

The UK Construction / Built Environment Sector

Safeguarding our heritage and meeting the challenge of the future



Introduction and overview – innovate to build a better environment

There can scarcely have been a time when the importance of the built environment industry has been greater – not just to renew and care for the country's building stock, but to do so in a way that meets the needs of a new low carbon economy, in the context of severe economic restraint. A great sense of achievement can be realised by being part of a team which has created exciting new structures such as the Eden Project in Cornwall, the 2012 Olympic Stadium,

London, the National Space Centre, Leicester, the Bullring, Birmingham, and the Millennium Bridge, Gateshead. **The UK construction and built environment industry has an international reputation for world-class design, inspirational architecture and the highest quality building.** Working in this sector can lead to being a part of a team of professionals creating something lasting and helping to shape the environment for future generations.

The construction and built environment industry is the UK's largest industry, employing 2.35 million people and accounting for over 8% of the UK workforce. (*Sector Skills Assessment for the Construction Sector 2009, ConstructionSkills*). It is estimated that the industry will offer career opportunities for approximately 48,000 people over the next four years. **The infrastructure provided by the construction and built environment industry offers the foundation for all other economic activity.** The UK faces a number of crucial challenges in relation to the built environment including energy security, carbon reduction, resource efficiency and waste reduction. The built environment sector has a critical role to play in delivering these commitments, but also in providing sustainable employment and growth. The industry has the challenge of meeting the commitment of the Climate Change Act, 2008 to reduce our carbon emissions by 80% by 2050. (Low Carbon Construction, BIS, 2010). This challenge involves ensuring sustainability within the industry which will require **“the creation of buildings and infrastructure to shape communities in a way that sustains the environment, generates wealth over the long-term and enhances the quality of life for people”.**



Almost half of carbon emissions are connected to the built environment. However, tackling carbon emission reduction in new buildings alone will not provide the required improvement. A major programme of adaptation and refurbishment of existing buildings will also be required. This means an increasing emphasis on built environment based solutions, for example by renovating existing homes and non domestic buildings to be more energy efficient. This has the twin benefit of stimulating the economy and helping shape a low-carbon future. There will also be significant construction work involved in the building of low carbon/renewable power (e.g. new nuclear power sites, wind farms, wave and tidal generators) to supply the UK's energy needs. (*ConstructionSkills Sector Skills Assessment 2009*)

The industry provides the fabric of life, spanning the following areas:

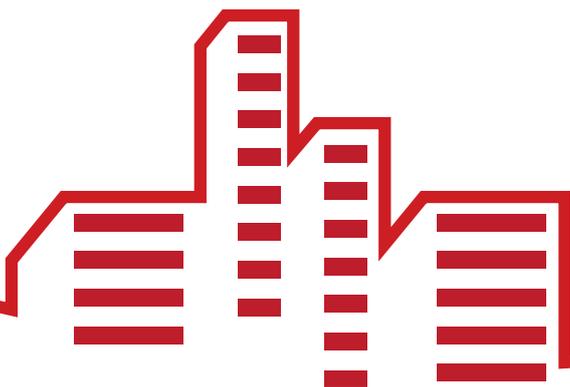
- Infrastructure – roads, rail, airports, power stations,
- Residential – public and private housing, including repair and maintenance
- Non-domestic buildings – schools, colleges, hospitals, offices, retail, factories, warehouses

This supplement focuses on two areas of the built environment that are often hidden from view as potential careers – Building Services and Historic Building Conservation. Both sectors have identified skill shortages and offer sustainable employment with a range of routes into craft, technical and professional roles.

Building Services

Building services include all the heating, light and power within any building. As buildings get larger and more complicated, the responsibility, cost and design of services becomes more critical, as well as representing a large percentage of actual cost. Imagine a hospital without lifts, lighting, cooling, ventilation, power, fire safety equipment, water. The actual building itself is a shell – holding all the services – and life and death depends on the building services. Building services design engineers are involved in designing the services that can reduce carbon emissions made by buildings. This can be achieved on new buildings with renewable energy or it may be by working on existing buildings that need refurbishment to make them more energy efficient.

There are many different careers in Building Services with professional roles in design, project management, consulting or as a quantity surveyor as well as education. There are also a range of technician and skilled craft roles in air conditioning, plumbing and heating and electrical work as well as specialist posts in fire or energy related engineering.



Case study



Louis-James Fifield,

Loughborough University PhD student

Why did you choose Building services?

Building services is an area of engineering that is not very well known to the general public. I found out about building services from my uncle who was an electrical buildings services engineer. He told me about the projects he worked on and this inspired me to look into the area for myself. I found that it was an area which would be interesting to pursue a career.

What was your route into Building services?

In my first year at University, I studied Aerospace engineering, then after spending summer with my uncle, I changed over to mechanical engineering. In my final year project, I focused on low carbon buildings. At the same time, I was applying for work experience with different engineering consultancies and was privileged to be offered a placement from Buro Happold. I spent the summer there working as a student building service engineer, and an opportunity was opened up for me to do some further study in the London-Loughborough centre for doctoral research in energy demand.

What do you enjoy most about your role / course?

I am currently in my second year of a four year programme of research, where I am looking at reducing the energy demand in hospital buildings. The thing I like most about my role is making the regular visits to the hospitals, where I can learn firsthand how building services are operated in a hospital environment.

What are your future plans and aspirations?

My first aspiration is to finish the challenging program of study which I am taking part in. After this, I do not have any specific plans, I am open to different opportunities which may present themselves at the time. There may be the possibility of continuing in the academic field, or even working in low carbon engineering consultancy. In either case I would like to work towards the qualification of being a chartered engineer, working in the area of hospital buildings.

Why do you think it is important to be professionally qualified, i.e. EngTech (Engineering Technician), IEng (Incorporated Engineer), CEng (Chartered Engineer)?

From the small experience I have had in the industry, I have seen that being a qualified engineer opens up the door to many different opportunities of work. i.e. working abroad and in more senior positions.

Historic Building Conservation

Introduction and overview



Historic Building Conservation is a sub-sector of the Built Environment industry that is largely unknown. Research has shown it appeals to a much more diverse range of entrants than its host sector¹. A variety of careers exist within Historic Building Conservation, including on a professional level; Conservation Architecture, Historic Building Surveying and Building Conservation Engineering, as well as many craft roles such as Stonemasonry, Blacksmithing, Thatching and Stained Glazing.

Britain has over 6 million historic buildings, a definition that refers to any building constructed pre 1919². These buildings play an important role in the future of Britain's built environment. The upkeep and maintenance of Britain's historic buildings represents a large proportion of the mainstream construction industry, with the UK spending approximately £5 billion a year on conservation and restoration within the historic built environment. There is a large network of skilled building professionals and crafts men and women needed with the knowledge and understanding of the methods and materials required to restore, maintain, conserve and repair the UK's historic buildings in line with a strong conservation philosophy, ensuring these buildings will be around for future generations to enjoy.

Career Routes

Professional Careers

There are a number of ways and levels to train towards a professional career working with historic buildings. A range of Building Conservation Foundation Degrees are available at colleges around the country. These offer a two year industry-based qualification designed for people who want to start or further their career in the area of building conservation. Many of these are linked to a university offering a top-up programme to a BSc in Building Conservation. Undergraduate degree programmes are available specialising in Building Conservation, however these are at present few in number. Alternatively, many people wanting to pursue a professional career with historic buildings do a first degree in a related mainstream

1. Buxton, A. (2010). *A Future in the Past: Unlocking a Career in Britain's Built Heritage*. Sheffield: Sheffield Hallam University.

2. NHTG. (2008). *Built Heritage Sector Professionals: Current Skills, Future Training*. London: NHT

profession such as architecture or building surveying, before specialising in building conservation at post graduate level. **Post Graduate** courses in building conservation are offered at a number of universities, and provide the specialist knowledge required to work on historic buildings. Many people enrolled on post graduate courses in building conservation come from disciplines other than the built environment, including art, archaeology and history backgrounds.

Craft Careers

Many of the specialist skills needed to preserve Britain's historic buildings are in decline, with some in severe danger of dying out completely. There are now a range of heritage craft courses on offer around the country aimed at reducing the skills shortages in the following main craft based disciplines:

- bricklaying and craft masonry
- carpentry and joinery
- lead working
- painting and decorating
- plastering
- roof slating and tiling
- steeplejacking
- stonemasonry

As well as college based courses, traditional craft training is also provided by organisations such as the Prince's Foundation for the Built Environment and the Heritage Lottery Fund's Traditional Building Skills Bursary Scheme.

Case study



Tracy Simmons

Conservation Building Surveyor of Historic Royal Palaces

How did you get interested in working in the built heritage sector?

I have always had an interest in historic buildings and find the fact that they stand the test of time longer than we do fascinating – if only walls could talk! When studying for my degree in building surveying, I always thought that my dream job would be working with historic buildings but thought that I would not get the chance. Historic buildings just seemed to be more interesting to me than more modern housing stock and general public buildings.

Why did you choose this type of work?

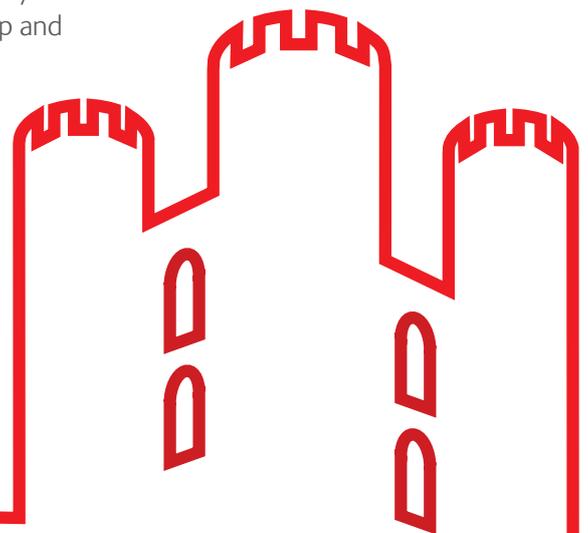
I enjoyed geography at school and being outside. Although I was not quite sure what I wanted to do for a career, I knew that I did not want to be sat at a desk all day. I thought building surveying would be a good excuse to be able to take a peak around big houses that perhaps you wouldn't ordinarily get the opportunity to see. It also meant that I would get the chance to be out and about.

How did you train to work with historic buildings?

I didn't purposely set out to work in the historic environment, it was an ambition but I didn't know how or whether it was possible to achieve. I took A levels in English, Geography and Economics and then an HND in Building Studies. I then transferred to the second year of a Building Surveying degree. After university I worked as a surveyor within a private practice. I was responsible for managing day to day repairs and refurbishments for a large social housing stock. Some of the houses were Victorian and therefore I gained a little experience applying for listed building consents. At this stage my main aim was to become a Chartered Surveyor and I needed more variety and support in my role to be able to achieve this. I moved onto Local Authority and worked for the London Borough of Richmond. I worked within the property department and this time dealt with buildings within the borough that were not housing, i.e schools, leisure centres, council offices and places of interest. Again I did repairs with historic buildings that were Grade 2 or 2* listed and gained a little more experience in dealing with building consents etc. I then saw a job was advertised for a Conservation Building Surveyor at Historic Royal Palaces (HRP). I remember being excited about the advert and thinking it sounded perfect but thought I didn't have a chance. I had an interview and nearly fell over when I had the call to offer me the job.

What does your role as a surveyor for Historic Royal Places involve?

The main objective as a Conservation Surveyor is to give the palaces the care they deserve, ensuring that the building fabric is maintained to exemplary conservation standards. I provide the interface between the ownership and the delivery of the conservation work, acting as the client representative for the day to day management of a project and coordinating the interests of HRP and the project team, ensuring the work is carried out on budget and on time. I provide or co-ordinate professional advice on a range of technical matters relating to the projects including, building conservation, structural issues and fire precaution. My role also includes recording and documenting the conservation work we are doing for historical purposes.



What do you enjoy most about your role?

The variety! Working at the different palaces you are dealing with different construction and periods of history as well as working with different teams of people. Every day is different, for example I can be working on stone cleaning and conservation at the Tower of London dealing with stone dating from the 11th century, followed by the conservation of 16th Century iron work at Hampton Court Palace, and then the installation of new exhibition displays, interpretation installations or building condition surveys. The subject matter varies so greatly, and there is always something new that can be learnt from the building or from the people you are working with, the curators and the history or the specialists carrying out the work.

How does working as an historic building surveyor fit with your family life?

Like with any job and a young family it is a juggle and I often feel like I have done a days work by the time I get to my desk in the morning. I enjoy my job and I also enjoy family life too so the balance of working a three day week works well for me. When I am really busy it is sometimes difficult to fit all my work into just three days and so I often take calls or access the computer from home on my days off but I try to keep this to a minimum. This does however work both ways and if I need some flexibility around my children, my employer lets me have time off.

Entry routes and the importance of STEM subjects

Opportunities within the built environment sector range from professionals including designers, architects, engineers and surveyors to technicians and skilled craft workers, such as carpenters, plumbers and electricians – and specialist skills mentioned previously. STEM subjects usually provide the basis for entry into the well known and the hidden careers within the sector. Good career opportunities exist for those who have an interest in the design and management of construction projects, the supporting technical roles and also for those who wish to develop and use practical craft skills working on site. Team work is essential. The work has to be designed, planned and priced involving professional architects, engineers, quantity surveyors and estimators. Professional managers are required to plan and organise the work.

Entry can be through going directly to college. There are over 400 colleges of further education that offer construction-related training courses, including the National Construction College (the largest construction college in Europe), run by CITB-ConstructionSkills. These can lead to qualifications ranging from craft level to technician level in an engineering discipline and technical membership of a professional body, such as the Chartered Institute of Building. There are over 90 Higher Education Institutions that offer foundation, undergraduate and higher degrees that can lead to full qualification and chartered membership status of professional bodies including Chartered Institution of Building Services Engineers (CIBSE) and Royal Institution of Chartered Surveyors (RICS).

For further information about apprenticeships, access: – www.apprenticeships.org.uk

Technician

Entry at technician level requires 4 good GCSE's (including English, Maths and Science) as well as A levels or equivalent vocational qualifications. Technicians are valuable members of the built environment team who support the work of engineers, architects and surveyors. Entry is by working and going to college part-time through an apprenticeship or employment as a trainee, or going to college full-time. Once working, further vocational and / or professional qualifications are needed to move to supervisory or management roles. Example occupations include: CAD Technician, Civil Engineering Technician, Architectural Technician, Quantity Surveying Technician, Site Technical Support.

Diploma

The Diploma in Construction and the Built Environment offers a mix of classroom learning and hands-on experience. There are three levels – Foundation (level 1); Higher (level 2); Advanced (level 3). The Diploma covers three main areas:-

- Designing the built environment
- Creating the built environment
- Valuing and using the built environment

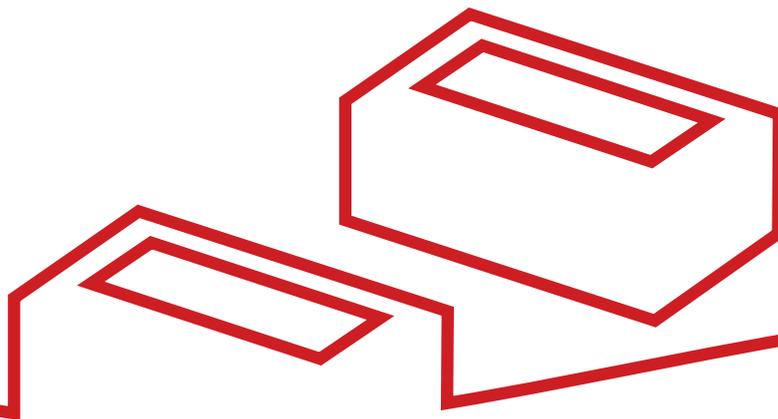
Information about the diploma is available from –
<http://www.constructionandthebuiltenvironmentdiploma.co.uk>

BTEC HND

The Higher National Certificate (HNC) and Higher National Diploma (HND) can be taken either part-time or full-time. Entry is at 18 via A levels or the National Certificate or National Diploma in Construction. This qualification can lead to progression onto a degree course without having to complete the first year (for HNC entrants) or first and (sometimes) second years (for HND entrants). For course details access:- www.ucas.co.uk

Foundation degree

Foundation degree courses are available in construction and the built environment, and are a work-related higher education qualification. A full time foundation degree course generally takes two years. Further information can be accessed via:-
<http://fd.ucas.com/FoundationDegree/About.aspx>



Degree

Examples of degree course subjects particularly relevant to this sector include:

- Built Environment
- Construction Studies
- Construction Management
- Building Studies
- Architecture
- Building Surveying
- Architectural Technology
- Building Services Engineering
- Built Heritage

For example, BEng honours degree courses in building services engineering are offered by 10 UK universities, and most engineering and scientific degree courses – e.g. electrical, electronic or mechanical engineering, and IT – would be relevant to a career in building services. For details of construction and the built environment related degrees access:– www.ucas.co.uk

A number of professional careers can be accessed via a Postgraduate course after completion of a first degree. The first degree does not always have to be a Built Environment subject.

The grid below provides examples of the professional level careers available in the industry – within these generic careers there are specialisms such as Fire Engineering and Building Conservation. For information and case studies about these and other related career areas, access www.bconstructive.co.uk or the individual professional sites listed at the end of this supplement.

Architecture	Engineering	Surveying	Planning & Management
Architect	Building Services Engineer	Building Control Surveyor	Construction Manager
Architectural Technician	Civil Engineer	Building Surveyor	Project Manager
Architectural Technologist	Structural Engineer	Quantity Surveyor	Town & Country Planner
Landscape Architect			



Mythbusters

The Construction & Built Environment industry has few opportunities for progression

This is untrue as there are excellent prospects for promotion, so long as further qualifications are obtained. There are skill shortages at all levels for qualified people. Those who become chartered often decide to run their own professional practice. Within this industry many people start their own companies or progress to partner level – opportunities for this will increase as new buildings and existing or historic buildings are expected to meet new low carbon and waste reduction targets, so long as the new skills needed for this have been gained.

The Construction & Built Environment industry is just “jobs for the boys”.

Almost 200,000 women work in the built environment industry, so there are many opportunities for women. In fact women account for only 1% at craft level, but they do account for 11.6% of those working in design and management occupations. Participation varies between professions, with engineers having much lower rates than architects where participation is more than one third. Although starting from a low base, numbers of women entering the industry are growing year by year, particularly at professional level. The industry itself is also changing, facing skills shortages and recognising the need to follow other industries in diversifying their workforce. The historic building professions have larger numbers of women involved, partly because those with qualifications in archaeology, museums and history (where numbers of women are higher) see the potential for fulfilling careers. Most of the built environment professions have groups that promote equality and diversity – for instance Architects for Change (see RIBA website).

A Look into the Future

A high priority for the built environment sector in the future will be to address the challenge of carbon reduction, as it accounts for 47% of all UK carbon emissions generated. New legislation has been put in place, but skills will need to be adapted and updated. The UK Low Carbon Transition Plan as it relates to the built environment has the following pointers to the future requirement for the industry:



Residential

- Increased energy efficiency in homes to reduce emissions by 29% by 2020 (from 2008 levels)
- All new homes to be zero carbon from 2016
- Smart displays to be fitted to existing meters for 2 to 3 million households by 2016; and smart meters to all homes by 2020
- Major retrofit programme to increase energy efficiency of existing stock

Non-Domestic Buildings

- Increase in efficiency to reduce emissions by 13% by 2020 (from 2008 levels)
- All new public sector buildings to be zero carbon from 2018, and private sector buildings by 2019

Infrastructure

- A more flexible, smarter grid
- New nuclear power stations to provide additional power between 2018 and 2025
- Major programme of wind power and marine energy to increase electricity from renewable sources to around 30% by 2020
- Programme of carbon capture from coal-fired power stations

Websites and links to classroom resources

ConstructionSkills (Sector Skills Council and Industry Training Board for the construction industry) –

www.cskills.org – Represents the voice of the industry. Includes Job profiles, entry routes, and curriculum resources.

bconstructive – www.bconstructive.co.uk –

Click 'careers' to look at case studies and to choose a built environment career with the help of a virtual careers adviser.

goodday – www.goodday.org.uk –

The SummitSkills careers site has an excellent range of information covering Building Services as well as case studies and qualification routes.

Chartered Institution of Building Services Engineers (CIBSE) –

www.cibse.org.uk –

Includes *Careers Factsheets* covering all aspects of building services engineering, and inspirational case studies.

Chartered Institute of Building – www.ciob.org.uk – The voice of the building professional, providing careers information on the professions in the sector.

Royal Institute of British Architects (RIBA) – www.architecture.com – The 'Education, careers and CPD' section includes 'Resources of schools and colleges' together with information on qualifying as an Architect.

The Chartered Institute of Architectural Technologists – www.ciat.org.uk –

Architectural technologists are the technical specialists in building design, the careers section provides a range of information and qualifying courses and routes.

The Royal Institution of Chartered Surveyors (RICS) –

www.ricscourses.org – Includes a 'Careers' section and a list of all RICS accredited courses and case studies.

Institution of Civil Engineers (ICE) – www.ice.org.uk –

Contains 'Career development' and 'Education' section which includes teacher information and resources.

Construction Youth Trust – www.constructionyouth.org.uk –

The Trust helps young people facing financial barriers, poor understanding of construction and the built environment, or barriers of gender or ethnicity, by offering bursaries and work placement schemes.

Historic Building Links

Building Conservation – www.buildingconservation.com

Building Crafts College London – www.thebcc.ac.uk

CADW – www.cadw.wales.gov.uk

COTAC – www.cotac.org.uk

Craven College Centre for Construction & Heritage Skills – www.craven-college.ac.uk

English Heritage – www.english-heritage.org.uk

Historic Scotland – www.historic-scotland.gov.uk

ICCOMOS – <http://blog.icomos-uk.org>

Institute of Historic Building Conservation – www.ihbc.org.uk

National Heritage Training Academy South West – www.nhtasw.org.uk

National Heritage Training Group – www.nhtg.org.uk

Society for the Protection of Ancient Buildings – www.spab.org.uk

The Prince's Foundation for the Built Environment – www.princes-foundation.org

Traditional Building Skills Bursary Scheme – www.buildingbursaries.org.uk

JTL – www.jtltraining.com –

Leading training provider to the building services engineering sectors. Provides information on apprenticeships, including electrical and plumbing work.

Stephen Lawrence Trust – www.stephenlawrence.org.uk/programmes/architecture-for-everyone/

The London Development Agency has delivered a series of activities at the Stephen Lawrence Centre, with the aims of:

- Helping young people find pathways out of poverty into careers in architecture and urban design and regeneration
- Improving the educational achievements of black and minority ethnic young people
- Promoting diversity in architecture and associated professions