

Heritage Building Crafts

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Local materials in use. East Meon

Further information relating to appendices, graphs, statistical data and questionnaires can be found on the website: www.craftsintheenglishcountryside.org.uk

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Heritage

Introduction Building Crafts

The aim of the research presented in this section has been to analyse the heritage buildings sector and identify any skills gaps, and to highlight the extent and nature of rural skills training and make recommendations for improvement. The research exercise set out to do the following:



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Thatching, Rosemary Lane, Norwich (1948)

- review the heritage buildings sector, define 'traditional' crafts and skills and identify component trades, market size and trends, with particular reference to rural areas;
- describe and analyse the specialised knowledge, techniques and levels of performance required to restore, repair and maintain historic buildings to the standards required by local planning authorities and official conservation bodies. Areas covered to include: operations; materials; geographical distribution; walling (bricks, stone – masonry and dry-stone walls – clay, chalk, wattle and daub, plaster work – including pargetting); roofing (tiles, slates, reed, straw and other); constructional joinery;
- assess the adequacy – quantitative and qualitative – of the provision of craftworks and supervision based on information supplied by, e.g., professional associations, preservation bodies, local planning authorities, architectural partnerships, etc. ;

- identify training and education facilities, including in-service training (e.g. apprenticeships), to include an assessment of the impact of the reduction in direct workforces and the larger, integrated building firms and the increase in professional heritage specialists. Also, training schemes run by the National Trust, British Waterways, etc., and specialised instruction and training currently provided: levels and qualifications, and analysis of courses offered by technical colleges and specialist centres – e.g. West Dean, museums, Livery Companies, Herefordshire College of Technology;
- assess the adequacy of training provision;
- make recommendations and proposals for change and improvement.

The scope of the report is heritage building skills. This term is subject to interpretation, but for the purpose of this study is defined as: 'Specialist building skills using traditional materials and techniques required to conserve, preserve and restore the nation's historic buildings and structures.' It does not include modern maintenance and refurbishment skills and techniques, using modern materials and components.

The definition of a historic building does not rely solely on whether a building is formally recognised and protected as being of architectural or historic interest. Technically defined, it is one that is 'of solid wall construction built with porous fabric that both absorbs and readily allows the evaporation of moisture'.

The craft occupations included within heritage building skills are also not clearly defined. For the purpose of this report the occupations included are: bricklayers/craft masons, carpenters and joiners (bench & site), roof slaters and tilers, stone masons (including flint workers), leadworkers, painters and decorators, steeplejacks, scaffolders, glaziers, hard landscapers, wall and floor tilers, plasterers (solid and fibrous), façade cleaners, thatchers, dry-stone wallers, cob and earth wallers, rural pargetters, wattle and daubers and blacksmiths (ironwork).

Methodology

Desk research has been used to review the available data and information held by the major stakeholders in heritage and conservation skills, including the Department of Culture, Media and Sport (DCMS), the Countryside Agency, English Heritage, the Society for the Protection of Ancient Buildings (SPAB), trade associations, employer organisations, professional bodies, advisory bodies, suppliers of materials, Learning and Skills Councils, the Construction Industry Training Board (CITB) and education and training organisations.

Primary research was undertaken to provide essential data for key areas where information was lacking. This included interviews with key stakeholders and questionnaires to NVQ providers and to conservation officers (the Conservation Officers' Questionnaire).



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Trainee Pargeter

Report Structure

The report is divided into five main sections:

- 1 *The Heritage Market*: provides data on the size and structure of the repair and maintenance market and information on the heritage market. The overall magnitude of the problem – the supply/demand equation – has to be accurately defined so that a true picture of skill gaps can be established
- 2 *Supply Characteristics and The Labour Market*: identifies the characteristics of the heritage building supply side and the information deficit.
- 3 *Processes, Materials and Skills*: identifies the specialist materials and skills required to repair and maintain the historic building stock. The individual reviews of each material component of the historic buildings sector – covering timber, plants, earth, fired clay, lime, stone, metals and glass – help to define the pathways (from source to final application) and skills required in their application and use.
- 4 *Training*: reviews heritage training provision, trainee destinations, funding, employer links, qualifications and the information deficit.
- 5 *Recommendations*: describes the recent actions already taken by the government, English Heritage, the CITB and National Heritage Training Group and the key areas for immediate and future coordinated action to support the sector's further development. Improvements in training are treated holistically within the construction industry – the sector cannot be studied in isolation.

Finally, there is an addendum, written by Bob Bilbrough, with a summary of recent developments that have taken place since the compilation of this report.



The Heritage Market

© Anne-Katrin Purkiss



Thatchers, West Sussex

Introduction

England has the greatest concentration of historic buildings of any country in the world. It is now widely recognised that the historic environment is one of the country's most valuable assets. As well as contributing to the quality of life, it also helps to support the nation's economy through tourism and in encouraging investment and creating jobs.

© Paul Felix



England also has one of the most advanced (some would say throttling) systems of protection of the built environment. The Society for the Protection of Ancient Buildings (SPAB) was the earliest society – again in the world – whose stated aim was to protect historic buildings. Planning authorities are charged with safeguarding the future of more than 375,000 listed buildings and 9,000 conservation areas. A high proportion of historic and/or listed buildings, and the craftspeople who service them, are located in what can be broadly termed rural areas: the outer suburbs, villages and country towns.

There is a strong sense of a need to care for our old buildings, as evidenced by the findings of an opinion poll carried out by MORI on behalf of English Heritage in 2000. The poll showed that 87% of people in England think that the historic environment plays an important part in the cultural life of the country and that there should be public funding to preserve it. There is a general outcry whenever an important building bites the dust. Indeed, it was the overnight destruction of the art deco Firestone Building near London in 1980 that triggered a major re-listing exercise that encompassed almost the entire stock of historic buildings in England.

Historic buildings have moved into the limelight partly as a result of a number of emerging political, economic and social agendas. These are varied, and include:

- reaction to the destruction of the built environment in the 1960s and 1970s;
- a strengthening of legal protection as a result of listing;
- a broadening of understanding of the historic environment and traditional building materials;

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- sustainability agendas;
- the expansion of urban – rural migration (and second-home ownership);
- new curriculum and teaching methods;
- mass communication – especially TV – featuring restoration and design themes;
- raised awareness/participation in traditional skills (2001 was featured by English Heritage as Year of Crafts);
- the creation of new administrative entities with enhanced powers in the more environmentally sensitive regions, e.g. areas of outstanding natural beauty (AONBs), National Parks.

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Dry-stone walling, Cotswolds AONB

But other, more fundamental, underlying trends pull against these factors, leaving the impression that rhetoric and reality have parted company. Set against the above are:

- a lack of clear leadership or direction;
- a lack of information relating to the sector;
- a critical lack of resources for key training establishments;
- a lack of manpower – 2001 Year of Crafts passed by virtually uncelebrated;
- an emphasis on urban agendas;
- the effect of rural problems e.g., foot and mouth disease, a rural housing crisis;
- the disbandment of the Council for Small Industries in Rural Areas (CoSIRA) as a specialised division within the Rural Development Commission and the transfer of rural craft training to the Learning and Skills Council;
- the dismantling of traditional employment structures, e.g. direct labour forces ;
- serious under-resourcing and a reduction in local authority spending on vernacular buildings;
- a severe neglect and lack of knowledge, and a continuing destruction (wilful or otherwise) and erosion of rural building stock;
- the closure in 1996 of Fort Brockhurst, Hampshire, formerly the English Heritage Training Centre;
- a decline in the number of traditional building firms
- a lack of recruits into the sector;
- a parting of the ways: an emphasis on new building methods (based on fast track, value engineering, buildability etc.)

Inevitably, given the frustrations that result from these tensions, we have to ask whether there is any justification for yet another study instead of the implementation of immediate action. However, the tensions reveal that an impartial overview of the sector is missing. Only by cutting through the confusing and conflicting data can a reasoned strategy for action emerge. One fact that is constantly repeated is that there is a general skills shortage in the sector, amounting, in the view of many people, to a crisis.

Generally, traditional skills are dying and even tradesmen are forgetting the skills they once had.

(Allerdale DC)

There is a desperate shortage of skills and of understanding of conservation needs.

(Rushcliffe DC)

Good craftspeople across all sectors are in very heavy demand.

(Test Valley DC)

Definitions

Although the nature of the beast might be well known, a key problem remains one of defining the exact scope of the historic building sector. In other conservation fields, there is little difficulty identifying the variables in the supply and demand equation.

There is no question of a run-of-the-mill portrait painter being assigned to the conservation of a famous historic painting, for example; and an IKEA factory worker would not be let loose on the restoration of a Chippendale chair. The heritage market, however, is primarily a subset of a construction industry which, in the wake of reports by Sir Michael Latham (*Constructing the Team*, 1994) and Sir John Egan (*Rethinking Construction*, 1998), is primarily concerned with buildability, advanced technologies, value engineering and fast-track construction. The gulf between 'intelligent' new-build systems and the meticulous repair of an historic building has never been wider.

Repair and maintenance work can range from fixing a gutter bracket to restoring a Grinling Gibbons carving. A significant market, but the heritage building sector constitutes only a part of it – one that has, as yet, not been clearly defined or quantified. A better understanding is required of the market's size, segments and demand trends in order to estimate the heritage building skills required.

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Major repair and extension to existing cottage



Case Study Thatching: problems of defining the issues

Thatching is one of the smallest craft components in the historic buildings sector. It is also one of the most problematic. There are 24,000 listed thatched buildings in England, but no reliable statistics for the number of unlisted thatched buildings. Some local authorities have begun to carry out surveys of thatched roofs to determine local styles, but the national picture of the distribution of water reed, combed wheat reed and long straw is still obscure. There are probably 900–1,000 thatchers, but as there is no unified trade body, no accurate national data are available. The two bodies that do exist – the National Council and National Society – probably represent less than a third of all thatchers. Their polarised views only serve to impede progress. Similarly, there are no recognised national entry standards – anyone can set up as a master thatcher. The industry is bedevilled by infighting and resistance to the employment of external skills and expertise. English Heritage's forays into the profession have spawned a 'resistance movement' amongst a small but vocal group of thatchers who are currently 'advising' local authorities to ignore the guidelines. A few local authorities have adopted their own thatching policies and issued recommended specifications; some will supply a list of 'approved' thatchers, although the criteria for selection are not at all clear.

© Andy Tyrner



Damien Layt, trainee thatcher.

Since the closure of the Rural Development Commission's Salisbury Office, there has been no 'voice' for thatchers (as used to be the case when the *Thatching Newsletter* was in circulation). At the one recognised centre of training at Knuston Hall, Northamptonshire, trainees of established master thatchers have the opportunity to work with all 3 main thatching materials and to concentrate on the materials and styles to meet their local need. Of the 47 trainees who passed through Knuston between 1995 and 2000, 13 were instructed in long straw thatching. The future of the centre is now hanging in the balance as Countryside Agency funding is being withdrawn. The Thatching NVQ Level 2 does not as yet include a conservation module. The content of NVQ3 thatching has been considered by an 'independent' lead body (now under the CITB's wing) for several years, and has only recently been approved. However, there is no infrastructure (or, it seems, demand) to deliver it. Thatchers are wary about sending apprentices on courses; many believe they are the best teachers. There is certainly no concept of any formal process for the continuing upgrading of skills and knowledge.

The thatching industry relies on a complex network of suppliers (spar-makers, toolmakers, scaffolding firms, etc.), the extent of which is difficult to define given the lack, once again, of reliable statistics. While the amount of material required to thatch a roof can be calculated, disputes about longevity, frequency of repair, etc. mean that it is impossible to generalise on the annual amount of thatching straw and water reed required. In this country, seed of only two varieties of thatching straw can be 'legally' sold. As a result, the straw-growing industry, operating on the margins of legality, is somewhat impenetrable; training (or even basic information) for growers is non-existent. The quality and quantity of imported thatching materials is notoriously difficult to assess. Thatched building owners are not obliged to keep log books, and are exposed, if at all, to various sources of unreliable information (e.g. thatching magazines issued by insurance firms). Because they do not know the right questions to ask, there is a serious lack of accountability. A thatcher is not obliged to provide guarantees, and can get away with using any grade of thatching material in the knowledge that the owner will not be able to tell the difference between water reed and straw, let alone imported and native-grown material.

Impartial advice on thatching is difficult to come by. Expert witnesses are non-existent. Architects, surveyors, etc. receive no core teaching on thatching; accredited advanced conservation courses only dabble in the subject and cannot source the necessary unbiased teaching skills. Continual Professional Development (CPD) training is ad hoc and has to draw on the same narrow pool of expertise.

There are glimmers of hope, however. An overview of England's stock of thatched buildings suggests that few are suffering from grave neglect. Some significant initiatives are being implemented. The National Trust's Holnicote Project demonstrates how an integrated approach to research, survey, growing, maintenance, training and record-keeping can help to move on the debate. Insistent conservation officers have managed to reverse the tide on the disappearance of long straw. Enterprising individuals are developing more efficient machinery and experimenting with wheat varieties to deliver better thatching straw.

Repair and Maintenance

Output

Figure 1 shows construction industry output at constant 1995 prices. Repair and maintenance work, on average, accounts for 48% of total output. In 2001 repair and maintenance output was £28 billion and the total output of all work £60 billion.

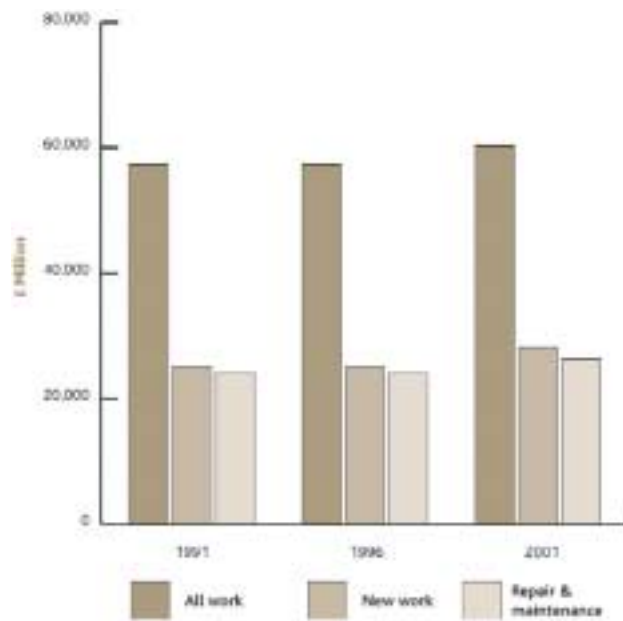


Figure 1: Construction output

The repair and maintenance output can be broken down into sub-sectors, as shown in Figure 2, at constant 1995 prices. The value of repair and maintenance has increased slightly over the last ten years. There has been significant growth in private sector other work. Conversely, the public sector has reduced in value in both the housing and other work sub-sectors.

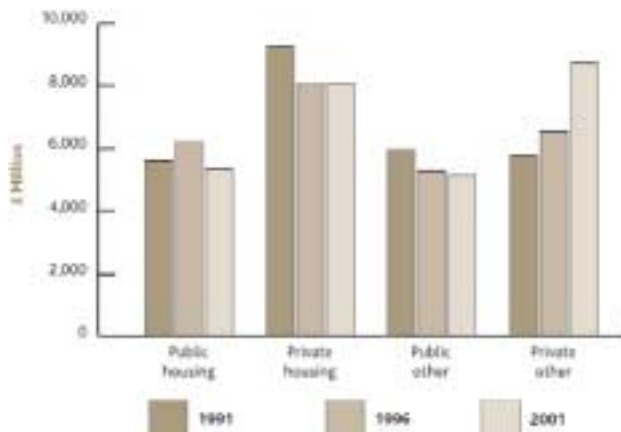


Figure 2: Repair and maintenance output



Distribution of repair and maintenance work

The regional distribution of repair and maintenance work is shown in Table 1. Around 40% of total output was in the south-eastern region. However, while the historic built environment has primarily to be maintained, it is not a static asset. Extensions, alterations and additions are constantly being made to the stock of historic buildings, and these require, in many cases, a similar raft of skills, particularly where design guidance, listed building consents or conservation advice insist that new work should match the original fabric.

New design work – again either in areas where planning controls are stringent or where one-off projects using traditional methods and materials are undertaken – has also increasingly drawn on the heritage sector's skills base. A project such as the late Sir Paul Getty's new library extension at his country house in Wormsley, Buckinghamshire cost £16 million. Constructed with 2,000 square metres of flint facings, the project absorbed most of the region's flint-working expertise for more than two years – but it also spat out some trained apprentices and extended the knowledge and capabilities of the existing workforce.

Table 1: Regional distribution of repair and maintenance work (£ thousands)

Region	1991	1996	2001
North East	689	807	967
Yorkshire and Humberside	1,691	2,089	2,413
North West	2,100	2,657	3,172
East Midlands	1,332	1,662	1,905
West Midlands	1,708	2,192	3,193
East Anglia	779	990	1,175
Beds, Essex, Herts	1,328	1,648	2,301
Greater London	2,688	3,034	4,720
Kent, Surrey, Sussex	1,787	2,102	3,390
Berks, Bucks, Hants, Oxon	1,632	1,880	2,376
South-west	1,862	2,161	2,883

Heritage Expenditure

There are no definitive data for the size of the heritage market. The capital expenditure by the main public sector and charitable organisations on heritage projects is shown in Table 2. If grounded only in the repairs and maintenance output sector, a guestimate of national heritage expenditure is up to £2 billion per annum, or around 6% of total repair and maintenance output at current prices. Further research is required to provide a more detailed and accurate picture.

Table 2: Heritage expenditure (£ millions), 2001/2

Organisation	Expenditure
English Heritage	33.7
Heritage Lottery Fund	300.0
National Trust	55.0
British Waterways	43.0

Note: not all this expenditure is on building works



Heritage Market Information

Information exists, in a fragmented form, on the physical size and condition of some parts of the historic and national building stocks. These include: sites and monuments records, listed buildings, cathedral survey/church repairs, conservation areas and housing condition surveys.

Sites and monuments records

There are now more than a hundred Sites and Monuments Records (SMRs), mainly based in shire counties, unitary authorities or in shared partnership arrangements. There are estimated to be around a million sites recorded in SMRs in England and around 5% of the land area of England contains recorded archaeological monuments (including buildings). The Association of Local Government Archaeological Officers (ALGAO) estimates that the number of entries is growing at around 5% per annum. It is widely recognised that the role and scope of SMRs need to be better defined. National definitions and standards are currently under consideration.

Listed buildings

There were 376,094 listed building entries in August 2002. These included Grades I, II*, II, A, B, C and those entries not currently assigned a grade. Some churches on older list entries are still graded A, B and C. Planning Policy Guidance 15, para 6.6, states that these all should be treated in the same way as Grade I and II* buildings on the Department for Culture Media and Sport's (DCMS) list of buildings of special architectural or historic interest. There are three grades of entry: Grade I (comprising 2.5% of all entries on the English Heritage Listed Building System), Grade II* (comprising 5.7%) and Grade II (comprising 91.8%).

The Listed Building System (LBS) database relates to listed building entries, not to individual buildings or ownerships, or to buildings associated with a listed principal building (within the curtilage). Thus, a terrace of houses or a range of farm buildings would often be given a single list entry. The total number of individual buildings

has not been calculated, but the figure of around half a million such items is probably now an underestimate. It is estimated that approximately 1% of all dwellings are listed. Table 3 gives listed buildings by type. Table 4 provides details of the distribution of listed buildings and conservation areas.

Table 3: Listed buildings by type, 2002

Listed Building Type	Percentage of total list*
Domestic	37.9
Agriculture and Subsistence	12.2
Commercial	7.8
Transport	7.0
Religious, Ritual and Funerary	6.5
Gardens, Parks and Urban Spaces	5.6
Commemorative	4.2
Industrial	2.3
Recreational	2.2
Educational	1.6
Water Supply and Drainage	1.4
Health & Welfare, Communications, Defence, Maritime (each category less than 1%)	3.0
Other	8.4

Source: State of the Historic Environment Report, 2002

*Total population 376,094 buildings

Table 4: Regional distribution of listed buildings and conservation areas, 2002

Region	Percentage of listed buildings	Percentage of conservation areas
East Midlands	7.8	11.0
East of England	15.3	12.5
London	4.9	10.0
North East	3.2	3.0
North West	6.9	7.4
South East	20.3	21.7
South West	23.7	18.0
West Midlands	9.4	8.1
Yorkshire	8.5	8.3
Totals	376,094*	9,072

Source: State of the Historic Environment Report, 2002

*Total population of buildings is estimated by English Heritage to exceed 500,000

Central government, through its various departments and agencies (excluding English Heritage), manages more than 1,000 listed or scheduled buildings. More than half of these are managed by the Ministry of Defence, with 12% being managed by HM Prison Service. The proportion of government-managed buildings that are Grade I or II* is much higher than the national average. Local authorities are also significant listed building owners. The Church of England has the largest estate of listed buildings, certainly of high-grade buildings. It estimates that some 12,000 of its 16,000 buildings and structures are listed. British Waterways owns more than 2,800 listed structures, a large number of them bridges. The National Trust owns 2,341 listed buildings. In addition to listed buildings, many local authorities maintain their own lists of buildings that are of importance in the locality, even if they do not merit statutory protection.

English Heritage estimated in 2002 that around 3.7% of Grade I and II* listed buildings are at risk. The 2002 Register identifies 641 entries (4.1% of list entries) comprising 748 items (approximately 2% of London's listed building stock, not just list entries). Progress is being made on securing the future of more than a quarter of buildings on the register (28% Grade II and unlisted). Almost half are domestic buildings and more

than a quarter are in public ownership. Places of worship are a particularly important category of listed building. They include chapels, churches and cathedrals of Christian denominations, as well as mosques, temples and synagogues of other faiths. For historical reasons, the majority of listed places of worship belong to the Christian denominations. Churches and cathedrals in use are exempt from secular listed building controls because they have acceptable alternative mechanisms in place to control proposals for change.

Cathedral survey/church repairs

The *Cathedral Fabric Needs* survey in 2001 identified £164.6 million of 'urgent and necessary' repair needs (at 2001 prices). The survey repeated research first carried out in 1991. Ten years later, 85% of that work had been completed, much of it with assistance from the Cathedral Repairs Grant Scheme. The cost of the work identified in the 2001 survey as being necessary by 2006 (excluding maintenance and development projects) was £57.1 million. This is significantly lower than the 1991 figure, and it can reasonably be concluded that in this part of the historic environment investment and management have been successful in slowing deterioration.



Renovation of St. Wendreda's, March, The Fens

© Tony Keeler

A survey of 3,424 churches and Christian places of worship in 1999 found that the average annual expenditure on repair and maintenance of places of worship of those denominations active in England varied from £184,960 of repair and £72,157 of maintenance (total £257,117) for cathedrals to £5,249 of repair and £1,393 of maintenance for the Free Churches (excluding Baptists, Methodists and the United Reformed Church). The survey calculated that a very rough indication of the level of annual repair and maintenance figure was between £228 million and £568 million.

Conservation areas

In June 2002 there were more than 9,000 conservation areas. Figures released by the Chartered Institute of Public Finance and Accountancy (CIPFA) for 1999/2000 indicate that the average conservation area was 25.7 hectares in size. The regional distribution of conservation areas was shown in Table 4.

Housing condition surveys

The English House Condition Survey 1996 estimated there were 20.4 million dwellings in England (647,000

more than in 1991), 4.8 million (24%) dating from before 1919. London, the North West, South West and Yorkshire regions have above-average numbers of pre-1919 dwellings.

Of the current housing stock built before 1850, the largest single category (more than 40%) of dwelling type is the detached house; less than a third of the stock is terraced. The majority of the housing stock built during the periods 1850 to 1899 and 1900 to 1918 is terraced, but housing stock surviving from the 1919 to 1944 period is almost 50% semi-detached, with just over a quarter being terraced. There is a higher percentage of pre-1919 dwellings in the rural stock (28%) compared to the urban stock (23%). After inner city London, predominantly rural districts dominated by seaside and spa towns have the highest level of pre-1919 dwellings (38% of all stock).

Town and country

The majority of protected buildings date from before a time when no town in Britain, with the exception of London, had a population of more than 100,000 people. Outside the capital, every town and city consisted of streets of small houses and shops, stables and workshops. None could boast a large building except for a church or cathedral and perhaps a prison, castle, market hall or assembly room. All of these would probably have been built over long periods; local regulations and custom often meant they would have been constructed and maintained by craftsmen resident within the town or its close neighbourhood.

Beyond the towns, scattered across the countryside were the manor houses, farms and cottages of the rural workers – all built by local people in local styles with local materials. A smattering of large country houses effectively straddled the urban/rural divide; the aristocrats who built them had one foot firmly in the urban camp and drew their inspiration from a broader spectrum of professional advisers and materials; often, though, the skills drawn upon actually to construct these places were home-grown: those

© Rob Fraser



Leek, Staffordshire





Parade School Mews housing conversion, Berwick

of the estate workers or village and country town craftspeople.

By the beginning of the First World War, the urban fabric had been entirely transformed – factories, warehouses, town halls, law courts, banks, multi-storey offices, concert halls and theatres mushroomed in response to urban demands. But rather than leading to a clearer distinction between town and countryside, the picture became more blurred, as urban fingers stretched out into the countryside through suburban development, networks of transport systems (river, canal, railway) and the export of civil engineering skills, and rural areas slowly succumbed to the installation of water and sewage systems, paving, drainage and lighting schemes.

The distinction between old buildings that in some way receive special protection through planning controls and those that are still 'antique' is a crucial one. Only one in ten of the 24% of pre-1919 dwellings in England is afforded some kind of protection through listing. The buildings that inevitably fall through the net are the

products of that expansionary phase, dotting the landscape with plainer eighteenth-, nineteenth- and early twentieth-century farmhouses and villas, typical Victorian terraces, Edwardian semi-detached houses and so on. Quite apart from this massive array of domestic structures, a plethora of unadorned but nevertheless representative farm and industrial buildings, workshops, shops, commercial and public buildings also appeared on the landscape. This 'grey' area of overlap between traditional and modern again makes quantification of the sector extremely difficult. For the owner of such unprotected buildings, it is still a matter of personal choice when undertaking repairs or alterations whether or not to choose to tap into the heritage building skills sector.

Heritage market drivers

In its *State of the Historic Environment Report (2002)* English Heritage found two main drivers for preserving the nation's historic environment. First, people care for and value this environment. For example, the National Trust has 2.9 million members and 40,000 volunteers. Second, the historic environment has real economic value. In 1998 there were 1,253 million day visits to the English countryside generating spending of £11.5 billion. Of all trips to the countryside in 2001, 24% comprised visits to heritage sites and 16% to museums or galleries

A steady flow of affluent migrants to rural areas has increased demand for conservation work on historic houses and gardens. It is likely that with an ever more affluent and educated society the demand for heritage building skills will continue to grow for the foreseeable future.

One frequently hears of potential purchasers not wanting to touch a listed building, 'because we won't be able to do anything to it'. But the legislative framework and the role of English Heritage and local authorities, together with pressure exercised by official conservation bodies, play a key role in sustaining and encouraging the growth of the market for heritage skills – either negatively through the threat of serving repair notices or more positively by the raising of standards. This stubborn protectionist approach can also, by extension, go some way towards protecting the 'grey' area of unprotected historic buildings.

Supply Characteristics and the Labour Market

Introduction

General information is readily available on the size and locations of construction businesses. It is also relatively easy to discover the number of people employed in particular construction occupations, demographic trends, skill shortages and gaps and replacement rates. However, there are few specific details about heritage building supply characteristics or its labour market.

© Nick Smith



Preparing materials, West Wiltshire Downs AONB



Structure of the industry

There are approximately one and a half million people employed in the UK construction industry; that is, approximately 8% of the working population. The figure would be very much higher if this were to include all those who, though not directly involved in the production of buildings and other construction work, are closely connected with the industry in other ways – the staff of the many legal firms specialising in construction, civil servants in the relevant departments of central and local government, housing association staff, researchers engaged in research establishments, employees in the building materials industry and so on.

There are more than 160,000 firms, ranging from giant corporations to one-person businesses. Between them, they produce £65 billion worth of construction work each year. It is a vast, complex and important industry. It not only creates the physical environment in which most of us live; it is also responsible for the maintenance of the existing built environment. This is clearly a sensible arrangement if the materials, skills and techniques etc. employed in new and old structures are the same. Unfortunately, conservation requirements are too often treated by new-build firms as millstones around their necks. New energy targets and ever more demanding building regulation requirements simply cannot be shoehorned into historic structures without causing much damage.

Table 5 provides a breakdown of the key trades registered in construction. Almost all the specialist trades shown in the lower part of the table are small and medium-sized enterprises (SMEs), with 92% of employers employing fewer than eight people. Many of the general builders are also small firms. The construction industry and heritage building therefore have a high division of labour and rely heavily on specialist contractors in the production process. The trend is for modern contracting methods to continue to increase the division of labour by creating new specialists.

Table 5: Key specialist trade firms registered in construction nationally

Type of firm	Percentage of all firms
General builder	24.5
Civil engineer	12.2
Building and civil engineering	2.2
Total: main construction firms	38.9
Electrical	11.9
Plumbing	7.7
Carpentry and joinery	6.1
Heating and ventilating	3.4
Painting and decorating	5.5
Roofing	3.4
Plant Hiring	2.4
Glazing	1.9
Plastering	1.6
Flooring	1.6
Ceiling specialist	2.8
Construction engineering	0.5
Scaffolding specialist	0.6
Tiling specialist	0.5
Demolition	0.5
Miscellaneous trades	10.7
Total: specialist trade firms	61.1

Source: Department for the Environment, Transport and the Regions (DETR) Construction Market Intelligence, 2000



Walling competition, Cotswolds

There are, however, few entry requirements for a builder with general training or with an NVQ in any of the construction disciplines – such as carpentry, plastering or brickwork – who chooses to move from mainstream construction work into the traditional buildings market. No formal accreditation is required to register with the Guild of Master Craftsmen. This situation creates considerable problems when trying to identify *bona fide* members of the heritage sector of the construction industry. Standing is built on word of mouth rather than objective assessments of standards of work. This is in contrast to, for example, the status of gas engineers, who have to be Corgi-registered and have their work regularly inspected and assessed by experienced examiners.

The construction industry has progressively changed over the last 30 years from an industry of general contractors employing one or two specialist subcontractors to an industry of specialist management contractors coordinating the work of specialist trade and service contractors and suppliers. Specialist contractors provide the core of the industry's labour supply chain. The work they do as subcontractors accounts for a very significant component of total industry output. Increasing specialisation in, and requirement for, dedicated heritage-based skills has therefore spread upwards and led to the creation of dedicated heritage firms, which specialise exclusively in repair work. Again, there are no recognised entry requirements into this sector and any building company can move seamlessly from mainstream construction work to the heritage sector. There are also companies that specialise exclusively in different aspects of the heritage market – for example timber framing, stone restoration, thatching, etc. Such firms will tend to be engaged on high-profile restoration projects.

Only a small minority of the general heritage firms, however, will work exclusively on the repair of historic buildings. Many will be required to carry out new-build work in the shape of extensions to existing properties, whilst others will continue to keep a hand in mainstream building projects so as to avoid putting too many eggs into one basket. There are, therefore, major obstacles in determining the exact size of the workforce engaged in heritage building work.



Construction occupations

With these major caveats in mind, Table 6 illustrates the construction industry's occupational breakdown both as a percentage and of total numbers employed. It shows which occupations are the CITB's responsibilities *vis-à-vis* its statutory duty to collect levy from construction companies (the levy is based on payroll, so many small businesses are exempt). The occupations involved in heritage building work have been shown in colour. Assuming that 5% of the population of these occupations is involved in heritage work (based on an estimated heritage sector annual turnover of £2 billion), there are probably around 36,500 people working in the heritage building sector

Table 6: Construction industry occupational breakdown (potential heritage occupations in colour)

Cat No.	Occupation	Overall total employment %	Approximate total number of people
1	Carpenters/joiners (sitework)	10.7	149,800
2	Carpenters/joiners (b/work)	2.4	33,600
3	Shopfitters	0.4	5,600
4	Formworkers	0.1	1,400
5	Wood machinists	0.2	2,800
6	Bricklayers	13.8	193,200
7	Cavity wall tie installers	0.1	1,400
8	Façade maintenance/cleaning	0.2	2,800
9	Stone masons	0.4	5,600
10	Plasterers (fibrous)	0.6	8,400
11	Plasterers (solid)	2.1	29,400
12	Dry liners	0.3	4,200
14	Slaters/tilers	2.6	36,400
15	Built-up felt roofers	0.6	8,400
16	Sheeters/cladders	0.6	8,400
17	Single-ply roofers	0.1	1,400
19	Mastic asphalters	0.2	2,800
20	Painters/decorators	6.6	92,400
21	Glaziers	0.5	7,000
22	Wall/floor tilers	0.8	11,200
23	Floorcoverers	0.5	7,000
24	Ceiling fixers	0.4	5,600
25	Demountable partition erectors	0.4	5,600
26	Demolition operatives	0.8	11,200

Cat No.	Occupation	Overall total employment %	Approximate total number of people
27	Steeplejacks/LC engineers ^a	0.1	1,400
28	Scaffolders	1.7	23,800
29	Steel erectors/riggers	0.2	2,800
30	Structural steel workers	0.2	2,800
31	Plant mechanics	0.7	9,800
32	Electricians	0.8	11,200
33	Crane drivers	0.2	2,800
34	Plant operators	3.1	43,400
35	Road vehicle drivers	1.6	22,400
36	Asphalters	0.7	9,800
37	Bar benders/steel fixers	0.1	1,400
38	Public utilities distribution operatives	1.7	23,800
39	Mason paviors	0.5	7,000
40	Other CE operatives ^b	4.1	57,400
41	Plumbers	2.1	29,400
42	Heating/vent engineers	5.3	74,200
43	Refrigeration/AC engineers ^c	0.5	7,000
44	Thermal insulation engineers	0.6	8,400
45	General operatives	4.8	67,200
46	Maintenance operatives	1.4	19,600
47	Non-construction operatives	0.5	7,000
48	Office supervisors	4.0	56,000
49	Office clerical staff	6.9	96,600
50	Office sales staff	1.2	16,800
51	Management	6.5	91,000
52	Technical functions	2.6	36,400
53	Planning services	0.2	2,800
54	Architectural/design	0.3	4,200
55	Engineering/design	0.6	8,400
56	Surveying	1.4	19,600
Totals		100.0	1,400,000
Potential heritage occupations total		52.1	729,400
Assuming 5% (based on estimated heritage sector turnover) of potential heritage occupations linked to heritage work			36,470

Note: ^a LC = lightning conductor; ^b AC = air-conditioning; ^c CE = civil engineering

Source: CITB Survey of Employment in the Construction Industry, 1998; SCPR Research

As an alternative to this 'top-down' approach, an attempt can be made to estimate the sector by focusing on its constituent parts. Although there are no national listings of individual craftspeople, the breakdown might be as shown in Table 7. The list should in no way be taken as definitive as there are so many qualifiers to take into account:

- very few firms, as already stated, operate exclusively in the repair/restoration market, so the figures are probably best viewed as full-time equivalents (FTEs);
- supply industries, such as manufacturers of lime products, stone quarries, straw-growers, etc., are not taken into account;
- professionals (architects, surveyors, conservation officers, etc.), managers, plant operators, etc., are excluded;
- 'peripheral' or esoteric elements associated with historic buildings, such as millwrights, damp-proof specialists, etc. are not taken into account.

Table 7: Heritage occupational breakdown

Timber framers	1,000
Architectural joinery	5,000
Thatchers	900
Stone slaters	600
Roofers (tiles and slate)	3,000
Earth wallers	40
Brick restoration/repair	3,800
Traditional plasterers (incl. pargetters)	1,200
Stone masons (incl. dry-stone wallers)	3,200
Flintworkers	60
Traditional metalworkers, incl. lead plumbers etc.	800
Glaziers (historic glass)	600
Traditional painters and decorators	1,000
Total	21,200

The exercise in fact highlights the principal conundrum faced by decision-makers. The heritage building 'sector' is not made up of identifiable individuals exclusively dedicated to the task of maintaining and repairing the stock of historic buildings in this country. Rather, the approach has to be reversed. The three real questions are: (1) What is the exact size and shape of the historic built environment? (2) What is the size and scale of the pool of skills required to service this 'sector'? (3) What is the optimum framework for delivering the necessary training, while recognising that this framework may be partially bedded in mainstream construction training and partially in dedicated, specialist 'craft' skill training?

With the above qualifications in mind, estimating the exact size of the 'rural' sector becomes even more problematic. The numbers working in 'pure' rural building crafts are clearly very small – i.e. around 900 thatchers and 2,000 roof slaters and tilers. The Dry-Stone Walling Association estimates that there are about 900 dry-stone wallers working in the UK, with around half of those working on a part-time basis. Very few crafts or firms are, however, limited to rural areas. Thatch, cob, stone slating and pargetting survive in urban areas (e.g. Norwich, Exeter, Horsham, Ipswich, respectively); many conservation firms are able to move seamlessly from humble rural structures to major urban institutional buildings.

On the other hand, many individual craftsmen and small building firms are based in villages and market towns and do most of their work within a 10-mile radius. In rural areas with a high density of old or listed buildings, this would comprise a large proportion, or, where there choose to specialise, the majority of their work.



Self-employment

Results from the Year 2000 Labour Force Survey show that self-employment in the construction industry accounts for 31% of total employment. However, there is considerable variation between different occupations working in the heritage building sector. For example, around 25% of scaffolders and steeplejacks are self-employed, while the figures for bricklayers, carpenters and painters and decorators are 48%, 52% and 62%, respectively.

Demographic trends

The age profile of the unemployed in the construction industry has undergone changes since the early 1990s. Figure 3 shows how the construction labour market has aged, with a considerable increase in the 35–39 age group, some increase in older age groups, but some decline in the 16–19 age group.

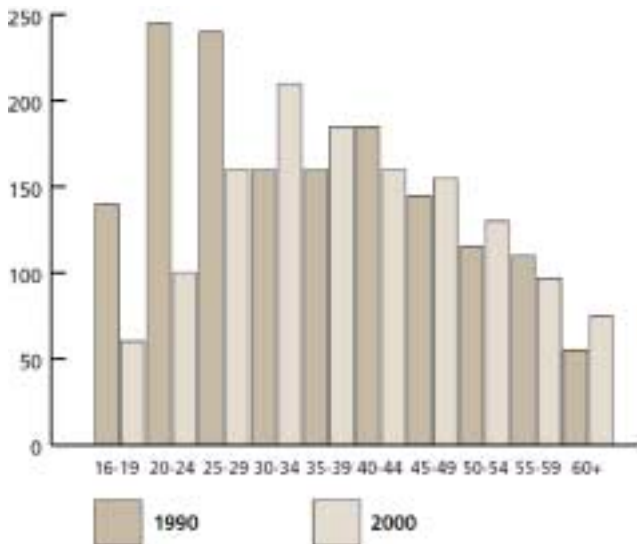


Figure 3: Age profile of all manual workers in construction
Source: Office for National Statistics: Labour Force Survey

Characteristics of the Workforce

There is little room in the heritage building sector for a 'romantic' view of the traditional crafts. The conservation of historic buildings is a keenly competitive market – the arena itself is relatively small and competition to win tenders is therefore fierce. The major restoration firms bid for large projects across the country, thus placing considerable demands on their workers, who are expected to be peripatetic, spending extended periods of time away from home.

© Simon Cook



Renovation, Hugh Town, St Mary's, Isles of Scilly

The workforce is almost exclusively white and male. There is little indication that any significant opening up of the labour market through EU initiatives has taken place in this sector, or is likely to occur in the near future. This lack of mobility on an international scale tends to close off the heritage sector from the cross-border exchange of ideas, techniques, etc., which is unfortunate given that all European countries face similar problems in maintaining their historic built environment. There is also little indication that the heritage sector draws on other sources of international labour, unlike the main construction industry.

- No model profile background exists for someone working in the heritage sector.
- There is no evidence of strong family continuity, as is sometimes stated for the 'craft' sector.
- A good proportion of those in the industry have passed through the conventional City & Guilds or NVQ systems and have moved to the heritage sector after becoming disillusioned with the mainstream construction industry.
- There are perceived advantages of working in the heritage building sector – higher returns in charging for specialist work, more satisfying working conditions, etc.

The heritage sector also increasingly attracts individuals who subscribe to a 'green' agenda and who have become disaffected with the environmental effects of modern construction. On the whole, these are people in their 30s or 40s who wish to make a lifestyle change. Many come from high-pressure jobs, such as teaching, computer programming, finance, etc. Others move over from general building work into repair work, having secured one or two such jobs and established a reputation by word of mouth.



Skills shortages

The underpinning skills and knowledge required for heritage building work are to be found in competent construction workers. Built heritage skills are often, with exceptions, a combination of post-training experience and development.

In its report *Sustaining Our Living Heritage – Skills Training for the Heritage Sector* (2000), the Heritage Lottery Fund (HLF) found skill shortages in the built heritage sector, as summarised in Table 8. They are almost all in craft and technician level skills, and reflect the difficulties that

organisations have had in securing subcontractors of an appropriate quality. The HLF Report found that shortages were particularly acute in highly specialised skills, such as the repair of stained-glass windows, conservation joinery, traditional ironwork, high-level scaffolding, flint knapping and lead work. Among the more widely reported of the more general skill shortages, three stood out: stone-masonry and carving, roofing using asymmetric and traditional materials, and thatching.

Table 8: Skill shortages in the heritage building sector, 1996–99

Occupation	Function	Comment
Bricklayers	Interpretation/use of non-traditional bonds and decorative features; brick repairs and fine pointing; lime mortar analysis; preparation and placing Flint knapping renovation	Widely reported shortages amongst contractors
Joiners	Advanced joinery using traditional methods for conservation and repair Timber frame restoration and fault recognition	Occasional specialist skills Emphasises renovation skills over replacement
Metalworkers	Fault diagnosis in structural metalwork. Historic metalwork repair and replication	As for joiners
Quantity surveyors	Specification and analysis applying conservation methods	Limitation seems to be supply of surveyors with appropriate conservation experience
Roofers	Asymmetric/traditional material skills. Roof lead workers with experience of traditional materials and conservation	Requires mix of unusually developed practical skills and roof conservation knowledge
Scaffolders	Experience of high irregular features	Mainly relevant in relation to church buildings
Stained-glass conservators	Analytical, restoration and craft skills	'There are perhaps ten very busy people we would trust with this work and you step outside them at your peril' (Cathedral Dean)
Stone-masons	Banker masons with experience of masonry repair and hand tool cutting/carving	Widely reported issue
Thatching	Long straw comb thatching Regional thatching traditions	Skills erosion largely the result of loss/shortage of traditional materials

Source: HLF Report, *Sustaining our Living Heritage – Skills Training for the Heritage Sector*, 2000

Heritage Building Crafts

Similar reports of skill shortages have been highlighted in recent years by employers' organisations such as the Construction Confederation, the Civil Engineering Contractors' Association, the House Builders' Federation and CITB. Typically, employers find difficulty in recruiting carpenters, bricklayers, plasterers, plumbers, electricians and roofers.

A survey of conservation officers (Conservation Officers' Questionnaire) produced a similar, general picture of skill shortages, which in some cases conflicts with the findings of the HLF Report (see Figure 4).

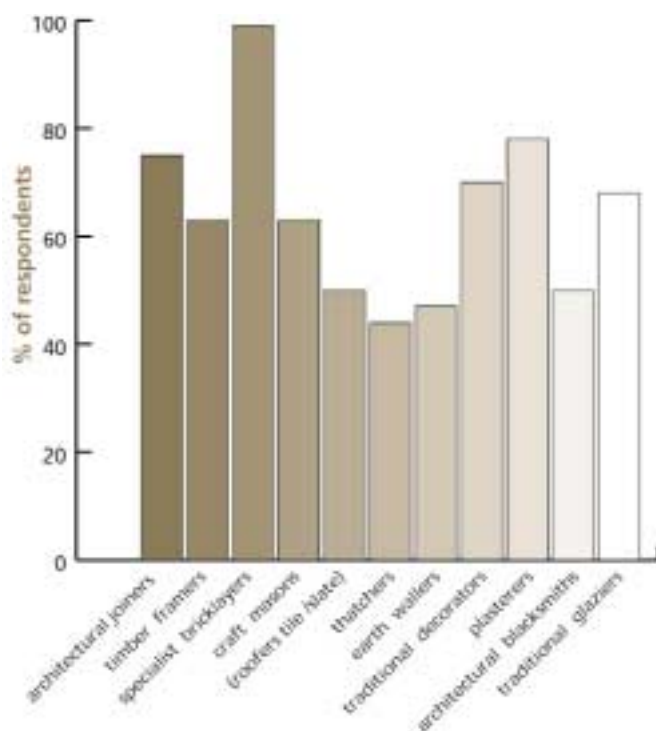


Figure 4: Perceived skills shortages

Source: Conservation Officers' Questionnaire (136 sample)

From a national perspective, the crisis lies in the key 'core' skills required to maintain the built environment. The hierarchy of perceived shortages is informative. A lack of bricklayers competent to deal with historic buildings was emphasised in 99 of the 136 survey returns. Plasterers came next, followed by architectural joiners, traditional decorators and glaziers, and finally architectural blacksmiths. Only in the field of conventional roofing with slates or tiles does there seem to be a more relaxed feeling that supply and demand are more in tune with each other (though see more below).

Area-specific skills, understandably, feature less prominently, but the hierarchy is again significant. Timber framers and craft masons head the list of such skills, followed by earth wallers and, finally, thatchers. The last is perhaps surprising given the HLF findings – but it does seem that in many areas there are enough thatchers to meet the required demand, although one district pointed out that there was a 12–18 months' waiting list (Broadland DC). A shortage of expertise in stone slating was picked out by many conservation officers as a pressing problem causing major concern.

Other skills areas mentioned by specific councils in the survey included the following:

- dry-stone wallers (Chorley BC);
- flint: 'Very few craftsmen who can construct good quality flint walling or carry out good quality repairs to flint walls' (Arun DC);
- leadwork (Chorley BC; Wirral Metropolitan BC);
- plumbers for traditional leadwork (Southend-on-Sea);
- pavers (East Lindsey DC); 'it's almost impossible to find contractors capable of river cobbled surfaces' (Macclesfield BC);
- repair of traditional street surfaces: setts, stone flags (Stockport Metropolitan BC);
- rot specialists (Chorley BC);
- sign writers (East Lindsey DC);
- steeplejacks (Vale Royal BC);
- stone cleaning (Carlisle CC).

Some areas, it should be noted, sounded a more positive note. General comments included the following:

Although there are shortages, the situation has been, and is, improving
(Breckland BC)

County Council information shows we have skills in all areas
(Crewe and Nantwich BC)

Not sure there are any skills shortages
(East Devon DC)

Because of the courses, we now have a good pool of craftsmen/women generally
(Essex CC)



Although these are personal, impressionistic views, the picture of skills shortages probably needs to be refined to take account of the fact that there will be significant pressure points in certain areas of the country, whilst elsewhere the historic buildings sector is responding reasonably effectively to demand.

Some respondents, however, were equally keen to point out that the picture is not just one of assessing skills shortages:

People who are not necessarily best qualified to do a job are employed for reasons other than skills shortage – i.e. often builders will employ their brickies on stone-wall building because this is the quickest and cheapest option for them.

The effects of skills shortages on specialist contractors are to:

- increase wage costs
- stifle productivity growth, increase wastage and avoidable costs
- limit workload;
- severely restrict business development;
- lose valued customers;
- increase recruitment costs;
- cause difficulty in finding quality labour and new recruits.

The effects of skills shortages on clients are:

- delays in commencing design, construction and project completion;
- inflated tender costs and project cost overruns;
- a poor service, industry image and reputation.

Table 9: Employees' skills gaps

Occupation	Function	Comment
General building	Multi-skilled with experience of basic building conservation, masonry repair	Inadequate exposure in initial training
Master Crafts person	Crafts people with training and coaching ability	Lack of qualification focus and/or motivation of skilled crafts people

Source: HLF Report, *Sustaining Our Living Heritage – Skills Training for the Heritage Sector, 2000*



Traditional materials, contemporary design

Skills gaps

The HLF Report found that skills gaps among existing personnel were perceived as being smaller in scale and usually related to professional as opposed to craft-level skills. Those that were found at craft level are described in Table 9.

Skills gaps exist in all construction occupations, although the problem is not perceived by industry as being as serious or pressing as that of skills shortages. In the case of experienced operatives with a traditional apprenticeship background the skills gaps identified include:



© Weald & Downland Open Air Museum

Volunteers learn oak-frame techniques

- health and safety refresher training
- developing multi-skills, as a result of workers having to cover for skills shortages
- new product and component knowledge: e.g. the use of special adhesives in the wall and floor tiling sector

The following list indicates the main causes of shortages and gaps, even in companies where training is a high priority:

- low level of new recruits entering specialist occupations in recent years
- an ageing and retiring workforce
- a steady rise in construction output
- the increased tendency for pupils to stay in education until the age of 18 and the subsequent lack of available 16-year olds
- a low and decreasing level of unemployment in the UK and increasing competition for labour

- an outflow of labour during times of recession from the construction industry to other – often more attractive – industries
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- a low and decreasing level of unemployment in the UK and increasing competition for labour
- an outflow of labour during times of recession from the construction industry to other – often more attractive – industries
- labour-only subcontractors not providing training and employers regarding training as a cost rather than an investment
- cyclical industry turnover subject to severe fluctuations and redundancy
- low profit margins, low levels of investment in human capital and short-term planning horizons
- poor industry image and branding
- lack of respect for the workforce
- relatively low pay for demanding work
- relatively poor terms and conditions of employment, including pensions
- changes in legislation (e.g. Construction Design and Management Regulations. 1994 and Health & Safety Regs. 1996)
- industry pressure for competent workers forcing employers to register workers on the Construction Skills Certification Scheme (CSCS) or other approved scheme and to train and assess employees to NVQ standards.
- increased competition from other industries for talented young people and graduates
- labour market sliding back into self-employment because of a lack of clarity and enforcement of the Construction Industry Scheme.

Total construction employment and additional requirement

The CITB produces an annual forecast of average additional requirement for construction occupations. Table 10 provides the latest forecast for the period 2002–6, as well as the number of first-year starters in 2000/1. The table shows that in numerical terms the biggest annual requirements are expected to be for many of the trades (in colour) associated with the building heritage sector.

Table 10 also shows that there is a widespread shortage of first-year starters, with the exception of technicians, bricklayers, carpenters and joiners, where starters exceed the replacement rate. The retention rate of trainees may be low (around 60% in some sectors)

thus potentially leaving a net shortfall even in these occupations (but see the discussion on NVQs in the section on training below). One of the worst affected sectors is the roofing industry. The majority of roofers are being trained informally so there is the danger that bad as well as good practices are being perpetuated. It is also likely that the shortfall in labour replacement is being made up either by unskilled labourers or by adult workers who drift into the trade: both categories pick up skills and practices on the job.

Table 10: Total construction employment and additional requirement by occupation

Occupation	Employment 2002	Employment 2006	Average annual requirement 2002	Number of first-year starters 2000/1
Managers	141,600	149,800	7,700	–
Clerical	121,200	125,800	6,400	–
Professionals	41,000	44,000	2,200	–
Technicians	40,800	44,500	2,300	6,420
Carpenters and joiners	212,300	217,800	11,200	15,440
Bricklayers	117,800	118,100	6,100	8,750
Painters	88,100	89,400	4,700	4,590
Plasterers	37,000	34,000	1,800	960
Roofers	46,200	47,200	2,500	390
Floorers	21,000	21,500	1,100	310
Glaziers	8,100	8,300	200	230
Other SB operatives ^a	39,200	40,400	2,100	280
Scaffolders	18,000	18,500	1,000	720
Plant operatives	41,200	42,100	2,200	170
Plant mechanics/fitters	22,000	22,600	1,100	130
Steel erectors/structural	13,800	14,100	900	20
Other CE operatives ^b	90,600	93,100	4,800	80
General operatives	72,600	70,300	3,600	1,720
Maintenance workers	23,300	23,600	1,000	15
Electricians	138,500	145,000	7,400	5
Plumbers	111,100	114,500	6,000	–
Non-construction operatives	29,600	30,400	–	–
Total	1,475,000	1,515,000	76,300	40,225

Note: ^a SB = Specialist building; ^b CE = Civil engineering Source: CITB Employment Model. Business Strategies Limited (BSL)

Skills Challenges

The HLF Report found evidence from employers confirming fears that the built heritage sector is suffering from what amounts to a skills crisis. Results of the research showed that the reasons are complex and not easy to resolve; they go beyond shortfalls in the supply of skilled practitioners. Furthermore, it was found that the problems are rooted in issues to do with contracting processes, weak specification and awareness among owners and professionals, cost pressures and the uncertain supply of appropriate materials. Some employers have shown that much can be done by individual organisations to adjust to such problems. However, for small employers with irregular skills needs or little internal training capability, this is much more difficult.

The report also concluded that many of the skills problems in the sector are self-inflicted because of weak management capacity, luke-warm employer commitment to in-service training and ineffective mediation in a very complex labour market. The researchers were concerned that responses that look at the skills imbalances will fail to address some of these more fundamental sector-level

rigidities and will therefore have very little impact. The report found the following underlying problems in the skills supply and demand imbalance:

- constraints on skill supply
- ineffective utilisation of available labour
- weak management processes
- ineffective mediation processes within the heritage labour market.

The researchers concluded:

Put together, we believe these add up to a sector failure in developing and sustaining specialist skills ... and a serious capacity constraint to the preservation and promotion of heritage in the UK.

A common theme in the report was the need to develop a clearer understanding of heritage skills and their application among decision-makers – varying from senior managers, trustees and councillors to individual owners of properties. There was some evidence that skill use in the sector is likely to be held back as much by lack of demand as by a deficiency in supply.

Processes, Materials and Skills



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Demonstrating lime plasterwork



Introduction

The preservation of historic buildings is really no longer a living tradition in what might be called vernacular hands, or in a vernacular context. Almost every shred of the economic, social and practical context in which vernacular buildings were erected has disappeared and many of the skills involved in their maintenance today are revivals, close approximations or indeed entirely new interpretations of the practices of the past. Even with thatching – often claimed to be the only living vernacular building tradition left – the production and processing of thatching materials and, increasingly, their fixing would be as unfamiliar to a fifteenth-century thatcher as modern timber framing would be to a fifteenth-century carpenter.

Construction work today places an emphasis on measurement, alignment, fixing and fitting – essentially precision tasks that require a workforce trained to identifiable, measurable standards. The skills that have to be brought to bear to ensure sensitive repairs or alterations are not, by contrast, a static assemblage of recognised text-book techniques and abilities; instead, they demand an individual sensitivity and willingness to participate in a constantly evolving, learning environment.

Deconstructional as much as constructional skills are needed in the heritage building sector because historic buildings need to be carefully 'unpicked'. This involves removing inappropriate claddings, disassembling components, historic fixtures and fittings, storing them for re-use, and then reintegrating them by placing and blending them in with the renewed structure. 'Unpick' in this context is a clear departure from the normal 'demolition' procedures adopted by contractors when clearing a site.

The Latham and Egan reports of 1994 and 1998 have placed an emphasis on the need for value engineering, fast-track construction and quality assurance. While these may be essential for new-build projects, they entirely overlook the special needs of the repair and maintenance market in general and of the built heritage sector in particular.

The process of repairing an historic building nevertheless has to follow new-build procedures in terms of the legislative framework (planning permissions, building regulations, health and safety legislation, contract law, etc.) whilst at the same time encompassing some idiosyncratic processes peculiar to heritage buildings. These may include applying for special

permission when a building is listed, seeking out specialist advice from conservation professionals, costing a project where there are many variables at the outset which cannot be adequately priced, obtaining an archaeological assessment of the building prior to or while works are carried out, sourcing and securing the specialist skills required to carry out the repairs, sourcing often rare or scarce specialist materials and, finally, having to pay VAT on repair work – an extraordinary anomaly given that new-build work is exempt.

Historic buildings are invariably diverse structures, essentially composites of materials illustrating an accretion of skills over time. The organic nature of such buildings needs to be understood so that repairs do not erase important clues relating to phasing and development.

Unlike present-day buildings, which (despite a proliferation of design guides) often pay little respect to the ecological context of which they should or could form a part, vernacular buildings require a different understanding of the *genius loci* – there therefore has to be a much closer dovetailing between the sourcing and application of materials, because the materials are not necessarily controlled (or controllable) through the British Standards system.

The availability of materials is therefore intimately linked with the skills training agenda. There is very little point in addressing the need for skills training in areas such as stone slating or wrought-iron work if the basic component – the material to which such skills relate – is not available.

The *Conservation Officers' Questionnaire* (COQ) helps to provide an overall view of where material shortages (or absences) compound the problem of skills training



(see Figure 5). Stone was considered to be by far the most difficult material to source, both for walling and roofing. Thatching materials, lime-based products, cast- and wrought-iron and glass were roughly on a par with each other in terms of relative scarcity. Timber and bricks were seen as less difficult to obtain. The requirement for clay and earth tends to be very localised and was, in the overall picture, not seen as a major problem for sourcing.

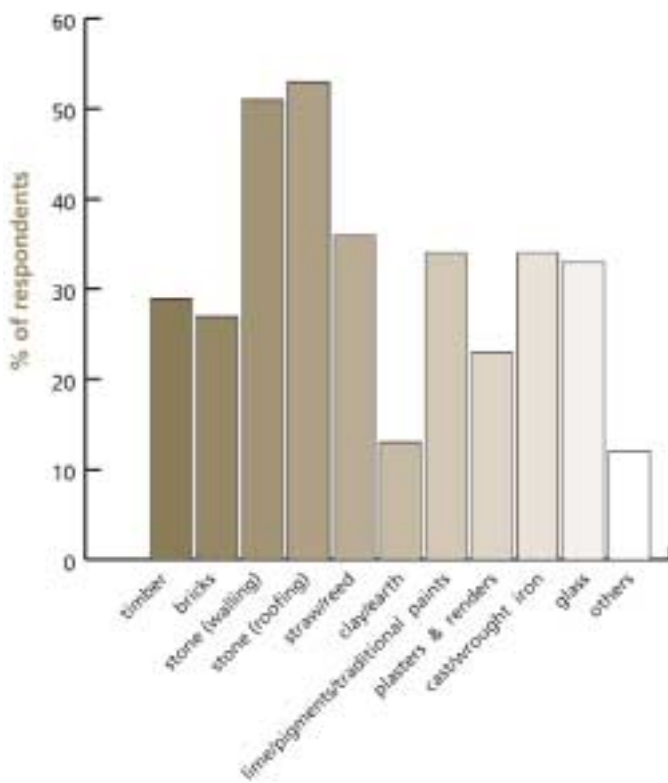


Figure 5: Perceived material shortages
Source: Conservation Officers' Questionnaire (117 sample)

The regional significance of material shortages is dealt with in more detail later on; at this stage, the tendency for a 'mirror' picture to exist with the skills shortages graph shown above in the section 'Supply Characteristics and the Labour Market' (Figure 4) should be noted. A shortage of bricklayers is more of a problem than the availability of bricks; a shortage of plasterers more of a problem than the availability of plasters and renders. On the other hand, thatch is less available than thatchers, stone less than stonemasons. Only in the timber area does there appear to be less of a problem in sourcing both material and craftsmen, although it should be stressed that this is not

to imply that the situation is by any means ideal. Rather, the analysis indicates that it is the total picture and the relative imbalances between craftsmen and material sources that add complication to the picture.

Where material availability was not necessarily an issue, cost might prevent the use of the correct vernacular materials. Outside the scope of this report, relative costs between, say, hand-made and mass-produced bricks must be borne in mind when assessing the reasons behind certain skills shortages.

The materials used in vernacular buildings range from very 'soft' – organic plant remains – to the very hard – granite etc. (see Figure 6). The nature of the material to some extent determines the type of skills that need to be applied. The 'soft' materials, by their very nature, often require a great deal of prior preparation either off-site (straw growing/processing, timber cutting, jointing, etc.) or on-site (e.g. mixing daubs, treading cob, watering and yealming straw); materials have to be shaped (timber mouldings, moulded plasterwork, etc.) or worked in to pre-existing structures and textures (in situ timber repairs, blending in 'new' roofing). At the other end of the scale the 'hard' materials require a different approach – there is often a greater separation between the manufacturing process (which in the case of ores, lime, brick clays, etc. involves converting the raw material using fire) and their application (e.g. between brickmaker and bricklayer). The on-site skills associated with these 'hard' materials have more to do with positioning and alignment (brick courses), measurement and fitting (metal fixings).

England is remarkable for its enormous variety of local building materials and styles. A complex underlying geology can be divided into two distinct regions – 'hill' and 'vale'. The former extends to most of north and north-west England and the south-west peninsula, with a limestone belt running south-west from Yorkshire through to Dorset, and in the south and east sections of chalk downland. Over most of England outside the Midland Plain, East Anglia and the Southern Counties, stone is the principal

walling material and stone and slate the principal roofing material.

Timber frames, wattle and daub and thatch are characteristic of the clay vales with pockets of clay walling – ‘cob’ and ‘clinch’ – in Devon, Dorset and East Anglia. Flint occurs widely in chalk districts.

	Natural	Fired	
<i>Above ground</i>	Plants Timber		<i>Soft</i>
<i>Surface/ below ground</i>	Earth Stone Ores	Clay Lime	<i>Hard</i>

Figure 6: Material sources

The distinction itself between hard and soft skills should not, of course, be a rigid one. The most important point about the distinction is that most vernacular buildings include both ‘soft’ and ‘hard’ materials, and therefore require a multiplicity of skills which marry the ‘soft’ skills of mixing, cutting, jointing, shaping and adapting with the ‘hard’ skills of positioning and alignment, measurement and fitting. Today, because hard materials are used so extensively in the construction industry, the demand is for the second grouping of skills rather than the first.

The focus on ‘vernacular’ building inevitably draws attention away from the ‘grey’ area of old but unprotected buildings. Not all buildings from the pre-1919 era are solidly constructed. Jerry-building has been a feature of every era. Yet there are still thousands of essentially unprotected buildings that exhibit some or all of the following characteristics:

- well-executed masonry (stone or brick) using lime or weak cement mortars where appropriate
- restrained dressings (stone, brick and timber) for window and door surrounds
- moulded timber architraves, skirting, balustrades, sashes and casements (to take plain glazing) either hand- or, more likely, machine-made
- stud and lath walling, trussed rafter roofs, planking and timber staircases
- lime-plastered interior walls, possibly enriched by simple cornices, ceiling roses, etc.

- breathing paints and simple wallpapers
- factory forge-produced metalwork for rainwater goods, door ironmongery and simple railings
- tile or slate roofs often incorporating simple lead flashings.

The special qualities of such buildings are too often bypassed when repairs and maintenance are carried out. Similarly, a further category of conservation requirement has to call on specialist skills that require a ‘national’ perspective. These skills straddle historic specialisms such as stained-glass restoration as well as emerging new conservation requirements relating to industrial technologies and processes linked to preserved innovative structures built with materials such as concrete, asbestos and corrugated iron. The particular needs of the ‘grey area’ and these specialist industrial areas reinforce an important distinction already noted in the previous section, and which can be restated here as a difference between:

- 1 Core skills: these constitute the nationally relevant core skills required to ensure that adequate levels of repair and refurbishment are applied to the total stock of historic buildings. A survey carried out in the West Midlands Region in September 2001 confirmed that the perceived need was for training in ‘the basics’ – i.e. mortar preparation, pointing, brickwork and rendering.’
- 2 Regional craft skills: these comprise area-specific skills such as earth walling, stone roofing, thatching, historic timber framing. Because they draw their inspiration from regional cultural traditions, they demand an appropriately tailored regional approach to training.
- 3 National ‘specialist’ skills: these comprise skills that are neither ‘core’ skills or area-specific, but because of the material (and associated design considerations) involved, they require a coordinated holistic approach for England (and in many cases beyond), with interdisciplinary engineering skills being brought to bear on developing and applying solutions to innovative new buildings.

The following investigation into the materials and skills required to maintain and develop the surviving stock of historic buildings will build on these distinctions.

Timber

Timber occupations fall into two groups: framing and joinery. Framing involves a good deal of yard-based/on-site activity, whilst joiners tend to be workshop-based and therefore more detached from the building process itself.

© Terry Heathcote



Constructing an oak frame, Holmsley

Timber framing

Examples of timber framing can be found in most areas of England, but with an absence in the south-west (where mass-walling and stone predominate) and in the stone areas of the north-east from East Anglia up to Northumberland, though with isolated pockets in central Yorkshire and straddling Nottinghamshire/Lincolnshire.

The timber-frame system creates an entirely prefabricated building. Once erected, framed buildings have to be in-filled – in the past a diversity of materials including wattle and daub, brick and stone have been used, depending on age of the structure and regional traditions. The skills of the timber framer must therefore include a knowledge of how these different walling materials work.

Unlike brick and stone building, timber framing was largely abandoned in the eighteenth century, especially for domestic buildings. Timber frames clad in tarred weatherboarding were still used for agricultural buildings in areas such as the Chilterns well into the nineteenth century, and modest structures such as squatters' cottages continued to be built with timber frames. But few firms now at the forefront of timber-frame repairs and restoration can claim a long pedigree: the processes, knowledge and skills of timber framing had effectively to be rediscovered in the last century.

Timber framing is now recognised as a discipline in its own right in the conservation sector. The Carpenters' Fellowship has about 1,000 members; its manifesto is 'to increase communication, training and sharing of knowledge amongst those interested in historic and new timber-framed structures'. The Fellowship was formed at Avoncroft Museum of Historic Buildings in August 2000, and is described as 'probably the





Oak frame prepared off site for construction

first jamboree of timber framers ever held in the UK'. It organises an annual weekend outdoor conference in August or September. Membership costs £30, and subscribers receive a copy of the annually updated *Members' Network*, which lists details of members and their areas of work or interest. There is also a newsletter, and subscribers receive issues of the independent journal for timber framers, *The Mortice and Tenon*. Occasional training and education days are offered free or at minimal cost. Apart from the Fellowship, the English Heritage master classes in timber-frame repairs, run at The Weald and Downland Museum, are perceived as being the best for receiving training in the heritage sector.

Timber framing for new-build is also experiencing something of a comeback, and restoration firms are turning out new framed buildings. These are very popular for garages and outbuildings. Programmes such as

Channel 4's *Grand Designs* have done much to publicise the attractions of timber framing as well as focusing on the advantages of employing traditional materials and practices. Even so, the approach to repairing timber-framed buildings still tends to be very variable: many are too willing to replace rather than repair.

Timber roofs

Cruck buildings can be found in the western part of England. In the south-west they are associated with mass walling, whereas towards the Midlands, fully-framed cruck buildings become the norm. Many buildings with mass- or brick walling also require the skills of a carpenter with a knowledge of framing to care for the roofs.

The respondent to the COQ survey for Darlington pointed to a shortage of skills 'for repairing existing timber roof structures', indicating that even in predominantly non timber-framed areas, masonry or earth buildings will still have significant timber components. Pole rafter roofs, common in, e.g., Dorset, also require sympathetic repair techniques. Often dismissed as being structurally unsound, they tend to be entirely removed rather than strengthened or consolidated.

Secondary timber elements

The timber-frame structure consists of all the secondary elements of panels, door and window openings, complete with mullions, etc. Timber framing demands a particularly acute ability to think in three dimensions and the framer therefore has to call on a wide range of skills (see Box 1).

The revival of timber framing has been helped by the long-standing environmental protection given to native woodlands. Sourcing timber has not therefore been considered a problem by many local authority conservation specialists, although Leicester CC remarked that it 'depends on sizes required – large oak timber may prove difficult' and North Wiltshire DC and South Somerset DC both pointed out the problems of sourcing elm. Suffolk CC stressed the difficulties of sourcing good quality softwood. New Forest DC and Macclesfield BC both referred more to issues of overall quality than to general availability, while Walsall Metropolitan BC saw the problem as being more 'due to cost of decent timber and clients' willingness to pay'.

Box 1 Skills checklist for timber framing

Planning

- understanding of engineering of timber-framed buildings, loads, assembly, etc.
- knowledge of historical development of timber-framed buildings
- knowledge of properties of timber, including knowledge of various species, strengths, decay, etc.
- understanding drawings/specifications
- estimating quantities, pricing, etc.
- knowledge of timber framing glossary
- reading timber marks and markings
- knowledge of legislation

Sourcing

- sourcing of timber, coppice

Preparation

- conversion of timber and coppice, including splitting, sawing, etc.
- marking out, cutting and assembling complicated joints
- moulding (planes, etc.)

Execution

- assembly
- maintenance of tools
- competence in the use of lifting gear, including hoists, etc.
- timber finishes, patina, sensitivity to painted timber, etc.
- integration of frames with other materials (foundations, plinths, infill, roofing, adjacent buildings)

Repair and maintenance

Repairing timber-framed buildings requires many additional skills to those learnt under the general carpentry and joinery NVQs

- knowledge of repair philosophies and techniques
- knowledge of alternative fixing/repair methods using stainless steel, resins, etc..
- sensitivity towards shaping and piecing-in new timbers, including knowledge of timber decay, etc.

However, despite the potential richness of native sources of timber, there was some indication that not all supplies for heritage work are sourced in this country:

The last oak I acquired was French.
(Melton BC)

When timber is needed it has to come from a distance. Although there are timber merchants in neighbouring counties it is usually Solopark or France. Ashpoles have to be sourced, as do laths for plasterwork.
(Rutland CC)

Joinery

Whilst the timber-framing market appears to be reasonably well served (with a number of firms switching comfortably between new build and repair), the joinery market is poorly defined; consequently, clients are left with few pointers (other than local authority 'recommendations') for identifying joiners with the requisite skills to repair historic doors, windows and internal features. Fareham and Southend-on-Sea BCs, amongst others, reported difficulties in finding joiners to make replacement windows or do window repairs, while Stockport Metropolitan BC stated problems with 'repair to existing windows/doors'. The greatest difficulty seems to be in sourcing competent carpenters who could execute works on-site to the necessary standard

However, not all local authorities were equally gloomy. East Staffordshire was unequivocal in saying that 'there are excellent joiners in this region'. Regions with strong traditions in cabinet- and furniture-making have benefited from the better facilities and courses initially made available to serve these industries.



Box 2 Skills checklist for joinery

Planning

- understanding the relationship between joinery members and construction context – e.g. timber porches affixed to stonework
- methods of protecting exposed joinery
- knowledge of development of joinery techniques and methods
- knowledge of properties of timber, including knowledge of wide range of species (including exotic), grading, strengths, decay, etc.
- understanding drawings/specs
- estimating quantities, prices, etc.
- knowledge of joinery glossary
- understanding relationship between furniture-making and building joinery
- knowledge of legislation

Sourcing

- sourcing of joinery timber, particularly exotic species

Preparation

- conversion of joinery inc. sawing, planning, moulding, fretting etc
- marking out, cutting and assembling complicated joints

Execution

- assembly
- maintenance of tools
- timber finishes, patina, painted timber, marquetry. etc.
- integration of joinery-made items with other materials
- carving skills

Repair and maintenance

- knowledge of repair philosophies and techniques
- knowledge of alternative fixing/repair methods using stainless steel, resins etc.
- sensitivity towards shaping and piecing-in new timber inc. knowledge of timber decay etc.
- mending/repairing porches, floorboarding, joists, staircases, historic windows etc.

Plants

Plant material is found on roofs in the shape of straw, reed, heather thatch, etc.

© Pauline Rook



Barn Farm renovation, Luppitt, Blackdown Hills

Thatching

Thatch – the covering of a roof with plant stems – is one of the most ancient of roof coverings, and, to many, the most characteristic of rural, vernacular materials. Thatch is an organic material, and therefore truly sustainable. Approximately 24,000 listed buildings are thatched, a number that is believed to be between 40 and 50% of all thatched buildings.

The status of thatch has fluctuated according to social changes and the availability of alternatives. There has been an almost total reversal in thinking from the late nineteenth century, when thatch was generally condemned as being poor man's material, to the present day, where it is regarded as a high status, expensive roof covering.

Most of the surviving thatched buildings are confined to the southern half of England, and are largely located in rural areas. In the past, three principal regional traditions of thatching could be identified: combed wheat reed in the south-west, long straw in the Midlands and southern counties, and water reed in eastern areas – principally East Anglia – with pockets in other wetland areas. Generally speaking, different skills are required for thatching in long straw, combed wheat reed or water reed, although some thatchers will be competent in all

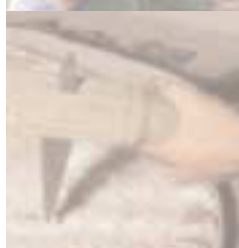
three areas. In addition, specialist skills are required for other more esoteric materials used in thatching such as heather and turf, traditions now principally confined to northern England. However, it should also be stressed that there is a vulnerable straw thatching tradition in North-East England which tends to get overlooked.

The three main traditions have become diluted over time – combed wheat reed has pushed eastwards into long straw areas, while water reed has rampaged across the country, even into former combed wheat reed strongholds. 'Hybrid' straw thatches have emerged in the Home Counties.

There is a critical problem in sourcing materials. Melton BC reported a shortage of thatching materials in general. However, straw in particular is apparently particularly hard to get hold of – both Aylesbury Vale DC and New Forest DC commented on the difficulties of sourcing the material, while East Dorset and Test Valley DC say that shortages are mostly seasonal. In the south-west, according to North Dorset DC and South Somerset DC, there are also problems sourcing combed wheat reed.

Some thatchers believe that, given the problems of sourcing suitable straw, learning the skills associated with straw techniques – particularly long straw – is a wasted investment. One of the principal reasons for the easy spread of water reed into all parts of 'thatched' England is the relative abundance of imported supplies, mainly from Eastern or Southern Europe. But, as Rutland CC commented, 'the local material is straw and every effort is made to have straw thatch. This, however, is difficult when there is a two-year waiting list for the material.'

One council in the Welsh Marches bemoaned, rather surprisingly, the lack of sedge to use on 'traditional' water reed roofs in the region. As neither water reed nor sedge is found in the area, it is worth pointing out that misguided



© Patrick Sutherland



Cut thatching reeds, Norfolk Broads

(though well-intentioned) conservation guidance has played its part in undermining the skills base.

Heather thatching in England is a vulnerable technique – most surviving examples are ‘revivals’ rather than part of a continuous tradition of thatching. Other esoteric thatching materials, such as flax and barrel shavings, require special knowledge and expertise which can probably only be passed from thatcher to apprentice.

The report on the greenwood crafts elsewhere in this book notes growing shortages of spars, resulting in higher prices and the importation of increasingly large quantities of ‘gads’ from Eastern Europe. In the hazel-growing districts of southern England thatchers either make their own spars or buy them from specialist makers, having, in some cases, supplied them with hazel rods.

Given the acute problems in sourcing materials, it is worth emphasising the position relative to thatchers. The general perception of the thatching industry is that it is experiencing a crisis in terms of recruitment and skills. In some areas, where dense numbers of thatched buildings survive, this certainly does appear to be the case. Rutland CC reported a short supply of thatchers; the few that exist are in continual demand and there is often a two-year waiting list. In other areas, the picture is more complex: Chester CC commented that although there is a reasonable supply of thatchers, too few of them are willing to work with straw, while Herefordshire CC remarked that there are enough of them, but many are very reluctant to travel.

The apparent belief that the thatching industry requires no more than an injection of new blood is far off the mark. As the graph of skills shortages given in the previous section (Figure 4) suggested, thatchers are reasonably numerous and they are also relatively well skilled in the narrow band of ‘accepted’ thatching

techniques of combed wheat reed and water reed, although fewer are bothering to learn long-straw thatching. The long-term viability of the Knuston Hall Training Centre in Northamptonshire is a real cause for concern, but the problems with this sector lie also in the difficulties involved in securing supplies of suitable thatching materials and in negotiating the minefield of thatching politics.

Box 3 Skills checklist for thatching

Planning

- understanding of organic plant remains – properties, structure, longevity
- knowledge of historical development of thatch and thatching techniques
- understanding drawings/specs
- estimating roof areas, prices
- knowledge of terms
- knowledge of legislation
- knowledge of regional styles and techniques

Sourcing

- acquisition or growing, harvesting, processing and storage of material
- sourcing of spars, tarred twine, timber for eaves and verges

Preparation

- repairs to roof timberwork, possible use of underlay
- on- and off-site techniques (yealming, combing etc.)
- preparation of spars

Execution

- application of thatch – laying, fixings, ridges, verges, hips, eaves, valleys
- finishes – shearing, netting, flashings etc.

Repair and maintenance

- knowledge of repair philosophies – patching, spar coating, correct materials
- knowledge of potential survival of historic basecoats, etc.
- knowledge of fixing techniques

Earth

Earth forms the basic ingredient in the following processes: cob or wichert; earth blocks or rammed earth; and daub in-fill.

© Pauline Reek



Cob-walled building, Pamos Farm, Devon

Cob

Cob is a splendid, ecological material with excellent insulation properties. The largest concentration of cob buildings in England extends across the south-western counties from Cornwall to Hampshire; within this area the greatest number are in Devon, where many medieval mass-walled buildings survive. The colour of the material is that of the local subsoil, varying from a rich red-brown in Devon to a creamy white in Wiltshire and Hampshire.

Outside the south-west, cob buildings were once much more extensive, but now survive only in smallish pockets. The County Board of Agriculture Reports of the late eighteenth century testify to their widespread distribution throughout the Midland counties in particular. In south Buckinghamshire, particularly in Haddenham and Long Crendon, there is an isolated concentration of buildings made of a local clay with a high chalk content called wichert, or 'white earth'. This was used for buildings of all kinds up to the nineteenth century. An emerging concern here is the use of cob blocks made in and exported from Devon for repairwork.

Perhaps at the opposite extreme is the material of the east Midlands – called 'mud' locally. It has the rich, dark golden colour of Cotswold stone; most surviving mud buildings date from the eighteenth and nineteenth

centuries. Because there is good building stone available, only the lesser buildings are actually made of mud and most of these have been altered with brickwork, or are cemented over.

In the Solway Plain of Cumbria, more than 100 farmhouses built of clay daub-ins survive, made of shallow courses of clay separated by layers of straw.

Clay lump

Clay lump buildings are very common in central and south Norfolk; they exist but are less common in south Cambridgeshire, west Suffolk and north-west Essex; and there are fewer still in Bedfordshire and eastern Hertfordshire. Most of the farm buildings are tarred; cottages are lime-plastered.

Pise

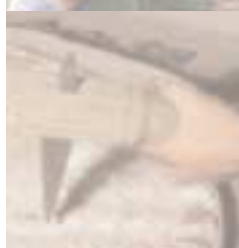
It is impossible to indicate the regional distribution of pise. The process, imported from France largely through agricultural manuals from the late eighteenth century, is most likely to have been used by socially advanced landlords in southern England. True pise (as opposed to shuttered cob) is exceedingly rare.

Daub

In areas where earth structures were not found, a principal problem can be sourcing suitable earth. In-fill systems to timber-frame buildings vary enormously across the country and the consolidation and repair of daub panels requires a great deal of skill and expertise. Too often, historic in-fill fabric is sacrificed unnecessarily in the desire to strip back to bare frames.

Earth building

Sourcing suitable materials for earth building can present problems. East Kennet DC commented on the difficulty of accessing suitable chalk cob, while



Rutland CC commented that mud 'can be locally swept up but there is a tendency for clay to be used rather than mud. This is not satisfactory and a good local source would be helpful.'

Despite substantial losses of traditional earth structures, the considerable merits of the earth-building processes have led to a number of attempts to revive them. Architects such as Ernest Gimson and Clough Williams-Ellis stimulated a brief revival in the early part of the twentieth century. In Leicestershire, the Manpower Service Schemes of the 1980s were harnessed to help rebuild crumbling cob walls, while in Devon, Alfie Howard passed on his cob-building skills to a number of enthusiastic students.

Because of its sound ecological roots, earth building is experiencing an enthusiastic, though somewhat restricted, revival in some parts of the country. Planning controls are being relaxed, and Kevin McCabe is (at the time of writing) building an ambitious house of cob in Devon following on from other successes during the 1990s. Aylesbury Vale DC has been involved in promoting wichert repairs by teaming up with Haddenham Parish Council. But this revival is not sufficient to cater for the numbers of crumbling earth buildings, boundary walls, etc.

Cob is essentially a simple, natural material prepared using craft techniques and knowledge which in the past has been within the remit of an agricultural workforce, and not therefore requiring detailed structural training, but more importantly entailing a 'feel' for the material combined with a practical approach and experience. Few trainees, even if from a rural background, will have acquired the necessary skills that provided the right kind of practical experience. The agricultural labourer in the nineteenth century required a physique accustomed to manual labour (shovelling dung, loading carts, etc.), a strong familiarity with the properties of local soils in all weathers through tillage, sowing, weeding, etc., and an ability to stack crops and build ricks (and therefore innately understand the potential instability of loadings) combined with a dexterity for shifting and positioning loads. The skills required for earth building today therefore need to compensate for the lack of experiential context. Research has demonstrated that mechanical aids can speed up what tends to be a slow process, making labour expensive. Compactors, combined with easily reusable shuttering, particularly aids the rammed earth process.

But as in all cases, the skills required to *repair* cob are not necessarily the same as those required to *build* in the material – these too have to be developed (see Box 4).

Box 4 Skills checklist for earth construction

Planning

- understanding of engineering of cob buildings, loads, assembly, racking, etc.
- knowledge of history of mass walling
- understanding drawings/specifications
- knowledge of terms
- ability for estimating/pricing
- knowledge of legislation

Sourcing

- knowledge of properties of earth, aggregates, straw shuttering and equipment and where to source it
- extraction skills – mechanical digger

Preparation

- making/building shuttering, clay lump moulds
- preparation of stone or other plinths and foundations

Execution

- knowledge of building in courses or 'lifts'; experience of drying times required
- skills to maintain tools correctly
- competence in the use of shuttering/scaffolding
- ability to form openings
- building-in of timberwork for roofs, joists, etc.
- finishes – lime washes and plasters
- integration of cob with other materials (foundations, plinths, in-fill, roofing, adjacent buildings)

Repair and maintenance

- knowledge of repair philosophies
- sensitivity towards remixing/reconstituting old material
- stitching new cob to old
- fabricating blocks to matching specification

Fired Clay

Fired clay products fall into three categories: walling materials (bricks), roofing materials (tiles) and decorative ware such as floor tiles and terracotta work.

© Anne-Katrin Purkis



Pitsham brickworks, traditional method brickmakers

Bricks

Generally, the areas of brick walling complement those of stone. The great age for brick in the countryside was undoubtedly the eighteenth century, when it also increasingly replaced timber framing. England therefore tends to divide into two brick areas, separated by the limestone belt running south-west to north-east across the country. Up to the end of the nineteenth century, and in most rural areas, the colour and texture of bricks usually reflected the local clays and gave buildings a distinct regional character. In the north-west, bricks were varying shades of red, from the subtle reddy-brown hues of the Midlands to the strident cherry reds of the Lancashire shales. In the south-east, there were two main colour palettes, the reds and the greys. The greys varied from russet red to pale yellow and true grey bricks were rare; by the later eighteenth century the standard colour of brick in and around London was a dull beige/yellow.

Bricks constitute the earliest example of a building material manufactured from natural ingredients rather than wrought from them. They do not tend to feature widely in the rural building stock until the sixteenth century, by the end of which many yeomen were

improving their farmhouses by adding brick chimneys, or were busy replacing wattle and daub with brick noggings. The twentieth century witnessed a cataclysmic period of brickwork closures. In the Chilterns, three working brickyards (Dunton Brothers, Matthews and Bovingdon Brickworks) are the sole survivors of more than 100 operating in the second half of the nineteenth century. In other areas, continuity is even more tenuous. The consequent loss of local distinctiveness in brickwork cannot be overestimated.

However, the relative ease with which bricks can manageably be transported has also meant that increasingly there are no hard and fast boundaries. There is nevertheless a general problem in obtaining good-quality brick of the appropriate size, colour and texture; even where brickworks do survive, there is often a long waiting list for bricks of quality. The second-hand market can meet some of this shortfall, although the underlying stimuli to such sources – the demolition of a pre-existing brick building – calls into question the effectiveness of strategies to protect the historic built environment.

Projects using expensive hand-made 'specials' can be totally ruined by poor trowelling techniques. Achieving thin, precise joints is now a rare skill, but one that desperately needs to be taught to and mastered by many more bricklayers. The availability of competent bricklayers is the major problem identified by most local authority conservation specialists.

In this respect, Bursledon Brickworks, near Southampton, is regarded as a pioneer, combining manufacturing with an educational role by means of training courses, and by setting itself up as a Centre for the Conservation of the Built Environment. At Bridgwater, a brick and tile museum is also currently being established by Somerset County Museums Service.





Box 5 Skills checklist for bricklaying

Planning

- understanding relationship of solid and cavity brick walls or brick used as in-fill to other constructional components
- knowledge of brick types, sizes, colours, textures
- knowledge of properties of brickwork, including structural capabilities, etc.
- knowledge of history of brickwork
- knowledge of mortars, binding agents, etc.
- understanding drawings/specifications
- estimating quantities, prices, etc.
- knowledge of brickwork glossary
- knowledge of legislation

Sourcing

- sourcing of bricks, specials, etc. to match existing bricks

Preparation

- setting out foundations, walls, arches, etc. with lines, etc.
- preparation of mortars

Execution

- laying brickwork
- trowelling and pointing techniques – tuck pointing, etc.
- maintenance of tools
- integration of other elements – doors, windows
- application of decorative patterning
- mixing, banding with other materials – stone, flint, etc.
- rubbed brickwork

Repair and maintenance

- knowledge of repair philosophies and techniques
- knowledge of alternative fixing/repair methods
- sensitivity towards shaping and piecing-in new bricks – sensitivity to structural strengths of mortars

Tiles (and terracotta)

The types and shapes of tiles, especially of plain tiles, have changed little in the past four centuries. Nibs have been added, wooden pegs have been superseded by nails, and fashions in roof preparation and the treatment of tiles in fixing have changed. Torching and bedding of clay tiles is only rarely undertaken in specialist conservation projects. Nevertheless, the plain tile is one of the simplest and at the same time one of the most ingenious means ever invented for throwing water off a sloping surface.

In the south-east of England, and in other parts of the country from the late nineteenth century, tiles were used to face timber-framed buildings. The precise mathematical tiles found in Kent, Sussex and elsewhere mean that hand-made specials have to be created for repair work.

The second-hand market in clay peg-tiles is significant, but local conservation specialists increasingly insist on having new hand-made tiles. Keymer is the market leader in this field. Brickworks in other parts of the country should follow their example and, where the local supply of clay is suitable, be encouraged to start making tiles again.

Pantiles

Stone is not so abundant on the eastern side of England, and it was here, from the mid-eighteenth century, that pantiles began to make an appearance. They are generally confined to the east and north-east, although a significant pocket developed around a major centre of production at Bridgwater in the eighteenth and nineteenth centuries. Consequently, pantiles are also found in Somerset, Gloucestershire, Avon and parts of Wiltshire. Pantiles of a more variegated colour, including apricot, are very hard to find.

Floor tiles

Identifying, sourcing, laying and repairing indoor clay tiles involves a more complex assemblage of skills. Tiles were also made for a variety of specialist purposes – such as for bread ovens.

Box 6 Skills checklist for peg-tiling

Planning

- understanding relationship of tiles to other constructional components, including rafter and batten spacing, underlays, etc.
- knowledge of clay roofing types, sizes, colours, textures
- knowledge of properties of tiles, including structural capabilities, etc.
- knowledge of history of tiling/roofing
- understanding drawings/specifications
- estimating quantities, prices, etc.
- knowledge of tiling glossary
- knowledge of legislation

Sourcing

- sourcing of tiles to match existing materials
- sourcing of fixings (possibly manufacture of wooden pegs)

Preparation

- setting out underlays, battens, etc.

Execution

- laying tiles
- torching techniques
- maintenance of tools
- integration of other elements – chimney flashings, dormers, etc.
- hips, ridges, valleys, eaves
- integration with rainwater goods

Repair and maintenance

- knowledge of repair philosophies and techniques
- knowledge of fixing/repair methods
- sensitivity towards shaping and piecing-in new tiles – matching colour, etc.



Trainee laying Forest marble stone slates

© Marianne Sühr



Lime

Limestone, including chalk, provides the raw material for lime in Britain. This has exerted a huge influence on the appearance of the countryside and vernacular buildings in general through its use in external renders, pointing, internal plastering, etc. Poor pointing can ruin an otherwise attractive vernacular building, while the introduction of 'hard' plasters and cement mortars has materially disturbed the ecological balance of buildings that were historically allowed to 'breathe' because of the inherent qualities of lime.

Non-hydraulic lime is the principal binder of most traditional mortars, plasters and renders. It is still widely neglected in modern building practice. Lime is produced by breaking the stone into lumps and heating the raw material in a kiln. During burning, carbon dioxide (and any water) is driven off. The end product is calcium oxide, 'quicklime', sometimes described as 'unslaked lime' or, rather misleadingly, as 'lump lime'. Quicklime is transformed into slaked lime through the addition of water, producing calcium hydroxide. When used for mortar or plaster, slaked lime is exposed to the air, carbonation takes place and the material returns to its calcium carbonate origins. Hydraulic limes harden or set by chemical reaction with water. The source of hydraulic limes is limestone, but only limestone that naturally contains a proportion of clay in addition to calcium and magnesium carbonates. No significant quantity of hydraulic lime is now made in England – mostly it is imported from France.

Lime is used in a variety of applications: mortars, external renders, plaster ceilings, lime washes and paints. Limewash is a traditional surface finish for daubs, lime plaster, limestone and earth walls and has also been used on sandstone, brickwork and timber. The basic constituent is lime, and the simplest wash is made by slaking fresh quicklime, sieving the resulting putty and adding sufficient water to make a thin cream. Pigments may be added for colour, and tallow, linseed oil or casein for a more durable treatment.

Although a number of firms now market lime products, sourcing is still viewed as a problem. Macclesfield BC reported that the nearest supplier of lime-based products was 30 miles away. Walsall Metropolitan BC also commented on the fact that very few firms are locally based.

As in the case of earth walling, much of the ecological context within which lime was used in the past has been lost. Lime burning is no longer a feature of the agrarian scene, while the extensive use of lime washes for protecting animal housings, etc. is also now defunct. The necessity of limewashing domestic interiors more frequently than occurs with modern-day paints perhaps deters users, although increasingly the use of binders has assisted with reapplication rates.

The types of skill required to use lime are associated with the following tasks and trades: mortars – bricklaying (see above); external renders and plaster ceilings – plasterers; renderings to walls of historic buildings, which include a wide range of aggregates, binders and reinforcement, such as:

- lime renders applied in two or more coats to a backing of brick, stone or lime-based undercoats
- daub, usually applied in a single thick coat to a backing of wattle or lath
- strong renders based on hydraulic cements and applied in two or more coats to brick, stone or lime-based undercoats
- oil mastics applied in one thin coat to brick, stone or lime-based undercoats

The 'rediscovery' of lime can be claimed as one of the late twentieth-century triumphs of the conservation world, espoused particularly by SPAB with a missionary zeal. The Lime Centre in Hampshire is regarded highly by conservation specialists and delivers training courses – it claims to be the 'foremost UK facility for hands-on experience with lime, complementing academic courses'.

But although its profile has been raised significantly, it is clear there are still major problems in overcoming prejudices and lack of skills:

There is a need for those skilled in working in lime. A number have been on a steep learning curve but are not entirely happy and easily revert. There is also a need for plasterers competent in repair and replacement of plaster floors.

(Rutland CC)

There is a lack of expertise in the use of lime mortars for repairing brick and stone – especially rubble stone.

(North Dorset DC)

There is a shortage of people who really understand lime (including hydraulic and the need for/use of pozzolans) and who can do really good lime pointing and rendering.

(South Somerset DC)

There is very poor provision of those able to deal in plain or decorative lime plaster work.

(Chester CC)

South Bucks reported a lack 'particularly of builders happy with lime mortar', South Holland of 'builders with sufficient knowledge of lime', while Walsall Metropolitan BC commented on the 'general shortage of builders confident to work in lime-based products'. East Staffordshire CC commented that 'external plasterers are in short supply and decorative plasterers rare', Macclesfield BC reported a 'chronic shortage of conservation specialists' for plasterwork and Walsall Metropolitan BC identified a 'shortage of plasterers, particularly for external work.

Box 7 Skills checklist for using lime

Planning

- understanding of backing materials, failures such as crazing on surface, separation from backing and powdering on surface
- understanding drawings/specifications
- knowledge of terms
- estimating/pricing capability
- knowledge of legislation

Sourcing

- knowledge of properties of lime, renders and sources

Preparation

- possible burning and slaking of lime, mixing with required aggregates/additives
- safe setting up and use of lime pits
- making moulds
- preparation of backing surfaces – e.g. repointing, provision of adequate key

Execution

- familiarity with wide range of plastering techniques, number of coats required, drying times, addition of hair, etc.
- sensitivity towards cutting out and matching colour and texture
- ability to run mouldings, execute decorative plastering such as pargetting
- skills to maintain tools correctly
- finishes – staining, joint lining, etc.
- application of limewashes and paints

Repair and maintenance

- knowledge of repair philosophies
- ability to remix/reuse lime mortars
- familiarity with structural capabilities of backing materials
- ability to make up matching plaster moulds
- familiarity with requirement for continuous maintenance schedules

Stone

It is doubtful whether any other country as limited in area as England has been able to offer such a wide choice in types of building stone. This huge diversity has created both the fascinatingly rich palette that characterises our stone buildings, but also a headache in terms of the difficulties involved in sourcing suitable materials with which to repair them. These difficulties were mentioned by many respondents to the questionnaire:

A good match to local stone comes from only one quarry in Staffordshire – quality and supply are not always good.

(Chester CC)

Our local stone (Gornal stone) is no longer quarried and it is a diminishing resource.

(Dudley Metropolitan BC)

We have a local problem with 'Spilsby Greenstone' for which there is now no quarry.

(East Lindsey DC)

Local stone is now imported from St Bees or Scotland.

(Ellesmere Port and Neston BC)

Most of the historic buildings were built using material from very local stone pits. This is not now available and most of the 'ironstone' is brought in from Northants or Oxon. It is very difficult to find matching stone for repairs. It would be helpful to have clear information on existing quarries. Contractors find it strange that one should want to know which quarry stone has come from. Limestone is available from Clipsham and Creton, mostly used for new building. Ketton is occasionally available in small quantities for important repairs.

(Rutland CC)

By contrast the supply of stonemasons in many areas does not give cause for concern.

Box 8 Skills checklist for stonemasonry

Planning

- understanding relationship of masonry used as principal walling material or as in-fill to other constructional components
- knowledge of geology, stone types, sizes, colours, textures
- knowledge of properties of masonry, including structural capabilities, etc.
- knowledge of history of masonry
- knowledge of mortars, binding agents, etc.
- understanding drawings/specifications
- estimating quantities, prices, etc.
- knowledge of masonry glossary
- knowledge of legislation

Sourcing

- sourcing of stone to match existing, including type, position in quarry, bedding planes, etc.

Preparation

- setting out foundations, walls, arches, etc. with lines, etc.
- preparation of mortars
- preparation of stonework – knapping, cutting, shaping

Execution

- laying, placing stones
- trowelling and pointing techniques
- maintenance of tools
- integration of other elements – doors, windows
- application of decorative features, corbels, finials, kneelers, drip/hoodmoulds, cappings, etc.
- mixing, banding with other materials – bricks, etc.

Repair and maintenance

- knowledge of repair philosophies and techniques
- knowledge of alternative fixing/repair methods
- sensitivity towards shaping and piecing-in new stonework – sensitivity to structural strengths of mortars

Dry-stone walling

Dry-stone walls are found in many parts of England, wherever field, mountain or quarried stone is plentiful. Walls can be built of most types of stone – the skill is in making the best use of what is available. There are regional variations, but the same principles apply throughout. Some structures are built using dry-stone techniques, but the principal application is for boundary walls, which are built without mortar or cement, reducing the cost and allowing the wall to settle safely and to survive frosts.

© Nick Turner



Dry-stone walling competition, Cotswolds AONB

The first stage is to clear and level a foundation. Foundation stones are laid firm and level with their ends extending into the centre of the wall, blocked tight together and well packed. Double stones are built tight together with their ends running into centre of wall. The centre is well packed and brought up with the sides. Joints are well broken: one-on-two, two-on-one. Through-stones and covers are well fitted and extend 5–8cm over the double stone. Top stones are set upright (some regions have them leaning) not less than 20cm in height and well blocked together.

There has been a revival of dry-stone walling over the past 30 or so years; grants for farmers and landowners in some regions assist in the repair and rebuilding of dry-stone walls. There are 200 full-time

professionals belonging to the Dry-stone Walling Association and probably around 400 in all in the UK (this excludes jobbing farmers and shepherds). A Countryside Commission Report of 1996 (CCP 482) estimated that there were 112,600 kilometres of wall, but this is certainly an underestimate. The Report also concluded that only 4% of the walls are in excellent condition, and a further 9% in good condition. Most jobs do require some new stone, although existing walls are robbed to repair and rebuild others. In the Cotswolds, a high proportion of new stone is used in repairs, because of the tendency there for the interiors of the walls to shatter due to the properties of the local stone.

Stone slate roofing

Stone slates and slating have, in the past few years, received considerable attention. Stone slates have been used in England since Roman times and are found wherever rock could be split to form a reasonably thin slab for roofing. Examples exist in almost every geological period and rock type. They are known variously in different parts of the country as grey slates, flags, flagstones, thackstones, slats, flatstones, stonetiles and tilestones. Geologists prefer the term 'tilestone' as these limestone and sandstone products are not geologically slates. That is, they are sedimentary rather than metamorphic, and consequently split along a bedding rather than a cleavage plane.

The principal areas of the country that sustain slate roofing have been mapped (see English Heritage Stone Slate Technical Advice Note, www.english-heritage.org.uk) and are a reminder of how extensively it was once used. The geology of England is rich and complex and this is reflected in the great variety of building stones used for roofing across the country:

- limestones and sandy limestones: found in Dorset, Oxford, Somerset, Wiltshire, Gloucestershire, Northamptonshire and North Yorkshire;

Heritage Building Crafts

- sandstone and limey sandstones: found in Sussex, Kent, Northamptonshire, Cumbria, Northumberland, South Wales and Bristol, Gloucestershire, Cheshire, Derbyshire, Yorkshire and County Durham, Lancashire, the Welsh Marches, Shropshire, Herefordshire and Worcestershire.

Stone slating is thus a highly regionalised roofing form, arising from the distinctive local geology and fundamental to the distinctive local character of vernacular buildings in many parts of the country.

Stone slates have been discovered on Roman sites at a number of locations around the country, and have been in use ever since. The major building booms of the sixteenth and seventeenth centuries seem to have been an important period for the expansion of stone slating; given the threat of fire, it was much safer and more durable than thatch and began to be used more widely for all buildings, not just the large manor houses of the wealthy. Stone slating continued in many parts of the country as an important local industry until the late nineteenth century, when a steady decline set in. The fact that it has always been a modest and local activity, generally utilising materials from the immediate area, means that its use is very varied in different parts of the country, and an important contributor to the development of the vernacular traditions in each area.

However, sandstone and limestone roofing is becoming increasingly rare and in some areas is actually defunct. As locally produced products come to the end of their natural lives, because of declining supplies, imported or artificial substitutes are taking their place. These have little to do with the local architectural traditions, and result in a gradual erosion of local distinctiveness. The catalyst of this cycle of substitution and loss of local character, which began in the nineteenth century, was the development of transport systems that permitted the importation of cheaper, alien products from other regions of Britain. The extensive transport network which was in place through the canal and railway systems in the mid-nineteenth century facilitated the widespread use of Welsh slate on a national basis. Today, the same process is occurring on an international scale. The result has been that the production of stone slates in some areas ceased years

ago and the few examples that are still available are in a precarious situation – largely dependent on indirect support through the grant-aiding heritage bodies for their continued existence.

Stone slates were either mined or quarried, but in both cases the quarries tended to be small in scale. In Sussex, for example, many of the duck ponds adjacent to old farmhouses were originally the quarries for the Horsham stones found on the roofs. Mined slates (Collyweston/Stonesfields) constitute only a small percentage of stone slate roofing. Frost action was used to split the slates. Today, the difficulty is that the quarrying is culturally split between those that produce very high volumes of aggregate, which involves crushing the rock, and those that carefully extract the stone for sawn architectural products – i.e. neither is suitable for roofing. This is compounded by environmental pressures



© Charlie Hedley

Coble facing wall to conform to District Council rules, Solway Coast

which discourage the reopening of quarries. Conservation planning policies conflict with mineral policies.

In many parts of the country the production of stone slates has declined to the point where they are simply no longer available, and have fallen prey to cheaper 'matching' products (some imported from India), alternative materials such as Welsh slates or tiles and the salvage market. This is reflected in the many responses to the COQ, for example:

Green Welsh slate is difficult to obtain, Harnage stone slate likewise (relatively few buildings).
(Chester CC)

Collyweston is sometimes hard to source ... local Swithland slate can be sourced, but large, graded quantities are scarce.
(Leicestershire CC and Melton BC)

Collyweston is not at present available. That which could be used is in a quarry where there is blasting for road stone, etc., therefore the slates cannot be considered a viable material. A search is continuing for alternative source,s but although there is geological evidence it has to be economically viable, and overcome opposition from planners. There were a number of sites of slates around the villages – i.e. not all Collyweston is Collyweston and this could be a way forward, except for economics and the planners. Artificial materials are not visually satisfactory, nor is their performance.
(Rutland CC)

A stone roof is one of the most expensive to produce and install. However, it is a material that will be long-lasting and of high quality. When examined over the potential lifespan of the roof, and considering that even when the building is re-roofed 100 or more years later – and even then the stone slates can probably be reused – stone slates prove to be an economic choice. There is also the argument about sustainability, which is now integral to most local development plans. Stone slates constitute one of the most sustainable of all roof materials – they require low energy to produce and install, are long-lasting and reusable. The potential for reducing costs by increasing and retaining the market for new stone slates to a sustainable level is clearly a key issue.

There are, however, other production issues that relate to the local variety of the vernacular material, and to the way in which they were fashioned into slates, which require discussion and for which producers need a clear lead. In the South Pennines, for instance, a number of different stone types can be found, which vary markedly in character. It was the roofer's skill and style of working that added the final dimension that created the local and regional character of stone roofs.

Distinctiveness derived from the colour and texture of the rock; from the size, thickness, flatness and surface texture of the slates and the treatment of hips and valleys, ridges, dormers, eaves and abutments: all were intended primarily to resist the weather but allow the expression of the craftsperson's artistry and were made possible by the particular characteristics of the rock. In Yorkshire, for example, the large, gritstone or sandstone slates result in simple roof shapes and detailing, whilst on the typical Cotswolds building smaller limestone slates are used which can be fashioned into swept valleys and dormers so characteristic of that part of the country. The size and thickness of the material, along with the local climatic conditions, also determined the pitch of the roof. The large Pennines slabs can be used on lower pitches of about 30–35 degrees, whilst smaller stones require steeper pitches (up to 60 degrees).

The consequent loss of skills accompanying the decline is compounded by poor specifications. Usually, there is no reason why a stone slate roof should not last 100 years. There is great confusion between traditional and modern practice, and the ability of traditional practices to meet modern requirements is often unsuccessful and causes early failures. The use of cement mortar to point roofs may utilise a traditional technique, but in the wrong material. Training for both roofers and specifiers is still very poor, although English Heritage has now produced excellent guidance. At present, stone slating is not included in any of the Level 1 or 2 NVQ courses, although English Heritage has again been developing a training module. A Roofing Industry Alliance has been established to try to improve the low standard of roofing workmanship in the UK. In 2001, after a four-year campaign to raise awareness, it was stated that 'in some regions supply problems are being resolved'. The COQ responses do not necessarily bear out this confidence and there is still a paucity of information measuring the success of these initiatives in relation to training programmes and recruitment levels.



Flint

One notable exception to this picture of a reasonable match between supply and demand, however, is the appalling lack of practitioners able to execute good flintwork. In this area, there clearly is a skills crisis. The 'craft' tends to fall into two camps – high grade flintwork using, for example, knapped flints in flushwork is the province of the stonemason, but the vast majority of rubble flintwork will be undertaken by bricklayers.



Flint and brick walling, Singleton

Arun DC remarked on the shortage of craftsmen who can construct good-quality flint walling or carry out good-quality repairs to flint walls. Lewes DC also mentioned a lack of flint wallers and flint, as did Kings' Lynn BC and West Norfolk DC. Breckland DC referred to 'the problem of sourcing flint from chalk (as opposed to derived secondary flints)' and East Kennet DC reported that flint and chalk blocks were difficult to obtain.

As the lack of flintworkers is clearly such an issue, the remainder of this section will analyse the particular problems associated with this aspect of the craft in much greater detail. Flint deserves to be at the top of a list of favoured materials, but it is still seen as difficult to acquire, difficult to convert, and difficult and expensive to build with.

Flint is associated with the chalk band that stretches across south-eastern England from East Anglia to Dorset and the South Downs. It is one of the most widely available, naturally occurring stones found in southern Britain. Its mineral content, composed of crystalline silica

(quartz) and hydrated silica (opal), gives its core a smooth, often jet-black texture with an almost vitreous lustre. Flints are also differentiated by the degree of cortication, patination and secondary coloration.

A rich history

Flint has been used in many different contexts in the past and the history of its development as a building material reveals both the breadth of possibilities it offers and also the range of techniques and skills needed by the expert flint waller to repair and maintain historic flintwork.

Because of its ready availability and cheapness, flint may have been in continuous use as a building stone for more than two millennia, though the extent of its use and the status of buildings on which it was used have fluctuated over time. Early examples, such as the theatre at Verulamium, have flint walls of two parallel leaves bonded at intervals with long flints but with a central void mostly filled with flint rubble. In the town walls, bands of facing flint alternate with narrower layers of thin bricks and tiles. At Berkhamsted Castle, only the flint in-fill survives of what would have been even more massive walls, the outer leaves of smarter stonework having been robbed over the years and reused elsewhere in the town.

Many medieval churches using flint walling survive. Anglo-Saxon and Norman walls show a predominance of mortar with fragments of brick and stone rubble, together with unfractured nodules of flint, scattered haphazardly or roughly coursed in the face of the walls. By the eleventh century, ashlar quoins and dressings were beginning to appear (brick was little used for dressing flint before the mid-sixteenth century). By the early thirteenth century, proportionately less mortar was being used and after c.1250, flints began to be laid in more regular courses. In the early medieval period, flint walls were commonly limewashed or rendered externally. Probably for this reason,

examples are found that incorporate a random mix of materials, some reused. As this practice ceased, the quality and appearance of flintwork became more important. At the same time, chalk was being quarried for agriculture and building, yielding virgin flint suited to splitting, so by the fourteenth century walls were being faced with irregular knapped flint (i.e. where the flint nodules have been split to expose a flat surface). More decorative work begins to emerge in the middle of the fourteenth century and by the fifteenth century flintwork is generally more carefully selected, graded and coursed, often with fully knapped faces (i.e. squared so that they fitted together rather like bricks). The fifteenth century churches in the flint band across East Anglia are supreme examples of superb quality 'flushwork'.

By the sixteenth century, as church building declined, flint began to be used more widely in domestic buildings. Chequerwork, used on churches in the fifteenth century, percolated down into domestic buildings; in timber-frame buildings, flint continued to be used in plinths (as seen in medieval barns, etc.) but also for a short phase was popular in early chimney stacks. Small ancillary buildings of flint may once have been more common, but none survives from this period. As timber-frame construction steadily went out of fashion, brick rather than flint became the favoured material, although good sixteenth- and seventeenth-century examples of flint farmhouses and cottages can be found. When the two are found together, there is often a tendency to hide the side and rear walls of flint behind a brick façade.

In the eighteenth century, as church or chapel building tended to opt for brick, secular landowners perpetuated the use of high-quality flintwork, particularly in the use of knapped and squared flints. This rarely applied to their country houses, but instead was increasingly employed for estate buildings and structures in landscape garden designs – the ebullient designs that mushroomed at West Wycombe Park, Buckinghamshire are particularly splendid. Gothic cottages, gazebos, grottos and follies often appear as exotic, romantic counterpoints to the more formal design of the classical house. Examples of decorative flintwork on quoins is a local adaptation of the more common rock-faced stone features in classical buildings elsewhere.

Though it never surpassed the number of pure brick buildings, the emergence of unknapped flint on more modest buildings is ironically closely tied with increased brick production in the eighteenth and nineteenth

centuries. Thick beds of flints overlying the brick earths provided a ready and abundant source of material. As these areas of former common land were colonised, numerous small cottages were built of randomly occurring rubble flintwork to house a growing rural workforce. In these more 'humble' examples, the walls were constructed of flint rubble, the flints being simply bonded together using mud rather than lime mortar.

Another stimulus to the increasing use of flint came from the steady improvements made to roads, which until 1888 remained primarily a responsibility of parish councils. Vast quantities of flints were picked off ploughed fields for road maintenance as a means of employing those who qualified for parish relief, often women and children. Stone breakers were employed to split these flints for road use, a practice that may have stimulated the use of more knapped flints in buildings.

All these factors prompted the gradual emergence of flint-with-brick as a predominant 'style', which was particularly adopted in East Anglia and the Chilterns, although in many areas the continued quarrying of stone produced some fine examples of alternate flint and block stone banding. The nineteenth century was the heyday for flint, a marked contrast emerging between 'polite' and 'vernacular' buildings. Many smaller houses, cottages and farmsteads were built with rubble flint facings tied to backings of brick or, occasionally, chalk. Villas, industrial and public buildings often incorporated conscious expressions of 'manufactured' flintwork. Flint was seen as particularly appropriate for Gothic buildings, and even appears in urban contexts. Many of the pre-eminent Victorian architects used flint for churches or other institutional buildings. Inspired by English regional Gothic precedents, they experimented with bold new uses of flintwork, elaborate brick diaper patterns and occasional polychromy. They sometimes borrowed traditions from other regions: knapped flushwork from East Anglia, for example, crept into other flint areas. Small clusters of flint buildings also became commonplace in the nineteenth century, as did terraces, some of considerable length and uniformity. Many country





estates used flint for cottages in villages, perpetuating its use well into the late nineteenth century

In the first half of the twentieth century, flint continued to be used in church buildings, for semi-detached houses and extensions to farmhouses. By the middle of the century, its use was declining, although some rural housing continued to adapt the use of flint to contemporary designs. Flint remained popular for boundary and garden walls and, from the 1960s, it began to reappear in institutional buildings. One major use of flint in the latter part of the century was on the Wormsley Estate, Buckinghamshire, where in the late 1980s a major new building project involved the construction of 2,000 square metres of new flintwork, a remarkable showcase of techniques and styles ranging from the humblest grade of flint to the most sophisticated.

As awareness of the loss of local character grew in the twentieth century, the 'traditional' flint house has been revived by developers and builders with varying degrees of success. Some blend well into their village surroundings, but too many incorporate incongruous token panels in predominately brick-built buildings, demeaning the skills of the flintworker. But much more damaging for the survival of flintworking skills has been the increasing use of concrete blocks with flint inserts. Imported, manufactured blocks such as these – often with more cement than flint left showing – both undermine the local economy and also drastically erode the bank of indigenous flintworking skills. Poor specifications are also at fault for producing visually poor results. New flintwork therefore often fails entirely to respect regional distinctiveness or to specify appropriate methods, skills and materials to achieve flintwork of the highest possible standard.

Chalk and field flints

Flints are found embedded within the layers of upper chalk, and in the top strata of the middle chalk below. They take

many forms, though they most commonly occur as random, separate nodules up to 60cm (2ft) across. Typically, they are sinuous, amorphous lumps, often with knobbly protuberances and sometimes perforated.

Although all flint originated in the chalk, erosion over millions of years has freed nodules from this initial setting. These processes have inevitably tended to change the stone's appearance, hence 'derived' field flints tend to be stained brown and often possess their original, eccentric contorted shapes, or they may be fractured by exposure to frost, sun and agricultural machinery.

A notable characteristic of flint buildings is the consistent use of flints from both the chalk strata and the overlying clay. Flint appears in buildings in its natural form as smooth, amorphous nodules, but also as bruised boulders, fractured fragments, smooth cobbles, and split or knapped pieces. Good-quality work uses chalk flints, although where they are predominant, the effect can be 'over-busy'. Field flints tended to be used in 'humble' domestic buildings, boundary walls, etc. Pleasing results have been achieved in the past by mixing the two types of flints.

The distinction gives rise to two entirely different sourcing problems. Chalk flints have to be derived from quarrying activities, and thus suffer from the same sourcing problems as all other quarried stone. Field flints, on the other hand, are theoretically available in vast quantities waiting to be plucked off the fields. The labour intensiveness of such work, however, means that they tend to remain where they are – although a mechanical flint 'harvester' with a grading mechanism has been employed successfully for this job. Sourcing suitable flints can therefore also be very time-intensive.

Buildings and structures of every shape and size have been constructed from both types of flint, enriched by the many combinations of other materials it meets with. Examples of flint construction are found throughout the flint band, although prevailing geological conditions will affect relative densities. Flint boundary walls are ubiquitous and a fair number of farm buildings survive. Flint has tended to be used for plinths in barns, while flint and brick is found in stables, cart sheds and pigsties. Flint was often used on secondary buildings, extensions or lean-tos, rather than appearing as the main walling material.

Conventional stonework often aims for consistency and uniformity, but the characteristics of flints – their



Flint walling, West Wiltshire

shape, colour and texture – invest them with a vibrancy quite unlike other stonework; the beauty of flintwork lies in its potential for creating anything from precise blockwork using accurately knapped flints with thin joints to a more random, 'rustic' appearance using unfractured, amorphously shaped stones. In addition to localised variations, colour, shape and coursing, technique and conscious 'borrowing' of styles help to create a rich palette of possibilities.

In theory, the flint waller's brief is a simple one: to lay building blocks bonded together with a jointing material or mortar. With flintwork, the proportion of stone used is sometimes less than 50% given the amount of mortar, rubble and other stone or brick used in the finished construction. But there are in fact many different ways of building with flint. It has been used:

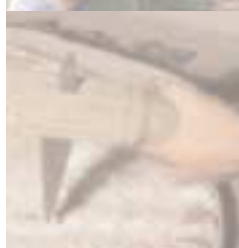
- for foundations for structures, instead of concrete;
- as solid masonry; if used structurally it is often built 1.33 times the thickness of a brick/block wall, but will obviously vary in accordance with the size of structure; traditionally, the minimum normal thickness for cottage walls would have been about 450mm (18in) and even boundary walls were seldom much less; some church tower walls are as much as 1.5m (5ft) thick;
- as solid masonry in non-structural situations, a free-standing flint wall 230mm (9in) wide can be built to a height of some 1.5m (5ft) – any higher will require a width of 330mm (13in) (brick and a half or more);
- as above but with a rubble core – used in free-standing walls;
- as a core to other masonry (as at Berkhamsted Castle);
- as a facing to an outer skin in a cavity wall;
- as a non-structural facing to some other backing material such as brick;
- as flint cobbles or knapped flints for flooring and pathways;
- as a decorative motif mixed with other materials such as brick or stone (e.g. in 'flushwork' panels).

Shuttered and freehand flintwork

Flintwork can be constructed freehand or by the use of shuttering. Freehand construction, being the more skilled application, is essential when building coursed or rough-coursed flintwork, where the flints are laid in horizontal rows with consistent spacing between each piece. String lines are used on both sides if constructing a free-standing wall. The principal technique is to learn how to bed the flints 'flat', as if the wall were being built against a sheet of glass, using a straight edge to check that nothing projects beyond the general line of the wall face. Profiles can be used for quoins and jambs.

Shuttering has long been used for constructing flint walls, both for rubble-cored walls and flint facings on brick or stone backings; it can help to achieve flat planes, although it is obviously difficult to gauge the finished effect. Before erecting shuttering, any toothed quoins or piers, dressings, plinths and backings have to be built to a minimum height of 225mm (i.e. the average height of a board laid horizontally). Layers of flint are added within the shuttering made of boards firmly secured on either one or both sides of the wall. Selecting the flints primarily for their external face, they are laid like headers with one end set firmly against the shutter and the other pointing into the wall; also slightly downwards and outwards to direct any water away from the core of the wall.

When bedded comfortably in the mortar no two stones touch, but should be set as close together as possible to avoid excessive areas of



mortar. Long bonding flints should be built in at regular intervals, with any voids being filled with brick and tile rubble, but care is needed to ensure that every crevice is filled, especially in the toothing of the piers. Smaller flints will be required to level off each rise to avoid excessive thicknesses of mortar which distort the overall appearance and are vulnerable to frost. Shuttering to each rise is normally removed the following day; the process is then repeated until the required height is achieved.

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Flint detailing

The flintworker's palette

Flint walls can be smooth textured, rough faced or knapped into precise blocks. Ways of laying flint are almost as varied as the material itself. Different methods of coursing, close or wide spacing and the consistency and appearance of the mortar all contribute to this diversity. Flints were either used whole, fractured or 'knapped' to provide a shaped, smooth surface. Knapped flints can be split so that irregular but 'flat' faces are exposed. Flint often breaks in handling, sometimes in a remarkably sheer plane, causing it to resemble a 'knapped' surface. A skilled knapper can split flint with very little force, and is able to judge its condition and quality by the sound of the hammer blow. Chalk flints are more workable – three strikes will produce a good face, while field flints often only allow one hit before they fracture. Some walls will incorporate whole, random and 'fractured' flints. In some cases, one area of wall may use knapped flints, another random.

Flints can be selected and graded by size, used randomly, or made into squared or rectangular flint blocks usually measure about 100mm (4in) by 75mm (3in).

Whether knapped or not, flints can be built coursed or uncoursed. Further visual effects can be achieved by laying each piece at an angle or slant; when alternated course by course, a herringbone effect is produced. By mixing types of flintwork, or flint with other materials, banded visual effects can be created. Where appropriate, the sometimes harsh effect of massed flint can be softened by rounding edges or building in curved designs. Wall surfaces can be broken up by recessing or expressing panels.

Mortars

Building in flint is a slow process. Early lime mortars, using local chalk, gave little or no hydraulic set. By the end of the eighteenth century stronger hydraulic limes were becoming available, and in the nineteenth century in particular, black mortars, using additives such as coal or brick dust, soot or ash, were used to give a definite visual effect. The large quantities of mortar required must be allowed to dry out slowly to achieve a firm set. As flint is such a hard, impervious material, water absorption from mortar is minimal. A strong cement based mortar is therefore quite inappropriate; shrinkage cracking around the flints will allow water ingress, with possible damage to the mortar core or backing, particularly in frosty conditions. The flints themselves can even split in extreme conditions.

Traditional mortars are made with sand and lime, the lime being made by burning limestone or chalk. The tendency today is to use Portland cement in the mix, but the elasticity and porosity of lime mortar allows a flint wall to breathe, moisture to evaporate and fine cracks to 'heal'. Its use is ecologically friendly, and even allows the wall to be dismantled and reconstructed without loss of material. To obtain the best performance from lime mixes, the correct sand and lime to water ratios have to be employed. Sharp sands with angular particles including some 4–5mm of grit produce the strongest mixes. A less coarse aggregate may be needed for the finer joints of brick quoins, but the colour and texture should not be noticeably different. The choice of binder is essential, and the skilled flintworker must make the right selection of binder and lime to achieve the strength, porosity, durability and flexibility required.

One of the arts of flintwork is knowing the correct time to complete the finished joint effect required. When the initial set has taken place, the face is often 'beaten' with a stiff-bristled brush to reveal the aggregate in the

mortar. As noted, flints can be set very close together, or in a more random, open fashion. In flushwork, which has to be constructed freehand, the moisture content of the mortar has to be increased because of the narrow joints, to allow the mix to be rubbed into the joints. As soon as the pointing starts to set, excess mortar is removed from the flints with a small trowel. Various techniques can be used to change the finished appearance of the mortar, although jointing should never be the dominant factor in flintwork. For example, the waste flakes pushed into the mortar joints are called gallets, a technique encountered mostly in the south-east of England.

Material combinations

Flint wallers need to have a good working knowledge of a wide range of other building materials, which historically have been used in conjunction with flint. Flint, unlike dressed stone, for example, is rarely a 'stand-alone' material. Because it is somewhat intractable, 'softer' or more workable materials are usually used in conjunction with it for cappings, piers, quoins, banding (horizontal and vertical) string courses, window and door openings. The presence of good brick earth means that, in the absence of other good building stones, flint is often combined with brick.

A particular choice of combination materials is often dictated by local geological conditions. Brick textures vary according to the type of clay used. Proximity to certain quarries produces pockets of localised stones. Brick is sometimes mixed in randomly with flintwork. More elaborate patterns ('diaper work') were produced in larger buildings, mixing knapped flint with dressed brick. Non-native bricks such as yellow 'stocks' are often encountered, changing the overall texture and appearance when incorporated in flint buildings. Clay tiles were sometimes used for quoins and lacing courses. The alternative to clay was dressed stone, but because of its cost it was sparingly used and is more often associated with prestigious buildings such as churches or estate buildings. Limestone and sandstone could be transported over large distances if the specification required high-quality dressings. On superior buildings, stone is combined in formal diaper and chequerboard patterns to great decorative effect. Stone, tiles and bricks can sometimes appear randomly used in flintwork.

Decorative elements

A skilful flint waller should be able to incorporate any of the following constructional elements; the truly skilled flintworker will base these securely on local examples, and a successful project will incorporate them in proportion.

Corners Although examples occur, it is difficult to make good, strong corners with natural flint. Brick or stone are more frequently encountered. (In one or two cases, the reverse occurs, with flint, usually in a rusticated form, being used for the quoins in an otherwise brick building.) Traditionally, corner quoins are three courses high, one-and-a-half bricks wide on the long face and one-brick wide on the short face, though it is not uncommon to see them four, five or more courses high. Alternatively, quoins or piers are used at set intervals to present a toothed appearance, 'in' and 'out' on successive courses.

Doorways and windows Dressings to the jambs of doorways and windows often repeat the patterns encountered on the corner quoins except that their face widths are usually less, often consisting of one brick and half a brick. Window heads develop towards shallow segmental heads.

Strings These can be done as all headers, alternate headers or stretchers, or random. One course is sometimes quite sufficient, although up to four or five bricks deep occur in domestic situations at first-floor level to accommodate joists; these can be enriched with cogged or dog-tooth detailing or other decorative friezes, but keeping the correct visual ratio of brick and flint. Pleasing effects have been created where the flintwork is divided up into panels by vertical and horizontal brick banding. Because flint is a robust material, eaves do not require a pronounced overhang. They can be matched to any detailing carried out at first floor level.

Cappings Local brickyards can often provide hand-made coping bricks for cappings – apex, half-round, ogee, double bullnose. A 330mm (13in) wall, for instance, might top out with a course of brick, a course of plinth bricks and a coping brick. However,



many variations can be found. Brick on edge cappings became common in the twentieth century, effectively downgrading both the aesthetics and skills required to 'finish off'. Flint buttresses occur, but more usually they are of brick or dressed stone, sometimes incorporating small panels of flint.

© Greenhalf Photography



Wall at Weald & Downland Open Air Museum

Repairing flintwork

Traditional flint walls inevitably fail. Extensions and conversions involve disturbing historic flintwork. When refurbishing a property, repairs may well need to be carried out. Walls should be kept clear of ivy (which will eat into the mortar and expose the soft inner core of mortar and rubble) and disturbance of foundations from tree growth. Defective roof coverings should be replaced and rainwater down pipes and gutters checked for blockages. Site drainage needs to be monitored to avoid rising damp.

Flintworkers need to see beyond just the face of the flint wall. Old flint walls often have shallow or non-existent foundations, and ground movement may have caused them to lean or crack. Facing flintwork may have become detached from its brick or stone backing. Poor bonding can also lead to rubble-cored flint walls becoming weak and unstable, or to joints with dressings and cappings opening up. Flints may have split or become dislodged as a result of unequal settlement or overloading, mortar erosion (in and behind the flint facing), or have 'popped' due to moisture penetration and build-up through hairline cracks in cement-rich mortars. Dressings of softer brick or stone may wear back first. The failure of the water-shedding coping of

a flint boundary wall will lead to the rapid washing out of the mortar core by driving wind and rain resulting in inevitable collapse. Voids in rubble cores or cracks in the facing material may be filled with liquid mortar, and ties and stitching may arrest the problem where facings or dressings have failed without recourse to major rebuilding.

A great deal of repair and repointing is unnecessary on structural grounds and is often poorly executed, with mortar smeared crudely over the faces of the flints, using an incorrect cement-rich mortar. Even good repointing will upset the visual balance of a previously well-weathered flint wall. When repointing or repairing knapped flint walls, it is essential that the flint faces are cleaned thoroughly as work progresses. As close a match in texture and composition as possible to the existing historic mortar present in the flint walling should be sought. This may include some quite large-sized aggregate – almost small gravel and small unburnt lime chunks or chalk. Since the mortar needs to provide a good bond to the flints and old backing mortar, matching existing mortars as closely as possible will help to reduce shrinkage cracks and will match permeability to avoid trapping moisture. Black or coloured mortars may have been used, and the skilled flintworker should be able to reproduce such detail.

Close reference should be made to the existing historic finishes – the experienced flintworker should know where to look for, and how to interpret, evidence of unweathered jointing in protected areas of walls, such as under wide eaves or in hidden corners or recesses behind buttresses or piers. Where rebuilding is necessary, particular attention should be given to the selection of matching flints, their pattern and spacing, and marrying together the new and the existing work.

Conclusion

This overview of flint has been deliberately detailed, as it reveals the complex factors that the skilled flintworker has to take into account when executing good flintwork. As is only too evident, the skills required to build with flint are extremely wide-ranging and demand a breadth of knowledge, sensitivity and flexibility that are rarely to be found in current flint-walling outfits. An opportunity for extended workplace training under the supervision of experienced flint-workers is of particular importance to the survival of the craft.

Metals

Relatively little attention has been paid to the role of metalwork in historic structures, despite the fact that careful conservation of large metal objects such as steam boilers and agricultural machinery is relatively well catered for by restorers and conservators. The result is that the character of many buildings has been irrevocably marred by poorly executed ironwork.

There are two or three leaders in the field (e.g. Dorothea Restorations) that will undertake repair of large metal structures, but this is hardly adequate to deal with the vast architectural stock of metalwork. Some buildings – particularly those associated with industry and milling – may use large quantities of ironwork; whole structures have been built of cast-iron panels – such as the fine Caversham toilet block erected at the Chiltern Open Air Museum, Buckinghamshire. Dating from the Edwardian period, the panels were cast by Walter MacFarlane of Glasgow, indicating that, in the case of metals, considerable distances could exist between source and destination. Many metals (e.g., wrought iron, lead) are also capable of being recycled and reused (sometimes transferring metals from one arena to another, as in the case of railings relentlessly requisitioned for aircraft manufacture in the Second World War).

In the building arena, metal appears in many shapes, sizes and contexts:

- window and door furniture – hinges, locks, knobs, catches, latches, letterboxes, etc.
- window casements
- ferramenta
- roofing lead, zinc, copper
- rainwater goods
- drainage covers
- ventilation grilles
- many small fixtures and fittings (e.g. hanging hooks, light switches)
- sanitary fittings
- fixings (nails, tacks, etc.)
- wiring
- straps and ties for repairwork
- gates and railings

Metalware is a key component of architectural salvage stocks. It can usually be relatively easily detached and recycled. However, whether it is correctly treated in such circumstances is open to doubt. The context for preserving metalwork correctly, using polishes, waxes, etc. on a regular basis, has been lost – maintenance of metalwork is therefore

a key issue and there appears to be little research being conducted into metal treatments for preventing corrosion. The COQ sheds little light on the question of skills and material shortages in this arena.

Cast iron

Cast iron is difficult to repair and requires refined welding skills to stitch it together. Foundries can be found to take on casting jobs but sourcing competent craftsmen with the necessary pattern making skills can create problems. Another problem is sourcing for small-scale jobs.

Wrought iron

Wrought-iron work draws on three types of metal: mild steel – mixed with alloys; recycled wrought iron (the Wrought Iron Company at Blists Hill recycles wrought iron by re-rolling it; it was intending to manufacture it at one stage); imported Dutch iron – very few impurities – has to be imported in 20-ton loads.

Much wrought-iron work is undertaken by ordinary blacksmiths, some of whom may be earning their living mainly as farriers or by producing decorative wrought-iron work. There are very few architectural blacksmiths dedicated solely to repair work. Most will be producing new designs for ornamental gates, staircases, etc. However, the impression is that the right person can be found with a little 'digging'.

Zinc and copper roofing and leadwork

Eastbourne BC identified problems in sourcing 'preformed zinc', Southend-on-Sea BC mentioned a shortage of plumbers for traditional leadwork and Wirral Metropolitan BC specified a lack of leadworkers.



Glass

Whilst stained glass has been intensively researched and receives a relatively high degree of protection from trained specialists, 'vernacular' glass and glazing has received far less attention and tends to be at the bottom of the repair list. Standard glaziers are often brought in to replace windows, sometimes substituting modern float glass for historic fabric, which has an entirely different texture and visual effect, quite apart from the fact that the original might have been etched with initials or inscriptions.



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Training in the intricacies of plate glass work

Beyond domestic buildings, many historic industrial and institutional buildings will incorporate glass that may have been produced using a variety of techniques. The chronology of glass manufacture illustrates the increasing complexity and variety of manufacturing processes. Window glass was not produced in significant quantities in this country until the thirteenth century, when broad sheet was first made in Sussex, although it was of poor quality and fairly opaque. Manufacture slowly decreased and had ceased by the early sixteenth century. In 1330 French glassmakers produced crown glass for the first time at Rouen. Some French crown and broad sheet were imported into the UK.

By 1620 blown plate was being produced in London by grinding and polishing broad sheet, and was used for mirrors and coach plates. In 1678 crown glass was first produced in London. Because of its finer quality, this process predominated until the mid-nineteenth century.

However, in 1688 the French produced polished plate in larger sizes by casting and hand polishing, and in 1773 English polished plate by the French process was being produced at Ravenshead. By 1800 a steam engine was used to carry out the grinding and polishing of the cast glass.

In 1834 Robert Lucas Chance introduced improved cylinder sheet, using a German process to produce finer quality and larger panes. This glass was used to glaze the Crystal Palace in London. The process was used extensively until early in the twentieth century to make window glass. From this period onwards machines were developed to automate the production of obscured glass and, later, window glass. In 1847 James Hartley introduced a rolled plate glass with obscured ribbed finish, which is often found glazed in the roofs of railway termini. In 1888 Chance Bros introduced machine-rolled patterned glass and in 1898 hexagonal rolled wired cast was being manufactured by Pilkington. In 1903 machine-drawn cylinder glass was invented in the USA, and was manufactured in the UK by Pilkingtons from 1910 to 1933. In 1913 a factory in Belgium produced the first machine flat-drawn sheet glass, which was first drawn in the UK in 1919 in Kent. The first UK production of continuous polished plate glass, using a single grinding system, occurred in 1923. In 1938 Pilkington developed the twin ground polished plate system and it was not until 1959 that float glass – which now dominates the UK market – was launched on the UK market by the company.

Many glaziers were traditionally also plumbers, because the majority of early casements used lead canes to hold the glass.

London Crown Glass, the historic glass 'leader', can supply two main categories of period window glass, designed for different applications. Genuine hand-blown cylinder glass (e.g. German cylinder blown sheet type NR) is used for matching existing original cylinder-blown or crown glass. It is used where existing original glass is broken

or where replacement windows are required to match existing sashes in a period building. As genuine hand-blown glass, each sheet varies a little from the next. The attraction lies in the small blowing imperfections – a few small bubbles (seeds) or a trace of a ream (fold marks or a wave in the glass) found in this style of glass. Cylinder glass marked NR (no ream) is the most suitable for window sashes of the late seventeenth century up to the early twentieth century. Cylinder glass marked LR (low ream) is generally reserved for sixteenth-century or earlier windows in lower-grade housing or stables and for leaded lights. This is because the glass has a more heavily marked surface reflecting an earlier style and a lower grade of glass. Because crown glass is no longer made, London Glass has produced a variant of cylinder blown glass called 'Vauxhall glass'. This is similar to cylinder blown sheet type NR, but during the final process the glass is slightly curved to give the bulging appearance of crown glass. Wherever an authentic appearance is important, hand-blown cylinder glass is the preferred choice.

Period-style window glass (e.g. 3mm Georgian sheet) is a lower-cost alternative for the complete glazing of windows or a façade where no original glass remains and the fine quality of a hand-blown glass is not required. These glasses are designed to recreate the gently wavy reflection of crown and cylinder glass. From inside, the glass appears without the small imperfections found in hand-blown glass. However, because of the appealing reflective qualities, it is used in place of standard window glass. Ordinary window glass, which sadly is still sometimes specified for period buildings, is usually float glass or horticulture sheet. Float glass gives a bland mirror-like appearance when glazed in period window sashes. Horticultural sheet additionally shows a machine wave spreading across the pane of glass, but only in one direction, giving an unattractive effect. Both float glass (first used in 1959) and horticultural sheet (first

used in 1919) spoil the appearance of a period building. Period-style glass is produced by carefully bending mechanically drawn sheet (i.e. not hand-blown) glass in special moulds. Victorian sheet is also manufactured by a drawn sheet process. Period-style glass is generally glazed where no existing original glass remains (e.g. barn conversions), as they do not have the small flaws and imperfections which make cylinder glass so appealing.

The skills required for glazing are not listed in detail. The questionnaire yielded little information on this skill. However, those who work on or make decisions regarding historical window glass must understand the complicated nature of the material itself, the way it is fitted into the window/building context, the ways in which it interacts with its environment and the combined effect of these. Architectural advice, desirable for an overall view of the performance of glass, should be sought from specialist professionals who have worked within the large- and small-scale vagaries of historical window glass. The conservation and glazing skills necessary for undertaking work on the glass, leads, ferramenta and window surrounds should also have been proven. The Council for the Care of Churches has a list of specialist glaziers but, as glazing should not be considered in isolation to its building context, it is usually advisable to seek such advice through an architect who will have knowledge of the associated masonry, building and non-glazing problems. (See J. and N. Ashurst, *Practical Building Conservation: Woods, Glass and Resins*, English Heritage Technical Handbook 5, 1988.)



Site Skills

Foreman

It is generally recognised that heritage building firms suffer from a lack of competent foremen. It is clear that further research is required within the industry to establish whether the market can sustain the delivery of a dedicated NVQ qualification or form of accreditation aimed specifically at raising foremanship skills.

There are clearly many areas where on-site management differs substantially between new-build and conservation projects. The conservation foreman should ideally:

- have a grounding in architectural history and the structural development of historic buildings;
- have a knowledge of conservation philosophies;
- be aware of special legislation relating to historic buildings;
- be able to 'read' complex specifications and drawings;
- have a working knowledge of all material properties/conservation techniques;
- have a grounding in material diagnostics;
- be able to instruct scaffolders, service installers, etc., so as not to interfere with historic features and surfaces;
- have good communication skills to deal with conservation specialists as well as suppliers, interested members of the press and public;
- be able to judge processes to assist with time-management programmes.

Building labourer

The role of the 'conservation' labourer is easily overlooked, but emphasis has already been placed on the need for a sensitive approach to 'unpicking' historic buildings – a job that is usually entrusted to labourers with insufficient training and instruction. Again, further research is required to establish whether there would be a demand for a dedicated qualification or module.

Business skills

Many contractors, and self-employed craftsmen require training in business skills. They need to keep abreast of changing employment and accounting legislation, need IT training and assistance with business planning and project

management. Again, some aspects of the skills required for this work are peculiar to the heritage sector and so it is important that these needs are recognised when training programmes are being constructed.

Professional skills

Beyond the individual recognised craft skills that need to be brought to bear on individual historic buildings, there are also a great many skills that impact on the outcome of a successful conservation strategy. This is clearly a fundamental area for concern given that the role of such professionals is effectively to 'manage' change to the historic environment. They are therefore at the coalface of sourcing materials and craftspeople to undertake work on historic buildings and consequently can have a profound effect on the nature, size and functioning of the skills base in the country.

Property professionals play the principal role in the survey of buildings and will also be the key players in any process of change as they are the ones who have to identify and address the causes of any problems. It is important that they, and workers at other levels in the construction industry, are kept abreast of discussions and new regulations made concerning the environment.

The questionnaire provided insight into where the most acute shortage of skills lay at the professional level: 73 of the 156 replies mentioned shortages, specifying, for example, architects, structural engineers, surveyors and highway engineers. Figure 7 identifies the main categories reported on by respondents. A particular problem identified concerned architectural designers (often untrained or undertrained):

There are many so-called architectural services suppliers. many of whom are dire.
(East Staffordshire BC)

The main problem is that owners will not pay for these specialists. Society feels they can manage without them.
(Harrogate BC)

When asked to comment on whether conservation officers themselves received adequate training, there was a mixed response. Most – 80% (117 out of 147) – considered they required extra training. When asked what areas this training should cover, there was a very varied

response, indicating the considerable demands placed on conservation officers. One should bear in mind that the skills base qualification is itself quite diverse and these are therefore additional skills. As one (frustrated) respondent put it:

The post of conservation officer (CO) is not one that relates to any single profession unlike Planning Officer or Environmental Health Officer. LAs need to consider what they want their CO to do. If they are members of the IHBC, they already cover everything there is to know about buildings - only God is more all-knowing. What is needed is that government and LAs realise that there is no such thing as a CO: there are specialist historic building planners, there are specialist architects and surveyors etc. What is needed is depth of specialist training, not the broadening of more general training (disguised as 'specialist' training)

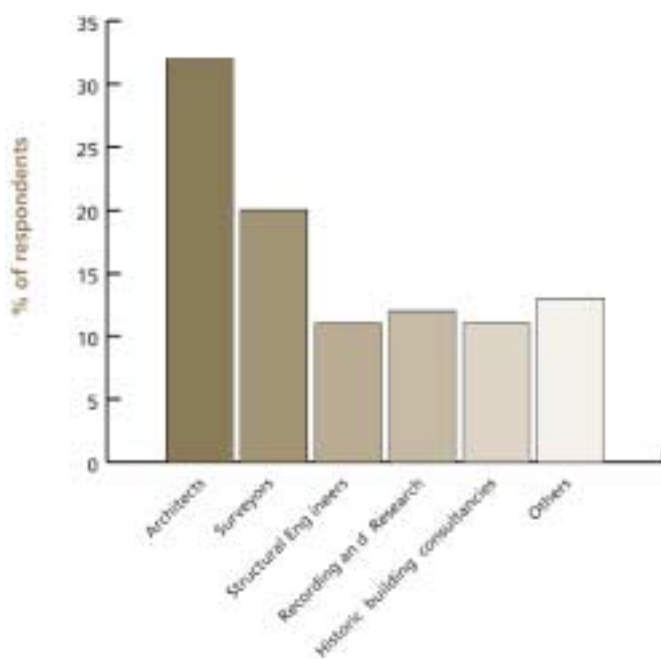


Figure 7: Professional skill shortages

Source: Conservation Officers' Questionnaire (117 sample)

Some felt that team working could mitigate the lack of broad-based training: 'It would be advantageous to secure a better team of officers in the same authority or county who could link their professional services/knowledge together in, e.g., surveying, material analysis, specifying, design.' Liverpool, for example, 'has a team that includes COs with architecture, planning, urban design, architectural historian and chartered surveyor skills – a good mix and opportunities for learning from one another.' However, many also felt they needed additional professional skills themselves. In addition, there was also a feeling that full-time conservation courses concentrate 'on theory and history with very little time given to hands-on working'; several respondents mentioned a desire to get out into the field to understand the craft processes themselves in greater detail. The issue here was being able to communicate effectively with craftspeople – skills training was therefore required 'to the degree of enabling demonstration'.

The COs specified a variety of skills that they would like to see included in training programmes. In terms of theoretical/professional knowledge, these included:

- archaeological basics
- architectural design and detailing
- community involvement
- design (urban, landscape and civic); town-planning
- finance (implications for aspects of, e.g., conservation, archaeology)
- fundraising
- historical and structural building analysis
- project/programme/property management
- regeneration
- repair specification
- structural engineering
- surveying
- valuation; feasibility studies

Heritage Building Crafts

In terms of practical knowledge, the following were amongst the many skills listed:

- building technologies, old and new
- construction/restoration techniques and materials, old and new
- craft skills, including stonework, pointing, brickwork, rendering, joinery, metalwork, roofing, decoration
- general trades
- practical building know-how

Many respondents were careful to point out that training should be adjusted to suit their needs. Their backgrounds are very different: they include art historians, architects, town planners, to name but a few. It was also pointed out that a number of authorities don't actually employ a conservation officer, so there is a general need for broader training in planning departments.

Education and training relating to older, and in particular historic, buildings has been severely limited until relatively recently. Even now, many property professionals, primarily architects and surveyors, do not receive a satisfactory introduction to the differences between traditional and modern methods of construction or learn

properly how to survey older buildings. For example, a commonly perceived defect in older buildings is that of dampness, yet there is very little training aimed at diagnosing damp problems; property professionals are not shown how to use a moisture meter, just that they should use one. The current system does not produce a sufficient number of professionals with the necessary skills, nor does it encourage them to act as good custodians.

The areas where the education and training of professionals can be improved should include an understanding of:

- the materials and methods of construction of traditional buildings
- the performance characteristics of the materials used to build and repair traditional materials
- the dynamics of air and moisture movement in a building and its relationship to the external environment
- the consequences of any changes in the intended performance of traditional buildings
- the materials and methods of repair and maintenance appropriate for traditional buildings



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Restoring glass at St Mary's, Fairford

Training

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Introduction

The twin problems of the shortage of skilled workers in the construction industry and the inadequacy of training have been voiced since the end of the First World War. A report in 1943 complained of the 'casual form of engagement which was formerly the most unsatisfactory characteristic of employment in the industry'.



Cob-walling demonstration

One of the consequences of this had been that although apprenticeship schemes existed, 'they followed no comprehensive and systematic plan'. The report therefore recommended 'the setting up of a training and apprenticeship council for the industry'. That recommendation was followed, but the situation did not improve. The Construction Industry Training Board (CITB) was set up in 1964, but 30 years later there were complaints in the industry of skills shortages. In 1994 Latham called the need for discussion of training reform 'a matter of urgency' and four years later Egan said there were 'significant gaps' in training, which had to be filled.

However advanced the technology an industry employs, its effectiveness depends ultimately on the people who run it. In an industry like construction, which, despite modern techniques, is still very labour-intensive, the skills, commitment and effective organisation of the workforce are overwhelmingly important in determining whether the industry can produce a high quality of output at a fair price. In fact, it could be argued that improvements in productivity in construction are as likely to come from improvements in employment practices as from advances in technology.

It is a point underlined in the Egan Report, which specifies 'Commitment to People' as one of its key drivers of change:

Commitment to people means not only decent site conditions, fair wages and care for the health and safety of the workforce. It means a commitment to training and development of committed and highly capable managers and supervisors. It also means respect for all participants in the process. ... It is the Taskforce's view that construction does not yet recognise that its people are its greatest asset and treat them as such.

This last sentence is a remarkable indictment of an industry that has existed in its modern form for two centuries and in which there has been a long series of attempts to improve labour relations and working conditions. 'The point here is not that no advances had been made over these years, they certainly had. The point is rather that the industry always seemed to its critics to be one step (or more) behind in developing programmes appropriate to current conditions' (R. Morton, *Construction UK: Introduction to the Industry*, 2002: 10). Morton also points to the high level of self-employment and labour-only subcontracting which differentiates construction from virtually every other industry and is a major contributor to the inadequacy of training and consequent skills shortages (p. 67).

The same arguments that have been applied to the construction industry generally for some years have now been applied to the historic buildings sector. English Heritage's 2000 report, *Power of Place*, argued there was 'a serious shortage of traditional building skills in many parts of the country. ... Opportunities for training, particularly craft apprenticeships, are needed to meet future demand, and employers ... need to be given an incentive to provide training.' And the Heritage Lottery Fund, in *Sustaining Our Living Heritage – Skills Training for the Heritage Sector* (HLF Report, 2000), chose to paint a particularly gloomy picture,

verging on a 'crisis' analysis of skills shortages: 'The lack of conservation craft skills across the sector is a cause for considerable concern, because it is putting the fabric of the heritage at risk' (p. 7).

Despite many calls for better training, any attempt to establish a consolidated view of the training currently being delivered is a major undertaking because of its fragmented nature and the lack of any specific body charged with monitoring delivery and content. Some information is available on heritage skills training suppliers and courses. Useful work has been undertaken by Conference on Training in Architectural Conservation (CoTAC) to catalogue courses. The HLF Report itself provides the only overview of heritage building skills. However, there is little specific information about course capacity, occupancy or success rates. Some of the specific conclusions drawn in that report should therefore be questioned.

The HLF Report did, however, generally conclude that the built heritage sub-sector is difficult to come to terms with when attempting to identify discrete skills and

training needs. Much of the underpinning skills and knowledge likely to be needed are not developed specifically for application in a heritage context. Built heritage specialist skills are often an amalgam of post-recruitment development and generic expertise in construction. There are exceptions, but in general this hybrid form of skill – at professional, technical and craft level – is characteristic of those who work in the sub-sector.

The question has therefore been about who should assume responsibility for spearheading any training initiatives. In responses to this question, 136 local authorities reflected both the very wide spectrum of possible training providers and the considerable confusion as to where the onus of responsibility should lie. Many responded with a range of options and combinations (see Table 11), which, when consolidated into groups and expressed as a graph, are distributed as shown in Figure 8.

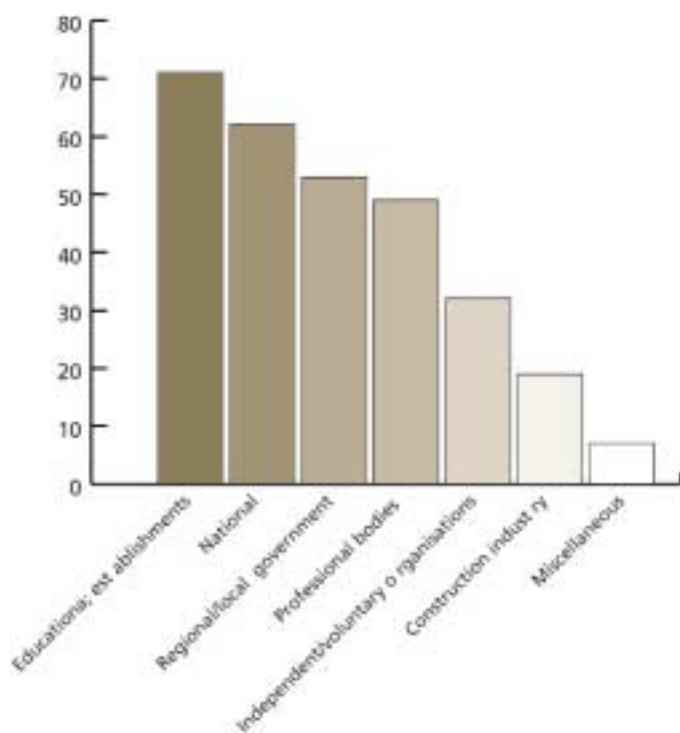


Figure 8: Favoured delivery options

Source: Conservation Officers' Questionnaire (136 sample)



Heritage Building Crafts

Table 11: Training delivery options: number of responses

National		Education	
National body	3	Technical colleges	2
National skills body	1	Technical schools	1
Dedicated national centre	1	Colleges	8
Other agencies	1	Specialist colleges	2
Central bodies	1	Old-type colleges linked to apprenticeship scheme	1
Government	1	North Shropshire College	1
Government bodies	2	Local training establishments	1
English Heritage	43	Local/regional colleges	8
CITB	6	Training providers	1
Countryside Agency	1	Higher education	1
CABE ^a	2	Further education colleges	5
HCA ^b	1	City & Guilds	1
HLF	2	National education system	1
British Waterways	2	Normal education	1
Development agencies	1	Educational establishments	4
Regional Development Agencies	1	Academic centres	1
Regional bodies	1	Regional universities	1
Local authorities	44	Universities	14
County Councils	7	Training and skills centres	1
Essex CC	2	Local university	1
BEAMS	1	Bournemouth University	1
External professional agencies	1	Brighton University: architectural school	1
Professional bodies	5	University partnerships	1
Specialist courses in CPD	3	Architecture centres	1
Consultancies	1	Local schools	1
Special consultants	1	Schools	1
Specialist organisations	1	West Dean	2
Architects	1	Weald & Downland	5
Architectural historians	1	Bursledon Brickworks	2
IHBC ^c	24	Lime Centre	2
IHBC regional branches	1		
Local conservation officers' groups	2	Miscellaneous	
Association of Conservation Officers	1	Private Sector	1
RTPJ ^d	2	Specialists	4
RIBA ^e	3	Different organisations	1
RICS ^f	4	Whatever source is appropriate	1
CIOB ^g	2		
Construction industry		Independent/voluntary	
Building federations	2	Independent organisations	1
Craft enterprises	1	Civic societies	1
Trade organisations	1	Amenity societies	3
Guild of Master Craftsmen	1	National amenity organisations	1
Practical craftspeople	1	SPAB	20
Trade bodies	1	Georgian Group	1
Construction industry	4	Victorian Society	1
Building sector	1	The National Trust	2
Specialist craft organisations	1	Voluntary bodies	1
Main contractors	1	Building preservation trusts	1
Skilled contractors	1	Trusts	2
Specialist contractors	1	Local experts	1
Contractors	1	Specialist groups	1
Specialist firms	1		
Craftsmen	1		
Specialist craftspeople	1		
Private companies	2		
Product manufacturers/suppliers	1		

Notes: *a Commission for Architecture and the Built Environment; b Heritage Conservation Association; c Institute of Historic Building Conservation; d Royal Town Planning Institute; e Royal Institution of British Architects; f Royal Institution of Chartered Surveyors; g Chartered Institute of Building*

Source: Conservation Officers' Questionnaire (136 sample)

Vocational Education and Training

Any attempt to identify the range of courses and qualifications relevant to the heritage building sector inevitably raises problems of definition, particularly when many of the skills employed are generic to construction.

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Stonemason's tools

Craft level training is criticised in the Heritage Lottery Fund (HLF) Report. In most cases, it was felt that the shortcomings could best be addressed by post-qualification short courses on specific built heritage skills (e.g. on lime mortar use and application, or conservation joinery using traditional methods). Problems associated with such courses concern marketing, cost and lack of demand. These problems were found to be especially acute when courses focused on regional traditions with a relatively small practitioner market.

The HLF Report found that heritage employers have occasionally collaborated to support or influence new provision in response to changing skill needs – but this was found to be rare. Most employers felt they didn't have enough links with higher or further education, sometimes just because their business was too small. The quality of the market messages going into publicly funded vocational education and training has therefore been weak, a finding that is supported by the CITB's experience and research.

According to the HLF Report, the problems that exist in many parts of the built heritage sector of accessing and using skills reflects the imbalances in supply, the weak vocational orientation of some of the existing course content and the general distribution of courses, which results in oversupply in some areas and little (or no)

provision in others. The Report found that some of these problems stemmed from the responses of individual universities and colleges to existing funding systems, and that any action taken to address them will need to consider ways of refocusing institutional attention towards employers' needs. Furthermore, it was found that that this issue is one that other sectors with more refined employer – education relationships have also found difficult to address and sustain. Although response to the emerging needs of the heritage sector was generally slow, it was stronger in the private education and training sector, but mostly only in terms of full-cost short courses. These were often beyond the means of small firms, independent entrants and the self-employed.

The HLF Report found that, with the exception of museums, most companies continued to support traditional apprenticeship training in construction crafts. The trainees were generally recruited directly by the organisations concerned, and were not linked to government funding through the Modern Apprenticeship framework. In most cases, the apprentices in these organisations were being trained specifically for built heritage specialisms. This involved a mix of S/NVQ-based on and off the job training and assessment, combined with exposure to many projects with differing built heritage and conservation dimensions. The mix of in-depth and broadly based training was seen as critical. It developed the breadth of practical skills, team working and interpretative understanding expected of a built heritage craftsman. Those who had been trained in this way were much in demand.

The provision of heritage building training is largely centred on the south-east and south-west of England. To some extent this reflects the market for heritage building work. (see: www.craftsintheenglishcountryside.org.uk)



Table 12: Heritage building qualifications

Occupation	NVQ level	Additional units	CSCS endorsement title
Bricklayer	NVQ 2 & 3	L2: MR195 L3: MR199, MR200, MR201, MR202	CSCS Endorsement Bricklayer (Conservation)
Carpenter/Joiner	NVQ 3	MR176, MR177, MR170, ^a MR 171 ^a	CSCS Endorsement Carpenter & Joiner (Bench Work Conservation)
Carpenter/Joiner	NVQ 3	MR174, ^b MR 177 ^b Site work	CSCS Endorsement Carpenter & Joiner (Site Work Conservation)
Façade cleaner	NVQ 2		CSCS Façade Cleaner and Repairer Cards
Maintenance operations	NVQ 2 & 3		CSCS Maintenance Operative Card
Plasterer	NVQ 2 & 3 (solid or fibrous work)	L2: MR220, MR221, MR222, MR223, MR225 L3: MR228, MR228, MR213, MR230, MR231	CSCS Endorsement Plasterer (Conservation)
Painter/decorator	NVQ 3	MR247, MR248, MR251	CSCS Endorsement Painter & Decorator (Conservation)
Roof slater/tiler	NVQ 2 & 3	L2: MR290, MR292 L3: MR299, MR300, MR301	Plasterer (Conservation) Roof Slater & Tiler (Conservation)
Stonemason (Conservation)	NVQ 2 & 3	L2: MR195 L3: MR266, MR51, MR213	CSCS Endorsement Mason
Wall/floor tiler	NVQ 3	MR212, MR213	CSCS Endorsement Wall & Floor Tiler (Conservation)
Thatcher	NVQ 2 & 3		CSCS Thatcher Card
Building site management	NVQ 4	SML4 011; inspect, schedule and implement conservation works	
Conservation officers	NVQ 4		
Conservation consultants	NVQ 5		

Note: a Wheelwrighting units; b Timber frame erection units
Sources: CITB/City & Guilds Unit Builder, 2nd edition, 2002

However, the provision is unplanned and contains many barriers to training entry and progression. The CITB and the National Heritage Training Group (NHTG) have identified access to high-quality training as a major issue. Because of the very specialist nature of the heritage building sector it is imperative that training provision is planned and coordinated on a national and regional basis.

The CITB's On-Site Assessment and Training Programme (OSAT) would appear to be particularly appropriate to meet the training and NVQ assessment needs of specialist heritage building contractors. CITB research has indicated that employers like the idea of OSAT as it has the potential to train and qualify

construction workers, while minimising lost production time. In contrast, employers generally dislike the paperwork, jargon and poor service provided by some training providers. If OSAT is to work for the heritage building sector, a high-quality training and assessment infrastructure is required (see 'Recommendations', below).

Vocational qualifications

Most occupational areas within the built heritage sector now have standards-based qualification frameworks. Table 12 shows the building conservation qualifications available for traditional craft trades.

But what evidence is there to suggest that NVQs are a viable route for providing skills training in the historic buildings field? Even if the divide between conservation/restoration and new-build firms is becoming more pronounced, there would seem to be nothing gained from a divide-and-rule approach to training. Traditional building firms need to learn some of the tricks of modern house-building construction, quite apart from the health and safety and site procedures; at the same time, the volume house builders need to take on board the requirement for higher standards of workmanship as communicated, for example, through design guides adopted as supplementary planning guidance. Underpinning both is essential for learning basic principles of carpentry, masonry, roofing and internal finishing. And, as noted earlier, it is quite impossible to separate construction firms into two neatly defined groups. Firms that claim to have conservation or restoration experts will also be involved in building extensions or new-build projects. By far the majority of small to medium-sized building firms will be undertaking some conservation work.

This means that NVQs are really the only – if any – qualification system with which the majority of 'site operatives' walking onto a conservation building site will have come into contact. Those entering the trade will probably have learnt little about historic buildings at school (younger children are more likely to have visited an open air museum or carried out projects on their local environment). From school, their route might have taken various paths. They may have gone straight into the industry; in all likelihood they will have hitched up to a small firm (and the historic buildings sector is serviced in particular by one-person or small companies). If they have researched the field, they may have been fortunate in securing funding to undertake a modern apprenticeship scheme. If they were self-motivated, they may have attended evening classes. If they joined a larger firm, they may have stood a better chance of receiving in-house training, or been allowed out on a day release course. Finally, if they have special needs or have been unemployed, they might have been placed by a government-sponsored training provider with a particular construction company. But whichever of these routes they might have followed, their training will have been linked almost exclusively to the acquisition of NVQs. With the increasing emphasis on adult skills training, mature

students are also likely to find their upskilling needs catered for through the same system.

The mistake is therefore to assume that NVQ training is not a suitable medium for learning traditional craft skills. To carry out the basic tasks required on conservation sites identified above does not require a complex, in-depth knowledge of historic technologies, an intense understanding of edge tools or an advanced grasp of chemistry. The basic principles of setting out, gauging and using materials in the basic conservation process are essentially no different from what has to be learnt for the basic craft occupations at NVQ Levels 1, 2 & 3.

NVQ Levels

Level 1 Competence in the performance of a range of varied work activities, most of which may be routine and predictable.

For example: a student enrolled for NVQ Level 1 Wood Occupations (Construction) would study how to assemble joints, using hand tools, drawings, calculations, timber adhesives and fixing devices. For NVQ Level 1 Trowel Occupations (Construction), the student is introduced to tool-handling skills and the preparation and use of materials of the trade. NVQ Level 1 Decorative Occupations covers tools and equipment and surface preparation and decoration

Level 2 Competence in a significant range of varied work activities, performed in a variety of contexts. Some of the activities are complex or non-routine, and there is some individual responsibility or autonomy. Collaboration with others, perhaps through membership of a work group or team, may often be a requirement

For example: topics covered under NVQ Level 2 Carpentry & Joinery (Construction) would include how to assemble joints, door frames, linings, using power hand tools, trussed roofing, site work and joinery. NVQ Level 2 Brickwork covers construction methods and wall-building techniques. Painters and decorators move on to preparing work/areas/surfaces and learning about



Heritage Building Crafts

paint and wallpaper application techniques, including stencilling, marbling and ragrolling.

Level 3 Competence in a broad range of varied work activities performed in a wide variety of contexts most of which are complex and non-routine. There is considerable responsibility and autonomy, and control or guidance of others is often required.

For example: NVQ Level 3 Carpentry & Joinery (Construction) should extend the student's knowledge to cut roofing and wood machining. For bricklayers, complex setting out and walling details are covered. Painters and decorators address specialist surface finishes.

With this framework already in place, NVQs can only be ignored by the conservation world at its peril. They will, undoubtedly, continue to play a more important role:

In 1999, approximately 40 per cent of the workforce were qualified to National Vocational Qualification (NVQ) Level 3 or above. Over the next ten years this is expected to rise considerably, with the number of employed people with Level 3 qualifications increasing by 24 per cent, and those with Level 4 or above increasing by 26 per cent. (Ecotec Research and Consulting, Programme Area Review: Construction, Report for the Further Education Funding Council, 1999: 4)

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Trainees mixing plaster

But the view is already entrenched in some quarters of the conservation world that colleges do not possess the requisite training skills to deliver NVQ Levels 2–4. It is also argued that the standard of training that technical colleges are able to offer is being undermined by the generally poor ability of the intake. Such views tend to be based on opinions unsubstantiated by research. So little qualitative or quantitative investigation has been carried out to establish the extent, appropriateness and sufficiency of NVQ training for conservation work that the question has to be asked whether the approach should be so readily dismissed. Rather, we should be enquiring whether there are valid reasons to believe the existing training routes on offer are relevant to the conservation world, whether they need to be strengthened and, if so, what resources are needed to deliver them.

To test the proposition, a questionnaire was circulated to a total of 317 construction training providers listed on the CITB database. Information was sought on intake and training in the following areas:

- trowel occupations
- wood occupations
- wood machining
- roofing occupations
- stonemasonry
- decorative occupations
- plastering
- maintenance operations
- conservation and restoration

These NVQs were selected as being the most relevant to the 'craft' occupations employed on historic buildings, although it is of course recognised that electricians, plumbers, engineers etc. may at times come into contact with historic fabric and would benefit from conservation elements in the appropriate units.

A good response rate of 28% produced 89 replies. Of these, 64 (20.2%) can be used for analysis. Representative responses from each category of provider (colleges, training agencies, industry training providers, independent trainers and others – e.g. prisons, Army etc.) were received.



Course take-up

In the questionnaire, providers were asked to state how many students were enrolled on construction courses. Although data on NVQ Level 1 were collected, the information has not been presented (see Table 13), as the introduction of ICAs has confused the picture. Since the sample constituted 20% of all training providers, a factor of 5 can be applied to the results to estimate the national picture (see Table 14). For comparison, figures for the average annual requirement (2001–5) in each craft as estimated by the CITB are also given in Table 14 (the latter figures are for Great Britain).

Table 13: Number of students on selected craft courses (2002)

Craft	NVQ 2	%	NVQ 3	%
Trowel	1,376	30.1	356	24.2
Wood	2,220	48.5	883	60.1
Wood machining	118	2.6	21	1.4
Roofing	95	2.1	16	1.1
Stonemasonry	16	0.3	10	0.7
Decorative occupations	597	13.0	135	9.2
Plastering	132	2.9	26	1.8
Maintenance	20	0.4	8	0.5
Conservation			15	1.0
Total	4,574	99.9	1,470	100.6

Source: NVQ Questionnaire (CITB)

Table 14: Estimate of NVQ Level 2 student population (2002)

Craft	Total estimate for NVQ 2	Average annual requirement (GB)
Trowel	6,880	6,064
Wood	11,100	10,773
Wood machining	590	Incl. in above
Roofing	475	2,303
Stonemasonry	80	No data
Decorative occupations	2,985	4,446
Plastering	660	1,834
Maintenance	100	1,299
Conservation		
Total	22,870	

Source: NVQ Questionnaire (CITB)

A skills crisis?

If the supply levels are accurate, the findings suggest that rather than there being a blanket skills crisis, colleges are, in at least two areas – trowel and wood occupations – more in danger of oversupplying the market. This is borne out by further research as to whether courses were over-subscribed, satisfying demand or under-subscribed (see Table 15)

Table 15: Take-up of NVQ courses (2002)

	Over-subscribed	Satisfying demand	Under-subscribed
Trowel	18	13	13
Wood	29	13	9
Decorative occupations	4	6	8
Plastering	5	2	3
Roofing	2	2	1
Stone	1	1	2

Source: NVQ Questionnaire (CITB)

The imbalance between trowel and wood occupations on the one hand and stone, plastering, decorative and roofing occupations on the other is significant for 'conservation training', as it indicates how unhelpful it is to complain of skill shortages across the sector. Adopting a different approach towards the different crafts might be a more constructive strategy. Contrary to popular perception, bricklaying and carpentry skills are not in particularly short supply. What is required, however, in partnership with industry, is an enhancement of the existing training to supply the sector with more carpenters and bricklayers competent to work on historic buildings. The sector, for its part, needs to make these trainees aware of its existence and needs.

The excess demand could usefully be channelled into the other camp where real problems clearly do exist. The potential impact on historic buildings of the shortage of plasterers, painters and decorators, roofers and, to some extent, stonemasons is of major concern; yet an underused training capacity in colleges exists for these crafts.

The relevance of NVQ training to conservation

Some courses, such as those run by the Building Crafts College in London and Accrington and Rossendale College, Lancashire, already include significant sections on conservation in their NVQs, but, as one said, introducing the concept of heritage conservation to students is generally done more as an awareness-raising exercise than pointing them towards a possible career path.

One key aim of the NVQ survey was to try and identify how many of those engaged on NVQ training were actually being employed or sponsored by firms working with historic buildings. No definition of 'firms working with historic buildings' was given, leaving respondents to make their own assessment. The response in very many cases was 'very few'; 'none that we are aware of'; or, in a number of cases, 'not known'. All these perhaps reflect the lack of understanding on behalf of colleges of

And yet many respondents thought that 'historic buildings' constituted too specialised a sector for them to become involved in; they felt that the NVQ does not lend itself to specialisms. Table 16 indicates that the 'specialist' route is simply not applicable. Many colleges are clearly unaware of the construction profile of their student intake in terms both of the companies that employ them and of the individual training needs of the students themselves. Furthermore, Table 16 indicates that there appears to be a slight percentage increase of HBF involvement at Level 3; given that this level is supposed to take students to 'master craftsman' level, the rise may appear disappointing. Much more disappointing, however, is how few students overall are progressing to this crucial level. Pressure needs to be put on firms with a historic buildings portfolio to ensure that their employees move through the NVQ system rather than abandon it after taking Level 1 or 2. At the same time, colleges need to improve standards of training at Level 3.

Table 16: NVQ students employed by firms working with historic buildings

Craft	NVQ 2	HBF	%	NVQ 3	HBF	%
Trowel	1,376	260	18.9	356	77	21.6
Wood	2,220	427	19.2	883	216	24.5
Wood machining	118	8	6.8	21	6	28.6
Roofing	95	32	33.7	16	0	0
Stonemasonry	16	7	43.8	10	0	0
Decorative occupations	597	66	11.0	135	20	14.9
Plastering	132	54	40.9	26	10	38.5
Maintenance	20	0	0	8	0	0
Conservation		0	0	15	8	53.3
Total	4,574	854	18.7	1,470	337	22.9

Source: NVQ Questionnaire (CITB)

the real nature of their client base. Given the number of negative responses, the proportion of students stated as being employed by construction firms working with historic buildings compared to the total number of students at each level is therefore surprising (see Table 16). In other words, one in five students (and this is undoubtedly a minimum) had a direct link to historic buildings via their employers, who, it therefore follows, actually require a workforce skilled to work with historic buildings.

Table 16 also indicates that the level of interconnection between historic buildings and enrolled students clearly varies from craft to craft. The tightest relationship appears to exist for the plastering trades, but is significantly less important for those engaged in decorative occupations. By adopting a sectoral approach to conservation training, there is a need for colleges to promote uptake and recognise the need to gear plastering courses to historic buildings. With painting and decorating, the uptake and potential skills shortage is so poor that other routes may



Woodwork apprenticeship training

also have to be followed – e.g. by bolstering short-term courses for upgrading skills and to cater for the DIY market (which is in any case more significant in this sector). An understanding of lime and historic paints lends itself particularly well to this type of training delivery. Alternatively, it may be that a new category of NVQ for finishes covering plastering, painting and decorating in the historic environment is required, with the aim of raising the numbers and focusing the skills of entrants into this field.

The high involvement of both stonemasons and roofers in the historic buildings field is also evident. Again, these two areas may require different approaches. Craft colleges at Weymouth, Bath, York and London already deliver courses in stonework with a strong conservation content, and these should form the basis of a better resourced training network spearheaded by the Stone Federation. The roofing scene gives particular cause for concern. While the promotion of stone roofing has received considerable input from English Heritage (EH), the requirement for specialist skills and access to quarries probably should place it under the wing of the stonemasons' network. Training for slate and peg-tile roofing appears to be at a critically low ebb; as these are such fundamental requirements for maintaining and enhancing the historic environment, a review is urgently required.

Barriers to improving conservation training

The ability of training providers to respond to the challenge of improving skills training for the historic buildings sector is obviously hampered by many factors, and these need to

be fully understood if a workable system of NVQ training is to be implemented.

When asked whether they considered their courses provide students with adequate skills to tackle historic buildings, 51.5% of the 33 respondents who replied negatively pointed out that they are not actually aimed at students who wish to work in restoration. Indeed, in some cases doubts were expressed as to whether the historic buildings sector was sufficiently attractive to encourage students into the industry. Many course tutors thought it would be impossible to fit any more into the current syllabus; others felt that there is a shortage of suitable training material and that the content of the courses is too basic and not always relevant.

Another perceived problem was the nature of external influences that dictate course content, such as major house builders whose only interest is new-build. A few providers were also dubious about the capabilities of their student intake, complaining that many of them lack basic education abilities and are not sufficiently committed to the task.

Recruitment or updating tutors' skills was seen as an even more serious barrier to change. A lack of funding for courses and, as a result, the low rates of pay available for tutors were seen as the main problems. Most respondents had experienced enough problems recruiting for the main industrial trade skills, let alone for specialist historic needs.

In addition, the CITB reported a very low take-up of building conservation S/NVQ qualifications. The reasons for this are probably a combination of the lack of provision and trainees choosing general craft skills before specialising in heritage and conservation work. In 2002 the CITB research for the National Specialist Contractors Council also found a significant management and supervisory skills gap and a lack of appropriate S/NVQ qualifications at Levels 3 and 4. Work is now under way within the CITB to create a flexible suite of NVQs for managers and supervisors from all types of specialist and heritage organisations.



Opportunities to deliver/improve training

The flip side of the coin reveals that there is more than a glimmer of optimism – indeed, one senses a strong current of feeling that much more could and should be done to improve delivery of training in this field. This sense of optimism comes not just from the mainstream college providers but also from some quite unexpected quarters. For example, Pentonville Prison suggested that NVQ course content could be improved by including materials on historic paints, colours and materials; HM Prison at Wellingborough declared an interest in developing an NVQ in architectural metalwork, as they are about to open a blacksmith's workshop. Both welcomed the idea of working more closely with EH, as did Doncaster College for the Deaf, where the tutor had 'accessed some good material via the internet – e.g. pointing of old buildings' as course material. Here, surely, is where access and social inclusion issues for the historic environment really can be located.

Although many of the tutors in the mainstream colleges felt that NVQs were not providing students with the necessary skills to tackle historic buildings, this was not true in all cases. On the plus side, 20 respondents gave a qualified reply involving such phrases as 'yes, in time', 'to a limited extent' and 'in some cases'. And 5 respondents replied positively to the question, albeit tempering their answers with comments such as 'though this is not the purpose of the qualification'.

The principal, valuable point made in this context was that 'the skills taught are transferable, but often the techniques used are different'. Although the programmes currently on offer provide good basic skills training, further training and development are required on site to perfect the more advanced skills needed to work on historic buildings.

Just as significant (despite the barriers listed) is the undercurrent of goodwill that could be detected from the responses, which should be tapped and harnessed. A number of respondents said that they would be more than willing to develop specialist programmes if there were sufficient demand. Many tutors were at least aware of the possibilities for improving training and were happy to list

ways in which course content could be improved. These included: placing a greater emphasis on traditional skills and covering more theory on historical building; having stand-alone or additional modules within the NVQ that concentrate solely on historic building; returning to something more like the old City & Guilds Craft Courses; increasing the amount of project work undertaken on courses; encouraging the relevant industry to sponsor or fund specialist units within the course.

While these responses indicate that many tutors are not averse to developing courses for historic buildings, perhaps more surprising – given the barriers listed – was the number of them who announced positive plans actually to deliver training in this field. Proposals included:

- Conservation foremanship (Building Crafts College; RG Carter Technical Services Ltd; West Suffolk College).
- Earth walling (East Devon College; Otley College).
- Lime (East Devon College; West Suffolk College).
- Specialist architectural joinery (Accrington and Rossendale; Building Crafts College; East Devon College; West Suffolk College).
- Specialist brickwork (Accrington and Rossendale; Rugby College).
- Stone roofing (East Devon College; SM Roofing Supplies).
- Thatching (West Suffolk College).
- Timber framing (Building Crafts College; East Devon College; Huddersfield College; Otley College; St Austell College; The Laird Foundation).
- Decorative finishes (Stockport College).
- Flint knapping (West Suffolk College).
- Green woodworking (Otley College).
- Lead sheet (Building Crafts College).
- Gilding (Crawley College).

And significantly, 40% stated they would be interested 'in developing NVQs or modules to cater for the historic buildings market.'



Colleges were pretty unequivocal as to who they thought should spearhead the development of craft training. When asked whether there should be more liaison between training providers and other appropriate groups in the historic buildings sector, 58% thought links should be improved. EH in particular was singled out as the body that colleges thought should be taking the lead in cementing links.

Centres of Vocational Excellence (CoVEs) are currently being established to develop new and enhance existing vocational provision. The aim is to provide a strategic network of high-quality centres, taking account of local, regional, sectoral and national needs, with an emphasis on improving Level 3 training. In particular, collaborative ventures are encouraged to promote more dialogue between employers and training providers. By the end of 2003–4, £100 million funding will have been made available to develop CoVEs, and the Learning and Skills Council (LSC) has already announced the creation of 138 CoVEs, with more to come.

Labour market research to support the development of CoVEs identified construction as a key sector requiring such support: to date, 11 centres for construction crafts have already been approved around the country (see Table 17). Accrington and Rossendale College, one of the respondents to the NVQ survey, was one of the 'pathfinder' CoVEs. Their brochure, *Building Up*, reflects the massive impact such status has had on improving resources and networks. From the building conservation perspective, the unfortunate thing is that no strategic thinking seems to be being applied to ensure that the needs of the sector are properly addressed. Table 17 indicates the woeful lack of integration between the training providers in the sector. There appears to be virtually no overlap between the various centres providing or intending to provide conservation training, or between CoVEs and the conservation training providers.

Table 17: Centres of Vocational Excellence (as at April 2002)

Region	College	LSC	Vocation
East Midlands	Moulton College	Northants.	Construction
Eastern	Peterborough Regional College/Isle College/CRC	Cams. and Peterborough	Construction
London	Lambeth College	London Central	Construction
London	Barking College	London East	Construction
Northern	None		
North West	Manchester College of Arts and Technology/Skills Solution Ltd.	Greater Manchester	Construction
	Accrington and Rossendale	Lancashire	Construction crafts
South East	South Kent College	Kent & Medway	Construction
South West	Somerset College of Arts and Technology	Somerset	Construction (crafts, professions and sustainability)
West Midlands	Stourbridge College	Black Country	Built Environment
Yorkshire and Humberside	Hull College	Humberside	Construction technologies
	Leeds College of Building	West Yorkshire	Construction

Source: LSC websites/SWSLIM website

Destinations of early leavers and completers

The HLF Report indicated high drop-out rates, with one in ten institutions experiencing more than 50 per cent of enrolled students failing to complete. Compared to other areas, however, the data suggested that heritage provision in further education colleges has a stronger record of student retention than many other vocational subjects.

Research by the CITB indicates that of those starting construction training, just over 60% either go on, or continue, to work in construction, with 40% leaving the industry. CITB consider this to be at the upper end of such estimates, with an actual figure of between 20% and 40% leaving the industry, depending upon the course.

Funding training

The HLF Report found that a common cause of concern was lack of funding for training. This affected smaller employers and the self-employed in particular. The organisations felt it was simply too costly to send staff on the available craft level courses. Many of the courses would involve trainees attending courses on a residential basis, which significantly adds to the cost.

One organisation in the HLF Report highlighted the significant costs involved in using traditional apprenticeships to develop high-quality crafts people, stating that 50% of those qualifying leave within one year. Another organisation, using the Modern Apprenticeship Scheme, found that to produce a quality banker mason it needed to fund trainees to S/NVQ Level 3. The cost of this was estimated at £1,000 per trainee and was not covered by Modern Apprenticeship funding.

The HLF Report stated there is a danger that the funding processes of post-16 vocational education and training (and their traditions) emphasise student rather than employer demand. This has resulted in the demise of some traditional local skills that are likely to attract only small numbers of students. This remains an issue today.

The CITB now provides more flexibility in training grants, as long as employers produce a simple training plan. Take-up for this has been slow, but with improvements to the application process, it is expected that more employers will find this approach meets their requirements. Currently, 66% of CITB-registered firms do not claim any grant back.

The NVQ system of delivery through colleges is not of course the only route provided by the education system. More attention is being focused on the historic built environment at schools – Essex CC recently secured funding for an outreach programme for schools to complement its training courses at Cressing Temple. A number of universities run conservation courses aimed at practising professionals and conservation specialists – some, such as the Bournemouth University courses, will also attract craftspeople and those undertaking conservation foreman roles. A number of other institutions, though not in the mainstream educational system, nevertheless embrace education and training as a primary role. Examples of these institutions are the Weald & Downland Open Air Museum, West Dean College, Bursledon Brickworks and the Lime Centre, Hampshire. The success of the Weald & Downland Open Air Museum in this respect only highlights the failure of the other open air museums to take their training potential seriously – a great pity given the possibilities of their forming a strong regional network of providers.

Training organisations

National bodies

Conservation officers indicated support for a dedicated national centre to take on skills training. Very few respondents to the NVQ Survey were aware of the importance of CITB and its responsibilities for delivering training (see 'Recommendations', below). None mentioned the National Heritage Training Group, the lead body recently established to coordinate training in this field.

Other former national bodies with a responsibility for delivering training have shifted their allegiances or withdrawn entirely from the arena. The Countryside Agency is relinquishing its role in providing direct funding for Knuston Hall; Herefordshire College is now becoming more proactive in the delivery of training courses, particularly in the field of blacksmithing. Only a few respondents mentioned the new CABEs as influential in this respect – again, their role could be much more proactive in the training field through their support for architecture centres. British Waterways provides some key training courses at its Heritage Skills Training Centre, Hatton Works, and is clearly emerging as a key provider in the West Midlands (see below).

Heritage Lottery Fund

The Heritage Lottery Fund does not expect to fund training as such: it is up to the LSC, the regional economic development sector or European programmes to provide such funding. The HLF does, however, offer funding for specific projects or training organisations. Since looking after the needs of heritage sector includes intangible skills, the HLF undertakes various responsibilities:

- it plays an advocacy/promotional role
- it funds the training of volunteers
- it requires applicants to demonstrate a training element – it will, e.g., pay for apprentices (Yorkshire Sculpture Park is a good example: combined funding from the LSC pays for training, and staff are already NVQ assessors; when the project is completed in 2005, there should be 9 apprentices trained in connection with horticultural and building conservation skills)
- the application pack for lottery funding asks how many apprentices, placements, internships etc. will be created, and all projects over £1 million have to include a training plan

- it works with EH on tendering; the presumption should not be that the cheapest quote will get the job – the winning bid may include training costs in its tender
- it feels it should build social cultural training capacity and therefore at least promote training in any way it can – e.g., by opening up project sites to construction students, schoolchildren, etc.
- it publicises good practice through vignettes and case studies
- it gives guidance re training monitoring – the vacuum here is that HLF project advisors are not trained to monitor the training aspect – the policy is to employ general advisers dealing with access, volunteers, audience development, education.

English Heritage

By far the most frequently mentioned national body in the survey was English Heritage, the UK government's agency responsible for protecting and promoting interest in the historic environment. Having held a training remit since its inception, EH has worked in various ways to promote and deliver craft and professional training through lectures, courses, supporting courses delivered by others and publications. Since 2002, EH has adopted a more strategic national role on traditional craft skills and training needs, enabling and working with other partners to develop a coherent policy. The Conservation Director is responsible for craft skills strategy and liaises with various government departments, heritage bodies, sector skills councils, learning skills councils, amenity groups and others on relevant issues.

Within the Conservation Department, the Building Conservation and Research Team (BCRT) acts as a focus for project management, coordinating EH's approach to traditional building craft skills and practical conservation. BCRT also oversees EH's relationship with West Dean College, Sussex, in



delivering a programme of building conservation master classes. These courses, equipment and built structures for practical training exercises were transferred on the closure of EH's training centre at Fort Brockhurst, Hampshire in 1997. EH also supports short training courses at the Weald and Downland Museum and provides lecturers and demonstrators at a range of events promoting current best practice. It has also assisted in delivering practical conservation awareness training courses to improve local skills. This is augmented by organising conferences and seminars, often in conjunction with other partners and disseminating technical information through its suite of Technical Advice Notes, Practical Building Conservation Series, Research Transactions and videos, such as, *Framing Options* and *Making the Point*.

EH – and its predecessor the Ministry of Public Buildings and Works – has a long tradition of investment in craft training and employed a direct labour force, comprised of small regional teams working on conservation and repair of its properties. This was privatised in 1996 and work is now carried out by a range of contractors working to specifications prepared by regional historic building architects and surveyors. Technical matters, current practice, debating issues and sharing advice between the building conservation professionals is achieved through regular forums coordinated by the Chief Conservation Architect. Research, standards and technical advice on all aspects of conservation are also provided within EH by the Building Conservation and Research team.

The need to address the traditional building craft skills shortages was highlighted in the following reports: *Power of Place* (English Heritage, 2000), *Sustaining Our Living Heritage* (Heritage Lottery Fund, 2000), *The Historic Environment: A Force For Our Future* (Department for Culture, Media and Sport and Department for Transport, Local Government and the Regions), *CITB-Construction Skills, Foresight Report* (2002) and *State of Our Historic Environment* (English Heritage, 2002)

From this, EH was requested by the Department for Culture, Media and Sport to address the problems and to coordinate policy for traditional building craft skills and training issues. As a result, the National Heritage Training Group (NHTG), a specialist sector skills development group, was formally established in October 2002 through a memorandum of agreement between CITB-Construction Skills (Sector Skills Council for Construction) and EH.

As part of this process, EH organised the first ever summit of the built heritage sector at Warwick University in February 2003, bringing together heritage contractors, heritage bodies and training providers from across the UK to discuss the problems and this consequently strengthened the role of the NHTG as the body to represent the sector.

The NHTG is currently jointly funded by CITB-Construction Skills and EH and is under the direction of a heritage construction manager and heritage training adviser, who are responsible for implementing a coherent strategy for training and skills provision, to meet the demands of the traditional building crafts sector. This group is a formal part of CITB-Construction Skills protocol to engineer craft skills to a DfES model, with ownership and engagement by employers' groups (levy-paying members of the construction industry). The management committee is currently composed of representation from 75% registered 'in-scope' members of CITB-Construction Skills, the Historic Buildings Contractors Group, EH, Historic Scotland, COTAC, further education and private training providers, trade unions and the Building Skills Action Group sector clients. The group now has a UK-wide remit. As conservation forms part of the repair, maintenance and improvement sector of the construction industry (representing 57% of the total construction industry) the link between CITB-Construction Skills, EH and NHTG is a logical means of providing sustainable craft skills training and development.

The NHTG Business Plan was launched in England on 29 October 2003 at the Building Crafts College, Stratford, London, by Lord McIntosh, Minister for the Media and Heritage, with three main objectives:

- integration of stakeholders (national heritage bodies, grant-aiding bodies, historic building stockholders, the construction industry and training bodies)
- to carry out independent research on a regional basis in England and Northern Ireland and nationally in Scotland and Wales to provide up-to-date data, which does not exist, on building conservation and restoration training and skills
- to develop a 5-year training plan for traditional building craft skills, with separate provision for England, Northern Ireland, Scotland and Wales to retain regional and national variations. This will also set targets for recruitment, training, retention within the sector and

address qualifications development, assessment provision, manufacture and supply of materials, mentoring and research and development aimed at improving the image and performance of the sector

This craft skills mapping is currently being undertaken in the nine English regions, with the majority of the funding provided by EH, the Sector Skills Development Agency and CITB-Construction Skills. This will determine the extent of the historic building stock and in-depth interviews with contractors and training providers will establish supply and demand. The subsequent gap analysis will result in recommendations that, for the first time ever, will allow future planning based upon accurate statistics. The research will be completed by the end of September 2004 with the full report following in November 2004 and will enable better funding support for training, influence new or adapted training facilities, identify national and regional differences in provision and provide co-ordinated action to address the problems faced by the sector.

Whilst the NHTG primarily represents the traditional building skills that are in-scope with CITB-Construction Skills, other conservation skills, such as thatching, dry-stone walling, cob and adobe walling, flint work and related rural crafts, are seen as an allied and integral part of the overall skills and training requirements. These aspects are supported by EH and the NHTG through representation at committee level for the various bodies and by working in partnership with government departments and organisations, such as Lantra, the Learning Skills Council and others within the built heritage, landscape and rural sectors.

EH seeks to influence strategic policy on training issues and supports the CITB Construction Skills Certification Scheme, which is seen as a means of improving and validating standards within the sector. Through the NHTG it is actively participating in developing a mentoring programme and master crafts status as an integral part of career progression. It is also seeking to fund research into training and career progression of practical conservators to map their development and to promote the relationship between this group, craft trades and other professions. It is also actively working to influence the contractual process so that a well-developed training policy is an integral part of the tendering process for grant-aided projects and to encourage the use of contractors who invest in training.

Other bodies

By 2001, partly in an attempt to fill the vacuum left by EH's own inactivity, two different groups had taken up the challenge to establish themselves as lead bodies in the training field. Craft Skills Forum, which included representation from UK Skills, DCMS, The Countryside Agency and the Department for Education and Skills, to consider how best to support and promote craft skills in the future. Its stated mission was 'to promote wider recognition of traditional craft skills and the importance of their role as part of the nation's cultural heritage'.

The Building Skills Action Group (BSAG), on the other hand, had a more focused, but nevertheless broad, remit. It took the view that 'the future of our historic buildings stock is at risk, due to lack of expertise in the building industry and lack of understanding of appropriate repair'. The BSAG was an initiative of the Society for the Protection of Ancient Buildings, and aimed to represent 'all the sectors involved in, and/or with an interest in, training in the conservation construction field'. It brought together representatives from the Institute for Historic Buildings Conservation, DCMS, CITB, COTAC, HLF, Historic Buildings Contractors Group, TGWU, the National Trust, The Princes Foundation, the Building Conservation Centre Trust and two London colleges – and EH. Its mission was 'to promote a sustainable long-term skills base in the trades and crafts relating to the conservation sector of the building industry'.

These initiatives went to the heart of the training issue, kick-started the process of defining its needs and began to bring together the key players. Inevitably, practical implementation of some clearly stated objectives was derailed by the demands placed on such voluntary groups that have no mandate, no resources and no serious government departmental backing. The struggle of the BSAG to secure funding even to employ a single project director proved unsuccessful, although it might be questioned whether entrusting the remit to solve the whole problem of conservation training to a single individual isn't simply asking the impossible.



EH participated in such initiatives but, as these floundered because of a lack of resources, increasingly saw that the only way forward was to join with the main funding bodies in order to gain more clout. The formation of the National Heritage Training Group is the outcome of that process and formalises the link in particular between English Heritage and the CITB.

Regional and local authorities

The role of regional government in the promotion of training is still in its infancy. Clearly, there is enormous scope for Regional Development Agencies (RDAs) to initiate and influence training schemes, while regional spatial strategies can enshrine sustainable policies.

Should colleges be aligned to these sub-regional units? And what happens, in this new regional framework, to the former national training centres for e.g. thatchers, wheelwrights, etc., where numbers are so small? Equally, the role of county councils – a number of which play a proactive role in fostering conservation training initiatives – may well gradually evaporate. Indeed, some former county historic building units have already been dismantled – e.g. Buckinghamshire, where the district authorities were persuaded to fill the gaps – and the patchwork of provision is therefore magnified. This erosion of county council influences on conservation policies needs to be carefully considered, otherwise a valuable source of practical guidance, expertise and information gathering will be lost.

The weight given to the role that should be played by local authorities is exaggerated (see Figure 8 above) because of the bias of the questionnaire and the question itself. ('Do you think that local authorities should be responsible for conservation skills training and development? If no, who or what organization do you think should provide this training?') Many respondents were keen to qualify their support for local government participation, stating that this would be an ideal solution if funds allowed, or specifying that their involvement should only be on the basis of partnerships with other training providers. But some were less enthusiastic.

However, the negative reactions need to be qualified. Some local authorities have embraced training wholeheartedly and have created an enviable reputation for high-class delivery. The success of the Essex model, for example, was referred to by a number of respondents and appears to

have had a significant impact on levels of skills training – the respondent from Essex was confident that there were few apparent shortages as a direct result of the courses. (As noted above, the scheme has also been extended to schools through an HLF-funded project.) The training is held at Cressex, a county-owned site providing an ideal location to see conservation in action (the lack of such facilities in other counties creates a real barrier to providing training). Lime Days are the most popular. The courses also cover joinery, windows, timber-frame repairs, daub, brick and practical maintenance, and repair days for historic buildings owners. The first courses started in 1992, starting with one or two a year; they began with conferences and then opened up to day training courses. By 1996, there was a full provision of courses, all of which are entirely financed by the council. The aim is to price them so as to cover costs, not make a profit; those who attend the courses are losing a day's earnings. The courses usually consist of a mix of lectures and practicals. Tutors are drawn from a range of backgrounds, but the emphasis is on using practising craftspeople. As a result, a special relationship with key companies has been developed, which can lead to other spin-offs. For example, Bakers of Danebury give sponsorship for schools training to get older schoolchildren interested in practical training. During the summer months, more general conference-type courses are held for house owners, who are informed of the events through local publications and mailshots.

There are practical problems. Internal communications at Essex CC are reputedly poor: each unit runs its own budget, so that one unit has to invoice another if facilities are being shared. There are also inevitably problems in trying to keep control of the content of the courses. But the good side of this is that the Conservation Department is slowly building up a list of recommended tradesmen, demonstrating the shared advantage of running such training ventures. On the other hand, those who run the courses tend also to become inundated with specialist work, creating a vicious demand cycle. Cressex used to be open all week, but in the drive to ensure sustainability it is now often used for private conferences. A conflict of management is therefore emerging.

Essex is clearly a market leader – courses pioneered by Essex have tended to move to Weald & Downland and appear on their regular programmes. No other council has adopted the Essex mode on quite the same scale, although

Somerset runs courses in conjunction with district councils, and some other local authorities have organised special training days or conferences. One obvious problem is funding. As East Staffordshire BC stated: 'A moratorium on any CPD and related courses for staff has been imposed owing to budgetary and management lack of imagination. However, in partial compensation, I have been allowed to continue producing seminars for staff in conservation-related matters and will be providing similar for councillors, civic societies and EH.'

Some of the general problems of supplying training are provided in the response from Rutland DC:

Did some [craft days] seven years ago and have attempted to do so since. Major day organised for last autumn but very little interest so cancelled. With the development of national days, and articles in magazines interest appears to have been satisfied. Craftspeople invited to general day as above but no interest, or too busy. No tutors for specialized work. Some show interest in national courses but the expense and time is a deterrent. The Conservation officer is supposed to supply training to other colleagues. It is requested by planning staff and building control but too much other work. There is a conservation staff of one. Three might be able to do an adequate job. Courses for architects/surveyors would be ideal but probably a waste of time to try.

Most of the training put on by councils was not aimed at any specific target market. Twenty respondents mentioned that they or their councils run training courses specifically for planning committee members – although the number is worryingly few given the responsibility that such committees have in deciding changes to the historic environment, imposing special conditions relating to historic buildings, etc. Many were 'occasional' or 'ad hoc', implying very little continuity or commitment to making this an essential prerequisite for committee membership. Some local authorities, such as Cherwell DC, 'buys into courses run by others', but many respondents complained of recent cuts in budgets for CPD training.

Many local authorities did not feel that they should be directly responsible for conservation skills training, but many considered it their duty to play a proactive role in developing and marketing training opportunities in their region. The main role for local authorities thus appears to participate in partnership opportunities and promote training courses run by other bodies

Nevertheless, even where local authorities are not involved as direct providers of training, they have access to a raft of measures to lever in skills training as part of their duty to 'police' changes to the historic environment. They can, for instance, act as a source of advice, guidance and information; maintain information on buildings, etc.; maintain and publicise a database of competent craftspeople.

Lists of recommended craftspeople

Because of liability issues, many authorities are reluctant to be seen to recommend particular craftspeople. However, there are examples of good practice: South Northamptonshire produces a leaflet listing craftspeople across all relevant trades, whilst Norfolk CC's website directs interested parties both to craftspeople and to sources of supply. Hampshire is currently compiling a coordinated list of craftspeople and suppliers, but is still debating how to make this information available. Cherwell DC has employed an outside consultant to do this. Conservation officers' groups at the county or regional level (e.g. Derbyshire, Hampshire, Essex, Kent, Lancashire, Dorset, Leicestershire) seem to be the most effective medium for ensuring the compiling and continuing accuracy of such lists. Nevertheless, the collection of such material tends to be on a rather ad hoc basis, often relying on word-of-mouth recommendations. Only one or two authorities appear to exercise a strict vetting process on new entrants.

Promotion of use of local materials

Local authorities can exert considerable influence on the use of local materials through development control and listed building consent conditions.





Coble facing, Solway Coast

The county council supports two Chiltern brickworks in their structure plan. I am encouraging the sourcing of wychert earth locally, but it is in early stages.

(Aylesbury Vale DC)

We advocate brick and tile manufacturers that operate within the borough.

(Dudley Metropolitan BC)

A commitment to sustainability should manifest itself in the form of policies that require local quarries to adopt limited extraction of stone for repair purposes, or through the support of local brick manufacture. The implementation of building regulations could play a much more significant role, by adopting, for example, a points system, which would offset the level of fee payable against evidence for the use of locally sourced materials or labour.

Recommended specifications for specialist work

Many authorities issue guidance or take a more proactive role in deciding on agreeing specifications with contractors. By focusing on best practice, the need to update skills to meet the required specifications would be highlighted. The areas covered include mostly mortars and pointing, and

joinery repairs, but also a full range of other areas, such as brickwork, roofing (including thatching), timber framing, plastering, masonry and ironwork.

Though many councils do issue specifications, some take a different view. Arun DC, for example, states: 'Conservation Officers have to be increasingly careful in this area because of increased risks of litigation should there be even minor discrepancies in specifications or as methods evolve and change.' Some local authorities partially circumvent this problem by issuing guidelines – Herefordshire, for example, issues 'Advisory Notes for the Conservation of our Built Heritage' which include guidance concerning grants, materials allowed and suggested maintenance schedules.

There are two potential problems with this approach: first, the advice or guidance can become so general that it undermines the objective of furthering local styles; secondly, the necessary specialist expertise is not necessarily available at local authority level to ensure total accuracy.

Heritage open days

A number of councils run open days relating to listed buildings, craft skills, etc. Local authorities also sometimes lend to support to other privately run events, such as the Building Conservation event held at the Weald & Downland Open Air Museum.

Grants for skills training

Grants can be used effectively to impose conditions to foster skills training. There are obvious problems with this course of action, not least the fact that funds are too small or even non-existent in many cases. The LACP report showed that exactly half of responding authorities stated they operated grant programmes. Budget allocations vary enormously between authorities, ranging from £10,000 to £500,000. Most budgets, however, are very modest, averaging £20,000 per annum. So even where grants are made, the impact is limited, although some local authorities were more positive about possible future funding.

The introduction of Heritage Economic Regeneration (HER) schemes and Townscape Heritage Initiatives (THIs) are creating new opportunities in urban areas. Regeneration grants for e.g. Wolverton and Milton Keynes are being given

for sensitive repairs to run-down terraced houses, and also to reinstate traditional features such as sash windows and doors in modernised examples. Many such schemes could be used more effectively as leverage to encourage best practice and stimulate/fund skills training

Leading by example

Local authorities often own important chunks of the historic environment and could therefore take training policies into account when awarding contracts. Rather worryingly, a number of respondents are not aware of how many buildings are owned by their council. Many others have no idea whether training policies are taken into account when contracts are awarded.

Planning and development

Local authorities have great scope for incorporating pertinent policies in development plans, issuing supplementary planning guidance and cooperating in the creation of conservation appraisals and 'village design statements'. Supplementary planning guidance can embrace sustainability issues to ensure the sensible use of local resources for maintaining the historic environment and preventing the erosion of local skills. All relevant planning applications have to demonstrate how these guidelines have been taken into account.

The importance of local authorities plans, policies and guidance is that they:

- raise awareness of the quality of the traditional built character of an area by highlighting the vernacular materials, their characteristics, functions and uses
- foster an interest in and create respect for the historical diversity of vernacular buildings in the region
- re-establish traditional character where it has been damaged or eroded
- protect the distinctive character of the built environment by encouraging good repair practices
- encourage the sustainable use of a local, natural resource
- promote the use of vernacular materials in new developments so as to create respect for the traditional built character of the area
- encourage skills and workmanship to be of the highest standards to inspire high-quality design in new developments and assist in expanding the skills base

capable of sensitively repairing historic buildings by creating a framework of transferability across traditional and new buildings

The COQ demonstrated that a wide range of measurers is open to local authorities to support and steer, if not deliver, skills training in their areas. On the whole, the responses reveal a huge unrealised potential, if certain liability issues can be resolved.

Professional bodies

The Conservation Officers' Questionnaire highlighted professional bodies as playing a significant role in delivering training. Many of these courses are directed at professionals, and are delivered through CPD courses (RTPI, RIBA, CIOB). The RICS acknowledges the contribution of the conservation courses run by the College of Estate Management for surveyors.

For conservation officers themselves, IHBC supports a network of local conservation officers' groups, have been instrumental in forging ahead with the Conservation NVQs, and publicise conservation courses through their 'Context' Magazine and Yearbook.

The majority of this training is directed at conservation specialists rather than practising craftspeople. Much of this training could be enriched by greater cross-pollination of ideas and exchange of information.

Independent and voluntary organisations

The Prince of Wales's Charitable Foundation has emerged as a significant player in respect to training, supporting scholarships for applicants 'looking to develop or extend their practical knowledge of traditional building materials and techniques'. Applicants must be engaged in stonemasonry, carpentry or joinery, bricklaying, roofing and tiling, plastering, glazing, thatching or metalwork. Grants of between £500 and £5,000 can be applied for.



Building Preservation Trusts have unused potential in this sphere to stimulate training and fund educational initiatives. The Derbyshire Historic Buildings Trust is compiling a list of recommended craftsmen and suppliers. Local authorities could support this route and so by-pass the liability issues involved in recommending craftspeople.

The Society for the Protection of Ancient Buildings has established a huge lead in relation to the other national amenity organisations such as the Victorian Society and Georgian Group as a highly respected provider of training through its courses and fellowship schemes.

The National Trust (NT) appears to have no clear policy or long-term vision on training (except for in-house staff), despite its objectives. Apprentices have to be funded through the region. In the case of the Holnicote Project, all the thatched buildings on this Somerset estate are being treated as part of a holistic programme – looking at repairs, patching, growing corn and spars, training. A thatching apprentice has been taken on by the estate thatcher, Keith Payne. This is an unusual step for the Trust to take with an apprentice who would be trained by a non-member of staff. He was on a graded salary on apprenticeship rates in the first year, moving up to full rates by the third year (60% in year 1 at salary grade 9, 90% in year 2, full in year

3.) The Trust pays for his training and he attends a residential course at Knuston Hall for 2 weeks every year. The master also gets money for equipment, etc. The net cost is very low, because, in the first year alone, a lot of patching is done: the Trust will easily recoup what it has invested.

The Wessex Region is quite well supplied with conservation contractors, but the NT does not use them except where consultant architects are employed. There are about 35 members of staff in the direct labour team and about 5 outbases in Wessex where direct labour is used. The region has no expert roofers or any very good stonemasons; carpentry and joinery, on the other hand, are strong. The Trust has many mediocre buildings, but the direct labour team is not let loose on major properties. Skilled workers do not want to spend time cleaning out drains; the Trust, however, wants people who will do routine maintenance jobs as well as undertake skilled work. Ideally, the Trust should make a distinction between maintenance workers and specialist skills.

The Orton Trust, Northamptonshire, is noteworthy for its provision of training courses specifically dedicated to stonemasonry. Woodchester Mansion in Gloucestershire also runs a stonemasonry conservation centre.



Building affordable homes, Kent

The construction industry

European initiatives are being discussed which may have an impact on training in the UK. According to the Chairman of the Heritage Building Contractors Group (see below), there is great potential for a Europe-wide interchange of trainees of all disciplines as a good way of widening the experience and cooperation between countries, associations and companies.

Freedom of movement and employment of highly skilled staffed and operatives should be encouraged, as indeed should the idea of a pan-European database on training schemes, as well as the sourcing and storing of rare materials and research and new technologies. Exchange of knowledge, opportunities for debate and growth in understanding in a trusting way will provide the best route for the gradual evolution of these practices. Certainly, 'consistency' is a very important notion: building companies can look forward to a more stable market if consistency in method, quality, specification and training are achieved. There is so much more to be gained from European-wide training programmes than from only national schemes. The largest international corporations, which are attracted to fashionable environmental issues to help cleanse and enhance their corporate images, are also

showing increasing interest in financially supporting this highly fulfilling, emotive and soul-rewarding industry, which has great potential for reducing unemployment levels and helping to generate tourism income. There is also talk of how essential it is that the long-awaited EU accreditation and registration system for individual companies and operatives is put in place.

However, this brave talk is qualified somewhat by the observation that 'the general building industry has a poor image and a poor reputation in the view of the public, and the profile of this attractive, high-skill specialist sector needs to be raised to encourage a higher quality of educated students throughout Greater Europe to make a commitment to a career in this industry'. Other caveats expressed by heritage contractors in the UK reflect the fact there is a long way still to go.

I believe that it is essential for specialist building companies to be in fair competition with similar companies in order to maintain standards and stability of investment in training. It is neither fair, nor sensible to expect them to be exposed to unsustainable competition from large national and international contractors, who often employ only sub-contract freelance labour, which cut every cost possible and which have to take risks on quality to achieve completion within their price.

Other barriers to change include the need for similar standards to be developed throughout Europe. Some countries have maintained a long-standing structure of planning control, grading and listing of important buildings, monuments and sites, as well as establishing consistent relationships between owners, professions, building companies and funding sources, but many have few or none of these systems in place. Similarly, philosophies vary considerably on the method and degree of repair, conservation and restoration.



The role of the CITB in furthering training is clearly a critical one and has been assisted by the appointment of a coordinator for training in the historic buildings sector and by the formation of the NHTG. The CITB's training centre at Bircham Newton, Norfolk, could play an important part in the potential for the delivery of dedicated conservation programmes.

The Heritage Building Contractors Group is a member of the NHTG. It has only 30 members, and therefore represents only a tiny proportion of the conservation sector. The Linford Group includes historic building repair and conservation specialists Linford-Bridgeman. Companies in the group are all in private ownership, with a slight bias towards traditional skills, and whilst all members compete fiercely in the open competitive market, they all support a

strong commitment to the highest quality of competence, developing skilled craftspeople, through directly employed trainees. As a voluntary body, the potential of the group to effect change is inevitably compromised by the lack of time that can be devoted by already busy contractors to furthering its aims.

Various other trade/building federations and associations have a key role to play in supporting, developing and delivering training programmes. A view that conservation skills are esoteric or, worse, positive hindrances to the advancement of the trade is unfortunately rooted in the minds of those who have a controlling influence in such associations. The case study, however, demonstrates what can be achieved to stimulate craft training.

Case Study The Dry-Stone Walling Association Craftsman Certification Scheme

The DSWA is a registered charity. It operates a national series of progressive, practical tests leading to the Master Craftsman Certificate in dry-stone walling. The scheme was established in the early 1980s and provides recognised skills certification for wallers and dykers, giving employers guidance on the ability of the individual (see Table 18). There is a biennial review of the test requirements to ensure the scheme meets the needs of employers and wallers. Tests are at four levels:

- 'Initial' covers the basics of the craft – how to repair a gap
- 'Intermediate' includes the building of a wall with a cheekend or wallhead
- 'Advanced' involves both retaining and curved walls
- 'Master Craftsmen' covers the building of various structures to a high degree of finish

There is also a category for 'regional styles'. It is anticipated that this section of the scheme will encompass further regional styles as and when there is demand for recognised certification.

The Association has a group of Master Craftsman Certificate holders who have been trained in skills assessment and who regularly come together for a review of standards. These examiners are present throughout the practical tests. Tests are open to all individuals, not just members of the Association. Tests are carried out on 'test days', at the candidate's workplace or as part of a training scheme. Note that a number who applied in 2000 – 1 were not tested until 2002 because of access restrictions during the foot-and-mouth crisis.

Table 18 DSWA Master Craftsman Certificates

Year	Applicants	Initial	Intermediate	Advanced	Master Crafts-men	Total certificates issued
1997–8	185	103	26	11	5	145
1998–9	113	68	11	5	4	88
1999–2000	208	127	36	10	1	174
2000–1	135	55	20	6	1	82
2001–2	83	32	5	4	4	45
5 years	724	385	98	36	15	534
Total	4,574	854	18.7	1,470	337	22.9

Source: NVQ Questionnaire (CITB)

Individual firms and contractors have a vital role to play in furthering training. Larger companies working mostly with permanent, directly employed operatives still rely on experienced tradesmen and women passing on their own skills and techniques to their apprentices. This training runs parallel to the formal, academic training in colleges and grant-aid schemes. There appears to have been a change in policy regarding some funding schemes that ran on a 'use' or 'lose' policy, which restricted the longer-term commitment of employers, to two- or three-year budgets that allow unused funds to be carried over, thereby providing greater flexibility. This should encourage companies to increase their intake of trainees, especially if it provides training grants not only for the 16 – 23 year olds, but also for retraining older entrants and the unemployed.

The small construction firms that make up the heritage building sector also play an important role in training. This is illustrated by the fact that nationally one-third of the CITB's training grant is awarded to firms too small to pay the statutory training levy (with a payroll below £61,000). These firms typically take on 33% of the CITB's new trainees. It also illustrates that the majority of CITB-registered firms fail to take advantage of training grants. However, many small construction firms (including the self-employed and labour-only subcontractors) do not have a strong commitment to skills training. These firms operate in a short-term environment, characterised by workload uncertainties and low profit margins, which discourage longer-term investment in training. Many firms may be described as 'life-time' businesses, which cease to operate when the owner retires.

The four principal ways in which companies contribute to training are by:

- providing expertise to deliverers of other specialist courses;
- delivering courses in-house;
- matching on-the-job training to the needs of the workforce;
- enhancing motivation by adopting standard management techniques.

Some conservation firms have fully grasped the need for training and see it as a continuous process of up-grading skills to meet new challenges. But there is clearly a vital

need for a detailed study of heritage contracting firms to elicit more information on what training has been received and, more vitally, how contractors could best be served by a more integrated approach to conservation training in general.

Education and employer links

The HLF Report found links between education and employers to be undeveloped. In particular:

- training links with heritage employers focused for the most part on longer-term full- or part-time courses, rather than on more flexible forms of provision, such as block release or intensive short courses;
- other forms of educational support were rare; customised training on employers' premises was offered by fewer than one in ten providers, although experience from the study suggests this can be a highly cost-effective form of provision for in-service development and new skill needs;
- in about half the universities and colleges employers sat on subject-based advisory groups; but there were few other examples of providers and employers establishing a strategic relationship;
- messages from employers about their skill needs have often been obscured or poorly articulated to the public education and training sector;
- many of the links with employers were informal, arising as a result of participation in professional or trade groups and exhibitions, college open days and, most commonly, student work placements.

The CITB is responsible for coordinating the development of construction qualifications. It has developed construction awards to be recognised as a 'technical certificate', alongside the NVQ, in a modern apprenticeship. This has been necessary to meet the changes to NVQs, which now require far more work-based evidence to prove competence.



This also has a knock-on effect to create closer education and employer links to enable work-based evidence to be recorded. This culture change is creating difficulties for both training providers and employers.

The HLF concluded that targeted initiatives which bring together employers and key providers are needed if there is to be an effective response to some of the more urgent skills gaps. It was felt unlikely that all the skills needs can be addressed within existing further and higher education or other public funding mechanisms. In addition to this, the study identified the need for improved links between specialist interest groups, professional bodies and other organisations and those involved on the ground such as employers or purchasers of skills. The establishment of the NHTG provides an opportunity to bridge these gaps.

Partnership Initiatives

There is clearly great scope for effective training partnerships to be established, given the broad range of current or potential providers. The principal advance has been the establishment of the NHTG, bringing together EH and the CITB, although the body has still to prove it can act as a coordinating force.

There are many instances of partnerships having been or currently being formed to deliver training. Instances include the tripartite arrangements between the Weald & Downland Open Air Museum and Bournemouth University to deliver conservation courses. Other projects involving successful partnerships include the establishment by North Shropshire DC of a practical training centre with British Waterways, a local FE college and neighbouring local authorities. Herefordshire DC teamed up with colleagues in Shropshire:

to form a group referred to as 'The Middle Marches Partnership', which has a twofold role: the sourcing of local materials for use on buildings and, on the education front, evening classes for anyone interested, professionals and lay-people alike, that cover all aspects of historic buildings, their construction and material. In 1998 we built an updraught brick-kiln which is fired regularly producing bricks made from local clay by students and other interested parties, having been helped initially by Northcot Brick Company, which tested our local clay and went on to produce their successful 'Marches Red'

brick. Along with our Minerals Officer, we have been involved with the Herefordshire Stone Tile Group in the reopening and re-establishing of this local and unique industry. ... The possibility has been floated with Defra for the growing of straw for thatching on set-aside land. ... The Partnership has commissioned a Feasibility study to determine initially the interest in using locally resourced materials.

There is also no shortage of positive ideas on this front, as can be seen from the following comment from Huntingdonshire DC:

It is considered that the formation of Heritage/Traditional skills initiatives at a district level, perhaps funded in the same way as 'English Heritage Buildings at Risks' posts, would be appropriate. Such possibilities were recently discussed/raised with EH at a regional BAR meeting.

Whilst all such schemes should be applauded, the danger is that individual initiatives will only add to the current fragmented state of training provision. What is desperately needed is a tripartite meshing together of the following sectors to create a deliverable, adequately resourced, integrated training programme (see Figure 9). If this fails to take place, it seems likely that the fragmentary picture, indicated in Table 19, which indicates remarkably poor coordination across the sector, will only become exaggerated.

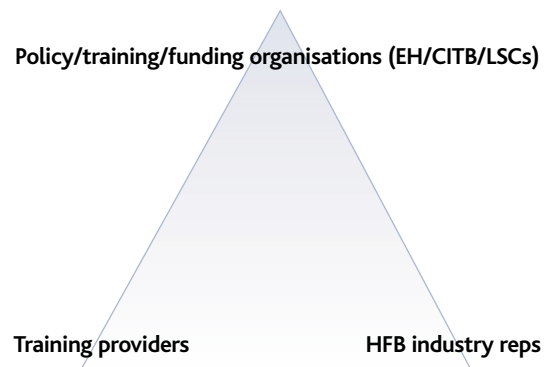


Figure 9: Integrated training programme



Table 19: Conservation training and NVQs

Region conservation course providers	CoVE College	COTAC Craft Courses	NVQ 2002 Survey	Other known
East Midlands	Moulton College		Rugby College of FE	The Orton Trust Knuston Hall
Eastern	Peterborough Regional College/Isle College/ CRC		Hertford Regional College/ Suffolk College/ West Suffolk College	Essex County Council
London	Lambeth College/ Barking College	Lambeth College/ Building Crafts College	Building Crafts College	SPAB (various locations)
North-east	None		New College, Durham/	
North-west	Manchester College of Arts & Technology/ Skills Solution Ltd./ Accrington & Rossendale College		Stockport College/ Accrington & Rossendale College	
South-east	South Kent College		Canterbury Eastleigh College/ Guildford College of Further Education/ Thanet College	Weald & Downland Open Air Museum/ West Dean College/ The Lime Centre/ Building Crafts & Conservation Trust/ Burlesdon Brickworks Conservation Centre/
South-west	Somerset College of Arts & Technology	City of Bath College/ Weymouth College		Woodchester Mansion Trust
West Midlands	Stourbridge College	South Birmingham College Hereford College	Worcester College of Technology	British Waterways Heritage Skills Centre
Yorkshire and Humberside	Hull College/ Leeds College of Building	York College of Further and Higher Education	Huddersfield Technical College/Otley College	

Conclusions

Greenhalf Photography



Thatching, Amberley, Sussex Downs AONB

Because it is not a clearly defined subset of the construction industry, the heritage building sector is difficult to quantify. Guestimates suggest the sector generates in the region of £2 billion of work per annum and employs 20,000–40,000 FTEs. However, given that this excludes the 'grey' area of unprotected historic buildings, this is likely to be an extremely conservative assessment of the size of the heritage building sector's worth and workforce.

Although there are about 30 larger companies involved in restoration, the majority of workers in the heritage sector are in small firms or are self-employed. The workforce is almost exclusively white/male in composition and, compared to mainstream construction work, recruits are generally drawn from more diverse backgrounds.

The historic buildings sector is therefore a complex one, and most of the underlying skills and knowledge likely to be needed are not developed specifically for application in a heritage context. Built heritage specialist skills are

often an amalgam of post-recruitment development added to generic expertise in construction. There is a widespread perception that the heritage sector suffers from skills shortages – some would claim a skills crisis. Conservation of the built environment covers a wide variety of activities. Listed structures range from country houses to bridges, factories, shops, mills, farm buildings, smaller cottages and privies. The work that needs to be carried out might be anything from rebuilding and renovation of derelict properties to extensions to historic buildings, or repair and maintenance programmes. Successful approaches to new build in sensitive historic environments also require that traditional skills be transferred into this arena. Undoubtedly, the stock of historic building is at risk, due to lack of expertise in the building industry and a lack of understanding of appropriate repair methods. There

are numerous examples of projects where work, even when funded by conservation grants, has signally failed to conserve and has even destroyed important structural or decorative features.

Equally, there are many areas where access to suitable materials – particularly quarried materials such as local stone for walling and slating, but also other materials such as thatching straw, cob, etc. – can be blamed for preventing good repair work. In some areas, the supply of traditional materials has diminished or dried up altogether and has been accompanied by a rapid erosion of the expertise associated with them. Elsewhere, as training and the use of materials have become standardised, craft-level skills with local traditions and methods have been lost.

Rather than skill shortages, real and pressing as they are, the more serious crisis is the lack of coordinated training policies and programmes. Training provision for the heritage sector is generally nothing short of abysmal and is in a parlous, fragmented state. This applies to both craftspeople and professionals. There are some examples of high-quality training programmes, but a number of vital areas are badly neglected and there is little incentive for established tradesmen to train to a higher level or to equip themselves with the necessary experience to work on historic buildings. This is partly because of the chronic lack of direction and coordination that exists in the sector and partly because of a genuine lack of resources. There are signs of activity from English Heritage and the CITB through the formation of the National Heritage Training Group. Moreover, there are signs in the regions of a keen willingness to develop new programmes; the bare bones of an infrastructure do already exist, particularly through the NVQ system, but also through a plethora of other training avenues.

Successful training delivery depends on the availability or presence of other resources, robust accreditation systems for skills acquired, sound contracting processes and high specification systems, effective human resource strategies, and high levels of awareness among owners and professionals

This report concludes that to view skills in isolation is an unhelpful approach; talk of a skills crisis is scaremongering, which ignores the real needs of the sector. The heritage trades in fact divide into three areas: core skills (e.g. bricklaying, joinery, plastering, glazing and

roofing), regional craft skills (e.g. timber framing, thatching cob walling, pargetting, flintworking, stone slating and dry-stone walling) and national specialist skills (stained-glass work, conservator skills for industrial materials). Skill gaps can be identified in each of these areas, but must be understood within a matrix that takes account of four important factors: training needs, material availability, training delivery and the wider context of project delivery. Using this more integrated analysis, it will be seen that different solutions will apply to each of the different segments of the workforce. Thus, within the core skills sector, it is not bricklayers that are in short supply, but the level of skills training delivered to repair and maintain historic brickwork. Recruitment of plasterers and roofers, on the other hand, is a real issue. In all cases, additional specialist NVQs at Levels 3 and 4 are not required, but conservation modules that can be built into the core trade teaching right from Level 1 are necessary. As with area-specific skills, there is not an identifiable lack of thatchers and stonemasons, but straw and local stone are proving to be key barriers to sensitive repair. Nevertheless, stonemasonry training is quite widely available, while the provision of thatching training is entirely hanging in the balance over the uncertainty of LSC funding for the NETS Thatching Training run at Knuston Hall.

The construction industry is generally perceived as having a low status and tends to adopt an ethos of low price bidding and high-cost, low-value output. Under the influence of Egan and Latham, this view is beginning change to and there is more of an emphasis on fast-track engineering and buildability. Either way, the heritage sector will become more of a 'branded' subset if it retains its vital commitment to craftsmanship. This does not rule out 'plugging' into mainstream techniques and processes where these can assist with the proper care of the historic building stock. But none of this will occur until the heritage sector embraces an integrated policy towards training; only then will it acquire an exclusive identity that recognises and celebrates the importance of the built heritage to this country.



Recommendations

There is a need for a sustainable long-term skills base in the trades and crafts relating to the conservation sector of the building industry. Here, we identify the actions needed by government, English Heritage and the construction industry to improve heritage building training and skills, as well as the areas for immediate coordinated action by the stakeholders.

Government action

A Force for Our Future is the government's statement on the historic environment, published in December 2001, responding to the English Heritage Report of 2000, *Power of Place*. The statement recommended the following actions to improve heritage building skills:

- the government will work with English Heritage and the Learning and Skills Council to increase opportunities for those who wish to take their interests in the historic environment further, for example through further and higher education or vocational courses (Action Point 10).
- English Heritage will coordinate the work of the Building Skills Action Group and the CITB and other interests to ensure a coherent approach to meeting skills requirements (Action Point 19).
- the government is exploring with the Learning and Skills Council how some planned Centres of Vocational Excellence could specialise in skills relevant to the historic environment (Action Point 20).
- the government is encouraging grant-givers to give a degree of priority to training in conservation craft skills (Action Point 21).

English Heritage action

Following on from the *A Force for Our Future* report, the Department for Culture, Media and Sport (DCMS) commissioned English Heritage to coordinate the first ever audit of the state of the historic environment. The main findings of the report indicate that the historic environment is a major economic asset, which people care about, and that managing change should to be undertaken constructively and with care.

The report also identified shortages of skilled building workers in the core skills areas – joiners, bricklayers and

scaffolders – making it all the more important to keep historic buildings, including newer buildings such as Victorian and Edwardian terraces, in good condition. Many buildings (including 23.5% of the housing stock) were built before 1919 using traditional building techniques. Therefore traditional building skills must be retained if these are to be kept in good repair.

English Heritage has funded an additional heritage construction manager post to work as part of the CITB's specialist contractor team. In addition, it recommends that a comprehensive and maintained database of heritage building skills provision, including on-site assessment and training providers, should be established. A more complete survey on the condition of the historic building stock is also urgently required – English Heritage has already begun this task.

CITB action

The National Heritage Training Group (NHTG) was established in November 2002 with a CITB grant of £25,000. The aims of the group are to take measures to encourage and promote conservation training and education to meet the needs of the sector. Members of NHTG include Heritage Building Contractors Group (HBCG), English Heritage, the CITB, COTAC and the Building Skills Action Group. Representation may need to be extended in the future to include other government agencies and other advisory groups, such as IHBC, CABE, BRE (Building Research Establishment) heritage groups. These include the National Trust, Landmark Trust, SPAB, the Prince of Wales's Foundation and training provider representatives from colleges – e.g. Building Skills Craft College (London), Lambeth College, etc. NHTG should also identify a lead body in each of the sectors as a means of formalising connections with each of those sectors and to ensure they have a voice.

The NHTG website was established in January 2003 together with promotional and careers literature. In March 2003, the CITB commissioned the Heritage Building Skills Report in order to review the range of existing built heritage information and identify the gaps, and to highlight the areas of concern related to heritage building skills that require immediate coordinated action.

In terms of training, work is already under way to develop a flexible suite of NVQs at Levels 3 and 4 suitable

for specialist contractors' managers and supervisors. The CITB's National Specialist Team has developed a new national assessment centre to support the full range of specialist trades. The centre, located at East Leake, currently supports 500 NVQ candidates. The centre plans to offer an assessment infrastructure to trades working in the heritage building sector which do not have an assessment infrastructure in place. To support this development the centre has gained approval from City & Guilds to offer the AI assessor qualification. This will allow the centre to train new assessors from the heritage building sector to assist in developing the training infrastructure. The centre will provide in-scope companies with a free on-line NVQ registration service to include internal and external verification.

On behalf of the Construction Skills Certification Scheme (CSCS), the CITB is developing conservation endorsements as proof of competence for those working in the building heritage sector. The first CSCS endorsement cards were presented in November 2002 to Ian Shipp, a 23-year-old carpenter, and Lee McInnes a 24-year-old bricklayer, both employees of R G Carter Heritage.

The Heritage Building Skills Report has sought the views of NVQ providers and conservation officers. Case studies have been used to determine training needs in conservation firms. But further information is desperately required from the industry itself to support heritage building skills planning. In conjunction with English Heritage, CITB should provide funding in order to gather accurate information on the heritage building market in terms of output and trends; analysis of the differences between the rural and urban heritage building markets; an in-depth audit of the heritage building labour market; an audit of training provision by occupation to establish capacity, output and quality; and consultation with heritage building organisations and training providers to assess how training of new entrants (young and mature) and skill updating should be arranged and funded in the future. A proposal for undertaking this work is now being considered by English Heritage and CITB.

CITB should also consider establishing training coordinators to help small businesses formulate policies and plans and to broker partnerships between the industry, training providers, local authorities, etc. Furthermore, CITB should consider developing a conservation foremanship and labourers' qualification that would suit the needs of the

heritage building sector. A two-year day release course focusing on on-the-job training opportunities could be put together which combines best practice in the construction and conservation industries. The resulting eight modules might cover:

- conservation philosophies: the heritage bodies and what they expect (legislation, archaeological surveys);
- conservation management: IT applications, contractual relationships, specs., CDM requirements;
- material properties and conservation techniques;
- material diagnostics;
- management of historic sites;
- personnel management;
- material procurement;
- specialist module (e.g. mills, churches).

Appropriate training paths for managers, office and sales staff in the heritage sector should also be agreed and developed.

Heritage Lottery Fund action

Following the publication of *Sustaining Our Living Heritage* in January 2001, the HLF made it a requirement for applicants to produce a training plan for all projects requesting a grant of more than £1 million. The HLF has published a useful guidance document, *Training Plans: A Guide*, to support applicants in the process.

Regional action

The NHTG's integrated training strategy can only be implemented if the relationship between regional development agencies and local authorities is clearly articulated. Conservation planning at the county level should not be allowed to disappear in the emerging vacuum. Local authorities need urgently to review the quality and provision of conservation advice and adopt a common training policy for conservation officers. Training should also be provided for planning



departments and committees. Local authorities could play a much greater role in developing skills in their regions by creating a toolkit of measures to educate the public, guide investment in training, etc. These measures should include:

- acting as a source of advice, guidance, information and specifications;
- maintaining information on buildings;
- maintaining and publicising a database of competent craftspeople;
- promotion of the use of local materials through the development plan process and more enlightened mineral plan policies;
- where appropriate resources and facilities are available, delivering training or promoting accredited training in their regions by other providers;
- raising awareness by holding events, publicising best practice;
- securing and using grant aid to steer investment in skills training;
- leading by example when awarding contracts for repairing their own listed buildings.

Training providers

A life cycle approach to training in the conservation of the historic built environment needs to be adopted so that modules become core elements of National Curriculum teaching and beyond. Inset days for teachers should address the issue. Open Air Museums could also play a role.

There need to be more incentives for training providers to establish programmes of training. More qualified trainers are required, and they need to be kept abreast of new developments, health and safety and environmental skills.

FE colleges and training providers in other related disciplines (e.g. surveying) should incorporate within their courses a greater degree of core conservation teaching, as well as offering further specialist conservation modules for improving base-line qualifications. Furthermore, commonality between courses should be constantly monitored both to encourage a generic, integrated approach to conservation and ensure consistency in delivery of courses, and also to avoid unnecessary duplication. Off-the-job education and training programmes are needed to develop the core skills and knowledge required to progress to supervisory roles.

As well as developing new training routes, support needs to be given to strengthening existing ones. Theory and practice needs to be introduced into NVQs to give trainees an overview of the role played by the core materials (wood, stone, brick, paint, etc.) in traditional building techniques and how it integrates with other materials, and to give them an opportunity to use a traditional method in college project work. This training must be reinforced through practical on-site work to ensure that the student is given the chance to see, handle and perhaps experiment with historic examples of the core material.

By working through the NVQ system, an appropriate sectoral approach to each craft can be developed. Mid-level colleges with the training skills and courses to deliver NVQ Levels 2–4 need further support. However, a lack of coordination between the various organisations is an impediment to progress. In particular, the NHTG need to establish better links with the colleges so that course provision is tailored to the needs of the historic buildings sector. At present, colleges are developing, or are planning to develop, courses with a conservation content in a vacuum. NHTG should be playing a significant role in steering such developments, providing input into the structuring of suitable modules or units and appropriate, well-researched, accurate course materials.

Owners

Clients should be persuaded to adopt log books for listed/historic buildings which identify the specialist requirements for repair and maintenance. They need to be made more aware of the fact that performance improvements are linked to the skills and qualifications of the firm, business or professional employed. Clients can play a role in stimulating the transformation of the sector by encouraging the employment of qualified contractors, consultants and professionals. They should insist on contracts stating that the contractor is employing a trained workforce (including subcontractors), members of which are given further training in the course of the work if necessary.

Professionals

Conservation elements should be integrated into vocational training courses for architects, surveyors, planners, specifiers, etc. Conservation modules should be devised for all CPD training.



Manufacturers and suppliers

Material suppliers should be key players in promoting a better understanding of the ecological context for the supply of vernacular building materials. There is scope for better provision of training offered by materials suppliers in order to increase its effectiveness in relation to other conservation training programmes. Manufacturers and suppliers should be encouraged to provide training workshops on the use and properties of materials.

Sectoral action

Lead bodies for each sector should be identified and strengthened. A skills checklist should form the core of NVQ conservation modules to ensure that dedicated training paths are developed for each sector, fully tailored to its specific needs.

Company action

A framework should be introduced so that employers can identify their skill requirements and take responsibility for investing in and providing training to meet those needs, through the appropriate strategy, training plan or policy. Each employee should be encouraged to undertake a smooth and recognised training path as part of their career. Employers should investigate the possibility of establishing 'apprentice sites' for trainees nearing completion of their training to enable them to work with other trainees on a real construction project. They might also consider setting up employer-run training workshops covering activities that are not in the scope of FE colleges.

Firms should encourage colleagues to keep share skills knowledge through both internal and external networking. More informal learning routes can be explicitly recognised and supported by encouraging: membership of relevant bodies (craft organisation membership); time off to attend significant training sessions/conferences; participation in exhibitions/demos at public events; staff exchanges (national/international); work shadowing/cross-training and mentoring; involvement of relevant craftsmen at the pre-tendering stage; explanation of content, aims and organisation of projects prior to commencement; internal evaluation of projects through on-site awareness sessions and reviews; recognition of people's contributions and opportunities for, e.g., research; access to information, including use of IT.

Firms with the capacity to offer external training programmes should ensure they are a key factor in the delivery of a coherent internal training programme. These should be structured to take into account audiences (including CPD opportunities with architects, surveyors, planners, conservation officers, working with conservation course deliverers, craftspeople, other companies, homeowners), graduated pricing structures, facilities, organisation, delivery and accreditation. One further commercial possibility is to deliver leadership/team training sessions for businesses, perhaps using a team project to make improvements in the yard.

In larger firms, the appointment of a training organiser should be considered, with responsibility for organising the programmes efficiently, but also possibly with a remit to encourage training in the company as a whole.

Employees should be encouraged to view their involvement with their firms in a longer-term perspective. Training should be structured around a life cycle approach so as to support employees from the moment they arrive, through their acquisition of skills on each project, and through to the realisation of their ideals as respected, competent senior members of the workforce.

Induction procedures should be reviewed. New young recruits could spend their first two or three years with a company as trainees, fulfilling the role of 'conservation labourers' (recognising that specialist skills and knowledge were required at this level) but with the prospect of training being offered in a specialist skill once the trainee has moved round and worked under the various craft areas. This approach would help to develop a common foundation training programme for all new recruits

Individuals should be encouraged to take responsibility for ensuring that their skills are developed and updated throughout their working life. This requires a structured training path for each individual, by establishing individual learning accounts and a documentation system relating to training, and dovetailing this with an annual review of training needs.

Recent Developments

Included here are updates on the activities of the National Heritage Training Group, the Heritage Lottery Fund, English Heritage, the government's White Paper, *21st Century Skills*, and Sector Skill Councils.

National Heritage Training Group

The National Heritage Training Group (NHTG) was established in February 2003, and is made up of contractors, leading heritage bodies, trade unions and training providers from across the UK. It is strongly supported by CITB Construction Skills (Sector Skills Council) and works closely with the staff of English Heritage's Conservation Directorate, who have direct responsibility for craft and conservation skills.

As noted in the section on English Heritage in the main report, in October 2003 the NHTG published and launched its Business Plan, *Building on the Past: Training for the Future*. This builds upon three essential areas for immediate action. First, to integrate the work of the NHTG with contractors, training and funding providers, the main clients and other key stake holders. Second, to carry out a detailed UK-wide survey to establish the regional and country-wide variations in skill shortages and training provision (see below). And, third, to develop and implement a traditional building crafts skills training plan for England, Scotland, Wales and Northern Ireland.

In February 2004, the NHTG commissioned an in-depth research project on a regional basis throughout England. The objectives are: to analyse the building conservation and restoration market, in particular to identify and quantify demand by English region; to identify, quantify and analyse the traditional building crafts labour market by occupation for each English region; to review the knowledge and understanding of the production and manufacturing processes of traditional building materials by English region; to audit traditional building crafts skills training provision by occupation for each English region; and to make recommendations for improvement in delivering training provision and sustaining a skilled building conservation workforce to meet the demands of the sector. This project is funded by English Heritage, the Sector Skills Development Agency (SSDA) and CITB-Construction Skills. The results will be published before the end of 2004 and will address many

of the issues raised in this report. Further in-depth research will shortly be commissioned by the NHTG in Scotland, Wales and Northern Ireland.

The NHTG website has been undergoing development. This will provide a range of services, including a searchable source of information on the range of current training courses available across the UK for traditional building skills for the crafts person and professional, careers advice and guidance, regular updates on the NHTG's work, news from across the sector on training and skills and free subscription to an electronic newsletter.

As part of the delivery of its Business Plan, the NHTG is taking forward a number of practical initiatives – it is, for example, currently mapping out career progression routes that will be published on its website and included as part of a careers guidance booklet that will be disseminated to schools, colleges, companies and individuals. The NHTG is also examining existing Master Crafts' qualifications, with the aim of developing a single qualification that satisfies the needs of industry and provides consistent standards for clients.

The Heritage Lottery Fund

Following the publication of research commissioned by the Heritage Lottery Fund (HLF) and published in *Sustaining our Living Heritage*, the HLF supported a series of actions to increase its support for heritage skills. These included adding specific questions to application materials, encouraging stand-alone training projects for volunteers, and adding a requirement for all projects over £1 million to have a training plan.

One year on, evaluation suggests that some impact is being made in the heritage sector, particularly on volunteer training. However, in general HLF assesses progress as being slow. It feels there is a poor training and development culture in the sector, proven by poor quality training plans. Also, extracting added value from larger HLF capital projects by using them as sites to develop skills is not been realised. Finally, few opportunities have been taken up to train modern apprentices, up-skill existing staff or to build partnerships with training providers and develop long-term solutions to skill shortages and gaps.

In December 2003 HLF contracted with the NHTG to undertake further consultation and development work to explore whether HLF should offer Heritage Lottery Fund

Training Placement Bursaries (HLF TPB). The result of the consultation was unanimous support for HLF intervention in supporting heritage skills development with the focus on work-based training. It was found that the sector values on-the-job training as an effective vehicle to deliver high-quality training, although it does not attract any statutory funding. There was confirmation of the skills needs of the sector, particularly NVQ Level 3, informed by recent labour market information from the built and natural heritage sectors.

The HLF cannot provide either comprehensive or long-term funding for skills training, which is the responsibility of the Sector Skills Councils. However, it can make a real impact in the short term by providing funding to help the heritage sector to design and develop exemplar work-based training projects. HLF feel this type of intervention would assist the sector work more creatively and develop an understanding of training processes. Such an investment would enable the sector to build capacity in skills training, creating partnerships that would lead to long-term funding as well as enabling individuals to develop their skills.

At its meeting in June 2004, the HLF Board agreed to invest in a one-off Training Placement Bursary to support work-based training. Bursaries were identified as the most effective way of using HLF funding, as this will remove an identified barrier to taking up training opportunities. A sum of £4 million has been identified to fund these schemes, which can run for a maximum of 4 years in the first instance.

English Heritage

In March 2004 English Heritage launched 'Historic Environment – Local Management' (HELM). This is a web-based training programme for councillors and officers in local authorities and government agencies, such as planners, highway engineers and estate managers who make decisions on everything from urban regeneration to countryside initiatives and transport strategies. HELM is part of EH's wider commitment to providing the tools to enable local authorities to manage change in the historic environment and the project aims to improve decisions that affect the historic environment across all aspects of local and regional government. It is a £500,000 project and has the backing of the Office of the Deputy Prime Minister (ODPM).

The website includes information on local heritage management as well as technical advice and training

activities. It will contain examples of good practice from both EH and local authorities up and down the country. The training topics will include how the historic environment relates to housing, farming and regeneration, transport issues and retail development. Training will be available from September 2004. Historic environment presentations will be included as part of the induction process for new councillors, while seminars and workshops will form an integral part of professional development programmes.

The HELM website address is <www.helm.org.uk> and its range of expert guidance will continue to be expanded online as the project develops.

The government's White Paper: 21st-Century Skills

It is widely agreed that NVQs are still not working as planned. The government's White Paper *21st-Century Skills: Realising Our Potential – Individuals, Employers, Nation* (July 2003), recognises the key role played by qualifications in accrediting learning and skills. The government has identified five action areas for improvement. First, employers' needs for skills must be placed centre stage: managing the supply of training, skills and qualifications should respond directly to those needs. Second, ambition in the demand for skills should be raised. Increased productivity and competitiveness will only be achieved if more employers and employees are encouraged and supported to make the necessary investment in skills. We need a new social partnership with employers and unions, and a much stronger focus on driving up skills and productivity in each sector of the economy and in each region.

Third, many more learners should be motivated and supported to re-engage in learning. For too many people, learning is something that stops when they leave school. Learning new skills, at work and for pleasure, must become a rewarding part of everyday life. Fifth, colleges and training providers must become more responsive to employers' and learners' needs, reaching out to a wider group of businesses and people, and



providing training in ways that suit them. Creating a truly demand-led approach means reforming qualifications, the way colleges are funded and the way training is delivered.

Finally, much better joint working across government and the public services must be achieved. This is not just a strategy for the DfES, but a shared strategy involving the DTI, the Department for Work and Pensions, the Treasury and the range of agencies involved in training, skills, business support and productivity.

The government has vowed to tackle the current NVQ problems by reforming the qualifications framework, including introducing a flexible credits framework. The White Paper states: 'We will reform the qualifications framework so that it is more flexible and responsive to the needs of employers and learners by:

- Strengthening and extending Modern Apprenticeships, as a top quality vocational route designed to meet the needs of employers. We will lift the current age cap, so that adults will be able to benefit.
- Reviewing, through the work of the group led by Mike Tomlinson, the vocational routes available to young people, and strengthening the focus on their employability and enterprise skills.
- Making qualifications for adults more flexible by dividing more learning programmes into units and speeding up accreditation of new qualifications.
- Introducing a credit framework for adults, to help both learners and employers package the training programmes they want, and build up a record of achievement over time towards qualifications.
- Making it easier for people to gain the skills they need by reviewing in each sector the need for new adult learning programmes to develop generic skills for employment.'

More flexibility may be achieved by using a small number of core units and a wide range of option units that cover a range of related occupations. This approach could potentially assist the built heritage sector to provide qualifications for occupations with a limited skills set; accommodate occupational and regional variations; and accredit multi-skills, particularly important in rural construction crafts where a wide range of skills are often required.

Sector Skills Councils

Sector Skills Councils (SSCs) are strategic organisations and a source of funding for the development of heritage building skills training. SSCs have been designed by the government to be independent, UK-wide organisations developed by groups of influential employers in industry or business sectors of economic or strategic significance. SSCs are employer-led and actively involve trade unions, professional bodies and other stakeholders in the sector. They are licensed by the Secretary of State for Education and Skills, in consultation with Ministers in Scotland, Wales and Northern Ireland, to tackle the skills and productivity needs of their sector throughout the UK.

SSCs give responsibility to employers to provide leadership for strategic action to meet their sector's skills and business needs. In return they receive substantial public investment and greater dialogue with government departments across the UK. This will enable sector employers to have a far greater impact on policies affecting skills and productivity, and increased influence with education and training partners.

Each SSC will agree sector priorities and targets with its employers and partners to address four key goals: reducing skills gaps and shortages; improving productivity, business and public service performance; increasing opportunities to boost the skills and productivity of everyone in the sector's workforce, including action on equal opportunities; and improving learning supply, including apprenticeships, higher education and national occupational standards.

There are currently seven built environment and heritage related SSCs. Four are operational as a Trailblazer or Licensed SSC and three are still under development.

1. *CITB Construction Skills* (licensed September 2003)

This is the largest SSC and is a key partner in the NHTG. It is also the standard setting body for built heritage occupations. In partnership with City and Guilds CITB, it is the awarding body for built heritage craft NVQs. As the last remaining industrial training board, CITB collects levy from employers and pays out training grants. It also supports a system of on-site assessment and training to enable experienced workers to achieve NVQs in the workplace.



CITB-Construction Skills covers a wide range of sectors in the development and maintenance of the built environment, including the heritage building sector. It represents around 7% of the national economy in terms of GDP and includes house building (public and private), infrastructure (roads, railways and utilities), non residential building in the private sector (schools and colleges, hospitals, offices), industrial building by the private sector (factories, warehouses) and commercial building by the private sector (offices, shops, entertainment, health and education).

2. *Creative and Cultural Industries Sector Skills Council* (development phase commenced April 2004).

The proposed CCI SSC will provide the strategic leadership and communication necessary for a highly fragmented sector where the majority of firms are micro-businesses or small to medium-sized enterprises (SMEs). The CCI SSC takes over much of the work previously undertaken by the Cultural Heritage National Training Group. The sub-sectors covered by CCI SSC are the arts (music, the performing arts, visual arts and literary arts), cultural heritage (museums, galleries and heritage organisations), craft (including designer makers of contemporary crafts, covering more than 50 specialist trades and occupations) and design (specialist consultancies covering graphic, spatial and domestic products).

3. *Energy and Utility Skills* (licensed February 2004)

The industries comprising Energy & Utility Skills form the top tier of the UK's energy and utility supply pyramid representing all facets of the creation and delivery of electricity, fuel for heat, water, the removal of waste water and the waste management sector. These industries support the needs of industry, commerce and the nation.

4. *Summit Skills* (licensed December 2003)

This covers building services, including electro-technical, heating, ventilating, air conditioning, refrigeration and plumbing industries.

5. *Lantra* (Trailblazer SSC from November 2001)

The SSC for the environmental and land-based sector covers agricultural livestock and crops, animal care, animal technology, aquaculture, environmental conservation, equine, farriery, fencing, floristry, forestry and timber processing, game conservation, land-based engineering, landscaping, productive horticulture and veterinary nursing

6. *Asset Skills* (development phase commenced October 2003)

This comprises all businesses and people involved in the maintenance and development of the built environment for the benefit of employers, individuals, residents and communities. The sector lies firmly at the heart of the interface between people and the built environment. It includes certain surveyors, property managers, residential estate agents, caretakers, facilities management professionals, cleaners, town planners, letting agents and housing managers.

7. *Proskills* (development phase commenced September 2002)

Process and manufacturing of glass, extractives, coatings, refractories, building products, paper and furniture.

Information Sources

Principal Sources

- Heritage Lottery Fund (HLF) Report: *Sustaining our Living Heritage – Skills Training for the Heritage Sector*, 2000
- English Heritage Report: *Power of Place*, 2000
- Department for Culture, Media and Sport: *The Historic Environment: A Force for Our Future*, 2001
- English Heritage: *State of the Historic Environment Report*, 2002
- CITB: *Skills Foresight Report*, 2002, and other construction training and labour market research reports and data
- DTI: *Construction Statistics Annual*, 2002
- English Heritage and IHBC: *Local Authority Conservation Provision in England, research project into staffing, casework and resources*, Oxford Brookes University, February 2003
- English Heritage, National Heritage Training Group, CITB, Heritage Building Skills Report, March 2003

Sustaining Our Living Heritage – Skills Training for the Heritage Sector (HLF, 2000)

In 1999 HLF commissioned research and consultation into the skills and training needs of the heritage sector. The research had three aims:

- to establish the nature of the heritage labour market, including paid staff and volunteers;
- to assess the difficulties inherent in recruiting, retraining and training skilled staff;
- to make an assessment of the extent to which existing training opportunities are addressing skill gaps and shortages.

The researchers (HOST) reviewed other studies, including the Cultural Heritage National Training Organisation's labour market assessment, interviewed 40 heritage agencies and 50 employers and analysed the volume and range of vocational education and training opportunities of direct relevance to the sector.

Table A1: Built heritage case study organisations

Case study organisation	Number
Specialist building contractors	2
Grant awarding and technical advisory bodies	2
Local authorities	2
Museums with substantial involvement in the construction and reconstruction of vernacular buildings	3
Owners/managing groups of historic properties, monuments or sites	3

The study was the first to consider the skills and training needs of all parts of the heritage sector, including built heritage. It provides an overview of the context in which heritage specialists are being trained and employed. It identifies shortages of specialists in specific areas and skill gaps in existing workforces and lays down challenges to employers, training providers, funders and policy-makers to work much more closely together to ensure the supply of skilled people on whom the heritage sector depend.

In the built heritage sector the researchers interviewed 20 agencies. Twelve case study organisations were studied, ranging in size from those with more than 1,000 staff to small specialist employers with fewer than 40 staff – as shown in Table A1.

Power of Place (English Heritage, 2000)

In February 2000, the Department of Culture, Media and Sport and the Department of the Environment, Transport and the Regions asked English Heritage to coordinate an important and wide-ranging review of all policies relating to the historic environment – all the archaeology, buildings and landscapes that surround us. A steering group, chaired by English Heritage Chairman Sir Neil Cossons, oversaw the work of the review. It included members of key heritage and environment bodies in England, as well as observers from both government departments. Research was commissioned from MORI and a consultation exercise was conducted. The report *Power of Place* was submitted to the government and published as a public document in December 2000. It recommended the following actions to improve heritage building skills:

- make a requirement that public bodies take training policies into account when awarding contracts, and support regional centres of excellence for skills training and development;
- set up a national conservation training forum to bring together all training and qualification initiatives and promote equal opportunities in the historic environment sector;
- broaden the training of conservation officers to encompass related specialist professional skills;
- provide help and advice for private owners on whom to ask for advice and where to find experienced consultants and skilled crafts people.

A Force for Our Future

(Department for Culture Media and Sport and Department for Transport, Local Government and the Regions, 2001)

A Force for Our Future is the government's statement on the historic environment, published in response to Power of Place. It describes the historic environment as a 'sleeping giant' whose energy is ready to be released. Education, social inclusion, planning, conservation, regeneration and tourism are all set to gain from this new understanding and commitment. The historic environment holds the key to an inspiring education resource, more attractive towns and cities, a prosperous and sustainable countryside, world-class tourist attractions and new jobs.

The report recommended the following actions to improve heritage building skills:

- the government will work with English Heritage and the Learning and Skills Council to increase opportunities for those who wish to take their interests in the historic environment further, for example through further and higher education or vocational courses (Action Point 10);
- English Heritage will coordinate the work of the Building Skills Action Group and the CITB and other interests to ensure a coherent approach to meeting skills requirements (Action Point 19);
- the government is exploring with the Learning and Skills Council how some planned Centres of Vocational Excellence could specialise in skills relevant to the historic environment (Action Point 20);

- the government is encouraging grant-givers to give a degree of priority to training in conservation craft skills (Action Point 21).

State of the Historic Environment Report, SHER

(English Heritage, 2002)

Following on from the *A Force for Our Future* report, DCMS commissioned English Heritage to coordinate the first ever audit of the state of the historic environment. The main findings of the audit show that people care about the historic environment, that the historic environment is a major economic asset and that managing change needs to be undertaken constructively

The report identified a chronic shortage of skilled building workers – stonemasons, joiners, bricklayers and scaffolders – making it all the more important to keep historic buildings, including newer buildings such as Victorian and Edwardian terraces, in good condition. Many buildings (including 23.5% of the housing stock) were built before 1919 using traditional building techniques. Therefore traditional building skills need to be retained if these buildings are to be kept in good repair.

This audit, if repeated in the future, has the potential to provide valuable data on the demand side of the heritage building market.

Skills Foresight Report

(CITB, 2002)

This is a regular report produced by the CITB designed to satisfy the requirements on sector skills information as laid down by the National Training Organisations National Council and now the Sector Skills Council. It will be key a document to inform the CITB's planning in its future role as an industry Sector Skills Council. 'Skills foresight' is defined as 'a structured way of thinking about future skills needs to help meet them'. To achieve this aim, the report adopts a three-stage approach:



Heritage Building Crafts

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

The report provides construction occupational skills data at regional level. However, it does not provide specific data for the heritage building sector.

Construction Statistics Annual

(DTI, 2002)

This is the third edition of *Construction Statistics Annual*, which conveniently brings together inside one cover a wide range of statistics that are currently available on the construction industry. The 2002 edition gives a broad perspective of statistical trends in the construction industry

in Great Britain through the last decade, together with some international comparisons and features on leading initiatives which may influence the future. Statistics are provided on, amongst other things, output, the structure of the industry and employment. However, no specific data is available on the heritage building market.

Local Authority Conservation Provision in England

(English Heritage and IHBC, February 2003)

This study is available on the English Heritage and IHBC websites. It contains valuable information about the effectiveness of listed building controls and the available resources that local authorities can draw upon to implement changes.

Heritage Building Skills Report

(English Heritage, National Heritage Training Group, CITB, March 2003).