White Paper
2016 - The door to accelerated BIM adoption?
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Introduction

2016 is an important year in the building and construction sector with deadlines for both the use of BIM on all Government projects and the adoption of the Government Soft Landings process, now passed.

This should see the accelerated adoption of BIM across the sector, creating a pathway to "Digital Built Britain" and the promise of BIM Level 3.

Conversely, if following the deadline these initiatives still fail to gain traction, the risk is that progress stalls and product manufacturers and others in the supply chain become increasingly sceptical about the cost-benefit of investing in BIM.

This would be a tragedy, argues Andy Stolworthy, BIM Manager for ASSA ABLOY UK Specification, in this first in a series of Discussion Papers addressing key issues in specification.

To share your views and comments on this important topic, please link to https://www.linkedin.com/company/assa-abloy-uk

About the Author

Andy Stolworthy is BIM Manager for ASSA ABLOY UK Specification, a leading supplier of door opening solutions for the built environment.

Andy is recognised as an innovator in the doorset and access control market, with a commitment to using technology to disrupt and improve design-led specification and the flow of traffic around a building.

He has pioneered the company’s introduction of BIM objects, Environmental Product Declarations and is planning ahead for the impact of the “Internet of Things” and BIM level 3.
ASSA ABLOY UK Specification

ASSA ABLOY is the global leader in door opening solutions, is committed to innovation in design, and providing support and resources to architects and specifiers across every sector.

ASSA ABLOY UK Specification provides specifiers with a number of decision support tools, including BIM objects for a wide range of timber and metal door sets, together with an NBS writing support service for items specified as standalone components.
Timber doors

ASSA ABLOY UK Specification supplies timber doors to match all the relevant industry standards, including durability, acoustic, fire, whole life costing and sustainability, with doors that are fire rated to 120 minutes, achieve an acoustic rating of up to 40 decibels and performance ratings up to ‘Severe duty’, as well as Equality Act compliant doors.

With Safeguard Doors, ASSA ABLOY was the first timber door company to achieve LPS 1175 issue 5 level 4, offering the highest levels of security for timber composite doors, approved by the British Government.

Installing timber door cassettes allows delivery and fitting to be later in the construction schedule, reducing the likelihood of damage and helping construction teams to optimise cost schedules.

In addition, by supplying doorsets where only non-flush fitting items are assembled on site, this reduces fitting times and opportunities for high value ironmongery to go missing.

The company also offers a full door scheduling service to support specifiers and contractors at the detailed specification stage.

Metal doors

ASSA ABLOY UK Specification also offers proven steel security doors within the Powershield range.

These precision-made doors are supplied with factory-fitted hardware and installed by skilled teams of directly-employed site personnel.

For architects, specifiers and contractors, ASSA ABLOY Security Doors offers one-stop security door solutions from a single, experienced and trusted source that will provide a full project management service from door design to installation.

Architectural Hardware

ASSA ABLOY UK Specification also supplies a comprehensive choice of architectural hardware. Designed to aid the specification process, these are offered as grouped products defined by vertical markets, including the education, health and commercial sectors.

The commercial range also features Skyline, a Scandinavian design influenced collection of levers, pulls, hinges, accessories, door controls, exit devices, locks, electric locks and cylinders.
Introduction

It was in May 2011 that The Government Construction Strategy was published by the Cabinet office. The report announced the Government’s intention to require collaborative 3D BIM (with all project and asset information, documentation and data being electronic) on its projects by 2016.

As the report stated clearly:

“Essentially the UK Government has embarked with industry on a four year programme for sector modernisation with the key objective of: reducing capital cost and the carbon burden from the construction and operation of the built environment by 20%.

The second Government Construction Strategy was published by the Cabinet office and the Infrastructure and Projects Authority in March 2016. It sets out plans to deliver £1.7 billion of efficiencies, as well as a more ambitious set of measures to enable departments to derive further benefits from BIM and gradually move toward BIM level 3.

So with the 2016 deadline now passed, there are a number of obvious questions:

a) How has BIM worked so far?

b) Was the Government deadline a sufficient incentive to drive BIM adoption to the next level?

c) What are the challenges and opportunities ahead?

“Central to these ambitions is the adoption of information rich Building Information Modelling (BIM) technologies, process and collaborative behaviours that will unlock new more efficient ways of working at all stages of the project life-cycle.”
The success of BIM to date

To answer the first question, a report card on the first four years of BIM would probably mark it as "A minus".

On the one hand, as the Digital Built Britain paper stated, the Government has seen Level 2 BIM deliver "significant cost savings which have greatly assisted the construction costs savings of £840M in 2013/4" and "enabled us to help secure 20% savings on CAPEX, as recorded by Cabinet Office case studies against the 09/10 benchmark."

However, a recent survey (November 2015) by Building magazine found that while the proportion of people who had used BIM on projects lifted to 66%, up from 52% last year, it was less encouraging to find that for the all-important Level 2, progress seems to have stalled.

The proportion of firms working at this level was up, but only by a single percentage point, to 32%. Around half of firms said they hadn’t used BIM Level 2, with the remainder saying they didn’t know whether they had. For those that were using BIM on projects, they were using it more often. Just under a third (32%) said they were using BIM on more than half their projects, compared to 24% last year.

Supporting these findings was the NBS survey on the uptake of BIM, which found that whilst 48% of those surveyed were aware and currently using BIM, this was actually a reduction from the previous year’s score of 54%.

Yet, on a more positive note, at the same time, the NBS BIM Toolkit moved out of beta status in September 2015, marking its true readiness for project use, and serving as a sign of Level 2 BIM’s transition from a Government initiative to “an industry standard.”

As part of the project, NBS has published over 5,700 templates offering guidance for Levels of Detail (LOD) and Levels of Information (LOI) for a wide range of construction objects spanning architecture, civil and structural engineering, building services and landscape design.

These templates are freely available online, via an API or in Microsoft Excel format, and are clearly aligned to project stages, ensuring the required information is clearly related to real-world requirements across the project lifecycle.

The Toolkit also allows users to define Employer’s Information Requirements (EIRs) at every project stage and these can then be cross-referenced with a client’s original ‘plain language’ questions, making the delivery of a task information delivery plan (in line with PAS 1192:2) easy.

During the six-month beta period, the NBS BIM Toolkit generated enormous interest from construction professionals in the UK and abroad with over 3,000 projects created.
Was the Government deadline a powerful incentive?

Turning to the issue of whether the Government was a sufficiently important client for the 2016 deadline to have real impact, there is no question that the public sector was a vital client, indeed essential, through the recessionary period and early stage recovery from 2009 -14.

But now the landscape appears to be shifting. Recovery is steadily progressing: ONS output statistics for April 2014, showed 4.6% growth, with spending coming from the private sector, particularly in the form of a 23% surge in private housing work.

This shift in the balance of spending, combined with the overall picture of more contracts coming to market, might suggest that the industry is becoming less beholden to public sector work.

Yet, the fact remains that the Government is the construction industry’s single largest client, responsible for more than 40% of the annual spend in the UK, according to Barbour.

In addition, the Government’s current Construction Pipeline (August 2015) reflects 2,262 programmes and projects covering 16 sectors with a total value of approximately £119 billion.

The pipeline includes many key priority investments including HS2; the new Highways Agency Road Investment Strategy; the second phase of the Priority Schools Building Programme and Nuclear Decommissioning projects.

So, in summary, the Government clearly has the “clout” in the market to enforce its stated policies on BIM… if it has the willpower and resources to do so.

Certainly for ASSA ABLOY UK Specification, Government funded projects are a key element, especially in the health and education sector, and experience over the last 3 years is proving the value of effective data sharing through BIM in terms of more efficient project delivery of doorsets for the shell and core stage as well as the later fit out phase.
Do central and local Government have the resources to impose BIM?

And this is where concerns are being quietly expressed in some sectors of the market. No one doubts the Government’s intentions or desire but having reached the deadline will this be translated into direct action? For example, will there be real consequences for non-compliance with the obligation to use Level 2 BIM? Will contracts not be awarded or penalties imposed?

These concerns have grown when industry has seen the Government change tack on a number of other high profile initiatives such as the Green Deal, the RHI and solar subsidies as just a few examples.

However, the new Government Construction Strategy appears to demonstrate a continued commitment to BIM.

With the 2016 BIM level 2 mandate now in place, all central government clients must issue Employer’s Information Requirements (EIR) with tenders, setting out their BIM Level 2 information requirements on projects.

But will this happen? Given the cutbacks on staffing and resources in many Government departments there are understandable concerns that the ‘skillbase’ on the client procurement side has been depleted.

The importance of this is highlighted if we take a step back and remind ourselves of a couple of key points from the original “Strategy Paper for the Government Construction Client Group From the BIM Industry Working Group – March 2011” which stated that Government clients would need to:

1. Be very specific with supply chain providers, they will only provide that which is asked for.

The supply chain has become very adept at producing information for the delivery of specific parts of an asset. Issues arise not generally in the individual businesses but where they interface with others or have to deliver a composite set of information from across the supply chain. The contract requirements must be specific regarding deliverables and responsibility for delivery.

2. Measure and make active use of outputs.

Make sure that the government client makes use of the information it has asked for, specifically for ensuring key decisions are supported by verified information, but most importantly post occupancy where the potential benefits of information management are clear. The information supplied by the supply chain must be used to drive strategic decisions and demonstrate transparency during the delivery and operational phases of the building’s life.

These are clearly laudable aims but they require a considerable time investment by the Government client.
The challenge of GSL

This applies in equal measure to the Government Soft Landings Initiative, which is now also in full force. Again, it is worth reminding ourselves of what this calls for from the Government client, with what was referred to as: “The Golden Thread”

This requires early engagement of the end user and inclusion of the GSL champion on the project team during design and construction through to operational handover.

It also asks the team to set clear targets and measures for:

- **Social outcomes**: Functionality & Effectiveness – for productivity, user and business requirements.
- **Economic outcomes**: Operational and capital costs identified early- to reduce costs in construction and operation.
- **Environmental outcomes**: Performance to meet carbon and sustainability targets, including energy, carbon, water and waste.

GSL also calls for a focus on commissioning, handover and training in partnership with users and operators to enable effective operation and early optimisation of the asset, plus post occupancy evaluation to assess performance for at least three years post completion to establish actual outcomes and lessons learnt.

Once again, there can be little argument with the aspirations of the programme but there are huge implication in terms of manpower and expertise for the clients, both in terms of setting the clear targets and outcomes at the outset and then evaluating the actual data for three years post completion.

This means that projects designed using BIM Level 2 in 2016 and built in 2017/18 will need to be monitored through 2020/21, to understand the full implications.

At ASSA ABLOY UK Specification, we believe this is fundamental and the next 5 years could prove transformational in the adoption of BIM, if this post-occupancy data can be captured and shared.

The adoption of BIM principals and data sharing by the FM sector is paramount if BIM is to achieve its true potential and that is why the GSL process is so important in driving the initiative. And, in turn, that explains why there is concern whether Government clients will have the resources and manpower to meet with BIM level 2 and GSL and how this will be policed effectively.

The lesson is that, for BIM to achieve its full potential, the critical “factor” is the client.
Realising the opportunities for BIM post 2016

Following the 2016 deadline, what are the opportunities?

In our view, there are three opportunities ahead, which should ensure BIM continues to develop:

1) BIM and FM
2) BIM and climate change
3) BIM and Digital Built Britain (BIM level 3) non-compliance
Facilities Management and BIM

In many senses BIM has a second and some would argue even more important “life stage” ahead, when it moves out of the design and build phase and into the occupancy phase and becomes of real value to the facilities management sectors.

Again the GSL principles are designed to ensure the early engagement of FM and the end user during the design and construction process. Delivery and operation of building purpose is considered as a key element of the design.

It also calls for continued commitment to aftercare post-handover from the design and construction teams and post-occupancy evaluation and feedback to design and construction teams to ensure lessons learnt are captured for future projects.

In an ideal scenario, BIM will provide a fully populated asset data set to feed into CAFM systems and modeling will enable planning modifications. This data will need to be maintained throughout the building lifecycle.

However this vision seems to be some way from reality at the moment. For example, the BIM manager at Capita’s property and infrastructure business stated in July 2015, that “one area of the built environment sector has so far struggled with the demands of BIM – facilities management (FM)”.

Among the promised benefits of BIM is that knowledge transfer between the construction and operational phases of a project will be significantly improved.

The argument runs that FM teams will be given all of the knowledge generated and fed into the BIM model during construction, and use the model to overhaul the efficiency of their management operations.

As the project lifecycle moves forward, the same model can then be handed back to design teams when the project is due to be refurbished, again capturing all the knowledge from the whole operational phase.

But, according to Capita, this post-construction knowledge transfer process is not always as effective as we might hope and where there has been a rapid adoption of BIM within the construction industry, the FM market – which has different priorities and ways of working – has not engaged with the drive for BIM in the same way.

To quote the Capita report: “It is unrealistic to expect clients and FM teams to invest in the necessary software, processes or expertise to accommodate BIM models, particularly smaller organisations. Many FM teams don’t currently use any specialist software at all – and so expecting them to invest in niche design and modelling software is unlikely.”

“Data – rather than models – is the key to this challenge. FM teams generally work with databases, and structure their processes around them. There is no reason why BIM models can’t be converted into a form that clients and FM teams can instantly build into their approach.”
Facilities Management and BIM

“Instead of expecting facilities management and clients to adapt to new way of working, we are adapting the BIM information we supply into a format that fits into their existing best practices. Data – rather than a 3D model – is platform-agnostic, so FM companies will not have to invest in expensive software and training.”

“This way the knowledge captured by the construction team is adapted and adopted, and the FM team can build on it, rather than having to throw away the model or park it on a shelf and start again.”

The industry has recognised the issue of data compatibility with the COBie initiative and while using 2D data as an interim solution is pragmatic, the industry needs to be careful that we do not throw away the advantages of working in 3D for FM.

On a more positive note for BIM in FM, Kath Fontana FRICS, Managing Director of BAM FM was recently quoted in RICS News talking about.

“A great example of a practical benefit can be seen 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.”

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

“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?”

There can be little doubt that the uptake of BIM, in whatever format, by the FM sector will happen, assisted by GSL, and will provide an important ‘second stage’ boost to the BIM journey.

The ability to see ‘whole life data’ across the lifecycle of a building should be transformational, especially in helping to re-appraise the relative importance of the ‘capex’ and ‘opex’ budgets for decision-making.

Using the example of a simple door closer, at ASSA ABLOY UK Specification we already test these thoroughly and are able to calculate the likely number of operating cycles before the door will need maintenance. This data is invaluable at the initial specification stage, ensuring that the door is neither “under –specified”, so unable to withstand the levels of traffic and requiring frequent maintenance and early replacement, nor “over –specified” where the levels of traffic simply do not warrant it.

However, if this test data is supplemented by ‘real life’ data captured during the post-occupancy phase, then it will make predictive maintenance more accurate and also enable the team to spot “outliers” or problem areas more quickly.

For example, if a door closer is failing, data from the door can flag up the need for investigation. The FM team can then inspect the area and identify why the door closer is failing, this will allow the team to make improvements that will prevent the same issue occurring a few months or years later.

With the move towards Level 3 BIM and the Digital Built Britain strategy, which will be explored later in this paper, steps will be taken so that real life data may be able to feedback into the product development. If this is achieved, a virtuous circle will be created that will feed the next generation of design and specification.
BIM and climate change

It is also the occupancy phase of a building’s lifecycle that will have most impact on the potential to reduce carbon emissions and it is important to remember that BIM is not just about cost reduction; the original 2011 paper also had the objective of reducing the carbon burden from the construction and operation of the built environment by 20%.

In this context, the UK Government was a signatory to the recent 2015 United Nations Climate Change Conference, COP 21 or CMP 11, Paris Agreement, which called for action to hold the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels.

Everyone in the building “chain” understands the need to make buildings more sustainable at every stage; in the design, the manufacture and supply of the building materials, in the construction, the occupancy and maintenance, and finally the demolition and recycling of materials and the site use.

However for this to be implemented effectively, everyone needs to be operating from agreed and tested data about every element in the build.

This is where Environmental Product Declarations and Life Cycle Assessments are so critical.

Currently, although EPDs are used in several European countries, they are not mandatory in the UK. However, they are used in BREEAM and voluntary adoption is growing. There are now about 2,000 EPDs available across Europe, and the system is likely to grow in importance as more architects and specifiers use it to compare the environmental properties of different products.

Again this is an important part of ASSA ABLOY UK Specification’s investment, with a growing range of EPDs enabling the environmental impacts of products to be measured. ASSA ABLOY UK Specification is currently working towards how this information can be understood and practically used.

In addition, having worked on BREEAM ‘excellent’ rated buildings, including the UK’s first BREEAM ‘excellent’ rated school, the team has extensive experience in meeting best practice for sustainable building design. Furthermore, ASSA ABLOY took part in the pilot for the new BREEAM Associate online training course, to understand how manufacturers can be effective and proactive, giving knowledge and confidence when going into the BREEAM process, so as to get the best result in the most efficient way.

With this experience, one of the challenges (and opportunities) we see, is the integration of this data into the BIM framework in an effective and efficient way. The risk is that either we have disparate documents, which are not linked or integrated, so in “data silos” or, on the other hand, the BIM object becomes so data heavy that it compromises usability.

The integration of LCAs into BIM is also becoming a reality with the introduction of Tally, a software application for Revit that calculates the environmental impact of building materials, providing architects, engineers and building professionals with insight into how materials-related decisions made during design influence a building’s overall ecological footprint.

Unfortunately, this uses only American generic EPD data but we can anticipate further development in this area during 2016 as EPDs become more common. However, it highlights the fact that we are still at the early stages in a long journey towards fully using “Big Data” technologies and thinking in the construction sector.
The opportunity of Digital Built Britain and BIM Level 3

This view is also highlighted in the “Digital Built Britain” strategy paper, which makes it clear that Level 2 BIM is a stepping-stone to much greater opportunity and rewards. This is also supported by the updated Government Construction Strategy, which aims to facilitate the move toward BIM level 3.

Level 3 will enable the interconnected digital design of different elements in a built environment and will extend BIM into the operation of assets over their lifetime. It will support the accelerated delivery of smart cities, services and grids.

In particular the Digital Built Britain strategy creates the opportunity for major disruption to the current approach to designing and procuring infrastructure projects, which, according to the report, not only adds significantly to transaction and delivery costs, but also creates artificial scarcities of key services, resources and components through duplication of activity.

To quote the report “The most obvious example of this is in the design of projects where scarce professional services are often used to do detailed design work that is often repeated by suppliers and would more properly be done by those suppliers in the first place.”

Digital Built Britain also seeks to disrupt the common practice of dividing projects up into trade packages for procurement, arguing that greater use of component-based design and manufacture enabled by standard product libraries with embedded performance, cost and carbon data has the potential to address this limitation on the supply chain.

Traditional methods also follow a linear process with clients identifying needs and formulating a brief, passing through design, procurement, delivery and operations. There is no feedback loop to optimise performance or to evaluate changes of use.

With the potential of the “Internet of Things” to capture in-use performance data, Digital Built Britain anticipates that these processes will change and “in service performance data” will transform the way we manage and deliver assets.
The opportunity of Digital Built Britain and BIM Level 3

Three strands of Digital Built Britain also stand out.

First, the belief in 3D printing and other local fabrication techniques, to provide components for infrastructure projects, as well as Smart factory automation.

Second, the use of embedded sensors and other features of the Internet of Things, to monitor the condition of infrastructure and predict the need for maintenance interventions, creating a feedback loop back to the asset brief, enabling the opportunity to invoke performance contracts.

Third and perhaps most notably, as it is an issue of real currency at the moment, Digital Built Britain raises the vital issue of security for the first time in a BIM related report, when it states that “Protecting national security, we must ensure that in increasing the availability of data, we put in place or build into design of any BIM project and its on going management, security measures and protocols such that threats may be deterred, detected, or the consequences of an attack minimised.”

This focus on security is likely to increase the level of scrutiny placed on entrance systems, internal doors and access control systems during the specification stage and then ensuring the appropriate security level is maintained through the building’s occupancy.

While CCTV and alarm systems are vital parts of a building’s security, they are essentially a deterrent or support post-event investigation; it is only the locks, whether mechanical, electro-mechanical or digital, that provide a true barrier to entry, when fitted to a door with the right security rating and appropriate hardware.

This is an area of expertise for ASSA ABLOY UK Specification and we envisage more specifiers will require advice in this area in future, as part of the drive towards BIM level 3 and a “true digital building culture”.

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Summary

As this discussion paper highlights, 2016 is a critical year for “digital building”. As an industry we have made great strides since 2011 in the adoption of BIM and the 2016 deadline to use Level 2 BIM on all Government funded projects was an important milestone, especially when combined with the implementation of Government Soft Landing protocols.

The Government is such an important client for the construction sector that it has the market power to drive change.

However, there are concerns whether, with the current stresses on public finances and cutbacks in Government departments, there will be the manpower and skills in place to implement these policies effectively and ensure compliance.

If not, then there is a real risk that the pace in adopting BIM will stall and private sector organisations will question the levels of investment they are making in this area.

More positively, if we can overcome this potential risk and BIM Level 2 is mandated successfully, then it opens the way for the next stages in the BIM journey, with its adoption by the facilities management sector as BIM designed and built premises move into the occupancy phase.

At the same time, continued collaboration on defining industry wide data sets and data structures will lead to more environmental information, from EPDs and LCAs, being integrated into BIM protocols.

This will then create the momentum for the construction sector to embrace the tenets and vision of Digital Built Britain and move towards BIM level 3 and reap the benefits that digital disruption can deliver across the building supply chain.

At ASSA ABLOY UK Specification we are committed to making this journey and are excited by the opportunities ahead as the digital agenda comes to fruition and as building security has an increased profile.

We recognise there are serious challenges ahead but the potential rewards outweigh the risks, if the industry embraces the digital agenda wholeheartedly.

But we also recognise there are other viewpoints and perspectives and we invite you to share your thoughts and comments on these important issues and join the debate at https://www.linkedin.com/company/assa-abloy-uk and to register your interest in receiving further papers in this series of ASSA ABLOY UK Specification Discussion papers published throughout 2016.
ASSA ABLOY is the global leader in door opening solutions, dedicated to satisfying end-user needs for security, safety and convenience.