

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)?

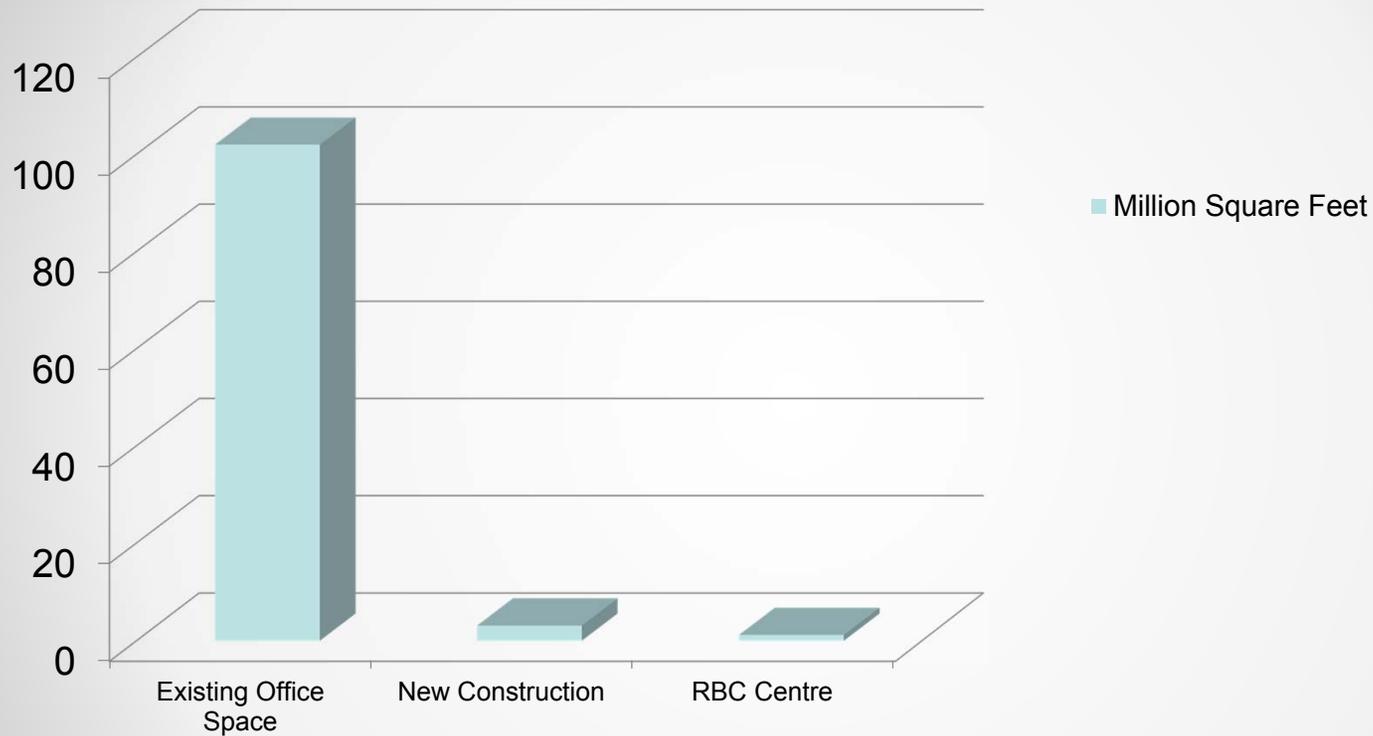
IFMA defines FM as:

*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

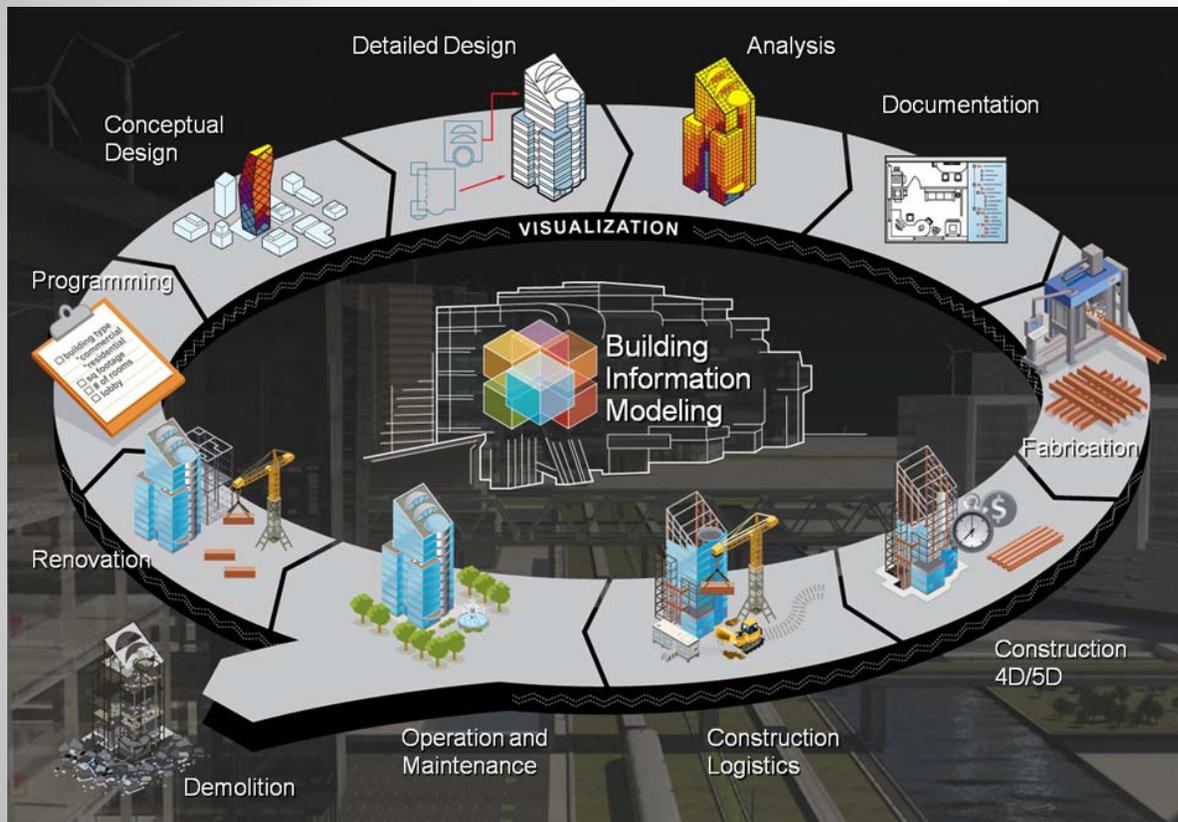
- Communication
- Emergency Preparedness and Business Continuity
- Environmental Stewardship and Sustainability
- Finance and Business
- Human Factors
- Leadership and Strategy
- Operations and Maintenance
- Project Management
- Quality
- Real Estate and Property Management
- Technology

How to get BIM into an Existing Building



Toronto Office Space 2007
National Real Estate Investor

Trends and the Value of BIM?



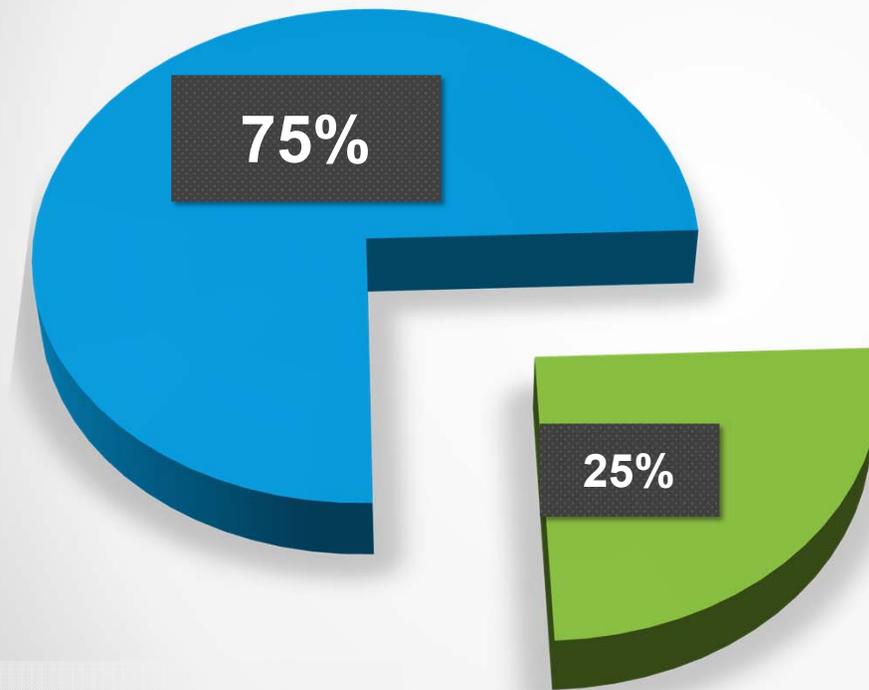
MAD – 4,000 years

CAD – 40 Years

BIM – 10-12 Years

Revit – April 2000

Life Cycle Costs of a Building

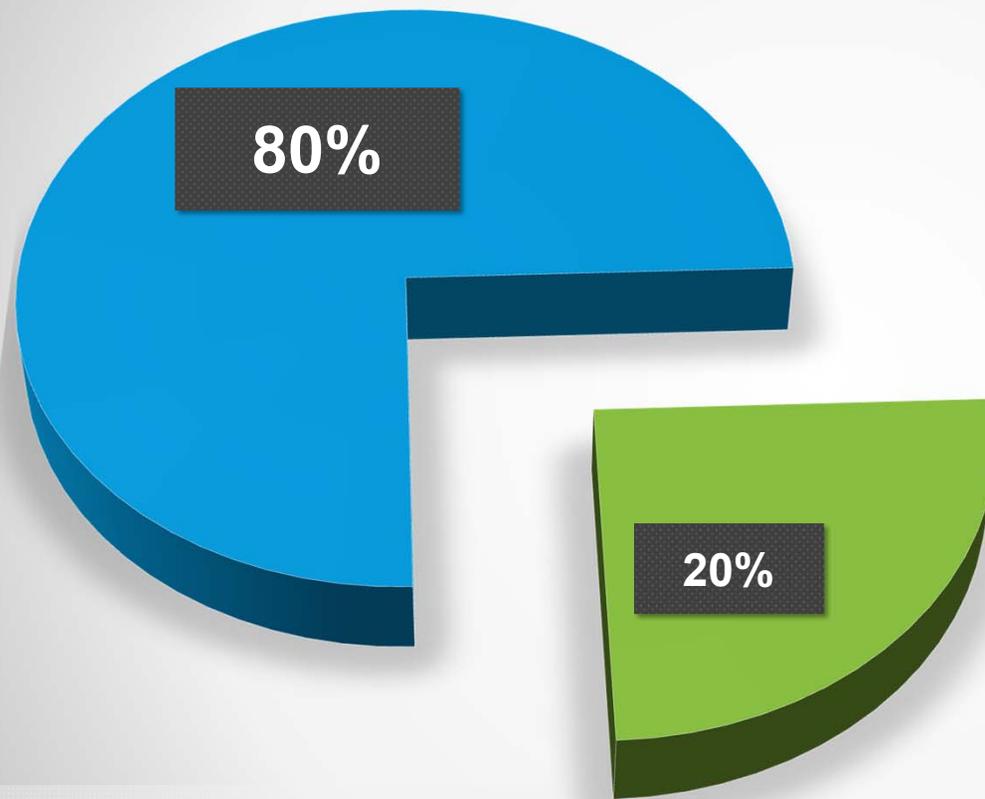


According to *IFMA*, 25% of a building's lifecycle budget is dedicated to the design and construction of the building. The remaining 75% is spent on operations and maintenance.

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

■ Design & Construction ■ Operations & Maintenance

24-7 Life Cycle Costs



■ Design & Construction ■ Operations & Maintenance

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.

Current & Leading Trends in FM Technology



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

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

Reduced inventory costs

Reduction in cost for repurposing space

Better Customer Service

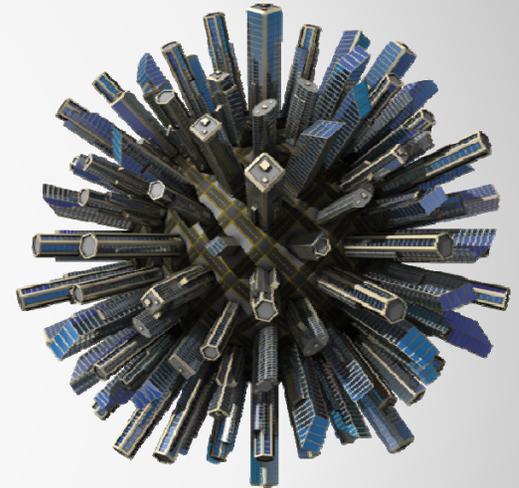
Data entry is done at time of build

Some cost can be capitalized

Adoption & Requirements – Many Aspects

Many Standards, Programs and Initiatives that define or require high performance and sustainable design requirements

- USGBC, LEED, GBI
- ASHRAE, EPA, ASHE, ISO
- NIBS, NCS, AIA
- gbXML, Haystack, LoRa, CoBIE, SpIE
- Federal and State Governments
 - Standards, benchmark and disclosure



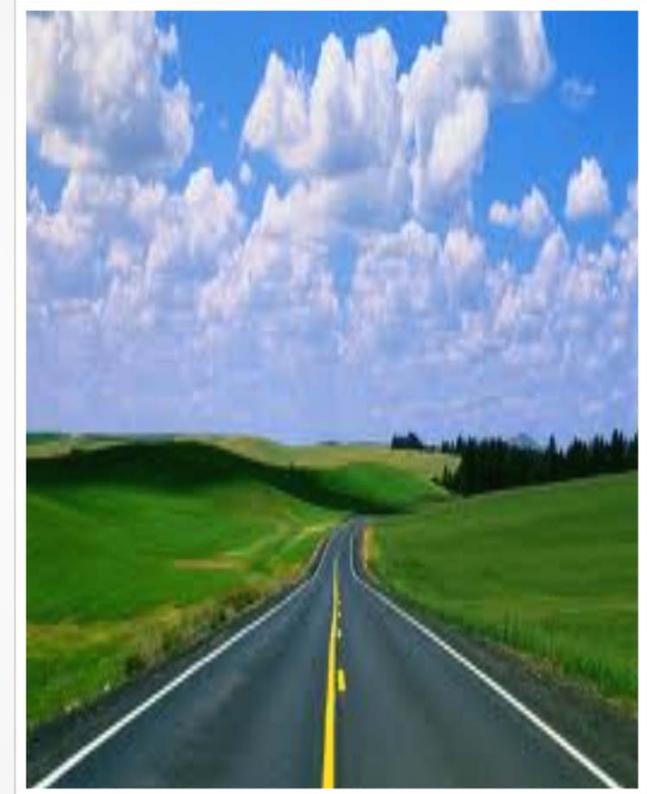
Let's Develop a BIM Roadmap for Existing Buildings

Where are we starting from?

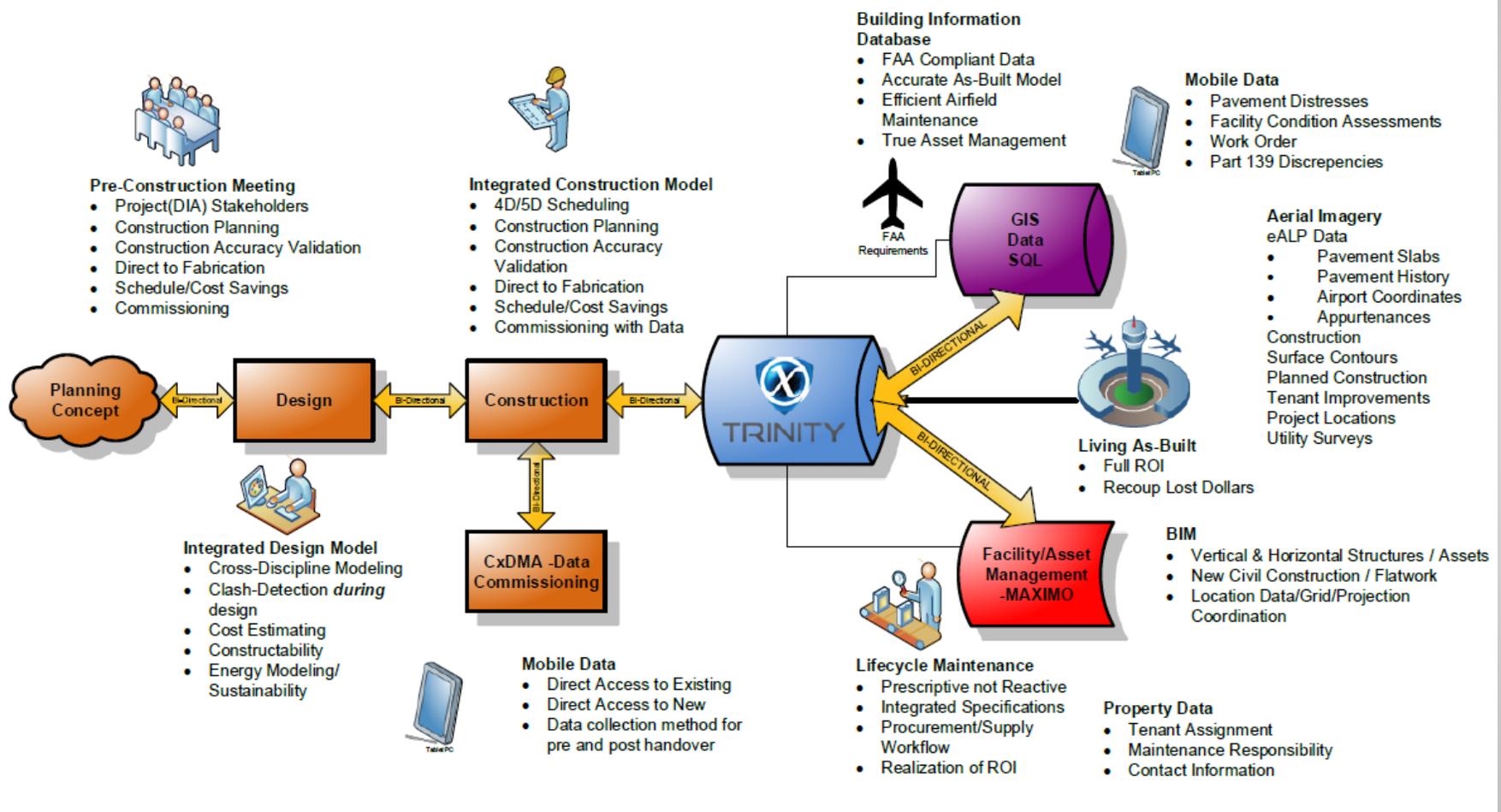
What would we like to achieve with BIM?

What might our steps look like?

Does this make sense for us?



Realizing Data Delivery - Evolution



Multiple Sources of Data

Installation

INSTALLATION OF A 2" & 4" PREFILTER IN COMBINATION WITH A DOUBLE HEADER FINAL FILTER

These instructions are for installing either a 2" or 4" prefilter (typically PerfectPleat, Premium or Premium HM pleated filters) used in combination with VarCoal DFI (nominal 12" deep) final filter into 16 galvanized holding frames.

- Two sets of latches are needed for these applications. Four (4) spring latches, P/N 026-357-006 are used to hold the VarCoal DFI into frame. In addition, four (4) prefilter latches, 026-36339-001 are used to hold the 2" and 026-36339-000 are used to hold the 4" prefilter.

Exhaust Fan Form

Common Data

Project Name: _____ Date: _____
 Project Owner: _____ Equipment Tag: _____
 Project Number: _____ Serial No.: _____
 Date: _____ Scanned Code: _____

Manufacturer: _____ Specified _____ Submitted _____ Installed _____

Model No.: _____
 Type: _____
 Class: _____
 Airflow (GPM): _____
 Ext. S.P. (in. wg): _____
 Motor Horsepower: _____
 Voltage/Phase: _____
 Service: _____
 Location: _____

Specific Components Included

Component	Component

Requested Documentation Included

Select if provided

- A1 Manufacturer's Cut Sheet
- A2 Performance data (fans curves and data, etc)
- A3 Installation and startup manual and plans

Mechanical - Leads

- Pressure: 0.000 psi
- Heating Total Capacity: 0.00 Btu/h
- Cooling Per Minute: 0 GPM

tranTV

Name

- Fittings Tee - 200
- Fittings Transi - 200
- Fittings Sprink - 200

View By: Status

By Stat	Status	Value	Percent (%)
	ASSIGNED	3	4.05
	WORKDONE	21	18.89
	WORK	65	59.29
	WORKVIEW	1	0.91
	WORKDE	17	16.46
	COMP	1	0.91

Status, Work Order, Work Type

Status	Work Order	Work Type
WORKVIEW	12-22891	SC
WORKDONE	12-22890	SC
WORKDONE	12-28180	CM
WORKDONE	12-27611	CM
WORKDONE	12-26905	SC
ASSIGNED	12-26311	SC
WORKVIEW	12-44828	SC
ASSIGNED	12-49120	SC
WORKDONE	12-47202	CM
ASSIGNED	12-28986	SC

14"x12" SMOKE EXHAUST UP&DN
 FSD 2000-30"X16" SA-G-35(H)
 RA-E-(V) FIRE SERVICE ELEV LOBBY

Multiple Sources of Data

Occupant Evaluation and Feedback



Discussion – BIM and Real World Considerations



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?

“Would a detailed facility assessment survey provide value no matter what the final decision was on BIM?”

Taking your BIM to FM

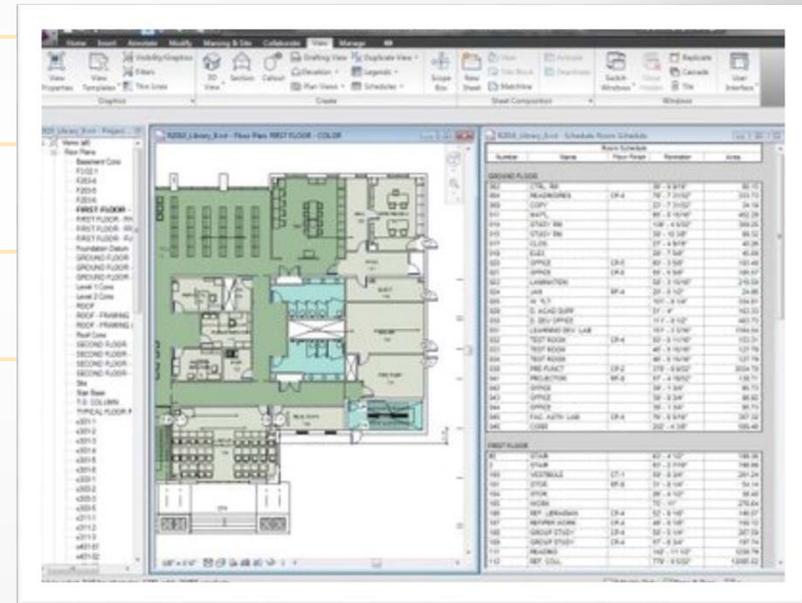
What software do I need?

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?



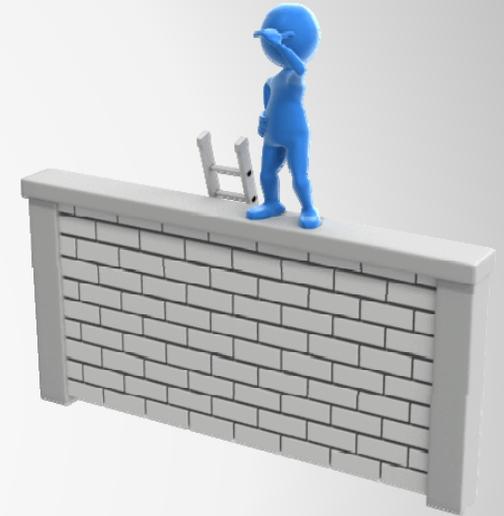
A New Way of Thinking

Normalizing Data, Stakeholders and Processes

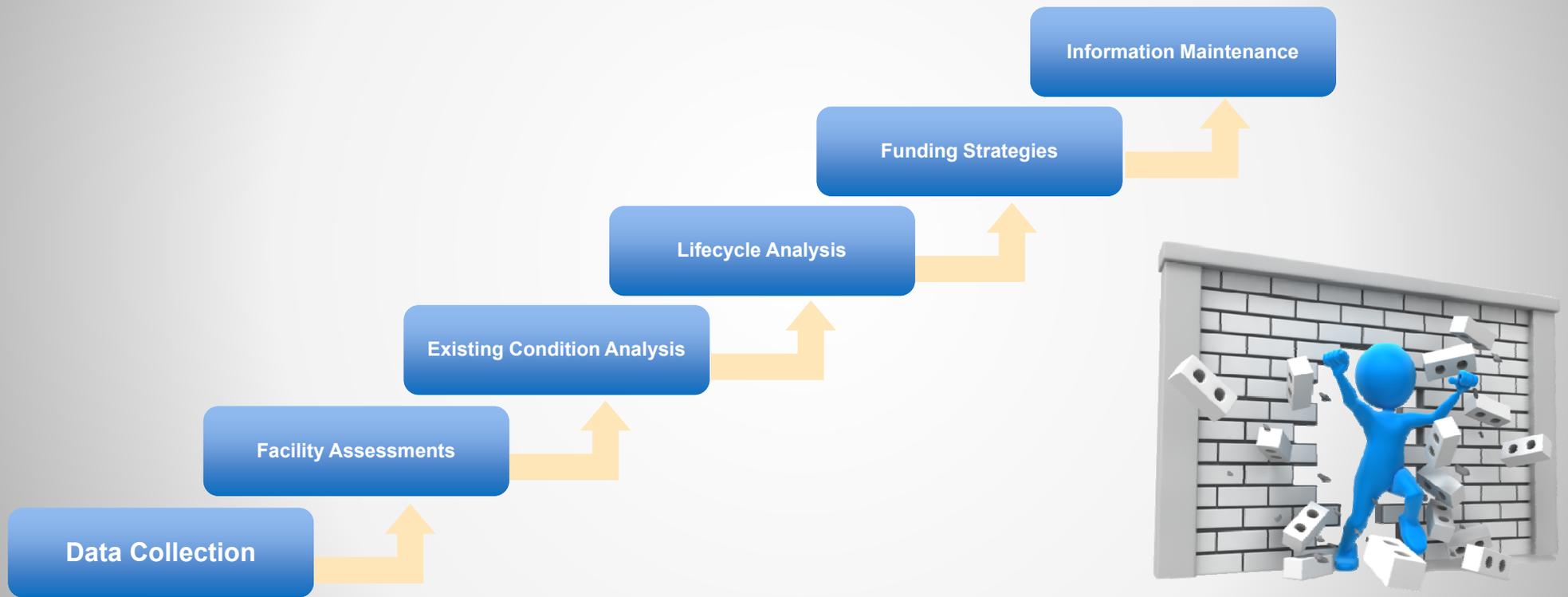
- ✓ *Ongoing Data Migration*
- ✓ *Perpetual As-Built drawings*
- ✓ *Perpetual Commissioning (Cx)*
 - ✓ *Retro and Re-Commissioning*
 - ✓ *Whole Building Cx*
- ✓ *Scheduled Facilities Condition Assessments*

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 - CxDMA



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



Case Study Overview

- 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
 - 4 Tenant Suites
 - Conference Centre
 - Presentation Centre
 - 10 Training Rooms
 - 8 Meeting Rooms plus 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

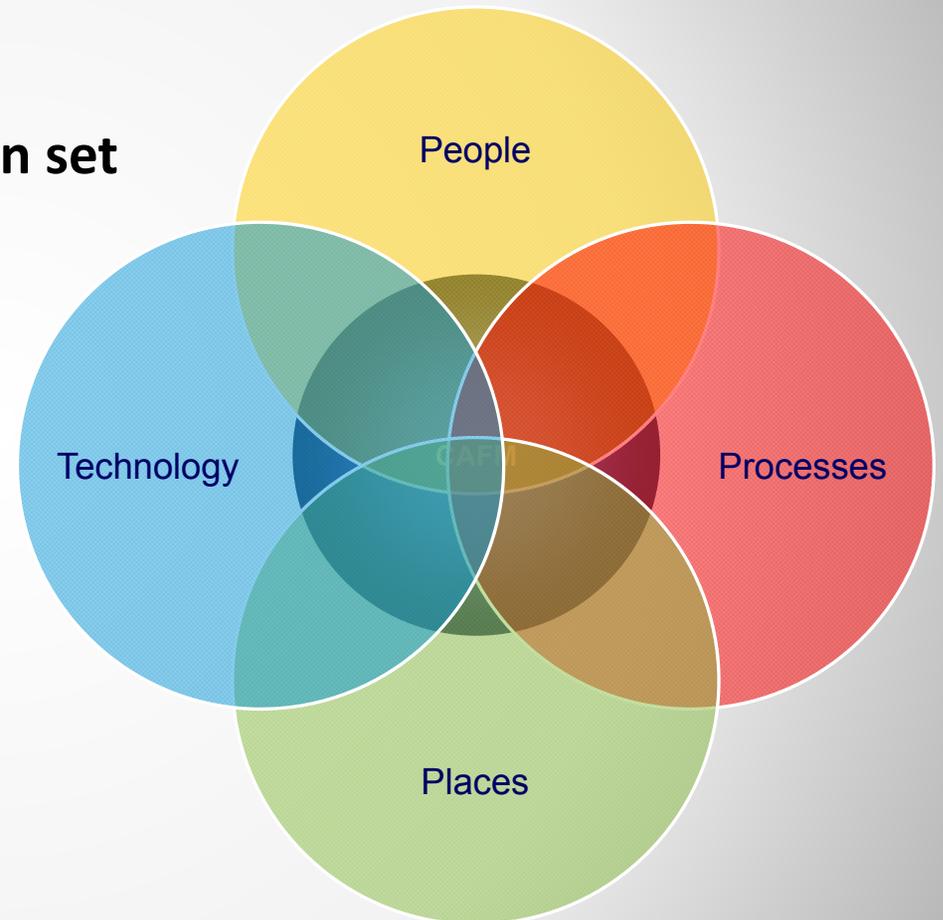
- Cannot provide reliable drawings to contractors
 - No compiled set of documents
 - Certain as-built drawings never received
 - Not as-built i.e. Sewer lines, equipment locations
- Data is not organized in a database
 - No filtering, grouping, searching ability
 - Have found equipment that was not captured 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



Costs and ROI – 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 – 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 – 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 – 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: 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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