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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

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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 CO² 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 obstacle 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
RIAII / CITA BIM Workshop

- 2011 RIAII 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

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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: -0.5 to 4.5 PMV
(IES COMFORT V5)
Low Carbon Options

Figure 6: Mass Model 1

Figure 7: Mass Model 2

Figure 8: Mass Model 3

Figure 8: 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

- 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
Major BIM Activities in Ireland

What major BIM activities .......

CITA | Construction IT Alliance
BIM | Building Information Modelling | Ireland’s Opportunity
Presentation To
GCCA | Government Construction Contracts Committee
Wednesday 2nd May 2012

Presentation by:
Dr. Alan V Hore
Executive Director, Construction IT Alliance
Ralph Montague
Director, Arcdox
Co-Ordinator CITA LinkedIn Group

Accompanied by:
John McGowan
Director, Construction IT Alliance
Barny McAuley
Phd Student
Dit Bolton Street

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CITA BIM Survey 2012

Should Ireland follow the UK in mandating BIM

- Yes: 62.2%
- Neither Yes or No: 27.0%
- No: 10.8%

Can BIM help Ireland reach its Carbon Targets

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

BIM as FM Tool in Managing the Government Estate

- BIM can be a crucial FM tool: 37%
- BIM can be a significant FM tool: 36%
- I am undecided: 22%

BIM Importance in 5 years Time

- No importance: 5%
- Low importance: 4%
- Moderate importance: 31%
- High importance: 24%
- Very High importance: 25%

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Thank You!