Autodesk® BIM 360™ Field; University Hospital Case Study
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CR2281

This case study chronicles the implementation and use of Autodesk BIM 360 Field cloud service on a major capital improvements project. Emphasis is on user groups, use of mobile devices in facilitating project management, BIM, commissioning, facilities maintenance and computerized maintenance management systems (CMMS). Additionally, the class includes some discussion on the challenges that were encountered in using Autodesk BIM 360 Field and the solutions that were developed to overcome those challenges.

Learning Objectives
At the end of this class, you will be able to:

- Describe the real-world challenges of Autodesk BIM 360 Field and take away actual solutions and lessons learned.
- Identify similar challenges and address them in the early stages of a project.
- Explain how Autodesk BIM 360 Field interfaces with other Autodesk products and third-party FM applications.
- Describe the resources, planning, and stakeholder participation required for effective FM implementation.

About the Speaker
Jesse is a Project Engineer at Zachry Construction Corporation based in San Antonio, TX. Over the past eight years, he has worked on projects for both government and private owners, ranging between $2M and $547M. His ability to utilize the latest technological advancements in the field has led him to his current assignment as the CMMS Manager for the ZachryVaughnLayton Joint Venture at University Hospital in San Antonio, TX. As the CMMS Manager he has had a significant role in assisting the owner in developing its CMMS data standards and developing the scope of work surrounding the owner’s CMMS effort. Additionally, he has played a role in assisting the owner in developing their BIM execution plan to be utilized on future projects. Along with being the CMMS Manager, he is the Joint Venture’s Autodesk® BIM 360™ Field account administrator and is responsible for training project personnel and all user groups.

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Describe the real-world challenges of Autodesk® BIM 360™ Field and take away actual solutions and lessons learned.

Deployment

The initial deployment of Autodesk® BIM 360™ Field was a challenge because we didn't have a dedicated individual responsible for implementation. Once we had the staff in place to focus on implementation and rollout, the utilization of the software took off.

User Groups & User Group Needs

Users will fall under one of the following five categories; Architect, Contractor, Engineer, Owner and Subcontractor. In our case, we found that even within these five categories of users, there were subgroups that had varying needs. The way that we were able to address these varying needs was to customize project locations and issue types.

As can be seen in the screen shot above, for our project we have the following locations; Punch Locations, Smoke Compartments, Tower BIM, Tower Elevators, Tower Interior, Tower Skin and Tower Structure. Each of these locations have sublocations that allow the various users to drill down to specific project areas as needed.
Within the five default issue type categories, our project has customized the issue types to fit the varying needs of the project’s user groups which allows for greater accuracy and definition when creating, tracking and communicating issues.
Mobile Devices

It's important to note, that we began our efforts back in 2010, Autodesk® BIM 360™ Field was known as Vela Systems and needed to be run on a tablet PC. The tablet PCs that we purchased were heavy and the battery life was about four hours. Our initial implementation efforts were falling short in part because we couldn't get project personnel to stick with using the tablet PCs. Everything changed with the launch of the iPad2 and the iPad application. Currently, there are over 150 iPads onsite.

BIM

Our project is a BIM heavy project and from the beginning, we were going to utilize the clash detection process for coordination. As per the contract language, the project team was to develop a BIM execution plan to define this process. Initially, clash detections were tracked on an Excel log and this required a significant amount of maintenance. However, after realizing the efficiency in managing issues with Autodesk® BIM 360™ Field we made the decision to track clashes in the software rather than Excel.

In our BIM execution plan, there was a note on BIM to FM, facility management (FM), which essentially stated there were things that could be done, but we weren't going to do it. When we were in the early stages of implementing Autodesk® BIM 360™ Field, it was decided to take advantage of the software's ability to track and capture FM data. In order to incorporate the FM
scope of work into the contract documents, the project's BIM execution plan was appended to include the standards developed for tracking equipment and capturing the defined data fields.

Facility Management (See Attachment C)
Facility management data collection responsibly and definitions can be found in appendix C. The basic responsibility of the general contractor and connected subcontractors will be to collect all required FM data in the format outlined in appendix C into a compatible database system so as to be able to download the FM data directly to the TMS FM software.

Although there were some struggles early on with viewing models in the field, due to the size of our project's models even though they were divided by building and level. The model viewing engine improved tremendously and so did our use of the model viewer in the field. The iPad app became the primary tool to verify as-built conditions against the model and to capture FM equipment data while personnel are on site walks.
Communication/Interpretation

One of the more unique challenges that we happened upon was the psychological reaction to the word “issue”. We found that most users have a negative connotation associated with the word issue and became defensive when there were a number of issues assigned to their company. Even with the various issue types we created to try and communicate what was being observed. Essentially, we found ourselves having numerous philosophical conversations with various users on the topic of issues versus observations. We found that after working through these conversations, most people had a change in perspective and were more at ease with the terminology.

Contract Deliverables (Federated Models)

The language in our BIM execution plan requires us to deliver a federated model. With the web interface in Autodesk® BIM 360™ Field, the functional experience presents no significant issue when interacting with the models. From a process experience, we found that we were going to
routinely cycle through syncing the models with Autodesk® BIM 360™ Field to extract and import FM data.

This presented a problem for us, because we didn’t want to impact the existing users in the existing projects. Our solution was to create ghost projects with limited users that would allow us to perform these repetitive syncs without impacting the other project’s data. Once we have completed the FM scope of work, we will bring all of the FM data it into the existing, or primary, projects.
With the iPad app, the initial functional experience presented a challenge because of the size of our models. The typical file size of our models ranges between 60 MB to 150 MB and we were not able to use the models in the field. However, with the upgrade to the latest BIM engine, we have not experienced any significant functional issues when interacting with the models. From a process experience, we found that establishing standard viewpoints would allow for faster navigation.
Modeling Methods (Blocks v. Objects)

Another result of the language in our BIM execution plan is that the project did not require specific standardized modeling practices or deliverable requirements with respect to FM data. This meant that the various project team members delivered models/files in various authoring formats, such as AutoCAD, CADmep+ and Revit. What we found is that we have to manage a series of search sets within each model to populate FM data. Also, we established the use of a key identifier (we used “_etag”) to enable us to find the required FM equipment. This allowed the more advanced subcontractors to write a script that would append this tag to the equipment name, making it a quick process to tag them on the authoring side and to also search for them in Navisworks.
Library management

There were two major concerns that surfaced during the rollout of Autodesk® BIM 360™ Field regarding the project's library. First was the size of the contract documents, there are 2,500+ plan sheets combined in eight volumes of drawings. Second was the owner's request that issues and/or pushpins migrate up through the various drawings revisions as the project progressed. In order to accomplish both of these items we opted to replace drawings as new plan sheets were issued in subsequent proposal requests (PRs).

Safety Integration

We did not have much success in implementing the use of Autodesk® BIM 360™ Field with our safety program. This occurred for two reasons; first, the safety program was well established and we opted to focus on construction documentation and quality control. Secondly, we couldn’t get the personnel to commit to incorporating Autodesk® BIM 360™ Field into their daily activities.

Opposition to Change

As with most advancement in technology, there are always some individuals that are slow to accept that there is a new way to do something. In our experience, we have found that demographics don’t really indicate who is or isn’t going to embrace or reject these advancements in technologies. In order to overcome this opposition, we had to be diligent in our education, demonstration and training efforts.
Identify similar challenges and address them in the early stages of a project.

Ask Questions during the RFP Process

With respect to facilities management (FM), we found that we should have and could have asked more questions than we did during the RFP process. Additionally, we found that even during the early workshops to establish the FM scope and develop data standards, we constantly needed to ask questions about the owner’s processes in order to determine what it was that they wanted to accomplish with respect to the FM effort.

Understand how people feel about and use technology

Regardless of the person and/or organization and the related function in the industry, some people and/or organizations just don’t like technology, whether it’s to increase efficiencies in project management in the field or facilities maintenance. The way that they have done things for their entire professional careers is not broken and they feel this is what works best for them. Some people and/or organizations are simply just not good at using the latest technology, but want to become more proficient and need the opportunity to learn and sharpen their skills. Other people and/or organizations are fantastic at using the latest technologies and want to be pushing the boundaries of the leading edge.

Contract requirements versus owner expectations

Managing contract documents is not something new. However, when it comes to facilities maintenance, understanding the owner’s vision compared to understanding what is contractually required is essential to be able to meet their expectations. The benefit of knowing whether an owner has an established vision of their project that fits into an overall plan is a tremendous advantage. Especially, if this vision can easily be conveyed during the initial phases of project and can be incorporated into the contract documents.
Explain how Autodesk BIM 360 Field interfaces with other Autodesk products and third-party FM applications.

**Autodesk Products**

There is a plugin that is available for download from Autodesk® BIM 360™ Field that can be used with Navisworks and Revit. This plugin allows users to sync data from the project’s model(s).
3rd Party FM software

The export feature within Autodesk® BIM 360™ Field’s equipment module is a simple and efficient way to transfer the project’s FM data to a 3rd party FM software using Excel.
In our case, we decided to perform some minor formatting changes to the initial output as a quality control measure.
Describe the resources, planning, and stakeholder participation required for effective FM implementation.

Resources

As the owner illustrates their needs, wants and vision regarding FM, it’s important to identify the organizational hierarchy that will be responsible for the decision making when it comes to establishing data standards. Also, there needs to be a level of understanding when it comes to the owner’s current facilities maintenance personnel and processes. Additionally, there needs to be a level of understanding when it comes to technology and the ability of team members involved in the project.

Planning

Regardless of the resources available, when it comes to facilities maintenance, planning for this effort needs to begin in the earliest stages of the project. As the planning progresses, the resources required to complete the FM scope of work will likely be impacted.

Stakeholder participation

With respect to the owner’s needs, wants and vision, understanding the limitations of the owner’s implementation of BIM is essential. It’s my opinion, that one cannot ask enough questions. Also, the level of contractor BIM expertise will be crucial in delivering a successful project.