

# BIM is now and forever

BIM (Building Information Modelling) has been widely proclaimed as one of the most exciting developments in the construction industry. The recent proliferation of BIM products has seen more and more companies and individuals joining the BIM parade. Is this just a passing fad, or a new standard for the industry?

## What is BIM?

In its simplest form, BIM is a technology which allows information about a building to be represented in a more realistic way. It allows models to be created based on the elements or products that you think about when designing or constructing the building. So instead of information being based around geometry (lines, points, faces, etc) it is based around construction elements such as walls, windows, beams and columns, or manufactured products such as HVAC units, lifts or cladding systems.

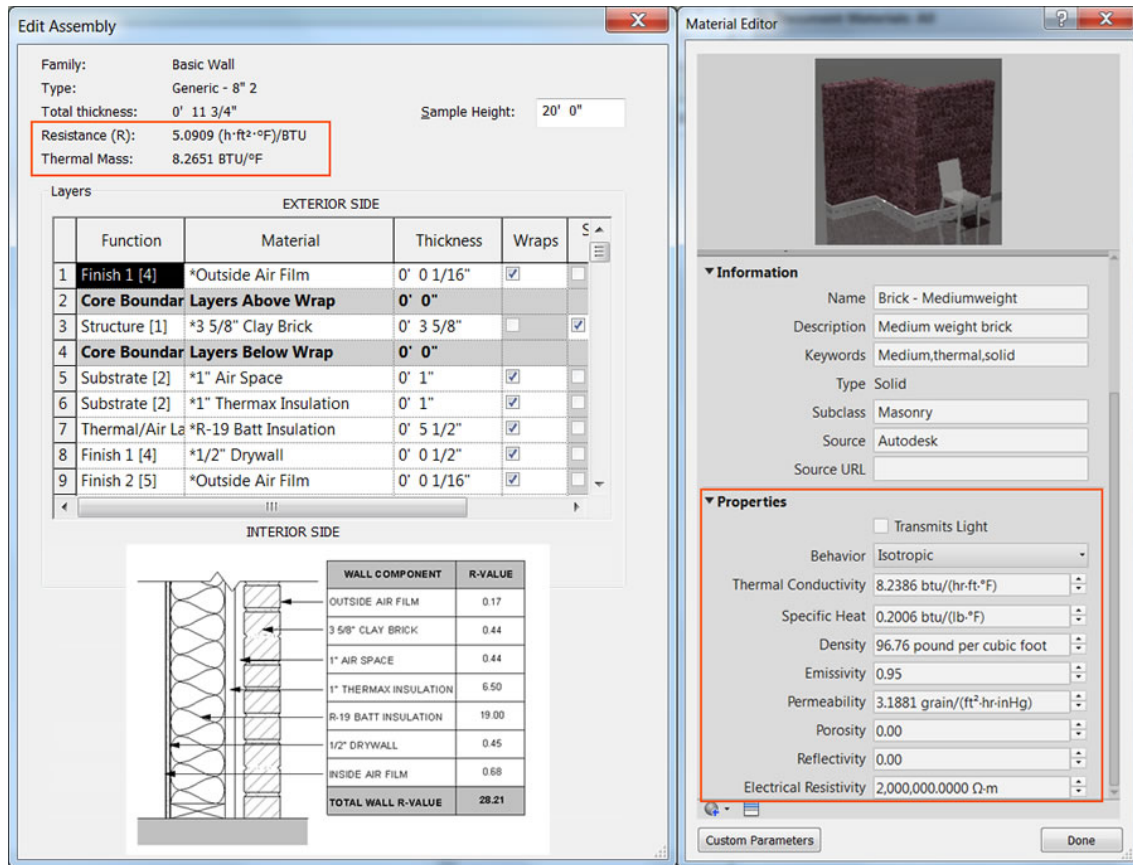


Figure 1: Autodesk Revit property edit (© Autodesk)

## Why is this exciting?

This is an enormous step up from traditional ways of modelling a building in 2D and 3D CAD systems. Instead of the computer program reasoning just based on building geometry it can reason about the actual product which is being designed. If the BIM system knows that you are modelling a window, it can ensure the right information is collected about that window and can ensure it is properly inserted into the wall that it is placed within. Additional aspects can also be considered, such as

calculating the impact of the window on lighting or heating in the space, or ensuring the cost of the specific window frame and hardware is included in the costing. The BIM system can collect information across the whole life-cycle of a building to ensure that a complete record is always available for every part of the building from design intent, conceptual design, detailed design, engineering design, construction, as built, and facility management over its whole life. Complete, consistent, up-to-date information for every aspect of the building for every project partner at all times.

### **What will it change?**

BIM is going to change almost everything in the industry over the next decade.

#### *Software*

Almost every software tool that is used in the industry will change to take advantage of the information rich environment that BIM provides. We have already seen the transition from 3D CAD products (e.g., Architectural Desktop) through to full BIM based products (e.g., ArchiCAD, Revit, etc). Alongside this, many simulation programmes (e.g., Ecotect for environmental simulations, FDS for fire, or SimTread for modelling pedestrian movement) are adapting to the richer information available from BIM to provide semi-automated simulations of building models as they evolve. Project management and facility management software tools are also starting to adapt to the existence of BIM. In the future, new software tools are likely to become available to take advantage of the data captured within a BIM model, such as automated code compliance checking. This is already used in Singapore and is being investigated by city councils in New Zealand.

#### *Information*

Significant amounts of information are being made available electronically as Internet applications expand into every discipline. So now we expect to find regulations, manufacturers' product information, certificates, etc online. With the advent of BIM, many of those information providers are working to ensure that their data are compatible with BIM tools. In the UK we have just seen the launch of their National BIM Library to publish product data in a format suitable for all major BIM tools.

#### *Processes*

Unlike the introduction of CAD, which essentially computerised the existing manual process conducted on drawing boards, the biggest positive impact of BIM occurs when existing processes change. IPD (Integrated Project Delivery) and Alliancing create more collaborative environments for design processes, and the proponents of these practices recognise that BIM is the underlying technological platform that supports this process change. BIM is all about collating and sharing information about a building, so the greatest benefit is generated when processes change to allow more professionals to access the information and to be involved in decisions made about the information. This is the message that has been pushed for almost two decades in UK reports on their construction industry (e.g., Latham and Egan reports which pushed for partnering, collaboration, integrated teams, etc to save up to 30% in time and costs on projects) and in the USA where a NIST report identified \$15.8 billion per annum in extra costs due to poor interoperability.



**Figure 2:** IPD project at Sutter Health Fairfield Medical Office Building (© Vance Fox)

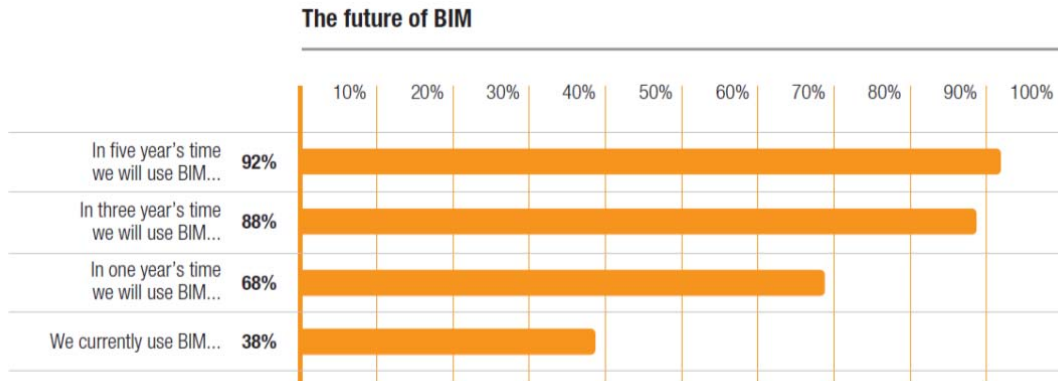
### *Education*

BIM will be an integral part of education both for new comers training for the industry and experienced practitioners already working in the industry. Tertiary institutions around the world are refocusing their attention to train professionals in the new environment that will be created by BIM. In New Zealand this is being led by Unitec with their integration of BIM into the Bachelor of Construction degree, and it is expected that other institutions will follow suit. In the USA we see groupings such as A+CA (Architecture and Construction Alliance) which are universities where architecture and construction are taught in the same faculty in an integrated manner, and where BIM is used as the technology platform to allow these disciplines to collaborate. Some countries are also getting very serious about 'retrofitting' their construction industries with BIM knowledge - the UK government, for example, has just announced that it will retrain its entire construction workforce in the use of BIM. While the New Zealand government has not shown an interest in following suit, there are many user groups to support those taking steps with BIM (e.g., Revit User Group, ArchiCAD BIM User Group, Effective Prototyping, Interoperability and Communication Group, etc).

### **Who is going to use it?**

The early adopters of BIM have tended to be the large players in each national market, as they have the resources to take risks with new technologies. However, BIM adoption has gone beyond that stage to the point where many governments are starting to demand BIM information. The UK has already mandated the use of BIM for government projects, but is also requiring BIM to be used in all projects by 2016 (and hence the need to retrain their workforce). Similarly, in the USA, the GSA (the procurement agency of the US Government) mandates the use of BIM on all projects that they let. So it is clear that many countries see a benefit from the use of BIM, not just for large companies but for the whole industry. Whether New Zealand will move to mandate the use of BIM in any segment

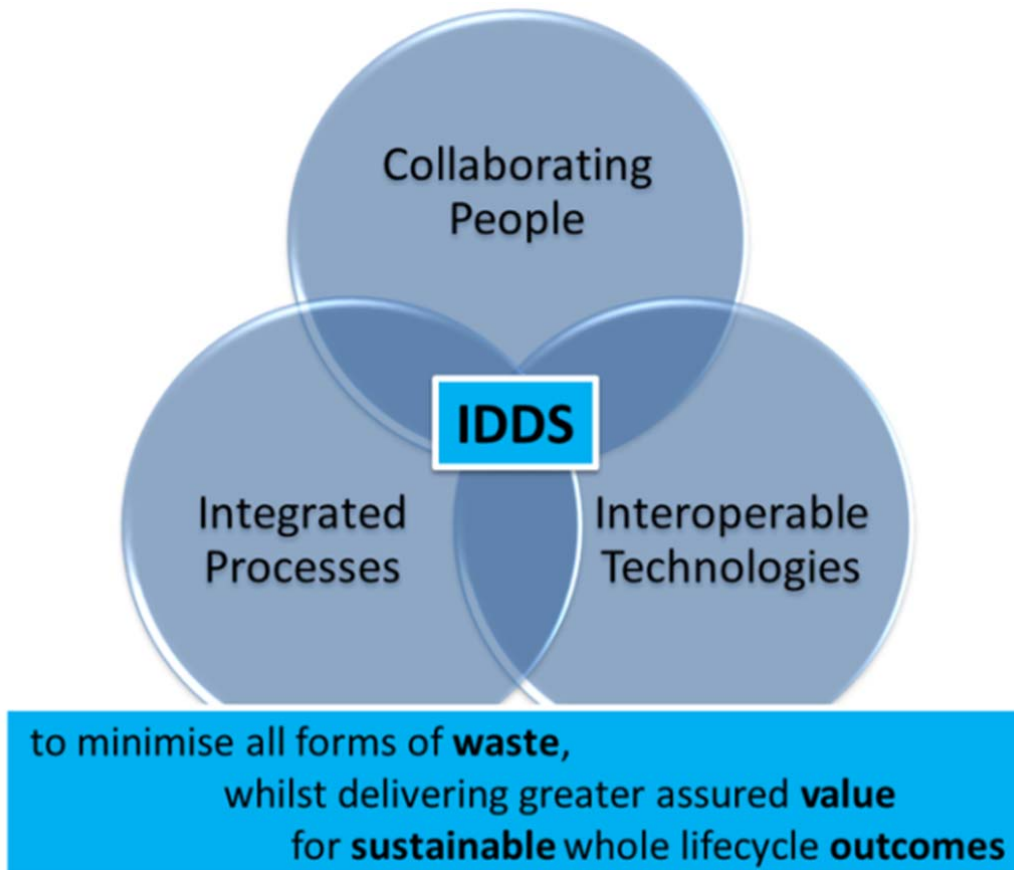
of the market is yet to be seen, but there will be incentives to use BIM for general practice with the introduction of new services which will only work for those who are BIM competent. For example, when councils introduce online code compliance checking, this will only be available for BIM models.



**Figure 3:** NZ National BIM Survey 2012 (Masterspec - Construction Information Limited)

**What will happen in the future?**

It is clear that the momentum behind BIM has crossed the tipping point and we will become a BIM dominated industry. This is going to transform the industry in many significant ways as outlined above, but is also likely to cause changes that no one has yet anticipated. What we do know is that adoption of BIM is not the end point in this transformation. The CIB (International Building Council), which represents over 500 research organisations internationally (including BRANZ who are on the CIB Council), has launched a priority theme on IDDS (Integrated Design and Delivery Solutions) to explore what is needed after BIM, and to develop research trajectories which will ensure that the benefits that BIM will deliver can be grown for decades to come. BIM is just the start of an exciting journey for this industry, and moves it squarely into a central part of the knowledge economy.



**Figure 4:** The Three IDDS Imperatives