Learning Objectives

- Explain different components of the Last Planner System® (LPS ®)
- Define ways to improve reliability of plans
- Create mechanisms to improve learning from planning
Question – Answer in the Chat

• Are you satisfied with the way projects are currently delivered? YES/NO
• Why?
## Traditional vs. LPS®-based Planning Systems

<table>
<thead>
<tr>
<th>Traditional</th>
<th>LPS®</th>
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<tbody>
<tr>
<td>• Push schedules – what is more convenient, not necessarily more realistic</td>
<td>• Pull schedule - Work released based on the system status</td>
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<tr>
<td>• Schedules developed without input from those executing the work</td>
<td>• Plans are collaboratively developed</td>
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<td>• Very detailed at the project start – quickly become outdated</td>
<td>• Promote conversations/collaboration – Increase commitment</td>
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<td>• Produce realistic plans – increase flow reliability</td>
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</table>
Why implement the LPS®?

- Increased workflow reliability – increased productivity
- Accountability – buy in from those developing the plans
- Transparency
  - Routine
  - Tasks clearly defined
  - Conversations promote trust and shared understanding
  - Metrics promote learning
Why implement the LPS®?

- Average reliability of promises made vs. promises kept = 54%  
  (Ballard and Howell 1994)
- Construction productivity growth increased 1% over the past 20 years  
  (McKinsey Global Institute 2017)
- Addition of 36 seconds of direct work per hour - improve construction productivity and yield a yearly return of US$ 5.4 billion to the construction industry in the US and Canada.  
  (Neve et al. 2020).
- One unit of increase in PPC results in 1.095 rise in productivity.  
  (Liu and Ballard 2008)
Increase the level of detail and specificity of tasks as more detail become available and execution approaches
LPS® Connected Conversations

Milestone Planning
- What **SHOULD** be done
- Define milestones

Phase Pull Planning
- Use milestones for backward planning
- Specify handoffs

Lookahead Planning
- What **CAN** be done
- Identify constraints
- Make work ready – assign responsibility and deadlines for removing constraints

Weekly Work Planning
- What **WILL** be done
- Make promises, create accountability

Learning/Improving
- What **DID** get done
- PPC & Causes for variance

(Lean Construction Institute)
Milestone Planning
- SHOULD

Phase Pull Planning
- Handoffs

Lookahead Planning
- CAN

Weekly Work Planning
- WILL

Learning/Improving
- DID

Project

Phase

2-6 weeks

Phase

1 week

(Level: Uncertainty)

(Level: Detail)

(Lean Construction Institute)
Milestone Planning

Baseline schedule with milestones

What SHOULD be done in the project
- Major activities
- Long lead items
- Long durations
Pull Planning

Details phase of the project

Defines handoffs between trades

- Release of tasks based on actual availability of resources
- Backward scheduling based on each client’s needs throughout time
  - Use milestones to start the backwards planning process
  - Start at a major milestone for the phase
    - What is needed to reach the milestone?
- Conversations between trades
  - I give (PROMISE), I get (REQUEST)
Examples of Information in a Stickie

- what will we do where?
- what are the conditions of satisfaction?
- how long will we take?
- what do we need so that we can complete the task?

- what will be done?
- where? by whom?
- what does good look & feel like?
- how long will it take?
- what is needed to do it? from whom?

By Alan Mossman
https://www.researchgate.net/publication/321804312_Last_Planner_5_1_crucial_collaborative_conversations_for_predictable_design_construction_delivery_Dec_2017
How Does a Stickie Look Like?

Courtesy of: McCarthy Building Companies
Each trade is given a different color.
<table>
<thead>
<tr>
<th>Mon 9/17</th>
<th>Tues 9/18</th>
<th>Wed 9/19</th>
<th>Thurs 9/20</th>
<th>Fri 9/21</th>
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**Crews working in the same location**

Courtesy of: McCarthy Building Companies
Pull Planning Boards

Courtesy of: McCarthy Building Companies
Conversations

Courtesy of: McCarthy Building Companies
Lookahead Planning

Make Work Ready

- What resources are needed by when (constraints)
- Who will take charge of removing constraints
- Define constraint log – Assign responsibilities
- Create a workable backlog – tasks ready to be done
Examples of a Constraint Log

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<tr>
<th>PROJECT:</th>
<th>STAGE:</th>
<th>AREA:</th>
<th>WORK WEEK/YSR:</th>
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<tr>
<th>UPN OR WBS (scope ID)</th>
<th>ASSIGNMENT ID</th>
<th>CONSTRAINT DESCRIPTION</th>
<th>CUSTOMER</th>
<th>RESPONSIBLE INDIVIDUAL</th>
<th>DATE IDENTIFIED</th>
<th>DATE NEED RESOLVED</th>
<th>DATE PROMISED</th>
<th>DATE RESOLVED</th>
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Weekly Work Planning

Commitment Planning

- Identify assignments that are sound
- Determine the available manpower for the period
- Allocate sound assignments to crews and subcrews
- List tasks in a workable backlog (left over work)
- If workers are still available after the plan is done, ask supervisors for directions
- Supervisor reviews the plan
- Track the progress of the plan on a daily basis
- Chart the total PPC and reasons for non-completed work

(Ballard & Howell, 1998, p.13-14)
Percent Plan Complete (PPC)

\[ \text{PPC} = \left( \frac{T_{ca}}{T_{tot}} \right) \times 100 \]

- \( T_{ca} \) = Completed assignments (100% done done done!)
- \( T_{tot} \) = Total number of assignments

- Measures plan reliability
- Promises made vs. Promises kept

Ask 5 Whys to identify the root cause of problems
21 / 24 = 87.5%

Reason Why
WWP Categories of Variance

1 – Bad Planning
2 – Prerequisite Work
3 – Design Issue
4 – Failed Inspection
5 – Labor not Available
6 – Materials not Available
7 – Equipment not Available
8 – Contracts / CO’s
9 – Submittals
10 – Weather
11 – I Forgot
12 – No Update (Missing Info: may or may not have been late)
13 – Unforeseen Conditions
Analysis – PPC and Root Causes

Percent Plan Complete (PPC) Evolution

Analysis of root causes for non-completed tasks

Plan changes during the week 18%

Overestimation of production rates 18%

Planning failure (interferences with other tasks) 28%

Lack of materials 24%

External factors to the project 18%

(Kemmer et al. 2007)
Post COVID-19 World
Stock Exchange Style Session
In-Person Session with Social Distancing
In Person Session with Social Distancing Outside of the Trailer
Virtual Pull Plan w/ Oracle Cloud
Planning with Oracle Cloud
Planning with Oracle Cloud
Questions

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