An Experiment in Takt Time
Introduction to Project

- 7,500 SF Gut and Remodel
- Downtown San Mateo, CA
- OSHPD Project
- Occupied Building/ Operational Hospital
- IFOA-IPD Contract with Trade Partners
- Last Planner
- Pull Scheduling
- BIM Modeling
Why Takt Time?

- P2SL looking for small project
- James Pease of Sutter Health recommended P2SL for Pankow
What is Takt time?

- German word for beat
- Match production rate to demand rate
Takt Time
Takt-time planning process

- Data Collection
- Zone / Work definition
- Team agreements
- Rough balancing
- Fine balancing

Adapted from Ballard and Tommelein (1998) white paper on continuous flow
Flow Summary

Are these work flows compatible?
Takt-time planning process

- Adapted from Ballard and Tommelein (1998) white paper on continuous flow

Sequence Details:
- Rough in electrical before top of wall drywall
- “I can install prefab walls in 4 days, but only if entire space is clear.”
Line of Balance Scheduling

• What is Line of Balance?
• What does it have to do with Takt Time?
Line of balance scheduling

• Optimize the schedule
• Used it for pull planning
• Did not use the full BIM, still improved the schedule significantly
• Line of balance scheduling IS NOT takt-time planning
Dreams to Field

• How did we implement Takt Time and Line of Balance in the field?
Overhead Phase LOB

• Begins with Layout on the floor, ends with duct insulation, plumbing chlorinated and all overhead conduit installed.

• 44 days total
Individual Trade Workflows

- **Duct Sequence:** 2,1,3,6,5,4
- **Piping Sequence:** 2,1,3,6,5,4
- **Electrical Sequence:** 5,4,1,2,3,6
Overhead LOB
Controlling the schedule

- Last Planner system
- Visual plan system in the field
- Goal: Communicate where people are actually working, how fast they are, and if they need to speed up or slow down
Communicating and controlling the space schedule

Daily progress reports and space schedule displayed via whiteboard

10/4/2014
Interactive Daily Reports and Color Up
Continuous Improvement of the Plan

- Initially structured with 4-day takt time, but this needed to be adapted.
Continuous Improvement of the Plan

• Printed out 11x17 of the LOB schedule and worked with the trades to reschedule w/ a pencil and ruler

• Took out 8 days in the schedule due to changing the sequence and crews
Current Inwall Phase LOB

- Now: 29 day sequence. (initially 37 with 4-day takt).
Overhead Phase Summary
Takt Time Planning Results

• 44 to 32 days
• Slowed down some trades, redirected some trades, sped up others, identified Last Responsible moment to speed up or slow down
• “9/10 when we accelerate, this costs us money. We’ve gone so much faster on this job and it hasn’t cost us a dime”—PM Jeff Stewart of Southland
Trade Partners Panel

• Thoughts when first introduced to Takt Time and Line of Balance
• Benefits and Draw Backs?
• Opinion of Daily Color Ups and Reports
• Effect on working conditions
• Ownership of space/ cooperation
• Crew Sizes/ Hours Spent compared to original estimate
• Material Management
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Final Thoughts and Lessons Learned

• Data of Findings (PPC)
• Success of Project
• Calculated Risk
• Final Perspective of Takt Time
• Incorporating Owner Change Order and saving time
Questions?