WHITEPAPER

Getting the Right Amount of Model Data for Facilities Management

Building information models (BIMs) can be an excellent source of information for facility managers. However, this is only possible if organizations clearly define upfront what facilities management-related data should be included in the BIM and how that information will be communicated to relevant information systems. Defining BIM standards is a great first step for importing data into facilities management systems.

Why Do Owners Need a BIM Standard (and How to Create One)?

Before organizations consider how to import BIM data into their facilities management systems, it is helpful to first develop a BIM standard or guideline which will support this work. A BIM standard, often referred to as a BIM Project Execution Plan (PxP) in the AEC community, is a document that all stakeholders adhere to during a project, starting from the initial planning stages and ending with the data to be imported from the model into facilities management systems. When teams establish a BIM standard upfront, the modeling process and handoffs between groups go more smoothly.

Collaboration among key stakeholders is essential when creating a BIM standard. Each group of constituents, ranging from architects to construction professionals and building owners, may have its own requirements for the model. Currently, most AEC firms create their own standard. However, that standard usually doesn't always entirely align with what owners need from the building information model to manage the facility after construction. That is why it is important for all stakeholders to convey their expectations for the model from the start and capture them in a BIM standard. Although standards may differ from project to project, they should be consistent between projects within a single building owner organization.

When creating a BIM standard, there are three key questions that must be answered:

1. **What data do you need?** The first step is for organizations to determine what information should be included in the model. As part of this process, it can be helpful to determine who will use different pieces of information. This prevents models that are overloaded with information that no one will use.

2. **How will you collect it?** Once the team has identified the information that will be included in the model, they must explore where the data is located. Since building information models capture many different types of data, it is possible that the information will reside in several systems or electronic documents.

3. **How will it be kept up-to-date?** As noted above, the data in a BIM may come from a variety of systems or documents. Teams must determine how to keep the model up-to-date, since the source systems and documents serve as the "system of record" for the information. As information changes and is updated in the system of record, a mechanism must exist to update the BIM.

Examples of BIM Standards

Every BIM standard is unique and tailored to the team's needs. Here are a few examples of BIM standards which illustrate the approaches taken by different groups.

- **The National BIM Standard – United States.** The National BIM Standard – United States offers consensus-based standards. The goal with open BIM standards like this one is to build models and deliver facilities that will deliver high performance throughout their lives.

- **Indiana University BIM Guidelines and Standards.** Indiana University requires all consultants and contractors on capital projects over $5 million to conform to its BIM standards.

- **U.S. Veterans Administration BIM Standard.** The U.S. Veterans Administration has adopted BIM to support better healthcare for American veterans. Building information models are used to deliver higher quality facilities more rapidly. BIM is also used to maximize building performance after the construction phase is complete.

COBie: What Is It and Why Should Owners Care?

As building owners embark on importing BIM data into their facilities management systems, the topics of COBie and IFC often arise. Sometimes there is confusion about the differences between the COBie and IFC. Below is basic information about how COBie and IFC are defined and how they differ from one another:

- **IFC (Industry Foundation Classes).** Industry Foundation Classes are a data standard that defines objects and their associated properties. For example, IFC contains what a door is and what properties it has. IFC provides an open and neutral data format that supports interoperability between information systems. This simplifies sharing of data. Since IFC supports definitions for 800 objects and 12,0000 properties, it is rare that project teams need all of them. In response, organizations have created "model view definitions" which contain a subset of IFC information.

- **COBie.** COBie is an IFC model view definition that supports facilities management. As a result, it focuses on the subset of IFC information that is most relevant for the ongoing operation and management of a building. The goal of COBie is to provide an information exchange specification for the lifecycle capture and electronic delivery of information needed by facilities managers.

COBie identifies the facilities management-related content that must be captured and exchanged electronically at each phase of a project. Throughout the building lifecycle, data is generated that can be useful for facilities managers. For example:

- Designers provide the space layout, system list, equipment types, and equipment locations.

- Builders add information about the equipment make, model, and serial number. They also provide manufacturer literature, warranty, and replacement part information.

- Commissioning agents provide the job plan data with associated tools, training, and equipment requirements.

COBie also addresses the information exchange requirements for data. Electronic data exchange is an essential part of the building lifecycle, as projects transition from design to construction to owners. Clear information exchange requirements eliminate the need for facility operators to manually enter data into their information systems. For all these reasons, it can be helpful to integrate COBie into BIM standards. It should be noted, however, that COBie is definitely not a prerequisite for BIM. Organizations can develop their own BIM standards without COBie.

How Much Data is Too Much? What's in BIM and What Do I Need in the Facilities Management System?

While IFC and COBie provide standards and guidelines, most facility management systems only need a very small subset of these data standards. Furthermore, standards will be unique to each owner incorporating data elements that support their processes, procedures and IT systems. Three key questions that are used to create a BIM standard are also helpful when determining how to leverage BIM information in facilities management systems.

1. **What data do you need? (who will use it?)** Building engineers, space planners, and other facility management professionals may utilize data from BIM in facilities management systems. To identify what's needed, it's often productive to engage in an iterative process with stakeholders. Ask them what they must know today, what they would like to know tomorrow, and what they would want to know if the sky was the limit. The results of these conversations will identify what data is needed and can support development of a roadmap. It's important to remember that more detailed information is often more expensive to obtain. Organizations should consider upfront how much money they want to invest in developing data to support facilities management activities.

2. **How will you collect it? (where does the data live?)** As noted earlier, facilities management-related BIM data may be stored in other electronic documents and systems, such as equipment maintenance manuals, systems that
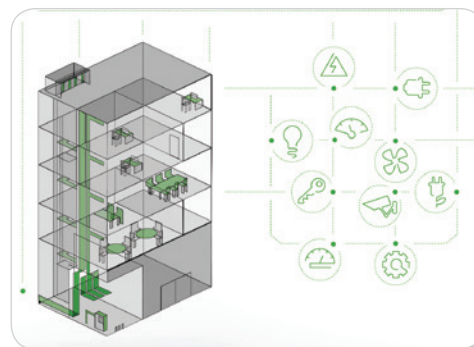
control and manage equipment, construction commissioning checklists, or cloud-based applications like BIM 360 Field that contain relevant data that's not captured in a Revit model. To migrate data, those documents and systems must be integrated. Teams should be aware that the BIM data requirements for facilities management must be defined before architects and engineers create the models. Architects and engineers need to know how far to push the envelope with regard to the level of development of components in the model. The standard level of development of the data may not be detailed enough for facilities management purposes. For facilities management, it's important to distinguish between the detail associated with data and the detail associated with geometric aspects of the building. In many cases, the geometric detail can be minimal, but the data often needs to contain a higher level of detail. For example, facilities managers will need adequate information in the model about chiller parts to support ongoing building operations.

3. **How will it be kept up-to-date? (what is the system(s) of record?)** When building information models are used for facilities management, it is essential that the data is kept up to date. Transferring data into facilities management systems once may not be enough. If organizations can't commit to keeping model information current, then there is no value in collecting it. If the facilities management system is not the "system of record" where BIM information is maintained, then ongoing updates between the facilities management systems and the source systems will be needed to keep data current.

Integrating BIM and Facilities Management: Where the Rubber Meets the Road

IMAGINiT Technologies has extensive experience working with clients as they integrate BIM with their facilities management infrastructures. Here are a couple of tools that we've found helpful for importing BIM data into facilities management systems:

■ **ARCHIBUS Smart Client Extension for Revit.** This application provides the mechanism to capture information (either graphics or data) from BIM which can be used by ARCHIBUS for lifecycle management of real estate, infrastructure, and facilities management. The Smart Client for Revit supports alignment of fields in different systems, bi-directional data interchange, identification of systems of record for data maintenance, and leveraging BIM standards. Organizations can synchronize COBie information automatically with design and facility management activities in real-time, without human interventions. Rules are configurable, so they match the organization's BIM Execution Plan / BIM Standards.

■ **ARCHIBUS Web Central 3D Navigator.** This tool makes facilities management data easier to visualize, navigate, and locate through a 3D interface. This tool incorporates building information models and data directly into the larger ARCHIBUS Integrated Workplace Management System (IWMS). By connecting models to ARCHIBUS, facilities management teams gain easy access to information that can be used for maintenance, condition assessment, project management, compliance, emergency preparedness, and more.

Conclusion

By starting the conversation early about the data needed for facilities management, building owners can make the most of their building information models. Adopting best practices related to BIM standards and integration with facilities management systems is a proven way to derive the greatest performance from buildings throughout their lifecycle.

About IMAGINiT Technologies

IMAGINiT Technologies, a Rand Worldwide Company, is a leading provider of enterprise solutions to the engineering community, including the building, manufacturing, civil and mapping industries. With over 25 years of experience, and over 40 offices throughout North America, we provide the expertise, training and support to help companies realize the full power of design technology, maximize ROI and gain competitive advantage.

IMAGINiT is a leading provider of Autodesk software solutions and the largest North American Autodesk Authorized Training Center (ATC) partner. All of our locations are supported by a vast pool of engineering resources focused on developing real-life business solutions for their local clients.

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