A model answer

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Andrew Pryke discusses how a BIM application can help risk management at different stages of a project?s lifecycle

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Whenever you undertake a project, there is always some element of risk, whether from cost overruns, project delays or buildings not performing as expected. While adopting building information modelling (BIM) cannot eradicate all risks, it enables us to de-risk many areas across the project life cycle. This provides greater certainty and ensures that key project milestones are met and assets delivered as expected.

The UK government?s Level 2 BIM mandate sets out a standard process for the industry to follow. The PAS 1192 ? 2 and 3 information management standards track the RIBA work stages from briefing through to design and construction and, most importantly, the operations stage. This ensures that teams focus on their ultimate goal from the outset, and that assets are designed to meet client needs. The use of standard documents such as employer?s information requirements, the BIM execution plan and the BIM protocol makes certain that the right material ? graphical, non-graphical and data ? is produced at the right time, and that everyone is working towards the same deadlines and goals.

The BIM execution plan is developed at the outset during the digital project execution workshop and it defines, for example, the roles and responsibilities for each team member as well as the way in which the model will be constructed. A BIM protocol is also established, which is an agreement between all parties to exchange models and information, ensuring that a transparent data-sharing environment is created. To be certain that each team member can fulfil these requirements, a gap analysis and supply chain capability assessment should be performed to identify any risks that would prevent effective collaboration or the achievement of PAS 1192, which covers areas such as skills and capability, organisational readiness and technology. Any issues should be addressed via workshops, ongoing training and support.

The design phase

Computer animation and 3D model fly-throughs help clients to experience their building before it is built, enabling them to understand the effect their choices will have on its performance and the user?s experience.

This enables better and earlier decision-making and greater collaboration between the client, design team and other stakeholders. It helps reduce the risk of buildings failing to meet employees? or customers? needs. These tools can be used to market properties at an earlier stage, helping clients to meet occupancy and sales targets.

By employing the same language, such as the common classification for objects in rooms, quantity surveyors can automatically take area information from the model in a format that is user-friendly, increasing the speed of calculating a design cost for a project.

At Aylesbury Vale Academy, for example, BIM enabled bills of quantities to be created 80% faster, while also improving cost certainty by 30%. The same classification allows facilities management service providers to assign operational data and costs during the design and construction phases, so they can develop a cost to operate and a service charge more accurately and earlier than before. At the Connect110NS development in Glasgow, we achieved this 6 months before completion, thereby de-risking operational costs for the client and tenants.

Pre-construction efficiencies, cost savings and waste reduction can all be achieved by using BIM, thereby reducing the risk of cost or time overruns. Logistics planning prevents site delays, while clash detection allows us to ?build the building? twice, saving time and money by reducing the amount of rework on site. At Leeds Arena, our ability to use the model to take off quantities to order materials reduced wastage by 8%, compared to the Leeds Beckett University Rose Bowl, a project completed 2 years earlier without the use of BIM.

Figure 1: The virtual world meets the real world for increased operational efficiencies, cost savings and user satisfaction

The construction phase

Targeted software and mobile technology offers a way to manage risk during the construction phase by providing an accurate audit trail, up-to-date information, progress reports and interim certificate analysis. It uses iPads and cloud connectivity to let individuals record information on site for access whenever they need it later. It means that everyone uses the same assessment tool, process and documentation, and so all users have information that is timely and relevant.

Changes can also be managed effectively using the model and the 3D intelligent objects it contains. When a decision is made to change an item such as a chair, the model automatically shows the other items this decision will affect and calculates the associated costs.

The operational phase

With 80% of a building?s costs related to operations, risk does not disappear once construction is completed. The government?s Soft Landings initiative, part of its Level 2 mandate, requires an annual post-occupancy evaluation for at least 3 years, to ensure buildings perform as anticipated and to allow lessons learned to be incorporated into future projects.

Information has to be collected during the design and construction phases to enable comparisons between actual performance and what has been predicted. This process is supported by the data-rich BIM model and PAS 1192, which allows the correct data to be identified and recorded from the outset and used during operations. This data can be continually enhanced by linking the model to a computer-aided facility management system, which ensures that the model is updated in real time and allows facilities managers to unlock efficiencies.

At Wharfedale Hospital in Leeds, we have seen savings of 45% on unplanned maintenance activities and 20% on planned preventative maintenance tasks. In addition, response rates to problems have improved by 54% and productivity has increased by 50% during planned preventative maintenance tasks.

Estate management

The creation of an estate-wide model allows monitoring and performance benchmarking across all assets. The model?s data can be supplemented by technology such as sensors and smart applications, which enhance the building information with additional sets containing environmental, social and business data.

These extra layers enable estate managers to take a more holistic view in decision-making and allow them to reduce risk and realise new opportunities, including managing spaces more effectively and planning estate-wide maintenance activities.

The digital world is moving at speed, resulting in a smarter environment, smarter business systems and hence smarter people. Failure to adopt will ultimately mean a failed business.

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Further information

- Image ? BAM Construct UK
- Related competencies include Data management , Risk management
- This feature is taken from the RICS *Construction journal* (September/October 2016)