

2021 Introduction to Lean Project Delivery



Lean Construction Institute
Immersive Education Program



- Wear masks at all times in indoor events.
- Complete your daily health screening on your phone and bring it with you when you enter the center each day.
- Practice social distancing to the extent possible.
- If you feel ill at any time, please leave the conference and return to your room/consult a physician as necessary.

David MacNeel, On Point Lean Consulting
Lauren Simone, W.M. Jordan

October 19, 2021

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Instructor Introductions



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Immersive Education Program


Dave MacNeel
On Point Lean




Lauren Simone
W.M. Jordan COMPANY

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INTRODUCTION TO LEAN PROJECT DELIVERY



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Discussion Question

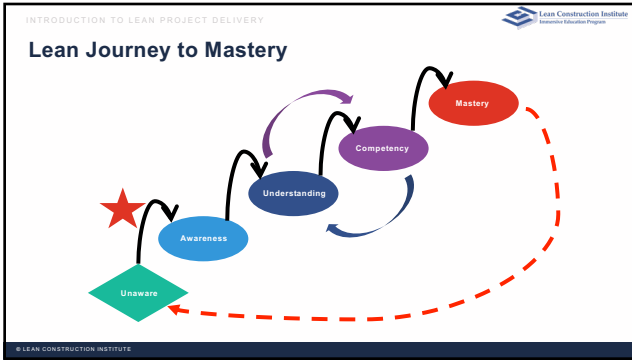
What do you want out of this Introduction to Lean Project Delivery?

What questions do you have?

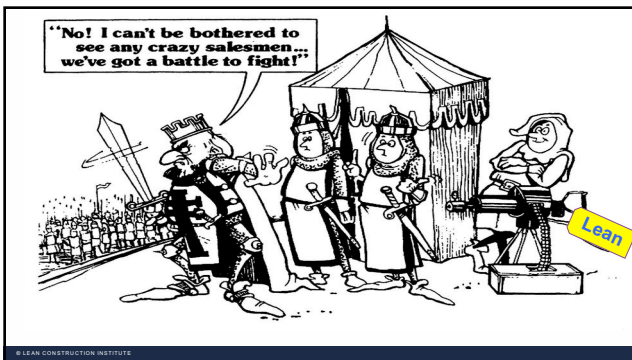
5 minute discussion
ELECT A SPOKESPERSON TAKE NOTES

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Definitions

Lean:
Culture of respect and continuous improvement aimed at creating more value for the customer while identifying and eliminating waste.






Lean Project Delivery:
An organized implementation of Lean principles and tools combined to allow a team to operate in unison to create flow.


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Origins of Lean

- **Scientific Management** 1880-1930 
- **Assembly Lines** 1903-1914 
- **World War II** 1939-1945 
- **Lean Manufacturing** 1945 - present
Toyota Production System (TPS)  



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Meals Per Hour Video

- Super Storm Sandy 



TOYOTA

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Two Non-Negotiables

- Respect for people
- Continuous improvement








 

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Traditional Delivery Outcomes...

-  Risk is high
-  Teamwork is unreliable
-  ~70% of projects are delivered late
-  Customers are not satisfied
-  ~73% of projects are over budget
-  Profit margins are shrinking
-  Rework and waste is high

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Discussion Question

What are your **dissatisfactions** with the way projects are currently designed and constructed?



10 minute discussion
ELECT A NEW NOTE TAKER & SPOKESPERSON


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Lean Construction Background

-  Early 1990's: Glenn Ballard & Greg Howell focused on construction reliability & planning
-  Surveyed ~475 Superintendents and foremen and asked, **"What do you intend to complete next week?"**



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Brief History : Lean in Design & Construction





54%

Discovery: on average, only 54% of planned work was completed by the end of the week.


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The Opportunity...


MANUFACTURING



Waste 12%

Productive Time

DESIGN/ CONSTRUCTION



Waste 57%

Productive Time






2004 study by the Construction Industry Institute

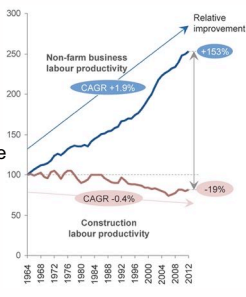
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Why Lean?

-  Construction productivity is declining
-  Construction costs are skyrocketing
-  Injuries are too high
-  Traditional planning systems are unable to produce predictable workflows
-  Workflow reliability directly affects speed and cost of projects










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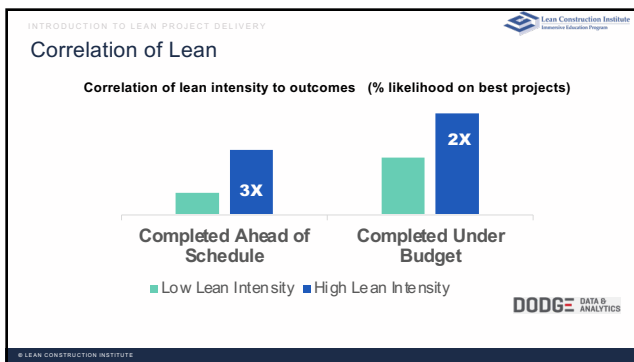
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Lean Project Delivery Enables

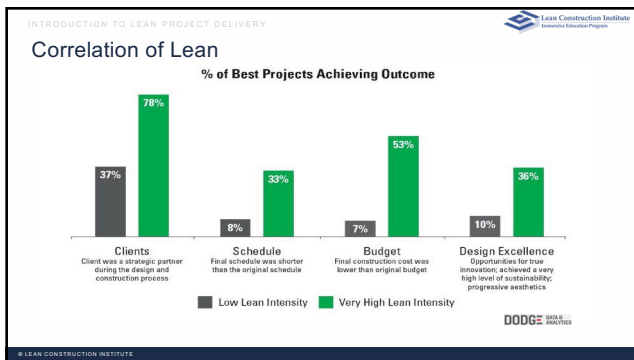
-  Risk to be collaboratively managed
-  Projects to be delivered on time
-  Projects to be delivered within the budget
-  Less waste and rework
-  Team-wide reliability
-  Higher customer satisfaction
-  Fair profits for providers

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*“Lean processes bring about improvements not only in cost and delivery but also in **quality and safety.**”*

– WORLD ECONOMIC FORUM'S SHAPING THE FUTURE OF CONSTRUCTION: A BREAKTHROUGH IN MINDSET AND TECHNOLOGY (PG. 31).

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Thyssen-Krupp Steel Mill – Mt Vernon, AL (2009)


Results: Lean vs Traditional

- **Duration:** 6 months vs 9 months
- **Productivity:** 12% fewer labor hours
- **Overtime:** 17% vs 35%
- **Peak labor:** 270 Lean vs 420 Traditional
- **Total Cost:** 17% Less (\$30MM vs \$35MM)

See www.onpointlean.com/case-study/




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Goals of Lean Design & Construction

- 1 Achieve reliable workflow
- 2 Maximize value to the customer
- 3 Minimize waste
- 4 Optimize the whole, not the parts
- 5 Develop a discipline of learning and continuous improvement.




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Plan – Do – Check - Act (PDCA) The Deming Cycle

Improve the System



Study the Results

Predict

Take Action,
Try it Out


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Benefits of Lean

- 1 Safer work environment: fewer incidents & injuries
- 2 Increased cost & schedule certainty
- 3 Increased productivity
- 4 High stakeholder satisfaction
- 5 Less stress on participants



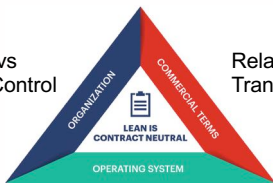
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Project Elements: Lean vs Traditional

Collaboration vs
Command & Control



Relational vs
Transactional

Reliability Focus (Flow) vs CPM Scheduling (Push)

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Production System Design Exercise

The Airplane Game



Lean Zone® Production Methodologies is a registered trademark of Visionary Products.

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Airplane Simulation Debrief

Discuss and answer the following questions:

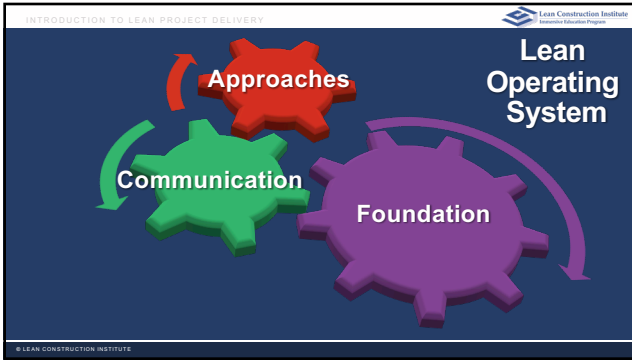
- 1) What are the key points/lessons?**
 - What did we do (or change) to get so much better?
- 2) How might these Key Points and Lessons apply to your work?**
 - Elect a new notepokesperson

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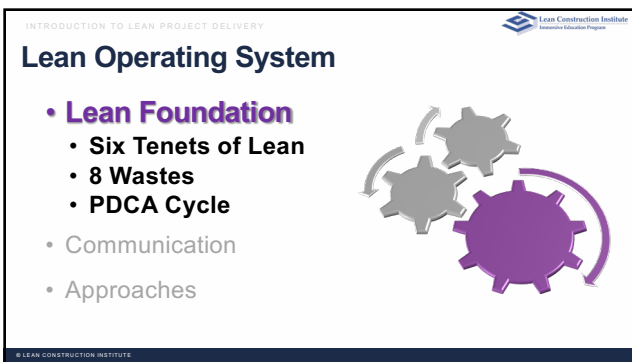
Airplane Game Lessons

- Release work from one party to the next by **pull** instead of push (1 piece flow)
- **Minimize batch sizes** to reduce cycle time
- Make **everyone responsible** for QC
- **Balance the workload** between trades
- Encourage and enable performers to **collaborate** with one another to maintain steady workflow

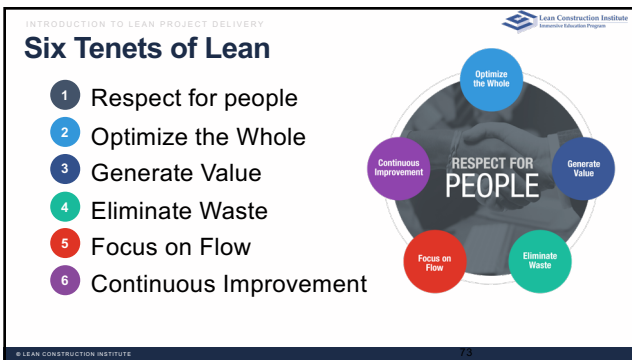
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Optimize the Whole ...not the parts

Value optimization encourages looking beyond the local and individual efforts to study the overall outcome to determine where value is added or waste can be eliminated

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Generating Value

"If it is not something the client is willing to pay for, it is non-value added. Everything else is waste, and therefore should be eliminated, simplified or reduced."

— *The Toyota Way*, by J. Liker

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Removal of Waste

- Lean Burrito video by Paul Akers

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The 7 Deadly Wastes – Taichi Ohno, Toyota

- T**ransportation - Unnecessary movement of “things”
- I**nventory - Excess materials
- M**otion - Unnecessary movement by people
- W**aiting - Workers waiting for work OR Work waiting for workers
- O**ver-production - Producing more than is needed
- O**ver-processing - Spending more time or expense required
- D**efects – Rework due to poor quality or out-of-sequence work

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The 8th Waste: Talent

- T**ransportation - Unnecessary movement of “things”
- I**nventory - Excess materials
- M**otion - Unnecessary movement by people
- T**alent – underutilizing the creativity and skills of the team
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Discussion Question

List examples of waste you see in the design and construction process

Table Discussion: 10 minutes
Report out: 10 minutes

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The 8th Waste: Talent

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Continuous Improvement (PDCA)

Leaders must create an environment where experimentation is encouraged and small, manageable failure is acceptable if the goal is to improve continuously.




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Lean Operating System

- Lean Foundation
- **Collaborative Communication**
 - Project as a promise
 - Conditions of Satisfaction
- Approaches



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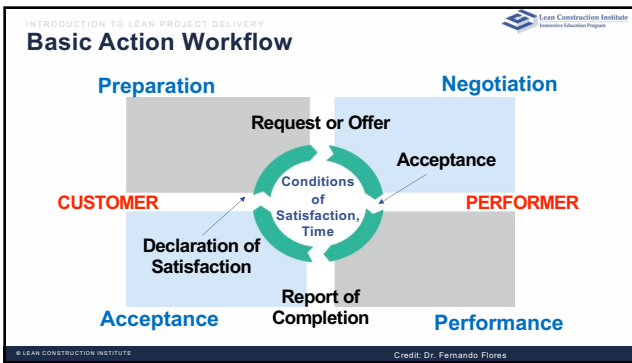
Project is a Promise



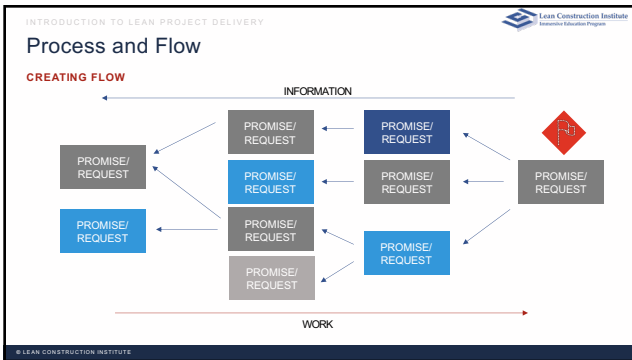
A project is a very big promise delivered by people in an ever-changing network of promises.

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Project Conditions of Satisfaction (CoS):

- Similar to a Project or Team Charter
- *Value Definition Statements* developed by the team – OAC & key trade partners
- Determines which *tests a project must pass* to be accepted as a success.
- Inform the *decision-making process* of the team.

CONDITIONS OF SATISFACTION

- 1. IMPROVE THE PATIENT SATISFACTION SURVEY SCORE BY 2.5%
- 2. IMPROVE THE AVERAGE ORDER TO DELIVERY TIME BY 30 MINUTES
- 3. REDUCE THE NUMBER OF FALLS FOR THE EMERGENCY DEPARTMENT BY 2.5%
- 4. UPDATE THE LAST PLANNER SYSTEM TO TRACK AND MANAGE CONSTRUCTION WITH A FIVE (5) OF EXCELLENCE
- 5. 100% COORDINATION TO BE DONE THROUGH CONSTRUCTION DOCUMENT DEVELOPMENT
- 6. EXCELLENCE IN SAFETY: 30% EXCELLENT RATINGS AND ZERO LOST TIME INCIDENTS
- 7. EXCELLENCE IN HOUSEKEEPING: 90% EXCELLENT RATINGS OF VISITS
- 8. FINISHES BY PREFABRICATION
- 9. ALL TEAM MEMBERS WILL GO THROUGH ONBOARDING


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Lean Operating System

- Lean Foundation
- Collaborative Communication
- **Approaches:**
 - Integrated Project Delivery (IPD)
 - Team Organization
 - Big Rooms
 - Target Value Delivery (TVD)
 - 5S Implementation
 - Last Planner System® (LPS)
 - Other tools



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Integrated Project Delivery (IPD)

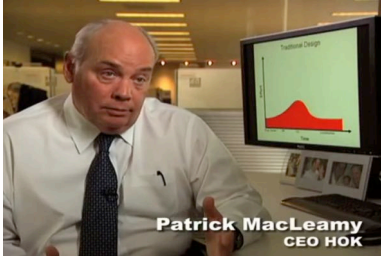
- Contract form – IFOA / Consensus Docs
- Think “JV “between O/A/C/Key Trades
- Cost Plus
- Shared Risk/Reward
- Combats the downfalls of traditional Design, Bid, Build

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MacLeamy Curve Video



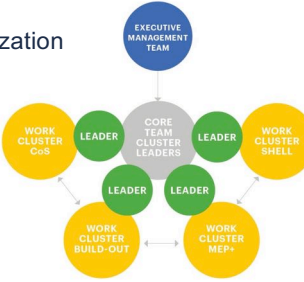
Patrick MacLeamy
CEO HOK

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IPD Work Cluster Organization



Executive/Senior Management:

- Not involved in day-to-day of team
- Resolve conflicts

Core Team:

- Day-to-day leaders of the team

Work Cluster Leader:

- Coordination between work cluster & core team

Work Clusters:

- System oriented
- Cross discipline
- Stakeholder representation
- Form as needed


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Big Room

- Speed communication
- Improve decision-making
- Reduce 'siloed' thinking
- **Rapidly Advance work**



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Items Remaining

- Flashlight (4"D" Battery)
- 5" Knife
- Air map of AZ
- Plastic Raincoat
- Compass
- First Aid kit
- 9mm Pistol
- Parachute
- Salt Tablets (100)
- Water (20oz bottle pp)
- Book "Edible Animals of the Desert"
- Sunglasses (1 pp)
- 90 Proof Vodka – 750ml
- Trench Coat (1 pp)
- Cosmetic mirror

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Decision Making Continuum

From *Rangers Lead the Way* by Hohl & Karinch

I tell, you do **Your input could affect my decision** **Consensus**

Limited: 1 3 5 **Strong Team**

• People **More Time**

• Equip. 2 4 6

• Time 2 4 6

What are your concerns about my decision? **Majority Rules** **I'm delegating to you**

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Traditional vs. Target Value Delivery

The goal of TVD:
Minimize the waste inherent in the design-estimate-redesign cycle(s) of the traditional approach.

Traditional: Cost is an *OUTPUT* of design

TVD: Cost is an *INPUT* of design

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Traditional Delivery vs Target Value Delivery

Traditional Delivery:

- Work performed in silos – low visibility
- Early commitment to design solutions
- “Finish your work before I start mine” mentality

Target Value Delivery:

- Information is shared early and often
- Sets of solutions are carried and optimized holistically
- Continuous estimating and cost modeling based on concepts

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MONTHLY PROJECT UPDATE

A3 Thinking

(A3 = 11 x 17 paper size)

- Pioneered by Toyota
- Disciplined and highly collaborative approach to Plan-Do-Check-Act
- A3 Applications:**
 - Problem Solving
 - Policy Deployment
 - Reporting
 - Capturing Decisions

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Choosing by Advantages (CBA)

A sound decision-making system for determining the **best decision** by looking at the **importance of the advantages** of each alternative.

	Alternative 1	Alternative 2
Factor: Square Feet of Mechanical Space Required	Control Room Heating/Hot Water System	Control Room Heating/Hot Water System
Units	Advantage 1000 sq ft	Disadvantage 1000 sq ft
Factor: Access for Maintenance	Advantage Easy access to all equipment	Disadvantage Access to equipment
Units	Advantage 1000 sq ft	Disadvantage 1000 sq ft
Factor: Quantity of Bidders & Bids	Advantage 2 bids	Disadvantage 1 bid
Units	Advantage 1000 sq ft	Disadvantage 1000 sq ft
Factor: Ability to do Future Work Without Interruption	Advantage 100% access to work	Disadvantage Access to work
Units	Advantage 1000 sq ft	Disadvantage 1000 sq ft
Factor: Pumping Energy	Advantage Less required due to long distribution	Disadvantage More required due to long distribution
Units	Advantage 1000 sq ft	Disadvantage 1000 sq ft
Factor: Construction Schedule	Advantage Longer due to the distribution	Disadvantage Shorter due to the distribution
Units	Advantage 1000 sq ft	Disadvantage 1000 sq ft

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Choosing by Advantages (CBA) Overview

- Sound outcomes **require** sound decisionmaking methods
- **Methods** → Decisions → Actions → **Outcome**
- Decisionmakers must learn & use sound methods
- Decisions must be anchored to **relevant factual data**
- **Decisions must be based on the importance of advantages**

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CBA Vocabulary

- **Alternatives**
 - Two or more people, things, or plans from which one is to be chosen
- **Factor** (subjective)
 - Element for comparison of Alternatives
- **Criteria** (subjective)
 - Must or Want condition of a Factor

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CBA Vocabulary

- **Attribute** (objective)
 - Character, quantity, or quality of **one** alternative
- **Least Preferred Attribute** (subjective)
 - Stakeholder choice for each Factor
- **Advantage** (objective)
 - Difference between Attributes of **two** Alternatives OR benefit, gain, improvement, or betterment
- **Anchoring**
 - All decisions, attributes, questions, & importance must be based on (anchored to) relevant factual data.

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CBA Cardinal Rule:

Decisions **must** be based on the **importance of advantages**


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Determining the Importance of Advantages

Advantages	Score
+2 Airbags (Paramount Adv.)	100
+6 MPG	70
+2 MPG	50
More Appealing Interior	40
Appealing Interior	30
+2 Passengers	40
+1 Passenger	30



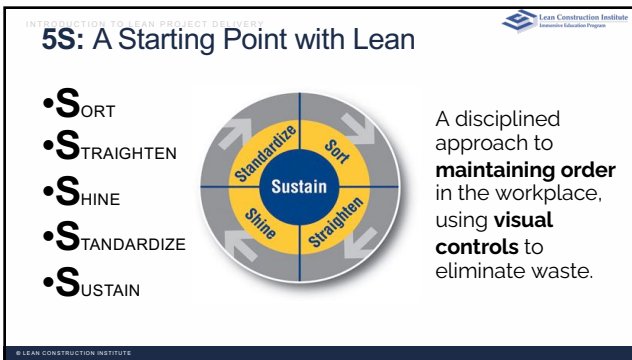
Advantage scoring is **anchored** to the **Paramount Advantage**

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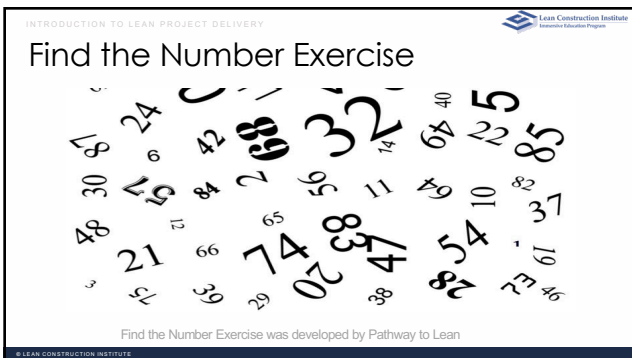
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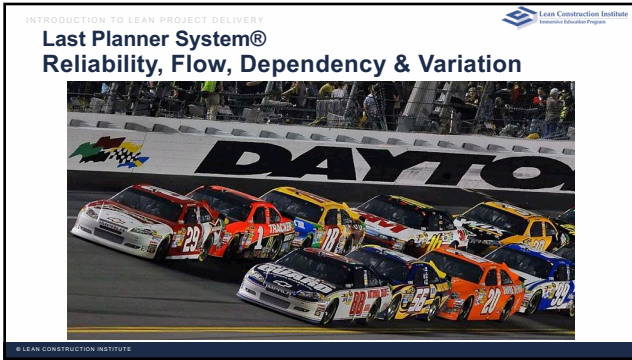
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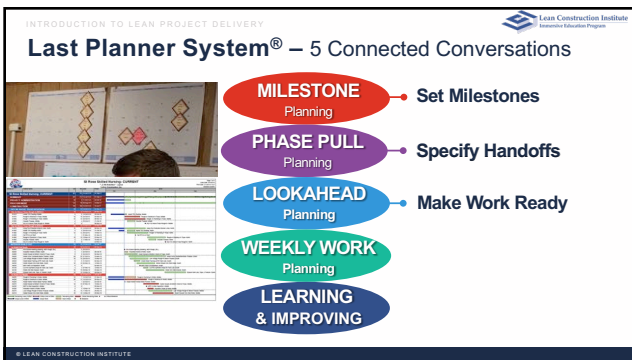
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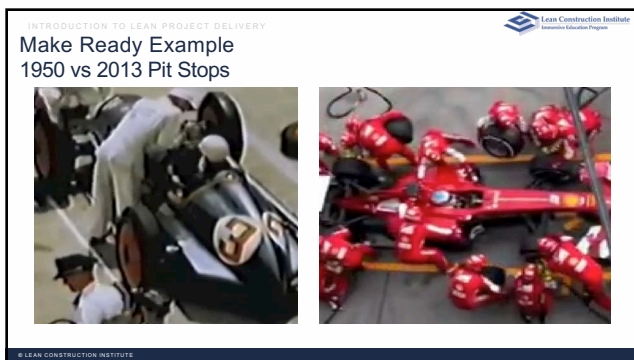
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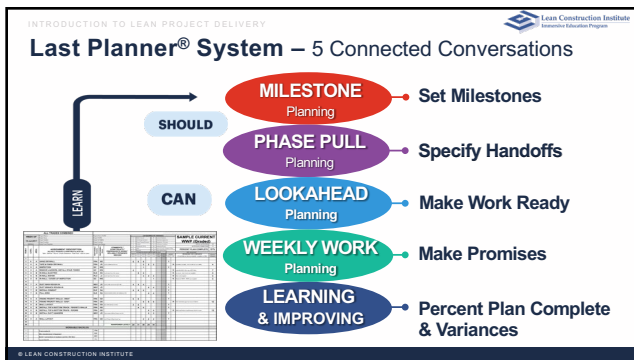
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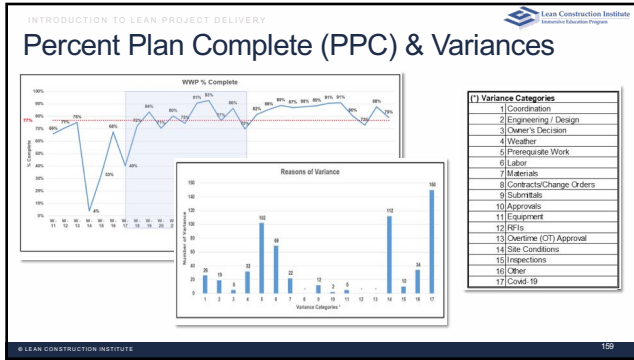
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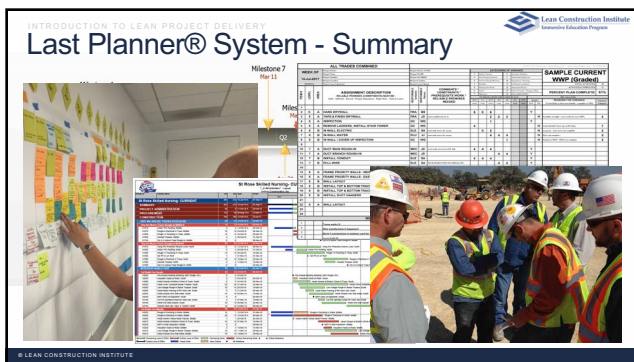
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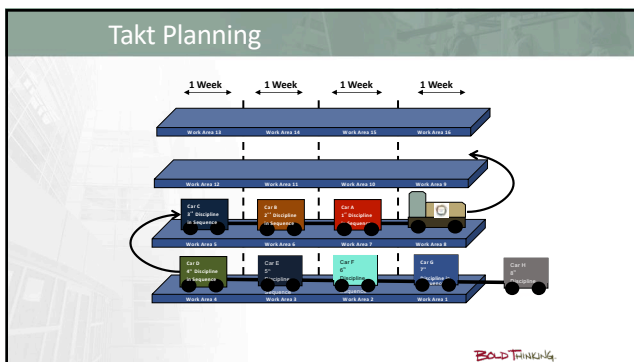
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Discussion Question

Implementing Lean Design & Lean Construction

What new actions or ideas will you take back to your project?

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Lean Journey to Mastery

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Paul Akers: 3 Keys to Lean Video

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Conduct Plus/Delta

Capture on a flip chart or white board, or use **Sticky Notes**

Plus: What produced value during the session?
"I LIKED..."

Delta: What could we change to improve the process or outcome?
"I WISH..."

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Questions?

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More Learning

Books:

Events:

- Local Community of Practice
- Design Forum (May)

E-Learning

Start learning now:
www.LeanConstruction.org

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David MacNeel
 Cell: 513-500-4511
 dmacneel@onpointlean.com

Lauren Simone
 Cell: (804) 432-6192
 lsimone@wmjordan.com

The image displays five book covers related to lean construction and leadership. From left to right: 'The High-Velocity Edge' by Steven J. Spear; 'Extreme Ownership: U.S. Navy SEALs Lead and Win' by Jocko Willink and Leif Babin; 'The Toyota Way' by Jeffrey K. Liker; 'The Owner's Dilemma' by Barbara White Bryson and Casan Yetmen; and 'It's Your Ship: Management Techniques from the Best Damn Ship in the Navy' by Captain Michael Allen.

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This concludes The American Institute of Architects
 Continuing Education Systems Course

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