Use of Building Information Modelling in Responding to Low Carbon Construction Innovations: An Irish Perspective - Presentation

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Use of Building Information Modelling in responding to Low Carbon Construction Innovations: An Irish Perspective

By
Barry McAuley , Dr. Alan Hore & Dr. Roger West

Presented by
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Ireland and the need for change

- Ireland - huge financial losses in the public works
- Reduce greenhouse gas emissions by up to 20%
- Public sector must own or rent only buildings with high energy-saving standards and promote the conversion of existing buildings to "nearly zero" standards
- UK Low Carbon Construction Innovation and Growth Team Report
- BIM can be utilised on future and present public works projects in Ireland
Lit Review

- 46% of the CO\textsuperscript{2} emissions and generates 40% of all man-made waste (Hallberg and Tarnardi, 2011)

- 74% of Western European BIM users report a positive perceived return on their overall investment in BIM (McGraw Hill, 2010)

- Over 25% of the survey participants views BIM as highly applicable for use in green retrofits (The McGraw–Hill Green BIM Report, 2010)

- BIM has the greatest potential to transform the habits and, eventually, the structure of the industry (UK Government’s Construction Client Group BIM Working Party Strategy Paper, 2011)

- In order for Ireland to create a similar framework to the UK there are a number of obstacles to be addressed in the form of both legal and technical categories (McAuley et al, 2012)
Methodology - RIAI / CITA BIM Workshop

• Raise awareness and promote a higher level of understanding of BIM
• Demonstrate a more effective way for teams to collaborate
• Assess / demonstrate some of the BIM software tools available
• Validate designs through digital analysis
• Test BIM technologies in responding to low carbon construction demands
2011 RIAI showcase of integrated and collaborative Working

- 3D BIM Model on Screen
- Laptops On Meeting Table (No Paper)
- Instant Access to Sophisticated Information and Analysis
- Digitally Recording Decisions in Real-Time

Monday 25th June 2012
Pilot Team and Process

- Leading design professionals from selected firms within the AEC/FM sector
- Consulting engineers, services engineers, architects, and consultants
- Additional support from contractors, QS’s, technical support, FM support for handover documentation and BIM energy specialists

- Digital brief with the overall goal to design a BIM model of a standard generic DOES school
- Exploded down to its components
- Synchronised with a central server
Pilot Analysis

Generic School broken down to its core elements

Build the Base BIM Model ► “Explode” to Standard Components ► Prepare a New Design
Pilot Analysis

- Designers to create four mass models at different orientations and to perform exercises in concept energy analysis.

- Calculate the energy usage for the year and so, therefore, assuming discounts rates, a life-cycle energy usage / cost could be generated.

- CO\textsuperscript{2} emissions from electricity and fuel consumption for the analysed model, minus the renewable energy potential.

- The energy analysis enabled a relatively easy calculation to be performed with regard to whole-life energy usage for all four design iterations.
Pilot Analysis

Thermal Comfort
Predicted Mean Vote
Value Range: -5.0 - 4.0 PMV
(34007BCT 1S)}
Low Carbon Options

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**Figure 6: Mass Model 1**

**Figure 7: Mass Model 2**

**Figure 8: Mass Model 3**

**Figure 9: Mass Model 4**
Findings

• BIM process permitted a different and more sustainable method of construction to be undertaken

• Design changes best impacted the carbon output of the model

• BIM enabled the designer to have the option to choose a carbon friendly design for the primary school.

• Still requires “an act of faith” for the Irish Government to fully embrace it.

• Reluctance to incorporate more change
Ireland’s challenges

► Getting people up to speed and training is key
► Getting people to change mindset
► Irish Government to step up to the challenge
► Investment is needed by AEC businesses
► Need to utilise BIM champions with your organisation
► Interoperability of BIM products to be addressed
**Major BIM Activities in Ireland**

**What major BIM activities ......**

- Collaborative networking effort
- Gaining international interest
- Discussion on Key Topics/Obstacles
- Expert Opinion and Table Discussions
- Record & distributed outcomes back to Industry
- Promote/Communicate Industry Consensus & Joined-up Thinking

**Construction IT Alliance**

**BIM WORKSHOP SERIES 2012**

A series of workshop events designed to facilitate a high level discussion of the key stakeholders on the immediate obstacles to the implementation of building information modelling in Ireland. Specifically the workshops are designed to address in:

- Facilitating the general adoption of BIM in Ireland.
- Disseminating best practice and application of BIM in a variety of direct and indirect construction related work processes.
- Facilitating a consistent and co-ordinated message back to industry in how to best implement building information modelling in Ireland.

Monday 25th June 2012
**What** major BIM activities ……

**CITA | Construction IT Alliance**

**BIM | Building Information Modelling | Ireland’s Opportunity**

**Presentation To**

**GCC | Government Construction Contracts Committee**

**Wednesday 2nd May 2012**

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CITA BIM Survey 2012

Should Ireland follow the UK in mandating BIM
- Yes: 10.8%
- Neither Yes or No: 62.2%
- No: 27.0%

Can BIM help Ireland reach its Carbon Targets
- BIM is the answer: 4.1%
- BIM can play a significant role: 8.1%
- I am undecided to its use: 29.7%
- BIM can play a minor role: 45.9%
- BIM has no role: 12.2%

BIM as FM Tool in Managing the Government Estate
- BIM can be a crucial FM tool: 22%
- BIM can be a significant FM tool: 36%
- I am undecided: 37%

BIM Importance in 5 years Time
- No importance: 5%
- Low importance: 4%
- Moderate importance: 24%
- High importance: 31%
- Very High importance: 31%
Thank You!

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