

**Beyond Scanning:
Gathering & Using Data
for Managing Historic
Buildings Sustainably**




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**Beyond Scanning:
Gathering & Using Data
for Managing Historic
Buildings Sustainably**



OR

**The potential of technology
and what it could achieve**

OR

Starting small thinking big!

Too big – right now



**Start Small.....
still learning!**

The property experts – still learning!



**“A model can provide a
centrepiece for better
communications.”**



Collaboration with Cadw

**“We don’t currently have the skills to truly realise the
benefits of BIM,”** says Matt McDermott, of the RICS. **“Using
a BIM model and squeezing value from it is something we
haven’t done before.** So it’s a massive step and we’ll need
training.”

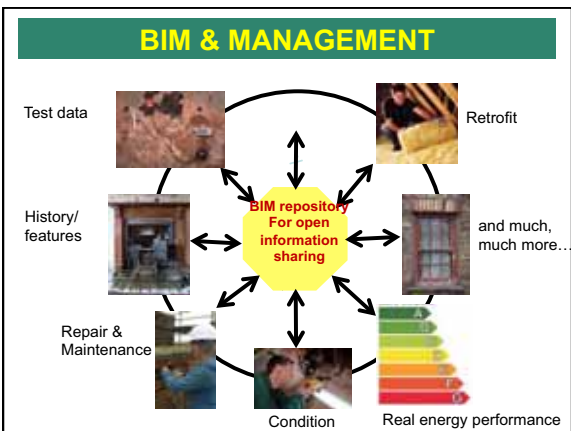
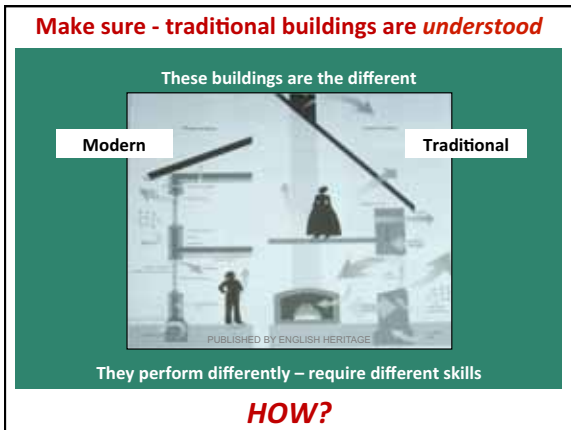
So lets start small.....

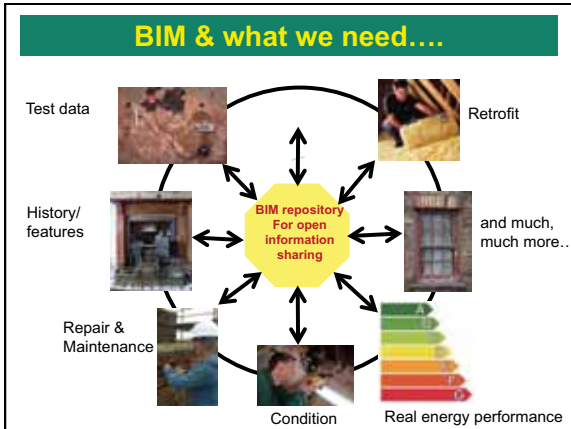
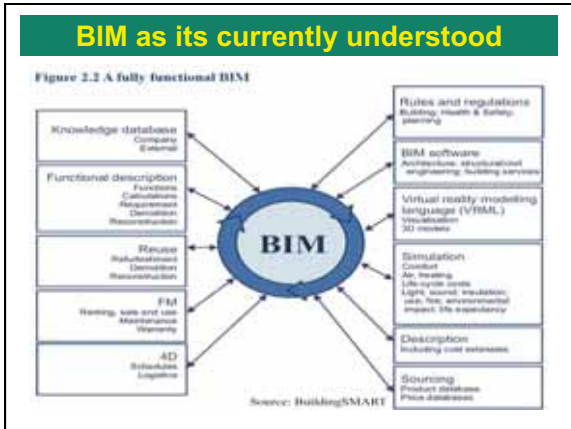
Starting small!



Introducing Heritage Cottage



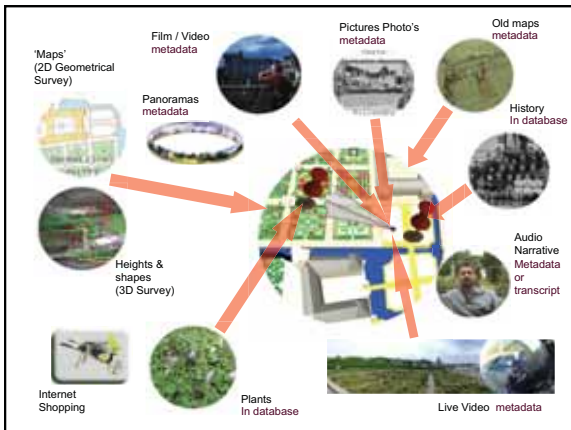




BIM & MANAGEMENT

But is it possible?

Photographic Point	Video Point	Point Classification (Point)	Point - Pointings (Point)	Abstract Point (Point)
<ul style="list-style-type: none"> • Date & Time • Location of camera • Lens/Field of View • Positioning of Image 	<ul style="list-style-type: none"> • Date & Time • Location of camera for still & end of each shot • Positioning of video 	<ul style="list-style-type: none"> • Date & Time • Pointing • Location • Height above ground • Visible area 	<ul style="list-style-type: none"> • Date recorded • Pointing • Level of detail of image • Field of view • Perspective or other projection • Location of camera 	<ul style="list-style-type: none"> • Status of software • Date captured in London • Camera software • Date of detail of image • Level of detail of software • Location of image



BIM & MANAGEMENT

But is it possible?

Cadw working with Cardiff Metropolitan University....
Researching what others are doing...

Access to Smithsonian interactive website via <http://3d.si.edu/browser>
 Access to XRDom and Cityserver via <http://www.x3dom.org/>
 & <http://www.cityserver3d.de/en/>
 Each contains interactive explorable examples of 3D on the web

- ### BIM & MANAGEMENT
- What it can achieve**
- 1. Building Information Modelling and Management.**
 - 2. Bringing together, integrating and 'managing' information.**
 - 3. Incorporating 'real' data – providing a useful tool for managing information and the building.**
 - 4. Potential for training using BIM – data from the analysis and work – potential for online knowledge and learning.**

BIM & MANAGEMENT

But what is it in reality?

1. BIM/ HBIM/ EBIM – does it matter?
2. Calculating measurements and volumes for tests (e.g. co-heating) – laser scanning and the 3D model
3. Design of new work (e.g. new extensions)
4. Installation of measures/ works (e.g. wall insulation)

BIM & MANAGEMENT

Laser Scanning – Digital 3D Model



- A record
- Measurements
- Using it for interpretation
- Building Information Modelling (BIM)
- Used for learning

Understanding Heritage Cottage

Standard information – quality and reliability

- Valuation report
- Building Survey Report (on acquisition)
- Energy Performance Certificate (EPC)

1. Will we properly understand Heritage Cottage from this?

2. Will it help sustain it and make it energy efficient?

What do we need to know to ensure Heritage Cottage is sustained and energy efficient?

Understanding Heritage Cottage

What do we need to do to ensure Heritage Cottage is sustained and energy efficient?

Understand its real thermal and moisture performance and how it relates to its environment and occupancy.

Understand the real benefits and costs of any energy efficiency measure – on an incremental basis.

Finding realistic solutions

Understanding Heritage Cottage

Tests and analysis

Detailed building / pathological analysis



Overall analysis

Understanding Heritage Cottage

Tests and analysis

Detailed building / pathological analysis



Timber

Understanding Heritage Cottage

Tests and analysis

Detailed building / pathological analysis




Damp

Understanding Heritage Cottage

Tests and analysis

In situ U Value tests and thermal analysis




Heat Loss

Understanding Heritage Cottage

Tests and analysis

In situ U Value tests and thermal analysis

Note the difference between the calculated and measured U-values

Element/Location	Description	Thickness	Calculated U-value	Measured U-value	Difference
Wall - Living Room	Ground floor, north wall, west side	520 mm	2.36 W/m ² K	1.89 W/m ² K	19.92% better
Wall - Living Room	Ground floor, north wall, east side	520 mm	2.36 W/m ² K	1.63 W/m ² K	30.93% better
Wall - Bedroom 1	First floor, south wall	460 mm	2.57 W/m ² K	1.90 W/m ² K	26% better

↑ Greater heat loss due to damp wall

Understanding Heritage Cottage

Tests and analysis

Infrared thermography

Thermo Co-Heating

Air Leakage (door blower)

Whole house monitoring

Modelling energy performance of the envelope

Influence of use and weather - analysis

and making use of data that already exists...

Understanding Heritage Cottage

Tests and analysis programme

1. Before repair.
2. After repair – measuring performance improvement
3. After retrofit – measuring performance improvement

Energy efficiency created by REPAIR

Energy efficiency created by RETROFIT

All data input into BIM

From 3D Model to BIM

Next stages:

1. Cadw working in partnership with Cardiff Metropolitan University – create a BIM – also part of a learning programme
2. Create a BIM in Revit – input real data.
3. Evaluate effectiveness of the new build type BIM.
4. Take forward BIM development in the most appropriate form.
5. Learn lessons from Heritage Cottage – before any larger applications!

The Content of BIM with Real Data!

From energy performance to how to repair

Energy efficiency

Climate Change

Retrofit

Sustainability

Appropriate Knowledge

Appropriate skills

Building Pathology

BIM – basis of on line learning

Helping to sustain traditional buildings in Wales

1. A real project in Wales – data from Wales, plus other data – A REAL CASE STUDY.
2. Highlighting that energy efficiency is not just about 'measures'!
3. From analysis to craft work implementation.
4. Cadw web site – guidance with video – bit size chunks of knowledge
5. Potential for innovative learning using BIM – support by BEST (Built Environment Sustainability Training).

Thinking big!

Laser scanning + 3D Model + ?

Neath Abbey

Starting small!

But lots of potential!

and a project for learning....

BIM – and other technologies

Why bother?

1. Grab attention to basic but important issues – understanding & treating traditional buildings better
2. Create data to grab attention & improve knowledge
3. Try and make sure technology moves in a direction that best suits heritage sector & traditional buildings
4. Link issues together – manage better
5. Greater efficiency and effectiveness
6. Learning

Other technologies in use at Cadw include i-Pads for inspections/reports and Drones

CAERPHILLY CASTLE

THANK YOU

Starting small – thinking big!

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