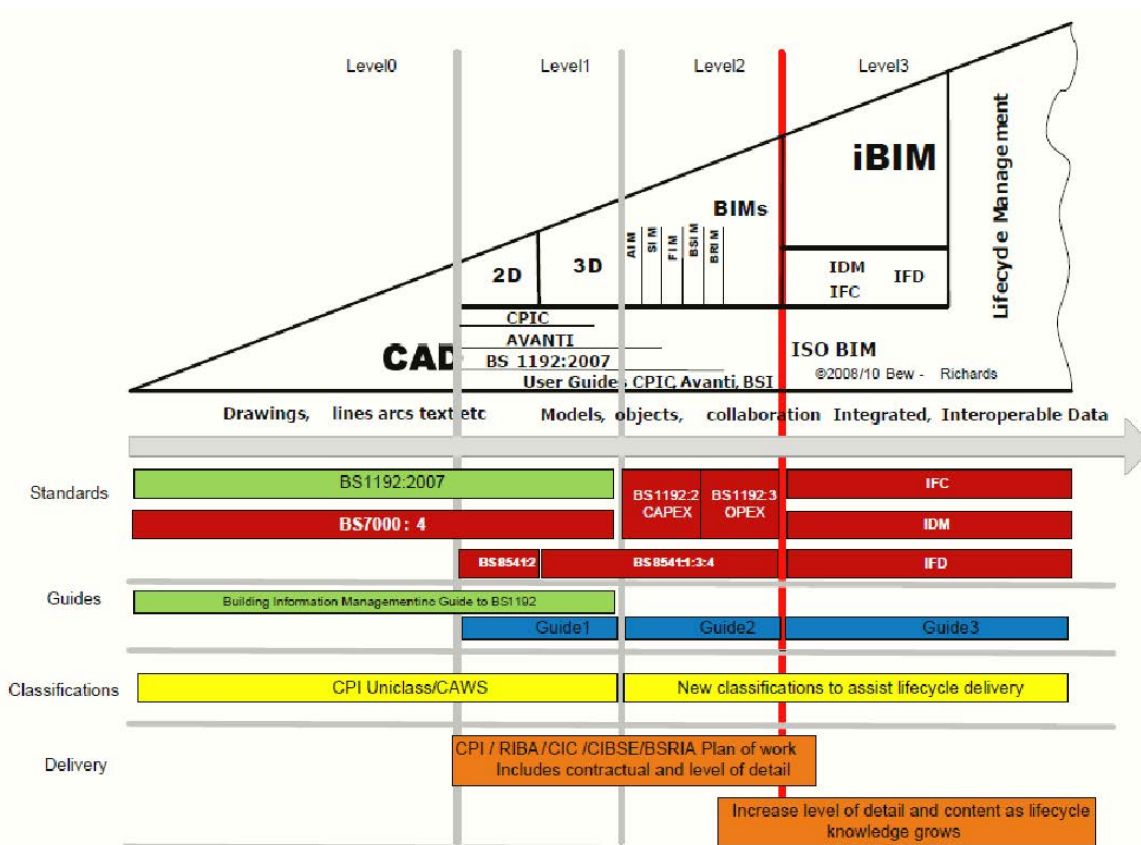


Building Information Modelling (BIM)

The digital revolution has affected every part of our lives from how we consume our entertainment, to how we communicate with other people both in our personal and professional lives. Construction is no exception, first with the arrival of CAD, and the use of tools such as SBEM or SAP to calculate compliance, now Building Information Modelling (BIM) is taking the industry by storm, fuelled by the government mandate that all publicly funded projects must employ BIM level 2 by 2016.

What is BIM?

BIM is often mistakenly thought of as a tool. In fact it is not. Various definitions of BIM exist in the industry including “an approach to being able to describe and display the information required for the design, construction and operation of constructed facilities”. BIM allows all stakeholders in a design team to collaborate and produce a detailed model and plan for the construction of a building. It facilitates the collection and organisation of a huge amount of data to drive better value and faster construction, and provides a blueprint for the long term operation and maintenance of the building. There are lots of different software platforms and tools that can be used to facilitate the process, and there are several different levels of detail and collaboration. BIM has different levels as shown below with respective standards, guides, classifications and delivery mechanisms.



Source: (BIS-BIM-strategy-Report 2011)

The purpose behind BIM is the better management of information at every stage of a building's life in order to reduce waste, drive better value, optimise performance and provide a better end product for the user. For the construction industry BIM should improve standards, enhance profitability, stream line processes, and make product information more easily accessible, inevitably leading to more satisfied customers.

The key to the successful implementation of BIM is collaboration

This means that BIM is everybody's responsibility and everybody should have input, from the designer, to building control, to the contractor, to the building owner or end user. Whether it is to highlight a particular need, tweak the design to achieve better efficiency, rationalise deliveries or order a proper programme of maintenance, BIM is about every stakeholder. Manufacturers also have a part to play; by providing product specific BIM objects, with the correct information required by designers. These data rich 'objects' must be compatible with software used by designers in the industry and manufacturers must ensure that all information is kept up to date and easily accessible. In addition to BIM objects manufacturers should make information available in Construction Operations Building information exchange (COBie) format which also provides product information and delivers the long term maintenance and facilities management plan for the building.

The Software

A number of software platforms for BIM have been developed, including Autodesk Revit, Nemetschek Vectorworks, Bentley AECOsim and Graphisoft ArchiCAD. There are also platforms that are preferred by designers for specific areas such as TEKLA for structural steelwork.

The independent Industry Foundation Classes (IFC) have also been developed, providing an industry-wide open and neutral data format which allows the information to be shared across all of these differing platforms. From March 2013, IFC became registered with ISO as an official International Standard, ISO 16739:2013. It is intended that IFC and COBie will be the backbone of BIM design, allowing the principles of collaborative working to be applied.

Both generic product types and many manufacturers' products are available as BIM objects and can be downloaded from websites such as www.bimstore.co.uk/ and www.nationalbimlibrary.com. Having actual manufacturer data helps to greatly improve levels of accuracy and optimise specification and efforts are being made to bring some standardisation to manufacturers' objects, so that there is consistency in the amount and quality of the information that is available at different stages in the design process.

The NBS Toolkit

In 2015 the NBS released the BIM Toolkit, which offers a unified classification system and simplifies the process of producing a digital plan of work (dPOW). This is the essential first stage of planning and supplying the necessary information at the beginning of a project, identifying what is required, who is doing what, and when.

Insulated Panels and BIM

Because of their composition, insulated panels lend themselves easily to the BIM format. Whether they are included as generic objects or manufacturers' objects the logistical benefits of having single components from one source instead of multiple elements is immediately apparent, as is the fast track construction that insulated panel systems allow. Manufacturers' objects also provide a wealth of data in terms of thermal and fire performance, durability, coating life expectancy, materials used in manufacture and end of life information. This information then forms part of the building manual, giving building owners and facilities managers all of the information that they need to manage, maintain and optimise the building.

The Future

According to the 2016 NBS National BIM Report, awareness of BIM has risen from 58% to 96% between 2010 and 2015, and usage has risen from 13% to 54% in the same period.

Level 2 BIM is now mandatory for all Ministry of Justice and Government projects, as of April 2016. As such, the number of users will almost certainly increase and those unwilling or unable to engage could potentially lose the opportunity to tender successfully for work. However, detailers and draftsmen of cladding and roofing who continue to use 2D CAD systems may soon have to adopt 3D software enabling full collaboration with the design team. Software providers must continue to facilitate collaboration via IFC and COBie standards which will benefit the whole industry. Parametric IFC is also a future aspiration for the industry but will certainly provide benefits particularly to insulated panels manufacturers allowing them embed "rules" within BIM objects that provide guidance to designers.

The rationale behind this mandate is that it will support at least two of the four targets set out in the 2025 Construction Strategy:

- 33% reduction in the initial cost of construction and the whole-life cost of built assets.
- 50% reduction in the overall time, from inception to completion, for new-build and refurbished assets.

From April 2016 Government projects also require project participants to adopt Government Soft Landings (GSL), which directly involves the end user.

The construction industry is now working towards Level 3 which means a 5-year preparation period (2016-2020) and a 5-year implementation period (2021-2025). By 2025, it is expected that 'Open BIM' should be utilised on all government projects.

Glossary of terms

BIM (Building Information Model): the creation of a model that represents a building or asset's physical characteristics, performance and manner of construction, together with useful information for anybody involved in designing, building and operating it.

Level 2 BIM: fully collaborative 3D BIM (with all project and asset information, documentation and data being electronic).

Industry Foundation Classes (IFC): an industry-wide open and neutral data format which allows the information to be shared across different platforms.

COBie (Construction Operations Building information exchange): provides a common structure for the exchange of information about buildings and infrastructure, both new and existing facilities.

PAS 1192-2:2013 and PAS 1192-3:2014: standards defining commonly agreed and adopted work stages for the building or asset.

Security PAS 1192-5 (to be published summer 2015): specifying a security-minded approach to be applied to all processes and tools used by the employer and the whole of their supply chain.

Digital Plan of Work (dPoW): Who does what, when, and to which level of detail.

Government Soft Landings (GSL): a client focused policy to ensure that the end result is fit for the client's purpose and that they have been involved in the collaborative construction process from the outset.

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Whilst every attempt has been made to verify the guidance given, it should not be regarded as definitive. Because individual manufacturers' products vary, the performance should always be confirmed with them.