Last Planner Production Control

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Project Production Institute
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# Construction Weekly Work Plan

## 1 WEEK PLAN

**PROJECT:** Pilot  
**FOREMAN:** PHILLIP  
**DATE:** 9/20/96

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>Est</th>
<th>Act</th>
<th>Mon</th>
<th>Tu</th>
<th>Wed</th>
<th>Thurs</th>
<th>Fri</th>
<th>Sat</th>
<th>Sun</th>
<th>PPC</th>
<th>REASON FOR VARIANCES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas/F.O. hangers O/H &quot;K&quot; (48 hangers)</td>
<td></td>
<td></td>
<td>XXXX</td>
<td>XXXX</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>XXX</td>
<td></td>
<td>No Owner stopped work (changing elevations)</td>
</tr>
<tr>
<td>Gas/F.O. risers to O/H &quot;K&quot; (3 risers)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>XXXX</td>
<td>XXXX</td>
<td>XXXX</td>
<td>XXXX</td>
<td></td>
<td></td>
<td>No Same as above-worked on backlog &amp; boiler blowdown</td>
</tr>
<tr>
<td>36&quot; cond water &quot;K&quot; 42' 2-45 deg 1-90 deg</td>
<td></td>
<td></td>
<td>XXXX</td>
<td>XXXX</td>
<td>XXXX</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>Chiller risers (2 chillers wk.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>XXXX</td>
<td>XXXX</td>
<td></td>
<td>No Matl from shop rcvd late Thurs. Grooved couplings shipped late</td>
</tr>
<tr>
<td>Hang H/W O/H &quot;J&quot; (240'-14&quot;)</td>
<td></td>
<td></td>
<td>XXXX</td>
<td>XXXX</td>
<td>XXXX</td>
<td>XXXX</td>
<td>XXXX</td>
<td></td>
<td></td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>Cooling Tower 10&quot; tie-ins (steel) (2 towers per day)</td>
<td></td>
<td></td>
<td>XXXX</td>
<td>XXXX</td>
<td>XXXX</td>
<td>XXXX</td>
<td>XXXX</td>
<td></td>
<td></td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>Weld out CHW pump headers &quot;J&quot; mezz. (18)</td>
<td></td>
<td></td>
<td>XXXX</td>
<td>XXXX</td>
<td>XXXX</td>
<td>XXXX</td>
<td>XXXX</td>
<td></td>
<td></td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>Weld out cooling towers (12 towers)</td>
<td></td>
<td></td>
<td>XXXX</td>
<td>XXXX</td>
<td>XXXX</td>
<td>XXXX</td>
<td>XXXX</td>
<td></td>
<td></td>
<td></td>
<td>No Eye injury. Lost 2 days welding time</td>
</tr>
<tr>
<td>F.R.P. tie-in to E.T. (9 towers) 50%</td>
<td></td>
<td></td>
<td>XXXX</td>
<td>XXXX</td>
<td>XXXX</td>
<td>XXXX</td>
<td>XXXX</td>
<td></td>
<td></td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>WORKABLE BACKLOG</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boiler blowdown-gas vents rupture disks</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

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Project Control vs Production Control

• The job of project control is to determine if the project is on course to achieving its objectives. Reactive.
• The job of production control is to do what is needed in order to accomplish project objectives. Proactive.
• Both are necessary.
  — Doing project control without production control is like trying to drive while looking in the rear view mirror.
  — Project control feedback is needed in order to adjust production to targets.
• Measuring and managing work flow reliability is essential for production control.
Issue #1: How to increase the match between WILL and DID?

- Shielding: Only include in daily/weekly work plans tasks that are sound, sequenced, sized, and well defined.
- Reliable promising
Percent Plan Complete (PPC) Chart

Rasacaven: Electrical Power Distribution
Impact of PPC on Productivity

![Graph showing the relationship between PPC and productivity. The graph includes a linear equation: \( \text{Prod} = 0.530 + 1.095 \times \text{PPC} \). The table below provides data points for different PPC levels and corresponding productivity percentages below budget.

<table>
<thead>
<tr>
<th>PPC</th>
<th>% actual productivity below budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>50%</td>
<td>0.04</td>
</tr>
<tr>
<td>60%</td>
<td>0.16</td>
</tr>
<tr>
<td>70%</td>
<td>0.23</td>
</tr>
<tr>
<td>80%</td>
<td>0.29</td>
</tr>
</tbody>
</table>
Issue #2: How to make ready what SHOULD be done so it CAN be done?

• Analyse & Remove Constraints
• Breakdown tasks into operations
• Design new operations collaboratively
Typical Constraints on Construction Tasks

- Drawings
- Submittals
- Requests for Information
- Materials
- Labor
- Construction Equipment
- Tools
- Work Space
- Permits
- Safety plan
LAST PLANNER SYSTEM: the Lookahead Process

Design Criteria

Work Structuring

Master & Phase Schedule

Selecting, sequencing, & sizing work we think can be done

Lookahead

Current status & forecasts

Information

Make work ready by screening, pulling, & FRS

Workable Backlog

Selecting, sequencing, & sizing work we know can be done

Weekly Work Plans

Resources

Production

Completed Work

Chart PPC & Reasons

Action to prevent repetitive errors
Issue #3: How to set goals and sequence tasks? How to decide what SHOULD be done when?
Master Scheduling

Master schedules should be at milestone level because Forecast error increases with the length of the forecast period and the level of detail.
Countermeasures for poor quality of work plans and schedules

1. Master schedules were kept at milestone level of detail

2. Phase schedules were developed by those with direct responsibility for doing the work being scheduled, filling in the gaps between milestones in the master schedule, phase by phase, and

3. Scheduling was done at more detailed levels nearer in time to scheduled execution—the rolling wave approach: project-phase-process-operation-step.
Pull Planning

Courtesy of Alan Mossman
LAST PLANNER SYSTEM: the Master Schedule

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Completed Work
# Last Planner Functions & Methods

<table>
<thead>
<tr>
<th>WHAT</th>
<th>HOW</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Detailing the phases between master schedule milestones</td>
<td>A. Pull planning</td>
</tr>
<tr>
<td>B. Making scheduled tasks ready in lookahead planning</td>
<td>B. Constraints analysis</td>
</tr>
<tr>
<td>C. Selecting tasks for daily and weekly work plans</td>
<td>B. Task breakdown</td>
</tr>
<tr>
<td></td>
<td>B. Operations design</td>
</tr>
<tr>
<td></td>
<td>C. Commit only to tasks that are well defined, sound, sequenced and properly sized</td>
</tr>
</tbody>
</table>
Last Planner Functions & Methods

**WHAT**

D. Making handoffs reliable

E. Learning from broken promises

F. Measuring planning system performance

**HOW**

D. Reliable Promising

E. 5 Whys

E. Prevent-Detect-Correct-Analyze

E. Plan-Do-Check-Act

F. Percent Plan Complete

F. Tasks Made Ready

F. Tasks Anticipated

F. Repetitive Errors Avoided
## Different Behavioral Rules

### Last Planner
- Commit only to tasks that are defined, sound, sequenced and sized
- Raise your hand the moment you lose confidence that you can remove a constraint in time
- Plan collaboratively with those who are to do the work being planned
- When promises are not kept, analyze the reasons to find countermeasures that prevent reoccurrence

### Common Practice
- Work around problems
- Raise your hand when you know you cannot remove a constraint in time
- Planners produce plans and workers execute those plans
- When an employee does not do their job, replace them
Did I achieve my objective?

• “...to clearly differentiate the Last Planner system of production planning and control from the approach and methods of conventional project management.”

I look forward to hearing your comments and questions.