10 BIM for FM Deliverables in 20 Minutes
10 BIM for FM Deliverables
20 Minutes

brian.krause@clarkconstruction.com
ava.norton@clarkconstruction.com
Objectives

• Understand Different BIM-FM Deliverables
• Learn Workflows for Deliverable Types
• Review Tips and Lessons Learned for Future Projects
# BIM-FM Project Deliverable Comparison

<table>
<thead>
<tr>
<th>Project</th>
<th>Market</th>
<th>Volume</th>
<th>Data in Authoring Software</th>
<th>Data in Viewing Software</th>
<th>COBie Data in Spreadsheet</th>
<th>CMMS Coordination</th>
<th>3D As-Built</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Air &amp; Space Museum</td>
<td>Museum</td>
<td>$445</td>
<td>✓</td>
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<td>Seatac IAF</td>
<td>Airport</td>
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<td></td>
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<td>Government</td>
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<td></td>
<td></td>
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<td></td>
<td>✓</td>
</tr>
<tr>
<td>UMD Bioengineering</td>
<td>Higher Ed</td>
<td>$120</td>
<td>✓</td>
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<td>✓</td>
<td></td>
<td>✓</td>
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<td>Bowie State Natural Science</td>
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<td>$85</td>
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<td>✓</td>
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<td>600 Massachusetts Ave</td>
<td>Commercial</td>
<td>$80</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
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<tr>
<td>Cannon House</td>
<td>Government</td>
<td></td>
<td>✓</td>
<td>✓</td>
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<td>WSU Digital Classroom</td>
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<td>GWU 7th &amp; 8th Floor Lab Fitout</td>
<td>Higher Ed</td>
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</table>

#BIMForumED
BIM-FM Project Deliverable Analysis
Deliverable Analysis Conclusions

- Number of assets and attributes aren’t currently driving bulk of effort

- Deliverable type driving effort
  
  4 – 3D As-Built
  3 – Data in Authoring Software
  2 – Data in Spreadsheet
  1 – Data in Viewing Software

- Number of assets and attributes will drive bulk of effort when process is refined
BIM-FM Deliverable Challenges

• Clarity of deliverable – What is really desired and useful?
• Timing of definition of deliverable
• Authoring ability of software and cross platform capabilities
• Owner, Designer, General Contractor, Subcontractor understanding
• Data population and integrity process
• As-builts, field conditions, and change order incorporations
Clark & Virginia Tech BIM-FM Playbook

- **Owner Requirements**
  - Assets and Attributes
  - Data Format
  - Model Navigation and Organization
  - Model Content

- **Model/Data Population**
  - Native Model Population
  - Spreadsheet Population
  - Composite Model Population
  - Quality Control

- **Installation As-Builts**
  - Field Data Population
  - Change Process and Procedures
  - Field Verification
Workflows for Delivery

Native Model Population

Composite Cloud Model Population

Spreadsheet Population

Composite Model Population
Native Model Population Workflow

Owner Parameters Predefined → Parameter File Embedded in Native Model → Properties Populated in Parameter File
Composite Cloud Model Population

Native Models Published to Cloud → Composite Model
Built in Cloud → Model
Parameters Built → Data
Collected in Field

East County Detention Center
Indio, CA
Spreadsheet Population

Create Model → Automated Data Export → Excel Field Population → Data Pushback to Model(s)

Cannon House
Washington, DC
Composite Model Population

Create Composite Model → Assign Properties in Custom Tab → Link O&M

Bowie State Natural Science
Bowie, MD
I have a Model with Data, Now What?
CMMS Example Work-Flow, No Model

1. Open Dashboard
2. Filter by Zone or Equipment
3. Select Work Orders
4. Assign to Technician
Technician Question, Heat Exchanger

1. Review Work Orders
2. Select Equipment
3. Identify ID in Model
4. Open Model
5. Search by Equipment ID
Technician Question, Valve Location

1. Equipment Location Unknown
2. Locate Equipment ID
3. Open Model
4. Search for Equipment ID
Cross Platform Capabilities
# Data Entry & Integrity

<table>
<thead>
<tr>
<th>Col A</th>
<th>Col B</th>
<th>Col C</th>
<th>Col D</th>
<th>Col E</th>
</tr>
</thead>
<tbody>
<tr>
<td>From ELECTRICAL Model</td>
<td>From TMA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item</td>
<td>IF/TC/FIXTURE/THROUGH/LS/CT/01:00.0334333477</td>
<td>Verification #1</td>
<td>Alternate Tag # (Asset ID)</td>
<td>Verification #2</td>
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<tr>
<td>Name</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>PM-7B.CEB-01</td>
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<td>E/FIXTURE/ITEM/THROUGH/LS/CT/01:00.0334333477</td>
<td>YES</td>
<td></td>
</tr>
</tbody>
</table>

**Formula #1:** Compares each row value in column B (OBJECTTYPE) to all values in Column D (ALTERNATE TAG#)

\[
\text{IF}(\text{ISERROR(MATCH}(\text{B3},\text{D1:S3:S3:}239,0)),",",\text{"YES"})
\]

- Returns a ‘0’ if no OBJECTTYPE value is found for that row (i.e., OBJECTTYPE value is missing for that model object)
- Returns a space if the OBJECTTYPE value is that row has no match with any ALTERNATE TAG# value in column D
- Returns a ‘YES’ if the OBJECTTYPE value for that row has a match in the ALTERNATE TAG# column

**Formula #2:** Compares each row value in column D (ALTERNATE TAG#) to all values in Column B (OBJECTTYPE)

\[
\text{IF}(\text{ISERROR(MATCH}(\text{D3},\text{B1:S3:S3:}9150,0)),",",\text{"YES"})
\]

- Returns a ‘0’ if no ALTERNATE TAG# value is found for that row
- Returns a space if the ALTERNATE TAG# value in that row has no match with any OBJECTTYPE value in column B
- Returns a ‘YES’ if the ALTERNATE TAG# value for that row has a match in the OBJECTTYPE column
As-Builts Change Incorporation
Conclusion

• Clearly define deliverables early
• Clearly define assets and attributes early
• Different deliverable types have different levels of effort
• Delivery type will dictate a workflow
• Defining how a deliverable will be used in the end should be discussed in the beginning
• Think about how a deliverable will be used by end users
• Understand how to control the quality of the deliverable
Thank You

brian.krause@clarkconstruction.com
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