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**BIM
FOCUS**

INSIDE:

Peter Hansford, Government Chief Construction Adviser details the value of BIM for the UK

David Philp, Head of BIM at Mace and the UK BIM Task Group explains the importance of SME's

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Introduction



Designer
Andrew Bosworth

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Welcome to our Planning and Building Control Today supplement focussing on BIM.

BIM is surely the buzzword of the moment in the construction sector, partly due to the impending 2016 deadline the government has set for all centrally-funded public procurement projects to be delivered using Level 2 BIM as set out in the Government Construction Strategy.

Perhaps one of the biggest challenges is raising awareness of the benefits of BIM in addition to building capacity and capability within the supply chain. It requires a challenge to preconceived ideas, and encourages techniques and incentives to standardise ways of working in which 3D geometry and data is stored throughout the lifecycle of buildings and infrastructure.

The BIM Task Group's main priority is to raise awareness and they have made significant progress in this regard. The NBS annual BIM survey

for April 2014 (which took place at the end of 2013) certainly suggested that uptake of the collaborative technology has risen sharply over the past year. The next step is surely one of wider adoption.

This special focus edition boasts important messages from David Philp, Head of UK BIM Task Group highlighting the important role that SMEs play in the future of BIM and Peter Hansford, Government Chief Construction Adviser at Department for Business Innovation and Skills discussing the government's commitment. We also examine legal considerations from Andrew Marsh, Partner at DAC Beachcroft LLP.

I hope you find the articles here informative and interesting, and welcome your feedback.

Lisa Carnwell
Publisher

Contents

4 | BIM Level 2: Mapping the road to success

Peter Hansford, Government Chief Construction Adviser details the value of BIM for the UK

10 | BIM and the SMEs: Opportunity is knocking

David Philp, Head of BIM at Mace and the UK BIM Task Group explains the importance of SME's

14 | Empowering the world's BIM community

Andera Al Saudi, Business Director for The BIM Hub sheds light on their vision

19 | BIM Level 2: Legal considerations

Andrew Marsh, Partner at DAC Beachcroft LLP provides an overview of the legal considerations

24 | Designers – don't be scared of BIM

Alex Wall, Managing Director of WCEC Group Ltd discusses the benefits of BIM for SME's and provides advice for new adopters



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BIM Level 2: Mapping the road to success

The UK construction industry is making a good start in embracing BIM, providing the opportunity for reform and economic success as global leaders. Peter Hansford, Government Chief Construction Adviser details the value of BIM for the UK...

Technology is moving fast – including in construction. We are moving quickly towards a digital economy which is starting to have profound implications for our built environment. We must act now to ensure UK construction is, and remains, at the vanguard of smart construction and digital design, and have made a good start in embracing this through the BIM programme. Indeed, the UK BIM standards and processes are working as a world-wide acknowledged benchmark for industry digitisation.

For the public sector, BIM offers HM Government the opportunity to industrialise and reform its built environment through a digitally enabled procurement

process. Indeed, the level 2 BIM programme is already helping cement significant savings: early adopters such as the Ministry of Justice (MoJ) are reducing cost and improving quality through their BIM library concept, where they have standardised and digitised many of their assemblies. This process has also helped them drive down area requirements and determine solutions which will make it easier to ultimately economically dispose of their assets – such as courthouses – by formulating standard grid solutions compared to traditional non-standard layouts.

Our present goal is that all centrally-funded public procurement projects be delivered using Level 2 BIM by 2016, and the government's commitment to this



Peter Hansford
Government Chief
Construction Adviser
 Department for Business
 Innovation and Skills

target – set out in the Government Construction Strategy – remains firm. It provides a strong drive towards digitising our industry and, I am glad to report, one that is going well with significant progress and appetite from the departments to adopt BIM within standard procurement practices and operations. We are on track with our plan for getting BIM Level 2 production ready, which will position the departments perfectly for increasing the rollout of BIM across projects and making it business as usual.

With around 2.9 million people employed within our industry, the biggest challenge is not within the government departments, but raising awareness, building capacity and capability within the supply chain. Our whole sector approach to BIM is making organisations challenge preconceived ideas, and encourages techniques and incentives to standardise ways of working in which 3D geometry and data is stored throughout the lifecycle of buildings and infrastructure.

Key to this is the creation of Level 2 BIM maturity by the BIM Task Group who, along with BSI, have developed a number of standards, documents and guides to explain clearly how BIM should be applied. This is the big challenge for the supply chain: better controls and definitions of both data deliveries and data classification. The Level 2 BIM programme is a key enabling strategy for the UK developing both these processes, and open data definitions. Creating a capable, informed work force will cement the UK as

the recognised leader in vision, policy, capability and results for Digital Construction World Wide.

Creating and managing digital data sets for transactions and queries is undoubtedly a step change for industry. Within the supply chain we are seeing early adopters offering levels of efficiency, reduced costs, faster delivery and ultimately, delivering buildings and infrastructure that are ‘right first time’, and offerings consistent with sectors that have made a switch to digital working and process automation. Communities such as the BIM4 working groups are helping articulate the business case for BIM, and help demystify what needs to be done within their relevant populations to make level 2 BIM happen. The fact that they can build in beta digitally and debug before executing flawlessly on site makes it all worthwhile.

The Industrial Strategy for Construction – Construction 2025 – set out a vision of “an industry that is efficient and technologically advanced”. It is therefore essential that we are prepared for a sector switch from analogue to digital given the size of the prize. Economists have estimated that the UK market for BIM-related services will be an annual £30bn by 2020. In a global context, UK-based firms already export £7bn of architectural and engineering services. Pursuing a global leadership position in developing BIM capabilities will provide strong potential for further export growth, and enable our industry to deliver higher quality and a more sustainably built environment for future generations. ■

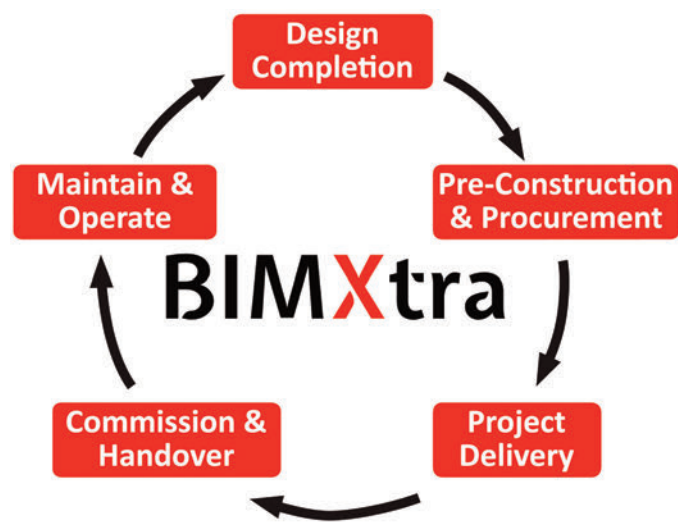
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Bringing the simplicity and opportunity of BIM to all

BIM means lots of things to many people and risks being one of the most misused words in construction, however BIM represents the enabler to a transformation that is engulfing not only the UK but also the global design, engineering & construction market; and why, because BIM enables us to work together more easily, in a modern digital environment. Using BIM we are encouraged to share information bringing efficiency and visibility, to ultimately, reduce the risk and cost of our projects. In addition we influence and improve the ongoing operation of our assets, delivering a better more intelligent output for our clients and in doing so providing them with more value in their portfolio of assets.

BIM enables people to interact with their projects in a visual environment, but is increasingly focussing on “the I in BIM”, the INFORMATION, which is held within the modelled objects as data. With modern BIM tools, information previously held in separate and disconnected documents, can be created and held within the modelled objects as the central repository for core project information.

Like the automotive industry before us, the efficiency and simplicity of a managed information process contributed to the renewed success of manufacturing. The effect has been that we buy more cars, appreciate the fact that they are more reliable, last longer and cost less to use and maintain – vehicle manufacturing is in new health.



The expectation is the same for the construction industry, allowing us to define and communicate our requirements better, iron out issues before arrival on site, remove unnecessary waste in the process and provide, for the Client, a better service and an intelligent model that can help better manage the clients asset through its operational lifecycle.

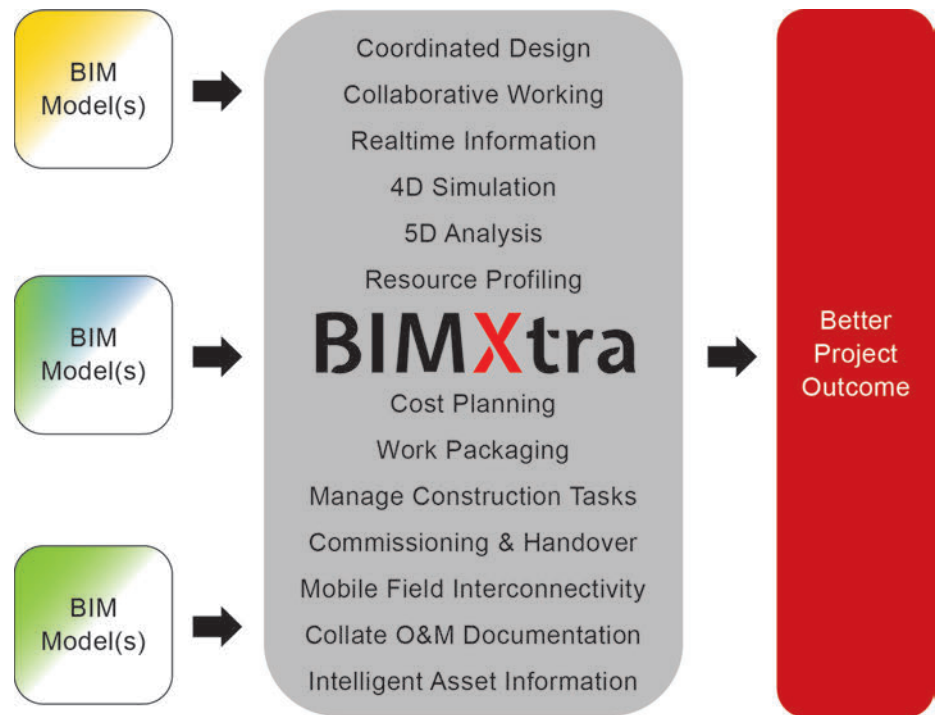
Not surprisingly achieving the utopia from this transformation, like all transformations has it's challenges, however, much has been done to address the needs of industry through new technology, and the guidance for the new BIM enabled project delivery process is established in the British Standard and PAS 1192 series, but to maximise the benefits of these new tools we need to consider the working practice changes that are also needed in many environments.

Driven by a focus on low cost procurement that can result in uncertain end out cost and, subject to your position in the supply chain, insufficient consideration of whole life operational cost, together with margins driven ever lower in a highly competitive market we are often faced with risk aversion rather than more proactive risk management.

However, in some parts of our industry suppliers and manufacturers are fully integrated with 3D CAD-CAM tools either direct to manufacture or through the creation of fully coordinated pre-assembled or pre-manufactured modules that dramatically reduce the onsite work and risks in installation and in doing so provide a higher quality product, manufactured and tested in a controlled environment.

The vision of BIM is that all parties in the supply chain collaborate across the same source of information, and make informed decisions based on better information with an improved awareness of the repercussions on others.

BIM delivers the maximum benefit when all parties take part, the leadership of key



Clients like Government, who acknowledge the benefits in project delivery and on-going asset management has been instrumental in establishing BIM as a modern working practice.

The prize for all of us is a better, more efficient, higher quality, world leading industry.

Providing a simple solution to the technology and workflow issues of BIM is where Clearbox can support the process.

Clearbox

Clearbox are a technology provider looking to bring the opportunity of BIM to all through their digital information hub BIMXtra which enables simple access to the information based around a true common data environment. BIMXtra addresses many of the issues of BIM by bridging the gap between the complexity of the BIM authoring tools and the plethora of project tools that characterise the current construction market. BIMXtra not only supports project delivery during the design and construction phase but delivers out the

intelligent asset information at handover to provide a new level of opportunity for Facility Management and Asset Management.

BIMXtra takes information from BIM and makes it available to all in the simplest of approaches. Each user has access to the information they need in the right format at the right time, allowing the influence of BIM to be shared out from the design through the entire project delivery phase. BIM in BIMXtra not only enables interrogation and exploitation of the visuals but also extends and enables the full digital information management of the project.

Developed by individuals with years of experience of delivering design and build projects, and who use BIMXtra tools themselves on their own projects, BIMXtra will help enable consultants, contractors, and SMEs alike to enjoy and benefit from BIM.

So if you are starting your journey or have uncovered some of the complexities of BIM then we can support you to meet the

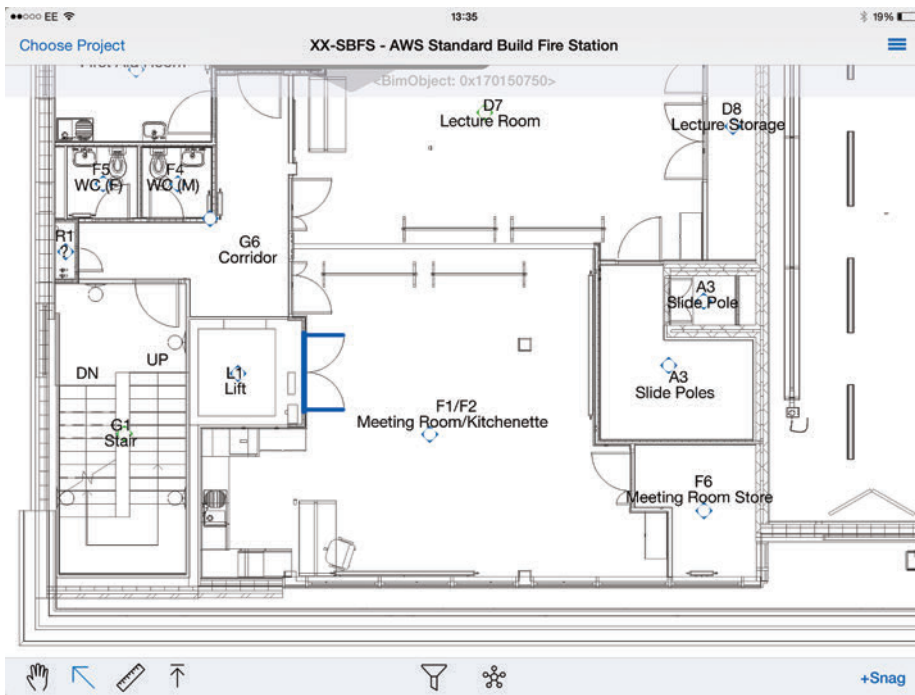
requirements of Level 2 BIM and beyond as a hosted solution. As 2016 approaches and the gap between the haves and have not's of the BIM world grows there is no better time to jump on board and benefit from the lessons learnt from some of the early adopters.

In this, the first of four articles leading to the 2016 deadline we aim to take you on a journey of the simple functionality that is now readily available, as well as reassure individuals of the benefits of BIM that can be realised in case studies. In the next papers

we will address the solutions and some case studies to allow users to appreciate the scale of the benefits and the simplicity and ease with which this can be achieved starting with the interface to programme.

Graeme Forbes

Graeme Forbes is the Managing Director of Clearbox a technology and consulting business that brings years of experience in the BIM space through new collaborative tools that help to bring simplicity to the delivery of BIM based projects.



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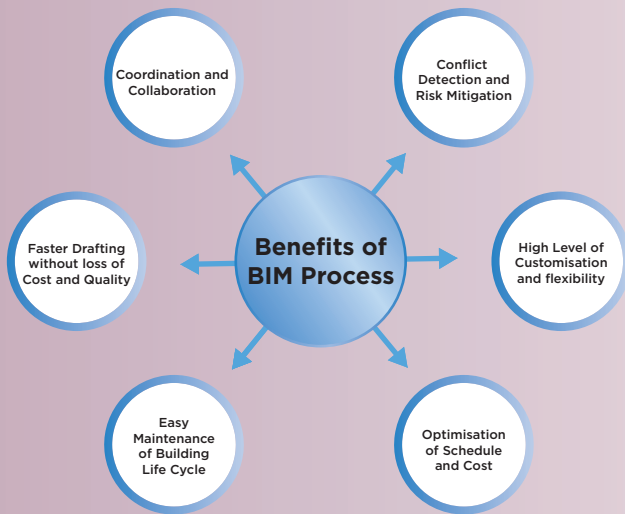
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Let US help YOU with your BIM requirements

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.





BIM and the SMEs: Opportunity is knocking

SMEs are key to the UK's BIM journey, so their uptake is vital to ensure our BIM leadership. David Philp, Head of BIM at Mace and the UK BIM Task Group explains their importance...

In 2013, there were 4.9 million businesses in the UK, with over 99% categorized as small or medium sized businesses (SMEs) i.e. employing between 0-249 people. Of this populace the SME community's share of construction turnover in the UK private sector was 72.4%.

Given that SMEs are the backbone of our sector, we must ensure that they have sufficient digital capacity and capability to ensure that the UK remains at the forefront of BIM leadership across the globe. But why should they care? Why should they consider investing in change?

The reality is they have to compete on a new basis with fierce international competition for the provision of skills and products and ever tight project afford-

ability 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.

BIM really offers SMEs the opportunity to raise their game and contend in the heavy weight classes. Despite often being resource constrained, the SMEs are a motor of innovation with inherent change characteristics often not found in bigger organisations, coupled with faster decision making processes. It is essential, however, that SMEs build adequate knowledge capital in the BIM space to improve their value creation processes to:

- Sell or export this knowledge to another organisation as part of their offering; and,



**David Philp MSc BSc FRICS
FCIOB FGBC
Head of BIM at Mace and
Head of UK BIM Task Group**

- Improve their offering, such as manufacturers who can liberate the data associated with their products to increase exports, create new markets or simply get specified earlier in the construction process.

There is much evidence to support the hypothesis that digital enabled workflows benefit the SME in the built environment. Organisations such as David Miller Architects (DMA) have seen both direct and indirect benefits through their BIM implementation; growing from a small to medium size practice through the efficiencies they are achieving, but also how they are being perceived differently by clients and through meritocracy competing for larger and more prestigious commissions.

Additionally, the tier 2 and 3 communities play an important part in enabling the larger tier 1 organisations. It is therefore essential there is a symbiosis between these parties to help each other up-skill and exchange digital data.

So where should an SME start their journey? Firstly start with the free stuff.

1. Perhaps I am a tad biased on this but visit the BIM Task Group website www.bimtaskgroup.org. This is a treasure trove of great resources on the BIM standards and processes. Be sure and visit the labs space and read the fortnightly newsletters.

2. Read PAS1192-2:2013 and PAS1192-3:2014 which looks at information management for the capital and operational phases of construction projects using BIM. These can be downloaded free of charge from the BSI website. They can be also be accessed via the BIM task group website.

3. Build a network – trust me, BIM is about open innovation and collaboration. Join the dots with your local Regional BIM Hub <http://www.bimtaskgroup.org/cic-bim-regional-hubs/> and the BIM4SME working group <http://www.bim4sme.org/> who are doing great work to raise the awareness and value proposition of BIM for smaller organisations.

4. Capability. You are probably already doing some BIM efforts but perhaps you don't even realise it. Have a review of how you create or manage your digital data. Do you use a common data environment? Work out where you are on your point of departure and determine what up-skilling is necessary to close the gaps. Consider both: knowledge of processes as well as skills on digital toolsets.

5. Have a play about. Most technology vendors offer free viewing, or indeed in some cases, free clash detection tools. Often viewing and reviewing models will be all you need and you can do it for free.

Do your duty. Ensuring the UK construction sector builds on its rich heritage and makes a big step into the digital frontier will be massively driven by the uptake of the SME community, so remember you can't hit a home run unless you step up to the plate.

Our digital universe is growing exponentially as are the opportunities. Big data, and the increasing value of the internet of things will all create new exciting prospects for the SME players in our fast changing built environment.

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BIM – From Design to Demolition

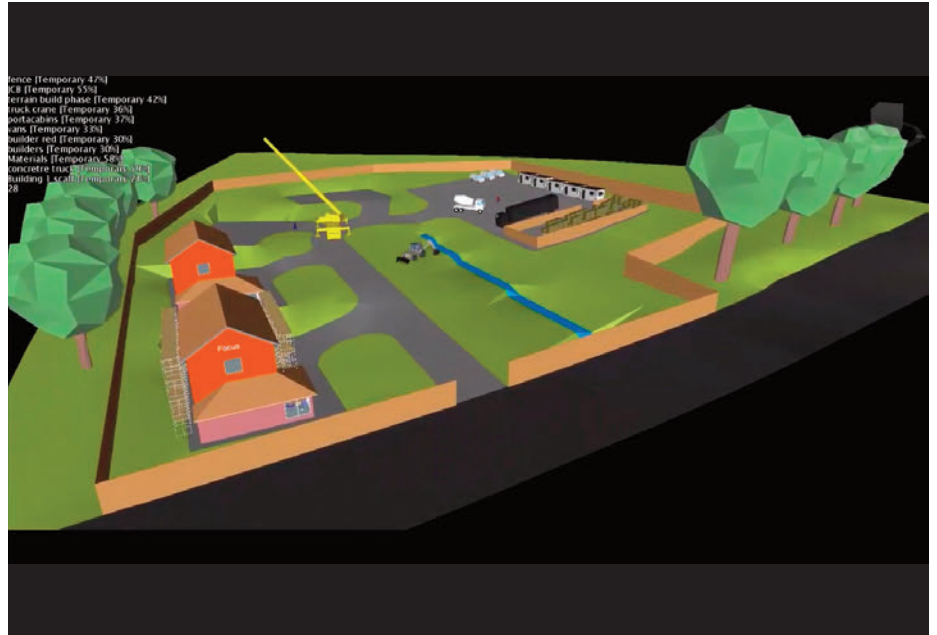
UWE Bristol launches new MSc in BIM to help meet stricter public construction protocol

Stricter government requirements on managing the building lifecycle for publicly funded projects are being met by the launch at UWE Bristol of a new MSc Building Information Modelling (BIM) in Design Construction and Operations. BIM is emerging as the industry standard approach to the modelling and management of a building's lifecycle, from design and construction to maintenance and demolition. The UK government's construction strategy has pushed forward the programme for adopting it – from 2016, all publicly funded projects will have to meet the BIM protocol. Public sector contracts are worth almost £37bn per year, making up a considerable proportion, 38%, of all UK construction output.

However, lack of education, skills and trained professionals are among the major obstacles to the adoption of BIM in the industry. UWE's postgraduate certificate, postgraduate diploma and master's degree courses in BIM in Design, Construction and Operations aim to respond to this challenge.

UWE Bristol programme leader Professor Lamine Mahdjoubi said, "Since BIM was introduced in the construction industry, it has become a worldwide focus of the construction industry. Many of the world's leading architecture, engineering, and construction firms are on the way to adopting BIM. However the majority of the construction industry is in the hands of small and medium enterprises (SMEs) who are not ready for such a sudden change."

What sets this programme apart is the context of inter-professional and multi-disciplinary



approach and expertise that exists in UWE's Faculty of Environment and Technology. Unlike existing postgraduate programmes in BIM, which tend to focus on specific aspects of building information management, such as design or sustainability, this new programme is more holistic in its approach and deals with the whole built environment lifecycle, including design, construction, operation, maintenance, and sustainability.

This unique programme emphasises innovative sustainable and collaborative practices in building information modelling and management. It will be distinctive in offering more employment opportunities for our graduates through the opportunity for work placements with key partners such as Stride Treglown Plc who are currently leading the South West BIM hub, and BAM Construction Ltd.

Keith Wildin of BAM Construction Limited said, "UWE Bristol is unique among education

establishments, having recognised that the BIM 'process' is more important than the 'technology.' This approach to teaching BIM will prepare students for working in a co-operative environment that has the potential to transform the UK construction industry by questioning current practices and developing technological knowhow facilitating the BIM process."



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Empowering the world's BIM community

The take up of BIM is growing, and with the help of a specialised online networking service dedicated to the construction industry, engagement should increase. Andera Al Saudi, Business Director for The BIM Hub sheds light on their vision...

The global construction industry is enormous, with over US \$7.2tn worth of construction projects completed every year, and is expected to grow by 67% to \$12tn in 2020. The construction industry is complex, fragmented and rife with problems such as delays, rework, standing time, material waste, poor communication, conflict and being over budget, compounded by the global slowdown and the need to address sustainability issues.

The challenge we all face is to encourage continued investment in tackling these issues in a market made 'nervous' by a reduction in the value of property and subsequent threat to profits. A way to restore investor confidence is through reducing investment risk by producing more at a lower cost, which can be achieved by eliminating waste and improving overall productivity across the construction process.

The BIM process

The Building Information Modelling (BIM) process and technologies have been developed specifically with these problems in mind and have been very successful in resolving them. BIM is a business process supported by technology, which itself is optimised by deploying the process. While traditional methods use technology in isolation, the BIM process uses technology in collaboration.

With the take up of BIM growing daily, the construction industry is going through change which many construction professionals believe will revolutionise the industry. Whilst adoption is increasing the actual level of BIM, the use is mostly limited to quantity take off and coordination of multi-discipline activities at the office. However, the use of the different 'BIM

uses' is slowly but surely growing including project management and construction sequencing. The full impact of BIM in the construction industry sector is yet to be realised.

To help the construction industry have a better understanding of BIM, a number of initiatives have been set up such as BIM associations, BIM forums, BIM task groups, BIM committees, BIM events, BIM conferences etc. all aimed at construction professionals to help them with information sharing and education. The greatest challenge in the construction industry is to connect the BIM stakeholders in a single specialised networking service, enabling the BIM community to work together.

Thousands of companies have started to promote their businesses in line with the BIM adoption in a quest to be more competitive, and are aiming to get a bigger stake of the AEC market. These companies have initiated changes within their organisations by setting up BIM departments and teams, or outsourcing to BIM service providers/consultants to help with the change process. This has led to an exponential increase in BIM related articles including presentations, papers, case studies, reviews, research material etc. which can be found through a quick search for 'BIM' on the internet. Whilst this enormous amount of BIM information is valuable, it is quite unstructured and takes a considerable amount of time to filter down to what the reader is looking for, and quite often the reader ends up spending hours upon hours searching the internet with little or no benefit in return.

Many of us actively use sites like Facebook and Twitter to promote our businesses. When looking to connect

with more business-related contacts we usually turn to sites like LinkedIn to develop relationships with people we have worked with or may want to work with. LinkedIn groups support a limited form of discussion area, moderated by the group owners and managers. The active use of these social sites has helped the growing use of social networking by business professionals. However, these sites are not really suited for meeting the growing need in supporting BIM professionals.

The BIM Hub is a pioneer in providing specialised online networking services dedicated to the construction industry. It provides the first social platform that brings all the construction industry into a single hub. The BIM Hub's goal is to empower the BIM community to better **connect, learn, develop** and communicate real world data and help people better understand and engage with the places we live, work and play, and together build a more connected, liveable and sustainable world. Features include the world's first BIM Company Directory, networking with construction and BIM professionals and an expertly-curated set of resources for all industry professionals. In the coming months The BIM Hub will include BIM related projects, tenders, careers and events.

Connect: Until now, connecting with others about BIM has been a formidable challenge. But when the strength and might of the construction sector is harnessed, streamlined and brought together through BIM, the industry as a whole will become stronger, more efficient and more effective. This will lead to improved efficiencies and profitability for those that adopt and adapt.

The BIM Hub enables everyone in the construction industry to network and connect whether they are government officials, project managers, consultants, architects, engineers, contractors, manufacturers, management operators or educational bodies.

Learn: Learning about BIM requires a great deal of time and effort. Construction companies and organisations are working in silos, left to their own devices.

Before The BIM Hub there were no online websites that covered the full spectrum of BIM information required to implement BIM. The BIM Hub is about usefulness and relevance of information today and tomorrow, in a trusted environment. The BIM Hub works to provide professionals with the best-curated content on BIM.

Develop: The BIM Hub develops the capacity of people to understand and implement improved policies, enhanced processes and overall, a better way of working to shape the evolution of BIM. The BIM Hub showcases the work of leading companies involved in BIM, developing and enabling businesses to benefit from interoperable processes and technology.

Join the BIM community free at www.thebimhub.com and help shape the future of the construction industry. ■

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The Leica Geosystems BIM Field Trip

Building 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.

Leica
Geosystems

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EMEA Director Software Solutions

Leica Geosystems

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Your BIM wants to get out of the office



Replicate the accuracy of your coordinated model directly into the field with Leica Geosystems digital layout solutions. Perform quality assurance backchecks and bring deviant points back to the model to evaluate and address downstream constructability issues.

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BIM Field Trip

by Leica Geosystems

For further information about BIM please contact Tahir Sharif tahir.sharif@leica-geosystems.com or call on 01908 513400



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BIM Level 2: Legal considerations

Understanding the contractual framework for the implementation of BIM is an important first step to removing any 'blockers' to successful BIM construction projects. Andrew Marsh, Partner at DAC Beachcroft LLP provides an overview of the legal considerations...

In 2013 the government launched its Construction 2025 Industry Strategy to provide a vision for "long-term strategic action by government and industry to continue to work together to promote the success of the UK construction sector". Building Information Modelling (BIM) was high on the agenda. It identifies BIM as critical to allow the sector to deliver more sustainable buildings more quickly and more efficiently.

The Government is keen to put the UK at the forefront of BIM and by 2016, all centrally procured government construction projects must be delivered using BIM. This will apply throughout the supply chain across all values of project. However, in the NBS' recent survey, 95% of respondents were aware of BIM but only 54% were actually using it. There could be a number of reasons for this relatively mixed take up; lack of knowledge, lack of opportunity, lack of technical skill or lack of resource. An understanding of the contractual framework for the implementation of BIM is an important first step to removing any 'blockers' to the successful implementation of BIM construction projects.

What is BIM?

"At its simplest level, BIM provides a common environment for all information defining building, facility or asset together with its common parts and activities. This includes building shape, design and construction time, costs, physical performance, logistics and more" (RICS "What is BIM").

BIM is used at a number of different levels of maturity from Level 0 being a paper based process with CAD drawings, to Level 3 which is a fully integrated and

collaborative process on a web-enabled hub. For 2016, the government target is Level 2 BIM in which separate disciplines create their own models but all project data is shared electronically in a common environment. The Construction 2025 Strategy expects to see the UK Government and industry to move to Level 3 BIM between 2013 and 2025.

The contractual framework for BIM

The contractual framework for Level 2 BIM has been established. Level 3 BIM presents a different set of contractual challenges which are not addressed in this article.

The government's BIM Strategy followed the recommendations of the BIM Industry Working Group which recognised that contractual issues had the potential to act as a source of inertia holding back the adoption of BIM on projects. The Working Party report dated March 2011 recommended little change to the 'fundamental building blocks' of existing contracts to facilitate working at Level 2 BIM.

The Working Party recommended the use of simple amendments to existing standard form contracts, to incorporate standard BIM Protocols and Service Schedules to define BIM specific roles; ways of working and desired outputs.

The Construction Industry Council's (CIC) response to the Government's BIM Strategy was to issue a CIC/BIM Protocol for use on all common construction contracts to support Level 2 BIM. There are other Protocols available, but this article concentrates on the CIC/BIM Protocol so as to illustrate the relevant

issues. Further, the JCT does anticipate the use of the CIC/BIM Protocol (“the Protocol”).

The Protocol makes minimum changes to pre-existing contractual arrangements and sets out the parties obligations to provide defined elements of their works/services using models. Once incorporated the Protocol is a contractual document and takes precedence over the other contract documents.

The CIC also sponsored the production of PAS1192-2:2013, by the British Standards Institution, which is a specification for the information management requirements necessary for working at BIM Level 2.

The Protocol should be read in conjunction with PAS1192-2:2013.

The Protocol

All parties engaged in a project using BIM are required to have the same Protocol appended to their contracts. This will ensure common standards and methods of working. It is the responsibility of the Employer in each contract in the supply chain to ensure that a Protocol is appended to the contract.

The Protocol includes a ‘model’ amendment to expressly incorporate the Protocol into standard forms of contract.

Model Production and Delivery Table (MPDT)

The MPDT is a key contractual document annexed to the Protocol. It defines which models are covered by the Protocol, allocates responsibility for the preparation of the models and identifies the Level of Detail (LOD) required at project stages or ‘data drops’.

Definitions of LOD’s can be found in PAS 1192-2. The project stages or ‘data drops’ should match the stages used on building and infrastructure projects, or professional appointments, such as RIBA Plan of Work.

The Information Requirements (IR)

The IR is the second key contractual document annexed to the Protocol. The IR contains the information necessary for the production and development of the

models in a consistent and uniform way across the project. For example, it will prescribe the Common Data Environment, the software details, file formats, file layers, the language, abbreviations and symbols, zoning requirements and information protocols such as spatial co-ordination and information exchange.

It is the responsibility of the ‘Information Manager’ to agree and issue the IR, which should be incorporated into all contracts on the Project.

The Protocol assumes that the IR (and the MPDT) will be completed and developed by someone with a strong technical knowledge of BIM.

The Information Manager

The Protocol requires the Employer to appoint an Information Manager. It is expected that this role will form part of a wider set of duties, and is likely to be performed by the Design Lead. However, it could be a stand-alone appointment if the employer chooses to.

The scope of services for the Information Manager needs to be properly defined in its Appointment.

The CIC have published a Scope of Services document for the role of Information Manager which includes:

- Establishing the Common Data Environment;
- Establishing processes and procedures to receive information into the Information Model;
- Maintaining the security and integrity of the Information Model;
- Agree and implement plans for the provision of information, the level of detail and the relevant stage.

The Information Manager has no design related duties and is in effect, the ‘policeman’ for the Information Model.

Intellectual Property Rights

As a consequence of the increased collaboration

necessary when working on a project using BIM, the issue of intellectual property rights is obviously a concern and it is specifically addressed in the Protocol.

The provisions in the Protocol regarding IP rights are reasonably complex, but the basic principles of the arrangements are as follows:

The ownership of rights in the models produced by a Project Team member remain vested in that Team Member.

However, the Employer is granted a non-exclusive licence to use the material in the models for the 'Permitted Purpose' which is defined as; "a purpose related to the Project (or the construction, operation and maintenance of the Project) which is consistent with the applicable Level of Detail of the relevant Model and the purpose for which the relevant Model was prepared".

The licence also permits the Employer to grant sub-licences on identical terms to other Project Team Members. The licence does not include the right to change any information in the Model without the Project Team Member's consent, except in limited circumstances. So, in short, the Intellectual Property rights in the Information Modelling remain with the originator, but the Employer and the other Project Team Members have the benefit of licences to use that information for 'the Permitted Purpose'.

Clearly the definition of "Permitted Purpose" is an important one, hence the importance of addressing properly the terms it refers to in the MPDT and IR.

Performance Obligations

The Protocol requires the Employer to ensure a Protocol is incorporated into all Project Agreements, that the IR and MPDT are reviewed and updated at relevant stages, and that an Information Manager is appointed at all times.

The Project Team Members are required to produce the specified Models to the required Level of Detail specified in the MPDT, using the level of skill and care

required under the original contract, at the stage(s) specified in, and in accordance with the IR.

In terms of liability for the Information Modelling, the Protocol states that a Project Team Member shall have no liability for the use of, copying of, amendment of or modification of such information other than as permitted by the licence to use for the 'Permitted Purpose'.

Similarly the Employer's liability for any Information Modelling provided to the Project Team Members is limited to that in respect of the licence it granted for use for the 'Permitted Purpose'.

Conclusions

The contractual framework for operating at BIM Level 2 is available via the Protocol, supplemented by PAS1192-2 and existing standard form contracts.

These are standard form documents. Amendments to these documents could create increased liability and contractual uncertainty.

The effectiveness of these contract documents is assisted by careful comprehensive and informed preparation of the technical data which supports them – the MPDT and the IR.

The above is a summary of the contractual considerations. This is of course a 'new' area for participants in the industry and it is recommend that legal advice is obtained before entering into any contractual arrangements. ■

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BIM – defining better information management

BIM, 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.

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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

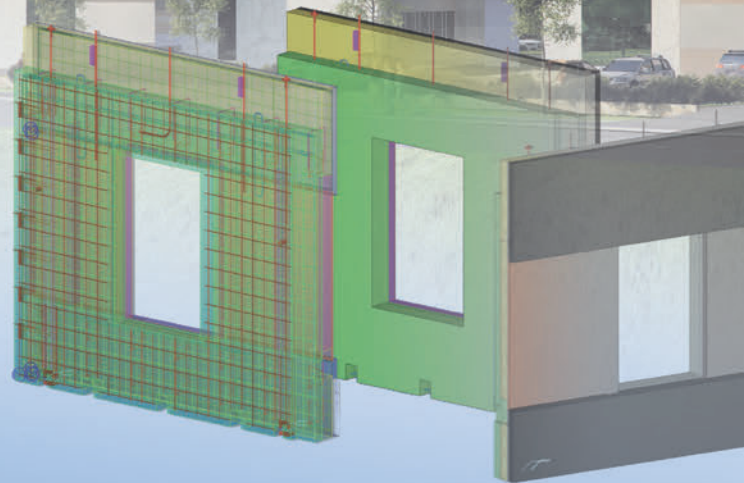
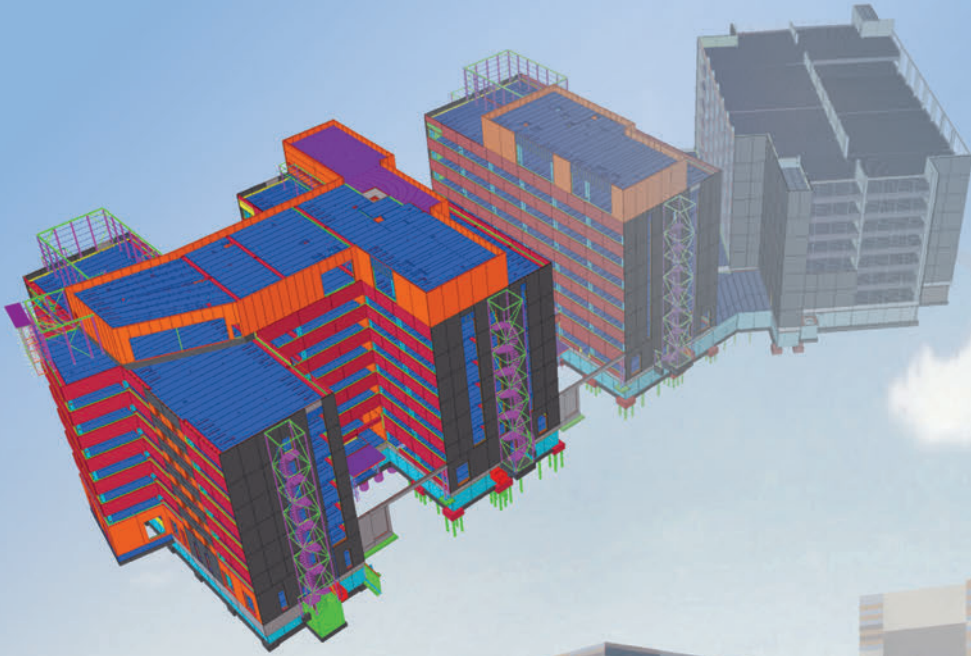
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With the almost daily BIM announcements by clients, contractors and suppliers identifying their increased efficiencies and greater value by adopting BIM, not to mention the Government drive towards adoption by 2016, Tekla recognise that forming a BIM 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.

For further information on how Tekla can assist with BIM implementation and other consultancy services we offer, please call 0113 307 1200.

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Designers – don't be scared of BIM

Alex Wall, Managing Director of WCEC Group Ltd discusses the benefits of BIM for SME's and provides advice for new adopters...

Within the world of BIM there is a lot of jargon and a lot of discussion about revolutionising the process of design and construction.

This in itself leads to anxiety and becomes a barrier to BIM adoption for many SMEs. With the government target of "Level 2 BIM" now less than 18 months away this is further increasing levels of anxiety, confusion and uncertainty.

My message is simple. **Don't panic.** Focus on your business needs and how you can benefit from this technology. BIM technologies offer a much more efficient and effective tool to design with. You should adopt BIM technologies to increase your efficiency and give you competitive advantage.

I have repeatedly seen that the effective adoption of BIM software can increase design productivity by between 20 and 40%. I have seen this across multiple sectors and disciplines, at all stages of design and for all sizes of projects. Design information can be produced more quickly and more accurately with associated schedules both linked and automated.

Improved collaboration, coordination, project planning, procurement and cost control can be viewed as secondary benefits together with potential project tender requirements. Focus on your primary goal of design efficiency. The other benefits will follow.

I suggest a 5 point plan for easy cost effective pain free BIM adoption:

- **Start small** – get one or two workstations set up and train a small number of staff;
- **On the job training** – select and deliver a trial project using BIM;

- **Allow time** – your first project will take longer and be less efficient. You get more efficient on every project;
- **Be structured** – naming and data entry are important. Adopt industry standards such as the AEC (UK) BIM standards;
- **Get help** – employ a consultant to help you learn how to use the software efficiently and understand the standards.

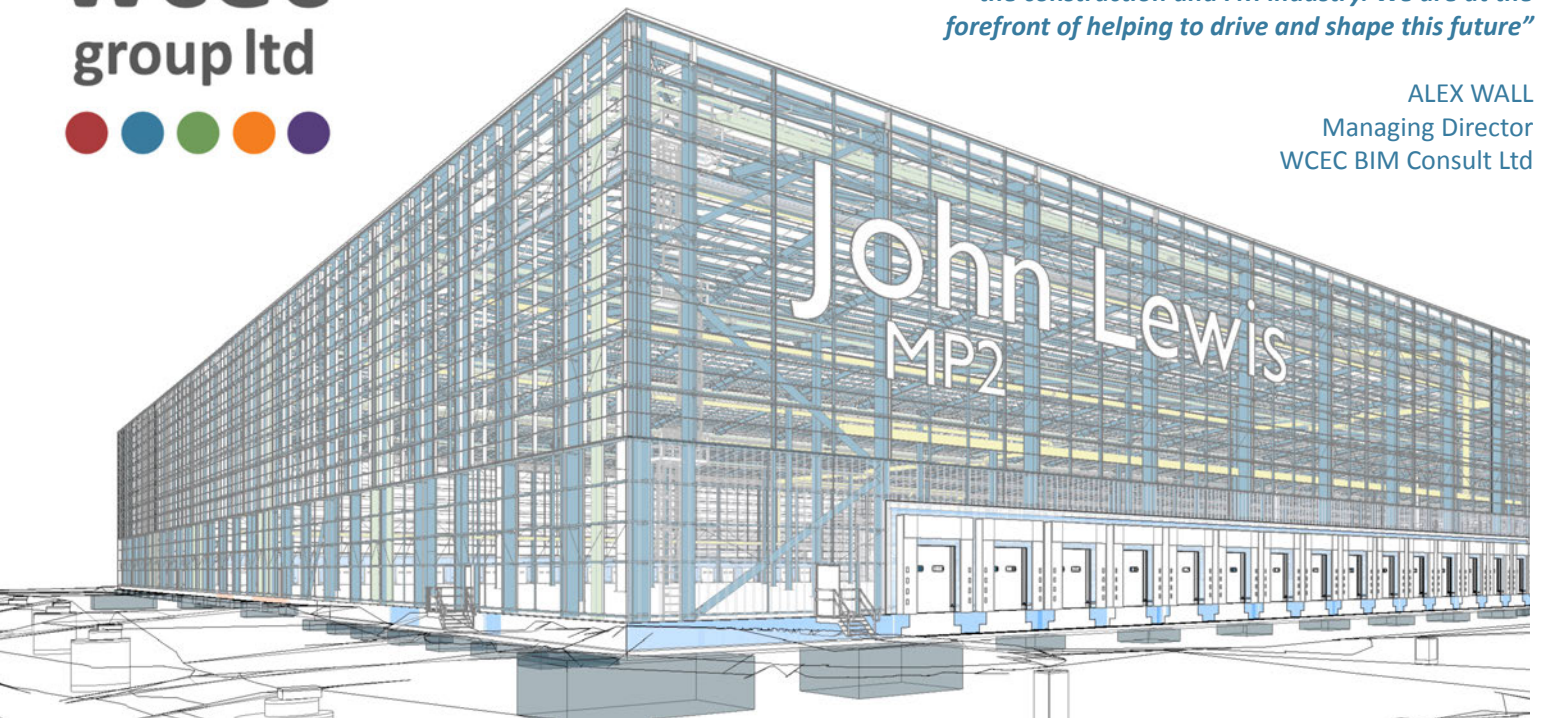
Don't spend a lot on software and train people who are not ready to use BIM. To be effective, people need to work on real projects and be dedicated to getting the most out of the software. I would also suggest you don't pay for expensive protocol documents to be written (they are probably only cut and pasted from the industry standards anyway).

The first project will be hard but don't be put off. Levels of efficiency will continue to increase. Efficiency is derived from having good libraries of design components and comprehensive drawing and schedule templates. These will develop over time.

The potential of this technology is exciting so focus on how it can benefit your business. ■

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"If implemented correctly BIM is an efficient process which saves time and money at all stages of the construction process. It should be central to how we manage designs, costs and construction works timely, efficiently and accurately."

DAVID BIRD BIM Manager, WCEC BIM Consult Ltd



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