



BIM provides a visual communication tool for effective management of project information

Building Information Modelling: The Recipe for Project Success

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Introduction

From the pre-planning and design stages of a project to the operation and maintenance of installed building services, Building Information Modelling (BIM) systems offer considerable advantages and benefits. Just as CAD and prefabrication revolutionised the design and construction functions and became the industry norm, BIM is set to become standard practice globally for the efficient whole-life management of building projects.

What is BIM?

BIM is a process that enables architects, engineers, contractors and owners to collaborate throughout the lifecycle of a building: from the earliest design concept to demolition of the building. It

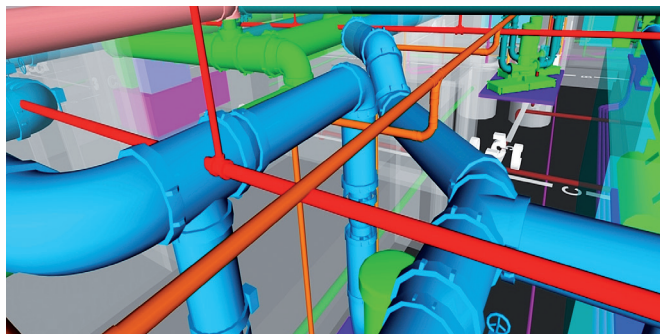


Figure 1: Clash detection identifies piping collisions at an early stage to avoid problems on site

works on the principal of spending time and effort at the very outset to reduce the risk of problems onsite that can be difficult to resolve, cause delays and incur additional costs.

More than just 3D drawings, BIM concepts include collaboration between trades that have previously worked independently. Utilizing software such as Revit, a 3D computer model that represents the physical and functional characteristics of a facility can be created. This becomes a visual communication tool shared by all stakeholders that can be used to effectively manage project information for consistent, accurate and coordinated models.

In practice, each partner owns their own model. The coordination team brings together the models, integrates the information and carries out clash detection to identify any pipe collisions or interferences within the model. Once clash detection is run, trades will come together in coordination meetings to discuss and troubleshoot issues that were found in the models. This allows for open communications and quick resolution during planning stages.

Since it forms a reliable basis for decisions regarding design

About the Author

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details, scheduling and clash detection, BIM-led projects can be planned and executed more quickly, economically and sustainably.

Legislative Encouragement

Although the concept of BIM got off to a slow start, it is now gaining ground globally, including in India. For example, there is a recent EU directive to encourage, and even mandate, its adoption in member states by 2016. And the UK, the Netherlands and Norway are among the countries that have already made BIM mandatory for publicly-funded building projects.

Regulation in many states of the USA has led to a doubling of BIM adoption over the last five years, whilst the Netherlands has seen a threefold rise from under 10% to over 30% of projects using BIM in the same period.

The greatest rate of increase, however, has been in the UK where BIM-led initiatives have risen from under 5% to over 30% of building and infrastructure projects. BIM is now standard practice for many leading construction companies and, as its use gathers pace, supply chain companies are responding.

Advantages of BIM

Compared with traditional building contracts, BIM creates standardisation and a level playing field for all, making cost estimations more accurate and the comparison of quotes easier. The traditional bidding process starts with conceptual designs submitted by the consultant on which contractors base their quote. This often requires bidding contractors to seek more information from the engineering office, make assumptions or take on a large measure of responsibility.

Having all the information contained clearly and accurately within the model in advance means the job can be priced easily, helping owners to compare bids and removing the element of risk for clients and contractors alike. Changes can still be made at a later stage if required, but unnecessary change orders that can add significant cost to the project and delay completion are eliminated.

Similarly, BIM helps keep projects on track due to its work scheduling capability. The model can be used to map a timeline for construction that shows when and in what sequence components need to be installed. As a result, downtime is avoided, productivity boosted and owners can see how quickly the work will progress.

Further down the line BIM can advise what maintenance is needed – when a component needs to be replaced or a piece of equipment serviced; for instance, helping owners draw up a maintenance schedule to ensure optimum system performance and thereby contain costs. This facility can be especially useful for retrofits.

Summary of BIM Benefits

- Maximum project co-ordination
- Close partner communication
- Accurate design detail
- Reliable costing
- Early clash detection
- Quick conflict resolution
- Less field measurement
- Fewer change orders
- Fast and smooth work scheduling
- Waste and rework reduction

- Uninterrupted work flow
- Higher productivity
- Less risk
- Lower cost
- On-time project completion

The advantages of prefabrication are widely acknowledged throughout the industry and prefabricating using grooved pipe joining has proved to deliver additional benefits. Not surprisingly, organisations that many years ago latched on to prefabrication as a strategy to minimise risk, increase productivity and save time on the jobsite are now among the first to embrace BIM.

It is an enabler for lean construction that can be relied upon to facilitate prefabrication: contractors can use the 100% correct model to determine cut lengths of piping and start prefabricating assemblies with confidence. Just as prefabricating in ideal conditions off-site delivers greater efficiency on-site, so using BIM removes uncertainty and eliminates problems during construction and installation. *The philosophy is the same: spend time at the earlier stages to reduce problems and time spent in the field where the risk is greatest.*

The Role of a Manufacturer in BIM

Leading manufacturers in the pipe-joining sector have taken steps to allow users to effectively integrate products into BIM software systems. At an individual project level, company experts work with designers who will include systems in their drawings to help them understand how the products can be best used and routed in specific software.

For example, we work with the major BIM software manufacturers, including Autodesk, Bentley, Prologman and Stabiplan, to ensure that our products can easily be used within their relevant packages such as AutoCAD, Revit MEP, Fabrication, MagiCAD and StabiCAD.

BIM confirms, for example, that prefabricated sections can be dropped in as required and that there are clear access routes for

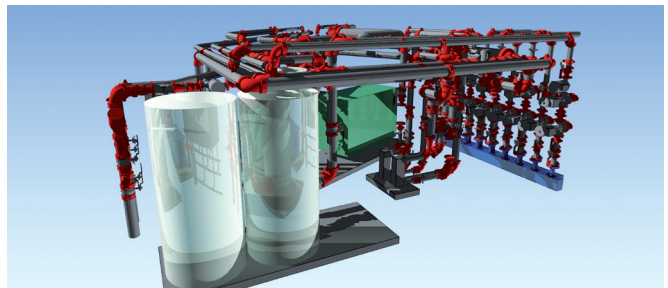
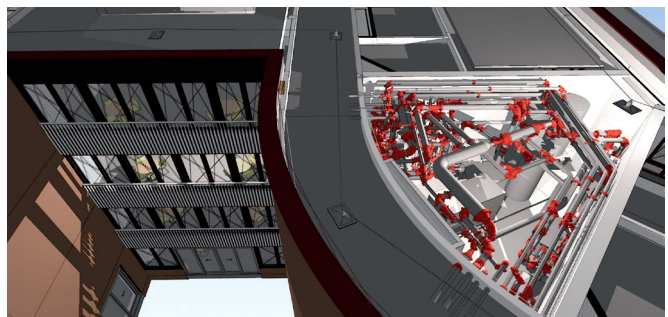


Figure 2 and 3: Many important global projects have used the Revit BIM-enabled CAD library from Victaulic including the new London Heathrow Airport Terminal 2

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maintenance staff – or otherwise clearly shows if there are clashes, in a way that would not be possible with other methods.

Lifetime Advantages

Where changes are needed they can be made safely, quickly and easily. For instance, if an elbow needs to be moved to avoid hitting another component, this can be done in minutes using the model but might take hours in the field. Clicking on a component identifies the product and gives dimensions.

If the designer changes the diameter, the component also changes and the layout drawing and bill of materials are automatically updated. This would be much more complicated, time-consuming and costly with another method. Projects that have produced drawings using the Revit BIM-enabled Victaulic CAD library include the London Heathrow Airport New Terminal 2 - recent *Building Services Project of the Year* finalist, and the Weggeler Centre, Almelo – a flagship BIM project in the Netherlands.

Conclusion

Just as CAD and prefabrication have revolutionised the design and construction functions and become the industry norm, so BIM is set to become standard practice for the efficient whole-life management of building projects. With a growing number of products and support available to partners, the way forward to project success is clear. Using BIM to focus on design detail and pre-construction work delivers right-first-time results on the job and allows for easy maintenance and smooth operation for the life of the building. ❖