

BIM: COMING TO A PROJECT NEAR YOU

BIM's profile is rising, although it has in fact been around in the UK and internationally for a number of years. Recently media coverage of BIM (Building Information Modelling) has gathered pace, triggered in the UK by government support. Much of the commentary to date has heralded BIM not simply as a technological advance, but also as a force for change in terms of more collaborative procurement routes. In this note we examine whether BIM really will have the type of far-reaching implications that many commentators have suggested. We focus in particular on the impact (if any) of BIM on:

- collaboration / construction procurement routes
- new professional disciplines: the BIM Model Manager
- design liability / PI insurance
- intellectual property / copyright
- confidentiality

Government Support / Private Sector Ambivalence?

In the UK, the Government is leading the push for BIM uptake. The Government Construction Strategy issued in May 2011, included a requirement for fully collaborative 3D BIM (known as Level 2 BIM – see below) on all Government projects by 2016.

In contrast, in the private sector, our straw poll has revealed that opinion remains divided as to the merits of BIM. There is resistance from some on the basis that BIM stifles creativity if used too early on in the design process or because it is too expensive and complex to implement. Others have already embraced BIM on the basis that it saves costs by identifying problems before they arise on site or because it is a useful facilities management tool.

What Is BIM?

So, what is BIM? Basically BIM is a sophisticated three dimensional (3D) computer model which represents in huge detail every element of the building. It has been said that with BIM you build twice, once virtually and once in reality. That in itself is perhaps nothing more than a natural development from the type of CAD that designers have been using for years. The factors that make BIM different and which are generating excitement in the industry are threefold:

- the BIM model is intended to be a shared resource for the project. In other words, the design team, the contractors and sub-contractors are all meant to work off the same model;

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Key issues

- UK government strategy requires BIM on public projects
- Private sector ambivalent about BIM
- BIM = collaboration but beware pitfalls
- Rise of BIM Model Manager?
- BIM protocol: standard form yet to emerge

- the BIM model is interactive and works "intelligently". For example, if say one element of the structural design is changed, the model will automatically make corresponding changes not just to the rest of the structure but to all other relevant parts of the building. With this comes the concept of automatic "clash detection", namely the identification by the model of inconsistencies between different elements of the design before they arise on site; and
- the BIM model may contain extremely detailed information about materials, equipment, environmental efficiencies, programme, cost and facilities management.

BIM Maturity Level?

Before considering BIM's day to day impact on the project, it is vital to ascertain the proposed BIM maturity level. BIM Levels 0, 1, 2 and 3 are becoming common parlance in the construction industry. In essence:

- Level 0 BIM = use of 2D CAD files or hard copy 2D drawings for production information;
- Level 1 BIM = use of 2D and 3D CAD information but without data integration into a single tool;
- Level 2 BIM = use of 3D information models by all key team members in an integrated fashion, but separate models may be utilised;
- Level 3 BIM = use of the same, single integrated web based 3D model by all team members across the project, with potential to include in the model detailed data regarding time (4D), cost (5D) and facilities management (6D).

In this note we focus on the legal and procurement implications for projects using Level 3 BIM, given that it has the greatest potential for impact beyond the pure technological advance.

That said, even with Level 2 BIM, there will be a need for project documentation to impose obligations around integration and co-ordination. Most well drafted professional appointments will do this already (for example, by way of a design responsibility matrix).

BIM = Collaboration?

A collaborative approach amongst all members of the construction team is generally seen as crucial for successful Level 3 BIM implementation. At its most basic, this entails everyone using the same BIM software. At the moment, there are numerous competing software providers in the market offering BIM products. Some organisations have told us they are reluctant to make the significant investment required in terms of software purchase and staff training until one BIM provider emerges as the market leader.

Assuming everyone on the project can be persuaded/can afford to adopt the same model (and that may perhaps be an ambitious assumption), the next step is to enshrine collaboration into the legal framework. In the UK at least, much construction documentation is based on industry standard forms. So how have the publishers of these forms responded to the potential need for collaborative Level 3 BIM?

Standard Forms

Many standard forms used in the UK already include (optional) provisions about collaborative working, value engineering and a duty of good faith (for example, the JCT Supplemental Provisions). Others have collaboration at their heart, such as the NEC suite.

In terms of BIM-specific amendments to the standard forms, the so-called old-guns have surprisingly beaten the new out of the blocks. JCT has adopted a light touch approach: it has addressed BIM through its 2011 Public Sector Supplement proposing an optional addition to the main standard forms providing for the inclusion of a BIM protocol as a Contract Document. To date no specific amendments have been proposed to the NEC standard forms to address BIM co-ordination, and we anticipate that most NEC users will simply adopt the approach of including any BIM protocol as part of the "Works Information" with which the contractors must comply. The CIC (Construction Industry Council) has established a BIM forum and it is reported that a new CIC consultancy services agreement featuring a BIM integrator/coordinator role may be in the

pipeline. The Chartered Institute of Building has recently issued for review as a consultation draft a "Contract for Complex Projects" containing proposals for BIM use. As far as we are aware, neither the RIBA, ICC nor the ACE have published amendments to their standard form appointments to cater for BIM, but the RIBA has published a "BIM Overlay" to its widely used Plan of Works (Stages A-M).

BIM Protocol?

We anticipate that a market standard will evolve in terms of the wording of a BIM protocol, which can form a schedule to each consultant's appointment (as well as being a contract document forming part of the building contract). This could include roles and responsibilities within the design team in terms of model creation and updating; the role of the BIM Model Manager (see below); model access rights; a duty to warn of errors/inconsistencies. Some of these areas will already be covered in appointment scopes but there will be a need to avoid overlap/inconsistency between the appointment terms, the building contract and any BIM protocol.

Making Collaboration Work Through Co-ordination

Some commentators have gone further and suggested that merely including a BIM protocol as an appointment schedule or contract document is not enough. Instead they recommend a multi-party BIM co-ordination agreement ("BIMCOA") to be entered into by the client, each member of the design team and any designing contractors. In our view this additional layer of documentation is probably overkill, assuming that the professional appointments are signed up fairly early on in the design programme, the scopes are properly co-ordinated and any contractor involvement in the design process is properly documented (for example through a well drafted pre-construction services agreement (see below)).

Procurement Routes

If collaboration is prioritised on projects using Level 3 BIM, there will be some procurement routes that will lend themselves to reflecting this priority better than others.

We anticipate that the trend towards two-stage design and build for large, complex projects where time is critical will continue, but with an additional driver where Level 3 BIM is used: namely, the ability to engage the contractor early on in the design process and in the development of the BIM Model.

A recent dispute that arose in the US highlights what can go wrong where lack of contractor involvement early on in creation of the model led to a mismatch between the virtual BIM model and its translation into the physical structure. It is reported that the architect and M&E engineer used BIM to design the MEP (Mechanical, Electrical and Plumbing) systems which were to be installed into a ceiling void. Unfortunately, it appears that it was not communicated to the contractor that he needed to use a very specific installation sequence in order to fit the components into the ceiling void. Consequently the contractor ran out of space once the work was 70% complete. The parties blamed each other and went to litigation. Apparently an out of court settlement was reached (the details of which are confidential) but it has been reported that the architect, M&E engineer and contractor shared liability to the client to the tune of several million dollars. This dispute shows that early contractor involvement and clear communication remains key to mitigate such risks and avoid similar problems when using BIM.

Pre-construction Contractor Involvement – Pitfalls?

Early contractor involvement commonly sees a two-stage tender process with the contractor and client signing a pre-construction services agreement ("PCSA"). A PCSA can be very useful from a Level 3 BIM perspective as it can, for example, include a list of BIM focused pre-construction services, such as collaboration and co-ordination with the design team, value-engineering and buildability advice. However, it can also lead to commercial problems for the client, due to lack of competition in the second stage of the tender process when the contract sum is to be agreed. PCSAs seeking to bypass

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this problem will often provide for "open book" sub-contract package tendering to increase transparency and competition, and will usually entitle the client to terminate "at will". However these legal remedies may be of little practical help if, where the incumbent contractor and client are unable to agree the contract sum at the end of the second stage, market conditions allow potential replacement contractors to charge a premium for the risks inherent in taking over the project. This may be compounded where the new contractor is asked to take over responsibility for the terminated contractor's BIM Model input.

The BIM Model Manager

In our experience, private sector clients who have actually used Level 3 BIM have needed to engage a specialist firm to manage the BIM model. The responsibility of the BIM Model Manager will be to decide when changes to the design are uploaded into the model and officially incorporated into it. In other words, a management and procedural role as gatekeeper of the model. This role could either be included as part of the architect's, engineer's or project manager's scope or be the subject of a separate appointment. If the project is being procured on a turnkey basis, the design and build contractor could equally take on the BIM Model Manager role. If the BIM Model Manager is not a professional designer, there will be a need for his decision to be informed by the lead designer responsible for design co-ordination. We anticipate that the BIM Model Manager could potentially evolve as a new professional sub-discipline. We understand that some firms of architects have already rebranded aspects of their practice to include a BIM Model Manager function.

Design Liability

Does the use of Level 3 BIM create new risks for designers in terms of their liability? This is not something which appears to be at the forefront of anyone's mind when embarking on a Level 3 BIM project, where the focus is on collaboration and teamwork. However, there are potential pitfalls for designers around the "intelligent" nature of Level 3 BIM software which means that changes to one area of the model could automatically modify other parts of the model, possibly without the original designer's input or active knowledge. That could potentially expose designers to liability by deeming them to be aware of changes to their design made by others as part of the BIM process.

If disputes are to be avoided, these risks need to be analysed on a project by project basis and then carefully documented in the appointments and contract documents.

From the client's perspective, the use of Level 3 BIM could make it difficult to unravel the source of the error(s) behind a design defect where numerous different designers are inputting into the same model. The BIM Model is not infallible: it will only be as good as the data put into it and mistakes caused by human error are always a possibility. We anticipate that where design and build procurement is used it will be more important than ever for the contract to impose full design responsibility on the D&B contractor (including responsibility for design work pre-contract) so that the client does not need to look into the history of how the BIM Model was created (assuming the contractor remains solvent of course). Currently it is necessary to amend most standard form contracts to achieve this: for example, in the JCT Design and Build Contract amendments are required to impose responsibility on the contractor for any errors or inconsistencies in the "Employers Requirements". Level 3 BIM makes these types of amendments especially important from the client's perspective.

Defects/Shortcomings Within The BIM Software

Another potential risk area for designers using Level 3 BIM is liability for model failure. We anticipate that design team members will not wish to take on any liability for data corruption/loss caused by software malfunction. There is a risk that any errors in the data produced from the model due to a software defect may have a disproportionately large cost impact when compared to the liability of the provider of an off-the-shelf software product. We understand that industry practice is to attempt to limit the software provider's liability to the acquisition cost of the relevant software.

PI Insurance

We are not aware of any resistance from PI (professional indemnity) insurers to their architect, engineer or other designer clients using BIM, or indeed of PI insurance premiums increasing if BIM is used. That is perhaps surprising: the type of collaborative working necessitated by BIM could be seen as muddying the waters in terms of the chain of responsibility and liability whereas PI insurers usually prefer precisely defined scopes. While the idea of a single, integrated "no fault" project insurance policy for BIM-based projects has been promoted (including within the Government's strategy paper), the details of the exact nature and function of such insurance appear to be in need of further refinement. Traditionally single, integrated "no fault" project insurance is seen as expensive and generally only considered on very large, complex projects. Perhaps BIM uptake will lead to increased demand for such insurance? To date, we have not yet seen much evidence in the insurance market of new products responding to this potential gap in the market.

Copyright Ownership

Copyright ownership will be a relevant issue for both the work products that are used to create the Level 3 BIM model (the "inputs") and the model itself, together with the information it generates (the "outputs").

In principle, BIM should not impact on the ownership of copyright in the inputs. The traditional position of most standard appointments (with the designer retaining ownership in the copyright in its work product and licensing to the client to use and reproduce the design) should not be adversely affected.

With several consultants and contractors contributing to the design, the question of who owns the copyright of the outputs will be key. This will be of particular importance to a client, who will need to use the model to procure construction of the building and potentially operate it depending on exit strategy. As such, ownership of the outputs will often sit most naturally with the client. The appointments could establish an acknowledgement amongst all design team members of the client's ownership of the model itself and all model generated outputs to be created and used for the project.

Confidentiality

One consequence of Level 3 BIM is that the work product of each design team member will be accessible not only to the contractor and client but also to all other members of the design team, and to end users such as tenants or other occupiers. As a result, designers may be required to divulge what they would consider to be their own proprietary intellectual property rights (IPR) to a wider audience than they would traditionally be used to, some of whom could well be competitors on concurrent or future projects. The same issues could arise for contractors both in terms of design or sequencing/logistics which can be commercially very valuable.

Each professional appointment could go some way to mitigating these concerns by containing comprehensive confidentiality undertakings, applying equally to every member contributing to the model and any user wishing to have access to the model.

Designers may also be keen to investigate whether it would be possible to hold commercially sensitive data outside the model itself, providing limited (possibly redacted) access on a need-to-know basis only. While that approach would erode the collaborative nature of Level 3 BIM to some extent, it may go some way to mitigating the concerns of designers with a wary eye on losing control of their proprietary IPR.

Conclusion

It is not always the case that the private sector follows the government approach to procurement (witness, for example, the lower uptake of the NEC in the private sector compared to its more common usage in the public sector). In our view, if Level 3 BIM does deliver the promised efficiencies, it is likely to become commonplace on large, complex projects in both the private and public sectors. However, there is no need to panic or change tried and tested procurement routes or legal

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frameworks simply because BIM is being used. On projects where BIM has been used to date, there was little stomach for complex amendments to standard forms to cater for BIM. We anticipate this will continue, but with a market standard evolving in terms of a "slot-in" BIM protocol to be included in the legal documents. Many organisations will struggle in the economic downturn to make the kind of substantial outlay on training and investment that may be required if they are to avoid being left behind in the race to be Level 3 BIM ready. BIM supporters would argue that the front-loading of investment should be more than offset by the decrease in time and cost during the construction phase and the reduction of inefficiencies during facility operation and maintenance.

Many organisations are maintaining a watching brief until market practice in terms of BIM use evolves. At the very least, it seems clear that clients, designers and contractors will have to get to grips with the more collaborative working practices that the use of Level 3 BIM will entail.

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