Standardisation: The Value of Digital BIM
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Building a better world together

BIM
What is it?
BIM is…

• not just 3D CAD;
• not just a new technology application; and
• not next generation, it is here and now!

BIM is essentially value creating collaboration throughout the entire life-cycle of an asset, underpinned by the creation, collation and exchange of shared 3D models and intelligent, structured data attached to them.

http://www.bimtaskgroup.org/bim-faqs/

BIM, BIM and BIM

Building Information Model
(What things is produced)

Building Information Modelling
(How the thing is produced)

Building Information Management
(Who produces What thing and When)
Building Information Model

Graphical Models  Non-graphical Information  Documentation

UK BIM Drivers
Notable Reports
1994 Constructing the Team
  • Target: 30% Real cost reduction
1998 Rethinking Construction
2002 Accelerating Change
2009 Never Waste a Good Crisis
  • Target: Annual 10% Time and Cost reduction
  • Target: Annual 20% Reduction in defects
2015 Fixing the Foundations
2016 Modernise or Die
2018 Hackitt Report

Rethinking Construction

- Up to 30% of construction is rework
- Labour is only utilized at 40-60% efficiency
- At least 10% of site materials are wasted
- Accidents account for 3-6% of project costs.
Information is invariably inaccurate, ambiguous, and incomplete.

How do we know?
Uncoordinated Information (2D)

Uncoordinated Information (3D)
2011 UK BIM Level 2 Mandate

"This Government’s four year strategy for BIM implementation will change the dynamics and behaviours of the construction supply chain, unlocking new, more efficient and collaborative ways of working. This whole sector adoption of BIM will put us at the vanguard of a new digital construction era and position the UK to become the world leaders in BIM."

Francis Maude
Minister for the Cabinet Office

reducing capital cost and the carbon burden from the construction and operation of the built environment by 20%...

2016 UK BIM Level 2

Level 0  Level 1  Level 2  Level 3

Level 0

Level 1

Level 2

Level 3

iBIM

IFD

IFC

ISO BIM

CAD

2D  3D

Architectural

Fire Engineering

Services

Structural

IfC

CPCIC

Avanti

BS 1192:2007

User Guides CPCIC, Avanti, BSI

Drawings, lines, arcs, text etc.

Models, objects, collaboration integrated, interoperable data

Lifecycle asset management

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Removing the BIM Blockers

Blockers to BIM Level 2 adoption

Perceived Blockers

- Cost
- Legal
- Technology
- Standards
- Cultural
- Education
- Training
BIM Level 2 Standards

BS 1192
BS 1192-4
BS 8536-1 & 2
PAS 1192-2
PAS 1192-3
PAS 1192-5

BIM Level 2 – Supporting

PAS91
BS7000-4
BS8541 Series
BIM Level 2 International
As a response to an International drive for BIM level 2, ISO 19650-1 and ISO 19650-2 are being developed.

These initial International standards will incorporate:

• BS 1192
• PAS 1192-2
BIM Level 2 Key Components

Information Delivery Cycle

Copyright © BRE
Common Data Environment

Key Elements

- **WORK IN PROGRESS** is where deliverables are developed;
- **SHARED** Information must be approved;
- **PUBLISHED** Information must be authorised; and
- **ARCHIVE** contains a copy of all transactions and deliverables to the client must be verified.
BIM Level 2 Driver – Reducing Waste

ENGLISH OXFORD DICTIONARY

ADJECTIVE

eliminated or discarded as no longer useful or required after the completion of a process.

NOUN

An act or instance of using or expending something carelessly, extravagantly, or to no purpose.
Employers Information Requirements

Employers Information Decision Capture:
– What the Employers Wants?
– What they want included?
– What they want excluded?
– When do they want it?
– What formats do they want it?
– What Tools will they use with it?
– Etc…

*BIM Execution Plan (BEP)*

Supply Chain Response
– Response to the EIR
– Opportunity for Employer to evaluate what information is being delivered
– Defines project delivery:
  – Standards
  – Methods
  – Procedures

*Reduce Waste*
Information Delivery Requirements
What is the information being produced?
Who by?
When?
Is it named correctly?
**Do we need that information?**
Is it appropriate?
**Do we need additional Information?**

*Reduce Waste*

Ownership & Responsibility

BIM Managers / Consultants
Vs Information Management Responsibilities

*Reduce Waste*
Clash Detection Vs Clash Avoidance

Clash Detection (Additional Service):
Weekly posting of Information
– Software Clash reports
– Clash Error Lists

V’s Clash Avoidance (Inclusive Service):
– MIDPs Information Delivery
– Volume Strategy
– Roles and Responsibilities

Reduce Waste

CDE, Naming, Revision and Status Codes

Unclear / Missing Project Information
– Use of Naming Standards
– Standardised Fields
– Use of Status Codes
– Use of Revisions Codes
– Delivery Through CDE process
  – Check
  – Review
  – Approve

Reduce Waste

File Naming

Revision and Status Codes
BIM Level 2 International
As a response to an International drive for BIM level 2, ISO 19650-1 and ISO 19650-2 are being developed.

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• PAS 1192-2

Reduce Waste
9.1.4 Data delivery shall include some all of the following data entities: native (product-proprietary) file formats, COBie-UK-2012 and read-only PDF; to enable a complete Level 2 project.
CAD (Electronic Drawing Board):

PAPER DELIVERABLES

BIM Models:

PAPER DELIVERABLES
BIM Level 2 - COBie:

STRUCTURED DATA
Construction
Operation
Building
information
exchange

COBie - XML as Excel

Construction Operations Building Information exchange
BIM Object

Visual, Symbol, Graphical & Non Graphical Data

The BIM Object Issue
Delivering Manufacturers Data

**BIM Object Providers**
- All use different standards
- No complete range of products
- Differing Quality
- Not compliant with BS8541

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**BIM Library Objects:**

**Revit Standardised Parameters**

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<thead>
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<th>No</th>
<th>Window Type</th>
<th>REVIT AcousticRating</th>
<th>NBL AcousticRating</th>
<th>BIM Store AcousticRating</th>
<th>BIM Object</th>
<th>Reference</th>
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<td>2</td>
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<td>Rw(C;Ctr) 42(1; -5)dB</td>
<td>-</td>
<td><a href="http://www.jeld-wen.com/en-us/professional/technical-documents/acoustic-ratings">http://www.jeld-wen.com/en-us/professional/technical-documents/acoustic-ratings</a></td>
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Typical BIM Object

NBL Window

Properties – Sheet 6

<table>
<thead>
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<th>Property</th>
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<td>URL</td>
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<td>VentilationBackgroundVentilation</td>
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<td>VentWoodSpeciesOptions</td>
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<td>WarrantyDurationLabor</td>
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<td>WeatherPerformanceResistanceToWindLoad</td>
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</table>
“Beginning with the End in Mind…”
How do I get the Objects?
How do I get the Data?
How do I calculate BREEAM HEA 01?
How do I replace the glass and what size is it?

Developing Industry Templates

http://bretemplater.com

Based Upon IFC 4x Data Types
110 Standard IFC Templates included:
BRE Data Ecosystem

BRE Templer
BRE DataBook
PLUGins
COBie
Asset Management

Reduce Waste

BIM: What is possible?
Avanti Management Team
Over 30 Real Projects
Case Studies
- St Helens
- Palace Xchange

The Standard Methods and Procedures used became BS 1192:2007

Reduced Waste

Measured Time / Cost Savings of 20% Identified

http://pano.autodesk.com/pano.html?url=jpgs/0e32a506-f39e-484c-8f0d-f791ad9e66e1
COBie (Structured Data)

Construction
Operation
Building
information
exchange

Http://aim.activeplan.com
Space Management

Asset Model – Forge Viewer
Door Asset Properties

Asset Information Requirements

Reduced Waste

DataBook
BUILDING AS A MATERIAL BANK

- CIRCULAR ECONOMY IN THE BUILT ENVIRONMENT
- SUSTAIN AND INCREASE THE VALUE OF MATERIALS IN BUILDINGS

- WWW.BAMB2020.EU

Reduction Waste

Smart Home Lab

Connectivity
Energy, lighting, air
Smart Metering
Cyber Security
Temperature sensors in BIM

<table>
<thead>
<tr>
<th>IoT Product Template</th>
<th>Contextual Data</th>
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<tr>
<td><strong>Product Class:</strong></td>
<td>Temperature sensor</td>
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<tr>
<td><strong>Sensor Class:</strong></td>
<td>Single sensor</td>
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<tr>
<td><strong>Product Type:</strong></td>
<td>Analogue Temperature Sensor</td>
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<tr>
<td><strong>Units:</strong></td>
<td>Degrees Celcius</td>
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<tr>
<td><strong>Value:</strong></td>
<td>22.2</td>
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<tr>
<td><strong>Time:</strong></td>
<td>12:03:16</td>
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<tr>
<td><strong>Dimensions:</strong></td>
<td>X, Y, Z</td>
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<tr>
<td><strong>Sensor Group:</strong></td>
<td>Living room T sensors</td>
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<tr>
<td><strong>Location:</strong></td>
<td>X, Y, Z</td>
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<tr>
<td><strong>Orientation:</strong></td>
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<tr>
<td><strong>Associated Room:</strong></td>
<td>Living room</td>
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<tr>
<td><strong>Associated Surface:</strong></td>
<td>Wall 1</td>
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<td><strong>Associated System:</strong></td>
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<td><strong>Linked Devices:</strong></td>
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</tbody>
</table>

Temperature sensors in BIM
BIM + IoT: Temperature in living room

Internal Temp (°C)

17:23 - 17:50

Smart Buildings: BMS + IoT + BIM

• Temperature
• Luminance
• Humidity
• Motion
BIM is the future…

BIM Level 2: Back to Basics
Embrace the possibilities:
Delivery Good Information
Facilitate Good Decisions

Reduced Waste

Thank you

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