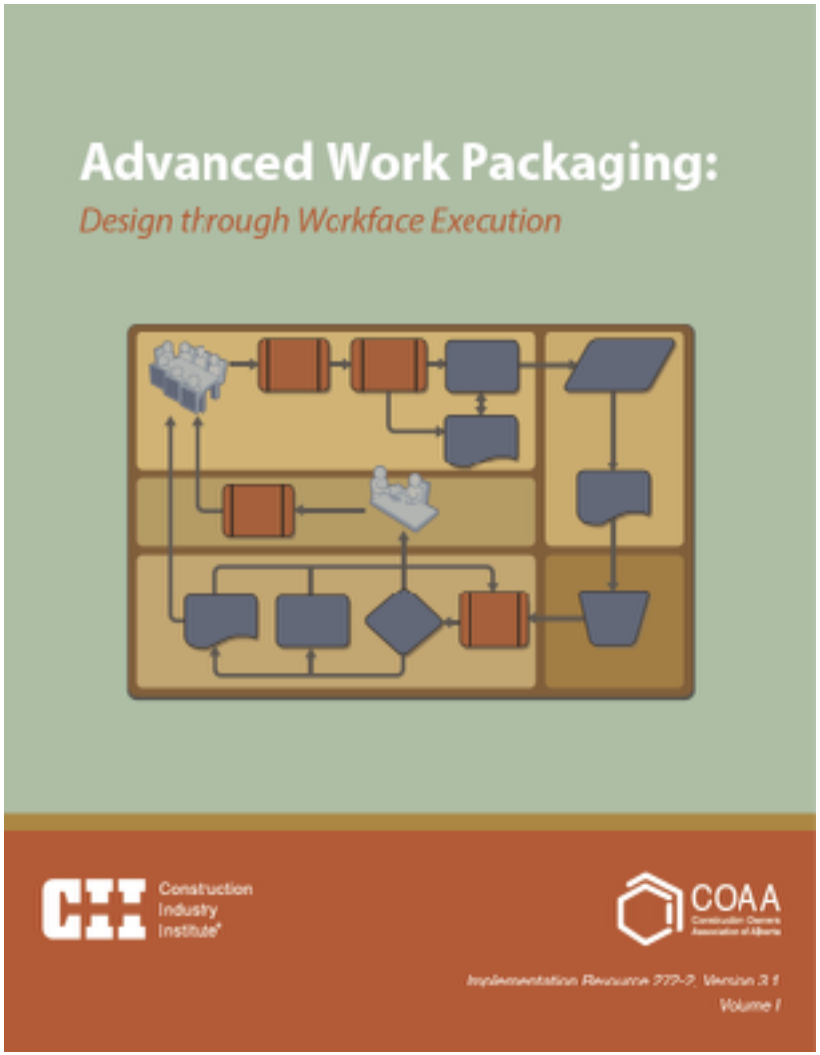
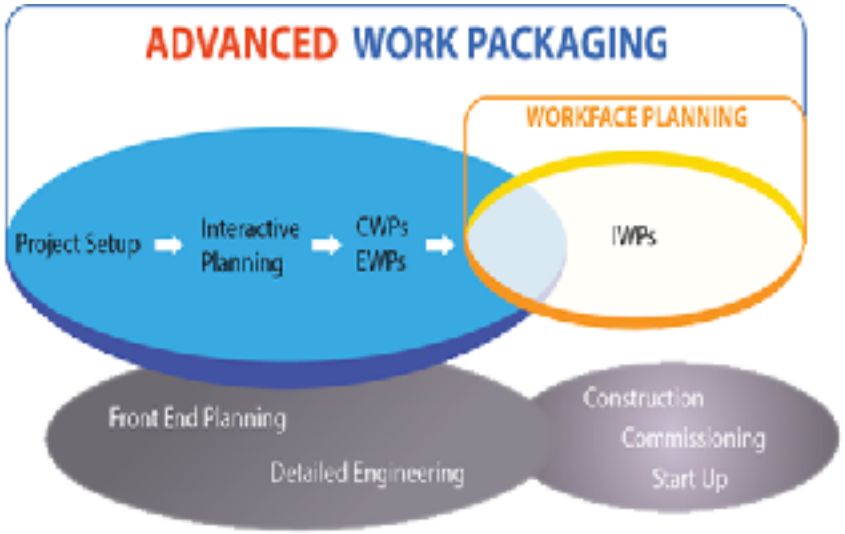
STRATEGIC PROJECT SOLUTIONS®

Effective Supply Flow Control

PPI Symposium

29 November 2017





2014-210

Effective Implementation of Work Packaging for Complex Projects

Scope:

Project cost and schedule overruns in the energy and industrial sectors have reached crisis levels. These cost and schedule overruns are impacting shareholder value and the ability for energy and industrial companies to deliver and maintain their assets. Work Packaging is one area that is gaining much interest among owners, operators and EPC firms. Recently, CII and COAA released Report 272-2 Advanced Work Packaging. Building on and expanding this recent work, this PPI research project explores how the application of operations management theory and practice can optimize the execution of work packages and in so doing support better control and predictability of project cost and duration.

Partner:

Project Production System Laboratory (P2SL) University of California Berkeley

Researchers:

Glenn Ballard, MBA, PhD Research Director P2SL, University of California Berkeley
Iris Tommelein, Professor of Engineering and Project Management, University of California Berkeley

PROJECT PRODUCTION INSTITUTE

A Critique of Advanced Work Packaging

JUNE 2015

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WHAT WE EXPECT TO FIND (HYPOTHESES):

1. Failure to specify pull in AWP design, naturally results in push. We expect to see huge inventory growth on projects using AWP if they do not specify pull.

2. The larger the transfer batch, the longer the duration of the process. We expect to see projects taking longer rather than being done more quickly, unless they reduce the transfer batch.

3. Having defined work packages, coordinated between engineering and construction, does not reduce the challenge of coordinating massive flows of materials, information and resources to construction sites when needed. We expect labor utilization to get worse rather than better.

4. Inventory growth, longer project durations, and higher labor costs—plus increased costs for expediting and firefighting—are expected to result in projects well over budget and time.

Situation and Unintended Consequences

Strategy to Better Synchronize Supply with Demand

Learnings to Date

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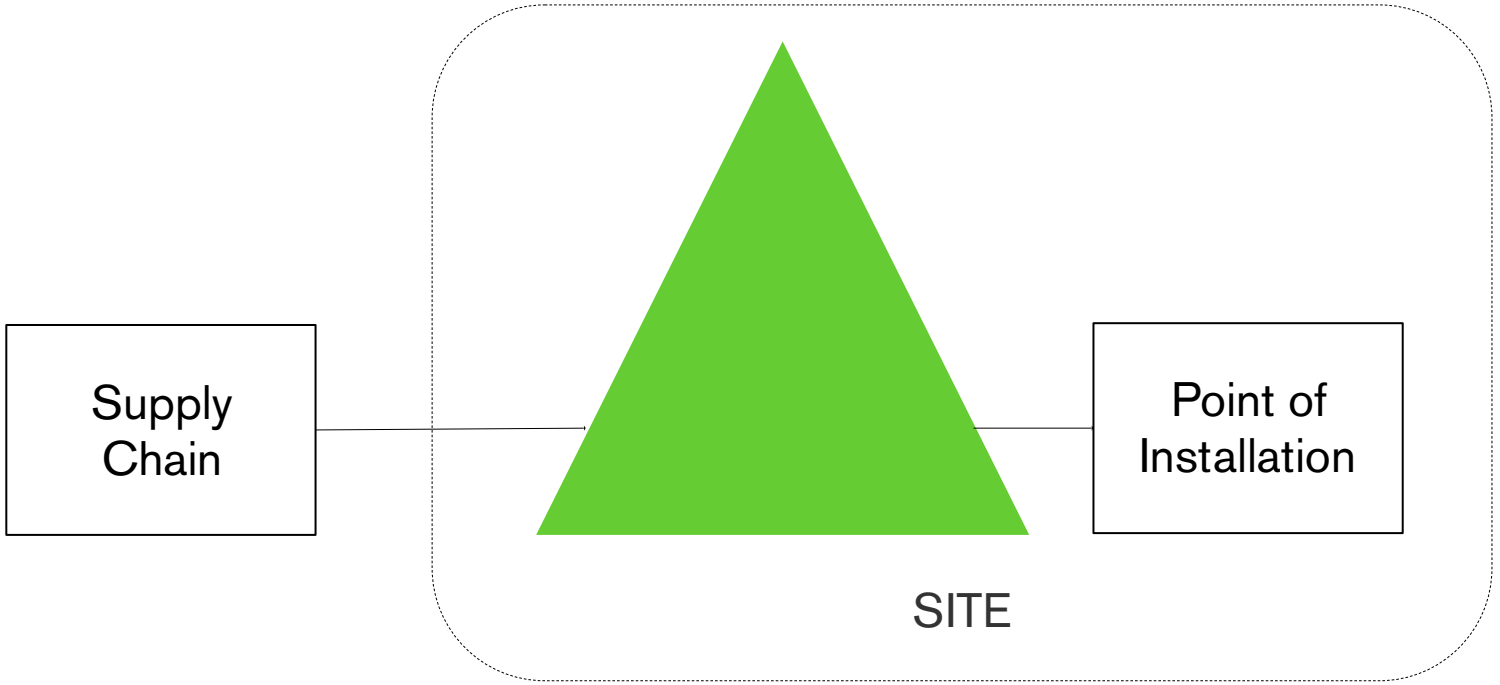


Inventory

“We cannot get what we need when we need it”

Implications

1. Safety Risks

2. Schedule Delays (+ loss of revenue)

3. Higher Cost (“the price is not the cost”)

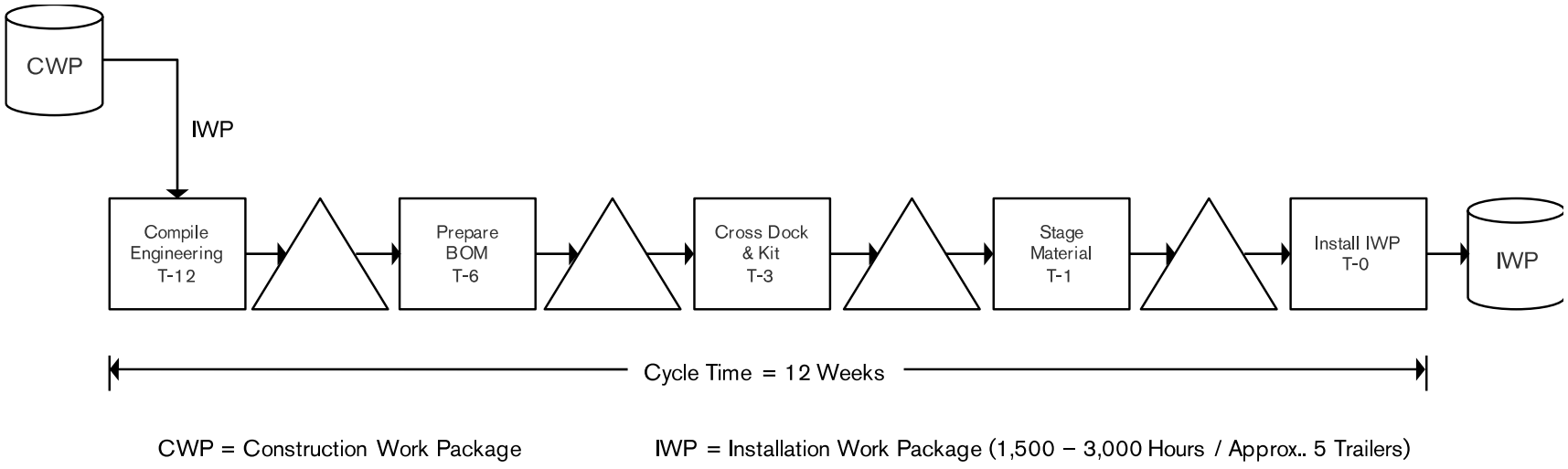
What They Were Doing

1. Use of Workface Planning

2. Shared onsite logistics capacity

3. Project Controls (Era 2) systems driving demand

Workface Planning (WFP)

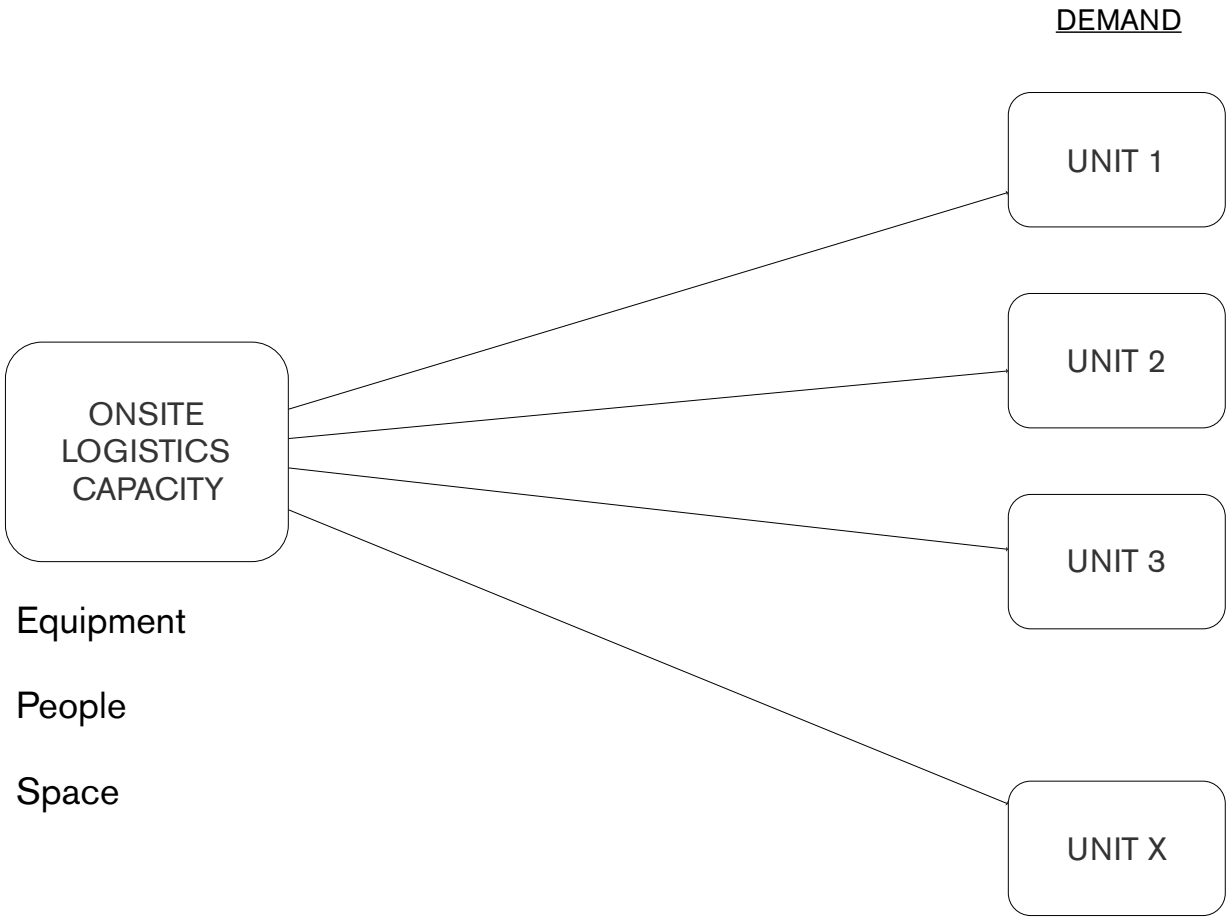


1 – Field Material Requests (FRMs) must be submitted 21 days in advance of need date

2 – Size of FMRs is set based on IWPs (2-3 weeks worth of work)

3 – If 100% of IWP materials are not on site, FMR cannot be submitted

Shared Logistics Capacity



Little's Law:

$$TH = WIP / CT$$

TH = 20 trailers / day

CT = 21 days

→ WIP = 420 trailers

TH = 20 trailers / day

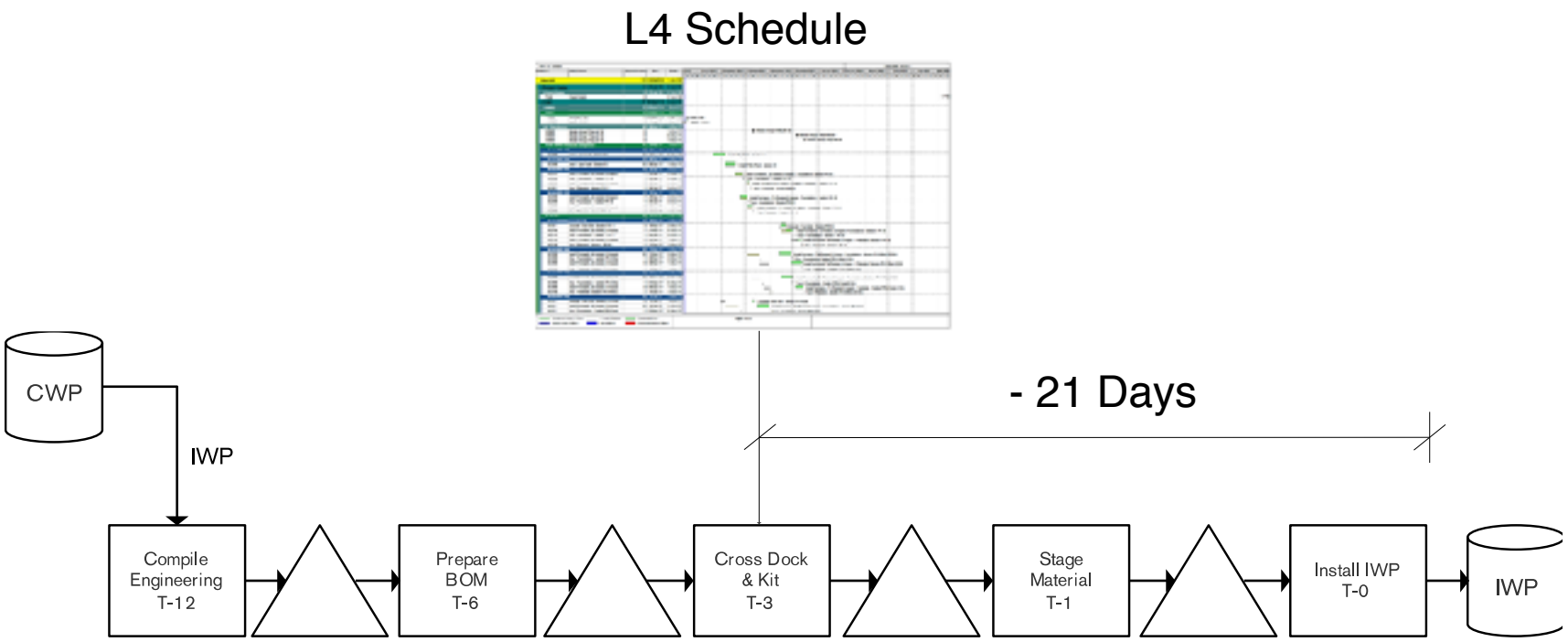
CT = 5 days

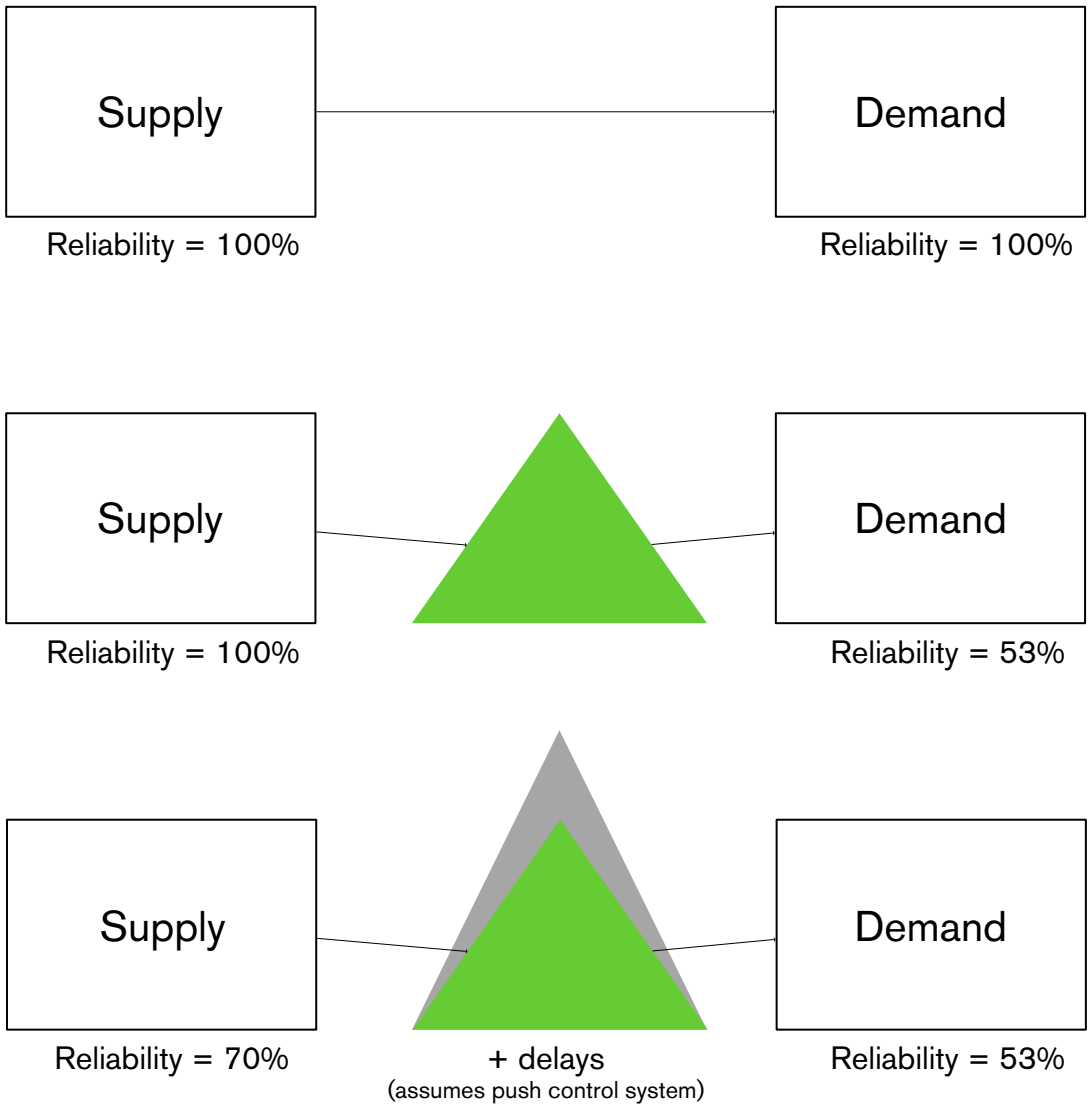
→ WIP = 100 trailers

Cycle Time Formula:

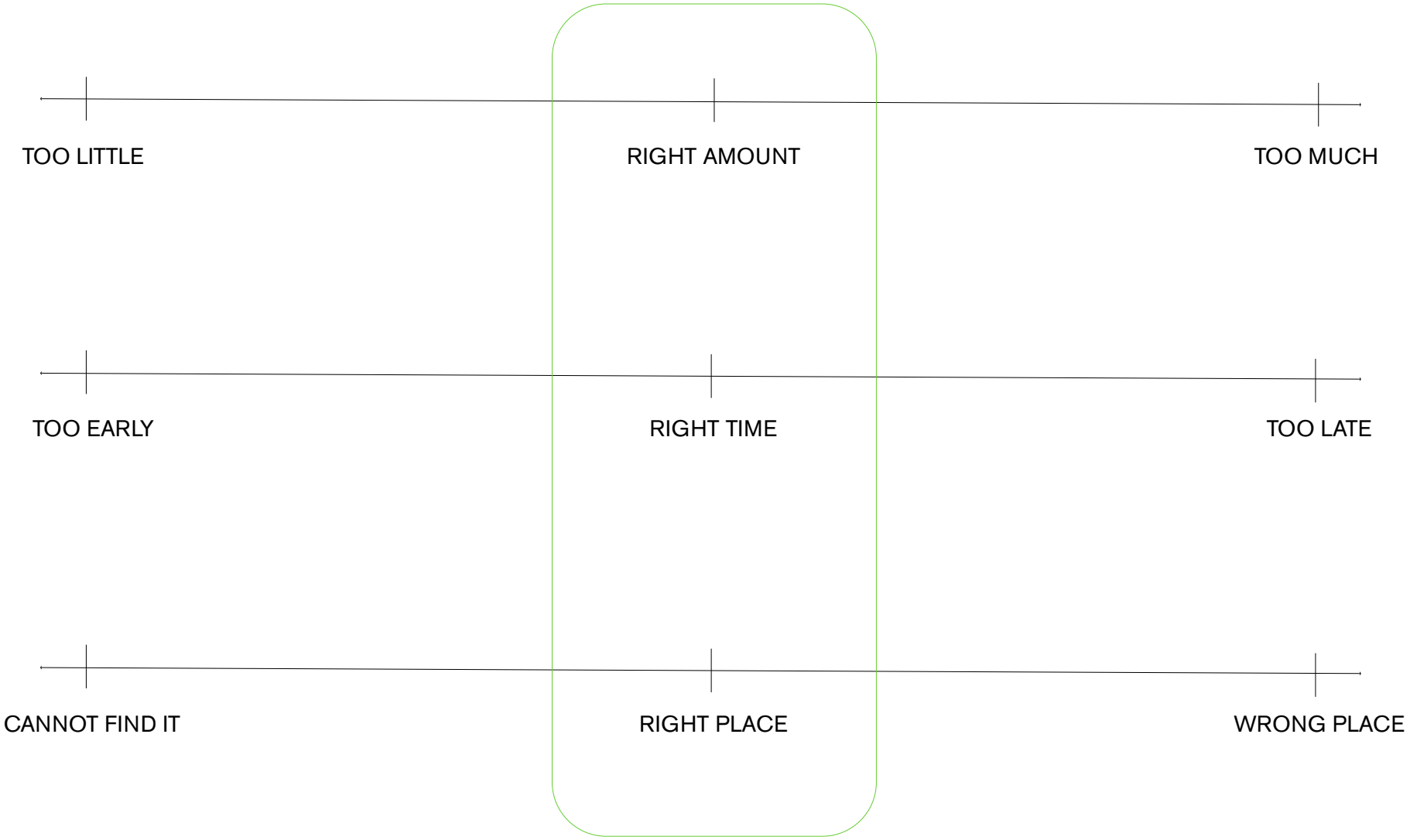
$$CT = BT + MT + ST + PT + QT$$

Project Controls Driving Demand





Variability → Excessive WIP → Cost & Schedule Overruns



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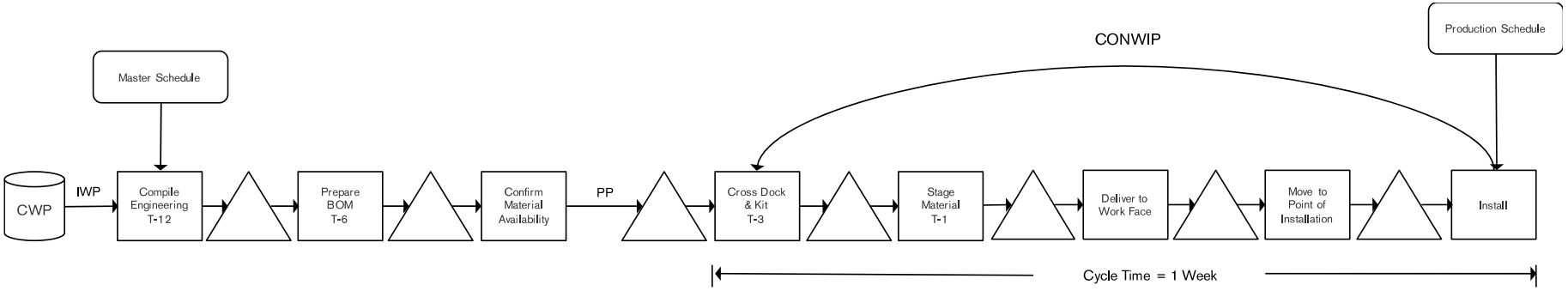
Proposed Strategy

1. Increase reliability of demand

2. Pull materials to the point of installation

3. Control and optimize supply



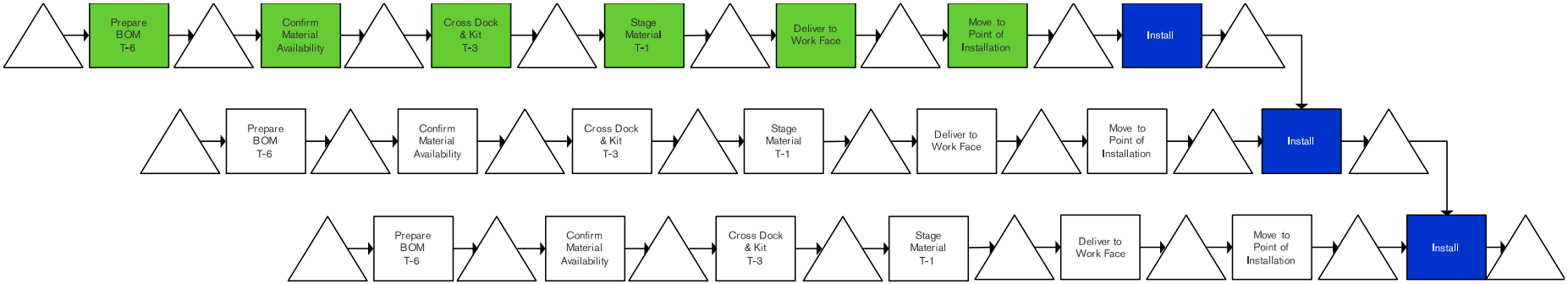
CWP = Construction Work Package

IWP = Installation Work Package (1,500 – 3,000 Hours / Approx.. 5 Trailers)

PP = Production Package (1 Shift for 1 Crew)

AUTHORIZE TO LOAD	LOAD	MOVE TO POI	AT POI	INSTALL
DAY -4	DAY -3	DAY -2	DAY -1	DAY 0

SUPPLY



SPS|PM MATERIALS MANAGER (SUPPLY)

SPS|PM PRODUCTION CONTROLLER (DEMAND)

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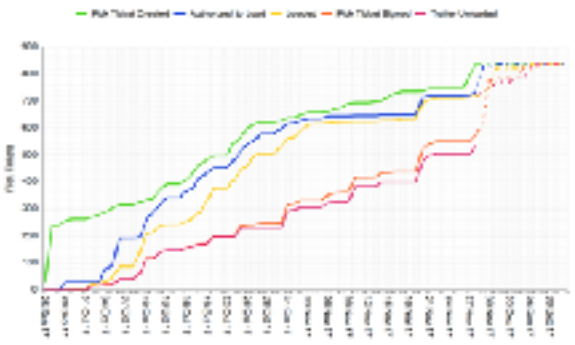
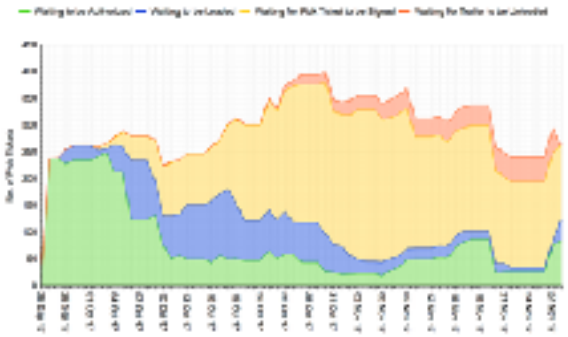
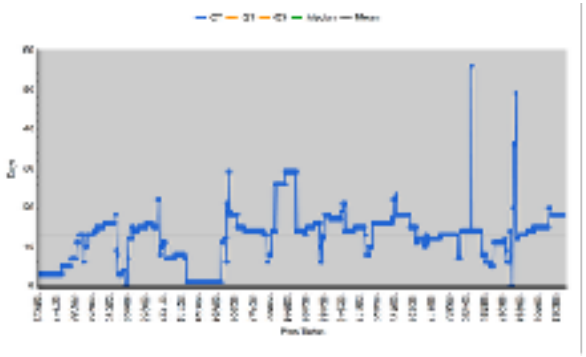


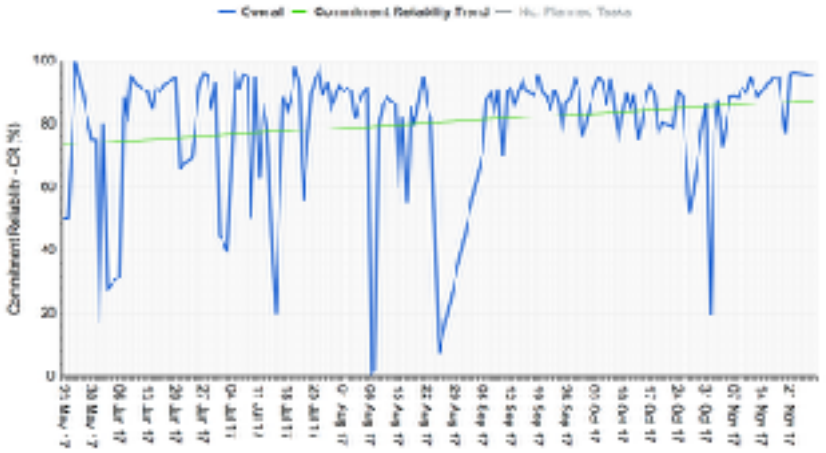
Throughput



Work in Process (WIP)



Cycle Time



<u>Demand</u> Reliability Trending Up

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PROJECT 1

PROJECT 2

More than Just a Coincidence

What is your Supply Flow Strategy?

“The enemy of a good plan is the dream of a perfect plan”

Carl Von Clausewitz (1780-1831)
Prussian soldier, military historian and military theorist

“The most serious mistakes are not being made as a result of wrong answers.

The true dangerous thing is asking the wrong question”.

Peter Drucker

Questions