An Introduction to Pull Planning

October 15, 2015
Who is Heery?

- Full-service architecture, interior design, engineering, construction management, and program management firm
- Founded in 1952
- Headquarters Atlanta, GA
- Wholly-owned subsidiary of Balfour Beatty plc

Locations & resources
- 20 full-service offices throughout the US
- 640 employees
- National expertise with local focus
Learning Objectives

• Provide exposure to some of the common terms in the Lean Construction Process

• Provide an introductory understanding Pull Planning

• Create interest in further study
Lean Principals

- **5S** (workplace organization): Sort, Straighten, Sweep, Standardize and Sustain
- **A3 Report**: Standardized problem-solving
- **Big Room**: Project leaders collaboration
- **Choosing by Advantages**
- **Corporate Performance Management**
- **Enterprise Resource Planning**
- **Just-in-Time**
  - **The Last Planner System**: Commitment to schedules by all project team members

- **Multi-party Contracts (IPD)**
- **Pull Planning**: Sequencing tasks
- **Six Sigma**: Process improvement
- **Target Value Design**: Concurrent design and cost management
- **Stretch & Flex**
- **Toyota Way**
- **Value Stream Mapping**: Map all stages of a process to ID improvements
- **Lean Construction**: Elimination of waste
- **Plus/Delta**

IFMA
International Facility Management Association
Last Planner® System Overview

Should-Can-Will-Did Planning

As Needed

Should

- Master Planning
  - Milestones
  - Master Schedule
  - Establishes promise of project

- Pull Planning
  - Phase Schedule
  - Collaboratively built plan
  - Focus on handoffs

Can

- Make-Ready Planning
  - Look-ahead Plan
  - Make work ready
    - Identify constraints
    - Commitments to remove constraints
    - Constraint Log

- Weekly Work Planning
  - Weekly work plan
  - Reliable promising

Will

- Weekly Work Planning

Did

- Learning
  - Daily coordination
  - PPC
  - Rapid learning

Creating and maintaining reliable workflow

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Pull Planning – What is it?

• A tool that strengthens our current scheduling process by helping manage risk through detailed collaborative planning and continuous improvement.

• A method of planning where the flow of activities and information are based on the request (pull) of downstream work.

• A means to ensure active involvement from all project stakeholders.
CPM Scheduling
Pull Planning vs. Traditional Schedule Development

Pull Planning is a departure from traditional scheduling methods.

TRADITIONAL

• CPM is forward looking and based on duration and sequence
• CPM is usually prepared by a single individual
• Once approved, distributed to construction team as a guide
Pull Planning Approach
Pull Planning Process

1. Develop **milestone plan** with the project team
2. Develop **phase plan** (activities and sequence of work) as subcontractors are brought on board
3. Transfer phase plan activities to scheduling program as needed/required
4. Develop **weekly work plan** (look-aheads) from phase plan
5. Hold 15-minute huddle with foremen each morning to review activities from yesterday and today
6. Hold weekly foreman’s meeting to review and update the weekly work plan
7. Update schedule (weekly/bi-weekly) following weekly foremen meeting
Pull Planning Process

Milestone plan

Phase plan

Weekly work plan

M  T  W  T  F  M  T  W  T  F  M  T  W  T  F
Pull Planning Process

**PULL PLANNING**
build & manage the project schedule
**IN 7 EASY STEPS**

1. Review milestones
   - Foundation complete: May 3rd, 2015
   - Structure complete: July 1, 2015

2. Phase planning (identify critical activities & sequence of work)

3. Build/update/validate the CPM schedule using the phase plan(s)

4. Develop the weekly work plan

5. Hold 15-minute daily huddle to review activities from yesterday & today

6. Conduct weekly update meetings to review/update the weekly work plan, complete PPC log and root cause analysis

7. Update CPM schedule (weekly/bi-weekly) & review the PPC log

**Items needed:**
- sticky notes
- sharpie markers
- project team
- plan boards

**Add resources:**
- Champion (Supt)
- implementation guide
- 360 page

IFMA
International Facility Management Association
Who is Involved?

**General Contractor**
Superintendent leads the process, typically with help from assistant super(s), PM, APM or PE

**Trades**
Project Manager typically focuses on big picture and has authority to make commitments

Foreman is responsible for day-to-day schedule management and provides accurate production rates and manpower to ensure commitments are realistic

**Design Team and Owner**
Present during phase planning, kept up to date on a regular basis (OAC meeting)
Milestone Plan

• Developed internally by the project team and OPRs
• Often starts with the high-level schedule developed as part of RFP response
• Identifies major milestones needed to ensure project success
• Breaks project down into manageable time frames, which become phase plans
• Continual reference used to gauge project progress
• Examples: Foundation complete, structure complete, substantial completion, etc.
Milestone Plan Sticky

Milestone

Target / critical date
Phase Plan

• Is developed collaboratively with all stakeholders and trades.
• Identifies all tasks that must be completed to enable a milestone to be met.
• Tasks organized on boards identifying the flow of work from week-to-week.
• Used to build or validate/update the schedule.
• Revisited regularly, updated as needed.
• Trade foremen and project managers required to attend the phase plan sessions.
• Examples: Top-out, dry-in, lobby finishes, commissioning, etc.
<table>
<thead>
<tr>
<th>Task &amp; area</th>
<th>Predecessor</th>
<th>Duration (days)</th>
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</thead>
</table>

**Phase Plan Sticky**
Weekly Work Plan / Look - Ahead

- Breaks down Phase Plan tasks down to the work day level.
- Typically a 4 to 6 week period.
- Updated weekly with field supervisory personnel.
- Used to validate the Phase Plan.
- Typically done on a Friday for the following week.
- Details work that CAN be done the following week.
- Updated weekly with field supervisory personnel.
- Reviewed with foremen daily in the 15 minute huddle.
- Activity examples include Formwork Columns 1-4, Rebar Columns 1-4, etc.
Weekly Work Plan / Look-Ahead Sticky

Task & area
Predecessor
Crew size
Percent Plan Complete (PPC) Log

- Excel worksheet used to track overall project and individual trade progress
- Provides quick and easy way to assess project schedule and trade performance

\[
\text{PPC} = \frac{\text{# of activities completed}}{\text{# of activities planned}}
\]

- Record and discuss uncompleted tasks during weekly foreman meeting
- Identify the root cause and re-plan upcoming tasks to maintain milestone dates (traceability)
- Two tabs within the worksheet:
  - Individual trade PPC – typically not public
  - Overall PPC – public, posted in the trailer
### Percent Plan Complete (PPC) Log

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<th>Company</th>
<th>Week of</th>
<th>Tasks Completed</th>
<th>PPC</th>
<th>Avg. PPC</th>
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### PPC Color Code Legend
- **Sandbagging**: 0
- **Right on Track**: 1
- **Slipping**: 2
- **Trouble**: 3
- **Problem**: 4
- **Failure**: 5

---

**IFMA**

*International Facility Management Association*
Root Cause Analysis

1. Why didn’t we finish that activity?
   • The material wasn’t delivered.

2. Why wasn’t material delivered?
   • We were waiting on shop drawings.

3. Why were we waiting on shop drawings?
   • Because the manufacturing detail had not been secured.

4. Why not?
   • We changed manufacturers three weeks ago
Pull Planning – Why use it?

- Creates a more predictable work flow through collaboration and public buy-in and commitments
- Provides clear picture of the flow of work, handoffs, constraints, etc.
- Ensures trade expertise is leveraged (Last Planners)
- Drives quality and safety through increased accountability and awareness
- Helps to eliminate rework
- Reduced schedule and thus cost risk
- Timely identification of unknowns, assumptions and/or misunderstandings – reducing delays and/or re-work.

Apply to any phase of a project
### Design Phase

#### Review & Decision Matrix

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**Legend:**
- Present for Decision
- Present for Consideration
- Start Considering
- To Be Considered Later
- Already Signed Off
• Submittal Review Process

Contractor Prepares Submittal → CM logs, reviews and Forwards to others for review → A/E logs, reviews within team or sub consultant → CM reviews comments/actions and approves → Contractor implements

FM & Other Stakeholders review and comment

Pull plan to establish review and turnaround standards, RACI roles

• Integration

Integration Matrix
Pull Planning - Summary

- The schedule is built by working backwards from the milestone dates, “pulling” activities based on the needs and responsibilities of downstream work.
- Involves the right people.
- Used to validate and update the Phase Plan based on the Milestone Schedule.
- Allows everyone to consider not only their efforts but how they sequence with others.
- Weekly Work Plan sessions enable continuous improvement.
- Buy-in to the commitments with measured performance.
Questions?
Team Meetings

• **Milestone planning meeting:**
  - OAC project team
  - Project scope overview
  - Review project milestones
  - Review / define the phases of work

• **Phase planning meeting:**
  - GC and applicable trades
  - General process overview
  - Review milestones
  - Develop phase plan – (particular phases identified prior to meeting)

• **Weekly work plan meeting:**
  - GC and applicable trades
  - Review applicable phase plan(s)
  - Break down phase plan tasks into one day activities
Definitions

- **Lean Project Delivery System** - An organized implementation of Lean Principles and Tools combined to allow a team to operate in unison.

- **Last Planner System (LPS)** - The collaborative, commitment-based planning system that integrates should-can-will-did planning (pull planning, make-ready look-ahead planning) with constraint analysis, weekly work planning based upon reliable promises, and learning based upon analysis of PPC and Reasons for Variance.

- **Pull Planning** - The portion of the Last Planner System that focuses on Phase Pull-planning - A plan for executing a specific phase of a project using a pull technique to determine hand-offs. It is prepared by the team actually responsible for doing the work (Last Planners) through conversation. Work is planned at the “request” of a downstream “customer”.

From Lean Construction Institute
Definitions

- **Target Value Design** - A disciplined management practice to be used throughout project to assure that the facility meets the operational needs and values of the users, is delivered within the allowable budget, and promotes innovation throughout the process to increase value and eliminate waste.

- **Plus/Delta Review** - A continuous improvement discussion performed at the end of a meeting, project or event used to evaluate the session or activity. Two questions are asked and discussed. Plus: What produced value during the session? Delta: What could we change to improve the process or outcome?

- **A3** - A one-page report prepared on a single 11 x 17 sheet of paper that adheres to the discipline of Plan-Do-Check-Act (PDCA) thinking as applied to collaborative problem solving, strategy development or reporting. The A3 includes the background, problem statement, analysis, proposed actions, and the expected results.

From Lean Construction Institute