BIM and Asset Management
Workflows to Close the Circle

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It is critical to define a standardized list of Assets at the Design Stage to be able to integrate a BIM Model all the way down to Construction and into Operations without the burden of re-creating the Model all over again in every single Stage of the process.
KEY LEARNING OBJECTIVES

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

- Better understand the workflow of incorporating Asset Management information within a BIM Model.
- Define the list of Parameters that need to be consider throughout the project development and how they are mapped to the different building objects/elements.
- Establish a criteria of who is responsible of getting the right information into the Model so when is handed over for Maintenance, the Model can be easily integrated with an Asset Management System.
- Understanding the implications of a new way (electronic version) of handling and integrating the Close Out Package documentation with the BIM Model.
- Get to know some Asset Management Systems that interact with Revit.
Provide AU Session feedback

- Via the Survey Stations, email or mobile device.
- AU 2016 passes awarded daily!
- Give your feedback after each session.
- Give instructors feedback in real-time.
AGENDA

Who We Are
The Background
The Solution
The Challenges
What Needs To Be Done
Demo
Next Steps
Conclusions
Q&A
WHO WE ARE
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DCV Consultores

DCV is a South America based consulting company who offers solutions for Architects, Engineers and Contractors along with Developers and Owners in the areas of Virtual Design and Construction.

We have over 10 year of experience which has allowed us to built an expertise on BIM workflows, processes, procedures and best practices applied specifically for the AEC market.

Over the last 3 years we have been working directly with the Autodesk LATAM Team helping the biggest Construction and Real Estate companies in the region adopt BIM Technology.
Among the services we offered are the following:

- BIM Adoption / Implementation
- BIM Standards Development
- BIM Management
- Training and Support
- Modeling
- Project Coordination
- Virtual Reality
WHO WE ARE

Microdesk

AECO Industry Consulting Firm

- Founded in 1994
- 11 locations nationwide
- 140 AECO Consulting Specialists and Software Developers
WHO WE ARE

Microdesk

We provide process consulting, technology, integration and software development services to streamline:

- Planning
- Design
- Construction
- Operations and Maintenance
- Facilities and Asset Management
THE BACKGROUND
Typical Building Lifecycle Costs

- Conceptualization & Analysis: 5%
- Design: 15%
- Documentation: 80%
- Construction: 15%
- Maintenance & Operations: 80%
THE BACKGROUND

Throughout the project development, lots of information is input to a BIM Model by all participants but the data components (properties, parameters, values, fields, etc.) of an Asset Management System are often left to last or never take into consideration.

This information is needed for Maintenance and Operations and without effective, reliable and timely data, an Asset Management Program will not be sustainable.
THE BACKGROUND

When construction is completed, owners receive drawings, specifications, catalogs, operation manuals, warranties, etc. as part of the close-out package.

The project information is not centralized and the data comes from different sources.

This information is not always accessible to parts of the Organization that need it.
THE BACKGROUND

Design  Construction  Maintenance
THE SOLUTION
THE SOLUTION

If we can centralize all the project related data into a single system, the information can be leverage by multiple users.

BIM is one of the several tools that will help us standardize and automate the way we can feed asset data and information into an Asset Management System.
To that extend, we need to “start from the end” and ask our maintenance people what needs to be included in the information they receive, so when they get it, they can get the most out of it.
THE SOLUTION

An Asset Management System can serve as a single repository of all project related information, allowing to schedule maintenance jobs, keeping track of changes as well as all historical data performed on an asset and providing access to all team members.
THE CHALLENGES
THE CHALLENGES

Collect and organize assets, along with the associated information.

Centralize the asset data within or linked to a BIM Model throughout the asset lifecycle allowing different people to access the data they need as they need it.

Understand what the field staff need to operate and maintain those assets and provide them with the tools to help them do their job more efficiently.
Successful implementation of any technology within an Organization is built on these three elements.
THE CHALLENGES

People

- Staff turnover
- Educate every single Department and/or Division within the Organization on the benefits of BIM for Asset Management
- Change mindset from 2D drawings to 3D asset databases

Process

- Standardize how to incorporate intelligent data into the projects
- Establish a workflow to advance BIM development from Design through Construction and Maintenance
THE CHALLENGES

Product

- Access to cloud-based applications
- Modeling
- Visualization
- Yearly Upgrades
- Asset Management
WHAT NEEDS TO BE DONE
Organize your efforts around the four components of the Project's Lifecycle.
WHAT NEEDS TO BE DONE

Develop a framework that includes:

- A Criteria for the selection of Projects that will be developed in BIM and used for Asset Management
- BIM Standards and Support Files that supports the four components of the Project’s Lifecycle
- BIM Contract Language for Design and Construction
- Identification and Organization of all Assets
- Organization of BIM content
- Require an As-Built Models as a deliverable
- Develop Pilot Projects for building-based and field-based assets
An Asset Management Program should be flexible enough to allow the use of BIM at any Stage of the Project regardless of when it starts.
WHAT NEEDS TO BE DONE

Understand the differences between the Level of Development and the Level of Detail.

An Object developed in LOD200 can be integrated to an Asset Management System.
Document and organize all of the assets into two major categories, building-based and field-based assets, along with all the associated information.

For building-based assets we have identified about 350 objects under 75 major categories, which will become the basis of our asset hierarchy.

These objects have been grouped together under five major disciplines, Architectural, Electrical, Mechanical, Plumbing and Structural.

The next step is the identification of the field-based assets.
Group all these objects into discipline sub-groups, such as HVAC, Plumbing, Fire Protection, Electrical, Electronics, etc.
WHAT NEEDS TO BE DONE

Mechanical Equipment have different properties depending on it’s particular function (air-based, water-based, etc.) and should be treated differently as the project moves from Stage to Stage.

Air Handling Unit

Chiller
Organize the Mechanical Equipment in specific Sub-Categories based on their function.
WHAT NEEDS TO BE DONE

Create Systems and Services and identify which Objects that are part of them.

**Category**

**System** (Objects)

**Name**

- Air Terminals
- Duct Accessories
- Duct Fittings
- Ducts
- Mechanical Equipment
- Pipe Accessories
- Pipe Fittings
- Pipes
- Sprinklers

- Air System
- Diffusers
- Dampers
- Filters
- Rectangular Ducts
- Rectangular Fittings
- Air Handling Unit

- Fire Protection System
- Sprinklers
- Panels
- Valves
- Metal Pipes
- Metal Pipe Fittings

- Pumps
- Etc.

- Supply
- Return
- Exhaust
- Etc.

- Wet
- Foam
- FM200
- Etc.
The identification of these categories and sub-categories of MEP objects (equipment, components, systems, sub-systems, etc.) is helping us creating “buckets” of data with similar characteristics (properties, parameters, values, fields, etc.) that will help us push the right data to the right object and/or groups of objects at any Stage of the Project.

These “buckets” of data will allow us to keep the information organized along with keeping the Model updated regardless of where the data is defined.
WHAT NEEDS TO BE DONE

It is critical to build a library of specific BIM Content that will be organized based on these “buckets” of information.
Create custom “data fields” for Asset Management that fit your needs and define at which stage of the Project (Design, Construction and/or Maintenance) they need to be filled.
WHAT NEEDS TO BE DONE

We are forcing Contractors to provide an as-built / as-constructed BIM Model at the end of construction.
DEMO
Challenge

Population of a CMMS system

- Project Close Out Packages – 12 to 18 months
- Traditional Data Capture with Data Scrubbing – 6 to 12 months
- Manual Data Entry by sitting through Close Out Packages

Result
  - Disconnected Export / Import processes that are difficult to manage and repeat as building change

CMMS and Revit

- Both contain asset data
- Both contain asset location information
BIM Savings

- Up to 40% unbudgeted change orders eliminated
- Up to 80% reduction in time to generate a cost estimate
- Cost estimation accuracy within 3%
- Savings up to 10% of the contract value through clash detections
- Up to 7% reduction in project time

Stanford University Center for Integrated Facilities Engineering (CIFE) figures based on 32 major projects using BIM
Benefits

ModelStream v1.0

- CMMS asset automatically created / updated
- Asset attributes populated from Revit
- Location information creation
- Bi-directional synchronization of assets and location data between BIM and CMMS
ModelStream

As-Built Model

- Now becomes the Record Model
- Is now relevant for the life of the facility

Facility Maintenance & Operations Staff

- Visualization toll embedded with Maximo
- Work area verification (valve location, access panels, etc.)

In the end it is a **Record Model** that is dynamically connected to the Enterprise Asset Management Systems which allows for the visualization and capture of operational data.
NEXT STEPS
NEXT STEPS

To develop a database were the Level of Detail (amount of data) and the Level of Development (amount of geometry) coexist.

To develop a custom version of the template family files which will include all the necessary “data fields” needed for Asset Management.
NEXT STEPS

To develop add-ins that will help us automate the process of validating the integrity of content (family), which will include:

• Categories and Sub-Categories
• Systems and Services
• Parameters
• Etc.
CONCLUSIONS

The integration of BIM with Asset Management Applications is a long-term plan but to see results you should set and defined short, mid and long term goals.

Talk to your Maintenance and Operations people, find out what they need.

As with any other technology, when implementing an Asset Management Program you need to do it through Pilot Projects and fine-tune it as you move forward.
CONCLUSIONS

Adjust the tools to the end user’s needs as much as you can to get buy-in.

When starting a Asset Management effort, start small and build the effort up.

Time spent planning is time well spent.
THERE IS LIGHT AT THE END OF THE TUNNEL
JUST KEEP MOVING
Q&A
Thank You So Much