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INSIDE:

Jon Kerbey, Director of BIM at HS2, explains how BIM will be utilised on the UK's first high speed rail endeavour

Kath Fontana, Managing Director of BAM FM and chair of RICS FM PG board, shares her thoughts on why it's important for the facilities management industry to engage with BIM now



Read more on pages 80 and 81

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Introduction



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Welcome to the Spring edition of BIM Today.

Opening this bumper publication is an interview with Jon Kerbey, Director of BIM at HS2, who explains how BIM will be utilised on the UK's first high speed rail endeavour. In the interview, he outlines how HS2 has a duty as a major infrastructure project to help to educate on, and promote the use of BIM within the construction industry. He goes on to touch on how HS2 will address the skills gap, along with what his views are on implementing BIM successfully.

Richard Waterhouse, the Chief Executive at NBS and RIBA Enterprises also writes in this edition analysing the results of the fifth annual NBS National BIM Survey. He described the results as "the most intriguing yet" and echoes the sentiments of Jon Kerbey, also touching on the skills gap that is becoming apparent. Waterhouse comments that: "the availability of resource and expertise that can research, implement and educate the industry in new ways of working (including BIM) is limited".

We also present an article from Andrew Carpenter, Chief Executive of the STA and Chair of BIM4Housing who believes that when it comes to BIM, the housing sector has very much been a latecomer in terms of implementation. Although the BIM4Housing members are dedicated

to implementing an easy to use BIM structure, the main obstacle being faced concerns collaboration and integration from the wider housing industry.

Kath Fontana, Managing Director of BAM FM and chair of the RICS FM PG board makes a welcome addition to our range of experts, discussing why it's important for the facilities management industry to engage with BIM right now, and what professionals in the industry need to know about it. She argues for the need to understand the impact of BIM on the FM sector, saying that every FM business should have a BIM strategy so they can plan their approach and allocate appropriate resources.

In addition, we have articles from John Tebbit from Robust Details, John Eynon, Chair of the CIC South East Regional BIM Hub and Dr Anne Kemp, Chair, BIM4IUK and Vice Chair of BuildingSMART, amongst a whole host of industry experts.

There will be something of interest for all our readers contained within this edition, and I look forward to hearing your thoughts and suggestions for future content. Until then, happy BIMming! ■

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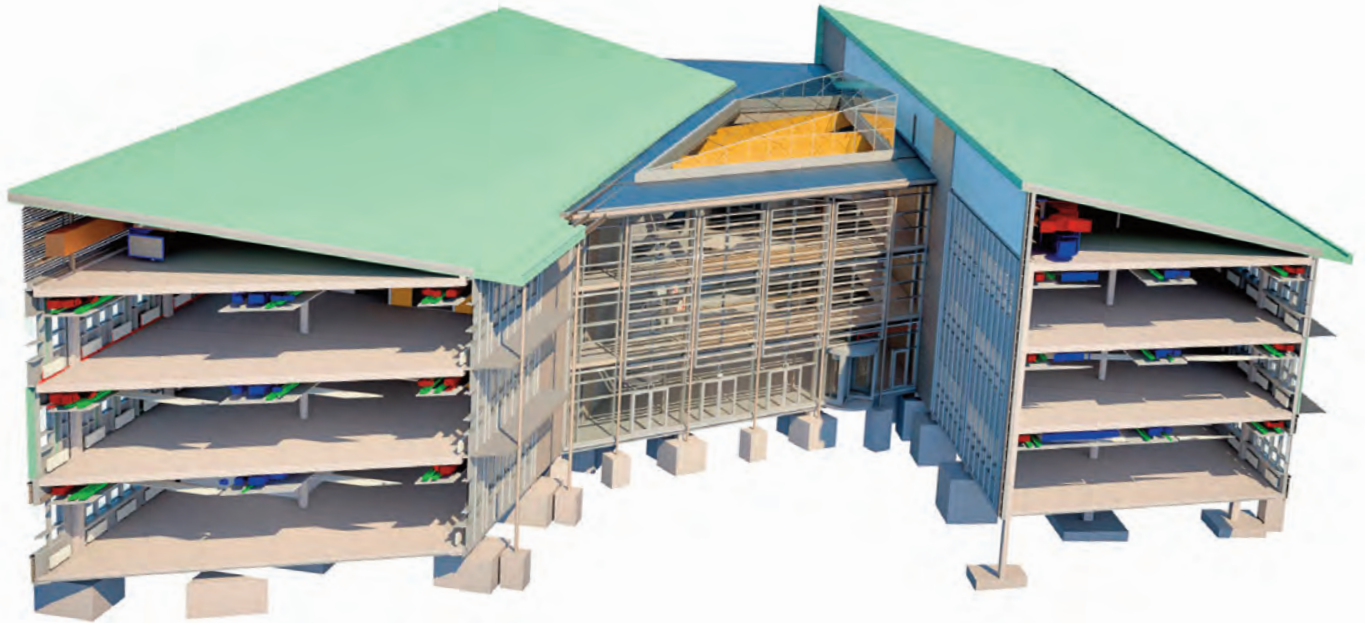
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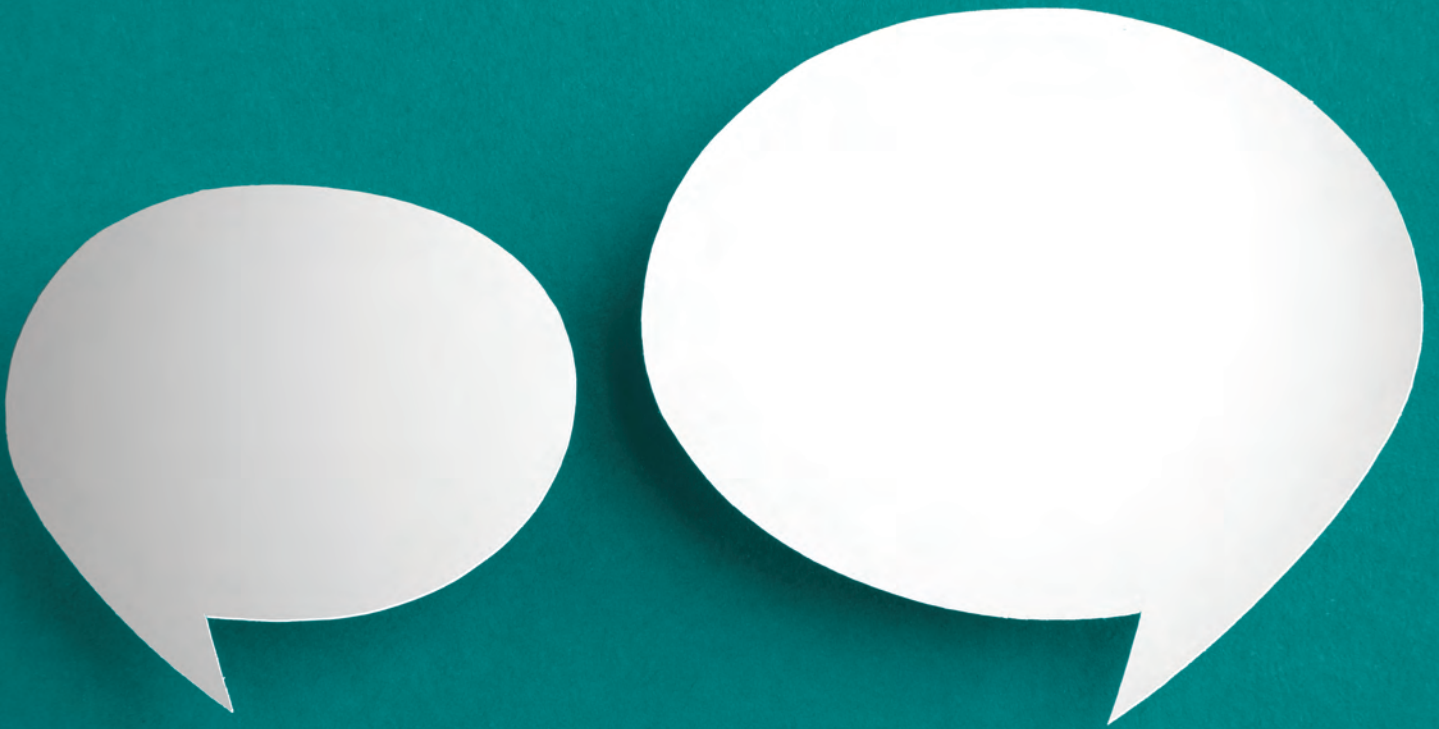
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BIM the HS2 way

In an interview with Jon Kerbey, Director of BIM at HS2, he explains to Editor Lisa Carnwell, how BIM will be utilised on the UK's first high speed rail endeavour...

HS2 has not been met with universal glee from everyone in the UK and still has its critics with many believing there is no real business case for it. Whatever your stance, the now Conservative-led government have always maintained its importance for the UK economy and will strive to ensure its implementation. They believe that HS2 is all about the future of building and strengthening the economy and the importance of recognising the growth of cities and the need to link them efficiently.

The first phase of HS2 between London and Birmingham was voted for in the House of Commons last year with a staggering majority of 452 to 41. The Hybrid Bill is now going through the parliamentary scrutiny process at Select Committee stage, where they are examining the route with a fine tooth-comb. It is hoped that the Bill will receive Royal Assent sometime in 2016.

Construction of the first stage will begin in 2017 with enabling works, utility diversions and demolition. Major tunnelling and civil engineering work will start in

2018. Once complete, the new line will connect with the existing network north of Birmingham to allow services to travel onward to places like Liverpool, North Wales, Stoke-on-Trent, Glasgow and Edinburgh.

It is estimated that around 26,000 people will work on delivering HS2 with more than £10bn of civil engineering contracts due out for tender later this year. A project of this scale demands an approach that can handle the complexities of large-scale infrastructure – BIM of course was the natural choice for delivery. Jon Kerbey outlines the fact that:

"Nothing as yet has been built, all our value lies in our data about the railway. Using BIM as the methodology and the mechanism for capturing all that data and turning it into useful information and knowledge is the backbone of the project's success".

Standards

Using the standards involved in working to BIM Level 2 ensures that HS2 can use them in contracts to specify to the supply chain. Kerbey explains:



of the recommendations resulting from it. One is to develop an up-skilling portal – as described by Kerbey as like “a web-based environment for interested parties to visit and learn about guidance, what we are doing, and what processes we will have, and what it means to meet the requirements of BIM in HS2.” The portal is due to be released in the next couple of months.

“It will be open to everyone and we will continue to develop it as our requirements become clearer and we get closer to procurement and contract awards,” Kerbey says.

“The content will be continually developed to make sure it is useful to everyone – not just our supply chain. We want it to be as helpful as possible to the wider construction industry, picking up the baton from Crossrail in terms of what they have done for industry, by learning their lessons and hopefully moving industry on.

“It is part of our duty as a major infrastructure project to help, but without catalysts like HS2 and Crossrail, it can be difficult to get momentum. The government has done a great job in promoting awareness of Level 2 and - at the end of the day – there’s nothing like the lure of big contracts to motivate firms.”

It is widely recognised that the UK has a shortage of the required construction skills, especially for HS2, or indeed any large rail project. At the moment, we have many capable of basic construction skills up to level 2, but HS2 need at least 50% of the workforce to be above that level. They are addressing this shortage through assisting the Department for Business, Innovation and Skills to establish the new [National College for High Speed Rail](#), which will help to develop the next level of skills needed by the time of peak construction. HS2 will be able to act as a catalyst for the industry - giving it a shove on BIM, but also a shove on basic level skills too.

It is hoped that by initiatives such as the new college, the image of engineering can be changed. No longer should the sector be seen as just manual work – with the advent of BIM, there are whole new careers available with technology at the heart. Only 1 in 7 engineering graduates are women. There is no real

“We have examined some of the standards to see how we can implement them most effectively and efficiently throughout all the supply chain. Because some standards are more accepted than others in terms of the supply chain capability level, we ran a supply chain upskilling study last year which was published back in October [available here](#).

“It clearly showed that Tier 1 companies are confident in meeting the standards as they are already doing BIM, or are well on the way to doing it. However, the study showed that if HS2 doesn’t intervene with Tier 2 organisations and below, there may be some issues with them meeting the requirements. HS2 are working on that at the moment – how we can best engage with them, and what that engagement looks like.”

Education and skills

Being engaged with the supply chain also means that HS2 are quite visible in conferences and events – explaining what they are doing, what they want to do, and what their vision is. As part of the up-skilling study, they are starting to implement some

reason for this low figure – it just needs a little encouragement for them to take up the new roles. Industry is changing quickly, but people's perceptions are lagging behind.

Challenges

Any project of this scale will create many challenges, but foremost on Kerbey's 'worry list' at the moment is that of procurement. He discussed the issue of specification stating it was vital that:

"We are specifying in enough detail for our supply chain – making sure we have the right information and BIM standards within the contracts, and making sure we have the right incentives in place to ensure we can deliver on our requirements".

He went on to say that:

"It's hard to specify really early in a project – which is what BIM requires for it to be successful – so you need an intelligent client. It's difficult to maintain the balance between under specifying so that you have complete flexibility in the supply chain, and over specifying so you almost stifle innovation. There aren't many user cases to go against, but working closely with Crossrail has enabled us to understand how they would do things differently this time".

The software

Kerbey outlined that it was important to remain agnostic in their approach to the software used in the BIM process. They have listened to what the supply chain want and are trying to take technology out of the equation by concentrating on the information required. He explains:

"The reason we want to remain agnostic about software use is because if we were to dictate a software platform or design package that all of our supply chain had to use, it might mean that it may not be relevant to all of the disciplines that require different software packages.

"Also, we would be putting a massive reliance on some of our smaller suppliers to upskill in a package they may never use again on another project. This would be a big investment for them, not just from a training perspective, but also a software licensing perspective. The suppliers are comfortable with the packages they already use and they know how to get the best out of them in the most efficient way. We want to take advantage of that. If we as the client can accept data from any software package, then that will help the supply chain."

This software agnostic approach should also enable a simple approach to COBie detailing. The ability to use the data schema as the data exchange protocol doesn't change the approach as to whether HS2 used a single, or a multi-vendor route. Using a standard format to validate and to check asset information against it is vital. As Kerbey explains:

"If we can standardise data throughout the entire supply chain, then we've got a relatively easy job of joining everything together. However, the amount of data is really a different matter. This is one of the areas that we are testing at the moment – just to ensure that it is effective and efficient and we can do something with it."

A successful BIM project

So what does a successful BIM project look like? What first steps are the most important? For Kerbey, the key is standardisation. This was the first aspect made clear in the project – making sure that everyone had standards to work to that achieved standardised data deliveries, and that there was a

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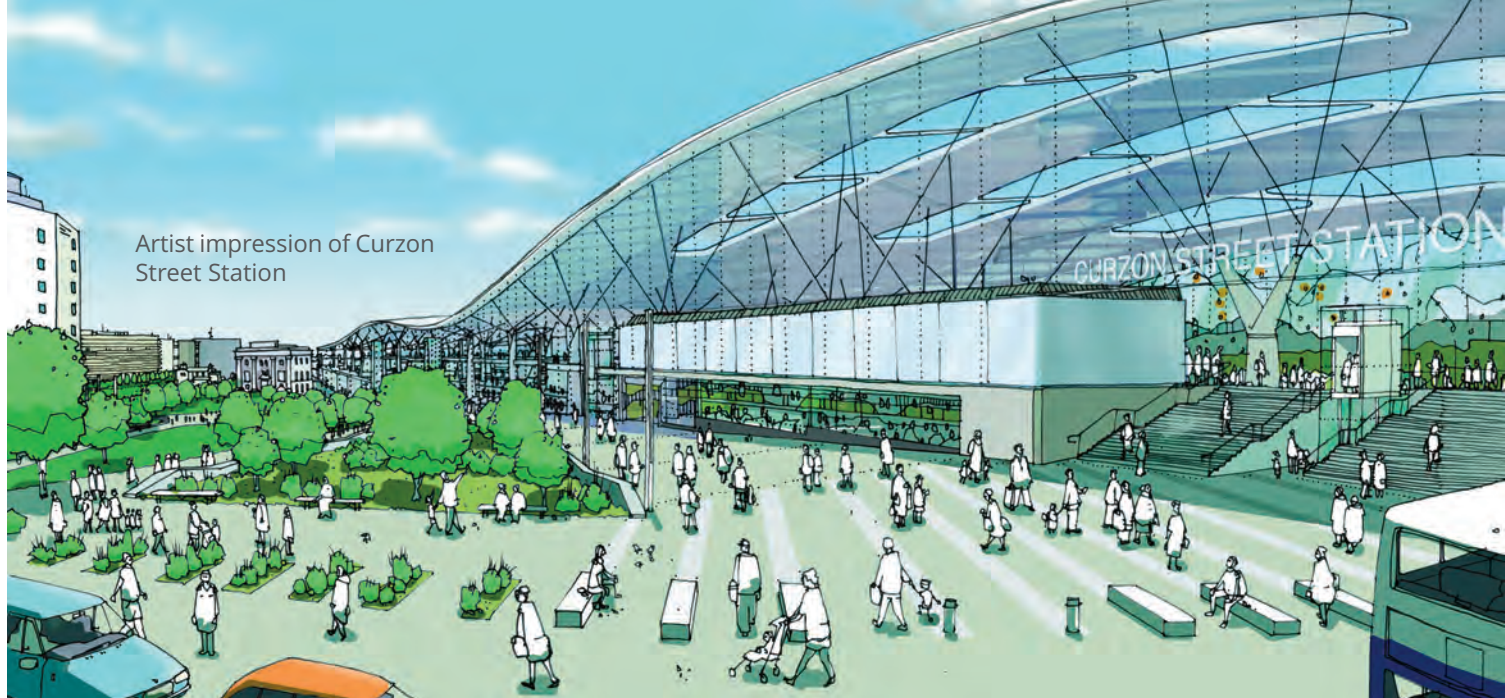


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standard common data environment that people actually worked in. This for Kerbey ensured they could improve the validation and assurance processes and streamline some of the delivery, and therefore, examine what efficiencies could be achieved.

One of the biggest benefits of BIM is that by working in a virtual world, the project can be tested and certainties realised very early on. As Kerbey described:

“When you do finally get onsite, you know what’s going to happen, when it’s going to happen, what will go where, and where people will be – the whole process is about mitigating risk. We are doing this earlier than anyone has before which has meant a change of working. BIM is very much about a cultural change and about people making decisions early on in the project. It has certainly presented more opportunities than it has frustrations, and provided a big learning curve for both the client and the supply chain.”

HS2 is reaping the lessons learned from Crossrail, which is perhaps Europe’s largest construction project to date. In an [interview](#) in an earlier edition of PBC Today, their Head of Technical Information Malcolm Taylor, said that the Crossrail project would be “exploiting, exploring and developing technologies that will be copied and built upon in future projects”. He wasn’t wrong. Kerbey acknowledged that one of the lessons learned means that:

“We actually understand a lot about our assets already. Even though we haven’t built anything, we have virtual assets and we know where they are down to a certain level of detail. We are capturing

information about them now and that will continue to mature as we go through construction, moving to as-built asset information. The big benefit is having a really efficient hand-over of information from HS2 construction, to operations and maintenance. By working in a data driven environment now, and to a standardised approach, we will be able to hand over data easily.”

Meeting the 2016 deadline

The question of whether industry will meet the 2016 deadline is usually met with a similar response to that of Kerbey, who said he hoped they would. It seems pretty clear that those who are already engaging in BIM are seeing the benefits and will continue to develop their processes, but there is still some work to do. The HS2 supply chain BIM upskilling study showed that with certain tiers of the supply chain, some progress is still required and for Kerbey, he believes that:

“We need to make BIM fit for purpose, particularly for the lower levels in the supply chain – making sure they understand what they have to do, and that BIM is not a big unwieldy beast that maybe Tier 1 organisations have to cope with. It’s important to make it relevant to the people and organisations that are doing it.” ■

Jon Kerbey
Director of BIM

HS2 Ltd

www.gov.uk/government/organisations/high-speed-two-limited

www.twitter.com/HS2Ltd

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New tools are empowering designers to explore new materials, builders to take advantage of innovative construction methods, and entire project teams to deliver better performing projects.

BIM, there is no turning back. It is no longer a question of why but how do you best take advantage of BIM? What's your take on BIM? BIM is about integrating data, people, and processes in a unified environment.

Technology is the enabler and supports BIM processes. Today we are seeing projects delivering a return on investment in BIM when our users integrate people and processes, and are supported by appropriate technology.

The new Abu Dhabi Midfield Terminal Building project is a great example of a BIM-driven approach. This approach is fundamental to facilitating the delivery of this extraordinary project through its lifecycle - and is helping to minimize risk and ensure project success. In this project, the Consolidated Contractors Company, part of the TCA Joint Venture of TAV, CCC and Arabtec, managed to reduce the cycle of critical RFIs from 28 days down to 2 - 7 days. They saved USD 1 million and 51,000 working hours by resolving clashes between just the façade and other disciplines.

How are you supporting your customers in their BIM journey? Cadventure, a partner of Bentley Systems provides software and services that empower multi-discipline project teams to advance to what some call BIM Level 2 by facilitating optioneering as well as enhanced project delivery. Among these offerings are OpenPlant, AECOsim, and OpenRoads. Secondly, being able to collaborate and share information throughout the project lifecycle regardless of asset types is paramount. Bentley's ProjectWise has long been the recognized industry standard for work sharing for design integration. Just two months ago, we launched ProjectWise Essentials, which we like to think of as "ProjectWise for everyone." With ProjectWise Essentials, organisations of all sizes can now get immediate access to ProjectWise capabilities. It is fully provisioned as a "software at your service," providing cloud-based access to ProjectWise and incorporating industry standards such as BS 1192 workflows, best practices, and processes based on our experience in working with larger organisations.

We also understand that projects vary in size and complexity. Bentley's R&D team is committed to delivering solutions that are scalable in terms of the multidisciplinary project teams engaged in the effort, project size, project complexity, and geographic distribution.

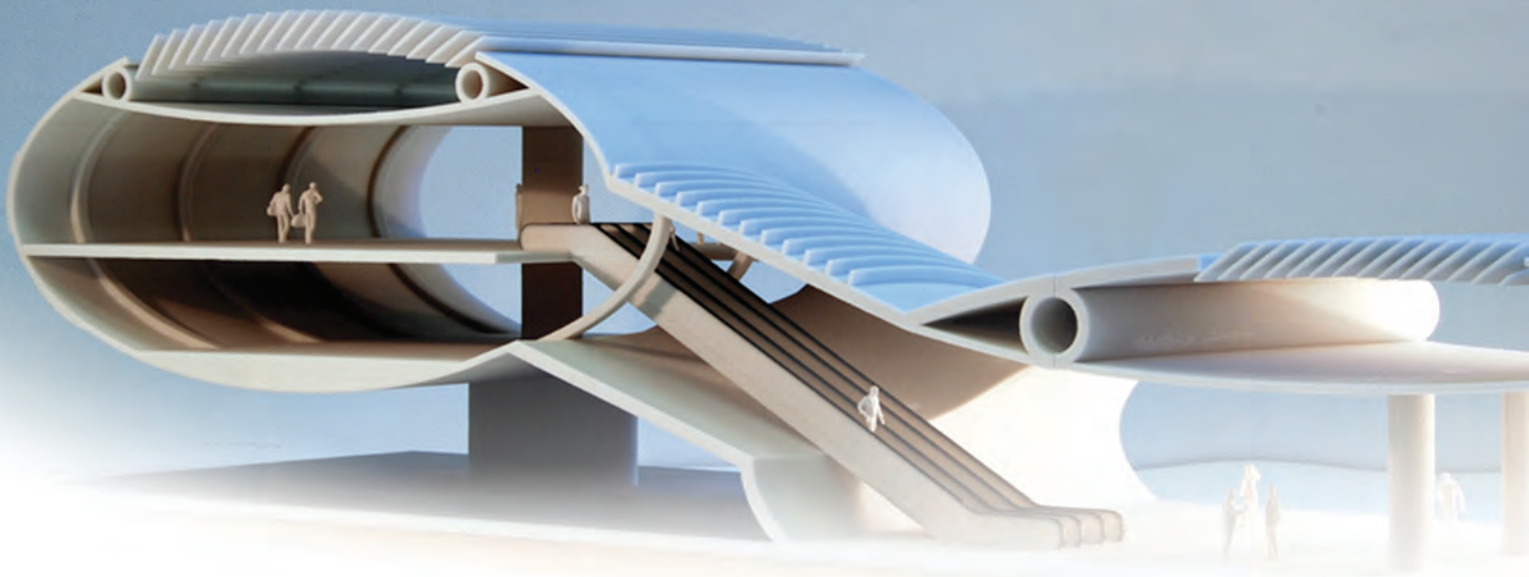
With Bentley's proven technology and LEARNservices, they help users address their design, engineering, and construction challenges. For example, The Crossrail-Bentley Information Academy was launched as part of a technology partnership with Crossrail, Europe's largest infrastructure project.

The Academy, located in Bentley's U.K. headquarters, educates participants in the people, processes, technology, and workflows required to achieve the Crossrail target of delivering a worldclass asset, and is one of the innovative initiatives helping Crossrail become among the first organisations to reach BIM Level 2.

The challenge for any organisation is to get the most advantage of constructible models? How do you respond to that challenge? The mission is to help users gain more visibility into the path of construction. That's why the focus is on improving information mobility, construction modeling, and industry interoperability. For example, Bentley is collaborating with Trimble to deliver realworld solutions that will transform the design to construction workflow - by enabling greater information mobility through ProjectWise CONNECT Edition and Trimble Connect platform.

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The BIM countdown to 2016

As the BIM clock continues to tick, Kath Fontana, Managing Director of BAM FM and chair of RICS FM PG board, shares her thoughts on why it's important for the facilities management industry to engage with BIM now, and what professionals in the industry need to know about it...

Facilities management (FM) is a discipline that has the power to change organisations of all shapes and sizes for the better. Whether it's the improvement of estate management, the restructuring of how goods and services are procured or the more effective use of company facilities, FM plays a vital role in bringing about positive benefits when viewed as a strategic necessity.

It's when thinking about the vast array of functions covered by FM practitioners that one can't help but realise the impact that BIM is going to have on the sector – particularly when it comes to helping the sector do its job with greater efficiency and effectiveness.

Take the public sector for instance. Its increasing focus on BIM shows that the operational stages of a project will only become more important and it expects FM to be ready for these new ways of working. There are a few things happening that only increase the importance of BIM for the FM sector.

The first is fulfilling the government mandate of reaching Level 2 BIM by 2016, which requires all project and asset information, documentation and data to be electronic. This target is less than 200 working days away.

The recent [Digital Built Britain](#) report is clear about how the government wants to move BIM after 2016. This includes creating new commercial models that link design/build/operate contracts, and developing commercial mechanisms requiring FM to deliver against BIM standards. Public sector requirements are going to be increasingly robust for FM. We can't ignore this momentum and we need to respond well to this public sector challenge.

Secondly, the private sector is very keen on BIM, especially for new speculative developments. BIM is seen as cutting edge and high-specification premium buildings expect to have a model as part of the handover package. Facilities managers working with premium developers are starting to be asked to handle BIM and digital FM.

The final point is a general one around data. The term 'big data' is a little overused but management of data, transparency, management information, smart buildings, aggregation of data, smart cities, etc are all becoming much more important. FM must be aware of this new focus.

Interestingly, Jones Lang LaSalle has recently said its vision is to be a technology company that delivers property. It wants to use data to enable clients to make strategic decisions about their property assets, especially during the operational phases.

FM and BIM maturity

On the BIM maturity scale, FM is roughly at Level 1, i.e. data is moved around manually, or sometimes electronically through spreadsheets, but it's not federated or validated. For some, achieving Level 2 by 2016 will be quite a challenge.

There's some talk about a Level 3A, which is effectively an enhanced Level 2 with added operational depth. Unfortunately, some clients don't want to engage with BIM and the FM supply chain because they can't find a commercial or contractual solution for it, other than varying a building contract or consultancy agreement. This is a barrier to adoption but the wider industry reaching Level 3A will actually help FM achieve Level 2.



10 things FM should know about BIM

- BIM is just as much about digital FM as it is about virtual construction.
- BIM is bringing transparency of asset data and so it is bound to change how FM is procured and managed.
- It's absolutely not about more work, it's about smarter working.
- It applies to all public and private sectors and all types of property, from housing to hospitals, and will be incredibly useful for all buildings, not just new build.
- Project size does not matter. As more buildings of all sizes have models, BIM will be the standard way to do things.
- It's not about technology; it's about process and collaboration. Facilities managers do not need to be experts in CAD technology or 3D modelling.
- New commercial models are coming and FM should help shape these.
- A focus on post-occupancy evaluation will mean FM needs to support the collection, interpretation and analysis of this data.
- Facilities managers need new skills and capabilities to engage with BIM, work with post-occupancy evaluations and get involved with the design teams etc.
- The BIM genie is out of the bottle – there's absolutely no going back.

BIM benefits for the FM sector

A great example of a practical benefit can be seen in our work at a large general hospital. There was a fire in the client's (non-BAM) facility, impacted by failed fire dampers and breaches in firewalls from post-construction installations. Safety Notices were issued to every establishment requesting information on the fire dampers and firewalls in all buildings.



Kath Fontana, Managing Director of BAM FM and chair of RICS FM PG board

Using our building information model, we were able to generate a full schedule of information for the BAM facility in about 15 minutes containing asset numbers, classifications, locations, etc. This saved us around four days of effort and had an intangible benefit of increased client confidence in us.

“On the BIM maturity scale, FM is roughly at Level 1, i.e. data is moved around manually, or sometimes electronically through spreadsheets, but it’s not federated or validated. For some, achieving Level 2 by 2016 will be quite a challenge.”

In contrast, we recently received a new build project to price on a tender basis. We had four weeks to analyse the job without an asset register, and using only 150 general arrangement PDFs, which is quite typical for the industry. How much easier would this be using BIM?

Be proactive

We must understand the impact of BIM on the FM sector. Every FM business should have a BIM

strategy so they can plan their approach and allocate appropriate resources.

BIM is a fast-moving field and FM must engage and influence how the operational aspects of an asset are developed digitally. If this isn’t done by us it will be done to us.

The BIM clock is ticking. Are you ready? ■

For more information on BIM, visit <http://www.rics.org/uk/tag/bim/>.

.....
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"BIM, Digital Life and the Third Industrial Revolution"

"It is not the strongest species that survive, nor the most intelligent, but the ones most responsive to change." *Charles Darwin*

Do you remember the ZX Spectrum? Commodore 64? Amstrad PC? Betamax and VHS? How things have changed! Then there is the internet, email, and the like. Facebook has 1.2 billion users, founded in 2004, vying for largest nation with China and India. Twitter with 500 million is larger than the USA. The world is our oyster thanks to 4G, smartphones, and online information 24/7.

This digital revolution is transforming our lives as individuals, industries and communities. Music is the most recent example where MP3s and iTunes transformed how music was produced, distributed, and sold.

Our lives have been digital for many years. Consider Electronic Point of Sale (EPOS), and handling of our banking and transactions. Using Big Data machines, corporations analyse our digital footprints to profile our spending patterns and lifestyles.

The reasons and drivers for our industry to move to digital – BIM and Common Data Environments – lie more outside than within!

Across the Internet of Things (IoT) or Everything (IoE), all around us machines, objects and sensors of all kinds are communicating and sharing data.

16 billion devices are projected to be connected on the IoT by the end of 2014, 50 billion by 2020, and one trillion by 2040.

This is why migration to BIM for our industry is absolutely inevitable.

"16 billion devices are projected to be connected on the IoT by the end of 2014, 50 billion by 2020, and one trillion by 2040."

All of the above things become possible; joining up buildings, assets and infrastructure, individually and on an urban, national and international scale. BIM isn't about a single building or asset, nor just design and construction. It's about how we live in the built environment and share and use information about absolutely everything.

This is a Darwinian moment for our industry. The First and Second Industrial Revolutions were about mass production. The Third Industrial Revolution is about the information economy – how digital industries are changing our lives. We trade, consume and use information/data all the time and we need to adapt both as individuals and businesses.

The 2016 Level 2 deadline approaches and in theory the target will have been met for some of the leading government departments. Outside of Whitehall the picture is very different as we all know. Supply chain and upskilling SMEs will remain high on the agenda for several years in achieving consistency of Level 2 adoption.

Simply implementing the 3D aspects of BIM, plus some data transfer in a federated CDE would represent a huge step forward. The benefits would be obvious in terms of less waste, higher quality and profitably. That's a good place to start, but as an industry we have a long way to go to fully implement BIM Level 2.

And for next time...The CIOB BIM Handbook and UK BIM Level 2 – The 8 Pillars of BIM!

John Eynon is a writer, blogger and consultant. You can catch up with him at www.zenanddm.com

Check out his website at www.openwaterconsulting.co.uk



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BIM – the digital wave detox

John Tebbit, Managing Director at Robust Details Ltd outlines his concerns about BIM and how the digital wave should be seen as the equivalent of a detox by getting rid of unnecessary processes...

Early in 2014, as a deputy chief executive of the Construction Products Association, I set up BIM for Manufacturers and Manufacturing (BIM4M2) and then promptly left. Despite, or possibly because of this tough love approach, BIM4M2 is thriving (see www.bim4m2.co.uk).

Even though I'm now in the world of house building as managing director of Robust Details Limited (www.robustdetails.com), BIM, or more accurately digital construction, still has a great deal of interest for me. Indeed by not being in the trenches of the BIM movement but in the helicopter high above, I feel that some aspects have become clearer.

First let me nail the myth that somehow the manufacturers are lagging in the digital world. Most architects and contractors will contend that they are

the leaders, and even the odd client will vouch for their visionary stance. Actually guys, you really are newcomers to the digital world. The simple fact is that digital controls for manufacturing started in the early 1950s and today, virtually all manufacturing processes are controlled digitally. From my own experience in timber based manufacturing in the early 1990s, we had AutoCad drawings being converted into files that were transferred to the computer controlled machinery that processed tens of tonnes of chipboard an hour. Manufacturing is now virtually all digital, from the design of the products to the manufacturing process, the QA and testing, and of course the sales order processing.

The problem is the format of the digital information. Nowadays designers and contractors want the manufacturers to provide information in specific

(and not always consistent) formats. However, even within manufacturers' own companies there are often systems that cannot talk to each other very well. So rather than "driving innovation down the supply chain" as I often hear, a far better approach would be to ask the manufacturers about their existing digital data and how it could best be shared and used.

The second area that worries me is that lawyers are increasingly interested in BIM. I have a rule of thumb that whenever lawyers and/or the city financiers are interested in something, it means we are making that thing too complex. There is the anecdote that the construction industry spends more on lawyers than it does on research and development. Whether that is true or not, it feels true. Couple that with the most powerful marketing strategy of all, FUD – or fear, uncertainty and doubt, then look at all the lawyers circling round and warning about moving to fully shared digital models and processes, and it leads me to believe that the legal industry really doesn't want to lose a very profitable gravy train. Sure there are some big issues but letting the lawyers design the process is like asking energy companies to design and run a programme that reduces energy consumption in housing. What? You say we have done that.....ah well, I suppose there is always the first turkey that will vote for Christmas.

The third area is a fairly technical one. Virtually every CAD system relies on assembling elements together, often from a library of standard elements. When these elements are joined in the design, there are usually rules embedded in the elements that say how they join. This works quite well as most manufacturers sell elements or parts of them, so they can supply the digital models of the elements.

However, many of the problems in construction are not with the elements themselves. They are with the interfaces between elements. As we move towards zero carbon, the heat leaking through these interfaces, often called linear thermal bridges, is becoming critical.

It would be really helpful if we could have a library of standard interfaces that then had rules embedded within them about how they extended their edges to produce elements. That would also help me with robustdetails® where we have a pattern book comprising standard interfaces of walls and floors.

I have spoken with many CAD and BIM experts about this and almost without exception I have been told that this is possible now, but then when I have asked for real examples none has yet emerged. Perhaps the interface driven modelling approach rather than the element based approach is yet to arrive. I suspect it will always be a hybrid approach.

In summary, the digital wave is already well into construction. No industry hit by the wave has ever resisted it for long and construction will be no different. At the moment though, too many people are trying to digitise their existing processes rather than thinking it through properly. We don't have bar code coordinators in every shop checking whether the bar codes are right, so eventually the construction industry will also need to accept that digital data doesn't change in transmission.

We will always need the creative designers, the makers of the stuff and things and the people who put them together. Anything more than that is just waste and the sooner we see the digital wave as the equivalent of a detox, getting rid of unnecessary processes, the better. ■

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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.

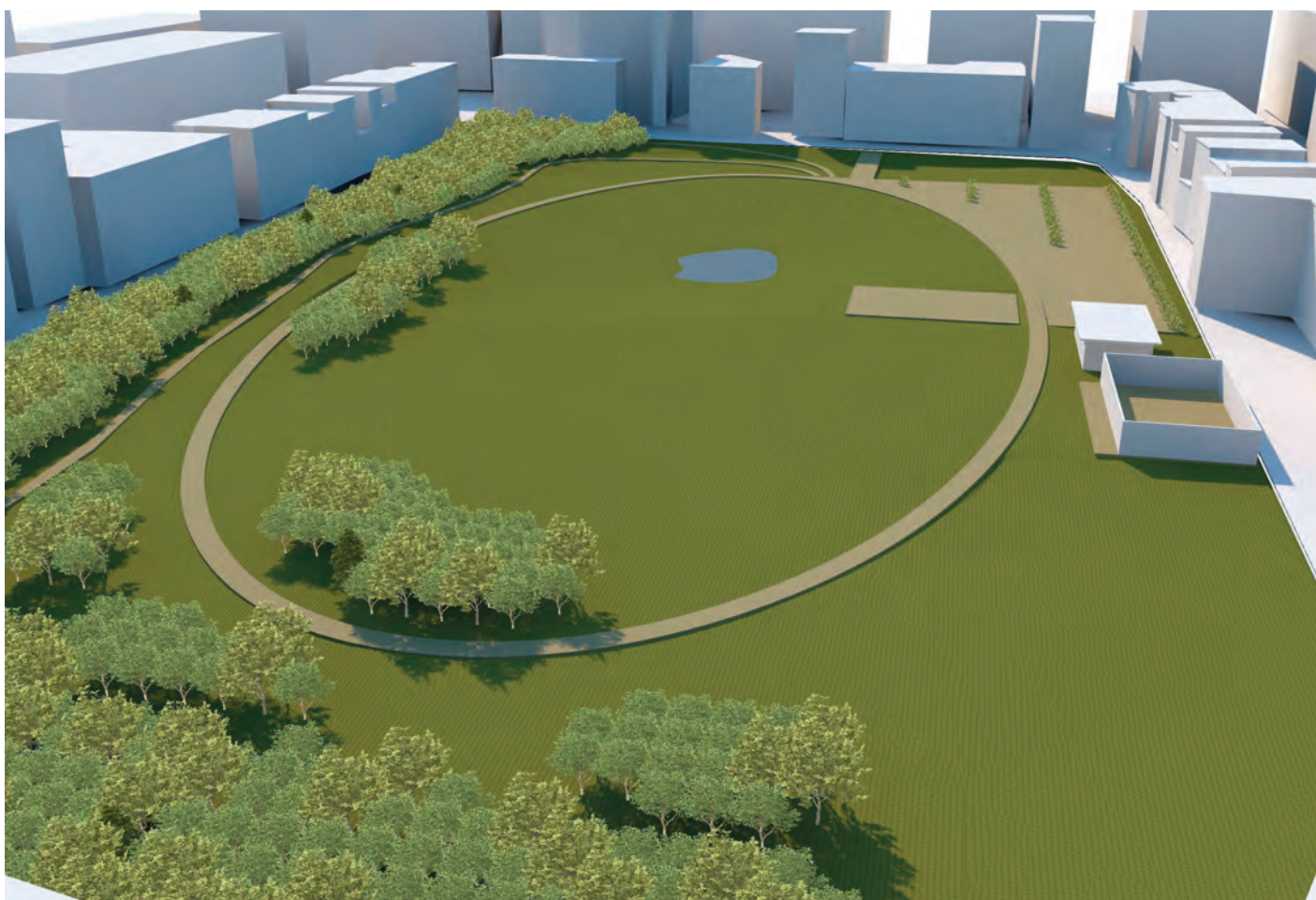


For information on the Lloyd's Register BIM Level 2 Accreditation Scheme please visit the BIM scheme guidance document on our website which may be accessed by the following link:

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

Or contact:

Terry Mundy
Business Development Manager
Tel: 07712 787 851
Email: terry.mundy@lr.org



Getting our BIM data in order

Martyn Horne of the Landscape Institute's BIM Working Group explains why BIM data in the form of COBie requirements is not something to fear...

To paraphrase the former Chief Construction Advisor to the UK Government, Paul Morrell, BIM is an opportunity for the construction industry to get its data in order. Of course BIM is a lot more than that, and the ability to create models of building and landscape projects in the virtual world prior to construction offers all sorts of benefits such as design analysis, clash detection, pre-visualisation and increased levels of automated design documentation. However, in this article I want to talk about data or information — the 'I' in BIM. The UK Government's BIM Mandate for Level 2 is fast approaching and the provision of data in a standard known as COBie is an important aspect of that mandate.

The UK Government BIM Level 2 Mandate and COBie

The ability to attach or embed data to virtual 2D or 3D geometry is not new. For example, I have been working with Nemetschek Vectorworks since the mid 90's, and even back then it was possible to assign data to objects in order to automatically generate schedules, reports and bills of quantities. The problem with working in any software of the time was that due to a lack of data standards, almost every project, certainly every practice, used different sets of data, which typically evolved idiosyncratically over a number of years. The difference with the BIM evolution is that collectively, as an industry, we are trying to agree

common data standards throughout the lifecycle of a project chain. This involves the multiple tiers of the supply chain, the consultants, architects, landscape architects, designers, the contractors, facilities management consultants and the client.

Such a big project will take time, and for it to be successful, it will be necessary to tackle it in a number of stages. This is precisely the approach of the UK Government and the BIM Level 2 Mandate for 2016. One of the aspects of this mandate is the ability to deliver COBie compliant data. As described by Bill East of Prairie Sky Consulting; “COBie is the list of all the managed and maintained assets in a building.” He goes on to say that “the data delivered matches the information provided on the design schedules”. With my Landscape Institute hat on, I would substitute ‘building’ with project, in order to encompass wider industries such as landscape and infrastructure. Many commentators incorrectly refer to COBie primarily as a spreadsheet. It is more accurate to describe it as a data set which corresponds to a common standard, which can, if so desired, be presented in a spreadsheet format or which can also reside in a database. The important aspect is that the data corresponds to a common standard.

Why is COBie criticised?

To make my position clear, I think COBie is a good thing even if it does come in for some criticism. Often, I hear the general term that ‘It doesn’t work’. This is generally unhelpful and simply leads to increased levels of what my colleague Robert Anderson, refers to as ‘FUD’, in other words fear, uncertainty and doubt. Having said which, there are a few factors which can lead to COBie failing.

First is the misunderstanding that the full COBie dataset needs to be completed at the outset of the project. This misapprehension leads to consultants involved in the design stages to complain that their creativity is being stifled. The reality is that COBie can be completed in stages and the data is built up over time reflecting the level of resolution and detail of the design in progress. In the CIC Digital Plan of Work, there are several formal ‘data drops’ ie designated points in the design process where a data exchange takes place between the various members of the project team.

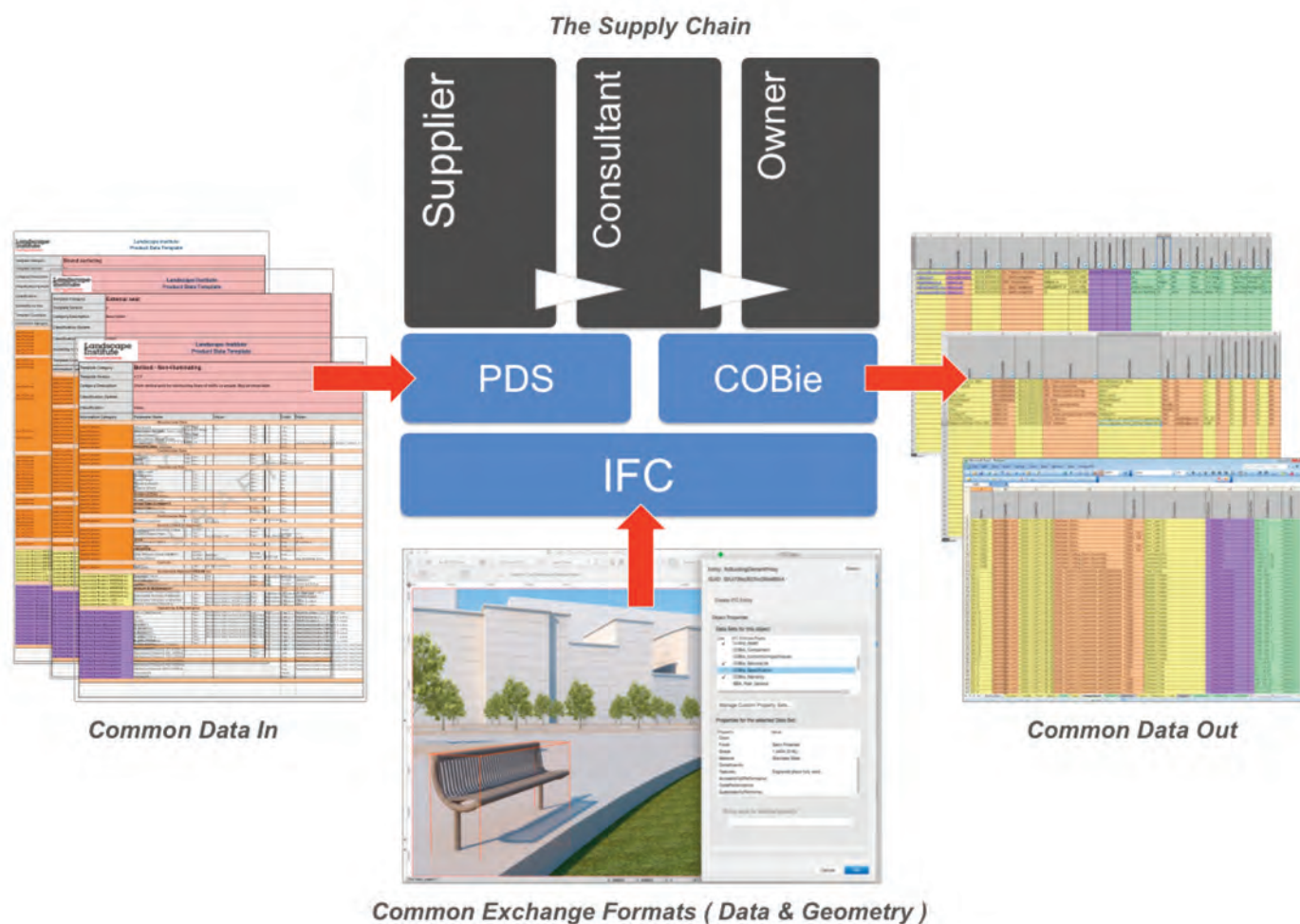
The early COBie data drops contain little more than a confirmation of the brief and schedules of the conceptual spaces, zones and areas of the building, site and landscaping. These are easily produced from today’s BIM software.

It is only during the later COBie data drops that an additional refined dataset is required. At these stages, COBie requires a listing of the types of object used within the project, followed by individual components of the design and then the specific manufacturer and supplier.

The requirement to provide product manufacturer details leads to the second misapprehension about COBie – that of product attributes. COBie allows for product attributes to be supplied at the later stages of the project. There are two questions to consider here. Firstly, where does the designer get this information from and secondly, is it necessary to provide a complete product data specification for each object within the BIM?

To address the first question, let’s be clear, it is not the intention of COBie to place the burden of data input onto the shoulders of the architect designer. Instead, this will be fulfilled by the development and implementation of common industry standards for product specification. Initially called SPie in the US (Specifiers’ Properties information exchange) this has evolved in the UK into what we know as Product Data Templates (PDTs) and Product Data Sheets (PDSs) – simply put, these are common templates (PDTs) supplied by the respective industry institutions (such as CIBSE, Landscape Institute) which provide a common set of data fields. They are templates because at this stage they contain only the field names but no actual data. These templates are then filled out by each manufacturer, and supplied to the design team in the form of Product Data Sheets or preferably, digital models embedded with the same common Product Data Information.

Various organisations such as CIBSE and the Landscape Institute are working on these data templates as we speak, and we are currently in a period of consultation with manufacturing organisations and the manufacturers themselves. Another interesting development on this side is the formation of a



BuildingSMART group including representatives from ARUP, Nemetschek Vectorworks, RIBA NBS, the Landscape Institute and the BRE, in addition to several international organisations who are looking specifically into how these data templates will fit into the open BIM standard of IFC.

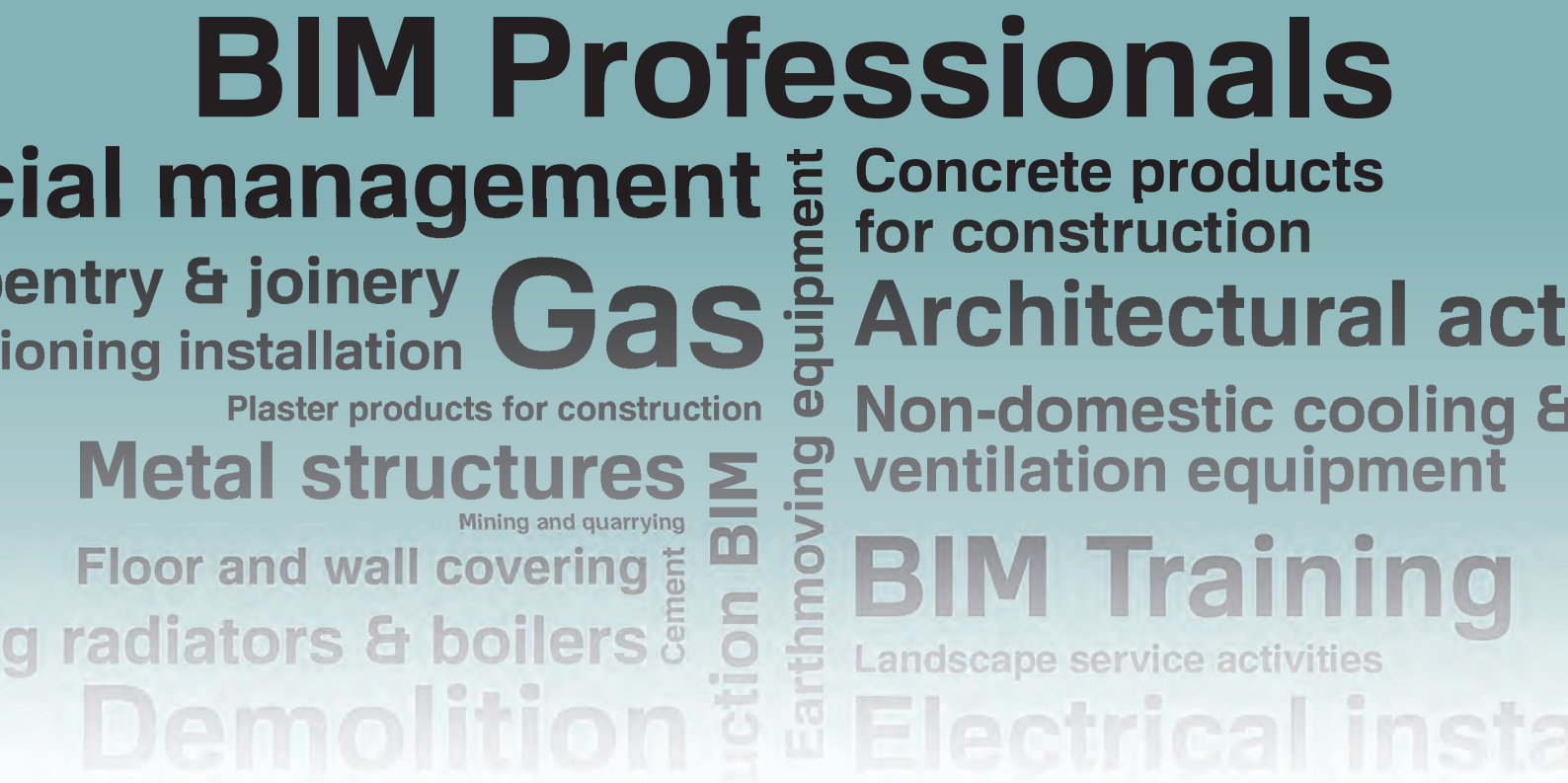
It is fair to say this is an evolving process and with this in mind it is important that when COBie is requested at the outset of a project, the Attributes section of the COBie dataset is considered carefully at this point in time. This is where it becomes critical to have both a BIM Execution Plan (BEP) and an Employers Information Requirement (EIP) document in place at the outset of the project.

To address the second question, as to whether it is necessary to supply a complete product specification for each object within the BIM, the current consensus would suggest that it is not. Instead, we need to think about a number of aspects; what information is required to make an informed decision about which

product to use in the design; what information needs to be supplied in order to construct the project; what information will be required to maintain the project and what information are the manufacturers able to provide. The Product Data Templates and Sheets project outlined above will, I believe, go a long way to answering these questions and it will be very interesting to see how this aspect of the BIM process evolves to help us collaborate together effectively and get our data in order. ■

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YOUR ONE-STOP-SHOP PLANNING DIRECTORY

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www.adjacentgovernment.co.uk/npbc/



INNOVATION IN VECTORWORKS BIM

READ AXIOM ARCHITECTS STORY ON GETTING STARTED WITH BIM

THE PRACTICE

Since Axiom Architects was founded in 1986, the practice has grown from its origins in Lewes, East Sussex, to become a well-established company with experience in a variety of sectors from hotels, bars and restaurants, to offices, residential schemes and educational projects across the UK and abroad. Our projects have allowed us to work with a wide range of clients, including multinational organisations as well as small companies and individual private clients.

Vectorworks Architect has been our primary CAD programme since its origins as MiniCAD, though it is only over the last 2 years that the practice has begun to adopt a 3D working method and started to explore the benefits that Vectorworks provides as a Building Information Modelling tool.

STARTING SMALL - PREMIER INN HOTEL, CLACTON

The construction of a new Premier Inn in Clacton represented our first use of BIM on a live project. The proposed scheme was a 3 storey new build hotel comprising 66 bedrooms with a ground floor reception and restaurant and associated staff facilities. The building followed a relatively simple rectilinear form and had a limited number of room variations based on a standardised layout.



Given the modest size of the scheme, the high degree of standardisation and repetition and the project's fairly modest size, the proposed hotel was ideally suited as a BIM test. As a relatively model design, it also offered potential for BIM components used in this project to be refined and developed on later jobs offering future efficiency savings.

Timescale was also a key consideration, the intended project programme allowed 16 months from the start of RIBA Work Stage 4 to completion on site. The scheme followed a traditional procurement route with a 12 month construction programme, allowing 4 months to complete production information for the project.

EXPLORING BIM ON A LARGER PROJECT - HUB BY PREMIER INN, KINGS CROSS

With the success of Premier Inn across the UK and London, 2014 saw the public launch of 'hub by Premier Inn', it's first hotel opening in the West End of London in November that year. This hotel was also the first in the UK to achieve a BREEAM Outstanding rating.

The hub concept is based around an affordable compact bedroom designed for city centre locations that includes high tech features such as high speed wi-fi and mobile app operated lighting, air conditioning and smart TVs. Making the most of the space available, the compact room design features various fitted components to maximise functionality of the room within an area of 11sq m. Given the compact footprint and extensive level of fit-out to each room, accuracy of construction and furniture specification was key to delivering a successful product.

After working on that project and developing the prototype design in a 2D traditional manner, the similar standardised layouts, bespoke fitted components and innovative high-tech room design were well suited to a BIM approach.

MANAGING A CONSOLIDATED MODEL

With a more developed understanding of 3D working in Vectorworks, initial BIM development for the project sought to develop a project resource library of building elements and symbols for key



components and room types and establish an organisational framework for the project.

Working in 3D and developing BIM information substantially increased file sizes beyond those we had previously been dealing with, but learning from previous trial projects, it became essential to plan out how the model was constructed to both limit file size and enable more than one person to work on the project at any time. To streamline work, the general model co-ordination was managed by the project leader who referenced detailed sections, schedules and room layouts to be worked on by others in parallel.

BREEAM BENEFITS

Another benefit in using a Vectorworks BIM workflow was the ability for information such as materials quantities for building elements to be quickly and accurately scheduled for Key BREEAM credits. Use of spaces allowed floor finishes and areas to be easily calculated. Floors, walls, roofs and partitions were scheduled to allow environmental ratings for the various elements to be measured.

DEALING WITH DESIGN CHANGES

Over the course of design development, various aspects of the scheme and Hub brand were changed. Through the use of a 3D model



and project symbol library, such changes could be easily and quickly accommodated, with changes in plan automatically updated in elevations, sections and other drawings referencing these key sources.

The ability for Vectorworks to quickly and easily filter out construction component information also meant that the same construction model could be used for planning applications without the need to draw separate schemes in parallel.

EXPORTING 3D INFORMATION

Whilst we are yet to use BIM collaboratively, this project did involve some limited exports of 3D information. The 3D model was used to generate Cinema 4D computer visualisations, which was also exported for the purposes of Rights of Light negotiations, helping to accurately establish the daylight and sunlight impacts of proposals upon surrounding properties. At tender stage an IFC 2x3 format

model was also exported, allowing tendering contractors to call off materials quantities and obtain more accurate pricing information.

CONCLUSIONS

Whilst we are only taking our first few steps into the world of BIM, Vectorworks BIM capabilities have allowed us to progress fairly smoothly from our previous 2D working into 3D without the need to learn new software packages or suffer problems of compatibility moving from one CAD platform to another.

Written by Luke Bray of Axiom Architects and Jonathan Reeves of Jonathan Reeves Architecture

Architectural Design
www.axiomarchitects.co.uk

Vectorworks BIM Training & support was provided by Jonathan Reeves
www.jra-vectorworks-cad.co.uk

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Vectorworks Architect - Supporting Building Information Modelling workflows from concept through completion

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Are you BIM ready?

What to ask of your business

In part 1 of a series of articles, NBS asks if you are BIM ready, and outline what your business needs to do before 2016...

The UK Government has mandated that all centrally-funded work is to be undertaken using BIM by 2016. This is now less than 12 months away, and for those organisations that haven't yet done so, this series of articles explains how to implement BIM in your organisation – and don't worry, it's not too late!

The process of implementing BIM is about change management, first and foremost. To do this successfully, the process needs to be carried out methodically. The best way is to make a 'BIM implementation plan', and the steps for this are outlined through the course of this series. Part 1 deals with the first step, which is to undertake an audit of your existing business.

Business audit – part 1

1. Establish your existing BIM maturity level

The Government mandate for next year is for BIM maturity Level 2, for centrally-funded work. The maturity levels up to and including Level 2 have been defined, although Level 3 is still to be finalised. However, most organisations that haven't yet achieved Level 2 will probably already be complying with one of the lower levels; and of those who are already aware of the existence of maturity levels, 35% are currently only one step down at Level 1 ([source: NBS National BIM Survey 2015](#)).

Broadly speaking, Level 0 represents the use of CAD for 2D drafting only, and no collaboration between parties. Level 1, meanwhile, includes the use of 3D CAD for conceptual and presentation work, with data being shared electronically; often by the main contractor (this has in fact been increasing in popularity over the last five years or so). For Level 2, 3D CAD models are developed by each design team, sharing

the information not simply as 'prints' (whether paper or electronic, such as PDF) but in the form of the CAD model itself, albeit exported to a common file format that can be read by other software applications. It is the common file format, together with the management and method of sharing the data, which underpins the definition of Level 2, and which requires more rigorous application and implementation of standardised working methods than may have been the case previously. Like Quality Assurance, BIM Level 2 is aimed at ensuring that information is produced and shared in a consistent and standardised manner.

Refer to [BIM levels explained article](#) on theNBS.com for more information.

2. Existing client base

Look at your existing client base. Are they public- or private-sector clients? Do they need to comply with the Government mandate? Do they want to comply anyway, for 'best practices' reasons? The Government mandate is in respect of 'all public sector centrally-procured construction projects', so if the majority of your workload comes from healthcare or educational projects, for example, then BIM Level 2 compliance will almost certainly be unavoidable if you don't want to lose established business relationships.

Aside from your clients, what about the contractor organisations that you most commonly work with? Larger contractors are more likely to require BIM collaboration, because their workloads may take in public-sector projects, even if yours doesn't.

3. Nature of existing work

Review your existing workload, as well as past workload. Are any current projects, or clients, public

sector-based? Have you completed any publicly-funded work in the past, where there's a chance of repeat work? Or has your organisation only ever been involved in private-sector works?

Perhaps equally importantly, do you have reason to believe that BIM could benefit current (or planned) projects? Are there any past projects where, in hindsight, collaborative working could have improved the project outcomes? For example, were any profits reduced as a result of discrepancies between design team information; or could building operating costs have been reduced if thermal modelling had been able to be carried out at an early stage of the project?

4. Future work sector plans and ambitions

Looking forward, what are your plans or ambitions for the direction of your business? You should already have an up-to-date business plan which will answer this question. Do you want to maintain what you're doing now, or move into other work areas? In the aftermath of the recession it could pay to follow the old adage that, spreading workload between different work sectors can help to reduce exposure to future downturns.

Do you want to expand, for example into the public sector, or even to cash in on international work? BIM is being talked about on a global scale, not just the UK, and foreign competitors are equally likely to be up-skilling.

5. Existing skills

Examine the skill sets of all of your existing staff. This may mean conducting a survey to pick up any training or qualifications obtained by staff since they joined your organisation. Do any of them have relevant skills, which could assist in implementing BIM practices, and possibly remove the need for outsourcing training? Have any of them expressed any specific interest in BIM? Enthusiasm can be a significant aid to implementing change to long-established working practices in an organisation.

BIM working isn't just about software, and a range of skills will be required. Suitable skills could include:

- 3D CAD expertise;
- IT and networking knowledge;

- Data transfer, security, and sharing;
- An aptitude for teaching and encouraging others;
- Familiarity with standards, data management and protocols;
- Project management experience;
- Coordination and liaison skills;
- Financial and performance measurement/assessment. ■

Parts 1-4 of the series available at theNBS.com.

Useful links

BIM levels explained – article on theNBS.com
<http://www.thenbs.com/topics/BIM/articles/bim-levels-explained.asp>

The 20 key BIM terms you need to know – article on theNBS.com
<http://www.thenbs.com/topics/BIM/articles/the-20-key-bim-terms-you-need-to-know.asp>

NBS BIM Object Standard
<http://www.nationalbimlibrary.com/nbs-bim-object-standard>

NBS BIM Toolkit
<http://www.thenbs.com/bimtoolkit/>

NBS National BIM Survey 2015
<http://www.thenbs.com/topics/bim/articles/nbs-national-bim-report-2015.asp>

RIBA Plan of Work 2013
<http://www.ribaplanofwork.com/>



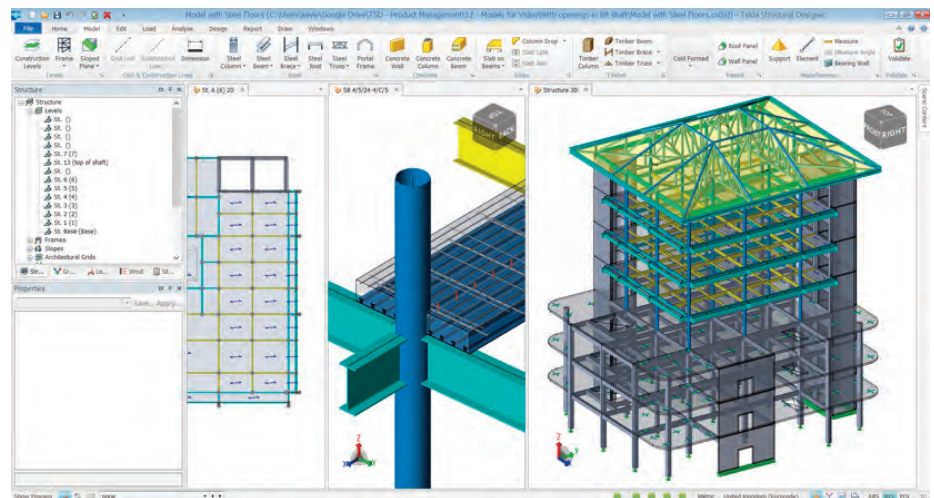
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Tekla Launches Structural Designer

A Powerful New Way for Engineers to Analyse and Design Buildings...

Tekla, a Trimble company, announced it has added a product to its portfolio, Tekla Structural Designer; a dedicated analysis and design software for structural engineers working on commercial building projects. Tekla Structural Designer complements Tekla Structures - extending the benefits of 3D modelling for engineers with an innovative approach that combines analysis and design into a single, seamless process. Tekla Structural Designer's sophisticated loading and analysis functionality, fully automated design, high-quality documentation and seamless Building Information Modelling (BIM) collaboration allows engineers to analyse and design buildings more efficiently and cost effectively.

Tekla Structural Designer offers powerful features for optimising concrete and steel design, and enables engineers to compare alternative design schemes quickly, efficiently manage changes and collaborate seamlessly. Regardless of project size or complexity, Tekla Structural Designer's fully automated, productivity-enhancing capabilities enable

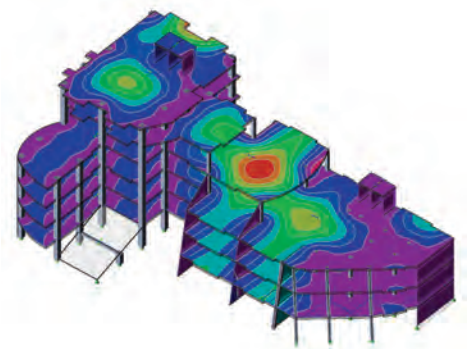


engineering firms to successfully bid on more projects and enhance their client service.

"Many of us at Tekla are engineers ourselves and understand the importance that productivity, value engineering, constructability and change management play in the design and build process," said Barry Chapman, Director of Engineering Segment at Tekla. "We have created and added Tekla Structural Designer to our Tekla product portfolio to further extend the benefits of 3D modelling directly to engineers, by bringing them the power to analyse and design better in a way that can save time, cut costs and provide a competitive edge."

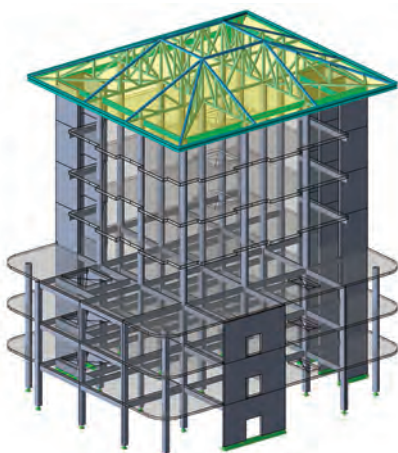
Tekla Structural Designer: Meeting the Real-World Needs and Challenges of Engineers

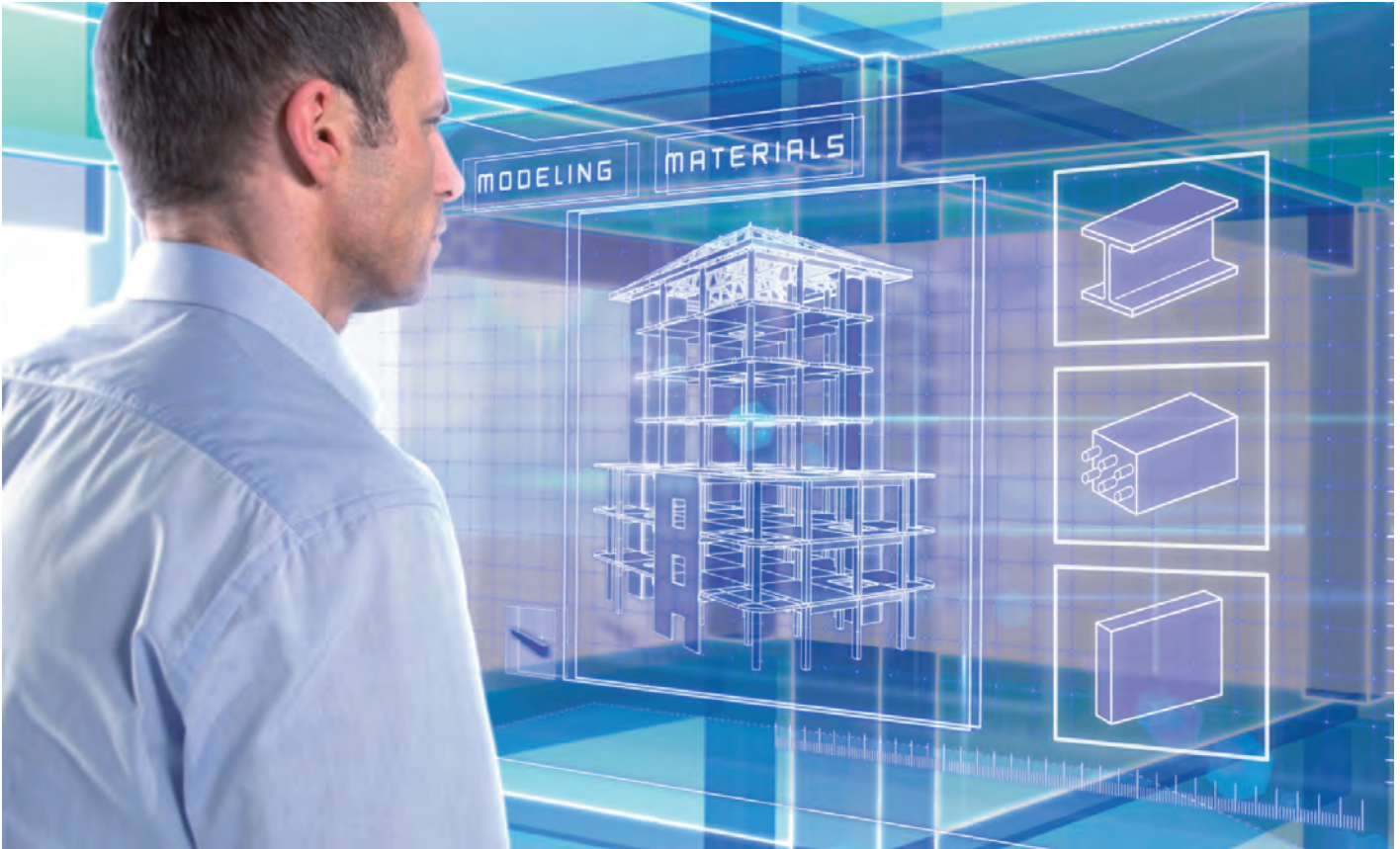
Improving Productivity – By enabling structural engineers to create a single analysis and design model, Tekla Structural Designer



eliminates the need for post-processing analysis results. Fully automated loading and design includes wind loading and finite element analysis for faster design times, while product documentation is automatically produced, allowing engineers to make informed decisions at every stage of a project.

Bidding Projects to Win – Structural engineers can quickly create and compare multiple design options for determining the most competitive scheme to successfully bid on more projects.





Streamlining Change Management

– With Tekla Structural Designer, changes can be easily managed, reducing response time at any stage of a project. The changes can be applied across the entire model to instantly assess impact and automatically get a re-design in seconds. Calculation reports that automatically update eliminate the need to generate new reports manually when changes occur.

Enhancing BIM Collaboration and Integration

– This was in mind when Tekla Structural Designer was developed. Structural engineers can synchronise models repeatedly with Tekla Structures and other tools without compromising vital design data. Tekla Structural Designer's auditing tools let engineers see what has been added, changed or deleted during integration, reducing the risk of errors and maximis-

ing collaboration with other project team members, including technicians, fabricators and architects. Internal communication within the structural design office between structural engineers and technicians is more fluent and accurate.

Cost Savings and Convenience

– With all structural analysis and design functions combined into a single solution, Tekla Structural Designer eliminates the need for additional modules or software packages to buy, maintain, learn or integrate with.

Tekla Structural Designer is available now to a range of design codes, including British Standards, Eurocode and US design code. It offers a range of services including local technical support provided by experienced structural engineers and an online knowledge base with learning materials.

For more information, visit www.tekla.com/tekla-structural-designer.



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BIMXtra delivers an integrated digital handover

In what is otherwise a complex manual process, Kier Construction and LSI Architects have delivered an integrated digital handover of some student residences for the University of East Anglia using the leading edge Clearbox solution, BIMXtra. What is even more remarkable is that this is on a circa £10m project that has utilised many different BIM authoring tools. As a consequence the project won the Construction Computing Awards 'Collaboration Project 2014' after bringing the whole team together to work in a single federated source of data, and was also a finalist in the BIM Project 2014 at the same event.

“From a site and personal perspective the overall implementation of BIM on Crome Court was a tremendous success and testament to the hard work and professionalism of the overall team, including Sub-contractors and Consultants”.

The key to this success on a project with so many different authoring tools is the ability of BIMXtra to gather models and data as a single source of truth; in essence a real Common Data Environment in which everyone had only one instance of handover information before the output was compiled directly to a COBie level 4 data drop.

LSI Architects used ArchiCAD, the Mechanical/Electrical Engineer used Revit, Ramboll the Civil/Structural Engineer used Revit for Substructure, and Microstation for Civils with the CLT frame manufacturer using 3D Cadwork to produce their fabrication model. Bringing all these different types of authoring tools together is notoriously difficult, but with



BIMXtra and using IFC where appropriate, we imported the models into a structured data environment and allowed all parties to work on the handover information without having to go back to the model to enter data with all the inefficiencies and complexity of double handling information. In reality once you get beyond COBie drop 3 most of the information is not relevant to the design and so putting it in the model is of debatable merit, it is also hard to attach documents and other relevant information whereas in BIMXtra any of this information is easily attached or referenced.

What will also potentially help the Clients FM team is that many of the updates in operation are simply data changes, whether they are changes to a piece of equipment or confirmation of a recent inspection they require quick and easy access without the complexity and cost of the traditional authoring tools.

The data captured in BIMXtra throughout the project delivery, has been extracted as a COBie data drop via built in functionality. The University now have the opportunity to drive the data into their CAFM system via a database to database transaction.



In essence the data content in the authoring models can be as light as the author may choose, with any additional required design performance data inputted directly into the BIMXtra environment associated to the components. Once design schedules were complete and validated, we added the Construction and O&M information required to populate the Asset Information Model (AIM) for handover.

Speaking about the success of the project, Kevin James the Project Manager for Kier Construction said "From a site and personal perspective the overall implementation of BIM on Crome Court was a tremendous success and testament to the hard work

and professionalism of the overall team, including Subcontractors and Consultants".

This has been an enlightening project for the Kier Eastern Team. We now have confidence to deliver the 6D output and are engaging with other clients to explore the benefits this can provide for them, we see this as a key factor to securing future work as we move further into the digital delivery of construction information. While we found areas for further improvement in the process, the Clearbox team responded quickly to give us the opportunity on the Crome Court project, and this helped to inform the development of this particular area of BIMXtra to be refined further for the next project.



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Delivering COBie in the Real World

Government contracts are increasingly requiring the delivery of detailed information about assets incorporated into their construction projects. This information is handed over during the construction project and at completion and is commonly termed “COBie” (Construction Operation Building Information Exchange).

The initial source of the COBie data is from the BIM models. Traditionally to develop the COBie output, trained operatives either insert information about the asset into a BIM model or type it into associated schedules – a time and skills expensive process with all the opportunity for error that occurs from disconnected information.

And then what happens if there are changes to the asset or you have several BIM models created by different design disciplines?

Clearbox Ltd have developed BIMXtra which makes creating the COBie output a simple part of the design and construction process.

The BIMXtra process takes all of your BIM models (most CAD formats) and consolidates them into a single “federated” model. Information about the asset is then enriched with information generated by the project stakeholders. Using common software tools information is uploaded and stored against the asset. Because it is held in an associated database, any change to the asset is highlighted and track changed, and because we use common tools to upload the information, no special training is required.



With BIMXtra you can handover at completion all the asset information, i.e. geometric, design, commissioning, test data, O&M etc... as part of the normal project delivery process.

BIMXtra provides the accurate COBie output, giving the end user the digital asset information to allow the end user to effectively maintain and operate the asset with the minimum of added effort from the project delivery team.

A digital handover enables the operational phase

In reality, conventional handovers that were focussed on paper based systems invariably required the Client to employ people to translate handover information into a format that asset management and CAFM (Computer Aided Facilities Management) systems could use. The presence of COBie helps this to happen by simple file transfer, but goes on to reduce the cost of implementing other valued toolsets like, energy monitoring

or remote fault monitoring which all rely on the simple transfer of data at handover into a specialist tool. Reducing the cost associated with the information transfer reduces the real cost of using other tools and consequently improves the ROI (Return on Investment) over other tools. So the benefits to the operational phase arise from the handover and will no doubt affect cost and carbon at the same time.

The digital output has moved from Client, post-handover to Project, pre-handover

So producing a digital handover (COBie or otherwise) has real value, but the laborious nature of producing the outcome has moved from a post-handover task carried out by the Client, to a pre-handover task carried out by the project. BIMXtra is designed to make the task simple

Level 2 BIM is a file based process and this makes the task of producing COBie cumbersome, BIMXtra solves this issue

In Level 2 BIM the process is essentially a file based output in which information has to be collated and assigned to the COBie file. The starting point of this is the model which identifies the objects to be included in the COBie file. However, much of the information required for handover centres around documents and attachments such as procurement information, warranties, commission records and test sheets. Model based technologies are neither appropriate nor efficient at handling such associations of information. Indeed, in operation the problems are accentuated when you examine typical day to day asset management tasks which rely essentially on data changes to objects, not changes to the geometry and model information.

A recent handover by Kier Construction on Crome Court for the University of East Anglia exemplified these points, but it was all the more acute because the project had been authored in four different BIM authoring tools. Its saving grace was that it was small enough to manage, but not large enough to be able to afford dedicated personnel on the issue. So BIMXtra really helped and led to the project becoming the Construction Computing Collaboration Project of the year 2014.

The benefits of a data centric process for BIM don't stop at COBie, they are everywhere

In BIMXtra, the process of data aggregation, enhancement and compilation of the information is a core part of the BIMXtra toolset. BIM outputs from consultants are pulled into BIMXtra and the data arranged in a structured format for users to interface with, pertinent to the way they work. BIMXtra supports the management of the process to ensure the current information is available to export when necessary to the COBie output, as a change managed outcome of the process, not a process within itself. The benefits of collecting information this way ensures that when there are design changes or updates, a user can simply push a button and generate a new output report.

In contrast to this, managing the process of adding data into models; compiling, structuring and organising documentation, recreating an updated COBie file whilst a project progresses – the differences are significant.

But the benefits of this data centric approach to BIM does not stop at the ease with which we produce the COBie output, or indeed most digital handover packs. It is the simplicity with which most other BIM tasks

can be undertaken; from efficient visual programme simulation, right down to the ease with which the federated model viewing can be managed through our purpose built viewer. A data centric approach to BIM makes the process easier and more manageable. Evidence from the recent handover of the University of East Anglia student residence project by Kier Construction Eastern bears this out and highlights the benefits technology can bring to this new BIM world.

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 the Clearbox website can be found at www.clearboxbim.com



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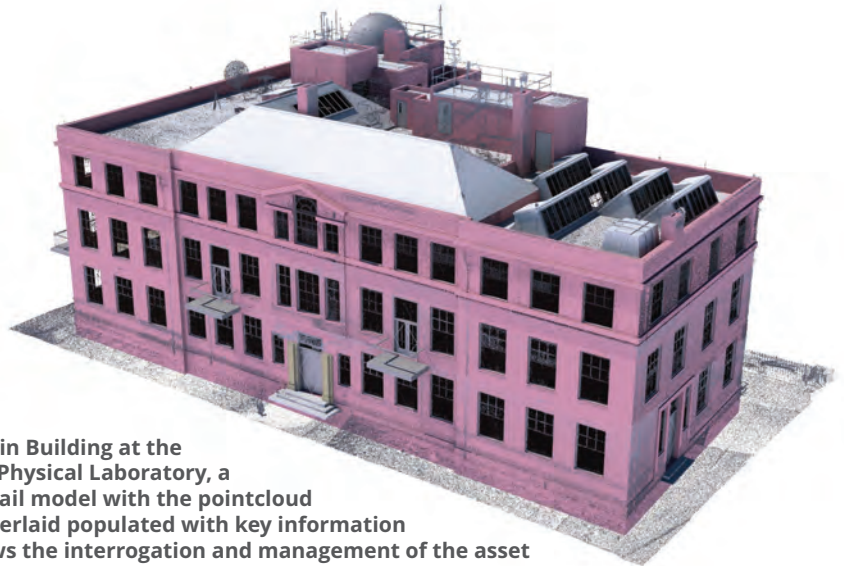
Putting the 'I' in Existing Building BIM

Studio Klaschka have been working with Kier Construction and the Clearbox Team to provide a series of existing building BIMs. Having been producing these models one thing that has surprised me is that the specification of existing models seems to be ten years behind new build BIM which has a high expectation about the non-graphical information in a model. A model with high geometric detail, can be costly to build, but how valuable is that extra detail?

Can we really call 3D models that happen to be built in BIM applications BIM, if they have no information, I don't think so. At best they are BIM Ready.

Working with a forward looking data centric client like Clearbox has meant that we haven't had to argue that adding data is worthwhile. The models we have produced have generally been of a lower level of detail

The Darwin Building at the National Physical Laboratory, a lower detail model with the pointcloud survey overlaid populated with key information that allows the interrogation and management of the asset

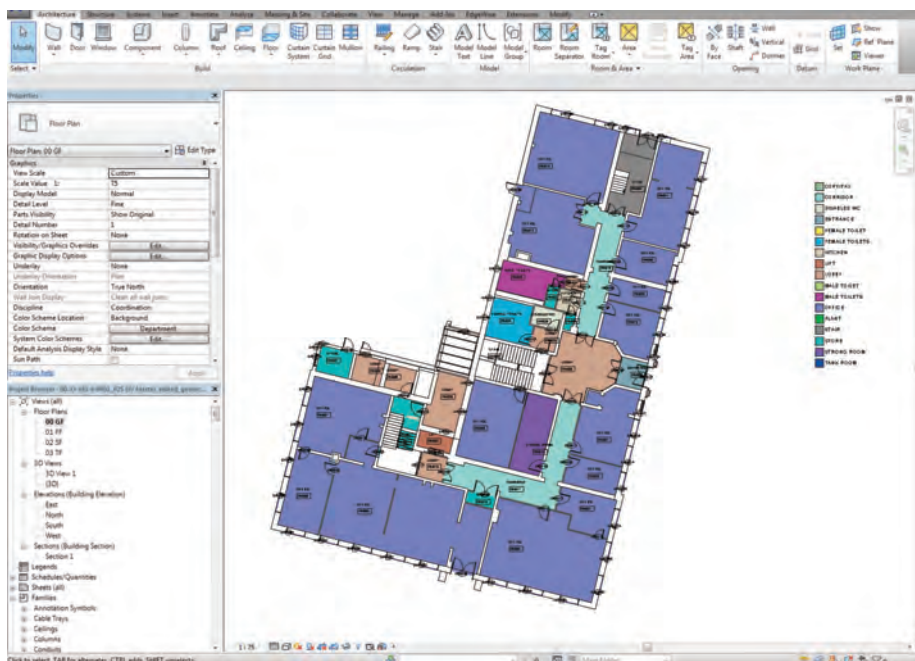


than the many you will have seen in the press, but they are data rich with elements classified and numbering and types added to key groups of objects.

These data rich models are usable by a much wider range of team members than conventionally where for example the quantity surveyor may have to use traditional estima-

tion until the designer's model is available. With a data rich model, where areas of rooms, numbers and sizes of door and window types, areas of existing cladding are all available without further classification a cost estimator can use this data from the model to try out various what if scenarios while the design consultants develop the layout and strategy.

Surely this makes a good case for survey models to have this kind of information added to maximise the early uses and ultimate value.



A plan or schedule from the model in Revit reveals the data, if this is added as part of the existing model production process it is available early to the whole team

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The NBS BIM Toolkit evolution

Stephen Hamil, Director of Design and Innovation at the NBS, outlines how the NBS BIM Toolkit has been received around the country and what happens next...

Back in 2010, I remember listening to Paul Morrell, the then chief construction adviser, present the government's Construction Strategy and being inspired by the radical vision of the part Building Information Modelling (BIM) would play in transforming the construction industry.

To think that now, nearly four years on, NBS is in a position to complete Level 2 BIM, and in advance of the government's 2016 deadline for its use on public sector projects, is very exciting.

Launched on 8th April to great response and engagement, The NBS BIM Toolkit public beta is a web-based resource, tailor-made to guide users through the construction process. At the heart of the project is a standardised and digitally-enabled classification system coupled with a level-of-definition reference library and digital plan of work tool.

Combined, these have the power to transform the delivery of construction projects for all disciplines and across all scales of projects; from large infrastructure schemes to small, domestic scale works.

Given the confusion that still remains over what Level 2 BIM actually means or constitutes, the completion of such a defining suite of documents is critical to further BIM adoption and the enhanced building design and delivery this will bring.

The NBS-led team has been working hard to ensure the BIM Toolkit is easy to use and offers step-by-step support to define, manage and verify responsibility for information development and delivery at each stage of the asset lifecycle.

Whilst the NBS BIM Toolkit is being delivered by NBS in conjunction with colleagues from BIM Academy, BDP, Laing O'Rourke, Mott MacDonald, Microsoft, Newcastle University and RICS, its development has benefitted from input from a wide range of construction industry professionals.

The project team has consulted with architects, clients, contractors, engineers, manufacturers and facility managers, and over the last few months the NBS BIM Toolkit has been taken on the road around the UK in association with the UK Government's BIM Task Group's BIM Hubs.

In addition to demonstrations at major industry events such as Ecobuild, these free events have provided construction professionals in all regions of the UK with an early opportunity to preview and comment on the Toolkit.

Feedback has been invaluable and a number of recurring themes have emerged. For example, it is clear that Level 2 BIM is not just about design but managing the entire information set. Yes, graphical representations of doors or boilers are important, but equally so is the documentation of a solid brief, the clear allocation of tasks and responsibilities and any results of the consultation process.

The importance of the early stages (0 & 1) in the new plan of work has also been made clear; making sure you are thinking strategically before thinking about the products.

Above all though, these various events have made the team more certain than ever that the Toolkit has

the very real potential to transform the procurement of buildings and infrastructure by defining and testing the BIM data required at each stage of the project.

“Whilst the NBS BIM Toolkit is being delivered by NBS in conjunction with colleagues from BIM Academy, BDP, Laing O’Rourke, Mott MacDonald, Microsoft, Newcastle University and RICS, its development has benefitted from input from a wide range of construction industry professionals.”

In addition to a wealth of technical content, users are able to access a support area which includes a series of articles providing expert advice on a range of relevant subjects such as; the concept behind Level 2 BIM, the levels of definition for construction objects and how to develop employer’s information requirements.

Free-to-use, the NBS BIM Toolkit empowers all parts of the construction industry.

Clients and managers of assets are able to comprehensively define information requirements to ensure their needs are met and better project outcomes are guaranteed.

Design and construction teams are able to assemble a team with clearly assigned roles and responsibilities to work collaboratively on their Level 2 BIM projects.

Finally, manufacturers are able to provide digital information quickly and easily to specifiers on thousands of construction projects.

In summary, by proving the answer to achieving Level 2 BIM, the Toolkit will immediately start solving some of the problems the construction industry has struggled to overcome by moving it from an analogue system of working into a digital world.

It will also ensure that the UK construction industry capitalises on the clarity of its public sector vision for BIM. A unique vision that is increasingly being followed by the private sector and a digital approach that will put the UK in a position of worldwide leadership. ■

To create your first BIM Toolkit project, go to <https://toolkit.thenbs.com/>.



.....
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BIM: Starting with the Design

Some say BIM is a type of software. Others say BIM is the 3D virtual model of buildings.

Many say BIM is a process or BIM is nothing more than the collection of all building data organized into a structure database easy to query both in a “visual” and a “numerical” way. It is safe to say that BIM involves all of the above and much more...

For architects, when it comes to BIM, detailed deliverables begin with a 3D digital model of the building. This model, however, is a lot more than pure geometry with some nice textures cast over it for visualization. A true BIM model consists of all the virtual equivalents of the actual building objects and elements used to construct a building.

These intelligent elements are the digital prototype of the physical building elements such as walls, columns, windows, doors, stairs, etc. This allows us to simulate the building and understand its behaviour in a computer model far in advance of the actual construction starting.

Now, clients, building owners and operators are getting more and more access to BIM models through their mobile devices. This shift in access is moving the adoption of BIM onto the next level.

Design

Any architect with the passion to freely explore design ideas can fulfil their wishes without compromising on documentation precision and quality. With ARCHICAD, you can model and shape freely, creating the forms you want and changing complex elements in the most appropriate view.



ARCHICAD provides direct modelling capabilities in a native BIM environment with its end-to-end BIM workflow using Priority Based Connections and Intelligent Building Materials, and the MORPH™ tool.

Documentation

With an ARCHICAD 3D Building Information Model, all the necessary documentation and images are created automatically. Priority-based junctions and intelligent building materials ensure correct graphical representation of elements and materials in sections, surfaces in 3D views, and thermal properties throughout the building energy evaluations. ARCHICAD also offers a native BIM design and documentation workflow for Renovation and Refurbishment projects. ARCHICAD simplifies the printing or publishing of project 2D drawing sets, generating them easily from the same Building Information Model.

Collaboration

When implementing BIM on any scale, architects, as the authors of a model, need to reliably collaborate with other disciplines. GRAPHISOFT has always been a pioneer of collaboration through the use of IFC to import and export a model. This adoption of IFC allows BIM data to be supplied to

engineers, contractors and clients in a standard and widely used format.

About GRAPHISOFT

GRAPHISOFT® ignited the BIM revolution in 1984 with ARCHICAD®, the industry first BIM software for architects. GRAPHISOFT continues to lead the industry with innovative solutions such as its revolutionary BIMcloud® the world's first real-time BIM collaboration environment, EcoDesigner™, the world's first fully BIM-integrated “GREEN” design solution and BIMx®, the world's leading mobile app for BIM visualization. GRAPHISOFT has been a part of the Nemetschek Group since its acquisition in 2007.

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NBS BIM Toolkit to support enhanced EIR

Stephen Hamil, Director of Design and Innovation at the NBS, describes how the NBS BIM Toolkit is used to support Employer’s Information Requirements (EIR)...

A set of Employer’s Information Requirements (EIR) is a key document in the UK ‘standards’ (PAS1192-2) for anyone working to the Level 2 BIM process. It is intended to be part of the wider tender document set for the procurement of the Design Team and the Constructor and sets out clearly what models will be required at each stage of the project and what the purposes of these models will be.

The core purpose of an EIR is to document the information requirements and also to establish the information management requirements. This document forms the basis upon which the bidders can then respond with their outline BIM Execution Plan (BEP). The BEP demonstrates how, if successful, the bidders will deliver and manage this digital information throughout the project.

Figure 1 below shows the suggested structure of an EIR as published on the HM Government’s BIM Task Group website.

As can be seen from Figure 1 the EIR establishes, from the outset of the project, a whole host of issues and responsibilities that will run through its lifetime. By providing this guidance at an early stage this should enable bidders to remove allowances for ‘don’t knows’ within both cost and programme – working towards meeting two of the primary objectives of the Government’s construction strategy to which BIM is an important contributor.

A template EIR with embedded guidance may be downloaded for free from the [BIM Task Group](#) website. This may then be adapted to form project-specific requirements for each of the sub-sections.

From June, the free to use NBS BIM Toolkit should be used to generate the content for sub-section 1.1.4 of an EIR, which deals with level of detail. The toolkit defines the specific information requirements that are aligned to the project stages that the bidders and then project team subsequently build on through the digital plan of work.

1.1 Technical	1.2 Management	1.3 Commercial
1.1.1 Software platforms 1.1.2 Data exchange format 1.1.3 Co-ordinates 1.1.4 Level of definition 1.1.5 Training	1.2.1 Standards 1.2.2 Roles and responsibilities 1.2.3 Planning the work and data segregation 1.2.4 Security 1.2.5 Coordination and clash detection 1.2.6 Collaboration process 1.2.7 Health and safety/CDM 1.2.8 Systems performance 1.2.9 Compliance plan 1.2.10 Delivery strategy for asset information	1.3.1 Data drops and project deliverables 1.3.2 Client’s strategic purposes 1.3.3 BIM-specific competence assessment Figure 1 – Structure of an EIR

Figure 1 – Structure of an EIR

Figure 2 shows typical tasks in the Toolkit, which the user may adapt to the specific project needs. This information can then be exported into a digital format for re-use, and also a Microsoft Office format for ease of insertion into an EIR document.

The client's high-level 'plain language questions' may be added into this section of an EIR. This gives further clarity to the supply-chain in terms of the specific questions that need to be answered at each stage of the project. Some of these questions may be quite simply referred to against any tasks or deliverables within the information requirements. However, for other questions the complexity of the information required to answer is probably best provided by the expertise within the supply chain.

Figure 3 shows a simple relationship between a 'plain language question' and a task. Figure 4 shows a complex relationship between a plain language question and a task.

Example template 'plain language questions' may also be downloaded for free from the BIM Task Group Labs website. <http://www.thenbs.com/BIMTaskGroupLabs/questions.html>.

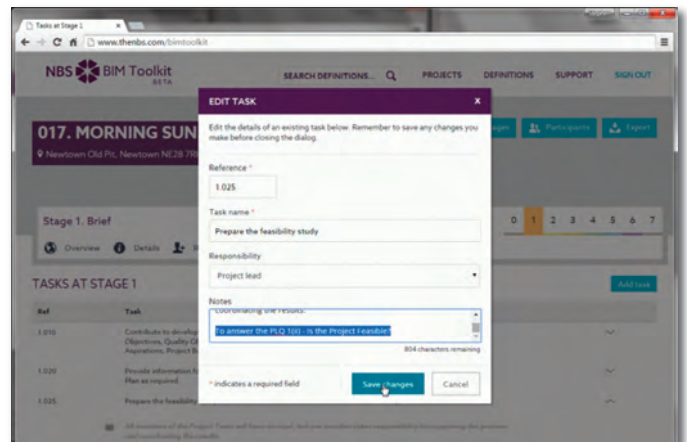


Figure 3 – A simple one-to-one link between PLQ and Task

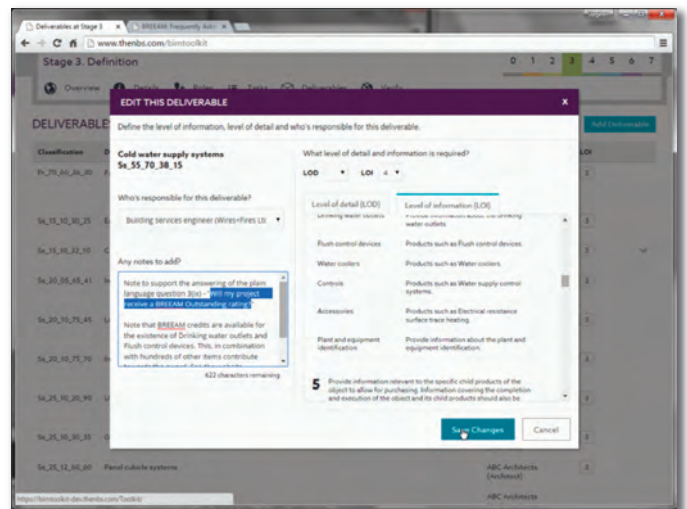


Figure 4 – The far more complex plain language question to answer

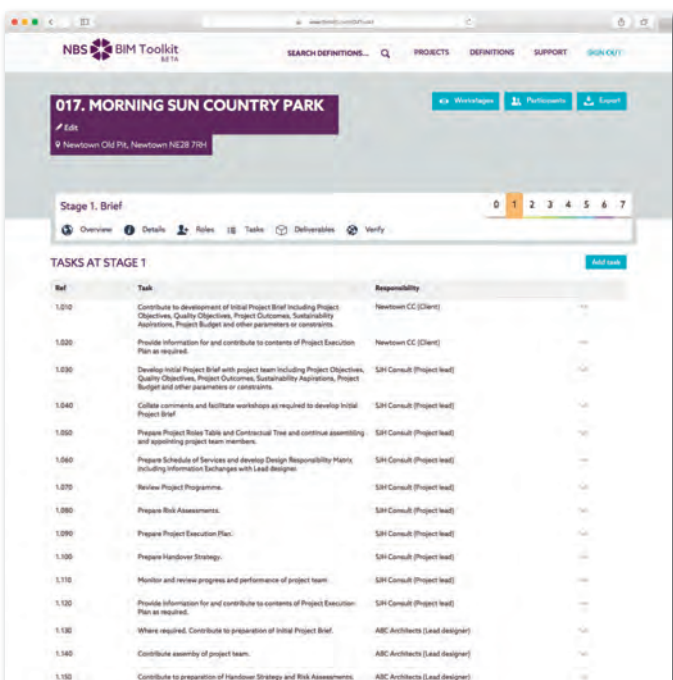


Figure 2 – Exporting the information from the digital plan of work

The role of the NBS BIM Toolkit is not to pre-link each potential plain language question with specific tasks and deliverables. However, it does give an excellent base framework through the combination of the digital plan of work tool and the associated level of definition templates. ■ www.theNBS.com/BIMToolkit

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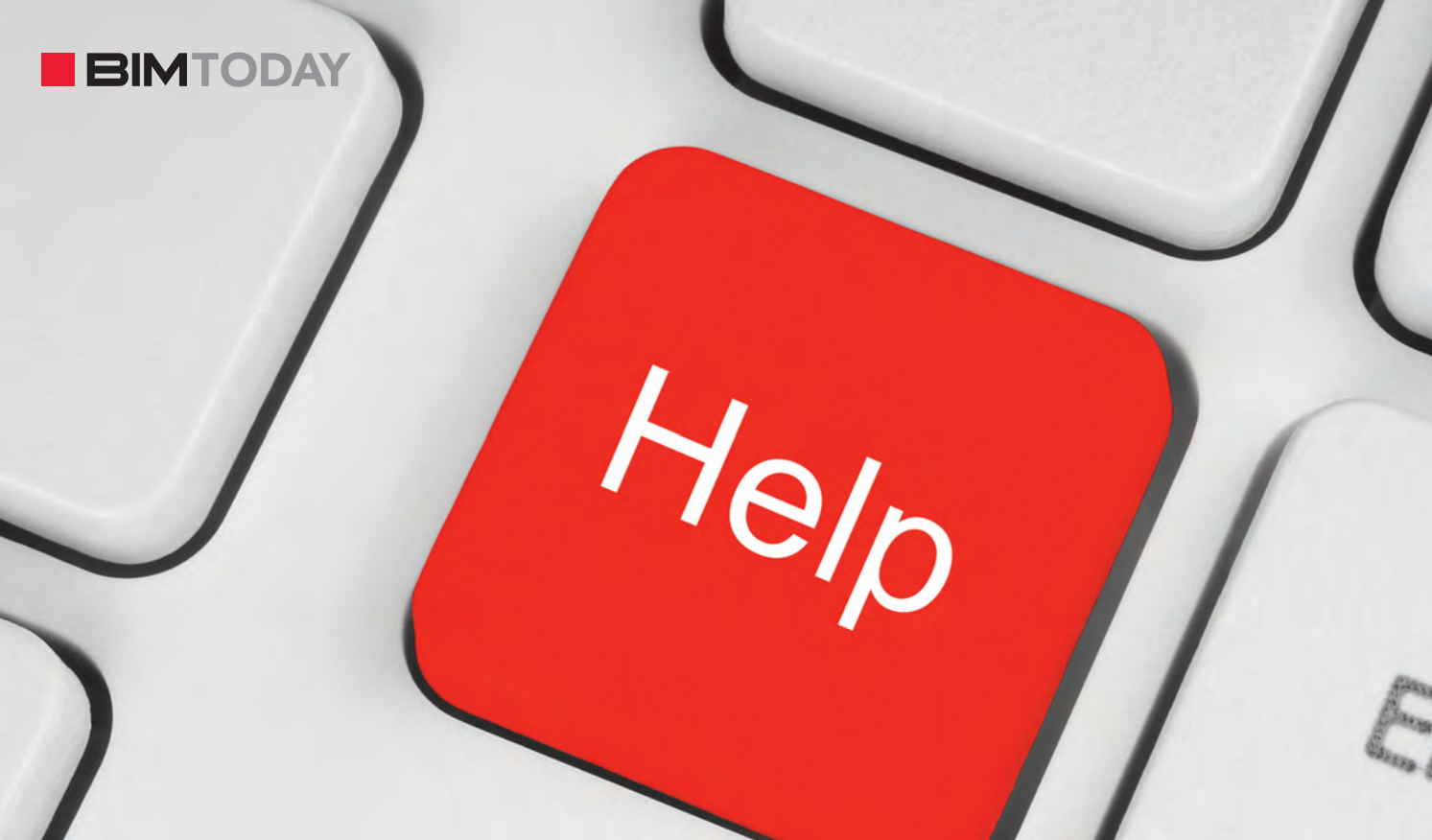
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Level 2 BIM by 2016? Help!

John Eynon, Chair of the South East Regional BIM Hub, architect, writer and blogger, describes how to meet the impending BIM deadline and proves there is nothing to fear...

If you're new to BIM then welcome to a world that is as exciting and challenging as it is intimidating. You may have heard that there is a UK Government target of "BIM Level 2" by 2016? So you might be wondering what does this mean? For me? My organisation? Is this really important? Do I need to do something? Where can I get help?

Unfortunately, this short article will not give you all the answers you need to these questions but we can make a start and I can point you towards some resources that will help – most of which are free – good news!

What is BIM? It is about creating, using and sharing digital information across the design/construction and operational life of any built asset.

Why BIM? The UK Government Construction Strategy published in 2011 identified that working using BIM processes and technology could enable

significant savings to be made in operational costs and reduce waste.

What is Level 2? This is defined on the Bew Richards BIM Maturity diagram, but basically we all continue to work as individual disciplines on a project, but we produce digital information in the form of data and 3D geometric models. These are then combined using technology to form the Project Building Information Model.

Where can I get help? Relax! There are plenty of free resources available, a few are listed below.

BIM Hubs – Make contact with your local Regional BIM Hub Champion. Your local BIM Hub holds meetings and will offer points of contact. There you will meet people and organisations at all stages of the BIM journey from complete beginners to experts and everyone in between. Also representing all stakeholders in the industry, such as clients, designers,



John Eynon, Chair of the South East Regional BIM Hub

consultants, contractors, suppliers, manufacturers and owner/operators. The Hubs offer a safe environment where you can ask your questions and meet people who are in the same boat. Wherever you are in the UK, there is a BIM Hub near you.

The BIM Task Group website is the place to go for information about UK BIM. There you will find news, case studies, and the standards and documents you need and all are available for free download.

It's good to talk, and the world of BIM has its own language, rules and set up which be confusing. Finding a few friendly faces to share the journey with can be a great help.

BIM 4 Groups – There are various sector specific groups set up such as BIM4SME, BIM 4 Clients, BIM 4 Retail and so on. Joining up with these networks opens up discussing BIM with people who face just the same issues and situations as you.

These are just a few of the resources available. A few more are listed below which will be of help:

Resources:

Regional BIM Hubs – <http://www.bimtaskgroup.org/bim-regional-hubs-champions/>

BIM 4 Groups – <http://www.bimtaskgroup.org/partners-3/>

BSI BIM Investors Report – Free PDF download, use Google search

UK BIM Task Group website – <http://www.bim-taskgroup.org>

BIM Demystified by Steve Race (2nd edition) – Available on Amazon, £19.99

You can catch up with blogs by John Eynon at www.zenanddm.com. ■



.....
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How to move faster, collaborating in the cloud

Steve Jobs loved the discipline and productivity of small teams. In an interview with Fast Company, Apple CEO Tim Cook was asked how he keeps Apple effective, fleet and non-bureaucratic. Cook said "It's harder and you are fighting gravity... We've turned up the volume on collaboration because it's so clear that in order for us to be incredibly successful we have to be the best collaborators in the world."

Poor collaboration has set many government projects on a path to failure, often with legal disputes and exploding costs en route.

One of the largest disasters was of course the NHS IT program that cost around £10 billion, but the same problems with collaboration sap time and money from many construction projects.

Troubled projects often seem like chaos, and it's a fitting description. Chaos theory shows that surprising complexity can emerge from very few, simple rules. This means that even

if a project launches with a good plan, the right direction and the right contracts, it will often go badly off course. The only way to keep it on track is by maintaining seamless collaboration and complete clarity from start to finish, so the inevitable array of problems can be killed quickly.

It's often easy to see in hindsight that a lack of collaboration was key, but the solution is to enable the team to work together in the cloud from the start. This doesn't just avoid problems, it enables greater productivity, smarter solutions and a less stressful environment.

Adoddle is the cloud-based collaboration platform used by many of the most challenging projects, from London's Leadenhall building (the cheese grater) and Heathrow Terminal 5 (the UK's largest free-standing building) to the £20b Crossrail project.

Adoddle has quickly become the collaboration platform for many of the world's largest infrastructure projects, from Dubai International

Airport to major rail infrastructure projects in Sydney and Hong Kong.

Stop waiting for information

There is no secret to Adoddle's success. It simply uses the cloud to solve the age-old problems of collaboration. Like a chain of people all waiting for information from each other before they can proceed with the next task. With Adoddle, everyone can access all the information they need in the cloud, at any time, from any location. This also reduces risk as everyone accesses the full original information. During the construction of New York's Citygroup Centre, key joints designed to be welded were instead bolted. Experts predicted that a storm could topple the building, damaging 100 city blocks.

Stop email killing your productivity

Email transformed productivity when it first arrived, and has been gradually diminishing it ever since. We have all felt the frustration of dealing with endless emails instead of getting





things done, and struggling to find the files we need. Email is a terrible way to store and organise information, with endless strings of comments and attachments, but few clear action points.

Adoddle converts this chaos into highly organised information, with clear tasks and deadlines assigned to specific people. Many of us are tied to email like a ball and chain, and copying information into other applications can be a chore. To get around this, Adoddle adds a button to outlook, to quickly transfer information, so a monstrous string of emails becomes an actionable list of tasks.

The same Adoddle button appears in Word, Excel and Powerpoint, to quickly send files to Adoddle, where they can be shared, discussed and attached to tasks.

Get control through clarity

Another big nail in the coffin for chaos is the ability to see exactly what's happening at all times. Weekly or monthly reports from contractors are fine as long as they are always

positive. Otherwise finding and fixing the problem or isolating the bottleneck is a tough task, particularly when contractors reports may be designed to hide them. With Adoddle, the project manager can see the progression of all files, forms, tasks and models and all the relevant conversations.

A customisable dashboard enables a high-level view of progress at a glance, and when there's a problem it's easy to drill down and identify it, before it becomes a bigger problem. Just as everyone on the project knows what they need to do and by when, project managers know what's causing delays and who to call, without having to trawl through any ambiguous reports.

Collaborate better, for smarter solutions

Saving time, money and stress are the obvious advantages of a cloud platform like Adoddle. But the most valuable advance is that it enables more seamless multi-disciplinary collaboration. Ideas are shared more freely, which invariably means smarter, faster solutions. Steven Johnson, author of 'Where Good

Ideas Come From' spent five years researching the subject. He found that the great driver of innovation has been the historic increase in connectivity and our ability to exchange ideas with other people.

When Elon Musk floated the idea of a hyper-loop - a 1200km/h train operating in a vacuum tube - hundreds of engineers from firms like Boeing, Airbus and NASA began collaborating in their spare time to make it happen. Construction on a 5km public hyperloop in central California is due to start next year. Through fluid, multi-disciplinary collaboration, these teams from different companies and locations are taking on challenges that most established companies would shy away from.

Cloud-based collaboration enables information and ideas to flow faster. People can access files directly, without bothering or waiting for someone else. The project manager has complete clarity and with it the ability to quickly identify and kill problems. And most importantly, everyone involved can contribute more, achieving greater success as a team.

Visit asite.com to start working faster and smarter with Adoddle.



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Why 'Soft Landings' matters

At Rider Levett Bucknall we think that Government Soft Landings is a game-changer.

Potentially, it paves the way towards a new way of delivering construction. It leads to a total focus on clients' needs and an analysis of what the building is for, and not what type of building it is going to be at practical completion.

In reality clients do not want a building. They want to know what it can do for them. What matters is how it performs, how it functions, how the occupants feel and how it meets the objectives of the client's business.

Crucially, the soft landings approach changes our relationship with the people who commission and the people who use the buildings we build. This is good, because ultimately the building is only as useful as the occupants make it.

A prime motivation for soft landings is the often huge performance gaps that appear between the promise sold to clients, the suitability of the building delivered and the performance of that building in operation.

Too often buildings are handed over that don't work for the users and occupants are sometimes left with little guidance on how to operate what is a complex asset.

Poor aftercare and poorly considered design are not isolated to construction but soft landings can deliver much more for the client; an operational facility not the practical completion of a building.

There are barriers. The biggest may well be



the fear of extra costs, particularly as these costs tend to be accrued at the front end. But longer term, costs will be reduced through a higher performing asset which is designed with the long-term in mind.

As part of our process we carry out whole life costing through our own in-house tool. Our software integrates capital, energy, carbon and lifecycle costs into one model and considers factors including; the upfront capital costs of construction, maintenance and repair costs (including replacement), projected energy usage costs, carbon emissions, FM costs and decommissioning and demolition costs at the end of the asset's lifetime.

By linking this information with data from the BIM and Computer Aided Facilities Management (CAFM) databases we can develop a considered view of costs throughout the lifetime of the building. Regular performance management and analysis is undertaken and then fed back into the model which ensures that the BIM is maintained and always relevant.

By taking this holistic approach, clients can significantly reduce their long term costs and carbon emissions and ensure that their building is fit for purpose throughout a predefined time period.

With business needs changing, it also provides enough information to enable an efficient, flexible approach to estate management and the ability to change things if required in the future, for example repurposing existing space.



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Open standards for open BIM

Dr Anne Kemp, Chair, BIM4IUK and Vice Chair of BuildingSMART reflects on recent discussions surrounding BIM in terms of the route to a Digital Built Britain and open standards...

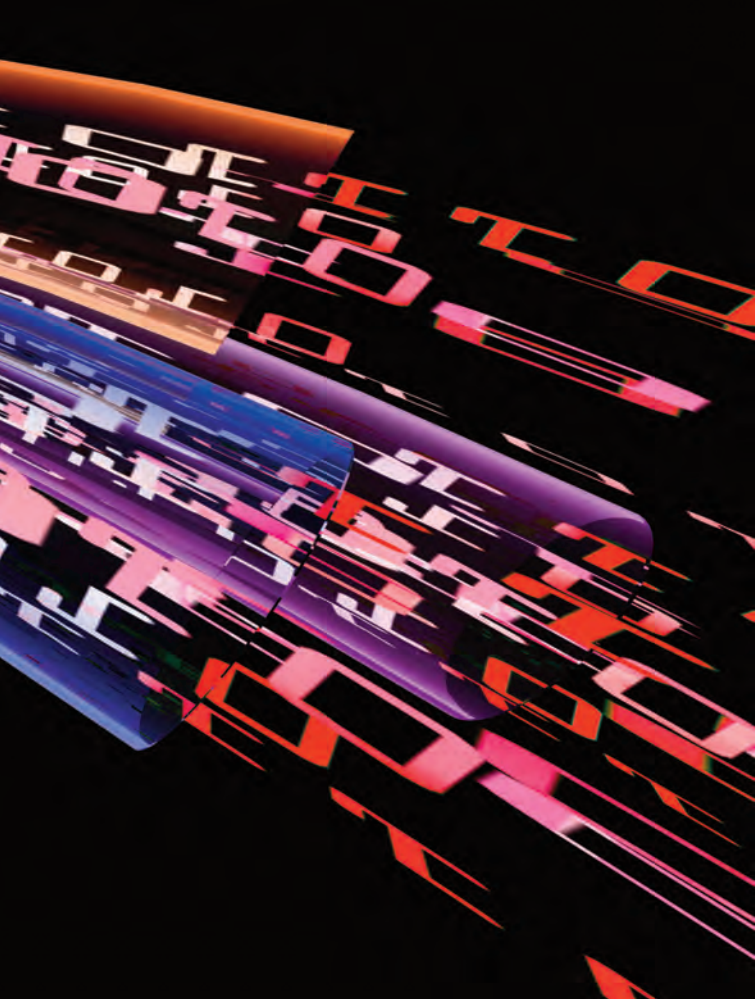
I've recently become Vice Chair of BuildingSMART UK and Ireland, and over the past 2 weeks I have been getting familiar with the organisation, both at the UK Chapter level and at the International level – since the last week of March was set aside for the BuildingSMART International Summit which was hosted at Watford followed by BIM Prospects, the BuildingSMART's first outward facing conference, in London.

I became very aware during this time of the vocabulary that the "BIM" community adopts, and how there is then a further vocabulary within BuildingSMART across the international organisation, but also within each Chapter. Why else would we still be having a debate about whether BIM is "just a technology"?!

I also became aware that we were exploring two parallel journeys, which were interdependent and converging.

The first was that of BuildingSMART itself – where it has come from, its heritage, the cornerstones of its success, and how it is evolving to adapt to the disruptive changes across the industry which serves the built environment.

Secondly, and particularly because the conference was hosted in the UK, we were overtly exploring the BIM journey here and how that appears to the rest of the world – its relevance, its current status and intentions, and the prospects for its contributions globally to deal with the disruptive changes we all



BuildingSMART and OGC are working on a number of initiatives to develop greater collaboration between the organisations. It's useful to observe that IFC (Industry Foundation Classes) is to BuildingSMART what GML (Geographic Mark-up Language) is to OGC. And there needs to be a compromise, to achieve the kind of integration across differing platforms, spatial scales, and life stages that I believe the infrastructure industry needs to deliver on the promise of what BIM can achieve.

All these organisations have an over-arching, common problem statement which the industry as a whole needs them to address – that of how to stop data becoming part of the problem, whether it's open and structured data, or whether it's unstructured and generated by numerous devices, including ourselves.

I'm writing this on a return journey from a GreenBIM event, where I gave a talk on collaborative working – and how BIM can help to realise this. What was really insightful for me, was that this led on to two roundtable discussions around what is really required to realise BIM for Infrastructure – and the role of open standards.

The feedback was very clear. People don't really want to know what is happening under the bonnet and what format the data may or may not be in. They simply want to know that the data is open, and it is shareable – if that is appropriate, which it may not be to the wrong people if it is the detailed design of a prison. They also want to know that the services that the data supports serves their purpose – from the grassroots, of how a building can serve the needs of the individuals and organisations using the facility, or to a responsive BIM4Potholes where the individual can feel that there will actually be a follow-up to their report. That link of data to purpose also needs to go up to the strategic level, where organisations can prioritise investment projects to ensure that their business delivers the right outcomes to the customers they serve – whether that is a fast and efficient journey from Edinburgh to Birmingham, or supply of quality school places, to the demands of a changing demographic profile across the country.

face. We determined that we are well on the road now to providing the building blocks required to deliver projects in Level 2, and that these were important to implement before venturing to Level 3.

But we also determined that the vision of what Level 2 then provides for us – the route to progression to a Digital Built Britain – has to be underpinned by the development and maintenance of international open standards. This is why BuildingSMART International is cited as one of the four organisations partnering to facilitate Digital Built Britain.

Looking back into February, I took part in an international thought leadership forum, followed by keynote speeches on Geo-BIM at the Geospatial World Forums in India and the Middle East. This provides a clue to another parallel journey which I also believe is converging with BIM in a way in which I have been hoping for some time. And that is the continued strengthening of the Open Geospatial Consortium (OGC) in developing open geospatial standards to serve overall management of information. Neither is it any accident that OGC has realised the strength in collaborating with other open standards bodies, such as the Worldwide Web Consortium (W3C).



What is clear is that the open standards organisations need the right people to come forward to help. For a start, there is a challenge around succession planning – we need younger people coming in with a passion to get stuck in. And we also need relevant Use Cases – examples of various problems and challenges which need to be solved and which can test current and evolving thinking. I am really heartened to see some of our major clients coming forward to collaborate – and the BIM4Infrastructure group can certainly help others who are interested to get a clearer picture of what is happening. Do please let me know if you want to be involved.

But my final point – what could be the unintended consequences of this immersion in digital data, within a virtual as against real world? And how can we design the way we deliver the data to avoid or work with these unintended consequences? How do we ensure that we not only enable intelligent computers and intelligent infrastructure – but that we also enable intelligent human beings who aren't merely consuming data – but are also able to engage,

reflect and make humane, socially responsible decisions? ■



.....
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BIM processes for Infrastructure projects

Egis now have some experience and practice in BIM processes for infrastructure projects especially in facilities constructed on the ground or under the ground for human activities development inside the territories¹ ”.

Compared to the buildings, the scope is larger, in terms of scales to be covered, systems to be developed and type of works to be constructed.

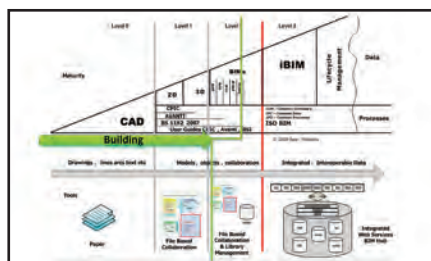
If the development of the BIM for Infrastructure must avoid “re-inventing the wheel”, the items of interoperability of data, tools and processes need to be re-visited in order to stay relevant and to provide some real added value.

Level of BIM maturity In Infrastructure

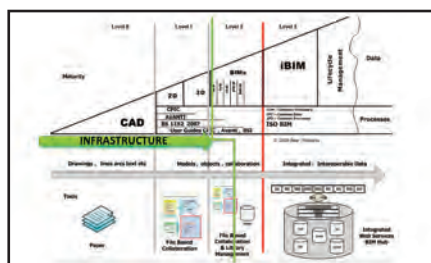
The BIM European Task Group, is agreed that the average level of maturity possible is Level 2 with the objectives to deliver for the year 2016. To simplify the concept, the BIM maturity Level 2 means: “Objects and models in 3 dimensions delivered in using the available standards and collaborative processes (for instance, Workflow, libraries...)”

Two schemas compare how Egis evaluates the Level 2 maturity for a construction to be considered in a building, like a metro station, and for a construction like a motorway, based on the experience of delivered projects in France or in Middle East.

The processes for building are very much oriented by the 3D objects, natively managed by the authoring tools, using IFC standard, but losing maturity with the collaborative processes due to the usual collaborative tools: they are mainly dedicated for files management.



Level 2 for Buildings



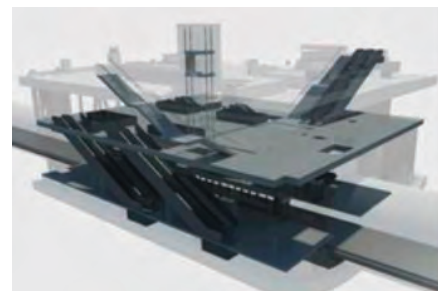
LEVEL 2 for Linear Infrastructure

The infrastructure processes are more oriented models than objects which are not natively managed by the authoring tools. Nevertheless, because the collaborative tools are oriented files management, they appear relevant to manage the models files (workflow, versioning, etc.). It has to be mentioned, that the level of maturity cannot be homogenized for all of the works included in the infrastructure project and the extension of the standards are in progress with BSI and OGC.

Data Drop or Concurrent Engineering (C.E.)

Two approaches are possible for the BIM management:

- The data drop approach is mainly oriented on the deliverables to be produced by the BIM models for each phases. The goal is to deliver digital information for procurement.
- Another approach is possible with the goal to organize the approval management



Rennes Metro station

under a concurrent engineering process by the workflow management. BIM is used for the approval process, prior to the usual submission of deliverables (drawings, reports and models). The expected impact is to decrease the number of deliverables issuances.

In case of developing the C.E. approach, the collaborative tools and the processes become the center point, the node of the BIM. The BIM benefits are not oriented to the Client only, but also to the information producers, improving their acceptance of the BIM implementation.

The BIM execution plan

The “Bim execution plan” has to be considered not only as a key document but a key moment to clarify with all of the stakeholders, the BIM expectations.

Three aspects of the BEP:

- The “Bim execution plan” or the “Bim protocol” (NEC Contract) can be required by the Client in the “Terms of Reference”. In this case, it is a contractual obligation to proceed through the design plan and the design schedule.
- For the C.E. process, the BEP is additional to the Project Management Plan. The QA/QC system is impacted.



NRL in La Réunion

- But the BEP is also a communication's documentation: to develop with the design team or the construction team how to save some benefits from the BIM, and to define with the Client what is the added value expected. Usually, the time to spend for the BEP creation, is largely underestimated.

In C.E., the BEP becomes the comprehensive way and tools of the project management.

Model Review and Project review

An Infrastructure project combines a large number of heterogenic models and tools to be associated and integrated. The Model review and the Technical Project review must be considered as two very different steps, in a process of C.E.

The model review is integrated within the QA/QC process, and resolves in one time, the design quality and the models integration quality. For C.E., it can be done in any time, to check each design progress. For an infrastructure project, to have a view of the project integration, it is needed to proceed to a dedicated 3D model integration in a specific tool, which is no more an authoring tool. The Bim Coordinator proceeds to this integration and activates the QA/QC processes.

The Project review must be prepared in a very different way, even if it is based on the same 3D models and the same integration tool. A

BIM project review must be focused not on the 3D aspects but on Contractual issues and constructability. The BIM manager role is to associate any issues detected during the Model Review to a contractual information or requirement, in creating metadata and monitoring relating to the Contract. The BIM navigation needs to be organized by contractual issues allocated by the 3D model viewer.

metadata and standardization

The Perspective of the BIM level 3 for Infrastructure projects requires solving at least two main issues:

- A full modeling of the infrastructure, including the underground with interoperability between the various domains, including geographical information.
- The possibility to have a full integrated meta data management, (versioning and status) at any stage of the project.

This last issue seems a realistic perspective in the shorter term than the full 3D objects integration. But the cost saving for all the stakeholders could be very profitable.

GOLD LINE in DOHA

With the current construction boom in Qatar, Egis Rail teamed up with Louis Berger in the Project Management of the Qatar Integrated Railways Project. This will be a very challenging role for EGIS Rail since the Qatar Rail has



L2 Motorway in Marseille

initiated the use of BIM Building Information Modelling in all its current and future projects. With experienced BIM Coordinators, Egis Rail is assisting Qatar Rail in implementing BIM Plan as per the Employers' requirements. Checking and validation of the BIM models as submitted by the Contractor, making sure that BIM uses are strictly adhered to and follow the Standard, Methods and Procedures as mandated the Client.

1 MINnD: "Modeling the INfrastructures INteroperable INformation in n Dimensions" is a French National Research Project, sponsored by the Ministry of Environment and Energy (MEDDE) <http://www.minnd.fr/>



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BIM and Lean Construction – a clear synergy

Lauri Koskela, Professor of Construction and Project Management at the University of Huddersfield explains how BIM feeds into the principles of Lean Construction creating a common ground of improvement...

Building Information Modelling (BIM) and Lean Construction have now existed as independent initiatives for two decades or more. Both have had an origin deriving from academic studies, with the focus gradually shifting to industrial application. Initially, these two initiatives had their own separate networks of supporters, and the general understanding was that they offered mutually competing agendas.

However, less than ten years ago, practitioners trying to implement both Lean and BIM made a surprising insight: there is considerable synergy between these two initiatives – they fit together like hand and glove. Since then, this synergy has been increasingly been utilised in practice and explored in academic research.

It can be claimed that there are four major linkages between Lean and BIM. Firstly, BIM contributes directly to Lean principles. An example is provided by clash detection. The BIM software usually allows for the elimination of clashes between different design disciplines. This reduces delay and rework on site. In studies done in the era of two-dimensional drawings, design inconsistencies were identified as the single most important cause of problems on site. Thus, Building Information Modelling, as such, is reducing unnecessary effort and waste. This impact will be realised even without any efforts to implement other Lean principles.

Secondly, Lean principles and methods can be supported or facilitated through BIM. In this case, the existing BIM functionalities are used in a systematic manner for enabling Lean procedures and principles. For example, a computer simulation of a construction sequence is added as an essential

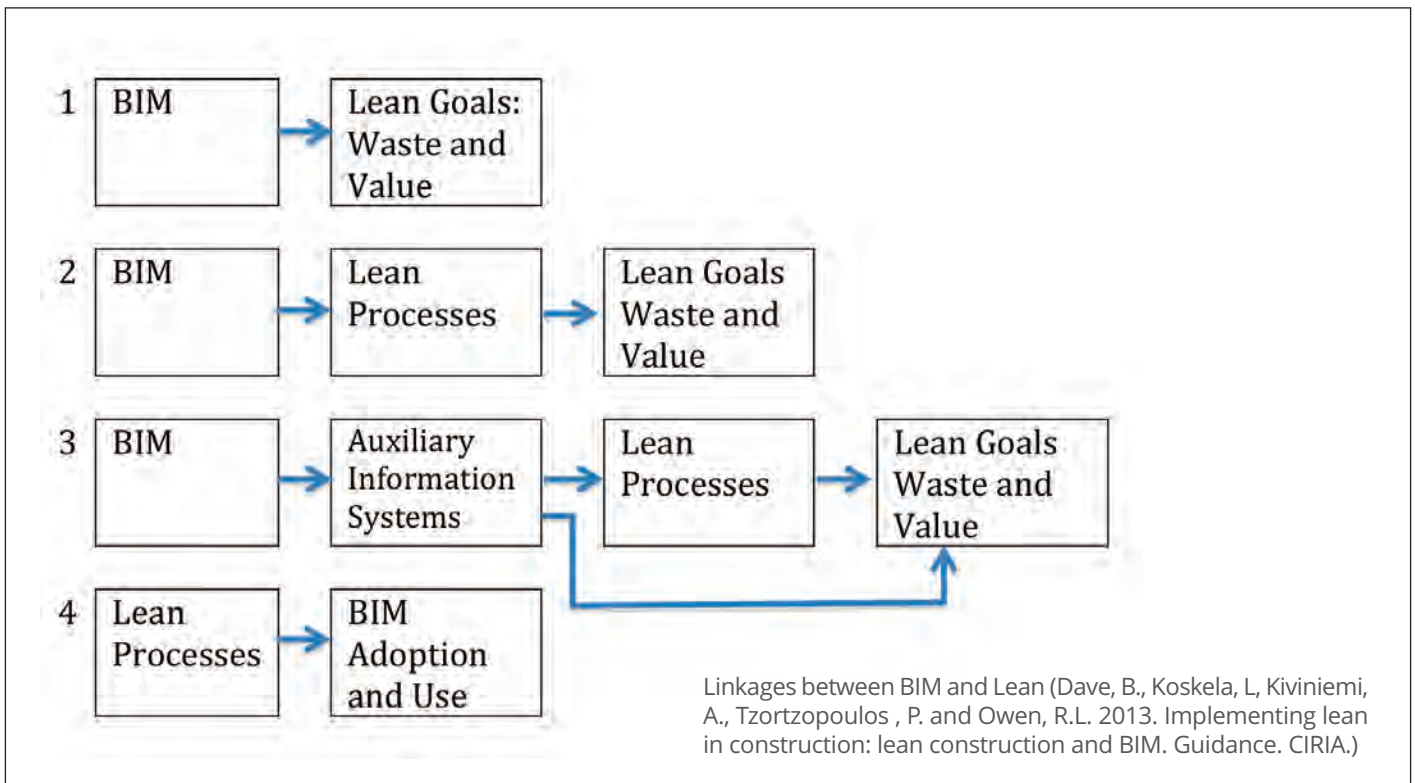


Lauri Koskela
Professor of Construction
and Project Management

part of collaborative planning of site tasks. Also in many other ways, illustrations and views derived from BIM can be used as tools of visual management, a cornerstone of Lean, to create a common ground between different participants in a design or construction process.

Thirdly, BIM based methods and tools can be developed and used for realising Lean principles. In this case, BIM functionalities are extended or augmented for the sake of realisation of Lean principles and methods. Rapid iteration cycles are at the heart of Lean. Cost or carbon footprint calculation models, taking their input data directly from a building information model, support this Lean principle. But there are many more opportunities. Rapidly evolving mobile computing is creating new possibilities for delivering BIM information directly to the work-face. Also, new software functionalities are currently being developed to allow viewing relevant parts of the building model during a collaborative planning session.

However, the relation between Lean and BIM is not a one-way road. Fourthly, it is argued that Lean principles



facilitate the introduction of BIM. In Lean Construction, the emphasis is on predictability, discipline and collaboration. These are features which will support the introduction and implementation of BIM based technologies, especially the commercial solutions (sharing of gains and pains), and organisational solutions (integrated working, big room) developed for creating a collaborative environment for Lean implementation, seem to be suitable also for getting all benefits out of BIM.

These linkages have important managerial implications for both construction project management and management in firms participating in such projects. The incremental preparation of the building model should be careful, comprehensive and systematic, for realising the direct positive impacts to their full extent. However, for realising the full potential, the implementation of Lean in parallel to BIM should be considered. Then, the question arises how Lean processes can best be supported through BIM functionalities. On the other hand, it needs to be explored which auxiliary models would be useful and how they could leverage Lean processes. It is clear that relevant skills and capabilities have to be created as a long-term effort in the various firms of the

construction industry – they cannot be created from scratch in the timeframe of an ordinary construction project.

“Building Information Modelling, as such, is reducing unnecessary effort and waste. This impact will be realised even without any efforts to implement other Lean principles.”

In the area of computer-integrated manufacturing, there has been the saying that computer integration is like a magnifying glass: it makes a good system even better, but makes a poor system even worse. This insight seems to be true again in the context of Building Information Modelling, where computer integration is raised to a new unprecedented level. ■

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Lauri Koskela

Professor of Construction and Project Management

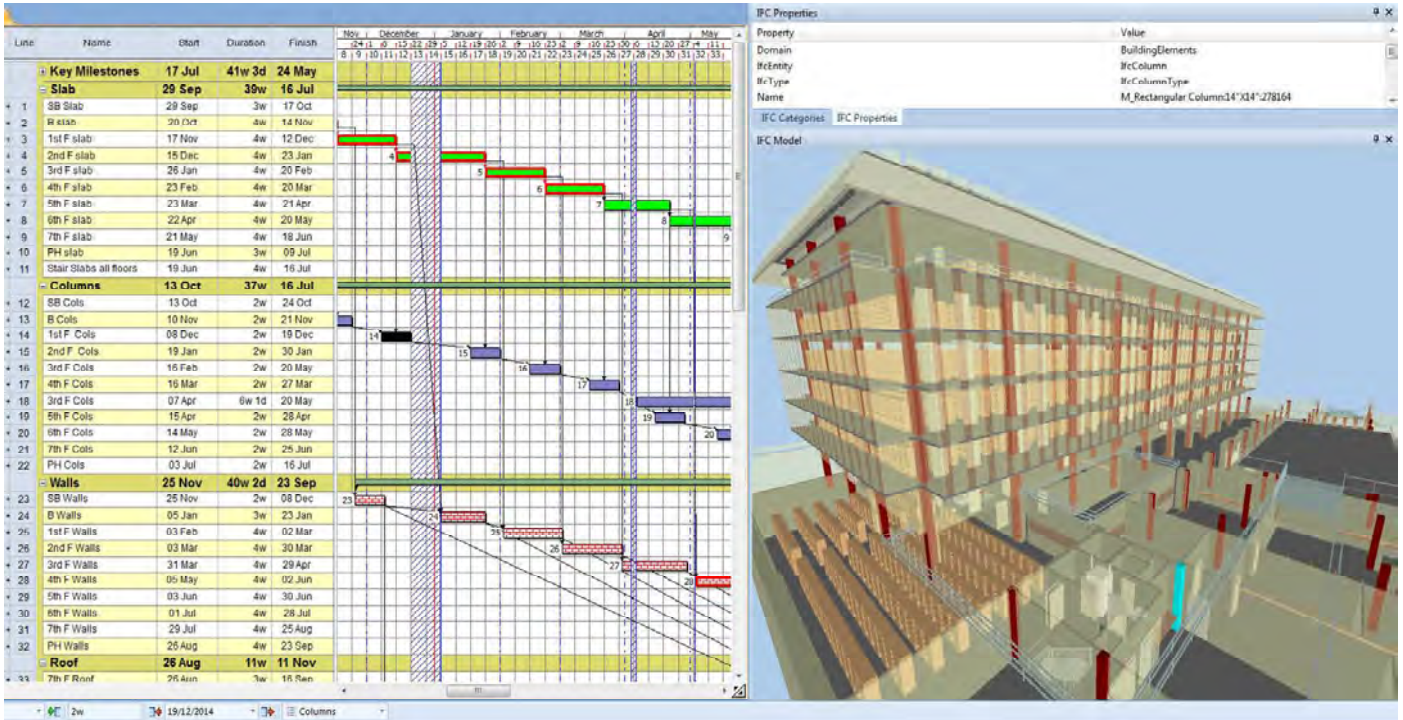
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The Information Manager and BIM

Steve Faulkner, Associate Director responsible for BIM Management at the structural engineering company Elliott Wood, and member of the BIM4SME Core Group, reviews the importance of the Information Manager...

The Government BIM Task Group is doing a sterling job in producing the BIM Level 2 Toolset. However, whilst the industry is developing their knowledge and becoming more enlightened in Building Information Modelling, what parts of the Toolset should be put into practice now?

BS1192:2007 is a good document, however, not many organisations adopted all of its recommendations. Most of us simply extracted the parts that added value; the drawing numbering. The same approach could apply to PAS1192-2, another good document, one which becomes clearer as one gains a better understanding of BIM.

We think it's imperative that we all try to adhere to the general principles laid out in PAS1192-2 but on the other hand, we do not believe that all of its recommendations are required on every project – in some cases it may actually cause unnecessary confusion.

So, who decides what should be included in the Employers Information Requirements etc.? Well, The CIC BIM Protocol, widely accepted as the industry standard states:

“The Protocol requires the Employer to appoint a party to undertake the Information Management Role. This is expected to form part of a wider set of

duties under an existing appointment and is likely to be performed either by the Design Lead or the Project Lead, which could be a consultant or contractor at different stages of the project. In some circumstances the Employer may appoint a stand-alone Information Manager. The Information Manager has no design related duties”.

“As an overview, the IM’s role should be to work with the Lead Designer to facilitate and document the BIM process in order to make projects more efficient from concept through to facilities management.”

Considering this, the secret to successful BIM could lie with the appointment of the Information Manager (IM). After all, in many instances it will be the IM who will advise the Client and instigate the route the BIM journey will take.

To capitalise on the current situation, we have seen the emergence of the BIM Consultant. Whether the Information Management is performed by a member of the Design Team or an external BIM Consultant is up for debate. There are pros and cons for both approaches; BIM Consultants are typically more aware of government protocol, but Designers generally deliver what is required for the project in hand.

Personally, we get frustrated having to trawl through overly complicated BIM documents trying to find the important bits. BIM documentation needs to be simple and concentrate on the key features. 10 pages of important information will likely get read, 200 pages of waffle will not, and the important bits will be lost in the process.

Additionally, it’s important that roles and responsibilities are agreed at the outset. We are working on a project where our initial structural Revit model was based on the Architect’s version. The Services Engineer had done the same. As a team we had had planned to co-ordinate the models in the forthcoming weeks

(when the models were more complete). In the meantime the IM federated the Designer’s models, produced a list of every individual clash, and circulated a report indicating all of the clashes to the team for action – a complete waste of time!

As an overview, the IM’s role should be to work with the Lead Designer to facilitate and document the BIM process in order to make projects more efficient from concept through to facilities management. The BIM process can be as simple or as complicated as we want it to be.

We prefer the simple approach, and using a traditional procurement route we have attempted to outline the key roles of the Information Manager below:

RIBA Work Stages 0, 1, 2 and 3

The pre-contract information management may be managed by either one of the design team or an external BIM consultant.

- Stage 0 (Strategic Definition) – Government Soft Landings (GSL) & Information Manager (IM)

The Client appoints the IM. The IM, Client, and ideally the Design Lead should then review any lessons learned from previous projects (refer to Governments Soft Landings) and sets out the BIM Strategy for the project.

- Stage 1 (Preparation and Brief) – Employer’s Information Requirements (EIR) & Model Production and Delivery Table (MPDT)

The IM produces the Employers Information Requirements (EIR); detailing the specific BIM requirements and inform the team what models are expected via a basic Model Production Delivery Table (MPDT).

- Stage 2 (Concept Design) – BIM Execution Plan (BEP)

The IM produces the Pre- Contract BIM Execution

Plan (BEP) with the Design Team. The BEP shows how the requirements of the EIR will be delivered. A basic Common Data Environment (CDE) also needs to be established.

- Stage 3 (Developed Design) Model Production and Delivery Table (MPDT) & BIM Competency Assessment (BCA)

Develop the Model Production Delivery Table (MPDT) to include; models required, when, by whom and the Level of Development (LOD) expected. BIM Competency Assessment Forms are established to evaluate potential Contractors.

“Personally, we get frustrated having to trawl through overly complicated BIM documents trying to find the important bits. BIM documentation needs to be simple and concentrate on the key features.”

RIBA Work Stages 4, 5, 6 and 7

Post-contract, it is suggested that the lead contractor should take responsibility for the information management. It may be prudent for the pre contract IM to be retained Client side in an advisory/monitoring role.

- Stage 4 (Technical Design) – CDE, BIM Execution Plan (BEP), Master Information Delivery Plan (MIDP)

The IM establishes the CDE for use by the entire Project Team. He then develops the Post Contract BEP to show how his Delivery Team will deliver the requirements of the EIR and include the Master Information Delivery Plan (MIDP)

- Stage 5 (Construction) Project Information Model (PIM)

The IM federates the Project Information Model (PIM) by merging all of the models as required by the MPDT. Where models have been developed by a

specialist (e.g. steelwork fabrication) these need to replace the Designer's elements.

- Stage 6 (Handover & Close out) – Asset Information Model (AIM)

The IM then creates the Asset Information Model (AIM) ready for handover to FM. The AIM should be a true graphical representation of that constructed. Add metadata for maintenance purposes as required by the MPDT.

- Stage 7 (In Use) Facilities Management (FM)

PAS1192-3: 2014 Information Management in the Operational Phase introduced The 'Organisation Information Requirements' (OIR) and The 'Asset Information Requirements' (AIR). However these are for another article on another day.

Whoever performs the role of the IM, the important issue is they look at what the requirements are for the project in hand, and learn from previous mistakes. The IM should adhere to the principles of the government's BIM Toolset, using the parts that add value, but most importantly, they need to keep things simple. ■



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Steve Faulkner

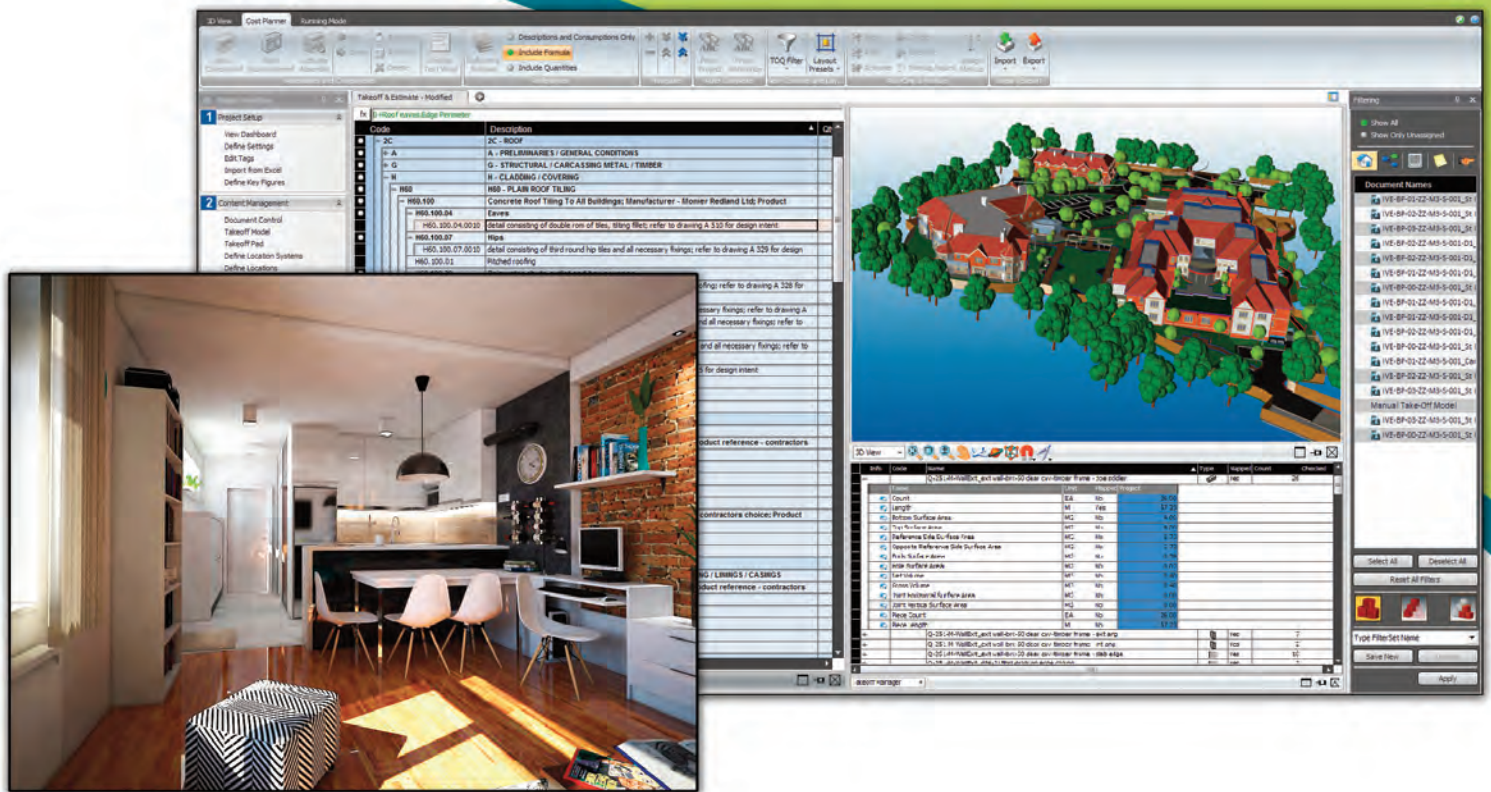
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BIM Level 2 Compliance and Implementation at Bill Prep

Our BIM journey began in January 2014 with a significant investment in BIM neutral collaborative software. This software is fully integrated across 2D and 3D measurement and billing, 4D planning and programming and 5D costing.

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- Model audits for BIM level 2 compliance
- Clash detection
- BIM consultation and implementation

BILL PRODUCTION

Through our software we are able to bring in 3D models from almost any native format and automatically group identical BIM components to generate a substantial amount of quantity data for use in preparing cost plans and bills of quantities.

This process reduces measurement time and increases accuracy, it also allows for manipulation and adjustment of component data without affecting the authoring model.

All secured projects are now quantified through BIM as our in-house team of 3D software engineers will create 3D models from 2D drawings.

These models are created for measurement purposes and therefore include a lot more information than most models available at tender stage.

By creating our own models we are able to increase our scope of services.

BIM SERVICES

BIM level 2 compliance has been achieved through a series of coordinated processes and implementation of national standards such as BS1192:2007, PAS1192-2:2013 and COBie-UK-2012 into our project workflows.

We have our own internal BIM protocols and have adopted the AEC Cad standards best practise for open BIM.

We are able to offer a wide range of BIM services from simple 2D to 3D modelling through to fully rendered visualisations and 4D simulation.

We provide our clients with an exceptional level of BIM modelling service tailored to meet and support specific requirements as well as consultation and guidance to implement BIM to achieve BIM level 2 compliance.

To see samples of our models please click here: <FTP://remote.billprep.co.uk>

Username: BP-Client Password: Passw0rd

The practical challenges of BIM

Hinesh Mistry, Water Global Technology Leader – BIM, at CH2M HILL outlines the current challenges of BIM, but also the confidence within industry that challenges can be overcome...

In 2012 the UK Government mandated that construction firms must achieve Level 2 Building Information Modelling (BIM) on all central government projects by 2016. With less than one year to go until the deadline, UK construction companies are aligning their efforts to meet the government's compliance target, with a concern that firms who fail to meet this target may not be able to tender for work. During my time working in the sector I have seen first-hand some of the challenges that companies across the industry are experiencing in this. However, I have also witnessed the steps that many clients such as the Environment Agency have taken to tackle head-on some of these issues.

At a basic level BIM is a very broad term that describes the process of creating a digital model of a building or other structure, such as bridges, in a virtual manner and maximising the use of that information. BIM Level 2 specifically concerns information which is linked to a 3D virtual model that is used in the lifecycle of that asset. As such, there are a number of standards that have defined the requirements. In the work I have undertaken with government agencies to develop their BIM processes, this has posed several challenges.

The Common Data Environment (CDE) is the first of these, as it raises a number of practical issues. The standard (BS 1192:2007) calls for a single environment for all entities to work within for the lifecycle of that asset. There are two options; supplier provided CDE and Client provided CDE.

If a supplier provides this CDE, a client will require a log-in in order to access information — all of which is within the supplier's system. If there are multiple suppliers, then there will be numerous systems,

requiring clients to have multiple accounts and passwords. Further problems of access may also arise should one supplier leave the project. Secondly, if a CDE is provided by the client, all information will be stored on a central location. However, this is generally inconvenient for suppliers whose systems may not be suitable for authoring models. This is because each supplier will have a multitude of complex BIM authoring tools which together provide the BIM. As a result of these issues, a typical project will have, as a minimum, two common data environments; namely the client CDE and the supplier CDE. [see Figure 1].

“The approach that companies should take with regards to the transfer of information is defined in BS 1192-4 standard which prescribes the use of Construction Operations Building Information Exchange (COBie), a spreadsheet data format, as the data exchange medium.”

Another challenge arising is the enabling geometry to be viewed by any party. Currently, one of the few formats which is vendor neutral and can be viewed across different systems is Industry Foundation Classes (IFC). However, while this format retains the geometry of the model, it loses some of the intelligence which can result in a rather static model. Even the use of native formats, if not properly considered, can be costly.

The popular Revit design authoring package for example, which has been used in the building industry is not backward-compatible, which means that future Revit model users will need the latest version to open the latest files. However, with most UK government agencies recognising the need for

Collaborative Data Environment(s)

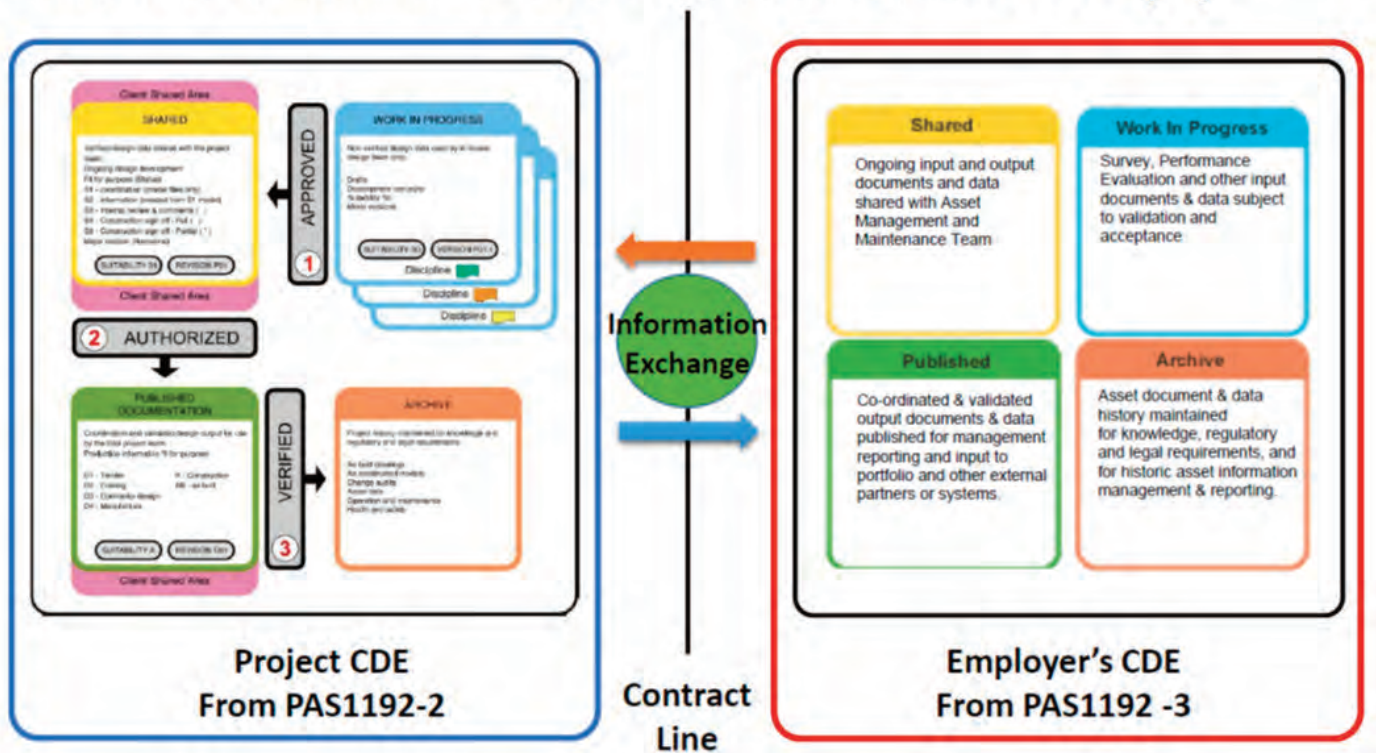


Figure 1

vendor neutral model formats, there is confidence that software suppliers will have recognised this opportunity and provide the necessary output. And with IFC 4 under development, this vendor neutral format is here to stay.

“It may require a lot of effort in the short term, but once fully implemented, Level 2 BIM will be a positive development for the UK construction industry.”

A further hurdle for construction companies attempting to reach government compliance targets is information or data transfer. The approach that companies should take with regards to the transfer of information is defined in BS 1192-4 standard which prescribes the use of Construction Operations Building Information Exchange (COBie), a spreadsheet data format, as the data exchange medium. This was selected as a means by which companies can package up data from various

sources and deliver it in a standard format. It has been relatively successful in the building industry where the COBie template was developed, however, transferring this COBie template into the infrastructure arena can be somewhat more challenging as there are difficulties with mapping assets across.

There are two issues here. The first concerns mapping across the nomenclature to ensure that the language being used is applicable to the infrastructure, and the second is for design authoring applications to provide automated outputs directly in COBie format. This first challenge has been addressed by the Environment Agency, where the COBie data structure has been mapped to their data structure, which means that automated data exchange is a reality. As for the second challenge, continued and consistent dialogue, standards and interactions from all levels should help to ensure that the required technology will become available soon.



The final challenge for BIM is, and in all likelihood will always be, the need for a human user to create, navigate, and assess a virtual 3D construction and to transfer information across systems. However, whilst having to learn new methods of working may pose difficulties, undertaking this learning gradually using bite size chunks of information will pay dividends. Companies can help improve their employees' understanding by facilitating their learning through the provision of materials and information sessions/briefings. In addition, once standards and workflows become automated, users will find they have more time to focus on the great projects they are working on.

Whilst achieving BIM Level 2 compliance in time for the government's 2016 deadline may seem a little daunting, and whilst there certainly are challenges arising, the majority of these issues can be tackled. The 2016 deadline is fast approaching but it will help to spur companies on to implement changes that they are more than capable of making with their skilled workforces. It may require a lot of effort in the

short term, but once fully implemented, Level 2 BIM will be a positive development for the UK construction industry. It will enable more complex and imaginative designs, improve the design process, and benefit workers through increased risk mitigation and on-site health and safety. Challenges are there to be overcome, and I believe that these will soon be conquered as companies adapt, and technology develops to see BIM become the norm. ■

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NBS BIM OBJECT STANDARD

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6 Steps to improving your Digital Procurement process

Following on from my article in the last edition of BIM Today regarding Lonely-BIM to Collaborative BIM I wanted to delve further into how BIM practice and methodology has assisted in Premier Interlink's internal process changes, all part of our planned staged BIM implementation.

This article is regarding a specific point in time within the BIM process and is focusing on the Manufacturers and Contractors within the BIM process.

Aim of the process

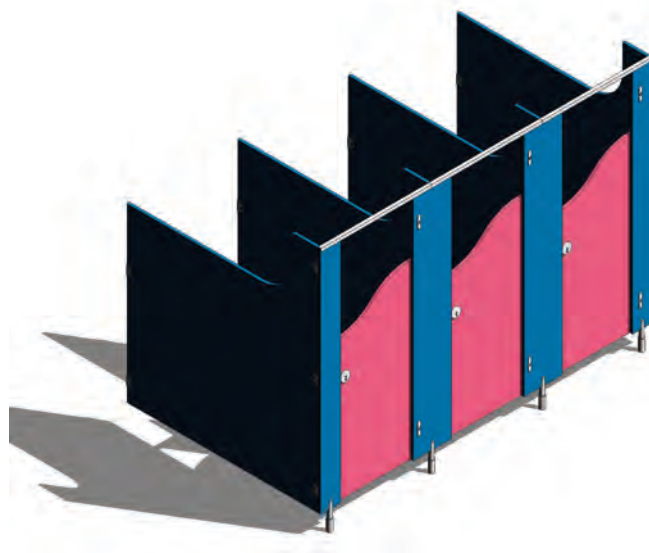
Use 3D objects and/or structured data to assist with the Procurement process at Premier Interlink, both in terms of specification for quotes and also ordering purposes.

The first 'opportunity' to overcome was to find a supply chain member who had generated their objects/data sufficiently for our internal process to be developed. Thankfully the team at Cubicle Centre ticked all of the boxes and were also very keen to work on this with us as it also tied in with their next stage of BIM development.

In this instance the objects provided by Cubicle Centre have been developed to provide parametric options to suit their full range of products and have been updated over a period of time so that they are data rich without being extensively large in file size.

Step 1 – Training and model authorisation

The team at Cubicle Centre provided in-house training with the staff at Premier Interlink to ensure best use of their BIM objects and data, this training also brought a number of proposed future development requirements was of benefit to both businesses.



Premier Interlink then undertook their own internal training and process reviews to ensure the objects they were going to work with were fit for purpose and provided the 3D object and data requirements needed within the business.

Step 2 – Data use for internal processes

This step brought to light a few interesting data access issues with nested families within the Revit software that were then resolved internally by using Ideate BIMLink. This meant we could use the nested object data to generate our own internal description and procurement scheduling outputs – a fantastic step forward in Premier Interlink's procurement process!

The output itself currently resides within a schedule within Revit as we do not currently link direct to our BIM/Procurement software... a solution for another day!

Step 3 – Visualisation – assisting with sign off from the client

A basic step for most people reading this article but for our business moving from 2D to 3D just over a year ago this output has

been a significant step forward in how we communicate with the client. The signoff process will no longer be a simple 2D plan (and perhaps elevations of the object if you are lucky) but will contain the visual and colour aspects for signing off too. We also tie this into our developing object authorisation process where the colours are set to red by default until confirmation occurs; this colour system enables the approval process as having striking red objects on the screen/pdf output soon provides answers.

Step 4 – Utilising the actual objects and data as part of the order

In the case of Cubicle Centre we were extremely fortunate to be working with a team who had developed their own solutions from their BIM objects, namely an output format used by their manufacturing plant which has saved them around 5 working weeks a year compared to the old process!

To facilitate this the developed procurement process not only utilised the data within the objects to ensure clarification and communication of descriptive data for all

parties for quotation and ordering purposes, it also then uses the objects themselves upon order.

This process is simple in execution and it may develop further upon regular use. Once the BIM objects provided have been manipulated to suit the project needs and have been signed off as approved by the client we send these objects direct to the supplier as part of the Procurement order.

Step 5 - The supplier manufactures the product directly from the BIM Object provided by Premier Interlink

This step is somewhat restricted to the supply chain's own use of their objects; if they have developed internal solutions that utilise this data then this step can occur.

Upon the receipt of order and BIM objects Cubicle Centre use these directly within their manufacturing process, adding their own data and IP fields/customisation without losing any of the options chosen for the

project. This solution has major benefits compared to the traditional PDF process in that the objects and data we have designed are manufactured 'as-is' promoting accuracy, reducing duplication of work and providing a product that we know is fit for purpose.

Step 6 - A product that fits, reduction in process steps, a happy client

And we all go home happy(ier)



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The NBS National BIM Survey results

Richard Waterhouse, Chief Executive at NBS and RIBA Enterprises, analyses the results of the fifth annual NBS National BIM Survey...

The fifth annual NBS National BIM Survey has turned out to be one of the most intriguing yet. The UK construction industry has emerged from its longest recession in living memory to a point where activity levels are placing increasing strain on resources. With industry forecasts predicting further significant growth for the coming years, additional pressure is likely and as a result, the need for delivering efficiencies in design and delivery stages are needed more than ever.

However, the availability of resource and expertise that can research, implement and educate the industry in new ways of working (including BIM) is limited. Despite improvements, further investment is needed to inform and enable the majority to understand and adopt the new methods of working.

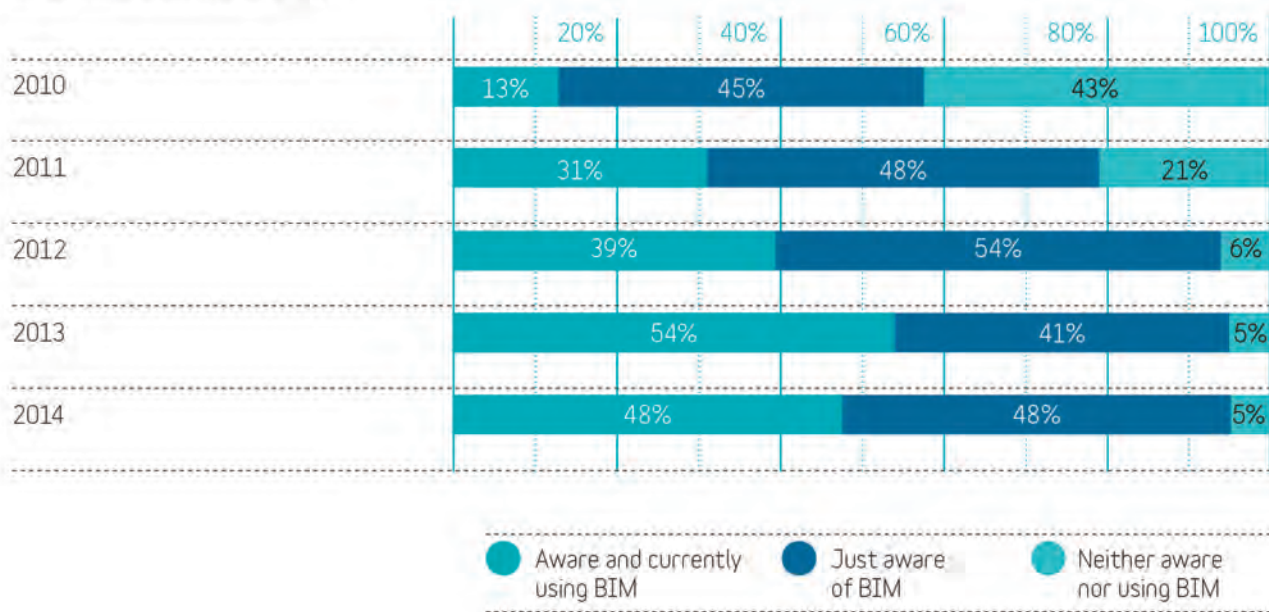
In this year's survey, we see that BIM adoption is moving from being led by innovators and early adopters, towards being a more mature market,

where the more mainstream are investigating and assessing the benefits of doing so. Time, levels of expertise and cost remain barriers to BIM adoption and there is still a lack of clarity in the industry with many sceptical of the claims made for BIM by some.

However, those who have adopted BIM are willing to make its benefits clear. These include improved cost efficiencies, client outcomes, co-ordination, speed of delivery and better information retrieval. These are all benefits of BIM, seen by the majority of BIM users. With 92% telling us they will be using BIM within three years, we expect those benefits of BIM to be near universally felt.

Meanwhile, the Government's BIM target date of April 2016 is drawing near. The report examines the industry's assessment of the Government's decision to place BIM, as an enabler, at the heart of its strategy. The industry broadly supports the Government's approach, describing it as being on 'the right track'. It

BIM awareness and usage



sees BIM as assisting the UK meeting at least two key targets – 33% reduction in the cost of construction and whole life costs, and a 50% reduction in the overall time, from inception to completion.

It is through the success of BIM in centrally-procured projects that we will see – and are seeing – real savings that make the return on investment in BIM evident to all sectors of the construction industry.

The first NBS National BIM Survey recognised the importance of ‘putting the ‘I into BIM’, placing information at the heart of this technology. We have clearly moved on from the time when 3D CAD could be mistaken for BIM.

At NBS we have been working to deliver increasingly sophisticated, and standardised, levels of information into the information model through the timeline. This began with our innovative specification product, NBS Create, and then developed through the creation and growth of the NBS National BIM Library. We were able to fully integrate these products together through plug-ins, allowing information to be co-ordinated between the specification model and the geometry model.

2015 sees the next stage in this trajectory of development. Part funded by Innovate UK, and produced in partnership with the industry, NBS have released the NBS BIM Toolkit (<https://toolkit.thenbs.com/>) public beta. This free to use tool offers a Digital Plan

of Work tool, and a new unified classification system. It provides support to define, manage and validate responsibility for information development, as well as its delivery, at each and every stage of the construction lifecycle.

These are innovative times. The BIM journey continues – though the road isn’t always straight. BIM is still developing, not least in the definition and standardisation of the higher levels, as well as in the development and adoption of COBie. Come 2016, we look forward to BIM, and the BIM mandate, proving their worth. ■

Download the full NBS National BIM Report 2015 here <http://www.theNBS.com/bimreport>.



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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.



John Adams
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 4Projects by Viewpoint
 Tel: +44 (0)845 330 9007
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BIM for surveys - a model of excellence

Through a combination of its highly experienced, knowledgeable personnel and the latest cutting-edge technologies, Murphy Surveys is at the forefront of delivering expert survey solutions. Commenting on the growth and expansion of the company since its foundation, Kai Duebbert, Managing Director of Murphy Surveys explains:

"We've grown considerably and established ourselves as one of the leading surveying companies in the UK, with a portfolio of long-standing clients who return to us for our full range of surveying services. We work with our clients to find the best approach for them – this is achieved through direct consultation with the client to find appropriate solutions to fit their projects and budget. A lot of effort is invested into working with the client to make sure that the whole system is designed properly to meet their needs."

Project Profile

Murphy Surveys recently completed a project at Kidderpore, Hampstead which involved the survey of 15 Grade II listed buildings, as well as the surrounding land and all utilities services. The project began with a precise survey control. Murphy's then scanned the area using a high definition 3D terrestrial laser scan and produced high dynamic range 360 panoramic imagery. Collaborative point-cloud viewing (TruView) was produced prior to production of 3D parametric BIM.

Heritage projects such as these pose very specific challenges; the random and varied nature of each building means each one has its own levels, spaces and details. Murphy Surveys were able to overcome such



hurdles due to the experienced nature of both the surveyors involved and the BIM modelling team. Collaboration was key to producing the model.

"We work with our clients to find the best approach for them – this is achieved through direct consultation with the client to find appropriate solutions to fit their projects and budget."

Windows and columns in the buildings were all varied and extremely ornate. Custom families had to be built for each type of window which included items such as glazing bars, metal security bars and grills. Reveals and stonework surrounds of a widely varied nature across all 15 buildings were also required. Point clouds were incorporated into the model to ensure the utmost accuracy when it came to modelling the existing surfaces. Modelling took into account the

verticality and horizontality of the walls, ceilings and floors. Sagging often occurs with heritage buildings and existing structures; this was taken into account when these were modelled.

The ability to view point cloud scans of the buildings using TruView allowed clients and design teams to view the rich real time laser scan of the existing structure internally as if they were navigating in Google Maps Streetview. Of vital importance is the ability to pan and zoom around the scans and view from each scanner position. This is invaluable in saving time, as there were no site return visits. It also allows quick, efficient and accurate collaboration.

Aside from being a visually accurate model of the buildings on the site, relevant information was also inputted to the model. This included information such as customised parameters, which allowed the BIM modellers to note various conflicts or notes regarding



the model. Any items that were unknown or deviations from real world conditions were noted in the relevant walls and surveyed surfaces that were in the model, while other deviations and comments from both surveyors and the modelling team were also inputted to the relevant object properties for tracking and usability purposes.

“A lot of effort is invested into working with the client to make sure that the whole system is designed properly to meet their needs.”

Once parameters like these are created and used consistently by all, filters and schedules can be set up easily in the model file which allow the client and other users to isolate and filter all relevant objects in the model, even those that contain particular notes and information. We can then view such objects at a glance, instead of trawling through a drawing looking for inaccuracies or devia-

tions manually and comparing these against other information. This is essential on large projects like this in order to cut down on time spent checking over models and drawings.

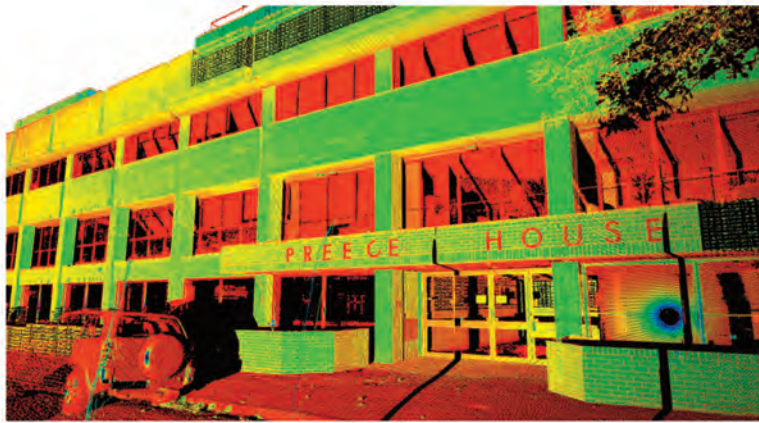
At its most basic level, this allows errors or difficulties in a survey to be highlighted quickly and therefore tracked. It is essential that such notes and tolerances are kept track of in the model in order to improve the accuracy and collaborative nature of surveying. Creating and maintaining good and accurate data, with the help of notes and comments, helps identify objects of interest other than just the visual. This means schedules and spreadsheets can be generated for both asset management and fabrication purposes, as well as surveying real world physical conditions.

This process allows valuable information to be more viewable to everybody and highlights how important BIM can be. Aside from creating 3D representations of the built

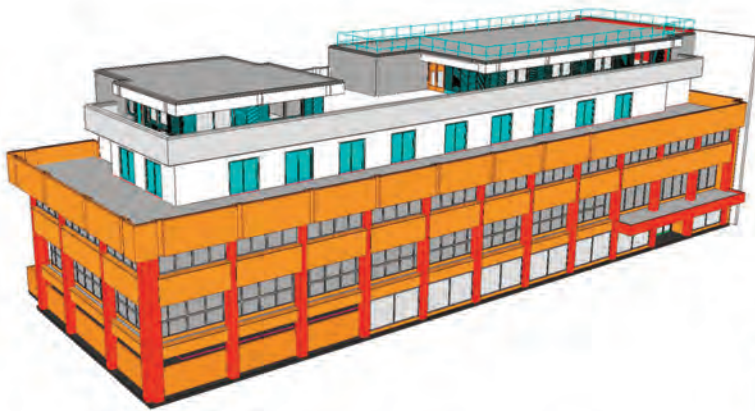
environment, BIM allows all information to be kept in a single model or environment. Instead of collating various sheets, CAD drawings and specifications in various IT systems or cabinets, this single model significantly reduces waste, time spent on return site visits and ultimately costs.

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10D - Surveying using laser scanning technology

10D began as a Building Surveying practice offering services including building design, cost control and project management. Through collaboration with UK laser scanning Engineering firm Adv Simtech, we explored the advantages of combining laser scanning, building surveying and computer modelling. Our first project was a complex site in central London and it was scanned and surveyed within an hour. Accurate 3D spatial data was recorded and there was no concern regarding the next consultant being able to open and use massive point clouds of data, we used it ourselves. The deliverable of accurate "As built" models and drawings was combined with analysis, such as rights to light, and visualisation with the use of virtual cameras throughout the scene. The accuracy and detail of the scan data and model exceeded the client's expectations. We know how quickly 3D data can be captured and our concept of keeping our services in-house has ensured these benefits are passed to the client. The concept of laser scanning, design, and modelling skills under one roof was proven.

What clients need

Clients require usable deliverables and that's what we provide. Whether it's an accurate survey and the preparation of drawings and a planning application, a computer model for rights to light analysis, an accurate digital terrain model to analyse environmental impact, or a BIM model to get you on the right path, we do it in-house. The benefits of laser scanning are never lost



between consultants and speed and accuracy remain the key advantages of our method of working.

Scan to planning stage

By combining new technologies from the geo spatial sector with traditional Building Surveying skills we now bring a whole set of in-house skills to a client. We don't just scan to BIM, we scan and design. A one stop shop to bring your vision to planning stage and further. On larger projects where you have your own design team you no longer need to be concerned whether your Architect can receive and interpret your scan data, leave that to us.

Conclusion

At 10D, we combine traditional client facing Building Surveying skills with the speed and technologies of the Geo Sector. We believe we are unique in that we can single handily

take your project from scanned data through to the planning stage. Why deal with lots of consultants when one will do?

10D, seeing things differently



Dave McWilliams
Director and Building Surveyor

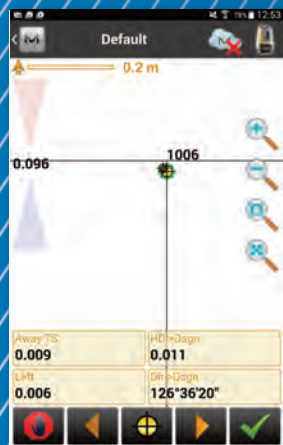
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The Topcon LN-100



The latest Total Station solution by Topcon is designed to make things easy on site. Take the concept of the laser level and apply it to a positioning instrument.

Make the unit as simple to use as possible and reward the operator with increased, cost effective site productivity.

Who should be looking at this instrument?

Anyone who recognises these tasks:

- Working with coords in a spreadsheet
- Manually entering coords of a plan on to the instrument
- If you're using a two-man theodolite or Total Station for setting out – it's time to move on.

Wasting time, wasting money, you can do it twice as fast with half the team. Robotic instruments are the future.

What's stopping you?

Have you ever experienced trying to connect radios for robotics? Forget it, that's a thing of the past. The MAGNET Construct App on Google Play Store or the Autodesk BIM 360 Layout App means you can connect to your tool via WiFi or Bluetooth with a single button press. Switch the tool on, select the network and you're ready to go, it's that easy.

Tracking of the prism, and getting the tool to follow you used to be a chore. No more, the tracking on the LN-100 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 Enterprise Solutions or Autodesk BIM 360 Tools puts high-end positioning technology in reach of anyone looking to up their game.

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

SUPERCARGE YOUR SETTING OUT



LN-100 | 3D Layout Navigator

- Revolutionary new concept
- Set up in 20 seconds
- One-button operation
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BIM paves the way to success

Tahir Sharif, EMEA Director Software Solutions at Leica Geosystems gives an overview of how BIM has been adopted by civil engineers who are now seeking to identify the role it can play in their field...

Civil engineers who are regularly engaged with architects or structural engineers may already be familiar with BIM, but for those who are involved in designing roads and highways, the process is a whole new world, but one that is highly relevant now and will continue to grow in importance.

BIM helps not just in constructing 'buildings' but also in building any sort of infrastructure. It is an integrated process built on coordinated and reliable information about a project from design through construction and operations.

BIM can be considered a thought process that governs work through various stages of the project in the shape of information that stays digital, consistent and coordinated. Hence, the chief benefits of BIM are that there is no duplication of information. It is a constantly updated centralised database model and streamlined flow of information from field (survey) to design and finally to construction and maintenance/operations.

BIM and civil engineers

Implementing a BIM process for road and highway design starts with the creation of coordinated, reliable design information about the project, resulting in an intelligent 3-D model of the roadway. The elements of the design are related to each other dynamically, not just points, surfaces, and alignments, but a rich set of information and the attributes associated with it.

For example, halfway through a roadway design project the profile may need adjustments to a vertical curve and the grades. By adjusting the profile, all of the related design elements update automatically, allowing the designer to instantly see the impact.

In this way, BIM facilitates evaluation of many more design alternatives. As part of the design process, civil engineers can leverage the information model to conduct simulation and analysis to optimise the design for constructability, sustainability and road safety. Finally, with a BIM process, design deliverables can be created directly from the information model. Deliverables include not only 2D construction documentation,

but also the model itself and all the rich information it contains, which can be leveraged for quantity take-off, construction sequencing, construction stake-out, as-built comparisons and even operations and maintenance.

In the case of construction stake-out, digital points are added in the office to the information model and can be sent directly to total station equipment on site. This equipment has the ability, once coordinated to stake-out numerous points robotically removing the need to generate stake-out points from 2D CAD or paper drawings. This process allows a more efficient and accurate way to link the office to the site and through verification of the as-constructed, links the site back to the office.

The use of modelling, 3-D visualisation and analysis is nothing new for road and highway design professionals, but with traditional drafting-centric approaches, design, analysis and documentation become disconnected processes, making evaluation of what-if scenarios inefficient and cost prohibitive.

By dynamically connecting design, analysis, and documentation in a BIM workflow, most of the effort in a roadway design project is shifted back into the



detailed design phase when the ability to impact project performance is high and the cost of making design changes is low. This allows engineers to spend more time evaluating what-if scenarios to optimise the design and less time generating construction documentation.

Machine guidance applications can benefit significantly from a BIM model, an object based model supports attribute meta-data associated to work packages for specific machine types. High accuracy paving machines require parametric models, while earthmoving machinery can work with surfaces, string-lines as well as parametric models.

Benefits in civil design

The most immediate benefits of BIM in the case of

road and highway design are better designs and increased efficiency and productivity. Because design and construction documentation are dynamically linked, the time needed to evaluate more alternatives, execute design changes and produce construction documentation is reduced significantly. This is particularly important for transportation agencies because it can shorten the time to contract letting, resulting in projects being completed sooner and within more predictable timetables.

Beyond efficiency and productivity, BIM facilitates roadway optimisation by including visualisation, simulation and analysis as part of the design process. Many criteria can be assessed to achieve an optimal roadway design, for example in terms of constructability, road safety and sustainability.

Constructability

Civil engineers typically design for code compliance, not for constructability. But incorrect interpretations about design intent made in the field because of ambiguous documentation can lead to delayed schedules, change in orders and RFIs (requests for information) after construction begins.

Consider a typical new highway construction project with bridges and interchanges budgeted for £100m. Typically, about seven to eight per cent of the investment will go into design development. Reducing the design spend by 35 per cent with a more productive process saves £2.6m. But reducing the construction portion by 15 per cent by considering constructability during design saves nearly £14m. These savings don't take into account litigation that can result from mistakes in the field. Designing for constructability can help reduce these mistakes before they become a problem.

“By dynamically connecting design, analysis, and documentation in a BIM workflow, most of the effort in a roadway design project is shifted back into the detailed design phase when the ability to impact project performance is high and the cost of making design changes is low.”

Rich BIM models allow the machine guidance to reach new levels of data capture and as-built object modelling. Machine control, with a CAD based model improves productivity on a job site, by eliminating the need for traditional stake-out methods. However, the BIM model offers the ability to work with specific objects, and update at an object level the specificity of as-built information. This includes capturing more than just points; it includes layers, material type, and underground utilities, contributing to a rich model to be used further in the process.

A single BIM model can be updated from a variety of machine control applications simultaneously, and shared across multiple systems, minimising duplication of work.

Road safety

Analysis to ensure safe stopping and passing sight distances is a key factor driving design decisions. Traditional sight distance analysis is based on mathematical equations applied to vertical curvature in the road profile. But this approach fails to take into account factors such as horizontal layout and visual obstructions. Integrating interactive visualisation and sight distance simulation into the design process allows the civil engineer to identify quickly whether the road geometry meets critical safety parameters related to sight distances, including grades, curvature, and visual obstructions such as barriers, berms and foliage.

Probably the most significant advantage of BIM compared with a drafting-centric process is the ability to extend the use of the information model beyond design, analysis and simulation into the field (construction) through solutions like Leica's BIM Field Trip. For example, transportation agencies increasingly are using the 3-D model for operating construction equipment with GPS (Global Positioning System) machine guidance. Benefits include increased productivity and accuracy, reduced survey costs, lower equipment operating costs and an extended work day. ■



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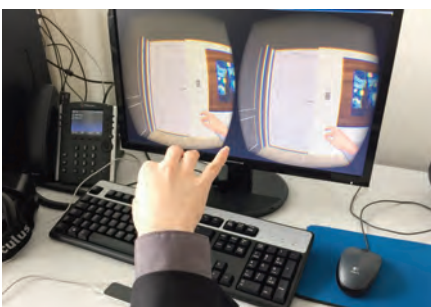
How Virtual Reality is Changing Construction

The rapidly increasing popularity of the Oculus Rift has brought us a whole new world of Virtual Reality. The future is getting closer and you can now experience full immersion in a virtual world. Wearing the Oculus Rift you will feel as if you've been taken into an entirely different place; flying through the sky, stuck on a roller coaster or left alone in a haunted house. This technology is starting to gain traction in design as people are now able to explore buildings that are yet to exist. The creative team at modularize, based in Liverpool, are already able to take your BIM/Revit models and turn them into a place you can explore from the comfort of your own office, this is a realistic 1:1 scale mind-blowing experience.

This is all made possible by the use of a Game Engine called Unity 3D. This software allows the team at modularize to create visualisations from scratch. They can create anything you like, from interactive sliding doors, lifts and escalators through to realistic day/night solar cycles. Imagine the power of using fully immersive Virtual Reality experiences of the BIM models on your computer to get a first-hand look at your building long before it's built.

Reach Out and Touch

The array of exciting technology on the market for design professionals is exploding.



There are a number of systems which sense movement of the hands or body and some that even generate tactile feedback. These technologies, when combined with VR form an increasingly realistic experience.

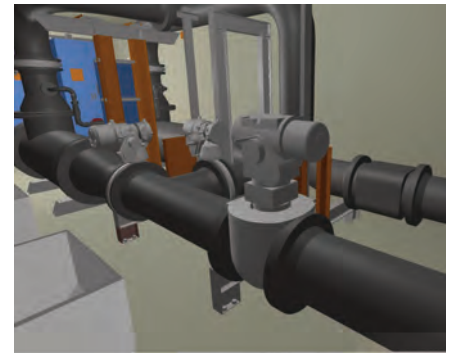
"The creative team at modularize, based in Liverpool, are already able to take your BIM/Revit models and turn them into a place you can explore from the comfort of your own office, this is a realistic 1:1 scale mind-blowing experience."

Combination of the VR headset with a hand sensor such as the Leap Motion allows Unity to track hand movements and include them in the VR world. This produces a more responsive experience within which the user can realistically interact with virtual objects. Reach out in front of you and actually push the virtual door open.

Saving Real Money, Virtually!

Working with a manufacturer of modular plant rooms, modularize developed a fully immersive VR model which was used during design reviews and project meeting to discuss the set-up of the equipment and the buildability of the design.

A surprising result of this particular project was that, while immersed in the virtual world, the design team realised that the building was actually too big! This resulted in the decision to reduce the building width by 500mm. The savings from this decision alone were estimated to be around £2000. This made the investment of £500 in a VR model an absolute no-brainer!



Spruce Up Your Sales

Imagine being on the road, visiting clients and using an interactive product configurator on your laptop. Take this one step further and impress with a VR headset to put your prospective sale right in the picture. The development of simple product configurators combined with VR output is an amazing sales tool. Using cloud technology this can also be linked back to your companies ordering systems to ensure the stock is available when it's needed. Again, the sky is the limit.

Contact modularize Now

If you're interested in learning more about the benefits of VR for construction projects then give the team at modularize a call to discuss your project in more detail.



Matthew Egan

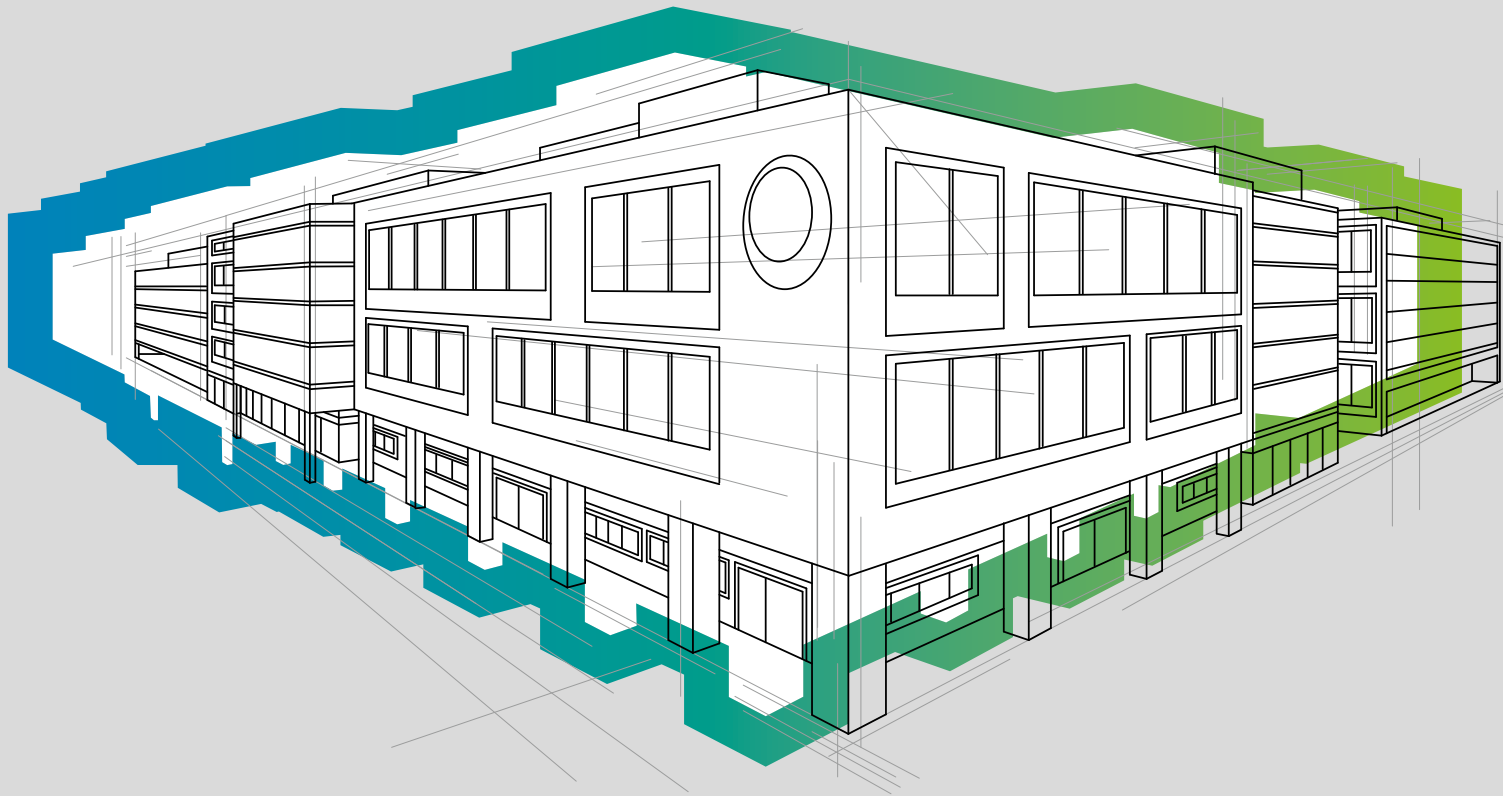
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A coordinated approach to BIM.

Previously architects did not always have the most efficient way of sharing information, so their design intent could be lost. Andy Murphy, Non-Residential Sector Director at Saint-Gobain, explores how Building Information Modelling (BIM) has the potential to revolutionise the efficiency of projects in the built environment.

With the construction industry fast recovering with spirit from the recession, there has never been a better time to embrace new technology and approach our craft with fresh perspective.

BIM is a fundamental part of the Government's 'Construction 2025' vision and, as we get closer to the 2016 deadline it has started to gain momentum. At this point, all centrally funded Government projects will need to be constructed using BIM at level 2, with the aim of improving construction efficiency. Finding the errors in the computer-generated model before the actual build begins will help to reduce errors and strengthen proposals. This should ultimately add immense value, reducing time on site and improving efficiencies during the construction stage.

Before BIM, Computer-Aided Design (CAD) drawings were relied on for helping to complete a construction project and differing as-built drawings from the contractor to get an insight into architects' choices. This was not always enough information to aide a project efficiently and cost effectively over the its lifetime.

With the potential to serve as an electronic manual to assist those maintaining the built environment, it can allow users to share a common set of information on construction projects that can be transmitted easily between all interested parties.

Quality Control

BIM has been around for several years and has been used across many sectors to ensure that many types of construction are

digitised at the design stage. In the automotive and defence industries, BIM has been a key driver of innovation, enabling supply chain efficiencies, encouraging collaboration and allowing best practice to be shared in depth and breadth throughout the community of partners involved in the activity. The pace at which BIM is now being used in the construction sector is accelerating, with recent research indicating that 94% of main contractors expect to be using BIM technology by 2017.

BIM technologies enable improved quality of project design while driving down the cost of construction by streamlining and modernising the processes by which we design, construct and manage Government-built assets.

Coordination is key

Three years ago, Saint-Gobain adopted a coordinated approach to its BIM data production with the objective to position itself as the leading touch point for architects, designers and contractors who require high-quality information on the sustainable materials, products and solutions that are available from Saint-Gobain.

The project to coordinate Saint-Gobain's BIM data ensures that it's as accurate and detailed as it can be. This means that projects designed using its solutions can be the most integrated available on the market, with the best opportunity to offer economies in design, construction and post-delivery management.

Saint-Gobain's newly launched Multi-Comfort approach to building design, which focuses on the wellbeing of building occupants by ensuring that thermal, acoustic, indoor air quality and optimised glazing solutions are all properly considered from the beginning of the design process, is enabled by Saint-Gobain's BIM approach.

Continually updating the training that is provided to Saint-Gobain BIM technologists to the highest, most current standard is a key enabler of this approach. This ensures that all Saint-Gobain companies have individuals capable of producing and managing BIM data that is of a market-leading standard. This is a unique approach from the world's leading sustainable habitat business.

The right software

Autodesk is the leading brand for BIM design software, data production and management. Their suite of products provides a portfolio of interoperable 3D visualisation tools that support BIM-based workflows. These two global thought leaders have entered into an agreement in order to ensure that Saint-Gobain continues to be positioned as the reference in the production of BIM data for the construction industry.

The agreement enables Saint-Gobain to share software licences across its 34 brands in the UK on a totally flexible basis. This keeps BIM data provided to the market completely up to date, accurate and available free of charge to construction industry partners, designers and clients.

As its BIM activity continues to expand, new users can be added to the Saint-Gobain BIM community without the need to purchase additional licences. This is because individual software licences can be used by multiple individuals over time, rather than under the previous widely adopted model whereby a licence, once assigned, could not be easily re-deployed.

Optimum Results

Saint-Gobain is globally positioned at the forefront of innovative thinking on issues of comfort and sustainability for the owners, designers, constructors and occupants of the built environment. The agreement that Saint-Gobain in the UK and Ireland has entered into with Autodesk is a major step towards ensuring that it is positioned to deliver the optimum level of BIM data to the construction sector. Continuing to support and assist customers to produce buildings that are truly comfortable, affordable and sustainable. BIM is critical to those objectives, as reflected in Saint-Gobain's action to guarantee its leadership.

BIM is not a complete solution; it's a process to be added to the skill set to promote best practice. If all members of the built environment supply chain start to use BIM to its full potential, the industry can begin to work together more effectively. With the announcement that all new central government-funded buildings must be constructed using BIM software in tandem with Government Soft Landings (GSL) by 2016, this awareness and collaboration will only support the promise made when delivering building design.

A longer-term approach to buildings is needed to improve industry efficiencies and quality. If we give greater weight to the user's requirements at the design stage, the focus is on meeting their needs at the design stage, streamlining the process in the long term.

[Click here to download your free copy of Saint-Gobain's BIM Basics guide](#)



Large scale refurbishment and retrofit using BIM

Is it worth it?

Neill Ryan is CEO of VRM Technology (VRM), a software company based in London and Dublin that provides a cloud based collaboration and invoice management platform, Refurbify, to the construction industry. Integrated mobile survey apps allow property surveys to be completed and once uploaded to the cloud will produce whole property 2D plans, 3D models, schedules of works, bills of materials, works budget costings and much more automatically in real-time! Live works can be measured and monitored using smart phone based evidence of use apps that track progress in real-time against planned works and specified products.



VRM has spent the last 2 years working on private and government backed construction research projects that cover many different types of technologies and processes from pre-works through to the final delivery stages. This has given the company the opportunity to collaborate with leading industry organisations and learn how technology is currently used (or not used) in the domestic refurbishment and retrofit market.

The most interesting of all the topics covered is BIM and its use in the refurbishment and retrofit markets. When the value of the works at hand are generally less than it might cost to produce useful BIM models, one has to ask the question, why use BIM at all?

While there are benefits of BIM for all the parties in the construction supply chain, for

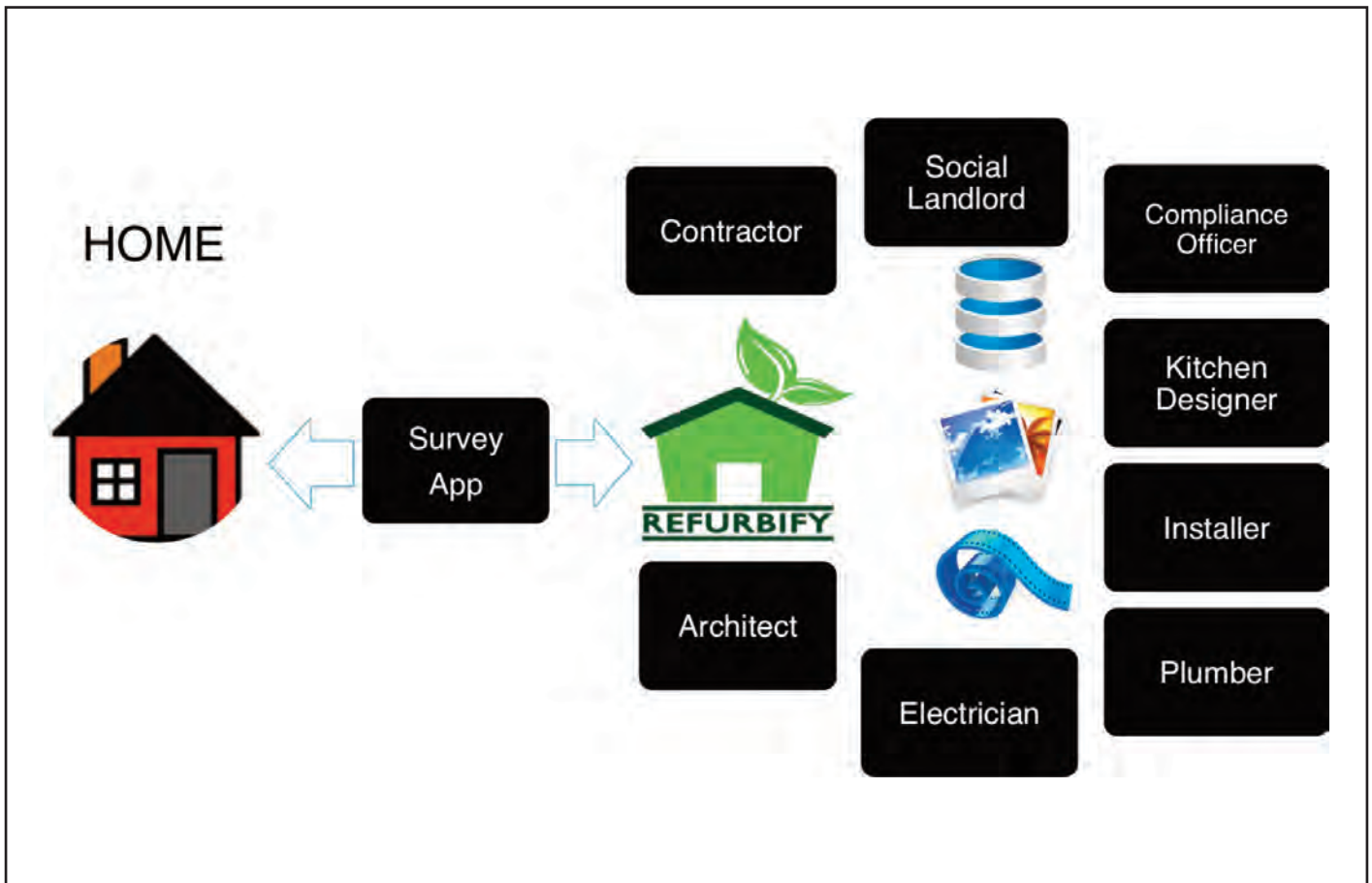
the purpose of this article lets start with a medium sized social housing provider with limited budgets, increasing annual maintenance costs, tenants not paying the rent due to high energy costs and a desire to retrofit or refurbish to resolve these issues. Due to the high costs of the type of retrofits required to adequately achieve these goals there is a huge emphasis on the quality of works. This is required to make sure that the reduction in maintenance costs and energy costs will be sustained for the projected life of the works installed. So how can BIM help here?

Using a survey tool such as Refurbify, whole property surveys have been captured either during one visit or smaller surveys completed during ongoing maintenance visits. The difference with these surveys compared to

those currently captured is that they have the end goal in mind. The costs, the products, the labour and the time that is required to perform any chosen measures on properties that that are being surveyed.

“VRM has spent the last 2 years working on private and government backed construction research projects that cover many different types of technologies and processes from pre-works through to the final delivery stages.”

Once this data is captured, an IFC model of each property is immediately available on the Refurbify cloud. This model can be instantly queried to provide estimated



schedule of costs and durations for any work measures that are of interest. Contractors can be sent a link to IFC models, along with associated tagged information such as photos and videos, specified products and labour skills. Costs and products can be agreed and added directly to the system so that the BIM data is updated accordingly.

“Even the small tradesman can play a part in updating the BIM information by confirming their tasks have been completed and taking photos of their work and products use via a smart phone and a mobile app.”

Once the works have been decided the agreed BIM information can be used to schedule the works and monitor them in real-time. Products can be scanned onsite and referenced against the specified products, the duration of tasks can be compared pro-actively against the

planned task durations. Live costs can be compared to budgeted costs as all of the onsite data is continuously checked against the planned and specified BIM data.

Even the small tradesman can play a part in updating the BIM information by confirming their tasks have been completed and taking photos of their work and products use via a smart phone and a mobile app.

The end result for the social housing provider is that BIM gives them complete control and visibility of the process from the early deliberations of choosing which properties should be upgraded, to choosing a contractor, monitoring the essential elements of the live works, approving invoices that are automatically generated and linked to virtual evidence from the works performed.

The quality and costs of the planned works have been matched to the delivered works and the promises of ongoing reductions in energy

and maintenance costs can be more certain.

For more information about VRM or Refurbify please feel free to contact using any of the details provided on our website.

<http://www.vrmtechnology.co.uk/contact>



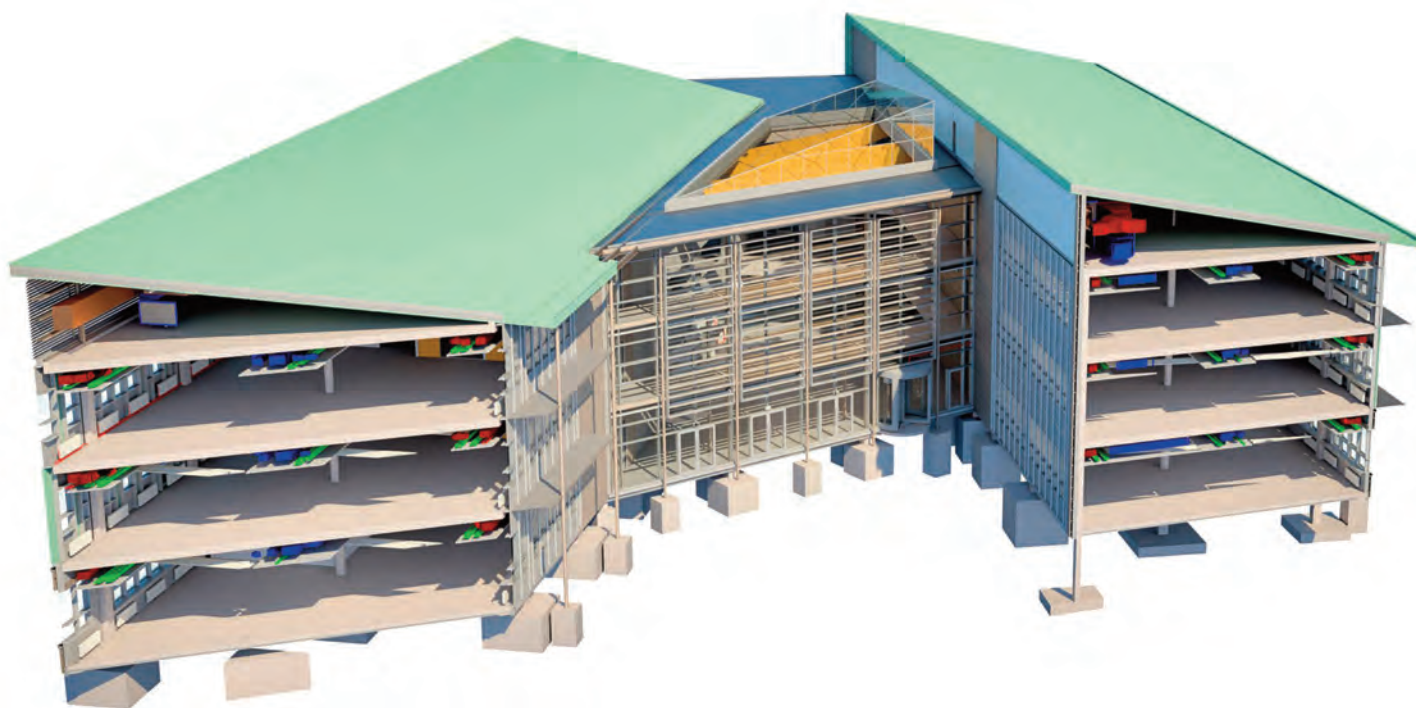
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Housing a BIM revolution

When it comes to BIM, the housing sector has very much been a latecomer in terms of implementation says Andrew Carpenter, Chief Executive of the STA and Chair of BIM4Housing...

In place for around 18 months to date, the BIM4Housing working group has been developed to provide support to those involved in the design, construction, management and delivery of private and affordable housing. With a sense that the sector is at least three years behind its construction counterparts, we need to examine the importance of BIM4Housing.

Whilst its members are dedicated to implementing an easy to use BIM structure, the main obstacle being faced concerns collaboration and integration from the wider housing industry – without that support from the supply chain, BIM4Housing will be a much harder nut to crack.

Of course, the biggest challenge is people – essentially, BIM will only work well if everyone is on board. With a change in culture, BIM has massive potential, especially when it comes to reducing construction costs and boosting asset management.

When it comes to ‘people’ – BIM actually provides us with a real opportunity. We all understand the issues the industry is facing due to a lack of young professionals joining the industry, and this is largely due to the out-dated image associated with the construction industry as a whole. BIM however offers a more modern and indeed attractive environment for those joining the industry – broadly speaking, ‘Generation Y’ is more accepting and to some extent, more adept



Andrew Carpenter, Chief Executive of the STA and Chair of BIM4Housing

at the new technologies entering the industry.

Moving forward, we need to continually highlight the benefits of BIM. Offsite construction, for example, benefits greatly from the collaborative approach that BIM encourages.

This can be as simple as delivering design time savings – which alone are a very attractive benefit – or can be as complex as showing how the final house will perform throughout its life, using the timber and other materials selected. In this way, a new build can be monitored the whole way through the process, providing useful updates if and when design changes are made.

The only way to really ensure that BIM is utilised within the housing sector is by encouraging best practice.

A great example is Nottingham City Homes, where around 15% design savings on average have been achieved since implementing BIM. This is largely due to the fact that design changes can be done there and then – and since it is more immediate than before the introduction of BIM, a great deal of time is

saved. It also means that residents can be shown, almost in an instant, what the new plans will look like if changes are made.

Similarly, Telford Homes has seen a significant time/design saving too. Another advantage for Telford Homes is that its clients – many of which buy off-plan – can see what the property will look like and can be kept up to date with progress being made during the construction process.

“BIM however offers a more modern and indeed attractive environment for those joining the industry – broadly speaking, ‘Generation Y’ is more accepting and to some extent, more adept at the new technologies entering the industry.”

Having spoken widely on the topic of BIM – at twelve conferences around the country so far this year – the STA is starting to see a gradual acceptance of the benefits of BIM. However, still for far too many if BIM can be avoided, be it because it is seen as either confusing or as an unnecessary use of time, then it will be. ■



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Wienerberger BIM objects now downloadable directly from its website!

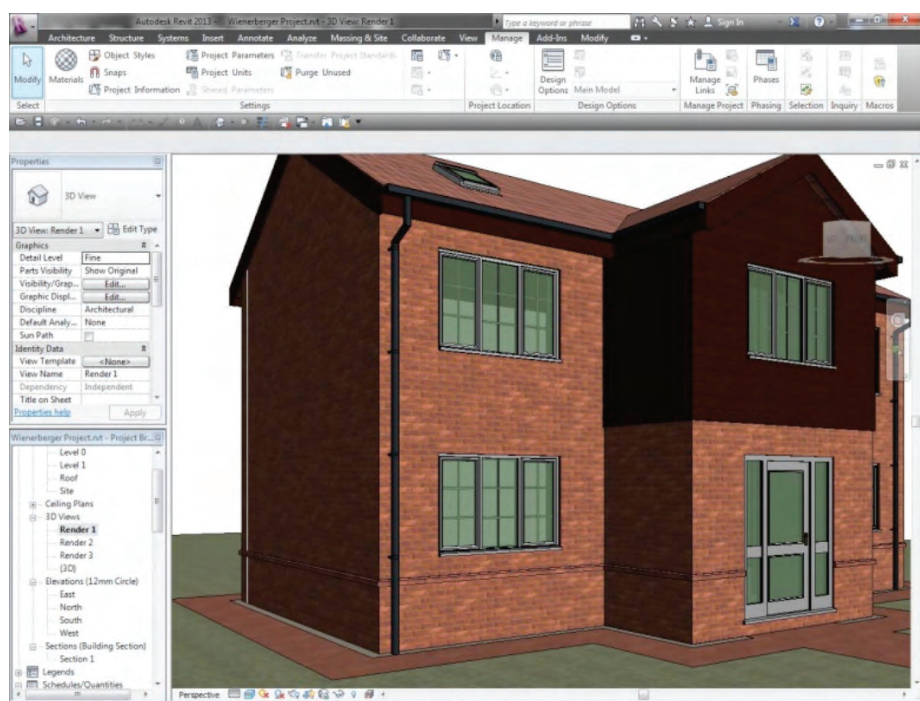
1 April 15: Wienerberger, the leading provider of wall, roof and landscaping innovations, launched its fully functional Building Information Modelling (BIM) portal on its website called BIM Lab in April 2014. BIM objects from Wienerberger can now be downloaded directly from the Wienerberger website www.wienerberger.co.uk/welcome-to-bim-lab or via BIMStore.

The portal marks the first time that Wienerberger has opened up its product and construction system portfolio for use with BIM technology – allowing architects and specifiers the opportunity to get a clear understanding of exactly how certain products will practically function in their projects, and has proven very popular. Wienerberger has made full BIM specifications available on products right across its three divisions of roof, wall and landscaping.

Annette Forster, Marketing Director of Wienerberger UK commented: “We have a catalogue of wall types based upon our brick products as well as individual components being modelled. These are much more useful for architects. We also have the performance data, weights, densities and other useful information included in our offering. We are the first manufacturer to offer this information across the entire building envelope of roof, wall and landscaping.”

Harald Schwarzmayr, Managing Director of Wienerberger UK, commented:

“We pride ourselves on innovating on behalf of our customers, and it’s clear to us that BIM



An example of a Wienerberger model

provides an incredible level of information and insight for architects and specifiers at the crucial initial design stages of projects. As such, we feel it is really important for Wienerberger to have an easy-to-access BIM platform to showcase exactly how well our products perform, and indeed how versatile they are.”

He continued:

“We understand that evolving technology has a huge potential to transform the construction industry, and we are committed to ensuring that we translate the latest thought leadership and research into practical innovations for our customers to use. Our BIM Lab is a great example of that, and just one of many more that we hope to launch over the next few years.”

To visit the Wienerberger BIM Lab, please find visit www.bimlab.biz. To find out more about Wienerberger UK please visit: www.wienerberger.co.uk



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The building model will show the user how certain products will practically function in their project

The whole Wienerberger product range is included in the BIM Lab

All BIM Lab downloads are FREE and available immediately

One Wienerberger BIM Lab.

Endless possibilities.



BIM technology is no longer the coming force in construction and building design, it's the present and the future.

The Wienerberger BIM Lab means that our product models can be downloaded for FREE and slotted in to your BIM design, allowing you to see just how well they perform.

Visit the BIM Lab today: www.bimlab.biz

Email: BIMLab@wienerberger.co.uk

Web: www.bimlab.biz or follow links from www.wienerberger.co.uk

Twitter: @wienerbergeruk



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 www.british-gypsum.com/wbssapr or call our Technical Advice Centre on 0844 800 1991.

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 method¹. In order to get the best out of BIM, accuracy of product and system objects is essential.

A key discussion point at the recent BIM round table hosted by British Gypsum was the difficulties that facilities managers currently faced in obtaining building information data from projects at handover. This collaborative forum consisted of various industry representatives including an architect, an off-site manufacturer, a facilities management company and a technology solutions provider. Discussions highlighted the importance of accurate data being available to the end users of a building to enable the most efficient running of the property.

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?

¹ Competitive Advantage, Adoption of BIM 2013



Paul French
Commercial Market Manager
 British Gypsum
british-gypsum.com



Not All CDEs are created Equal

The hype around BIM continues at pace, with the UK Government's mandate of achieving Level 2 BIM on all central government projects by 2016 fast approaching. We frequently engage with project teams that have been asked to implement 'BIM' on both public sector and private sector schemes, without any real objectives of what needs to be achieved in place.

BIM is not all about the design and construction phases of the process. There are savings to be had from the 'build it twice' (once virtually and once in reality) approach through the avoidance of clashes and rework, but the greatest savings by far will be realised in the operational phase of the asset.....provided an accurate, up to date data set of what the asset actually consists of is in place at handover.

The term Common Data Environment, or CDE, has appeared in our industry over recent years as a result of documents like the PAS 1192 series. But what does this actually mean and how do you select a CDE that is fit for your requirements?

A CDE for BIM

From my perspective a CDE is just a new term for what we know as a collaboration system and indeed a 'project extranet' before that. One difference is that the CDE needs to be able to manage data related to the asset as well as files such as drawings, specifications, reports etc. There are some fundamental requirements for the CDE:

- Ideally the CDE will be available via the web and hosted in a secure environment

ensuring all project participants can access the system to input files and data as required;

- The CDE will have levels of security to ensure project participants only access and amend data and files in the areas of the system that they are permitted to do so;
- Version control – the collation of a robust audit trail and history related to the data and files will be controlled by the CDE.

There are other considerations which will undoubtedly help and in some instances are fundamental to the successful outcome of the project (i.e. completed on time, on budget and with a full and comprehensive set of data and files available at handover):



- Will the CDE support a standard, PAS 1192-2 naming convention and process for managing files and data?
- Can a schedule of deliverables be developed in the CDE so that deliverables are clearly identified?
- Is the CDE capable of managing information and data supplied from non-design sources, such as commissioning data for example?
- Can project participants continue to easily utilise the applications that they need to carry out their role on the project....Revit, Sketchup, Vectorworks, Syncro, Solibri, etc?

These requirements begin to differentiate the generic file sharing applications such as Dropbox from the developed for purpose applications such as CONJECT.

Don't forget time, quality and cost

However there are also some fundamentals that absolutely have to be considered if the traditional time, cost and quality outcomes are to be successfully achieved. The CDE must facilitate collaborative working but must still provide the level of control required

to ensure that the asset complies with the requirements of the original scope and that both the client and the delivery team are provided with, or providing, exactly what they expected to be provided with or delivered. This means that the CDE must still allow the traditional project controls for managing contractual correspondence and communications if the project is to have any chance of a successful outcome.

The CONJECT CDE has been built on the same principles as we have always applied to collaboration and control and can help organisations achieve successful project outcomes.

Find out more in our [Common Data Environment information sheet](#).

To support Level 2 BIM, users need a CDE that is able to manage data related to the asset as well as files such as drawings, specifications, reports etc.

About CONJECT

CONJECT is a leading international software company, providing SaaS solutions to support BIM and manage key processes throughout the plan-build-operate life-cycle for the real estate as well as architecture, engineering and construction (AEC) indus-

tries. The CONJECT mission is to help its clients increase quality, reduce costs and better manage risks across their property and infrastructure portfolios. Operating in 14 international cities; the UK head office is in Woking, Surrey. CONJECT applications are used by more than 40,000 businesses worldwide, and every month there are more than 3,000 new users of CONJECT software.

For more information see www.conject.com, or follow CONJECT on [LinkedIn](#) and on [Twitter @CONJECT](#).



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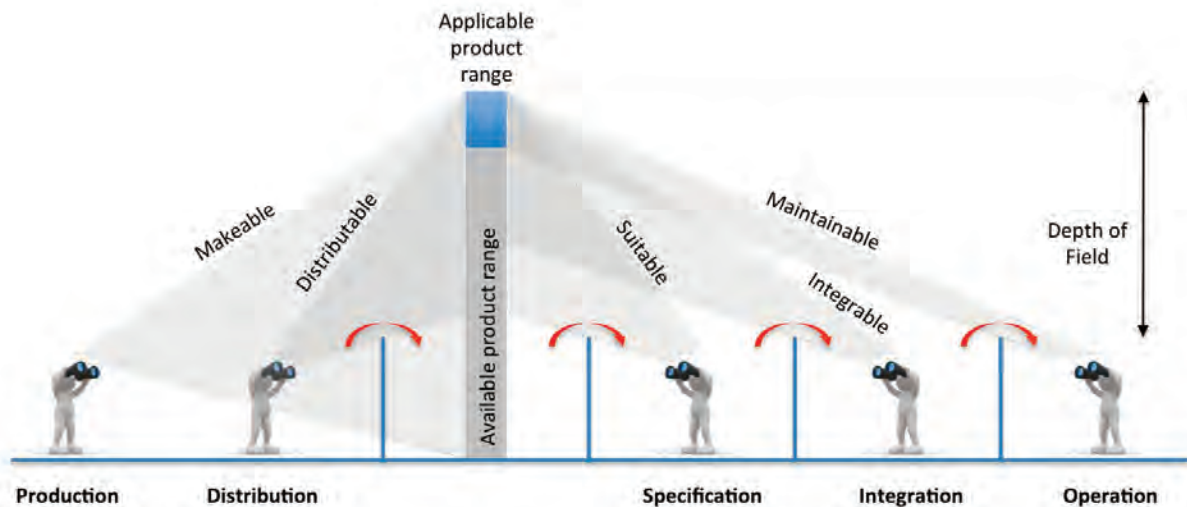
The BIM menu of information

Steve Thompson, Chair of BIM4M2 and Market Manager for Construction and Infrastructure at Tata Steel discusses the game-changing potential in efficiency improvements that BIM offers, but says it will only be deliverable consistently with clear definitions of what information is required and a menu of information for a project team to select from...

The recent BIM4M2 survey of manufacturers highlighted a number of things, one of which was that manufacturers are often asked for BIM objects or 'all of your BIM', without it being clear what information is really being asked for. To use the well-known quote from Theodore Levitt, "People don't want to buy a quarter-inch drill. They want a quarter-inch hole!" When someone asks for a BIM object or 'all of your BIM', what they really need is information in a digital, exchangeable format that supports their project activities. There are significant efficiencies that can be gained within the supply chain if we all work together to ask and answer the right questions.

Beyond the commonly accepted information requirements to enable exchange such as IFC and COBie, the information necessary to meet these requirements can vary significantly, and can have a huge impact on the results. If too much information is included for the sake of covering the bases, this can provide unnecessary constraints on the supply chain, but also miss the opportunity to get the most suitable products and solutions into the project efficiently.

Looking at the first sketch to illustrate the point, a manufacturer may have a range of available products to suit a generic application. The specifiers may look



1: Over-constrained depth of field – information thrown over the wall

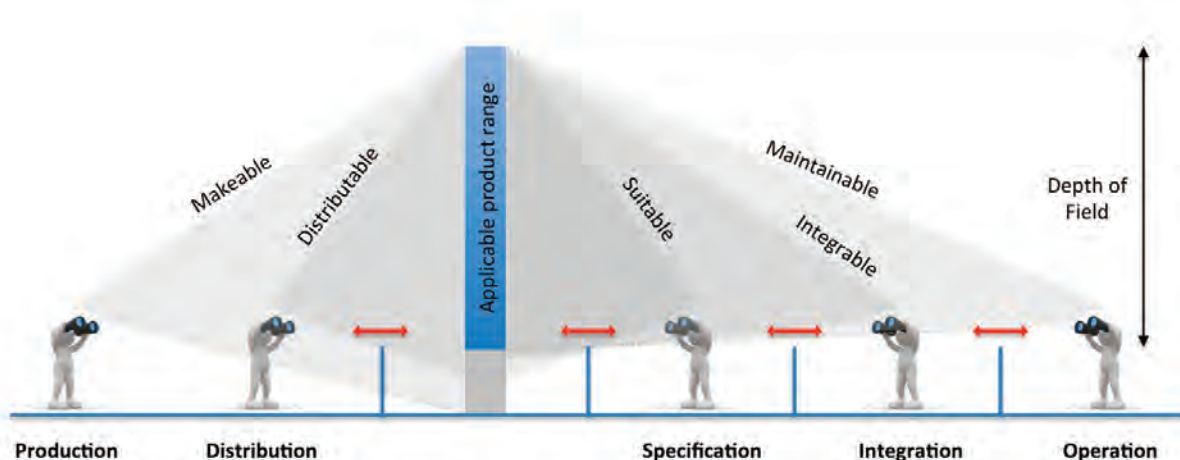
at the range of products and identify those that are suitable for the project they are working on, and specify a range to work from. The contractor may then look at what he can deliver at an acceptable cost and timescale that falls within the range identified by the specifiers. The asset owner and FM organisation are likely to have a set of criteria for ongoing maintenance and renewing of the products, but that view may only include a small range of products already selected. In other words, the proportion of products within a range that meet all those requirements is unlikely to be a large proportion of the full product range as a result of over-constraint. This can be the story if information is thrown over the wall between players, or BIM objects passed between stakeholders without a clear definition of what information is required.

“If too much information is included for the sake of covering the bases, this can provide unnecessary constraints on the supply chain, but also miss the opportunity to get the most suitable products and solutions into the project efficiently.”

It's important to understand the impact of exchange of information on the supply of construction products, not just on their specification and installation.

How does a product get from its specification and production through to its integration within a built asset? What complicates the issue further is that the distributor of the products may look at that original range of products and decide that he can only deliver a proportion of those products to a project based on his view of timescales, costs, etc.

So how do we increase the likelihood of delivering the right products and information to suit everyone's needs? We need to increase the depth of field (distance between the nearest and farthest objects in a scene that appears clear) and field of view (the extent of the observable world seen from a given viewpoint). We need to define information requirements based on purpose, not just by product type and generic application, and ensure these requirements are clearly shared through two-way communication between players if we are to benefit from some of the available efficiencies in the supply chain. These include reducing delivery times by providing information on clear decisions that impact on the supply of products, followed by early supplier awareness of product decisions. If people want a quarter-inch hole, let's understand that's what they want and make sure that's what we help deliver; not just focus on delivering a drill without understanding which drill bit we need for the job in hand.



2: Clearly defined information requirements – communication across the wall

I'm hopeful that the BIM Toolkit will help us achieve this, supported by the further development and application of PDTs (Product Data Templates), enabling each of the players within an asset's and product's lifecycle to increase the depth of field and define information requirements. It's important that we don't overload models with unnecessary information and constraints, but that instead we make information available for project teams to use where appropriate. For this we can learn from the concept of Product Lifecycle Management (PLM) used in the manufacturing and other sectors, and looking forward to Level 3 and Digital Built Britain, real-time analytics will make the potential opportunities for improved efficiencies much more transparent. For example, supply chain partners may be assessed based on their performance, measured throughout a number of projects instead of data being exchanged and validated only at key project stages.

"It's important that we don't overload models with unnecessary information and constraints, but that instead we make information available for project teams to use where appropriate."

So to summarise, BIM is a process which offers game-changing potential in efficiency improvements,

but these will only be deliverable consistently with clear definitions of what information is required at a project and discipline level (including product supply), and by enabling project teams to select relevant information to answer those requirements, nothing more and nothing less; that is the concept behind PDTs, a menu of information for a project team to select from. ■

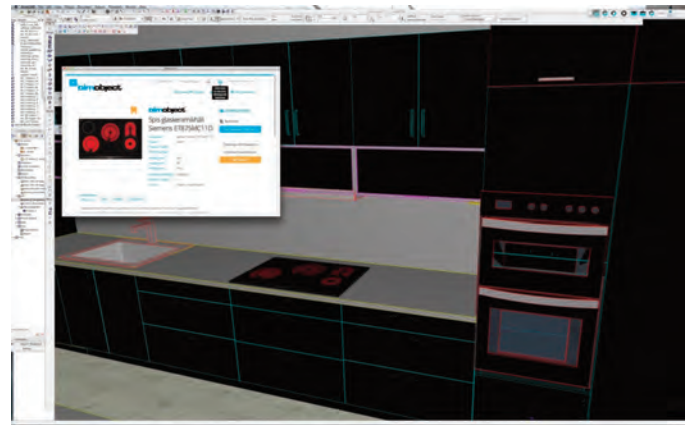
BIM4M2

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Chair

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BIM Objects

The fundamental building blocks of Building Information Modelling (BIM)



Kitchen appliances as Objects produced by BIMObject Mosquito software

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 – 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 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 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 reference 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 manufacturers which already have digital representations of their products in a

mechanical CAD system, now they can benefit from the conversion process to BIM developed by BIMObject. This process is quicker to deliver, less costly and provides consistent quality – all of which are significant improvements on the current hand crafted methods. What could be more effective than taking what exists already and re-using it in a different way?

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 over 300 manufacturers as customers, over 90,000 registered users, and with over 1.6m downloads from its portal. BIMObject is headquartered in Sweden with subsidiaries in USA, 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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A Guardian for BIM

“Building Information Modelling (BIM) is the next generation of digital representation for architectural projects,” says Lance Altizer, Marketing Director for Guardian Europe...

Whereas previous digital objects have been used to quickly and easily port 2D or 3D images into systems like CAD (Computer Aided Design), BIM takes a new approach by offering many more properties to the objects. This allows specified product data to not only facilitate the initial design; it also provides a background data set which runs the life cycle of the project. Although BIM initially debuted in the late '80s, technology has only now caught up with the concept.

Guardian Industries Corp. is a global manufacturing company with leading positions in float glass and fabricated glass products for commercial, residential, interiors, automotive, and technical applications. Its products include both float and value-added coated glass-products, low-emissivity (low-E) glass, mirrored, and insulating and reflective glass for a wide range of construction projects.

Guardian's BIM objects have been created through the Royal Institute of British Architects (RIBA) and are carefully designed and considered to ensure the optimum flexibility and utilisation within the BIM environment. BIM objects carry a vast amount of information for glass, including geometric data, light analysis, the properties of building components including the manufacturer's details and performance data, as well as providing the ability to produce accurate building product quantities. This means that any BIM object used on a project has a complete record associated to it that can help facilitate

replacements (if needed) during the building's life. The system even tracks warranties (where applicable) and takes into account geographic information to help the architect or designer make the right choices on the glass specified for the project.

Architects and designers are keen to take this format on board for glass and glazing products, as it helps to ensure the right quantities are purchased for the project. Product information is embedded in the BIM object, so the architect or designer has a prepared specification written as soon as a product is selected, saving both time and money. In fact, BIM is designed to enable easy design changes, an example being that a glazed area can be easily increased as BIM takes account of the design change and automatically adjusts the other parameters to account for the alteration.

There are many drivers in the UK towards a move to Building Information Modelling, including owners and building proprietors who are better able to manage the cost of a project from “as designed” to “as built.” Another leading driver is the UK Government, whose Chief Construction Advisor Paul Morrell announced at the start of 2011 that all Government projects over £5 million must adopt BIM. In June 2011 the Government published its BIM strategy, which defined that 3D.

BIM must be supplied with all projects and asset information, documentation and

electronic data for projects by 2016. The most recent study on BIM integration prepared by RIBA showed an increase from 13% manufacturer participation in 2011 to 54% manufacturer participation in April 2014. Clearly the drivers for BIM are achieving the desired response.

“Guardian Industries Corp. is a global manufacturing company with leading positions in float glass and fabricated glass products for commercial, residential, interiors, automotive, and technical applications.”

Guardian's BIM objects allow glass to be specified either as a design material in its own right, or in single, double or triple glazing, with data variations to account for laminated glass and other glass processes such as heat treatments. All of Guardian's products available for commercial construction have been modelled from clear annealed float to laminated and coated products such as ClimaGuard® low emissivity glass, and Guardian SunGuard® high performance solar control glass, which includes the SunGuard® SuperNeutral™ series and offers highly selective glass options with a high light transmission, low solar factor and a low U value. Decorative products have also been modeled such as Guardian SatinDeco® acid-etched, translucent glass. To ensure all products are easily accessible Guardian has a listing in the National Building Specification BIM Library,



as well as objects hosted on their website product pages at www.guardianglass.co.uk.

Each of Guardian's BIM objects have been made available in Revit and IFC format, which are the leading systems for running BIM software. To help architects, designers, and other BIM professionals understand how Guardian BIM objects work in the BIM environment a short educational film has been produced by RIBA. The film is available on the BIM home page at www.guardianglass.co.uk/architectural/bim.

Guardian Plus™ – Technical Support on glass

When you think of glass in building, think of Guardian. Guardian not only offers full support on glass and glazing specifications, it also offers access to the Guardian Plus™ Technical Centre. Access to the Technical Centre is free of charge and offers a wealth of support including access to a vast technical library which uses a search engine to trawl through the hundreds of technical documents on glass and glazing available and offer answers to most technical questions.

There is also an acoustic calculator which

provides acoustic information including decibel ratings and octave centre frequencies for the majority of glass constructions. You can find out the performance values of different glass combinations by downloading the Guardian Configurator™ as well as support on BIM where you can download objects via the BIM Generator.

“Guardian's BIM objects have been created through the Royal Institute of British Architects (RIBA) and are carefully designed and considered to ensure the optimum flexibility and utilisation within the BIM environment.”

In line with the technical theme of Guardian Plus, there are educational video's demonstrating how glass is made, how different coatings are produced and perform, applications for glass and glazing and the functions of different glass types.

Through Guardian Plus you can also complete CPD accredited training modules which provide detailed technical information on glass and applicable Standards and Regulation

like Building Regulation Document L. There are ideas for glass applications through the “Glass as a design material” module, which teaches the right application for the right types of glass and so much more.

To learn more about glass, join Guardian Plus for free today. For access to the Guardian Plus Technical Centre, visit www.guardianglass.co.uk.



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BIM3 Initiatives Launched by Government – but what about BIM2?

The government has launched its building information modelling (BIM) level 3 initiatives with a view to implement in 2025 and aim of improving data security and accessibility, scrapping paper contracts and driving infrastructure-spending efficiencies.

Here, David Wigglesworth, Managing Director of UK Specification, a division of ASSA ABLOY UK, looks at the new level in terms of its objectives and likely levels of adoption, and how the global leader in door opening solutions is already on its way to achieving its aims.

Government BIM task force chief – and BIM working group chair – Mark Bew said “BIM3” would bring every aspect of an infrastructure project into one central plan that each construction team member had access.

Its predecessor, BIM2 must be used on a mandatory basis on all government projects from 2016. That means client, contractor and designer will be working from data-rich models – but in the current state, not necessarily the same one.

What makes BIM3 different, and the 10 year journey the Government is taking, is it believes it will improve the design process further and make it even more efficient, so that the whole specification process, right from manufacturers will be able to feed straight into models and all parts of the supply chain will have better access to resources such as manufacturing data.

According to Bew, BIM3 will allow a significant shift from traditional agreement forms

to “much more transparent and paperless contracts.”

Mobile is Key

BIM as a concept has undoubtedly been bubbling under the surface for many years and the Government acknowledges the challenges ahead to achieve BIM3, as an intense step up from BIM level 2 in terms of further moving away from the traditional contract forms.

In addition, any future proof BIM activity must be accessible from any device, as more business is conducted by tablet and mobile technology.

“You get people using quite complicated software in big machines which limits [accessibility] to a community of designers and engineers,” Bew said. “It needs to be accessed by anyone onsite or in the building via iPhone or iPad.”

Bringing all the information together into one project file also improves data security. In effect in accordance with BIM3, data will be secure by design, and not an afterthought and additional resource.

BIM3 will also improve the understanding of existing assets, which will “aid planning and forecasting around need”, said Bew.

Building Physics, People and Traffic Flows

Bew added that this would allow for improvements in the design and planning process through the better modelling of building physics, people and traffic flows.

To translate this to ASSA ABLOY’s world, this is something UK Specification has adopted right from the start of its BIM journey, based on the amount of doorsets that can be used in a building and the impact on its daily use.

Taking specification from this perspective, for example, can influence the door width of a building’s overall dimensions, flow of people through a building and ultimate safety and security of those people.

Smart Future

Looking to the future with the emergence of smart homes and intelligent buildings, Bew believes the data gathered from BIM3 will feed into the smart cities and services, already being developed in concept with Bristol being primed as the first smart city in the UK.

“The aim is for construction to become much more focused on customer and community need rather than asset oriented,” he says.

“So the asset is created for the provision of a service not the other way around. Once this matures it will enable us to control social wellbeing and the cost base of the nation.”

BIM Adoption

Whilst all this sounds enlightening and the potential of BIM3 is clear and highlighted by Government to have a positive impact on the specification process as a whole, challenges over adoption remains of critical concern.

For the most part, UK Specification still believes there is a significant requirement to demystify the objectives of BIM right from the



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The global leader in
door opening solutions

Innovation in Design

basics of what it's about and how it can really help the specification process. After all, it's not described as the biggest cultural change in a generation by the RICS for no reason!

"The aim is for construction to become much more focused on customer and community need rather than asset oriented."

BIM really represents not just a process or technological trend but also a culture change, caused by external forces i.e. Government and other groups.

UK Specification currently offers to partner with specifiers architects, design led main contractors and property development companies, who we know are under increasing pressure to use BIM building practices (and will have no choice post 2016 for public sector

programmes) to seamlessly adopt the principles of BIM in all aspects of building design.

But we also go one step further, and offer over 60 of our own exclusive BIM doorset objects, carefully designed following significant research to deliver on specific applications.

With this proposition, we believe UK Specification as a business division from ASSA ABLOY UK, can not only become a total provider of the highest quality architectural ironmongery and innovative doorsets, but also we can provide added value and knowledge of BIM practice, to level 2 and 3 to which we are already striving, together with the flexibility to engage with architects, design led contractors, property development companies and end users.

For more information on UK Specification, please visit www.assaabloy.co.uk or join the

debate on LinkedIn at www.linkedin.com/company/assa-abloy-uk.

Issued on behalf of UK Specification by ASSA ABLOY UK.

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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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BIM4FitOut – Tools of trade

Mark Norton, Chair of BIM4FitOut and ISG's Head of BIM for Fitout and Engineering Services describes the latest tools on offer to encourage and assist those embarking on BIM implementation...

During 2014 and so far in 2015, we have seen a marked change in Building Information Modelling and its take up in the fit out marketplace.

Client awareness of the benefits of using BIM have manifested themselves in detailed scopes (Employers Information Requirements or EIR's) and this has duly been adopted by certain Tier 1 contractors.

BIM by its nature is built on collaboration, shared goals and shared responsibility; this should be born in mind with any undertaking. A team effort where you can be supported whatever your experience, is one of the cornerstones in the way we operate BIM4FitOut.

The BIM4Fitout aim is to share knowledge across its members and aid, assist, and promote supply chain engagement with its own BIM journey.

We are currently developing and promoting three exciting tools for the supply chain – moving the BIM agenda forward.

The BIM Workbook

An important launch tool set to get supply chain engagement, increase awareness and capability is the BIM4FitOut workbook.

Its primary goal is a simple approach on developing a capability from scratch – to deliver a BIM project, explaining the terminology used, various acronyms and abbreviations, current guidelines, relevant British Standards, and practices within the industry. As well as being a 'what document' it is also a 'how to document' clearly taking a specialist contractor through the steps of delivering a BIM implementation plan.



Mark Norton MIET LCIBSE, Chair of BIM4FitOut and ISG's Head of BIM for Fitout and Engineering Services

Supply chain support is paramount and the workbook will deliver solutions and answers to common frequently asked questions in an easy to understand language and format. This source of information will then allow the reader to put together a roll-out plan or strategy for BIM implementation.

The workbook which has been supported by CITB will be available for all specialist contractors across construction.

BID4Free

BID4Free is an exciting initiative to give BIM 'newbies' a free to use web based platform to tender and bid for projects with a BIM content.

Dr Jozef Doboš from [3D Repo](#) is developing a common principle web based software application that requires no specialist technology – a simple laptop will suffice. In addition, no specialist training is needed to use the software. It is an intuitive application, easily adopted by the user and productive – giving measurements, quantities and a viewer. The software will allow anyone to tender on a BIM project, on any machine or tablet in any browser, and importantly, it will be fully encrypted allowing for confidentiality.

Minimizing any financial outlay for this is a significant benefit as the software is free at point of use by specialist contractors. This will start to give an idea of what to expect from a model and how to operate it – aiding and enabling supply chain members to interrogate, assess, and price projects that they may well have been excluded from previously.

3D Repo have already tested the software with members of FIS and expect that by March 2016 it will be fully deployed.

It has been stated widely that if SMEs (in this case individual subcontractors) do not engage with BIM, they could well be left behind and lose a great deal of business. This software could be a saving grace for many in the industry.

BIM capability

BIM capability within the supply chain is an important area when assessing skill levels and competency. These can be awash with technical questions, process interrogation and a bewildering array of acronyms. We as a group are developing a Compliance Questionnaire to assist in this common form of assessment used by Tier 1 contractors. Our questionnaire will use a 'plain language' approach, reducing the potential for confusion and simplifying the 'tech talk' to an easy, more palatable level to the newcomer.

This will not only aid the supply chain member with what knowledge and technology may be required,

but also give a solid idea of where they may be and what training is necessary to raise their profile to the next level.

This plain language capability questionnaire has relevance and importance with Tier 1 contractors – it allows them to assess during pre-qualification enquires and at tender stage. ■

BIM4FitOut was formed by FIS (the Finishes and Interiors Sector) to address the impact of BIM on the fit out and finishes sector. As a government's BIM Task Group partner, the group aims to ensure that the sector supply chain is ready for this new way of working.



.....
Mark Norton MIET LCIBSE
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[www.twitter.com/BIM4FitOut](https://twitter.com/BIM4FitOut)

BIM - what's stopping you from starting?

As the industry moves forward, so are many companies with their BIM projects and pilots. There is however, still a reluctance to embrace the technology, with many companies dragging their heels. Less than a quarter of building services contractors and consultants are currently using products with full BIM information. Many small and medium-sized firms can be reluctant to take the next step, but the benefits are not just for the big boys.

Time savings?

There are many articles written about the advantages of BIM, but most state that the biggest driver is time savings. With all designs being held in one file, it is easy to streamline boring and repetitive tasks, allowing AEC professionals to spend less time managing documents and more designing and constructing.

But how will it change the day-to-day? Hand renderings are an extremely time-consuming, expensive activity. By using interconnected design, these crucial pre-tender documents are easier to produce and require less effort, experience and time, which result in design concept images that not only look good, but can also be used to generate drawing sets.

Which project?

Many firms will claim they are waiting for the "right job" to come along before implementing BIM. Any project that includes elevations, sections and schedules are perfect for a first BIM project. A dry run with a small, already completed project is always a good idea, minimising errors and risk before attempting a live project.



More opportunities?

It's a fact! - BIM helps organisations win more work. Healthcare, Education and publicly-funded projects will all require BIM information. Even when clients don't require the use of BIM, being able to demonstrate the ability to use BIM gives an organisation a competitive edge.

Cost concerns?

There is a common misconception that BIM applications are expensive and affordable only for large firms. This is no longer the case with "LT" versions of Revit and the opportunity to purchase desktop subscriptions, which can be rented for short or long term projects. A 2013 McGraw-Hill Construction report noted that firms that had adopted BIM experienced a positive ROI, 36% reporting an ROI of over 25%.

Why wait?

The efficiencies and benefits to be derived from BIM adoption are well-publicised. But why not tell us, what's stopping you?

As a leading provider of Autodesk software, we at Quadra Solutions have the expertise to advise you on your move to BIM. Our experience, coupled with our knowledge of software, training and technical issues make us the perfect partner for your BIM plans. For more information about the services we provide please contact us at bim@quadrassol.co.uk or 01254301888

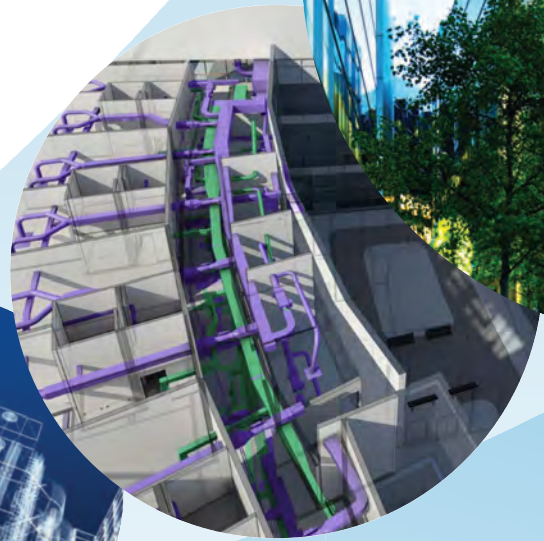
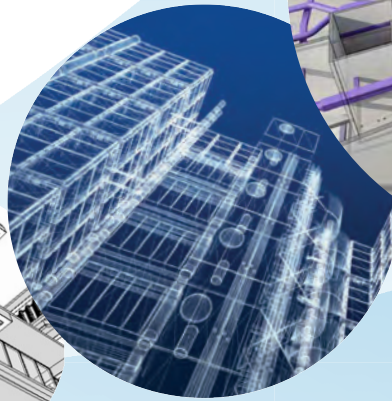
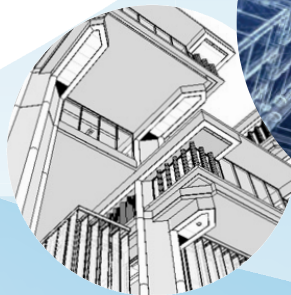


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Business Collaborator:

Adopt our Semantic BIM Platform today and realise the benefits for your asset's lifetime...

Data, data, data

Admit it. When you think of BIM the first thing that pops into your head is a 3D model. That's fine. You're only human. And those 3D models look really nice, so we don't blame you. But, they are only the tip of the iceberg when it comes to unleashing the true potential of BIM. We believe what's really important is the data that's attached to that 3D model.

Data is what BIM is about because every single object in a 3D model can be described by tens or hundreds of pieces of information.

When we first looked at BIM, we didn't just see a 3D model. We saw the huge potential for swathes of interconnected data held within – Open Linked Data. We saw a rich semantic web of information that described the asset.

We didn't build a 3D viewer first. We built a semantic data engine that could understand a BIM model, extract the rich asset information and give us an infinite number of ways to slice and dice it.

By building our BIM platform on top of semantic web technologies we are leading the way to the future.

Why do we say this?

Because we think our credentials speak for themselves. Founded in 1998, we were the only Project Extranet (CDE) vendor present on the leadership team responsible for the 2011 BIM Strategy Paper – leading to the UK

Government BIM mandate. In other words, we've been working towards Level 2 BIM 2016 for a pretty long time!

Semantic BIM – Protect your asset's future today BIM brings enormous advantages to construction:

- Walk through a virtual model of a building
- Identify potential clashes before carrying out any work on site
- View and optimise the construction sequence

And more – but BIM alone is just scratching the surface of what can be achieved.

Semantic BIM accelerates everything to the next level. Asset data is freed from proprietary models and stored in a web of connected data. Information can be queried, analysed and combined with both internal and external data sources, making for better and more informed decisions that are reached rapidly, throughout the lifecycle of your assets.

How do we achieve Semantic BIM?

- By communicating information needs to the supply chain
- By capturing the right data and delivering this to decision makers
- By linking together data sources for rich analysis

BIM Platform Components Common Data Environment (CDE) BC 6.3 – CDE for documents: a highly

configurable document management, workflow and project collaboration platform.

BIM Data Server – CDE for models and data: manages model geometry and data supporting powerful searching across objects and their properties.

Process Management

BC Assure: ensures that your projects follow the BIM Execution Plan and adhere to your processes.

3D BIM Data Viewer

A fully integrated **BIM Data Viewer** supporting OPEN standards and delivering class-leading performance and scalability when viewing IFC 3D BIM models.

Semantic BIM. The Future of BIM. Today.

To discover more visit: www.groupbbc.com/semanticbim



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INNOVATIVE ESTIMATING

Succeeding in today's marketplace is not a simple task. You have to respond promptly, accurately and confidently to all estimating challenges.

Traditional estimating methods are simply not enough.

CostOS Estimating brings the essential innovation to comply with the modern needs of estimating and sets the standards for a successful future.

CostOS V covers all classes and types of estimates, from high level conceptual to detailed and definitive ones. It has been carefully designed with the estimators in mind and provides a modern and intuitive Graphical User Interface, making the transition to the system quick and easy.

Today, CostOS V is successfully applied by contractors, facility owners, consultants and engineering firms. It is built to assist companies operating both on a local and international scale and it consolidates experience acquired through a global network of presence.

CostOS V brings intelligence and adds value to the work you have performed through the years. Its unique engine allows estimators to build on their experience and semi- automate or fully automate their estimating processes.

BIM 5D

CostOS V has an embedded BIM engine allowing you to work directly on your 3D models and apply the 'what you see is what you estimate' method. It works with Open Standard IFC files making sure that you can work on 3D models of all common BIM designing software. CostOS V was one of the two systems to reach the final stage of the BuildingSmart's Quantity Takeoff information exchange (QTie) challenge, and proved that BIM is ready for takeoff.

EXCEL FORMULAE & FUNCTIONALITY

The new CostOS V comes preloaded with many spreadsheet capabilities combined over a relational resource database. You can define your own formulae at a cell level, assign your own custom fields and even take control of the calculations that the software performs.

GIS TAKEOFF

Nomitech's latest innovation is the GIS Takeoff tool that comes on top of CostOS V. Large developments, mega-projects and infrastructure projects can be analysed with unmatched ease and speed, even when no information is available. The tool can even provide routes of transportation networks and the depths of the sea for your offshore projects. Combine the GIS Data with your cost models and assemblies to make go/ no go decisions and to optimise your engineering.



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BIM: Library objects for AEC industries

Stephanie Kosandiak Lead Programme Manager for Construction at BSI and Nick Nisbet Lead Technical Author discuss how the BS 8541-5 Library objects for architecture series will impact BIM...

As BIM Level 2 becomes more widely adopted in the UK, BSI is delighted to be adding two new British Standards to the BS 8541 Library Object series providing a consistent set of 3D libraries and definitions for construction product manufacturers and suppliers.

The BS 8541 series has become the key point of reference for specifying and assessing the quality of manufacturers', generic and template objects for use with BIM, and is heavily referenced in the NBS Object Library recommendations.

BS 8541-5:2015 Library objects for architecture, engineering and construction: Assemblies

Assemblies are an increasingly important aspect of construction, as built-environment design, (pre-) fabrication, construction and operation are streamlined. BS 8541-5 addresses the problem of supplying some information on the overall assembly, and some on the constituent parts. The transmission of information about assemblies is especially challenging when both the overall assembly and the constituent parts have significance in the management of the design, construction and use. In particular, attention might



by third party schemes. This part ensures that the attributes relating to any such scheme, such as Environmental Product Declarations (EPD), WRAP and DEC, can be transmitted clearly with details of their source, degree of authority and applicability. Whilst the inclusion of such information in a construction library object for BIM is optional, this Code of Practice will help ensure that the appropriate degree of comparability and verification can be used. Construction products regulations and CEN standards for buildings and products provide the primary examples. This part of BS 8541 supports the communication of the voluntary environmental product declarations (EPDs) required by BS EN 15804 and BS EN 15978, as well as the CE marking details, in a format which can be incorporated in BIM processes. It also covers the communication of other product declarations such as wastage rates developed with the UK Government WRAP programme and UK Government Display Energy Certificate (DEC) declaration scheme.

Summary

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. ■

switch between the overall assembly and the constituent parts, which might affect processes such as material take-off.

This has implications for specification, comparison and selection of products and solutions, for coordination, for take-off and for asset management.

Examples include during design, pre-designed aspects, complex system solutions, and repetitive space types. During construction, assemblies represent pre-fabricated and off-site manufactured items and recommended details. For handover and operations, assemblies may represent engineered-to-order solutions, standard furniture schedules and standard asset groupings.

BS 8541-5:2015 Library objects for architecture, engineering and construction: Product and facility declarations

Most construction products are now supported by a plethora of declarations of properties supported



.....
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Image Courtesy of F10 Studios

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Realising a BIM solution

Building Information Modelling, Computer-Aided Design, and Visualization projects are becoming more complex and demanding, is your hardware up to the challenge?

Enhanced workstations for professionals in the design and construction industry are now essential to help them realise their full potential and reduce business operating costs. Only by optimising workflow can you enable critical changes and decisions to be made efficiently.

Workstations Specialists primary goal is to provide industry professionals with the necessary advice and solutions to enable the user to complete projects effectively and within deadlines. Being an award-winning computer workstation and rendering system manufacturer based in Derby, UK, they design and manufacture high performance computing solutions for a variety of 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 nearly 30 years, and are at the forefront of the industry with their class leading product portfolio and an in-depth knowledge of the industry.

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, performance 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 NVIDIA Quadro 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.
- For computationally intensive simulation task Workstation Specialists recommend the use of a NVIDIA Tesla GPU compute cards. NVIDIA Tesla technology allows you to have supercomputer performance running near silent under your desk.
- Workstation Specialists integrate independent software vendor (ISV) certified components in their workstations, giving customers the confidence that the system is compatible, reliable and has the true performance they require.
- Full independent reviews can be located on their website at the following page. 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 warranty.

- Worldwide shipping is also available.

"Enhanced workstations for professionals in the design and construction industry are now essential to help them realise their full potential and reduce business operating costs."

Whether you are in need of single system or a larger offering, improve your company's efficiency and remove bottlenecks with a truly dedicated BIM solution. 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 and help recover costs.

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Sales Manager

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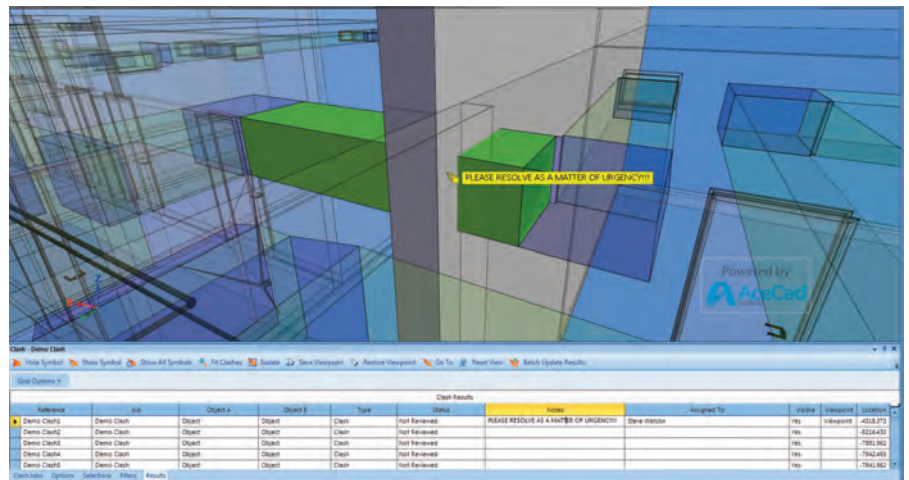
Putting BIM to work

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:

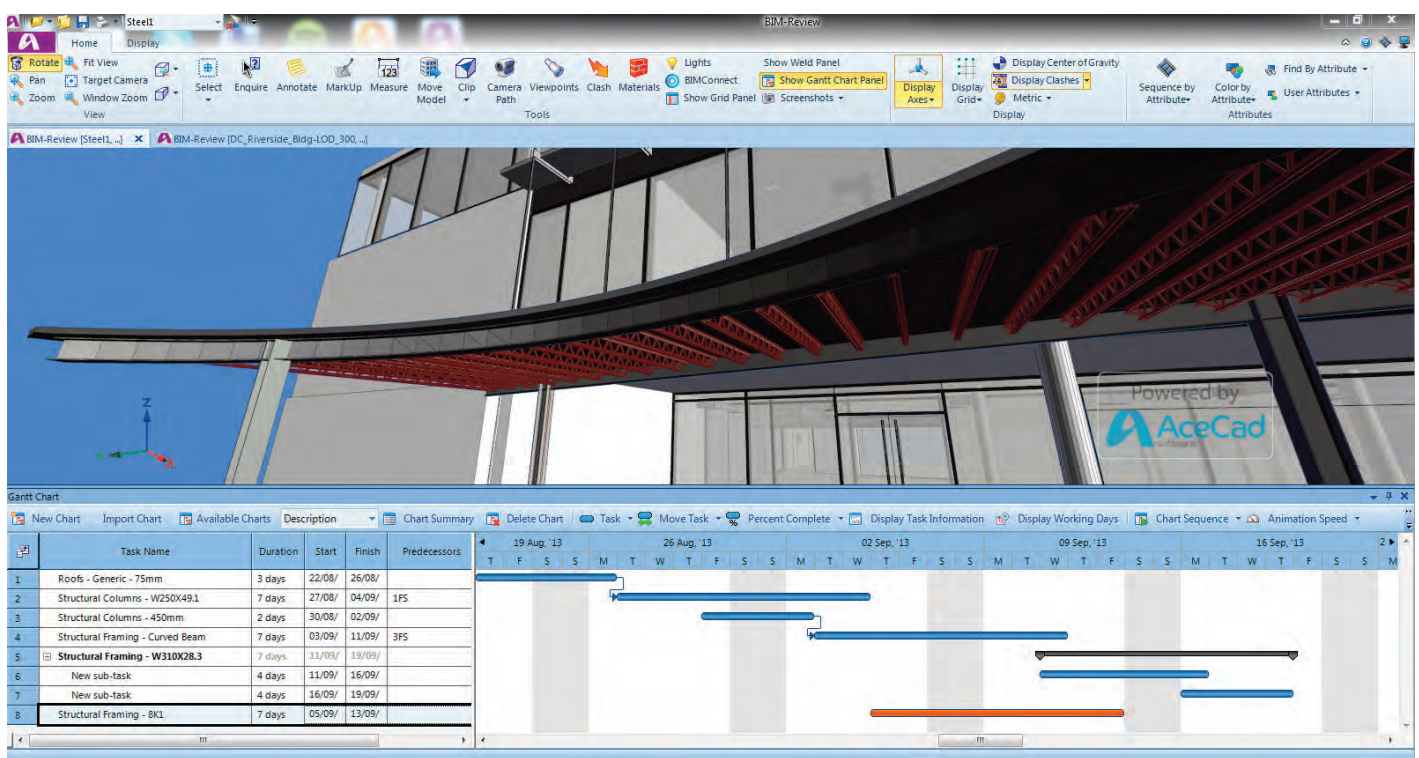
- Improved workflow through real-time access to BIM model content across multiple teams.
- Enhanced decision support through improved collaboration.
- Immediate identification of clashes and conflicts.
- Improve planning with 4D timelines for engineering, procurement, suppliers and construction teams.

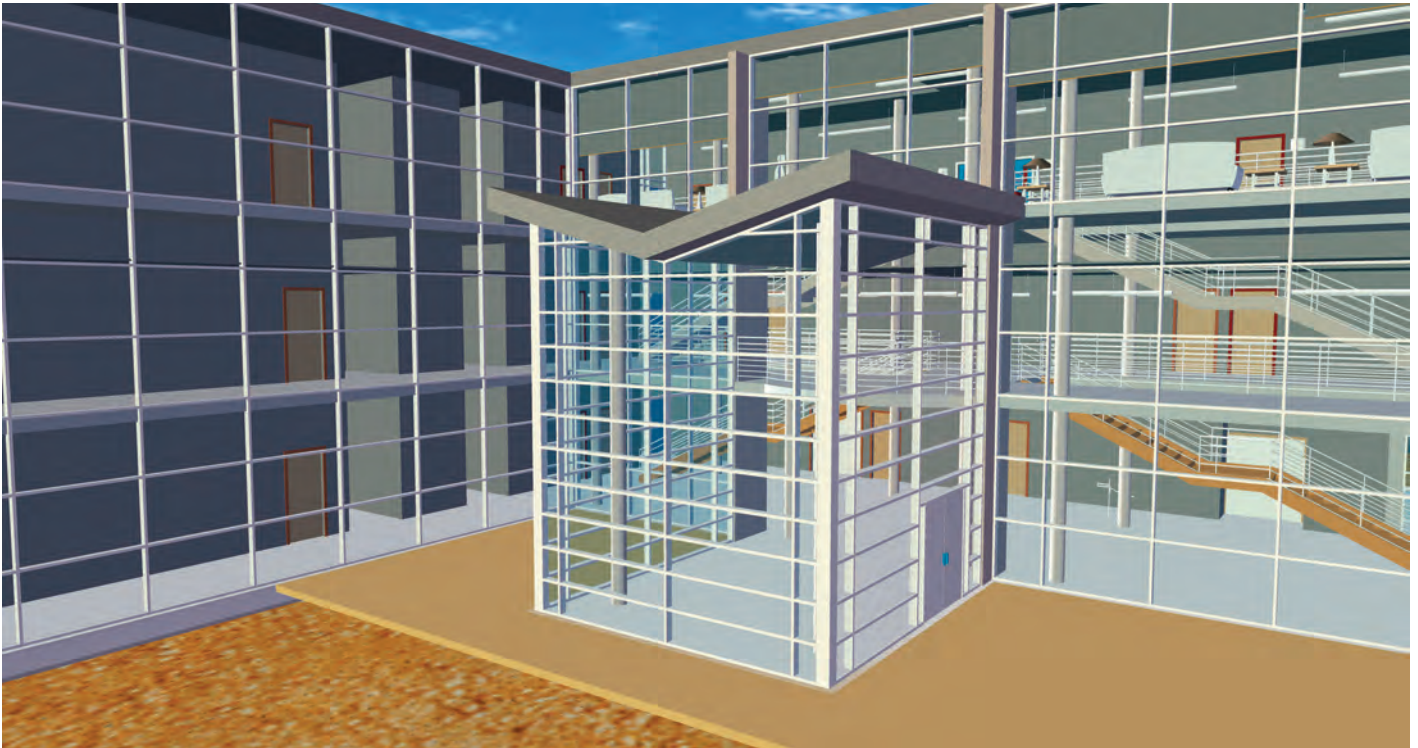
Because BIMReview enables more efficient working, it has the capability to shrink schedules and reduce the risk of overruns.

"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.

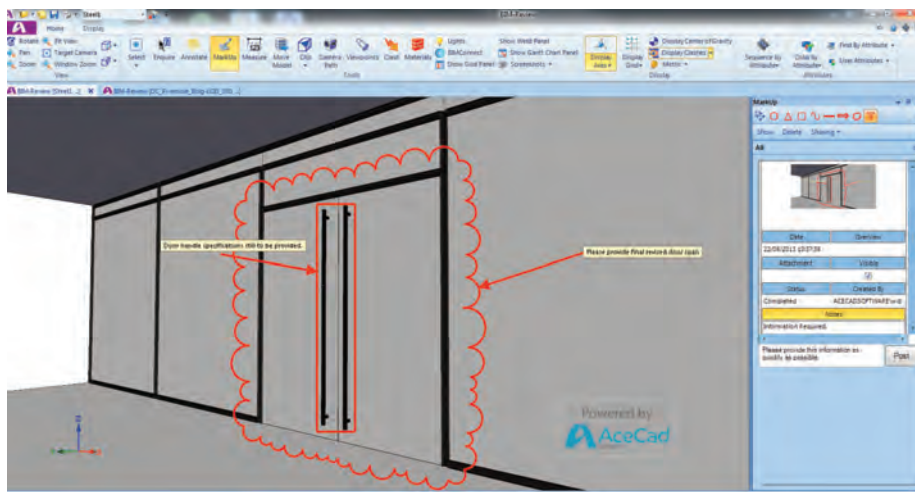
Improved project efficiency

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>

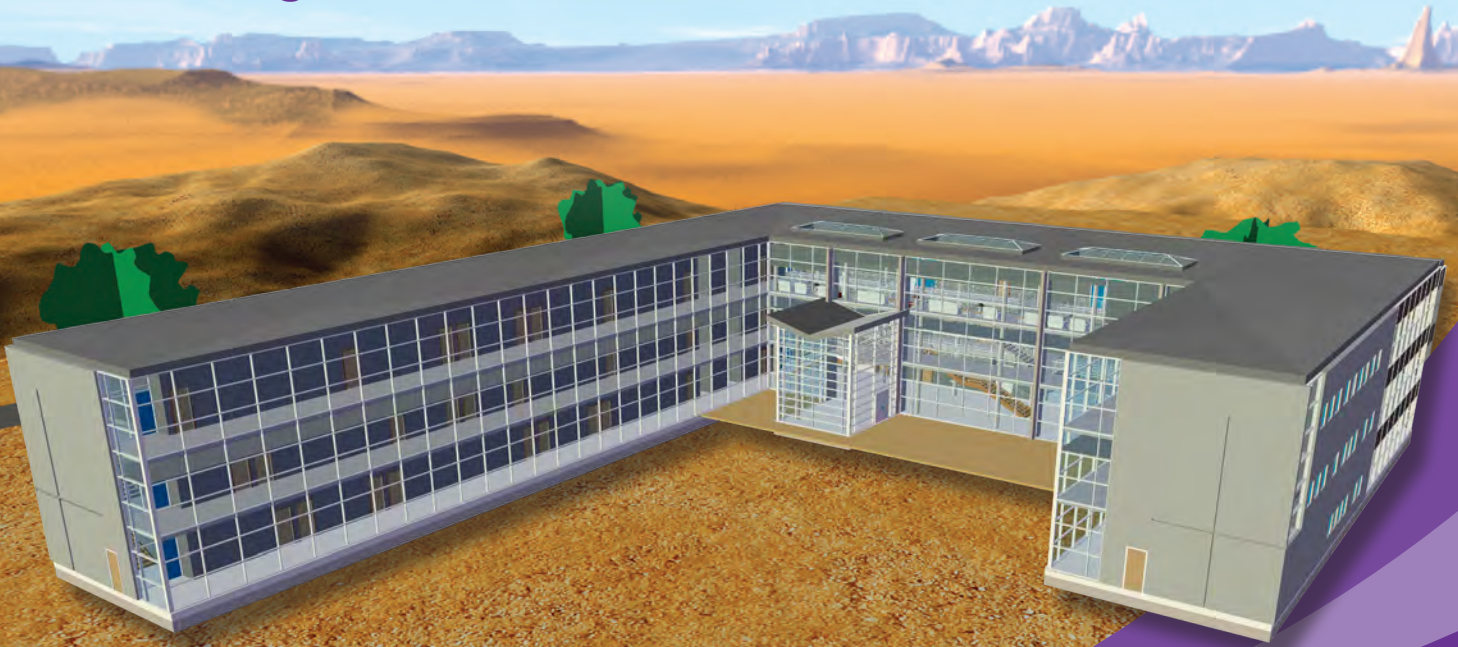


Mr Simon Inman
Director

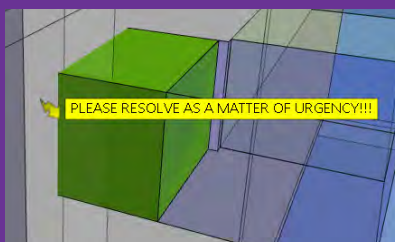
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Visualise your project from concept to completion

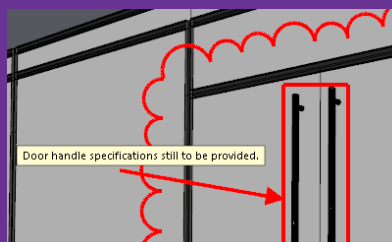
BIMReview, the affordable BIM collaborative and visual tool from design to the construction site.



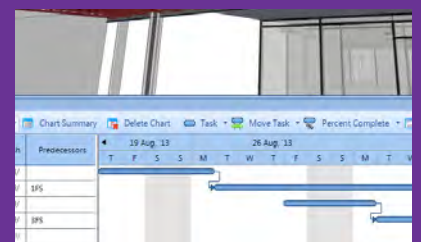
3D Clash Detection



3D Visual Mark-Ups



4D Planning



To start saving time, money and resources today:

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or visit: www.bim-review.com



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BIM for coastal defences: Identifying data

In the second 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...

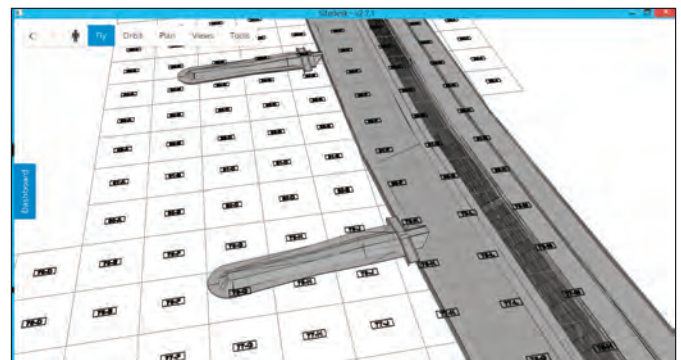
The Fylde Peninsula Coastal Programme (FPCP) is a partnership between Wyre Council, Blackpool Council, Fylde Council and the Environment Agency. It is responsible for managing the Fylde Peninsula's coastline and reducing risk of flooding to people and the developed, historic and natural environment. The new defences will protect 12,000 properties in total – 7500 in Rossall and 4500 in Anchorsholme, plus critical drainage and transport infrastructure.

Carl explains to PBC Today how the project is progressing compared to the team's expectations...

"We were surprised at the lack of interoperability between CAD packages as well as the limitations of exporting models and data to IFC and other formats. Initially, this caused us a great deal of concern as we were worried that critical data could be lost or be too difficult to find on a scheme of this scale.

"To help define and then address this challenge, Rob Umphray from Sitedesk suggested a situational questioning workshop. The aim of this exercise was to identify all of the situations that could arise during the lifetime of the asset in order to define the data sets and data sources that would be required to effectively manage each of these situations should they occur. This exercise provided us with an information template that we could work to, as well as a legend to work from when we need to recover the information. We were surprised by the number of permutations that resulted, ranging from the relatively benign to complete disaster scenarios.

"One of the early outcomes of the exercise was that there are lots of data sets and information buried at



different levels in both the models and drawings. This disparity, allied to the challenges of interoperability may have made it challenging for the team to get the information that they needed.

"We solved this issue by overlaying a 3D grid over the entire area of each of the original models (see image above). The grid allows us to separate what are very large schemes into smaller segments which were aligned to the topography of the scheme. This way the relevant data sets are constrained to a smaller area. The data is presented in line with our scenario templates so should someone be maintaining the lifebelts, it is simple for them to find anything they need. On the other end of the scale, should there be a massive storm that damages the defences, we have all of the information that we need to reconstruct or repair as necessary, related directly to the area of the damage. The grid also helped mitigate some of the risks identified by interoperability concerns. Critical data sets could be re-entered if required to ensure that all of the right data was in the right place before we needed it.

"One of the biggest successes arising from the exercise was that it provided us with a template that made it simpler for the Balfour Beatty staff and council



Rock armour continues to be delivered to site where it is lifted from the wagons with an excavator, weighed and placed on the beach in the defined storage area

officers to capture and relate the required groups of information to each area of the scheme. It also allowed the data to be captured and logged once, avoiding a duplication of effort. The grid system has also made it simpler to validate the information, as this too is completed on a grid by grid basis.

"The exercise also made us think about and define our workflows, particularly in relation to planned maintenance schedules and how we cope with expected reactive maintenance. We are already creating bespoke digital forms for each of these workflows so in the event of any planned or expected reactive maintenance, we can automatically assign the work to a council officer or subcontractor with the correct information and drawings.

"The Sitedesk software www.sitedeskconstruct.com contains a form creator as well as a time and user-based task assignment system. This provides us with the ability to integrate all of the benefits of the 3D

design and virtual construction process into our asset management and FM processes, without the cost of an FM system or the data integration costs. We see this as a massive plus which keeps the model and the data alive.

"This exercise provided us with an information template that we could work to, as well as a legend to work from when we need to recover the information. We were surprised by the number of permutations that resulted, ranging from the relatively benign to complete disaster scenarios."

"We will shortly be completing the Anchorsholme scheme and the Rossall scheme is progressing at pace. The grid scheme has also helped minimise errors by breaking a large scheme into understandable pieces which has helped make the evolution into BIM workflows far less challenging.



Environment Secretary Owen Patterson MP attended an event to mark the start of the work on the flood defence scheme, along with Councillor Derek Antrobus, Chair of the Regional Flood and Coastal Committee

“Moving forward, we are considering expanding the ways to use the model and the system. We are already incorporating pavement and lighting maintenance, lifebelt maintenance, statutory sand level measurement and compliance, but there is no reason that we cannot include environmental surveys, litter surveys, water quality measurements, fly tipping and graffiti hot spot identification, parking meter maintenance – the list seems almost endless”.

Lessons learned so far...

For Green, the biggest lessons learned so far are:

- To work with the entire team to identify and define all of the scenarios that the asset may encounter throughout its lifetime;
- To use these scenarios to understand, define and map the combinations of data that are required to manage each situation and keep the map in case an unidentified scenario arises;
- To ensure that the relevant data sets are easy to populate and verify for those entering the data as well as simple for current and future users to find and use. ■



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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.

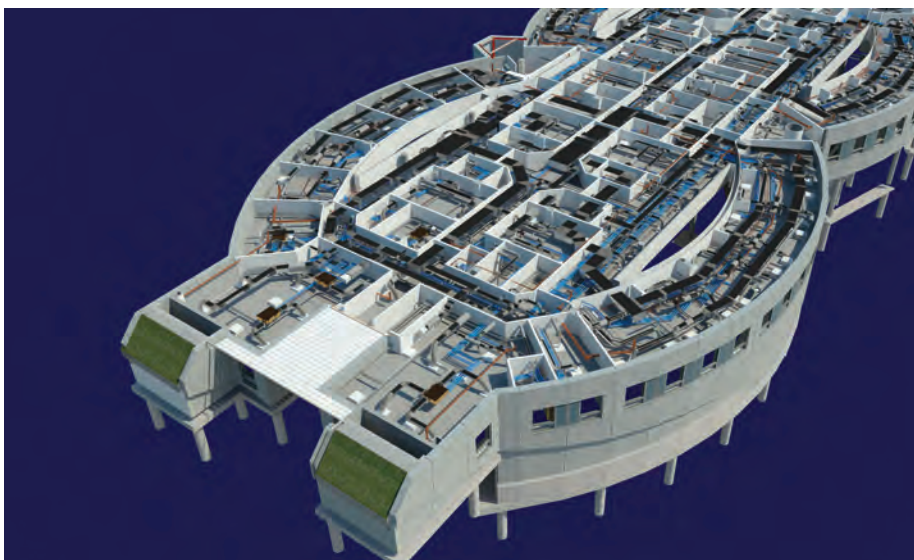
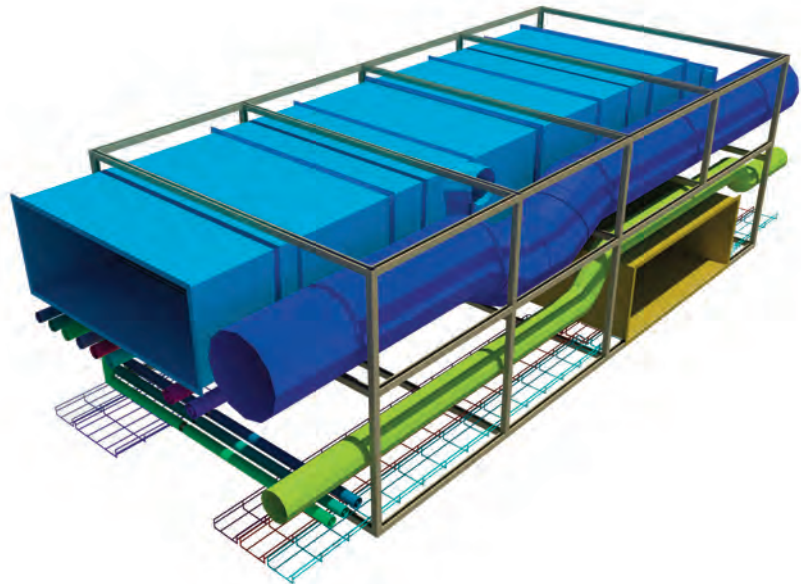
This emphasis, coupled with the current decrease in construction programmes, means that there is an increase in need for very accurate co-ordinated drawings within clients budgets. The CAD Room knows that this is key to our clients successfully installing their M&E projects, and so we ensure that we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

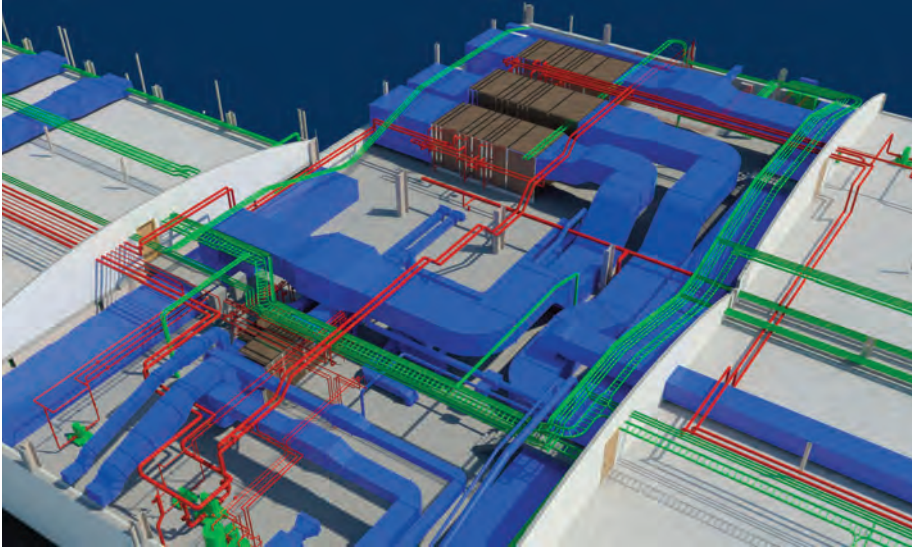
The CAD Room specialise in providing a complete integrated CAD service for any project utilising the design to produce co-ordination, fabrication, and installation drawings for all building services. The CAD Room also ensure that all services offered are totally co-ordinated with the building fabric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

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

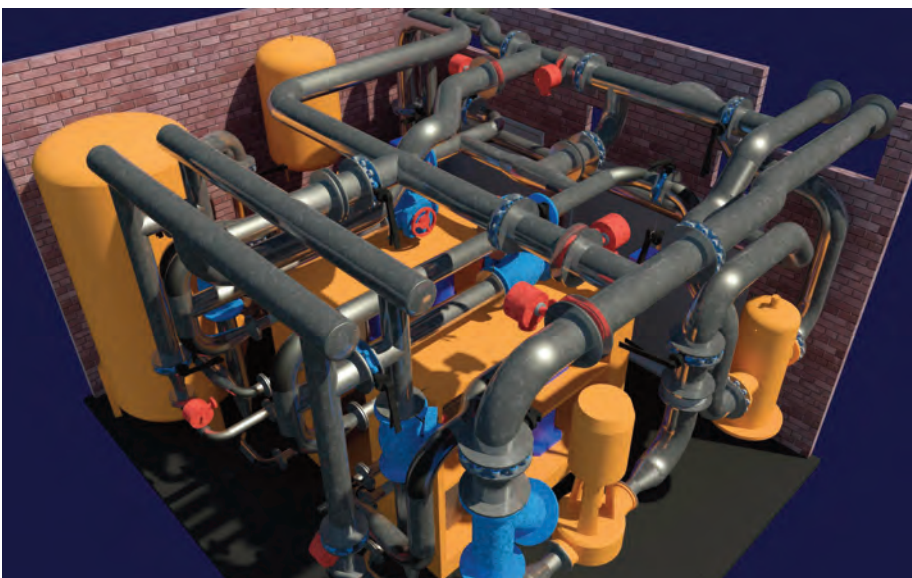
which will assist with the commissioning, operation, and maintenance activities of each piece of equipment, including: interactive 3D designs showing how to take apart and reassemble items of equipment, and also specifications which will allow replacement parts to be ordered.

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

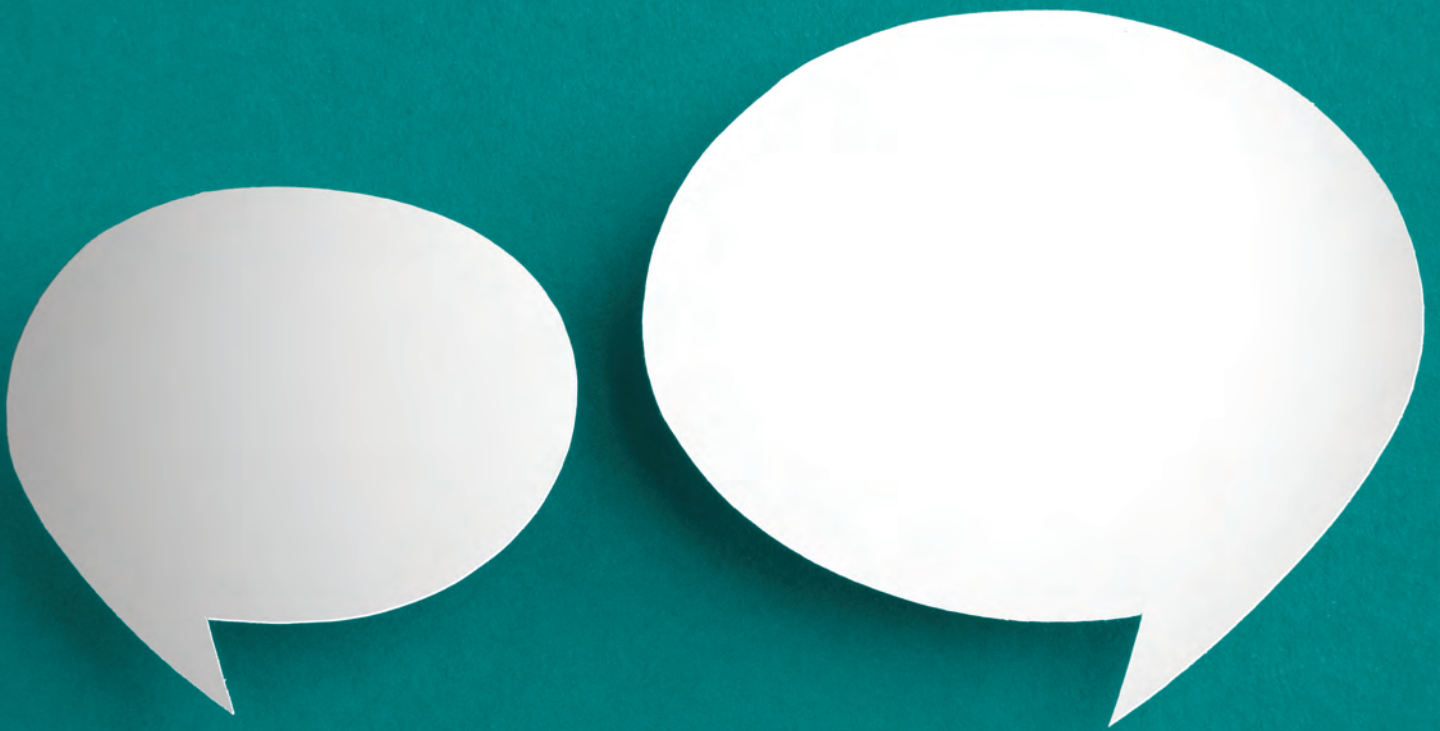
The team at The CAD Room are also well used to the major file transfer sites e.g. ASITE, 4PROJECTS, 6PROJECT, BIW, etc. or you can use our own FTP site if need be.

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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Building Information Modelling



Building Information Modelling (BIM)

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BIM: A view from the coalface

Terry Gough, BIM champion at Kent County Council outlines the challenges faced as a Client attempting to implement BIM technology, along with the challenges faced by working practices both in-house and with the supply chain...

This article is intended to help anyone embarking on a BIM journey by describing what challenges I faced from the very beginning, and how, as a Client, we have found solutions. The BIM experience can be difficult, but with the buy-in and support from partners, the process can be enjoyable. As someone who has 'been there, done that, and got the t-shirt', I hope my first-hand account will at least be informative.

"I recognised early on that educating BIM was a key aspect, and have helped and worked with a number of small businesses within their own offices to up-skill staff and give them a better understanding of what BIM can offer in relation to being better informed through better design, clear information, and working collaboratively."

In my first foray into the BIM world, it was critical that I understood what BIM was, what it meant for the business, but also how that would impact on our wider supply chain. Therefore, my first step was to absorb the PAS and BS documents that had been produced on behalf of the Government. This lasted a number of weeks before I knew what I was talking about and could communicate effectively with all partners. This then lead me on a journey of discovery, not only with the documentation, but also with the current thinking in technology. My first thoughts were one of horror, but then I realised that this was not a lonely journey, but one that I would be on with a number of other BIM enthusiasts. This thing called BIM needed to be tamed, and that was what I set out to do.

I began by looking at what BIM implementation meant to staff and colleagues and how this would fit with our existing processes and procedures. This was never going to be easy, but I relished the challenge.



**Terry Gough
(MCIQB, MAPM)
Senior Project
Manager/BIM
Champion**

I started by developing a number of presentations that covered the very basics of BIM, but in relation to data and information capture as this is, and remains, the most important aspect of BIM. I arranged for a number of external companies to attend our office here in Maidstone to give first-hand experience of working with BIM and what it meant to them. This gave the staff a good grounding in what BIM was, and meant how it could be used in all of our projects on a day to day basis. The next stage was to progress with the processes and procedures, and I quickly undertook an exercise of re-writing a number of Proforma's to meet our requirements with BIM in the shape of EIR's, BIM Protocol and a BIM kick-off meeting agenda. This agenda marked the starting point. I also created a workflow process chart which broke down the tasks in relation to Project Management, Design Management, Cost Management, BIM, GSL and HSE in-line with the RIBA stages 0-7, which also worked well with the BIM information delivery cycle.

All of the above happened at the same time that I began to work with the SME's here in Kent in relation

to BIM. This was the most satisfying aspect, as I could impart my newly gained knowledge. I worked alongside both the National Federation of Builders (NFB) and Project Five on a 5 month learning curve which took the SME's through the basics of BIM, giving them all a great grounding and understanding of how to implement BIM within the business. This small group has now led to the Kent BIM Hub being formed which is going from strength to strength.

The Kent BIM Hub group initially started out as a few members who had carried out the NFB training, and we thought it may be a better long-term effort if we stayed as a group which I was happy to administer. However, the group then expanded through a talk I gave at a Construction Excellence (CE) breakfast meeting where there was more interest than we realised. I am now looking at the Hub to see how this will be sustainable for the future, and have set up a Steering Group to examine whether we could be a not-for-profit organisation aiming to help all members on their BIM journey through education and process change.

I recognised early on that educating BIM was a key aspect, and have helped and worked with a number of small businesses within their own offices to up-skill staff and give them a better understanding of what BIM can offer in relation to being better informed through better design, clear information, and working collaboratively. It was my intention that if Kent County Council was going to procure any contractors or consultants, they all needed to be able to deliver to Level 2 and work within a collaborative environment.

As someone that has experienced the implementation of BIM processes, I do feel that one area of concern worth mentioning is that of software vendors. I would advise that it pays to be mindful of what information is available, or what claims are made regarding what

the software is capable of, as this is sometimes an exaggeration, and they can't always do everything. Please do look at all options when assessing potential software solutions and ensure that it meets the needs of your business.

I have personally looked at a number of solutions for a Common Data Environment and have found this to be quite a lengthy exercise as lots of vendors offer a solution, but in reality, only offer a small percentage or a repository for information and not the actual collaborative tool, or indeed the tool to ensure that data and information can be captured and utilised to the benefit of the client or indeed their FM provider. I am now in the process of looking at potential solutions that would provide a Design, Build, Operate and Maintain solution, but this I feel is a step to far at this point in the development of software solutions, and don't feel that a one-stop-shop is currently available to Kent County Council. ■



.....
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Are you ready for BIM?

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It takes many activities and skills to bring the ideas and designs of Architects/Engineers to fulfilment. Building Information Modelling (BIM) attempts to standardise the creation and exchange of information to make the design, construction and operational management of a facility or infrastructure asset more efficient.

It is important to note that BIM is not just about buildings, but in its wildest context is being applied to facility, building, road, railway, and infrastructure projects. It is also now very much impacting organisations throughout the supply chain including manufacturers, fabricators and interior designers.

The word 'building' in itself also doesn't necessarily describe the full scope of a project – it doesn't cover policies, assumptions, strategic decisions, supply chain, specification, user



assessment, regulation and recycling sustainability. All are key parts of the projects 'information model' and should be included in the creation of the facility or asset information as the project progresses.

BIM covers all aspects of the project lifecycle and is being driven by UK Government, to ensure that all public sector projects are under-pinned by the creation, collation and exchange or shared 3D models and intelligent structured data that is attached to them. UK Government has defined a minimum requirement for Level 3 BIM by 2016, which defines a series of domain models and the provision of a single electronic environment to store shared data and information.

With the enormous amount of data and press available on the subject, making the right choices to begin your own BIM journey and maximise the return on your investment is critical. Man and Machine offer a variety of solutions and services to help you understand the impact of BIM and the market opportunity that it presents throughout the supply chain. The solutions and services

include BIM-based products, modelling and measurement solutions, BIM deployment programs, training and consultancy.

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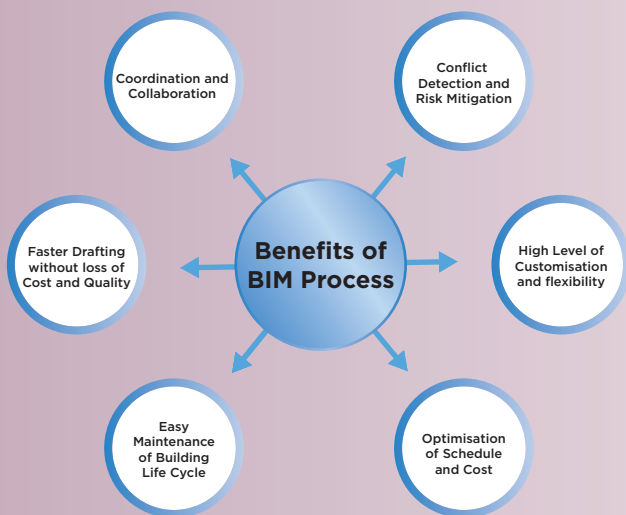


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Building Information Modelling is a work-flow process that uses modelling and software to create a digital model that will react and perform as it will in the real world.

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.





The NBS BIM Toolkit has been developed to guide you through the process needed to achieve Level 2 BIM.

This Toolkit offers a digital Plan of Work that provides step-by-step support to define, manage and verify responsibility for information development and delivery at each stage of the asset lifecycle. This is an essential tool to ensure you are ready for the Government mandated use of Level 2 BIM on all centrally funded projects.

Supporting the Plan of Work is a new unified classification system and corresponding Level of Detail and Level of Information definitions. This enables project teams to clearly define who is delivering what and when.

The NBS BIM Toolkit is now in its public BETA phase which means you can start using it on your projects today.

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