

DoD BIM Contract Requirements

BEST PRACTICES

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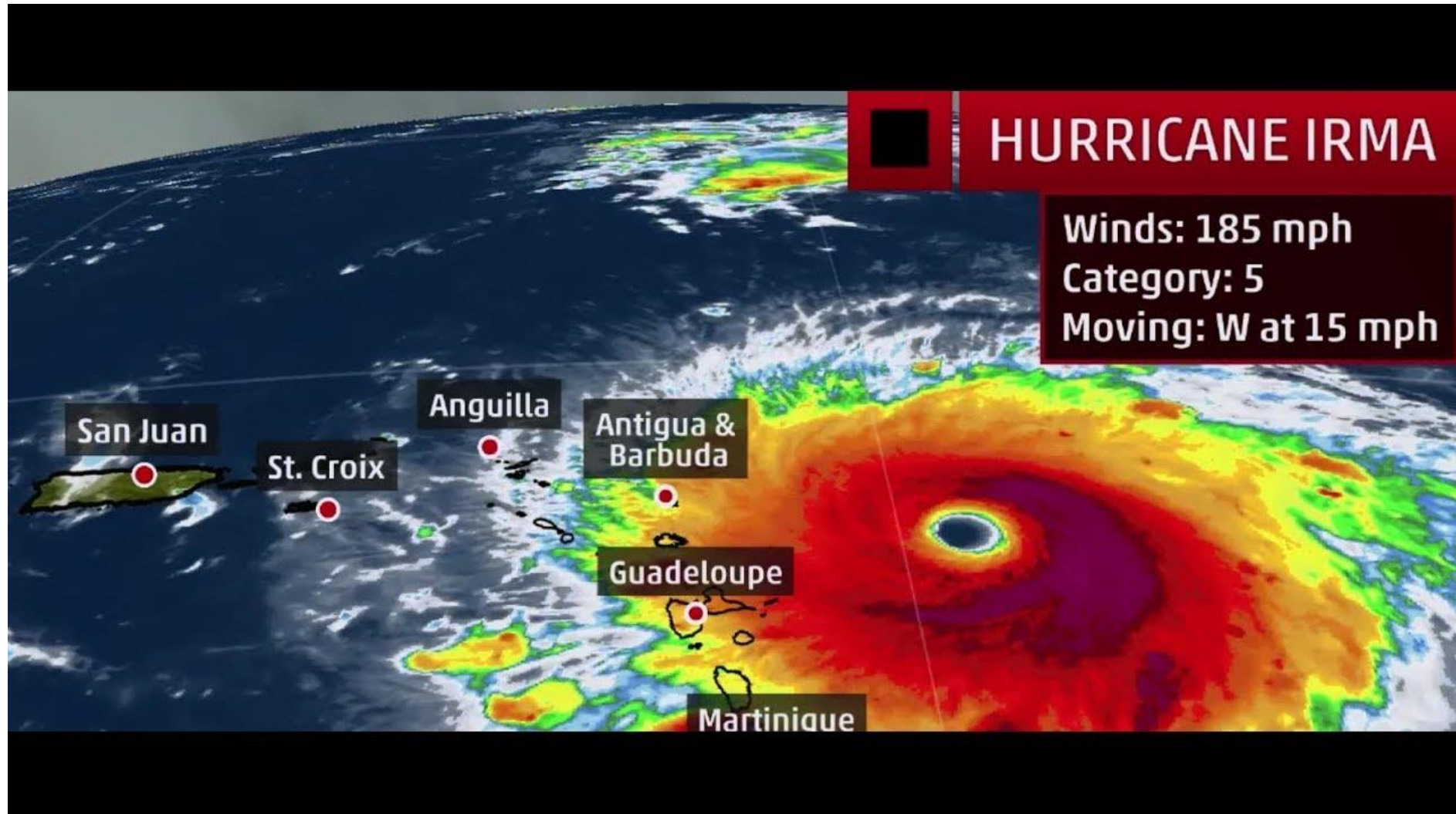


ARCHITECTURE | ENGINEERING | CONSULTING

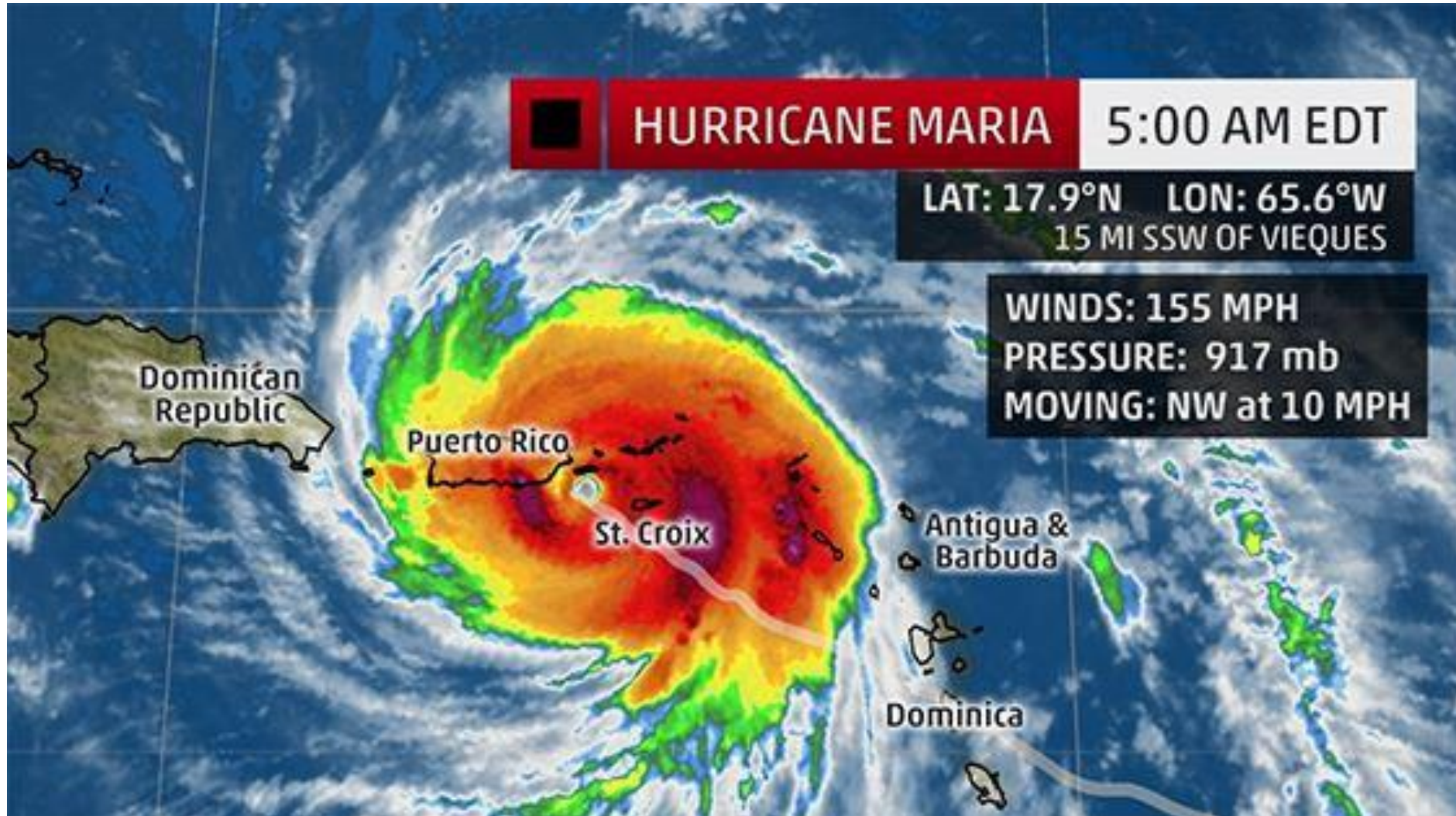
Hurricane Harvey



Hurricane Irma



Hurricane Maria



- Thousands Without Homes
- Combined Damage: Over \$200 Billion



As Architects and Engineers...

- We strive to improve Safety and Wellness on every one of our building designs
- But we cannot control nature
- If disaster strikes, what information will you produce to restore your losses to pre-disaster condition?



Introduction



**Leo Fernandez, Associate AIA
Aerospace & Defense
Production Technology Leader**



Leonel Fernandez, better known as Leo, is a design and strategic management professional with 15+ years of experience in the Architecture, Engineering, Planning and Technology industries; specializing in Building Information Modeling (BIM) management, design, indoctrination and implementation within the AECOO industry.

Leo joined RS&H as an Aerospace & Defense Production Technology Leader. Leo studied Architecture at the Polytechnic University of Puerto Rico and for over 11 years has been using Building Information Modeling technology to complete a wide range of Architectural Projects; ranging from schools and office buildings to large military facilities for DoD (USACE, NAVFAC, Air Force, Air National Guard & NASA), amongst other government agencies.

Leo is responsible for the implementation of BIM technology, BIM Standards, BIM Execution Strategies, BIM Quality Control Protocols, Training manuals and courseware. Since 2015, he has been teaching Building Information Modeling to future design professionals at a Florida college institution. He has lectured on the use of BIM in AECOO Conferences, and national events both in the United States as well as in the Caribbean. He is also an Industry member of the U.S. Army Corps of Engineer's Industry BIM Consortium.

Presentation Topics

- DoD BIM Goals & Objectives
- Common DoD Contract BIM Requirements
- Best Practices
- Q&A

DoD BIM Goals & Objectives: Air Force

1. Integrate BIM data with Air Force Facility Management and Geospatial tools
2. Eliminate conflicts via Clash Detection
3. Geolocation (create Control Points for Assembly Layout)
4. Accurate 3D Record Model for FM Team



DoD BIM Goals & Objectives: USACE

1. Use Spatial Program Validation to ensure the facility meets all program requirements
2. Design: Manage Design QC through Interference Management and Model Element confirmation
3. Construction: Interference Management and 3D Coordination
4. Site Utilization Planning (use BIM models to coordinate construction site logistics prior to and during construction)



DoD BIM Goals & Objectives: NAVFAC

1. Standardize data processes and data format for facility life-cycle sustainment
2. Design: Produce 3D Parametric Design Models
3. Construction: Produce Record Models
4. Data entered once, used repeatedly, used consistently, and maintained current

Common BIM Contract Requirements

1. BIM Project Execution (PXP) Plan
 - a. BIM Requirements Kickoff & Demonstration Meetings
 - b. Include BIM Execution Strategy
 - c. Include Process Maps (Level One and Two)
2. Minimum Modeling Requirements (M3 or eOMSI)
3. Mandatory BIM Uses (Design):
 - a. Design Authoring
 - *Using agency-specific Revit Templates*
 - b. Design Reviews
 - c. 3D Coordination (Interference Management)
 - d. 3D Control and Planning (Geolocation)
 - e. Facility Management Data (COBie & eOMSI)
 - a. *UniFormat and/or OmniClass*

Common BIM Contract Requirements

- 4. Mandatory BIM Uses (Construction):
 - a. 3D Coordination (Interference Management)
 - b. 3D Control and Planning (Geolocation)
 - c. Record Modeling
 - d. Facility Management Data (COBie & eOMSI)
 - a. *UniFormat and/or OmniClass*

- 5. Quality Control Checks

- a. Visual Check
 - b. Interference Check
 - c. Standards Check
 - d. Model Integrity Check
 - e. Version Updating Check
 - f. Revision Authority Check

Common BIM Contract Requirements

5. Deliverables:

- a. BIM Files
- b. CAD Files
- c. COBie Data Extraction (Excel format)
- d. Interactive Review 3D Format (NWC, 3D PDF, Bentley Navigator, etc.)
- e. Revit Compare Tool Report
- f. QAQC Reports (Model Checks)
- g. QAQC Reports (CAD Standards Checks)
- h. QAQC Reports (Model Integrity Validation)
- i. QA/QC Reports - Visual Check Report
- j. QA/QC Reports - Interference Management Checks
- k. IFC Coordination View
- l. List of all submitted files (Excel spreadsheet preferred)

Best Practices: Contract Language

1. Read!
2. Read!!
3. Read!!!

Best Practices: Contract Language

1. Do not agree to anything until...
 - a. Proposed Contractual Requirements are discussed during BIM Requirements Kickoff Conference
2. Understand that there are separate contractual responsibilities for:
 - a. Designer of Record
 - b. Contractor
 - c. Government

Best Practices: PM's & Negotiating Officers

1. Before you bid on DoD projects, familiarize yourself with your organization's:
 - a. BIM Skills
 - b. Experience
 - c. Ability to comply with BIM Requirements
 - d. Do not lie on Proposals
2. Assess the need to improve your organization's capabilities
 - a. Hiring someone with DoD experience
 - b. Staff Training

Best Practices: PM's & Negotiating Officers

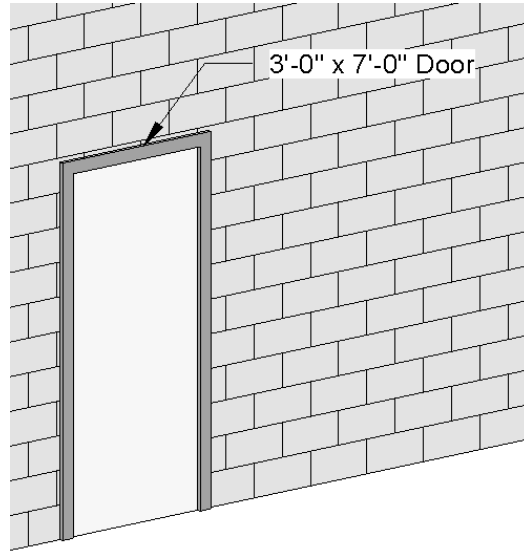
3. Familiarize yourself with Design Authoring Costs
 - a. Licensing
4. Familiarize yourself with frequency of:
 - a. Processes (QC checks)
 - b. Deliverables
5. Understand how all of the above will affect Financial Budget
6. Put together a winning team
 - a. Familiarize yourself with Production Team's skills
 - b. Technical Skills Assessments
 - c. BIM Managers (DOR & KTR)
7. Negotiate

Best Practices: Minimum Modeling Requirements

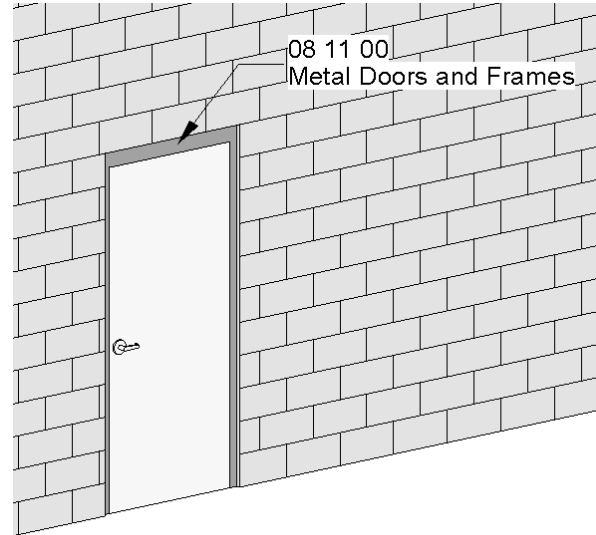
1. Familiarize yourself with Levels of Development (LOD's)
 - a. DoD only recognizes LOD 100, 200, 300, 400, 500
2. Familiarize yourself with Grade & Format Definitions
 - a. Grade: Granularity (LOD)
 - b. Format: 3D/2D, with/without Facility Data
3. Familiarize yourself with responsibilities between DOR and KTR
 - a. Minimum Modeling Matrix M3
 - b. eOMSI Facility Data Workbook

Levels of Development (LOD)

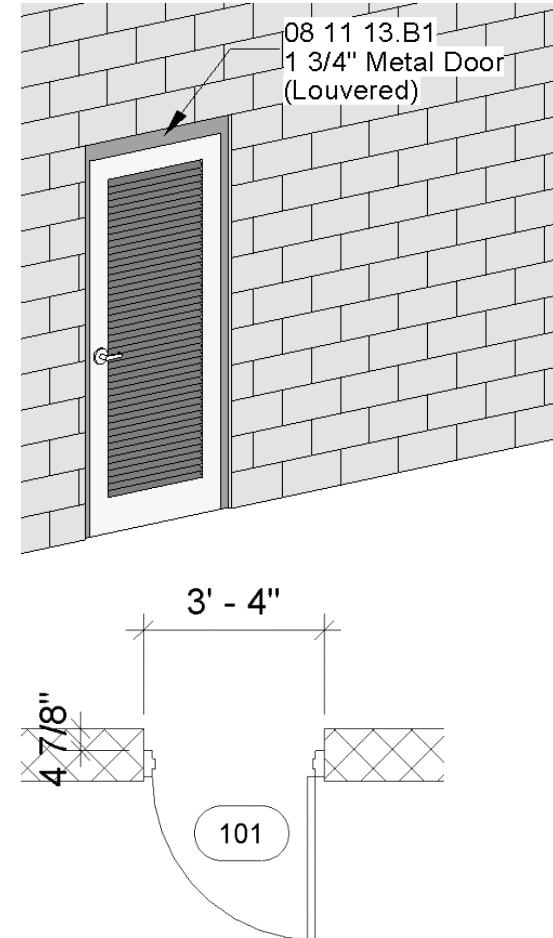
LOD 100



LOD 200

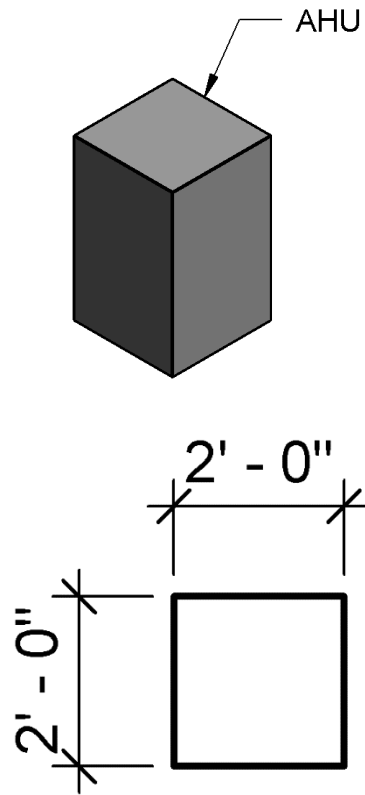


LOD 300

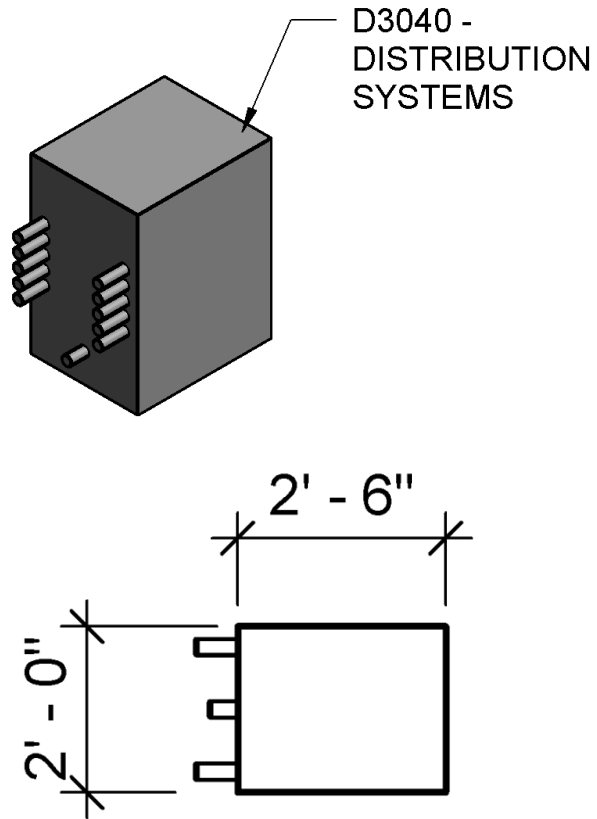


Levels of Development (LOD)

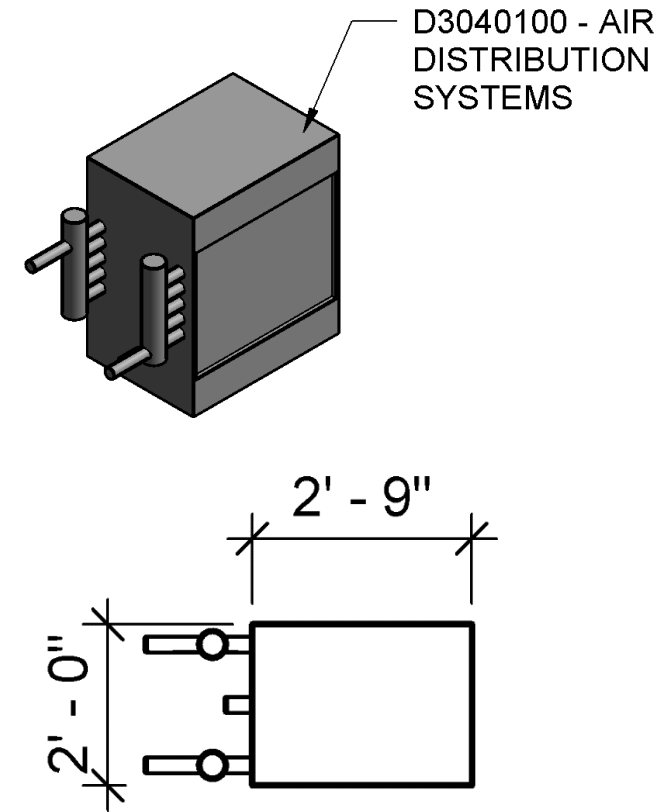
LOD 100



LOD 200



LOD 300

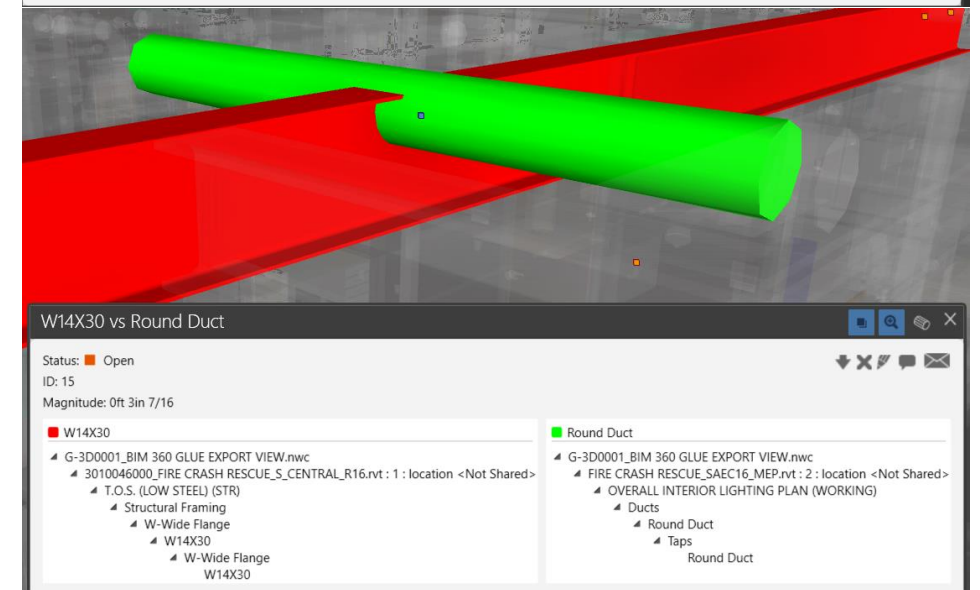
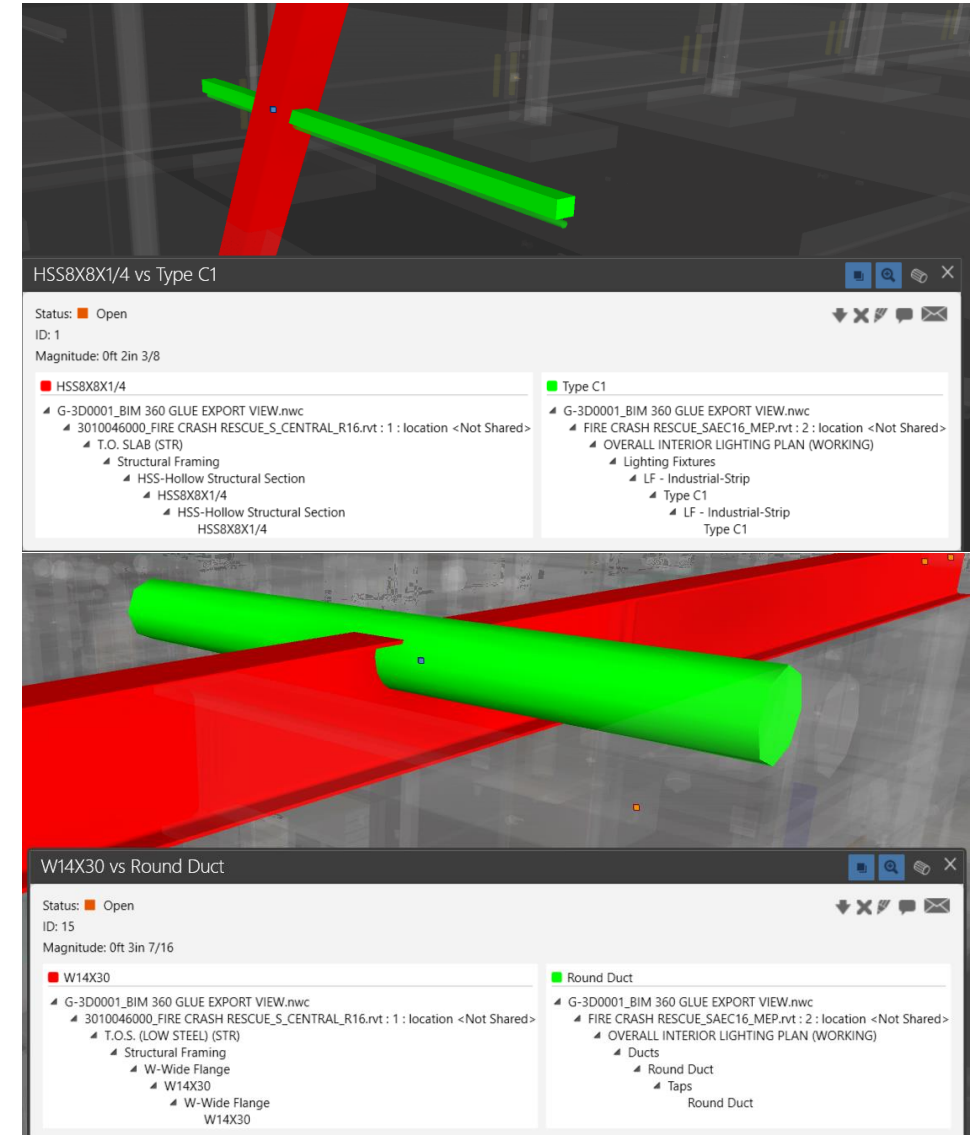
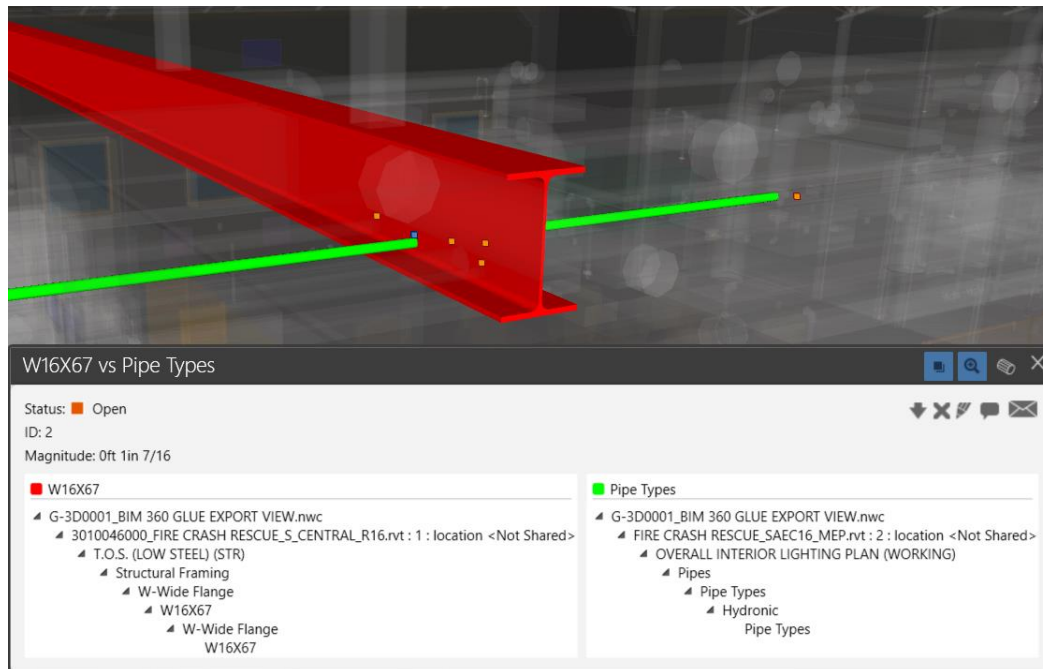


Best Practices: Record Models

1. Record Model requirement is to be fulfilled during Construction Stage
2. Familiarize yourself with Contractor's BIM skills
 - a. Contractual Requirement during Construction
 - b. DOR's: negotiate additional service to aid requirement fulfillment
3. Record Model to include:
 - a. Alterations between Design Development stage and what was Built/Installed
 - b. Final Resolved Interference Management
 - c. Final Facility Data

Best Practices: 3D Coordination

- Clash Detection
 - Navisworks or BIM 360 Glue
 - The goal of clash detection is to eliminate the major system conflicts prior to installation.
 - The information model is then used to create detailed control points to aid in assembly layout.

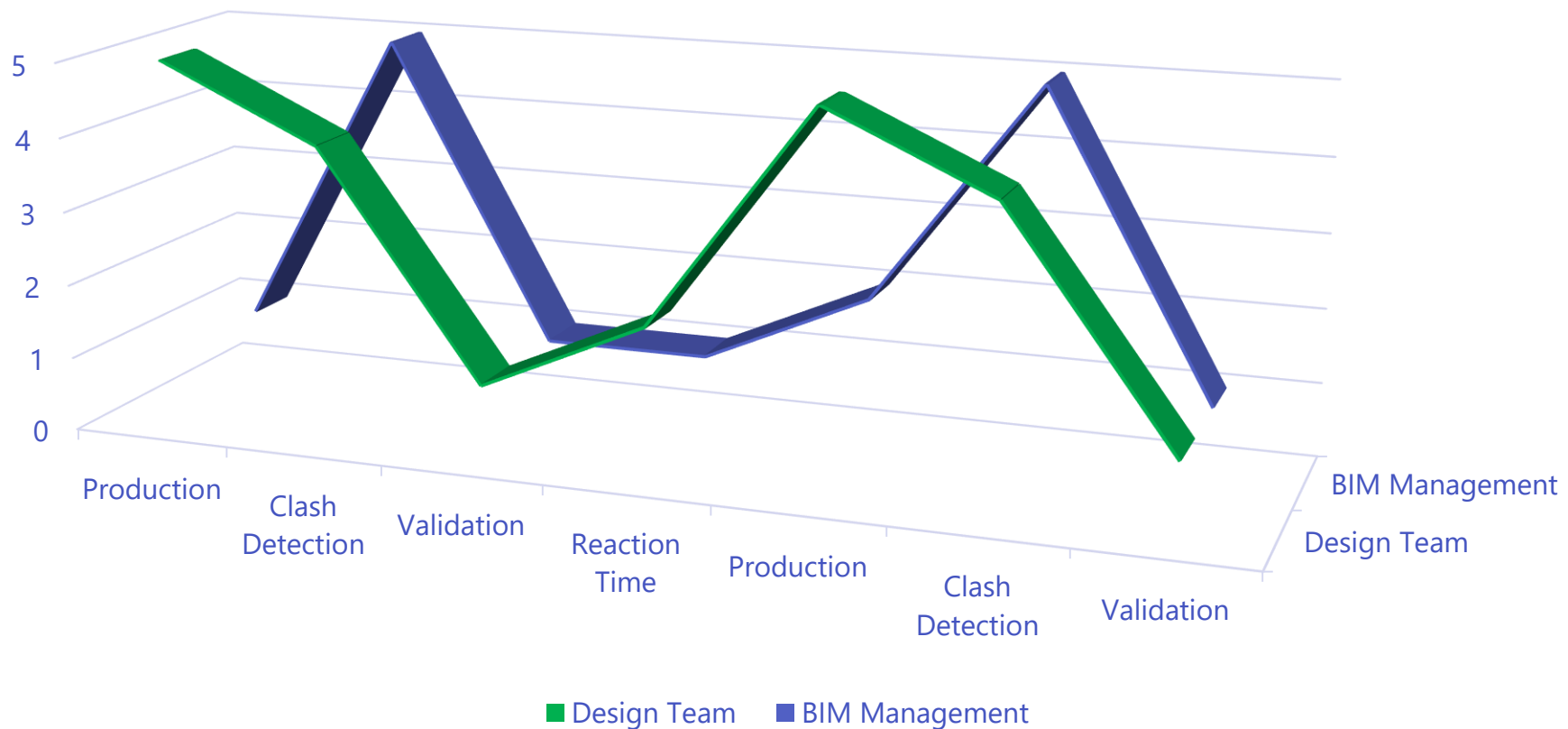


Best Practices: 3D Coordination

1. Familiarize yourself with 3D Coordination Software
 - a. Availability, Licensing Cost, Training, Means & Methods
2. BIM Manager & QC Manager to work together
3. Define 3D Coordination Strategy
 - a. Frequency
 - b. Validation
 - c. Reaction Time
4. Fight to maintain a unified check process
 - a. Avoid separate 3D Coordination checks between consultants

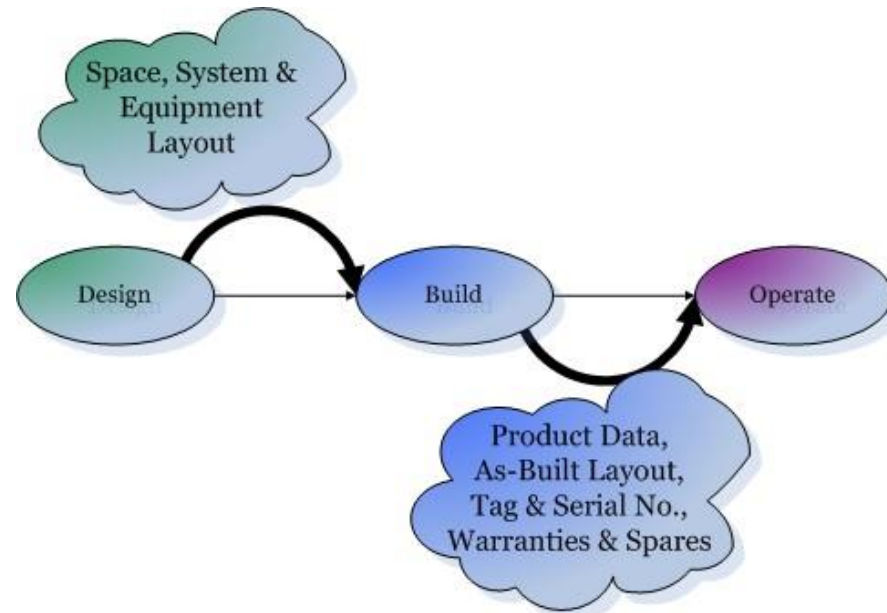
Best Practices: 3D Coordination

Frecuency, Validation & Reaction Time Explained



Best Practices: Facility Management (COBie)

1. COBie: Construction Operations Building Information Exchange
2. Goal: Integrate BIM data with DoD Facility Management and Geospatial tools
 - Record Model attributes and COBie spreadsheets are populated to provide information to the Facilities Management system.
 - Potential value:
 - Store operations, maintenance owner user manuals, and equipment specifications for faster access.
 - Maintain up-to-date facility and equipment data including but not limited to maintenance schedules, warranties, cost data, upgrades, replacements, damages/deterioration, maintenance records, manufacturer's data, and equipment functionality



Best Practices: Facility Management (COBie)

1. Familiarize yourself with the COBie process:
 - a. The Process begins during DD phase
 - b. Follow “The COBie Guide” instructions
 - *Download & install COBie Revit Plugin*
 - c. The DOR’s populate COBie data:
 - *UniFormat II*
 - *OmniClass*
 - c. Government extracts data in XML format to populate:
 - *Tririga software*
 - *BUILDER software*
 - d. The Process ends during Construction phase
 - *Record Model with final attributes*

Best Practices: Facility Management (eOMSI)

1. The eOMSI Facility Data Workbook (FDW) is an excel spreadsheet that documents the Mastersystems, Systems, and Subsystems installed in the facility during construction by the Contractor.
2. For each Subsystem installed in the facility, the Construction Contractor populates up to 17 required standardized facility asset data fields. Upon construction completion the Construction Contractor submits the final eOMSI for upload to MAXIMO.

REQUIRED ASSET FIELDS			
Position	Name	DOR/KRT/GVT	Explanation
1	AssetNum	KTR	Asset identification used by the KTR to uniquely identify assets or equipment (e.g. FAN001, AHU003)
2	Description	KTR	Primary Asset Name (100 Character Limit) To be completed by KTR
3	Long Description	KTR	Additional Relevant Information (1000 Character Limit) To be completed by KTR
4	Master System	DOR	Reference values from Model & Facility Data Matrix tab (MASTERSYSTEM)
5	System	DOR	Reference values from Model & Facility Data Matrix tab (SYSTEM)
6	Sub-System	DOR	Reference values from Model & Facility Data Matrix tab (SUBSYSTEM)
7	Building Number	GVT	Current Building # in Maximo for renovation work. Will be provided by GVT for new construction
8	Asset Quantity	KTR	To be completed by KTR (Quantity in correct unit of measure as defined in UOM field of the Model & Facility Data Matrix)
9	Replacement Cost	KTR	Contract install cost (material and labor) from schedule of values, bid proposal, etc.
10	Contract Number	GVT	Refer to Contracting Officer
11	Task/Delivery Order Number	GVT	Refer to Contracting Officer
12	Warranty Expiration Date	KTR	MM/DD/YYYY
13	Installation Date	KTR	MM/DD/YYYY
14	CLASSIFICATIONID	KTR	Reference values from Model & Facility Data Matrix tab (SUBITEM)
15	Room Number	KTR	Insert Room Number for installed equipment/asset.
16	Manufacturer	KTR	To be completed by KTR
17	Model	KTR	To be completed by KTR
18	Serial #	KTR	To be completed by KTR

Best Practices: Facility Management (eOMSI)

1. Familiarize yourself with the eOMSI process:
 - a. The Process begins during DD phase
 - b. Follow instructions on the eOMSI spreadsheet file
 - *Download & installation of a Revit Plugin is not required*
 - c. The DOR's and KTR populate eOMSI data (separately):
 - *UniFormat*
 - c. Government extracts data in XML format to populate:
 - *MAXIMO software*
 - d. The Process ends during Construction phase
 - *Record Model with final data*

Summary

Upon successful fulfillment of these BIM Requirements you get:

- a. Accurate Design & As-Built Geometry and Floor Plans
- b. Facility Asset Data:
 - a. *Specs*
 - b. *Quantities*
 - c. *Cost*
 - d. *Manufacturer Data*
 - e. *Warranty Data*
 - f. *Location*
- c. Geolocation Coordinates:
 - a. *GIS Location, Orientation & True North*
 - b. *Ability to do automated assembly layouts with control points*
- d. And so much more!

Advise: Host Data on the Cloud

Conclusion

- We have seen the benefits of completing BIM Requirements such as Facility Management data input & extraction
- Why isn't this a Standard Operating Procedure?
 - Human Nature: won't fix until broken
 - Sometimes challenging to meet these requirements due to budget constraints
- Let's not wait for another catastrophe to strike
- Let's meet halfway and work together to make the future a brighter one for all generations to come



QUESTIONS?

THANK YOU!

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