



# 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%



- Role** Who
- Scope** What
- Time** When
- Cost** How Much
- Quality** How Good
- Safety** How Risky



- Is the Information...
- Accurate
  - Timely
  - Available
  - Accessible
  - Searchable

# Which is More Efficient? (Lean)

Manufacturing

Built It Twice

**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

Construction

Built It Once



Uncoordinated Unresolved "Design Intent" Documentation

Code	Description	Quantity	Unit	Estimated	Actual	Price	Cost	Quantity	Unit
10000000	CONCRETE	1000	CU YD	1000	1000	1000	1000	1000	CU YD
20000000	STEEL	2000	TON	2000	2000	2000	2000	2000	TON
30000000	BRICK	300000	SQ YD	300000	300000	300000	300000	300000	SQ YD
40000000	CEMENT	400000	TON	400000	400000	400000	400000	400000	TON
50000000	AGGREGATE	500000	CU YD	500000	500000	500000	500000	500000	CU YD
60000000	PAVING	600000	SQ YD	600000	600000	600000	600000	600000	SQ YD
70000000	ROOFING	700000	SQ YD	700000	700000	700000	700000	700000	SQ YD
80000000	MECHANICAL	800000	TON	800000	800000	800000	800000	800000	TON
90000000	ELECTRICAL	900000	TON	900000	900000	900000	900000	900000	TON
100000000	PLUMBING	1000000	TON	1000000	1000000	1000000	1000000	1000000	TON

Price & Procure "Packages" of Work at Risk



Coordinate & Resolve Issues on Site "Physical Model"



Poor Information for Operations & Maintenance

# Which is More Efficient? (Lean)

Input / Effort

Output / Outcome

2 NO BIM

Describe buildings or infrastructure through SEVERAL, separately produced, separately managed, 2D documents (drawings, schedules, specifications, etc)

1 BIM

Describe buildings or infrastructure ONCE, through intelligent 3D "Objects" assembled in a Building Information Model

3 PSEUDO BIM

Describe buildings or infrastructure through SEVERAL, separately produced, separately managed, 2D documents (drawings, schedules, specifications, etc)

PLUS

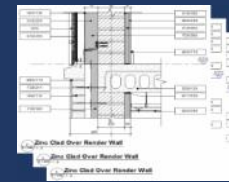
- Original Effort
- Rework
- Management
- Accuracy

Describe buildings or infrastructure ONCE, through intelligent 3D "Objects" assembled in a Building Information Model

X Inconsistencies, Errors, Omissions, Duplication, Rework



DRAWINGS



DETAILS



SCHEDULES



SPECIFICATIONS

X No Connection Between Model & Outputs

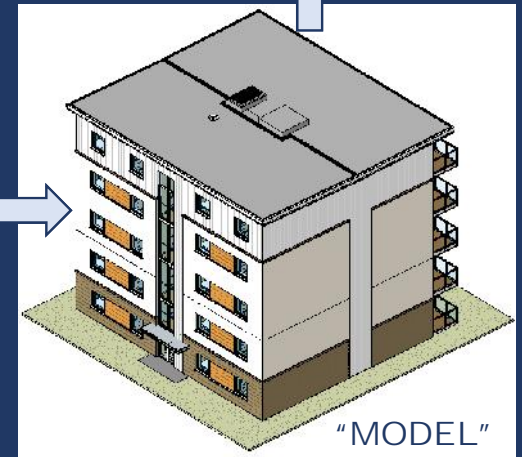
Connected ✓

"OBJECT"



Classification:  
Manufacturer:  
Properties:  
Materials:  
Performance:  
ETC

"ATTRIBUTES"



"MODEL"

Coordination | Sequencing | Costing | Analysis ✓

# The Digital Twin

Common Data Environment (CDE)

## Physical Assets

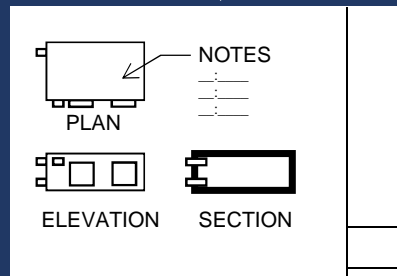
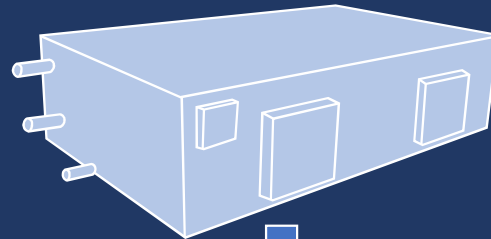
eg. Air Handling Unit



WITH BIM

### Graphical Data

**3D OBJECT (LOD)**  
 Geometry (size/shape) →  
 Location  
 Connections



**DRAWINGS**

### Non-Graphical Data

**ATTRIBUTES (LOI)**  
 Uniclass: Pr\_60\_65\_03\_87  
 Make: \_\_\_\_\_  
 Model: \_\_\_\_\_  
 Rating: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

FIELDS					
	A	B	C	D	E
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

**SCHEDULES**

### Documents

Drawings  
 Schedules  
 Specifications  
 Bill of Materials  
 Product Data Sheet  
 Commissioning Certs  
 Technical Submissions  
 Operators Manual  
 Records  
 etc

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



# Challenges Obstacles

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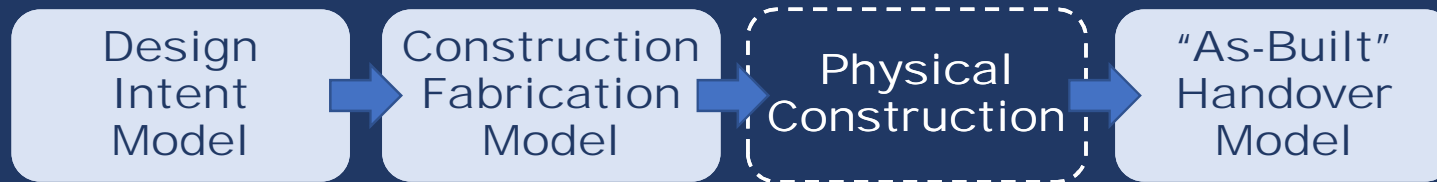
# Opportunities

# Procurement

If we're going to "Build it Twice", we have to "Buy it Twice"

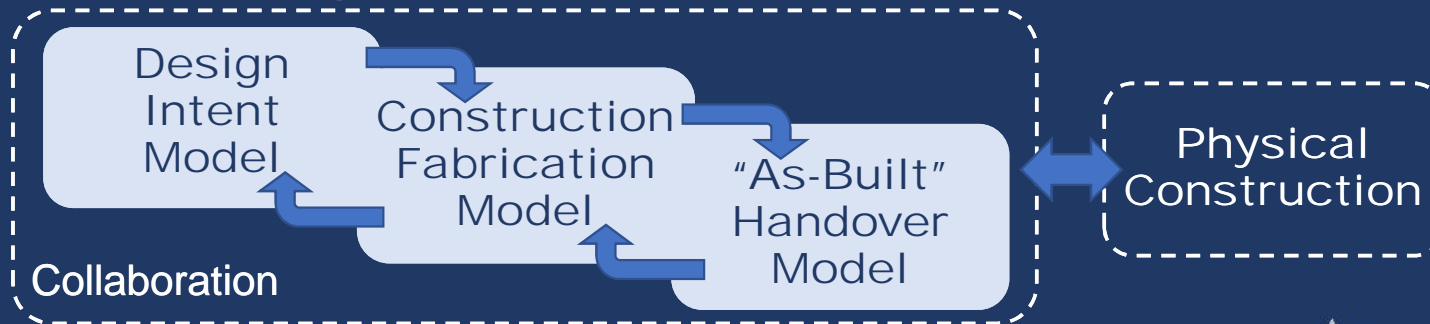
- Designers Do Design
- Contractors Do Construction
- Move Away from Adversarial Contracting
- Move Towards Partnering or Alliancing Contracting

## Construction - Fragmented Process



- Who
  - What
  - When
  - How Much
- ?

## Manufacturing – Own the Process End-to-End



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

# 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 ...the **Better**
- Less Transparent
- Strength is Ability to Carry Risk and Control Others
- Profit through Manipulation of Supply Chain and continuous efforts to reduce Quality

## Business Models that Create Value

- Less Expensive
- Quicker
- Less Uncertain ...the **Better**
- 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)

Build Better, Quicker, Cheaper (Less Waste)  
Disrupt, or Be Disrupted

# Relationships

You're either Helping the Process, or You're Hindering the Process



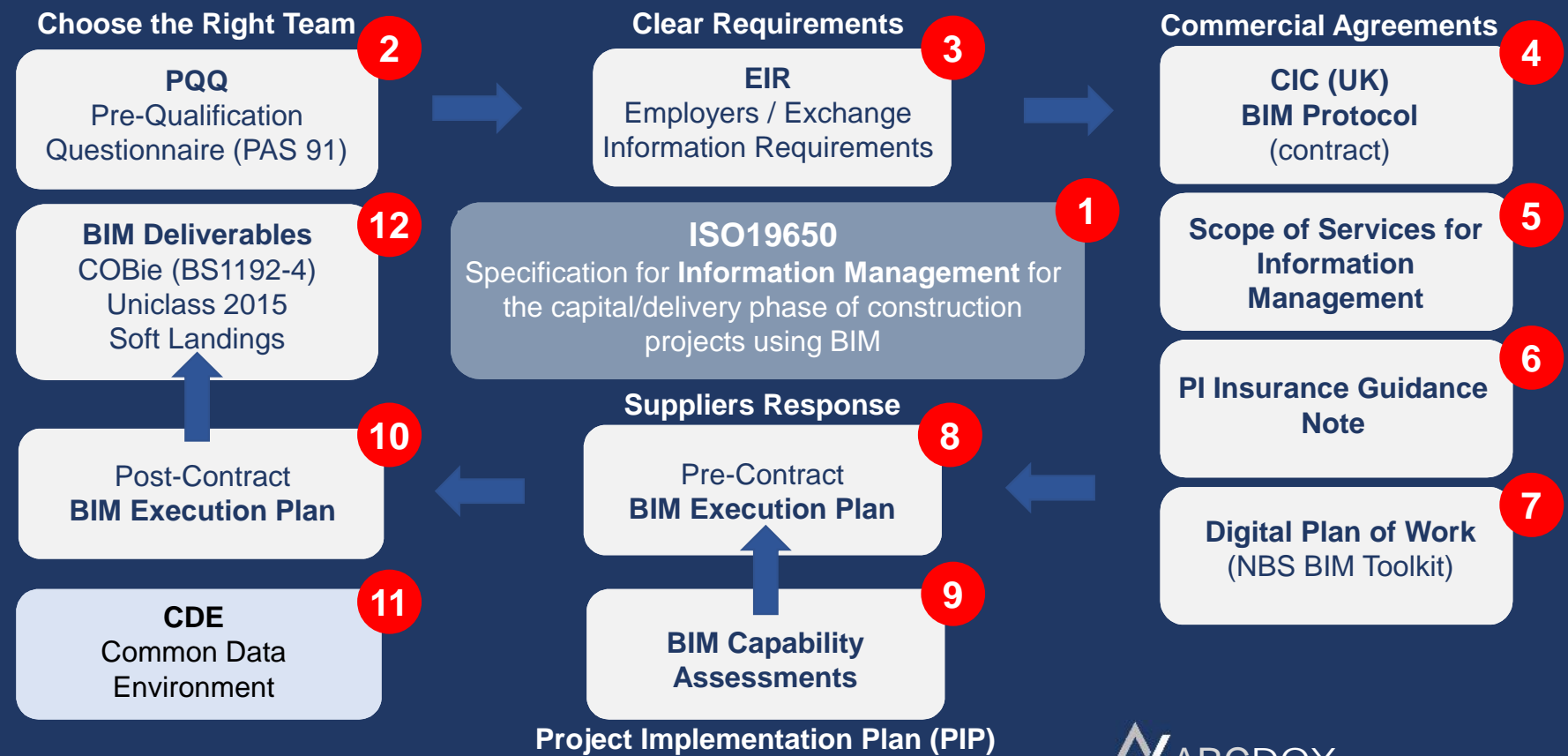
**People**  
**Process**  
**Technology**

**A “Digital” Process Requires**

- Capable People
- Collaboration
- Defined Process
- Industry Standards
- Take Responsibility

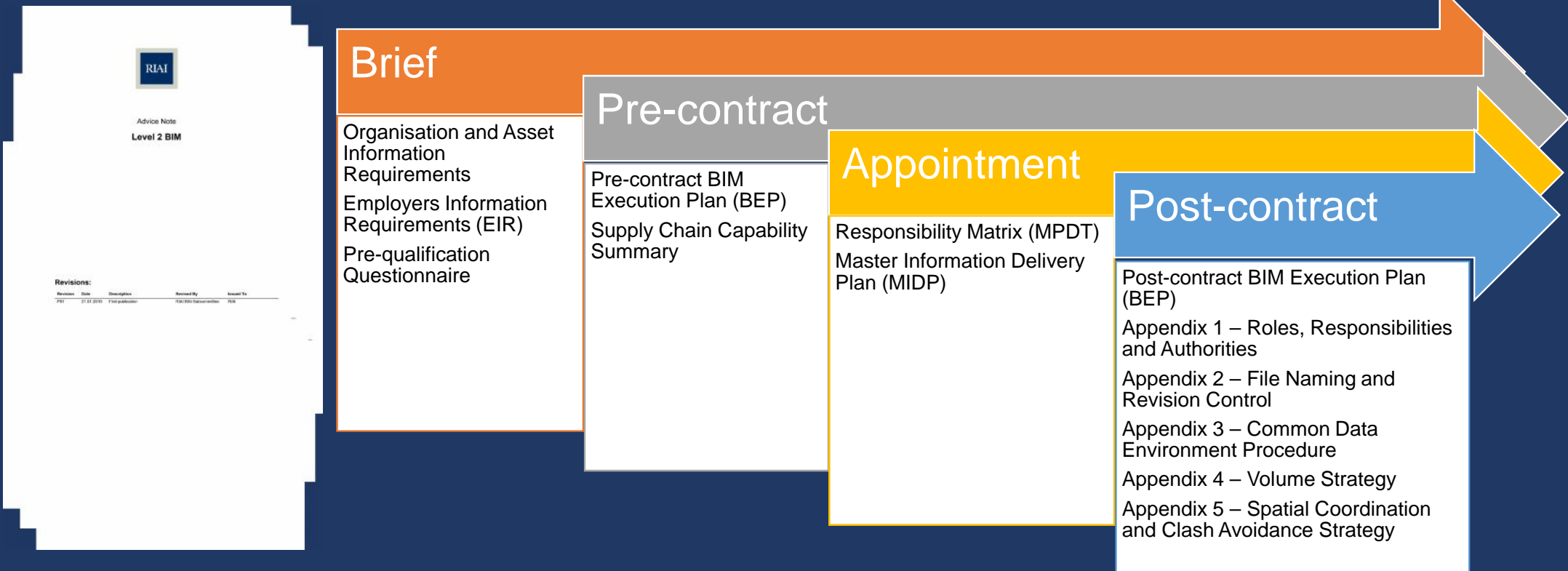
# Project Management Process

## Capital Delivery Phase (ISO 19650)



# RIAI BIM PACK

## Advise Notes, Templates & Guidance supporting BIM Level 2



<https://www.riai.ie>

# About ARCDOX

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

## CONNECT



[www.ARCDOX.com](http://www.ARCDOX.com)



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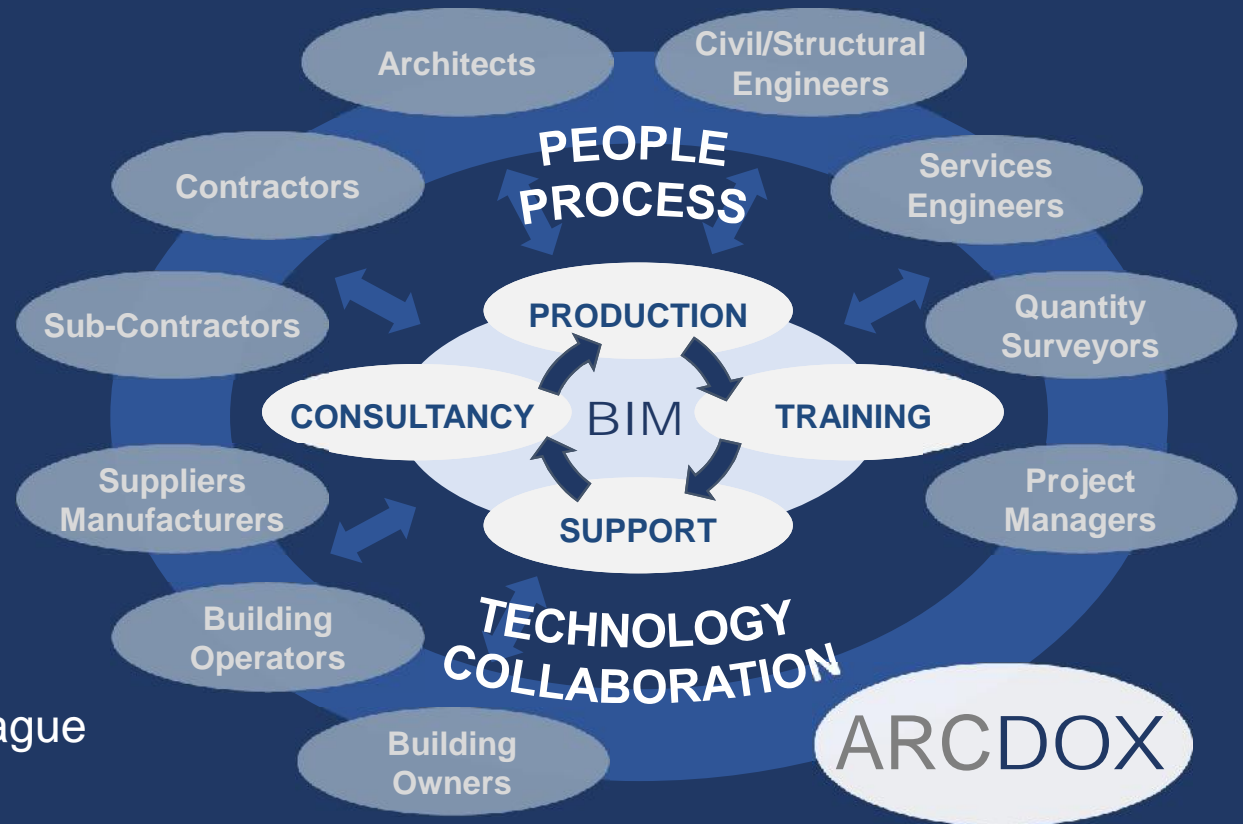
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# Discussion

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# 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...

Collaboration. Leadership. Teamwork. Commitment. Knowledge. Innovation. Integrity.

## 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:

- **P**romote the application of Lean Thinking & Practices in the Irish AEC sector.
- **D**evelop a national network of members committed to the application of Lean Thinking & Practices.
- **C**hallenge the status quo of current project thinking and delivery methods.
- **A**dvance amongst all stakeholders the business case for Lean Construction knowledge and skills.



*deliver projects better, faster, together*



# Contact LCI



[WWW.LEANCONSTRUCTIONIRELAND.IE](http://WWW.LEANCONSTRUCTIONIRELAND.IE)



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