Pull Planning Workshop – Central California Valley

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Lean scheduling and pull planning are both excellent methods of scheduling and sequencing a project. It has made huge impacts on scheduling for general contractors in southern and northern region of California. However, Central California has not been able to see the benefits and impacts of these scheduling tools because of the regions lack of use of lean scheduling and pull planning. Lean scheduling is a technique that encourages communication and collaboration between the project stakeholders. Pull planning offers project stakeholders a chance to rally together and collaborate. These pull planning sessions are useful for sequencing work to meet milestones or complete difficult construction activities. Through collaboration, we are able to eliminate waste and simplify the required work for the project. Central California is missing out on the benefits of this program. The traditional way of critical path scheduling is still the dominant scheduling method in this region. This workshop dives deep into defining what Lean scheduling is and what its benefits are. The workshop also helps to explain the full picture as to why lean scheduling and pull planning hasn’t made an impact in Central California.

Key Words: Pull Planning, Scheduling, Last Planner System, Central California, Productivity

Introduction

Construction project scheduling is a driving factor in establishing a project’s success. Traditional scheduling is slowly becoming outdated because of its lack of collaboration between the different entities involved in the project. Pull planning and the Last Planner System have been slowly taking over as the driving scheduling method in the Northern and Southern regions of California. Although it has spread slowly in those parts of the state, Central California, more specifically the Central Valley, has been unable to reach the same progressive milestones as the northern and southern regions. It is unfortunate that this method of scheduling hasn’t been utilized in Central California allowing for a simpler delivery of a successful project. Pull planning and the Last Planner System, help meet milestones efficiently and complete difficult construction activities comfortably with a more collaborative approach. To determine why Central California general contractors are not buying into this advanced scheduling system, interviews were conducted and a workshop regarding pull planning and the Last Planner System was shown.

Background

As an undergraduate student, my knowledge of scheduling is not at the level of an experienced superintendent, so before I conduct a workshop, research was conducted. Although experience can trump research, I feel the information I have assembled will help the companies that have attended my workshop.

Traditional Scheduling: Advantages vs. Limitations
Traditional scheduling has been used for decades as the primary scheduling method of the construction industry. This method is commonly referred to as the Critical Path Method (CPM) (CPM Advantages and Disadvantages, 2022). The CPM method is the most recognizable form of scheduling because of its signature Gantt chart visual with a highlighted critical path.

There is an extended list of advantages and limitations of the Critical Path Method, this paper will only focus on two central advantages and limitations. Let’s, start with the advantages. The CPM identifies the critical path of the project which helps in decision making, as float is defined for each task (CPM Advantages and Disadvantages, 2022). The critical path is full of activities that contain no float, which is why a project team needs to identify it and review it to make sure the logic ties are correct. When the project team can identify the critical path, the team can begin making decisions that help get those tasks organized and on track to finish on the date that is specified in the schedule. Usually, the critical path can be recognized early on in the project’s history with the creation of the baseline schedule. With early recognition, decisions on procurement for activities on the critical path are crucial. Another advantage the CPM has is it creates finished products (CPM Advantages and Disadvantages, 2022). The Critical Path Method does a really good job of showing a simple baseline schedule that can be understood by the owner (CPM Advantages and Disadvantages, 2022).

The Critical Path Method is a scheduling technique which has a lot of advantage, however, that doesn’t mean there are better options that can be explored to even further take this traditional scheduling method to the next level. The CPM of scheduling comes with limitations and one of the biggest is that project teams forget to update this schedule (CPM Advantages and Disadvantages, 2022). Teams can be overwhelmed during the duration of the project and not continuously update the project schedule because it is a task that can be easily ignored. Project teams need to update the schedule often in order to stay on top of it. If not updated, then the schedule could become very ineffective and no longer be a guideline for the project’s durations. Another big limitation of the traditional scheduling method is the lack of buy in from subcontractors (CPM Advantages and Disadvantages, 2022). When the baseline schedule is created, durations are put in the schedule based on past historical data. This does not give subcontractors input or buy-in to the duration of their work. The collaborative ambiance of the schedule is not present in this form of scheduling. The Last Planner System and pull planning carries this atmosphere and is a part of the principles of the technique.

**Lean Scheduling Principles**

With all progressive processes, comes principles that make up the foundation of that idea. There are four principles that define lean scheduling and the Last Planner System (Verutti, 2021).

- Define lean expectations in the bidding process
- Implement Lean Process Management Checks
  - **Feedback Check**
  - **Pull Check**
    - GC vs. Sub sequence, to meet certain milestones
    - Sequences that could be potential issues for project (i.e., tilt up walls, beam dip)
- **Workload Leveling Check**
  - Right crew size for production
  - Eliminate over staffed crews, avoid understaffed crews
- Always work to simplify required information
Optimize everyone’s time and eliminate waste

These principles should be embedded into the projects scheduling standard in order to successfully execute the Last Planner System and reap its benefits. Before we get into what makes the Last Planner System a great scheduling program, we need to define what it is first.

**The Last Planner System**

The Last Planner System is a scheduling program that promotes conversation between the “last planner” and the project management team (Davidson, 2013). The “last planner” is the foremen for the specific trade partners on the project team. Often times, the communication between the foremen and the project team is limited. This system creates an environment that promotes more collaboration between the foremen and the project management team. Through the Last Planner System, both the general contractor and the trade partners can work together to set milestones by discussing constraints in the projects master/baseline schedule (Davidson, 2013). Working through these constraints, we can resolve coordination issues in a more collaborative effort, instead of in a messenger format where information gets passed up and down the chain of command. With the Last Planner System, the project team, including its trade partners, are able to produce the best possible plan to solve any issues that may arise with meeting milestones or accomplishing difficult construction activities. By bringing attention towards “agreements” such as defined work sequence, relationship of activities, and activity handoffs, we are able to have a flowing schedule of work, rather than stop and start schedule (Davidson, 2013).

Scheduling is both a science and an art. The science is the logic of the schedule. It is the “easier” part of scheduling. The art is how we manage and communicate with trade partners and our project team to accomplish the work to complete. Connecting and collaborating is an art and not everyone can do it successfully because it is difficult. Not everyone understands things the same way, so we must adapt and exchange ideas in a different way in order to get the information across accordingly.

**Planning Phases**

The Last Planner System is broken down into five different phases that start at the beginning of the project and continue throughout the duration of the project (Davidson, 2013).

![Figure 1. Last Planner System Phasing Plans](image-url)
These phases help the project team, and its trade partners keep a collaborative environment from the start of the project to the finish.

- **Master Planning**
  - The first phase consists of establishing a master schedule with milestones that can establish a promise of completion for the project (Davidson, 2013).

- **Pull Planning**
  - Here we are able to specify handoffs and engage in collaborative planning through various pull planning sessions. We are able to connect as a project team and communicate what work needs to be done in order to start the next phase of work in order to meet out milestone (Davidson, 2013). This phase will be our primary focus because of its lack of usage in Central California.

- **Make-Work Ready Planning**
  - In this phase, we will have all of our sequencing laid out for the specified milestone, so now we will focus on look-ahead planning. Breaking down tasks as well as identifying & removing constraints is a key focus in this phase (Davidson, 2013).

- **Weekly Work Planning**
  - This is the most broken down phase which includes trade partners to committing to completing work on a weekly basis. Here we will measure planned percent complete (PPC%) and monitor our reliable promises from our trade partners (Davidson, 2013).

- **Learning**
  - As a project team, we want to learn from our successes and our mistakes. This phase gives us an opportunity to analyze and understand what went right and what went wrong while using the Last Planner System. Here, the project team can see what the advantages and limitations of the scheduling program were.

**Pull Planning**

All the phases of the Last Planner System are extremely important, this paper focuses on pull planning because it is the most collaborative phase of this scheduling program. It is a versatile scheduling phase that can help specify activity handoffs with durations indicated by trade partners. Pull planning starts with the end in mind and only completes work when it releases work to others (Davidson, 2013). Through key discussions surrounding constraints that are holding up other trade’s work, the general contractor can understand what to prioritize in order for the team to meet its milestone date (Davidson, 2013). Pull planning allows us to have a rallying point for each trade partner to make decisions conducive to moving the project forward. Because durations can sometimes be contingent on factors that can’t be controlled, they can sometimes be contingent. In the pull planning session, trade partners can be realistic with their durations and establish time for ‘contingent’ durations (Davidson, 2013).

This concept may look great on paper, but one of the biggest issues is, how are we going to get everyone in the same room? A foreman’s time is very constrained, and they may struggle with the notion of missing time out in the field to attend a pull planning session for one project. The solution to this, is using the technological advances the construction industry has made.
Pull Planning Software

If general contractors and their trade partners are having issues agreeing to a date to hold a pull planning session, there is an alternative option. Touchplan is an effective software that can be used as a remote pull planning session software. One of the biggest issues about pull planning is getting everyone in a room together to engage in the activity. Pull planning sessions can be lengthy and a lot of foreman’s and project teams are considerably busy during the week, which makes it difficult for them to commit so much time out of their day to one specific aspect of a project. Touchplan makes it possible for subcontractors to pull plan wherever they are located and at whatever time is convenient for them to complete the task. This type of software also enables easier modifications to be made as the schedule evolves.

Of course, there would need to be some small training given to the foremen in order for them to use this program successfully. However, if the project team decides they want to have pull planning sessions remotely at the beginning of the project, this is something that could be listed in the trade partner’s contract. This could mitigate any issues of not knowing how to use the software.

Interview/Pull Planning Workshop

The workshop that was designed and executed started off with interviews with a few general contractors and subcontractor that conduct work in Central California. This interview focused on four main questions:

- Has your company heard of pull planning? If so, what is your definition of pull planning?
- How often do you use pull planning for your projects?
- If it is not used often, what is restricting you from using it?
• What do you think would be a driving factor in why GCs and subcontractors do not participate in pull planning sessions in the Central Valley?
• Are you aware there are software programs that can do pull planning sessions?

The interview portion of this workshop is to get a better understanding of how much knowledge the specific company has about the topic of pull planning. It is in the interview portion of the workshop where I obtained information on why pull planning and lean scheduling has not made its way to Central California.

Interview Answers

Here are the general answers that I received from each of the five companies that participated in my workshop:

• Has your company heard of pull planning? If so, what is your definition of pull planning?
  o Every company I had interviewed had some knowledge of pull planning. Mainly, the knowledge was the basic definition of pull planning. There were a few that had a little more education on the topic because they either attended a session or ran the session.

• How often do you use pull planning for your projects?
  o The general contractors that attended my workshop had a few different reasons as to why their project teams do not hold pull planning sessions regularly. However, all of their reasons pointed back to the lack of sophistication of many of the subcontractors that perform work in the Central Valley. The lack of experience and education in lean scheduling methods from the subcontractors plays a huge role in running a successful pull plan meeting. General contractors tend to experience issues with subcontractors in these sessions that simply do not care enough about the task or who are just totally not prepared to contribute to the pull plan. The subcontractors that attended my workshop also agreed with the general contractor’s comments because these subcontractors that participated in my workshop are not the “problem child” trade partners. These subcontractors revealed that it is very frustrating to be in a pull planning session with other subcontractors that do not come prepared to these meetings. It totally derails the entire process of the pull plan.

• If it is not used often, what is restricting you from using it?
  o As stated in the previous questions, the restriction comes from the lack of experience and education in the subcontractors in the Central Valley. However, there was another industry restriction that causes certain general contractors to not do pull planning sessions. When you are a “hard-bid” general contractor, you tend not to know your subcontractors until the bid date. So, trying to implement lean scheduling aspects into contracts can be tricky, if not improbable. One general contract that was interviewed has this issue and is reluctant to implement lean scheduling aspects for their projects if it is not stated in the contract. It was stated that subcontractors would not participate if it was not written in their contract that they needed to do pull planning sessions. Contrary to design-build contracts, hard-bid contracts are much less collaborative.
  o General contractors and subcontractors also revealed that it is extremely difficult to get everyone in the same room to plan work together because of conflicting schedules. This was a common answer that was given by everyone.
• What do you think would be a driving factor in why GCs and subcontractors do not participate in pull planning sessions in the Central Valley?
  o As previously stated, the lack of experience and education from subcontractors performing work in the Central Valley is the driving factor in why pull planning is simply not executed in this region.

• Are you aware there are software programs that can do pull planning sessions?
  o Surprisingly, every contractor I met with did not know that there were software programs developed specifically for pull planning. This question was mainly to plant the seed of using Touchplan as a pull planning software to negate the issue of getting every trade partner in the room to execute a pull plan.

Presentation & Pull Planning Activity

Once the interview portion of the workshop was completed, a presentation about the above research was presented to the members who attended. The attendees had a chance to ask questions during the presentation as well at the end. Once the presentation was over, a small mock pull planning activity was executed. This pull planning session consisted of meeting a deck pour milestone of a first floor concrete structure. At the end of the activity, we took some time do discuss how the group would try to implement pull planning into their standard project scheduling practices.

Conclusion & Lessons Learned

This workshop that was delivered to companies in Central California was extremely helpful in discovering why lean scheduling and its principles have not been successful in the Central Valley. The interview portion of the workshop seemed to be the most beneficial part of the workshop which is what was expected. Subcontractors that perform work in this area appear to be at the root of the issue. Their lack of experience and education on the subject makes general contractors hesitate to hold pull plan sessions. General contractors tend to see a lack of preparation from these subcontractors in the pull plan sessions. There are a few subcontractors that are an exception. However, according to those that come prepared, dealing with other subcontractors who are unprepared for the pull plan is frustrating because the session isn’t as beneficial as it would be if everyone was equipped for the meeting.

References


Milestone: 2nd Floor Deck Pour

Duration: 31 days

Tasks:
- Pipe inserts (MEPP)
- Layout
- Shoring/Formwork
- Blockout Repairs
- PT install
- Plumbing
- Cure
- Strip Form/Shoring
- Greater Reinforcement
- Deck test
- Stress PT
- Gant PT heads