



Date: 03/02/2025
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E-BOOK

Revit for Project Delivery





OVERVIEW

This e-book is an extract from the Project workshop – A BIM project delivered in Revit book published on Amazon.

The purpose is to highlight some aspects of BIM and its practical use as an e-book.



Introduction

This book is aiming to introduce the concept of BIM and some practical elements to the planning and management of BIM and/or 3D collaboration projects.

This is not an “off-the-shelf” technical book that cover every aspect of “BIM”.

It rather focusing on some of the essential knowledge that is important in the professional environment to prepare a project and help the project team to contribute to the discussions on BIM and 3D coordination.

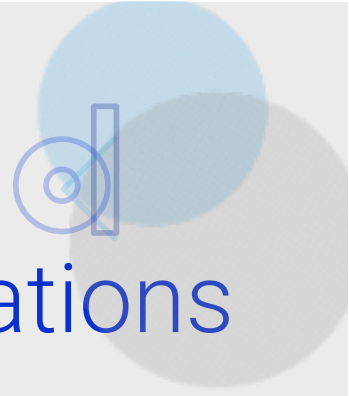
The e-book is centred around a Revit project, but the principles of the BIM process applies to any software. To be practically applicable, the book require that the reader think and reason about the project as one would do on a real live project.

We need to understand what is required of us as a designer, what the deliverables are and how we will produce and deliver the information.



“Inspired to progress, in the best way possible. By driving the innovation of technology, process, and service to unify an industry. To communicate and collaborate to be the best we can be.” – Jimi Clarke

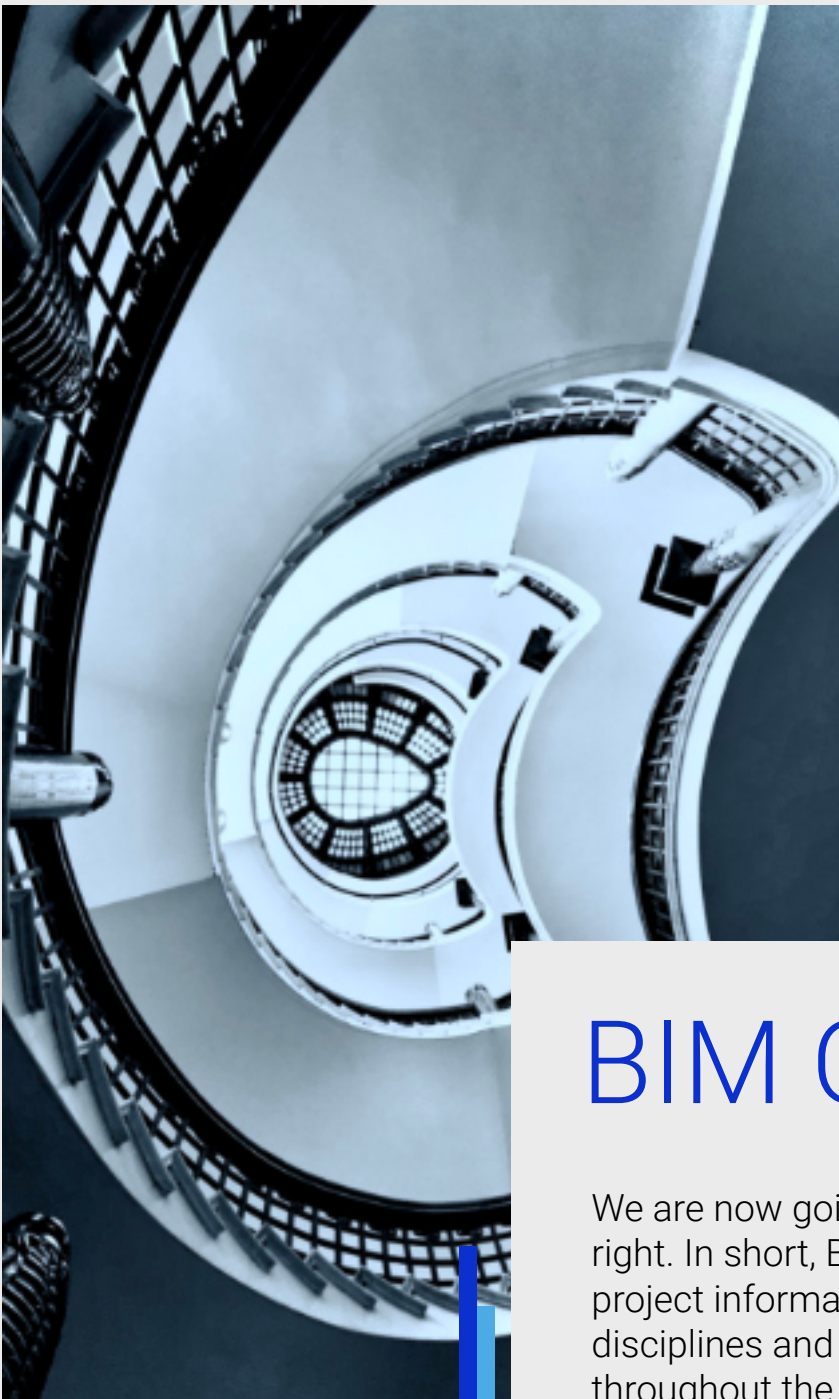




Common Terms & Abbreviations

- **BEP** - BIM Execution Plan
- **BIM** - Building Information Modelling
- **BS** - British Standard
- **CDE** - Common Data Environment
- **COBie** - Construction Operations Building Information Exchange
- **EIR** - Employer's Information Requirements or Exchange Information Requirements
- **ISO** - International Standards Organization
- **LOD** - Level of Detail (Geometry)
- **LOI** - Level of Information (Data in schedules)
- **LOMD** - Level of Model Definition (LOD+ LOI)
- **MIDP** - Master Information Delivery Plan
- **RM** - Responsibility Matrix Setting out responsibility for model or information production in line with defined project stages.
- **PAS** - Publicly Available Specification
- **PIM** - Project Information Model: a complete dataset of the project federated from individual discipline models and data
- **PIP** - Project Implementation Plan
- **PQQ** - Pre-Qualification Questionnaire
- **SMP** - Standard Methods and Procedures
- **TIDP** - Task Information Delivery Plan
- **WIP** - Work In Progress: information that has not yet been validated or issued.
- **4D** - A deliverable or model developed with time- or schedule-related information.
- **5D** - A deliverable or model developed with cost-related information





BIM Overview

We are now going to look at BIM to get the concept right. In short, BIM is a process we adapt to create project information that is relevant to different project disciplines and stakeholders at specific times throughout the project stages.

It is important to remember that the software e.g. Revit, does not make it "BIM". i.e. Revit is not BIM. Revit is a tool used in the BIM process to produce the information that the contractors and client need to build and manage the building.

So, what is the process? We will look at this from the point of view, that you are looking to work as an Architect and need to fit in to a team that work on a BIM project. You need to have the understanding and ability to hold basic conversations about the Revit work environment, the development of the project using Revit and the BIM process and how its adapted on the project.



BIM Overview - Continued

THIS RELATES TO HOW WE ARE

- Planning, resourcing, and setting up a project
- Implementing Revit. i.e. how it is setup, customised and configured on the network and individual users' computers
- Naming files
- Coordinating 2D and 3D models with other disciplines using real world coordinates
- Organizing our CAD system (the good old CAD Standards that we all hear about but never really read)
- Checking the data that we produce, so it is correct
- Sharing this data with other disciplines

Note: This book does not train you to take on a BIM coordination or BIM Management role. Initially we need to understand the process (and standards) we are using in our own practice.



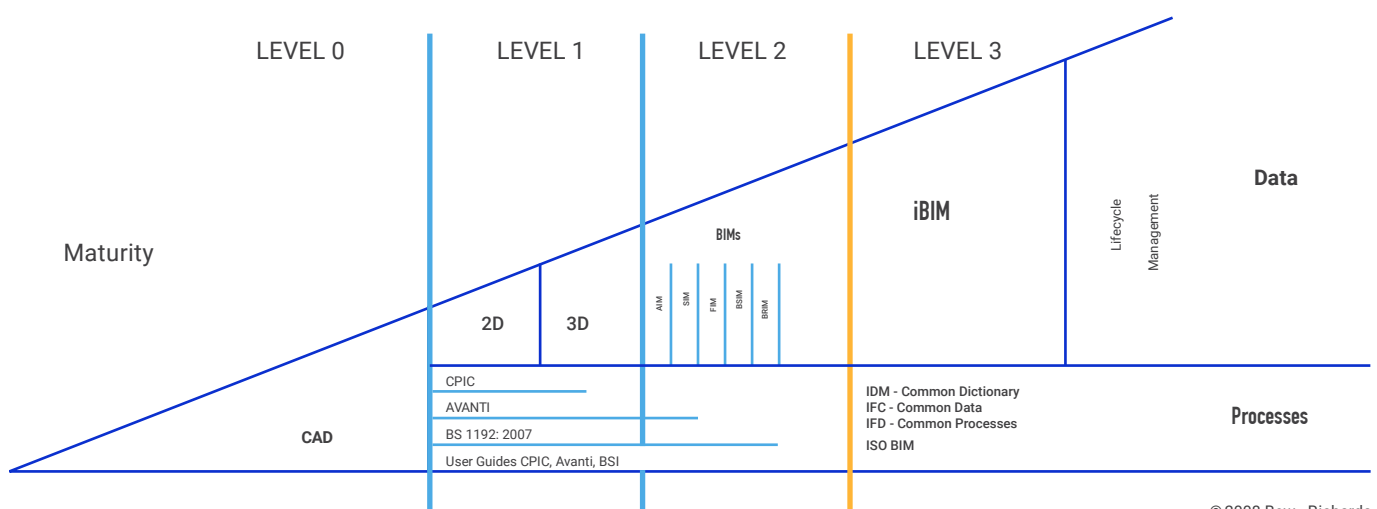
BIM Overview - Continued

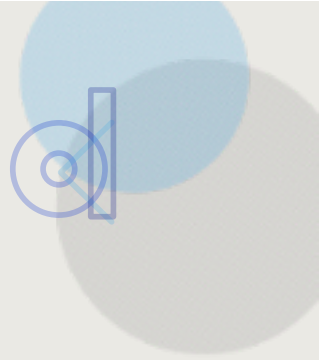
How we are collaborating, communicating, coordinating and sharing information is documented in a British Standard called BS1192 and should be reflected in the practice BIM/CAD Manual. What this mean in practice is:

- When you create a new model file in 2D and/or 3D (could be sketch-up or Revit). You must name the file following a specific naming convention.
- Your Technical support team/person must setup your project in a way that your model file carries the correct real-world coordinates for the project.
- When you model your building, you must use the correct colours, line types, line patterns, line weights (Object Styles in Revit), annotations etc. i.e. follow the CAD Standards.
- You and the project team must check so that the information that you have produced meet the requirements for the next issue and you must send it, on time, to the correct person who expect your information using an agreed method. E.g. a cloud service provider

Achieving this in the practice is called to be BIM Level 1 Compliant.

The image blow is a version of a “BIM Maturity Graph” it illustrates what’s been mentioned above and it is very likely that you have or will see a version of this graph in a practice BIM/CAD standards Manual





BIM Overview - Continued

After we have ensured that the practice have the required standards and processes in place. We need to look at how the wider project teams can work together. Hopefully, each practice has these BS1192 and CAD/BIM standards in place. But there are other documentations and processes that are established to help the teams deliver required information to the relevant people and the agreed time.

The first document we need to be aware of is called an EIR (Employers Information Requirements or Exchange Information Requirements) This is a document that should be issued by the Client, outlining what the desired standards, processes and deliverables are. The client should base this EIR on the Business objectives and Business Plan for the project in question.

Following the issue of the EIR. A BEP (BIM Execution Plan) is being developed. This document once completed and agreed on is referred to as a Project BEP or a Post Contract BEP. Will serve as the guide and plan for how the different teams will work together, what information will be produced by whom and when and how the information will be used.

It also includes the roles and responsibilities and contact details for individuals for each team. For example, the IM or Information Manager is a specific role that must be assigned on any BIM Project and the whole project team must be able to contact the IM.

This helps in spreading out the many tasks and roles that are needed on a larger construction project and enable better communication and faster resolution to problems that may occur.





BIM Overview

- Continued

One of the more important things to consider on a day to day basis as you are working in Revit is, what information will be produced. This is referred to as LOMD (Level of Model Definition) and is detailed in a document called Responsibility Matrix.

The Responsibility Matrix outline what specific elements and associated data a discipline will produce e.g. a Door and Fire rating. The LOD (Level of Detail or Graphical information) will be e.g. LOD4 at Stage 4. Meaning that the Door in the 3D model can be used for creating for example 1:20 detail drawings.

The Responsibility Matrix also outline the LOI (Level of Information or Data carried by the elements). E.g. The LOI for Stage 4 will be LOI 4. Meaning that the Door should contain information on for example Cost, Manufacturer, Ironmongery, Fire Rating, Classification etc. The definition of the LOD and LOI for different project stages can be found in the BEP and make up the LOMD.



BIM Overview - Continued

If a project can achieve these Standards, Processes, Role and Responsibility distribution, the project is BIM Level 2 Compliant.

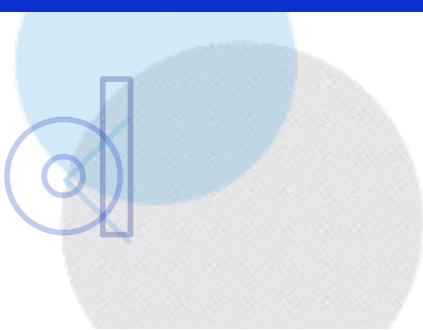
This standard of BIM Level 2 is now realized in the ISO19650 and apply as an international BIM standard. Chances are that the term “BIM Level 2” will be used in parallel with using “ISO19650” as a term for the foreseeable future and you should know that for the project design team, it means pretty much the same thing.

What the ISO19650 aim to do is to put the developers/clients in the driver seat to take ownership of the project (BIM) process and not leaving it to the design teams, as what the norm has been since April 2016 when the BIM Level 2 became a required UK industry standard.



Why is it important that the developer take ownership? Because the project must meet specific business aims and objectives for the client and it is only logical for a business owner to manage their own business processes.

NOTE: BIM is from the developer's point of view a Business Information Management process. For the designer BIM is Building Information Modelling (you build the information that the client need) and for the contractor BIM is Better Information Management (I.e. they need good information to manage the construction process)

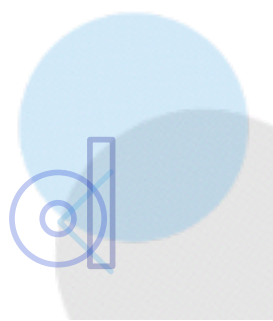


BIM Overview - Continued

By specifying early what the standards and processes are for the project. The developer can then manage the project and the business with the help of KPIs to measure and monitor the direction and success of the project throughout the project stages. In the end, if business goals and objectives are met, it can be concluded that BIM was achieved. So, in the onset of a project we should not think of BIM as something “we do”. What we do is deliver projects using standard methods and procedures with the help of technology and support. The result tells us if we achieved the goals and the “BIM”, or whatever BIM means for each stakeholder.

BIM Level 3 – The term no longer exists, and the concept of what BIM Level 3 should have been was never realized. The industry, ideas and developments have moved on. So, BIM Level 3 now only exist as legacy information in existing documents and so forth to illustrate what the theory once was back in the day. Pay no more attention to the term BIM Level 3.

However, the BIM process and technical innovations are moving forward and an understanding of BIM 2 and/or ISO19650 is vital. If you can keep the concept of BIM in your mind (as explained in this book) while you are working in Revit, you will be a real asset to any project team.



PROJECT PLANNING

Before we carry on setting up and developing our project. We need to ask a few questions. Collaborating and delivering projects in 3D that also meet specific requirements is not easy to get right! Theoretically, sure, it seems fairly easy. But practically, it is very difficult and requires dedicated roles and time.

Before every project starts. A project kick-off meeting should be held asking the following:

INITIAL QUESTIONS

Is this a BIM Project?

Is there an EIR or a formal request that the project should be BIM?

If not, the project is a Revit (3D) collaboration project.

Project number and name

Project Address

Design intent

Project Stage dates

Stage deliverables (is there a RM?)

Survey with OS grid availability

Is there an existing Project Origin?

Software use (versions and output formats)?

Project Team (name contact and experience)

Training Requirements

Does the Project Folder Structure exist already?

Is there any current work that is about to be issued that needs completing before the team is available for training and project setup process can be initiated?



PROJECT PLANNING

INITIAL TASKS UP TO THE FIRST DEADLINE

1. Archive all models that are not required for the next stage
2. Request existing H&S / Risk assessment, Fire & structural safety information from the client
3. Request / Acquire required surveys
4. Setup the Project Coordinates and Project Template
5. Setup and initiate the Project Coordination Testing
5. Training/Workshop booking
6. Pre-Appointment BEP setup
7. Consult the H&S representative for the completion of the CDM Checklist
8. Issue BIM capability assessment to the supply chain. And to request H&S information as per BSI_PAS_1192_6_2018.pdf Section 6.7 Strategy for the supply chain
9. AOB

Once we have the relevant information before the team starts to model, the project should be setup and tested and the project team trained.






Validation



Once we have some project information (LOMD) and before we send the information out. E.g. Drawing Sheets and the Model itself, we need to make sure that the model is fit for its purpose and we need to run through the Validation process.

Below is a proposed validation checklist. But, take some time to look over the section on BIM again and look at what your role on the project is and what you have agreed to deliver. The validation check should be there to help you make sure that you deliver what you have agreed to deliver.

Make a list of the things you think should be checked before you send off your model to (for example) other design teams. This will serve as your Validation check list. Having a defined Validation checklist and process in place is vital for successful team collaboration, BIM or not. The BEP should contain the critical points all teams should check before every issue. What would you check before you issue your model?



Validation



VALIDATION CHECKLIST

1. Project Coordinates
2. Naming convention
3. Do you have suitable LOMD (Alphanumeric and Geometric) in the Model?
4. Are there any geometry scattered in the model? Type ZE on the keyboard and check if there are any geometry far away from the building.
5. Is the modelling correct? i.e. are Walls, Floors, Ceilings, Doors, Stairs etc. forming a functional building? If, for example, there is a large gap between the Floor and external wall, and it is not part of the design, you have found an issue that must be resolved before the model is used for any output or shared with any other discipline.
6. Add your own validation points

This is your project and you should be aware of critical issues that need to be checked to ensure that the other disciplines can trust the information that you send out to them.

You should also know that the Validation process is not only important for the information that you send out. It is also very important for the information that is sent to you. The validation List that you have should be applied to the information that you receive.



Summary

When working on any collaboration project in 2D or 3D it is expected that we deliver information like drawings in a professional and usable condition for the project build.

However, when we add more complexity to the project, such as 3D geo-coordination and Facilities Management requirements, we need to adapt to new ways of working and collaborating as the project deliverables include more data that is produced using specialist technology. And, additional specialist management roles are required to make sure that the client's business aims, and objectives are satisfied.

We can achieve the client's (and our own) business aims and objectives by ensuring that we have a good understanding of how the processes work, and how we implement, configure, and utilise the technology to its full potential. We call it "BIM" as a broad term to specify that certain expectations of the project stakeholders are required.

However, it is up to us, who work on the projects, to apply the collaboration processes and technology in a practical way to deliver. If we have our resources setup to meet our own individual requirements as a cog in the machine, we can be better at contributing to the overall goal and successfully deliver projects achieving our own role definition of BIM.