Standards Outlook 2016

Construction and the Built Environment

bsi.

“Standards represent the distilled wisdom of what ‘good’ looks like. They are open, consensus-based frameworks for sharing knowledge between all industry stakeholders.”

Introduction

The digital revolution is reaching the construction industry and in the coming years is destined to change radically the ways in which the sector works. Whether we are looking at the use of Building Information Modelling (BIM) for the collaborative design of structures, the need for ‘smart’ technology to be embedded in construction components or the increased use of prefabrication and off-site manufacture, such technological change will ultimately affect everyone in the industry.

People who work in construction will already be familiar with the standards developed by BSI over decades that cover products, techniques, health and safety, design and much else, and will be used to working with these. But they may have had less exposure to the standards required to accommodate the changes that the rapid spread of digital technology will bring.

Changing landscape

BSI has been busy thinking ahead about the standards that professionals will need to work with to build confidence with these new digital technologies and components. This publication will bring you up-to-date with BSI’s standards development focus and the changing demands on the construction industry, and will tell you what we are doing to create the standards demanded as a result of these fundamental shifts.

These of course apply not only to contractors and manufacturers, but all the way across the increasingly fragmented supply chains which are commonplace in the industry. If suppliers conform to standards then contractors and clients can have confidence that the products, materials or services being supplied and used appropriately should not lead to structural or operational issues.

Alongside changing techniques, there is pressure for transparency. Standards help avoid the reputational damage that would result, for example, from the use of timber that has come from an unsustainable source or a product whose manufacture involved forced labour.

BSI does not develop its standards in a vacuum. We rely on and work in partnership with experts from across the construction industry, who give their time and knowledge to the standards development process. Their contribution means that the resulting standards are the right ones for the industry and will have wide acceptance and applicability within it.

Our experts’ immense breadth of knowledge is the key to getting these standards right, both in their content and their practical applications and through collaboration with major industry technical and trade bodies during their preparation. We are committed to deepening our engagement with the industry and the wider stakeholder community, bringing together the insight of experts and those who use standards, the needs of consumers and the requirements of regulators.

Industry-wide confidence

BSI has for more than 100 years been the recognised UK standard setting body appointed by HM Government, developing international, regional and local standards. The bulk of our work is focused on developing international standards and for this we depend on our community of 10,000 independent experts and the 1,200 committees for which we are responsible.

In the important European Union single market we work with our partners to develop standards that everyone finds acceptable and that can be used confidently for imports and exports.

We have an extensive portfolio of standards spanning the construction industry and majoring on such disciplines as building design and techniques, products, health and safety, infrastructure management and beyond. The portfolio is constantly being reviewed and amended to align with new technology and methods in the industry.

Standards matter. Standards represent the distilled wisdom of what ‘good’ looks like. They are open, consensus-based frameworks for sharing knowledge between all industry stakeholders including manufacturers, materials suppliers, architects, sub-contractors, contractors and clients.

As construction changes at an ever-increasing speed, BSI is here to help the industry understand, get involved in and shape what is happening. I invite you in this publication to see some of what BSI and our experts are achieving and I hope that this may spark your interest to become involved in standards development with us.

Shirley Bailey-Wood, Director Information Solutions, BSI

CONTENTS

State of the industry

Smart technologies look set to transform the way the UK construction industry works

After years of coping with the impact of the recession, construction is growing again. But while those in the industry are busy chasing and winning work, should they also spare time to consider what technological change may do to their business?

'Smart' technologies may be in their infancy but are set to change the way in which much of the industry works, for good or ill, and BSI has been working to understand how it can help construction maximise the resulting opportunities while avoiding the pitfalls.

Construction is one of the largest sectors of the UK economy, expected to contribute £120bn over the 2015-16 period alone, and it has been forecast to grow 23% by the end of 2018 by the Construction Products Association (CPA), which represents the leading materials companies. In its Winter 2015/16 market survey, the CPA forecast that construction output will grow by 3.0% in 2016.

Similar optimism could be found in the civil sector, where the Civil Engineering Contractors Association's (CECA) 2015 Workload Trends Survey, found 57% of UK firms reported that workloads were expected to increase over the next 12 months, a proportion that rose to 65% for England.

The industry's importance does not just lie in the domestic market. According to UK Trade and Investment, some £6bn a year worth of construction products and materials are exported from the UK, as is almost £3bn of construction services such as engineering consultancy and building design.

Construction's contribution to the British economy was underscored by the publication in 2013 of a joint UK coalition government-construction industry strategy for the sector, Construction 2025, and embedded in the Government Construction Strategy 2016.

STANDARDS OUTLOOK 2016

Some might think that with the industry growing at the pace forecast by the CPA and CECA the most appropriate strategy might be to simply carry on doing what has proven successful. The speed of technological change is relentless though, and construction firms that do not keep pace may find themselves at an eventual disadvantage against competitors.

The work BSI undertakes with its various industry expert committee members will have an important role to play in delivering the Construction 2025 strategy, and the laudable ambitions that lay behind it, because its success will ultimately take the industry into some unfamiliar technological areas.

The targets are ambitious. The global construction market is forecast to grow by more than 70% by 2025, and Construction 2025 calls for the UK's construction industry to increase its share of this market, achieving by 2025 a 50% reduction in the trade gap between total exports and total imports for construction products and materials.

Not only is the industry being called on by the government and clients to work more efficiently – for example through the increased use of Building Information Modelling (BIM) – it must also contend with the arrival of the 'internet of things' and demands that construction components have 'smart' technologies embedded within them.

Adaptation to technical changes has long been part of the construction industry's skill set, but the use of smart technologies may be new territory for many, in particular for SMEs, and could prove disruptive as well as offering opportunities.

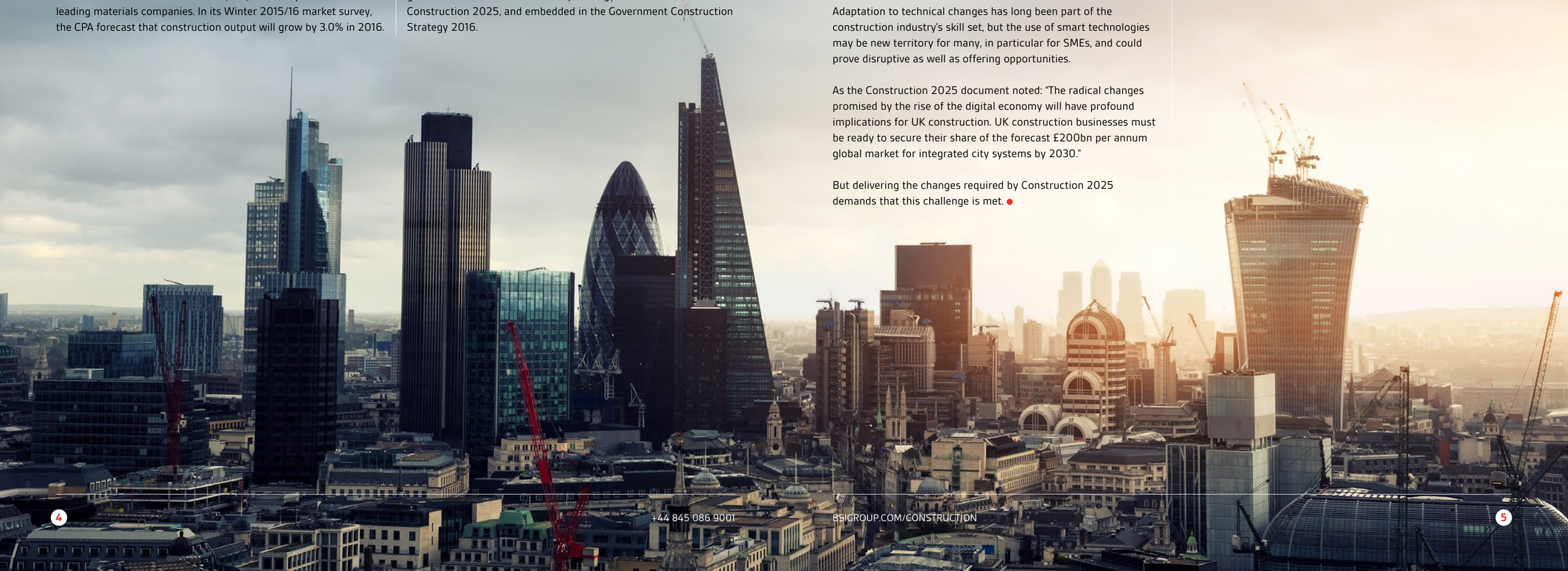
As the Construction 2025 document noted: "The radical changes promised by the rise of the digital economy will have profound implications for UK construction. UK construction businesses must be ready to secure their share of the forecast £200bn per annum global market for integrated city systems by 2030."

But delivering the changes required by Construction 2025 demands that this challenge is met. ●

23%

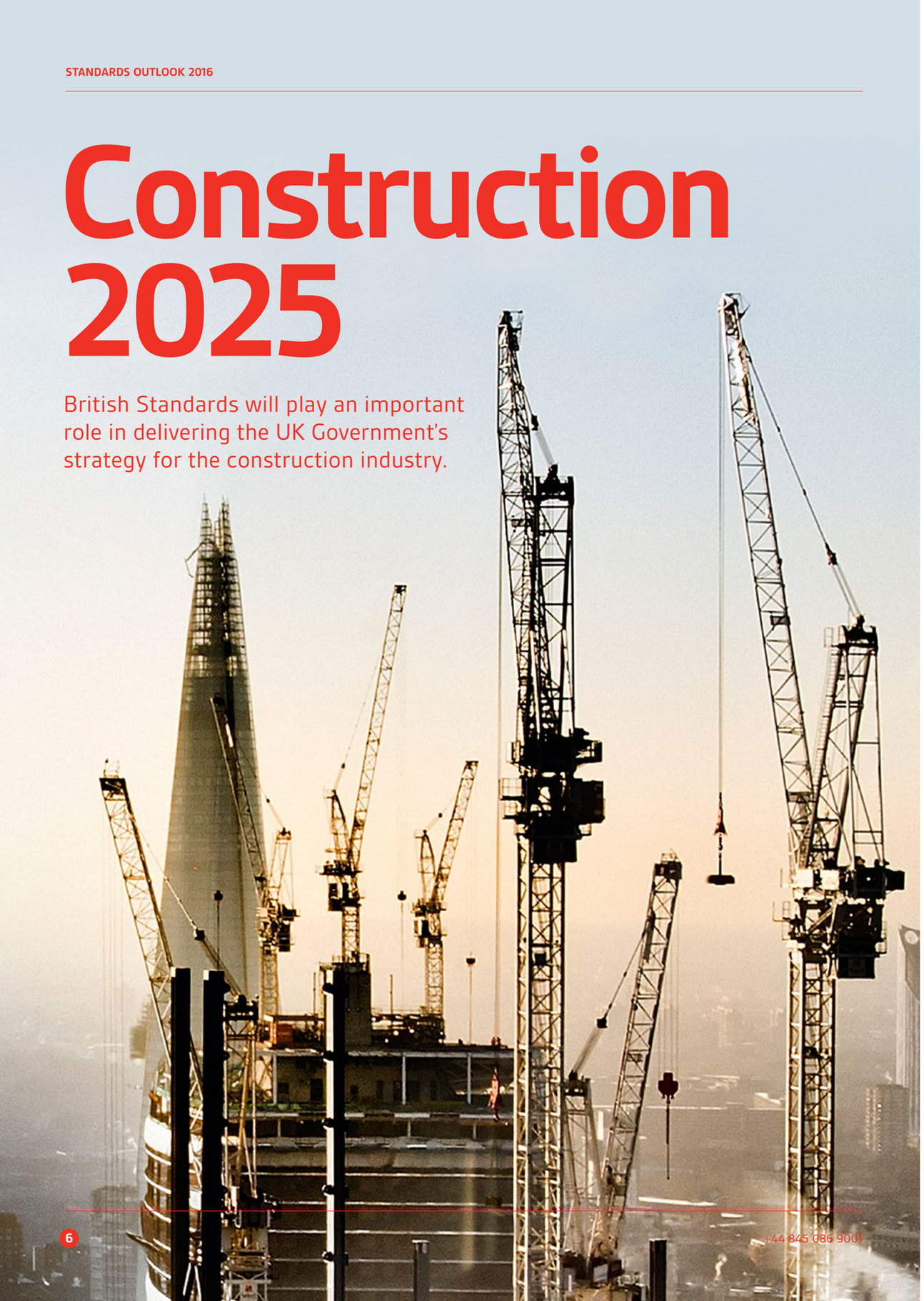
The percentage the construction industry is forecast to grow by end of 2018

"The work BSI undertakes with its various industry expert committee members will have an important role to play in delivering the Construction 2025 strategy."



Construction 2025

British Standards will play an important role in delivering the UK Government's strategy for the construction industry.



"As the standards get taken up by product manufacturers and designers, it will become increasingly possible to compare different products."

The Government Construction Strategy: 2016-2020 sets out a new plan to increase productivity in government construction to deliver £1.7bn efficiencies and support 20,000 apprenticeships over the course of this parliament. The strategy offers clear support for the ambitious objectives of Construction 2025, which include creating a construction industry that is efficient and technologically advanced, has a talented and skilled workforce, drives growth across the entire economy, and that leads the world in sustainable low carbon and 'green' construction exports.

As proof-points to demonstrate progress, the Construction 2025 strategy envisions the industry achieving a 33% reduction in the initial cost of construction and the whole life cost of built assets, a 50% reduction in the overall time, from inception to completion, that it takes to construct or refurbish buildings, and a 50% reduction in greenhouse gas emissions in the built environment. The strategy also includes 50% improvements in exports, an area where British Standards plays a significant role. Indeed, a 2013 report examining the economic benefits by the Centre for Economics & Business Research (CEBR) indicates the impact of British Standards on trade in the construction industry amounts to 5.2% of exports, translating into £150m annually.

And much of the BSI construction industry-specific work showcased in this report helps the industry to deliver on these goals. Our work in respect of advancing the efficient and safe manufacture of construction products, as UK lead for Standards supporting Building Information Modelling and Eurocodes, together with the activities that we are undertaking in the area of Smart Cities and the integration of digital technology, all significantly strengthen the industry's hand in terms of the Construction 2025 agenda.

Research that we have undertaken in the last 18 months, for instance, has highlighted that addressing the use of standards early in the design process can reduce construction costs by up to 5%, as well as accelerating specification, approval, and physical construction times. Other gains from the early and upfront application of standards include a lower re-build cost, a simpler approval process, and — critically — dramatic improvements in energy efficiency, both during construction and throughout a building's service life.

BSI is at the forefront of developing the standards that deliver these gains, in partnership with industry bodies and regulators, both in the UK and internationally. The European Union's Energy Performance of Buildings Directive, for instance, was re-written in 2010, and has led to work (currently underway within BSI) to redraft a number of existing BSI standards to provide a high quality, relevant and easy-to-use definition of what 'good' looks like. Furthermore, the directive proposes new standards, and BSI is now working closely with both the construction industry and the government to formulate a joint UK stance to put forward across Europe.

Embodied environmental impacts is another area of the sustainability agenda where BSI is working closely with the industry, government, and Europe. This relates to harmful effects generated by constructing and operating an asset through its whole lifecycle from 'cradle to grave' that is from the extraction of raw material for product manufacture through manufacture, build phase, in-use phase, through to deconstruction of the building. Our work here has resulted in several recent and leading-edge standards for defining and measuring embedded environmental impacts, such as *BS EN 15804:2012+A1:2013, Sustainability of construction works. Environmental product declarations. Core rules for the product category of construction products, and BS EN 15978:2011, Sustainability of construction works. Assessment of environmental performance of buildings. Calculation method. Last year we published BS EN 16309:2014+A1:2014 Sustainability of construction works. Assessment of social performance of buildings. Calculation methodology which examines the social performance of buildings. And the most recently published is BS EN 16627:2015 Sustainability of construction works. Assessment of economic performance of buildings. Calculation methods.*

The standards in this area provide a methodology for measuring the impacts from building works on sustainability (environmental, social, economic). As the standards get taken up by product manufacturers and designers, and the results are made available, it will become increasingly possible to compare different products and combinations of products making up a structure. This will enable benchmarking by industry and any subsequent regulation that may follow in this area. ●

33%

The reduction in the initial cost of construction and the whole life cost of built assets envisioned by Construction 2025

Building Information Modelling

Standardised computer-aided design software has the potential to transform the construction process by generating and managing information for a building throughout its entire lifecycle.

Building Information Modelling (BIM) is key to delivering on Construction 2025's ambitions. If the 33% reduction in construction costs and 50% reduction in completion times are to be achieved then it is clear that the construction industry and its supply chains will have to work very differently.

And that is exactly what BIM achieves. BIM takes work that was once done on paper by many different disciplines in the construction team and transfers it to a computer-aided design basis.

The ultimate aim of BIM is to enable all parties involved in the built environment supply chain, from procurement through to operation, to use the same digital model. For example, if an architect makes an alteration to a building's design, a structural engineer could immediately see what had been done and what implications this had for their part of the project.

A BIM model can also be used by relevant members of the supply chain and indeed can be kept in place to facilitate maintenance after the client has taken over the building.

While earlier versions of computer-aided design could do this for individual components, BIM integrates it all.

In short, BIM is the process of generating and managing information about a building during its entire lifecycle, using a suite of technologies and processes that integrate to form a component-based 3D representation of each building element.

Each element is generated from a product library and has embedded information about the product and its placement, material, specification, fire performance , U-value, fittings, finishes, costs, 'carbon content' and any special requirements, which is stored in the system.

Key benefits of BIM:

- Early cost certainty;
- Reduced delivery costs;
- Reduced operational costs;
- Reduced risk;
- Predictable planning;
- Reduced carbon impact;
- Reduced waste;
- Improved productivity;
- Improved project and asset sustainability.

> **"BIM takes work that was once done on paper by many different disciplines in the construction team and transfers it to a computer-aided design basis."**

Issues in using BIM

Digitisation in the built environment presents many challenges, from the traditionally bespoke nature of designing and building an asset, through to the complex relationships between clients, contractors, suppliers, operators and asset users. Each project normally starts from scratch, with those involved usually having no useful digital records to refer to.

Moreover, the industry is fragmented, with a large number of SMEs active within it at various points in the supply chain, which may find it problematic to invest the time and money in converting their working methods to BIM.

Different levels of BIM use

BIM Level 0 is the baseline: a construction industry defined by its use of separate sources of information, paper documents, and limited collaboration. BIM Level 1 retains these separate sources of information, but incorporates electronic documents, together with 2D or 3D CAD designs. BIM Level 2 progresses to the sharing of these electronic documents, with some automation: when a design changes, for instance, supply chain partners can receive automatic notification of such changes. A data interchange format, the Construction Operations Building Information Exchange (COBie), provides the digital 'language' for such data sharing.

Savings from using BIM

To encourage the adoption of BIM Level 2, the government has mandated that all contractors submitting tenders for centrally procured government construction projects

from spring 2016 must be BIM Level 2-compliant: a significant source of impetus, given the level of public sector expenditure on infrastructure and construction projects. It was announced at the Government Construction Summit in July 2014 that BIM has been identified as a significant contributor to savings of £804m in construction costs achieved during 2013/14.

20%
savings shown by BIM on capital build costs

With the inefficient communication of data accounting for up to 25% of the total cost of large-scale construction projects, the impact that BIM will have on the Construction 2025 agenda is considerable. Put another way, by eliminating that inefficient data communication within large-scale construction projects, the UK government — a prime sponsor of such projects — can achieve significant savings in public sector construction work.

BIM has shown 20% savings on capital build costs, and at a time of severe financial pressures and the cuts in public spending caused by austerity, ministers are understandably keen to try to get better value for money by building more cheaply. BIM assists this aim without compromising quality by cutting out wasteful processes during the construction phase. It is thus valued by a government that is seeking to sustain public buildings and facilities while saving money as far as possible.

This is why the UK Government has been so enthusiastic in promoting the use of BIM throughout the industry. The previous coalition Government began by establishing a UK BIM Task Group through the Department of Business, Innovation and Skills (BIS), and working with many industry partners including BSI to develop a set of BIM standards and tools; and followed by mandating the use of BIM Level 2 on public sector construction projects from 2016; and thirdly it made the standards and tools freely available to the UK Construction market.

> **“The aspiration is clear: a move right away from static designs, to full 3D ‘models’ held in the cloud, and accessed collaboratively by those involved.”**

BSI has developed a new BIM Level 2 website as a point of reference for clients, designers, contractors, trade suppliers, manufacturers, maintainers, operators and users to understand how to use BIM and data to improve productivity and reduce waste. http://bim-level2.org

Looking ahead to BIM Level 3

To ensure the UK can have an equally successful BIM Level 3 programme, the government is supporting work to further familiarise the industry with the concept. The 2016 Budget included an explict statement of intent when it comes to developing Level 3 BIM. The Construction Leadership Council – reduced to 12 members in July 2015 in a bid to make it more effective and business-focused – has put BIM at the heart of its strategy for Construction 2025, which commits to cut build costs by 33%. Level 3 takes the foundation of Level 2 and adds capital and operational expenditure across a building’s whole life.

BSI is continuing to work with UK Government and partners such as Ordnance Survey and BuildingSMART on a five-year project to define more closely what it will look like as part of the Digital Built Britain Level 3 Strategy (https://www.gov.uk/government/publications/uk-construction-industry-digital-technology).

The aspiration, though, is clear: a move away from static designs to 3D ‘models’ held in the cloud, and accessed collaboratively by those involved in particular projects. The UK is already a world leader in BIM, having invested significantly in leading the development of a set of world class BIM standards that are being adopted globally, and through BSI are being established as International Standards (ISOs), a task in which BSI and our community of experts has played a key enabling role.

A number of documents make up those freely-downloadable standards: *BS 1192:2007 (Principles), PAS 1192-2:2013 (Capex), PAS 1192-3:2014 (Opex), BS 1192-4:2014 (COBie), PAS 1192-5:2015 (Security) and BS 8536-1:2015 (FM Client Briefing).* Together they establish the principles, terminology, workflow and datasets involved in BIM, and also lay out BIM’s ‘maturity curve’, informally known as ‘The Wedge’ within the industry. ●

Smart Cities and our digital environment

As the integration of ‘smart’ technologies becomes more prolific in our cities, what impact will this have on the construction sector?

Why would the construction industry be concerned with Smart Cities, a concept that can appear concerned largely with better use of information technology and electronics?

It is incorrect to think of Smart Cities as solely a technological matter; it concerns the integration of ‘smart’ technologies into structures and the construction industry’s traditional approaches will need to change to accommodate this shift.

Imagine a future where our cities leverage digital technology in order to be better, smarter, more responsive, and more resilient places in which to live and work. Now, thanks to technological developments such as the ‘internet of things’, that future is closer and more possible than many of us realise.

At its simplest, an example of such smart technology in an installation would be the telemetry that displays imminent service arrival times at bus stops. A less obvious example, but one with obvious implications for construction, would be the embedding of sensors into bridges that will measure and report on anything happening to the concrete structure, so risks can be better managed. Flows in underground pipes could be collected by sensors, for example, allowing designers to know whether there is spare capacity.

In a Smart City it is even possible that data on citizens and their requirements — in areas such as healthcare, education and social care — dynamically informs decisions as to resource provision

14bn
The number of objects connected to the internet, worldwide

in an intelligent and integrated manner. Smart Cities can be seen at its broadest as putting intelligence into objects. The trend to Smart Cities could demand radical changes in the way the construction industry operates.

Components with embedded technologies could perhaps be made in factories and delivered to sites ready for assembly, so removing much of the work traditionally done in-situ with conventional materials.

It also means thinking differently about the operation of buildings. The operational phase of a building has been separate from its construction, but in future a building occupier will want to be able to see the building’s BIM representation and understand the technologies in it to assist with maintenance or operational changes. Gone will be the days when drawings were left in a cupboard and rarely consulted after completion.

Smart technologies may also affect how the industry organises itself, since its fragmentation into smaller firms means many may

STANDARDS OUTLOOK 2016

struggle with the skills, money and time needed to understand and work with smart technologies.

There are four Future Cities demonstrations in the UK: Bristol, Glasgow, London and Peterborough. Initiatives in Peterborough have seen the entire city connected to superfast broadband and a project through the BSI Smart Cities Leadership programme to develop the vision for the future of the city.

4

The number of Future Cities demonstrations in the UK: Bristol, London, Glasgow and Peterborough

'Smart Fengate' has recently stared on the Fengate industrial estate and business park to see what exchanges and relationships take place between businesses there and how links may be encouraged to scale up that economy. This will potentially form a future BSI Publicly Available Standard.

BSI is preparing a portfolio of materials that will help construction firms of any size make the transition into this new technological age, which will work across disciplines that might have been traditionally separate. These are leadership guides for those at the highest level, management frameworks for those overseeing implementation and technical standards for those at the sharp end of building and design.

High-level principles-based standards can provide a framework for making choices about sustainable development of Cities. The primary standard for sustainable development is BS 8900, which assists an organisation to think strategically about its intended course of action.

BS 8904 guidance for community sustainable development helps authorities think strategically about what sort of city their citizens and businesses want through stakeholder engagement.

That's the Smart Cities vision, which BSI is working to deliver, alongside industry, government and specialist partners. The UK is creating Smart Cities standards faster than anywhere else in the world, and BSI published three critical documents in 2014, with two following during 2015. (Visit www.bsigroup.com/en-gb/smart-cities/ for more information).

Interest is high and timely delivery is a pre-requisite , so BSI worked with the government-backed Future Cities Catapult centre to launch the Cities Standards Institute in April 2015, which is developing a work programme that will define a set of coherent standards for urban innovation.

Clearly, there are significant challenges in bringing the Smart Cities vision to fruition, and when contemplating these, it is clear how integral a role standards play – and the issues that those standards must address.

How should city leaders shape and share their Smart City objectives? What Smart City processes should a city have in place in respect of areas such as planning, and the sharing of digital (including geospatial) information? How should the technical challenges of capturing, reconciling, analysing, and using that digital information be addressed?

And how should geospatial mapping data be integrated with BIM Level 3 models of physical infrastructure assets? BSI, in its Smart Cities work to date, has already made significant advances in helping to answer these complex questions and to understand the interfaces between digital and physical components which will advance city and community developments.

Smart cities overview. Guide: PD 8100:2015, for instance, provides a high-level maturity framework for assessing a smart city, and guidance for city leaders on making the transition. And *Smart cities. Guide to the role of the planning and development process PD 8101:2014* delivers guidance for use by local authority planning and regeneration officers to identify Smart City good practice in a UK context, and the tools that they could use to implement this good practice.

Smart Cities: Vocabulary PAS 180:2014, meanwhile, provides an industry agreed understanding of Smart City terms and definitions to be used in the UK. *Smart City Framework. Guide to establishing strategies for smart cities and communities: PAS 181* establishes a good practice decision-making framework for city leaders to help them to develop, agree and deliver Smart City strategies. And *Smart city concept model. Guide to establishing a model for data interoperability PAS 182:2014* focuses on overcoming the barriers to Smart Cities, especially in terms of the interoperability of systems and data-sharing between agencies.

Our present programme of work furthers the Smart Cities agenda in a key area – data and privacy. All aspects of Smart Cities involve data, and maintaining privacy and determining the basis on which this may be shared among different public and private bodies has long been a contentious matter.

This is clearly not going away, as according to government estimates there are already 14 billion objects linked to the internet, 40 million of them in the UK. By 2020 these totals will clearly have vastly increased, bringing both opportunities and risks.

As we've seen, 'smart' infrastructure can greatly enhance service delivery but as this grows so too do the possibilities of data breaches of sensitive personal information. A key concern for BSI is the production of guidance on how data can be shared and exploited in situations where it is unclear who owns pieces of digital data, or what rights are attached to it. ●

“A key concern for BSI is the production of guidance on how data can be shared and exploited in situations where it is unclear who owns pieces of digital data.”

Regulatory compliance, guidance, and the development of good practice

The influence of British Standards Industry reaches far beyond UK borders, playing a significant role in the regulation of the global construction industry.

Standards continue to play a significant part in both promoting best practice, and helping the industry to be compliant with its regulatory framework. Deeply intertwined with the entire construction process, those standards embrace everything from design considerations to construction site practice, and building performance in areas such as energy efficiency and fire safety, to the specifications to be met by construction materials.

BSI's standards are heavily referenced because of their longstanding use and importance throughout the sector. They feature in statutory guidance that support Building Regulations in the UK and beyond. Countries as diverse as Singapore and Indonesia, for instance, make heavy use of BSI standards for construction projects, regarding the UK's regulatory framework — and its construction industry — as models of best practice. BSI works actively to share UK developments with countries and regions that have evolved their construction practices upon UK methods.

And the UK construction industry continues to play a full and active part in determining and shaping sector best practice. A large number of experts sit on the BSI committees that are involved in creating and developing BSI construction standards. Drawn from the industry, government, professional institutions, research bodies, universities, and industry forums, BSI technical committees have an extensive role to play: identifying and defining best practice for the industry; leading change for the industry and embodying new concepts within standards so that their expertise can be shared with others.

BSI's role, in turn, is to help promote that best practice, and also act as a conduit through which the construction industry can make its views on standards and best practice known to other interested parties: government, for instance, and regulatory and standards bodies in Europe and elsewhere.

BSI provides a forum through which the industry can engage with and learn from third parties with industry-specific insights and knowledge to share. This is particularly important in respect of large-scale infrastructure projects, where the opportunities for cost and timescale overruns are greatest.

BSI is also currently working with the academic community to build a standards roadmap for Smart Infrastructure, including the innovative use of sensor technology in concrete tunnel linings and similar applications in order to provide real-time data on structural integrity. Clearly, this has the potential to have an enormous impact on the construction industry, and construction best practice. ●

3rd-party forum: the BSI provides a platform through which the industry can engage and learn from one another

Construction products in a digital world

Get involved to help provide an infrastructure for the registration and use of persistent identifiers, for use on digital platforms.

In the spirit of innovation and best practice, BSI, NBS and the Construction Products Association (CPA) have invited professionals from throughout the construction industry to participate in a major research project looking at the feasibility and usefulness of a Digital Object Identifier (DOI) for building products.

Supported by Innovate UK, the project began in October last year. The research will establish how a common digital identification system for construction products could benefit the industry, and in addition it will define what product characterisation and contextual information is appropriate to record in establishing a digital identifier. If shown to be feasible and beneficial to the industry, the later stages will build on this initial work to create a pilot system.

The project brings together the specific skills of the three organisations who together have the expertise to analyse the digital and physical aspects that describe a product. The emerging system is intended to provide an infrastructure for the registration and use of persistent identifiers, for use on digital platforms.

The first stage of the research project, which will run for two years, will involve in-depth consultation with construction industry professionals including contractors and consultants as well as building product manufacturers via a series of interviews and workshops.

“The research will establish how a common digital identification system for construction products could benefit the industry.”

3 organisations will come together for the research project: BSI, NBS and CPA

Eurocodes and Eurocodes PLUS

BSI has been integral to the introduction of Eurocodes standards, which offer a unified approach to construction across the entire European Union.

With the introduction of Eurocodes – a common harmonised set of construction standards for the entire European Union – a programme of work stretching back to the early 1970s finally reached a conclusion in 2010. It was an endeavour in which BSI, together with the construction industry, had played a full part, liaising with European standards bodies and working to hammer out a practical and workable set of standards.

At a stroke, some 50 British standards were rendered obsolete, and withdrawn. In their place came some 58 Eurocodes standards. This not only made it easier to search and apply standards, but also helped to 'level the playing field' in terms of the UK construction industry's ability to export its services to other European countries.

And making the task of working with Eurocodes even easier, BSI has developed an online knowledgebase called Eurocodes PLUS, which helps standards users to collaborate on projects more effectively, cross-reference bodies of knowledge and use the standards information that they need more productively.

This is a web based workflow tool, enabling users to selectively compile all the standards information for a given project in a single repository, allowing it to be manipulated, annotated, and published in a variety of different ways, according to need. Moreover, it is 'role-based', developed with an understanding of which job roles within the construction industry use standards, how they use them and at which points within a project's workflow and navigating users accordingly.

Supplemented by purpose-developed supporting notes on best practice (in many cases commissioned from expert authors who helped to create the relevant Eurocodes), Eurocodes PLUS allows the industry to create, on a project-by-project basis, a dynamic document containing all the standards information required for a given project.

That said, the new Europe-wide Eurocodes aren't a 'one-size-fits-all' regime. Recognising that construction requirements do genuinely need to differ from country to country – think about the climate in Greece, compared to the climate of Norway, for instance – each country has been able to apply supplementary National Annexes, which provide the Nationally Determined Parameters (NDPs), for each Eurocodes standard.

Again, BSI and the UK construction industry worked closely to develop these, and today some 51 of the 58 Eurocodes have NDPs relating to the UK. The partnership also worked to create supplementary guidance to these annexes, in the shape of documents known as Non-Contradictory Complementary Information (NCCI).

And now, the UK construction industry and BSI are working together again: this time on the development of the 'second generation' Eurocodes, which aim to streamline and improve on the original Eurocodes, eliminating the need for so much supplementary information to be required in the form of the NDPs and NCCI annexes.

BSI is spearheading the process, not just for the UK, but for the entire European Union, managing the development of these second generation standards through a BSI-led secretariat working out of our global headquarters in London. The work programme began in 2015, and is due for completion in the early 2020s.

At its conclusion, there will be a new and improved set of building standards for the entire European Union, providing the UK construction industry with an unparalleled opportunity to help deliver on the Construction 2025 ambition of sharply increasing the industry's role in the fast-growing global construction market. ●

58

The number of Eurocodes standards that have replaced 50 British standards

STANDARDS OUTLOOK 2016

> **The UK construction industry and BSI are now working on the development of the 'second generation' Eurocodes.**

Learn more about standards

How to get involved

Share your expertise and work with us to create the standards of tomorrow.

The knowledge embedded in the standards we publish helps organisations to improve their performance, manage risk, innovate and grow. Formalising knowledge in this way builds trust with users, consumers and industry at large, bringing benefits to the wider community. But for standardisation to work, individuals and organisations from a wide range of stakeholder groups need to be involved in creating standards.

By participating, industry experts can represent their organisations and community of interest to ensure that their requirements, understanding of the market and voice is heard and captured when standards are developed at either national, European or international level.

We actively seek representatives from many other groups including: consumer organisations; industry and professional institutions; certification, testing and inspection bodies; educational establishments; research organisations; UK notified bodies; enforcement bodies and government departments.

All participation is voluntary and there are many ways that you can get involved in developing standards, including suggesting ideas for new standards, participating in public consultation on standards or by becoming a committee member. More than 10,000 members sit on some 1,200 BSI committees.

18,838
EUROPEAN
26,098
INTERNATIONAL
Number of Origins of standards published

49,457
Number of standards in our current portfolio

7,538
Number of standards projects in development

How standards are made

Products from BSI standards fall into three broad categories:

1 Standards products (i.e. publications established by consensus and approved by BSI committees).
2 Non-standards products (such as guidance documents, training materials and electronic products).
3 Joint products (i.e. combinations of standards and non-standards).

There are six types of British standard:

1 Specifications set out detailed requirements to be satisfied by a product, material, process, service or system and the procedures for checking conformity to these requirements.
2 Methods provide a complete account of how an activity should be performed (and, if appropriate, the equipment or tools required) and conclusions reached, to a degree of precision appropriate to the stated purpose.
3 Guides give broad and general information about a subject, with background information where appropriate.
4 Vocabulary standards list definitions of terms used in a particular sector, field or discipline.
5 Codes of practice comprise recommendations for accepted good practice followed by competent and conscientious practitioners, and bring together practical experience and acquired knowledge for ease of access and use of the information.
6 Classifications comprise designations and descriptions of different grades of a product and identify and arranges data in hierarchical order.

Our Committee Members

Our thanks go to all of the committee members who input such knowledge and time into our Standards Development programmes, and for the Construction and the Built Environment Sector. Particular thanks to the immediate past and current Chairs of our strategy committees, and their advisory panels:

CB/– and CB/10–**Mr Peter Caplehorn;** FSH/0–**Sir K J Knight** CBE QFSM; CB/20–**Dr Howard Taylor**; CB/30–**Mr Rob Warren**; CB/40–**Dr Hywel Davies**; CB/50–**Mr Haydn White** OBE; CB/60–**Dr Donald Lamont** MBE; CB/70–**Mr Adrian Brooks**

1,374
Number of members who act as experts in an individual capacity

11,285
Number of active committee members

1,064
Number of organisations the committee members come from

1,936
Number of technical and sub-committees

1,500
Approximate number of new experts who joined in 2014 & 2015

bsi.

...making excellence a habit.™