

Building Information Modeling (BIM)

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1. Introduction

- **BIM:** a digital process for creating and managing intelligent 3D models of a building's physical and functional characteristics.
- It serves as a shared knowledge resource across the project lifecycle, from design to demolition.

2. Key Concepts

- **Parametric objects:** model elements carry data (dimensions, materials, cost) and update relationally when changed.
- **Single source of truth:** all disciplines work from a coordinated, centralised model.
- **Dimensions:** 3D (geometry), 4D (time/scheduling), 5D (cost), 6D (sustainability), 7D (facility management).

3. Benefits

- Improves coordination and clash detection between architectural, structural and MEP systems.
- Reduces errors, rework, waste and cost overruns through early visualisation.
- Enhances collaboration and information exchange among project teams.

4. Standards and Tools

- **IFC:** Industry Foundation Classes, an open, vendor-neutral data format for interoperability.
- **Levels of Development (LOD):** define the detail and reliability of model elements at each stage.
- Common software includes Revit, ArchiCAD and Navisworks.

5. Applications and Challenges

- Used for design, construction sequencing, quantity take-off and ongoing facilities management.
- Adoption requires training, software investment and collaborative workflows.
- Data ownership, interoperability and standardisation remain ongoing concerns.