



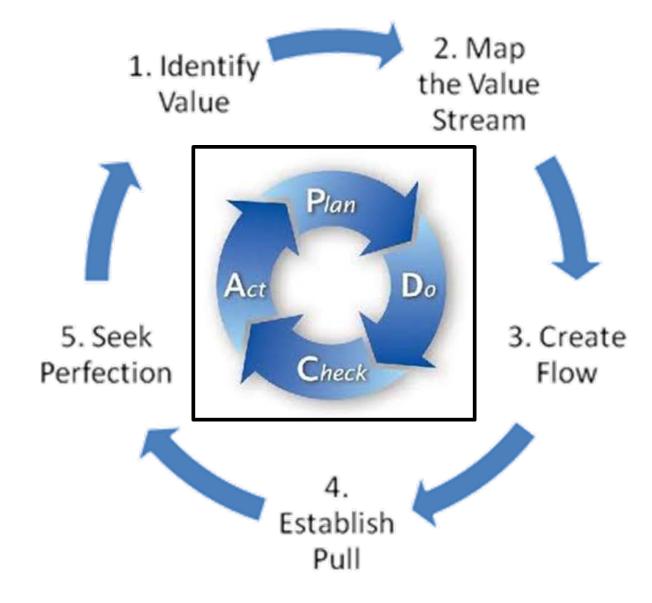


# Today's Objectives:

- Examine why creating and maintaining reliable workflow on projects is important
- Observe how using the Last Planner® System will create and maintain reliable workflow
- 3. Practice and learn the techniques of the LPS



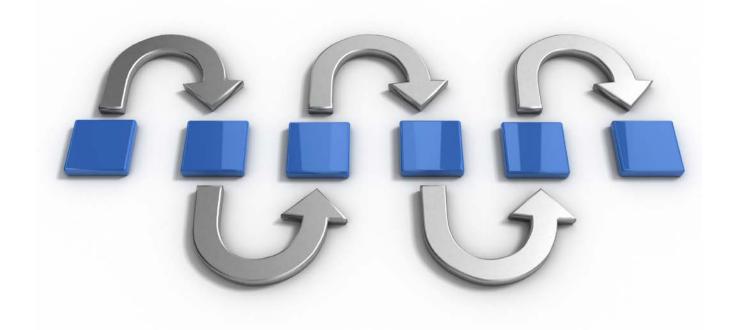
# Principle Elements of Lean





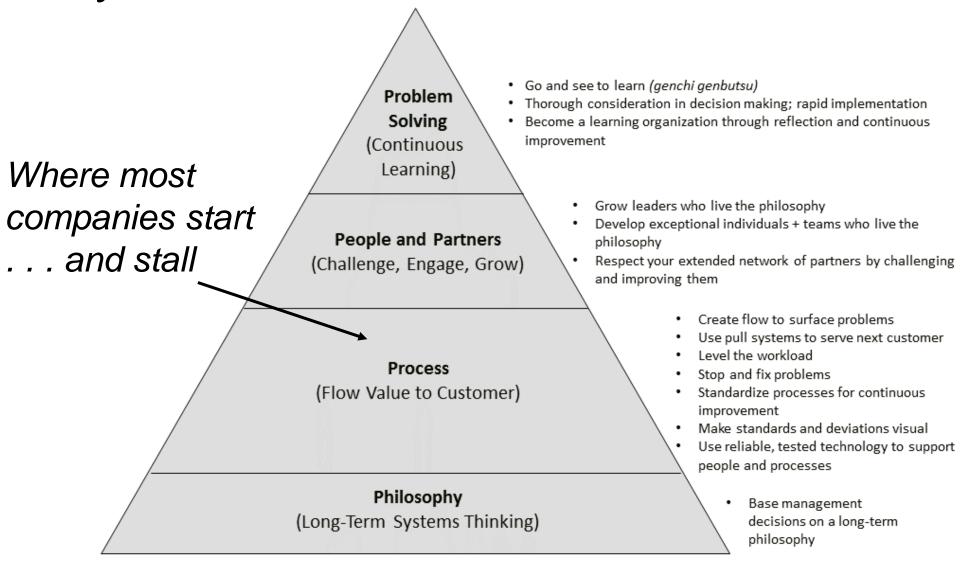
## A Lean Definition

A visual approach for creating quality, steady and level workflow within a process (value stream)





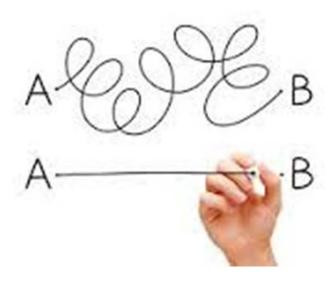
Toyota's 4 P Model





# Reliable, Level Workflow

Remove all non-valueadded activities (waste) from our processes (value streams)







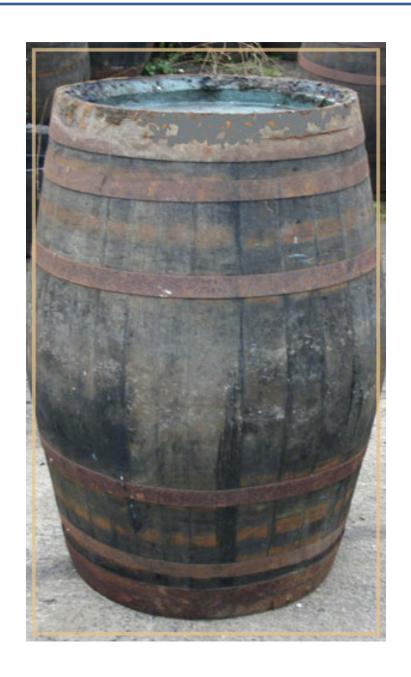
# Steady, Level Flow?









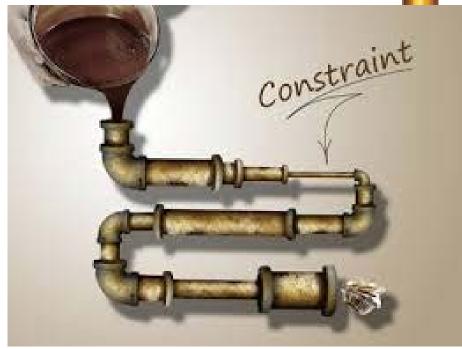






## Constraints = Variations







# **TIMMESS**

- Tools
- Information
- Material
- Manpower
- Equipment
- Safety
- Space



# **DOWNTIME**

- Defects
- Over-production
- Waiting
- Non-utilized Resources/Talent
- Transportation
- Inventory(WIP)
- Motion
- Excess Processing





- Rework Punchlist
- Failed inspections
- Requests for Information
- Change orders
- Submittals Shop drawings
- Inadequate Resources
- Inefficient work flow
- Work arounds
- Multiple handling of material
- Excess material
- Waiting on supplies
- Waiting on another trade
- Safety losses
- Improper sequencing of work

#### **DOWNTIME**

- Defects
- Over-production
- Waiting
- Non-utilized Resources/Talent
- Transportation
- Inventory
- Motion
- Excess Processing





## Value Stream

A sequence of interdependent actions that together create the path forward to satisfy the need of a customer



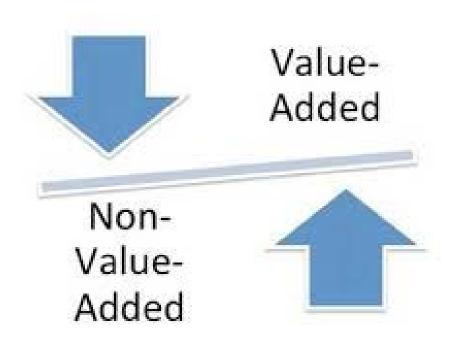




#### Value

Transforming pieces, parts and information in a manner in which the *customer* is willing to pay







# How to Improve Flow

Eliminate waste and add value

 Eliminate, reduce and manage variation in the value stream

 See the big picture - lose suboptimization or "silo" thinking





# Reliable Hand-Offs





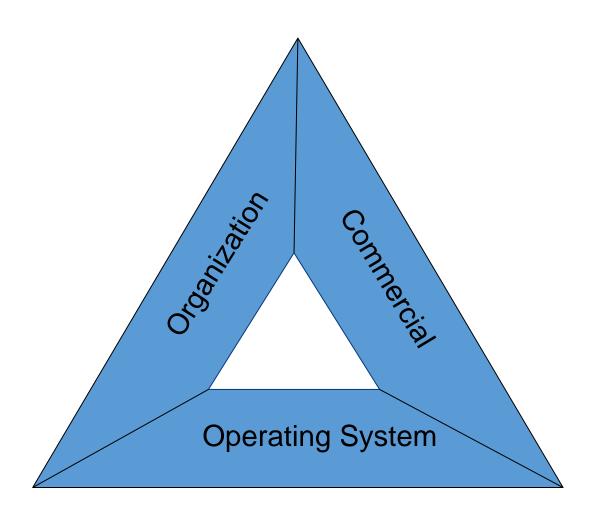


# **Unify Stakeholders**

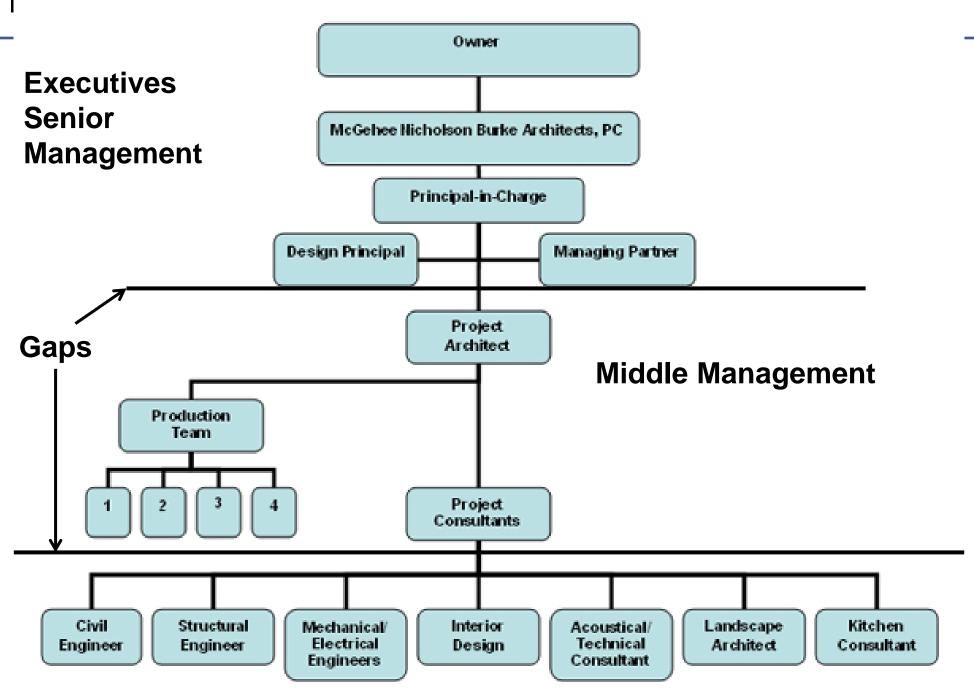




# THE THREE DOMAINS







Success Failure

# CONTINUTY TRIANGLE

Add PM's

Most Valuable < Resource Production
Workers
Value Creators

90%+\$

Continuity

Gaps

Why?

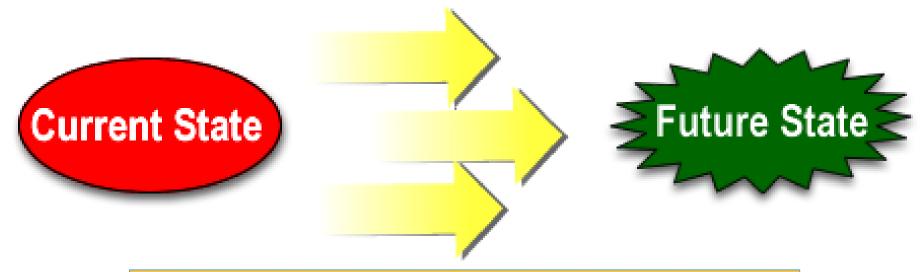
Middle Management

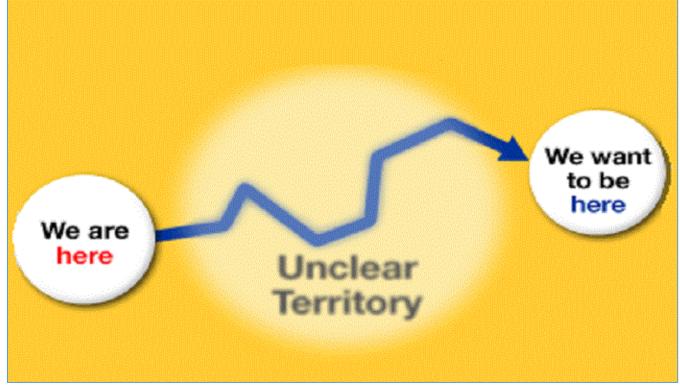
Waste

Exec

Servant Leadersh What?





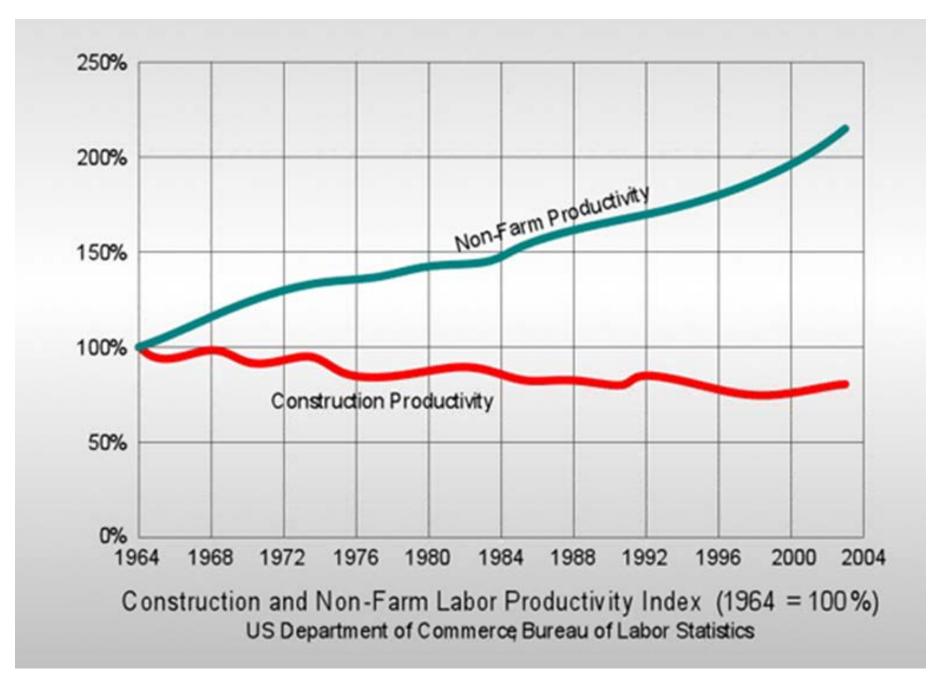




# How Productive Are We?









# How Good is Our Planning?







# Studies Show and Our Guts Know

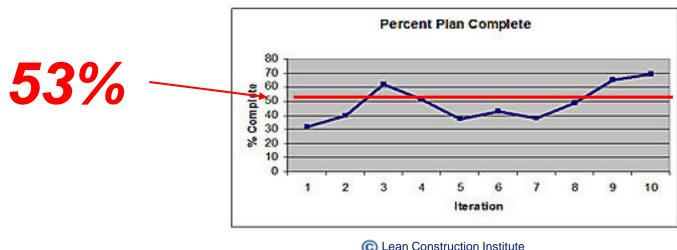
## Percent Plan Complete (PPC)

#### Last Planner

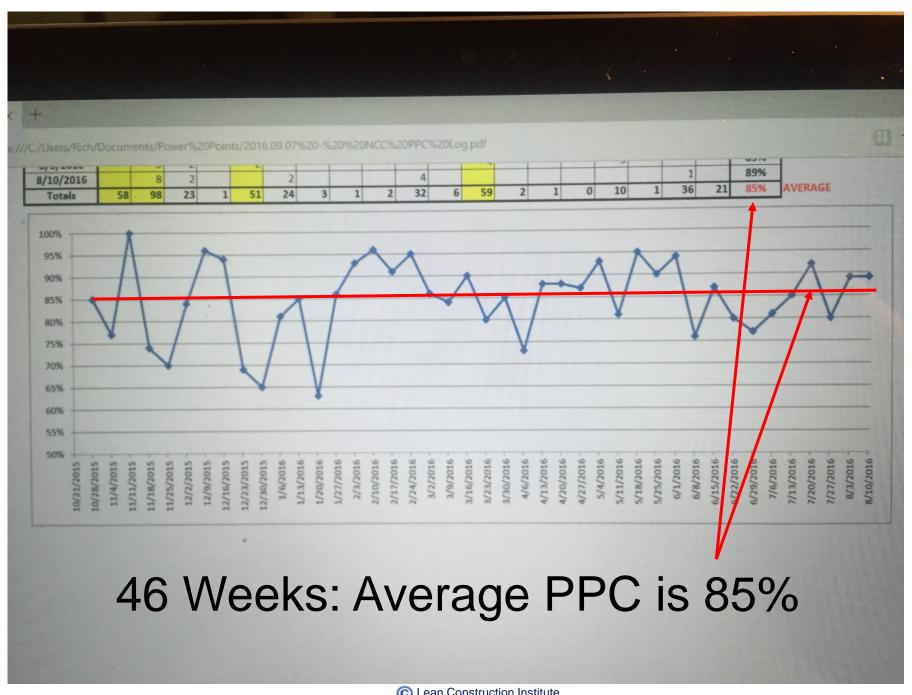
Tracking progress via Percent Plan Complete (PPC)

PPC = <u>number of planned activities completed</u> number of planned activities

E.g. 10 features planned, 8 features delivered PPC = 8/10 = 80%







#### Variance & Percent Plan Complete (PPC) Log



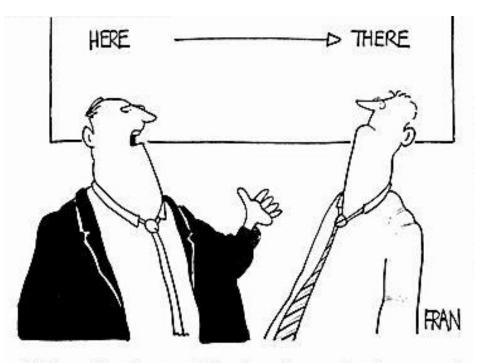
**Project Name-**WEEKS Reasons for noncompletion No. Reason Inaccurate planning 1 2 Prerequisite work 3 **Design matter** 4 Failed or no inspection 5 Labor not available 6 Material not available 7 **Equipment not available** 8 Contracts Change order (C/O) 9 Request for Information (RFI) 10 11 **Submittals** 12 Weather 13 I forgot **Unforeseen conditions** 14 15 Value engineering delay 16 Longer than anticipated 17 No access Other priority work 18 Percent Plan Complete (PPC) **NOTES:** 100% 95% 90% 85% 80% 75% 70% 65% 60% 55% 50% 45% 40% 35% 30% 25% 20% 15% 10%

> 5% 0%



## Three Theories:

- Traditional planning doesn't produce predictable workflow
- Workflow reliability directly affects system speed and cost
- Plans are forecasts all forecasts are unreliable



"It's a simple model... but it works for me..."





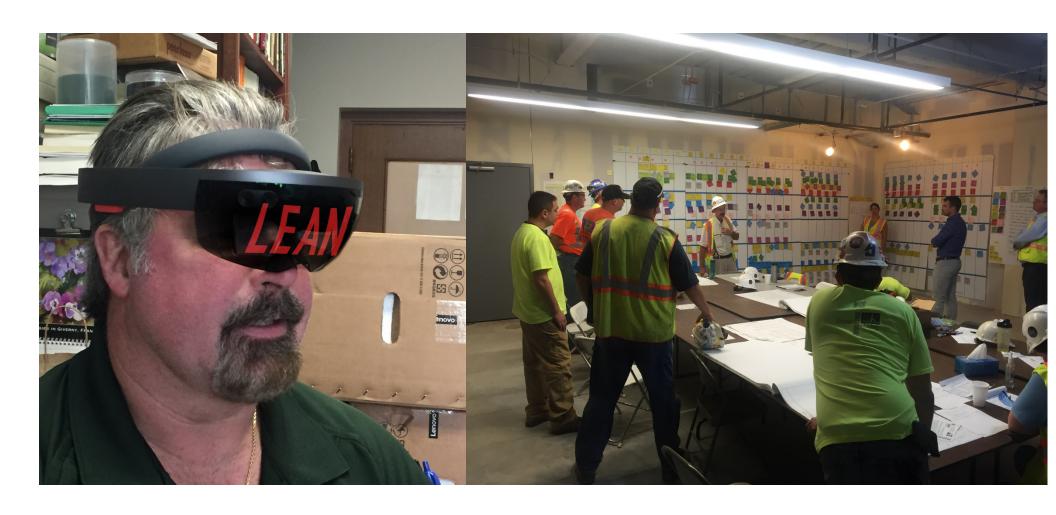
"Plans are useless, Planning is everything"
-Dwight Eisenhower



Break

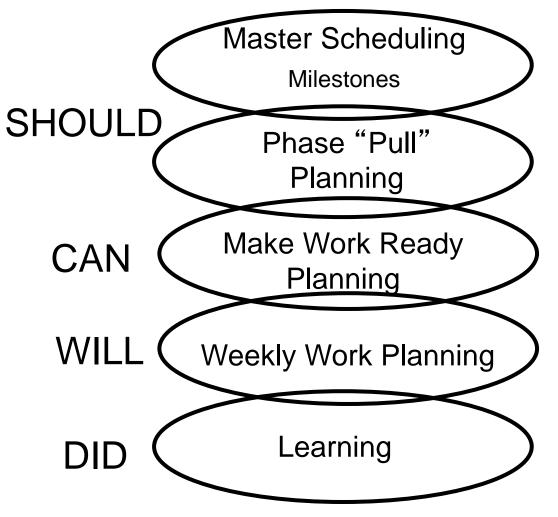


# Let's Examine LPS:





# THE LAST PLANNER® SYSTEM OF PRODUCTION CONTROL 5 - CONNECTED CONVERSATIONS



Set milestones & strategy Identify long lead items

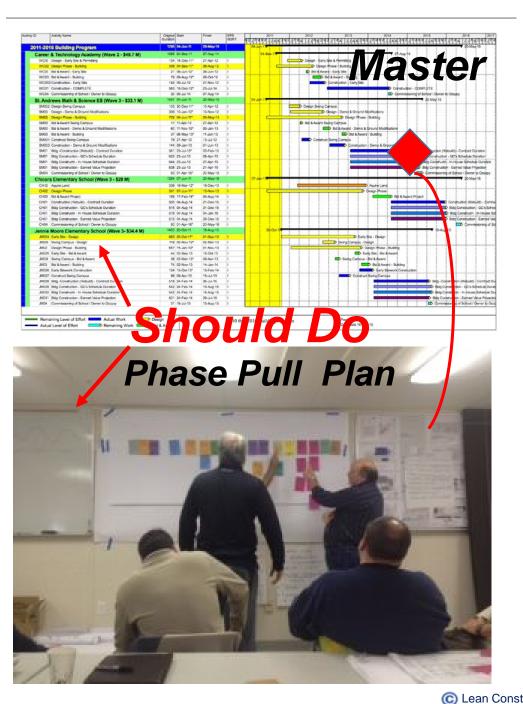
Specify handoffs Identify operational constraints

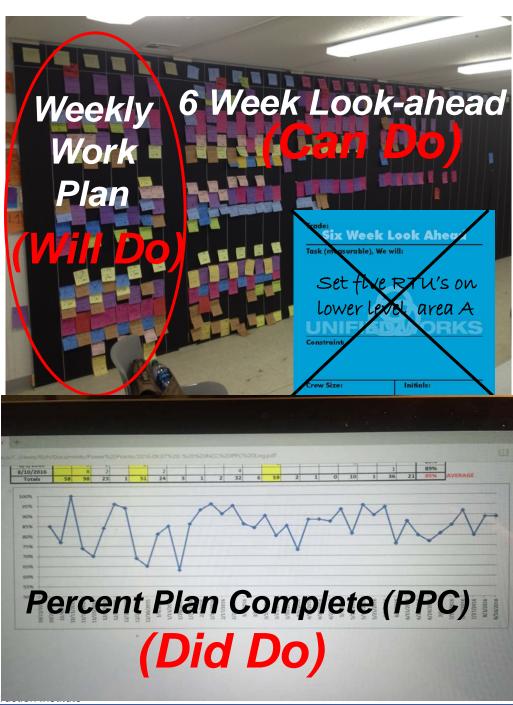
Make work ready & launch re-planning when needed

Make reliable promises

Calculate & analyze PPS-act on reasons for non-completion







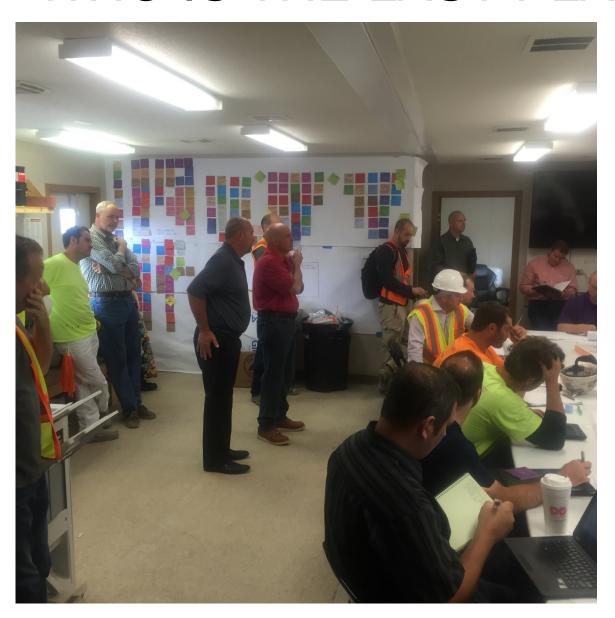


# Daily Huddle





# WHO IS THE LAST PLANNER?



- Front-Line manager
- Accountable for assigning and completing the work
- Empowered to make commitments ...or not
- Foreman and supt'd



### **Quality Assignments**





### 1) Definition:

- Specific and measurable
- Work can be coordinated

### 2) Soundness:

- They are workable
- They are clear and understandable

You have what you need from others



- 3) Sequence:
- They are in the right order

They will release other work?

You have identified workable backlog

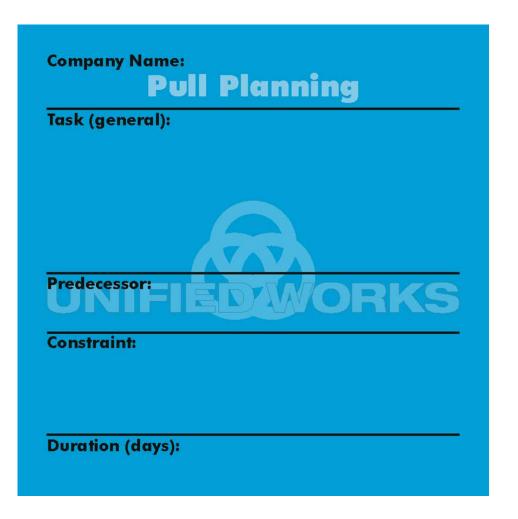
They are sized to the productive capability of

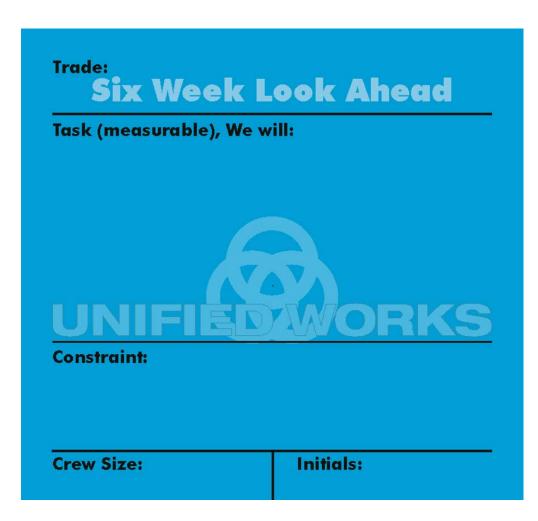
each crew or vice versa

4) Size:



### They Come in the Form of Sticky-Tags







### **Establishing Solid Target Conditions**

- Important to internal and external clients
- Be sure they are clear and specific
- In-line with contract





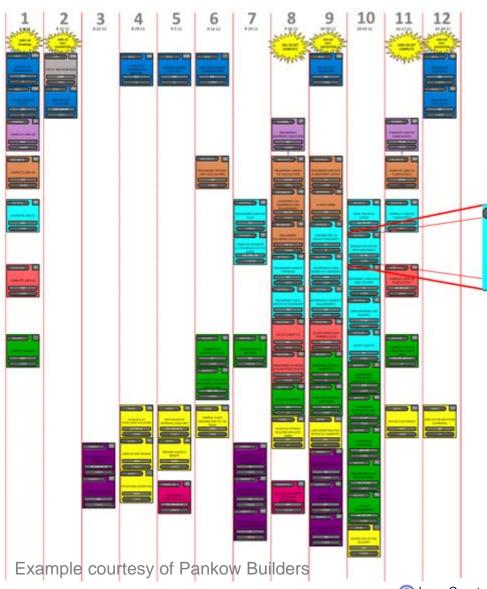
### Objectives of a Reliable Phase "Pull-Plan"

- Understand the general scope of the planning horizon
- 2. Establish the sequence and flow of the work
- 3. Validate the durations in relationship to the master
- 4. Benchmark this to see how you are tracking as the job progresses





### Document your work



DOCUMENTATION OPTIONS:

MOVABLE HARD COPY

**PHOTO** 

**EXCEL** 

LPS Softwares

**VISIO** 

**SURETRAK** 

MICROSOFT PROJECT

**NETPOINT** 

Electronic version should be accompanied by a

ACTIVITY

**Good Practice:** 

POST-IT ID # OF TIED

record photograph of

Pull Schedule on

wall

ELECTRICAL POST-IT ID #

BRANCH CIRCUITS TO



# Plus and Delta's of a Pull Planning Session Pluses: Delta's:

- Starts team formation
- Milestone is too long
- Constraints are identified
   Not all players present
- CPM is validated...or not
   Too long 4 hours +
- Strong planning start
- PP is disregarded
- Continual tracking device



### Objectives of Look- Ahead & Weekly Work Plan

- Identify & clear constraints
- Calculate PPC Variance
- Populate out six weeks
- Make work ready
- Analyze resources
- Consider hand-offs









### The Magic's in the Talks Among the Trades





#### **Constraint Log**



		Project	Name				
Constraint #	Date Identified	Individual Identifying Constraint	Description	Date to be Resolved	Activity Constrained	Responsible Individual for Resolving	Date Resolved
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Constraint Log

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A-GLANCE

2016 YEARLY PLANNER

JANUARY



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Parking Lot	UNIFIE
pject Name- NEW SCIENCE CENTER	
Person Identifying Issue	Responsible Date to be resolved State
PMI Moving Ally 3 in basement entry	A.A.N. 11/4
TM! Short grove with Pers	
SPCC-Angel Salamit OT costs to Owner For 10/31	AN 10/30 10/30
I LENEX-JC Lot for Steel Trailer Drop	DN/JH 11/23 11/25
all	CT. HH DN 11/04 11/6
HEC-AN DK Flagging	AW/DN 11/9 11/9
14 PCC- AN Submit of ROM to Owner for 11/7	KS 11/6 11/6
THI PEC KS SAMIT OT FOR WE MIS	KS (1914 11/13
MILL PCC-TEAM TRADE PARKING	TEAH/NCC 12/18 11/25
11/18 Lenex RFI-148 Stair + 3 Support Steel	HR 11/23 11/16
11/18 AW Calcs for Backfill - 7'APPROVED BY	PCC-AW 11/30 12/9
MC AW Lableschioth Mook-up Shops	HR/RFD 11/30 12/1
2010 1	11:00/NC 12)7 12/89
TOP HAT AWAY A PLC	P(C 13/4 12/9 TKE 12/4 12/24
1218 KS SAGE RELEASE	PCCGS1 12/23 1/13/16
soft Ast contract	SPERY 12/29 1/8/16 SPERY 12/13 12/23
116 AW PRESIDENT DYNAMIC-SUBMIT	CAI 112016 279/16
116 AW TEMP STAR PRICE P	11/3/16
	SE 1/18/14
113 AM BULLETINFOR ABBON PAIN-MEP	HAR 1/2/1/2 1/2/1/2
1120 AU RF1-249 CW+Slab Edge	1 + R 1   2   1   2   2   2   2   2   2   2
121 AV CONTROL MINE Submit 1	SS CONTRACTOR
2/10 AND Detropped Steel Page for Topping of the	H labs 2/29
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#### Variance & Percent Plan Complete (PPC) Log

UNIFIEDWORK

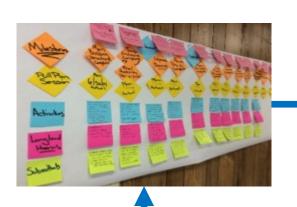
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### Session Roles & Responsibilities

Project Leader Project Manager	Production Manager Sup'td	Process Administrator Project Engineer	Last Planner Foreman
Clear constraints	Lead the 6WLA	Manage the logs & room	Make commitments -assignments
Serve the value creators	Challenge the planning claims	Walk Gemba	Identify constraints
Lead up and down the chain of command	Takes extreme ownership of project & team	Support sup'td	Share planning objectives with the field

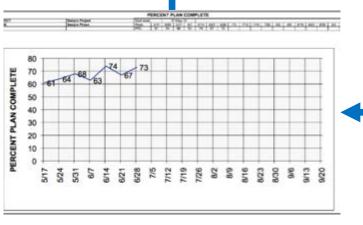




**Master Schedule** 



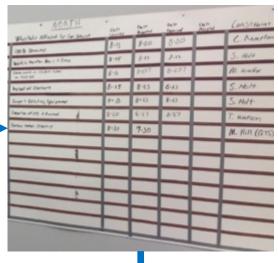
**Pull Planning** 



**Percent Plan Complete** 



**Daily Huddles** 



Lookahead Plan & Constraint Analysis

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Area:		Addition Interiors		Term	CATEGORIES OF			TOTAL ACTIVITIES							
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	Finis	h SLC under stair:	s		Eric Netherg		2	2							
	Paint	SLC under stairs	:		Jesus Mena			4	4						
	Paint	SLC stair			Jesus Mena			4	4						
	Testi	ng floor			Lance Leavitt	2									
	Plum	bing fixtures			Brian Masseg	2	2	2	2						
	Insta	II lockers in SLC		Brandon Graham				2	2						
	Plate	out			Lance Leavitt	2									
	Traff	ic coating			Shane Little	3	3	3							L
	Insta	ll window frames			Randy Vynn				4						
	Fram	e BH area			Eric Nethers					٠,					1

**Weekly Work Planning** 



### Benefits

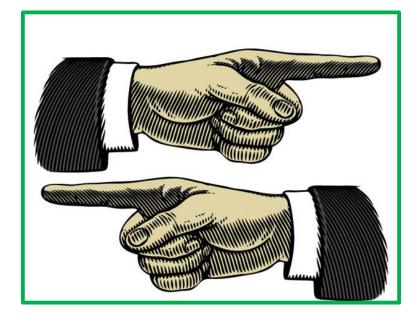
- Clears constraints on your work
- Makes work ready for you
- Gives you a voice at the table
- Eliminates reworks & waiting
- Improves accountability
- Gets decisions from upstream
- Eliminates stress
- Make the money you expected















- Conduct a mock LPS exercise on a small ground up project
  - Phase Pull Plan
  - 6WLA "around the horn" screening
    - Quality assignments
    - Workable backlog
  - WWP
  - Constraints, PPC, Variance, (Explanation and Analysis)
  - Parking Lot
- Opportunities and Threats to implementing



# **Questions?**



# Plus/Delta