Real World BIM: The Owner's Perspective

Geoff Williams / Daniel Stonecipher

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Class summary

For a facility manager and building owner, the information embedded in a Revit/BIM model represents the most tangible connection to the collective knowledge gained by the design team, the constructor and past operators of a facility. However, the technology, change and confusion surrounding BIM in the facility management industry is making it very difficult for a facility manager to navigate.

This panel, led by facilities and FM technology experts from IFMA's Information Technology Council, will lead the audience through the BIM value proposition for owners and provide tools for assessing if BIM is the correct tool for their specific operation. This will include a discussion about why BIM, at this point in time, may not be the correct solution; and separately, for those who are ready for BIM, how to adequately specify the needs of an organization related to BIM. For some, this may include developing a roadmap towards BIM aspirations.

Key learning objectives

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

- Understand and discuss the value of BIM to facility managers.
- Learn how to establish if BIM is right for an FM and his/her organization.
- Learn how to specify what an FM wants from BIM.
- Discuss when BIM may not be the solution for an FM.

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Introduction

For a facility manager, the information embedded in a BIM model represents the most tangible connection to the collective knowledge gained by the design team, the constructor and **past operators** of a facility.

This panel will lead the audience through the BIM value proposition and provide tools for assessing if BIM is the correct tool for their specific operation.

What is Facility Management (FM)?

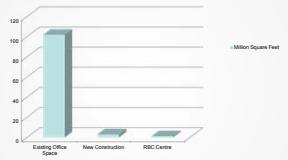
IFMA defines FM as:

Facility management is a profession that encompasses multiple disciplines to ensure functionality of the built environment by integrating people, place, process and technology.

11 Core Competencies of Facility Management

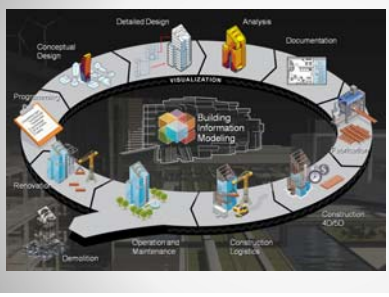
- Communication
- Emergency Preparedness and Business Continuity
- Environmental Stewardship and Sustainability
- Finance and Business
- Human Factors
- Leadership and Strategy
- Operations and Maintenance
- Project Management
- Quality
- Real Estate and Property Management
- Technology

How to get BIM into an Existing Building



Toronto Office Space 2007
National Real Estate Investor

Trends and the Value of BIM?



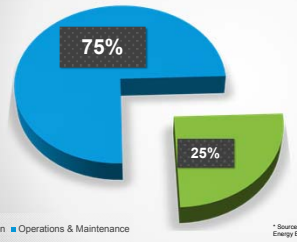
MAD – 4,000 years

CAD – 40 Years

BIM – 10-12 Years

Revit – April 2000

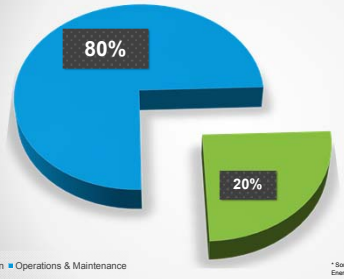
Life Cycle Costs of a Building



According to *IFMA*, 25% of a building's lifecycle budget is dedicated to the design and construction of the building. The remaining 75% is spent on operations and maintenance.

* Source: 2008 Buildings Energy Data Book, Buildings Technologies Program, Energy Efficiency and Renewable Energy, U.S. Department of Energy, page 3-12.

24-7 Life Cycle Costs



The median lifespan of a typical office building is 73 years.* However, at a 24/7, critical functioning facility such as an airport, the high usage factor is more likely to push the lifecycle cost past 80%.

* Source: 2008 Buildings Energy Data Book, Buildings Technologies Program, Energy Efficiency and Renewable Energy, U.S. Department of Energy, page 3-12.

BIM by the numbers ($$$)

- 10 Story Building in Atlanta
- 10,000 sq ft per story
- $145.00 per sq ft to build = 4.5 Mil *RS Means
- 8.25 per sq ft to operate = 825,000/year *BOMA
- Life of Building (25 years) = 20+ Mil

BIM by the numbers ($$$)

How long does it take to find proper wire runs ?

How long to research light fixture, door hardware, carpet, paint, filters ?

Maybe 5% of a work orders time

825K x 5%= 41K per year savings = 1Mil+ Over the life of the building

Reduced inventory costs

Reduction in cost for repurposing space

Better Customer Service

Data entry is done at time of build

Some cost can be capitalized

Federal BIM Requirements

- Much of the Federal Government is moving towards requiring BIM on most of all of their building projects. Currently GSA, Army Corps of Engineers, Air Force and Coast Guard are requiring BIM on specific projects.

GSA

U.S. AIR FORCE

United States Coast Guard
U.S. Department of Homeland Security

- These requirements will only increase as the benefits become more apparent and the software and process improve.

- Source GSA Whole Building Initiative

Federal BIM Adoption

The **GSA** (General Services Administration) was the first government organization to lead the US government into BIM and had a primary role in promoting BIM in the entire industry. They remain today a leader in the initiative, continually breaking new ground.

U.S. Air Force Building Information Modeling for MILCON Transformation

U.S. Army Civil Engineering Research Laboratory (CERL) The Corps of Engineers with the support of their laboratories are transforming to the use of BIM and leading industry transformation with products such as COBIE.

U.S. Coast Guard has also been a leader among government agencies and have pioneered the linking of mission to facilities and use of facility information during the operations and sustainment phases of the lifecycle.

State Government BIM Adoption

Texas

The Texas Facilities Commission (TFC) is responsible for planning, providing and managing facilities for more than one hundred state agencies in over 290 cities throughout Texas. Our current inventory totals 24 million square feet of leased and state-owned properties which include office, warehouse and parking facilities supporting the needs of over 55,000 state employees.

Wisconsin

This BIM Guideline applies to:

** Required on all construction (new and addition/alteration) with total project funding of $5M or greater,*

** Required on all new construction with total project funding of $2.5M or greater,*

** Required on all addition/alteration construction with total project funding of $2.5M*

or greater that includes new addition costs of 50% or more of total,

** Encouraged but not required on all other projects.*

Local Government BIM Adoption

Although Local Governments are moving slower, several follow State and or Federal guidelines when requesting proposals so we will start to see movement in that direction in the years to come.

NATaT National Association of Towns and Townships

National League of Cities

NACo National Association of Counties The Voice of America's Counties

BIM in Healthcare

Piedmont Newnan Hospital was one such owner with limited familiarity with BIM. As preliminary planning began on Piedmont's 136-bed, 350,000-square-foot facility, project manager KLMK Group introduced the idea of BIM as a cutting-edge technology that could assist the hospital in making better decisions earlier in the process. Specifically, the goals for utilizing BIM on the development of the new facility were to:

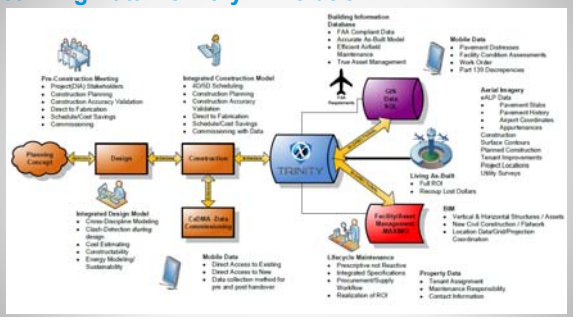
- Help Piedmont make decisions during the design process through 3-D visualization of specific components in the facility, such as the building exterior and patient rooms;
- Expedite the project schedule while controlling costs; and
- Provide the hospital with a 3-D close-out document.

Healthcare Design STEVEN C. HIGGS and DAVID Z. STOKES

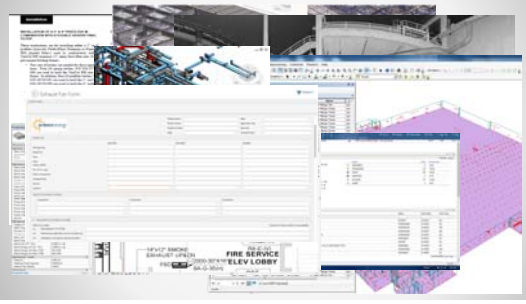
Let's Develop a BIM Roadmap for Existing Buildings

- Where are we starting from?
- What would we like to achieve with BIM?
- What might our steps look like?
- Does this make sense for us?

Realizing Data Delivery - Evolution



Multiple Sources of Data



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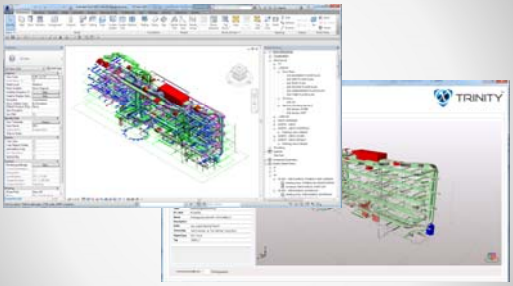


Multiple Sources of Data
Occupant Evaluation and Feedback

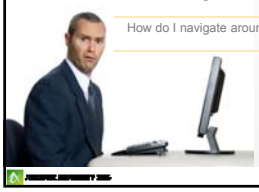
Discussion – BIM and Real World Considerations

"Would a detailed facility assessment survey provide value no mater what the final decision was on BIM?"

- Is all the data relevant to your business model?
- How much data is there to track?
- How big is the facility?
- Does it even warrant CAFM?
- Are electronic drawings available?
- How current are they?
- What is the age of the facility or portfolio?
- Is the space owned or rented?
- Can you prove the ROI?
- Can you maintain the model?

Taking your BIM to FM

- What software do I need?
- How do I see my data?
- How do I manage my data?
- How do I navigate around my model?
- How do I navigate around my model?



A New Way of Thinking

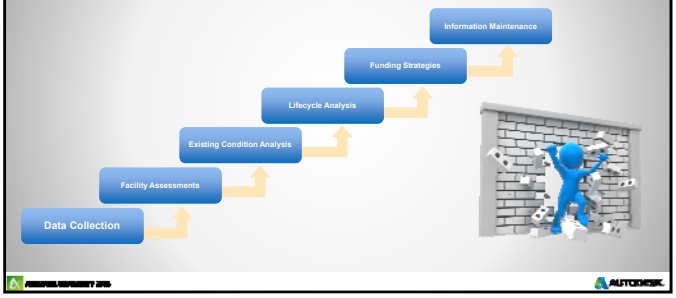
Normalizing Data, Stakeholders and Processes

- ✓ *Ongoing Data Migration*
- ✓ *Perpetual As-Built drawings*
- ✓ *Perpetual Commissioning (Cx)*
  - ✓ *Retro and Re-Commissioning*
  - ✓ *Whole Building Cx*
- ✓ *Scheduled Facilities Condition Assessments*

Traditional As-builts will transform from marked up field drawings and O&M's or limited CAD or BIM's, to a dynamic process of continuous data management that is engaged not only post construction, but throughout the entire capital planning, budgeting and operations cycle.

Source: Daniel R. Stonecipher

Planning & Design for Long Term Analysis



Facility Condition Assessment




"(FCA) is an industry term that describes the process of a qualified group of trained industry professionals performing an analysis of the condition of a group of facilities that may vary in terms of age, design, construction methods, and materials.

How often should we conduct an FCA?

Why should we fund it?

What do we do with the data?

Case Study: Centre for Health & Safety Innovation

Overview

BIM for Property/Facilities Management

- Introduction to Centre for Health & Safety Innovation
- What was needed as an Landlord, Tenant, Owner
- Case Study: CHSI Existing
- Application of BIM
- How to get BIM into the Facility
- Conclusion: Benefits of Operating with BIM

About Centre for Health & Safety Innovation

- 100,000sf office building built in 2006
  - 1 Floor
  - 5 Tenant Suites
  - Conference Centre
  - 9 Training Rooms
  - 5 Meeting Rooms
  - 1 Executive Boardroom
  - Full service cafeteria and catering
  - Open to the public
- 20,000sf warehouse and print shop

Introduction to CHSI – Customer Focussed

Introduction to CHSI – Customer Focussed


Introduction to CHSI – Customer Focussed


What Any FM Needs to Operate

A. Good Documentation = Good Decisions (MINIMUM)
- 2D, *As-Built* CAD Drawings – Minimum
- Equipment Data – Nameplate data, etc. (Database preferred)
- Documents – Electronic (PDF preferred)
  - Operations and Maintenance Manuals
  - Finish and hardware schedules
  - Warranties

B. The Ability to Maintain Documentation
- CAD - Kept in as-built condition
- CAFM – Manage data, run scenarios
- CMMS – Manage Work
- Lifecycle Tools – Plan for the future

What was Inherited

Some Documentation = Poorer Decisions

- 2D CAD Drawings
  - Not maintained, incomplete
  - Not as-built
  - No control diagrams
- Equipment Inventory
  - Asset list – created for insurance purposes
  - Various equipment lists for contracts, incomplete
- Operating & Maintenance Manuals
  - In binders by project, some projects missing
  - Binders of maintenance history (paper work orders from contractors)

Ability to Operate – Effectively Hamstrung

- Cannot provide reliable drawings to contractors
  - No compiled set of documents
  - Certain as-built drawings never received
  - Not as-built i.e. Sewer lines, equipment locations
- Data is not organized in a database
  - No filtering, grouping, searching ability
  - Have found equipment that was not captured in any list – Not being maintained
  - No reporting
- No Electronic Documents
  - No searching by equipment
  - No service history
  - No breakdown analysis
- Poor Information for Lifecycle Costing
  - Garbage in, garbage out – the above needs to be better developed in order to proceed

What if there was an initial BIM model?

- Many operational problems could be fixed during design/construction
  - Inaccessible equipment (Exhaust Fans)
  - Poor placement of equipment (Water Heaters)
  - Equipment made inaccessible after walls added (Junction Boxes)
- Proper as-built documents – Require LOD 500
- Ability to feed a CMMS solution through COBIE Data
- Ability to feed CAFM/Lifecycle costing through IFC's
- Ability to utilize the model for operating
- Require updated model as As-Built for changes made to the building

What if BIM was implemented now?

- Much more difficult to implement
  - **Need to complete documentation set**
  - Survey existing conditions
  - Gather equipment data
  - Fill in all gaps
  - Purchase software
  - Train staff
- Create LOD 500 model

How to get BIM into an Existing Building?

- *Communication* - More effectively communicate needs and concerns
- *Emergency Preparedness and Business Continuity*
  IWMS as a tool for planning and scenarios using BIM as a basis.
- *Environmental Stewardship and Sustainability*
  Use BIM tools to continuously reduce the environmental impact.
- *Finance and Business*
  Use metrics and data from BIM to make informed decisions.

How to get BIM into an Existing Building?

- *Human Factors*
  AODA for the Built Environment: Planning and compliance
- *Leadership and Strategy*
  Plan for the future with a strong foundation
- *Operations and Maintenance*
  Use tools, data, model for day-to-day operations and CMMS

How to get BIM into an Existing Building?

- *Real Estate and Property Management*
  Metrics for leasing, chargebacks, needs assessments etc.
- *Project Management*
  Plan with accurate data, schedule and return data to BIM
- *Quality*
  Improve interoperability through automation
  NIST Report 2004 - $10.6 Billion borne by owners/operators

Costs and ROI

A. Conversion Costs

- Surveying costs - $20,000
- Create electronic documentation - $10,000
- Create BIM model at LOD 500 - $20,000
- Purchase CMMS - $8,000
- Purchase CAFM - $7,000
- Training and implementation of CMMS/IWMS/CAFM $20,000

Total Estimated Costs = $85,000 - *about $0.71 per square foot*

Costs and ROI

B.Potential Savings

- Operational (hard/soft savings)
  - 15 minutes per work order average
    500 work orders per year @ $80/hr = $10,000 – Contractor
    500 work orders per year @ $40/hr = $5,000 - Owner
- Planning (soft savings)
  - Gathering of data takes an additional
    5 hours per instance @ $40/hr, 20 times per year = $4,000

Costs and ROI

B.Potential Savings (Continued)

- Real Estate planning (hard savings)
  - Over/underestimated space needs
    1% of 120,000sf @ $30/sf = $36,000
- Construction (hard savings)
  - Risk of errors and omissions
    15% of $150,000 capital budget = $22,500

Costs and ROI

C.Return On Investment

- Comparing costs to potential savings on the previous slides:
  $85,000:$77,500/year
- Simple payback in 1 year if all savings realized
- Simple payback in 2 years if only half of savings realized

Conclusion

Conclusion: Benefits of Operating with BIM

A. Consistent, Accurate Information
B. Common Platform to Maintain 'As-Built' Condition
C. Ability to Share Data
D. Operate Confidently
E. Effectively Plan for the Future & the Next Life Cycle
F. One-Stop Shopping
G. Return On Investment

Open Discussion

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Thank You!

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