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BIM in FM: Cementing its place in the industry

Flinders University used BIM in the construction of its new Tonsley building, focusing on the use of 3D BIM to deliver next-generation facility management, says JASON LILIENSTEIN.

BIM (Building Information Modelling) is a 3D model based concept that provides a shared knowledge resource linked to a 3D representation of a facility. With a proven ROI (return on investment) in design and construction, it has revolutionised the way that buildings are constructed. However, 3D BIM is fast becoming the Holy Grail in space, facilities and asset management, promising unparalleled power in operating buildings and infrastructure.

In trail-blazing fashion, Flinders University seized the opportunity presented by the construction of its new Flinders @ Tonsley building, focusing on the endgame from the outset to drive the use of 3D BIM to ultimately deliver the next generation of facilities management. The $120 million state-of-the-art building is the first major construction project in Australia to successfully implement 3D BIM across the full asset life cycle, from design through to construction and then, most importantly, into everyday FM.

The BIM journey

A six-storey 16,000-square metre building designed by HASSELL and built by Lendlease, the Tonsley building now houses 250 staff and 2000 students, and is the centrepiece of the revitalisation of the former Mitsubishi Motors manufacturing site. For Flinders University, the project presented a unique opportunity to implement innovative ways to better design, construct, manage and operate its facilities.

Through design and construction, HASSELL and Lendlease together coordinated the 3D modelling activities of Arup, KBR, WSP, Hindmarsh Plumbing, Trojan Fire Protection and Promptair. A BIM management plan outlined the scope of the BIM project and the responsibilities of each of the design teams. It also detailed how their activities would be coordinated through design and construction, what information they were to capture within the models and the process for resolving conflicts. The software to support these activities was chosen from what is a relatively mature 3D model authoring market; however, Flinders University recognised that to transition into FM, it needed a different type of BIM solution that could be scaled across the complete life cycle of its facilities, giving simple access to the opportunities that 3D BIM offered, blended with everyday core functionality.

It reached out to the industry and sought technology that could not only encompass its new, fully 3D modelled buildings, but also one that was capable of offering a cost-effective pathway to ultimately bring its entire existing portfolio into the world of 3D.

Zuuse was chosen to deliver a robust and scalable platform designed to be the single point of truth to facilitate better operational, tactical and strategic decisions throughout the entire asset life cycle – most importantly, in FM.

Regular meetings, close team collaboration and a clear set of guidelines helped contribute to a successful on-time, on-budget construction phase.

More importantly, though, was the bigger picture.

As the models were developed and refined through the construction phase, through a suite of integrated modules, Zuuse technology allowed the head contractor and subcontractors to progressively link critical construction, operations and maintenance information to the elements and systems in the models that would establish the basis of, and be invaluable to, the operations phase of the building.

Making BIM in FM a reality

In order to successfully transition BIM into FM, a number of issues had to be tackled head-on that, to date, the BIM movement has struggled to address in a scalable way.

First, the authoring of the models had to consider how the models would be used in the FM phase. This took into account not only visual accuracy, but also the way that assets and systems are named and identified. The clear, consistent naming, categorisation and identification of components as per as-built plans is an essential requirement to allow FM users to search and navigate models effectively to mine them for information.

Second, not all of the building data and documentation belongs in the BIM model. All software solutions are built on a database. Storing critical data and documentation in a BIM model locks this information away in a file format and makes it hard to access and update. By storing data in a database linked to the 3D BIM model, it can be maintained, manipulated and reported on efficiently.

Third, it had to be recognised that, in FM, 3D BIM is not necessarily king; data is king. A good example of this is the

"With the successful implementation of BIM, we now have technology controlling and benefiting the everyday FM operations of the building, pulling and pushing information linked to the 3D model to help facilitate our FM processes, make better decisions and reduce our costs."
Steve Woodrow, projects director at Flinders University

Asset Register – the foundation upon which all FM systems are built. Even on a fully modelled BIM construction project, not all of the assets that would populate the building's Asset Register will be modelled. Movable assets such as chairs, projectors, desks and portable pumps etc are all examples of assets that are delivered in schedules from construction teams and need to be captured and tracked, but would be inappropriate to include as (static) objects in the 3D model.

Finally, the transition into FM involved consolidation and repurposing of as-built models to better suit that phase. While an as-built 3D BIM model is an accurate record of what was constructed, in reality it's a complex collection of many models laden with construction data and parameters that offer no benefit in FM. Repurposing these models entailed creating standardised views of a building with transient and contextual objects removed and any relevant asset data extracted and stored in the database linked back to the objects from which they were extracted.

Once the models had been repurposed, BIM in FM became a reality by blending everyday core operational functionality with the 3D BIM model as the visual front end. In addition to the benefits that a 3D model lends to pre-activity analysis for maintenance work ('before I drill into this wall, what's behind it?'), the practical, basic, everyday requirement to drive both scheduled and reactive maintenance and capture the history of work carried out along with any associated documentation is now operational. Where applicable, as data and documentation is captured, it is all linked back to the assets and systems in the 3D model.

In summary, the 'systemisation' of BIM is the fundamental concept that contributes to the successful transition of BIM into FM. Once the rules of modelling and the processes of taking construction models into FM have been clarified, only then can a scalable, repeatable process be applied across all BIM projects.

Project outcomes

As the first major construction project in Australia to successfully implement BIM across the full life cycle of a building, Flinders University is now experiencing all the potential that BIM has to offer.

The key project outcomes are summarised below:

3D visualisation – Vital information is now always on hand in emergency corrective or preventative maintenance situations or for other ad hoc analysis. Downtime is reduced and so are costs. Less time is wasted looking for the physical plant/equipment in the field.

Efficient data capture – It is not always practical to capture all information within a BIM model. Trapping key information in a proprietary model format means that it is hard to extract and manipulate in an everyday context. A hybrid approach, with a database storing data and documents that are linked to a 3D model, combines the power of BIM with key functionality to support ongoing building operations, reporting and analytics.

Time and labour – Reduced time and labour costs searching for required information. Staff can be redeployed on to other higher value tasks, such as proactive planning and analysis.

Compliance and risk management – With a single point of truth for data storage, FM personnel can now confidently retrieve inspection and maintenance records, review operational failures and provide required certifications. The ability to produce reports based on specific facility inspection and certification criteria also means Flinders University can operate more effective risk management and compliance practices.

Full life cycle costing – The asset owners are now equipped with asset intelligence at any given point in time to ensure more accurate and cost-effective decision-making now and into the future. Asset condition, criticality and performance/quality standards data is now utilised to drive optimal maintenance, refurbishment and replacement strategies. ●

Jason Lilienstein is the CEO of Zuuse, having previously worked in a variety of software and emerging technology businesses, including ABB Ventyx, eServGlobal Limited and Onthehouse. His background in enterprise asset management and data has enabled him to help drive Zuuse from being a traditional BIM application to a full asset life cycle solution utilising 3D visualisation, mobility and information management.