BIM AND IFC THROUGH BUILDING LIFE CYCLE

Best practices and case studies

Keywords: BIM, IFC, building life cycle

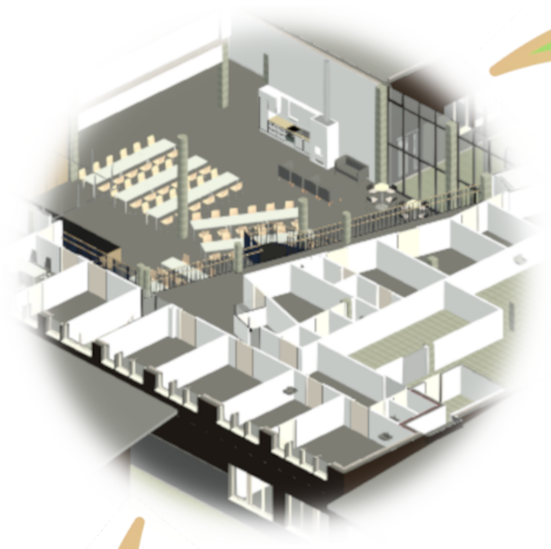
The concept of BIM (Building Information Modeling) has existed since 1970s. In early 2000 BIM started to form into what it is today. Only in fairly recent years has it become a common and widely used tool in construction.

The IFC (Industry Foundation Classes) data model is a way to describe architectural, building and construction industry data. It is a platform neutral and open file format used to exchange information between project teams.

BIM is a helpful tool to coordinate the design and construction of a building. With the help of IFC files, which are like complex PDF files in 3D, the collaboration between project teams is easier than with traditional methods. However, the use of BIM and IFC can decrease drastically after the building is finished. It is not always time or cost efficient to upkeep BIM throughout the building's life cycle and they can also be a burden if used when they are not really needed.

1. PLANNING AND CONSTRUCTION PHASES

All construction projects benefit from BIM and IFC. Cost efficiency, coordination, various simulations and building usability are some key points that can be reviewed with BIM and IFC.



2a. OPERATION PHASE, SIMPLE BUILDING

With simpler and smaller buildings, full BIM is not always necessary. Documentation is comprehensive but basic (2D DWG, PDF...). Changes are minor and infrequent, usually only maintenance and repair.

3. END OF LIFE

At the end of buildings life cycle BIM has all the information needed for efficient recycling and reuse of materials and equipments. The process should be planned well beforehand to prevent the need for costly storage of structural elements and other parts.

At end of life, BIM is also useful for evaluating the financial and technical efficiency of various decisions made during building life cycle.

2b. OPERATION PHASE, COMPLEX BUILDING

Complex buidings, like large office buildings and shopping malls, benefit from BIM and IFC in operation phase. With a detailed and comprehensive BIM model, even a full digital twin is possible. It enables up-to-date information on the building and its properties at any given moment.

In some cases it is necessary to maintain an updated BIM. Such cases include industrial complexes and other buildings that change frequently and where the building itself is an integral part of the operation of the property.

If the best option is to use BIM through the life cycle of the building, there are still several factors to consider; who will update the BIM, when it will be updated, what tools are used, where the BIM is stored etc. BIM is a software-based solution and softwares used in generating BIMs can change yearly. It is not guaranteed that the BIM generated today will be valid in five years. In addition to the software, also BIM requirements change as the technology evolves.

BIM has undeniable benefits when constructing a building, with Smart Cities and Digital Twins and in specific scenarios where it is useful throughout the facility operation. It also has uses when eventually deconstructing the building. If the BIM is updated properly, all the materials and the equipment the building contains are available through BIM. BIM can be used to visualize the deconstruction process, identify recoverable materials and analyze the performance of the building for future reference, among other things.

As BIM is usually used to reflect the current state of the building, IFC can be used as a snapshot tool to record the changes through the life cycle of a building. IFC snapshots can be a useful tool when evaluating the cost and efficiency of various changes to the building. With energy simulation software, IFCs can be used to simulate how a change would affect the energy consumption of a building.

Jari Kuusisto
Karelia University of Applied Sciences
jari.kuusisto@karelia.fi

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