Taking Design to Operation
Part 2

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BUILDING INFORMATION MODELING TO FACILITY MANAGEMENT SERVICES

Leveraging data for better facility management
Building Lifecycle Cost

$30 Million
Total Project Costs

$90 Million
O&M Costs over the Life Cycle of that Building (25 Years)

Planning 1%
Design 2%

Operations 75%

Construction 22%
12.4% of annual O&M costs are waste due to inability to find information and validity of that information.

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

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\text{\$3,600,000 * 12.4\%} = \text{\$446,400/year}
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**Wasted Money:**
- 5 years: \$2.23 million
- 15 years: \$6.69 million
- 25 years: \$11.16 million
Waste within Facility Management

- Inaccessible Information
- Inaccurate Information
- Wrong Tools
- Unable to locate issue
- Location availability
CASE STUDY: 92,000 SF Facility / 5 stories tall
Use of BIM during Facility Management & Operations & Maintenance (FMOM)

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)
What is BIM?

“The process of generating and managing building data during its life cycle using three-dimensional building modeling software.”
“The process of generating and managing building DATA during its life cycle using three-dimensional building modeling software.”
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
4 Types of BIM

BIM for Design

BIM for Construction

BIM for Manufacturing

BIM for Operations
BIM originally started as a design tool for architects to help visualize the space being designed.

Engineers have adopted BIM to help run calculations, reports, schedules and also visualize design when necessary.
CONSTRUCTION DOCUMENTS

‘ONE CHANGE WILL UPDATE THOUGHOUT FULL PACKAGE’
‘ONE CHANGE COORDINATED ACROSS ALL DISCIPLINES’
BIM users experience a 5% reduction in the final construction costs, a 5% increase in the speed of completion, a 25% improvement in labor productivity and a 25% reduction in site labor.

*Building Better with BIM – Missy England  
(Procore – The Jobsite)*
CLASH DETECTION
VIRTUAL REALITY & AUGMENTED REALITY
ITEMIZED REPORTING

PREFABRICATION

PROJECT SPECIFICATIONS

MANUFACTURING
PREFABRICATION
BIM FOR OPERATIONS

How does the information gathered during design and construction affect the way a building is operated and maintained during a building lifecycle?

Integration of 2D & 3D data developed during design and construction.
2D Data

- Commissioning Reports
- Warranties
- User Manuals
- O&M Manuals
- Specifications
- Room Data Sheets
- As-Built Drawings
3D Data

- Model Elements
- Design Models
- Construction Models
- As-Built Models
- Facility Management Models
BIM-FM supports many different responsibilities of a facility manager. The concept is not just giving managers the ability to read in 3D but to also retrieve the correct information while better understanding the building.
THE BIM FOR OPERATIONS PROCESS
BIM is a Process

EDUCATE

STANDARDIZE

VALIDATE

IMPLEMENT

MAINTAIN
BIM is a Process

EDUCATE
STANDARDIZE
VALIDATE
IMPLEMENT
MAINTAIN
BIM PROTOCOL

STANDARDIZING THE PROCESS
DATA DELIVERABLE PROTOCOL

STANDARDIZING THE PROCESS
BIM Protocol

- OWNER
- STANDARDS
- CONTRACTS
- BIM EXECUTION PLAN (BXP)
Standards become the most important piece of BIM-FM. As if standards are not in place the information received at the end of a project could render meaningless.

- Deliverable Format
- Naming Conventions
- Specification Format
- Collection of Information
- Model Detail
AIA BIM Contracts

- AIA E203-2013
- AIA G201-2013
- AIA G202-2013
- BIMFORUM LOD SPEC
BIM Execution Plan (BxP)

Building Execution Plan is created during two meetings, one with the designers and one with the contractor. This meeting recognizes the requirements and documents the process in which the team will fulfill them.
DESIGN-CONSTRUCT-CLOSEOUT

DATA COLLECTION

OPERATE
Design

- ROOM DATA SHEETS
- EQUIPMENT DATA
Design
- ROOM DATA SHEETS
- EQUIPMENT DATA

Construction
- PRODUCT DATA
- SYSTEM MANUAULS
- LOG OF WORK

DATA COLLECTION
Design

- ROOM DATA SHEETS
- EQUIPMENT DATA

Construction

- PRODUCT DATA
- SYSTEM MANUALS
- LOG OF WORK

Handover

- COMMISSIONING REPORTS
- O&M MANUALS
- WARRANTIES
- AS-BUILT MODELS
BIM is a Process

- EDUCATE
- STANDARDIZE
- VALIDATE
- IMPLEMENT
- MAINTAIN
12.4% of annual O&M costs are waste due to inability to find information and validity of that information.
Information Validation

Cloud Collaboration platform allows all players to understand the requirements and how their information is being graded.

- Rule Based Data Validation
- Client / Designer / Contractor Access
- Cloud Collaboration
- Informational reporting
DATA COLLECTION

DESIGN-CONSTRUCT-CLOSEOUT

OPERATE

Building Data
Operational Data Collection

KPIs

ENERGY USAGE

UPDATED CONDITIONS

SQUARE FOOTAGE

PREVENTATIVE MAINTENANCE

Operational Data