



Standards Outlook 2014

BSI – developing global business standards

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“Together with our network of experts we’re shaping business practices around the world and playing a lead role in the international community in areas of importance to the UK”

Foreword

By Scott Steedman CBE
Director of Standards

In December 2013, BSI signed an agreement with the Standardization Administration of China (our counterpart body in China), which was a milestone for China and the UK.

This historic agreement, signed in front of the Chinese Premier Li Keqiang and UK Prime Minister David Cameron, opens the door for industry to put forward British and European standards for potential recognition or adoption by China.

Whether you see China as a potential market opportunity or business partner, a common approach to standards for business will reduce costs, raise quality and improve market access. Strengthening our relationship with China also brings opportunities for increased collaboration between experts in all areas of our work, particularly in new fields, such as smart cities and Building Information Modelling.

Standards are an accelerator of trade and a springboard for industry to increase success around the world. Almost all 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’re responsible.

I’m grateful for their commitment to codifying the best practice knowledge that provides so much opportunity for business and industry to deliver innovation, growth and sustainable development.

As the UK’s National Standards Body, appointed by HM Government to represent the UK in Europe and globally in matters of standards, we’re committed to deepening our engagement with industry and the wider stakeholder community, including users, consumers and regulators.

The UK is exceptionally good at creating business standards that attract international interest and support. Anti-bribery, organizational governance and asset management standards are three current examples where UK thought leadership is shaping best practice.

Increasingly, we see market interest in standards that codify not only technical specifications and management processes, but also the values and principles that underpin successful organizations, and practices that shape how companies can become more innovative, better governed and more responsible.

Our recent research report, *Backing Market Forces: How to Make Voluntary Standards Markets Work for Financial Services Regulation*, sets out the opportunity for standards to provide support to the financial services sector.

Over the past year our work with the Technology Strategy Board has demonstrated how the use of standards can increase confidence in the commercialization of new and emerging technologies.

These are exciting times for standards making, in the UK and internationally. Together with our network of experts we're shaping business practices around the world and playing a lead role in the international community in areas of importance to the UK.

As you'll see in the examples included throughout *Standards Outlook 2014*, the breadth and depth of our work reaches all sectors and types of organization, large and small. With your help and input we'll continue to influence and develop standards that support UK business and society. We're always open to new proposals and look forward to hearing from you.



Scott Steedman CBE
Director of Standards
January 2014



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“The case studies contained within this publication show how standards continue to provide a practical, effective, user-friendly solution to a wide range of real-world issues”

Introduction

By Shirley Bailey-Wood MBE
Director of Publishing

I am delighted to introduce our annual briefing, this year called *Standards Outlook 2014*. Its publication comes at a time when we've seen a significant increase in interest in, and demand for standards, as the UK economy recovers and new insights into the benefits of standards emerge.

BSI Standards is part of BSI Group, a global business standards company that provides organizations with solutions that can help them to improve their performance, manage risk more effectively and grow sustainably. Standards also inspire confidence by delivering assurance to markets, customers and consumers.

We've been at the forefront of standards development for more than a century and as the UK's National Standards Body, strengthened by our network of experts and clients, we continue to play a lead role in standards development in the UK and through international standards-making fora.

BSI has a well established international reputation and we maintain a global view in our work. Our focus is informed by industry – global and local – so that we can create the standards that our customers and partners need, to help facilitate trade and drive better organizational performance. We produce this standards knowledge in a variety of formats, and through various distribution channels and access methods as demanded by users.

In 2013 we participated in 7,000 standards projects and most of these address global needs, working closely with customers in the UK and in countries as far afield as Taiwan, Japan and Korea.

Global influence

We continue to expand our work into new areas, bringing together new participants, fuelling interest in standards and their impact in global markets. As technologies, services and innovations merge and evolve, standards are at the forefront of helping the wisdom of past developments to create new platforms for success in the future.

Throughout 2013, some significant new areas of interest emerged that are key to new and emerging industries in the UK. These could provide a strong foundation for success on a global scale and this publication sheds light on our work to support that vision.

You can also read about the role that standards could play in helping people to live more independently as they get older, as well as the contribution standards could make in emerging healthcare fields such as synthetic biology and cell therapies. Standards will play a vital role in areas that demand research and innovation, where consumer concern can be high.

We've been working with the Technology Strategy Board to develop a standards strategy in these areas, to help ensure that new solutions can be brought to market successfully, safely and quickly.

Looking ahead

Sustainability continues to be a key issue, of course. Standardization continues to help organizations of all types and sizes to become more sustainable and to prove their sustainable

credentials, while reducing their costs, boosting efficiency, attracting new customers and meeting legislative requirements. Standards making in this area continues and *Standards Outlook 2014* explains how.

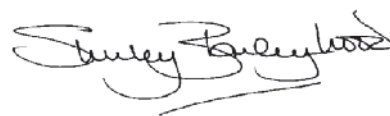
Standards will also enable the development of the smart cities of the future, where infrastructure, communications and data exchange will combine to increase efficiency and improve the lives of those living in urban communities. You can find out more about the role that standards could play and how our lives could change as a result.

I particularly hope you enjoy reading the case studies within this publication, as they show how standards continue to provide practical, effective, user-friendly solutions to a wide range of real-world issues, enabling business, government, consumers, academia and others to overcome a wide variety of challenges.

Expert input

Finally, I'd like to take the opportunity to thank the members of our network of 10,000-plus contributing experts who sit on our committees. Without their knowledge, experience, hard work, commitment and willingness to collaborate, it would not be possible to make sure that standards continue to embody current and future thinking. We're extremely grateful for their input and if reading about their contribution inspires you, why not get involved in shaping the future of standards? We look forward to hearing from you.

Standards Outlook 2014 provides a mere snapshot of our work, but I hope you find it an engaging, inspiring and enjoyable read.



Shirley Bailey-Wood MBE
Director of Publishing
January 2014

BSI Standards in numbers

Standards

34,000

standards in our current portfolio

2,500

standards we publish each year

7,000

standards projects in development

Existing published portfolio and projects in development

Subject area	Active projects	Current titles	Total
ICT	931	4,094	5,025
Electronics	710	3,720	4,430
Electrical machinery and components	655	3,623	4,278
Mechanical machinery and components	608	3,265	3,873
Energy	589	2,474	3,063
Food and drink, agriculture	813	1,670	2,483
Materials	470	2,010	2,480
Aerospace, automotive, transport	532	1,518	2,050
Construction	330	1,681	2,011
Consumer goods	216	1,342	1,558
Health and safety	145	1,307	1,452
Healthcare	333	1,073	1,406

Origins of standards published

95%

international and European

5%

national

Comments on draft standards

Our open online system helps to collect comments before standards are published.

Year	Comments	Users
2013	6,471	8,179
2012	6,756	5,756
2011	9,629	8,468
2010	5,240	6,265
2009	3,856	4,481

<http://drafts.bsigroup.com>

306

employees

13,929

Subscribing Members

32,200

customers



Committees

10,275

active Committee
Members who come from

2,387

organizations

1,118

act as experts in an individual
capacity

200

new experts joined in 2013

1,200

technical and sub-committees

International committee chairmen and
working group convenors coming from
UK committees

ISO/IEC (international)	554
CEN/CENELEC (European)	293

Committee Members have the expert knowledge needed to help create published standards. They come from industry, trade associations, government organizations, professional associations, research institutions, academia, consumer and public interest bodies.

Top five professional institutions represented

		Committees/sub-committees
1	The Institution of Civil Engineers	41
2	The Energy Institute	39
3	The Institution of Engineering and Technology	37
4	The Institution of Structural Engineers	32
5	The Institution of Mechanical Engineers	29

Top 10 trade associations represented

		Committees/sub-committees
1	BEAMA	139
2	GAMBICA Association	98
3	UK Steel Association	75
4	British Cables Association	64
5	British Plastics Federation	63
6	Society of Motor Manufacturers and Traders	56
7	Safety Assessment Federation	51
8	Energy Networks Association	50
9	Association of Manufacturers of Domestic Electrical Appliances	48
10	British Measurement and Testing Association	48

About BSI Group

2,900 employees

67 offices globally

70,000 customers in 150 countries, including 55 per cent of FTSE 100 companies, 40 per cent of Fortune 500, 26 per cent of the Nikkei and 12 per cent of Hang Seng-listed companies

73,000 people were trained in 2012 on how to implement standards

99,000 business locations certified by BSI

Ranked 1st in North American and UK certification markets

3,600 BSI Kitemark™ licences

7,400 CE marking certificates

92 per cent of the world's top 25 global medical device manufacturers choose BSI as their notified body for CE marking certification against EU Directives

*All numbers correct at time of print.

Maximizing performance

How business standards help organizations worldwide to deliver improved innovation, growth and confidence.

We're playing a key role in revising ISO 9001 – the world's most used quality management standard. More than 1.2m organizations are certified to the standard and the revised version will leave them even better placed to boost their performance through improved quality management.

Based on the BS 5750 series of standards that we launched in 1979, the ISO 9000 series was first published in 1987. To ensure that ISO standards remain current, reviews take place every five years. A review of ISO 9001 was due, so the international committee (of which BSI holds the Secretariat) conducted a stakeholder survey to canvas opinion on how the standard could best be improved.

Because it's such a key international standard, we made a draft revision available for public feedback at committee stage. And a plenary meeting of international experts took place in October 2013, during which more than 3,000 comments from around the world were reviewed. A new draft will be available for further comment in 2014, with the final revised standard due for publication in 2015.

Financial services

Co-funded by the Department for Business, Innovation & Skills and in partnership with the Chartered Institute for Securities & Investment, in 2013 we commissioned independent research into the role that standardization could play in financial services.

City of London-based commercial think tank Z/Yen carried out the research and hosted discussions groups, as well as conducting interviews and surveys with various institutions, professional bodies, trade associations and consumer groups to gather opinion.

The subsequent report – *Backing Market Forces: How to Make Voluntary Standards Markets Work for Financial Services Regulation* – was prepared by Professor Michael Mainelli and published in November 2013. It identified areas within the financial services sector where standards could deliver real advantage and work on this will get underway in 2014.

Vehicle damage repair

We're working with stakeholders from industry and consumer representatives to revise the highly successful standard for vehicle damage repair processes, PAS 125, with a view to it becoming a British Standard.

We published PAS 125 in 2011 in response to strong market demand to improve the quality of vehicle repairs following crashes. It sought to align repair processes with current legislation, technological developments and best-practice recommendations. PAS 125 covers repair processes, competence of personnel, tools and equipment, parts and controlled consumables, as well as quality control and the removal, refitting and replacement of windscreens.

Many insurance companies have adopted PAS 125 as their *de facto* crash repair standard and there is an associated BSI Kitemark™ scheme that is now carried by some 900 garages. The revised British Standard version of PAS 125 could be published as early as 2014, with the goal of much wider use and recognition.

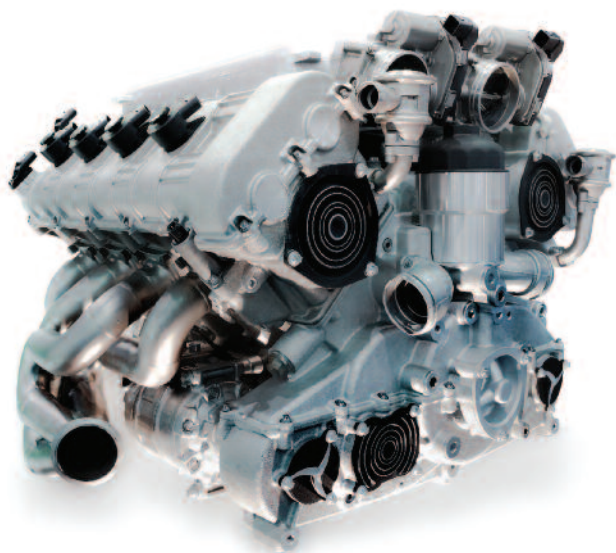
High Speed Two

We've also been working with High Speed Two Ltd (HS2), the company formed by the government to develop the high-speed rail link between London and Birmingham and the north of England.

We're working together on a consultation project, the first of its kind, which is part of HS2's Efficiency Challenge Programme. It aims to improve and enable better management of infrastructure design codes and standards to deliver efficiency and cost savings. Several new standards have been proposed, which industry believes will streamline design practices and lead to better use of existing design standards (see p34).

Building Information Modelling

Billed as the biggest development in the construction industry for decades, the adoption of Building Information Modelling (BIM) is the result of the need to reduce costs, waste and carbon emissions, while improving supply chain efficiency. BIM is the process of generating and managing information about a building during its entire life cycle, made possible by a 3D representation of each building element.





“We’re working on a consultation project, which is part of HS2’s Efficiency Challenge Programme. It aims to enable better management of infrastructure design codes and standards to deliver cost savings”

Sponsored by the Construction Industry Council and with various stakeholder organizations sharing their expertise via a steering group, BIM specification PAS 1192-2 was published in 2013 and it is available to download for free from our website (bsigroup.com/pas1192-2).

Its requirements build on the existing code of practice for the collaborative production of architectural, engineering and construction information, defined within BS 1192:2007.

It’s intended for use by those who procure, design, build, operate and maintain buildings and infrastructure assets and the government is a BIM early adopter, having worked with industry to trial the new standard on pilot projects. In the first such project, the Ministry of Justice reported savings of up to 20 per cent on capital costs by using BIM when rebuilding part of HM Young Offender Institution Cookham Wood in Kent.

Public consultation for the Level 3 BIM specification, PAS 1192-3, closed in December 2013. While Part 2 focuses on the delivery phase of projects, Part 3 concerns the operational phase of assets, more specifically, the availability, integrity and transfer of data and information. Part 3 will be published in 2014.

Collaborative business relationships

We’re leading efforts to develop an international standard for collaborative business relationships based on BS 11000-1. Published in October 2010, BS 11000-1 provides a framework specification that can be used to maximize the value of collaborative business relationships by establishing and maintaining partnerships through which knowledge, skills and resources can be shared more effectively.

Collaborative relationships can enable better cost and risk management, while facilitating joint innovation that might not normally be achieved through a typical client-supplier relationship.

BS 11000-1 provides guidelines on increasing joint efficiency, transparency and understanding of governance processes, while helping users to monitor and evaluate partnerships through a relationship-management plan. Expectations are high that commercial relationships in countries throughout the world will benefit as a result of using a new international standard based on BS 11000-1.

Case study

Maintaining standards

How publication of BS 8544 will enable more cost-efficient maintenance and renewal of buildings and bring other benefits.



“BS 8544 enables you to set and defend budgets, target your investments and optimize the value of your maintenance spend”

Andrew Green, Director of Faithful+Gould and Lead Technical Author of BS 8544

“There was an overwhelming need for a solution that would enable a more structured and robust way to work out building maintenance costs, which is why a new standard for the life cycle costing of maintenance, BS 8544, was created,” explains Andrew Green, Director of international construction consultancy Faithful+Gould and Lead Technical Author of BS 8544, which was published in September 2013.

“Without the standard, the process is fragmented and plans focus on the short term, not necessarily making the most cost-efficient choices for the medium or longer term. It’s difficult to control a budget, too, because you don’t have overall visibility of costs, and you can’t predict future costs.”

Cost-saving benefits

As Green explains, BS 8544 enables users to collect data so that joined-up maintenance and renewal cost planning can be carried out. “You can make better decisions about how and when to target your maintenance and renewals. BS 8544 enables you to set and defend budgets, target your investments and optimize the value of your maintenance spend. You can also decide whether to invest in your assets or not, keep using a building, use space in a different way or move to a more cost-efficient option. There are numerous cost-saving benefits.”

The standard’s ‘plan-do-check-act’ principles enable users to identify assets, standardize how they look at them and break them down so they can work out the best maintenance strategy. Green adds: “You don’t have to keep on doing it, nor need to pay to call out surveyors every time, because you already have the necessary asset knowledge.”

Real world tests

During its development, the standard was applied to the 131 prisons operated by the Ministry of Justice, comprising 6,000 buildings and some six million assets. “We were able to establish an asset database for the whole Ministry of Justice custodial estate, in line with RICS and other standards,” explains Green, “then determine what maintenance and renewal was required to ensure legal and statutory compliance, and that assets remained fit for function and not over-maintained.”

The standard was also tested at Heathrow Airport. Green adds: “We looked at how assets were structured; broke that down into 23 types, such as lifts, escalators, fire mains and so on, to which we planned ‘keep-out-of-jail’ and ‘fit-for-function’ maintenance. Heathrow also has ageing assets worth billions of pounds. Using the standard enabled us to calculate savings worth 20 per cent of their allocated capex

funding for replacement works, as well as reduce their opex running cost budgets significantly.”

BS 8544 allows users to establish almost a “*Haines Manual* view of maintenance for every building type, which makes things much simpler,” says Green. “And data can be used to determine maintenance costs for new buildings, which can help you decide how they should be built and handed over to be operated and maintained. Because it provides robust, detailed whole life cycle maintenance costs, the standard is a key enabler to make BIM [Building Information Modelling] workable.”

Industry collaboration

Kathryn Bourke was the standard’s other Lead Technical Author. Green and Bourke were part of a BSI technical committee featuring lead practitioners in buildings maintenance, professional organizations such as the Chartered Institution of Building Services Engineers and the Building and Engineering Services Association, and client organizations such as the Ministry of Justice and Heathrow.

“It was a highly collaborative process,” Green recalls. “Involving the right professionals, experts and clients helped to ensure a robust, ‘real-world’ solution. You standardize good practice – not theory and concept.”

Case study

International appeal

The new ISO 55000 series of standards will enable organizations to get more out of their assets during their life cycles.



“Bringing together a panel of international experts enabled us to capture new approaches and evolve previous work into improved international standards”

Rhys Davies, Chair of ISO Project Committee PC251 Asset Management

The ISO 55000 series of international standards was launched in February 2014 and they have been created to help organizations maximize benefits from successfully managing their assets throughout their life cycles.

Rhys Davies, Chair of ISO Project Committee PC251 Asset Management, says: “Previous work in capturing good practice led to publication of PAS 55, which became a well-respected, globally used asset management benchmark. Bringing together a panel of international experts enabled us to capture new approaches and evolve previous work into improved international standards, which will be a significant step forward for good practice in asset management.”

Led by BSI, experts on the international committee came from the Institute of Asset Management (IAM), international equivalents and many other industry bodies (31 countries have been involved).

Robust framework

The IAM, BSI and other stakeholders authored PAS 55, which was launched in 2004 in two parts – PAS 55-1 (which included a 28-point physical asset management checklist) and PAS 55-2 (which provided guidelines for applying PAS 55-1).

Four years later it was revised following input from 49 organizations from 10 countries. PAS 55 provided a framework that could be used to optimize the cost, risk and performance efficiency of physical assets over their life cycles.

“The popularity of PAS 55 led to it being put forward to the International Organization for Standardization in 2009 to form the basis for a new international standard,” recalls John Woodhouse, Programme Director of PAS 55 development (2002-2008) and UK Principal Expert to the international committee.

Key differences

The new ISO 55000 series consists of three standards: *Asset management – Overview, principles and terminology*, ISO 55000; *Asset management – Management systems – Requirements*, ISO 55001; and *Asset management – Management systems – Guidelines on the application of ISO 55001*, ISO 55002.

Woodhouse adds: “Key themes that helped make PAS 55 successful have been retained, but while PAS 55 is focused on physical assets, ISO 55001 can be applied more easily to other asset types, such as data, knowledge or reputation, while retaining its natural suitability to physical asset management.

“The ISO 55000 family is structured around the new ISO model for all management systems, which will make it easier to align and integrate with other major standards, such as ISO 9001 [quality management], ISO 14001 [environmental management], OHSAS 18001 [occupational health and safety] and ISO 31000 [risk management].

Huge impact

“Assets and the value realized from them are key to whether an organization achieves its aims,” Woodhouse says. “Whether assets are physical, financial, human or intangible, good asset management maximizes value for money and meeting stakeholder expectations.

“The impact of PAS 55 has already been huge in terms of bottom line business benefits for organizations around the world. For example, in December 2013, Costa Rican national energy company ICE won the first ever IAM Asset Management Achievement Award for its PAS 55-based improvement programme, which was applied across 26 power stations.

“They quoted eight-figure annual benefits, as well as great cultural and plant performance improvements. I expect ISO 55000 to be even more effective than PAS 55,” he summarizes.

Delivering sustainability

A look at our recent sustainability standards development work and why product sustainability has become a key area of focus.

Much of our sustainability work in 2013 centred on product sustainability, reflecting the growing realization that an organization's key impacts, risks and opportunities are often associated with its supply chains and product life cycles.

Faced with diminishing natural resources, waste and instability in places where materials are sourced, businesses are increasingly realizing the need to make their production models more 'circular', which involves more recycling and re-use, while using fewer virgin materials.

With support from Defra (the Department for Environment, Food and Rural Affairs) and the Department for Business, Innovation & Skills, in 2013 we launched a new government-backed research and stakeholder engagement project to raise awareness of the role standards can play in the move towards a 'circular economy'.

This shift provides significant opportunities for UK businesses to contribute towards a resource-efficient, low-carbon economy, which can reduce costs and supply risk, while generating more value.

A review of waste policies published in 2011 by Defra recommended that government should work with standards organizations to encourage greater waste prevention requirements in product standards. The project in which we're engaged seeks to enhance existing standards and create new ones to help organizations develop their circular economy thinking.

Stakeholder engagement

In 2013 we hosted a forum to hear opinions on how standards could help organizations to source more responsibly. Attendees were able to learn about research we'd carried out into the topic, while presentations were also made by carbon footprinting expert Mike Berners-Lee and stakeholder organizations such as Kingfisher, ISEAL Alliance and Vivian Partnership. There was an overwhelming desire among those gathered to collaborate and this conversation will continue in 2014.

Our annual product sustainability conference, held in November 2013 in London, provided a fascinating insight into sustainable product innovation. It brought together industry experts, practitioners and policy makers to explain how forward-thinking initiatives (such as responsible sourcing, environmental footprinting and the circular economy) can make a difference.

We've also been working on a strategic standards approach to climate change adaptation, which seeks to help organizations, people and communities to be better prepared for the potential impacts of climate change. The ultimate aim – and one that standards support – is for people and organizations to protect themselves from negative impacts, while benefiting from new opportunities resulting from climate change.

In support of the Offshore Renewable Energy (ORE) Catapult, we've also begun Technology Strategy Board-funded research into the role standards could play in the rapidly developing area of ORE (eg wind, tidal and wave power). Standardization projects could follow in 2014.

New standards

Sponsored by the Greater London Authority, PAS 2070 was published in November 2013. Available to download for free from the BSI website (bsigroup.com/pas2070), it provides a robust and transparent method for measuring and reporting a city's greenhouse gas (GHG) emissions (see p35).

This added to our growing portfolio of GHG-management specifications that includes PAS 2050 (which enables the assessment of the life cycle GHG emissions of goods and services) and PAS 2060 (which enables users to demonstrate their carbon neutrality), the revision of which got underway in 2013.

The draft version of the textiles product GHG emission assessment specification, PAS 2395, was put out for public consultation in 2013, with publication scheduled for spring 2014. This is the third sector-application of PAS 2050 and it is intended to assist the international textiles industry in its effort to better assess and manage its carbon emissions and climate change impacts.





“In support of the Offshore Renewable Energy (ORE) Catapult, we’ve begun Technology Strategy Board-funded research into the role standards could play in the rapidly developing area of ORE”

PAS 600 was also published in 2013. It provides guidance on terminology, standards and claims for bio-based products such as enzymes, lubricants, organic acids, paints, plastics, polymers, solvents, etc.

Available to download for free from our website (bsigroup.com/pas600), PAS 600 provides small and medium-sized businesses with an accessible guide to bio-based product standards, legislation and regulation, codes of practice, and technical and environmental considerations.

Also revised last year was PAS 402, which can be adopted by waste resource management organizations for performance reporting.

BS 42020, the first formal British biodiversity management standard, was also published in August 2013. It provides a biodiversity management code of practice for planners and developers, among whom it has already been

well received. Two further biodiversity management standards are being drafted. One concerns woodland bat surveys, while the other will provide biodiversity guidance for operators of environmental or sustainable development management systems.

Energy management

The EU Energy Efficiency Directive was published in 2012, making energy audits mandatory for large organizations from 2015. The UK’s Energy Efficiency Deployment Office (EEDO) was asked to respond and we’ve participated in the workshop that it set up.

EEDO has also proposed the Energy Savings Opportunity Scheme (ESOS) and, building on our work in developing energy management standards (eg BS EN ISO 50001), we’ve been asked to create a PAS to determine ESOS assessor competency.

In 2013, ISO published a new technical standard, ISO/TS 14067, which provides guidelines for the quantification and communication of the carbon footprint of products. Currently under development too is water footprint standard ISO 14046, with publication likely in late 2014. Via representation from industry associations from the construction, manufacturing and food sectors, we continue to provide a strong UK voice into developing this new standard.

In 1992, we developed BS 7750, the world’s first environmental management systems standard, which is the basis of the ISO 14000 series, which was first published in 1996.

ISO 14001, the world’s leading environmental management standard, is being revised. A draft will be published in mid 2014, which will provide stakeholders with the opportunity to feedback and help shape the revised standard, which is scheduled for publication in 2015.

Case study

Sustainable outcomes

Why the revised version of BS 8900 is even better placed to enable organizations to embed, manage and assess sustainable development.



“The standard enables organizations to improve their processes so they deliver more sustainable outcomes, while improving business performance”

Dr Miles Watkins, BRE Group Business Development Director

In August 2013 we published the revised version of BS 8900, which enables organizations to embed the management of sustainable development in their everyday activities and decision making, as well as assess how well they manage their sustainable development.

BS 8900 was originally published in 2006, but now it's been superseded by a two-part document: *Managing sustainable development of organization – Guide*, BS 8900-1 and *Framework for assessment against BS 8900-1 - Specification*, BS 8900-2, which reflect latest sustainability management practices.

The committee that worked collaboratively to revise BS 8900 included sustainability experts from government, academia, industry, employee, construction and procurement organizations. Stakeholder workshops were also held to gather opinions on how the standard could best be improved.

Minimum principles

Dr Miles Watkins, BRE Group Business Development Director and Chair of the BSI committee that oversaw the standard's revision, comments: “The intent and spirit of the original standard have been preserved – it was a great piece of work – and the stakeholder section has been improved and

we've added minimum principles, which makes the standard even more useful.

“BS 8900-1 and 2 can help organizations of all sizes and types to think through sustainability issues relevant to them, using their own strategy and stakeholder input as primary feeds. The whole point is that the standard can be integrated into *existing* businesses practices.”

BS 8900 is *not* a management system standard, Watkins stresses. “There are no prescriptive details about how to achieve requirements – the focus is on outcomes rather than processes. The idea is to provoke thought and action, not to dictate, which makes things more strategic.”

Greater clarity

Part 1 of the revised standard adds greater clarity, for example, on the role of principles, stakeholder engagement and maturity assessment in sustainable development.

“It provides useful examples of sustainable development maturity matrices for different types of organizations, while the key principles of sustainable development – inclusivity, integrity, stewardship and transparency – are now minimum principles that can be used by all organizations,” says Watkins.

“The maturity matrix was very popular in the first edition, so we've improved it and included examples to aid understanding. If all organizations created a matrix of this type, it would be a powerful agent for change.”

Holistic approach

Part 2 provides a methodology based on Part 1 against which claims of compliance can be made. The framework in BS 8900-2 enables flexibility in the approach to sustainability an organization can take when applying the guidance in BS 8900-1, as well as clarity on how conformity can be demonstrated.

So, how should an organization work with the standard to achieve the best outcomes? Watkins replies: “The board or senior management team should read the standard thoroughly and make changes based on their ‘best fit’.

“It requires a holistic approach and responsibility shouldn't just be given to one person, it should be shared. Essentially, the standard enables organizations to improve their processes so they deliver more sustainable outcomes, while improving business performance,” he concludes.

Case study

Usability gains

PAS 2030 specifies requirements for installing energy efficiency measures in buildings. To enhance usability, it's now available exclusively online.



“Online access details are sent within 48 hours, granting the user access to the latest version of the specification for 12 months from their date of purchase”

Launched in January 2013, the Green Deal is the UK government flagship initiative that seeks to improve the energy performance of domestic and commercial buildings by the retrofitting of energy efficient measures (EEMs).

Property owners can make savings by using less energy and they can pay for improvements through their bills over time, which means that there are no upfront costs (although they may have to pay for the initial assessment).

All EEMs need to be installed in accordance with energy efficiency measure installation specification PAS 2030 and Green Deal legislation requires that all installers must be certified to PAS 2030.

Expert working group

We were commissioned by the Department of Energy and Climate Change to develop PAS 2030. A working group made up of representatives of government, trade associations, businesses and consumers was brought together to help create the specification and ensure that all stakeholder views were taken into account.

PAS 2030 sets out the management systems and installation processes required to meet the requirements of the Green Deal, including specific requirements for installation operator

competence. It provides a common specification that allows users to demonstrate that energy efficiency measures have been installed in accordance with the specifications issued by the Green Deal Provider.

The latest version of PAS 2030, published in January 2014, included changes made necessary by several additional EEMs that are now accepted under the Green Deal.

Online efficiency

For improved usability, delivery of PAS 2030 became exclusively online in 2013 – a first for BSI. When someone visits our website and buys PAS 2030 they receive a digital PDF-format version of the specification, which they can save to a computer desktop or device, print out or use straight away. They do *not* receive a hard copy of the specification.

Crucially, they receive online access to the latest version of the specification for 12 months from their date of purchase. With more updates possible, when changes occur updates will be displayed on the homepage, so users will be able to remain aware of their obligations and best practice requirements. We'll also alert them by email.

Speed and convenience

Accessing PAS 2030 online and finding information couldn't be simpler or quicker. From the first time a user clicks on their unique URL, they're logged straight into their dashboard and they can start using the specification right away.

There are no usernames or passwords to remember, all the user needs is the unique URL they receive when they purchase PAS 2030, which can be bookmarked for speed and convenience.

The online benefits include a dashboard that displays the full table of contents included in the specification, with links straight to those sections. There's also a search box that enables users to find the reference information they need quickly, while enabling users to bookmark sections they use regularly, for ease of access.

Enabling risk management

How our work with a diverse range of experts and stakeholders is helping people and businesses to mitigate a wide range of risks.

In 2013, we started working with experts and stakeholders to turn anti-bribery management standard BS 10500 into an international standard. BS 10500 was published in 2011, a year after the UK Bribery Act came into force.

The Act made it an offence for commercial organizations to fail to prevent employees, representatives and associates from committing bribery on their behalf. The consequences of this can be severe and although the standard cannot prevent bribery, it enables organizations of all types to demonstrate that they've put in place measures to attempt to prevent their representatives from contravening the Act.

Those who developed BS 10500 were keen to see it become an international standard, because many UK organizations operate globally or have suppliers or customers in other countries.

We hosted the first meeting of the ISO committee tasked with developing the first international anti-bribery management system standard. It's chaired by Neill Stansbury, Co-founder and Director of the Global Infrastructure Anti-Corruption Centre and Chair of the BSI Anti-Bribery Working Group. City of London Police was part of the working group that developed BS 10500 and is part of a UK delegation that is working with the committee.

Anti-bribery training

In 2013, in response to a growing number of cases being investigated, City of London Police and BSI joined forces to deliver a series of anti-bribery management and investigation training programmes. These sought to help businesses to implement an effective anti-bribery management system based on BS 10500 and conduct internal bribery-related investigations.

Adrian Leppard, Commissioner of Police for the City of London, comments: "Good business must identify and deter bribery, suffocating its opportunity to manipulate transactions. Businesses need systems to achieve this and BS 10500 sets a benchmark for good practice."

Cyber security

According to the Department for Business, Innovation & Skills (BIS) *Information Security Breaches Survey 2013*, the worst breaches can cost small firms up to £65,000 and as much as £750,000 for large organizations. This illustrates the importance of *all* businesses taking a robust approach to managing cyber security risks.

Previously, businesses seeking to protect themselves needed to refer to information security standard ISO/IEC 27001, but in 2013 we published PAS 555 to help them better manage their exposure to cyber security risks.

The specification offers a framework that defines the outcomes of good cyber security practice and it extends beyond technical cyber security to include people and physical security. The need to carry out a thorough cyber security risk assessment is central to the specification, because it helps organizations to better understand their exposure and develop a sound approach to managing specific risks.

PAS 555 was the result of industry recognizing the need for such a specification, as articulated in 2011 in the government's *Cyber Security Strategy*. It was sponsored and supported collaboratively by Cisco, Control Risks, G4S, PA Consulting Group and Symantec, with other key stakeholders involved in its development.

Cyber security expert Ed Savage of PA Consulting Group says: "Previously, most cyber security-related best practice focused almost exclusively on methods and controls. PAS 555 instead focuses on *outcomes* – the aims and impacts of security processes – and helps organizations to identify areas of their business that need protecting the most."





“Recognizing that standards could make a positive contribution, we were eager to work with food safety experts to develop a new industry standard that would help to ensure better food safety and quality”

Food safety

The headline-grabbing food safety scandal of 2013 severely dented UK consumer confidence in the retail food supply chain, while many businesses had to stand by and watch their profits plummet.

Recognizing that standards could once again make a positive contribution, we were eager to work with food safety experts and other stakeholders to develop a new industry standard that would help to ensure better food safety and quality for consumers, while aiding businesses by helping to restore confidence in the UK food supply chain.

In 2013, we published retail food safety specification PAS 221, which provided an industry response to improving the management of supply chain quality and mitigating associated risks. Sponsored by international food retailer Delhaize, PAS 221 was developed

with the assistance of Ahold, Asda, Carrefour, the Foundation for Food Safety and Certification, Meijer, Metro AG and members of the BSI Consumer & Public Interest Network (see p38).

PAS 221 provides a framework that can help businesses to better control food safety hazards, as well as specifying requirements for establishing, implementing and maintaining prerequisite programmes (which provide the foundation of an effective food safety system).

The specification offers guidance on selecting and managing suppliers, provides measures for preventing cross-contamination and makes specific references to managing the processing and selling of food products by *all* food retailers, including supermarket chains.

International health and safety

Approval has been given for an international standard to replace occupational health and safety management standard BS OHSAS 18001. Gaining international consensus for such a key standard is a major achievement and a plenary meeting took place in October 2013 in London. In attendance were delegates from around the world (organizations from more than 50 countries are involved) and a first working draft of the standard was produced.

David Smith, for many years Chair of our HS/1 Committee, will chair the ISO project committee tasked with developing the new standard – ISO 45001. The final version is scheduled to be published in October 2016, following draft and consultation stages. The standard will be aligned with quality management standard ISO 9001 and environmental management standard ISO 14001, revised versions of which will also be published in 2015.

Case study

Good governance

BS 13500 could help to mitigate corporate governance risks, with pilot scheme businesses recommending this pioneering new standard.



“BS 13500 is an effective tool. It’s easy to use and offers value to any organization wishing to improve its approach to governance”

Tim George, Deputy Company Secretary, Carillion plc

Published in August 2013, corporate governance code of practice BS 13500 is the first national standard of its type. Focusing on key issues such as accountability, control and direction, it’s aimed at businesses of all sizes and sectors.

Although it’s non-prescriptive, it provides a basic framework that can ensure that users have all the elements of good governance in place. It can also help to mitigate the risk of poor governance – the consequences of which can be extremely damaging, of course.

The standard defines governance as “the system by which the whole organization is directed, controlled and accountable to achieve its core purpose over the long term”. Crucially, BS 13500 explains how to evaluate governance systematically.

Key to success

The standard was developed with expert input from the Commonwealth Business Council, Cabinet Office, Institute of Operational Risk, UK Policy Governance Association, consumer interest groups and others.

Michael Faber, Chairman of the Governance Committee at BSI and Member of the Executive Committee at the Institute of Operational Risk, says: “Governance is key to the long-term

success or failure of any organization. The standard can raise the profile, understanding and effectiveness of governance, providing a standard of practice that can be applied consistently by all.”

Despite the availability of numerous codes and guidance, previously there was no harmonized standard for good governance that could be applied to organizations of all types. BS 13500 bridges that gap.

Test results

East London-based recruitment agency BeecherMadden was selected to test the new standard ahead of its publication. Its Operations Director, Karla Jobling, says: “As a growing business, attracting the best staff is key for us. Anything we can do to demonstrate we’re a great company to work for helps with that.”

Managing Director, Owen Jobling, adds: “We like the idea of benchmarking ourselves against best practice and we’re intrinsically interested in understanding all we can about governance. I can see how BS 13500 could ensure that our risk is always managed and controlled, even as the company grows rapidly and expands overseas. We can envisage promoting the standard to underline our credibility and enhance our reputation with clients.”

Delivering value

Another business with experience of testing the new standard is Carillion plc, a leading integrated support services company that has a substantial portfolio of public-private partnership projects and extensive construction capabilities. Carillion already complies with the UK Corporate Governance Code, and its existing provisions measured up very well to BS 13500.

Its Director of Legal Services, Richard Tapp, comments: “Effective corporate governance creates and sustains the leadership and decision-making frameworks that enable an organization to deliver value for all stakeholders. This standard will provide guidance for companies looking to develop their corporate governance structures.”

Tim George, Deputy Company Secretary, Carillion plc, adds: “BS 13500 is an effective tool. It’s easy to use and offers value to any organization wishing to improve its approach to governance.”

Case study

Crime prevention

How a new British Standard could help to dramatically reduce the vast sums of money lost each year as a result of procurement fraud.



“BS 10501 is a reliable, cost-effective solution that enables organizations to mitigate procurement fraud risk”

David Noble, Chartered Institute of Purchasing and Supply CEO

“Many organizations understand the risk of expenses fraud and take steps to try to prevent it, but often that isn’t the case with procurement fraud, which can be much more costly,” says Paul Guile, Chartered Institute of Purchasing and Supply (CIPS) Global Procurement Fraud Advisor.

“Despite this, many organizations just don’t recognize the risk, while even some that do can often lack effective procurement fraud-prevention measures. All organizations involved in procurement need to be aware of the risks of fraud.”

Best solution

It’s been estimated that procurement fraud could be costing UK public sector organizations as much as £2.3bn a year. Guile adds: “The true extent of private sector losses caused by procurement fraud is tougher to calculate, because many companies don’t publicize instances for fear of reputational damage, but we’re probably talking about a similarly huge amount of money lost each year.”

The CIPS had been working with various organizations for many years to help them mitigate the risk of procurement fraud, but Guile says there was a need for something more widely available. “Creating a consensus British Standard offered the best solution, so

we contacted BSI, who welcomed our approach, and soon a national consultation group was set up.”

Fraud controls

It featured stakeholder organizations such as the Serious Fraud Office, the Ministry of Defence, HSBC, BNP Paribas, Chevron, Raytheon, the NHS and Teesside University. “The group brought expertise from organizations operating globally, because the intention was to develop a standard that would be useful for UK-based organizations procuring at home and overseas,” Guile explains.

A draft version of the standard was released for consultation in November 2013, with Guile playing a lead role in its creation. The new procurement fraud control standard, BS 10501, is due to be published in March 2014.

“BS 10501 has been created to raise awareness of the problem of procurement fraud, enable organizations of all sizes and types to identify that it is occurring or has occurred, as well as put in place controls to mitigate risk.

“Recommended controls include ‘segregation of duty’, which simply means giving separate responsibility for raising orders, verifying work completion or supply and payment

authorization. Giving one person responsibility for more than one of these tasks increases risk,” says Guile.

Procurement authority

Another recommendation is delegating procurement authority to the right people. “Basically, that means the higher the value of the order, the higher it needs to go for authorization,” explains Guile. “There also needs to be proper due diligence carried out before high-value orders are signed off.

“Such controls can help to mitigate risk and they can be applied to contractors and sub-contractors, not just your own organization. Even if your measures are robust, fraud can occur elsewhere in the chain.”

David Noble, CIPS Chief Executive Officer, summarizes: “BS 10501 is a reliable, cost-effective solution that enables organizations to mitigate procurement fraud risk. It has been designed to work with an organization’s existing processes and it could prove to be an effective way to identify historical and current procurement fraud, while granting better protection going forward.”

Supporting innovation

How we're working with the Technology Strategy Board to consolidate the UK's position as a centre of excellence for emerging technologies.

In his 2012 report, *No stone unturned: in pursuit of growth*, former Deputy Prime Minister Lord Heseltine made 89 recommendations. Number 44 was: "The British Standards Institution, Technology Strategy Board and Research Councils UK should work together to ensure that new standards are set earlier in the development of new technologies".

Standards play a key role in driving innovation and creating wealth. Their timely, consensus-based use ensures that groundbreaking knowledge can be brought to market. As Lord Heseltine's recommendation acknowledges, this is aided by the early use or creation of standards, which benefits UK businesses, as well as the national economy.

Emerging technologies

The Technology Strategy Board (TSB) is the UK innovation agency. It is tasked with accelerating economic growth by stimulating and supporting business-led innovation. We're working with the TSB to develop standards strategies and development programmes to support four priority emerging technology strands of particular significance to the UK economy – synthetic biology, cell therapies, offshore renewable energy and assisted living.

In 2013, we started work that seeks to identify how a knowledge and standards infrastructure could improve productivity in synthetic biology design, characterization and synthesis, as well as turn new technology into a wealth-creating industry in the UK (see p26).

Cell therapy takes cells either from the patient or a donor and manufactures them into a useful product, such as an innovative medicine. Its origins can be traced back to the 19th century, however, advancements made in more recent times could revolutionize health and patient care. Once again, standardization could greatly benefit businesses and other organizations in the UK, which is already acknowledged as a centre of excellence and leader in the development, delivery and commercialization of cell therapy.

As well as research and clinical evaluation challenges, there are issues relating to developing products at scale, as well as translating scientific discoveries into practical application. We're currently looking at the role that standards can play in aiding development of new cell therapy products and treatments.

The project will also address the wider role of standards in regenerative medicine, identifying the types of standards-related information suitable for publication by BSI, in a way that will complement information published in the *European Pharmacopoeia of the Council of Europe* (which lists a wide range of drugs and other substances used to prepare pharmaceutical products in Europe). We will work with cell therapy stakeholders to establish how best standardization could be applied to improving selection of raw materials used in the cell therapy manufacturing processes (see p26).

Offshore renewable energy

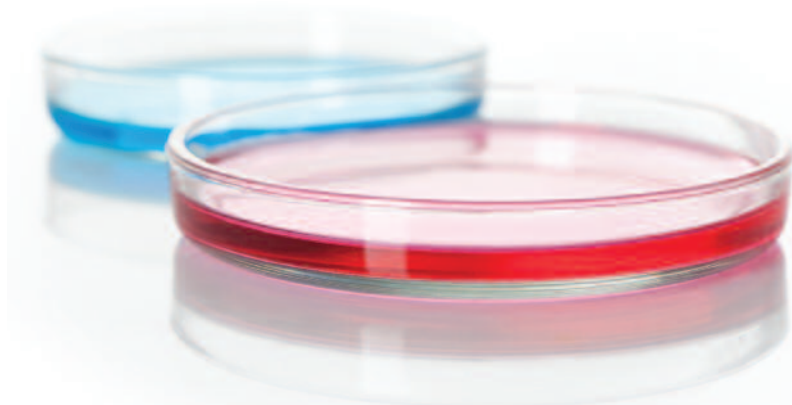
The UK is already a world leader in offshore renewable energy (ORE). To enable the UK to maximize the benefits of its pioneering ORE technological development and fuel rapid market growth, knowledge must be codified. Currently, most offshore installations are bespoke designs, which makes them high cost.

Standardizing components and practices will reduce investment costs, while increasing investor confidence by providing a risk-based approach to good practice and setting out frameworks for industry. This should encourage new entrants into the market, while helping the UK to consolidate its position as a global centre of ORE expertise (as well as supporting efforts to meet the government's 2020 renewable energy targets).

We're working with the ORE Catapult Centre and Carbon Trust to identify priority areas for standards development, mapping existing standards, consulting with industry experts on priority areas for future standardization and developing pilot codes of practice.

Independent living

With more people in the UK living longer and that trend set to continue, major changes to how long-term care is delivered are necessary. Solutions will also need to be found to enable older people to live more independently.





“Standards play a key role in driving innovation and creating wealth. Their timely, consensus-based use ensures that groundbreaking knowledge can be brought to market”

Standards are key to the deployment of assisted-living technologies, enabling new business models and delivery methods to be introduced by providing assurance that equipment produced by different manufacturers can function well together. Standards can also ensure that solutions comply with regulatory requirements, which will aid public confidence in products and simplify procurement of services and measurement of quality and risk.

The TSB Long Term Care Revolution project aims to stimulate radical new ways of delivering healthcare. So far, standards have mostly focused on ‘interoperability’ (ie making sure that different solutions can work with each other). But if there is to be a significant move away from institutionalized care, “disruptive innovation” (ie innovation that creates a new market and value network, while disrupting an existing market and value network) will need support from a range of standards that set out

principles for providing care, as well as enable better risk management and provide clarity and consistency for consumers.

We’re participating in the TSB Long Term Care Revolution project, working with others to identify how standards can support new healthcare provision, ensuring that the UK takes a leading role in revolutionizing care provision. Standards development towards this end is likely to gather pace in 2014 (see p29).

Smart cities

The smart cities of the future will make use of data capture and communication management technologies to deliver high quality services to citizens. Smart approaches to transport, utilities and waste management could transform the efficiency and sustainability of urban communities, leading to significant reductions in service provision costs and carbon emissions.

We continue to work with stakeholders to develop smart city standards. In spring 2013, we set up a steering group to develop a terminology specification, which was made up of experts in economics, the built environment, planning and technology.

PAS 180 is being developed and it will define concepts and terms for smart city urban infrastructures, systems and services. At the same time, PAS 181 is being developed, which will provide a smart city framework. Following public consultation that took place in autumn 2013, which elicited more than 160 responses, both specifications are due for publication in 2014 (see p24 for more on smart cities).



Urban development

What will be different about the smart cities of the future, how will people's lives be better and what role will standards play?

Smart city technologies, based on digital infrastructure and digital services, potentially offer a better and more efficient way to monitor and manage resources in cities.

Smart approaches to transport, utilities and waste management could transform the efficiency and sustainability of urban communities, significantly reducing costs and carbon emissions. The smart cities of the future will also be more attractive to citizens and businesses, while helping to drive economic growth and prosperity.

But smart cities are only possible if technologies can function in harmony (ie 'interoperate') and data can flow successfully between infrastructure, systems and services.

Not only must it be possible to capture information, but also to ensure that it can be shared. This is where standards can make a huge contribution.

The complexity of the smart city will also require guidelines, metrics and technical specifications to support collaboration between municipal authorities, the private sector and citizens.

Standards can accelerate the implementation of smart city solutions, while providing assurance to citizens that risks relating to information security, data protection and privacy are being managed properly.



How will the smart cities of the future be different?

Roads

Smart traffic systems will better regulate traffic flow. There will be less congestion and real-time traffic jam warnings will enable drivers to take alternative routes.

Vehicles

Hydrogen will power public buses, while electric cars will be supported by on-street recharging points. Self-driving cars will be able to locate available parking spaces.

Transport

Soft transport options such as walking and cycling will be favoured. Public transport will be better integrated, ultra-efficient and sustainable. Passengers will be able to use their smartphones to pay for travel.

Buildings

Structures will be built to rigorous environmental standards and they will be super energy efficient, with carbon dioxide emissions minimized.

Street lights

Dynamically operated city lights will significantly reduce energy consumed.

Homes

It will be possible to operate air conditioning, heating, lighting and appliances remotely by mobile phone. Green meters will track daily energy consumption, enabling better control. Solid waste will be removed by a pipe network.

Rubbish

Smart bins on public streets will automatically notify waste removal service providers when they are full.

Water

Water consumption will be significantly more efficient. Grey water (ie waste from wash basins, showers and baths) will be recycled for re-use. Municipal authorities will be able to detect water leaks quicker and more easily.

Electricity

Consumer behavior data will be used by the grid to maximize the efficiency, reliability and sustainability of electricity production and distribution.

Shopping

Consumers will be able to use their smartphones to pay at shops, restaurants, cafés, etc. Information about special offers will be revealed by pointing smartphones at shops.

Health

Health-related services and information will be delivered via telecom technologies. Data about people's health will be generated by wireless sensors located in their homes.

Wifi

High-speed internet will be available in public places throughout the smart city. Public displays will communicate information about the weather, traffic, transport, health, tourism and entertainment.

Case study

Biological thinking

How we're developing biological manufacturing standards and supporting the UK's position as a world leader in synthetic biology and cell therapies.



“A key challenge is to establish how standards can accelerate innovation and increase the likelihood of advancement in synthetic biology and cell therapies”

We are ideally placed to bring together innovation networks of stakeholders that are seeking to improve the quality and productivity of biological manufacturing processes.

Our work in this field includes developing a synthetic biology standards strategy and delivery plan, as well as seeking input from stakeholders to achieve consensus on the right way forward for cell therapy standardization.

Synthetic biology refers to the design and construction of biological parts, devices and systems. Cell therapies/regenerative medicine means replacing or regenerating human cells, tissues or organs to restore or establish normal function. A key challenge is to establish how standards can encourage innovation and advancement in both.

Synthetic biology

In partnership with the Technology Strategy Board (TSB), we've been working with SynBiCite to develop a strategy for standards in synthetic biology to help create a digital biomanufacturing industry and to accelerate the rate of commercial success using the technology.

Based at Imperial College London and funded by the Engineering and Physical Sciences Research Council, Biotechnology and Biological

Sciences Research Council and the TSB, SynBiCite is a new Innovation and Knowledge Centre created to improve the UK's ability to translate the emerging field of synthetic biology into application and provide a bridge between academia and industry.

The centre will become a national resource and involve researchers from 17 other UK universities and academic institutions, as well as 13 industrial partners, including the research arms of Microsoft, Shell and GlaxoSmithKline.

Standards developed in this area could play a key role in enabling various organizations to work in partnership, as well as ensure interoperability between synthetic biology technologies that are developed. Our strategy development work will enable the synthetic biology community in the UK to maintain its competitive edge by leading the development of international standards.

Cell therapies

In recent years we've also been working with the UK research base, academia, regulatory bodies and other public and private sector organizations to better understand the challenges faced by those involved in cell therapies/regenerative medicine.

We've long been committed to finding ways to support UK stakeholders by providing guidance documents, codes of practice and formal standards. Examples include PAS 84:2012, developed to encourage use of common terms and definitions within regenerative medicine.

More recently, we've been working with the Cell Therapy Catapult, a London-based centre of excellence for regenerative medicine that was established by the TSB in 2012. It was created to build the UK's position as a global leader in the development, delivery and commercialization of cell therapies.

Eight Great Technologies

Our unique capabilities for convening leading innovators, capturing best practice and making this available more widely will enable industry in the UK to innovate quicker. The Minister for Universities and Science, David Willetts, has identified synthetic biology and cell therapies/regenerative medicine as one of the “Eight Great Technologies” the UK needs to prioritize and in which the government is to invest more than £600m.

Case study

Recognizable progress

How a standard we developed enables the world's largest biometric project – while bringing unexpected benefits to people in rural India.



“More than 400m citizens in India have already had their iris patterns stored in formats specified by the standard. Every day another million are added”

A biometric system enables automated recognition of people based on their biological characteristics (eg fingerprints, face geometry, iris patterns), as well as their behavioural characteristics (eg *how* someone writes their signature rather than what it looks like).

Under the leadership of BSI and physicist Professor John Daugman, who developed the algorithm used in all commercially available iris-recognition systems, the iris-related part of the biometric data interchange standard ISO/IEC 19794-6 was revised in 2011 to provide a clearer explanation of how to produce images in more formats, including a new heavily compressed format.

National identification scheme

The revised standard is enabling the world's largest biometric project. Since 2011 it has helped the Unique Identification Authority of India (UIDAI) to begin the process of scanning the iris patterns, fingerprints and facial images of all 1.24bn residents of India.

This is part of a national identification number scheme called *Aadhaar*, which (according to UIDAI) seeks to “give the poor an identity so that they can claim their rightful benefits and enjoy greater social inclusion”.

So far, more than 400m citizens in India have had their iris patterns stored in formats specified by the standard. Every day another million are added at some 36,000 enrolment stations nationwide, which are managed by 83 agencies.

As part of the national identification number scheme, iris images are sent for authentication from a variety of locations (including remote rural areas) to a central database over channels with very limited bandwidth. This would have meant having to transmit digital images in small payloads, which requires significantly more time to process.

But research carried out at Cambridge University showed that with suitable pre-processing, iris images could be compressed to less than one per cent of their original size, remaining usable at a data size of just 2,000 bytes.

Field trials

In May 2013, UIDAI confirmed successful use of the revised standard's heavily compressed image format in large-scale field trials, which yielded an impressive 99.13 per cent successful online authentication rate (compared to 99.30 per cent for uncompressed images).

This had an unexpected additional benefit, in that it enables rural shopkeepers to use their cash tills as a remote ATM service that offers immediate authentication and online counter-transfer into the shopkeeper's bank account. This means local people no longer have to make lengthy journeys into a city to visit a bank to withdraw cash.

Unexpected benefits

Although the various image formats in the standard are now used in all iris recognition projects worldwide, is it an example that shows that our work sometimes brings unexpected benefits – even to people living in the world's most remote locations.

Working in healthcare

A look at our development work to create healthcare standards for dementia, long-term care and medical devices.

We continue to work with a wide range of stakeholders to develop standards intended to improve healthcare provision. Not only does this ultimately benefit those who require treatment (and their families), but it also helps to ensure that UK healthcare businesses continue to innovate and prosper.

More recently, one area in which we have sought to increase our involvement is in the support of dementia care. We're fully committed to working with government and other stakeholders to create a comprehensive portfolio of standards to support dementia care up to and beyond 2015, when the Prime Minister's Dementia Challenge is set to end (see p30).

We want to continue to work with others to identify where standards can support the development of dementia-friendly communities, in financial services, transport, hospitals, building design and other areas, as well as focusing on future priorities, for example, the development of international standards in dementia care.

High quality care

In addition to our ongoing work with the Technology Strategy Board and its Long Term Care Revolution project (see p29), in 2014 and beyond we will work closely with healthcare providers and professional bodies to identify where standards can support delivery of safe, effective, high-quality care in the UK.

We also want to engage medical royal colleges, regulators, local authorities and consumers to find out how standards can help when it comes to making informed judgements about quality of care. Adult social care providers will be the immediate focus, for which we believe there is a need for British Standards.

Medical devices

A large proportion of healthcare work carried out by our experts and committees in 2013 focused on delivering standards that support compliance with medical device regulation. EU Medical Device Directives require manufacturers to keep up to date with current and upcoming regulatory requirements and standards are used to demonstrate compliance.

Throughout 2013 we worked with organizations involved in the manufacture and supply of medical devices, to consider what key challenges they faced.

They reported that staying up to speed with existing and upcoming regulation was time-consuming, partly because of having to verify information, with many also bemoaning a lack of reliable advice. They also believed that some standards were too complex, while it was sometimes difficult to find which standards apply to a specific product.

Online service

Working closely with stakeholders and listening to the business challenges that they face has prompted us to consider how we can better assist them, not least by providing reliable, up-to-date information.

In 2014 we plan to develop an online service specifically aimed at meeting this challenge, a solution that will keep users informed not only of legislative changes, but also the revision of standards and development of new ones.



“We will work closely with healthcare providers to establish where standards can support delivery of safe, effective, high-quality care in the UK”

Case study

Long-term objective

How standards could make a significant contribution to addressing the growing need for long-term care in the UK.



“Standards can make a significant contribution to the development of innovative solutions that enable more people to live more independently as they get older”

In his 2012 report, *No stone unturned: in pursuit of growth*, Lord Heseltine recommended that we work closely with the Technology Strategy Board (TSB) and Research Councils to create standards for new technologies and services at the earliest opportunity.

Currently, we're working on four TSB pilot studies, one of which concerns assisted living, more specifically, the TSB's new Long Term Care Revolution project.

In September 2013, at a “revolutionary sandpit workshop”, TSB brought together organizations and people willing to work together to bring novel ideas to institutional long-term care, with £2.4m of funding available.

We delivered a presentation on the contribution that standards can make to revolutionizing long-term care, enabling the creation of new products and services, while ensuring that they can function together.

We also explained how standards could support assurance schemes, regulation and government priorities. A thought-provoking discussion session with workshop participants followed, focusing on how standards could be applied.

Consumer expectations

We've since commissioned research to gather opinions from the public, carers and nurses to find out more about consumer expectations for long-term care and the results will be published in 2014.

We also plan to hold workshops and roadshows at which we'll be seeking to find out more about consumer attitudes to standardization in revolutionizing long-term care. A framework document will be created and we expect to start developing two pilot standards in 2014, in support of the TSB Long Term Care Revolution project.

This provides an opportunity for early standards setting in an area of disruptive innovation (ie one that helps to create a new market by disrupting an existing one), as well as the chance for consumers to take the lead in setting standards for long-term care.

Cost implications

If nothing changes, the demand for long-term care will continue to grow because more of us will live longer, as a result of major advances in food, nutrition, health, medicine and hygiene that began in the previous century. This has major cost implications (the Local Government Association estimates that by 2019-20, adult

social care spending will exceed 45 per cent of council budgets).

The TSB wants to “eliminate institutional long-term care through business-led projects with the potential for real commercial value in the UK”. To achieve this, it wants to “harness creativity and innovative capabilities” in various sectors to provide more options in the future “that will enable people to live with more dignity and autonomy, as well as help decrease the financial pressure that government and individuals will face if they need high levels of care.”

According to the TSB: “Despite numerous initiatives, the UK still grapples with affordable long-term care that delivers quality of life for older adults and their families.” Standards can make a significant contribution to the development of innovative solutions that enable more people to live more independently as they get older.

Case study

Fighting back

How we're supporting the Prime Minister and various stakeholders to address the growing issue of dementia in the UK.



"We've got to treat this like the national crisis it is. We need an all-out fight-back against this disease, one that cuts across society"

Prime Minister David Cameron

According to national charity Dementia UK, 42 per cent of the UK population knows a close friend or family member with dementia. That's because more than 820,000 people in Britain have dementia and that figure is expected rise to more than one million by 2025.

Research commissioned by the Technology Strategy Board found that in UK care homes in the 1980s, 20-25 per cent of people had dementia, but now it's estimated that that figure has rocketed to more than 80 per cent.

Alzheimer's Research UK estimates that dementia currently costs the UK economy £23bn per year – which is twice as much as cancer and three-times as much as heart disease. Caring for a person with dementia has been calculated to cost £27,647 per year, much more than caring for a person with cancer (£5,999), heart disease (£3,455) or someone who has suffered a serious stroke (£4,770).

Dementia Challenge

In 2010 we published PAS 800, the result of working closely with the University of Bradford and other stakeholder experts. Intended to help carers, the specification provides a guide to the principles and recommendations of Dementia Care Mapping, which looks at care from the viewpoint of people with dementia.

When launching the Dementia Challenge in March 2012, Prime Minister David Cameron said: "We've got to treat this like the national crisis it is. We need an all-out fight-back against this disease, one that cuts across society. Dementia is a terrible disease and it is a scandal that we, as a country, haven't kept pace with it."

The Dementia Challenge seeks to significantly improve dementia care and research by 2015 through better health, care and research, as well as create dementia-friendly communities that understand how to help those with dementia, their families and carers.

Reporting directly to the Prime Minister, we are a member of a special Champion Group established to help create dementia-friendly communities.

Dementia Action Alliance

In 2012, we joined the Dementia Action Alliance and a few months later we ran a standards breakout session at the organization's annual meeting, as well as our own event in March 2013, with dementia-friendly communities and care provision as the theme.

Working closely with Alzheimer's Society, we developed a proposal for how a national standard could support a recognition process for dementia-friendly communities. It was based upon an Alzheimer's Society report.

National standard

We presented our proposal for a national standard at the PM Champions Group for Dementia Friendly Communities in July 2013, and we've been working with Alzheimer's Society to finalize the work.

In addition, we're looking to develop other standards to support dementia-friendly communities in such areas as building design, financial services, retail and emergency services.

Throughout 2014 we'll continue to work with the PM Champions Group and our committees to develop new standards, while seeking to make existing standards more dementia friendly and develop a means by which dementia standards can be considered in the future, once the PM Challenge has been completed.

Help to shape the future

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

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

By participating, industry experts can represent their organizations 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.

Participation in the development process enables you and your organization to take a leading role in the creation of standards that benefit your business, industry and society. Standards take many forms, including guidance, codes and specifications. Good standards need broad, open consultation during their development.

We work with trade associations and other organizations to ensure that users are represented when standards are created or amended.

We actively seek representatives from many other groups including: consumer organizations; industry and professional institutions; certification, testing and inspection bodies; educational establishments; research organizations; UK notified bodies; enforcement bodies and government departments. We're committed to the principle that national committees represent the interests of users, manufacturers, government departments and all other relevant bodies.

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.

Committee members give their time and expertise for free, but often their employers or trade association supports their participation. The level of commitment required varies, but most committees only meet a few times a year. Some members also represent the UK at European and international meetings overseas.

We can provide training in standardization issues, processes and bodies to committee members and chairs. We support the work of all committees and there are dedicated meeting facilities at our headquarters in Chiswick, London. We also provide extensive online systems to support the work of our technical committees.



If you'd like to become part of a national or international committee call our Knowledge Centre on **+44 20 8996 7004** or email **knowledgecentre@bsigroup.com** for more information

Working with government

How standards are continuing to help government to address a wealth of key challenges and achieve important targets.

In his 2012 report, *No stone unturned: in pursuit of growth*, Lord Heseltine gave his wide-ranging economic plan to improve the UK's ability to create wealth. His independent report made 89 recommendations that aimed to "inject stability into the economy, create conditions for growth and maximize the performance of the UK".

One of Lord Heseltine's recommendations was for BSI to work closely with the Technology Strategy Board (TSB) and Research Councils to create standards for new technologies and services at the earliest opportunity. The TSB is a public body set up in 2007 to drive and coordinate innovation in the UK.

TSB pilot studies

Last year we started working on four TSB pilot studies concerning offshore renewable energy (see p14), synthetic biology, cell therapy (see p26) and assisted living (see p29).

Currently, we're carrying out research into the role standardization can play in the rapidly developing area of offshore renewable energy (eg wind, tidal and wave power) and standardization projects could follow in 2014.

We're also working with SynBiCite, the Imperial College-led Innovation and Knowledge Centre in synthetic biology, to develop a strategy for standards to help accelerate development of synthetic biology and increase its success.

We've also been working with the Cell Therapy Catapult, a London-based centre of excellence for regenerative medicine established by the TSB in 2012 to build the UK's position as a global leader in cell therapy.

Synthetic biology and cell therapies/regenerative medicine have both been identified by David Willetts, Minister for Universities and Science, as one of the "Eight Great Technologies" the UK needs to prioritize and in which the government is to invest more than £600m.

Ministers' handbook

Working with the United Kingdom Accreditation Service (UKAS), in 2013 we developed a handbook for government ministers called *Standards and accreditation – Tools for delivering better regulation*. It explains how standards and accreditation can help government to deliver policy through self-regulation, earned recognition and co-regulation, in line with better regulation principles.

The handbook was distributed from the Prime Minister's office to all government ministers, together with a letter that highlighted the benefits of standards and accreditation as alternatives to regulation. The handbook can be downloaded in PDF format from our website (bsigroup.com/externalpolicy).

Standards and regulations

In February 2013, BSI and the International Organization for Standardization (ISO) hosted a seminar in London called *Standards and regulations: how can standards work alongside policies and regulations?* It attracted stakeholder representatives from 16 countries and international organizations who were invited to share their insight and talk about the challenges they face.

Scott Steedman, BSI Director of Standards, and Rob Steele, ISO Secretary General, opened the event, with Erik Wijkström, Counsellor from the Trade and Environment Division of the World Trade Organization, giving the opening keynote address to those gathered.

Presentations from representatives from the European Commission, Russian Federation, Germany, USA, Netherlands, China, Zimbabwe and the UK, as well as thought-provoking workshop sessions, shed light on how standards are used successfully to support regulation around the world. Opinions were also given about how this could be increased.

Discussions focused on regulators' poor understanding of standards, as well as the need for standards bodies to reach out to regulators in their own countries, and to encourage those in government to think differently about standards and the role they can play in support of regulation.

The topic of standards and regulations was further discussed at the ISO General Assembly in September 2013 and was also the subject of a conference held by the United Nations Economic Council for Europe in November 2013, at which we also gave a presentation on the need for clear separation between regulations and voluntary standards.





“Reporting directly to the Prime Minister, we are a member of a special Champion Group established to help create dementia-friendly communities in the UK”

Dementia Challenge

Reporting directly to the Prime Minister, David Cameron, we are a member of a special Champion Group established to help create dementia-friendly communities in the UK. The Prime Minister has put his full weight behind efforts to tackle the UK’s worsening dementia problem, which he described as a “terrible disease” and “national crisis” when launching his Dementia Challenge in March 2012.

The Challenge seeks to significantly improve dementia care and research by 2015 through better health, care and research, as well as create dementia-friendly communities that understand how to help those with dementia, their families and carers. We will continue to work with the government and others to seek to improve dementia care in the UK (see p30).

High Speed 2

In 2013 we began work on a consultation project for HS2 Ltd, the government-owned company responsible for developing and promoting the UK’s planned high-speed rail network (High Speed 2 or HS2), which will link London with Birmingham and the north of England.

This important consultation project supports HS2’s Efficiency Challenge Programme and it aims to find ways to better manage and improve infrastructure design codes and standards to improve efficiency and make cost savings.

Our initial research has been divided into three areas – civil engineering, buildings and railway systems. We’re working with our expert committees to revise or remedy codes deemed obsolete, inefficient or duplicate. Work will then begin on a publicly available specification that will guide designers efficiently through the

various design codes, standards and available methods for use on the HS2 project (see p34).

Greater London Authority

We also continue to work with government at regional and local level. For example, the Greater London Authority sponsored the creation of PAS 2070, which was published in November 2013 and is available to download for free from our website (bsigroup.com/pas2070).

PAS 2070 provide a robust and transparent method for consistent, comparable and relevant quantification, attribution and reporting of city-scale greenhouse gas emissions. The GLA is itself implementing the standard’s methodology in a bid to better monitor and report greenhouse gas emissions across the capital (see p35).

Case study

Speed and efficiency

Working to ensure that waste and inefficiency is removed from HS2's planning, design and construction processes.



“Work will begin on a standard that will guide designers efficiently through design codes, standards and available methods for application on the HS2 project”

In 2010, Infrastructure UK (a unit within HM Treasury) assessed the costs of constructing infrastructure in the UK, using other western European countries for comparison. “There were many reasons why costs were higher in the UK and recommendations to address this included looking at how design codes and standards were written and applied,” recalls Bill Grose, Arup Director and chartered civil engineer, who researched and wrote the resulting *IUK Cost Review*.

As a result, the Industry Standards Group was formed and in 2012 it produced a report called *Specifying Successful Standards*, which looked at how efficiency and competitiveness could be brought back into UK infrastructure design codes and standards. “Much of the inefficiency was not caused by the codes, standards and specifications – but how they were interpreted,” Grose emphasizes.

High Speed Two

The proposed new railway linking London with Birmingham and the north, High Speed Two (HS2), has adopted many *IUK Cost Review* recommendations, as well as implementing an Efficiency Challenge Programme, to which Grose contributes (he is currently seconded to HS2). “The programme is tasked with reducing capital costs by bringing efficiency measures

into planning, design and construction,” he explains. “A key initiative is to manage and improve infrastructure design codes and standards to ensure efficient design and construction.”

We’ve been commissioned by HS2 Ltd (the government-owned company responsible for the project) to look at how standards can help to maximize efficiency. Our initial research has been divided into three areas: civil engineering, buildings and railway systems. Input has come from designers, consultants and contractors from industry and professional bodies such as the Institution of Civil Engineers, the Institution of Mechanical Engineers, the Royal Institute of British Architects, the Rail Industry Association and others.

We’re working with our expert committees to revise or remedy codes considered obsolete, inefficient or duplicate. Work will then begin on a publicly available specification (PAS) that will guide designers efficiently through the various design codes, standards and available methods for use on the HS2 project.

Efficiency gains

“Designers recognize the benefits of a simplified process, because they’ll be able to spend more time designing rather than demonstrating

compliance,” adds Grose. “And contractors see the benefits in simplifying construction, standardizing details for improved production and avoiding unnecessarily complex construction details.”

Development of the PAS will happen in three stages. The first will establish expert teams and prioritize where particular effort is required. The second will detail codes and standards that will be cited, as well as significant gaps that must be addressed. The third will be to produce the PAS, build consensus and publish it.

“Ultimately, we’d like to remove the catch-all clause in design contracts that says ‘designers must comply with all relevant codes and standards’ and say something more helpful,” stresses Grose. “In extreme cases, these catch-all clauses can encourage unnecessary aversion to risk. Designers then spend too long demonstrating compliance and not long enough designing. Simplifying the approach to design codes and standards will help to reduce costs and ensure efficiency.”

Initial indications from Phase 1 work are highly positive, confirming potential for better use of standards by HS2 and its supply chain to save large sums during the capital expenditure stage, with knock-on through-life cost benefits.

Case study

Capital gains

How using the recently published PAS 2070 in London could help city leaders elsewhere to better manage greenhouse gas emissions.



“Measuring and reporting the GHG emissions of London is a major challenge, but we're very confident that PAS 2070 will enable us to achieve that very important objective”

Michael Doust, Senior Project Manager Energy and Climate Change at the Greater London Authority

Sponsored by the Greater London Authority (GLA), which is itself working to implement the specification's methodology, PAS 2070 was published in November 2013 and is free to download from the BSI website (bsigroup.com/pas2070).

Because it's intended for widespread use, the specification is the result of input from a truly international group of experts and stakeholders, including the City of New York, Stockholm Environment Institute, University of Colorado Denver, University of Toronto, as well as the GLA, Thames Water, Transport for London and London Sustainable Development Commission. Other stakeholders include ADAS UK Ltd, BioRegional Development Group, Blonk Milieu Advies, C40 Cities Climate Leadership Group, ICLEI Local Governments for Sustainability, University of Southampton and WSP Group.

More holistic assessments

PAS 2070 seeks to provide a robust and transparent method for consistent, comparable and relevant quantification, attribution and reporting of city-scale greenhouse gas (GHG) emissions.

This will encourage more holistic GHG emissions assessments, greater disclosure and more meaningful benchmarking to help city

decision-makers identify key emission sources and their drivers, as well as the carbon dependence of their economy and opportunities for more efficient urban supply chains.

Cities have a key role to play in tackling climate change, but municipal leaders need access to reliable GHG emissions data if they are to take effective action. Accurate measurement enables cities to assess risks and identify opportunities, and create a strategy to reduce GHG emissions in a quantifiable, transparent way.

Internationally recognized principles

GHG accounting methodologies used by some cities have different scopes and methodologies, making comparisons between cities problematic. PAS 2070 overcomes this by specifying requirements for assessment of GHG emissions of a city or urban area, as well as by following internationally recognized GHG accounting and reporting principles.

PAS 2070 captures both direct GHG emissions from sources within the city boundary and indirect GHG emissions from goods and services that are produced elsewhere for consumption or use within the city.

Practical application

Still under development is *Application of PAS 2070 – London, United Kingdom*, which, when published, will demonstrate how to apply the methodology to measure city-wide GHG emissions, using London as a case study. It will include guidance on data collection and quantification, as well as providing a template for reporting.

Michael Doust, Senior Project Manager Energy and Climate Change at the GLA, says: “We expect that using PAS 2070 will enable us to carry out a more complete assessment of GHG emissions throughout Greater London. We're in the process of implementing PAS 2070 and although collating data requires time and effort, the requirements set out by the specification are very clear.

“Measuring and reporting the GHG emissions of a city the size of London is a major challenge, but we're very confident that PAS 2070 will enable us to achieve that very important objective”.

PAS 2070 is part of BSI's growing portfolio of GHG management specifications that seeks to help organizations worldwide to deal with GHG emissions and the challenge of climate change more efficiently and successfully.

Working in education

Running the rule over our education strategy for 2013-2015 and the important goals it seeks to achieve.

Following a meeting of an education steering group consisting of academics from various UK universities, which took place in August 2012 in Loughborough, attention turned to developing a new education strategy for BSI for 2013-2015.

The focus is higher education, but some activity will continue in other areas, including further education. Priority academic areas will be: business and management; engineering and design; and computing and technology. Key BSI strategy areas, such as sustainability and accessibility, will be the primary focus within these academic areas when new projects are generated.

Our strategy objectives remain ambitious, including the goal to more firmly embed the teaching of standardization in the UK education sector. To achieve this, we plan to engage in a broad research project to gain an in depth understanding of how standardization is currently taught.

Plan of action

We'll also work with higher education institutions to try to create a pathway from lectures towards curriculum integration or creation.

We also want to increase our engagement with high-level stakeholders in professional bodies to encourage them to add standardization to their accreditation criteria, as well as enhance current resources on the BSI education website to ensure they meet national curriculum requirements.

To stimulate standards-related research, another of our key objectives, we'll lead discussions with regulatory and funding bodies in the education sector to stimulate funded research in standardization and other standards-related initiatives.

Milestones and deliverables

In 2013, a comprehensive review of the BSI Education website got underway. Using resources made available by the newly formed BSI Education Stakeholders Group, work also began on a comprehensive report into standards-related education in the UK.

A resource bank of BSI research, suitable for free use by education institutions, was created. BSI also has a speakers network of experts who can share their knowledge and experience with students and academic staff via lectures and seminars on campus.

By the end of 2014, our aim is for standards or standardization research to have a measurable presence in research and funding council guidance documents, with education about standardization a benchmark criterion on professional bodies' accreditation guidance.

BSI Education Stakeholders Group

We also want to increase the depth of previous collaborations to integrate into or create new curricula. In 2013, for example, we provided material that was integrated in to the MSc Management (International Standards) course at Swansea University.

We've already worked with such academic institutions as Middlesex University, the University of Manchester, De Montfort University in Leicester, Kingston University in Surrey and Birmingham City University. We'd like more UK academic staff to join the BSI Education Stakeholders Group and work with us to the benefit of students, academic institutions and standardization.

“Using resources made available by the BSI Education Stakeholders Group, work began on a comprehensive report into standards-related education in the UK”



Case study

Learning outcomes

A look at how our work on campus is raising awareness of standardization and helping to create the standards makers of the future.



“The lectures have been very well received – and that’s certainly been backed up by the highly positive feedback students have given”

Dr Eujin Pei, Senior Lecturer in Product and Furniture Design at De Montfort University

We believe it’s important to give lectures at UK universities for many reasons. As well as shedding light on our work and raising awareness of standards, students can find out how standardization can fuel innovation and help them in their studies and careers after they graduate.

Another key objective is to inspire students and academic staff to become actively involved in the standards-making process, so that they can help to shape the future. Feedback from students following BSI lectures has shown that many of them would like to be involved in the standards-making process.

Enjoyable and informative

We’ve been delivering lectures on BS 8888 to design students at De Montfort University in Leicester for three years. The standard brings together all international standards that govern preparation of technical product specifications.

“The lectures have been not only enjoyable, but also highly informative. Our students have learned a lot of potentially very useful information – even simple things, such as knowing they can search the BSI website for information about standards, is very useful,” comments Dr Eujin Pei, Senior Lecturer in Product and Furniture Design at De Montfort University in Leicester.

“The BSI BS 8888 lecture is held every year in November and in 2013 we expanded it from just first-year product design students to include a school-wide lecture series. We invited students and staff from other departments, including product and furniture design, design crafts and interior design. The lectures have been very well received – and that’s certainly been backed up by the highly positive feedback students have given.”

Committee member

Partly as a result of the lectures, Dr Pei has become formally involved in the standards-making process. “I’m part of the committee for additive manufacturing technologies, I joined in 2012.

“I knew of the committee through Sarah Kelly and Newell Hampson-Jones from BSI, who deliver lectures here at the university. The

committee has a good mix of academics and industrial stakeholder experts. I was encouraged to join because of my research work in additive manufacturing, as well as my background in new product development. Coming from an academic background enables me to contribute a more design-led focus on the technology.

“Essentially, the role of a BSI committee member is to contribute one’s expertise and experience to the committee’s standardization programme, and to represent the committee’s interests and concerns of the organization.

Shaping standards

“I believe that it’s extremely important for academic staff to be actively involved in shaping standards, from a teaching and research point of view. The teaching of standards not only educates students, but also better prepares them for industry.”

Our aim is for standards to be taught at all levels, so that students remain aware of any changes that take place. Ideally, standards should be taught in a broad sense at first and as students progress, the focus could be on more specialized areas, so that students gain specific knowledge that will help them in their careers after they graduate.

Working with consumers

How input from our Consumer & Public Involvement Network ensures that consumer interests are represented in standards making.

Standards help to protect consumers and ensure that they have the information they need to make informed choices. That's why involving them in determining the scope and content of standards is crucial and why the BSI Consumer & Public Involvement Network (CPIN) exists.

The CPIN is made up of consumers, who may not otherwise be involved in the standards-making process, as well as specialists in subjects ranging from child safety to ergonomics. In October 2013, Christine Heemskerk, former Chair of the Trading Standards Institute, became the new Chair of CPIN, replacing Lynn Faulds Wood.

Representing consumers

Throughout 2013, BSI CPI representatives played a key role in a wide variety of consumer-related projects, ranging from aesthetic surgery and beauty salon services to robotic devices and societal security.

Two CPI all-member meetings took place, one in June 2013 in Brighton and the other in December 2013 in London. In Brighton, Christine Heemskerk delivered a presentation on the value of standards to trading standards officers, who were gathered for their annual conference and exhibition. At the event, we sponsored the Trading Standards Institute Young Consumers of the Year competition.

Our new guide, entitled *Standards matter to consumers*, which was partially funded by the

“Last year we published BS 9266, which provides advice on the design of ordinary homes to make them more accessible for people with disabilities”

Department for Business, Innovation & Skills, was launched at the Brighton event. It explains the role that standards play in key consumer and public interest areas of services, wellbeing, inclusivity, sustainability, security, privacy and identity.

In 2013, we supported the UK's call for the European Commission to fund a new data collection system for home and leisure-related injuries and accidents. European standardization organizations CEN and CENELEC have already supported an initial document produced by ANEC, the European voice of consumers in standardization.

Better understanding the behaviour that causes such injuries aids understanding of how standards and designs need to change if such accidents are to be prevented.

Consumer standards

Last year we published BS 9266, which provides advice on the design of ordinary homes to help make them more accessible for people with disabilities, including some wheelchair users.

The standard is aimed at property developers, builders and anyone involved in reviewing

housing developments. Involved in drafting the standard were experts from the Access Association, Royal Institute of British Architects, Royal Institution of Chartered Surveyors, Greater London Authority and Local Authority Building Control, who drew on a number of sources including criteria from the *Lifetime Homes Design Guide* and the government document *Lifetime Homes, Lifetime Neighbourhoods*.

Packaging guides

Last year, to aid consumer understanding, we produced *Easy to open packaging – A consumer's guide to the European technical specification for packaging*. It provides information about the European standard for testing how easy a pack is to open. The standard helps manufacturers ensure that their packaging balances concerns about security of contents with ease of use, so that products are well protected, yet easy to access.

We also addressed concerns of child-resistant packaging by publishing a consumers' guide to standards on this subject. European standards (such as BS EN ISO 13127:2012 and BS EN ISO 8317:2004) have been developed to help manufacturers design safe and effective packaging. All our guides can be downloaded from our website (bsigroup.com/consumers).



Case study

Safety measures

With a revised version of BS 8848 to be published in 2014, we assess the contribution this safety standard has already made to managing risk.



“BS 8848 is a groundbreaking tool that can help organizers of adventurous activities overseas to benchmark safety to an agreed standard”

Shane Winser, Expeditions & Fieldwork, Royal Geographical Society (with IBG)

The updated version of BS 8848 will be published in spring 2014. The original standard was launched in 2007 at the Royal Geographical Society, after the organization had helped to draft it, following several high-profile deaths overseas.

The standard provides guidance on how to recognize well-organized adventurous activities overseas, as well as setting out good practice in safety management for organizers.

Improved safety

Julian Penney of Wokingham-based Pharos Response says: “I’ve been using BS 8848 since 2008, when I worked for a large schools expedition company. Our product was safe, but BS 8848 prompted us to review and enhance certain areas.

“The business I now lead helps organizations to develop their systems in line with the standard and conduct evaluations of external parties. Many UK-based travel companies have supply chains that include overseas sub-contractors, ranging from local tour operators to those offering white-water rafting excursions.

“For many operators, BS 8848 has catalyzed a much more robust due diligence process of overseas sub-contractors through more

detailed checking and internal audit processes. The standard has helped many providers to improve their safety management systems.”

Year-out activity

Wiltshire-based Year Out Group represents leading UK-based providers of year-out programmes. Its CEO, Richard Oliver, says: “We require our members to demonstrate they comply as much as possible with BS 8848 and encourage those offering group activities to formally self-assess themselves against the standard.”

Year Out Group was represented on the committee that drew up the original standard, and since March 2013 Oliver has chaired the committee that has been steering its review.

“Some members have used BS 8848 as a checklist for the risk and crisis management of overseas projects; other members when selecting leadership teams, participants and third-party providers. BS 8848 has also been used to improve our members’ policies and procedures so that they can manage risk more effectively, while retaining the adventurous nature of their programmes.”

Revised version

We ran an open consultation event at the Royal Geographical Society in June 2013 to encourage input into the revision of BS 8848 from the wider adventure travel market.

The event and engagement work stimulated more than 300 comments on the draft standard. With the standard now used by mainstream adventure travel companies as well as traditional gap-year and activity providers, the consultation provided an opportunity to reflect their views in the revision of BS 8848.

The revised standard will have a greater focus on key processes such as planning and risk assessment, as well as more information for participants about their responsibilities.

“The revised version will be even easier to follow,” Oliver adds. “And the original document was written primarily with group projects in mind, which was problematic for those offering individual activities. This has been addressed. The ultimate benefactors will be those taking part in activities overseas – their safety is paramount, of course.”

International development

How we're helping to improve quality infrastructure in countries throughout the world.

As well as having contributed to improving quality infrastructure in more than 45 countries, BSI International Projects' work helps to reinforce the UK's position as a global leader in standardization.

A recent project involved working with the National Accreditation Agency of Ukraine (NAAU) on a two-year 'twinning' project that ended in October 2013. Twinning projects bring together public bodies and institutions with public responsibilities in the EU and beyond to share best practice to enable reform.

International recognition

A key objective was to secure greater international recognition for NAAU's accreditation services, to better align them with international standards and achieve recognition by the European co-operation for Accreditation, International Laboratory Accreditation Cooperation and the International Accreditation Forum.

Information and document management systems were improved as a result, which will enhance NAAU's efficiency, while strengthening its capacity to accredit conformity assessment bodies for products falling under the EU New Approach Directives.

Working with the United Kingdom Accreditation Service, the National Physical Laboratory (UK) and the Federal Institute for Material Research and Testing of Germany, we analysed accreditation in Ukraine, created a development plan, trained staff, assisted during external assessments, improved processes for calibration laboratory accreditation and carried out standards awareness-raising activity.

Lebanon twinning project

In 2013, work also started on the Lebanon twinning project, which will end in summer 2014. The objective is to increase competitiveness of Lebanese products on international markets through conformity with international standards, and to better protect the health and safety of Lebanese consumers.

Our work includes: producing gap analyses, marketing and action plans; reviewing existing legislation and technical regulations; training; developing quality manuals and procedures; technical support to laboratories; facilitating standards development and updating technical committee structures; and awareness raising.

EU-China trade project

Last year also marked the mid-point of a five-year project involving BSI International Projects working for the Chinese government to support reform in line with the country's sustainable development objectives.

A key goal is to improve China's framework for developing new and revising old technical regulations, standards, conformity assessment, market surveillance and accreditation systems. By 2020 China aims to become an innovative society, which is why its government has prioritized development of the nation's product quality infrastructure to meet international standards.

In support of this we are: providing technical assistance; helping to build institutional capacity; consulting on draft legislation and developing policies; conducting comparative studies; organizing workshops, roundtables, seminars and conferences; hosting study visits and internships; and delivering training.

Food safety in India

In May 2013, we began work on a new EC-funded project for India's Ministry of Commerce and Industry. It supports the Capacity Building Initiative for Trade Development, which seeks to strengthen India's capacity to achieve economic growth, sustainable development and reduce poverty through better integration into global trade by increasing product safety and quality, reducing costs and impediments to trade.

The project also aims to improve food safety standards and increase government agencies' capacity for export certification, testing, accreditation, conformity assessment, risk management and safety/quality standards enforcement throughout the food export value chain. It also aims to improve technical regulations and standardization, and enhance the knowledge and capacity of customs regulatory and training institutions.



“BSI International Projects' work helps to reinforce the UK's position as a global leader in standardization”

Case study

Turkish delight

How work completed recently by BSI International Projects could help Turkey to achieve its goal of full European Union membership.



“Awareness of Turkey’s quality infrastructure is much higher and the quality of its laboratory services has also improved”

With the aim of strengthening national quality infrastructure and removing technical barriers to trade with the EU to ensure free movement of goods, in 2010 Turkey’s Ministry of Economy and the Turkish Society for Quality commissioned the services of BSI International Projects.

The project also aimed to facilitate the implementation of EU legislation and regulation relating to the free movement of goods between Turkey and EU member states.

The project was split into five components and a management structure was installed in the capital, Ankara, made up of 10 permanent staff supported by 130 experts. We led a consortium of six pan-European organizations.

Stakeholder training

The focus then shifted to delivering training to a wide range of stakeholders in Turkey and approximately 280 technical training courses were delivered over the project’s term. This included training in accreditation standards for Turkish laboratories wanting to enhance their capabilities.

Following visits to stakeholders operating in locations throughout Turkey to perform in-depth consultations, two annual reports were produced that provided an overview of the nation’s quality infrastructure system, as well as giving recommendations for future development. Six sector-specific technical advice reports were also produced.

The fourth component consisted of 20 inter-laboratory comparisons and proficiency testing schemes, half of which concerned food and feed, six were focused on industrial products, while four concerned calibration.

Raising awareness

The project’s final component focused on raising awareness of quality in Turkey, which comprised 30 well-attended events and seminars that sought to reach out to Turkish small and medium-sized enterprises (SMEs) to inform them of the business benefits of standardization.

Two large international conformity assessment conferences were also held, each attracting many hundreds of attendees. Numerous surveys were also conducted in Turkish shopping malls to raise awareness among consumers of the key role standards play in ensuring product safety.

The project set out to strengthen Turkey’s institutional and infrastructural framework, to enable better implementation of EU legislation regarding free movement of goods. Now having been delivered successfully, the project is expected to have many other positive outcomes.

SME participation

There have been many other gains. Awareness of Turkey’s quality infrastructure is much higher and the quality of its laboratory services has also improved. More SMEs in Turkey now participate in the standardization process and awareness among consumers is higher.

The Turkish conformity assessment sector is better organized and market surveillance by authorized bodies is more efficient, while knowledge of EU Directives and standards among conformity assessment bodies, manufacturers and public authorities is also much greater.

How standards are made

The methods, people and processes involved in creating British Standards.



Method

Usually a technical committee or sub-committee tasks a drafting group or panel with drafting a formal consensus standard. Occasionally a consultant is commissioned.

There are specific rules for drafting standards to ensure they provide, for common and repeated use, rules, guidelines or characteristics for activities founded on usability, verifiability and commonality.

British Standards are usually developed within 12-15 months, while European or international standards take about three years. Commissioned or sponsored standards (eg publicly available specifications) can be developed within months (see p44).



People

We bring together technical committees of experts who volunteer to help us develop standards. They are representatives from industry, professional institutions, trade associations, certification bodies, testing and inspection bodies, research organizations, consumer interest organizations, educational bodies and government departments.

BSI content developers manage the drafting process of national standards from inception to publication. Technical project editors advise on the content, structure and presentation of European and international standards at all formal stages of their development and manage the drafting process for UK implementation.



Process

1 Proposal for new work
Anyone can bring a proposal for a new standard to a BSI committee, although committees usually generate proposals. Suggestions for new standards can also be made directly to BSI through the Director of Standards.

2 Project acceptance
Standards making requires dedicated resources and careful assessment of the market need and likely take-up. Before a decision is taken to proceed, a business case is prepared for each project to assess costs and benefits against acceptance criteria.

3 Drafting
Drafting is generally carried out by a small group of experts, before being forwarded to the technical committee for wider consultation.

Transparency of standards in development

Full details of all ongoing standards projects, all of our committees and the organizations that are currently involved are available online at <http://standardsdevelopment.bsigroup.com>. To protect their independence, BSI does not publish the names of experts on technical committees, but we do publish, with permission, the names of the organizations represented on each committee.

“British, European and international standards are reviewed at least once every five years or on receipt of new information that would prompt immediate action”

4 Public comment period

Once the committee is satisfied, a draft for public consultation is produced and published free online for anyone to comment. This enables a broader audience to view the draft document, ensuring transparency and acceptability of the resulting standard. Comments on all draft British Standards and some European and international standards can be made via the online BSI Draft Review System (<http://drafts.bsigroup.com>).

5 Final approval

Final approval for British Standards is agreed by committee consensus. European and international standards are also subject to voting by the member bodies of the respective organizations.

6 Endorsement to publish

Before a standard can be published, the Secretary and Chair of the relevant committee and/or sub-committee must give their endorsement. The BSI Director of Standards must confirm that the full process has been followed.

7 Publication

Details of new publications are available on our website and through our Membership magazine, *Update Standards*.

8 Maintenance and review

British, European and international standards are reviewed at least once every five years or on receipt of new information that would prompt immediate action. The relevant BSI technical committee is asked whether a standard should be: confirmed without change; confirmed after minor amendment; confirmed after major amendment; withdrawn; or declared obsolescent.

Once the national committee has reached its decision, an announcement is made in *Update Standards*, enabling wider comment. Comments are sent to the committee and the final action is announced in *Update Standards*.

BSI products

Products from BSI Standards fall into three broad categories:

- **Standards products** (ie publications established by consensus and approved by BSI committees)
- **Non-standards products** (such as guidance documents, training materials and electronic products)
- **Joint products** (ie 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.

PAS route

What is a PAS and why might your organization want to sponsor the creation of one?

What is a PAS?

The PAS provides a sponsored route to standardization, created to serve a market need. Potentially, any organization can commission a PAS. A PAS can provide product specifications, codes of practice, guidelines and vocabularies or be used as an assessment benchmark.

Why create a PAS?

It offers a quicker route to standardization, typically taking just nine months from launch to publication. Organizations can use a PAS to improve productivity, increase efficiency, reduce costs, maintain quality or speed up innovation. A PAS can help organizations to meet regulatory obligations, build trust with consumers or minimize complaints. Creating a PAS can enable you to establish standards in your sector, while providing a rapid, yet reliable standardization solution.

Are there any restrictions?

A PAS must not contradict existing formal standards. Content must be technically robust and it cannot include patented or proprietary methods or products. It must be written unambiguously, using only requirements and recommendations that can be objectively verifiable.

How is a PAS created?

Once the sponsor gives us the go ahead, we research related standards and other published information to ensure there will be no crossover. Together with the sponsor, we then formalize the document's scope, form a steering group and work with technical experts to develop an initial draft of the PAS.

Who sits on the PAS steering group?

Typically, between eight and 12 stakeholder experts. With our help, they comment on the draft, resolve technical issues and contribute to the development of the next draft. It's then sent to a review panel, which can include representatives from formal standards committees, government departments, trade and industry associations and consumer groups.

What about public consultation?

At the review panel stage, the draft is made available to the public, which means anyone can submit comments for the steering group to consider. Once all comments have been resolved to our satisfaction and that of the steering group, the PAS is published.

How do I find out more?

Contact **Jonathon Moyce** on **+44 20 8996 7858** or email **standards.solutions@bsigroup.com**

For business

"Phased array inspections [ie a type of ultrasonic testing] are now being used to assess welds in all sectors, however, because there were no formal European acceptance standards, insurers couldn't easily grant their approval.

"PAS 129 fills that standards gap and it will enable the more widespread use of such inspection methods, which will benefit businesses in many sectors."

Michael Dodd, Director of ITCL (technological inspection, testing and consultancy services provider)



For trade organizations

“Flexitanks are increasingly used for transporting non-hazardous bulk liquids in shipping containers. Globally, there are many flexitank producers, so PAS 1008 was created to ensure that flexitanks are manufactured and tested to agreed international standards, so that the needs of cargo owners and shipping transport providers are met.

“The Container Owners Association has a flexitank code of practice, which will continue to be used, but a more detailed specification was required to permit product specification. The long-term intention is to develop an international standard, but the PAS, published in early 2014, is an excellent first step. For industries that require a benchmarking system to provide standardized specifications for products and services, I’d certainly recommend commissioning a PAS.”

Patrick Hicks, General Secretary of the Container Owners Association



For government

Creation of PAS 127:2014, a guide to the checkpoint security screening of people and their belongings, was sponsored by the Home Office Centre for Applied Science and Technology.

Insufficient or inappropriate security measures may fail to prevent transgressions, while excessive measures can create unnecessary expense through inefficient use of staff and space, which can interfere with the normal functioning of the site or event being protected.

PAS 127 addresses the current lack of information on checkpoint security screening in non-regulated environments. It can be used in various settings, including government and private buildings, events and sporting venues, and in public spaces or on private land. Use in aviation and other transport security settings falls outside of PAS 127’s scope, as they are covered by separate national and international regulation.



Standards to look out for

Just some of the British and international standards that are scheduled to be published or revised in the next few years.

Quality management

As holder of the ISO 9001 technical committee Secretariat, we're playing a key role in revising the world's most-used quality management standard. More than 1.2m organizations are certified to ISO 9001, which is based on the BS 5750 series of standards we launched in 1979. A meeting of international experts took place in October 2013, during which more than 3,000 comments were reviewed. A new draft will be available for comment in 2014, with the final version expected in 2015.

Collaborative relationships

BS 11000-1 is to form the basis of a new international standard for collaborative business relationships. Published in 2010, BS 11000-1 provides a framework for maximizing the value of collaborative business relationships by establishing and maintaining partnerships through which knowledge, skills and resources can be shared more effectively. The publication date of the new international standard is yet to be confirmed.

Asset management

Based on the highly successful PAS 55, which was authored by the Institute of Asset Management, BSI and others and launched in 2004, the new ISO 55000 series of international standards seeks to enable more organizations to maximize the value of their assets over their life cycles. The ISO 55000 series will launch in January 2014.

Greenhouse gas emissions

The draft version of PAS 2395 was put out for public consultation in 2013, with publication scheduled for spring 2014. This is the third sector-application of PAS 2050, the specification for assessing the life cycle greenhouse gas emissions of goods and services, and it's intended to help international textiles industry businesses to better assess and manage their carbon emissions.

Environmental management

In 1992 we published BS 7750, the world's first environmental management systems standard. It formed the basis of the ISO 14000 series, which was published in 1996. ISO 14001, the world's leading environmental management standard, is being revised and a draft standard will be published in 2014. The revised standard is scheduled for publication in 2015.

Anti-bribery

In 2013 we started working with experts and stakeholders to turn anti-bribery management system standard BS 10500 into an international standard. BS 10500 was published in 2011, but the publication date of the new international standard is not yet confirmed.

Health and safety

Approval has been given to produce an international standard to replace the British occupational health and safety management system standard BS OHSAS 18001. A plenary meeting took place in 2013 in London, which was attended by delegates from around the world, and a first working draft of the new standard was produced. The final version of ISO 45001 is likely to be published in late 2016, following draft and consultation stages.





Procurement fraud

Scheduled for publication in March 2014, BS 10501 has been described by the Chartered Institute of Purchasing and Supply as "a reliable, cost-effective solution that enables organizations to mitigate procurement fraud risk". Stakeholders involved in its creation include the Serious Fraud Office, the Ministry of Defence, HSBC, BNP Paribas, Chevron, Raytheon, NHS UK and Scotland and Teesside University.

Smart cities

Two new smart city specifications are due to be published in 2014. PAS 180 will define concepts and terms for smart cities relating to infrastructure, systems and services, while PAS 181 will provide a smart city framework. Following public consultation in autumn 2013, more than 160 responses were received.

Adventurous activities

The updated version of BS 8848 will be published in spring 2014. The standard provides guidance on how to recognize well-organized adventurous activities overseas, while setting out good practice in safety management for organizers. The original standard was launched in 2007 at the Royal Geographical Society, after the organization had helped to draft it. The revised standard will have a greater focus on planning and risk assessment, as well as more information for participants about their responsibilities.

Customer service

BS 8477 sets out principles for establishing and maintaining an effective customer service culture, regardless of an organization's size or sector. The first full revision since publication in 2007 will be published in 2014. It's been comprehensively updated in line with current customer service good practice. Featuring useful benchmarks for good practice, BS 8477 can help an organization to assess its customer service levels.

Vehicle damage repair

We're working with stakeholders from industry and consumer groups to turn vehicle damage repair process specification PAS 125 into a full British Standard. PAS 125 was published in 2011 to improve vehicle repairs following crashes. Many insurance companies have adopted PAS 125 as their *de facto* crash repair standard and there is an associated BSI Kitemark™ scheme that's carried by some 900 garages. The new British Standard, BS 10125, is due to be published in 2014.

Fire safety

With a revised version scheduled for public consultation in 2014 and publication in 2015, BS 9991 provides guidance on the design, management and use of dwellings to achieve fire safety standards that protect building occupants and fire fighters. First published in 2011, the standard assists in the provision of fire safety measures, fire detection and alarm systems and fixed fire fighting systems. The revised version will aim to further consider sheltered housing and fire safety precautions for vulnerable members of the community, including those suffering with dementia.



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