

TDS-NAVFAC EXWC-CI-1404

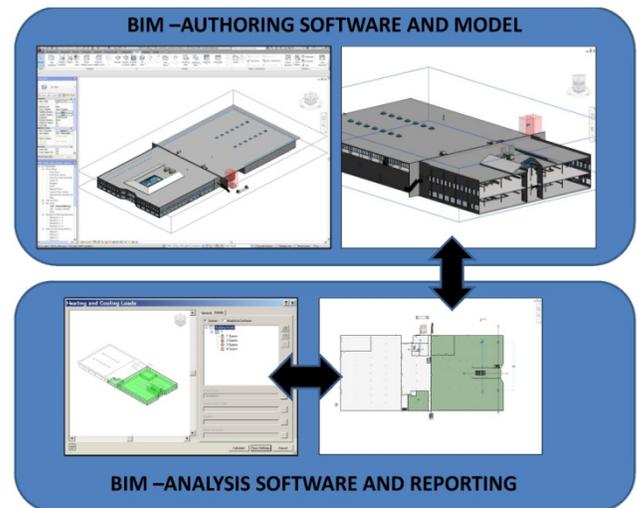
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## BUILDING INFORMATION MODEL (BIM) MANAGEMENT FOR STANDARDIZED ENERGY & ENVIRONMENTAL PARAMETERS

### Technology Description

Naval Facilities Engineering and Expeditionary Warfare Center (NAVFAC EXWC) is tasked to create, demonstrate, and validate a standard Building Information Modeling (BIM) object class data exchange library for select standardized designs/facility types that specifically address critical building envelope object-based parametric modeling. The project team used an existing office building (NBVC PH1100) and barracks (Bldg KJ Intrepid Hall) to evaluate BIM's potential to support DoD energy savings goals. The team's goal is to develop and analyze parameters for energy analysis, demonstrate BIM's potential to attain sustainability objectives that may assist with energy action choices, and to identify consistency in recording and reporting of energy and environmental data.

The team chose off-the-shelf BIM software to determine modeling value and practical use. Preliminary findings indicate that the Navy would gain the most value from BIM by specifying design and constructability models to contain key performance attributes. More specifically, the thermal properties found under type properties in family objects are critical building attributes within the model required to utilize BIM for building level reporting of Certified Facility Managers (CFMs). Once created within the as-built model, these new attributes are then compared with definitions for Energy Conservation Measures (ECMs) on counting for EISA 432 CTS reporting. Building level data within a BIM platform may eventually



become interoperable with Maximo and other existing Navy enterprise authoritative database systems.

Richly attributed data about building assets that are developed in BIM during the building design and construction phases can be pushed directly into Maximo during commissioning or at building handover. The integration requires Maximo version 7.x or later licenses.

### Value to the Warfighter

In an environment of diminishing resources, providing minimum building performance requirements and reducing life cycle costs will enhance DoD mission capability. Building Information Modeling (BIM) software is used to create building systems, mechanical

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zones, and attributes used to analyze energy performance.

### **Technology Transition Documentation**

Transition Category 4 - to provide the Government the knowledge base or information to make decisions. The report TR-NAVFAC EXWC CI-1401 'BUILDING INFORMATION MODEL (BIM) MANAGEMENT FOR STANDARDIZED ENERGY & ENVIRONMENTAL PARAMETERS' provides conclusions on the importance of key performance parameters of thermal properties, mechanical BIM Level of Detail (LOD), minimum hardware support requirements for BIM, and the importance of energy model calibration. It will be available shortly on the Defense Technical Information Center, [www.dtic.mil](http://www.dtic.mil).

### **Site Implementation**

It is essential that the transfer of models and information within the models from the front-end BIM authoring tools to energy analysis software become more uniform, seamless, and accessible in exporting 3D data with integrated energy data. Additionally,

NAVFAC's authoritative system for building information must be Maximo version 7.x or later compatible.

### **Specific Applications**

This study concluded that building energy simulation is a convenient and efficient method to evaluate energy consumption. Specific applications using three-dimensional building components enriches a facility BIM model by providing comprehensive visualization of the facility's architectural and mechanical systems. This is made further evident with the use of all the different combination of angles, views and levels of detail which come together to provide a real-space three-dimensional simulation experience and excellent spatial perception and facility referencing. All of these features available for modeling can be especially helpful for a designer, engineer, or facility manager when sizing and selecting new equipment and components or analyzing building performance. The facility's BIM model also benefits as a reference tool for material properties and information that accompany these components.

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