BIM for Facility Management
Managing for the Building Lifecycle

Michael Schley, IFMA Fellow, CEO and Founder, FM:Systems

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About Michael Schley

• Began career as an architect.
• Founded FM:Systems in 1984
• Serve as a Trustee on the IFMA Foundation
• Chair the IFMA Foundation’s Knowledge Management Committee
• Named IFMA Fellow in 2008
• Serve on Cornell and Georgia Tech Advisory Councils

About FM:Systems

• Developer of Integrated Workplace Management (IWMS) Software
• Autodesk Preferred Industry Partner for BIM and FM
Information to Manage the Life Cycle of our Buildings

90% of the costs of a building occur after construction.
Facility Management Benefits

1. Integration with Maintenance Management
Facility Management Benefits

Building Commissioning
Classical Method

1. Difficult to Access
2. Impossible to Analyze
3. Hard to Update
Facility Management Benefits

The “Electronic Owner’s Manual”
Replacing 3-Ring Binders with a live information system
Facility Management Benefits

2. Improved Space Management
Facility Management Benefits

3. Building Analysis, Particularly Sustainability Initiatives
Facility Management Benefits

4. Change Management
Facility Management Benefits

5. Lifecycle Management

Figure 1: Asset Lifecycle Model for Total Cost of Ownership Management

Source: Whitepaper published in the USA by IFMA and authored by IFMA, APPA, US Federal Facilities Council, Holder Construction

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Facility Management Benefits

• 6. BIM and Building Automation Systems
BIM and FM Possibilities
BIM and the FM Profession

• What does this all mean to Facility Management Professionals?
1. The Need for Information Management

- Information is not free
  - Cost to Collect
  - Cost to Verify
    - Nothing is more expensive than information you can’t trust.
  - Cost to Maintain
1. The Need for Information Management

An Approach

- Define the stakeholders, requirements and priorities
- Determine Criteria
  1. Health or Life Safety Requirements
  2. Regulatory Requirements
  3. Business Justification
2. Deciding Where to Begin

Prime Candidates for BIM

- Owners who Occupy
  - Education
  - Government
- Technical Buildings
  - Laboratories
  - Health Care
  - Airports
- New Buildings
2. Deciding Where to Begin

- What about Older Buildings?
  - Lightweight BIM - At Minimum:
    - Accurate Walls and Doors
    - Method to Keep Updated
  - Special Purpose BIM
    - Created for Special Analysis
    - Possibly Maintained but not necessarily.
  - Point Clouds
3. Changes in Relationships
Technology Enabling Collaboration

- Architects
- Interior Design
- Engineers
- Contractors/Subcontractors
- Project Management
- Space Management
- Facility Maintenance
- Real Estate
- BIM Models & Data

BIM in the Cloud
Technology can facilitate collaboration.

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4. Changes in FM Skills

• Information Management Skills
  – Writing specifications for information.
  – Managing changes.
  – Reviewing for completeness and accuracy.
5. Changes in the FM Practices

- Building Commissioning
- Ongoing Lifecycle Management
  - Capital Improvement Budgeting
  - Ongoing Building Assessment
Integrating BIM with Facility Management Systems

BIM

Middle-ware

CAFM / CMMS / IWMS

COBie

Direct BIM Integration

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FM:Systems Direct BIM Integration

Web Server

Database

AutoCAD Drawings

Revit BIM Models

Architects/ Engineers/ Contractors

Owners/ Facility Managers

FM:Interact

Space Management

Maintenance

Real Estate

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1. Bi-directional Flow of Information
   BIM Model Stays Live

FM:Systems Direct BIM Integration

- Web Server
- Database
- Revit BIM Models
- AutoCAD Drawings
- Space Management
- Maintenance
- Real Estate

Architects/ Engineers/ Contractors
Owners/ Facility Managers

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2. Support for both Revit and AutoCAD
3. Web access provides access to BIM for all users.

Web Server

Database

AutoCAD Drawings

Revit BIM Models

Architects/ Engineers/ Contractors

Owners/ Facility Managers

FM:Systems Direct BIM Integration

FM:Interact

Space Management

Maintenance

Real Estate
4. Use of web services and cloud-based hosting provides secure access to shared data by owners, AE’s, and contractors.
FM:Systems BIM Working Group
Case Study 1

Xavier University

- A Jesuit, Catholic university in Cincinnati
- Founded 1831
- 7,019 total students
- 70 buildings – over 2 million GSF
Xavier’s Hoff Academic Quad and Residence Hall Project

- $117 M, Largest capital projects in schools history
- Added 25% to campus
- 4 new buildings
- BIM used to facilitate design and construction
Xavier’s Challenges

• Facility information time-consuming or costly to gather
• Rapidly growing campus means even MORE information

“...I collected the data for 1.5M SF on campus by walking and typing the information into the system, I don’t want to do that again!

Greg Meyer, Xavier Facilities”
The designers and the contractors already have the information that I need to maintain and manage the buildings why should I have to recreate what has already been accomplished?

Greg Meyer, Xavier Facilities
Xavier’s Results

- Modeled entire campus in BIM
- Producing 10 Year Comprehensive Facilities Plan
- Forecasts facilities capital costs using data derived manually and from BIM models

10 YEAR COMPREHENSIVE FACILITIES PLAN - OVERVIEW

Background
The purpose of this report is to provide a 10 year comprehensive facilities plan that strategically incorporates the components of new construction, reduction of deferred maintenance, and ongoing renewal and replacement of Xavier’s Plant. The schedule and cost for all new construction was derived from the 2011 update to the Campus Master Plan. The renewal and replacement financial requirements as well as the deferred maintenance financial requirements were derived from the facilities assessment system database.

The Plan is in the form of a report detailing campus needs for the next 10 years, broken down by facility type and associated capital and operating costs.
Room finish information from design and construction phases....
Is linked to lifecycle data (expected life, replacement cost) in the facility management system.
Case Study 2
MathWorks

• “Accelerating the pace of engineering and science”
• Global software company headquartered in Natick, MA
• Over 2,100 staff worldwide
MathWork’s Apple Hill 4 Project

- 4 story 180,000 square foot corporate facility
- 460 offices, 300 person cafeteria, monumental stair atrium and various support spaces
- Anticipated Delivery date: December 2012
MathWork’s Challenges

- Maintenance management system not fully implemented
- Difficult to properly catalog and inventory building assets
- Highly technical building comes with a lot of information
MathWork’s BIM Vision

- Require BIM deliverables for project
- Leverage the data and information in the models to populate space and asset system
## Mathworks Results

### Detailed BIM Deliverable Requirements

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Mathworks Results
Detailed BIM Data
Case Study 3

Western Michigan University

- Located in Kalamazoo, Michigan
- 25,000 Students
- 8 million square feet
- 115 Buildings
Western Michigan Challenges

• Energy Analysis
• Renovation and retrofit requirements.

• Decision in 2009 to model 2/3 of 8 million SF campus.
Western Michigan Results

- Leveraged existing CAD drawings.
- Used student interns, providing valuable real-life experience.
- Completed 80% of campus in 5 months.
- Helps WMU make smarter decisions.
**ROI?**

How do you justify the cost of modeling?

How do you justify the cost of not modeling?
You assume that the status quo is free.

- Peter Strazdas, Associate Vice President of Facilities, Western Michigan University
BIM for Facility Managers
An upcoming publication by the IFMA Foundation and John Wiley & Sons

Scheduled for release in early 2013
HVAC system:

1. Central VAV, Electric Resistance Heat, Chiller <0.5kW/ton
   = $128,288

2. Under floor Air Distribution
   = $107,327
HVAC system:

Under floor Air Distribution:

Better alternative to conventional ceiling-based air distribution systems.

Why?

This technology uses the open space (under floor plenum) between the structural concrete slab and the underside of a raised access floor system to deliver conditioned air directly into the occupied zone of the building.

UFAD systems advantages
- Improved thermal comfort
- Improved indoor air quality,
- Reduced energy use.

By combining a building’s heating, ventilating, and air-conditioning (HVAC) system with all major power, voice, and data cabling into one easily accessible service plenum under the raised floor, significant improvements can be realized in terms of increased flexibility and reduced costs associated with reconfiguring building services.

- Information technologies
- High churn rates.

http://www.cbe.berkeley.edu/underfloorair/techoverview.htm
Closing Thoughts

- **BIM as a Practice**
- **Sharing Experience is Essential**
- **Manage for the LifeCycle**
Questions?
Thank You