Instructor Orientation

Unit 4: The Last Planner® System
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Webinar Learning Objectives

Following this webinar, participants will have the ability to:

• Discuss AGC’s Lean Construction Education Program.
• Explain the *Unit 4* course learning objectives.
• Recognize qualifications of a *Unit 4* instructor and understand the approval process.
• Identify the topics covered in the course and key instructional design elements.
• Deliver the activities and discussions included in the course.
AGC’s Lean Construction Education Program Overview

• A seven-unit series of courses that progressively covers a range of topics in Lean Construction including:
  – Variation and pull in production
  – Lean Workstructuring
  – The Last Planner System
  – Lean supply chains and assembly
  – Lean design and pre-construction
  – Problem-solving principles and tools
Instructor Qualifications

Instructors must have:

• Experience in implementing Lean Construction on several projects as a construction professional.
• An understanding lean concepts and terminology, including roles and responsibilities of project team members.
• Experience using the Last Planner System on at least two construction projects.
Instructor Approval Process

• Prior to approval, potential instructors must:
  – Review the entire instructor’s guide.
  – View this instructor orientation webinar.
  – Submit qualifications forms and bio to AGC of America.

• Once approved, applicants will be notified and their name will be included on the national list of approved instructors.

• Applications can be found at: http://www.agc.org/cs/lcep/instructor_resources
A number of symbols are used throughout the course to indicate:

- **Activity**
- **Animation on slide**
- **Discussion**
- **Learning objectives**

- **Note**
- **Questions to ask the class**
- **Review from a previous course**
- **Time allocated**
Changes to the Instructor’s Guide

- **PPT 1-15:** Emphasize that LPS introduces a dynamic new way of thinking — changing from a superintendent directing a project to the last planners creating a network of communication to lead to project completion.

- Remind participants that GCs hire subcontractors, expecting them to be experts in their trade but typically don’t treat them that way when they dictate how to do their jobs.

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**Comparing LPS with Current Practice**

In *LCEP Unit 3: Lean Workstructuring*, we examined how to attack a job, in *Unit 4*, we are looking at the heart of the LPS — engaging the foremen in the plan to build the project. The system only works if the last planner is empowered to say no to commitments that his/her crew cannot complete in the given time.

There are several key differences between current planning practices and the Last Planner System, as outlined in Figure 1.3. The current practice is to plan for what we assume (or hope) will happen, with the plan being created well advance and failing to take into account the day-to-day changes that occur on a jobsite. The LPS emphasizes the importance of connected conversations between foremen and the project superintendent, treating the foremen as the experts in their trade and encouraging them to share that expertise and their commitments with everyone on the project.

<table>
<thead>
<tr>
<th>Last Planner System</th>
<th>Current Planning Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>The future</td>
<td>Plan for milestones with</td>
</tr>
<tr>
<td></td>
<td>Perception that we</td>
</tr>
</tbody>
</table>
Changes to the Instructor’s Guide

PPT 1-19: Discuss contractual requirements, which should not be accepted as an excuse for not using the LPS.

because we didn’t plan things appropriately, and we didn’t plan appropriately because we didn’t have the time to do the planning. We often believe that construction is inherently chaotic and impossible to execute without workers waiting for work or work waiting for workers, but a combination of project management and production planning mitigates this chaos.

Contractual Requirements

It should be noted that the contract may dictate a certain scheduling process and system that may differ from the Last Planner System. Milestones and other schedule points may not be able to be moved as they would in a full LPS process due to contractual requirements. However, it is possible for the systems to complement each other, and contractual requirements should not be used as an excuse to avoid implementing LPS.

PM 8

Project Management vs. Production Planning on the Jobsite

Project management gives direction, and production planning provides a balanced path in the intended direction. Lean Construction achieves both, especially with the use of the Last Planner System, and promotes continuous improvement through change.

Figure 1.7 shows the plenum space (above ceiling). It’s a small space (2 to 3 feet), which requires significant coordination. Project management will produce a plan for the plenum space work and who goes in first. This is still high level, and the devil is in the details. Production planning will focus on running the job to get the planned sequence for above grid in place.
Additional Materials

• The make-ready/6-week look-ahead (48 x 96 inches).
  – The PDF from the CD can be printed on 11x17 and enlarged in sections at an office copy center; or the plan can be hand-drawn.

• The weekly work plan for Weeks 20 and 21 (36 x 36 inches).
  – The PDF from the CD can be printed on 11x17 and enlarged in sections at an office copy center; or the plan can be hand-drawn.

• A large piece of plain paper labeled “constraint board.”
• Pads of 3-inch x 3-inch sticky notes in different colors.
• Markers for each participant.
• Non-destructive adhesive to post items on the wall.
Room Set-up

• Be sure to have space to hang materials on the wall.
• Be sure to have space in front of the wall for participants to gather.
• If possible, set up one side of the room as a classroom and the other as a mock jobsite trailer.
Unit 4 Learning Objectives

Following this course, participants will be able to:

• Apply the Last Planner System on a project;
• Hold make-ready and weekly work planning sessions; and
• Calculate, track and analyze percent plan complete for a project.
Unit 4 Outline

• Four-hour course divided into three sessions:
  – Introduction to Production Planning and the Last Planner System – 55 minutes
  – The Levels of the Last Planner System – 45 minutes
  – Planning and Evaluating the Plan
    • Part 1 – 80 minutes
    • Part 2 – 60 minutes
Session 1 Learning Objectives

Following this session, participants will be able to:

• Define the differences between the Last Planner System and current planning practice;
• Explain the difference between project management and production planning;
• Define the concept of lean production planning as it applies to Lean Construction;
• Distinguish the differences between reactive control and proactive planning; and
• Recognize the steps involved in a lean project commitment.
What We’ve Learned So Far

• The goal of Lean Construction is to maximize value by eliminating:
  – Workers waiting for work
  – Work waiting for workers

• The way to do this is to:
  – Reduce variation
  – Eliminate waste
  – Improve workflow reliability
Introduction to the Last Planner System

- Project Objectives
- Lean Workstructuring
- Should
- Can
- Make Ready
- Will
- Weekly Work Planning
- Did

Project Information

PPC
Project Management vs. Production Planning

Production Planning

Running the job to get the promised sequence for day-to-day tasks
Session 1 Summary

• Project management establishes direction at a high level.
• Production planning focuses on day-to-day functions so that project-level milestones and phases are completed.
• Reactive control is after-the-fact action to get back on track.
• Proactive planning is about making things happen.
• Commitments are only complete when the customer accepts the work.
Session 2 Learning Objectives

Following this session, participants will be able to:

• Differentiate among the five levels of the Last Planner System;
• Identify the amount of detail and information to be included at each LPS level;
• Recognize the importance of documenting and analyzing constraints;
• Calculate the percent plan complete (PPC) for a week’s worth of work;
• Describe the uses of the PPC
• Identify means to determine the root cause of a failure; and
• Describe the purpose and outcomes of the daily huddle.
Levels of the Last Planner System

- **Master Scheduling**
  - Specifying milestones

- **Phase Scheduling**
  - Specifying handoff

- **6-week Look-ahead/Make-ready Planning**
  - Rolling look ahead & launch

- **Weekly Work Planning**
  - Measure PPC, act on reasons for failure to keep promises

- **Daily Huddles**
  - Confirming your weekly plan and adjusting as required

Questions:

- Are we confident we can deliver the project within the set limits?
- Who holds the promise to make this happen?
- Do we understand how we are going to do the work?
- Have we designed the network of commitments to make it happen?
- Are we confident we can deliver the milestones?
- Is the network of commitments active?
- Are reliable promises in place to make work ready in the right sequence and amounts to deliver the milestone?
- Are we confident the work will begin and end as planned?
- How will we coordinate and adjust?
- Have we promised our tasks will be done as planned or said no?
- What have we learned?
- What needs changing so we can improve our performance?
Percent Plan Complete

\[ \text{PPC} = \frac{\text{Completed Weekly Assignments}}{\text{Total Weekly Promised Assignments}} \]
Session 2 Summary

• LPS is a collaborative, commitment-based system.
• The LPS gives foremen the information they need to confidently commit to a task.
• An important component of the LPS is measuring the PPC on a weekly basis.
• Tracking the reasons for failures leads to continuous improvement and learning.
Session 3 Learning Objectives

- Explain the make-ready planning process;
- Conduct a make-ready planning session;
- Explain the weekly work planning process;
- Conduct a weekly work planning session; and
- Apply methods to encourage subcontractor participation.
Make-ready Planning Case Study

• Project overview:
  – An elementary school with an overall schedule of 12 months
  – It is a green field, new construction project
  – At the dry-in to ceiling cover-up phase
  – We are in Week 21
Make-ready Planning Case Study

• Rules of engagement
  – Subcontractors can only move their own sticky notes.
  – Start from the milestones and work backward.
  – All subcontractors should be able to place all their sticky notes in 10 minutes; the schedule doesn’t need to be perfect.
  – Once all sticky notes are up, the GC/facilitator will continue the planning process with the group.
  – There may be too much or too little work for all six weeks.
## Make-ready Planning Case Study

### Sample Elementary School: Make-ready Planning/6-week Look-ahead

<table>
<thead>
<tr>
<th>Sub.</th>
<th>Week 1</th>
<th>Week 2</th>
<th>Week 3</th>
<th>Week 4</th>
<th>Week 5</th>
<th>Week 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceiling</td>
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<td>Ceramic Tile</td>
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<td>Drywall</td>
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<td>Fire Proofing</td>
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<td>Misc. Steel</td>
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<td>Workable backlog</td>
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</tbody>
</table>

### Table

The table above illustrates the make-ready planning for a 6-week look-ahead for a sample elementary school. Each row represents a different sub-project, and the columns represent the days of the week across different weeks. The table is intended to help in organizing and tracking the daily tasks and progress for each sub-project.
Make-ready Planning Case Study

- Typical make-ready plan.
Running the Make-ready Meeting

• Your role as GC/facilitator:
  – Require participation from all subcontractors
  – Don’t dictate; engage the subcontractors in a conversation
  – Ensure milestones will be met
  – Start with the last subcontractor and work backward
  – Identify the critical path
  – Check reliability before tightening the schedule
  – Look for inefficiencies in the schedule
  – Acknowledge buffers
Weekly Work Plan Case Study

- Assume same subcontractor role(s) from first activity.
- Fill out sticky notes for your portion of the week’s activities.
- Place sticky notes on the Weekly Work Plan.

10 Minutes!
## Weekly Work Plan Case Study

### Sample Elementary School: Weekly Work Plan

<table>
<thead>
<tr>
<th>Sub.</th>
<th>Week 20</th>
<th>Week 21</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
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<tr>
<td>Ceiling</td>
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<td>Fire Proofing</td>
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<td>Fire Prot.</td>
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<td>Mech.</td>
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<td>Plumbing</td>
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<tr>
<td>Misc. Steel</td>
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</tr>
</tbody>
</table>

- Ceiling: Material delivery
- Drywall: Layout Area 1A, Layout Area 1A, Layout Area 1A
- Electrical: Install hangers Area 1A, Install hangers Area 1A, Install hangers Area 1A
- Fire Proofing: Shop drawings
- Fire Prot.: Shop drawings
- Mech.: Shop drawings
- Plumbing: Roof drain mains, Roof drain mains, Roof drain mains, Roof drain mains, Roof drain mains
The Daily Huddle

- Short, standing meeting to confirm work.
- Should not be used as an opportunity to update the weekly work plan.
- Create a parking lot for items that come up during the day to discuss at tomorrow’s meeting.
Session 3 Summary

• Many different ways to show the schedules – sticky notes, spreadsheets, etc.;
• Collaborative process and dialogue among subcontractors is key;
• GC no longer dictates the schedule.
Unit 4 Course Summary

- The lower levels of the LPS – make-ready, weekly work planning and daily huddle – fall below where traditional project planning ends;
- LPS works in a collaborative environment in which subcontractors discuss constraints and handoffs;
- Superintendents do not dictate the schedule in the LPS;
- Tracking assignment completion is key to learning and continuous improvement.
Closing Activities

• Please fill out your *Unit 4: The Last Planner® System* Participant’s Registration form.
  – Submit this form to your facilitator or mail it in yourself (with your facilitator’s signature) to AGC of America.
  – This form must be received for you to obtain credit for attending this course.

• Be sure to go online and fill out the course evaluation at [www.agc.org/LCEP/Evaluations](http://www.agc.org/LCEP/Evaluations).
Questions?

• Contact AGC of America at curriculum@agc.org for further information.

• The Last Planner® System participant’s manuals and instructor’s guides are available for purchase at http://store.agc.org/

• Visit www.agc.org/LCEP to view scheduled courses.

• Visit http://agcleanforum.org/ for more information about the AGC Lean Forum and its resources.