrined in legislation regarding efficient use of land, materials and labour. The current confused policy ambitions of various departments are unravelled and a coherent policy on land use, environmental protection and economic development emerges. Clients fully accept the need for sustainability (and the increased cost implications of doing so) and specify more energy efficient buildings made from materials with less embedded energy. Large contractors are forced by their shareholders to change their business model and put corporate social responsibility ahead of short term profits.
Legislation Star rating **	Increased intervention in the employment law eliminates certain site practices and equality legislation addresses the gender imbalance collectively this forces the adoption of alternative construction methods. Planning and building regulations are used to underpin the sustainability policy which pushes more development of brownfield sites using greater recycled materials to create lower energy buildings.

High Growth @ 3.3% per annum (& all else equal to base case)

Scenario 1 - High Growth Construction Employment and Training Requirement by Occupation Great Britain 2004-2008

	Total Employment		Average Annual Requirement (2004-2008)	Current Qualified Output 2003	Surplus/Deficit (2004-2008)
	2004	2008			
Managers	234,755	273,685	13,930	DK	DK
Clerical	164,620	173,950	9,220	DK	DK
Professionals	118,820	139,160	7,070	3,302	-3,768
Technicians	53,220	62,620	3,170	4,258	1,088
Wood Trades	288,800	324,710	16,770	4,983	-11,787
Bricklayers	144,400	155,400	8,170	2,791	-5,379
Painters	115,110	125,250	6,560	1,304	-5,256
Plasterers	36,770	34,790	1,940	443	-1,497
Roofers	57,760	64,940	3,350	311	-3,039
Floorers	41,260	46,390	2,400	183	-2,217
Glaziers	37,130	41,750	2,160	46	-2,114
Other SB Operatives ⁽¹⁾	45,970	48,710	2,580	287	-2,293
Scaffolders	24,750	27,830	1,440	302	-1,138
Plant Operatives	52,400	60,300	3,080	1,187	-1,893
Plant Mechanics/Fitters	30,940	34,790	1,800	225	-1,575
Steel Erectors/Structural	22,280	27,830	1,380	53	-1,327
Other CE Operatives ⁽²⁾	95,720	109,010	5,600	342	-5,258
General Operatives	100,670	109,010	5,720	2,205	-3,515
Maintenance workers	24,280	30,150	1,500	155	-1,345
Electricians	179,470	201,790	10,420	DK	DK
Plumbers	150,180	178,590	9,020	2,592	-6,428
Non-construction operatives	43,320	48,710	2,520	DK	DK
Total	2,062,620	2,319,370	119,800	24,969	-58,741

Source: CITB Employment Model, September 2004; Experian Business Strategies - (1)Specialist Building, (2)Civil Engineering

Note: Numbers rounded to the nearest ten - totals may not add up due to rounding

Current qualified output excludes those completing S/NVQ Level 1

	Average annual figure (2004-2008)
Requirement due to expansion	70,770
Requirement due to Supply Side Factors	49,000

Source: CITB Employment Model, September 2004

Appendix 6: The Minimum Change Scenario

In this scenario we consider the minimum change and its likelihood of occurring.

The minimum change is created by the major change drivers ceasing or reducing their action on the sector.

Driver	Conditions for minimum change
The economy Star rating *	Growth in the economy flattens
Pressure to improve performance Star rating **	The Constructing Excellence agenda engages only a few construction firms and many clients, disillusioned with the pace of change return to an adversarial approach to securing quality and delivery. They refuse to pay for poor work (retentions increase) and add penalty clauses for late construction.
Innovation and new technology Star rating **	In terms of construction products there is a reduction in the flow of new products entering the market as suppliers become disillusioned with take up by the industry and cut investment in research and development. Each sub-sector becomes more modular in its approach and less tolerant of architects seeking to create "signature buildings" so innovation is reduced. Innovation in the way buildings are built stabilises and introduction of new plant technology slows. IT is used where it works well and requires few skills i.e. basic word processing, spreadsheets and e-mail.
Sustainability Star rating **	The policy ambition is downgraded as pressure for infrastructure needed by public services, housing and education outweighs the need for sustainable development. There is insufficient flow of low embedded energy products to change construction products. Shareholders and clients are intolerant of the reduced margins and increased costs associated with developing brownfield sites, using low energy materials and energy saving products.
Legislation Star rating *	Government takes a far less interventionist stance and relaxes law on employment, planning and building regulations.

Low Growth @ 1.3% per annum (& all else equal to base case)

Scenario 2 - Low Growth Construction Employment and Training Requirement by Occupation Great Britain 2004-2008

	Total Employment		Average Annual Requirement (2004-2008)	Current Qualified Output 2003	Surplus/Deficit (2004-2008)
	2004	2008			
Managers	229,295	233,338	5,930	DK	DK
Clerical	160,790	148,310	3,970	DK	DK
Professionals	116,060	118,650	3,010	3,302	292
Technicians	51,980	53,390	1,350	4,258	2,908
Wood Trades	282,090	276,840	7,170	4,983	-2,187
Bricklayers	141,040	132,490	3,510	2,791	-719
Painters	112,430	106,780	2,810	1,304	-1,506
Plasterers	35,920	29,660	840	443	-397
Roofers	56,420	55,370	1,430	311	-1,119
Floorers	40,300	39,550	1,020	183	-837
Glaziers	36,270	35,590	920	46	-874
Other SB Operatives ⁽¹⁾	44,900	41,530	1,110	287	-823
Scaffolders	24,180	23,730	610	302	-308
Plant Operatives	51,180	51,410	1,320	1,187	-133
Plant Mechanics/Fitters	30,220	29,660	770	225	-545
Steel Erectors/Structural	21,760	23,730	580	53	-527
Other CE Operatives ⁽²⁾	93,490	92,940	2,390	342	-2,048
General Operatives	98,330	92,940	2,460	2,205	-255
Maintenance workers	23,710	25,710	630	155	-475
Electricians	175,300	172,040	4,460	DK	DK
Plumbers	146,680	152,260	3,830	2,592	-1,238
Non-construction operatives	42,310	41,530	1,080	DK	DK
Total	2,014,660	1,977,440	51,200	24,969	-10,791

Source: CITB Employment Model, September 2004; Experian Business Strategies - (1)Specialist Building, (2)Civil Engineering

Note: Numbers rounded to the nearest ten - totals may not add up due to rounding

Current qualified output excludes those completing S/NVQ Level 1

	Average annual figure (2004-2008)
Requirement due to expansion	330
Requirement due to Supply Side Factors	50,870

Source: CITB Employment Model, September 2004

Appendix 7: Country and Regional Forecasts

For each country or RDA area 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:

- ▶ Economic outlook
- ▶ Reported skill shortages and skill 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 forecast tables that are based on a medium-term perspective.

The forecasts are given in Tables. For each region, the tables include:

- ▶ Total employment by occupation in 2003 and 2007
- ▶ The average annual required intake over the forecasting period 2003–2008
- ▶ The cumulative required intake over the period as a whole.

As for the Great Britain table, the annual trained requirement is the difference between demand and supply and consists of two elements:

1. The extra intake required due to the increase, if any, in total employment
2. The number required due to supply side factors, i.e. outflows of workers and corresponding inflows into employment.

General Changes to the model

A number of changes have been made to the model since the Construction Skills Forecast Report 2003, the major changes are:

- ▶ DTI output data updated to use 2000 prices (previously 1995 prices)
- ▶ LFS historical data re-weighted to take into account problems with 1991 census
- ▶ Model re-estimated to include available data for 2003
- ▶ Consensus view of construction output growth now averaging 2.3% per annum
- ▶ Percentage of entrants to the industry from other industries already having relevant qualifications is now 38%
- ▶ Regional distribution of construction activity now influenced by Construction Forecasting & Research's (CFR) regional forecasts (previously Experian's Regional Planning Service Forecasts)

The first two changes were necessary to include the latest data as well as move to better estimates of both employment and output. The move to CFRs regional forecasts provides consistency between the model and subsequent regional reports, CFR use a Delphi process for forecasting, and also represents an industry specific view of the way regions will perform.

Great Britain

Table 1B Employment by Occupation in Great Britain

	Total Employment		Average Annual Percentage Change (2004-2008)	Average Annual Requirement (2004-2008)	Cumulative Requirement (2004-2008)
	2004	2008			
Managers	232,020	252,870	2.2	9,790	48,950
Clerical	162,700	160,720	-0.3	6,510	32,550
Professionals	117,440	128,580	2.3	4,970	24,850
Technicians	52,600	57,860	2.4	2,230	11,150
Wood Trades	285,440	300,010	1.3	11,810	59,050
Bricklayers	142,720	143,580	0.1	5,770	28,850
Painters	113,770	115,720	0.4	4,620	23,100
Plasterers	36,340	32,140	-3.0	1,370	6,850
Roofers	57,090	60,000	1.3	2,360	11,800
Floorers	40,780	42,860	1.3	1,690	8,450
Glaziers	36,700	38,570	1.3	1,520	7,600
Other SB Operatives ⁽¹⁾	45,440	45,000	-0.2	1,820	9,100
Scaffolders	24,470	25,720	1.3	1,010	5,050
Plant Operatives	51,790	55,720	1.8	2,170	10,850
Plant Mechanics/Fitters	30,580	32,140	1.3	1,270	6,350
Steel Erectors/Structural	22,020	25,720	4.0	970	4,850
Other CE Operatives ⁽²⁾	94,600	100,720	1.6	3,940	19,700
General Operatives	99,500	100,720	0.3	4,030	20,150
Maintenance workers	24,000	27,860	3.8	1,050	5,250
Electricians	177,380	186,430	1.3	7,340	36,700
Plumbers	148,430	165,010	2.7	6,340	31,700
Non-construction operatives	42,820	45,000	1.3	1,770	8,850
Total	2,038,620	2,142,930	1.3	82,580	412,900

Source: CITE Employment Model, September 2004; Experian Business Strategies - (1)Specialist Building, (2)Civil Engineering

Note: Numbers rounded to the nearest ten - totals may not add up due to rounding

* Cumulative Requirement for 2004-2008 inclusive (5 years); Requirement totals do not include Non-construction operatives

Economic outlook

The national construction industry remains in good health in 2004. While the national levels will again be strong in 2004 this isn't painting the whole picture. Last year saw a distinct divide between the bullish Northern and Central regions and the downbeat South, and this is a trend we can expect to see continue this year and next.

Private housing construction is still booming in the North, and though growth is expected to moderate from the particularly high current levels the sector will remain strong in the area. However, in the South uncertainty over supply and demand mismatch issues highlighted in the Barker review may temporarily restrain housebuilders as discussions continue about what action to take. The Central region has also experienced buoyant growth in this sector, though this is likely to moderate quite sharply next year.

High levels of government spending have bolstered the public housing and non-residential sectors, but even this has seen a Northern bias. Nevertheless, with the likelihood of a post-election tightening of purse strings we can expect to see this gap close.

We can also expect to see a return to similar growth among the regions due to a gradual pick up in commercial construction in the South, which has been constrained by the dormant offices market, and increasing levels of housebuilding in the South, which must be inevitable to address the large shortfall in supply.

England

Table 1B Employment by Occupation in England

	Total Employment		Average Annual Percentage Change (2004-2008)	Average Annual Requirement (2004-2008)	Cumulative Requirement (2004-2008)
	2004	2008			
Managers	205,730	223,880	2.1	8,290	41,450
Clerical	140,950	138,970	-0.4	5,380	26,900
Professionals	100,330	109,670	2.3	4,050	20,250
Technicians	45,530	49,980	2.4	1,830	9,150
Wood Trades	237,290	248,700	1.2	9,290	46,450
Bricklayers	125,120	125,840	0.1	4,830	24,150
Painters	95,700	97,140	0.4	3,670	18,350
Plasterers	32,870	29,050	-3.0	1,200	6,000
Roofers	48,010	50,350	1.2	1,870	9,350
Floorers	36,690	38,500	1.2	1,460	7,300
Glaziers	31,360	32,970	1.3	1,240	6,200
Other SB Operatives ⁽¹⁾	40,070	39,680	-0.2	1,520	7,600
Scaffolders	20,220	21,160	1.2	780	3,900
Plant Operatives	39,560	42,440	1.8	1,540	7,700
Plant Mechanics/Fitters	27,320	28,670	1.2	1,080	5,400
Steel Erectors/Structural	18,720	21,800	3.9	790	3,950
Other CE Operatives ⁽²⁾	81,060	86,160	1.5	3,230	16,150
General Operatives	83,870	84,690	0.2	3,200	16,000
Maintenance workers	20,970	24,290	3.7	880	4,400
Electricians	149,820	157,130	1.2	5,850	29,250
Plumbers	128,480	142,600	2.6	5,240	26,200
Non-construction operatives	37,480	39,320	1.2	1,480	7,400
Total	1,747,150	1,832,990	1.2	67,220	336,100

Source: CITB Employment Model, September 2004; Experian Business Strategies - (1)Specialist Building, (2)Civil Engineering

Note: Numbers rounded to the nearest ten - totals may not add up due to rounding

* Cumulative Requirement for 2004-2008 inclusive (5 years); Requirement totals do not include Non-construction operatives

Regional Development Agency Areas

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

South East

Table 1B Employment by Occupation in the South East

	Total Employment		Average Annual Percentage Change (2004-2008)	Average Annual Requirement (2004-2008)	Cumulative Requirement (2004-2008)
	2004	2008			
Managers	36,970	42,130	3.3	1,750	8,750
Clerical	28,430	29,390	0.8	1,290	6,450
Professionals	18,510	21,220	3.5	910	4,550
Technicians	7,610	8,770	3.6	370	1,850
Wood Trades	37,410	41,230	2.5	1,850	9,250
Bricklayers	19,740	20,870	1.4	950	4,750
Painters	15,940	17,000	1.6	750	3,750
Plasterers	3,580	3,340	-1.8	160	800
Roofers	7,890	8,700	2.5	390	1,950
Floorers	5,170	5,710	2.5	260	1,300
Glaziers	5,440	6,000	2.5	270	1,350
Other SB Operatives ⁽¹⁾	6,650	6,910	0.9	300	1,500
Scaffolders	1,800	1,990	2.5	90	450
Plant Operatives	5,600	6,310	3.1	280	1,400
Plant Mechanics/Fitters	3,580	3,950	2.5	180	900
Steel Erectors/Structural	1,740	2,140	5.4	110	550
Other CE Operatives ⁽²⁾	12,430	13,890	2.8	620	3,100
General Operatives	13,770	14,620	1.5	650	3,250
Maintenance workers	3,110	3,790	5.1	170	850
Electricians	20,690	22,810	2.5	1,000	5,000
Plumbers	20,490	23,860	3.9	1,030	5,150
Non-construction operatives	7,010	7,710	2.4	330	1,650
Total	283,570	312,350	2.4	13,380	66,900

Source: CITB Employment Model, September 2004; Experian Business Strategies - (1)Specialist Building (2)Civil Engineering

Note: Numbers rounded to the nearest ten - totals may not add up due to rounding

* Cumulative Requirement for 2004-2008 inclusive (5 years); Requirement totals do not include Non-construction operatives

Economic outlook

New construction in the South East is set to record no growth this year leading to a contraction in the industry, in real terms, according to a report out today. The construction industry's performance in the South East will be "alarmingly poor" this year but it is expected to pick up over the following years.

The South East's construction industry is heavily dominated by the housing and commercial sectors, both of which are in for a tough year. The housing market is likely to go through a lull this year while various plans are put into action to meet the demands of the shortage in affordable housing. So, whilst we can expect the sector to pick up strongly in the longer term, there is unlikely to be any growth this year. The commercial sector has been blighted by the recession in the offices market and has only been saved from a worse performance by increases in the entertainment, health and education sectors.

Infrastructure is also going through a quiet time, with the contraction of output last year set to be followed by further decline this year. The outlook for infrastructure is little better over the next two years, with modest growth in 2005 expected to be followed by a year of stagnation in 2006.

Looking forward, despite the poor expectations for this year, the South East can look forward to having a bit more to shout about in 2005 and 2006.

Reported skill shortages and skill gaps

According to the CITB-ConstructionSkills Employers' Skill Needs Survey Autumn 2003, 61% of companies in the South East reported difficulties in recruiting skilled staff in the previous three months. This is slightly lower than 67% of respondents in Great Britain who reported such difficulties. Moreover, the level of firms with at least one long-term vacancy is only 47%. Consequently 21% of firms in the South East found themselves with at least one unfilled long-term vacancy.

In the South East, participating employers found the most difficulty recruiting into Roofers followed by Wood Trades.

Recruitment problems are unlikely to ease in the South East, since 52% of participating employers expect their workload to increase over the next six months and 34% expect it to stay the same.

The results of the survey seem to indicate that as far as construction employers in the South East are concerned 'skill gaps' are not a particular problem for existing employees. The majority of employers, 84%, were satisfied that their **existing** employees were able to cope with current requirements, including dealing with new technology, new construction methods and/or new materials.

However 45% of participating employers reported problems with **new** employees who, although trained and qualified for certain occupations, still lacked a variety of skills required. This response is possibly not surprising since new trainees will need to do some on-the-job training even if formally qualified. This is probably more so in the construction industry than in other sectors.

Provision of training

Since its start in February 1999, On-Site Assessment and Training (OSAT) has expanded rapidly across Great Britain as a whole. By the middle of 2004 approximately 74,680 candidates had registered for OSAT, resulting in 27,229 S/NVQ achievements. The South East accounted for 2,728 of these registrations, and 1,853 of the achievements.

London

Table 1B Employment by Occupation in Greater London

	Total Employment		Average Annual Percentage Change (2004-2008)	Average Annual Requirement (2004-2008)	Cumulative Requirement (2004-2008)
	2004	2008			
Managers	34,200	37,190	2.1	1,110	5,550
Clerical	12,370	12,200	-0.3	400	2,000
Professionals	14,010	15,330	2.3	490	2,450
Technicians	6,570	7,220	2.4	220	1,100
Wood Trades	25,640	26,970	1.3	920	4,600
Bricklayers	9,290	9,370	0.2	320	1,600
Painters	11,720	11,930	0.4	390	1,950
Plasterers	4,420	3,930	-2.9	130	650
Roofers	2,780	2,920	1.3	100	500
Floorers	4,740	5,000	1.3	170	850
Glaziers	2,050	2,160	1.3	80	400
Other SB Operatives ⁽¹⁾	7,210	7,150	-0.2	210	1,050
Scaffolders	4,130	4,350	1.3	140	700
Plant Operatives	3,680	3,960	1.9	140	700
Plant Mechanics/Fitters	4,270	4,500	1.3	140	700
Steel Erectors/Structural	340	390	4.1	20	100
Other CE Operatives ⁽²⁾	7,500	8,000	1.6	280	1,400
General Operatives	9,090	9,210	0.3	300	1,500
Maintenance workers	1,600	1,850	3.8	60	300
Electricians	25,630	26,970	1.3	860	4,300
Plumbers	16,010	17,790	2.7	580	2,900
Non-construction operatives	4,830	5,070	1.2	160	800
Total	212,090	223,460	1.3	7,060	35,300

Source: CITB Employment Model, September 2004; Experian Business Strategies - (1)Specialist Building, (2)Civil Engineering

Note: Numbers rounded to the nearest ten - totals may not add up due to rounding

* Cumulative Requirement for 2004-2008 inclusive (5 years); Requirement totals do not include Non-construction operatives

Economic outlook

London is expected to perform considerably below the national average in each of the forecast years.

The office market, the major constituent of the commercial sector, which at the turn of the century accounted for over half of Greater London's construction, is still in a state of alert in London. Despite signs of an increase in take up of office space, it is likely to be some time before this feeds through to a currently cautious market.

Greater London still suffers from a severe lack of affordable housing, and we can thus expect to see increasing levels of expenditure on social housing. However, somewhat paradoxically, in the short run, the cooling housing market may lead to a decline in private housebuilding, although, with such a shortage of supply and the likelihood that interest rates will remain historically low, any kind of major crash seems unlikely.

For manufacturers in the London area, another poor year in 2004 will be followed up by a year of stagnation before the industrial sector finally picks up in 2006. On the positive side, the infrastructure market is set to see strong growth this year and next, with the Channel Tunnel Rail Link and T5 at Heathrow both in full swing.

Reported skill shortages and skill gaps

According to the CITB-ConstructionSkills Employers' Skill Needs Survey Autumn 2003, 65% of companies in London reported difficulties in recruiting skilled staff in the previous three months. This is comparable to the 67% of respondents in Great Britain who reported such difficulties. Moreover, the level of firms with at least one long-term vacancy is only 53%. Consequently 20% of firms in London found themselves with at least one unfilled long-term vacancy.

In London, participating employers found the most difficulty recruiting into Wood Trades followed by Supervisors.

Recruitment problems are unlikely to ease in London, since 67% of participating employers expect their workload to increase over the next six months, and 29% expect it to stay the same.

The results of the survey seem to indicate that as far as construction employers in London are concerned 'skill gaps' are not a particular problem for existing employees. The majority of employers, 76%, were satisfied that their **existing** employees were able to cope with current requirements, including dealing with new technology, new construction methods and/or new materials.

However 51% of participating employers reported problems with **new** employees who, although trained and qualified for certain occupations, still lacked a variety of skills required. This response is possibly not surprising since new trainees will need to do some on-the-job training even if formally qualified. This is probably more so in the construction industry than in other sectors.

Provision of training

Since its start in February 1999, On-Site Assessment and Training (OSAT) has expanded rapidly across Great Britain as a whole. By the middle of 2004 approximately 74,680 candidates had registered for OSAT, resulting in 27,229 S/NVQ achievements. London accounted for 12,663 of these registrations, and 1,730 of the achievements.

South West

Table 1B Employment by Occupation in the South West

	Total Employment		Average Annual Percentage Change (2004-2008)	Average Annual Requirement (2004-2008)	Cumulative Requirement (2004-2008)
	2004	2008			
Managers	18,800	19,780	1.3	410	2,050
Clerical	13,710	13,080	-1.2	290	1,450
Professionals	8,120	8,590	1.4	190	950
Technicians	4,750	5,050	1.5	110	550
Wood Trades	24,270	24,700	0.4	570	2,850
Bricklayers	16,700	16,300	-0.6	370	1,850
Painters	9,900	9,750	-0.4	220	1,100
Plasterers	3,600	3,090	-3.7	70	350
Roofers	7,650	7,790	0.4	180	900
Floorers	3,800	3,870	0.5	90	450
Glaziers	3,390	3,450	0.5	80	400
Other SB Operatives ⁽¹⁾	3,400	3,260	-1.1	70	350
Scaffolders	2,100	2,140	0.5	50	250
Plant Operatives	4,930	5,130	1.0	120	600
Plant Mechanics/Fitters	2,070	2,110	0.5	50	250
Steel Erectors/Structural	880	1,000	3.3	30	150
Other CE Operatives ⁽²⁾	7,420	7,650	0.8	180	900
General Operatives	9,710	9,510	-0.5	210	1,050
Maintenance workers	2,890	3,250	3.0	70	350
Electricians	14,450	14,700	0.4	320	1,600
Plumbers	12,130	13,040	1.8	290	1,450
Non-construction operatives	3,090	3,130	0.4	70	350
Total	177,750	180,400	0.4	3,970	19,850

Source: CIB Employment Model, September 2004; Experian Business Strategies - (1)Specialist Building, (2)Civil Engineering

Note: Numbers rounded to the nearest ten - totals may not add up due to rounding

* Cumulative Requirement for 2004-2008 inclusive (5 years); Requirement totals do not include Non-construction operatives

Economic outlook

After a bad year in 2003, the South West's construction industry has little more to look forward to this year, with only slight growth in nominal terms, reflecting another contraction in real terms. A similarly downbeat outcome beckons for 2005 with a slight improvement by 2006.

The forecast shows a particularly poor year this year for commercial and infrastructure construction. Unlike most regions, the commercial sector in the South West isn't as dependent on the offices market however, all sub-sectors have shown a drop in orders, suggesting another poor year. Expenditure on infrastructure is set to continue to drop from the unusually high levels witnessed in 2002.

The general outlook for the South West is rather bleak. Ironically, new construction output in the region is being partly supported by the industrial sector, where activity has leapt on the first signs of optimism from manufacturers. Also, the government has signalled its commitment to non-residential projects in the area. But in general, there is little to get excited about in the region, with even public housing, which is expected to experience very strong growth in other regions, expected to increase by just 5% this year before stagnating in 2005.

Reported skill shortages and skill gaps

According to the CITB-ConstructionSkills Employers' Skill Needs Survey Autumn 2003, 74% of companies in the South West reported difficulties in recruiting skilled staff in the previous three months. This is higher than 67% of respondents in Great Britain who reported such difficulties. Moreover, the level of firms with at least one long-term vacancy is only 56%. Consequently 16% of firms in the South West found themselves with at least one unfilled long-term vacancy.

In the South West, participating employers found the most difficulty recruiting into Wood Trades followed by Bricklayers.

Recruitment problems are unlikely to ease in the South West, since 58% of participating employers expect their workload to increase over the next six months and 38% expect it to stay the same.

The results of the survey seem to indicate that as far as construction employers in the South West are concerned 'skill gaps' are not a particular problem for existing employees. The majority of employers, 82%, were satisfied that their **existing** employees were able to cope with current requirements, including dealing with new technology, new construction methods and/or new materials.

However 55% of participating employers reported problems with **new** employees who, although trained and qualified for certain occupations, still lacked a variety of skills required. This response is possibly not surprising since new trainees will need to do some on-the-job training even if formally qualified. This is probably more so in the construction industry than in other sectors.

Provision of training

Since its start in February 1999, On-Site Assessment and Training (OSAT) has expanded rapidly across Great Britain as a whole. By the middle of 2004 approximately 74,680 candidates had registered for OSAT, resulting in 27,229 S/NVQ achievements. The South West accounted for 4,997 of these registrations, and 2,745 of the achievements.

Eastern

Table 1B Employment by Occupation in the Eastern Region

	Total Employment		Average Annual Percentage Change (2004-2008)	Average Annual Requirement (2004-2008)	Cumulative Requirement (2004-2008)
	2004	2008			
Managers	24,760	27,490	2.7	1,090	5,450
Clerical	15,730	15,850	0.2	640	3,200
Professionals	10,990	12,280	2.8	480	2,400
Technicians	5,150	5,780	2.9	230	1,150
Wood Trades	23,410	25,140	1.8	1,000	5,000
Bricklayers	17,800	18,340	0.7	760	3,800
Painters	9,760	10,140	1.0	410	2,050
Plasterers	3,800	3,450	-2.4	160	800
Roofers	5,340	5,740	1.8	230	1,150
Floorers	3,630	3,900	1.8	160	800
Glaziers	4,710	5,060	1.8	200	1,000
Other SB Operatives ⁽¹⁾	4,540	4,600	0.3	200	1,000
Scaffolders	2,070	2,220	1.8	90	450
Plant Operatives	4,590	5,040	2.4	200	1,000
Plant Mechanics/Fitters	2,960	3,180	1.8	130	650
Steel Erectors/Structural	1,640	1,970	4.7	80	400
Other CE Operatives ⁽²⁾	9,110	9,920	2.1	390	1,950
General Operatives	8,560	8,860	0.8	370	1,850
Maintenance workers	2,730	3,250	4.4	130	650
Electricians	16,640	17,880	1.8	730	3,650
Plumbers	16,740	19,000	3.2	740	3,700
Non-construction operatives	3,720	3,990	1.8	160	800
Total	198,380	213,070	1.8	8,420	42,100

Source: CITE Employment Model, September 2004; Experian Business Strategies - (1)Specialist Building, (2)Civil Engineering

Note: Numbers rounded to the nearest ten - totals may not add up due to rounding

* Cumulative Requirement for 2004-2008 inclusive (5 years); Requirement totals do not include Non-construction operatives

Economic outlook

The construction industry in the East of England is set underperform in 2004. However, forecasts for 2005 and 2006 paint a more optimistic picture.

The low growth seen over the last two years has been largely due to a weak commercial sector, traditionally the region's largest sector, which is forecast to be in recession for 2004. However, this year is expected to see the trough for commercial output and following a modest turnaround in 2005, we can expect to see exceptional growth from 2006.

Infrastructure output has been rather volatile in recent years but a number of new initiatives look set to bring strong growth by 2006. The area is also set to benefit from high levels of public funding, and a still bullish housing market means that these markets are looking good for the short term.

The poorly performing manufacturing industry has hampered industrial construction. However, with the outlook brightening in this sector, we can expect to see activity in industrial construction starting to pick up by next year before starting to really accelerate in 2006.

Nominal growth of 13% in 2006 will make the Eastern region the best performing in the UK in that year.

Reported skill shortages and skill gaps

According to the CITB-ConstructionSkills Employers' Skill Needs Survey Autumn 2003, 47% of companies in the East of England reported difficulties in recruiting skilled staff in the previous three months. This is lower than the 67% of respondents in Great Britain who reported such difficulties. Moreover, the level of firms with at least one long-term vacancy is only 29%. Consequently 21% of firms in the East found themselves with at least one unfilled long-term vacancy.

In the East, participating employers found the most difficulty recruiting into Bricklayers followed by Wood Trades.

Recruitment problems are unlikely to ease in the East of England, since half of participating employers expect their workload to increase over the next six months, and the same proportion expected it to stay the same.

The results of the survey seem to indicate that as far as construction employers in the East are concerned 'skill gaps' are not a particular problem for existing employees. The majority of employers, 79%, were satisfied that their **existing** employees were able to cope with current requirements, including dealing with new technology, new construction methods and/or new materials.

However 65% of participating employers reported problems with **new** employees who, although trained and qualified for certain occupations, still lacked a variety of skills required. This response is possibly not surprising since new trainees will need to do some on-the-job training even if formally qualified. This is probably more so in the construction industry than in other sectors.

Provision of training

Since its start in February 1999, On-Site Assessment and Training (OSAT) has expanded rapidly across Great Britain as a whole. By the middle of 2004 approximately 74,680 candidates had registered for OSAT, resulting in 27,229 S/NVQ achievements. The East of England accounted for 3,931 of these registrations, and 1,148 of the achievements.

East Midlands

Table 1B Employment by Occupation in the East Midlands

	Total Employment		Average Annual Percentage Change (2004-2008)	Average Annual Requirement (2004-2008)	Cumulative Requirement (2004-2008)
	2004	2008			
Managers	14,080	14,890	1.4	620	3,100
Clerical	14,730	14,120	-1.0	580	2,900
Professionals	8,360	8,890	1.5	340	1,700
Technicians	3,660	3,910	1.7	160	800
Wood Trades	22,150	22,650	0.6	870	4,350
Bricklayers	14,240	13,960	-0.5	560	2,800
Painters	12,000	11,870	-0.3	470	2,350
Plasterers	3,760	3,250	-3.6	140	700
Roofers	3,820	3,910	0.6	160	800
Floorers	2,600	2,670	0.6	110	550
Glaziers	2,620	2,680	0.6	100	500
Other SB Operatives ⁽¹⁾	4,120	3,970	-0.9	170	850
Scaffolders	1,100	1,120	0.6	40	200
Plant Operatives	3,640	3,810	1.1	140	700
Plant Mechanics/Fitters	3,950	4,050	0.6	160	800
Steel Erectors/Structural	3,560	4,070	3.4	140	700
Other CE Operatives ⁽²⁾	6,950	7,200	0.9	280	1,400
General Operatives	8,970	8,830	-0.4	360	1,800
Maintenance workers	2,020	2,280	3.1	90	450
Electricians	12,400	12,680	0.6	500	2,500
Plumbers	12,270	13,250	2.0	510	2,550
Non-construction operatives	4,100	4,180	0.5	170	850
Total	165,100	168,230	0.5	6,500	32,500

Source: CITB Employment Model, September 2004; Experian Business Strategies - (1)Specialist Building, (2)Civil Engineering

Note: Numbers rounded to the nearest ten - totals may not add up due to rounding

* Cumulative Requirement for 2004-2008 inclusive (5 years); Requirement totals do not include Non-construction operatives

Economic outlook

Following on from two very good years of growth, construction in the East Midlands is set to have another strong year. However, the long-term future is for growth in new construction to moderate in both 2005 and 2006.

Public sector construction is set to remain buoyant this year but current rates of growth are unsustainable and, as Government spending is likely to become more constrained in the next couple of years, growth is expected to moderate.

The private housing market, by some way the region's largest sector, is likely to be hit by the seemingly inevitable cooling of the housing market. After years of rapid growth, we can expect much more moderate rises in this sector.

With a number of Private Finance Initiatives (PFI's) currently underway in the health and education sub-sectors, the commercial sector is likely to perform well in the immediate future. However, with an apparent shortage of PFI's out to tender at present and retail activity relatively subdued, the outlook is not so bright, with the sector expected to decline by 5% in 2006.

Reported skill shortages and skill gaps

According to the CITB-ConstructionSkills Employers' Skill Needs Survey Autumn 2003, 70% of companies in the East Midlands reported difficulties in recruiting skilled staff in the previous three months. This is slightly higher than the 67% of respondents in Great Britain who reported such difficulties. Moreover, the level of firms with at least one long-term vacancy is only 57%. Consequently 20% of firms in the East Midlands found themselves with at least one unfilled long-term vacancy.

In the East Midlands, participating employers found the most difficulty recruiting into Wood Trades followed by Bricklayers.

Recruitment problems are unlikely to ease in the East Midlands, since 70% of participating employers expect their workload to increase over the next six months, and 23% expect it to stay the same.

The results of the survey seem to indicate that as far as construction employers in the East Midlands are concerned 'skill gaps' are not a particular problem for existing employees. The majority of employers, 77%, were satisfied that their **existing** employees were able to cope with current requirements, including dealing with new technology, new construction methods and/or new materials.

However 57% of participating employers reported problems with **new** employees who, although trained and qualified for certain occupations, still lacked a variety of skills required. This response is possibly not surprising since new trainees will need to do some on-the-job training even if formally qualified. This is probably more so in the construction industry than in other sectors.

Provision of training

Since its start in February 1999, On-Site Assessment and Training (OSAT) has expanded rapidly across Great Britain as a whole. By the middle of 2004 approximately 74,680 candidates had registered for OSAT, resulting in 27,229 S/NVQ achievements. The Midlands (East and West) accounted for 9,566 of these registrations, and 3,088 of the achievements.

West Midlands

Table 1B Employment by Occupation in the West Midlands

	Total Employment		Average Annual Percentage Change (2004-2008)	Average Annual Requirement (2004-2008)	Cumulative Requirement (2004-2008)
	2004	2008			
Managers	22,750	24,630	2.0	1,010	5,050
Clerical	14,460	14,200	-0.4	580	2,900
Professionals	8,920	9,720	2.2	380	1,900
Technicians	4,720	5,160	2.3	210	1,050
Wood Trades	24,800	25,970	1.2	1,020	5,100
Bricklayers	11,440	11,490	0.1	470	2,350
Painters	9,000	9,120	0.3	370	1,850
Plasterers	3,460	3,070	-3.0	140	700
Roofers	6,030	6,320	1.2	260	1,300
Floorers	3,630	3,810	1.2	160	800
Glaziers	3,620	3,790	1.2	150	750
Other SB Operatives ⁽¹⁾	3,280	3,230	-0.3	140	700
Scaffolders	1,390	1,460	1.2	60	300
Plant Operatives	4,160	4,460	1.8	170	850
Plant Mechanics/Fitters	2,440	2,560	1.2	110	550
Steel Erectors/Structural	1,880	2,210	4.0	80	400
Other CE Operatives ⁽²⁾	10,070	10,690	1.5	420	2,100
General Operatives	7,970	8,040	0.2	330	1,650
Maintenance workers	2,060	2,380	3.7	90	450
Electricians	13,370	14,010	1.2	570	2,850
Plumbers	14,960	16,560	2.6	640	3,200
Non-construction operatives	3,660	3,830	1.1	160	800
Total	178,090	186,710	1.2	7,360	36,800

Source: CITB Employment Model, September 2004; Experian Business Strategies - (1)Specialist Building, (2)Civil Engineering

Note: Numbers rounded to the nearest ten - totals may not add up due to rounding

* Cumulative Requirement for 2004-2008 inclusive (5 years); Requirement totals do not include Non-construction operatives

Economic outlook

Construction in the West Midlands will end the year with output growth way ahead of comparable UK levels. However, this level of growth is unlikely to continue. Growth is set to drop back down by 2006.

The industry this year is being bolstered by high levels of government spending and a still booming housing market. However, with a cooling housing market and the distinct possibility of a tightening of post election government purse strings, the industry will be looking to other sectors to drive it forward.

Demand for commercial construction (including offices, shops, and leisure centres), which has historically been the largest sector in the West Midlands' construction industry, is set to take up the baton with strong growth expected in 2005 and 2006.

The gradual turnaround in manufacturing will also mean that industrial construction is likely to pick up towards 2006. All in all, the future appears brighter than in recent times, although the industry will not see a return to the good old days of the late 90s.

Reported skill shortages and skill gaps

According to the CITB-ConstructionSkills Employers' Skill Needs Survey Autumn 2003, 69% of companies in the West Midlands reported difficulties in recruiting skilled staff in the previous three months. This is comparable to the proportion of respondents in Great Britain who reported such difficulties (67%). Moreover, the level of firms with at least one long-term vacancy is only 46%. Consequently 29% of firms in the West Midlands found themselves with at least one unfilled long-term vacancy.

In the West Midlands, participating employers found the most difficulty recruiting into Wood Trades followed by Bricklayers.

Recruitment problems are unlikely to ease in The West Midlands, since 60% of participating employers expect their workload to increase over the next six months and 38% expect it to stay the same.

The results of the survey seem to indicate that as far as construction employers in the West Midlands are concerned 'skill gaps' are not a particular problem for existing employees. The majority of employers, 75%, were satisfied that their **existing** employees were able to cope with current requirements, including dealing with new technology, new construction methods and/or new materials.

However half of participating employers reported problems with **new** employees who, although trained and qualified for certain occupations, still lacked a variety of skills required. This response is possibly not surprising since new trainees will need to do some on-the-job training even if formally qualified. This is probably more so in the construction industry than in other sectors.

Provision of training

Since its start in February 1999, On-Site Assessment and Training (OSAT) has expanded rapidly across Great Britain as a whole. By the middle of 2004 approximately 74,680 candidates had registered for OSAT, resulting in 27,229 S/NVQ achievements. The Midlands (East and West) accounted for 9,566 of these registrations, and 3,088 of the achievements.

North East

Table 1B Employment by Occupation in the North East

	Total Employment		Average Annual Percentage Change (2004-2008)	Average Annual Requirement (2004-2008)	Cumulative Requirement (2004-2008)
	2004	2008			
Managers	8,660	9,490	2.3	220	1,100
Clerical	5,720	5,690	-0.1	140	700
Professionals	3,730	4,120	2.5	100	500
Technicians	2,560	2,830	2.6	70	350
Wood Trades	10,890	11,550	1.5	300	1,500
Bricklayers	5,190	5,270	0.4	130	650
Painters	4,120	4,220	0.6	100	500
Plasterers	1,140	1,020	-2.7	30	150
Roofers	3,020	3,200	1.5	80	400
Floorers	1,860	1,980	1.5	50	250
Glaziers	1,170	1,240	1.5	30	150
Other SB Operatives ⁽¹⁾	2,450	2,450	0.0	50	250
Scaffolders	1,080	1,150	1.5	30	150
Plant Operatives	2,560	2,780	2.1	70	350
Plant Mechanics/Fitters	1,640	1,740	1.5	40	200
Steel Erectors/Structural	1,580	1,870	4.3	60	300
Other CE Operatives ⁽²⁾	4,390	4,720	1.8	120	600
General Operatives	4,870	4,970	0.5	120	600
Maintenance workers	970	1,140	4.0	30	150
Electricians	6,660	7,060	1.5	170	850
Plumbers	5,060	5,670	2.9	140	700
Non-construction operatives	2,040	2,160	1.4	50	250
Total	81,380	86,340	1.5	2,080	10,400

Source: CITB Employment Model, September 2004; Experian Business Strategies - (1)Specialist Building, (2)Civil Engineering

Note: Numbers rounded to the nearest ten - totals may not add up due to rounding

* Cumulative Requirement for 2004-2008 inclusive (5 years); Requirement totals do not include Non-construction operatives

Economic outlook

After riding the crest of a wave for the past two years, more spartan times lie ahead for new construction in the North East. The high growth levels of the previous couple of years were always likely to be untenable and it now appears that the outlook may be more bleak than initially thought.

Growth which had previously been spearheaded by a buoyant housing market and high levels of government spending on both housing and regeneration projects is expected to slow during the forecast period. Whilst the housing market remains strong in the area, we are expecting a cooling in the market and this, coupled with the risk of post-election tightening of purse strings, means that the impact of these sectors is likely to be less prevalent than before.

Commercial construction, the largest sector in the industry, is expected to suffer this year, being particularly affected by the lack of interest in the retail sector. We are expecting to see a drop of 5% in commercial construction in 2004 before a slow turnaround in the following years.

The infrastructure sector, last year excepted, has seen steady decline in recent times and we expect it to return to this pattern. There remains tremendous uncertainty around the East Coast Mainline upgrade with regular cutbacks and delays occurring.

The culmination of this news is that growth levels are likely only to be modest over the foreseeable future.

Reported skill shortages and skill gaps

According to the CITB-ConstructionSkills Employers' Skill Needs Survey Autumn 2003, 72% of companies in the North East reported difficulties in recruiting skilled staff in the previous three months. This is slightly higher than the 67% of respondents in Great Britain who reported such difficulties. Moreover, the level of firms with at least one long-term vacancy is only marginally less at 67%. Consequently 28% of firms in the North East found themselves with at least one unfilled long-term vacancy.

In the North East, participating employers found the most difficulty recruiting into Wood Trades followed by Bricklayers.

Recruitment problems are unlikely to ease in the North East, since half of participating employers expect their workload to increase over the next six months, and 39% expect it to stay the same.

The results of the survey seem to indicate that as far as construction employers in the North East are concerned 'skill gaps' are not a particular problem for existing employees. The majority of employers, 76%, were satisfied that their **existing** employees were able to cope with current requirements, including dealing with new technology, new construction methods and/or new materials.

However the same proportion of participating employers reported problems with **new** employees who, although trained and qualified for certain occupations, still lacked a variety of skills required. This response is possibly not surprising since new trainees will need to do some on-the-job training even if formally qualified. This is probably more so in the construction industry than in other sectors.

Provision of training

Since its start in February 1999, On-Site Assessment and Training (OSAT) has expanded rapidly across Great Britain as a whole. By the middle of 2004 approximately 74,680 candidates had registered for OSAT, resulting in 27,229 S/NVQ achievements. The North East accounted for 4,010 of these registrations, and 1,944 of the achievements.

North West

Table 1B Employment by Occupation in the North West

	Total Employment		Average Annual Percentage Change (2004-2008)	Average Annual Requirement (2004-2008)	Cumulative Requirement (2004-2008)
	2004	2008			
Managers	27,180	28,790	1.4	1,250	6,250
Clerical	20,320	19,520	-1.0	830	4,150
Professionals	18,820	20,060	1.6	790	3,950
Technicians	5,680	6,070	1.7	250	1,250
Wood Trades	39,840	40,810	0.6	1,600	8,000
Bricklayers	16,370	16,080	-0.4	680	3,400
Painters	11,900	11,790	-0.2	490	2,450
Plasterers	5,600	4,850	-3.5	230	1,150
Roofers	5,620	5,760	0.6	240	1,200
Floorers	6,480	6,650	0.6	280	1,400
Glaziers	5,310	5,450	0.6	210	1,050
Other SB Operatives ⁽¹⁾	5,530	5,330	-0.9	250	1,250
Scaffolders	3,860	3,960	0.6	160	800
Plant Operatives	5,130	5,380	1.2	200	1,000
Plant Mechanics/Fitters	2,460	2,520	0.6	110	550
Steel Erectors/Structural	3,410	3,910	3.4	130	650
Other CE Operatives ⁽²⁾	13,040	13,540	0.9	530	2,650
General Operatives	11,240	11,090	-0.3	470	2,350
Maintenance workers	2,700	3,060	3.2	120	600
Electricians	22,390	22,940	0.6	950	4,750
Plumbers	16,770	18,150	2.0	710	3,550
Non-construction operatives	5,480	5,610	0.6	240	1,200
Total	255,130	261,300	0.6	10,480	52,400

Source: CITE Employment Model, September 2004; Experian Business Strategies - (1)Specialist Building, (2)Civil Engineering

Note: Numbers rounded to the nearest ten - totals may not add up due to rounding

* Cumulative Requirement for 2004-2008 inclusive (5 years); Requirement totals do not include Non-construction operatives

Economic outlook

The North West's building and construction industry continues to be in rude health with expectations that it will spend its third year amongst the top three fastest growing regions for new construction. Growth rates will decline from the very robust levels last year and, indeed, over the following two years, but the region will still be performing very strongly.

Growth continues to be driven by housing. The private housing sector is still buoyant and, whilst a slowdown appears inevitable, it is not expected to be dramatic and may still be some time off. The North West has also been targeted by the government for high investment in public housing, with a number of areas within the region benefiting from the £500 million earmarked for Pathfinder schemes, which should ensure a strong outlook for this sector for some time.

The public non-residential sector has seen tremendous growth over recent years and looks set to continue in a similar, if not as dramatic, vein. Huge investment has gone into schools and hospitals in the area and there is also the possibility of the area benefiting from the outsourcing of government offices following the Lyons report.

Infrastructure has also been a key area of development for the North West in recent times. Large projects such as the Metrolink and the Merseytram are due to start imminently and, with work continuing on these and other initiatives for some time, the outlook is excellent.

With all sectors expecting positive growth, it is commercial construction that is set to see the slowest growth for the next few years. This is predominantly due to the subdued offices market in the region. Consequently the outlook is bullish for the region.

Reported skill shortages and skill gaps

According to the CITB-ConstructionSkills Employers' Skill Needs Survey Autumn 2003, 78% of companies in The North West reported difficulties in recruiting skilled staff in the previous three months. This is higher than the 67% of respondents in Great Britain who reported such difficulties. Moreover, the level of firms with at least one long-term vacancy is only 56%. Consequently 22% of firms in The North West found themselves with at least one unfilled long-term vacancy.

In The North West, participating employers found the most difficulty recruiting into Bricklayers followed by Wood Trades.

Recruitment problems are unlikely to ease in The North West, since all participating employers expect their workload to either increase (72%) or stay the same (28%) over the next six months.

The results of the survey seem to indicate that as far as construction employers in The North West are concerned 'skill gaps' are not a particular problem for existing employees. The majority of employers, 87%, were satisfied that their **existing** employees were able to cope with current requirements, including dealing with new technology, new construction methods and/or new materials.

However 59% of participating employers reported problems with **new** employees who, although trained and qualified for certain occupations, still lacked a variety of skills required. This response is possibly not surprising since new trainees will need to do some on-the-job training even if formally qualified. This is probably more so in the construction industry than in other sectors.

Provision of training

Since its start in February 1999, On-Site Assessment and Training (OSAT) has expanded rapidly across Great Britain as a whole. By the middle of 2004 approximately 74,680 candidates had registered for OSAT, resulting in 27,229 S/NVQ achievements. The North West accounted for 10,850 of these registrations, and 3,502 of the achievements.

Yorkshire & Humber

Table 1B Employment by Occupation in Yorkshire and The Humber

	Total Employment		Average Annual Percentage Change (2004-2008)	Average Annual Requirement (2004-2008)	Cumulative Requirement (2004-2008)
	2004	2008			
Managers	18,330	19,480	1.5	840	4,200
Clerical	15,480	14,920	-0.9	630	3,150
Professionals	8,860	9,470	1.7	370	1,850
Technicians	4,830	5,190	1.8	220	1,100
Wood Trades	28,890	29,690	0.7	1,160	5,800
Bricklayers	14,360	14,150	-0.4	600	3,000
Painters	11,380	11,320	-0.1	470	2,350
Plasterers	3,510	3,050	-3.5	140	700
Roofers	5,860	6,020	0.7	250	1,250
Floorers	4,770	4,910	0.7	200	1,000
Glaziers	3,050	3,140	0.7	120	600
Other SB Operatives ⁽¹⁾	2,870	2,780	-0.8	130	650
Scaffolders	2,700	2,770	0.7	110	550
Plant Operatives	5,270	5,550	1.3	210	1,050
Plant Mechanics/Fitters	3,940	4,050	0.7	170	850
Steel Erectors/Structural	3,680	4,230	3.5	140	700
Other CE Operatives ⁽²⁾	10,140	10,560	1.0	410	2,050
General Operatives	9,670	9,570	-0.3	400	2,000
Maintenance workers	2,890	3,280	3.2	130	650
Electricians	17,600	18,090	0.7	740	3,700
Plumbers	14,070	15,280	2.1	600	3,000
Non-construction operatives	3,540	3,630	0.6	150	750
Total	195,670	201,130	0.7	8,040	40,200

Source: CITB Employment Model, September 2004; Experian Business Strategies - (1)Specialist Building, (2)Civil Engineering

Note: Numbers rounded to the nearest ten - totals may not add up due to rounding

* Cumulative Requirement for 2004-2008 inclusive (5 years); Requirement totals do not include Non-construction operatives

Economic outlook

The building and construction industry in Yorkshire & Humber put in a very strong performance in the second half of last year and it looks set to take this momentum into 2004 outpacing both the North East, and the North West.

Yorkshire & the Humber, like the other northern regions, has grown strongly over the last two years. However, while the other regions are starting to slow down, 2004 is likely to be equally as strong as the years before for Yorkshire and Humberside.

As is the case for all regions, Yorkshire and Humberside has been benefiting from the housing boom and, with Government spending in the area high, a number of housing and regeneration projects have fed through into the region. However, the region has by no means been dependent on these factors alone. Whilst many regions have felt the bite of the manufacturing slump Yorkshire and Humberside has seen excellent gains in industrial construction and, with business and export confidence amongst the highest in the country, the outlook for this sector looks set for a rosy future.

The only cloud on the horizon has been the confusion over the £500 million Leeds Supertram Project, which has now been put on hold by the Secretary of State for Transport. He did, however, emphasise the commitment still to spend the money on the region's infrastructure and, thus, the long-term picture still remains buoyant.

Reported skill shortages and skill gaps

According to the CITB-ConstructionSkills Employers' Skill Needs Survey Autumn 2003, 75% of companies in Yorkshire and Humber reported difficulties in recruiting skilled staff in the previous three months. This is higher than the 67% of respondents in Great Britain who reported such difficulties. Moreover, the level of firms with at least one long-term vacancy is only 64%. Consequently 11% of firms in Yorkshire and Humber found themselves with at least one unfilled long-term vacancy.

In Yorkshire and Humber, participating employers found the most difficulty recruiting into Wood Trades followed by Bricklayers.

Recruitment problems are unlikely to ease in Yorkshire and Humber, since 54% of participating employers expect their workload to increase over the next six months and 39% expect it to stay the same.

The results of the survey seem to indicate that as far as construction employers in Yorkshire and Humber are concerned 'skill gaps' are not a particular problem for existing employees. The majority of employers, 93%, were satisfied that their **existing** employees were able to cope with current requirements, including dealing with new technology, new construction methods and/or new materials.

However half of participating employers reported problems with **new** employees who, although trained and qualified for certain occupations, still lacked a variety of skills required. This response is possibly not surprising since new trainees will need to do some on-the-job training even if formally qualified. This is probably more so in the construction industry than in other sectors.

Provision of training

Since its start in February 1999, On-Site Assessment and Training (OSAT) has expanded rapidly across Great Britain as a whole. By the middle of 2004 approximately 74,680 candidates had registered for OSAT, resulting in 27,229 S/NVQ achievements. Yorkshire and Humber accounted for 6,046 of these registrations, and 1,781 of the achievements.

Scotland

Table 1B Employment by Occupation in Scotland

	Total Employment		Average Annual Percentage Change (2004-2008)	Average Annual Requirement (2004-2008)	Cumulative Requirement (2004-2008)
	2004	2008			
Managers	18,510	20,710	2.8	1,050	5,250
Clerical	15,320	15,550	0.4	790	3,950
Professionals	10,690	12,040	3.0	580	2,900
Technicians	4,860	5,490	3.1	270	1,350
Wood Trades	33,220	35,950	2.0	1,750	8,750
Bricklayers	7,420	7,700	0.9	400	2,000
Painters	11,590	12,130	1.2	610	3,050
Plasterers	1,680	1,540	-2.2	90	450
Roofers	5,770	6,250	2.0	320	1,600
Floorers	2,710	2,940	2.0	150	750
Glaziers	2,060	2,230	2.0	110	550
Other SB Operatives⁽¹⁾	2,370	2,410	0.5	130	650
Scaffolders	3,230	3,500	2.0	180	900
Plant Operatives	7,380	8,180	2.6	390	1,950
Plant Mechanics/Fitters	2,130	2,310	2.0	120	600
Steel Erectors/Structural	1,990	2,400	4.9	110	550
Other CE Operatives⁽²⁾	8,090	8,870	2.3	430	2,150
General Operatives	10,660	11,100	1.0	570	2,850
Maintenance workers	2,210	2,650	4.6	130	650
Electricians	17,870	19,350	2.0	970	4,850
Plumbers	12,720	14,550	3.4	700	3,500
Non-construction operatives	3,730	4,030	1.9	200	1,000
Total	186,220	201,870	2.0	9,850	49,250

Source: CITB Employment Model, September 2004; Experian Business Strategies - (1)Specialist Building, (2)Civil Engineering

Note: Numbers rounded to the nearest ten - totals may not add up due to rounding

* Cumulative Requirement for 2004-2008 inclusive (5 years); Requirement totals do not include Non-construction operatives

Economic outlook

The building and construction industry in Scotland is set to follow up an excellent 2003 with another strong year in 2004. Indeed, Scotland is set to outperform Great Britain as a whole each year until 2006.

The high levels of growth forecast in Scotland are still being driven strongly by the private housing and public non-residential sectors. As with the rest of Great Britain, a cooling housing market seems inevitable at some stage. However, we do not expect this for some time in Scotland and it is unlikely to be as dramatic as some first suggested.

Whilst the construction of schools and universities has started to decline, the health sub-sector looks likely to keep non-residential construction high, with the Scottish Executive having pinpointed it as one of its target areas. With other projects such as the MOD's refurbishment of military barracks set to commence, the continued health of the sector appears assured.

A flagging manufacturing sector has meant a return of the downward trend in industrial construction witnessed at the start of the millennium. The commercial sector has also been unable to break its fall, with a fourth consecutive year of decline forecast for the coming year. The poorly performing office market has heavily influenced this.

Reported skill shortages and skill gaps

According to the CITB-ConstructionSkills Employers' Skill Needs Survey Autumn 2003, 67% of companies in Scotland reported difficulties in recruiting skilled staff in the previous three months. This is exactly the same as the proportion of respondents in Great Britain who reported such difficulties. Moreover, the level of firms with at least one long-term vacancy is only 49%. Consequently 22% of firms in Scotland found themselves with at least one unfilled long-term vacancy.

In Scotland, participating employers found the most difficulty recruiting into Technical followed by Wood Trades.

Recruitment problems are unlikely to ease in Scotland, since 54% of participating employers expect their workload to increase over the next six months and 42% expect it to stay the same.

The results of the survey seem to indicate that as far as construction employers in Scotland are concerned 'skill gaps' are not a particular problem for existing employees. The majority of employers, 81%, were satisfied that their **existing** employees were able to cope with current requirements, including dealing with new technology, new construction methods and/or new materials.

However 40% of participating employers reported problems with **new** employees who, although trained and qualified for certain occupations, still lacked a variety of skills required. This response is possibly not surprising since new trainees will need to do some on-the-job training even if formally qualified. This is probably more so in the construction industry than in other sectors.

Provision of training

Since its start in February 1999, On-Site Assessment and Training (OSAT) has expanded rapidly across Great Britain as a whole. By the middle of 2004 approximately 74,680 candidates had registered for OSAT, resulting in 27,229 S/NVQ achievements. Scotland accounted for 6,144 of these registrations, and 3,792 of the achievements.

Wales

Table 1B Employment by Occupation in Wales

	Total Employment		Average Annual Percentage Change (2004-2008)	Average Annual Requirement (2004-2008)	Cumulative Requirement (2004-2008)
	2004	2008			
Managers	7,780	8,270	1.6	450	2,250
Clerical	6,430	6,200	-0.9	330	1,650
Professionals	6,420	6,870	1.7	340	1,700
Technicians	2,220	2,390	1.8	130	650
Wood Trades	14,930	15,360	0.7	770	3,850
Bricklayers	10,180	10,040	-0.3	540	2,700
Painters	6,480	6,450	-0.1	340	1,700
Plasterers	1,790	1,560	-3.4	90	450
Roofers	3,310	3,400	0.7	180	900
Floorers	1,370	1,410	0.8	70	350
Glaziers	3,280	3,370	0.7	170	850
Other SB Operatives ⁽¹⁾	3,000	2,910	-0.8	170	850
Scaffolders	1,020	1,050	0.8	50	250
Plant Operatives	4,850	5,110	1.3	250	1,250
Plant Mechanics/Fitters	1,130	1,170	0.7	60	300
Steel Erectors/Structural	1,320	1,520	3.6	70	350
Other CE Operatives ⁽²⁾	5,450	5,690	1.0	280	1,400
General Operatives	4,970	4,920	-0.2	260	1,300
Maintenance workers	810	930	3.3	50	250
Electricians	9,680	9,960	0.7	520	2,600
Plumbers	7,230	7,860	2.1	390	1,950
Non-construction operatives	1,600	1,650	0.7	90	450
Total	105,250	108,070	0.7	5,510	27,550

Source: CITB Employment Model, September 2004; Experian Business Strategies - (1)Specialist Building, (2)Civil Engineering

Note: Numbers rounded to the nearest ten - totals may not add up due to rounding

* Cumulative Requirement for 2004-2008 inclusive (5 years); Requirement totals do not include Non-construction operatives

Economic outlook

New construction in Wales is set to perform excellently again in 2004. 2005 will also be a strong year, although the rate of growth slows in that year and 2006.

Analysis indicates that house building will have another strong year of growth, due to increased Government funding for the public sector and buoyant market conditions for the private sector. Public sector house building will continue to rise for the next couple of years, although at a moderating rate. It appears inevitable that the housing market will start to cool and after this year we expect to see a decline in output in this sector by 2006.

In the short run, public spending on non-residential projects will bolster the industry. The Welsh Assembly has signified its commitment to the health sector and so we can expect to see a strong impetus from this to new construction output.

In the longer term, we are expecting to see a strong turnaround in the infrastructure sector, with a number of road and power projects set to get underway. In contrast, industrial construction is set to slow over the coming years, with a contraction in output likely in 2005.

Wales will considerably outperform the national average this year before growth converges in 2005 and 2006.

Reported skill shortages and skill gaps

According to the CITB-ConstructionSkills Employers' Skill Needs Survey Autumn 2003, 66% of companies in Wales reported difficulties in recruiting skilled staff in the previous three months. This is comparable to the proportion of respondents in Great Britain who reported such difficulties (67%). Moreover, the level of firms with at least one long-term vacancy is only 54%. Consequently 18% of firms in Wales found themselves with at least one unfilled long-term vacancy.

In Wales, participating employers found the most difficulty recruiting into Wood Trades and Bricklayers – both reported by 28% of employers.

Recruitment problems are unlikely to ease in Wales, since 59% of participating employers expect their workload to increase over the next six months and 35% expect it to stay the same.

The results of the survey seem to indicate that as far as construction employers in Wales are concerned 'skill gaps' are not a particular problem for existing employees. The majority of employers, 73%, were satisfied that their **existing** employees were able to cope with current requirements, including dealing with new technology, new construction methods and/or new materials.

However 59% of participating employers reported problems with **new** employees who, although trained and qualified for certain occupations, still lacked a variety of skills required. This response is possibly not surprising since new trainees will need to do some on-the-job training even if formally qualified. This is probably more so in the construction industry than in other sectors.

Provision of training

Since its start in February 1999, On-Site Assessment and Training (OSAT) has expanded rapidly across Great Britain as a whole. By the middle of 2004 approximately 74,680 candidates had registered for OSAT, resulting in 27,229 S/NVQ achievements. Wales accounted for 4,660 of these registrations, and 3,318 of the achievements.

Northern Ireland

	Employment		Average Annual Percentage Change (2003-2008)	Average Annual Requirement (2003-2008)	Cumulative Requirement (2003-2008)
	2003	2008			
Managers	4270	4680	1.83	240	1430
Clerical	3940	4750	3.81	230	1400
Professionals	1000	910	-1.84	50	320
Technicians	110	120	2.66	10	40
Carpenters & Joiners	9560	9550	-0.01	530	3170
Bricklayers	2130	2130	-0.01	120	710
Painters	2020	2230	1.98	120	690
Plasterers	2900	3190	1.98	160	990
Roofers	1830	1820	0.00	100	610
Floorers	330	360	1.99	20	110
Glaziers	970	970	0.00	50	320
Other Site-Based Operatives	1890	1890	0.00	100	620
Scaffolders	520	480	-1.87	30	170
Plant Operatives	4680	4580	-0.40	250	1510
Plant Mechanics/Fitters	380	420	2.13	20	130
Steel Erectors/Structural	160	140	-2.14	10	50
Other Civil Engineering Operatives	1470	1440	-0.37	80	480
General Operatives	8840	9360	1.15	490	2960
Maintenance Workers	20	17	1.22	0	10
Electricians	6490	7510	2.98	380	2280
Plumbers	4180	3890	-1.42	220	1350
Non-C construction Operatives	110	130	2.18	10	40
Total	57780	60580	0.95	3220	19370

Source: CITB NI Employment Model 2003: Experian Business Strategies – Specialist Building – Civil Engineering
 Note: Numbers rounded to the nearest ten – totals may not add up due to rounding

Economic outlook

The NI economy performed modestly throughout 2002 despite the challenging effects of the global economic slowdown. Economic growth in the Province was above the UK average, partly due to the continued growth in public expenditure and consumer spending.

In December 2002, the Northern Ireland Office announced its largest ever spend on infrastructure, equating to almost £2 billion over the next 5 years. The spend on infrastructure will be developed as part of a new Strategic Investment Programme, under the Northern Ireland Executive's Reinvestment and Reform Initiative (RRI), to erode the Province's £6 billion infrastructure deficit¹¹⁹.

The economic outlook for Northern Ireland in the short term is highly uncertain due to the current geopolitical situation, although the outlook for Northern Ireland over the medium to long term is good, with output growth at least in line with that expected for the UK as a whole. That said, hopes of sustained growth are reliant on the health of the economy in general, with regard to war, terrorism, the Peace-Process and the willingness of central government to fulfil spending promises given lower than expected tax receipts.

Reported skill shortages and skill gaps

According to the Northern Ireland Skills Monitoring Survey 2002, 10% of construction firms in Northern Ireland reported at least one difficult to fill vacancy, significantly lower than the 67% of respondents in Great Britain who reported such difficulties.

The main reasons given for difficult to fill vacancies by NI construction firms were not enough people interested in doing the job, lack of practical skills and poor attitudes, motivation and personality (10%). Other reasons given included a lack of the work experience required, impact of the benefits trap and too much competition from other employers.

According to the CITB NI Levy Payer Survey, employers found the greatest recruitment difficulties within skilled trades areas and in particular plumbers, plasterers and joiners.

The NI Skills Monitoring Survey 2002, indicates that as far as construction employers in Northern Ireland are concerned 'skill gaps' are not a particular problem for existing employees. Only 12% of construction employers in NI reported skills gaps in their existing workforce of which the main skill gaps reported were a lack of practical skills, interpersonal skills, team-working skills and computer literacy.

Provision of training

CITB NI is currently developing an infrastructure for OSAT in Northern Ireland. A two-year pilot scheme commenced in September 2003 and in the first year (2003-04) 44 individuals achieved a NVQ Level 2 or 3. It is anticipated that a further 100 candidates will achieve a NVQ during the second year of the OSAT pilot (2004-05) with a view to the OSAT scheme being expanded across the whole industry in Northern Ireland in the 2005-06 training year.

Appendix 8: CITB GB Operative and Craft Occupations

<p>Wood Occupations:</p> <ul style="list-style-type: none"> • Carpentry & Joinery • Shopfitting • Wheelwrighting • Timber Frame Erectors <p>Interior Systems:</p> <ul style="list-style-type: none"> • Suspended Ceilings • Relocatable Partitioning • Drylining Fixer & Finisher • Access Flooring <p>Fitted Interiors:</p> <ul style="list-style-type: none"> • Kitchen Fitters • Bathroom Fitters • Bedroom Fitters <p>Woodmachining Industrial Door Installer</p>	<p>Roofing Occupations:</p> <p>Mastic Asphaltting Rain Screen Cladding Roof Line Systems Applied Waterproof Finishes Roof Sheeting & Cladding Thatching Roof Slating & Tiling Liquid Applied Coatings</p> <p>Trowel Occupations: Bricklaying</p> <ul style="list-style-type: none"> • Craft Mason <p>Stonemasonry</p> <ul style="list-style-type: none"> • Banker Mason • Fixer Mason • Cladder <p>Plastering Wall and Floor Tiling Refractory Operations Chimney Engineering Pre-cast Concrete Erection</p>	<p>Accessing & Rigging:</p> <p>Scaffolding Steeplejacking Lightning Conductor Engineering Rope Access Demolition Asbestos Removal</p> <p>Construction Awards: FC in BCO (Foundation Certificate in Building Craft Occupations) FCA (Foundation Construction Awards) ICA (Intermediate Construction Awards) ACA (Advanced Construction Awards)</p>	<p>Decorative Occupations:</p> <p>Painting & Decorating</p> <ul style="list-style-type: none"> • Domestic • Commercial • Industrial <p>Glazing Floorcovering</p> <p>Maintenance Occupations:</p> <p>Insulation:</p> <ul style="list-style-type: none"> • External Wall Insulation • Cavity Wall Insulation • Draught Proofing • Loft Insulation <p>Cavity Wall Tie Replacement Damp-proofing and Wood Preservation Maintenance Operations Thermal Insulation Hazardous Waste Removal Energy Efficiency Services</p>
<p>Construction and Civil Engineering:</p> <p>Construction Operations General Building Operations Public Utility Distributions Highways Maintenance Roadbuilding Concrete Repairs Sprayed Concrete Decorative Imprinted Concrete In-situ Flooring Drilling and Sawing</p> <p>Sub-structural Work Occupations</p> <p>Underpinning</p> <ul style="list-style-type: none"> - Post Tensioning - Preformed Piles - Chemical Grouting - Ground Anchors - Structural Waterproofing - De-watering 	<p>Construction and Civil Engineering:</p> <p>Tunnelling Piling Land Drilling (including directional drilling) Trackworking Sealant Application Formworking Steelfixing Site Logistics Specialist Operations</p> <p>Superstructural Work Operations</p> <ul style="list-style-type: none"> - Structural Repairs - Composite Reinforcement - Post Tensioning 	<p>Specialised Plant and Machinery Operations:</p> <p>Plant Operations Plant Maintenance Façade Maintenance Water Jetting</p>	<p>Technical Supervisory, Management:</p> <ul style="list-style-type: none"> • Technical • Supervisors • Managers • Commercial

Appendix 9: CIC Built Environment NVQ/SVQ Qualification Status Chart November 2004

MANAGING				PLANNING & DESIGN				TECHNICAL PROVISION				CONTROLLING			
BOX 1		Level		BOX 6		Level		BOX 10		Level		BOX 14		Level	
Organisations	3	4	5	Setting policy	3	4	5	Analysis	3	4	5	Regulation	3	4	5
Large Business				Procurement	X	P	P	Land		X	X	Town & Country			X
Small Business			X	BOX 7				Buildings		P	X	Transportation			
BOX 2		Level		BOX 7		Level		Quantities			X	Building			P
Projects	3	4	5	Planning	3	4	5	Mapping			X	Conservation			X
For Clients	X			Town & Country			P	Testing			P	Environmental	P	P	X
BOX 3		Level		BOX 8		Level		BOX 11				BOX 15		Level	
Production	3	4	5	Design	3	4	5	Contracting	3	4	5	Inspection	3	4	5
Construction				Building				Estimating			X	New Work			P
Services				Structural			X	Planning			X	Maintenance			P
Maintenance				Civil Eng.			X	Buying			X	Services			P
BOX 4		Level		BOX 9		Level		BOX 12				BOX 16		Level	
Property	3	4	5	Maintenance	3	4	5	Resources	3	4	5	Health & safety	3	4	5
Buildings				Property				Plant			X	Construction	P		P
Land	X	P	P	Conservation	X	X		Materials			X	Transportation			
BOX 5		Level		BOX 9		Level		BOX 13							
Systems	3	4	5	Transportation				Property assets	3	4	5				
Services	P	P	X	Services	X		X	Investment		P	P				
Transportation				Pest Control		X	X	Valuation			X				
												KEY			
												Accredited			
												Validated			
												Under development			
												To be developed			
												Future potential			
												Unlikely development			

Appendix 10: Partners in change

We have worked with a great many partners in achieving what we have so far. We are extremely grateful for the help we have received from them. They include:

ACCAC	HEFCE
Adult Learning Inspectorate	HEFCW
BACH	Highlands and Islands Enterprise
CADW	Historic Scotland
Centre for Education in the Built Environment	Housing Corporation
Centres of Vocational Excellence (CoVEs)	IIP UK
Commission for Racial Equality	JobCentre Plus
Connexions	LSC
Constructing Excellence	ODPM
Construction Clients Group	OGC
Construction Products Association	Professional Institutions
DEL	QCA
DfES	RDAs and Local Authorities
Disability Rights	Scottish Enterprise and LECs
DTI	Scottish Executive
ELWA	SFHEFC
Employer Federations	SQA
English Heritage	Strategic Forum
Environment Agency	Trades Unions
Equal Opportunities Commission	Welsh Development Agency
Health & Safety Executive	Welsh Assembly Government

References

- ¹ CITB-ConstructionSkills and IFF Research, Workforce Mobility and Skills in the Construction Sector in London and the South East, 2003
- ² Office for National Statistics, Labour Force Survey, Spring 2003
- ³ Department of Trade and Industry, Construction Statistics Annual, 2004 Edition
- ⁴ Department of Trade and Industry, Construction Statistics Annual, 2004 Edition
- ⁵ Organisation for Economic Co-operation and Development (OECD), Economic Survey - United Kingdom 2004: Macroeconomic developments, prospects and policy challenges, 2004
- ⁶ Barker, K., Delivering Stability: Securing our Future Housing Needs, 2004
- ⁷ AMA Research, House Building Market Report, 2004
- ⁸ AMA Research, House Building Market Report, 2004
- ⁹ AMA Research, House Building Market Report, 2004
- ¹⁰ Construction Products Association, Construction Forecasts, 2004
- ¹¹ AMA Research, House Building Market Report, 2004
- ¹² Egan, J., The Report of the Construction Task Force to the Deputy Prime Minister on the scope for Improving the Quality and Efficiency of UK Construction, Rethinking Construction 1998
- ¹³ AMA Research, House Building Market Report, 2004
- ¹⁴ AMA Research, House Building Market Report, 2004
- ¹⁵ AMA Research, The Commercial Interior Refurbishment Market Report UK, 2004
- ¹⁶ AMA Research, The Commercial Interior Refurbishment Market Report UK, 2004
- ¹⁷ CITB-ConstructionSkills and MRM Solutions, The Skills for Productivity: Measuring Productivity in the Construction Industry, Unpublished
- ¹⁸ Annual Business Inquiry, 2003
- ¹⁹ Cullinane, P. (Ed), United Kingdom National Accounts: The Blue Book 2004, Her Majesty's Stationery Office (HMSO), 2004
- ²⁰ Ive, G., Gruneberg, S., Meikle, J. and Crosthwaite, D., Sector Competitiveness Analysis of the UK Construction Industry, Davis Langdon Consultancy, November 2003
- ²¹ CITB-ConstructionSkills and MRM Solutions, The Skills for Productivity: Preliminary Findings, August 2003
- ²² Proudfoot Consulting, International Labour Productivity Study 2003
- ²³ Ive, G., Gruneberg, S., Meikle, J. and Crosthwaite, D., Sector Competitiveness Analysis of the UK Construction Industry, Davis Langdon Consultancy, November 2003
- ²⁴ CITB-ConstructionSkills and MRM Solutions, Innovation, Skills and Productivity, 2003
- ²⁵ CITB-ConstructionSkills and MRM Solutions, Innovation, Skills and Productivity, 2003
- ²⁶ AMA Research, The UK Prefabricated Buildings Market Report, 2004
- ²⁷ Barker, K., Delivering Stability: Securing our Future Housing Needs, 2004
- ²⁸ AMA Research, The UK Prefabricated Buildings Market Report, 2004
- ²⁹ CITB-ConstructionSkills and MRM Solutions, Innovation, Skills and Productivity, 2003
- ³⁰ CITB-ConstructionSkills and MRM Solutions, Build to Last, 2004
- ³¹ CITB-ConstructionSkills and Experian Business Strategies, Employment Model Forecast, September 2004

-
- ³² Construction Industry Council, Davis Langdon Consultancy and Experian Business Strategies, Built Environment Professional Services Skills Survey 2003/04, 2004
- ³³ Economic and Social Research Council (ESRC) United Kingdom Longitudinal Studies Centre (ULSC), British Household Panel Survey, 2003
- ³⁴ Annual Business Inquiry, 2004
- ³⁵ Latham, M., Constructing the Team, Final Report of the Government / Industry Review of Procurement and Contractual Arrangements In The UK Construction Industry, 1994
- ³⁶ Egan, J., The Report of the Construction Task Force to the Deputy Prime Minister on the scope for Improving the Quality and Efficiency of UK Construction, Rethinking Construction 1998
- ³⁷ Egan, J., Strategic Forum for Construction, Accelerating Change, Rethinking Construction, 2002
- ³⁸ Health and Safety Executive, Statistics of Fatal Injuries, 2003/04
- ³⁹ Economic and Social Research Council (ESRC) United Kingdom Longitudinal Studies Centre (ULSC), British Household Panel Survey, 2003
- ⁴⁰ Office for National Statistics, Labour Force Survey, Spring 2003
- ⁴¹ Annual Business Inquiry, 2004
- ⁴² Annual Business Inquiry, 2004
- ⁴³ Construction Industry Council & Department of Trade and Industry, Survey of UK Construction Professional Services 2001/2002
- ⁴⁴ Office for National Statistics, Changes to self-employment in the UK: 2002 to 2003, December 2003 pp 623-628
- ⁴⁵ Office for National Statistics, Growth in self-employment in the UK, October 2004 pp399-404
- ⁴⁶ Office for National Statistics, Labour Force Survey, Spring 2004
- ⁴⁷ Office for National Statistics, Labour Force Survey, Spring 2003
- ⁴⁸ CITB-ConstructionSkills and Experian Business Strategies, Employment Model Forecast, February 2003
- ⁴⁹ Department of Trade and Industry, State of the Construction Industry Report, Winter 2002/03
- ⁵⁰ Office for National Statistics, Labour Force Survey, Spring 2003
- ⁵¹ Office for National Statistics, Labour Force Survey, Spring 2003
- ⁵² Council for Administration, Skills Foresight Report, 2002
- ⁵³ Council for Administration, Administration Skills Survey: Meeting Employer and Employee Demands, 2003
- ⁵⁴ Office for National Statistics, Labour Force Survey, Spring 2004
- ⁵⁵ Equal Opportunities Commission, Plugging Britain's skills gap: challenging gender segregation in training and work, 2004
- ⁵⁶ Office for National Statistics, Labour Force Survey, Spring 2004
- ⁵⁷ Office for National Statistics, Labour Force Survey, Spring 2004
- ⁵⁸ Office for National Statistics, Labour Force Survey, Spring 2003
- ⁵⁹ Department of Trade and Industry, Registered contractors by region of registration Q3 2003, Construction Statistics Annual, 2004
- ⁶⁰ Department of Trade and Industry, Construction Statistics Annual, 2004
- ⁶¹ CITB Northern Ireland and Experian Business Strategies, Employment Model Forecast, 2003

-
- ⁶² CITB Northern Ireland and Experian Business Strategies, Employment Model Forecast, 2003
- ⁶³ Department of Enterprise Trade and Investment Northern Ireland (DETINI)
- ⁶⁴ CITB Northern Ireland and Experian Business Strategies, Employment Model Forecast, 2003
- ⁶⁵ CITB-ConstructionSkills and IFF Research, Workforce Mobility and Skills in the Construction Sector in London and the South East, 2003
- ⁶⁶ Meikle, J. and Crosthwaite, D., *Personal communication*, Migrant workers in the UK construction industry, Davis Langdon Consultancy, August 2004.
- ⁶⁷ Eurostat, NewCronos, 2004
- ⁶⁸ Annual Business Inquiry, 2003
- ⁶⁹ Office for National Statistics, Labour Force Survey, Spring 2003
- ⁷⁰ Office for National Statistics, Labour Force Survey, Spring 2003
- ⁷¹ Office for National Statistics, Labour Force Survey, Spring 2003
- ⁷² Health and Safety Executive, Statistics of Fatal Injuries, 2003/04
- ⁷³ Health and Safety Commission, Statistics of Fatal Injuries 2002/03, 2004
- ⁷⁴ CITB-ConstructionSkills, Construction Skills Certification Scheme Statistics, January 2004
- ⁷⁵ CITB-ConstructionSkills and IFF Research, Workforce Mobility and Skills in the Construction Sector in London and the South East, 2003
- ⁷⁶ CITB-ConstructionSkills, OSAT Business Area Statistics, May 2004
- ⁷⁷ CITB-ConstructionSkills, Employers' Skills Needs Survey 2002/03, 2003
- ⁷⁸ Construction Industry Council & Department of Trade and Industry, Survey of UK Construction Professional Services 2001/2002
- ⁷⁹ MRM Solutions, Skills Census: A Report on Management Skills Gaps in the Construction Industry, 2003
- ⁸⁰ Federation of Master Builders, State of Trade Survey: Quarter 1, 2004
- ⁸¹ National Specialist Contractors Council, State of Trade Survey: Quarter 1, 2004
- ⁸² Royal Institute of Chartered Surveyors, Construction Market Survey: Quarter 1, 2004
- ⁸³ Civil Engineering Contractors Association, Workload Trends Survey: April 2004
- ⁸⁴ Construction Confederation and Construction Product Associations, Construction Industry Trade Survey, May 2004
- ⁸⁵ Learning and Skills Council, National Employers Survey, 2003
- ⁸⁶ Futureskills Scotland, Skills in Scotland 2002: The Employers View, 2002
- ⁸⁷ Future Skills Wales, Generic Skills Survey, 2003
- ⁸⁸ Department for Employment and Learning in Northern Ireland, Skills Monitoring Survey, 2002
- ⁸⁹ Hastings, J., *Personal communication*, Econometric Model Enquiry, Experian Limited, 06/05/2005.
- ⁹⁰ CITB-ConstructionSkills and IFF Research, Workforce Mobility and Skills in the Construction Sector, 2004
- ⁹¹ Construction Forecasting & Research (Experian Business Strategies), Construction Industry Focus, July 2004
- ⁹² CITB-ConstructionSkills, Trainee Numbers Survey, 2003/04
- ⁹³ CITB-ConstructionSkills, Recruitment and Careers Statistics, September 2004

-
- ⁹⁴ OPERA Building Research, Assessment of Potential Demand for a GCSE in Construction and the Built Environment, April 2003
- ⁹⁵ CITB-ConstructionSkills, Trainee Numbers Survey, 2003/04
- ⁹⁶ Department of Employment and Learning, Northern Ireland, Jobskills, 2003/04
- ⁹⁷ Equal Opportunities Commission, Plugging Britain's skills gap: challenging gender segregation in training and work, 2004
- ⁹⁸ CITB-ConstructionSkills Trainee Exit Survey 2001, published 2002
- ⁹⁹ Adult Learning Inspectorate, Annual Report, 2002/03
- ¹⁰⁰ CITB-ConstructionSkills, Training Capacity Survey, 2003
- ¹⁰¹ CITB-ConstructionSkills, Managing Agency Business Area Statistics, September 2004
- ¹⁰² CITB-ConstructionSkills, OSAT Business Area Forecast, October 2004
- ¹⁰³ Robert Bilbrough Associates, Assessor Capacity and Capability Review, 2003
- ¹⁰⁴ CITB-ConstructionSkills, Business Plan, 2004-2008
- ¹⁰⁵ Higher Education Statistics Agency, First Destinations Supplement, 2001/02
- ¹⁰⁶ Quality Assurance Agency for Higher Education, Quality Assessment of Building 1996-98, 1998
- ¹⁰⁷ Quality Assurance Agency for Higher Education, Quality Assessment of Civil Engineering 1996-98, 1998
- ¹⁰⁸ Construction Industry Council & Department of Trade and Industry, Survey of UK Construction Professional Services 2001/2002
- ¹⁰⁹ CITB, Levy/Grant Statistics, 2002/03
- ¹¹⁰ CITB, Levy/Grant Statistics, 2002/03
- ¹¹¹ CITB-ConstructionSkills and IFF Research, Measuring Private Investment in Training: Scoping Study, 2004
- ¹¹² CITB, The Effect of Employment Status on Investment in Training, 2003
- ¹¹³ CTA, Research Document, 2002
- ¹¹⁴ Pearce, D. The Social and Economic Value of Construction: The Construction Industry's Contribution to Sustainable Development, New Construction Industry Research and Innovation Strategy Panel, 2003
- ¹¹⁵ CITB-ConstructionSkills and MRM Solutions, Innovation, Skills and Productivity, 2003
- ¹¹⁶ IFF Research, The Effect of Employment Status on Investment in Training, 2003
- ¹¹⁷ Egan, J., The Report of the Construction Task Force to the Deputy Prime Minister on the scope for Improving the Quality and Efficiency of UK Construction, Rethinking Construction 1998
- ¹¹⁸ Egan, J., Strategic Forum for Construction, Accelerating Change, Rethinking Construction, 2002
- ¹¹⁹ <http://www.nics.gov.uk/press/dfp/021211a-dfp.htm>