First Steps to Successful Deployment of BIM for Healthcare Operations

Building information modeling (BIM) has strong potential for transforming the way that highly complex healthcare buildings are designed and delivered. Designers and contractors have found that using BIM can greatly reduce common errors that may not otherwise be discovered until components arrive onsite, resulting in improved scheduling and lower costs.

Similar benefits exist in applying BIM for the operation of buildings, particularly buildings as complex as today's medical facilities. Yet few healthcare organizations today understand how to begin harnessing the potential operational improvements that can come from having BIM data at their fingertips.

Much of the data needed for operations and maintenance (O&M) processes already exists in the BIM models turned over following construction, or could easily be included in these models with some advance planning. This data can be used in a multitude of ways—and that poses the first problem for many healthcare facility managers. As we explained in the first paper in this series, many healthcare facility managers are overwhelmed by the potential that BIM data holds and are unsure of where to begin applying this data to operational and maintenance processes.

"The application of BIM in facility management has been a conundrum for many FMs since many are not sure where to start or what would be best to require in the initial phases of a project. But that upfront knowledge is critical for FMs, as it enables them to get the most benefit for operations following turnover," points out Kathy Roper, a member of the HCI board of directors and recently retired Associate Professor and Chair Facility Management at Georgia Institute of Technology.

Roper adds, "Unfortunately, most architects, designers, engineers and constructors do not know exactly how operations will be impacted by their input, so participation of the FM in the early design phase is critical to realize the best outcomes."

So where do you start?

Three Questions to Ask to Plan Your BIM Implementation

The challenge many FMs face is organizing the overwhelming onslaught of data available through BIM. Much of the BIM data handed over by the construction team following commissioning might be completely irrelevant to facility management professionals. In addition, some of the data that could boost operations might not be necessary for design and construction so that data may not be included in the model. Often, that data could easily be entered during those phases—if only the FM was involved early in the planning, design and construction (PDC) cycle.

As a result, the time to start thinking about BIM in operations should be well before a new facility is up and running or plans for a renovation reach the drawing board. In fact, the most effective way to integrate BIM in healthcare O&M is by planning for facility management as early as possible in the PDC cycle.

Identifying during planning the information needed for operations will take long-range planning. But Chuck Mies, senior manager, AEC business development, for Autodesk Inc. in San Rafael, Calif., and a member of BIM for Healthcare Owners, notes in his white paper Preparing for post

occupancy BIM: Three questions owners should be asking, that this can easily be identified by asking three simple questions:

1. Who will be using the data?

2. What data needs to be captured?

3. How is that data going to be maintained?

Let's explore these more closely.

Identify Who Will Use the Data

To understand what data will be relevant for O&M, it's important to involve the people who will be using that data. Today, BIM data is most commonly used in healthcare facility management for two purposes: preventive maintenance and inventory. As a result, users will largely include maintenance technicians. However, depending on the health system's goals, users may also include:

- Subsets of maintenance technicians, including HVAC technicians, plumbing technicians, mechanical technicians, infection control technicians, or medical equipment technicians.
- Space planners.
- BIM/CAD technicians.
- HR/accounting.
- Move managers.
- Lease administrators.
- Sustainability managers.
- Facility manager and other internal staff.
- Outside AEC professionals/contractors.

If the possibilities seem limitless, a good place to start is by talking to your operations team. Discuss their responsibilities, why they might need data, how they could use that data, and what systems and tools they use. Consider, too, the problems they typically encounter and explore how easier access to information might help solve these problems. Once you understand the needs of the people who will use the data, work with these professionals to determine what data they will need.

By working with facilities stakeholders to create a plan for who will capture data and how it will be moved downstream, work processes can be put in place to can transfer data into facilities systems even before building occupancy.

Determining What Data to Capture

The next step is to identify what information should be collected in the model for use in O&M. This may be simpler than expected. In fact, the BIM in FM Consortium, a group of BIM facility management users working in partnership with FM:Systems and Georgia Institute of Technology to understand issues around BIM, found only six attributes to be of major importance for using BIM in facility management.

Leaders of the BIM in FM Consortium surveyed facility management leaders using BIM across several industries, with 25 percent of these respondents coming from the healthcare industry.

The Consortium notes in its paper, BIM for Facility Management, Version 2, that survey respondents' backgrounds predominantly in CAD/CAFM predisposed many of them to gather as many data points as possible.

However, the survey revealed six attributes to be among the most common data sets gathered. These attributes are: asset ID, manufacturer, model and serial numbers, asset type, and installation date.

While these six attributes present a strong place to start, to best determine the data that works for you, managers should ensure that BIM end-users are involved early in the design process. Depending on a facility's specific goals, the data might range beyond these attributes to include, for example, square footages, finishes and more.

John Muhler, architect handling campus planning and design for Mayo Clinic, notes that the health system has begun its move to BIM by focusing on easily available data. "Our first phase in moving to Revit is to reproduce any document in Revit that we had to have produced in CAD in order to move fully from CAD" he says.

It marks a simple place to start since the information is already being captured. But with this shift to BIM, this data can now be applied by the O&M team in a variety of ways. The O&M team is exploring the usefulness of accessing zoning maps for air handling units to manage servicing, and electrical maps highlighting receptacles, lighting and electrical panels.

The Ohio State University has been exploring how BIM can be used to better reap the benefits of warranties. Currently, when building components break, the facilities department often fixes it because warranty information isn't always easily available, accurately entered in the CMMS or entered before the warranty period has expired. Because this information is already easily available and presents the potential for significant cost savings, it presents a clear starting place.

To achieve this benefit, the health system identified that through BIM that they could attach warranty data to an asset. "We only need a few fields, like installation date and duration for the parts and labor warranty, and contact information for the warranty. If we can get those as a data elements instead of locked in a pdf, we can attach that data directly to the asset in our CMMS so everyone looking at that asset in the system can immediately find warranty information," says Joe Porostosky, director, facilities information and technology services, The Ohio State University. Collecting this data has now become a part of the standard process for any of the university's new buildings and significant renovations, allowing the system to access this data more frequently in the future.

Determining How to Maintain the Data

Most building components will undergo some type of change or renovation over the course of a building's life cycle. In many cases facilities already have maintenance management systems in place for updating attribute data. These changes should be included in the BIM model as well so that FMs are always working with an up-to-date model. In many cases, these systems can be integrated so updates occur simultaneously. Current, accurate data is key to the model's usefulness.

This process may seem time-consuming—and it may be initially—but it will save significant time, and money over the long-run. As Porostosky points out, "Maintaining the data is challenging,

and is an issue that exists outside of BIM. BIM isn't going to solve this challenge if it's not involved in the maintenance side of the process."

Carolinas Health's solution for maintaining its data was to establish a process of updating certain legacy systems while investing in new software solutions to fully integrate Revit across the system.

Because their Archibus software for space management was an off the shelf solution, a Revit integration was relatively simple for the BIM team. On the other hand, the O&M team purchased a new work order management system without a Revit integration component, so the BIM team had the opportunity to build a custom integration from the Revit model into their system.

As Meghan Ruffo, contract BIM manager, Carolinas Health System, points out, tools can be added over time to process additional data. "Don't think you have to have a perfect system set up to get started," she advises. "Say you don't have a space management system that integrates with Revit yet. You can still capture that information, and when you do implement that tool you will be ready to go."

Mayo Clinic also opted to move to new software. "We found that we have essentially three different programs running, one program that tracks our construction, a program that tracks our design, and a program that tracks our work orders. We're combining all three of those into one piece of software and making everything a bit more transparent," Muhler says. The current software limits access, leading to numerous questions. "We hear, 'When is this going to happen? Where are we in the phasing of this? How many projects are ahead of ours before our project gets going?'" Muhler says. "We plan on making these processes a little more transparent with the new software."

Connecting Operations to the Planning, Design and Construction Cycle

Although BIM presents great potential for improving the O&M process for healthcare facility managers, the key to successful deployment is focusing on how to use the data early in the planning, design and construction cycle. By giving FMs a voice at the table in the early planning stages of any project, these managers can identify data to capture that can provide tremendous cost savings over the life of the project.

About the Health Care Institute

The Health Care Institute (HCI), an IFMA Alliance Partner, serves a constituency that interacts directly with the business office and/or C-suite, and supervises multiple aspects of healthcare facilities management including healthcare facility design, construction and operations. HCI is one of the most prominent healthcare facilities-related organizations internationally, with members throughout the world.

HCI's nationwide educational seminar series has traveled to 25 different cities (some multiple times), resulting in a forum where facilities managers can problem solve with healthcare architects, designers, engineers, contractors and administrators. For more information about HCI, visit http://hcinstitute.info. Questions can be directed to media@hcinstitute.info.

About BIM for Healthcare Owners

BIM for Healthcare Owners is a collaborative community created for healthcare owners, and managed by healthcare owners, offering support for the BIM evolution. By creating a venue outside of the influences of the AEC industry from which owners who are practicing or interested in BIM can share best practices, have discussions on process and technologies, and examine successes and failures, the organization hopes to help others advance their BIM programs.

For more information about BHO, visit http://www.bimforhealthcareowners.com/.

For interested members of a healthcare owner, join the LinkedIn group at www.linkedin.com/groups/4988323.