Lean Construction & Integrated Project Delivery (IPD) Overview

Introducing Lean and the Lean Construction Institute to NWCCC

September 28, 2017

Lean Construction Institute
Transforming the Built Environment

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Topics

Why consider lean?

Origin of Lean Construction Institute & key Lean concepts

Why isn’t everybody doing this?

Engaging with the Lean Construction Institute & Cascadia Community of Practice

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What is Frustrating About Projects?

- Could you identify your 3 biggest frustrations?

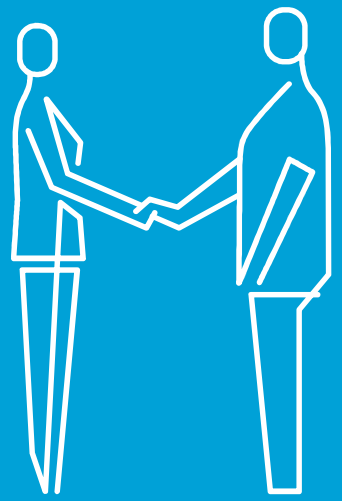
So what do **owners want?**

Predictable cost and confident ability to affect cost: make decisions on the spot

Predictable, **on time delivery**

Fair cost for delivered product

High compliance to program, quality, and lifecycle cost



Safe environment before, during and after construction

No fighting, finger pointing or **delays**

Flexibility to change as needs change

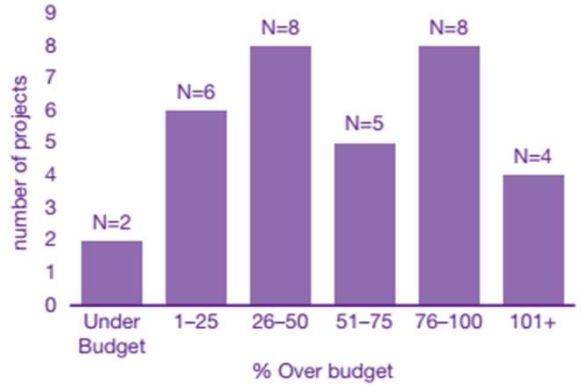
Stable, predictable, reliable, **long-term relationships**

Disappointing project outcomes are too common

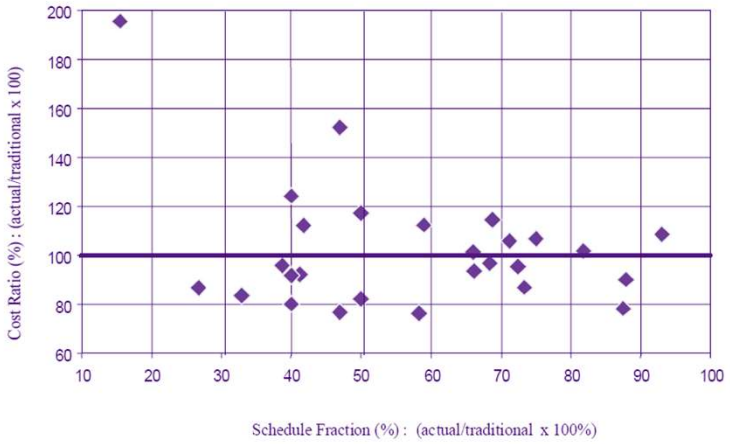
Countless studies and research reports from Construction Industry Institute and other organizations

Figure 1: Projects under budget are the exception, not the rule

Number of projects within cost overrun categories



Source: PwC analysis, based on industry research



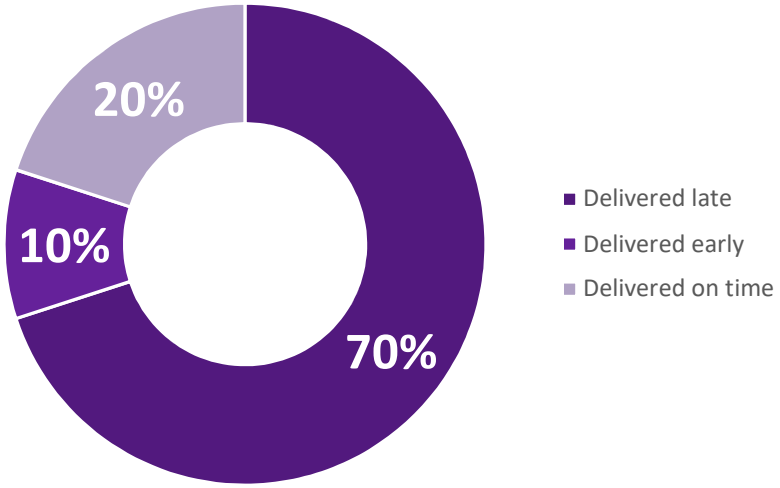
Construction Industry Institute RT-124: December, 2000

Figure 3.1 Cost Ratio vs. Schedule Fraction, Total Project

What's the problem with traditional approach?

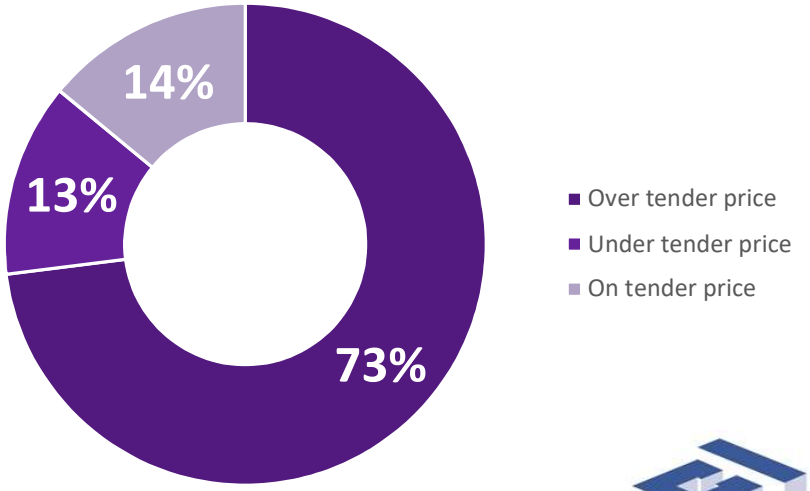
Time

70% were delivered late



Cost

73% were over budget



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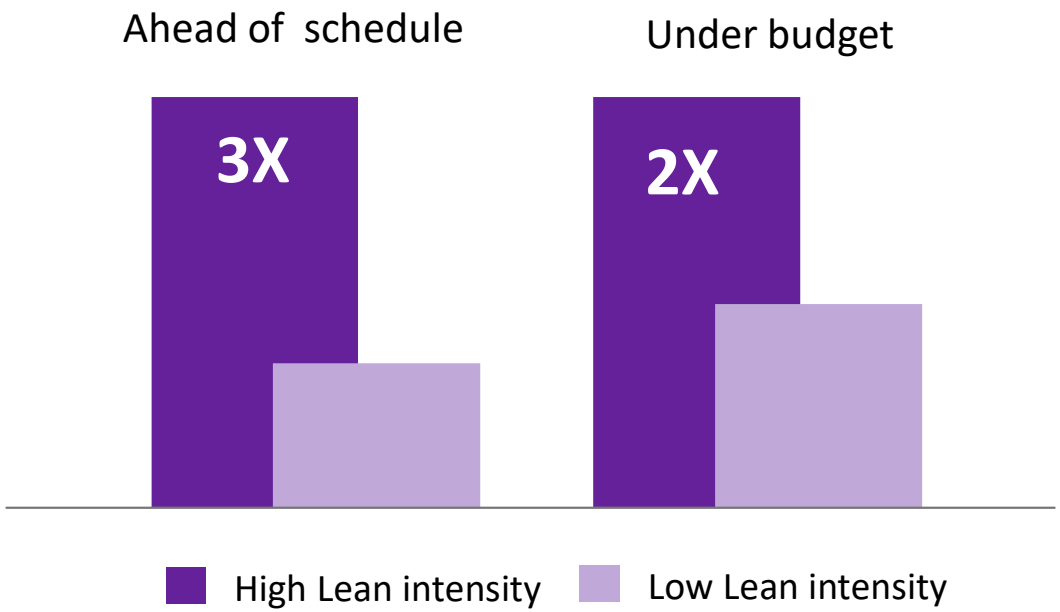
Why use Lean/IPD Approach ?

Correlation of lean intensity to outcomes (% likelihood on best projects)



DODGE DATA & ANALYTICS

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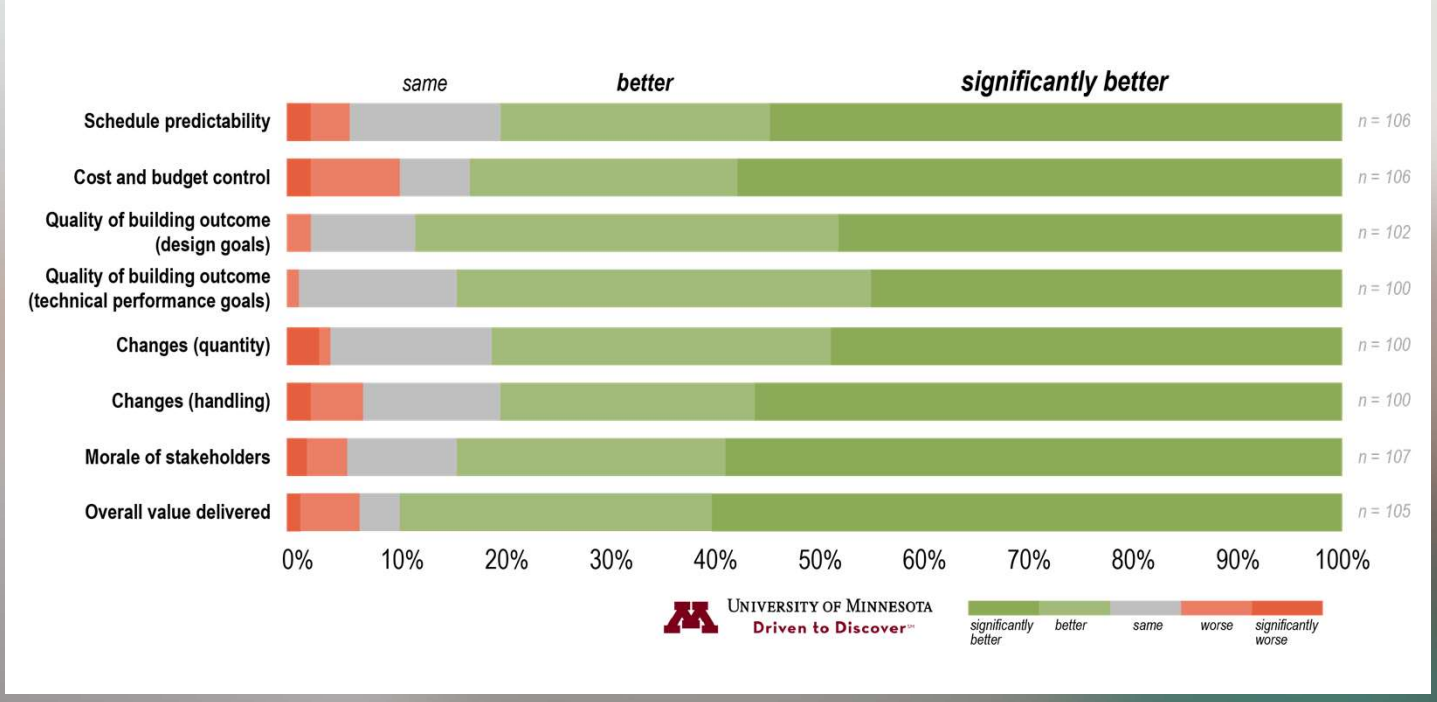
Lean IPD success
Independent Research Study

+80%

Better or **significantly better** rating

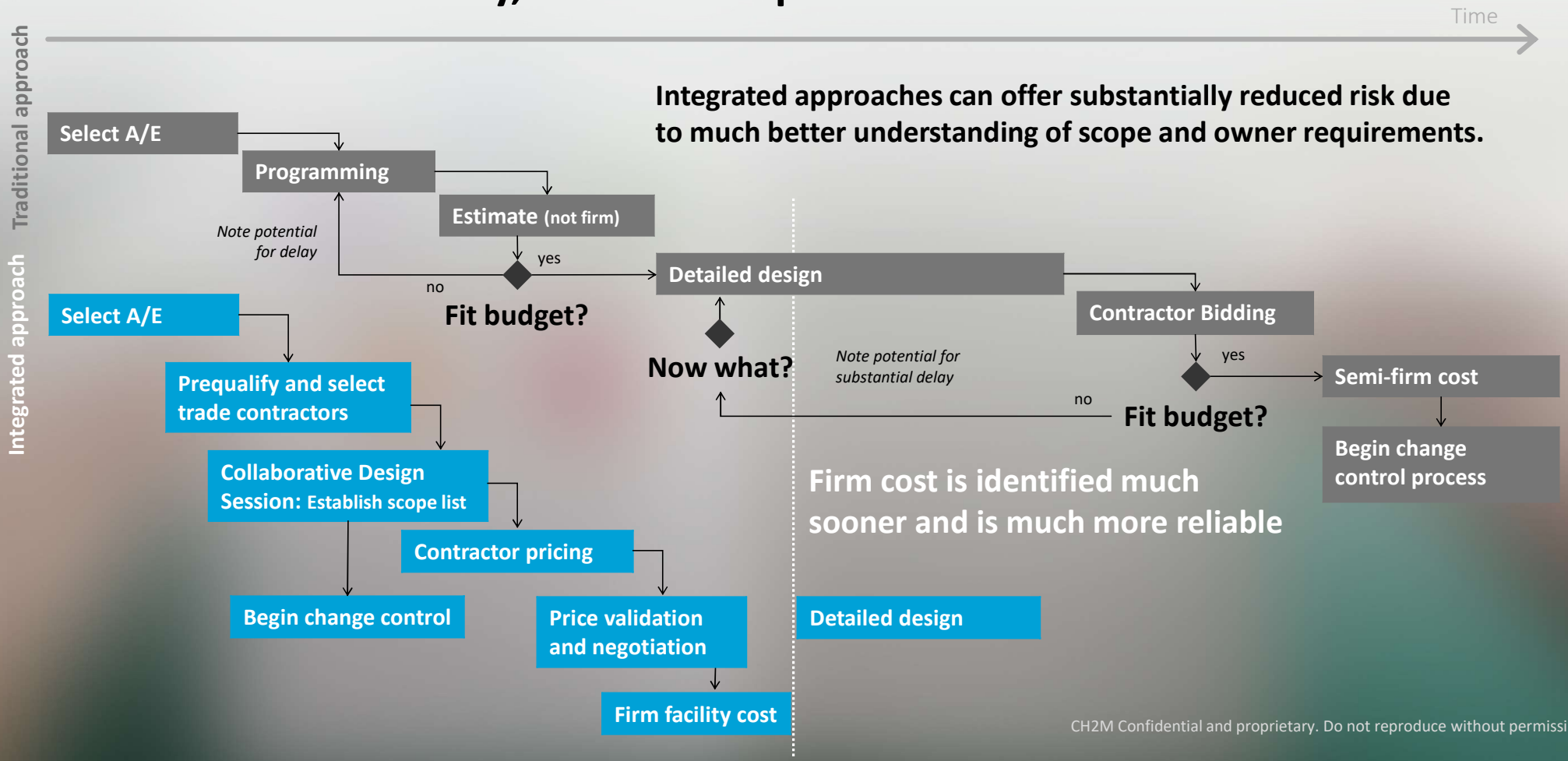
In every category for project performance, **+80%** rated the Lean IPD Model as '**Better**' or '**Significantly Better**' than a traditional delivery approach

- University of Minnesota

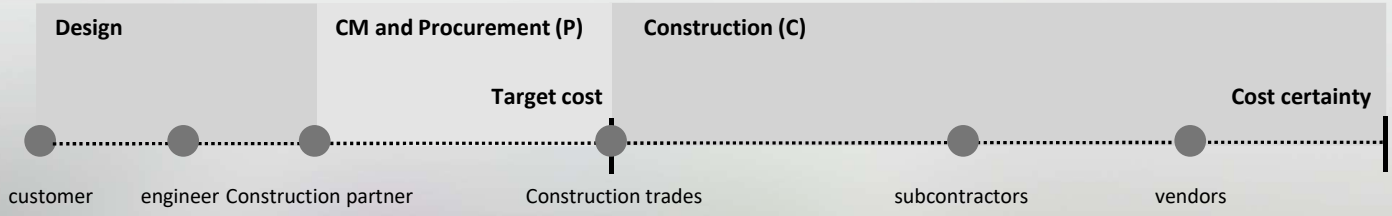


Go after the root cause of the problem

An integrated project delivery approach
eliminates unnecessary, iterative loops

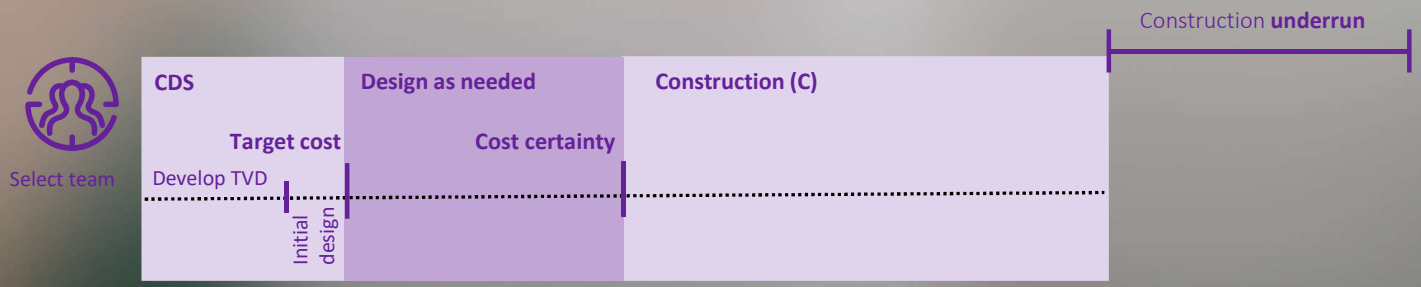


What we think will happen with traditional delivery



Traditional delivery is linear and sequential.

What actually happens way too often



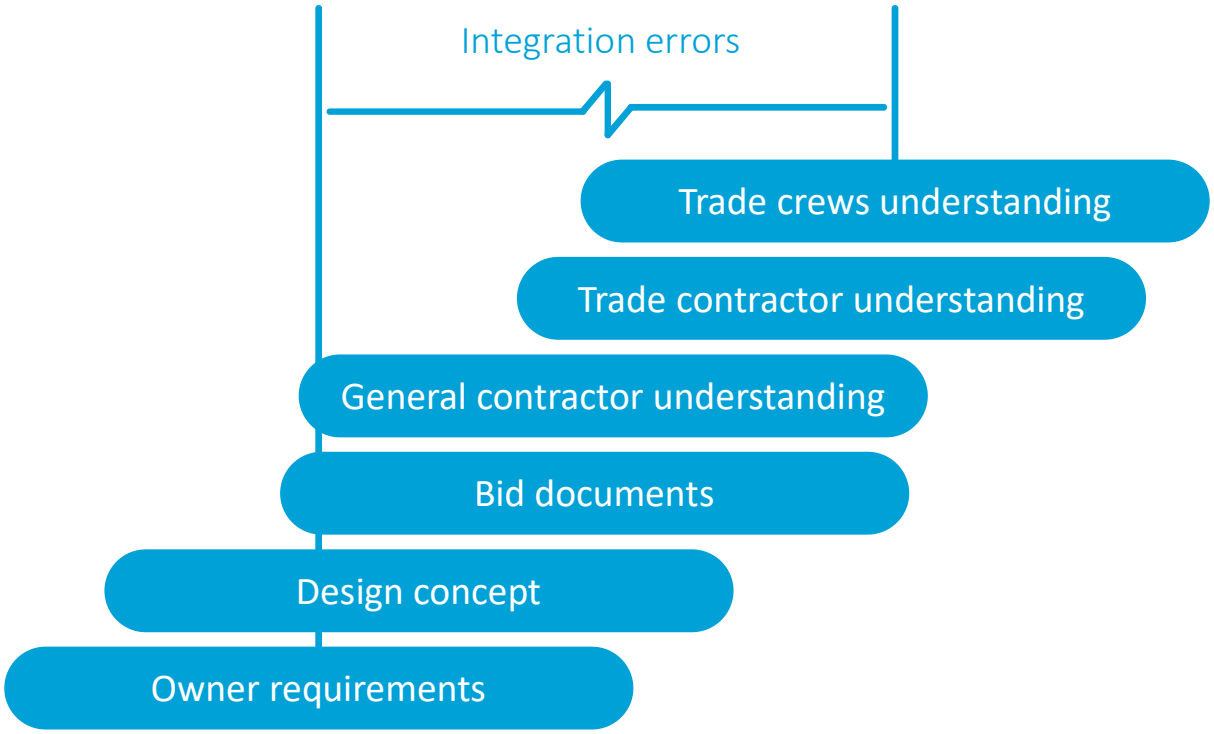
Early Outcomes:

- Client CoS
- Detailed scope matrix to facilitate pricing
- Risk evaluation
- Value engineering
- Constructability preview
- Milestone schedule
- Cost certainty
- Faster construction start

Alignment drifts and **integration errors**

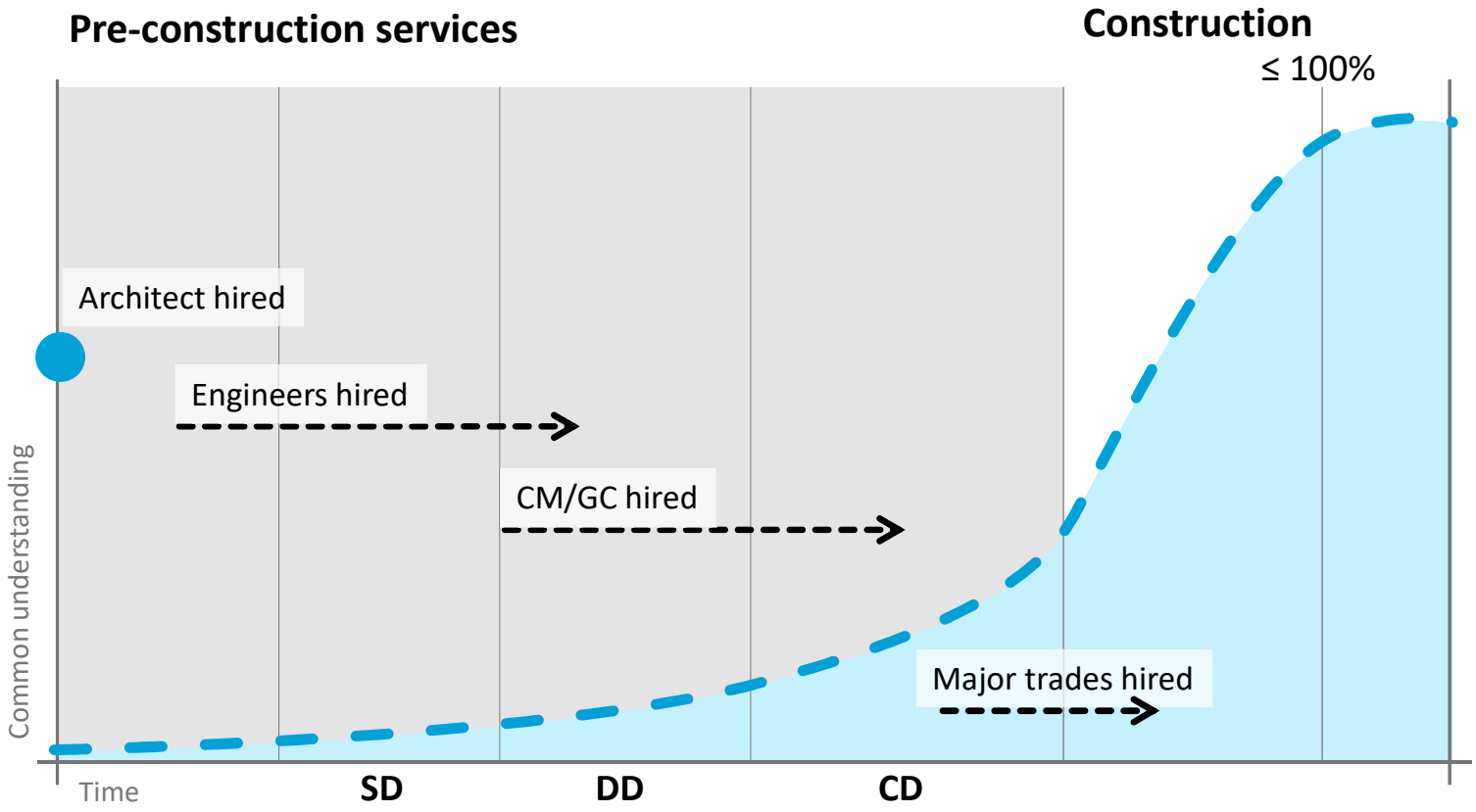
Integration Errors

- Add risk and contingency
- Create rework that becomes more disruptive the longer it remains unrecognized
- Disrupt the flow of work
- Create misunderstanding & unnecessary conflict
- **Represent the root cause of many project issues**
  - And the best place to focus remedies



Level of **common understanding**

Source: McDonough, Holland & Allen PC, Attorneys at Law



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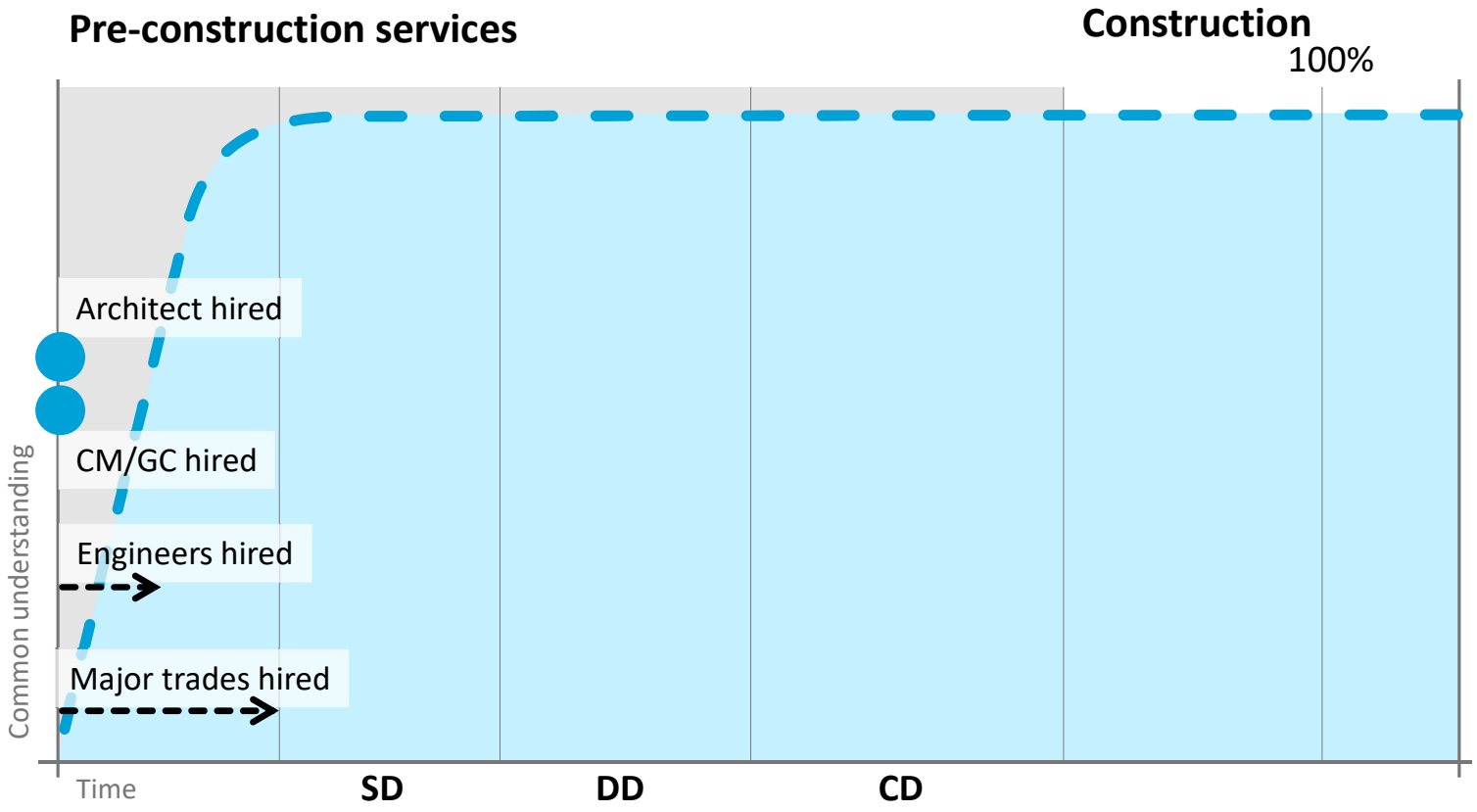
Integrated project delivery **common understanding**

Source: McDonough, Holland & Allen PC, Attorneys at Law



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Origins of Lean Construction Institute – A *few* Key Events

- Early – mid 1990s: Initial research
  - Howell, Ballard, Tommelein, Zobell, Macomber et. Al.
  - International Group for Lean Construction
- 1997: Lean Construction Institute Founded in Portland, Oregon

  ~ 20 people showed up for first "Introduction to Lean" -
  - Introduced Last Planner System
- 2001: Task Force Meeting in Las Vegas, NV to discuss the effect of contracts
  - Sutter Health joined the conversation
  - Will Lichtig began drafting Integrated Form of Agreement

Research findings from the early 1990's

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Six tenets of Lean Construction

1. Respect for people
    2. Optimize the whole
    3. Generate value
    4. Eliminate waste
    5. Focus on flow
    6. Continuous improvement

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Figure 3: 5 Cornerstones of Lean

The construction industry recognizes it needs to evolve to keep
complexity of the built environment, pre-manufactured
gress toward the same efficiency and

Owner Satisfaction Study Dodge Data & Analytics

JOURNEY TO TRANSFORM

LCI VISION

Transform the Built Environment through Lean Implementation

GOAL

Increase stakeholder satisfaction and project delivery value

OBJECTIVES

DEMAND	Create demand for Lean
CAPACITY	Create your capacity for learning and sharing better practices
VALUE	Establish standard metrics for Value and Satisfaction
KNOWLEDGE	Develop and deliver standard building blocks for Lean

STRATEGIES

1 Create a collegial owner group (demand)

2 Increase industry awareness by growing and enhancing Congress (knowledge)

3 Broadly communicate the business value of Lean (value)

4 Partner with other industry associations (value)

5 Leverage strengths of LCI Communities of Practice (capacity)

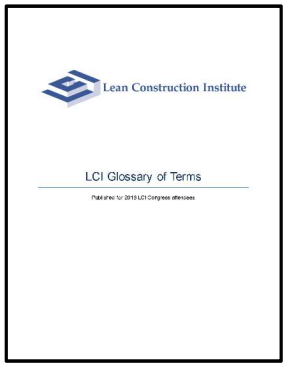
6 Significantly increase the rate of content development and distribution (capacity)

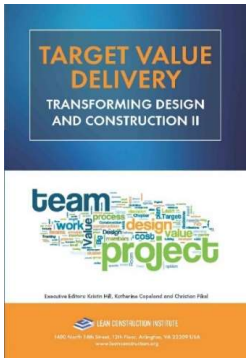
Goal #1: **Increase project delivery value and stakeholder satisfaction**

Owner Satisfaction Study
Dodge Data & Analytics

- Industry Satisfaction Survey (81 owner respondents)
- Owners' Forum

- Goal # 2: **Deliver standard building blocks for Lean**
  - Updates of LCI glossary of Lean Construction terms
  - *Target Value Design: Introduction, Framework & Current Benchmark*
  - *Target Value Delivery: Transforming Design & Construction II* (2016)





- Goal #3: **Create industry demand for Lean**
  - Board focus on owner outreach
    - Presentations at association conferences:

COAA
THE OFFICIAL WEBSITE OF THE CONSTRUCTION OWNERS ASSOCIATION OF AMERICA

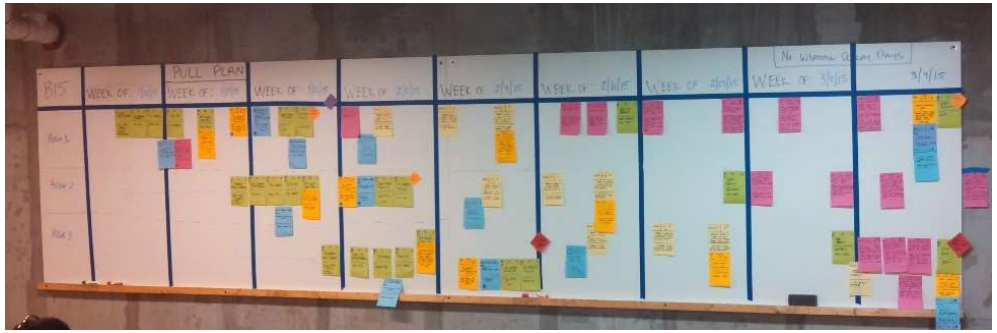
CURT The Owners Voice to the Construction Industry CONSTRUCTION USERS ROUNDTABLE

    - Outreach to individual owners
    - Support for Large Owners Group program
  - Owner-focus events: Congress, Webinars, CoPs

Last Planner® System

Phase pull planning

Look ahead planning



Daily huddle

Weekly work planning

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What is **Integrated Project Delivery?**

Integrated Project Delivery IPD is an alternative delivery method that leverages early collaboration and alignment by bringing together all project partners, including design, construction, trades, and vendors vs. traditional contracting methods that happen sequentially, often in a vacuum, requiring additional time and rework.

What does IPD do?

- **Allows us to engage deeply** with the client to establish the target-value
- Supports **early collaboration, innovation, and value engineering**
- **Increases alignment and reduces overall cost and schedule** by concurrently designing the product and process
- Helps us to **identify, eliminate, and mitigate project risk**
- **Leverages entire team's expertise** through collaborative design sessions (CDS) to leverage entire team's expertise

IPD benefits

Increased innovation

Increased value engineering

Cost reduction

Staff leveling

Schedule efficiencies

A project is **a promise**

A project is a **very big promise** delivered by people in an ever changing network of promises

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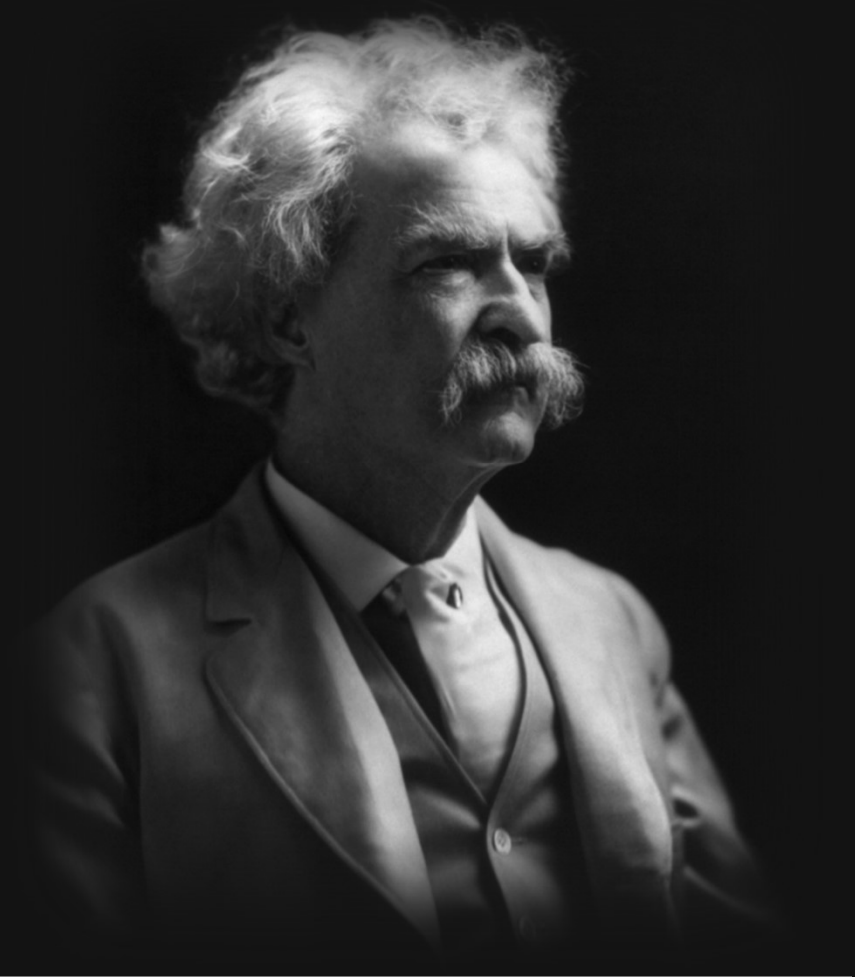
Distinct cost advantages of Lean/IPD delivery

- Cost effective solutions that would otherwise never be considered
  - "If that's what you're trying to do, why don't you…."
  - The Scope of an IPD project will ~~nearly~~ always be:
    - simpler
    - better integrated
    - more constructible
- Project can start much sooner and avoid schedule compression
  - Collaborative project delivery is ~~almost~~ always faster
- Less time and money spent designing (and estimating) what won't fit the budget
- Less risk for all participants

- Integration Errors eliminated much earlier and at much lower cost
  - Countless RFIs answered before they need to be written
- Attractiveness to bidders
  - More attractive projects generate more competitive response
- Team motivated to mimimize problems rather than exploit them

IPD enables flow. Flow is money.

So **why isn't everybody** working this way?



"It ain't what you don't know that gets you into trouble. It's what you know for sure that just ain't so."

— Mark Twain

Conventional wisdom?

“Who the hell wants to hear actors talk?”

— H.M. Warner, Warner Brothers, 1927

“We don't like their sound, and guitar music is on the way out.”

— Decca Recording Co. rejecting the Beatles, 1962

“I think there is a world market for maybe five computers.”

— Thomas Watson, chairman of IBM, 1943

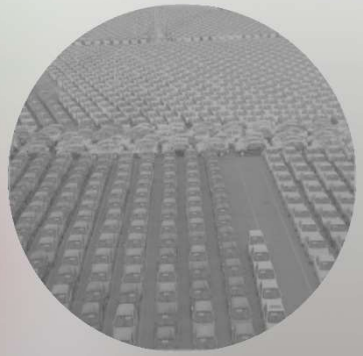
These slides from CII Research Team 291 and presented at the LCI Congress in 2011 by CH2M.

Photos from top: The Retro Barbershop; Beatlesgirl7; NASA Ames Resarch Center (NASA-ARC).

Historical conventional wisdom

Maybe it's time to rethink our paradigm about competitive bids providing lowest cost

A professional commander organizes his troops in straight, orderly lines in the middle of an open field and has them wear bright, red coats.



Trying to build a car with zero defects simply isn't cost effective

Construction is a dangerous business. Accidents and injuries are just part of the game.

These slides from CII Research Team 291 and presented at the LCI Congress in 2011 by CH2M.

Project delivery **paradigms**

"You manage the project by managing contracts."

"Win-win is an illusion. What counts is that I win!"

"Collaboration sounds great, but you have to give up competition. "

"Social science isn't real science."

"Trust is for suckers"

These slides from CII Research Team 291 and presented at the LCI Congress in 2011 by CH2M.

Competing paradigms

"Periods of revolutionary change begin with anomalies that the established paradigm is unable to explain, leading eventually to the development of a competing and ultimately victorious new paradigm."

Thomas Kuhn
The structure of Scientific Revolution (1982)

These slides from CII Research Team 291 and presented at the LCI Congress in 2011 by CH2M.

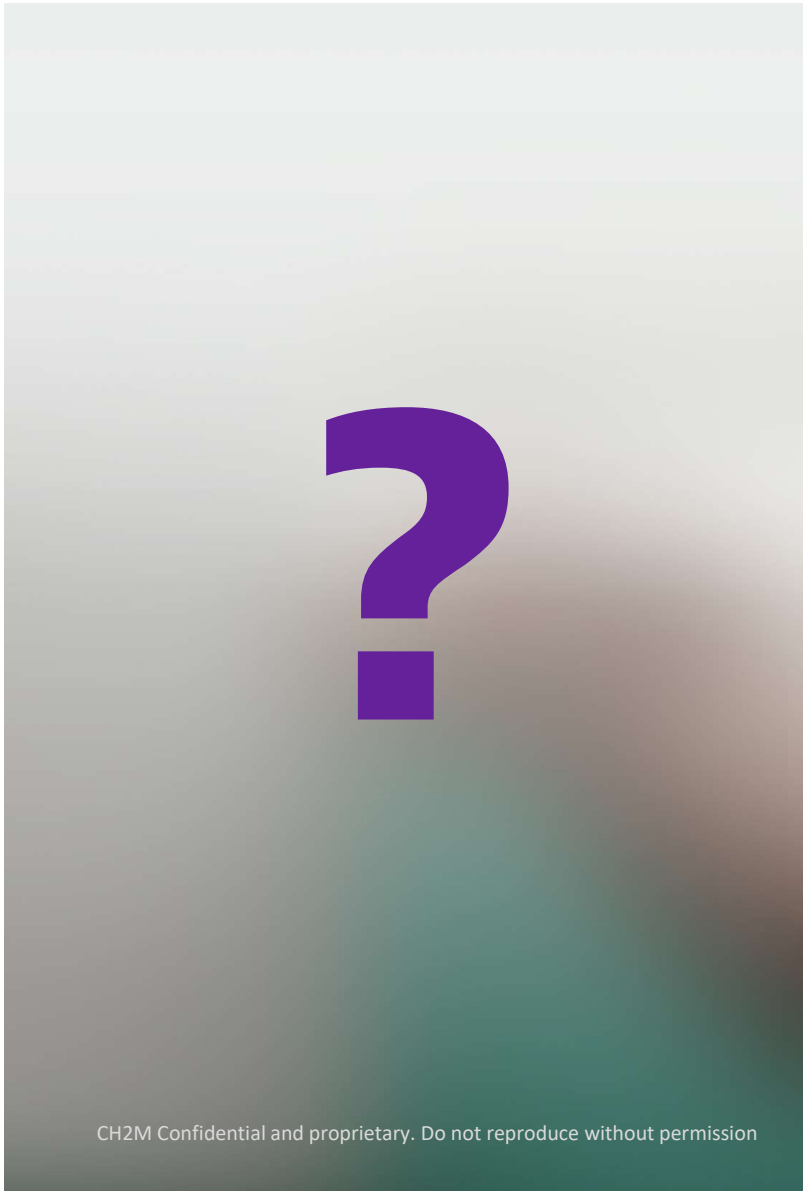
Where **do we fit in?**

What paradigms do we challenge?

How do we become the anomalies that lead others to recognize faulty paradigms?

Is challenging a set of institutional paradigms a call to action for an institution?

Is this a good “Chapter Challenge”?



These slides from CII Research Team 291 and presented at the LCI Congress in 2011 by CH2M.

Call to **action**

‘Create’ anomalies that compel confrontation with paradigms

Test widely held presuppositions that may be false

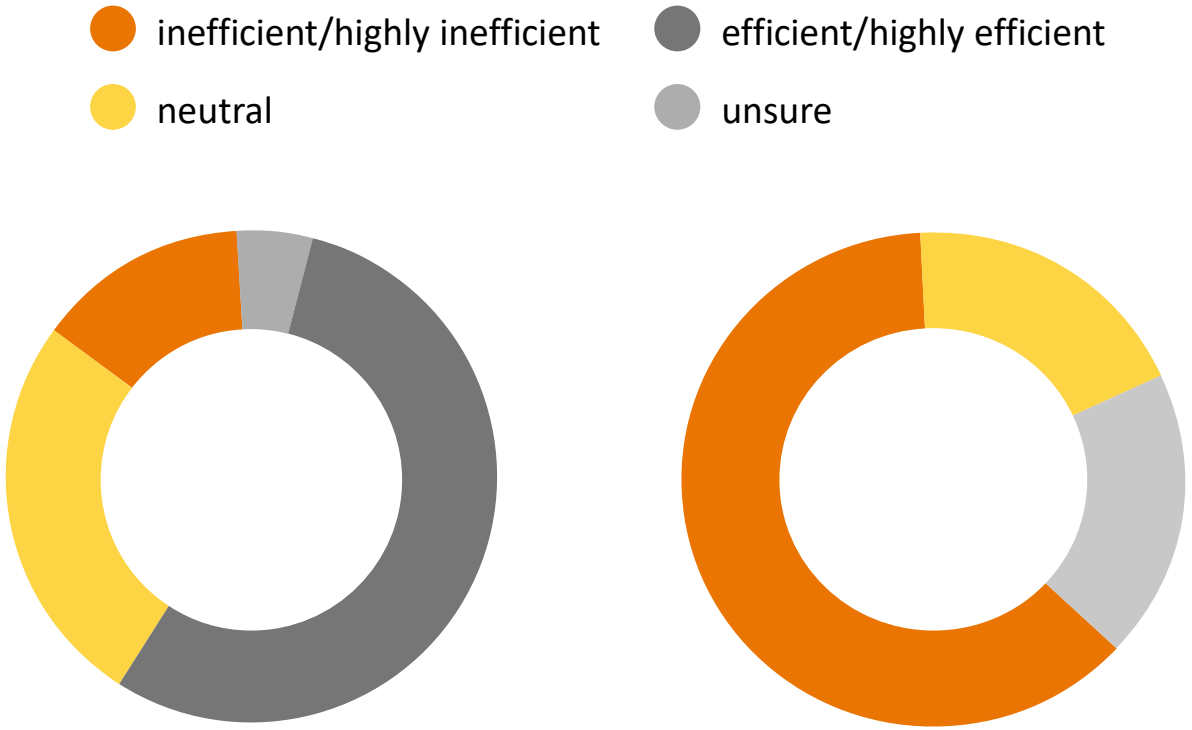
Apply competitive pressure in the market

These slides from CII Research Team 291 and presented at the LCI Congress in 2011 by CH2M.

Current industry situation – **waste is hidden**

Seeing the waste

Lean Practitioners understand that currently only 19% of the time in the construction industry is spent being ‘Efficient or Highly Efficient’… while Non-Lean Practitioners either misjudge or don’t recognize the waste



Non-lean practitioners

Lean practitioners

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Lean/IPD, **safety and quality**

Respect for individuals

Effective and transparent communication

Focus on effective process

Continuous learning and improvement

Recognizing that you don't need to accept bad outcomes

Further interest in LCI?

Leanconstructioninstitute.org

- LCI Congress, Anaheim, CA. October 17 – 20.
- Cascadia-Seattle LCI Community of Practice

Questions?

Thank You!

Plus/Delta

Figure 3: 5 Cornerstones of Lean

The construction industry recognizes it needs to evolve to keep
complexity of the built environment, pre-manufactured
ogress toward the same efficiency and

But how do I know **I'm getting the best price?**

- Lean IPD goes after the root cause of construction inefficiency
  - Lean/IPD can drastically reduce the integration errors that plague project delivery
- Owner benefits from a **team** enabled and motivated to help solve problems
  - Constructability and Safety are designed in from the start
  - Great solutions can be incorporated that otherwise would never be considered
  - Collaborative efforts represent comprehensive "rehearsals" that greatly enhance team effectiveness
- Competition and Collaboration are not mutually exclusive
  - Key pricing factors can be competitively negotiated without a full design
    - Focus the competition where it is most effective
  - Lean projects are very attractive – and therefore attract highly competitive responses from bidders

Early evidence is strikingly clear – Lean/IPD works!