

# ADJACENT BIM TODAY

## INSIDE:

**Stephen Hamil**, Director of Design and Innovation at NBS, discusses the digital toolkit that will complete the Level 2 BIM suite

**Dr Anne Kemp**, Chair, BIM4IUK enthuses about the potential of blending the BIM vision with that of geographic principles

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# Introduction



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Welcome to the February 2015 issue of BIM Today.

This is an exciting time in the BIM world. The NBS BIM Toolkit is on track for a Spring launch which should see a simplified, standardised, and digitally enabled classification system and digital plan of works tool. Our opening article is from Stephen Hamil, Director of Design and Innovation at NBS outlining the aims of the BIM Toolkit and also the call for industry to get involved in its development.

It isn't just the BIM Toolkit to look forward to – BSI will also be releasing a new suite of standards. Anthony Burd, Head of Market Development, and Stephanie Kosandiak, Lead Programme Manager for Construction at BSI have contributed a really helpful article outlining all the key BIM standards currently in use, but also the upcoming ones too, including 'PAS 1192-5 Specification for security-minded BIM, digital built environments and smart asset management.' Whether you're new to BIM or not, this article will act as a handy reference tool.

Any newcomer to BIM will undoubtedly have many questions relating to the first steps in terms of what tools and skills are required, and of course, how much it will cost. CIRIA have developed some guidance which may help to answer these questions. Bill Healy, their Chief Executive, explains the 'BIM Cube', which aims to provide

different stakeholders at different stages in the BIM process the insights they need.

This edition of BIM Today has three articles from BIM4M2. The first is from Steve Thompson, the BIM4M2 Chair who evaluates the product information required and how it can be delivered. Richard Blakesley, Chair of BIM4M2 Education Group, describes how the group works to educate, inform and encourage action to satisfy a BIM journey. And finally, Chris Witte, BIM4M2 Steering Group examines the recent BIM survey by Chris Ashworth, BIM4M2 Promotions Working Group Chair and Director of Competitive Advantage.

Elsewhere in the publication we also look at two very different case studies, highlighting how a government department and a local council are implementing BIM. The first is from Karen Alford, BIM Project Executive at the Environment Agency discussing what is essential for a client who is implementing BIM in their organisation. The second is from Carl Green, Head of Engineering Services for Wyre Council, who follows the progress throughout the construction and operation of the Fylde Peninsula Coastal Programme – the world's first BIM coastal defence scheme.

I am certain that whatever your discipline, you will find something of interest in this edition, and I welcome any feedback you may have. ■

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# The toolkit for BIM – completing the jigsaw

**Stephen Hamil, Director of Design and Innovation at NBS, discusses the digital toolkit that will complete the Level 2 BIM suite and how it will enable everyone in the industry to use BIM as an integral part of their everyday working lives...**

The previous issue of BIM Today carried the news that the NBS-led team had been appointed to develop the digital toolkit that will complete Level 2 BIM; now we are almost half way through the process and on track for a Spring 2015 launch.

## **So what is the toolkit? What will it do and why is it important?**

At the outset, it is important to remember that Building Information Modelling (BIM) is not an end in itself. The Government's Construction Strategy identifies predicted growth of 70% in the global construction market and is determined that UK businesses will be well placed to take advantage of this.

By delivering projects quicker, more cheaply and more sustainably, the industry can take the lead in a market where it already has a strong competitive edge and drive up exports. More broadly, BIM has a role within the burgeoning digital economy, as UK construction businesses need to be in a position to compete for the £200bn per annum market for integrated city systems that is forecast for 2030.

It is within this context that we are developing and delivering the digital toolkit on behalf of the UK BIM Task Group and Department for Business, Industry and Skills to sit alongside the five existing pieces of guidance that make up the Level 2 'suite'.

Collaboration is at the heart of BIM and at the heart of the toolkit. As David Philp, Head of UK BIM Task Group, said in BIM Today at the end of last year, BIM is a behavioural change programme which will enable and promote the closer integration of disciplines and it is this that will lead to the improve-

ments in project delivery that lie at the heart of the construction strategy.

Up to now, BIM has been seen by many as the preserve of a few, rather 'techy' people, but this misses the point and the industry runs a risk of getting side-tracked by almost endless technical discussions held by small groups.

The digital toolkit is aimed at addressing this: it will simplify processes and be intuitive and easy to use, enabling everyone to use BIM as an integral part of their everyday working lives, whatever stage of BIM adoption they are currently at. The toolkit will be fit for purpose right across the industry, including all disciplines and all scales of projects from large infrastructure schemes to small, domestic scale works, so no-one should feel that it is "not for them".

While the mandated use of BIM on central-Government funded projects from April next year is clearly providing much momentum, discussions with architects, contractors, engineers, clients, manufacturers and facilities managers have reiterated that there's a real need for this initiative across the board.

At a recent roundtable held at NBS Live, the widespread view was that, although everyone's current processes allow projects to get built, there are many holes in these existing methods of working. It's these holes that the digital toolkit aims to fill, providing the missing pieces of the BIM jigsaw.

This kind of discussion makes the team hugely optimistic that it will be used in the private sector as well as public, because it's just a smarter way of working.



Stephen Hamil, Director of Design and Innovation at NBS

So what exactly is the digital toolkit? Put simply, the project involves devising a standardised and digitally-enabled classification system and a digital plan of works tool. This will create a unified, single, classification system for use within construction and will provide an easy to use web portal which guides users through the construction process.

The first piece, the classification system, will be a new version of Uniclass which will be based on the international ISO/DIS 12006-2 framework. This will build on the work NBS has already carried out over recent years under commission from the Construction Information Committee (CPIC). By completing this, the industry will have a unified structure which will provide mapping and guidance so objects can be configured at a project level to have the correct multiple classifications where required.

Some 5,000 templates will be developed, setting out guidance for Levels of Detail (LOD) and Levels of Information (LOI) for construction objects. Initially these will be spaces, systems and products for architecture, building services, structural engineering,

landscape design and civil engineering. These will be freely available online and will also be available in both IFC and MS Excel format. These will form the “construction language” that all project teams can use to define their information exchanges for a particular stage of a project.

The second piece, the digital plan of work, will enable the project leader to clearly define the team, responsibilities, and an information delivery plan for each stage of a project, who, what and when – in terms of documents, geometry and property-sets.

Over the next few months the project team will continue conversations with representatives of all disciplines and will be asking for feedback on progress. To assist this, events, webinars and seminars will be organised by NBS in partnership with the professional bodies that sit on our steering group.

The digital toolkit is for the whole industry and to have the greatest chance of success, we want it to be developed by the industry. To get involved and to keep up with latest developments, please visit the NBS website ( [www.thenbs.com/bimtoolkit](http://www.thenbs.com/bimtoolkit) ) and the NBS BIM Toolkit and Digital Plan of Work Discussion Group on LinkedIn. ■



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# The Lloyd's Register Route to BIM Level 2 Accreditations

**Lloyd's Register Accreditation to BIM Level 2 is the provision of a public statement of the credibility of BIM business practice and effective performance of the certified organisation.**

The first step towards Lloyd's Register BIM Level 2 accreditation is the gap analysis. The gap analysis represents a high-level assessment undertaken to examine not only the overall status of the BIM processes, systems and competencies against the requirements of PAS 1192 and associated documents, but also business good practice and collaborative culture. The objective of the gap analysis is to identify any major gaps against the standard and scheme principles, and report on any identified weaknesses. The purpose of the assessment at this stage is not to undertake a detailed analysis of all different elements of the BIM related systems, but to establish an overview of the whole system, identifying areas for improvement which present most risk to the achievement of the organisation's BIM-compliant practices and objectives.

The gap analysis is typically performed through discussions with key reports. The audit technique adopted for this process provides the freedom for the auditee to explain their management systems without concerning themselves with how this meets the requirements of PAS 1192 and scheme requirements. This approach is based upon the view that it is more important that interviewees use the time to explain how they do their job within their existing BIM related system, without worrying about 'another' specification. Using a Socratic approach, the assessment team promotes a challenging discussion around key issues, which teases out the important areas for change and often helps the organisation understand their own system more fully. The challenge for the assessment team is to

relate the information gleaned in these discussions to the requirements of the scheme requirements, reflecting the context within which the organisation is working and providing relevant feedback.

On the conclusion of the gap analysis, which typically represents 1 day, a verbal report of the findings is presented in a closing meeting to the management team of the organisation under assessment. This is followed by a detailed report as to findings, classified according to the seriousness of the weakness identified. Whilst the discussion may start around the items identified requiring improvement, the key focus is on how the organisation can explore options to make changes, taking them further along the road to an effective BIM Level 2 compliant system.

The next step – certification assessment – is performed when the organisation seeking accreditation is satisfied they have addressed the findings, identified during the gap analysis, classified as major deficiencies and have made significant progress on an action plan to close out the findings classified as minor deficiencies.

The certification assessment will draw on the output of the gap analysis and the progress made, and will seek evidence that processes are in place addressing all areas of the scheme requirements. This more detailed assessment represents a verification, not only that all major issues identified during the gap analysis have been addressed, but also that the systems processes and competencies described during the gap analysis have been efficiently and effectively implemented. An important area examined at this stage is the communication within the organisation and extending to its consultants and subcontractors, such that all key contributory resource understand the scheme requirements and are themselves fully compliant.



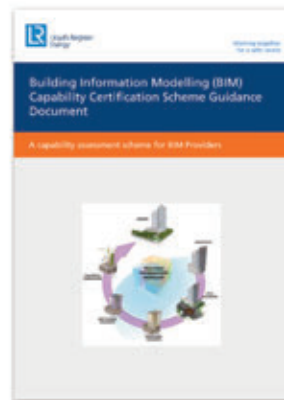
Experience of the implementation of a number of accreditation schemes that Lloyd's Register currently operate has shown that added value to the assessment process is best delivered through the adoption of the following assessment principles:

- Seeking Evidence of Conformity rather than looking for non-compliance, represents the most positive approach to assessment and provides better value add to the organisation and individuals being assessed whilst additionally providing assurance that weakness in the system will be found.
- Socratic Questioning provoking discussion and debate and assisting clients to identify the best practices that may be relevant and applicable to their circumstances.
- Domain Sector Expertise – Assessors assigned based upon their operational knowledge and experience in the domain which represents the core business of the client organisation. Ensuring that the assessors “speak the same language” are empathetic to the concerns and issues of the client and have a broad awareness of the risks to which the sector is exposed and are therefore best placed to add value to the assessment process.

The achievement of BIM Level 2 accreditation requires effort and management commitment. It is a step along the BIM good practice journey and reflects that organisations have met or exceeded the requirements of the Lloyd's Register BIM Level 2 Accreditation Scheme. To retain the accreditation requires a sustained approach to improvement and management commitment which must be evidenced during the surveillance programme which is undertaken during the three year accreditation validity. Failure to demonstrate such ongoing commitment may result in accreditation suspension

or withdrawal – a measure of the effectiveness of the accreditation scheme

The Lloyd's Register BIM level 2 assessment process incorporates PAS 1192 but additionally evaluates wider performance of the business in order to support its BIM related corporate goals. Accreditation represents independent confirmation of the achievement BIM level 2 good practices leading to best practice through defined, continuous improvement milestones, set out over the three-year accreditation term.



For information on the Lloyd's Register BIM Level 2 Accreditation Scheme please visit the BIM scheme guidance document on our website which may be accessed by the following link:

<http://www.lloydsregister.co.uk/documents/249617-building-information-modelling-bim-guidance-document.aspx>

Or contact:

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## BIM: the story so far

**Anthony Burd, Head of Market Development and Stephanie Kosandiak, Lead Programme Manager for Construction at BSI, outline the growing BIM landscape...**

The architecture, engineering and construction (AEC) industry previously relied on CAD and marked-up drawings to build. With the need to improve efficiency and reduce costs across the process, BIM software has filled the gap and shown that it can do both. The creation of a virtual 3D map (embedded with all the relevant data) of a building using digital technology, means that an accurate model can be constructed. This has major uses for everyone involved from the planning, design, construction and facility management aspects of the build, where all elements can be integrated and viewed by the architects, engineers and constructors.

Building in a simulated environment means that unforeseen issues can be corrected before any physical work can begin. As traditional methods have dominated the AEC industry for such a long time, this shift in process requires a shift in perception and working too. This includes a move towards a faster pace of working especially as BIM acts as a traceable database for the project. Therefore, all the associated costs of every design change can be tracked in real time. Stakeholders do not need to wait as long as they once had to, to see the implemented changes and can see what the final project will look like with demos and walkthroughs.

BIM is effectively changing the face of construction and is recognized not just by industry but the government as a key tool. As older methods eventually become obsolete, the AEC industry will have to adapt. In anticipation of the importance of BIM, BSI has developed a full BIM suite of standards to support the use of BIM.

### The key BIM standards

**BS 1192:2007** *Collaborative production of architectural, engineering and construction information. Code of practice.* The standard establishes the methodology for managing the production, distribution and quality of construction information, including that generated by CAD systems, using a disciplined process for collaboration and a specified naming policy.

**PAS 1192-2:2013** *Specification for information management for the capital/delivery phase of construction projects using building information modelling.* The requirements within PAS 1192-2 build on the existing code of practice for the collaborative production of architectural, engineering and construction information, defined within BS 1192:2007. It focuses specifically on project delivery, where the majority of graphical data, non-graphical data and documents, known collectively as the Project Information Model (PIM), are accumulated from design and construction activities.

**PAS 1192-3** is the partner to **PAS 1192-2**, and focuses on the operational phase of assets irrespective of whether these were commissioned through direct capital works, acquired through transfer of ownership or already existed in an asset portfolio. Like PAS 1192-2, PAS 1192-3 applies to both building and infrastructure assets.

**BS 1192-4:2014** *Collaborative production of information Part 4: Fulfilling employers information exchange requirements using COBie – Code of practice COBie (Construction Operations Building Information Exchange),* is required on all Government construction projects where information must flow into portfolio, asset planning and facility maintenance tools. BS 1192-4 provides users with recommendations on how to use COBie to structure information required

for the operation of an asset or facility during the construction process, supporting the processes outlined in PAS 1192-2 and PAS 1192-3.

**BS 7000-4:2013** *Design Management Systems: Guide to managing design in construction.* This BIS funded revision has been radically updated to take into account the development of BIM within the construction industry. It replaces **BS 7000-4:1996**.

**BS 8541** Series of Library Objects for architecture, engineering and construction – provides construction product manufacturers and suppliers with guidance on how to provide product information for inclusion in Building Information Models. It comprises **BS 8541-1:2012** *Identification and classification*, **BS 8451-3:2012** *Shape and measurement* and **BS 8541-4:2012** *Attributes for specification and assessment*.

### Upcoming BIM standards

There are several standards that work in synergy with the **BS 1192** suite of standards. The key ones expected in 2015 are: **BS 8541-5** and **BS 8541-6**. As BIM Level 2 becomes more widely adopted in the UK, BSI is adding two new British Standards to the BS 8541 Library Object series in early 2015. They provide best practice recommendations on how to develop library objects for assemblies and product and facility declarations.

- **BS 8541-5** *Library objects for architecture, engineering and construction: Assemblies* (on the sharing of sub-models representing combinations of components and spaces covering naming, classification and nesting) and;
- **BS 8541-6** *Library Objects for architecture, engineering and construction: Product and facility declarations – Code of practice* (on the sharing of data expected from product declarations, labelling and environmental tables) will be published in February or March 2015.

Lead Technical author, Nick Nisbet, explains, “Repeatable rooms and prefabricated modules, on the one hand, and the Construction Products Regulation

and energy performance reporting on the other, are issues of growing importance in the construction sector. These codes of practice build on the earlier parts of the series to help the industry achieve higher quality and accuracy when exchanging product (and facility) information."

**BS 8536:2010** *Facility Management briefing is being revised as Facility Management briefing for design and construction – Code of practice*, to take into account current industry best practices in briefing and the emergence of the soft landings process and BIM. The revised standard will give recommendations for design and construction to ensure that design takes account of the expected performance of the asset/facility in use over its planned operational life.

**BS 8536:2015** will introduce the integration of the principles of the soft landings process, combined with effective information management and the requirements for post-occupancy evaluation (POE) to strengthen the link between asset/facility owners, operators, and their facility managers and the design and construction team to assure performance of the design and the operational asset/facility in all aspects.

The standard cross-references information requirements associated with the mandated documents for BIM Level 2 PAS 1192-2, PAS 1192-3 and BS 1192-4 and is expected to publish in July 2015.

BS 8536:2015 is intended for use by individuals and organizations preparing or contributing to design, construction and operations, in both the public and private sectors, including owners refurbishing an existing asset/facility, organizations procuring a new asset/facility and the designers, constructors, subcontractors, operators, operations teams, facility managers and other specialists engaged in such activities.

**PAS 1192-5.** The UK BIM Task Group's "Security Working Group" announced late last year at "ICE BIM 2014: Business as Usual" Conference in London that "PAS 1192-5: Specification for security-minded building information management, digital built

environments and smart asset management", is currently in development.

The PAS will outline a risk assessment process to determine the sensitivity of information already held, or which will be acquired during the course of a project, and identify appropriate, proportionate security requirements for BIM collaboration which should be applied during all phases of the lifecycle of an asset, i.e. concept, design, construction, operation and disposal. It will then address the steps required to assist in creating and cultivating an appropriate security mind-set, and the secure culture necessary to enable business to unlock new and more efficient processes and collaborative ways of working.

The intended audience for this PAS includes organisations and individuals responsible for the procurement, design, construction, delivery, operation and maintenance of buildings and infrastructure assets. Although specifically targeted at the use of Level 2 BIM, the requirements will provide a foundation to support the evolution of future digital built environments and will contribute to smart asset management.

The standard is expected to publish in quarter two in 2015. ■



.....  
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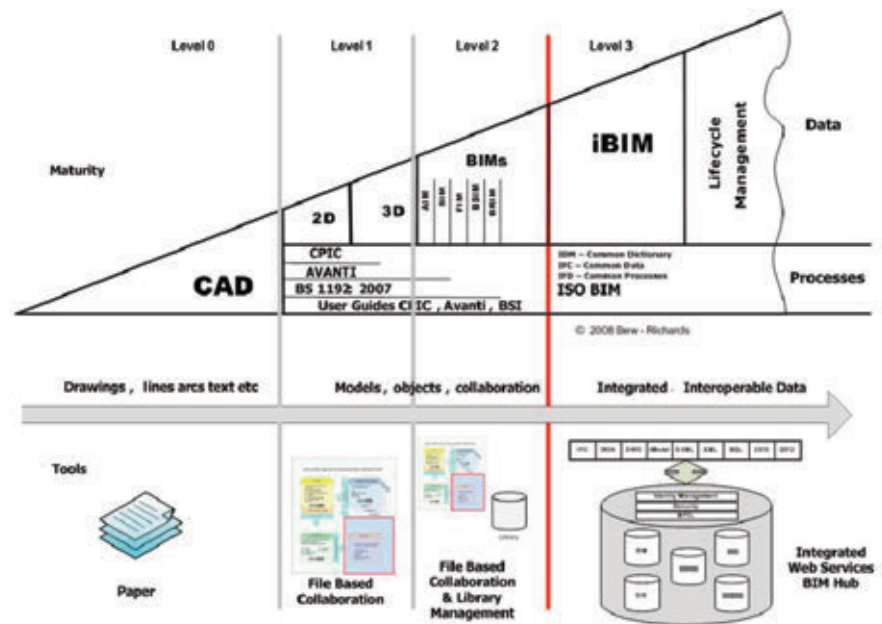
# Delivering a new Data Rich environment

The concept of BIM is remarkably straight forward; build a 3D model of what you plan to construct, review and check the model to make sure it works in a virtual environment and then construct it. In addition, this new found medium of communication extends to facilitate the downstream operation and management of the asset by providing access to essential information at the point of use.

For all parties, improved communication, surety of the outcome through 3D, 4D and 5D processes, a single source of truth in the information which can then be shared with all, the opportunity for offsite manufacture and pre-fabrication and the ability to recognise what needs to be done in maintenance before you get to the job site can easily be recognised from many everyday experiences to be a simpler and more efficient way to work.

Our opportunity through BIM remains; to **reduce the waste in what we do by rationalising the process of achieving the outcome**, as well as finding new opportunity from a better understanding and alignment of the end product with the initial requirements. This ideal remains at the heart of the BIM journey.

Many saw the opportunity, but it commendably took Government to lead the charge and their action has now delivered the well-known route map and ingredients necessary to reach the first milestone, level 2 BIM by 2016. As we enter 2015 and see the scale of change taking place around us it is clear that this journey is well underway. In many areas



Extract from Bew-Richards 2008

of the industry there are significant gains being made coupled with extended enthusiasm of the opportunity in front of us to re-engineer our industry, level 2 BIM is only the start of the end game.

For anyone who has grown up in construction the opportunity is significant, even obvious, and inevitably game changing but it does:

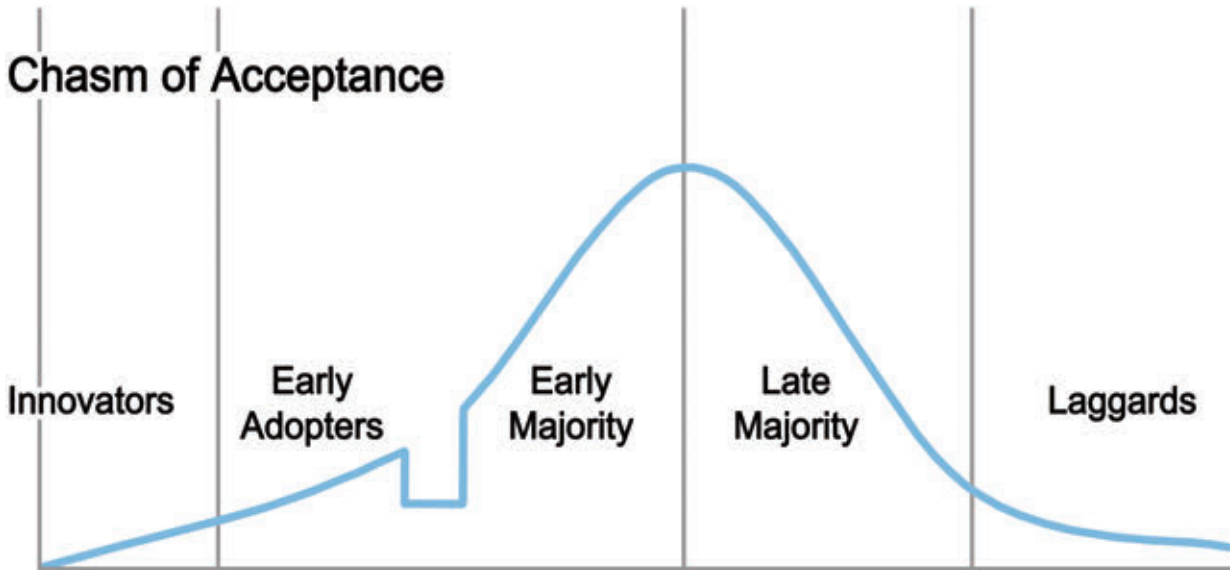
- Involve technology – to fundamentally **enable the opportunity**.
- Cause us to change our processes – to **realise the opportunity** and, most importantly of all
- Involve the engagement of people – to **embrace and deliver** a new outcome.

If only it were that simple, given the variety and complexity of the procurement routes

we use to deliver our asset base it is not difficult to appreciate the complexity this simplicity needs to fit within.

Needless to say these changes should not be restricted to visual representation alone. Leveraging the intelligence of the objects that we use to create the 3D virtual model allows us to count, measure, attach information and link to associated data which ultimately leads **BIM to participate in the “internet of things”**.

With all this information connected through a virtual model of our assets in which information and knowledge can be displayed in many different forms to support our decision making we start to replicate the simplicity and access we now see in many aspects of everyday life, some refer to this “gamification”.



Whilst the use of technology and the internet have become part of our everyday lives it has also become an influencing factor in the way that we work. BIM and the Cloud are starting to do the same, but there is a way to go until we repeat the same physical and behavioural impact that has happened in our daily lives. What we know is that the change is inevitable, is getting faster and as we cross the chasm of acceptance to new ways of working the inevitable split between leaders, followers and the undecided will be quickly swept through by the pace of change and the scale of the outcomes.

So what needs to change to this people, process and technology infusion to reach the sweet spot of real success and make this happen?

We know **real success will need to come from open easy sharing of transferrable information**. At Clearbox we believe the initial stepping stone comes from how easily we can access and manage the information to allow our teams to work together, this is the true simplicity of the common data environment (CDE) referred to in PAS 1192 Pt2.

### What are Clearbox doing to support this transformation?

At Clearbox we see this issue wrapped up in **the difference between a model**

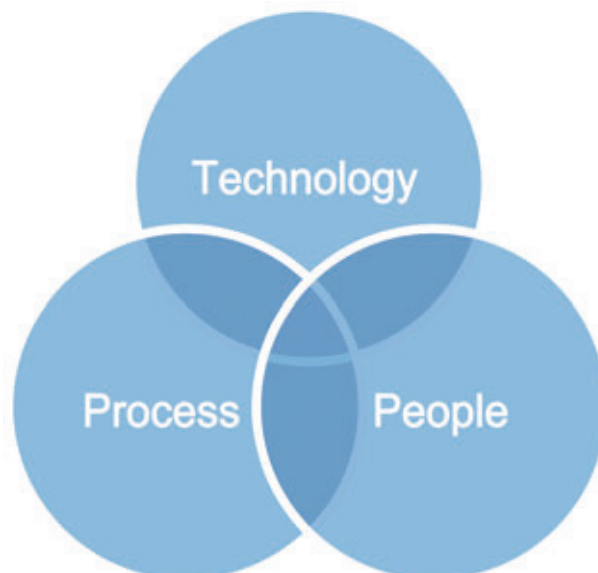
**centric approach to BIM and a data centric approach**. Ultimately our issue is to ensure that our ease of sharing and access to common data is delivered through a visual interface that allows us to see the outcomes we need at the required level of definition to suit the type of device we are using.

For us, **simplicity in the architecture of the product is key**.

When we search on Google Earth we don't load the detailed the model of the world as a multitude of small models the world is loaded at a level of detail and information

pertinent to the view we need and the view is then refined and the data we have access to updated as we proceed. When we access a retail website, on our smartphone the view is tailored to suit the device and the information we need, and while that view is rarely fully customisable it is inevitably likely to be pre-customised to suit the view we require while providing access to other information should we need more.

The better the suitability of the view to the information we need the more likely we are to have success and want to continue to use the website. Just look at the speed of adoption and growth of Google Earth, the



iPad, and Amazon and the simplicity of their user interface to recall just what the last 10 years have shown us.

In all these successes we see that the **management of the data** is the mechanism to control the visual interface. While we at Clearbox have made best use of existing industry tools our opportunity to step up our offering for users has been rate limited by the products currently on the market. Needless to say, in a space where the technology and its simplicity are key to the wider use and adoption of BIM, we have long recognised that we require a simpler, faster, more robust and scalable viewer that connects to the data environment contained in our core product BIMXtra.

We have also recognised that such a viewer needs to be supported by the data as opposed to being completely standalone in order to manage very large projects. Previously we have used a well-known viewer to enable users to access data and information in the visual environment. This is no longer sufficient to meet the needs and in order to future-proof the technology solution and deliver a better experience across common

market information standards we have now built an exciting new viewer, based around the type of technology that powers gaming, while providing the simplicity of the interfaces and access arrangements we see in everyday life.

Our approach is to make best use of and connect to, best in class tools, wherever they exist, and where they don't, develop our own to allow the sharing of intelligent data and information based around industry standards. This is a fast evolving environment but we know from the world around us that **data is the new oil**, and that a data centric approach to managing BIM is critical to the simplicity, scalability and future-proofing of our BIM solutions, **just look at the road map... level 3 is next.**

Graeme Forbes is the Managing Director of Clearbox a specialist digital information solution provider that is focussed on bringing game changing solutions to the construction industry and other asset intensive industries based around BIM based processes.

Access to Clearbox website can be found at [www.clearboxbim.com](http://www.clearboxbim.com)

This article is the first in a series addressing practical aspects of BIM in which Clearbox will look to explore how the technology architecture is fundamental to the ease with which BIM solutions can be improved. In the following articles we will look more at the step change contained by our new visualizer as well the impact on Project Controls, 4D Simulation and cost and commercial management, culminating ultimately in the digital handover of the asset.



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# BIM and GIS: A harmonious future?

**Dr Anne Kemp, Chair, BIM4IUK enthuses about the potential of blending the BIM vision with that of geographic principles and how it could be utilised to deliver major infrastructure projects...**

I believe that the convergence of BIM and geospatial in delivering major infrastructure projects is a game changer. But it will only be so if we understand and adopt a more holistic approach. And we can only do *this* if we consider the wider philosophy and approach of BIM and geospatial, rather than simply their tools and technologies.

The UK Government BIM programme is driven by the principle of managing information across the whole life of an infrastructure project, starting with the end in mind, and continuing forward to managing information across the whole infrastructure portfolio – with projects serving the needs of the wider context. That context may be a single organisation, such as Thames Water, Crossrail, Highways Agency, National Grid or Vodafone – but the real prize is if this can work across the whole of the UK's infrastructure.

I am a geographer, just finishing two years as chair of the [Association of Geographic Information](#). Consider the brand straplines of AGI – “championing the value that the intersection of geography and information has for the economy, business and for the individual”, and of the Royal Geographic Society (RGS) – “...the place for all those who want to know more about our planet and its people”. I have been working in the AEC industry for 25 years, and serve as the Chair of the Institution of Civil Engineers' BIM Action Group, and of BIM4Infrastructure UK. Throughout my career I have been striving to make the right and relevant information available to the right people at the right time to stimulate thought and to facilitate better decision making. What fascinates and excites me about the potential in blending

the BIM vision with that of geographic principles is the convergence of how we design and manage our physical infrastructure – both man-made and natural – with the human dimension. We can do this if we achieve collaboration across professions – but we need to cross the boundaries which exist between disciplines and between industries.

I reflect that what gives us so much angst is what we believe or interpret to be “right”, and it is here that perhaps we make the most mistakes. For each of us, our behaviours and our outlook are governed, often unconsciously by our background – our culture, our education, our discipline, our profession. And this can lead us, intentionally or not, to reject valuable and relevant approaches, data and information from sources which we are not familiar with, or we don't trust. Time and again I have seen barriers to sharing valid and insightful data or ideas arise through differences in professional language and approach.

Both geospatial and BIM technologies are there to serve data from disparate sources into a common pool in such a way that it can be trusted and understood by people from a range of backgrounds, disciplines and skills. The art and science of cartography has evolved to portray the real world in 2 dimensions, in a way which enhances and clarifies understanding. There are good and bad examples of where this discipline has been carried into GIS. There are many lessons to be learned about the dangers which can occur if information is inaccurate, incorrect, distorted, manipulated or mis-represented. And where an individual's privacy can be invaded by inappropriate integration and sharing of pertinent datasets. We



must carry these lessons forward as we extend our use of digital technologies to convey our understanding and interface with the world around us.

Every physical thing has a place and a given state and context in time. Our moods can be tracked through time and space – and the way we are impacted by, and adapt, to the world around us. As we move forward, and integrate the internet of things and of people with the physical infrastructure which we plan, design, construct and maintain, so will we enhance our understanding, and our ability to monitor, guide and control our behaviours and interaction with the man-made and natural environments which make up our planet. As planners, the socio-economic dimension has always played a part in the consideration of projects. But as we see a convergence of our physical world with the virtual world delivered through our mobile devices, so I anticipate the psychological dimension requiring more and more attention (see Susan Greenfield's "Mind Change", 2014, for more information). Furthermore, the amount of information which our senses receive, whether within the work environment, or within our day to day living, has been increasing rapidly. But information is not understanding, and we need to ensure that each of us is empowered and equipped to challenge the information which is served to us.

We need to ensure that BIM and GIS provide us with the information and the tools to enable us to interrogate, question and challenge the scenarios presented to us – and to allow us to make wise decisions which build on and complement the intellectual and analytical power which artificial intelligence will increasingly present to us.

So this is where I believe the convergence of BIM and geospatial can take us over the next decade in improving how we manage and interface with the outcomes of our major infrastructure projects. And while much has changed, we have a long way to go. There are arguments that the vision of the internet of things has not been realised because of the lack of standards. But there are more fundamental things missing before we are ready for that progression. In the UK, our ability to record and maintain a

comprehensive dataset of our buried infrastructure is hindered – not by technology – but by lack of policy and process. If as a country we really want to realise the vision of Digital Built Britain, then we must as an industry pull together and make this happen. Without doubt, there are problems around security. Without doubt there are challenges with standards. And without doubt there are issues around education and training. But what we really need is agreement – an understanding, and galvanisation around a common framework which can allow us to take this next important step, integrating both geospatial and BIM practices toward a coordinated, comprehensive and integrated model of our underground world equivalent to that above the surface. A number of activities are underway to seek to achieve this. Do get in touch if you would like to find out more. ■

ICE is working in a number of areas to enable this, and would be keen to know of others who have an interest in this area.

If you are, please contact Richard Armstrong on 0207 665 2411  
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# BIM: The bigger picture

At the Viewpoint North American user conference in Portland Oregon earlier this year I presented the theory behind Viewpoint's BIM strategy. Because our goal of developing the best Common Data Environment in global construction is heavily influenced by the UK BIM mandate, the diagrams and processes of PAS1192:2/3 featured heavily, and information exchange and activities either side of the contract line were discussed in some depth. Nowadays, the audience rates the speakers on mobile devices and comments were captured in snappy tweet sized snippets, so the feedback wasn't long in coming. The most fascinating was 'Very informative, but the session wasn't about BIM'. If the process of building an information model as a team to inform and enrich the design – build – operate lifecycle isn't BIM, what then is?

It's clear that BIM means many things to many people.

This seemingly bizarre comment made me think. Words and concepts behind acronyms are overshadowed by the desire to adopt new technologies to improve the processes and parts of the project puzzle the beholder occupies. The designers see reusable design artefacts, the contractors see the greatly improved design review process, estimators can see the quantity take-off potential, and the clients are promised better handover information. It's rather similar to the Indian fable of The Blind Men and the Elephant – the true form of BIM is masked by perspective.

At 4Projects by Viewpoint in Newcastle we see the whole picture, or indeed, the elephant in the room, every day. Our users span the entire asset lifecycle from concept sketches, through construction and use to demolition. The B555 roadmap describes

the need for a common data environment on both sides of the contract line so that information in the project information model (PIM) can be curated collaboratively by the tier 1 appointments and their supply chains, before being passed into an asset information model (AIM) for the clients operational use. Critically this AIM information should be structured in the same way as PIM. When the next project starts, the information can be churned back into the project as a key element of the briefing and tender process. But the self-populating employers information requirements (EIR) based on learnt wisdom from previous projects is currently a long way from fruition.

Car manufacturers have already created cleaner flows of products and data from inception to the hands of consumers. A new car comes with a handbook on operation and maintenance, the specification of the wiring or chassis is not relevant to the owner. In a similar way a building should be delivered with a well ordered handbook of relevant information. COBie is designed for this purpose; although each building is unique and requires tailoring of the required elements.

Why, also, do major construction companies and design practices adopt an internal facing strategy for BIM, when the government is encouraging a more external facing collaborative approach? Moving past this phase as we approach 2016 is the key challenge, and no one business can do it alone.

Perhaps delivering Level 2 ahead of the mandate is stalling for some because they believe their partners haven't completed the required work to reach this level, and focus therefore on matters that can be addressed today like developing a clash detection strategy, or deploying new BIM authoring software.



One of the most commonly cited shortcomings is the quality of EIRs. Lacking a fundamental digital project briefing document draws the focus away from creating a rigorous COBie delivery process. This is a symptom however, rather than the cause. How can a client prepare an adequate EIR when they don't know what data they need, or are able to, procure.

With prime responsibility are the facilities management software vendors. It is often said that until the FM tools can take COBie, the requirements cannot be set and, in turn delivered. FM software vendors refute this. They say that as soon as they know which parts of COBie their customers care about, they'll happily map COBie to their tool without risking access to legacy data. The FM world is aware of BIM and its consequences, but delivering BIM for FM tools which are fully 'COBie ready' is like designing HD ready televisions in the days when we only had 4 channels. The recent release of BS1192:4 was a key step towards BIM for FM in the UK, but software is not developed overnight and until this standard takes hold in live contracts the scope of works will remain incomplete.

Clients also take issue with the project team for not offering a menu of data for them to choose from; a kind of data takeaway menu allowing decisions to be made at the tender stage about which bidder offers not only the best price and value in terms of the physical project, but allowing the data product on offer to be judged as part of the process. But as with the FM conundrum the contractor counters with the need to understand the scope of works before pricing the job. As it is, BIM consultants are currently working hard to uncover the client's data needs by playing the role of a digital archaeologist, and the resultant bespoke EIRs lack consistency.

The government is also to blame for weak BIM Execution Plans leading to BIM projects resembling traditional projects but with more models and some new software tools. 'They haven't even finished Level 2, so how can we work to it?' This is true; it isn't all there yet despite 2016 approaching fast, and the situation described may appear to be a Mexican standoff, but the government has addressed

the issues they are charged with resolving believing it will have a domino effect on the other issues that prevent progress. They believe that through standardisation and a mandated process, a world leading construction industry will prosper in the UK, selling its services to the world whilst delivering better projects at home.

Substantial investment in UK construction has delivered the right platform to deliver more efficient, more predictable and better informed projects than ever before. The 1192 suite of documents has been designed and delivered to address the situations discussed above. The classification system required to unify the way we order work across the supply chain to deliver information exchanges has been chosen and is on its way to delivery. The dPoW work is underway to allow clients to plan their projects and specify their requirements in a standardised way. All this with the COBie schema mandated some time ago to offer a framework for passing information from PIM to AIM, combined with the imminent EIR template make for a compelling description and facilitator for Level 2 BIM maturity. When all of this effort is outlined, or even distilled into the Bew-Richards wedge, which first appeared in 2008 it is no wonder the world is paying attention, this includes global software providers like Viewpoint.

Although UK defined, these are not just UK specific issues. Every modern construction industry needs to extract structured data from their projects, distilling it into information, which, combined and interrogated produces knowledge, impacting their business with wisdom won.

As for BIM, has the concept outgrown its acronym? Maybe it's just 'Big Data' with BIM

processes as a mere source. We now have software as a service (SaaS) databases for construction, offering cross project knowledge capture and the collaborative data capture as and when it is created either on site, in the office or in the factory. This is why Viewpoint, as a software company that focusses solely on construction and which has a wealth of experience in SaaS and databases, is really focussing its energy in the BIM arena. We know construction and understand how challenging every day can be in your business and develop tools to help. We are already the home of thousands of live projects with all of the complex needs this brings. However, as construction industry processes evolve, the more structured data the supply chain will be able to produce to clients demand, creates a need for construction to have software tools that facilitate the delivery and acceptance of a digital product alongside the built fabric. So if you want to talk about how to construct, procure and take advantage of the 'I' in BIM call the 4Projects by Viewpoint team.



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# The 2014 BIM message

## As we enter another busy year for BIM processes, PBC Today outlines some of the key messages from 2014 by David Philp...

2014 was undoubtedly a busy year for the UK BIM Task Group, and with the 2016 deadline looming for all centrally procured projects to use Level 2 BIM, 2015 will witness ever-more enthusiasm and vigour in the implementation of this game-changing digital process.

PBC Today, as all regular readers will recognise, has been covering the BIM topic all throughout 2014, with 2015 being no exception as can be seen by the extensive coverage in this edition alone. Our BIM experts have been key in delivering important messages to industry about the latest developments and where more effort needs to be directed. I imagine that even our 'experts' are still learning a few new things about BIM as we progress on this digital journey, and that is where communication is vital. It's so important that we talk to each other so that we can all learn and become in the least more knowledgeable, and hopefully at best, create more experts to guide us through potential barriers to BIM implementation.

David Philp, BIM philosopher, Head of BIM Implementation for the Cabinet Office, and key figure at the UK BIM Task Group (and a must-follow on Twitter by the way: @thephilpster) is instrumental in delivering the BIM message. I'm certain that most of our readers will have either read his articles here, or heard him speak at the many BIM conferences he attends, and left feeling better informed.

In April last year, Philp began by telling PBC Today readers that although challenges remain in achieving Level 2 BIM, the benefits are well worth the effort. He mentioned that the Level 2 BIM challenges were

"diminishing all the time, and the heavy lifting around the processes have been completed by B.S.I. who published both PAS1192:2 and PAS1192:3, which look at information management and exchanges in the asset lifecycle. To make these work, it is essential that a common data environment is established right from the outset with strong governance, especially around classification systems and naming conventions."

In July, Philp then turned his attention to the importance of SME engagement in BIM, outlining their vital role in maintaining the UK as a BIM leader.

**"...collaboration is a key element in the successful delivery and execution of a project programme. In addition, it can act as a lever to help break down silos and successfully share information across teams."**

Given that in 2013, there were 4.9 million businesses in the UK, with over 99% categorized as small or medium sized businesses (SMEs), it is not surprising they are seen as the backbone of our sector. Their importance has to mean they have "sufficient digital capacity and capability to ensure that the UK remains at the forefront of BIM leadership across the globe" Philp said.

He continued by highlighting that: "they have to compete on a new basis with fierce international competition for the provision of skills and products and ever tight project affordability constraints. It is self-evident, therefore, that to flourish with the backdrop of these challenges that they must reform and unlock more efficient ways of working."

In October the huge issue of collaboration was raised. It is purported that BIM can aid collaborative working, and that collaboration is a key element in the successful delivery and execution of a project programme. In addition, it can act as a lever to help break down silos and successfully share information across teams.

**“It’s so important that we talk to each other so that we can all learn and become in the least more knowledgeable, and hopefully at best, create more experts to guide us through potential barriers to BIM implementation.”**

In Philp’s opinion: “the main pedal to ensure successful collaboration in a BIM environment is a clear ‘purpose’. High-performing teams are driven by a well-defined purpose (do not confuse this with a vision statement) and if BIM (Level 2) is good at anything it is; a) lots of new acronyms, but also b) defining clear information requirements at all stages of the asset life-cycle.

“Defined information requirements, defined processes (PAS1192-2 and 3) for information delivery and agreed data exchange standards (BS1192-4 COBie) create a strong foundation for collaboration, and when properly worked through with the entire project team, help create unifying goals. The wise client would also do well to additionally invest in BS 11000 Collaborative Business Relationships which defines roles and responsibilities and supports collaborative decision-making.”

Collaboration also needs to extend beyond delivery with the requirement for ‘Soft landings’ and the requisite for an operational champion to be involved throughout the plan of work for that project – starting with the end in mind and using the model as a basis to visualise and test the lifecycle solution at pre-construction stage. This is a great win in an industry where there is normally a large chasm between the delivery and operational lifecycles.

Philp also said that: “Forms of procurement should also be considered as a lever to encourage collaboration. The Government Construction Strategy trialled the use of procurement routes which sought early contractor engagement. The value of this timely appointment should not be underestimated, however, it is essential that this same strategy be considered in the early engagement of specialist contractors and manufacturers who are key to a joined up data hierarchy. This is as much a cultural change as it is a process change.”

Philp is keen for everyone to understand that we shouldn’t get “bogged down in a technical discussion when BIM is a behavioural change programme more than anything else”, a sentiment often echoed by other contributors to PBC Today.

So what can we expect to see in 2015 except for the final pieces to the BIM Level 2 jigsaw being realised? Well, we certainly should see the release soon of “PAS 1192-5: Specification for security-minded building information management, digital built environments and smart asset management”, which should outline the security threats to the use of information during asset conception, procurement, design, construction, operation, and disposal. This should help with security issues raised in Level 2 BIM projects after feedback from early adopters and BIM pilot projects. ■

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# COBIE – UK CASE STUDY

## STRIDE TREGLOWN

In 2012, architects Stride Treglown were appointed to deliver a UK Government early adopter BIM project. As 'pathfinders' working with newly defined processes and delivering COBie outputs, Stride Treglown faced a number of challenges. To find out how Stride Treglown successfully implemented the project, Solibri UK Managing Director David Jellings, chatted with Anthony Walsh, Senior Associate and Sector Lead for Public & Community Projects and Dean Hunt, BIM Co-ordinator for Stride Treglown.

### How did you first become aware of the Government BIM and COBie requirements?

'We had been working in a BIM environment for a number of years and as one of our key client groups is government, in particular justice and defence, we were aware of the new COBie requirement as a government directive from the outset. To help improve our knowledge, we've attended numerous conferences and seminars and disseminated the information internally to raise our overall company awareness. We knew this was going to be important and that it would involve developing new working practices, so we wanted to be properly informed.'

### When/how were you first involved in a COBie project?

'In 2012 we were appointed to deliver one of HM Government's Early Adopter projects. Our appointment was as the technical delivery architect, initially to deliver the scheme to COBie data exchange stage 3 (representing the technical design solution). This changed however and we were eventually became tasked with fully coordinating the BIM process and COBie data requirement (with the lead contractor, other consultants and the supply chain) to stage 6 – i.e. practical completion.'

Stride Treglown is an international architectural practice with overseas offices in Dubai and Abu Dhabi and eight offices in the UK including London, Cardiff and Bristol, making them the 10th largest architectural practice in the UK.

Sustainability influences the way Stride Treglown runs its practice and since 2009 they have reduced their carbon footprint by 40%. Their expertise covers most sectors and they apply commercial awareness to balance the sometimes conflicting aspects of time, cost and quality to achieve the best outcome for our clients.

Stride Treglown have always invested in technology and are at the forefront of BIM implementation.

### What were your individual roles in the project?

**Anthony Walsh:** 'I am a Senior Associate and Stride Treglown's Sector Lead for Public & Community, which incorporates this particular work stream.'

**Dean Hunt:** 'I am Stride Treglown's BIM Co-ordinator responsible for directing the project team in a collaborative BIM environment to ensure that the geometric coordination and data requirements were achieved and fully coordinated. I needed to develop new workflows and strategies to achieve the COBie data requirements for the project.'

### How did this project change the way you worked?

'We were already familiar with current BIM processes, such as coordinating geometry and clash detection. However, the new process required us to output intelligent data in a format that could be easily accessible to all. This necessitated implementing new working practices and protocols to ensure that these outputs could be incorporated into the COBie schema. Technically, we had to invest in additional add-ins for authoring tools to enable a more efficient workflow. We also had to invest time working with other project partners to help them deliver the data requirements.'

**“Early engagement of the whole project team is essential to ensure productive output. The management and collaborative culture of the team is just as important as the technical manipulation of the data.”**

*Anthony Walsh, Senior Associate, Stride Treglown*

### **What was the main initial challenge?**

‘This was a new way of working, not just for us, but everyone from the client down. The biggest challenge at the start of the process was the initial lack of understanding by the project team. The information requirements and formats were at first ambiguous, but after research into the requirements of COBie, the required levels of data became clearer and more understandable to us all.’

### **And the wider challenges?**

‘The whole team were fully committed to delivering the project, but not having previously worked with COBie, it was a steep learning curve for everyone involved, including the mechanical & electrical engineers, civil & structural engineers, catering suppliers and key supply chain partners. All were very enthusiastic about working in a collaborative environment. We believe our lead role was instrumental in ensuring that all parties were fully integrated into the process.’

### **How did Solibri become involved?**

‘We were aware of the options available to output COBie data, including directly from the authoring software itself. Initially this seemed like the obvious and easiest option but unfortunately it did not satisfy the requirements. It was important to us that we found a way of automating what was essentially a very manual process, in order to develop a repeatable workflow for our future COBie requirements. We originally became aware of Solibri Model Checker from our attendance at the ICE BIM Conference in 2012 and it seemed to provide the solution to many of our problems.’

### **How was Solibri Model Checker (SMC) applied in the project?**

‘One of the main problems we faced was how to ensure that the model contained the complete and correct COBie data. It is very inefficient to spend time validating, and checking COBie outputs only to have to correct them further down the line. Using SMC rule sets, we were able to validate the completeness of the COBie output before exporting to the data sheets. Using the classification tables to coordinate all

consultant models is a particularly powerful feature of SMC, furthermore, SMCs infinitely configurable user interface makes coordinating data straight forward and particularly excels when using IFC models prepared by varying authoring software. Within SMC we were able to federate all discipline models using IFC, which is the industry standard exchange format and also a requirement of the COBie deliverable. At every stage, the Solibri UK team worked with us closely to optimise these solutions.’

### **How successful was the application of SMC?**

‘We believe we successfully implemented the workflow that we initially set out to achieve. We strongly believe that COBie should be an output provided by data in the authoring software which is then federated, coordinated, validated, and checked by SMC, which then automates the export to the completed COBie sheets. By eliminating any manual data entry in the final COBie sheets we not only save a huge amount of time, but more importantly eliminate user error from the process. Large projects that require data output from many maintainable assets becomes almost impossible to achieve without using automation software such as SMC.’

### **How do you see the future for COBie and Solibri’s role in its implementation?**

‘Being championed by government, COBie will be business as usual from 2016 and we are already seeing elements of COBie being requested by some private clients. We feel ultimately that Excel as the output will gradually disappear; however, COBie data will remain and become the universal delivery method across all projects. Stride Treglown has now adopted SMC software to undertake internal coordination so that as a practice we can deliver fully co-ordinated buildings. We feel confident that SMCs communication method is far superior to its competitors and will be an essential component of future project deliveries.’

**“It was important to us that we found a way of automating the process, creating a workflow that was repeatable. It was imperative to generate the data requirement via industry standard IFC format as COBie data is a subset of IFC. We strongly believe COBie data should reside in the authoring software which can then be federated, coordinated, validated, and checked by Solibri Model Checker”.**

*Dean Hunt, BIM Co-ordinator, Stride Treglown*

## Moving to Level 3

Reports would have you believe that the design team is endangered due to the continued traction Building Information Modelling (BIM) is gaining in our industry and the belief that BIM is a panacea that automates design.

The Government requires that all centrally procured projects are compliant with BIM Integration Level 2 by 2016. Level 2 Integration essentially means using separately designed models, for example for the cost manager, architect, structural engineer and M&E engineer that are integrated (federated in BIM speak) by another piece of software ('middleware').

Many government bodies are well on the way. The next stage, Level 3, is a fully integrated single online model including sequencing, cost and life cycle information – 4D, 5D and 6D respectively.

A number of consultants appear to view this as a threat. We see this as one of the greatest opportunities for the professions for years.

Having worked on numerous projects based upon BIM it is clear that the architects' ability to provide cost planning is not a risk, and equally the structural engineer is unlikely to be providing the concept design anytime soon.

The early stages of design still require the expertise of the cost consultant to create estimates from scant information whether based on a fag packet or an early BIM.

The issues of client confidentiality and commercial sensibility mean that it is not appropriate to embed costs in a BIM. There



King's College London's Champion Hill scheme utilised BIM

are now numerous software solutions for cost consultants to rapidly extract quantities from a BIM and create a cost plan or Bill of Materials based upon the BIM. Future software development in BIM will eventually allow us to secure confidential data from other users. This is part of the governments proposed 'Level 3' Integration Model which is a few years away yet.

What is different for the QS is the process, particularly the briefing of designers to ensure that the BIM is designed in a manner that allows us to reuse data. Even then not all the information the QS requires is available directly from the BIM. There will always be an element of 'manual' work for the QS to close the gaps in the information provided to them.

We have also found that the reality of transferring data between the various pieces of software is not as seamless as the software industry would have us believe. Loss of data and file incompatibility is a major issue

and the time to resolve this should not be underestimated. Large file sizes also need managing if both your software and hardware is to cope.

The design team definitely isn't dead but must adapt to BIM if we are to properly embrace this sector changing opportunity.



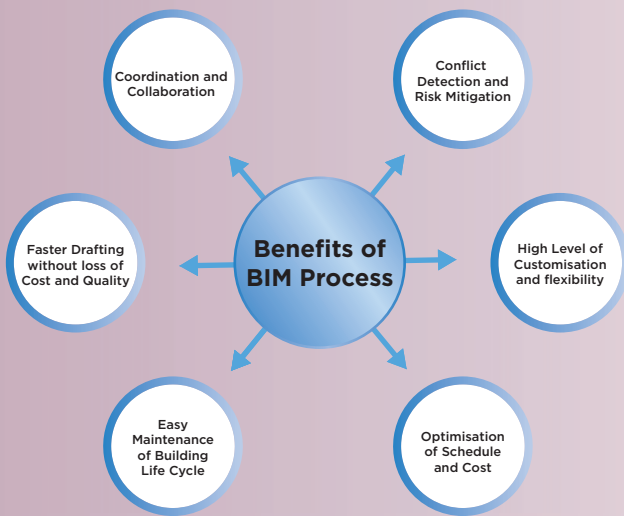
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## Let US help YOU with your BIM requirements

The way we partner with organisations - understanding their requirements and aspirations makes us stand out from the rest. Having successfully worked with numerous companies to implement the move to BIM, we now have a highly developed and refined process that can be adapted to individual needs.



### What is BIM?

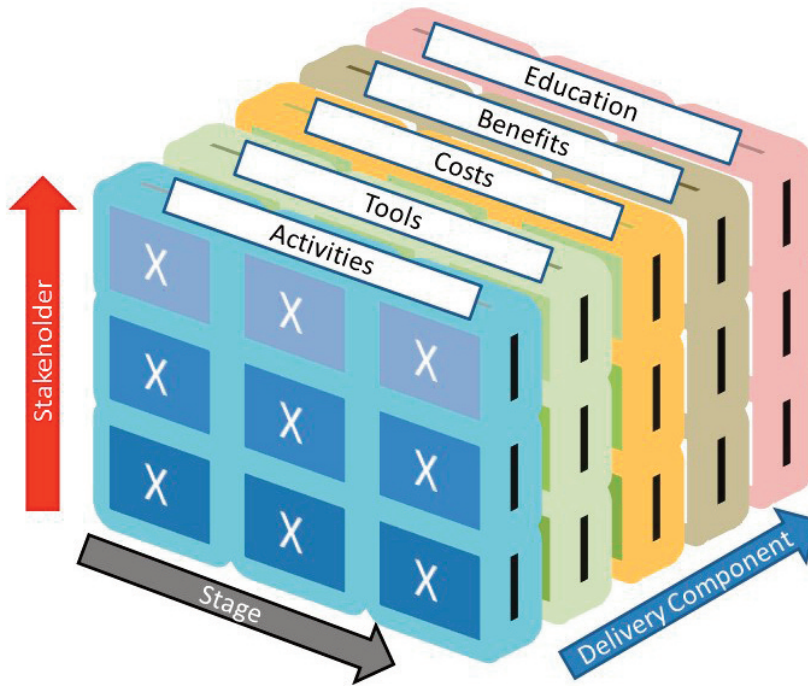
Building Information Modelling is a work-flow process that uses modelling and software to create a digital model that will react and perform as it will in the real world.

This model is used throughout the construction and ongoing maintenance of the project.

The Government have introduced a BIM Mandate, where by 2016, all professional businesses and construction workers wishing to work with, or for the Government, must be BIM trained and compliant to level 2.



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## The BIM Delivery Cube

**Tim Cole of Causeway and Bill Healy, Chair of the BIM Technology Alliance explain how the BIM Delivery Cube will support industry adoption of BIM, and why it was developed...**

To unlock the potential of BIM we need to consider the questions that BIM adopters will face and which, without clear answers, will add inertia or become progress blockers. Questions such as:

- What do we need to do?
- What tools do we need?
- What skills do we need?
- What are the benefits?
- How much will it cost?

The challenge was to distil the answers to these questions into simple, clear and brief guidance and to present them in such a way as to provide different stakeholders at different stages in the process the insights they need.

BIM is sometimes referenced as being a process. However it is more helpful to expand the definition

to embrace the key aspects upon which the benefits of BIM application depend. BIM is a technology-enabled information process that is built on collaboration and early engagement. Take away any of these elements and, although you can still make progress, the value is greatly reduced. The BIM Delivery Cube ("Cube") provides a matrix that links Stakeholders at all project stages with the aspects that need to be considered. This improves awareness; gives confidence to evolve; builds maturity; enhances collaboration and promotes adoption.

### **Debate stirring?**

The Cube was developed to be an aid to understanding, and a mechanism to share understanding and learning as BIM adoption spreads. It is not intended to offer a single comprehensive reference but rather to be treated as an open and shared resource that helps the benefits of BIM to be more easily understood and realised. People across our industry can use the Cube to support both initial engagement and operational use. Information within the Cube should be validated against the information from practical experience and, where changes are required or

Cube Stage	Plan of Work (other terms used)
Preparation	Brief
Design	Concept Design, Definition
Pre-Construction	Technical Design
Construction	Build, Commission
Use	Handover, Operations

The Cube not only provides insights that define the engagement plan for each individual stakeholder, but also provides the opportunity to understand the perspective of other stakeholders.

It is widely agreed that we need to support effective collaboration and early engagement if BIM is to deliver its full potential. The Cube can be used to foster this approach by providing a wider understanding of the roles and responsibilities of all stakeholders engaged in delivering successful project outcomes.

Presenting the Cube as a searchable information source has proved challenging. The data is readily available through the BIM Task Group website ([www.bimtaskgroup.org](http://www.bimtaskgroup.org)) and is increasingly being used. We are currently developing a simple and highly accessible on-line version that can be queried in any set of two or three-dimensional slices. This version should increase the number of people using the Cube as well as the community value it delivers.

With the support of BIM users, the Cube will play a key role in building a BIM community that is both well informed and able to collaborate effectively. ■

The Cube can be accessed at [www.bimtaskgroup.org/tech-alliance-bim-investment-guide/](http://www.bimtaskgroup.org/tech-alliance-bim-investment-guide/)

sections need to be updated, those changes should be shared, reviewed and incorporated. This way, the Cube remains a relevant source of information that is continually subjected to peer review.

The Cube's three axis are Stakeholders, Work Stage and Delivery Component. We have considered the guidance from the perspective of nine different Stakeholder groups (from Client to Asset/Facilities Manager), through the different Work Stages (from Preparation to in Use) and for five key BIM information aspects (Activities, Benefits, Tools, Costs and Education). The Cube has been built to allow customised views to be generated ranging from broad perspectives through to specific Stakeholder/Work Stage/Delivery Component information.

One of the most widely discussed aspects of BIM adoption relates to the cost for the different stakeholders at different stages in the project lifecycle. The Cube provides a guideline estimate, based on defined criteria and current experience. As experience grows these figures can be refined or adjusted to reflect industry averages.

It was a deliberate decision to restrict the amount of information that would be presented at each of the many data-points within the Cube. This is considered key to ensuring the Cube remains easy to use and provides clear guidance that is accessible to the widest possible audience.

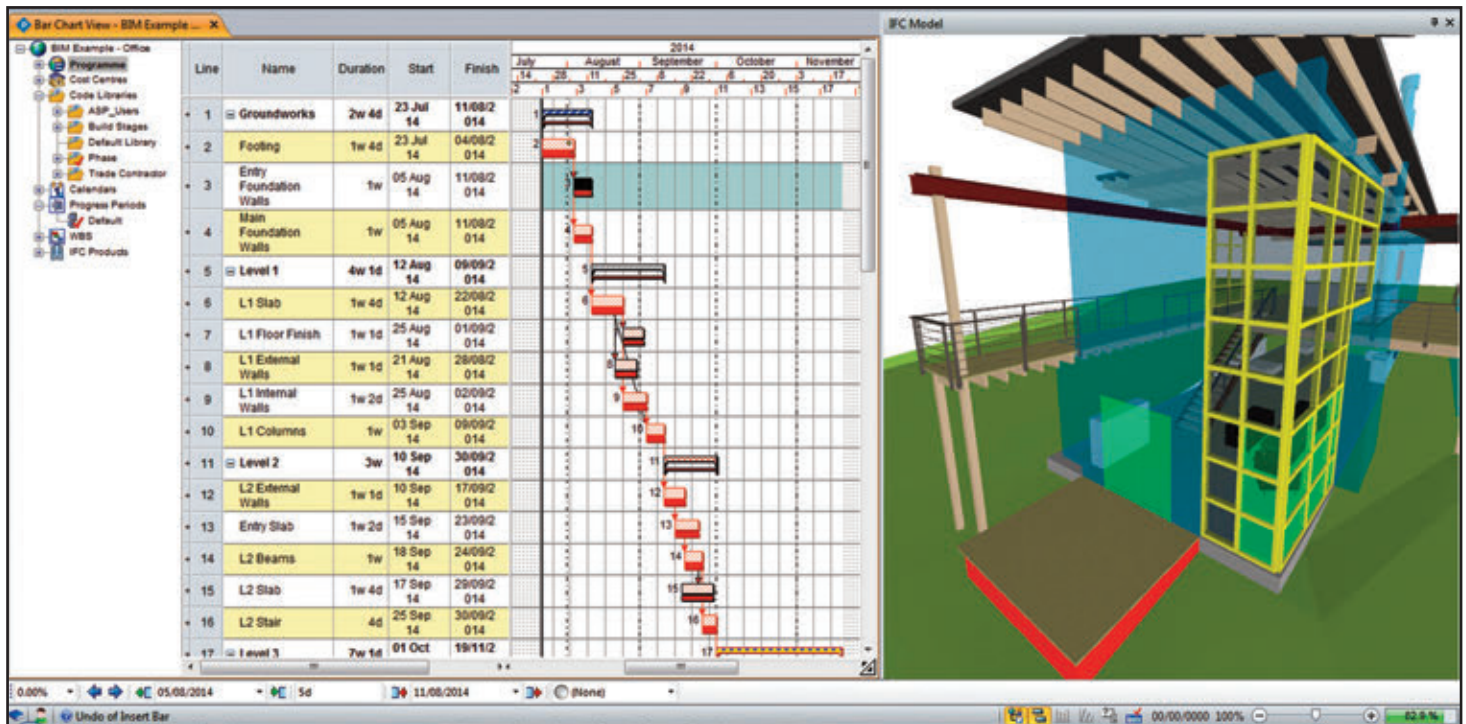
In time, it may be appropriate to provide an expansion to deliver more information. However, there is a strong argument that the Cube should remain centred on providing a comprehensive summary of BIM.



.....  
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# Are you ready for **BIM Level 2** next year?

All major construction projects in the public sector must be working at Building Information Modelling (BIM) Level 2 by 2016. Is your company able to exploit the power of BIM for the planning and control of projects in time for the deadline?

If you are still looking for the best software solution to handle BIM, you may be interested in our FREE Asta Powerproject BIM Roadshows.



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# Amec Foster Wheeler: Environment & Infrastructure Europe – BIM

Amec Foster Wheeler Environment & Infrastructure Europe progressed the adoption of BIM through 2014 as part of a standard approach to project delivery and data management within the architectural, buildings and civil construction sectors.

With the mandating of BIM Level 2 on all government projects by 2016, we have seen a substantial increase in public sector infrastructure projects requiring evidence of BIM capability within the PQQ stages of project bidding. Although the focus is on public sector projects, it is widely recognised that BIM will become the default way of working, a shift equivalent from drawing board to computer aided design, and an expectation for all consultancies to have BIM capability.

## Amec Foster Wheeler E&I Europe BIM Strategy

Our short term strategy set out to meet both the requirements of the BIM Level 2 mandate in line with PAS 1192-2 and 3, and the cultural changes required to ensure BIM is fully engaged and adopted sustainably within our business. The objectives of our BIM strategy identified the following critical success factors:

- Understanding the BIM requirements of sectors and clients
- Change management within project teams
- Project delivery processes
- Technology requirements
- Staff knowledge and training
- On-going research and development

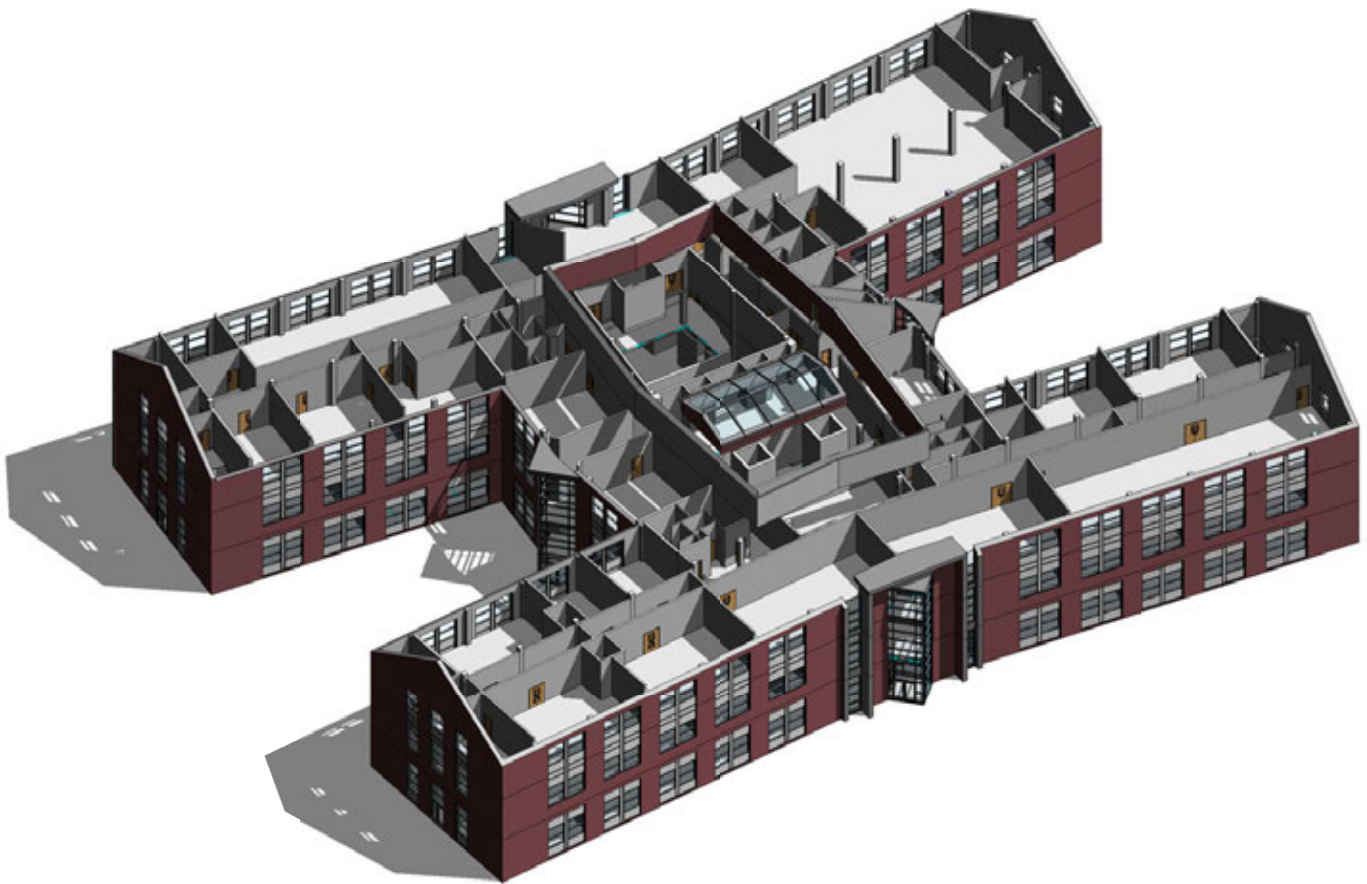


To begin the process, we formed a BIM Implementation Team which included external BIM consultants and global software partners to propose a roadmap outlining our transition into BIM describing short, medium, and long term goals. As part of our strategy, the BIM Implementation Team identified trial projects within the waste infrastructure and defence sectors to test our delivery process and software solution. These trial projects are allowing us to review our documentation and

evaluate our common data environment (CDE) data management and software solutions, as well as critically appraise cultural and project delivery processes.

## Learning from other sectors – Integrated Engineering & Design (IE&D)

It is accepted that alongside the government mandate, a fundamental business driver for adopting BIM is adding value to a client's



project by producing higher quality deliverables and reducing inefficient working. During the BIM implementation period, our Global Applied Technology team have aligned our BIM strategy and project processes with the business's wider culture, creating efficiencies through learning from experience within other sectors.

For many years in the oil and gas sectors, Amec Foster Wheeler has seen technology as a key enabler for Integrated Engineering & Design and data driven-engineering, which effectively translates to BIM Level 3 in the built environment. Data centric engineering focuses on electronic workflows and controlled automated data, which means that document production becomes a by-product of the database.

As well as the technical similarities between data-driven design and BIM, the oil and gas sector has addressed the 'people' aspect of adopting new processes, through regular communications ensuring those involved

understand the systems, workflows, and roles within the project process.

### **Amec Foster Wheeler E&I Europe BIM Future**

Our commitment is to ensure our BIM capability will encompass the full asset lifecycle from concept through to decommissioning and demolition. All engineering, design, and analysis activities will be object oriented and closely integrated, while the assurance and handover of information and documents to downstream activities controlled using the latest database technology. Procurement, construction, cost and schedule management through to operations and maintenance activities will be integrated around the same coherent data model ensuring accuracy and consistency during all projects.

Building upon our current experience and proposed BIM processes, the adoption of information centric technologies, common standards and collaborative behaviours will continue to unlock new and more efficient

ways of delivering as we head towards 2016 and beyond.



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# BIM – a digitised construction world

**Peter Caplehorn, Chair of BSI's Strategic Committee for Construction and Deputy Chief Executive of the Construction Products Association shares his thoughts on BIM...**

For a very long time there has been nothing as influential as BIM or as change generating with the potential to affect the business operations of everyone in the UK construction industry. A big claim, but one I make with very good reason.

I have worked in the industry as an Architect and been involved with practical construction technology and regulation for a long time. The issue identified by Sir John Egan in his 1998 'Rethinking Construction' report was that "Projects are widely seen as unpredictable in terms of delivery on time, within budget and to the standards of quality expected." Similarly, Sir Michael Latham's 1994 'Constructing the Team' report spoke of the fragmented nature of the industry. This is compounded by the use of unreliable information in a chaotic and selfish manner, resulting in huge inefficiencies and continued risk-laden and adversarial positions on nearly every project.

In contrast, the last few decades have seen many other industries embracing digitalisation – using software to design and develop test their products and processes. Many have also employed the same technologies for procurement supply chain management and full business operations. We often highlight the aero, automotive and food supply industries as significant examples.

BIM has come into its own and has been used individually and in many locations around the world for construction projects for many decades. In the not so distant past, the architecture, engineering and construction industry relied on CAD and marked-up drawings to build. BIM creates a virtual 3D representation (embedded with all the relevant real world

data) of a building using digital technology, enabling accurate construction of the design, improving efficiency and reducing costs across the process.

**“Most of manufacturing are now planning and developing their approach to digital supply and procurement. At the heart of all this activity is data – ensuring it is accurate and is used throughout the project being the simple and all-encompassing aim.”**

So valuable is this, that the recent UK initiative to organise digital approaches at a national level, set a mandated level of achievement and provides thought leadership supported by key standards in a unique manner. We have now reached a level of momentum that has invaded every corner of the industry. Clients, consultants, contractors and the whole supply chain have a growing awareness of the business benefits. This includes a move towards a faster pace of working especially as BIM acts as a traceable database for the project. Therefore all the associated costs of every design change can be tracked in real time.

There is still a lot to be done but the direction of travel and the potential have been clearly set out.

We are now just about 15 months away from the mandated deadline for anyone wishing to undertake government work to be able to demonstrate ability to maturity level 2 – a challenge as many teams at the leading edge are still not capable of this. However, the supporting methodologies information and standards are in place or being developed. We have



the family of PAS documents, and the data templates and the digital plan of work will be available in spring 2015.

Most of manufacturing are now planning and developing their approach to digital supply and procurement. At the heart of all this activity is data – ensuring it is accurate and is used throughout the project being the simple and all-encompassing aim. Identifying and using reliable data results in everyone having access to accuracy, de-risks the project, provides a clear set of information about the built asset, and how it operates.

This new world means a change of perspective from the client, the consultant, and the contractor, and does so for the better. The common and binding language of clean data allows efficiencies in time cost and performance, allowing prediction of these key parameters for everyone's benefit so we can actually design and build exactly what was intended.

This is the goal, and for it to deliver the full potential it will change every aspect of the industry, including the regulatory and planning world. Work is underway to establish how planning and planning applications can be processed in a BIM environment. Surveys of existing buildings and land areas can be undertaken digitally. Several parts of the world have developed electronic planning and regulation approaches. The UK will hope to incrementally process planning applications followed by processing of BIM models and associated data in the next few years.

Work is also underway to process technical standards digitising building regulation approval. This will start with assisting the process areas that are effectively based on relationships or numerical compliance. This will be followed by increasing digitisation of more complex areas allowing designers to design, and regulation requirements will be increasingly undertaken through software. In future years,

regulations may be formatted to be BIM friendly. However, that lies some decades ahead although work on how we move to maturity Level 3 is being mapped out and ensuring the regulation world is fully integrated is clearly essential.

Back to the here and now, there is still a considerable way to go, and for the benefits to be shared by everyone confidence in the outcome is key. Some areas of the industry are investing huge sums, even the smallest of SMEs are equally committed and proportionately investing time and money to join this step changing movement.

The need however is to ensure you are aware of the business benefits and the business plan is about adapting to BIM. For more information see the BIM task group website: [bimtaskgroup.org](http://bimtaskgroup.org) and download the relevant PAS documents at the BSI Shop (<http://shop.bsigroup.com/Browse-by-Sector/Building--Construction/Building-Information-Modelling-BIM/>)



.....  
**Peter Caplehorn**  
**Chair of BSI's Strategic Committee for**  
**Construction and Deputy Chief Executive of the**  
**Construction Products Association**

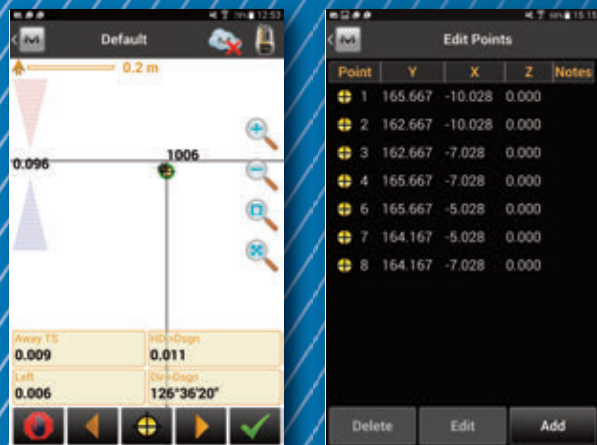
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**Tracking of the prism, and getting the tool to follow you used to be a chore.** The tracking on the LN-100 however, is one of the best on the market. The dual-colour guide light and laser pointer all help in making sure you can drive the instrument if you do manage to lose it.

**Robotics on a busy site is a nightmare.** In this case for setting-out, it's a no-brainer to use the Auto-rotate function in MAGNET and then move to the next point. Using the guide lights to put the reflector in the right place before locking on to take the measurement.

**Survey tools are for surveyors – I'm rubbish at levelling those instruments.** Coupled with an auto-levelling routine, setting up the instrument couldn't be easier. Mount it somewhere, switch it on, find two points to measure to so the instrument knows where it is on site, and then start marking the points from your list on the ground.

The LN-100 combined with the MAGNET Construct app puts high-end positioning technology in reach of anyone looking to up their game.

Fancy a look? Get in touch.....

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## LN-100 | 3D Layout Navigator

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# BIM – defining better information management

**B**IM, despite being a small acronym, is a big word in construction. While there has been a lot of hype around BIM over the last few years we see the conversation is starting to shift toward companies asking – what’s really in it for me? However, the discussion needs to further evolve to start looking at how BIM can help define and create better business outcomes.

Models are important but they aren’t the be all and end of the information revolution – it’s the data that’s important, and for many in the industry that will still be shared in familiar 2D products like MS Word or Excel.

BIM allows clients, operators and maintenance teams to have all their data for an asset in one place. It allows for meaningful analysis across a wider selection of business information to be carried out rather than making business decisions based upon anecdotal guesses. By combining disparate data sets together – linked around a model of the asset – it becomes possible to review infrastructure data in a much more powerful way and as a result, manage assets better.

Implementing and using shared data sets with feedback of what actually works – proven by hard evidence – will improve design in the future. However, this shift of how we manage information requires more than just using software, it requires a behavioural change. This is the real change that BIM brings to businesses. It breaks down silos and enables individuals, groups and departments to share information openly and transparently. This

doesn’t mean that all information needs to be shared with everyone all the time – BIM provides the opportunity for relevant information to live in the model and only be accessed when needed.

While BIM has and is continuing to help evolve and change the construction industry the next big step will be harnessing remote sensing and telemetry. Real time feedback on the performance of structures such as bridges and tunnels will allow managers to understand how their assets are actually performing. Automating processes so that out of range figures trigger further analysis or inspections, creates the ability for pre-emptive maintenance to be carried out in a structured way rather than just having reactive or end of life strategies in place.

BIM can mean something different to everyone and that’s not a bad thing. But better data sets make for better decision making and help owners, operators, designers and installers work much more efficiently from a position of knowledge rather than ignorance.

## Tekla Structures BIM software

We constantly test and develop Tekla Structures and help you to get started with it.

Models created with Tekla BIM software carry the accurate, reliable and detailed information needed for successful Building Information Modelling and construction execution. Welcome smoother workflow to your company with Tekla Structures and constructable models.

Tekla works with all materials and the most complex structures – you set the limits. Our customers have used Tekla Structures to model stadiums, offshore structures, plants and factories, residential buildings, bridges and skyscrapers.

## Help with implementation

Tekla staff and our resellers help with implementation of the software. We work closely with our customers and offer local support, training and consultation.

## Open approach to Building Information Modelling

Although Tekla is ready to use, the software is also highly customisable. As Tekla has an open approach to BIM, you can run other providers’ solutions and fabrication machinery and still interface with Tekla. Extending and enhancing Tekla Structures is easy with Tekla Open API, the application interface.

Duncan Reed, Digital Construction Process Manager, Tekla



**Duncan Reed**

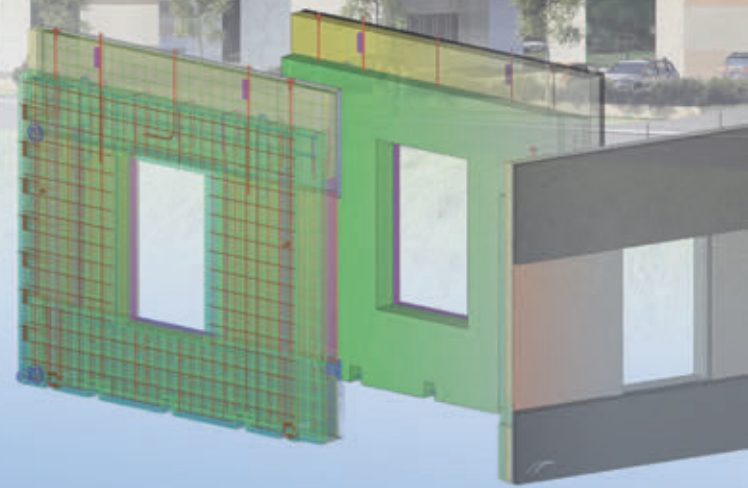
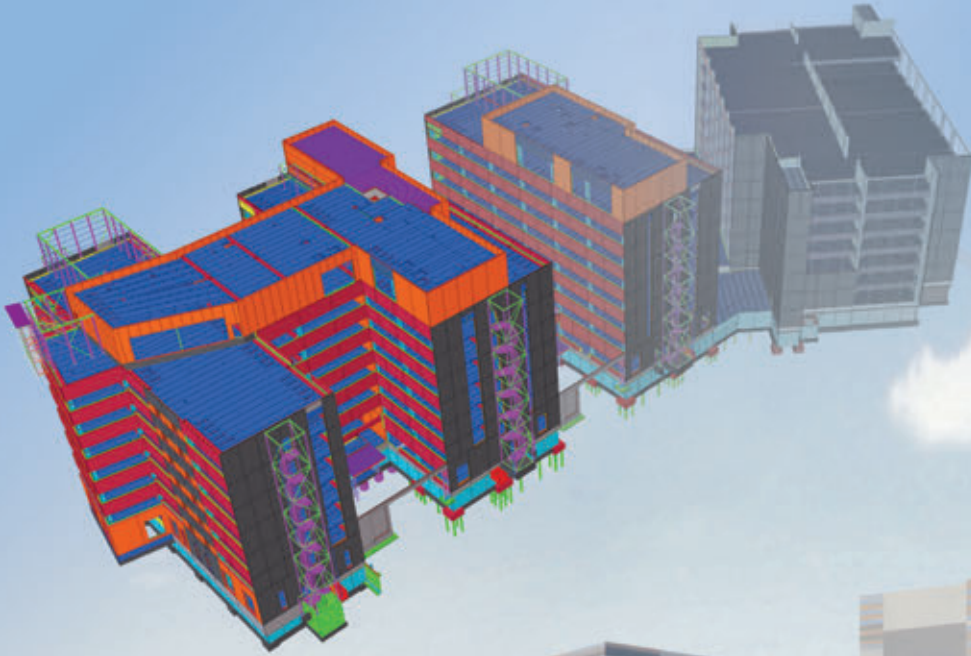
**Digital Construction Process Manager**

Tekla

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# DO BIM BETTER WITH TEKLA

With the almost daily BIM announcements by clients, contractors and suppliers identifying their increased efficiencies and greater value by adopting BIM, not to mention the Government drive towards adoption by 2016, Tekla recognise that forming a BIM strategy alongside responding to CE Marking and ISO requirements can seem a daunting task.

We can help with the implementation of BIM within your organisation - advising on making the right business decisions, getting the most from your software and help with workflow procedures to ensure you are ready for the challenge ahead.

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# Government Soft Landings within the BIM environment

**Sarah Birchall, Sustainability Engineer with the research and consultancy organisation BSRIA Ltd, describes what is required by Government Soft Landings...**

The word BIM is everywhere at the moment, and every now and then Government Soft Landings (GSL) is also mentioned in the same sentence, but there is still some confusion within the industry around what BIM and GSL are.

The UK construction sector is interested in these subjects because the UK Government has specified that all central government departments will be required to adopt fully collaborative 3D BIM (in terms of BIM maturity, this is Level 2 BIM which means, among other things, that all project and asset information, documentation and data is worked on electronically and collaboratively) on their projects as a minimum by 2016. Government has refined its definition of Level 2 BIM as compliance with the following seven components, one of which is GSL:

1. **PAS 1192-2: 2013** Specification for information management for the capital/delivery phase of construction projects using building information modelling
2. **PAS 1192-3: 2014** Specification for information management for the operational phase of assets using building information modelling (BIM)
3. **BS 1192-4: 2014** Collaborative production of information Part 4: Fulfilling employers information exchange requirements using COBie – Code of practice
4. **Building Information Model (BIM )** Standard Protocol for use in projects using Building Information Models
5. **Government Soft Landings (GSL)**

## 6. Digital Plan of Work

## 7. Classification

The first five of these are already available. The Digital Plan of Work and Classification are currently being developed by RIBA Enterprises, as part of a TSB-funded research project and are due for delivery in spring 2015.

On the UK Government's BIM Task Group website BIM is defined as "value creating collaboration through the entire life-cycle of an asset, underpinned by the creation, collation and exchange of shared 3D models and intelligent, structured data attached to them". BSRIA views it more simply as a managed approach to the collection and exploitation of information about built assets.

GSL is a UK Government client requirement on projects that has been drawn up from the principles of a BSRIA published document called Soft Landings Framework BG54/2014. These requirements have been developed for use within Central Government's own procurement strategy. The key objective is about "aligning the interests of those who design and construct an asset with those who subsequently use it".

Although the GSL process generally follows the Soft Landings methodology described in the publication, it also adds the use of metrics to demonstrate compliance with construction project outcomes.

Under GSL, government departments will be required to define a series of high-level outcomes at the very beginning of a project. GSL also provides key



Sarah Birchall, Sustainability Engineer, BSRIA

questions that will need to be asked by the government department's GSL project champion (an individual assigned to each project to see the GSL process is followed through) and answered by the construction team as the project progresses. It is designed to aid decision making and focus on the defined project outcomes. There are four areas that these outcomes need to link with and each will need targets and monitoring throughout the project stages:

1. **Functionality and Effectiveness:** the needs of occupiers/users of the building must be met effectively.
2. **Environmental performance:** performance targets in terms of energy efficiency, water usage and waste reduction must be met.
3. **Facilities Management:** a clear, cost efficient strategy for managing the operations of the building is vital.

In 2009, BSRIA and the Usable Buildings Trust developed the core principles and published the Soft Landings Framework. The idea behind it is to make buildings perform better from day one.

The Soft Landings approach identifies specific gateways in the design and construction process where the performance needs to be reviewed and any issues addressed. By using the gateways to make changes and monitor improvements, a building can pass more smoothly from its build phase into occupation. This creates a "soft landing" rather than a "crash landing".

4. **Commissioning, Training and Handover:** it is important that projects are delivered, handed over and supported to meet the needs of the end users, operators and maintainers.

Exactly how the metrics will be set is still work in progress but GSL, along with its measurements for building performance, will help ensure that the building delivered meets the client's aspirations and objectives. GSLs main benefit is around meeting the needs of the end users and the required operational outcomes.

Further information about BIM, Government Soft Landings and Soft Landings can be found at the following websites:

<http://www.bimtaskgroup.org/gsl/>

<https://www.bsria.co.uk/services/design/soft-landings/free-guidance/>



.....  
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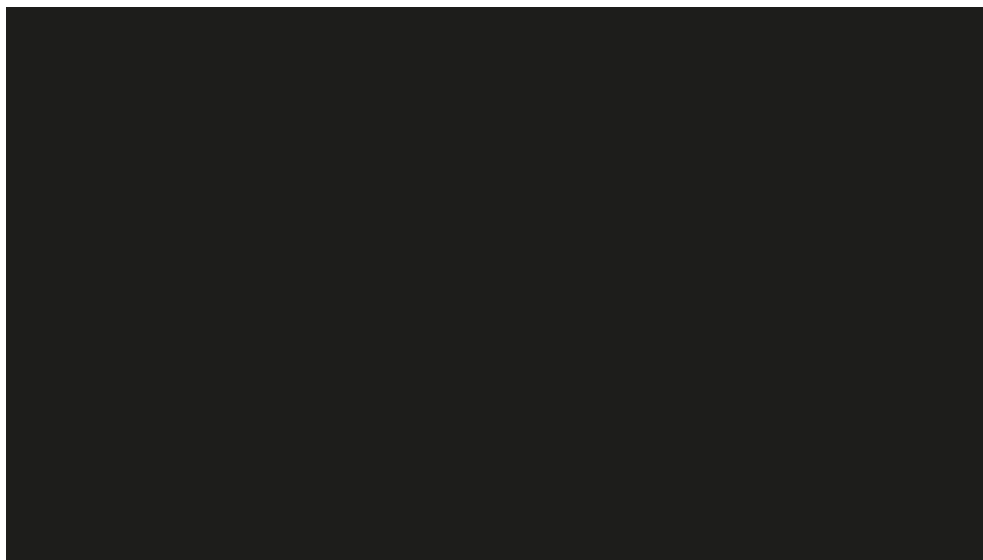


## **GREG DAVIES**, Operations Director at Concerto, discusses their integrated asset management solution, their on-going commitment to Government Soft Landings and his thoughts on 'the golden thread'...

### **WHY DID YOU DEVELOP THE CONCERTO SOLUTION?**

We originally developed the Concerto solution to directly support transformation projects within the UK Local Government, specifically to support Government collaborative strategy in managing estates and large-scale capital projects. Now it is used in both the public and private sector in all sorts of contexts.

We recognised the need for the Public Sector to move away from using disparate systems and knew we could offer significant efficiency savings



via an integrated, web-based solution with all relevant comprehensive functionality under one umbrella – project, performance, asset and facilities management. Concerto also integrates with external finance solutions so organisations can manage the entire asset lifecycle process without jumping from one solution or plugin, to another.

### **SO HOW DOES CONCERTO SUPPORT THE SOFT LANDINGS FRAMEWORK?**

The solution supports PAS1192-2:2013 both in terms of information management and handover.

The management, collaborative exchange and validation of data takes place in a single, Common Data Environment (CDE) which supports 2D and 3D visual data rendering, as well as transferable and scalable detailed data sets.

We also consider how the Asset Management, Operation and Maintenance of the project will be carried out and ensure handover of validated data to the Facilities Management phase.

Our initial development of BIM was directed at the handover from the project phase to the operational phase. Initially, the functionality was based around capturing and importing data from COBie and automatically building the MEP equipment register against the property asset, then utilising that MEP asset data for planned maintenance and reactive maintenance purposes. This allowed organisations to track asset full life cycle costs, encompassing areas such as reactive and planned maintenance, which then feeds a myriad of additional benefits.

We then examined the relationship between PAS1192 2 and 3, and continued our development to allow the capability for the Concerto system to collate and validate the data during the project phase, so when it is taken into the asset register, it is correct and relevant and in full support of PAS1192 & 3, which mean no more chasing Alice down the rabbit hole, as 'one truth' of the data exists.

With this in place, we are now in the position to guarantee project and asset BIM data is validated, handed over and all held in one central environment for the full life cycle of the asset. This maintains the essential 'Golden Thread', which is often lost in the construction process.

**WWW.CONCERTO.CO.UK**  
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## Manchester City Council

### TELL US ABOUT YOUR INVOLVEMENT WITH THE MANCHESTER TOWN HALL PROJECT?

Our BIM developments stemmed from relationships with customers in the Public Sector who were becoming more aware of the requirements of the Government Soft Landings strategy for BIM.

3 years ago, Manchester City Council invited us to attend a meeting with Laing O Rourke and NG Bailey about the Town Hall Complex, where we discussed how BIM data would be leveraged on the project in support of the government Soft Landing strategy for BIM. Lots of questions were asked across the table, and from this meeting, we formulated our initial ideas of what we really needed to achieve with regards to BIM.

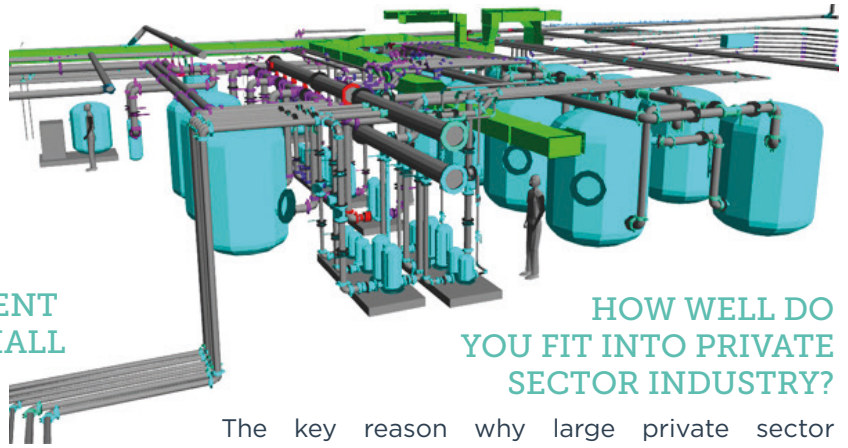
We went away and at our cost developed the initial BIM functionality. We then came back to the table with a proof of concept perspective how we envisage BIM to operate within our system. They loved it.

### AND, HOW IS THE FM TEAM AT MANCHESTER GETTING ON 3 YEARS DOWN THE LINE?

The FM Managers at Manchester state that the interface is simple to use by FM teams. For example, if a building user reports that a room is too cold, the FM team can access data relating to the systems supplying heat to that room and isolate these from the highly complex M&E systems supplying everything else. This makes it much easier for them to identify potentially defective items, such as the boiler supplying the cold room. Once the offending piece of kit has been identified, it is centred on the user's screen and placed in context, enabling the FM team to work out how to access it. They can also link to the operation and maintenance manuals and fault codes for that boiler, historical work, cost and survey information.

Data can also be downloaded to mobile devices, which is particularly useful when working on systems buried deep in a basement or in a remote area where there no data signal available.

They're now using Concerto across the Council for complete operational management of the entire corporate property portfolio, which includes condition surveys, estates management and much more, enabling the building of detailed financial information on of the council's assets.



### HOW WELL DO YOU FIT INTO PRIVATE SECTOR INDUSTRY?

The key reason why large private sector organisations also engage with us is because we are able to demonstrate the engineering data being captured and utilised during the operational life of the building is validated and carried through the process within a centralised, web based and integrated software environment. This is attractive for organisations who have large, geographically disparate, and complex asset portfolios, as the costs to manage these portfolios account for a large percentage of budget spend, so every penny spent that doesn't need to be reduces profitability.

### WHAT MAKES CONCERTO'S OFFERING STAND OUT?

We offer a very holistic solution based on an understanding that no two organisations operate in the same way. We have purposely developed our solutions to be intrinsically flexible so that clients can configure the software to their ways of working. Our clients are very positive about our solution and their relationship with us as a team, as we have always focused on good relations, usability, powerful functionality and value for money.

We believe that by allowing our customers to have a direct influence over the future development of the functionality; we aim to ensure the future relevance of our solutions within their organisations...we have never lost a client so we must be doing something right!

### ABOUT CONCERTO

Concerto's software portfolio enables customers in both the public and private sector to improve the performance, productivity and quality standards of asset and project management functions, meet and exceed set KPIs and realise the associated cost savings. We provide a range of solutions, which can interlink or stand-alone and are highly adaptable and scalable to a range of organisations and requirements. Please contact us for further information.

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# BIM and the SME: future-proofing operations

**Alan Muse, Director of Built Environment Professional Groups at RICS argues that without the engagement of SMEs in the BIM process, the UK could stand to lose its global competitiveness in the long term...**

**B**uilding Information Modelling (BIM) has come into sharp focus in recent years, particularly given the Government Construction Strategy (GCS), which requires contractors to have attained fully collaborative 3D BIM by 2016.

However, when it comes to adopting BIM there seems to be a two tier system developing between those that are actively engaging with the technology and those that aren't. Furthermore, it seems that it is the larger contractors that are more inclined to engage when compared to their SME counterparts.

In order to amplify, and collectively optimise the benefits that BIM brings to the built environment, it is imperative that all organisations regardless of their size, start to stand up and take notice of the technology. After all, there's one thing we can all be sure of, and that's that BIM is not going to go away anytime soon.

As it becomes a central part of construction procurement criteria in the public sector, we can expect the private sector to follow suit in the not too distant future – particularly given the potential cost and environmental savings that BIM usage brings. What's more, without the engagement of SMEs – a large part of the UK construction industry – the UK could stand to lose its global competitiveness in the long term.

That's why more SMEs need to start taking the necessary steps towards engagement. With the amount of information now available, there's never been a better time to start a 'BIM journey'.

RICS offers a number of resources, services and qualifications in order to help the industry engage fully with BIM. For example, we have dedicated

resources online with the aim of introducing all organisations to BIM as well as a number of training sessions which look at how BIM can be implemented and managed.

Furthermore, RICS has developed the first BIM Manager Certification scheme in response to industry requirements to have a standard that demonstrates the skills and competence of construction professionals in using BIM.

In February, RICS held a conference dedicated to BIM in London, which was designed to bring all sections of the industry together to discuss the issues surrounding the technology and its wider adoption across the industry.

With BIM set to gain momentum as the standard platform by which organisations of differing sizes and disciplines collaborate on construction projects, we must ensure that all sectors of the industry are equipped with the skills and training they need. Not only will SMEs future-proof their operations by adopting BIM, they will also help to support the UK industry in becoming a global leader in the implementation and management of the technology. ■

For more information on adopting BIM, visit: [www.bimtaskgroup.org](http://www.bimtaskgroup.org)

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# There is a better way...

For Architecture, Engineering and Construction teams, project schedules can slip as much as 30% due to miscommunication. Miscommunication leads to mistakes, and at any level, mistakes lead to rework, costing time and money. Wouldn't it be great if all that extra work could be avoided by keeping everyone involved and up-to-date at all times? The award winning SMART Visual Collaboration Solutions enable any meeting delegate, regardless of location, to participate in a meeting as if they were in the room, including interacting with content, be it simple sketches or in-depth 3D models, allowing them to manipulate and implement changes immediately. This leads to faster decision making, more project completions, quicker target achievements and ultimately, a faster return on investment.

As the global leader in interactive whiteboards, SMART Technologies brings over two decades of collaboration research and development to a broad range of easy-to-use, integrated solutions that free people from their desks and computer screens, making collaborating with digital resources more natural – transforming how AEC project teams coordinate, collaborate and communicate. SMART's solutions include large format interactive touch displays with collaboration software to make meetings more productive and distance collaboration software to support remote workers. Touch recognition features allow all meeting participants – wherever they are located – to directly mark up and manipulate images in the software. There are options for saving the work and integration with Microsoft® Exchange to instantly email session notes to all attendees.

Combining SMART's visual collaboration solutions with industry leading software from



Autodesk, Tekla, Adobe and Solibri, project teams around the world have experienced an increase in productivity, decrease in development time and an accelerated rate of innovation and time to market.

Companies including Ibsecad, 4t , Turner Construction, DPR Construction and VolkerWessels are transforming the BIM industry by using SMART's visual collaboration solutions to deliver projects on time and on budget, without sacrificing project quality. Recent research by Stanford University in the US stated the estimated savings of combining SMART with design review can be up to  2 million.

At the BIM Show Live 2014, SMART Technologies received the prestigious BIMMY Award for Most Innovation Product in recognition of how the solutions are changing the way the BIM industry works. The BIMMY Awards honours those that have raised the bar in relation to the AEC and BIM industry.

To find out more on how SMART are revolutionising the world of AEC please contact us.

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# There is a better way to work

With SMART visual collaboration solutions, people collaborate in visual and interactive ways, whether they're in the same room or in workspaces around the world. Because our solutions are designed to streamline the exchange of information and boost productivity, they can benefit virtually any organisation. They have been implemented by businesses in various industries, from architecture to manufacturing to telecommunications. SMART have helped customers find innovative ways to make more informed decisions, reduce costs, engage clients and stakeholders and train personnel – all by making it easier to share information and communicate ideas.



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# BIM and the landscape architect

**Martyn Horne of the Landscape Institute's BIM Working Group highlights how landscape architects can collaborate and share information with their project teams in the evolving process of BIM...**

Any person or company setting out on the BIM journey may understandably think that BIM and its associated term, the Building Information Model, refers directly to buildings or more specifically, architecture. They may also be forgiven for thinking that it also refers to a particular file format or specific piece of software. However, BIM is not a file format, it is not a piece of software and it is not even an information technology. Rather it is a business process that is defined by a series of workflows (that may vary from project to project) and these workflows are enabled by information technology. Furthermore, the building referred to in its name is not a noun as in 'the building', but a verb, as in 'to build'. This is the first step to understanding how landscape architecture fits into the BIM.

## Collaboration and communication

A key aim of the BIM process is to facilitate collaboration, communication and the effective exchange of data between different members of the construction team.

A typical visual definition of BIM is heavily focused on the architecture and it's often shown without even a basic terrain. But a building cannot, and does not exist as a separate entity to its site. As seen in Fig. 1, even at a basic planning level stage, the 3D model and its linked 2D plans, elevations, sections and information schedules communicate so much more information because they involve the site.

At the Landscape Institute we recognise the need to collaborate in order to get schemes built. The Building Information Model itself, can be seen as a manifestation of that collaborative process of

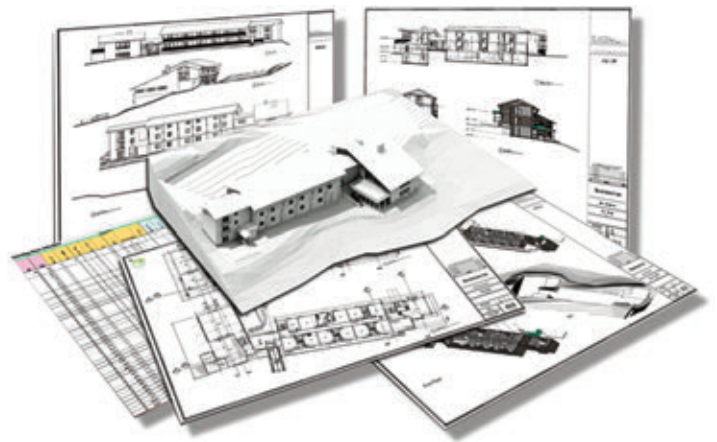


Fig. 1

communication and information exchange. It is most easily understood by the image below (Fig. 2), which shows a three dimensional digital model of the project to be constructed.



Fig. 2

From this model it is possible for the various parties involved in the project to extract both visual and data-based information back out of the model. For example, plans, elevation and sections can be taken or cut through the model and information can be

generated in the form of reports and schedules. Crucially, because the information can be taken from the live model, a great deal of the repetitive work encountered in traditional 2D CAD based drawing and schedule creation can be reduced and just as importantly, errors can be reduced or eliminated.

**What can landscape BIM offer specifically?**

In addition to the traditional documentation stage, the landscape BIM can offer terrain water flow analysis, minimum and maximum grading analysis, site cut and fill calculations, water volumes, existing tree survey and tree protection planning, planting schedules, material quantities, maintenance reports and clash avoidance with underground services.



Fig. 3

Both the Landscape Institute and the UK Government recognise that the software required to design and document architecture and engineering is not necessarily going to be the best software for landscape architects. It is one of the reasons that both institutions support the move to certified, but neutral file formats such as IFC and data exchange standards such as COBie and Product Data Templates.

**Helping the industry change**

One of the remits of the Landscape Institute’s BIM Working Group, which was set up approximately two years ago, is to develop change within the industry.

To highlight a couple of the group’s recent activities, we are currently running a series of BIM Masterclasses around the country to present the BIM workflow within the context of the UK Government’s Mandate for BIM Level 2, and the Digital Plan of Work within landscape architecture. The group is also involved in developing a series of Landscape Industries Product Data Templates which will feed directly into BIM Level 2 COBie datasets.

**Conclusion**

Change can be disruptive. Without a doubt, BIM will require an understanding of new processes and possibly the acquisition of new skills. But it is also important that as a design profession, we also maintain the values that make us unique. Too often, conversations about BIM exclude reference to quality of design, creativity and visual communication and it is really important that as we explore digital approaches and embrace the efficiencies of the new, that we also maintain the best of our traditional techniques and skills and expertise at the same time. It is an interesting time for landscape architecture as it is for the entire construction industry, but there has probably never been a time when the holistic perspective of the landscape architect has been more valuable. ■

For more information, please visit the BIM section of the LI website at: <http://www.landscapeinstitute.org/knowledge/BIMOpenProject.php>.



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**Martyn Horne**

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# BIM Objects

## The fundamental building blocks of Building Information Modelling (BIM)

The Government mandate to achieve BIM Level 2, on publicly procured projects, by April 2016 is edging ever closer.

Organisations involved in the design, construction and operation of a public building are being impacted by the information requirements inherent in meeting BIM Level 2. For designers, contractors, and the contracting supply chain, this means a more disciplined and comprehensive approach to the collection and recording of data about building assets. The Government goal is to provide asset data in a structured and recognisable format which can be transferred into a CAFM (Computer-Aided Facilities Management) system. COBie (Construction Operations Building information exchange) is the specified data format.

Whilst designers and contractors have been preparing for COBie for some time there is one community within construction which has only recently become aware of what Level 2 means for them – the manufacturers of building products. These manufacturers are the originators of the product data required in COBie and have the greatest incentive to ensure that this data – descriptive, performance, sustainability, etc., – is recorded accurately in BIM models. If it's accurate in the BIM model it will also be accurate in COBie.

The Level 2 data required for different types of building products is now being identified through the provision of Product Data Templates (PDT) – [www.bimtalk.co.uk/pdts](http://www.bimtalk.co.uk/pdts) – which manufacturers can fill out to provide data on their products (a Product Data Sheet – PDS). How this PDS data is incorporated into a BIM model can be achieved via a number of methods but most have the disadvantage of being manual, and therefore error prone, and time consuming. The most succinct method is to include this data with the geometric representation of the product – a BIM object. All manufacturers are able to produce a PDS but only a few have the skills to create geometric representations which will work well in the popular BIM modelling softwares. For this reason most

manufacturers look to an outside supplier to create their geometric objects, which also include the PDS data.

Having to use an outside supplier to create geometric objects clearly has cost implications for manufacturers. Today creating objects is largely a 'craft industry' with a limited number of experts able to develop objects. This craft industry isn't scalable so the large number of objects that will be required, both for 2016 and



*Kitchen layout in a BIM model including a cooker hob object created with BIMobject Mosquito.*

beyond, will be impossible to produce. And with this hand-crafted approach consistency is difficult to achieve and creation costs will remain at the higher end. In this situation with a requirement for many more objects, but only a limited pool of experts, how can the needs of the construction industry and product manufacturers be met?

BIMobject® has been reviewing this conundrum for some time and concluded that the development of BIM objects has to be 'industrialised'. This process has to include all the constituent parts of a BIM object - the geometric representation, the structured data (e.g., PDS) and any other unstructured information (e.g., PDF of installation instructions). This is a strategic focus for BIMobject in 2015. Put simply, there are two communities of manufacturers which need to be supported: those with no 3D representations of their products, and those with 3D representations produced

from mechanical design CAD software. To support the former, BIMobject Mosquito™ was introduced in late 2014. A new technology which enables manufacturers to self-build and maintain place-holder BIM objects containing 3D visualisations and data properties. During this year further releases of this software will extend the range of manufactured products to which this technology can be applied. An introduction to Mosquito can be view on the YouTube channel – key 'bimobject mosquito' into the search criteria. For those manufacturers which already have digital representations from their mechanical CAD system then it really is a case of 'watch this space' for upcoming announcements from BIMobject. The aim here is really simple: convert easily and accurately what already exists into formats which can be used by different BIM modelling softwares. To keep up to date check out <https://bimobject.com> regularly.

Through its cloud based portal BIMobject® provides the development, maintenance and syndication of BIM objects of manufactured building and

interior products. These objects are provided from the BIMobject portal, at no charge, to architects, designers, specifiers and contractors, and are available in native format for a number of the model authoring tools including ArchiCAD, Revit, SketchUp and also AutoCAD. Other formats are also available.

BIMobject was founded 3 years ago and since January 2014 has been a public

company list on NASDAQ OMX. A winner in 2013 of a Global Red Herring Award, which recognises world-wide the most promising start-up companies for their innovation and technology, BIMobject is now the largest provider in Europe of BIM objects with nearly 300 manufacturers as customers, over 65,000 registered users, and with over 1,000,000 downloads from its portal. BIMobject is headquartered in Sweden with subsidiaries in France, Hungary (for Eastern Europe), Germany, Italy, UK, and with business partners elsewhere in Europe.

Article written by:  
Alan Baikie, Managing Director, BIMobject UK

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Thousands of free BIM objects from almost 300 manufacturers across Europe. Over 60,000 architects and designers are using these intelligent and configurable objects, with automatic alerts when objects change.

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Make sure you're not missing out by going to [www.bimobject.com](http://www.bimobject.com) or, to find out more, enter **BIMObject** into search on YouTube.

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# The technology behind BIM

In matching the challenges and opportunities that BIM presents, Autodesk discuss the available software to satisfy the requirements for a successful project

The introduction of Building Information Modelling (BIM) has fundamentally changed the way in which the construction industry now approaches any project. But how does the available software match up to the various challenges and opportunities that BIM brings? Let's look at these through the various AEC stages of conceptual design, detailed design, and procurement process, on site and then finally at hand-over.

## Conceptual Design & Detailed Design

The conceptual design process is really the first stage of any BIM project. FormIT is a free tool available for iPad, Android as well as a web browser, which allows you to create conceptual massing studies. You geo-locate your site, and with simple finger gestures (push, pull, pinch) are able to develop design studies which can be shared with others or passed to Autodesk Revit for further exploration.

Autodesk Revit is the Swiss army knife when it comes to the development of a building information model. Whilst not BIM in its own right, Revit is considered to be central to the design authoring process allowing you to create information from concept through to detailed design. The Revit platform also integrates with cloud solutions such as Green Building Studio for sustainability studies and 3D Studio Design for photo realistic renderings and animations.

## Construction & Procurement

With the continued pressure on budgets, quality and timescales, savvy contractors are using BIM to improve their construction processes.

For example, historically, spatial coordination was performed with 2D plans, but this process only identified at most 60-70% of the conflicts, with the rest typically having to be sorted out on site. Changes made on site are expensive because original work must be discarded and the project becomes delayed while waiting for a new piece to be fabricated or installed. Navisworks allows you to view your model in 3D and spatial coordinate model data using powerful clash prevention tools, and works both with Revit and a multitude of BIM authoring platforms.

Navisworks can also be used for 4D phasing and sequencing, a powerful visualization and communication process that can give the project team a better understanding of project milestones. Finally, Navisworks allows for 5D cost estimation and quantity take-off. Once quantities are taken and verified, it's just a matter of applying historical costs and production rates from your subcontractors; dividing the project into logical locations; and applying unit costs for materials, equipment, and labour.

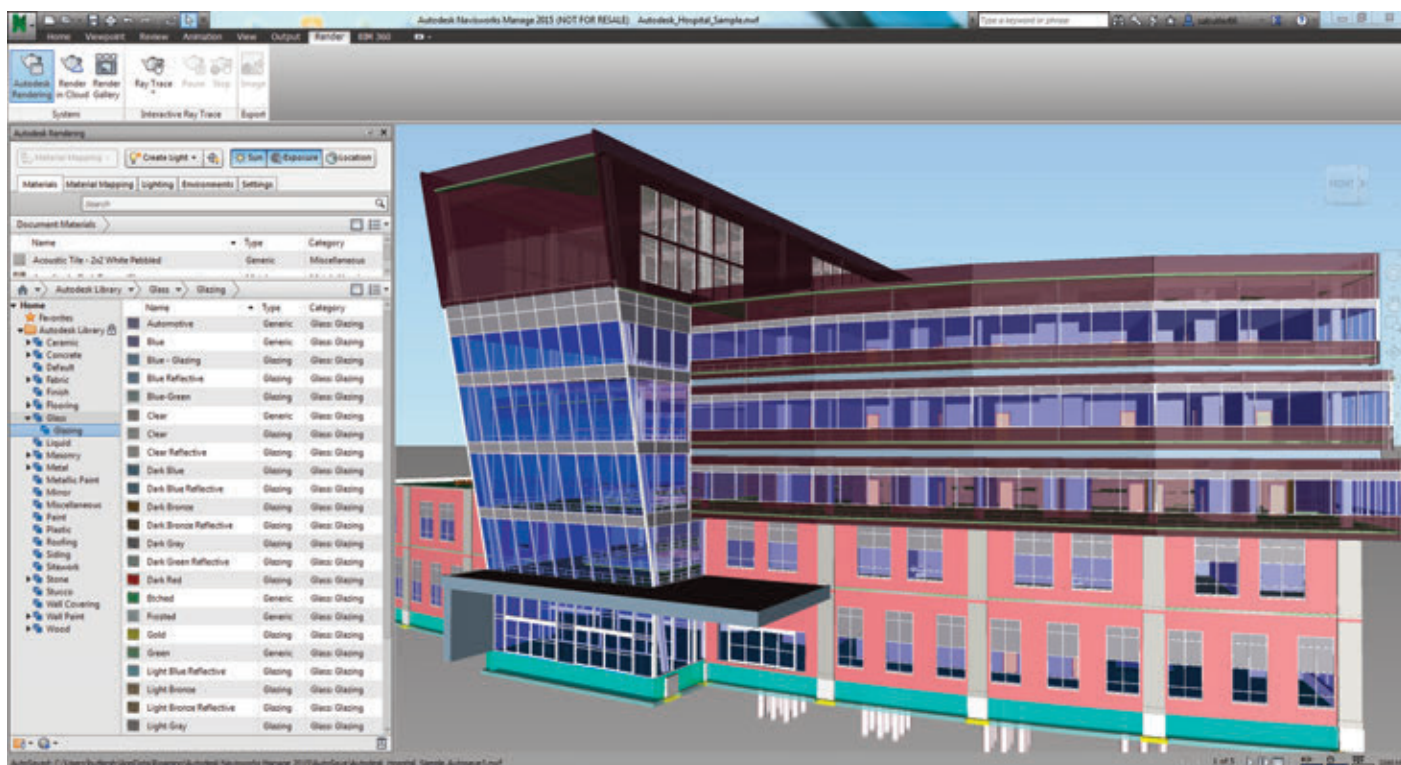
## Design to Fabrication

The design and construction process is

complex, it makes you wonder how anything gets built on time and on budget. The concept of fabricated design is something which is not new to the construction industry, but as resources become more scarce and time to market increasingly important, the move to BIM is starting to make Design-to-Fabrication commonplace. Autodesk offers a number of solutions that supports these workflows. Fabrication CADmep™ software for MEP fabrication supports detailing and installation workflows for mechanical, electrical, and plumbing (MEP) contractors. It provides tools that extend design intent to create more accurate, intelligent, constructible models of building services systems. Advance Steel, with its intelligent 3D modeling, speeds time to fabrication and construction with tools that automatically generate shop drawings and deliverables.

## Reality Capture

BIM is not limited to new buildings, so what do you do if you have an existing building which you need to retrofit? A 3D camera or better yet a laser scanner using LIDAR (Light Detection and Ranging) technology is a fast and accurate way to collect precise data about site conditions and/or a building. Using measurement technology similar to a total station, the collected points are recorded as X, Y, Z values. Millions or sometimes even billions of points are collected in minutes and this point cloud can then be developed into a 3D model representing the existing



conditions. Autodesk Recap can be used to clean up point cloud data or used to merge multiply scans so that the data scans can be used in other tools such as Revit, Navisworks and 3d Studio Max Design.

**Collaboration and the Cloud**

Mobile computing and the need to access information anywhere is driving a move to the cloud across the construction industry. Autodesk’s A360 and BIM 360 technologies work on a cloud-based framework that provides customers with a powerful set of tools and services that can dramatically improve the way teams work and share data. BIM 360 is specifically AEC focused and includes the BIM 360 Glue model collaboration and visualisation platform; BIM 360 Field provides a way for contractors to capture data from the field to push back into the building information model. This is driving incredible efficiencies amongst those that have implemented the technology, For example, site operatives are expected to complete status forms for health and safety as well as snagging and conditions surveys. The process is time consuming and manual in its nature. BIM 360 Field takes these paper-based

workflows and turns them into electronic forms which can be completed on site on a mobile device and synched back with the building model over the internet. Some of the biggest construction firms in the UK report massive improvements in productivity thanks to the use of digital processes and digital data capture on site.

**Handover and Asset Data**

Construction Operations Building Information Exchange (COBie) is an open data format centered on delivering building information and is a prerequisite of the UK Level 2 BIM mandate. COBie captures and records project data at the point of origin. This information is essential to support operations, maintenance and asset management once the built asset is operational. Autodesk has been at the vanguard of supporting this open standard, working closely with industry groups and bodies to ensure its design authoring software can deliver to these specific data requirements.

**Conclusion**

While we’ve looked at what an important role technology can play in the transition to

a BIM process, it’s important to point out that it is not only about the software. You will also need to define a clear change management programme. Your staff will be required to develop new technology and process skills and you will need to establish a measurable training programme as well as refined standards and processes to ensure you can deliver these data requirements. Once established, the benefits that BIM can bring will be realised, allowing you to offer better value to your clients, enhanced quality design, more sustainable buildings and an improved service offering.



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# The BIM journey – Begin with the end in mind

It has often been said that every journey starts with a single step. We at Quadra Solutions, believe that every journey starts with a question.

Where, when, who, why? Asking the right questions ensures the success of any journey and this is no different for BIM. What goals do we want to achieve from using BIM? Where do we want our organisation to be in the future? How do we achieve these goals, evaluate them and continue to exceed them?

The BIM Journey is not a short one; it's a long-term and continuous journey, which doesn't stop once you've achieved your initial goals. And because of this the destination is always changing. For many organisations the desired 'destination' is a reduction in waste, risk or errors and an increase in efficiency. But as a result of effective BIM usage, organisations can benefit from enhanced design quality, improved communications and quicker project delivery.

A BIM Execution Plan (BEP) is an important part of your BIM Journey and is something that is rarely done in isolation and needs to be communicated throughout the organisation. Quadra are currently helping numerous companies evaluate their plans, supporting them with their first steps.

Evaluating the potential success of BIM implementation is essential. According to the National Federation of Builders, 75% of BIM users say their organisation regularly and quantitatively assesses the impact of BIM and have done so from the very beginning. In order to manage the success of BIM,



organisations evaluate their ability to deliver projects on time, the reduction in remedial work or their success when tendering for contracts. In an online survey conducted by Autodesk, over half of respondents experienced productivity gains of over 50% using Revit and 17% experienced productivity gains of over 100%.

And as with any journey, BIM only succeeds if the correct preparations have been made; this includes embracing the BIM ethos, investing in the right support mechanisms and regularly maintaining and managing the process. Don't forget it's not only the financial contribution but also a cultural consideration that needs to be considered when implementing BIM.

At Quadra Solutions we work with a range of organisations at every stage of their BIM Maturity level; from organisations that are just starting to undertake BIM projects, to

those further into their journey. Our team of highly experienced and knowledgeable experts look at each case individually and undertake consultation to ensure our partners have all the answers required, to get the most from the transition to BIM. For more information about our partnership led approach to software, training, technical support and consultancy contact us using the details below.



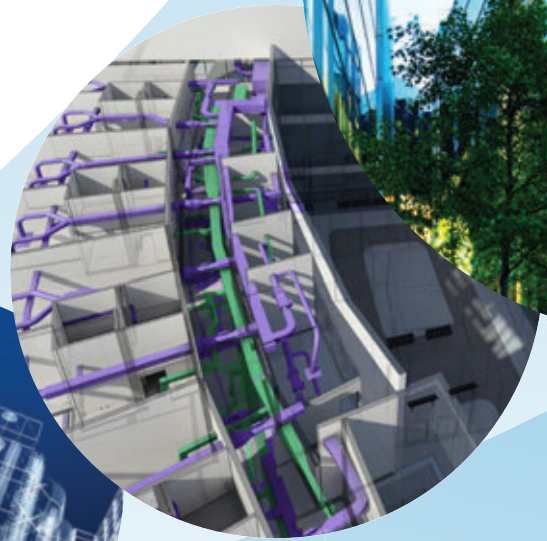
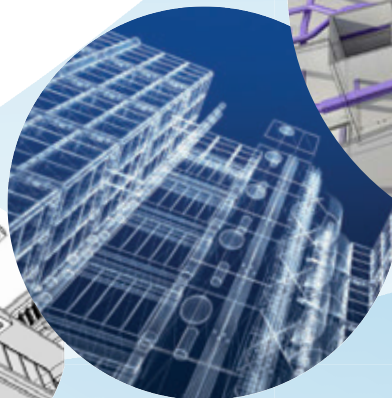
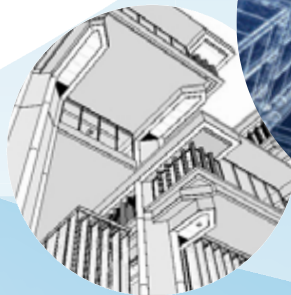
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# Where will your BIM Journey take you?

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# The Leica Geosystems BIM Field Trip

**B**uilding Information Modelling (BIM) is about transforming how buildings and infrastructure are designed, constructed and operated. It has the potential to add value across all phases of a project, from design through to construction.

BIM exploits the potential of digital modelling technologies to provide a new way of designing buildings and infrastructure and managing the design and construction processes. This approach brings together geometry (lines and surfaces) and rich non-geometrical information (intelligent descriptions of components, materials etc.) in an open data environment. BIM, during the design and construction phases of a project, has the potential to create an 'as-built' virtual model of the built environment, a digital asset that can be exploited throughout the operational life of the built environment.

BIM is a process that keeps projects on time and on budget reducing rework and increasing predictability and profitability. BIM has a solid return on investment with a 40% reduction in field changes, contract savings of over 10% and project time reduced by over 7%.

Whilst BIM adoption is growing positively, the actual level of BIM use is mostly limited to quantity take off, co-ordination of multi-discipline activities at the office, i.e. clash prevention. The use of 'BIM uses' is growing daily, including project management and construction sequencing. The full impact of BIM in the construction industry sector is yet to be realised. There is a clear trend appearing around the uses of 'BIM use' outside of the office.



Moving from 2D plan co-ordination to 3D model co-ordination is usually the first step, this allows contractors to spot and resolve potential problems. However to fully maximise what BIM can do, it is important to connect the digital world to the real world.

Leica Geosystems is a market leader in providing field solutions and is leading the way in helping to bridge this gap by taking BIM out of the office and into the field and vice versa. Leica Geosystems BIM Field Trip is a comprehensive solution with hardware, software, service and support components that increases the BIM benefits for owners, contractors, architects and the various trades involved in the BIM process.

With renovation and retrofit jobs on the rise, Leica Geosystems BIM Field Trip provides the cost-effective, complete and traceable georeferenced field data using a unique class

of "Survey-Grade" High-Definition Surveying Systems/3D laser scanners known as ScanStation to produce 3D point clouds that are consumed in a number of software environment through a unified workflow and data architecture. Where projects require the efficient capture and positioning of discrete points, Leica Geosystems family of measurements sensors – from high-end total stations to handheld distos come into play.

Within new construction the BIM Field Trip uses total station and multi-station technology to replicate BIM layout points in the field providing accurate real world implementation. You cannot achieve this kind of efficiency and accuracy with plumb bobs and tape measures, especially with today's complex designs and demanding construction schedules.

The Leica Geosystems BIM Field Trip technology offers a superior quality assurance

solution with innovative multi-station technology that continues construction layout and high definition as-built scanning in a single hardware solution. As-built quality assurance point cloud are compared to the model to assess systems like MEP providing insight critical to validate that buildings are being constructed as designed and evaluating potential issues at an early stage avoids rework in the field.

### **3D laser scanning/High-Definition Surveying (HDS) as the foundation of BIM**

As the equipment and service costs of laser scanning continue to decrease, the opportunity for leveraging 3D scanning in the construction sector is becoming even more tangible. Ultimately the technology of High-Definition Surveying (HDS) changes the way many construction professionals work.

3D laser scanners help to streamline workflows across a number of diverse industries. By allowing critical surfaces and environments to be measured with a level of confidence and speed not possible with traditional tools, 3D laser scanners provide users with a way to deliver robust models that can be revisited digitally at any point in time.

BIM is a 3D parametric model, which means that the objects in the model have intelligence embedded (meta data) and understand a variety of parameters and relationships that are defined by the project team based on the BIM use for the project (level of development). Metadata can be automatically stored in the point cloud file format, or can be linked to the point cloud or the 3D model objects after the measurement process. With this approach BIM can offer virtually unlimited possibilities for integrating business intelligence with the project or asset management.



Today HDS and BIM are technologies that have moved beyond concepts to being proven and demonstrated in projects executed worldwide and the growing capability of technology, allow "BIM stakeholders" to realise further gains through the deployment of such capabilities.

What is most exciting is that we are at the beginning of a fundamental change and digitization of a very old industry and such change promises to deliver greater gains to the full cycle of construction and operations activities to come.

Whether you are a beginner, intermediate or an expert working with the BIM process, the Leica Geosystems BIM Field Trip will help

you lower waste, work more efficiently, reduce costs, increase profit margins and maintain greater project safety.

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# BIM for clients – an EIR is key

**Karen Alford, BIM Project Executive at the Environment Agency discusses what is essential for a client who is implementing BIM in their organisation...**

The Environment Agency is mandated to deliver Building Information Modelling (BIM) and Government Soft Landings (GSL) by 2016 as part of its commitment to the Government Construction Strategy. I have been involved in this delivery since early 2012.

Most construction projects within the industry heralded as BIM exemplars so far have had the benefit of a healthy budget and have been self-contained. Both these factors have made it easier to implement changes to commercial working practices. My task has been to implement BIM and GSL across a business with framework contracts in place and a range of projects across England valued from £250k up to a £300m programme of works. From April 2015 the Environment Agency will routinely procure BIM and GSL on our projects, and this is very significant turning point for us.

## **What does BIM really mean and what is the role of the client?**

Across the industry there is still a common notion that BIM is just about using design software such as Revit. For a design team this may be partly true, but for the Environment Agency as a client, this is far from the case. In some extreme cases across the industry, there are reports that client misconceptions have resulted in the BIM requirement being expressed as a one liner simply saying, 'BIM is required'.

My experience is that most of our suppliers have BIM skills and some excellent examples to share. However, supplier BIM expertise is often within pockets in the organisation and in the main, has been driven to reduce risks within their organisation. Very few suppliers have been able to work with defined client requirements.

I recently re-read the government BIM Strategy and was struck by how relevant the recommendations made by the Government BIM working group for a client implementing BIM across an organisation have turned out to be, especially in my experience of doing this in the Environment Agency. I am going to cover a couple of these.

## **Be very specific with supply chain providers – they will only provide what is asked for.**

During the early stages of our BIM journey we spent some time investigating the activities and the interfaces between ourselves and our supply chain partners. We had candid discussions with some suppliers and it became clear how our approach unwittingly led to ambiguity about our requirements.

The introduction of an Employers Information Requirements (EIR) into the contract documents addresses this ambiguity and is essential for a client who is implementing BIM in their organisation. The EIR should focus on the corporate data and information requirements, and will be the mechanism for ensuring the information can be used efficiently and support decision making. An EIR provides clarity right from the start and gives the supplier the information they need to identify how they can adapt their business processes and project delivery model to produce reusable, and consistent outputs at an organisational level, rather than project by project. An EIR is also used by a lead supplier to commission work in its supply chain to get the requirements right at the point of creation, and avoid re-work at a later stage.

NBS, funded by InnovateUK are developing an enhanced EIR tool called a digital plan of works which will be available free of charge later this year. To keep implementation moving in the Environment





A concrete pour being performed in a river channel. Produced by BMM Joint Venture

Agency, we developed a prototype. It includes all the standard information outputs exchanged during a project and details specific standards, data requirements, and where responsibilities rest. The digital plan of works is also a tool for structuring discussions about the level of visualisation and federation of data needed in any model being produced. For us, environmental modelling is as important as design modelling, and BIM allows us to bring the two together. Like all organisations moving into a BIM world we still have some work to do, particularly around identifying precise data requirements. Our work so far has created a sound framework for further progress.

**“An EIR provides clarity right from the start and gives the supplier the information they need to identify how they can adapt their business processes and project delivery model to produce reusable, and consistent outputs at an organisational level, rather than project by project.”**

**Create the appropriate support infrastructure**

In addition to having BIM in our commercial tools, we as the client or employer, have in place a Common Data Environment (CDE). The PAS 1192 family of standards sets out the requirements for a CDE. Most project organisations will have some form of project collaboration tool, however many will need modification to meet PAS 1192 as it requires some method for validating data at each point of exchange. Software providers in the project collaboration tool market are

taking steps to modify their products.

Consideration also needs to be given to the tools asset managers may need now and in the future. There are viewing tools which will satisfy the needs of most clients, but if you plan on using integrated models for managing your assets in the future, some investment in software and training will be required. Managing data within models is a specialist

skill so select your staff carefully.

Fully incorporating a BIM approach challenges traditional ways of working and processes both within the client organisation and within the suppliers.

Government led BIM is about modernising the construction industry to be data driven and to utilise technology to deliver challenging cost and time efficiencies, whilst creating better assets which can be operated and maintained affordably without creating additional business risks.

Having leadership from the top supported by a team on the ground to develop tools and help project teams get to grips with the changes is essential for both client and supplier organisations.

If it was a simple as putting some BIM clauses into a contract, it wouldn't have taken us in the Environment Agency so long to get to this point. For any client embarking on introducing BIM across their business I advise taking small manageable steps bringing your teams and suppliers along with you and see it as a longer term programme of improvement not a quick fix. ■

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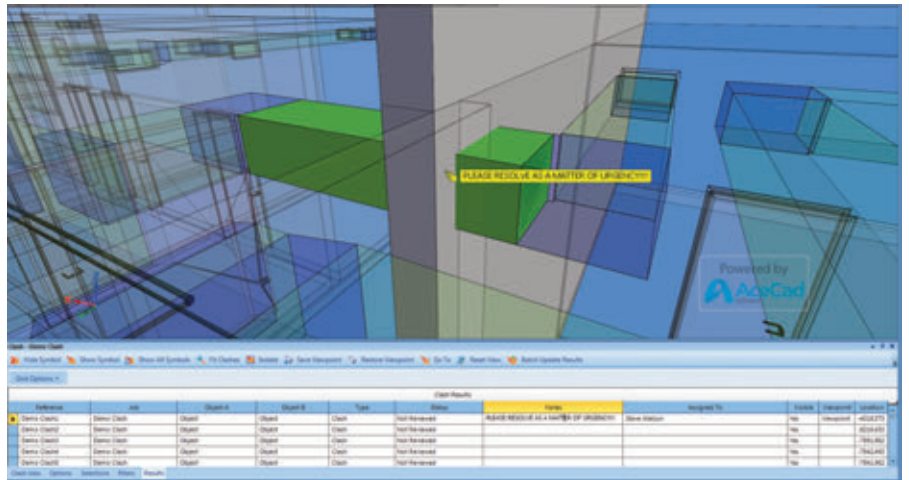
# Putting BIM to work

Building Information Modelling (BIM) has fast become an essential in today's construction industry. The challenge faced by management teams now is to integrate the vast amount of data available in the most useful, accessible way, so that it can support effective decision making.

Back in the 1980s, AceCad Software employed expertise gained in the oil and gas sectors to develop 3D modelling systems for steel fabrication.

The company has now put its sector expertise to use in BIMReview, a software tool that provides an integrated project hub bringing together data from multiple sources across a complete project lifecycle.

"BIMReview enables you to view all your 3D models simultaneously," explains AceCad's Technical Director Simon Inman. "By importing IFC, STEP, IGES, and CIS/2 models, along with API links, it brings together intelligence from all the major BIM authoring products."



BIMReview evolution delivers a range of practical benefits:

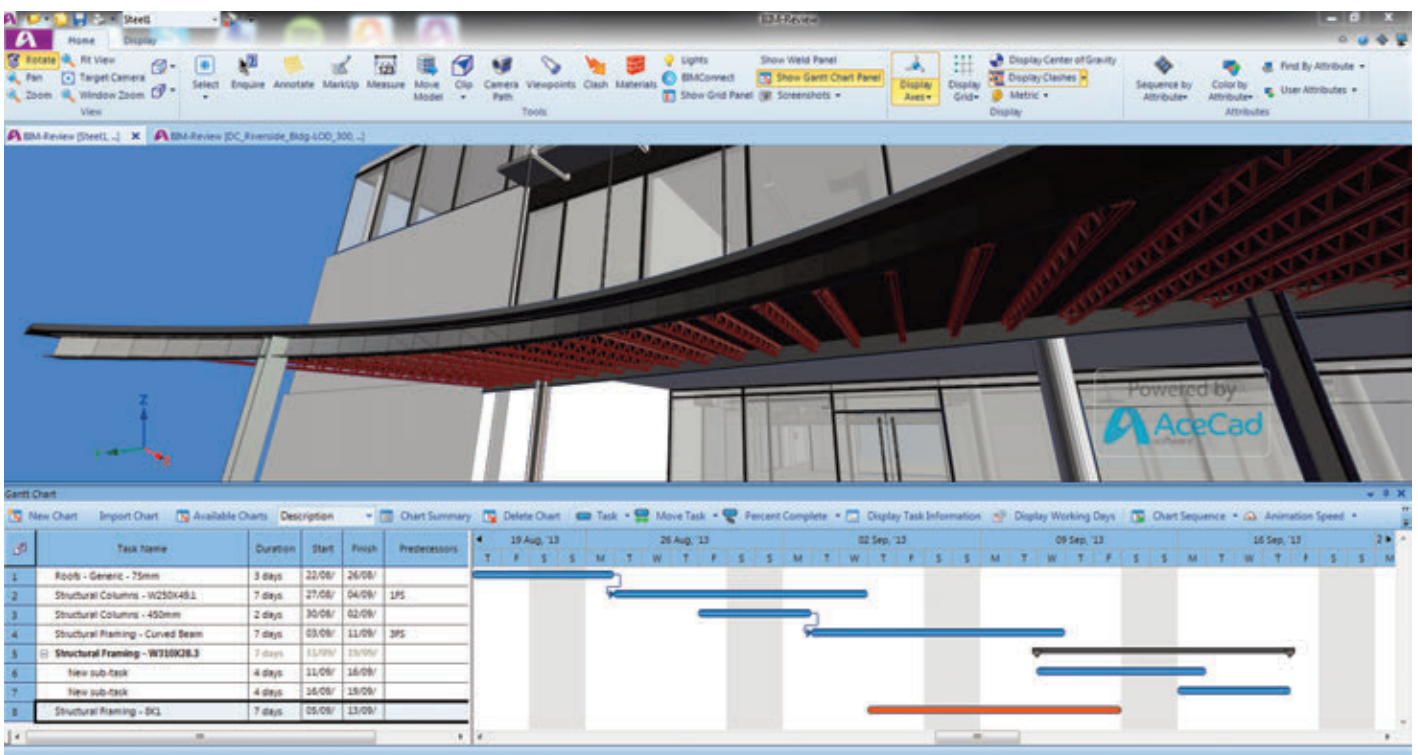
- Improved workflow through real-time access to BIM model content across multiple teams.
- Enhanced decision support through improved collaboration.
- Immediate identification of clashes and conflicts.
- Improve planning with 4D timelines for engineering, procurement, suppliers and construction teams.

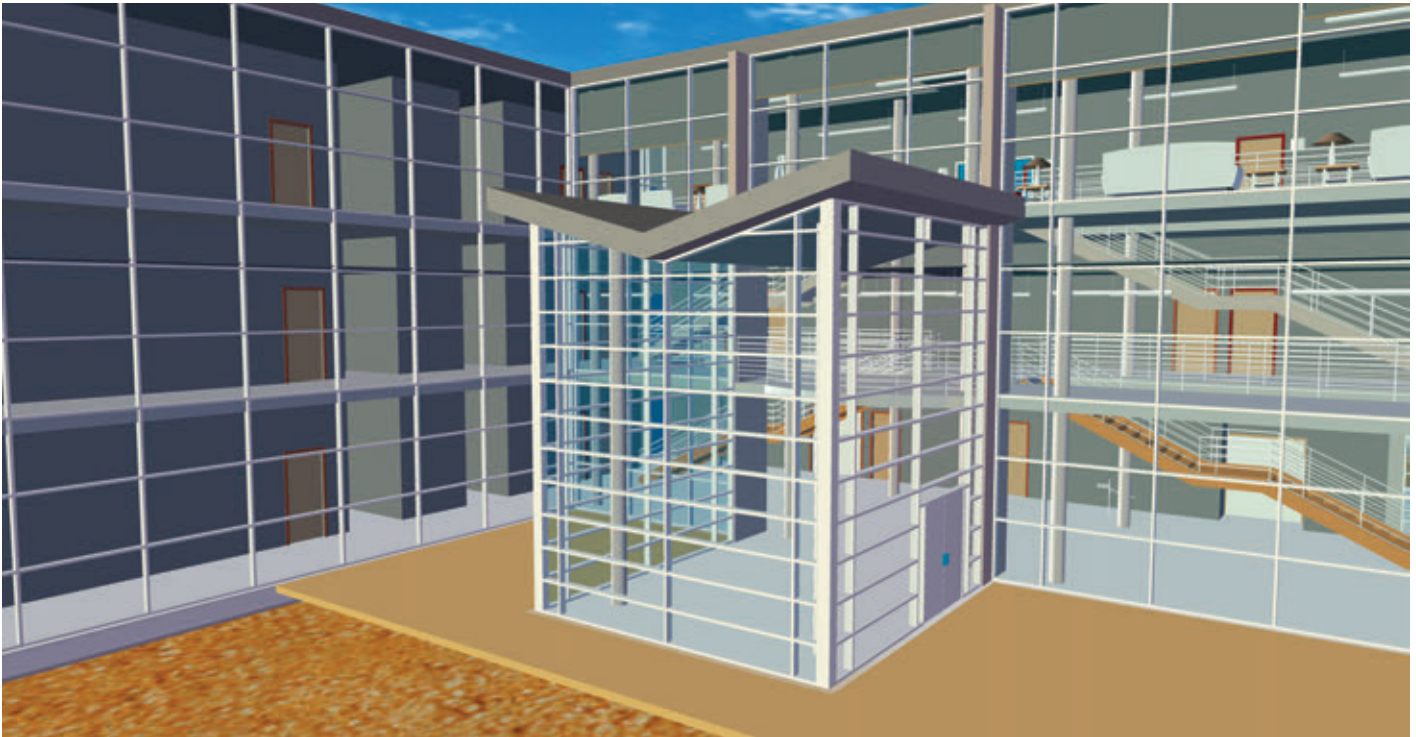
Because BIMReview enables more efficient working, it has the capability to shrink schedules and reduce the risk of overruns.

"BIMReview is proving to be an invaluable tool because it brings together everything you need to deliver a successful construction project in one easy-to-use desktop application," says Simon Inman.

## Low cost, immediate returns

One of the most appealing things about BIM-





Review is its low cost of ownership. It enables savings in materials, time and money because all of the information about a construction project is in one place. Because the application can be downloaded and installed within a couple of hours, the return on investment is effectively immediate. The intuitive interface means that users don't need onsite training, however, extensive support is available as well as online tutorial videos.

Cost savings from day one:

- Eliminate duplication and over-ordering.
- Better decision making through enhanced information.
- Immediate availability of essential data.

**Enhanced workflows**

BIMReview is designed to facilitate collaboration across the project. Architects, owners, consultants, contractors, fabricators and engineers can work on a single process through the same model with a level of accuracy not previously possible. When changes are needed, everyone involved has access to all the models and has the information necessary to make the most valuable input.

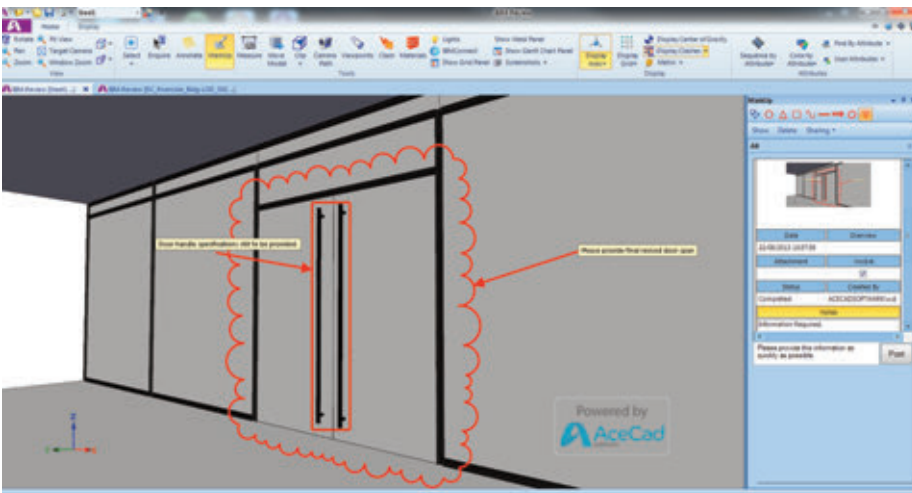
**Improved project efficiency**

By providing real-time access to BIM model content and status throughout the supply chain and across dispersed teams, BIMReview

enables more efficient working. Those involved in the project no longer have to locate and cross-reference multiple design models in order to properly understand and understand and resolve issues.

**Try BIMReview for free**

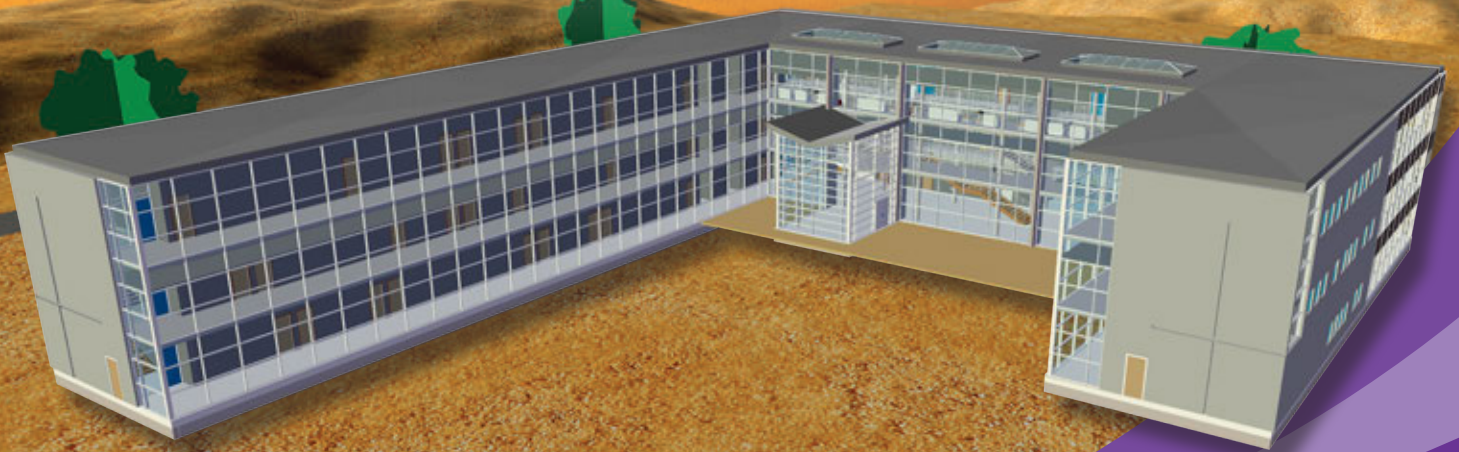
It's easy to use. You can download a free trial of BIMReview or request a free demonstration from AceCad's dedicated website: <http://www.bim-review.com>



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# Visualise your project from concept to completion

BIMReview, the affordable BIM collaborative and visual tool from design to the construction site.



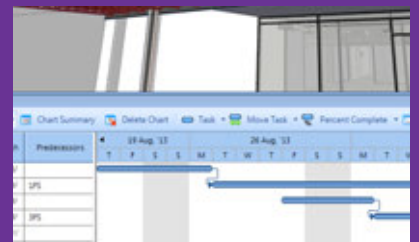
## 3D Clash Detection



## 3D Visual Mark-Ups



## 4D Planning



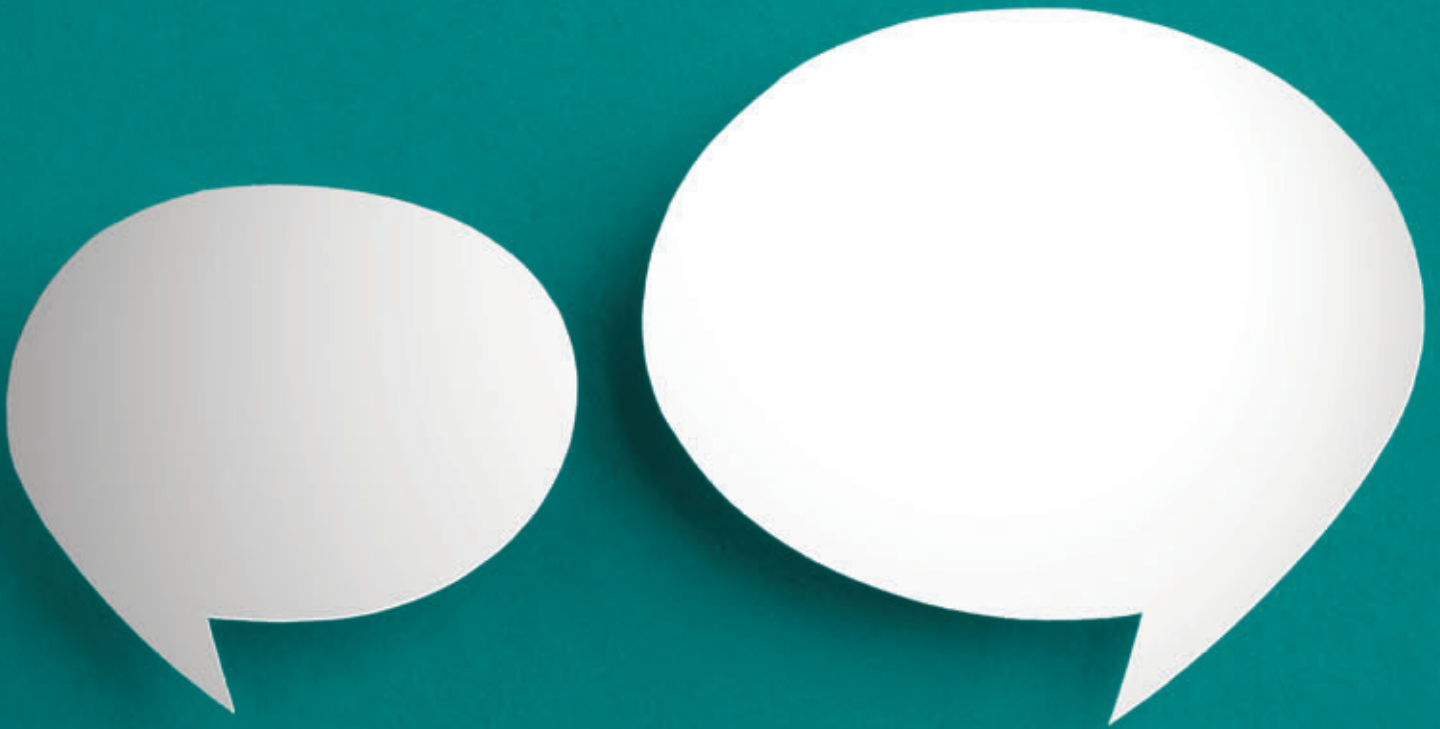
To start saving time, money and resources today:

Call us on 01332 545800  
or visit: [www.bim-review.com](http://www.bim-review.com)



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# BIM – where will the product information come from?

The potential impact of BIM on all stages of construction is undeniable. Expectations on the part of clients and other stakeholders are great and growing all the time as experience accumulates and as case studies based on successful projects emerge.

Part of the reason for this is that BIM can best be seen as belonging to a suite of related technologies and new ways of working – such as off-site manufacturing, smart buildings, data management, higher performing buildings – which collectively have been called digital engineering. The impact on how the built environment is designed, constructed, maintained, operated and dismantled or rebuilt will be profound.

Such statements are becoming commonplace and almost taken for granted. Indeed, to illustrate this, the Construction 2025 strategy launched last year is to a large extent formed around the idea that properly implemented, digital engineering will be capable of supporting the industry's need and desire for transformation, to perform at an altogether higher level (33% lower cost, 50% faster delivery, 50% lower impact).

It is becoming clear that as an industry either we already have the necessary tools, or that tools will be developed in the foreseeable future. BIM itself will continue to evolve and we can expect the flow of innovation to continue, but it is also clear that we face a step

Products manufacturers, like Saint-Gobain, carry out extensive testing on their products, both in laboratory conditions and on-site. With access to all this test data, who is best placed to provide high quality BIM datasets?

change, or a discontinuity, initially as more of the industry gets on the first rungs of the ladder of this new way of working. It is easy to see BIM level 2, namely forming and using the digital libraries of core information, as representing these first steps. Having addressed level 2 we will need to embrace BIM level 3 and all that that might bring with it, which many observers are expecting to enable the real transformation of the industry which is ultimately sought.

However good and efficient the software tools are, it is easy to overlook the other elements which need to be in place to make the whole design and build process work to actually deliver the quality and benefits expected by stakeholders, supply chain and clients. Some of these elements, such as collaborative working and sharing of information, are touched on in the other articles in this supplement. One specific area, of interest to manufacturers and suppliers like Saint-Gobain, is to do with the data, especially that to do with products, materials and assemblies, which form one aspect of the information input into the building or construction model. A moment's reflection enables one to realise that the library of product information being used by the BIM design tool needs to be appropriate, accurate and up to date, or errors will be hidden only to emerge at a later date in say the build or assembly process, or during operation, which will potentially be very costly to resolve.

As the use of BIM progresses from level 2 to level 3 it is clear that the depth and range of product information required by the designer will continually grow – from dimensional data, to include performance (thermal, structural properties, acoustics, embodied carbon, recyclability etc). Since BIM is not just about working in a different way but it also includes the idea that ultimately the client expects it to contribute to higher performance at a lower cost, then competitive commercial pressures will be brought to bear and will help to shape how

BIM is used. To win work the designer will need to have confidence that the optimum design is being offered, in all senses, and that this design can be delivered in reality. This means that the task is not just about the elimination of errors and uncertainty in the raw data, but that the right products are being used and those products have the precise properties (and associated data) sought and assumed by the designer in assembling the solution to be offered to the client. As additional dimensions of data start to be integrated into the BIM model this challenge will only grow.

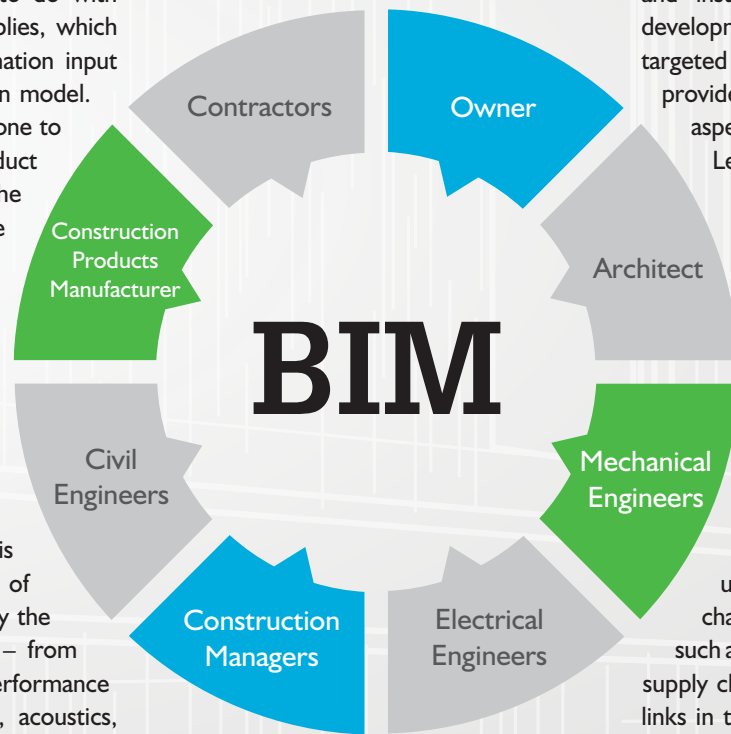
One solution offered is to use a library of generic product data – using average or typical data taken from across the market of a number of different versions of similar products (insulation, glass, wall linings, structural components, cladding etc). At first sight this solution may appear to offer a way through: a third party takes on the task of collating, interpreting and analysing the

data to form a set of typical numbers which the BIM model can then simply connect with and extract. But what are the disadvantages and is there a better way?

In any industry, manufacturers will vie with each other to develop and bring to market more competitive products and solutions. Construction is no exception. In the information-rich age of BIM, an integral part of this improvement process is the dataset associated with each product which will enable competent modelling and design optimisation. The use of generic or average data, of ill-defined ownership, would increase the risk of inaccurate data as well as resulting, in all probability, a sub-optimal design with the consequent risk of it also being less competitive commercially than one resulting from the use of better quality data relating to the actual physical solution being proposed.

Where does this higher quality, more useful, data come from? Manufacturers are in the best position to be able to offer this: they own the raw data for their particular product portfolio; they understand how to use their products in terms of design and installation; they invest in product development to bring to market solutions targeted to address specific needs; they provide technical support services on all aspects of their product or solution. Leading manufacturers, such as Saint-Gobain, are developing the delivery of this information in an on-line format for BIM so that the data is 'live'.

In the digital engineering age – where a building is built twice, once virtually in the BIM model and once on the construction site – product characteristics need to be captured in the form of electronic datasets which can be utilised and relied on by the supply chain. If a product feature is not in such a format its value is reduced. For the supply chain as a whole, and for individual links in the chain, to operate at maximum effectiveness and competitiveness the best quality data, namely the latest live data from the manufacturer, should be used. As digital engineering evolves, and demand for richer information grows, it will become even more critical to use manufacturers' live data.



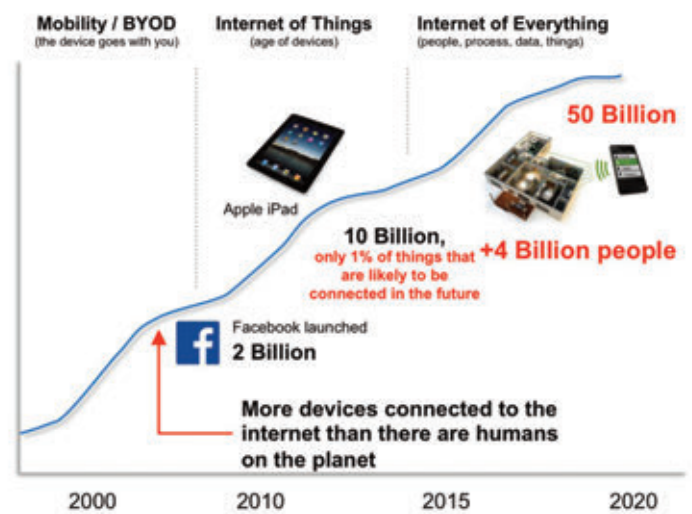
# BIM and the data challenge

**In developing data solutions for BIM Maturity Level 2, we also need to have in mind the future needs of Level 3 and beyond. Steve Thompson, Chair of BIM4M2 and Market Manager for Construction & Infrastructure at Tata Steel evaluates the product information required and how it can be delivered...**

One of the most interesting aspects of digitisation of the construction industry for me is the potential to see a more complete picture of the reasons for a project and how an asset can be delivered, operated and maintained to maximum benefit. With my architect's hat on I see the BIM process as potentially providing a more complete and detailed brief to work with, with access to the information I need to make real-time decisions. With my product manufacturer's hat on I see it as a way of helping project teams ensure they have the right product to meet their specific needs, as defined by the whole project team throughout the asset's life-cycle. This may sound idealistic, but on both counts these scenarios have already been achieved many times over, they're just not yet the norm.

To illustrate the bigger picture and the direction of travel, it's worth looking at the number of things connected to the Internet, and how this is predicted to increase exponentially over the coming years. There are already significantly more things connected to the Internet than there are humans on the planet, and the impact of this is that things and humans can more easily communicate and interact.

In addition to the predicted significant increase in connectivity, the United Nations are predicting a global urban population growth of over 2.5 billion between 2014 and 2050 (United Nations Population Division, 2014). In short, that means that if we house the increase in population at an average of 100 people per building, we will need to build just under 2,000 residential buildings every single day for the next 35 years.



Devices connected to the Internet over time. Source: CISCO IBSG, 2013

The reason for this slight detour is to highlight the point that when BIM maturity Level 2 becomes the norm, we are still only at basecamp in terms of the potential that can be achieved. It also means that in developing data solutions for Level 2, we need to have in mind the future climb to make sure we don't keep heading back to basecamp and starting again. From a delivery perspective, it means that with the scale of the physical construction challenge ahead, we need those tasked with delivery to be involved in defining the information that they will need to succeed, working with those who have the product data (manufacturers) to identify the data available and its potential benefits.

To get to the Level 2 basecamp we need structured, accurate, reliable and accessible product data that

*Continued on page 66...*



# BIM: Injecting innovation into the construction sector

The way we build is changing. There is a new breed of building design consultants emerging. Armed with a digital tool box, BIM enabled and “hyper collaboration” ready, augmenting our reality with layers of virtual information, firing lasers to scan structures, printing door furniture in 3D and surveying buildings with remotely operated flying quadcopter drones! This new breed of consultants are ready to inject innovation into our construction sector, ready to help us all save time, improve performance and make more money.

One such forward thinking organisation is called modularize. This fresh thinking team of engineers, scientists and architects is certainly well placed to not only surf a new wave of technology but to take you by the hand and let you enjoy the ride without incurring the costs or climbing the learning curve involved in aligning your organisation with the zeitgeist of construction.

Modularize is a very digitally focused company and BIM is one of its core competencies. The future of the construction sector is increasingly likely to become fully dependant on digital building models for design, procurement and maintenance and if you’re not already taking steps to get up to speed with BIM then its companies like modularize who can help you out.

In terms of distributing BIM capability throughout the supply chain we are starting to see a clear split in the industry with the emergence of “educators” and “enablers”. Modularize is camped in the BIM enabler category. This means that as one of their services modularize can offer clients a short-cut to BIM compliance. This is basically an outsourcing model. The two main examples of how outsourcing BIM works well for companies are:

1) Manufacturers of products such as door sets, window frames, air handling equipment, pumps, brackets (or any other item supplied or specified in a construction project) can employ modularize to generate a BIM library of their existing product range. This means that the manufacturer can very quickly provide a BIM catalogue on their website or uploaded to BIM libraries, helping them to get specified easier, more often and, therefore, opening the doors to more business. The online catalogue would even be intelligent and parametric, allowing different product variations to be generated quickly for your customers.

This undertaking would be achieved at a fraction of the cost it would take you to implement a BIM system or solution at your design office.

2) Compliance on larger projects can be achieved by outsourcing the full design element to modularize. By liaising with your team of engineers and designers, modularize can complement your existing capability with their BIM ready system. This allows you to compete immediately on tenders that require BIM compliance and also helps to streamline your design work-flow by developing parametric components and design automation into your processes.

Both of these options offer quick, cheap and effective ways to bring your company into the age of BIM. The benefits of outsourcing are huge since the risk of implementing BIM is lowered, providing a stepping stone if necessary to your longer term business strategy.

Working with clients from all corners of the globe, the team at modularize has developed

flexible, collaborative systems for design and project management which allow them to integrate seamlessly into any project, any size, anywhere in the world. Typically their clients are either:

- Property developers, builders or main contractors – if you need help in identifying the most efficient offsite construction systems for a project then you can engage modularize to consult.
- Manufacturers with an interest in the construction sector – you can work with modularize to uncover ways of streamlining your design processes, getting BIM “enabled”, or improving your manufacturing systems.
- Architects – you can also work with modularize to create fully immersive and interactive building simulations in a Virtual Reality system.

For such a wide range of services and a dynamic and forward thinking organisation, modularize has a lot to offer. Give them a call to discuss how they can help you on the track to more cost effective BIM compliance.



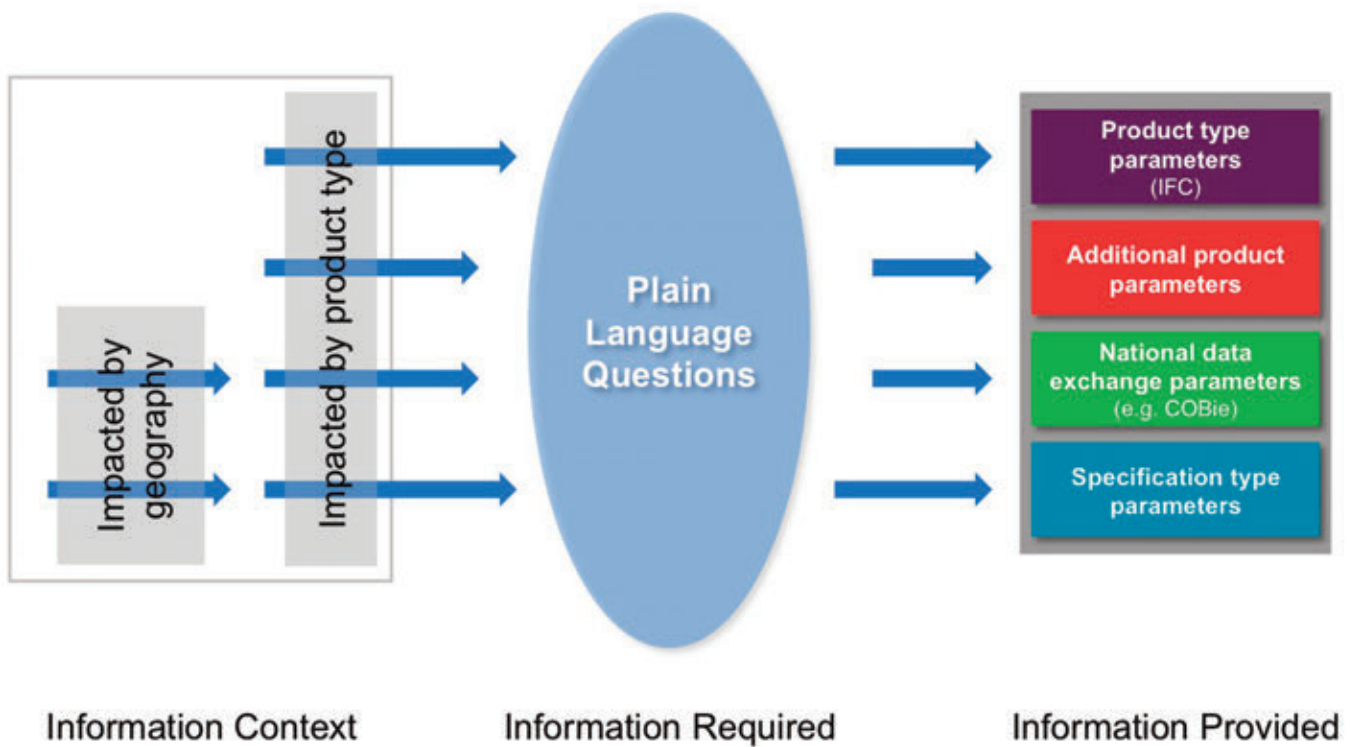
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*Continued from page 64...*

not only clearly describes what a product is and how it performs, where it comes from and how it needs to be maintained, but also helps in the specification, supply and construction stages of its lifecycle. The challenge for the manufacturer amongst others, is to provide the right information in a suitable format to support a vast range of players, across different sectors and in different territories, using different approaches. If that is going to be achieved, there are a few key issues to address:

- Clearly defining what a product is, so that everyone and everything knows what they are looking at;
- Understanding the information requirements of different players (e.g. architects, engineers, supply chain partners, contractors, clients) and providing answers to those requirements;
- Understanding the most suitable format for exchange and use of information;

- Understanding how information requirements change in different countries or applications;
- Delivering the information required to address all of these issues, and understanding the potential resources and investment required.

It is certainly crucial that product information can be exchanged across software platforms and regions, so there needs to be clear mapping to open standards, including IFC (the Industry Foundation Classes). In addition, there needs to be clear mapping to any nationally mandated or required exchange formats such as COBie in the UK. The terminology used in these systems is still inaccessible to a large proportion of those who need to use them, including the majority of product manufacturers. Describing the thickness of a profiled composite cladding panel highlights the need for clear descriptions and definitions of parameters. Whilst generally described to the same ISO standard, a quoted panel thickness can mean

the core thickness (without the depth of the profile), or overall thickness (including the profile depth). This means that if a parameter is simply described as thickness, there may be two very different values used in comparisons, potentially leading to incorrect specifications.

This is where the concept of Plain Language Questions (PLQs) comes in. If a manufacturer understands the questions they are being asked and in a language that they are familiar with, they are much more likely to be able to provide the right information to answer the question.

This is the concept behind PDTs and PDSs (Product Data Templates, which become Product Data Sheets when completed with a manufacturer’s product information). Originally developed by CIBSE, the PDT Steering Group now consists of representatives from other professional institutes, content providers, BIM4M2, BIM4 Fit Out, BIM4Water and BIM4DC (Data Centres). The focus is on having a cross-project team that has experience of a product or system type to develop templates based on what is required to effectively deliver that product, in commonly used language that is accessible to all. The BIM4M2 Data Working Group is working with others to significantly broaden out the reach of the templates to other product types.

In developing PDTs, the starting point is always COBie or SPie (Specifiers Product Information Exchange) templates where they already exist to ensure the minimum information requirements are met, and direct links to open standards. However, to maintain accessibility the complexity of mapping from the Plain Language Questions to these standards can, and is dealt with away, from the simplicity of the main data sheets.

The sheets are developed in a controlled environment between members of the design, manufacturing, contracting and FM communities, and then opened out to industry for wider consultation, meaning that the templates are created for industry, by industry.

There can be location-specific or sector-specific PLQs, all which are completed in Excel, and can then be used across all software platforms.

One of the key benefits of this approach is that the information only needs to be supplied by the manufacturer once for every product, and it can then be used in many applications, with project teams defining what information they require at each project stage.

The format can also be used as part of the selection process to filter products that meet the specified requirements. This may be achieved in the UK through the likes of the forthcoming Digital Plan of Works (DPoW), which whilst not mandated is likely to be used on public projects and will be a useful tool. However, as manufacturers who supply products into different territories, we need to provide data in a way that can be used in several formats and platforms, thus supporting both the Government’s 2025 Strategy to increase exports of construction products and those private sector clients in the UK that are already using alternative approaches to developing MIDPs (Master Information Delivery Plans), and different formats of information. By providing information in a format that can be easily mapped to suit these differing requirements we are likely to arrive at a more efficient solution all round. ■

For more information on Product Data Templates, visit [www.bimtalk.co.uk](http://www.bimtalk.co.uk) or the BIM4M2 website.

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**Steve Thompson RIBA  
 Chair**

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# What has BIM got to do with us?

**B**IM is fast becoming an industry standard and accepted norm for new building projects. Here, David Wigglesworth, Managing Director of newly formed UK Specification from ASSA ABLOY, demonstrates why it is so important for even manufacturers to take note.

Discussing his own journey to BIM, David highlights some of the key issues he has personally faced in ASSA ABLOY's journey, as well as some of the decisions the global leader in door opening solutions has taken that will be proven when put into practice in the evolution of UK Specification.

BIM is by no means new news. It's fair to say, if you're only just discussing BIM then you're already behind the curve, especially as the journey to creating BIM objects and a suitable offering for your customers and the market is a long one, not to mention a steep learning commitment.

## **BIM Journey**

BIM is something I understood as early as 2011 in my prior role as Managing Director of ASSA ABLOY Security Solutions and is now integral to our success at UK Specification.

ASSA ABLOY Security Solutions made excellent progress to stay ahead not just in adopting and delivering on the principles of BIM, but also in understanding, developing and driving BIM strategy.

We were able to leverage and drive this strategy alongside showcasing our knowledge and understanding of environmental performance declarations and whole life

costings to leverage market influences at leading industry events such as ecobuild, held in London.

Although we've learnt a lot along the way there are still many unanswered questions and unknown elements for producers of smaller components.

For the most part this is going to be a case working alongside end users and adapting to the changes as BIM practices become more sophisticated and common practice across a variety of builds.

And there is no doubt BIM has taken us to many places. But with the mandate by the government that all government-funded projects should use BIM by 2016, now just a year away, overall it has certainly taken it from a theoretical concept developed in the 1970s to an everyday practice that will impact on almost all levels of our industry.

## **So, Do You Care about BIM?**

The real question for us was did specifiers, architects, design led main contractors or property development companies care about BIM and architectural ironmongery and doorset specifications?

Admittedly, our first instinct was probably not, but when you consider the amount of doorsets that can be used in a building and the impact of, for example, the door width on a building's overall dimensions, flow of people through a building and ultimate safe and security of those people, we soon began to see that if positioned correctly BIM did have a role.

If approached correctly in a way to help not hinder specifiers with too much detail, then BIM objects for architectural ironmongery and doorset specifications would indeed be beneficial.

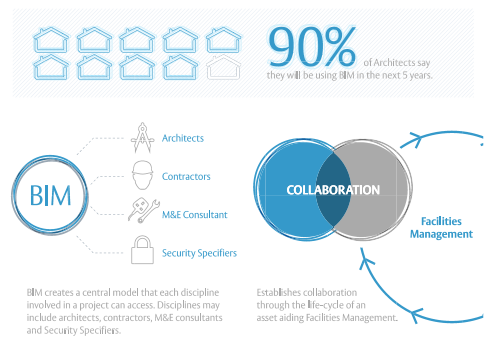
Thus, early on we created a BIM task group and obtaining feedback from our customers and their clients the early decision was made that this was a specification solution driven project rather than a product led one.

**"BIM is by no means new news. It's fair to say, if you're only just discussing BIM then you're already behind the curve, especially as the journey to creating BIM objects and a suitable offering for your customers and the market is a long one, not to mention a steep learning commitment."**

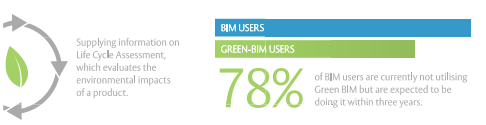
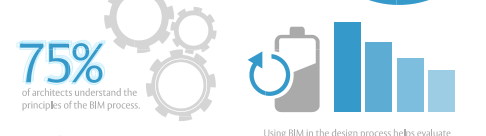
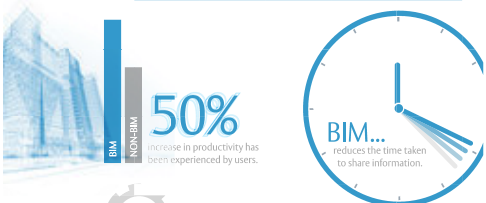
We then decided to pursue the development of doorset objects before latterly extending this to design led architectural ironmongery and doorset specifications sets.

By providing doorsets as BIM objects we believe we are providing a more solution-based proposition that is useful on all building scales.

The initial nine BIM objects were developed and designed to offer a total package of both architectural ironmongery and doorset specifications and doors and each object is tailored for the most common applications and uses.



4 5 6 7 clearly defined development stages to ensure clear understanding of progress; RIBA Plan of Works has been updated to reflect this.



**ASSA ABLOY**  
**Security Solutions BIM products will launch**

- 9 ASSA ABLOY Doorset BIM Objects available now
- 20 generic Hardware set BIM Objects available soon.
- The objects will be parametric, increasing the ease of flexibility for specifiers, who can more easily define the design intent of the object and make amendments to the model.

To find out more about ASSA ABLOY Security Solutions' BIM journey including our full range of BIM products visit: [www.assaabloy.co.uk/BIM](http://www.assaabloy.co.uk/BIM)

**Demistifying BIM**

More than this, the purpose of BIM is to create efficiencies in the development and construction of buildings, save time during the planning and build stage and reduce the cost of rectifying mistakes or unnecessary maintenance work. From the initial research we conducted we believe that supplying doorsets as BIM objects is inline with these objectives.

It creates an 'off the shelf' solution that has the correct architectural ironmongery and doorset specifications included, tailored to suit nine different applications, whilst supplying the information needed to be useful in an overall BIM development.

The next stage of the journey of these doorset objects was to find out how useful they are by establishing how are they used and the specific requirements of specifiers? We then rolled out 20 generic doorset objects, which we expect to have a much more select audience and again this will be another stage of the journey from which we can build and learn from.

This objective is something we are very proud to have not only achieved, but exceeded, with over twenty nine BIM doorset objects now available, designed to help architects and contractors who are under increasing pressure to use BIM building practices in all aspects of a building design.

**Our BIM Future: My Summary**

The RICS describes BIM as "the biggest cultural change in a generation". Culture is a set of shared beliefs, values and practices. In the case of BIM, it represents not just a process or technological trend but a cultural change is caused by external forces i.e. governments and other groups.

As ASSA ABLOY takes the next step in its own evolutionary journey in the launch of the unprecedented UK Specification business division, BIM is undoubtedly integrally important to our success.

By overseeing the background to the launch, our proposition to the market is now very clear and our objective is to depict the specification market and define what it is all about.

Our mission is to act as design consultants in the context of arranging ironmongery schedules to work with the design and performance of a building in terms of security, operation and the intended footflow of traffic. And we know anything specified must be fit for purpose and meet the standards that are legally required.

Deep within this proposition, we know that everything starts from a design led approach. The added value we are looking to capture is whole life costings – in terms of durability and lifecycle of the product for the building and our driven involvement with BIM initiatives will be key to our success.

We also know we still have many more lessons to learn but are determined to stay ahead of the BIM knowledge curve to deliver exact requirements for architectural ironmongery and doorset specifications.

For more information on UK Specification, please visit: [www.assaabloy.co.uk](http://www.assaabloy.co.uk)

or join the debate on LinkedIn at: [www.linkedin.com/company/assa-abloy-uk](http://www.linkedin.com/company/assa-abloy-uk)

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# Adoption of BIM by product manufacturers

**Chris Witte, BIM4M2 Steering Group examines the recent BIM survey by Chris Ashworth, BIM4M2 Promotions Working Group Chair and Director of Competitive Advantage...**

There are a lot of BIM surveys out there. They are all interesting to product manufacturers, but they don't really address our concerns or reflect our progress on our BIM journey. BIM4M2 conducted a survey of just under 200 product manufacturers firstly to understand how we as a newly formed group could add value to those embarking on that journey. An important part of our remit is to educate manufacturers and the insights from this research are helping us shape the advice we are developing. Secondly, we want to share the insights from the survey with as many product manufacturers and other interested stakeholders as possible. The survey should help those who have commenced their journey to assess progress and should act as a stimulus for those thinking about embarking shortly.

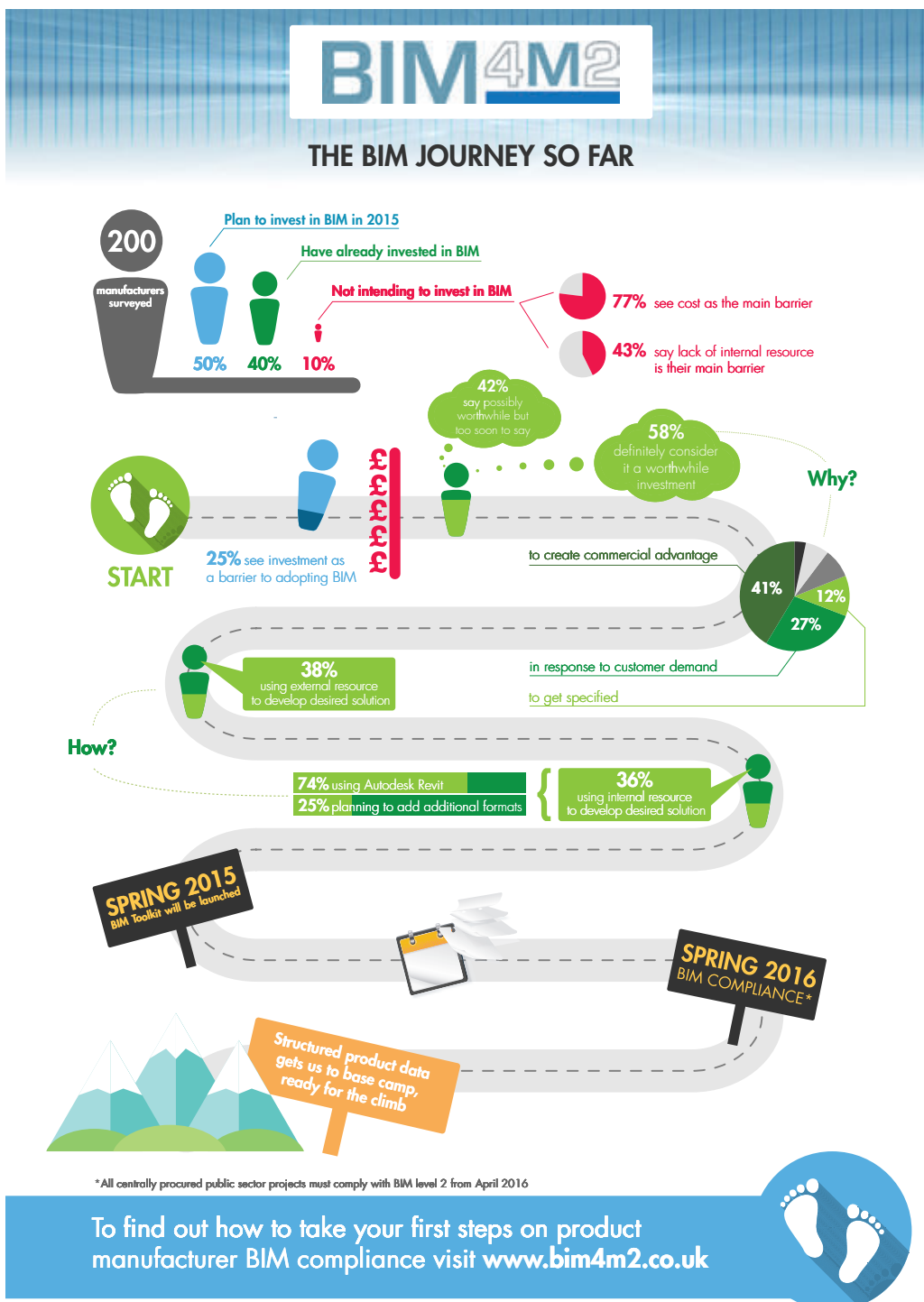
Those surveyed that have invested in BIM (40%) have done so to create commercial advantage (41%); in response to customer demand (27%); or in order to get specified (12%). However, 50% of those surveyed, whilst planning to invest in BIM soon (next 12 months), have yet to make a start. Of those not intending to invest in BIM, the cost was the main barrier (77%), followed by lack of in-house resource (43%). It is highly likely that some of these respondents are unaware of the Product Data Template route to compliance, which requires no more internal skills than are currently required to deliver project information; just in a different format.

Now is the optimum time to start your BIM journey, because the standards and optional tools will be complete by Spring 2015. So there is increasing clarity on what is required from product manufacturers. Having said that, there are still some important choices to be made.



Chris Witte, BIM4M2 Steering Group and Marketing Director Northern Europe at Knauf Insulation

One of those choices is about exactly what you need to develop and whether to do it yourself or get a third party to do the work. The first stage is to determine whether Product Data Templates (PDTs) or BIM objects are the best choice for your company. PDTs are excel based templates that capture all the product information required by a specifier and are compatible to BIM level 2. BIM objects (with PDT information as a minimum, plus graphical representation of your product) may be preferred by some specifiers. But whilst populating PDTs can be done in-house (they become Product Data Sheets when you have populated them with your information), fewer companies will have the internal skillset to develop their own BIM Objects. Our survey found that 38% of us are using external resources to develop our desired solution, but 36% are using internal resources. And the software of choice used



is Autodesk Revit (74%) with only a quarter planning to add additional formats.

It would be quite easy to become UK centric in our approach to BIM. However, since 52% of those surveyed export to mainland Europe, it is clearly important that all BIM solutions are sufficiently flexible to work in other geographies, with minimal adaptation. Working with BuildingSMART to achieve

standards consistency across geographies will become an increasingly important part of the BIM4M2 role.

1 in 4 respondents saw investment as a barrier to adopting BIM. The main concern is the resource required; but almost as important is convincing internal stakeholders as to the importance of focussing on BIM. Developing the business plan

*Continued on page 74...*

# SketchUp 2015 and it's interoperability with BIM

With the recent launch of SketchUp 2015, the latest edition of the 3D modelling platform from Trimble Buildings Group. Designed for architects, engineers, design and construction professions and with more than 30 million unique activations in the past year, SketchUp is the most widely used 3D modelling software in the world today. The latest launch features a new 3D Warehouse and some interesting integrations with BIM (Building Information Modelling). Elmtec is the UK distribution partner in the UK and our dedicated team can offer you advice, support, and provide you with the latest updates.

SketchUp Pro is a powerful tool for exploring and presenting your ideas in 3D. SketchUp is intuitive, allowing anyone to model in 3D quickly and accurately. Using 3D models, professionals can make informed decisions, communicate project details and share ideas with colleagues and customers.

LayOut – part of the SketchUp Pro suite, lets you combine SketchUp models with text and 2D graphics to produce multi-page presentations, professional design documents and permit, construction and other dimensioned drawings.

People from many disciplines use SketchUp to help them imagine their world in 3D, these include; Architecture and Design, Construction, Engineering, Digital Entertainment, and Education. SketchUP Pro's interoperability with other commonly used CAD/3D tools and data has been improved significantly with the latest version. In incorporating three new features to export and classify models, the program is making key steps into the world of integrating design.



IFC Export – since the information embedded in information models is often used by other software programs SketchUp Pro 2015 now includes another important industry standard to its roster of supported exports – the IFC 2X3 file type.

**“Elmtec is the UK distribution partner in the UK and our dedicated team can offer you advice, support, and provide you with the latest updates.”**

Classifier – this feature allows users to classify objects with the pre-loaded IFC classification, use alternate classification types or create a customised system for specific needs.

Component Options – provides editable options relevant to an object's classified type, allowing pertinent data about each object to be managed throughout the information modelling process.

“BIM workflows are often complex and rigid processes, and we believe they don't need to be,” said John Bacus, director of SketchUp product management at Trimble. “With the new release, we are enabling users to

participate more effectively at any point in the information modelling process. We've added simple tools for adding structured others on their project teams, regardless of the tools being used.”

SketchUp Pro licensing is now friendlier than ever before. Every SketchUp 2015 download starts with a 30 day trial of Pro features. Even better, 2015 Pro licenses can be used on a Mac or PC.

For more information please contact Elmtec on 01844 263750, email [sales@elmtec.co.uk](mailto:sales@elmtec.co.uk) or visit [www.elmtec.co.uk/sketchup](http://www.elmtec.co.uk/sketchup).



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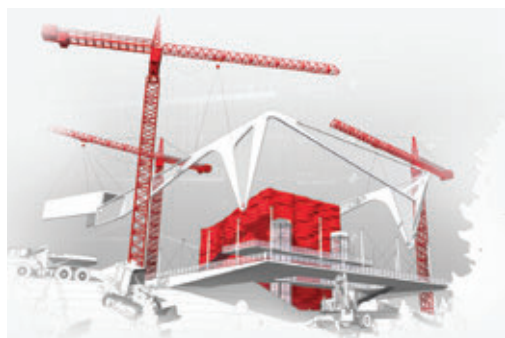


# SketchUp Pro 2015

## What is SketchUp?

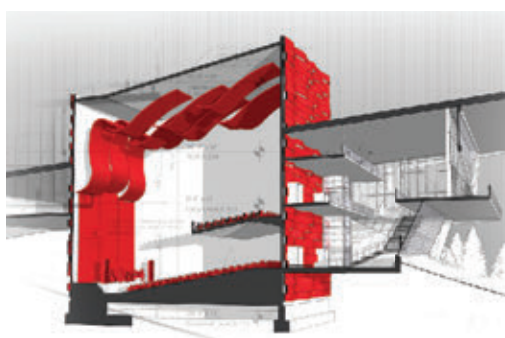
SketchUp Pro is like a pencil with superpowers. Start by drawing lines and shapes. Push and pull surfaces to turn them into 3D forms. Stretch, copy, rotate and paint to make anything you like. More advanced? Start modelling from CAD and terrain data, photographs or even hand sketches.

## New to SketchUp 2015



### New tools

- SketchUp 2015 features an official Rotated Rectangle tool, so you can now draw precise rectangles unbound by default axes.
- With our new 3-point Arc tool -- there are now four different ways to draw arc'ed edges.
- We've overhauled LayOut's Label tool. You can now conveniently place and align beautiful, two-segmented leader labels.



### Performance

- We've sharpened "Face-Finder," the code SketchUp uses to create faces while you're modelling.
- SketchUp is now self-aware of styles that help your model render faster.

**SketchUp Pro licensing** is now friendlier than ever before. Every SketchUp 2015 download starts with a 30-day trial of Pro features. Even better, 2015 Pro licenses can be used on a Mac or a PC.

Contact **Elmtec**, SketchUp's distribution Partner in the UK



**E:** [sales@elmtec.co.uk](mailto:sales@elmtec.co.uk)

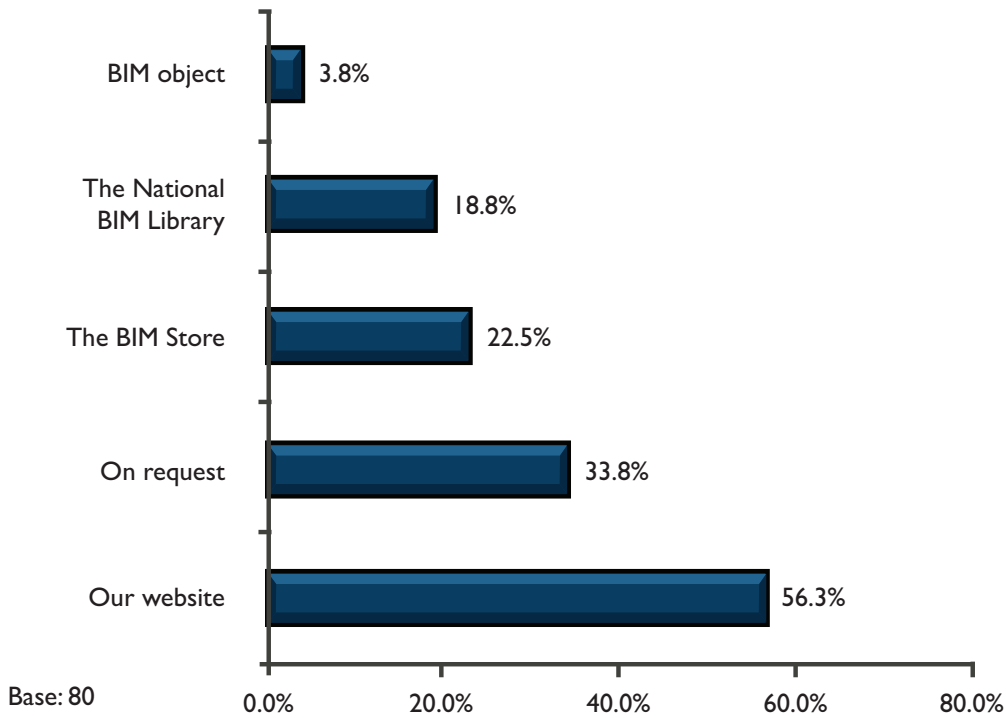


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**W:** [www.elmtec.co.uk](http://www.elmtec.co.uk)

**Fig 6.2: Where are your BIM objects available? – Have BIM**



*Continued from page 71...*

rationale to convince senior managers to invest in a BIM solution is part of the advice that BIM4M2 is developing for product manufacturers. Understanding software options also comes out as a greater concern than obtaining the finance to develop appropriate solutions. Of those that have implemented a solution, 58% consider it to have been a worthwhile investment, with one product supplier commenting that:

“There have been a high number of BIM downloads from our website and, as users are willing to register – a good quality database of users is being established. We conducted a survey of those downloading our files and 80% of downloads were for use on current projects. Our specification team are following up on those leads.”

Developing BIM objects is not the end of the journey, we have only reached base camp at this point.

The obvious place to promote your BIM solutions is your website (56%), but 34% of us are being more coy by only making the content available on request. The logic here is perhaps to protect the commercial advantage and tie in a technical conversation to the request, before sharing content. But 45% of respondents are making their content available through the libraries or clouds available such as BIMstore, NBL

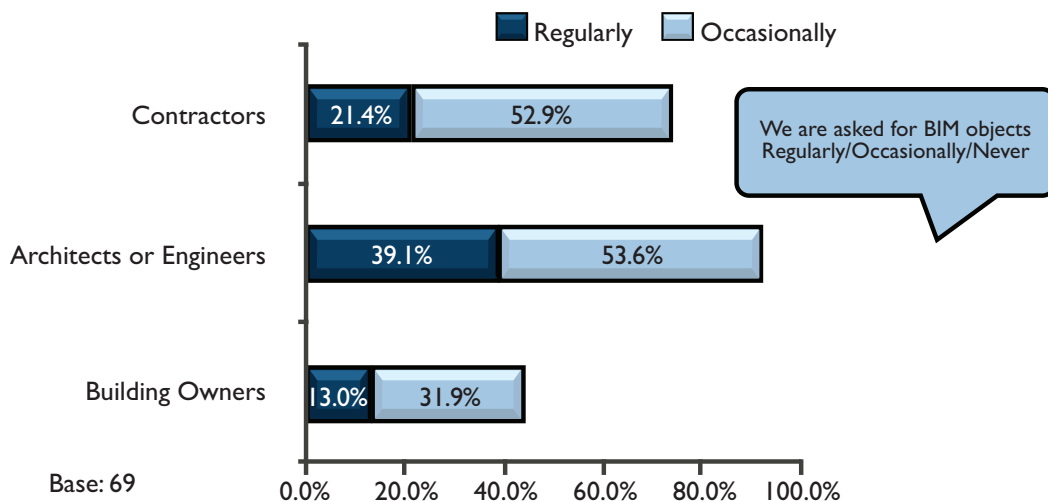
and BimObject (many of which are hosted both on a library and on a manufacturer website). The libraries give manufacturers an equal presence regardless of size, as well as a high number of specifiers searching their content; something that individual product manufacturer websites can't always achieve.

Those that have published BIM objects can expect requests from architects on a regular (39%) and an occasional (54%) basis; but fewer contractors make requests, as can be seen opposite. Making architects, engineers and contractors aware of your BIM capabilities is clearly an important focus area that can increase lead generation and specification opportunities.

Having a BIM solution where your competitors do not, is likely to be a short term differentiator. How successfully you build the new leads you generate into your CRM processes, and make the connection between BIM solutions and projects won, will be one of your long term differentiators.

Only 13% of those that have BIM solutions have case study examples of how BIM has helped secure work. This is probably because it can take several months for projects to come to fruition, and many

**Fig 5.1: Requests for BIM Objects – Have BIM**



additional weeks to develop good case studies thereafter. Another reason might be that the BIM solution has been developed as a piece of content, not as a catalyst for process improvement. If the content has been developed by marketing or technical departments, have sales been fully engaged?

Of those manufacturers that have BIM solutions, 82% have an individual responsible for BIM in their organisation, whereas for those planning BIM it is still a positive 58%. The benefits of BIM to the manufacturer are not just external. The need to provide up-to-date structured data in a digital format can lead manufacturers to improve internal processes. Can the data provision be automated? Can the data be used in the manufacturing process? There are examples starting to emerge, anecdotal at present, where companies have used BIM to improve internal processes in a number of ways. To the question: why did you invest in BIM? "business process efficiency", and "improved efficiency of manufacturing workflow" support the idea that BIM is as much about internal process improvement as it is about winning or maintaining specifications.

There is still an education job to do, even amongst those that have already published their BIM solutions.

59% of respondents incorrectly think that BIM Objects must be supplied to meet the Government's requirements in 2016. In fact it is just structured data to PAS 1192 – 2: 2013 that needs to be supplied. The PDTs are sufficient for this, but only 38% of us are aware of their existence.

In summary, the health-check on product manufacturers from this survey is that many (40%) are ready for April 2016 and most of the rest (50%) intend to be. However, there is still some knowledge building required even amongst those that have launched their own BIM content. ■

For the full report go to [www.bim4m2.co.uk](http://www.bim4m2.co.uk)

.....  
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[www.linkedin.com/company/bim4m2](https://www.linkedin.com/company/bim4m2)

# Ensuring accurate data for BIM projects

The use of BIM is increasing rapidly across the construction sector. By 2016 it will be compulsory for fully collaborative BIM processes to be used on all government projects greater than £5 million in value. The wider industry is adopting BIM as a way to more accurately predict and ensure performance throughout the life of the building; from initial design to operation and even deconstruction. It is suggested that by 2016 over half of UK projects will use the method<sup>1</sup>. In order to get the best out of BIM, accuracy of product and system objects is essential.

A working group called BIM for Manufacturers and Manufacturing (or BIM4M2), has been created to represent the needs of manufacturers as the industry moves towards the 2016 deadline. The group contains a mix of manufacturers (SMEs and multi-nationals), consultants and content providers, and aims to develop a consistent approach to structuring BIM data across organisations to improve information exchange and asset management. British Gypsum strongly supports the aims of this group as it recognises the importance to the construction industry of having a consistent approach to data structure.

Critical to the realisation of the benefits BIM can bring to the construction industry is the use of BIM objects that are current and updated in real time. To support this, British Gypsum launched the White Book System Selector, which is an online tool designed to help streamline the specification process for construction professionals. It allows specifiers to search and filter through tested British Gypsum plaster, partition, wall lining,



encasement and ceiling system solutions to select the right specifications for the job. Building Information Modelling objects (.rvt), CAD (.dwg) drawings, National Building Specification (NBS) Clauses and product and system datasheets (.pdf) are then available to download for the chosen solutions. This allows specifiers to retrieve important information in a few easy steps. Featuring simple and easy to follow search criteria, familiar to users of the White Book, this tool enables specifiers to filter by a variety of performance requirements, such as fire and acoustics, and be presented with a relevant solution for the job.

The holistic efficiency benefits that the use of BIM can bring to a construction project throughout its entire life can only be realised

if accurate data is used, therefore it's vital to include high-quality product information, and where better to get this than direct from the product manufacturer?

<sup>1</sup> Competitive Advantage, Adoption of BIM 2013



**Paul French**  
**Commercial Market Manager**  
 British Gypsum  
[british-gypsum.com](http://british-gypsum.com)



## White Book System Selector

### Find system solutions and BIM data quickly

Revit BIM files for all our system solutions can be downloaded from our online **White Book System Selector**. This tool works by using performance filters, such as fire integrity or acoustic insulation to search for the ideal solution to meet your project requirements.

It is vital that information contained within a building model is correct, as it will remain with the construction throughout its life; design, construction, operation and deconstruction. A key element to this approach is accurate system and product data, which is why we produce and validate this ourselves, ensuring a precise and reliable solution.

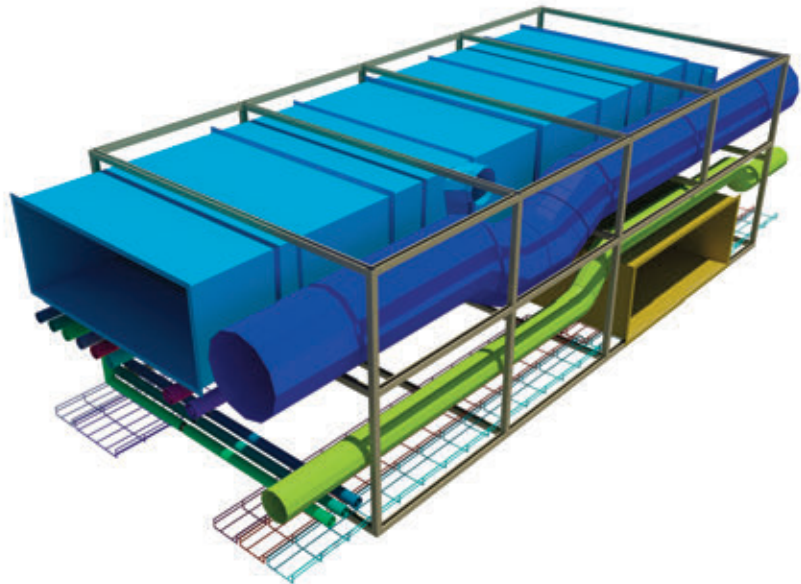
**For more information, visit [british-gypsum.com/wbssbim](http://british-gypsum.com/wbssbim) or call our Technical Advice Centre on 0844 800 1991.**

# The CAD Room is geared up for BIM

There is a widespread fact across the UK that BIM is the future for construction. The UK Government has put a great emphasis on Building Information Modelling (BIM) recently as part of their Construction Strategy, with the aim of all relevant departments adopting the collaborative Level 2 BIM by 2016. In their BIM document "Strategy Paper for the Government Construction Client Group from the BIM Industry Working Group" it is revealed that the renewed focus on BIM is due to the fact they the UK Government expects this will bring a significant improvement in cost, value and carbon performance through the use of open shareable asset information.

This emphasis, coupled with the current decrease in construction programmes, means that there is an increase in need for very accurate co-ordinated drawings within clients budgets. The CAD Room knows that this is key to our clients successfully installing their M&E projects, and so we ensure that we produce a fully co-ordinated BIM, CAD and M&E solution for each client's specific need.

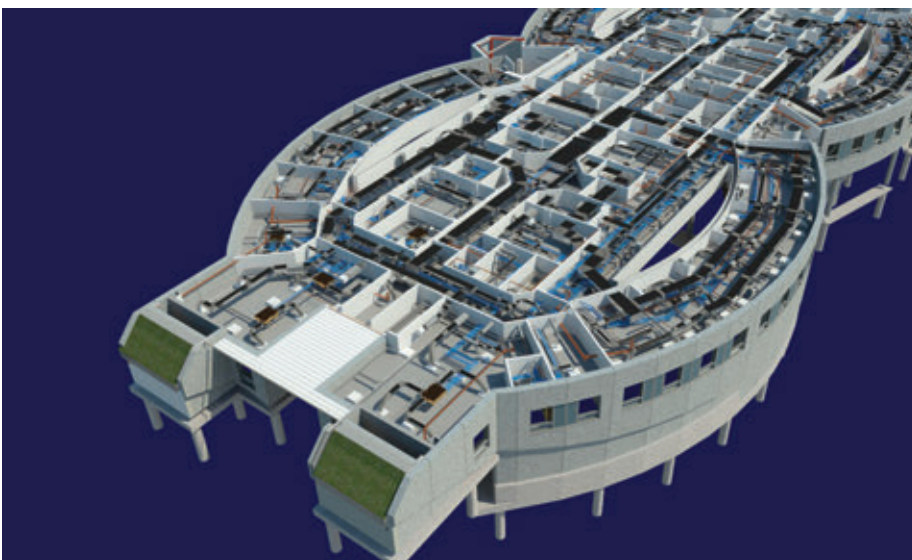
The CAD Room specialise in providing a complete integrated CAD service for any project utilising the design to produce co-ordination, fabrication, and installation drawings for all building services. The CAD Room also ensure that all services offered are totally co-ordinated with the building fabric such as: steel structure, concrete structure, walls, ceilings, etc., and we also ensure that all building services standards are adhered to.

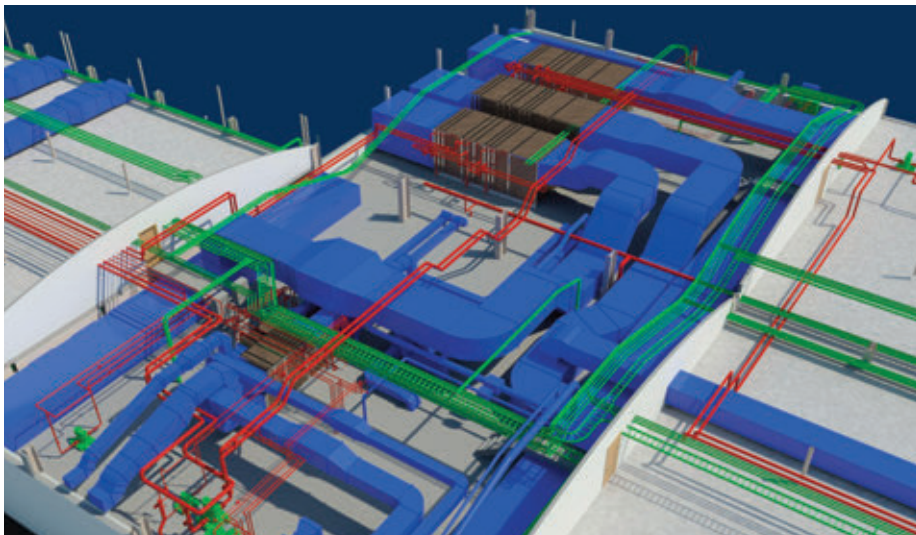


We make use of 3D structural and architectural models, to give you the client the ability to easily visualise the services within the completed building, which allows early clash detection enabling solutions to be found quickly therefore reducing time and cost. All building services are modelled using the latest BIM software, to ensure that all rendered images are realistic and this enables us to provide "fly through's" to clients so that all disciplines involved in the project can visually understand the extent of the installation. All our team are experienced in BIM co-ordination and M&E services, and adopt construction design management (CDM) good practice on all projects completed.

Some of the key benefits to using BIM and M&E co-ordination are:

- Collaboration ensures a better outcome. If all people involved in the project (including contractors, specialists, and suppliers) are using the same 3D model, it means that they should begin to cultivate better and more collaborative working relationships.





It also means that the focus is on achieving best value, from inception of the project to the eventual decommissioning.

- Enhanced performance. The use of BIM means that the comparison of different design options becomes swifter and more accurate, and therefore allows development of more sustainable and cost-effective solutions.
- Easier modification. Using BIM allows the project to be visualised thoroughly at an early stage, which gives all parties involved a clear idea of the project design, and therefore easily enables modification of the design in order to achieve the exact results desired. BIM also allow the project to be “built” in a virtual environment so

that complex procedures can be walked through beforehand, temporary work designs can be optimised, and the procurement of materials, equipment and manpower can be planned correctly.

- Reduced Wastage. BIM allows for precise programme scheduling means that materials are not over-ordered and that they can be ordered on a just-in-time delivery basis which should reduce the potential for damage. The BIM Model can also be used in the automated manufacturing of equipment and components, which should mean more efficient material handling and waste recovery.
- Asset Management for the Machinery’s Life. BIM Models contain product information

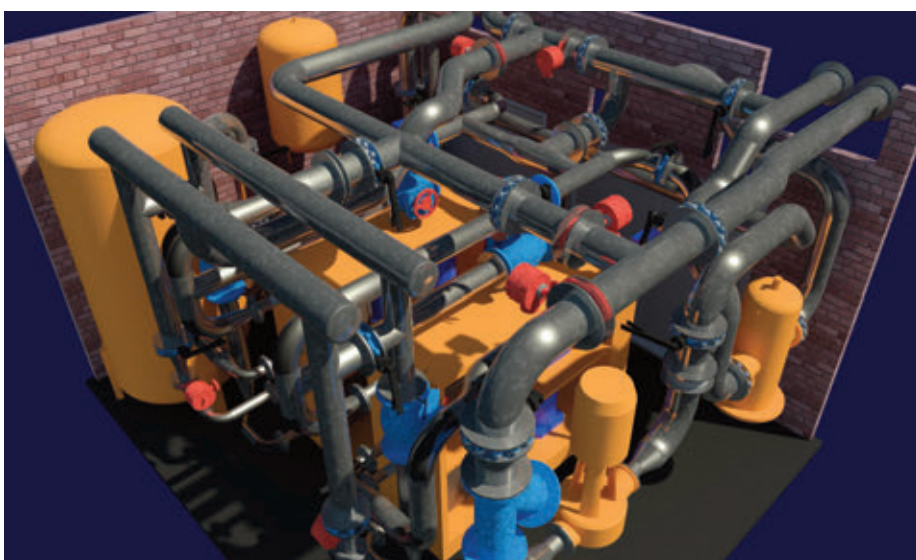
which will assist with the commissioning, operation, and maintenance activities of each piece of equipment, including: interactive 3D designs showing how to take apart and reassemble items of equipment, and also specifications which will allow replacement parts to be ordered.

The essential services which The CAD Room offer in order to ensure that your BIM project is a success are:

- Co-ordination Design Development
- Drawing Production Management
- Drawing Production from 3D Model
- BIM Intelligent Modelling i.e. co-ordination of Building Services
- Improved Engineering Solutions

The team at The CAD Room are also well used to the major file transfer sites e.g. ASITE, 4PROJECTS, 6PROJECT, BIW, etc. or you can use our own FTP site if need be.

The CAD Room is located within easy reach of major road, rail and airplane networks, which enables us to carry out local, national and international projects with ease.



#### Grant Hood

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# BIM4M2 education – the tools you need

**Richard Blakesley, Chair of BIM4M2 Education Group and Managing Director of Howitt Consulting, describes how the group works to educate, inform and encourage action to satisfy a BIM journey...**

You only have to mention the term “BIM” to a building product manufacturer and you will be certain to elicit a response. That’s the great thing about them; they keep up with what’s going on. The responses however will differ quite substantially.

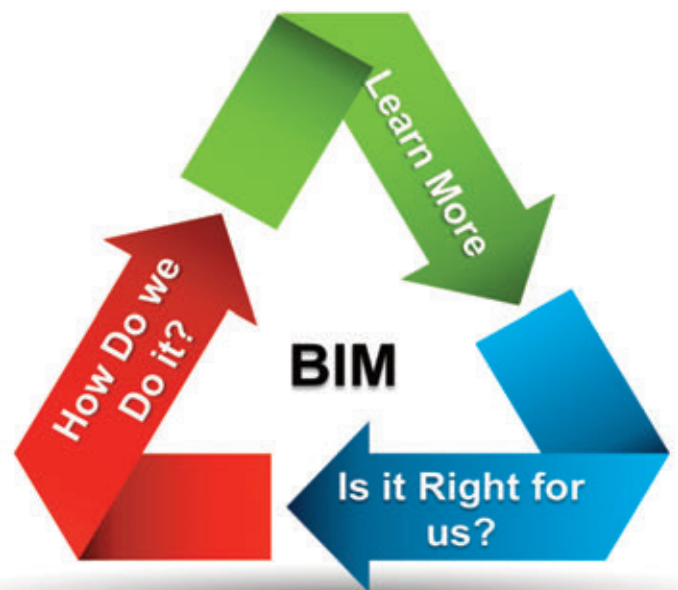
For some, this is the opportunity they have been looking for to differentiate their offer, for others it’s just another distraction from what they want to be doing. Still others see it as a necessary evil or an avoidable fad which will have its day just like so many others before it.

So the main question is, how do we decide which is the right response? And then, having decided that, the other questions come in thick and fast:

- What does it all mean?
- What level of resource will it take?
- When is the right time to make the move?
- What do we need to produce?
- Aren’t we in the VHS-Betamax situation?
- Why isn’t there a consensus on what Specifiers and Contractors want?

That’s another thing about building product manufacturers, they ask great questions.

That is where the BIM4M2 education working group comes in. It is a group of manufacturers and consultants who are honestly trying to wrestle with



these questions. We have some great discussions, sometimes heated, because we don’t always agree.

We have given ourselves the task of answering three basic questions:

- Is BIM right for us?
- How do we learn more?
- What should we do about it?

On the back of these questions at BIM4M2 we are in the process of launching some tools which manufacturers can use to get on the journey.

The first tool addresses the most basic question – do we need to respond to the BIM challenge? This is an evidence-based tool and looks at a number of areas



to work out the likelihood of a manufacturer needing to respond. These areas include:

- Level of business in different Market Segments
- The type of product which is manufactured
- The route to market that is pursued
- The level of requests for BIM content

In all there are eight areas and the manufacturer is encouraged to use this tool as part of a workshop which allows for a consensus to be developed. The tool provides a “likelihood of need to respond” score and also evidence-based response notes for each of the areas. This has proved very useful to provide direction and also to gain initial buy-in from board members who may not yet have grounding in the BIM arena. The tool also asks if the manufacturer would like to gain an insight into the financial risks of not responding to BIM. This risk is based on actual turnover and also the answers to the eight questions. The results pick up on survey data to provide a phased level of risk over a five year period. Much of the evidence-based data is from the BIM Adoption Survey of Manufacturers carried out during the second half of 2014 by the BIM4M2 Promotions Working Group. The tool will be launched in March and will be available from the BIM4M2 website.

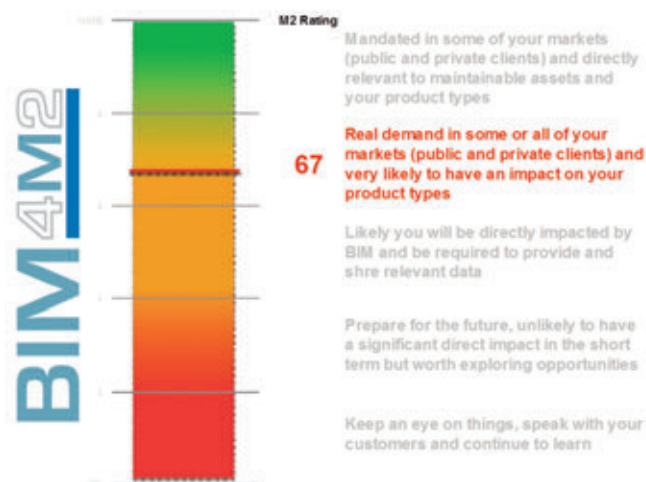


Image taken from the BIM4M2 – “Is it Right For Us” Tool

There are two other tools that are also being worked on. The first will allow the manufacturer who wants to learn more to find resources which will help. One of the things we hear most from manufacturers is that they feel many of the BIM providers are speaking from a place of self-interest and so we will make sure that these resources will have been checked for accuracy and independence.

The other main tool will be an outline for how to put together an implementation plan for BIM development. This will include sections on Business Planning, Implementation and Review processes.



The aim of these tools will be to educate, inform and encourage action. In short, to put manufacturers back in the driving seat as they look at how they should respond to the BIM challenge. ■

For more details please visit the BIM4M2 website at [www.bim4m2.co.uk](http://www.bim4m2.co.uk)

.....  
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## 21<sup>st</sup> Century BIM: Virtual Education Solutions

**South West College** is situated in a largely rural area of Northern Ireland, covering two counties with five separate campuses. It has recently been awarded a Grade 1 by the Education and Training Inspectorate (ETI) and is the only Regional College in Northern Ireland to achieve this accolade ranking it among the top 4 colleges within the 413 across the UK.

The College prides itself on its industry-facing collaboration, which was described as 'best in sector' in the recent ETI inspection. South West College continues to embrace technological advances and change in industry processes in all areas and has established itself as a leader in the field of construction. The College has fully understood the importance of the construction industry in adopting the new technologies and methodologies that are being developed in the area of Building Information Modelling (BIM). In conjunction with Northern Ireland BIM Hub, South West College recently delivered a very successful International BIM Conference which was attended by a large number of industry experts.

In order to support the industry, South West College has developed a BIM Hub to aid the training of those employed within the construction industry and associated services – including both public and private sectors. Industry standard software, such as Revit, Navisworks, Trimble Realworks, Pix4D, etc. has been put in place to support the industry to gain the necessary knowledge and skills in BIM to meet future government legislative requirements. The College has purchased specialised equipment in the areas of 3D geospatial scanning and Drone Technology for aerial surveying.

In recent years, South West College has invested substantially in Virtual Learning, both in terms of infrastructure and staff skills. The reasons for this investment are numerous and the benefits to the college and its students are significant. In November 2011, South West College successfully delivered a 'Virtual Stud-e-day' and 'Virtual Week' with 5655 learners logging on remotely to study online. Due to the success of this award winning Virtualisation Project, the College has increased its capacity to deliver bespoke online education solutions locally, regionally and globally e.g. Health and Safety in the Workplace.



*BIM HUB @ South West College*

Virtual learning, when delivered by South West College, is extremely 'student-centred'; it is also self-paced, interactive, engaging, hands-on and of high quality. Barriers of distance and time can be overcome which means students now have a choice and the college has an ever-growing marketplace. Virtual learning of the future will be very different to what has been offered in the past. Models of delivery are being developed that will mesh with the demands of a student population that is constantly evolving. The use of Remote Access to specialised software such as Autodesk packages, Blackboard, Collaborate, Immersive Environments, Simulation, Learning Games, Augmented/Mixed Reality, 3D Printing, Screencasts and Live Streaming have opened up possibilities that previously were not there. The only barrier we have in the future is our own imagination, and the College is making every effort to ensure our imagination is unlocked and your potential is fully realised.

The College's high performance Construction and Virtual teams comprise of individuals with unique skills that collectively work together to create innovative educational BIM solutions. Every member of the team is highly competent and experienced in their respective areas.

BIM training/courses may be delivered through on-line, blended learning and classroom based approach or through a combination of these.

Examples of courses available:

- BIM – an overview (Foundation Course)
- NOCN Level 4 Revit for BIM
- NOCN Level 5 Revit for BIM
- BIM Project and Asset Information Management (CAPEX & OPEX information management)

As well as the above courses, the College can also offer bespoke training to any organisation and if necessary carry out a company training needs analysis prior to curriculum development. Where applicable, the College offers Knowledge Transfer Partnership (KTP) and Innovation Voucher opportunities. BIM training at South West College will equip construction industry professionals with:

- An understanding of UK Government BIM Level 2 requirements and the relevant national and industry standards
- An understanding of the impact BIM Level 2 will have on construction workflow
- The skills to identify and assess the applications of BIM efficiencies within your organisation and implement same
- Capacity to meet government BIM requirements for main contractors, subcontractors and construction consultants to gain competitive advantage

If anyone within your organisation is interested in finding out more about BIM training at South West College or discussing the design of bespoke content, please contact:

**Stephen Moss** – Construction Curriculum Manager

Stephen.moss@swc.ac.uk

Tel: 078 9891 3742

**Tiernan McAlister** – Virtual Education Solutions

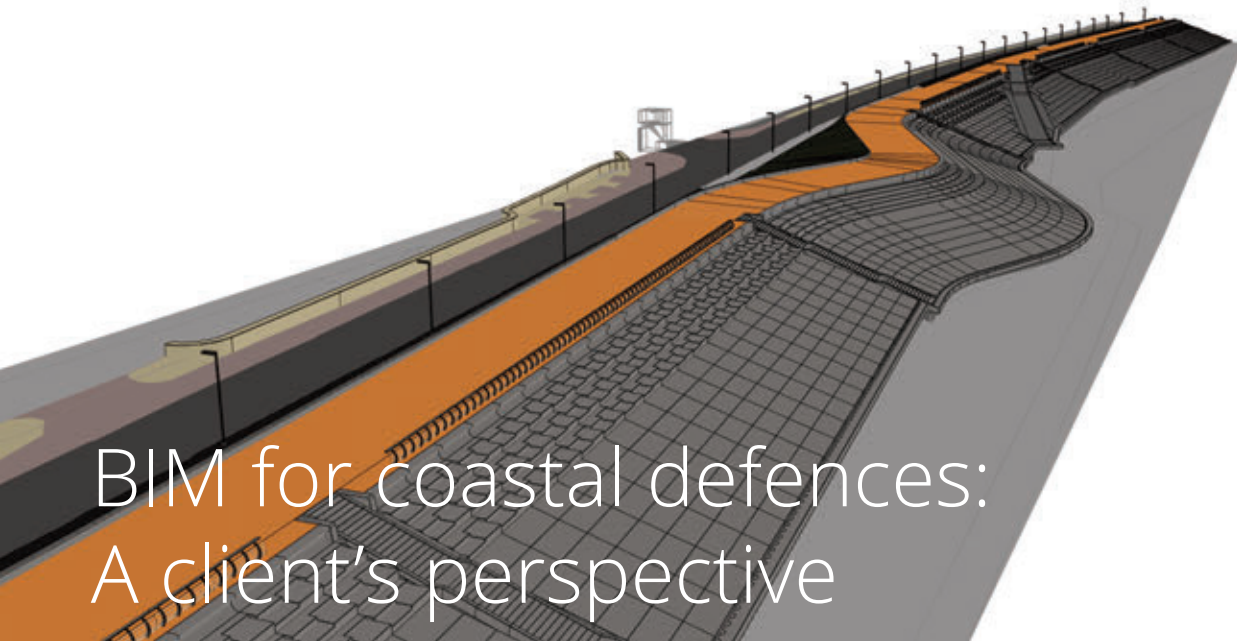
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## BIM for coastal defences: A client's perspective

**In the first of a series of interviews with Carl Green, Head of Engineering Services for Wyre Council, we follow the progress throughout the construction and operation of the Fylde Peninsula Coastal Programme – the world's first BIM coastal defence scheme...**

The Fylde Peninsula Coastal Programme (FPCP) is a partnership between Wyre Council, Blackpool Council, Fylde Council and the Environment Agency. It is responsible for managing the Fylde Peninsula's coastline and reducing risk of flooding to people and the developed, historic and natural environments. The scheme currently covers two areas, Rossall and Anchorsholme.

The Rossall area is situated on the North West coast between Cleveleys and Fleetwood in the Wyre Council area and is subjected to some of the strongest currents and highest waves on the coastline. The flood defences are old and could fail during a major storm, resulting in significant flooding to low lying properties in the area. The most recent major flood events occurred in 1927, which resulted in the deaths of six people, and 1977 when over 1,800 properties flooded following a breach of the sea defences.

Similarly, in the Anchorsholme area, situated at the northern boundary of Blackpool Council, major flooding occurred in 1927 and 1977. Flooding to the promenade, highway and tramway occurs regularly during storms when waves overtop the existing sea defences, resulting in temporary road closures. A United Utilities pumping station forms part of the

sea wall at Anchorsholme, which means Anchorsholme and parts of Rossall are also at risk of sewerage flooding.

The new defences will protect 12,000 properties in total – 7500 in Rossall and 4500 in Anchorsholme plus critical drainage and transport infrastructure. Extensive public consultation has been undertaken and a variety of public feedback has been considered in the development of both schemes. One clear underlying theme was evident throughout the consultation process; people just want to feel that they, and their properties, are safe.

Carl Green, Head of Engineering Services for Wyre Council, is leading the programme. Carl has over 20 years' experience in the design, construction, operation and maintenance of major civil and coastal engineering projects around the UK.

The project began in a pre-BIM world, where Green had seen contracts signed before relevant sections of the Government strategy had been released, particularly PAS1192/3. The competency of contractors to understand 3D modelling and information was key. Despite these competencies, it was clear that applying a nascent methodology to a 'world first' wouldn't be without issues, and it was this under-

standing that led to Carl's structured approach to maximising the benefits of BIM.

"When we started the process, we thought long and hard about the challenges that we face when looking after the current sea defences. The main issue is that the information in our archives wasn't complete. Some information had been lost, some had been borrowed over the years and not returned, and some wasn't even captured in the first place.

"This made it more difficult to completely understand exactly how the current defences were constructed, what maintenance had been undertaken and why and even where exactly the sewerage outfalls were. I was determined that the next generation of people who would be renewing the defences in 50 years' time wouldn't face the same challenges as my team".

Carl mentioned that one of the key challenges was ensuring that the right data was captured rather than all data.

"The natural view of many in the team was to attempt to capture all of the data possible. It quickly became clear that on a programme of this size, this approach would be unsuccessful due to the sheer volumes of data that could be generated.

"As a group, we looked at our own requirements during the pre-design, design, construction and operational phases and decided on the data that we would need to capture at each stage to meet these requirements, and optimise asset management and minimise maintenance costs throughout the lifecycle of the project.

"We then formalised this in a document to use as a template to ensure and verify that we have captured the required information. What was most interesting is how different the new EIR was from our initial Employers Information Requirement documentation. (EIR)".

The next key challenge was software. There are a multitude of design packages, and GIS packages, maintenance packages as well as existing council software and different packages from internal and external supply chain organisations. The new EIR didn't only include 3D models and traditional design

data. It also included photographs, spreadsheets, PDFs, MS Office, scanned paper documents, video, audio and even laser scan files. Carl explained how he and the team overcame this challenge:

"We were initially worried about how to make best use of the data with all of the different tools that were being used on the programme. It quickly became apparent that we needed to identify a simple to use tool that enables us to use and capture information throughout the construction and operational processes that ideally can be used in the field.

"We managed to find a tool called Sitedesk [www.sitedeskconstruct.com](http://www.sitedeskconstruct.com) which can handle large complicated models on mobile devices as well as desktops, all of the file formats and versions that we require. Sitedesk also allows all members of the team to use existing documentation and workflows if required. We chose Sitedesk because it makes it simple to take advantage of the whole life cost benefits of BIM without the exposure to high hardware, software or integration costs".

**Lessons learned so far...**

For Green, the biggest lesson learned so far is to be more prescriptive in terms of the desired whole life outcomes for the asset. This process is the best way to ensure that the EIR correctly informs and defines the quantity and quality of the information that is actually required to manage the construction and operation of the asset.

Next time we will evaluate progress against expectations... ■



.....  
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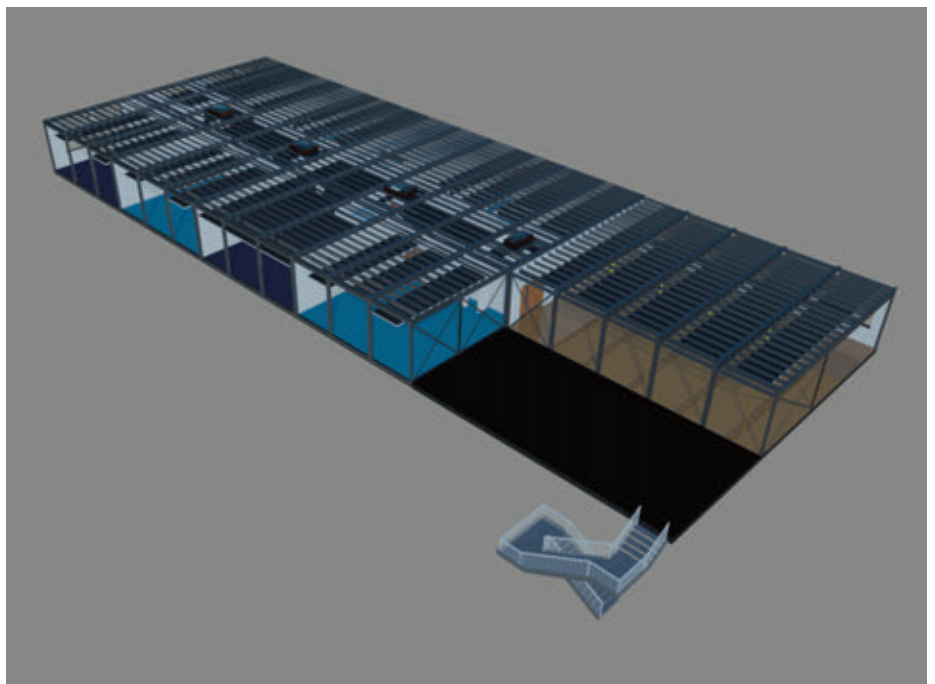
# The road from LonelyBIM to Collaborative BIM...

...an Offsite Construction and SME journey

While the benefits of BIM are widely recognised and detailed in many articles and presentations there are many businesses that are yet to receive a requirement for BIM as part of a collaborative project or have yet to even start looking at or understanding BIM.

At Premier Interlink we took the decision to investigate, evaluate and implement BIM processes and solutions prior to receiving a request from a client or main contractor, the aims being:

- Preparation: Having internal solutions ready for collaboration with others would assist with the workflow required when such a project landed within the business. It would then reduce the dreaded learning curve aspect that accompanies BIM which is often stated as a reason for poor margins on initial BIM projects.
- Staged Implementation: By setting our own goals and targets we were able to implement BIM processes and solutions at our own speed and to suit our own requirements, this meant implementing certain aspects sooner than others simply because they provided a quick ROI.
- Measured Outputs: proving that implementing BIM had a positive impact and driving further change into the business.
- Linking offsite and BIM to the 2025 targets: highlighting and building upon the advan-



tages offsite construction brings to these targets while also assisting in our design and manufacturing process.

To proceed with this we started on our 'LonelyBIM' solution. BIMExcellence define LonelyBIM as:

*'A term used to describe the practices of an organization, Project Team or the whole market where BIModels are not exchanged between Project Participants. Organizations at early stages of BIM Implementation or who only generate Mono-Discipline Models are considered to be practicing Lonely BIM – the opposite of Social BIM'.*

<http://bimexcellence.net/dictionary/lonely-bim>

But as an offsite construction manufacturer we perform a slightly different version of LonelyBIM in that a large portion of modelling work of multi-discipline aspect is undertaken by ourselves to suit our shop floor manufacturing requirements, so much so that it was coined as 'SelfishBIM' by a good friend of mine in the construction industry.

To assist with our LonelyBIM implementation Premier Interlink took the decision to put myself forward for an MSc in BIM Management at Middlesex University. This decision was taken to generate interaction with other construction professionals, many of which have had no offsite construction experience, and to assist with learning and understanding

BIM processes, but more importantly how this change in working affects others who we may not interact with on a day to day basis. This has then provided new opportunities and initiatives in Premier Interlink based on comments and discussions within the cohort.

The introduction of BIM has contributed significantly to an average reduction in delivered project costs of 2.5% in the last year. We do recognise that we have only just started our BIM journey and there will be many more opportunities as this progresses.

By having a solid BIM foundation and a defined implementation plan we are also now collaborative BIM ready. While we may not use certain aspects internally (such as COBie) we are fully aware and prepared for this and have working solutions in place. By having this philosophy and progression in place we can then work with clients and contractors to not only work as part of a collaborative BIM team but also advise and support the use of offsite construction in general.

If you are still waiting to implement BIM then there really is no time like the present, there is a lot of information on the web and I would always recommend starting with the UK BIM Task Group website in the first instance. Moving forwards, initiatives such as thinkBIM, The B1M, Class of Your Own and the BIM4 groups such as BIM4M2 and BIM4SME (which I am a member of) will all provide information, assistance and guidance on how best to proceed.



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Pete Foster is the Head of Digital Manufacturing Implementation at Premier Interlink (Waco UK Ltd) and specialises in process and business improvement within offsite construction and manufacturing. He has been actively involved in BIM since 2013.

Pete previously worked in the caravan and holiday home industry as a Drawing Office Manager and was responsible for implementing 3D based solutions with direct links to time/cost information.

He is attending a part-time MSc BIM Management course at Middlesex University and is a member of the BIM4M2 (manufacturing and manufacturers) and BIM4SME (Small/Medium Enterprises) groups. He is also heading up BIM for manufacturing for the Buildoffsite group.

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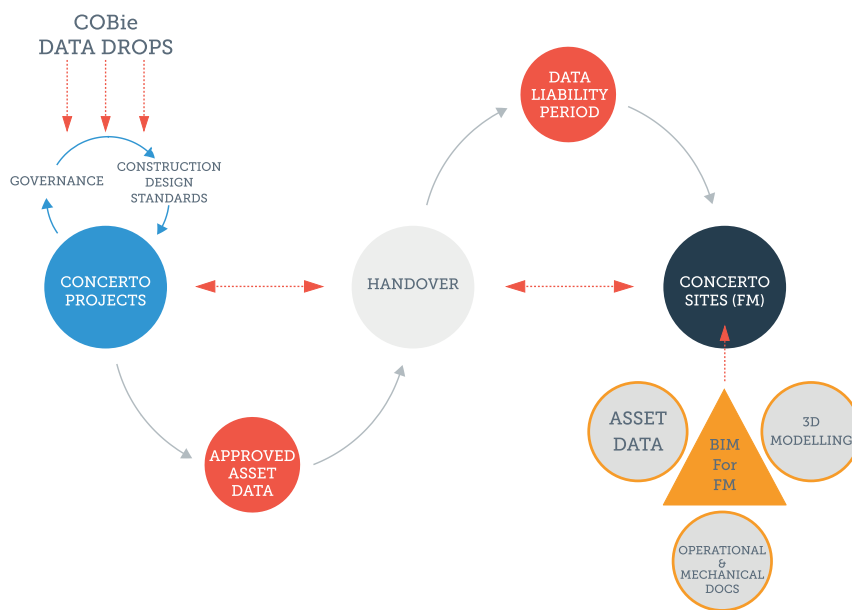


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- 5** Allows the intelligent client the ability to define the BIM data required for operational use and automatically pushes the defined data into the operational management system
- 6** Allows the end user of the building to leverage the collated BIM data, in both data table and visual forms, served via web technology for use within a facilities management environment
- 7** Provides a software environment in which the engineering asset related BIM data can be linked to planned and reactive maintenance activities, enabling performance and financial analysis of the assets to be undertaken. This data can then be utilised for review against subsequent and/or similar property related projects, enabling lessons to be learned from project to project
- 8** Enables engineering asset related BIM data to be directly associated with property condition surveys, enabling condition scores related to property related engineering assets be reportable as part of a property condition 5 year rolling programme
- 9** Creates and presents a technology strategy in support of the requirement to adopt a modern technological infrastructure in order to leverage BIM as a whole regardless of building life cycle stage



# BIM – The legal framework

**Julian Booth and Louise Forbes of law firm Olswang, consider the Construction Industry Council's BIM protocol and how it might be amended for anyone commencing a BIM-led development...**

As with any industry paradigm shift, the arrival and growing popularity of Building Information Modelling (BIM) in the construction industry has prompted careful consideration of the legal frameworks within which most construction projects sit. Although BIM is not an entirely new process (CAD engineers have often exchanged data throughout the design process), there are certain nuances within BIM (whether the project is operating at BIM Level 2, where independent 3D models are produced by each design team member, or at BIM Level 3, where the project is web-based, fully integrated and utilising 4D elements) which are best catered for under a BIM-influenced construction contract.

For example, 'data drops', whereby the project consultants upload design data into the model at prescribed points in the process, need to be executed at pre-agreed times, using specified file names, and any delay by an individual consultant will have a knock-on effect on the progress of both that individual consultant's design element and also the overall design of the project. Such matters should be addressed within the construction contract in order to provide clarity in the event of a dispute over liability for any loss or delay resulting from failure by a consultant to execute a data drop correctly and in time.

The main suites of standard form contracts have begun to acknowledge that a BIM-led project will require some specific amendments in order to address these nuances, albeit some offer more guidance than others. Whilst the JCT's Public Sector Supplement suggests that "simple integration of

BIM protocols" into its contracts should suffice, other suites provide more detailed guidance. The RIBA Plan of Work 2013 suggests that the project sets out the BIM supporting processes within the "Technology Strategy" of the project (including how information will be provided and in what format); while the CIOB's Complex Projects Contract (CPC) provides by default that the American Institute of Architects' BIM protocol be inserted into the contract (although it should also be noted that the CPC remains unique in providing BIM provisions within its core terms). The NEC suite, however, gives guidance on incorporating the Construction Industry Council's BIM protocol (CIC Protocol). Released in 2013, this and the AEC (UK) BIM Protocol, which is of a more technical nature, remain the only standard form BIM protocols produced for the UK construction market.

The UK Government's BIM strategy, set out in the Cabinet Office publication "Government Construction Strategy" (published May 2011), is to bring in a phased process for BIM uptake for all supply chain members involved in public sector procurement, so that eventually full collaborative working (with its associated efficiencies/cost-savings in procurement delivery) will be achieved through BIM Level 3. Given that the government's official target is for all government projects to be at least BIM Level 2 by 2016, it is perhaps surprising that, aside from the CIC Protocol, there are so few standard form protocols available to adapt or append to existing contractual documentation and that the standard form contracts are not more prescriptive about how BIM should be incorporated into the contract. Given this lacuna,

it seems sensible to consider the CIC Protocol, including how it might be amended for anyone commencing a BIM-led development.

The CIC Protocol requires an Information Manager to form part of the professional team whose primary responsibilities include coordinating software and data drops (in short, helping to coordinate the practicalities of the BIM process). This is a crucial role and one which is increasingly becoming a 'stand-alone' function, distinct from any other lead consultant's services.

The CIC Protocol also aims to synchronise intellectual property rights provisions with the practical requirements of the BIM process – another crucial provision in BIM, given how regularly in the BIM process consultants' designs will be published and utilised.

The primary weakness in the CIC Protocol is that it does not offer adequate provisions for model production and data information criteria, essentially leaving these for the parties to complete. The scope for inclusion of such criteria is limited to the protocol's appendices. Arguably, given the importance of the use of certain software and the provision of quality data, the CIC Protocol should cater for a more extensive set of BIM-related employer's requirements. This weakness could be side-stepped if elements of the RIBA Plan of Work 2013's guidance could also be incorporated (specifically those regarding introducing a 'Technology Strategy').

The CIC Protocol's other perceived weakness is that there is a lack of clarity surrounding the measurement of competency in the BIM process. The standard of care of each designer must be that of a properly qualified and competent consultant using and creating output through BIM software: quite what this level of skill and care is remains unclear, although the CIC Protocol cites British Standard PAS 1192-2 as the standard for information sharing. Given that BIM practice is still maturing, there is no obvious way in which the duty of care could be worded to address

this concern; however, a starting point should be that the contract itself is worded to identify BIM-specific services.

In the absence of any clear alternatives, the CIC Protocol provides a firm backbone around which to build a contract for a BIM-led project, and those entering into contracts for such projects (in particular the NEC and JCT suites) should consider that including the protocol may be the most straightforward and transparent way of incorporating BIM and any BIM issues into the contract. However, attention should be given to those areas in which the CIC Protocol is lacking, and further prescriptive wording should be included to ensure that there is greater clarity surrounding the obligations and liabilities of each party in respect of BIM. ■



**Julian Booth**  
**Associate**

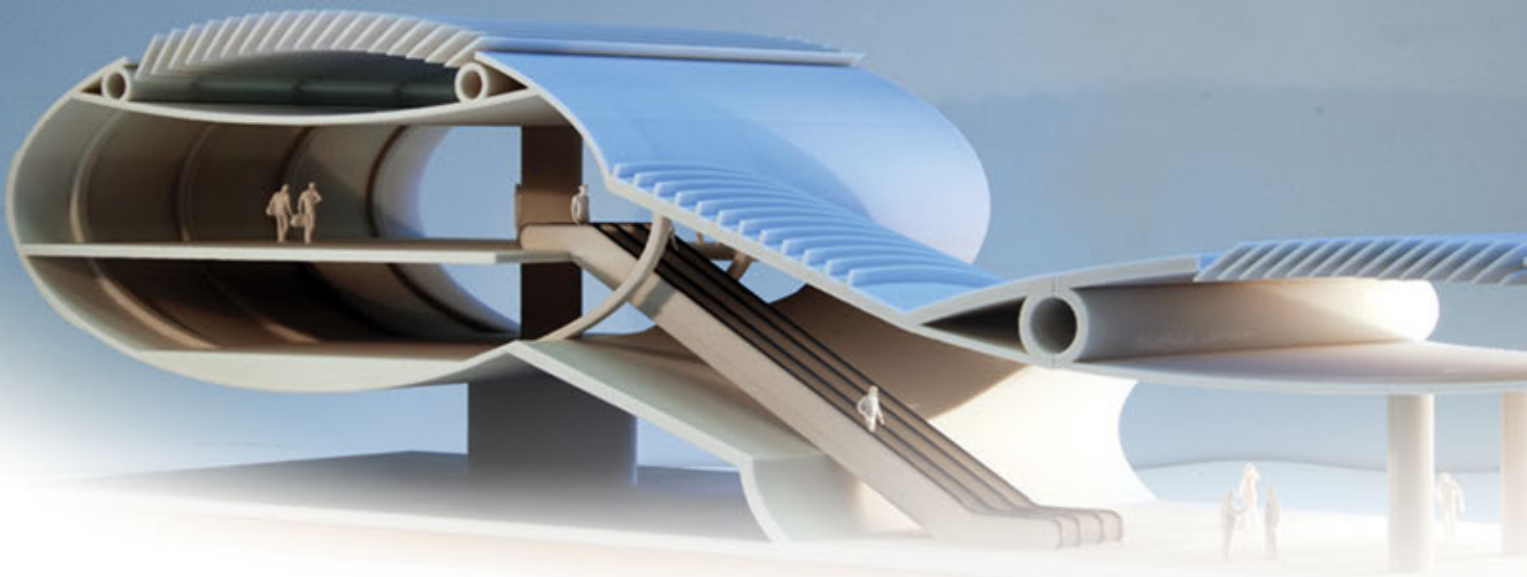


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# BIM certification

**Gaining recognisable BIM certification proves competency, compliance and capability of successful BIM delivery. PBC Today outlines what BRE can offer the industry...**

Achieving BIM level 2 is changing the construction landscape, but there are still some barriers to adoption. It will affect almost everyone working within the built environment, from those working in the architecture, engineering and construction industry, to commissioning clients, owners and facilities managers. In 2012 the NFB published its report 'BIM: Ready or not?' which indicated that there was a clear gap between the appetite for BIM in terms of the commercial rationale on the one hand, and the knowledge and skills to take action on the other. There has been some improvement, but there is still some way to go for the 2016 deadline, and gaining recognisable certification should be a priority.

However, there remains many misconceptions about what level 2 BIM is and how it should be implemented. To clear any confusion regarding the specific requirements to be met, they are all outlined within PAS1192-2:2013, which is summarised below:

- a) Development of information models which reference, federate or exchange information with other models;
- b) Provision of an Employers Information Requirements (EIR) document with clear definition and decision points;
- c) Supplier & Supply chain capability assessment;
- d) Provision of a BIM Execution Plan (BEP) including assigned roles, standard, methods, & procedures and a master information delivery matrix aligned with the project programme;

- e) Provision of a Common Data Environment;
- f) Compliance with the documents and standards listed in the Level 2 Documents and Standards section<sup>1</sup>;
- g) Development of information models utilising database-based software, and analysis software;

To aid the industry in achieving level 2, BRE have developed a number of services to bring recognisable qualifications and standards that will provide assurances to clients that the holder is competent, compliant, and capable of BIM delivery:

## Certification

**Business Systems Certification (BSC):** Aids by auditing designers, constructors and suppliers, allowing businesses to demonstrate their competence in understanding and being able to achieve the above requirements;

**Certification Professional Scheme (CPS):** Aids by educating and requiring attendees to demonstrate and understand the above requirements;

## Education

**BIM Accredited Professional (BIM AP):** Aids by educating attendees with BIM foundation knowledge and provides an overview of the above requirements;

**Other Education Material:** BRE also run awareness sessions, CPD seminars, and other education material to aid industry in achieving BIM maturity level 2;



**Consultancy**

Employers Advisory Service: Aids by developing key documents with the employer, such as the EIR or BEP. In addition, this service can aid further by auditing incoming documentation.

Supply Team Services: Aids by reviewing BIM processes and business documentation to ensure that they align correctly to the above requirements to allow BIM maturity level 2 compliance.

All of the BIM AP and Level 2 courses have been developed in partnership with Professor Mervyn Richards, OBE, the author of BS1192:2007, the standard for collaborative production of AEC information, and Paul Shillcock co-author of PAS1192-2:2013, the specification for information management using

BIM; Mervyn and Paul are actively involved in supporting the UK Government in defining and adopting Level 2 BIM. ■

For more information, visit the BRE BIM website: [www.bre.co.uk/homepage.jsp?id=3506](http://www.bre.co.uk/homepage.jsp?id=3506)

<sup>1</sup> <http://www.bre.co.uk/page.jsp?id=3508>

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Workstations Specialists primary goal is to provide industry professionals with the necessary advice and solutions to enable you to complete projects effectively and within deadlines. Workstation Specialists are an award-winning computer workstation and rendering system manufacturer based in Derby, UK. They design and manufacturer high performance computing solutions for sectors including BIM, 3D CAD, CAM/CAE and Visual Effects industries. As part of the AceCad Software group of companies they have been proudly producing computer workstations for over 25 years, and are at the forefront of the industry with their class leading product portfolio and in-depth industry knowledge.

Available with a wide variety of specifications, with prices starting from as little as £950, Workstation Specialists offer a complete custom built service with excellent pre-sales advice and consultancy; allowing you to invest in the most suitable

configuration for your requirements (whether this is dictated by application, project or budget). A free no obligation evaluation or demonstration service is also available, allowing new customers the ability to trial the latest computing technologies first-hand.

Find the right workstation for you:

- For high intensity and office based workloads the WS-E tower based range is the perfect companion to industry professionals. Designed and built with only ISV certified, enterprise grade components. Intel's Xeon processors coupled with professionally certified AMD FirePro Graphics, allows professionals the confidence that their workstation will deliver the results they require.
- For on the go users, Workstation Specialists have developed their WS-M Mobile workstation range. Designed to deliver workstation performance within a portable form factor. This range also includes the WS-M Slim the world's most powerful ultra slim professional laptop at under 2 cm thickness, under 2 kg and furthermore is now available with a 4K screen.
- Workstation Specialists integrate independent software vendor (ISV) certified components in their workstations, giving customers the confidence that the systems will have the compatibility, reliability and performance you require.

- Full independent reviews can be located on their website at the following page. [http://www.workstationspecialist.com/corporate/press\\_room/reviews/](http://www.workstationspecialist.com/corporate/press_room/reviews/)
- Following a comprehensive 48hr hardware testing process, all their systems are backed up by a complete 3 year parts and labour warranty.
- Worldwide shipping is available.

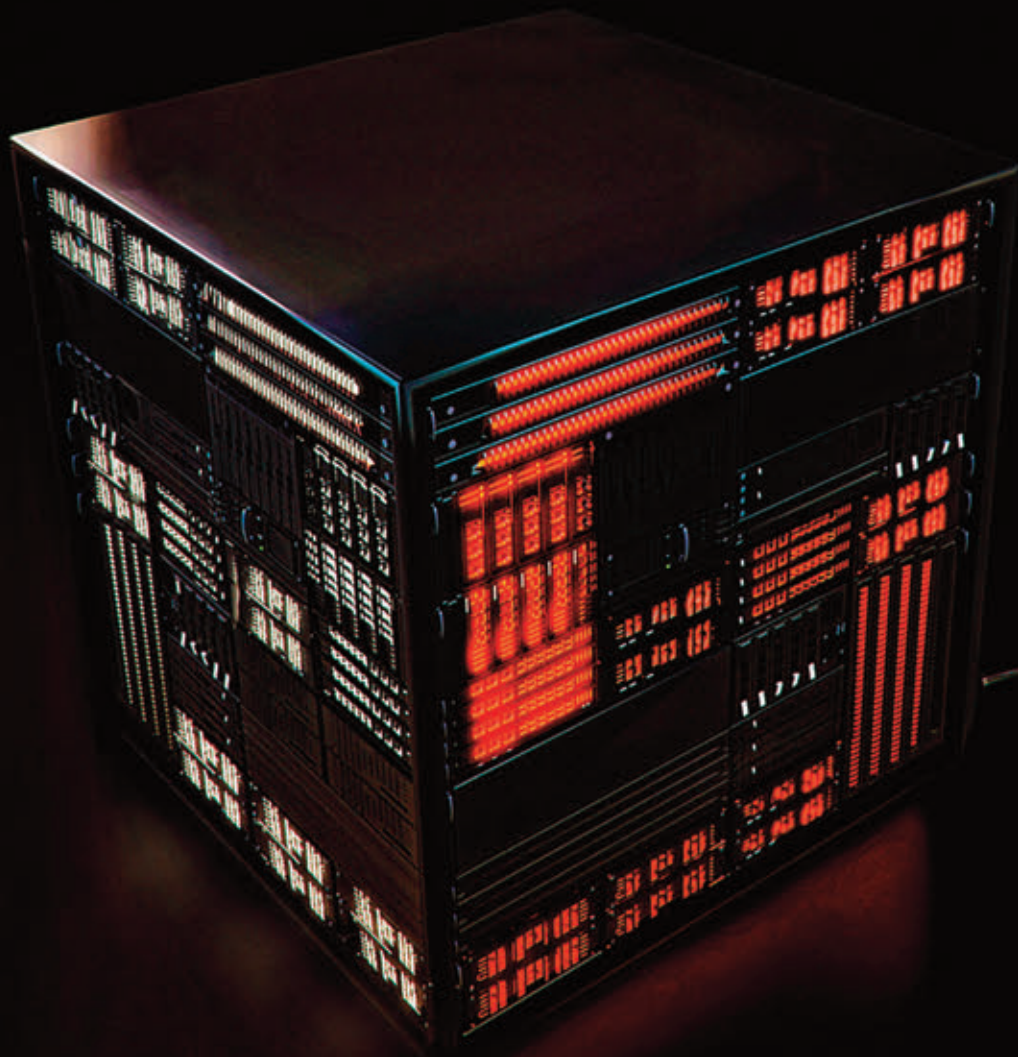
Whether you are in need of single system or a larger offering, improve your company's efficiency and remove bottlenecks with truly dedicated BIM optimised solutions. You no longer need an internal IT specialist to know the correct hardware systems for your requirements. Workstation Specialists will assess your specific needs and tailor the perfect solution to enhance your business.

For a free, informative consultation and quotation contact our pre-sales team today.



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**Sales Manager**

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