LEAN BIM
Building Information Modelling

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DIGITAL DESIGN | CONSTRUCT | OPERATE
SURVEY

1. How many of your Projects use Lean, but DON’T use BIM?
2. How many of your Projects use BIM, but DON’T use Lean?
3. How many of your Projects use BOTH Lean & BIM?
4. How many of your Projects use NEITHER Lean or BIM?

☐ 100%
☐ 75%
☐ 50%
☐ 25%
☐ 0%

Please Complete the Survey
Answers are Anonymous
Building Information Modelling - BIM & LEAN

What’s the Problem?
Where’s the Waste?
Where’s the Value?

Is this “information”
- Searchable?
- Accessible?
- Accurate?
- Useful?
- Valuable?

Cost of NOT using Digital
13-21% in Design/Construction
10-17% in Operations
(*Boston Consulting Group Report 2016)
Agenda

- What is the Connection between Lean & BIM?
- How can we use BIM to be more Lean?
- How can we be Lean in the way we use BIM?
- What are the Challenges?
- What are the Opportunities?
- Discussion, Questions & Answers
Relationship Between Lean & BIM

**LEAN** = Reducing Waste
**BIM** = Managing Information

**Quality of Information & Outcomes**

**Waste** “Adds No Value”
- Wasted Time or Effort
- Duplication of Effort
- Abortive Work
- Rework
- Stop-Starting
- Waiting
- Late Engagement
- “Fire Fighting”
- Excessive Contract Administration
- Disputes
- Litigation

>30%

Is the Information...
- Accurate
- Timely
- Available
- Accessible
- Searchable
### Which is More Efficient? (Lean)

#### Manufacturing
- **Built It Twice**

#### Construction
- **Built It Once**

#### Design
- Construct a Coordinated & Resolved “Digital Model”

#### Procure
- Price & Procure the Component Parts from the Model

#### Construct
- Assemble 100% in Accordance with the “Digital Model”

#### Operate
- “Digital Twin” for Operations & Maintenance

### Built It Twice
- Uncoordinated
- Unresolved “Design Intent” Documentation

### Built It Once
- Price & Procure “Packages” of Work at Risk

- Coordinate & Resolve Issues on Site “Physical Model”

- Poor Information for Operations & Maintenance

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Which is More Efficient? (Lean)

**Input / Effort**

1. **BIM**
   - Describe buildings or infrastructure **ONCE**, through intelligent 3D “Objects” assembled in a Building Information Model

2. **NO BIM**
   - Describe buildings or infrastructure **SEVERAL**, separately produced, separately managed, 2D documents (drawings, schedules, specifications, etc)

3. **PSEUDO BIM**
   - Describe buildings or infrastructure **SEVERAL**, separately produced, separately managed, 2D documents (drawings, schedules, specifications, etc)

**PLUS**

- Original Effort
- Rework
- Management
- Accuracy

**Output / Outcome**

- **X Inconsistencies, Errors, Omissions, Duplication, Rework**
- **X No Connection Between Model & Outputs**
- Connected

- **DRAWINGS**
- **DETAILS**
- **SCHEDULES**
- **SPECIFICATIONS**

**“OBJECT”**

Classification: Manufacturer: Properties: Materials: Performance: ETC

**“ATTRIBUTES”**

“MODEL”

- Coordination | Sequencing | Costing | Analysis

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Physical Assets
e.g. Air Handling Unit

**Graphical Data**
- **3D OBJECT (LOD)**
- Geometry (size/shape)
- Location
- Connections

**Non-Graphical Data**
- **ATTRIBUTES (LOI)**
  - Uniclass: Pr_60_65_03_87
  - Make: ______________
  - Model: ______________
  - Rating: ______________

**Documents**
- Drawings
- Schedules
- Specifications
- Bill of Quantities
- Product Data Sheet
- Commissioning Certs
- Technical Submissions
- Operators Manual
- Records
  - etc

**WITH BIM**

- **3D** Coordination (clash detection)
- **4D** Sequencing (logistics, safety)
- **5D** Quantity Extraction (cost, carbon)
- **6D** Analysis (structural, energy, etc)
- **7D** Operations/FM
  - etc

**Common Data Environment (CDE)**
Challenges

Obstacles

Opportunities
Procurement
If we’re going to “Build it Twice”, we have to “Buy it Twice”

- Designers Do Design
- Contractors Do Construction

Move Away from Adversarial Contracting
Move Towards Partnering or Alliancing Contracting

Construction - Fragmented Process

- Who
- What
- When
- How Much

Lean Approach...
Right Party to produce the Right Information at the Right Time, to deliver the Right Outcomes (Value)
Avoid Waste

Manufacturing – Own the Process End-to-End

- Collaboration
## Business Models

**Let’s Get Out of the “Waste” Business, and into Creating “Value”**

### Business Models that Thrive on Waste

- More Expensive
- Takes Longer
- More Uncertain
- Less Transparent
- Strength is Ability to Carry Risk and Control Others
- Profit through Manipulation of Supply Chain and continuous efforts to reduce Quality

**...the Better**

### Business Models that Create Value

- Less Expensive
- Quicker
- Less Uncertain
- More Transparent
- Strength is Ability to Reduce Risk and Collaborate with others
- Profit through “Partnerships” and Consistent Effort to Reduce Waste and improve Quality (Value)

**...the Better**

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**Build Better, Quicker, Cheaper (Less Waste)**

**Disrupt, or Be Disrupted**
Relationships
You’re either Helping the Process, or You’re Hindering the Process

People
Process
Technology

A “Digital” Process Requires
- Capable People
- Collaboration
- Defined Process
- Industry Standards
- Take Responsibility

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Project Management Process
Capital Delivery Phase (ISO 19650)

1. **ISO19650**
   Specification for **Information Management** for the capital/delivery phase of construction projects using BIM

2. **Choose the Right Team**
   - PQQ: Pre-Qualification Questionnaire (PAS 91)

3. **Clear Requirements**
   - EIR: Employers / Exchange Information Requirements

4. **Commercial Agreements**
   - CIC (UK) BIM Protocol (contract)

5. **Scope of Services for Information Management**

6. **PI Insurance Guidance Note**

7. **Digital Plan of Work**
   (NBS BIM Toolkit)

8. **Suppliers Response**
   - Pre-Contract BIM Execution Plan

9. **BIM Capability Assessments**

10. **Post-Contract BIM Execution Plan**

11. **CDE**
    Common Data Environment

12. **BIM Deliverables**
    - COBie (BS1192-4)
    - Uniclass 2015
    - Soft Landings

**Additional**
- **Project Implementation Plan (PIP)**
- **Digital Plan of Work** (NBS BIM Toolkit)
- **PI Insurance Guidance Note**
- **CDE** (Common Data Environment)
- **BIM Deliverables** (COBie, Uniclass 2015, Soft Landings)
- **PQQ** (Pre-Qualification Questionnaire)
- **EIR** (Employers / Exchange Information Requirements)
- **ISO19650** (Specification for Information Management)
- **Pre-Qualification** (PAS 91)
- **CIC (UK) BIM Protocol** (contract)
- **Scope of Services for Information Management**
RIAI BIM PACK
Advise Notes, Templates & Guidance supporting BIM Level 2

Brief
- Organisation and Asset Information Requirements
- Employers Information Requirements (EIR)
- Pre-qualification Questionnaire

Pre-contract
- Pre-contract BIM Execution Plan (BEP)
- Supply Chain Capability Summary

Appointment
- Responsibility Matrix (MPDT)
- Master Information Delivery Plan (MIDP)

Post-contract
- Post-contract BIM Execution Plan (BEP)
- Appendix 1 – Roles, Responsibilities and Authorities
- Appendix 2 – File Naming and Revision Control
- Appendix 3 – Common Data Environment Procedure
- Appendix 4 – Volume Strategy
- Appendix 5 – Spatial Coordination and Clash Avoidance Strategy

https://www.riai.ie
About ARCDOX

- Specialist BIM Consultants
- Services to Enable & Support BIM
- Extensive Experience
- Leading Industry
- “The Glue” to Collaboration

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ARCDOX Enabling & Supporting BIM
Discussion

Questions
Answers?
About LCI

WHO WE ARE...
Lean Construction Ireland is an all-island, independent, and not-for-profit association whose members passionately believe that Lean Thinking & Practices can enable and sustain enhanced effectiveness, efficiency, productivity, and profitability for the Irish Construction Sector, Clients, and Supply Chain.

WHAT WE DO...
Lean Construction Ireland leads a community of learning and practice that promotes the application of Lean Thinking & Practices throughout the Irish Architecture, Engineering, Construction (AEC) sector so as to realise value-add for all stakeholders in the value chain. It supports the open exchange of knowledge, information, and experiences around good practices and case studies. It also supports ongoing research into Lean practices nationally and globally, their application to AEC, and their sharing with the wider Lean Construction Ireland Community. It is aligned to LCI USA.

CORE VALUES...

VISION...
Deliver Projects Better, Faster, Together

STAKEHOLDERS...
- Public & Private Capital Project Clients & Owners.
- AEC Supply Chain.
- AEC Representative Bodies & Agencies.
- AEC Professional Bodies.
- AEC Academics.
- Lean Construction Trainers & Consultants.
- Lean Business Ireland.
- Ireland Inc.

OBJECTIVES...
To achieve this Vision Lean Construction Ireland will:
- Promote the application of Lean Thinking & Practices in the Irish AEC sector.
- Develop a national network of members committed to the application of Lean Thinking & Practices.
- Challenge the status quo of current project thinking and delivery methods.
- Advance amongst all stakeholders the business case for Lean Construction knowledge and skills.
Contact LCI

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