BIM
‘An Introduction’

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Engineers Ireland
Agenda

• Brian Lahiff - Introduction
• James Duggan - Civil
• John Casey - Structural
• Michael Downey - MEP
BIM
‘An Introduction’

Brian Lahiff
Thomas Garland and Partners
Agenda

• What is BIM?
• Why BIM?
• BIM Adoption
  – International Trends
  – UK Implementation
• BIM in Ireland
What is BIM?

- People, Process & Technology

- Services Consultants
- Quantity Surveyors
- Project Managers
- Specialist Consultants
- Architects
- Project Engineers
- Contractors
- Property
- Sub-Contractors
- Manufacturers
- Suppliers
- Tenants
- Clients
- Design
- Construction
- Investment
- Facility
- Drawings
- Schedules
- Specifications
- Documents
- Product Data
- Maintenance Manuals
- Users
- Owners
- Investors
- Solicitors
- Property Managers
- Facilities Managers
- Bankers
- Visualisation
- Structural Analysis
- Energy Performance
- Project Programming
- Cost Estimating
- Space Usage
- Operations & Maintenance
What is BIM?

“Building Information Modelling is a digital representation of the physical and functional characteristics of a facility. It is a shared knowledge resource for information about a facility, forming a reliable basis for decisions during its life cycle, from earliest conception to demolition”
What is BIM?

• Building Information Modelling
  – A Process (not software) – A New Way of Doing Things
  – Not CAD (2D line-based drafting / no inherent intelligence)
  – Production of Reliable & Coordinated Documentation
  – “Data-Rich” Virtual 3D Model of a Project – the “i” in BIM
  – Recording all Vital Design Information in a Single Database
  – Used by all Stakeholders throughout the Projects Lifecycle
  – Part of IPD (Integrated Project Delivery)
What is BIM?

BIM = OPPORTUNITY
Why BIM?

- **Design Challenges**
  - Need to streamline collaboration with the design team and maintain an accurate physical model.
  - Need to easily compare design alternatives.
  - Need to better understand my design with analytical results.
  - Need an accurate physical and analytical model to ensure I meet design intent and reduce issues and costs.
  - Need to visualise my analytical results quickly and easily.
  - Performing analysis is time intensive and requires computing power.

- **Clients** are now demanding performance results that BIM can deliver:
  - Cost | Value | Carbon | Information Asset
Why BIM?

- Seamless exchange, integration & management of project information
- Streamline fragmented work processes in construction – “silos”
- Achieve improvements in programme, productivity & quality

![Diagram showing BIM integration between stakeholders](image-url)
Why BIM?

• Loss of Information/Knowledge
  – Digitally Capture Tacit Knowledge and Design Decisions
  – Digitally Transfer Information through the Project Lifecycle

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**Diagram:**

- **Horizontal Axis:** TIME
- **Vertical Axis:** INFORMATION
- **Legend:**
  - DESIGNERS
  - CONTRACTORS
  - OPERATORS
  - PRINT/ISSUE
  - TENDER DRAWINGS
  - HANDOVER DRAWINGS
  - PAPER
  - DIGITAL
  - LOSS

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**Legend:**

- **Print/Issue**: PAPER
- **Tender Drawings**: Transition to DIGITAL
- **Handover Drawings**: Loss of INFORMATION
Why BIM?

- A More Sustainable Model of Building Procurement
  - Address Economic & Environmental Issues in Construction
  - Waste in Construction
    - Buildings Cost Too Much to Build
    - Buildings Cost Too Much to Operate
    - Buildings responsible for 50% of CO2 Emissions
- 30% of the cost of construction is **wasted** in the field due to:
  - coordination errors
  - wasted material
  - labour inefficiencies
  - other problems in the current construction approach

Why BIM?

• Shift Efforts – Reduce Problems

Source: Patrick MacLeamy – HOK
Why BIM?

- Stanford University Center for Integrated Facilities Engineering (CIFE) figures based on 32 major projects using BIM indicates benefits such as:
  - Up to 40% elimination of unbudgeted change
  - Cost estimation accuracy within 3%
  - Up to 80% reduction in time taken to generate a cost estimate
  - A savings of up to 10% of the contract value through clash detections
  - Up to 7% reduction in project time

Source: Patrick MacLeamy – HOK
Why BIM?

- **ROI**

  - 0.5 - 3 year payback / 21% - 61% Productivity Gain

![Graph showing design productivity over time with BIM implementation impact.](image-url)
BIM Adoption

US
49%
2009
McGraw Hill Construction

UK Germany France
36%
2010
McGraw Hill Construction

Ireland
16%
2011
RIAI BIM Survey
BIM Adoption

• 2011 NBS National BIM Survey (UK)
  – 78% say BIM is the future of project information
  – 31% are now using BIM – up from 13% in 2010
  – 75% will be using it on some projects by the end of 2012, and almost 19 out of 20 people expect to be using it in five years' time
  – More than 80% agreed BIM increases the coordination of construction documents, with 65% of those using the technology saying BIM delivered cost efficiencies.
International Market Trends

• 1992 CIFE (Centre for Integrated Facilities Engineering, Stanford)
  – new “production philosophy” required in construction
  – Lean Construction
• 1995 CORENET Singapore
  – streamline the fragmented work processes in the construction industry
  – €144million Construction Productivity and Capability Fund (CPCF)
  – Automated Code Checking through submission of BIM models
• 2003 GSA (General Services Administration) in US
  – established the National 3D-4D-BIM Program
• Finland, Norway, Denmark, Australia, Canada etc

“... it is not the strongest of the species that survives, nor the most intelligent, but the one most responsive to Change...”
Charles Darwin
UK Implementation

• 1994 Latham Report - “Constructing the Team”
  – identified industry practices as being “ineffective”, “adversarial”, “fragmented”, “incapable of delivering value for its customers” and “lacking respect for its employees”.
  – promoted partnering and better collaboration
• 1998 Egan Report - “Rethinking Construction”
  – substantial improvements in quality and efficiency required
• 2002 Egan Report - “Accelerating Change”
  – promoted “integrated working”
  – better collaboration can deliver greater process efficiency
• 2010 IGT (Paul Morrell) – “Low Carbon Construction”
  – government should mandate the use of BIM for public projects.
• 2011 UK Government Construction Strategy
  – BIM Strategy – 5-year staged plan to make BIM mandatory
UK Implementation

  - Year 5 – minimum “Level 2” BIM
  - COBie (Excel) Construction Operations Building Information Exchange format
Obstacles to Implementation

• Contractual and legal requirements
  – Conditions of Contract
  – Legal precedent

• Allocation of risk

• Sharing of reward

• Standardised information exchange

• Implementation costs
  – Education and training
  – Software and hardware
  – Development of component libraries

• Changing established business processes
BIM in Ireland

– CITA BIM Workshops - 10 No. Discussion Meetings in 2012

• Industry-Wide Representation (RIAI, ACEI/EI, IStructE, SCS, CIF, etc)
• Discussion on Key Topics/Obstacles
• “Unlock” & “Fast-track” development of BIM
• Expert Opinion and Table Discussions
• Record & Distribute the Outcomes back to Industry
• Promote/Communicate Industry Consensus & Joined-up Thinking
• Network with clients and other professionals with interest in BIM
• See www.cita.ie/BIMWorkshops/
• Next event 24th April
References

• Website Links
  – www.wbdg.org
  – www.bimtaskgroup.org
  – www.thenbs.com/topics/bim
  – www.cita.ie
  – www.arcdox.com

• LinkedIn Groups
  – CITA BIM
  – Revit Users Ireland
Summary

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Questions?