IFMA: Minding the Gap: Connecting AEC to Owner for New Construction, As-Built and Handover
IFMA Presentation Series #2
IFMA is the world’s largest and most widely recognized association for facility management professionals.

### By the Numbers:

<table>
<thead>
<tr>
<th>Count</th>
<th>Description</th>
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<tr>
<td><strong>24,000</strong></td>
<td>Active IFMA Members</td>
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<tr>
<td><strong>104</strong></td>
<td>Countries have IFMA Presence</td>
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<td><strong>6</strong></td>
<td>Worldwide IFMA Communities</td>
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<td><strong>134</strong></td>
<td>Global Chapters</td>
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<tr>
<td><strong>16</strong></td>
<td>Industry Councils</td>
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<td><strong>10,000+</strong></td>
<td>Credentialed FM Professionals</td>
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### Cost:

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<td>Professional &amp; Associate Membership</td>
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<td>Young Professional Membership</td>
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<td>Retired Membership</td>
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<tr>
<td>Student Membership</td>
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IFMA membership is an affordable investment with meaningful payoff.

- **84%** of employers state that IFMA education increases the collective FM knowledge of their organization.
- **74%** of employers feel that their reputation is improved by having employees complete IFMA credentials.
Join the IFMA iTC Community Today! $55.00

For more information visit: it.ifma.org or ifma.org

or contact Daniel Stonecipher at dstonecipher@immersivx.com
The goal of the 2nd edition of The Facility Manager’s Guide to Information Technology is to provide current best practices content and extend distribution to membership, interested parties and universities with FM Programs.

Win or Buy a Good Reference Tool!
Kindle or Hard Cover

Thanks for attending
The IFMA Sessions at
AEC Next 2019!
Jacob D’Albora, FMP
Director of BIM-FM Services at McVeigh & Mangum Engineering, Educated and trained as an architect, has embraced and sought to maximize the use of Building Information Modeling (BIM). Graduating from UNC Charlotte with a Bachelor of Architecture, Jacob gained over 10 years of experience before becoming an integral part of the McVeigh & Mangum Engineering (MME) team, a full service, multi-office engineering firm. Jacob has established himself as an industry leader in the BIM-FM arena and, through the use of BIM-FM, has provided the resources and training to facilities personnel necessary to facilitate the efficient execution of building maintenance duties and record keeping.

Doug Sinclair
Facilities Solutions Business Development Manager for Burns & McDonnell, has 29 years of experience in the AEC/OO industry and his skills include; program and project management, project controls, QA/QC, commissioning, as well as facilities and asset management. He has a deep background specializing in program and project lifecycle business process automation, data collection and management, PM/BIM/GIS/FM technologies, data analytics and reporting, including software development, integration and interoperability. Doug is responsible to lead and grow Facilities Solutions services by driving innovation, technology, thought leadership and excellence within the Business & Technologies Solutions group.
Connecting to the Owner; What does that mean?
Why do we do this?

Design → Construction → Handover → Operation
Why do we do this?
Let’s talk about Digital Transformation
Regulating the internet giants

The world’s most valuable resource is no longer oil, but data

The data economy demands a new approach to antitrust rules
These companies represent over 90% of the $3 trillion digital economy market (USD), or 1/3 of the S&P

Source - Forbes
YOUR MOBILE CARRIER SELLS YOUR DATA TO OTHER COMPANIES?
INTERNET OF THINGS
(they are everywhere)

Sensors embedded into their power turbines collect an estimated 500GB of data per day.

If they improve efficiency by 1% across the five of the key sectors they sell to, those sectors stand to make combined savings of $300 billion.
“By 2020, 75 percent of businesses will be digital, or have digital business transformations underway.”

-Gartner
Digital Transformation...

What does that mean for the AEC Industry..?
For my company..? For me..?
How..?
AEC Industry and Technology Adoption
Common Technology and Data Uses in AEC
<table>
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<tr>
<th>Sector</th>
<th>Assets</th>
<th>Usage</th>
<th>Labor</th>
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<td>Media</td>
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<tr>
<td>Professional services</td>
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<tr>
<td>Finance and insurance</td>
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<td>Wholesale trade</td>
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<tr>
<td>Advanced manufacturing</td>
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<tr>
<td>Oil and gas</td>
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<tr>
<td>Utilities</td>
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<td>Chemicals and pharmaceuticals</td>
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<tr>
<td>Basic goods manufacturing</td>
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<tr>
<td>Mining</td>
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<td></td>
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<tr>
<td>Real estate</td>
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<td></td>
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<tr>
<td>Transportation and warehousing</td>
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<td></td>
<td></td>
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<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Retail trade</td>
<td></td>
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<td></td>
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<tr>
<td>Entertainment and recreation</td>
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<td></td>
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<tr>
<td>Personal and local services</td>
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<tr>
<td>Government</td>
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<td></td>
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<tr>
<td>Healthcare</td>
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<tr>
<td>Hospitality</td>
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<td></td>
</tr>
<tr>
<td>Construction</td>
<td></td>
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<td></td>
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<tr>
<td>Agriculture and hunting</td>
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</tbody>
</table>
AEC Industry Challenges
Productivity Challenges

In 2004, a CIFE (Stanford) study showed construction alone as decreasing in productivity since 1964, while all other nonfarm industries have increased productivity by more than 200 percent during the same period.

In March 2013, Dr. Paul Teicholz (CIFE) released an update to the 2004 study indicating very little has changed since...

However, he pointed out that one important source of potential improvement is BIM; specifically “better use of data” to “support owner lifecycle requirements”.

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**Index of Construction Labour Productivity, 1948-2012**

- 1948=2001: Value added per hour
- 1948=2001: Value added per employee
- 1948=2001: Value added per establishment

**Value Added per Employee 2005 dollars**

- Real Value Added per Employee (2005 dollars)
- Construction
- Manufacturing

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**Presented by:**

- IFMA
- Technology Community
- AECNext
- SPAR3D
Interoperability & Handover Challenges

A National Institute of Standards and Technology study from 2004 recognized that the lack of AEC software interoperability conservatively costs the industry $15.8B annually... with nearly $4.8B spent on O&M verification costs.

The most recent Construction Owner’s Survey from FMI/CMAA lists “Transitioning to ongoing operations and maintenance” highest among the 16 areas of support they want from their AE/CM partners.
Recent Trends Changing the Industry and Owner Data Uses
Augmented Reality
Unmanned Vehicle Systems
IoT and the Edge

- Smart Building Energy Management
- Parking Sensors
- IoT Thermostat
- Voice Assist
- Smart Water Meters
- Smart Traffic Signals
- Geofence Beacons
- Smart Outlet
- Smart Street Lights
Why we **HAVE** to leverage technology.
Current Risks of the AECO Industry

SAFETY

“It is encouraging that 90% of all respondents reported safety as a top priority... The really bad news is in safety execution. Seventy-eight percent of those surveyed said they consistently work safely, but only 68% of field supervision could say the same.”

People of Construction Report 2019
Startfire Speaking and Consulting

CURRENT LABOR POOL

• 90% of U.S. general contractors reported that they concerned over the labor shortage. [USCC]

• 57% of contractors plan on hiring more employees in the next 6 months. [CIC]

• 57% of contractors also report having trouble finding skilled workers. [USCC]
Current Risks of the AECO Industry

CONST. COSTS
 Even putting aside current impacts of “trade war”:

“...the increase in project costs over the past few years has resulted in increased material costs and even unavailability of concrete products such as aggregates and cement. Material costs have increased 10-12% over the past year.”

CONST. SCHEDULES

• Pending Economic downturn?

• Owners want everything:
  • Fast
  • Good
  • Cheap

• Cannot have all three.
The Endgame
Role of Data in a Building Lifecycle
AEC’s Affect on the Facility Lifecycle

- 75-85% of a facilities total lifecycle cost is during operations and maintenance
- However the majority of information required to efficiently operate the facility is create during design and construction
- Data handover is crucial to success!
Building Lifecycle Costs

$30 Million Capital Project Costs

$90 Million in O&M Costs over the Lifecycle of the Building (25 years)
12.4% of annual O&M costs are waste due to inability to find information and validity of that information.

\[ \frac{\$90M}{25 \text{ years}} = \$3.6M/\text{year O&M} \]

\[ \$3,600,000 \times 12.4\% = \$446,400/\text{year} \]

<table>
<thead>
<tr>
<th>Wasted Money:</th>
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<tbody>
<tr>
<td>5 years</td>
<td>$2.23 \text{ million}</td>
</tr>
<tr>
<td>15 years</td>
<td>$6.69 \text{ million}</td>
</tr>
<tr>
<td>25 years</td>
<td>$11.16 \text{ million}</td>
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</table>
Case study: Use of BIM during Facility Management & Operations & Maintenance (FMOM) - 92,000 SF Facility / 5 stories tall

RESULTS:

• 63% Reduction in number of hours to complete work orders
• 98.5% Reduction in time needed for asset information
• 4.5% Decrease in costs of Engineering Maintenance
• 4% Reduction in projected cost per Patient Day (Over a 5 Year Period)
Which has more value..?
What is proper collection and implementation of data?
Establishing the Process
Expectations & Responsibilities

Design → Construction → Handover → Operation

HERE!

BEFORE THE PROJECT STARTS!
Approach

Everyone wants to achieve robust, useful asset information

- Better predictability
- Better outcomes from projects
- Better return on investment — both capital and labor costs

No skipping to the end! Impossible to achieve desired results without underlying information
Baseline Assessment

Where are you:

• As an individual?
• As an organization?
• Across your teams?

With access to asset information:

• Typical parametrics – make, model, manufacturer
• Installation details – date placed in service, installer, warranties
• Operational details – last inspection, diagnostics, last repair
Standards Checklist

Define categories of assets
• Buildings, land, equipment
• Business-critical, facilities environment, infrastructure, life-safety

Define levels of asset information
• MUST HAVE
• Should Have
• Nice to have

Define who needs the information
• Consider phases of the lifecycle – operations, design, construction, transition
Creating a Data Standard

Understand information to collect:

Handover Data (Design & Construction)

Operational Data (As-built & In Use)
Creating a Data Standard

Word of caution:

• Guard against data for data’s sake

• Use existing industry standards but pair down to useful data
Making Sense of Competing Standards

- Match developed asset information standard to your organization and need
- Strive for commonality while allowing for (small) differences
Publish Your Standard!

- Two places for publication – internal SOP’s or Policies and contracts for design and construction teams

- Quite challenging to change contractual terms on a project once started so make that part of your contract

- Standards are normally about what information to provide, not who provides it making contract language difficult
And finally...

Define where the data will be stored and how it interoperates with other Systems
New Construction is great; But what about existing facilities?
Existing Infrastructure

- Creation of As-Built Conditions
- Creation of Existing Asset Registry Inventory
- Collection of Existing Asset Conditions and Data
- Integration of As-Built and Existing Asset Information into other facility platforms
As-Built Conditions
Existing Asset Registry Inventory

<table>
<thead>
<tr>
<th>Space</th>
<th>SysCategory</th>
<th>Name</th>
<th>Description</th>
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<td></td>
<td>Counter Top</td>
<td>12&quot; height</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Bench - Server</td>
<td>4800 mm x 2100 mm</td>
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<tr>
<td></td>
<td></td>
<td>Backsplash</td>
<td>18&quot; x 18&quot;</td>
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<td>42&quot; x 24&quot;</td>
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<tr>
<td></td>
<td></td>
<td>Sink</td>
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**Specialty Equipment**

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<td>Endured Commercial</td>
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<td></td>
<td>Bobrick Washroom Equipment, Inc.</td>
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<td>Bobrick Washroom Equipment, Inc.</td>
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<td></td>
<td></td>
<td>Pork Industries, LLC</td>
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<td></td>
<td></td>
<td>American Standard</td>
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**Plumbing Fixtures**

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**HVAC Equipment**

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<td>American Standard</td>
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<td>American Standard</td>
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</table>
Asset Information Discovery

- Operations and Maintenance Manuals
- Still Under Warranty?
- Preventive Maintenance Schedules
- Commissioning Logs
- Geospatial

- Asset Condition
- Remaining Useful Life
- Deficiency Prioritization
- Critical Infrastructure
- Operational Efficiency
- Fault Detection/Diagnostics
Implementation Into Existing Facility Solutions
Completing the Lifecycle
Thank You

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