



# **WORKFACE PLANNING CONFERENCE-WIDE SESSION**

***FROM CONCEPT TO COMMISSIONING***



# INTRODUCTION

- *From Concept to Commissioning: what does it mean?*
- *Who is on the panel?*
  - ✓ **Ron Embury** | Engineering Team Leader, NOVA Chemicals (Owner)
  - ✓ **Ken Kohlruss** | Vice President Operations, Commonwealth Construction [CH2M Hill] (CMT)
  - ✓ **Jose Herrero** | Vice President, Fluor (Engineering Contractor)
  - ✓ **Tannis Liviniuk** | Lead Construction Analyst, Cenovus Energy (Construction Contractor)
  - ✓ **Lloyd Rankin** | Researcher, COAA (Facilitator)

# INTRODUCTION





# DESIGN BASIS MEMORANDUM (DBM)

*Defines the basic design parameters for the intended project. Generation, review, and approval of the DBM is a prerequisite for the development of the Engineering Design Specification (EDS).*





# DESIGN BASIS MEMORANDUM (DBM)

1) Develop WFP execution strategy

2) Assign WFP sponsors and champions

4) Project Milestone Schedule (PMS) (level 1)

6) High-level project review with construction input

3) Define WFP as required for all participants

9) Write WFP requirements in contracts

8) Demonstrate capacity to support WFP

5) Develop WFP execution plan

7) Design a server to host the databases used by all participants

10) Design Area Definition

13) Path of Construction

12) Demonstrate capacity to apply WFP

# DBM: OWNER

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## **DBM: OWNER**

At the DBM phase, we have three documents that set the stage for WorkFace Planning:

- Project Execution Plan
- Construction Execution Plan
- Constructability Implementation Plan



# DBM: OWNER

## Project Execution Plan (PEP):

- **Overall Project Milestone Schedule**
- **Project Strategy:**
  - **The project will be Construction-driven**
  - **Engineering and Procurement will sequence their work to meet Construction needs.**
  - **There will be extensive constructability input into the design and Engineering Work Package (EWP)**
  - **WorkFace Planning will be part of the Construction Execution Plan**
  - **No work packages (FIWPs) will start without all engineering, materials, tools, equipment and labour present on site.**
  - **Owner's commissioning sequence will be by operating systems and will be introduced in the engineering and construction schedules.**

## Construction Execution Plan (CEP):

• With respect to WorkFace Planning, the construction execution plan will:

- Set out the Construction Management Organization.
- Describe the Contracting Strategy
- Contain the WorkFace Planning Execution Plan
  - Workface Planning Approach
  - Workface Planning Overview
  - Workface Planning Implementation
  - Workface Planning Training
  - Workface Audit Process
- Progress Reporting

# DBM: OWNER

## Constructability Implementation Plan (CIP)

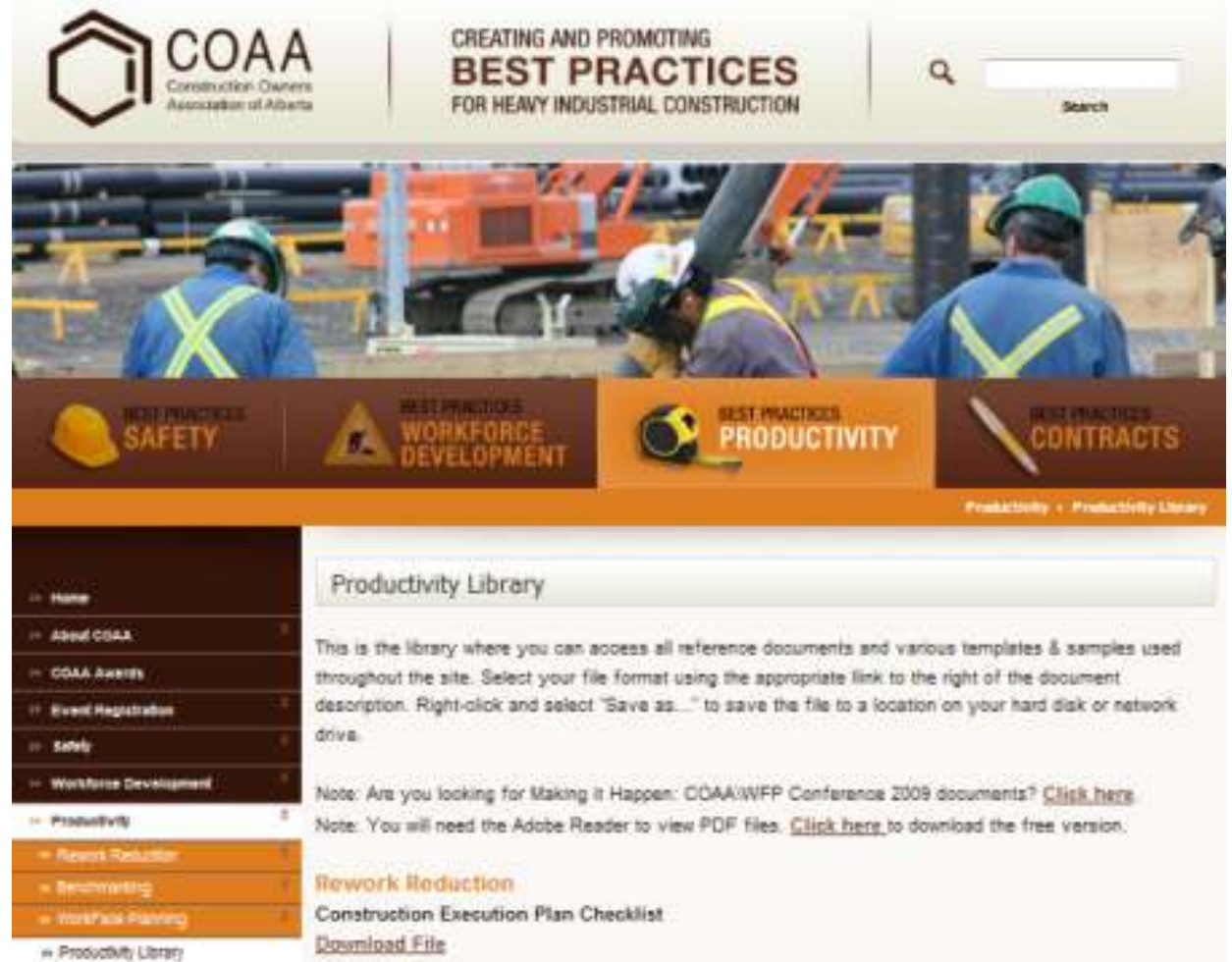
- **CIP is developed and started in the DBM phase. CIP is used to support WFP concepts.**
  - **Led by Construction**
  - **Sponsor(s) identified, Policy Statements described and Constructability Manager is appointed.**
  - **Sets out focus groups between engineering disciplines, Procurement, Owner, etc.**
  - **High-level construction sequence is developed.**
  - **Details of schedule integration is developed between parties.**
    - **i.e., Engineering drawing sequence developed to support FIWP Schedule**
    - **i.e., Procurement deliverables developed to support FIWP Schedule.**
  - **Various other activities are completed to promote ease of construction (design, layout, modular design, pre-fabrication, construction methods, weather, etc.)**



# DBM: OWNER

## Contract types:

- C
- CM
- EP
- EPC
- EPCM



The screenshot shows the COAA website interface. At the top, the COAA logo is on the left, and the text "CREATING AND PROMOTING BEST PRACTICES FOR HEAVY INDUSTRIAL CONSTRUCTION" is on the right. Below this is a navigation bar with four categories: "BEST PRACTICES SAFETY", "BEST PRACTICES WORKFORCE DEVELOPMENT", "BEST PRACTICES PRODUCTIVITY", and "BEST PRACTICES CONTRACTS". The "PRODUCTIVITY" category is highlighted. Below the navigation bar is a sidebar menu with options: Home, About COAA, COAA Awards, Event Registration, Safety, Workforce Development, Productivity (highlighted), Rework Reduction, Benchmarking, Workshop Planning, and Productivity Library. The main content area is titled "Productivity Library" and contains the following text:

This is the library where you can access all reference documents and various templates & samples used throughout the site. Select your file format using the appropriate link to the right of the document description. Right-click and select "Save as..." to save the file to a location on your hard disk or network drive.

Note: Are you looking for Making it Happen: COAA/WFP Conference 2009 documents? [Click here](#)

Note: You will need the Adobe Reader to view PDF files. [Click here](#) to download the free version.

**Rework Reduction**  
Construction Execution Plan Checklist  
[Download File](#)

# DBM: CONSTRUCTION MANAGEMENT TEAM

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# DBM: CONSTRUCTION MANAGEMENT TEAM

## WorkFace Planning Execution Plan

**JACOBS™**



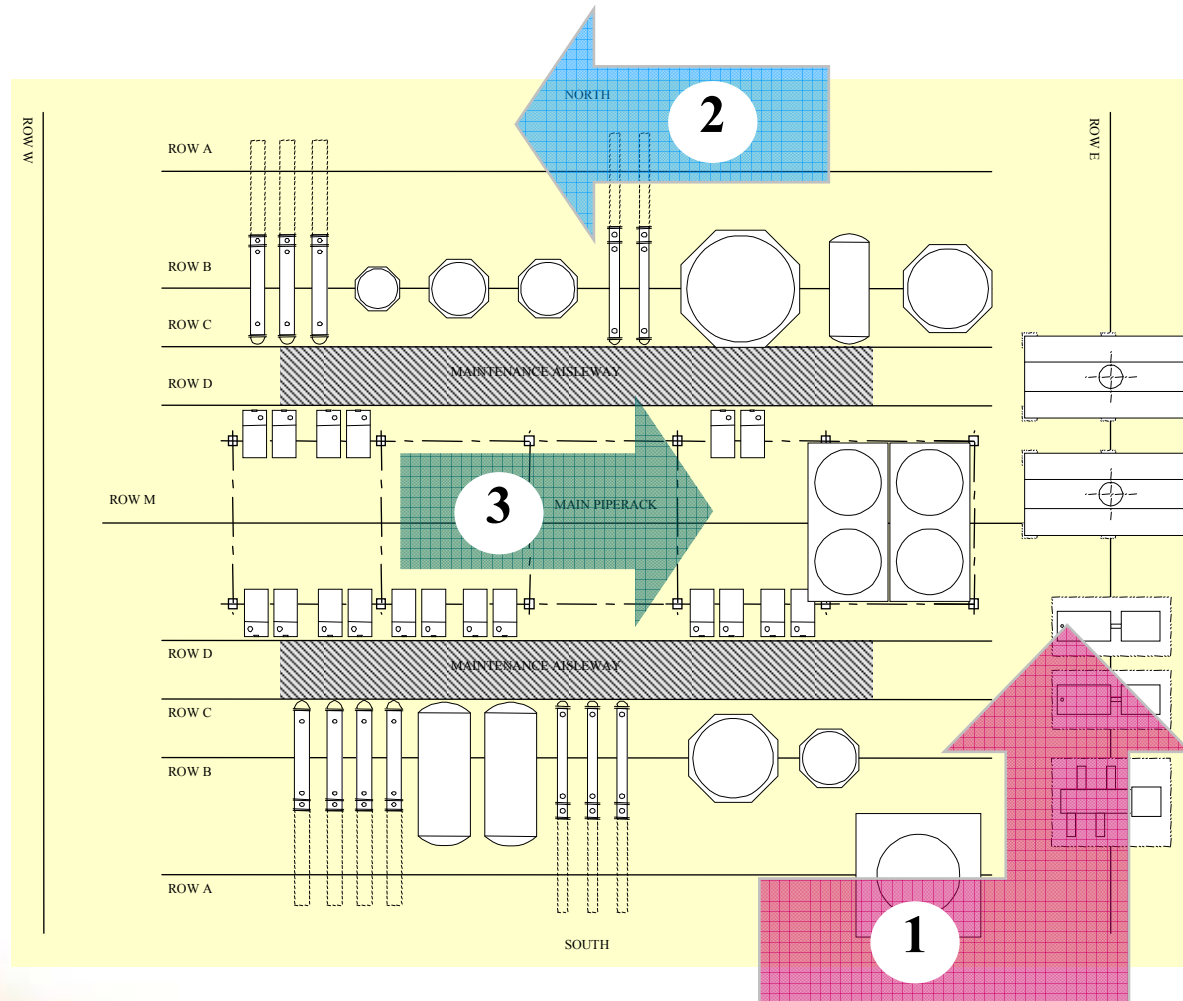
- 1.0 Definition
- 2.0 Purpose
- 3.0 Scope
- 4.0 Strategies
- 5.0 Participants
- 6.0 Roles and Responsibilities
- 7.0 Method
- 8.0 Systems
- 9.0 FIWP'S Release Process
10. Auditing

## **DBM: CONSTRUCTION MANAGEMENT TEAM**

*High-level project review which leads to Path of Construction*



# DBM: CONSTRUCTION MANAGEMENT TEAM

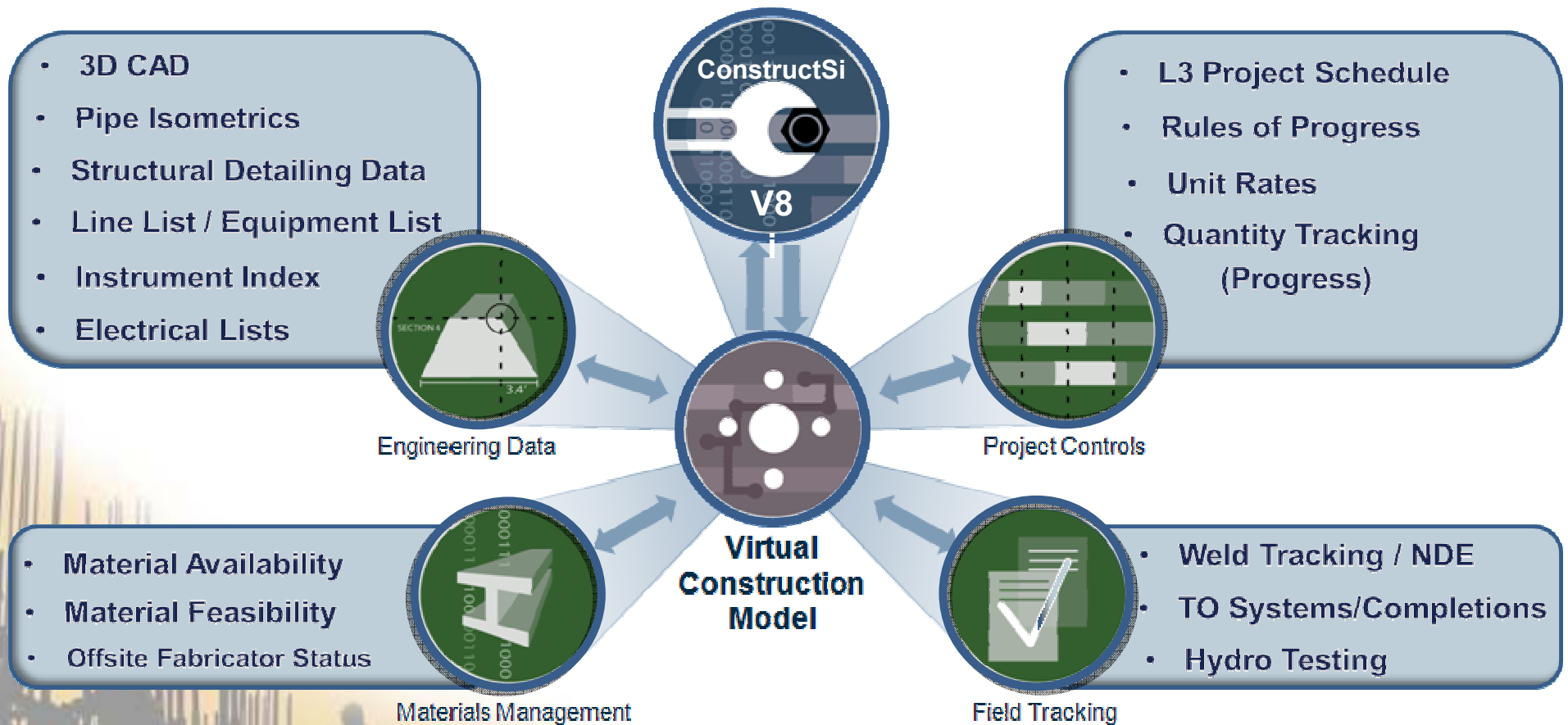


**Path of Construction**

# DBM: CONSTRUCTION MANAGEMENT TEAM

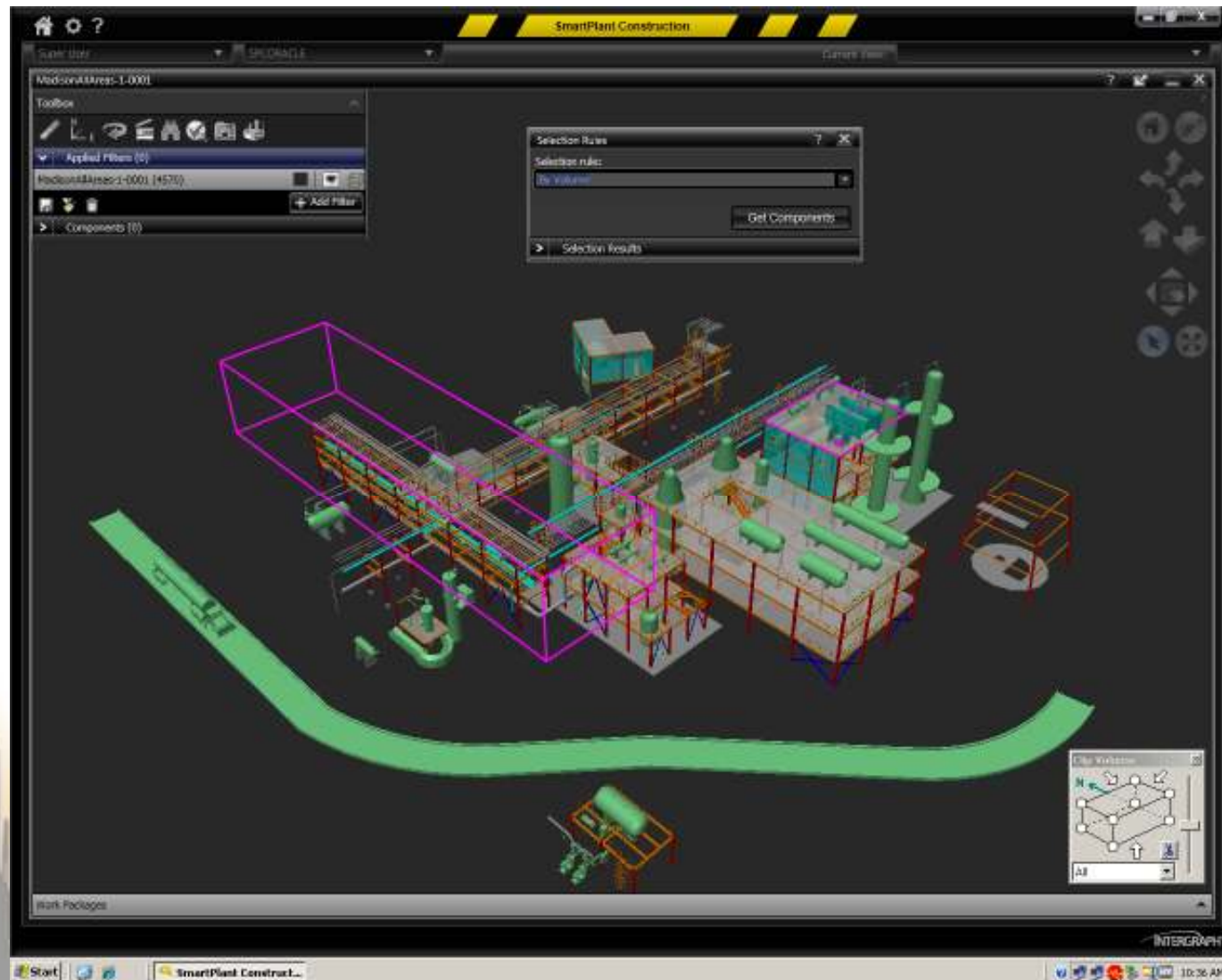
## WFP Automation

Bring your data together in one location





# DBM: CONSTRUCTION MANAGEMENT TEAM





# DBM: CONSTRUCTION MANAGEMENT TEAM



- Experienced trainers, educators and assessors (auditors)
- Assessment services
- Self-assessment tools

A background image of a DBM (Design-Build Methodology) assessment form. The form is tilted and contains various sections including "Project:", "Audit #", "Description", "Score" (with sub-columns for Neutral, Agree, Strongly Agree), "Date:", and "Comments / Observations". It also includes a "Section 1.0 Total (out of 70)" at the bottom. The form is overlaid on a silhouette of construction workers on a site.

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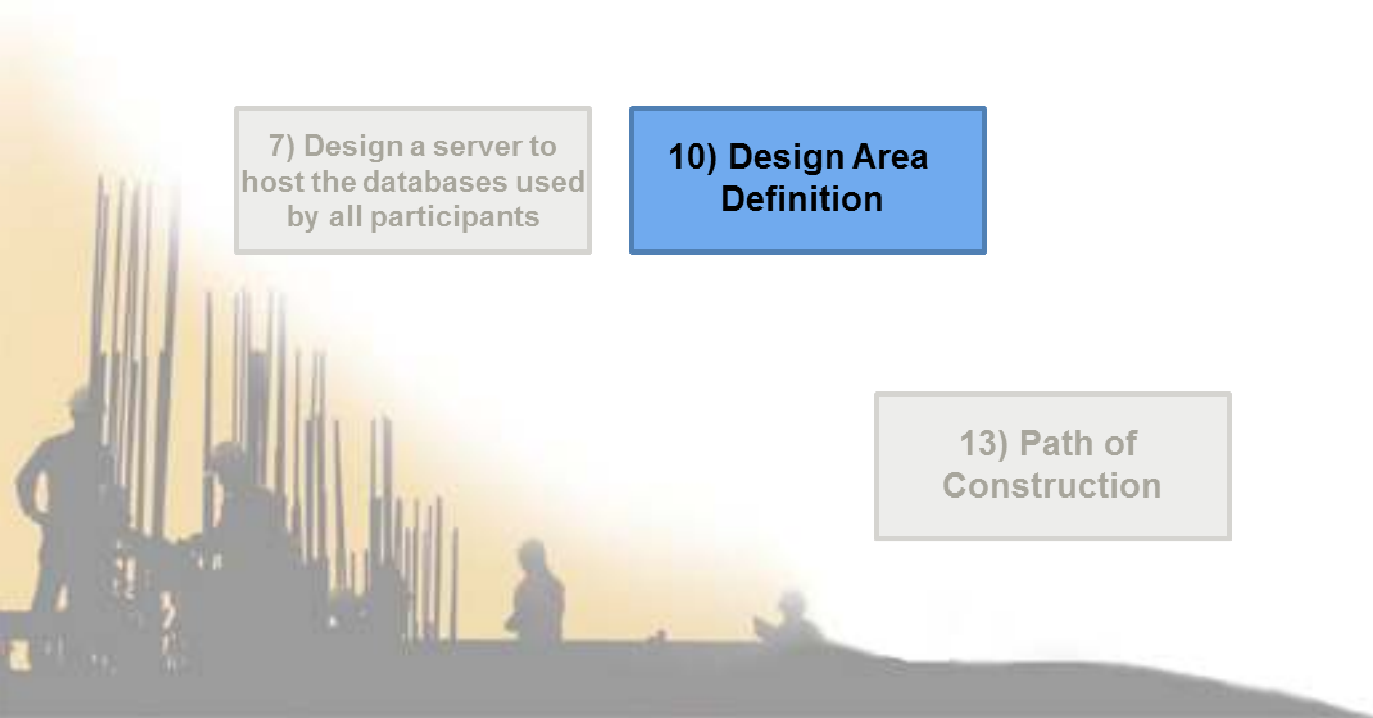
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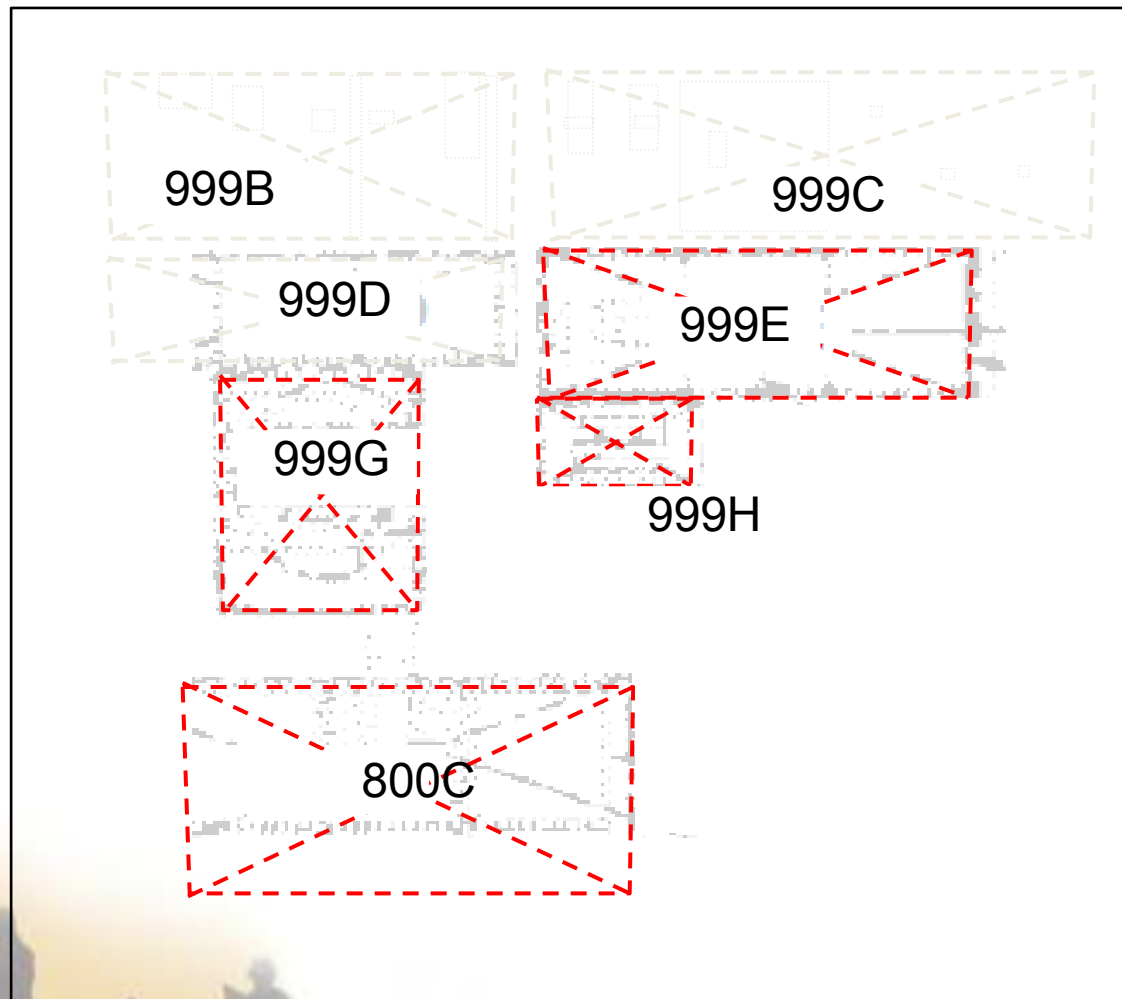
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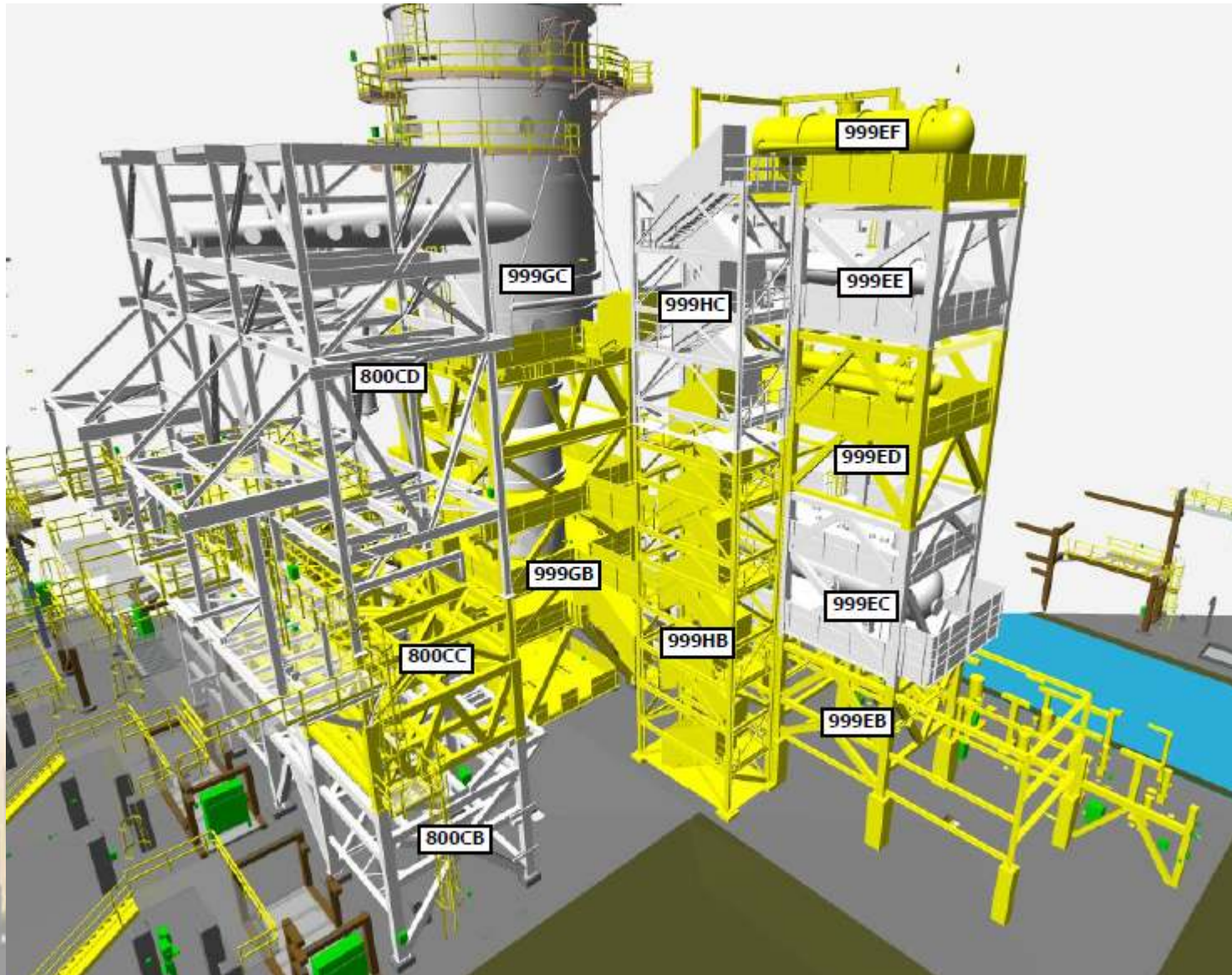
# DBM: ENGINEERING

## *Sample plot plan (partial)*

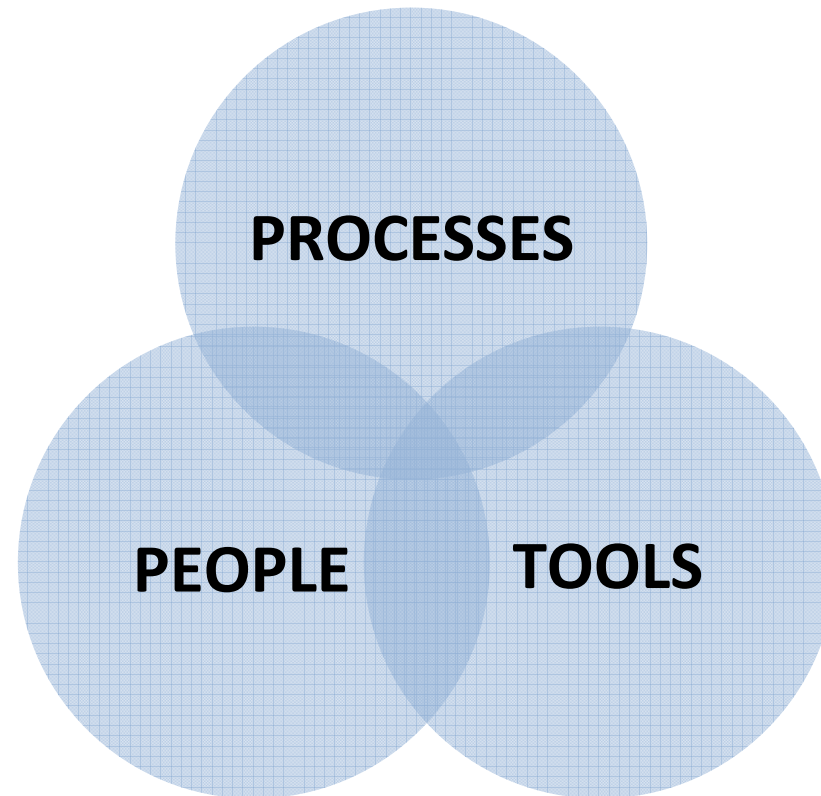




# DBM: ENGINEERING



# DBM: ENGINEERING



[Click to see process](#)

[Click to see table of contents](#)



# DBM: CONSTRUCTION CONTRACTOR

1) Develop WFP execution strategy

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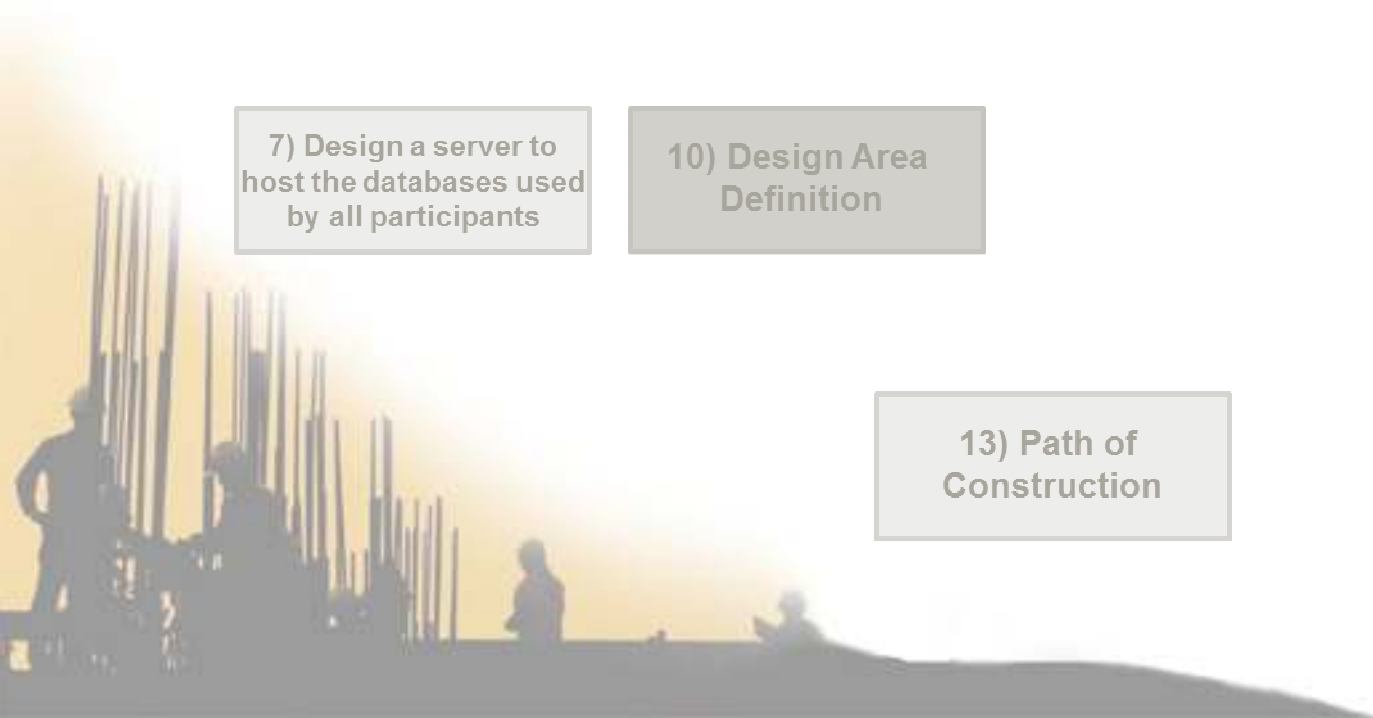
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# DBM: CONSTRUCTION CONTRACTOR

- Demonstrate high-level capacity to support WorkFace Planning
- WorkFace Planning Awareness for Trades People scheduled for delivery February 2011.
- Pre-beta sample available at this conference



# DBM: CONSTRUCTION CONTRACTOR

## *WorkFace Planning Awareness for Trades People:*

ASI ASCENSION  
systems inc.

**WorkFace Planning**

EXIT

AWARENESS FOR TRADES PEOPLE

Introduction - Course Overview



PROJECT AVAILABLE OTHER SKILLED  
SCOPE MATERIALS RESOURCES LABOR

Fourth, if and when specially-skilled tradespeople are needed on the project, they must be identified early and available when required. Examples include welders, electricians, pipefitters, boilermakers etc., with specialized tickets or training.

MENU GLOSSARY BACK <>> NEXT

01:09 / 04:17

OFF



# DBM: CONSTRUCTION CONTRACTOR

*WorkFace Planning Course Development Roadmap*





# ENGINEERING DESIGN SPECIFICATION: DEFINITION

*EDS defines all elements of project scope and is the control document for commencement of detailed engineering and procurement activities on the project. It is also used in scoping the development of the Authorization for Expenditure (AFE).*



# ENGINEERING DESIGN SPECIFICATION (EDS)

15) Project Summary  
Schedule (PSS) (level 2)

16) Review and  
Approve PSS

11) Ensure all  
databases are provided  
with the latest data

17) Define and Issue  
CWP Release Plan

20) Define and Issue  
EWP Release Plan by  
Design Area

21) Project Master  
Schedule (PMaS)  
(level 3)

18) Appoint Lead  
Planner; Commence  
WFP Process

17) Define and Issue  
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14) Review and  
integrate WFP processes  
and support functions

\* Proactively resolve  
conflicts between  
project participants



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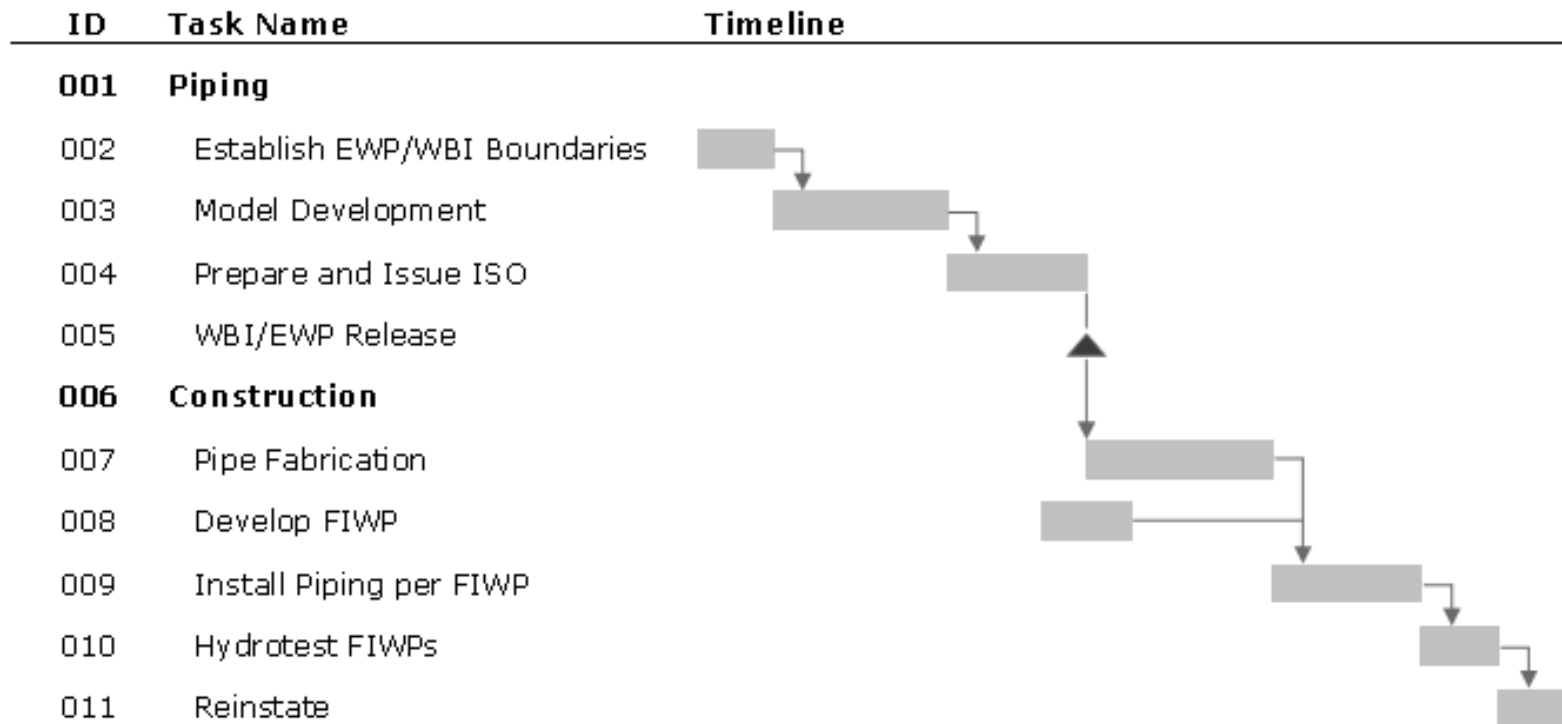
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# EDS: ENGINEERING

## Level 2 Schedule



## EWP Release Plan

Schedule Ref ID	Discipline Code	WBS Number	WBI Number	WBI Description	Engineering WBI Release Date	Materials WBI Release Date	Remarks
<b>511176 - Cooling Water Pumps &amp; Tankage</b>							
UTW1030	1	511176	511176100U	Underground Concrete CW	1-Jun-07		
UTW1040	1	511176	511176100N	Aboveground Concrete CW	29-Jun-07	Note >>	Embeds: 27-Jul-07
UTW1050	1	511176	511176100P	Paving CW	17-Sep-07		
UTW1580	2	511176	511176200N	Steel CW	13-Aug-07	24-Oct-07	Bracings
UTW1590	2	511176	511176200L	Miscellaneous Steel CW	3-Sep-07	2-Dec-07	
UTW1970	4	511176	511176400N	Equipment CW	2-Jul-07	Note >>	Materials release for install. per Eqp delivery sched.
<del>UTW2110</del>	<del>5</del>	<del>511176</del>	<del>511176500U</del>	<del>Underground Piping CW</del>	<del>17-May-07</del>		Replaced by WBI#5199995502U schedule Ref ID U
UTW2120	5	511176	511176500N	Aboveground Piping CW	6-Aug-07	Note >>	Release for fabrication per release curve
UTW2460	6	511176	511176600N	Electrical CW	30-Jul-07		
UTW2710	7	511176	511176700N	Instruments CW	26-Oct-07	Note >>	Field Instruments delivery: 01-Sep-07 to 30-Jun-08
<del>UTW2940</del>	<del>8</del>	<del>511176</del>	<del>511176800F</del>	<del>Fireproofing CW</del>	<del>3-Jul-07</del>		Deleted
UTW2950	8	511176	511176800N	Insulation CW	3-Jul-07		
<b>511177 - Cooling Water Plate &amp; Frame Exchangers</b>							
UTW1060	1	511177	511177100U	Underground Concrete EX	24-Apr-07		
UTW1070	1	511177	511177100N	Aboveground Concrete EX	30-Aug-07		Added
UTW1080	1	511177	511177100P	Paving EX	30-Aug-07		
UTW1600	2	511177	511177200N	Steel EX	13-Aug-07	29-Oct-07	Steel structure
UTW1610	2	511177	511177200L	Miscellaneous Steel EX	30-Aug-07	28-Nov-07	
UTW1980	4	511177	511177400N	Equipment EX	2-Jul-07	Note >>	Materials release for install. per Eqp delivery sched.
<del>UTW2140</del>	<del>5</del>	<del>511177</del>	<del>511177500U</del>	<del>Underground Piping EX</del>	<del>17-May-07</del>		Replaced by WBI#5199995502U schedule Ref ID U
UTW2150	5	511177	511177500N	Aboveground Piping EX	2-Aug-07	Note >>	Release for fabrication per release curve
UTW2470	6	511177	511177600N	Electrical EX	30-Jul-07		
UTW2720	7	511177	511177700N	Instruments EX	26-Oct-07	Note >>	Field Instruments delivery: 01-Sep-07 to 30-Jun-08
UTW2960	8	511177	511177800F	Fireproofing EX	3-Jul-07		
UTW2970	8	511177	511177800N	Insulation EX	3-Jul-07		

# DBM: ENGINEERING

## WBI/EWP Structure

- Activity code breaks down discipline code into different activities

Discipline Code	Model Type
0	Civil Works
1	Concrete
2	Structural Steel
3	Buildings
4	Equipment
5	Piping
6	Electrical
7	Control Systems

U	Underground
N	New construction, stick built above ground
P	Paving and Road.
L	Miscellaneous steel
T	Electrical Heat Tracing
F	Equipment Fireproofing

# EDS: ENGINEERING

## Level 3 Schedule

Activity ID	Activity Description	Orig Dur	Actual Dur	Rem Dur	Start	Finish	2006												2007												2008												2009			
							M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A		
<b>DESIGN</b>																																														
<b>Mechanical</b>																																														
VA10120	Issue Sized Equipment List - AFD	120	0	120	1-Jan-06	1-May-06	▼																																							
<b>Piping</b>																																														
VA10870	Dev 3D Piping Layout - Process Area	57	0	57	17-Apr-06	4-Jul-06	▼																																							
VA10900	Dev 3D Piping Model to 30% Reiew Pre VE	53	0	53	5-Jul-06	15-Sep-06	▼																																							
VA111010	Dev 3D Pip Model to 60% - DA151108 Compression	125	0	125	25-Sep-06	10-Nov-06	▼																																							
VA111012	Dev 3D Pip Model to 60% - DA151108 Compress VE	50	0	50	19-Mar-07	25-May-07	▼																																							
VA112005	Dev 3D Pip Model to 90% - DA151108 Compression	90	0	90	28-May-07	11-Oct-07	▼																																							
VAE2310	Issue Pipe Isos IFC - DA151108 Compression	40	0	40	19-Oct-07	29-Feb-08	▼																																							
VAW1870	Release WBI 151108500N - A/G Piping Compr	1	0	1	3-Mar-08	3-Mar-08	▼																																							
<b>CONSTRUCTION</b>																																														
<b>Piping</b>																																														
15C508500	Prefabricate Pipe Spools	90	0	90	31-May-08	17-Sep-08													▼																											
15C508502	Install A/G Pipe	132	0	132	12-Jul-08	28-Dec-08													▼																											
15C508504	Pipe Pressure Tests	45	0	45	18-Dec-08	8-Feb-09													▼																											
15C08505	Reinstatement	35	0	35	23-Feb-09	4-Apr-09													▼																											



# EDS: CONSTRUCTION MANAGEMENT TEAM

15) Project Summary  
Schedule (PSS) (level 2)

16) Review and  
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**11) Ensure all  
databases are provided  
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17) Define and Issue  
CWP Release Plan

20) Define and Issue  
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18) Appoint Lead  
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and support functions

**\* Proactively resolve  
conflicts between  
project participants**



# EDS: CONSTRUCTION MANAGEMENT TEAM

*Proactively resolve conflicts*





# EDS: CONSTRUCTION MANAGEMENT TEAM

**Review and integrate  
WFP processes and  
support functions**





# EDS: CONSTRUCTION MANAGEMENT TEAM

*Ensure all databases are up to date*



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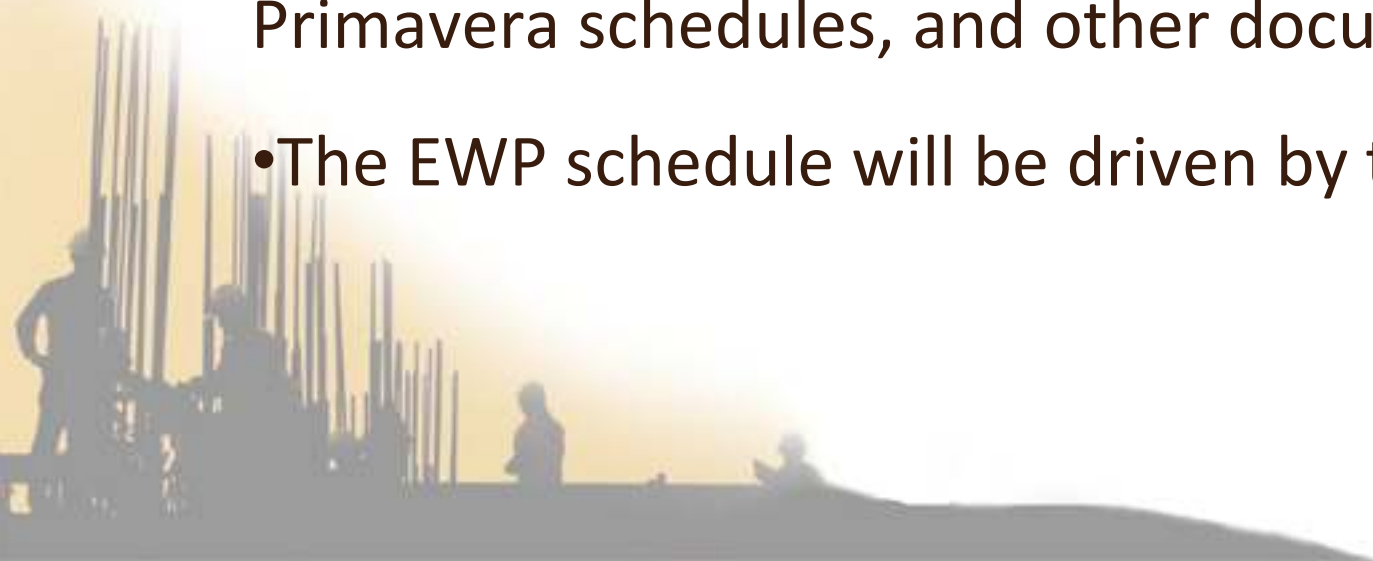
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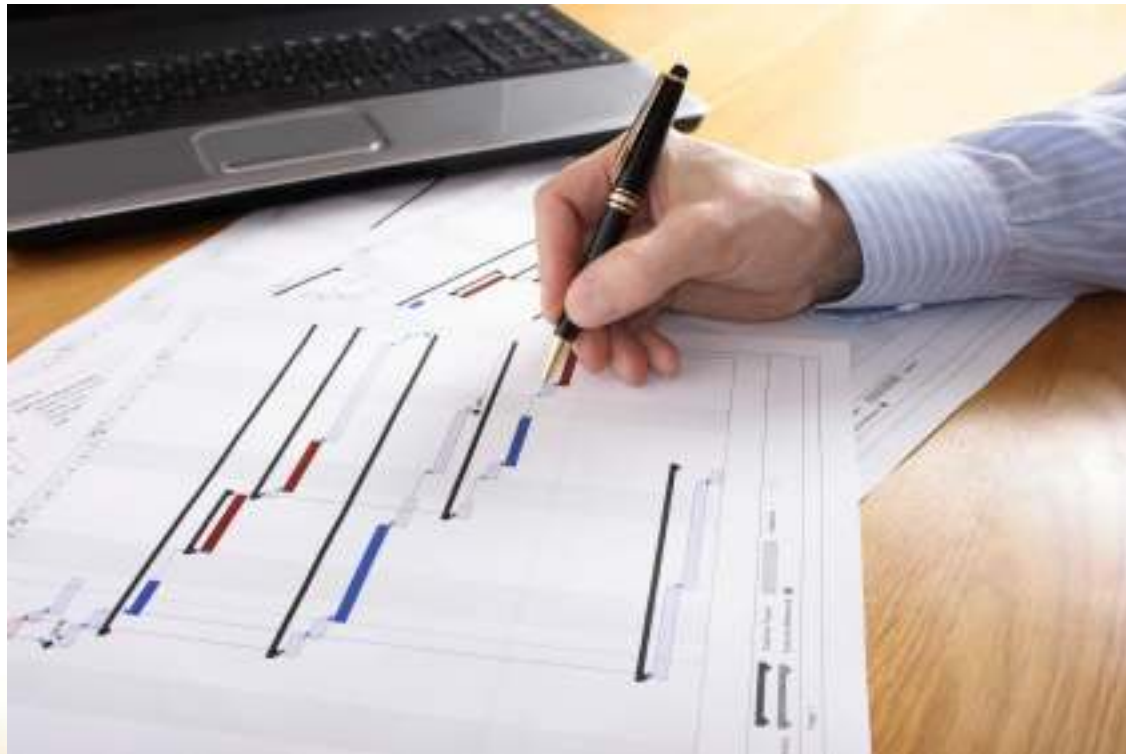
## Define and Issue CWP release plan

- Identify the size and description of all CWPs
- Determine when those CWPs will be developed and released
- These can be reported in Excel spreadsheets, Primavera schedules, and other documents
- The EWP schedule will be driven by the CWP schedule



# EDS: CONSTRUCTION

**Appoint lead planner and commence WFP process**





# EDS: CONSTRUCTION

## Define and Issue FIWP release plan

- Identify the size and description of all FIWPs
- Determine when those FIWPs will be developed and released
- These can be reported in Excel spreadsheets, Primavera schedules, and other documents
- FIWP development is driven by the CWPs



# DETAILED ENGINEERING

**22) Engineer develops  
and releases EWPs**

**23) Construction  
develops and  
releases CWPs**

**25) Review and  
approve  
PMaS**

**24) Detailed Area  
Schedule (level 4)**

**26) Break up CWP  
into Field Installation  
Work Packages (FIWP)**



# DETAILED ENGINEERING: CONSTRUCTION CONTRACTORS

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# DETAILED ENGINEERING: CONSTRUCTION CONTRACTORS

*Construction develops and delivers CWPs*

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# DETAILED ENGINEERING: CONSTRUCTION CONTRACTORS

## Detailed Level 4 Schedule

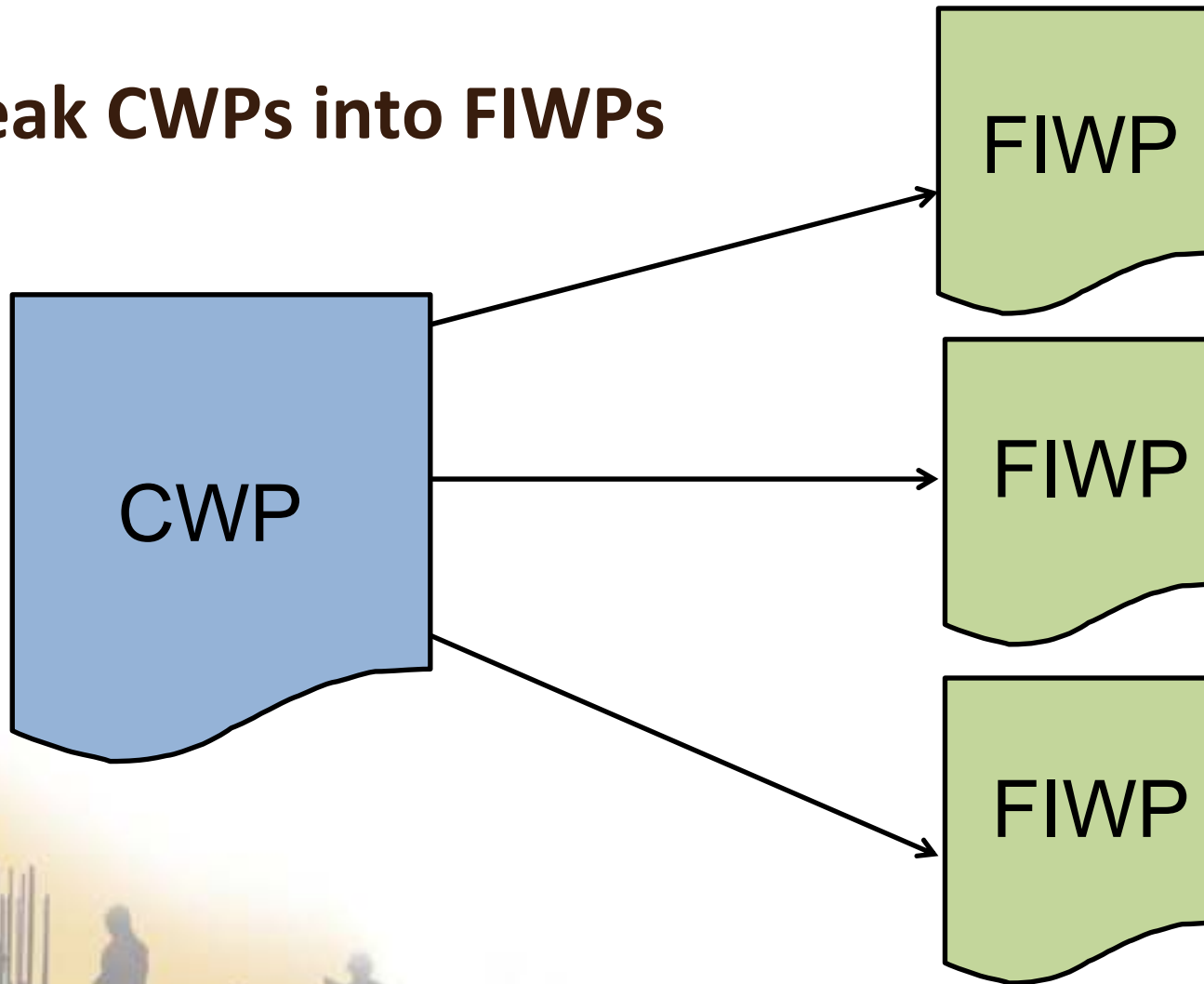
- This is a schedule of the release of the Field Installation Work Packages (FIWPs)
- These can be reported in Excel spreadsheets, Primavera schedules, and other documents



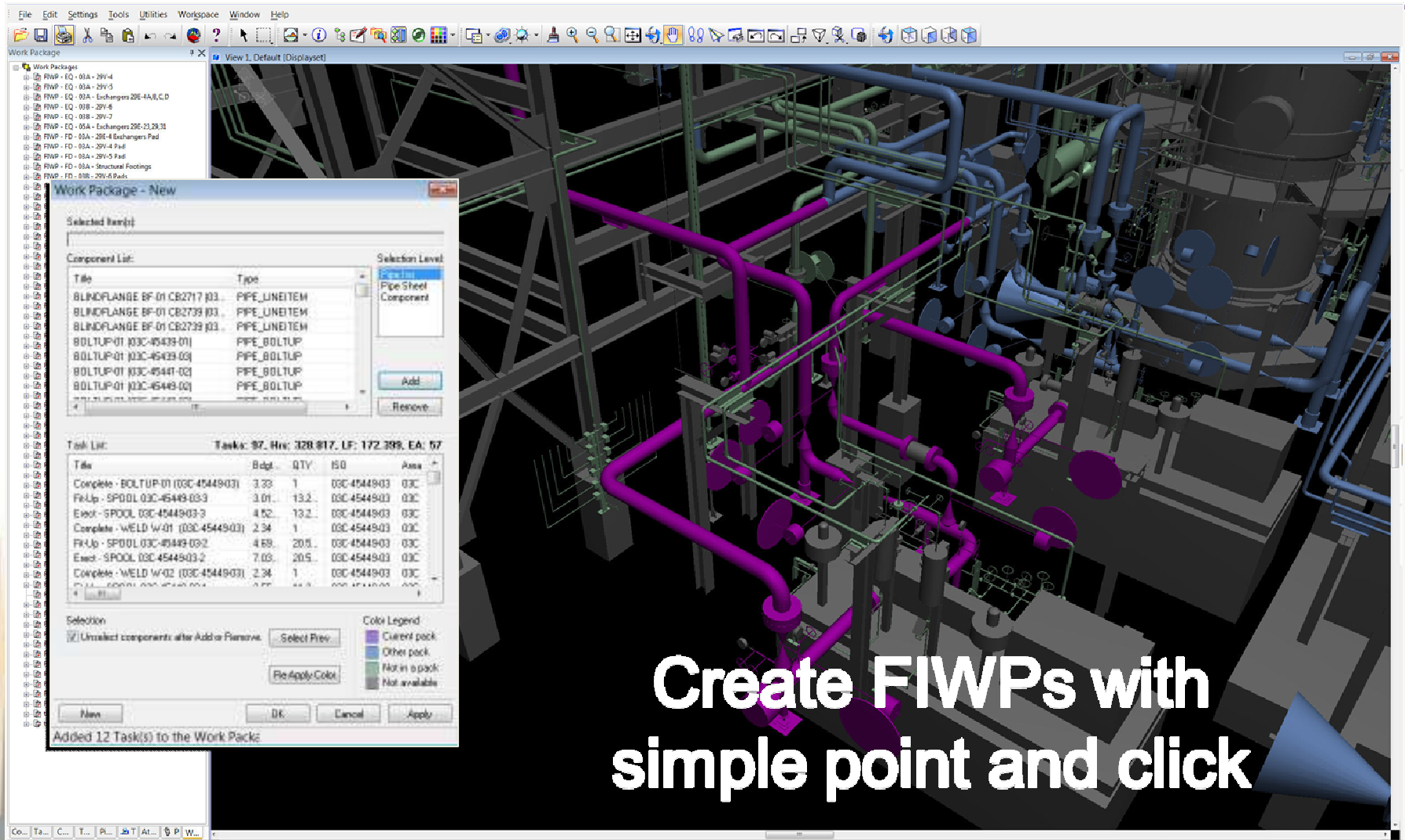


# DETAILED ENGINEERING: CONSTRUCTION

**Break CWP into FIWPs**



# DETAILED ENGINEERING: CONSTRUCTION



**Work Package - New**

Selected Item(s):

Component List:

Title	Type	Selection Level
BLINDFLANGE BF-01 CB2717 (03)	PIPE_UNITEM	Pipe/Flange
BLINDFLANGE BF-01 CB2739 (03)	PIPE_UNITEM	Pipe Sheet
BLINDFLANGE BF-01 CB2739 (03)	PIPE_UNITEM	Component
BOLTUP-01 (03C-45449-01)	PIPE_BOLTUP	
BOLTUP-01 (03C-45449-03)	PIPE_BOLTUP	
BOLTUP-01 (03C-45449-02)	PIPE_BOLTUP	
BOLTUP-01 (03C-45449-02)	PIPE_BOLTUP	

Task List:

Tasks: 97, Hrs: 328.917, LF: 172.396, EA: 57

Title	Qty	ISO	Area
Complete - BOLTUP-01 (03C-45449-03)	3.33	1	03C-45449-03 03C
Fit-Up - SPOOL 03C-45449-03-3	3.01	13.2	03C-45449-03 03C
Erect - SPOOL 03C-45449-03-3	4.52	13.2	03C-45449-03 03C
Complete - WELD W-01 (03C-45449-03)	2.34	1	03C-45449-03 03C
Fit-Up - SPOOL 03C-45449-03-2	4.69	20.5	03C-45449-03 03C
Erect - SPOOL 03C-45449-03-2	7.03	20.5	03C-45449-03 03C
Complete - WELD W-02 (03C-45449-03)	2.34	1	03C-45449-03 03C

Selection:  Unselect components after Add or Remove.

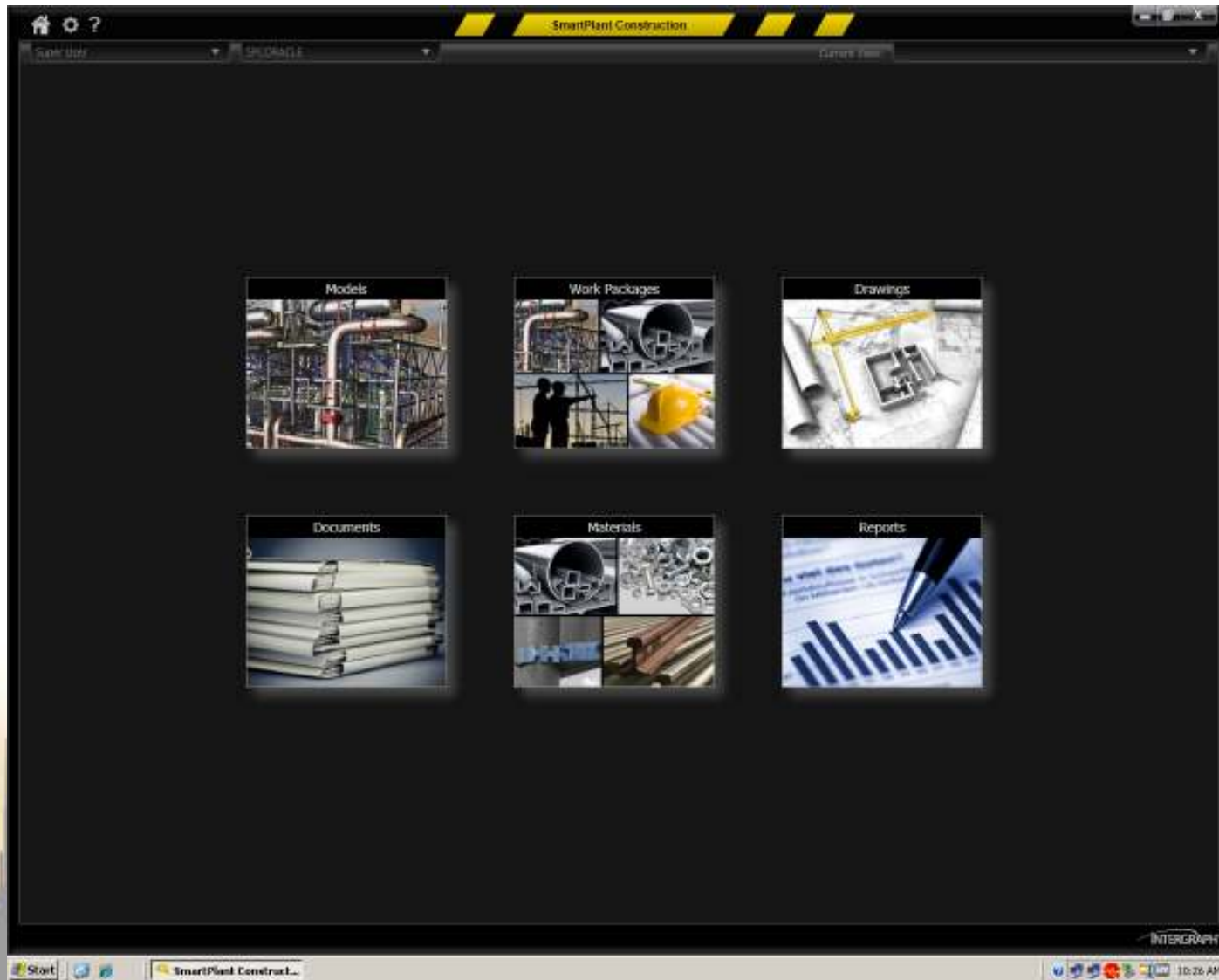
Color Legend:

- Current pack
- Other pack
- Fit in a pack
- Not available

Added 12 Task(s) to the Work Packs

**Create FIWPs with simple point and click**

# DETAILED ENGINEERING: CONSTRUCTION



# DETAILED ENGINEERING: ENGINEERING

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into Field Installation  
Work Packages (FIWP)





# DETAILED ENGINEERING: ENGINEERING

WBI RELEASE FORM		
WBI	512350100U	
WBI TITLE	North South Pipe Rack Foundations	
REV	0	
DATE PREPARED:	27-Mar-07	
UPDATED:		
PREPARED BY	Roopendra Singh	
Construction is informed that Engineering is complete in this WBI and the WBI is released for construction with the drawings listed below.		
DOCUMENT NUMBER	REV	TITLE
<b>Engineering Documents</b>		
51-SR-23-CSF-017	0	UTILITIES-512350 - NORTH_SOUTH PIPERACK - FOUNDATION DETAILS
51-SR-23-CSF-016	0	UTILITIES - 512350 - NORTH-SOUTH PIPERACK - FOUNDATION DETAILS
51-SR-23-CSF-015	0	UTILITIES-512350 - NORTH_SOUTH PIPERACK - FOUNDATION DETAILS
51-SR-23-CSF-014	0	UTILITIES-512350 - NORTH_SOUTH PIPERACK - FOUNDATION DETAILS
51-SR-23-CSF-013	0	UTILITIES-512350 - NORTH_SOUTH PIPERACK - FOUNDATION DETAILS
51-SR-23-CSF-012	0	UTILITIES-512350 - NORTH_SOUTH PIPERACK - FOUNDATION DETAILS
51-SR-23-CSF-009	0	UTILITIES-512350 - NORTH_SOUTH PIPERACK - FOUNDATION LOCATION PLAN
51-SR-23-CSF-008	0	UTILITIES-512350 - NORTH_SOUTH PIPERACK - FOUNDATION LOCATION PLAN
51-SR-23-CSF-007	0	UTILITIES-512350 - NORTH_SOUTH PIPERACK - FOUNDATION LOCATION PLAN
51-SR-23-CSF-006	0	UTILITIES-512350 - NORTH_SOUTH PIPERACK - FOUNDATION LOCATION PLAN
51-SR-23-CSF-005	0	UTILITIES-512350 - NORTH_SOUTH PIPERACK - FOUNDATION LOCATION PLAN
51-SR-23-CSF-004	0	UTILITIES-512350 - NORTH_SOUTH PIPERACK - FOUNDATION LOCATION PLAN
51-SR-23-CSF-003	0	UTILITIES-512350 - NORTH_SOUTH PIPERACK - FOUNDATION LOCATION PLAN
51-SR-23-CSF-002	0	UTILITIES-512350 - NORTH_SOUTH PIPERACK - FOUNDATION LOCATION PLAN
51-SR-23-CSF-001	0	UTILITIES-512350 - NORTH_SOUTH PIPERACK - FOUNDATION LOCATION PLAN
<b>Vendor Drawings</b>		

# CONSTRUCTION PHASE

31) Review and  
update Engineering

30) Issue Request  
for Information

37) Document the  
lessons learned

29) Need for  
extra information?

34) Identify  
“Work to Go” items

36) Approve results  
and initiate lessons-  
learned meeting

27) Implement and  
release FIWP (Dynamic  
Planning) (level 5)

28) Execute FIWP

32) Conduct Q/C  
verification

33) FIWP  
completed?

35) Deliver FIWP and  
present results



# CONSTRUCTION PHASE: CONSTRUCTION CONTRACTOR

31) Review and  
update Engineering

30) Issue Request  
for Information

37) Document the  
lessons learned

29) Need for  
extra information?

34) Identify  
“Work to Go” items

36) Approve results  
and initiate lessons-  
learned meeting

27) Implement and  
release FIWP (Dynamic  
Planning) (level 5)

28) Execute FIWP

32) Conduct Q/C  
verification

33) FIWP  
completed?

35) Deliver FIWP and  
present results

# CONSTRUCTION PHASE: CONSTRUCTION CONTRACTOR

## *Implement and Release FIWP*

### Table of Contents

1. Constraints
2. Scope
3. Safety
4. QA/QC
5. Trade Coordination
6. Material Take Off
7. Scaffold Request
8. Equipment Request
9. FIWP Lookahead
10. Timesheets
11. Model Shots and Isos



# CONSTRUCTION PHASE: CONSTRUCTION CONTRACTOR

*Execute FIWP*



*One of our silver-level sponsors - Phoenix Industrial - has incorporated their maintenance experience into the Phoenix WorkFace Planning approach.*





# CONSTRUCTION PHASE: CONSTRUCTION CONTRACTOR

*Progress project*





# CONSTRUCTION PHASE: CONSTRUCTION CONTRACTOR

*What if execution doesn't go according to plan?*

**RISK  
EVENTS**

**'PLAN B'**

**BACKLOG**



# CONSTRUCTION PHASE: OWNER

31) Review and  
update Engineering

30) Issue Request  
for Information

37) Document the  
lessons learned

29) Need for  
extra information?

34) Identify  
“Work to Go” items

**36) Approve results  
and initiate lessons-  
learned meeting**

27) Implement and  
release FIWP (Dynamic  
Planning) (level 5)

28) Execute FIWP

32) Conduct Q/C  
verification

33) FIWP  
completed?

35) Deliver FIWP and  
present results

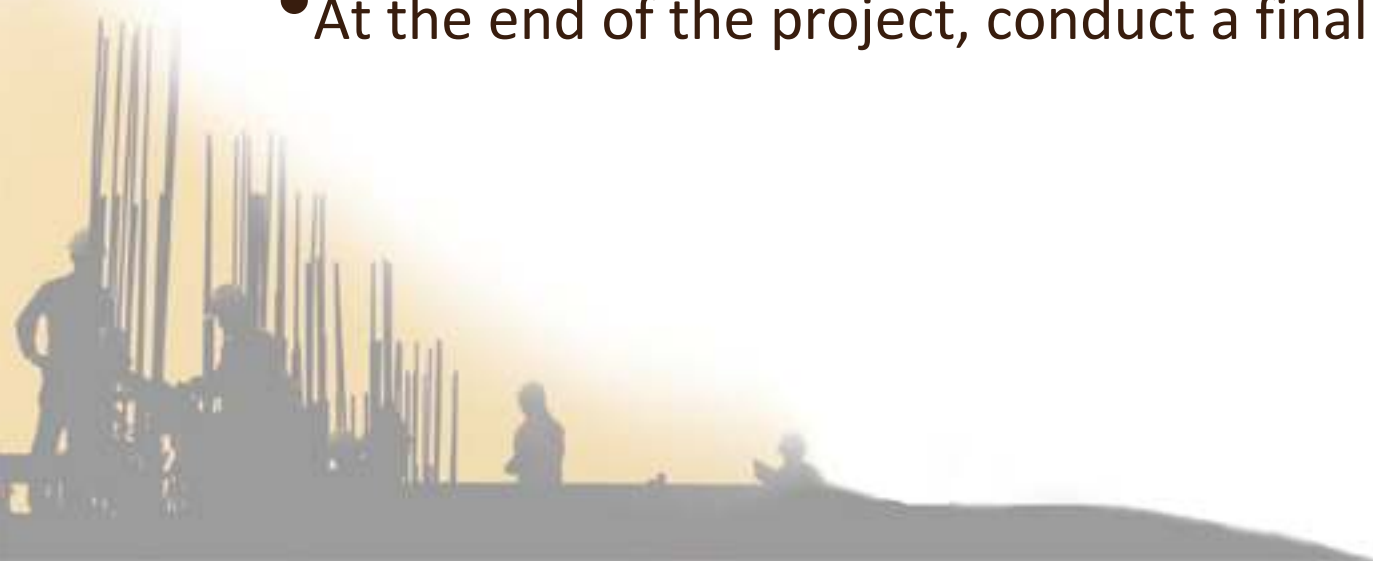




# CONSTRUCTION PHASE: OWNER

## WorkFace Planning Lessons Learned:

- Conduct Lessons Learned at the end of each phase of the project
- Do 'temperature checks' during each phase
- At the end of the project, conduct a final Lessons Learned.





# WORKFACE PLANNING EXCELLENCE

**Two of our sponsors have been recognized by COAA, winning awards for their excellence and leadership in WorkFace Planning.**



**JACOBS™**





# WORKFACE PLANNING

FROM CONCEPT TO COMMISSIONING



# AUDIENCE FEEDBACK

**NOTE: The information collected is anonymous and may be used for research purposes. By participating, you are giving your consent for the use of this data.**



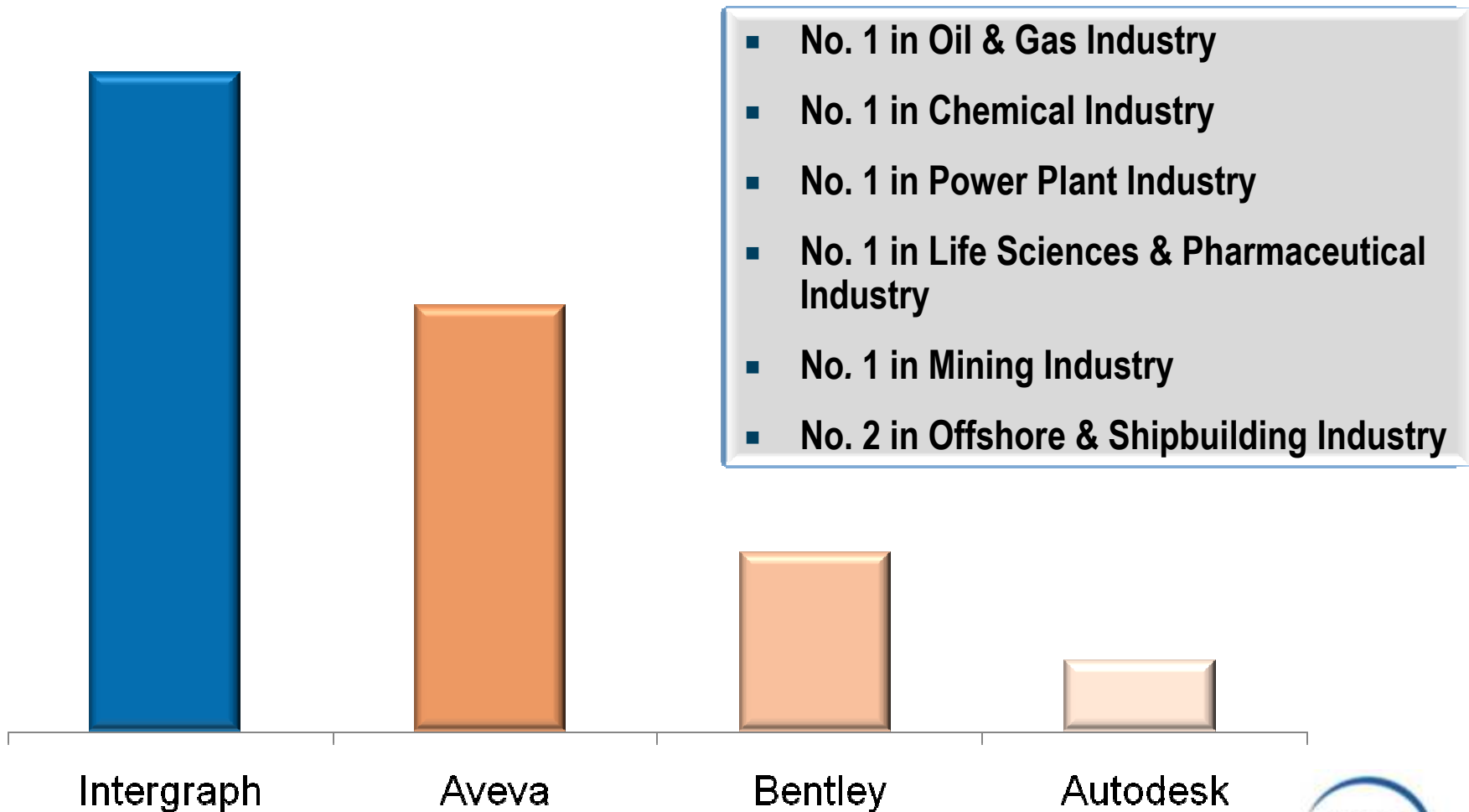


# Technical Panel List Intergraph PP&M SmartPlant Construction

**Michael Buss**  
**Vice President Materials & Construction**



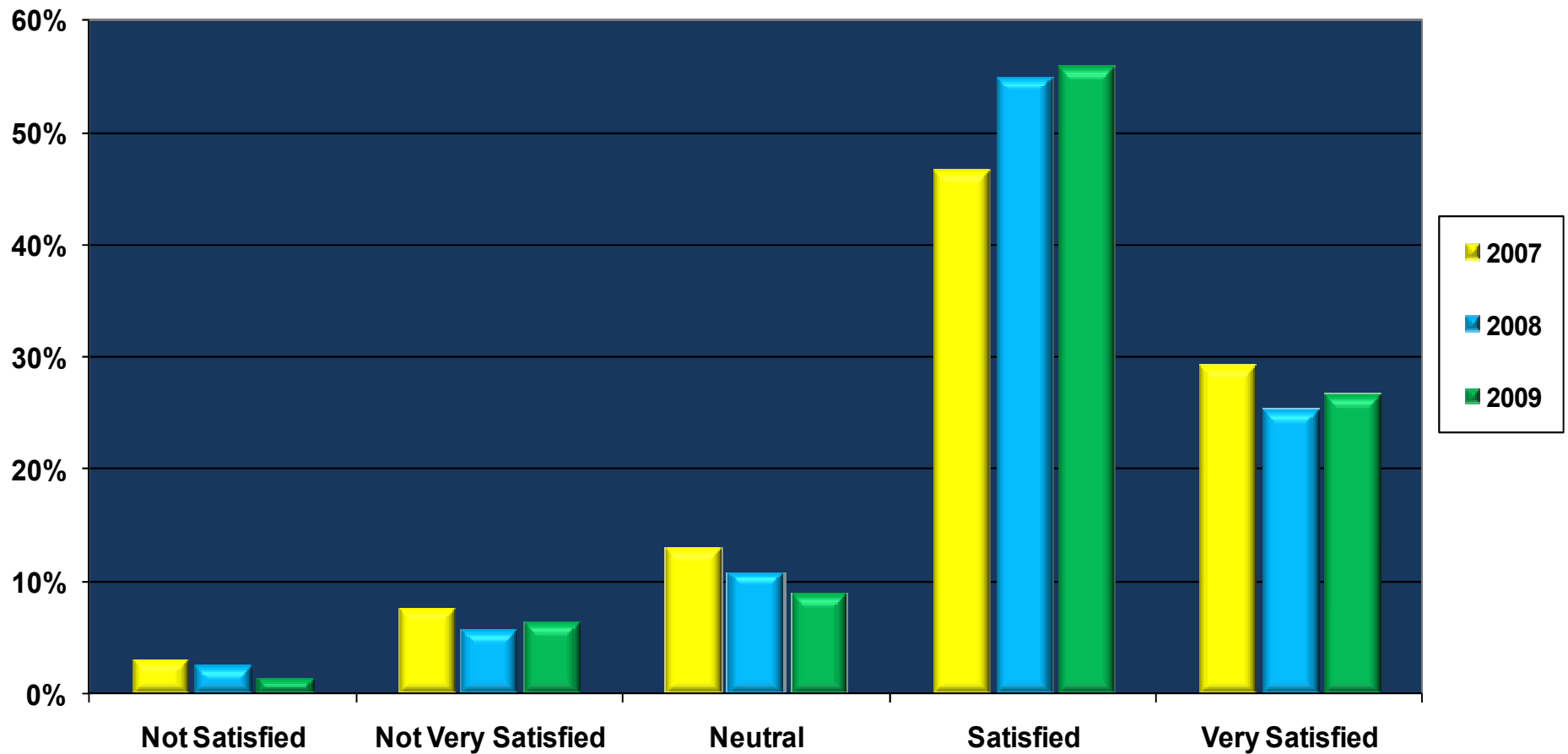
Intergraph PP&M: No. 1 or No. 2 in the industries we serve\*





## PP&M Customer Satisfaction

- 2009: Satisfied + Very Satisfied = 83%
- 2008: Satisfied + Very Satisfied = 80%
- 2007: Satisfied + Very Satisfied = 76%



## PP&M: Newest Solution Portfolio in the Industry

---

- Many competitive solutions are going back to the 80ies.
- Most PP&M solutions are newer than 10 years.



**In technology, Time matters!**



SmartPlant Construction

Super User | SPCORACLE | Current View:

MadisonAllAreas-1-0001

Toolbox

Applied Filters (0)

MadisonAllAreas-1-0001 (4570)

Components (0)

Available Filters

- Disciplines
  - Connectivity
  - Dimensional & Geometrical
  - Distributive System
  - Drawing Feature
  - Electrical
  - Equipment
  - Equipment Component
  - Hangers & Supports
  - HVAC
  - Inline-Instruments
  - Manufacturing Fabrication Construction
  - Piping
  - Piping Component
  - Port
  - Structure
- Drawings
- External Data
- Materials
- Packages
- Package Status
- Saved
- Saved Queries
- Spools

Work Packages

10 items | Name | My Packages

21 days | 11/29/2010 | 12/20/2010

Name	Created	Due	Details
New Work Package			
Concrete 4	11/29/2010		<a href="#">Click for details</a>
Equipment	12/06/2010		<a href="#">Click for details</a>
Equipment0903	12/06/2010		<a href="#">Click for details</a>
HVAC	12/13/2010		<a href="#">Click for details</a>
Piping 2	12/06/2010		<a href="#">Click for details</a>
Piping567	12/06/2010		<a href="#">Click for details</a>
Str			<a href="#">Click</a>

Super User

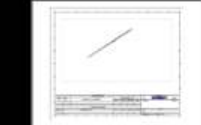
SPCORACLE

Current View: S-174

Drawings

55 items

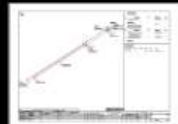
Name



CableTray-U01-CW002-ET-0...



CableTrayU01-CW002-ET-00...



CWR-010



CWR-013



CWS-001



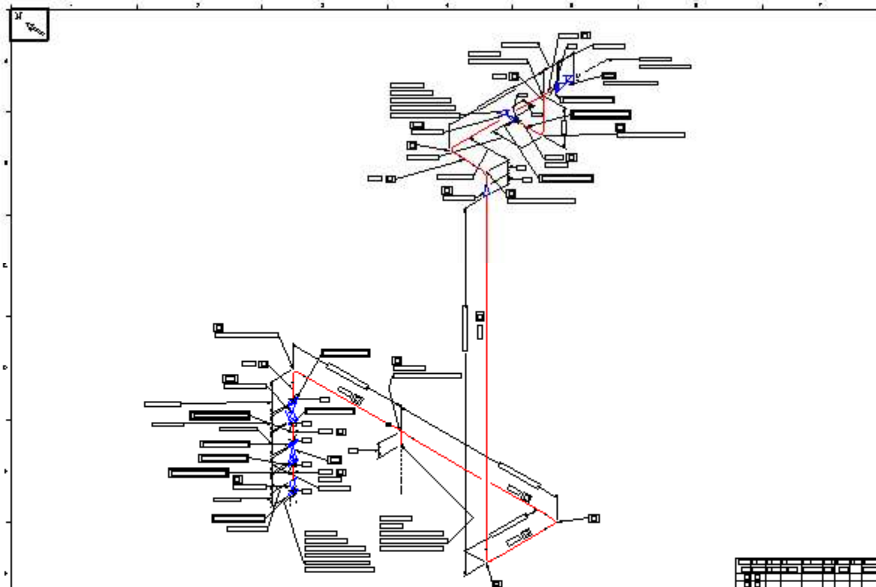
Distillation Unit0000-Undefin...

S-174

Toolbox

Applied Filters (0)

Components (0)

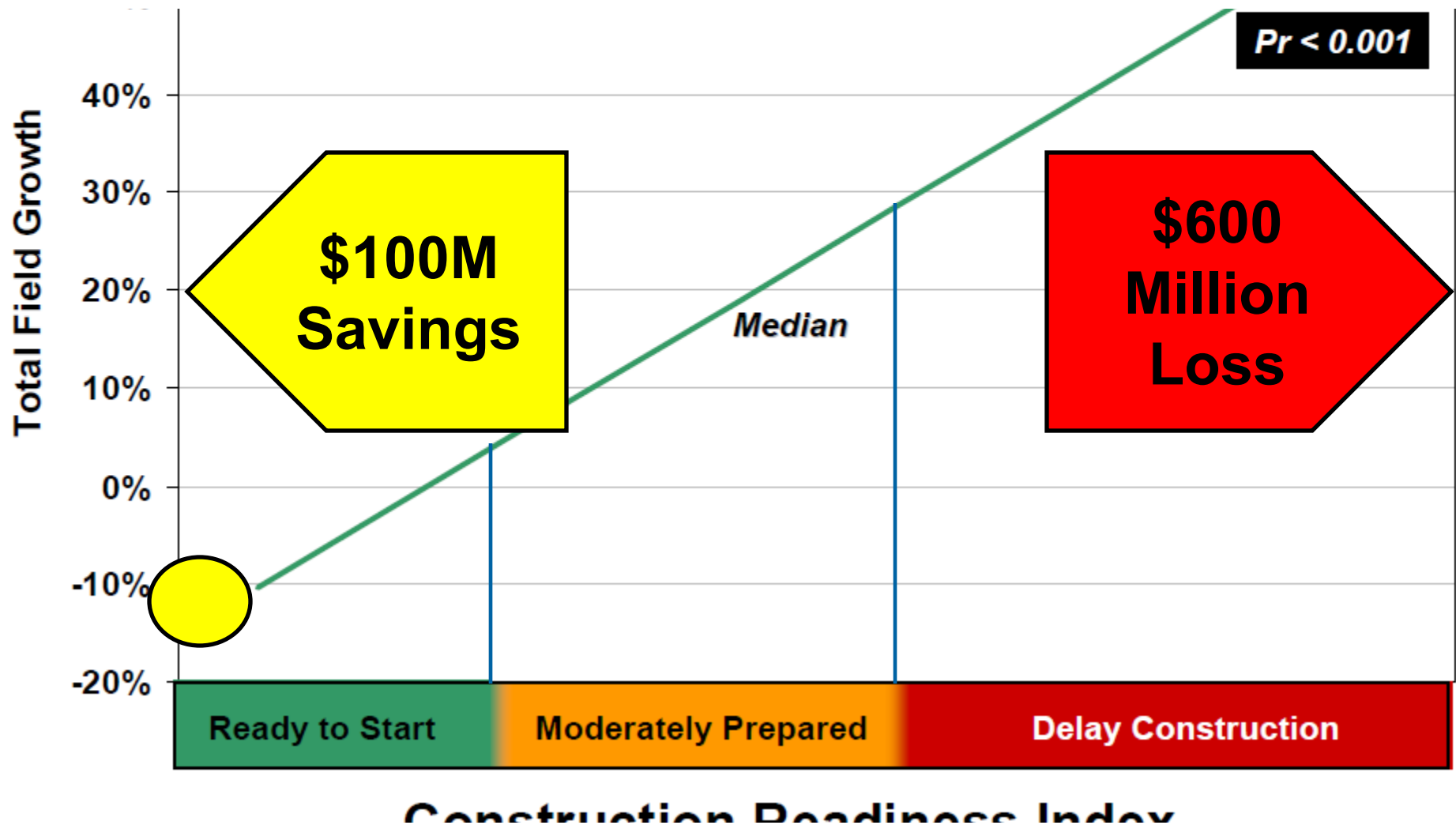
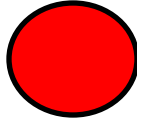


NO	DESCRIPTION	QTY	UNIT	STATUS	DATE
1	...	...	...	...	...
2	...	...	...	...	...
3	...	...	...	...	...
4	...	...	...	...	...
5	...	...	...	...	...
6	...	...	...	...	...
7	...	...	...	...	...
8	...	...	...	...	...
9	...	...	...	...	...
10	...	...	...	...	...
11	...	...	...	...	...
12	...	...	...	...	...
13	...	...	...	...	...
14	...	...	...	...	...
15	...	...	...	...	...
16	...	...	...	...	...
17	...	...	...	...	...
18	...	...	...	...	...
19	...	...	...	...	...
20	...	...	...	...	...
21	...	...	...	...	...
22	...	...	...	...	...
23	...	...	...	...	...
24	...	...	...	...	...
25	...	...	...	...	...
26	...	...	...	...	...
27	...	...	...	...	...
28	...	...	...	...	...
29	...	...	...	...	...
30	...	...	...	...	...
31	...	...	...	...	...
32	...	...	...	...	...
33	...	...	...	...	...
34	...	...	...	...	...
35	...	...	...	...	...
36	...	...	...	...	...
37	...	...	...	...	...
38	...	...	...	...	...
39	...	...	...	...	...
40	...	...	...	...	...
41	...	...	...	...	...
42	...	...	...	...	...
43	...	...	...	...	...
44	...	...	...	...	...
45	...	...	...	...	...
46	...	...	...	...	...
47	...	...	...	...	...
48	...	...	...	...	...
49	...	...	...	...	...
50	...	...	...	...	...
51	...	...	...	...	...
52	...	...	...	...	...
53	...	...	...	...	...
54	...	...	...	...	...
55	...	...	...	...	...

Work Packages

Work Packages

# Construction Readiness (Constraints) Impact to Growth & Cost Based on a \$1 Billion Project (Statistics from IPA based on 12,000 Projects)



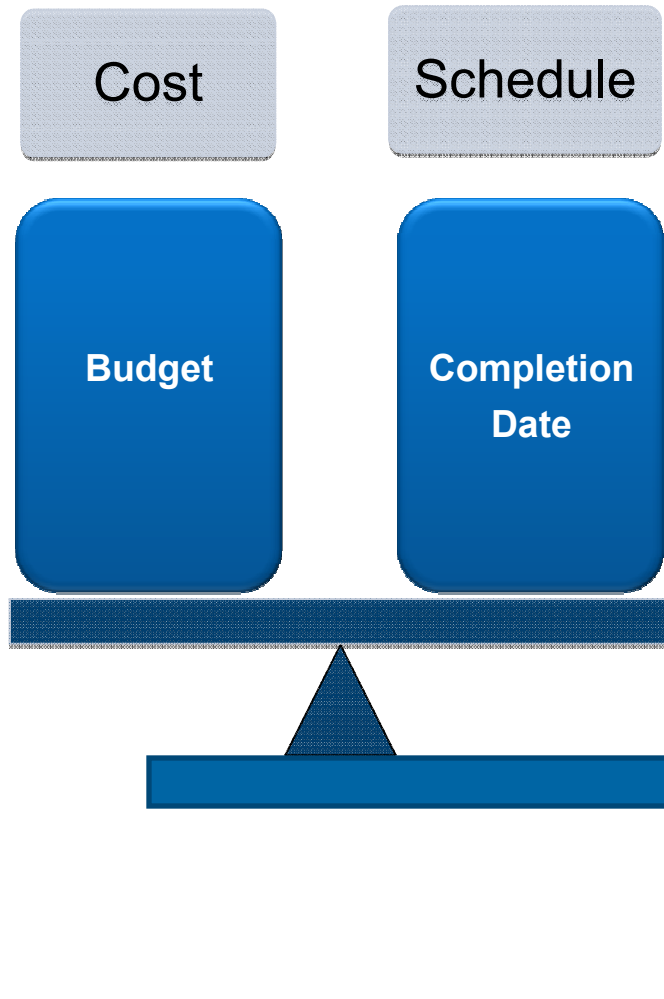
## Intergraph Survey during a Construction Webinar



Do you agree with the business value a construction solution would deliver?	US & Europe	Asia Pacific
Yes	89%	90%
No	0%	0%
Unclear	11%	10%



# Important to have Balanced Plan



Do you think SmartPlant Construction can deliver business value geared to improve your construction?	US & Europe	Asia Pacific
Yes	76%	80%
No	4%	0%
Unclear	20%	20%

# Work Planning Hierarchy



**Plant** → Nuclear Plant

**1.** → Containment Area

**1.1** → Containment Structure

**1.1.1** → Steel Liner

**1.1.2** → Dome

**1.1.2.1** → Set Dome

→ [Screenshot of Intergraph software interface showing work package details]

Field	Value
Work Package Number	8899990202.8
Description	8899990202.8
CWP Number	1.1.2.1 - RING CAP
EWP Number	TWO-400
Contractor	100-2348 - CH2M HILL
Discipline	NP&O
Purpose	Installation
Design Area	W&A
Status	Performance



# Work Planning Hierarchy



**Plant** → Nuclear Plant

**1.** → Containment Area

**1.1** → Containment Structure

**1.1.1** → Steel Liner

**1.1.2** → Base Mat

**1.1.2.1** → Formwork

**1.1.2.2** → Pour Concrete

Field	Value
Work Package Number	8809402028
Description	8809402028
EWI Number	1.1.2 - Pouring
EWI Number	TWO-800
Contractor	880-23456 - Contractor X
Discipline	Field
Purpose	Installation
Design Area	88024
Status	Performance

# Field Pipe Welding of Spool in Turbine Room



Plant

Nuclear Plant

1.

Turbine Room

1.1

Steam Piping

1.1.1

Spool S-175

1.1.2

Spool S-174

1.1.2.1

Heliarc Root Pass

Field Pipe Welding

Work Package Number: Field Pipe Welding

Description: L1.2 - 51029-Piping/valves

CWP Number:

EWP Number:

Contractor:

Discipline: Piping

Purpose: Welding

Design Area:

Status: Preliminary

Create Work Package for Field Welding



# Field Pipe Welding Work Package



SmartPlant Construction

Super User | SPCORACLE | Current View: Field P

Field Pipe Welding

- Information
- Schedule
- Drawings**
- Components
- Materials
- Files
- Snapshots
- Reports

Work Package Number: Field Pipe Welding

Description: [Empty]

CWP Number: 1.2.2 - S1029-PipingSystems

EWP Number: [Empty]

Contractor: [Empty]

Discipline: Piping

Purpose: Testing

Design Area: [Empty]

Status: Preliminary

SEE ISO NOT FOUND  
S-9868'6.3/8"  
N-7801'8.9/16"  
EL +245'4.1/16"

STEM UP

10.3/8"

2'3.1/2"

8X6"NPD

6"

EL +246'5.1/16"

9.15/16"

FW

10.1/2"

8X ISO S-174 DBB-1

STEM U +20 N

F16 G13 B15

S-174 SPOOL

13"

EL +245'4.1/16"

<10> 3

2"NPD

F11 G14 B17

<8> 2

Work Packages



# Break WP Components into Work Steps



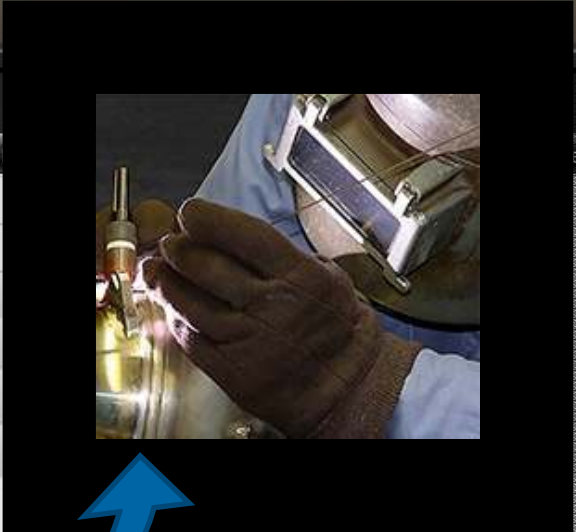
SmartPlant Construction

Super User | SPCORACLE | Current View:

Field Pipe Welding

Information | Schedule | Drawings | **Components** | Reports

Description	Size	Rate	Man	Complete
03-MS-1002				<input type="checkbox"/>
▶ Pipe	46 m			
▶ Flange-3321, Flange				
▶ Flange-3322, Flange				
▶ Assy_SH_CL_4-1-101				
03-MS-1002, Field weld at job site, including...				<input type="checkbox"/>
▶ Helarc Root Pass				<input checked="" type="checkbox"/>
▶ Back guage weld			1	<input checked="" type="checkbox"/>
▶ Weld 1st pass			2	<input checked="" type="checkbox"/>
▶ Weld 2nd pass			2	<input type="checkbox"/>
▶ Weld 3rd pass			2	<input type="checkbox"/>
▶ X-ray weld			1	<input type="checkbox"/>
▶ Add step				
S-174				



A blue arrow points from the 'Helarc Root Pass' step in the table to the inset image of a welder.

# World Wide: What some our partners say about Intergraph's approach to Construction Management

---



- **Technip (Europe)**

- “SmartPlant Construction opens the door to new possibilities in project execution on *any scale*”

- **URS Washington Group (USA)**

- “SmartPlant Enterprise’s cutting-edge attributes will *make us more efficient and add value* to our customer’s projects”

- **CTCI Corp (China)**

- “This application has the potential to introduce a step change in the way we do business and *lead to improvements in our projects*”

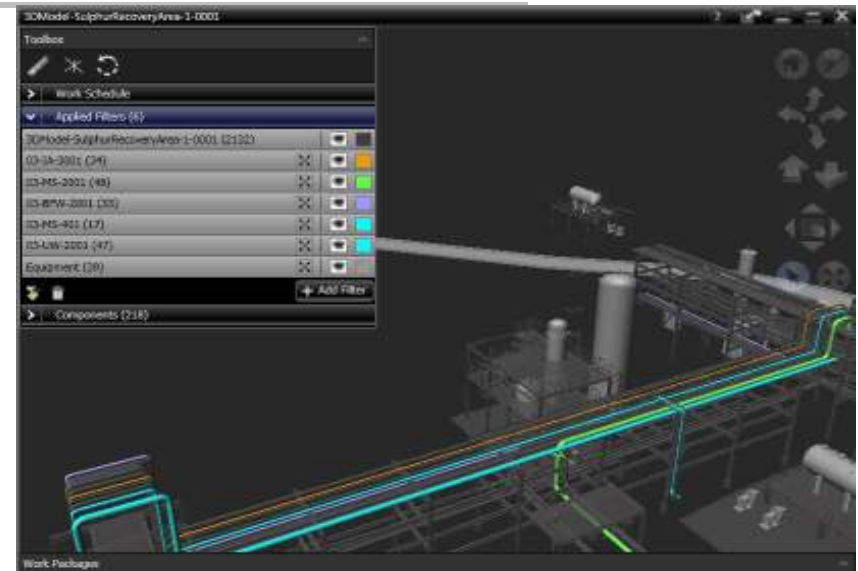
- **QUIP (Brazil)**

- “The success we have had with Intergraph solutions makes our decision to implement SmartPlant Construction a natural progression toward further increasing our productivity and enabling us to better plan and manage our projects”

*The power of Intergraph working with partners to succeed !*

# Summary

- **User Friendly**
- **Easy to administer**
- **Real time link to Engineering, Procurement & Schedule**
  - Refresh by a press of a button
- **Easy to deploy**
- **Broader solution then just WFP**





Global Capabilities.....



....to support Homogeneous and Heterogeneous environments



# English Environment



sb-1-eng

Information **Schedule** Drawings Components Materials

Planned Start Date: 11/14/2009  Planned Finish Date: 11/29/2009   
Actual Start Date:   Actual Finish Date:    
Estimated Man-Hours:

CWP schedule breakdown

Pkg Number	Description	Planned Start	Planned Finish
CWP 1.8.5	U03-PipingSystems	10/07/2008	05/30/2009
dd-test1			
sb_йфя	йфя Piping Field Installation	11/14/2009	11/29/2009
<b>sb-1-eng</b>	<b>Piping Field Installation</b>	<b>11/14/2009</b>	<b>11/29/2009</b>



# Chinese Environment



sb\_1大

信息 日程安排 图 组件 材料

计划的开始日期 2009-11-14 计划的完成日期 2009-11-29

实际的开始日期 实际的完成日期

估计的工时 1000.5

CWP 计划分解

Pkg 号	描述	计划的开始日期	计划的完成日期
CWP 1.8.5	U03-PipingSystems	2008-10-07	2009-05-30
dd-test1			
sb_йфя	йфя Piping Field Installation	2009-11-14	2009-11-29
sb_1大	大管 Piping Field Installation	2009-11-14	2009-11-29

# Russian Environment



sb\_йфя

Информация **Планировать** Чертежи Компоненты Материалы

Запланированная дата начала 14.11.2009 15 Запланированная Дата окончания 29.11

Дата начала (фактическая) . . . . 15 Дата окончания (фактическая) . . . .

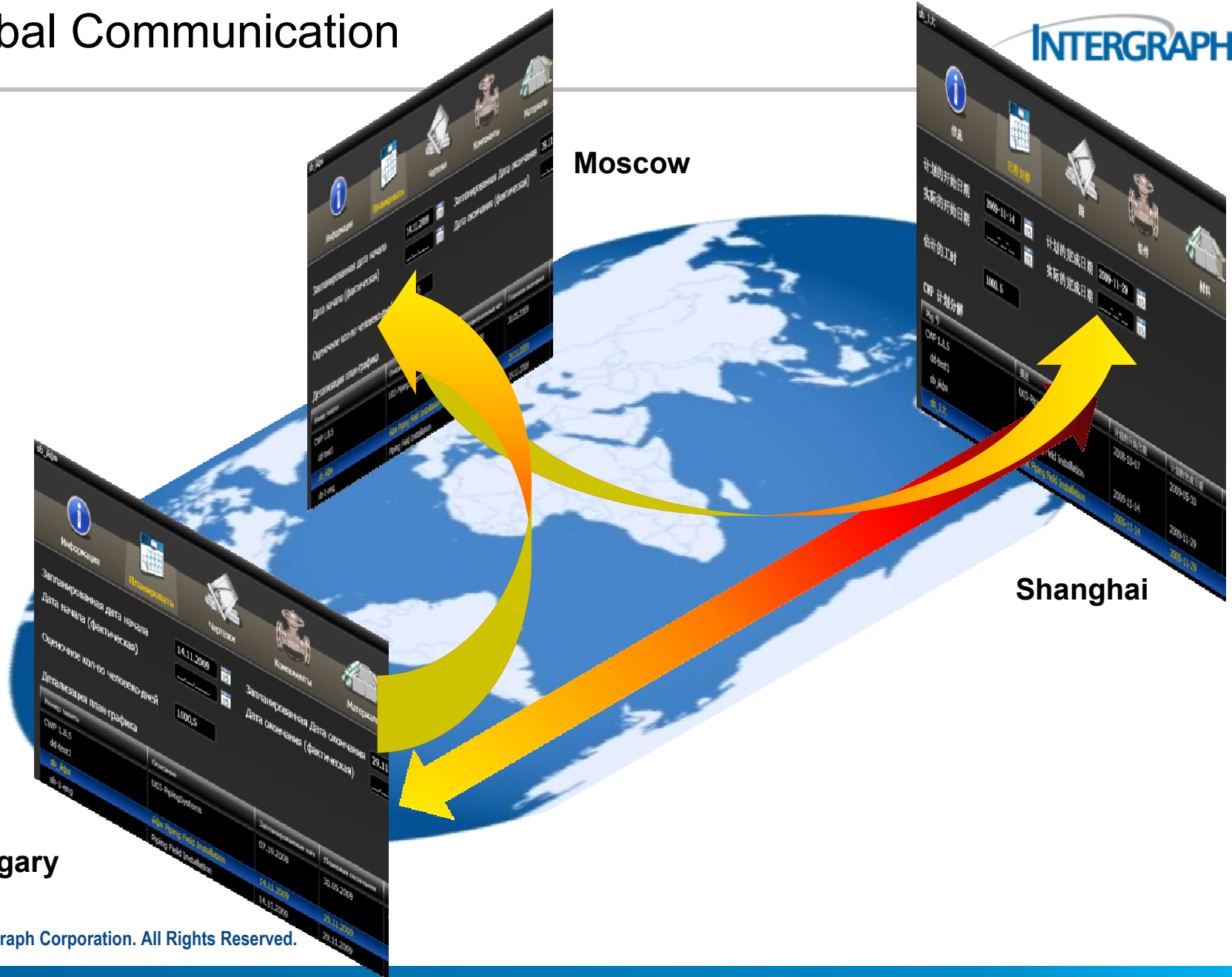
Оценочное кол-во человеко-дней 1000,5

Детализация план-графика

Номер пакета	Описание	Запланированные нач	Плановая окончания
CWP 1.8.5 dd-test1	U03-PipingSystems	07.10.2008	30.05.2009
<b>sb_йфя</b>	<b>йфя Piping Field Installation</b>	<b>14.11.2009</b>	<b>29.11.2009</b>
sb-1-eng	Piping Field Installation	14.11.2009	29.11.2009

# Global Communication

INTERGRAPH®





# **Making Good Projects Great**

**“More Business Value for Our Money”**

**Jim Porter  
DuPont VP Engineering and Operations (Retired)  
Workface Planning Conference  
Calgary, Alberta  
December 1, 2010**



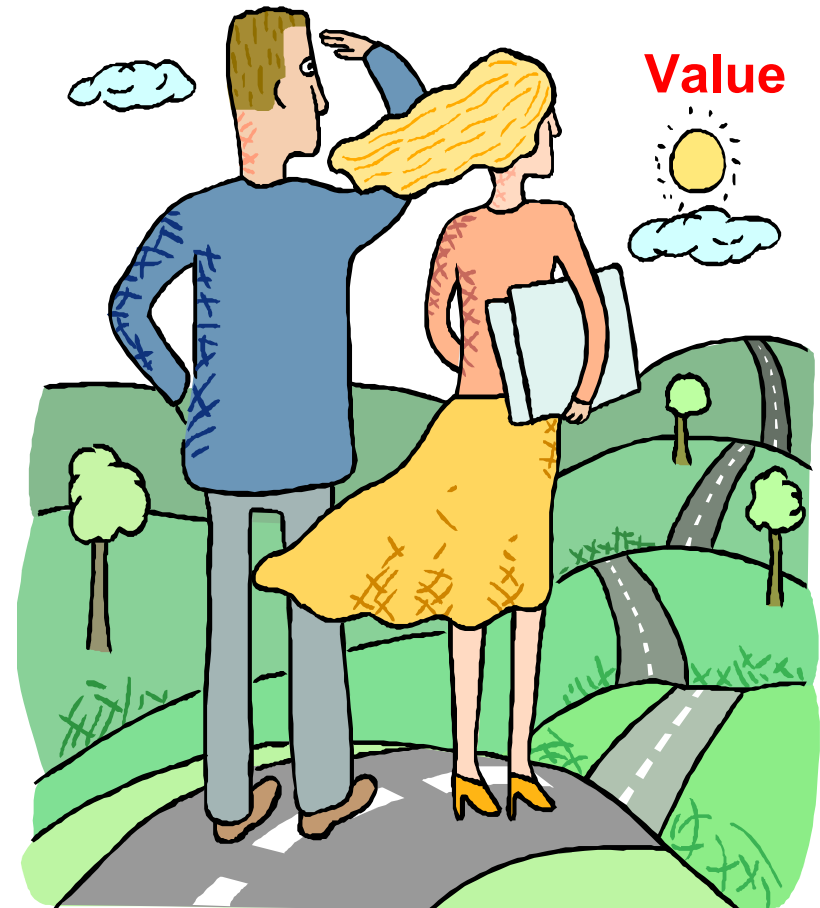
# Safety Contact – Cell Phones & Driving





# My Beliefs...

1. Construction Industry is critical to future **business success**.
2. Construction Industry must help owners understand how to capture **business value**.
3. Owners must operate in ways that ensure Construction Industry **effectiveness and sustainability**.





# Business Value

$$\text{ROIC} = \frac{\text{Net Income} - \text{Dividends}}{\text{Total Capital}}$$



**ROIC**

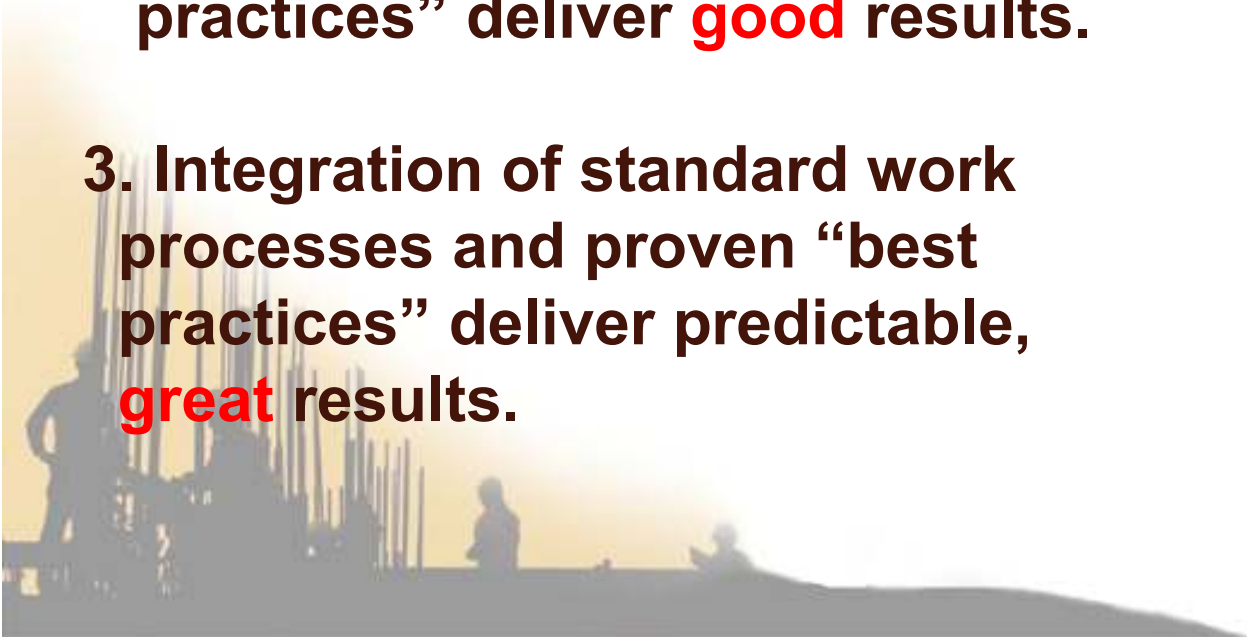
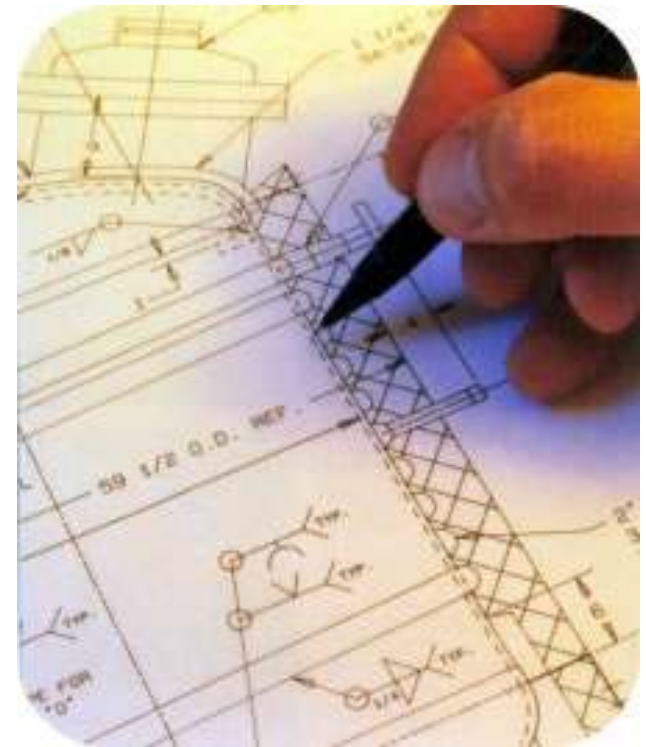
**Invested Capital**





# My Experiences...

1. Standard work processes executed in a disciplined manner deliver **predictable** results.
2. Consistent use of proven “best practices” deliver **good** results.
3. Integration of standard work processes and proven “best practices” deliver predictable, **great** results.



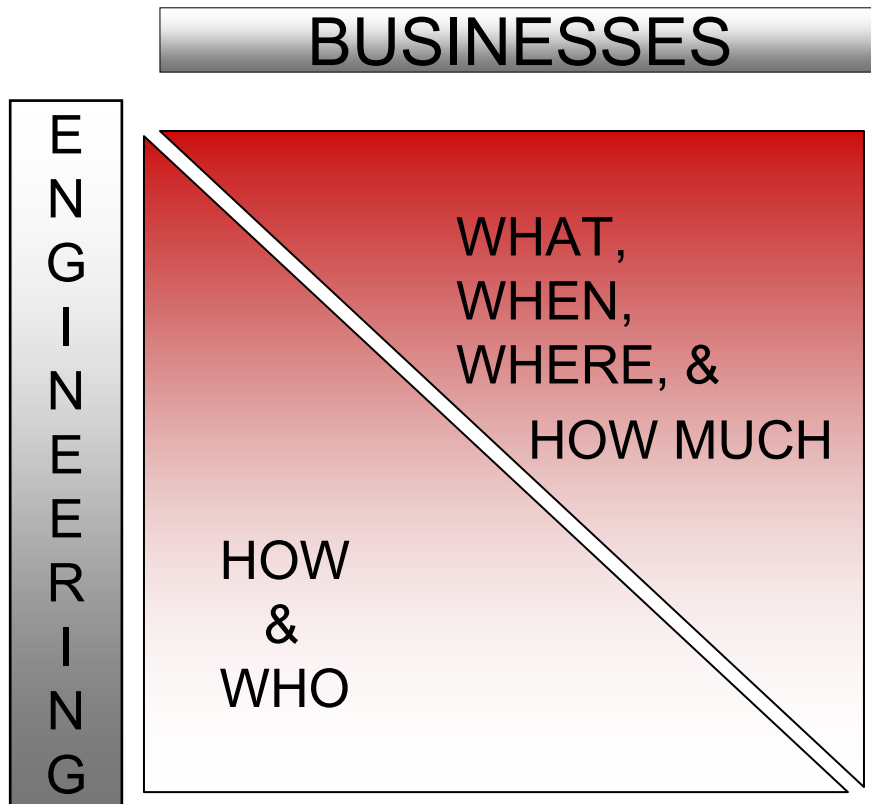


# WorkFace Planning

**An integrated work process  
and  
a best practice.**



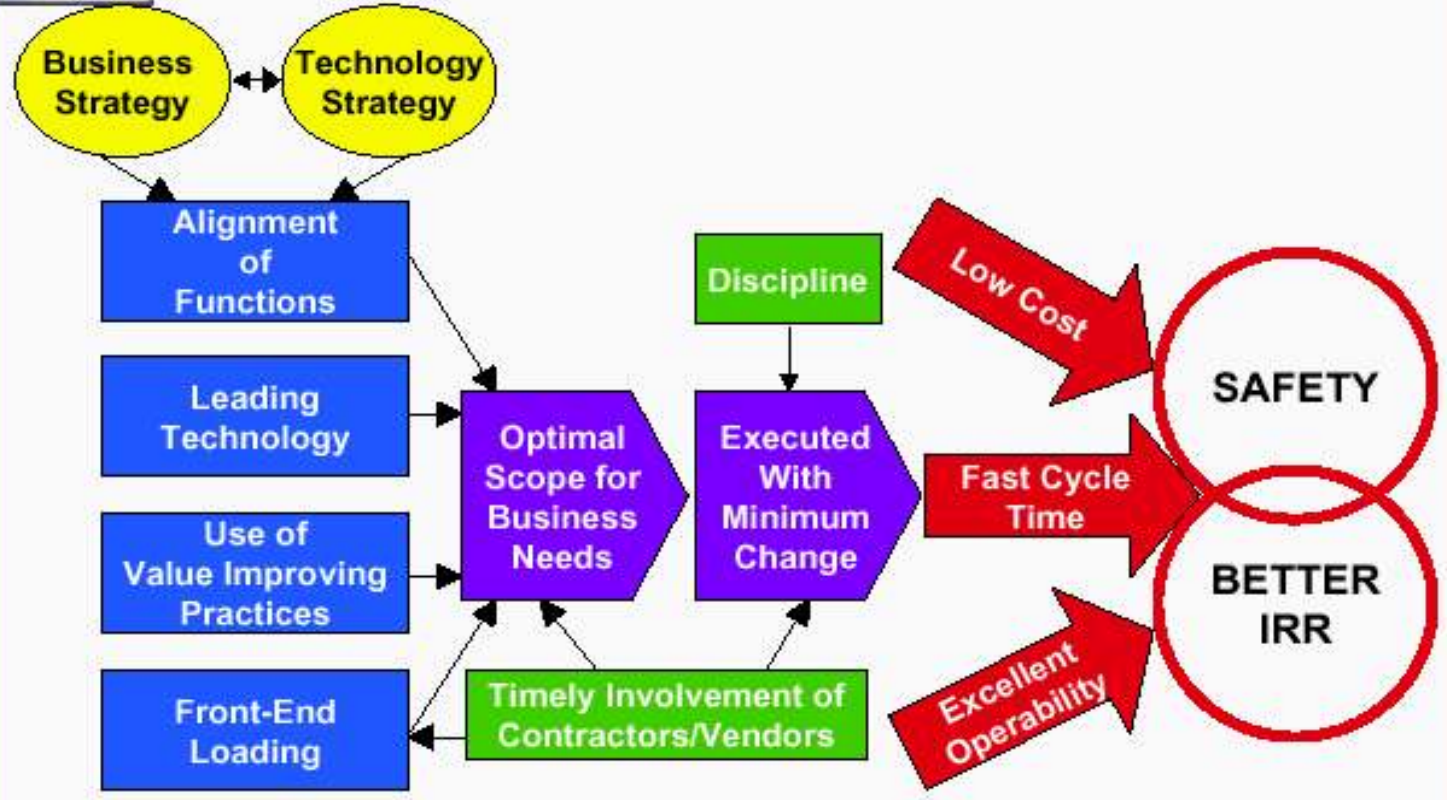
# “One Enterprise” Project Work Processes



- Businesses Lead Cross Functional Project Teams to Do FEL and Determine “What, When, Where and How Much.”
- Engineering Develops the Most Competitive “How and Who” and Leads FEL and Project Execution.
- Requires Mutual Accommodation and Collaboration to a Higher Degree than Ever Before.



## Elements of Capital Effectiveness



*Key Leading Indicators*

*Key Performance Indicators*





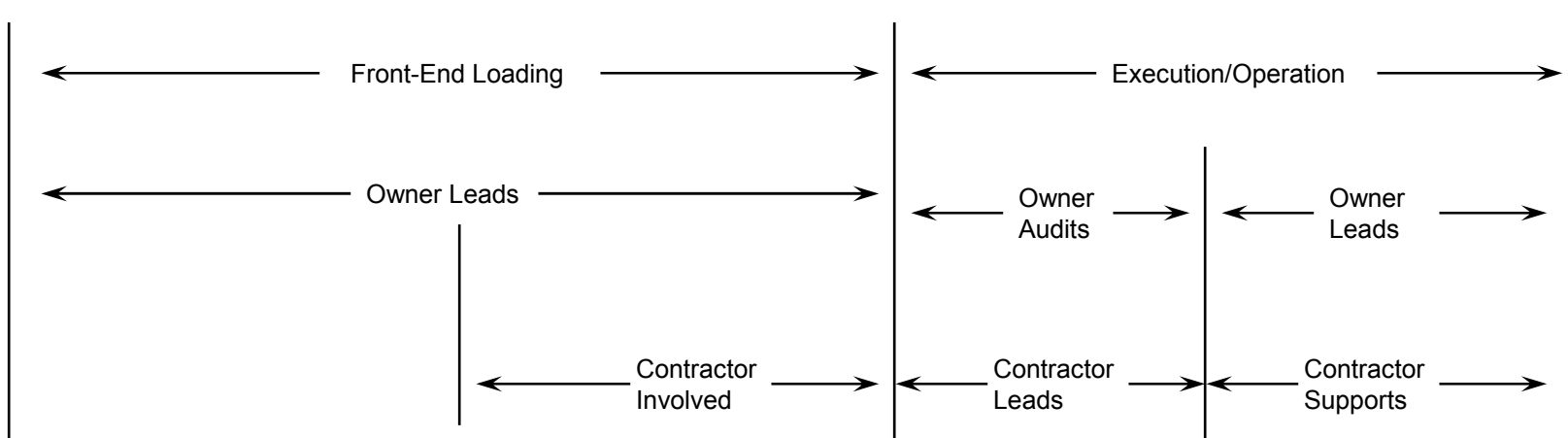
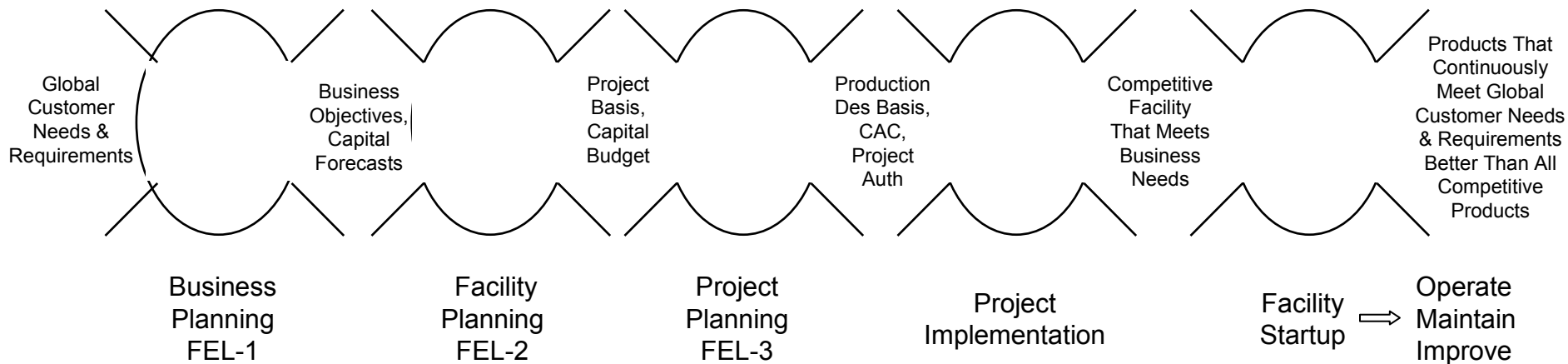
# WorkFace Planning

**Goal of WorkFace Planning is to improve performance by getting the right things to the right place at the right time:**

- The Project must be planned forward from Engineering to Start-up since process systems drive commissioning and start-up, commissioning and start-up drive construction and construction drives engineering and procurement.
- The planning process must work backward from Startup to Engineering to schedule the release of engineering to the field since the Path of Construction will drive the prioritized release of Construction Work Packages (CWP).
- The prioritized release of CWP will determine the order in which the Field Installation Work Packages (FIWP) must be prepared and released to drive the sequence in which engineering and procurement is delivered to the field.



# Facilities Engineering Process



# FACILITIES ENGINEERING PROCESS



- Process/Product Development
- Market Forecasts
- Sales/Capacity Reconciliation
- **Competitive Studies**
- Legal/Environment/S&OH
- Process/Technology Evaluation and Selection
- **Procurement Screening**
- **Strategic Review**
- **Informal VGAs**
- Preliminary Process Hazard Assessments

- **Form Project Team**
- Prepare Project Objectives
- **Identify Site Options**
- Hold Business Review
- Technology Screening & Conceptual Engineering
- **Evaluate Business Feasibility**
- SHE Strategy & Screening Reviews
  - Consequence Analysis
- Run Pilot Plant
- Prepare Basic Data
- Prepare Screening VGA

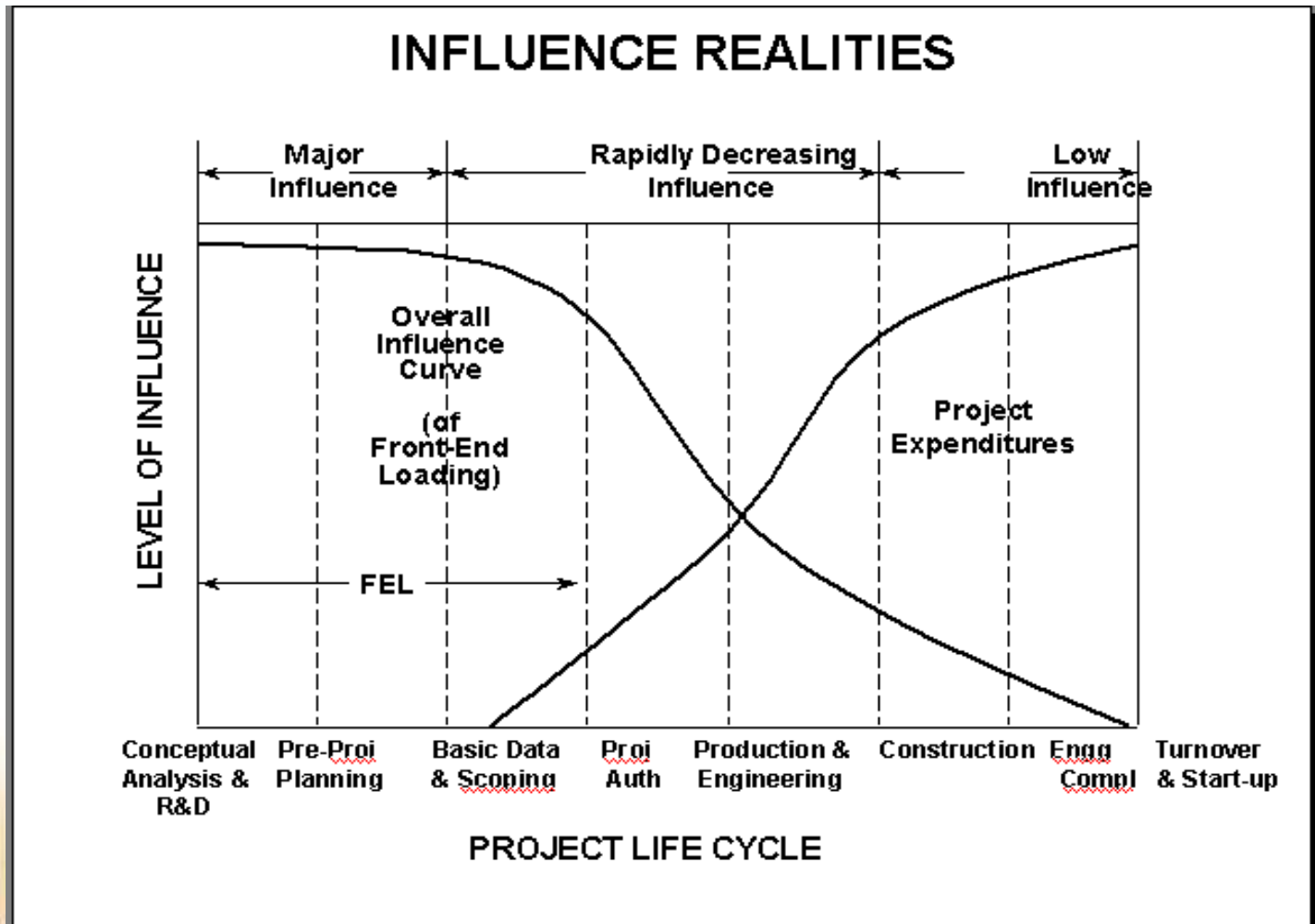
- Project Survey(s)
- Design P&I Diagrams & Major Equipment
- **Procurement Plan**
- **Execution Plan**
- **Preliminary Equipment Arrangements**
- Scope of Work
- **Schedule Analysis**
- SHE Pre-Auth Reviews
  - PHR, Ergonomics & Fire Protection
- **Estimate Preparation**
- Appropriation Request



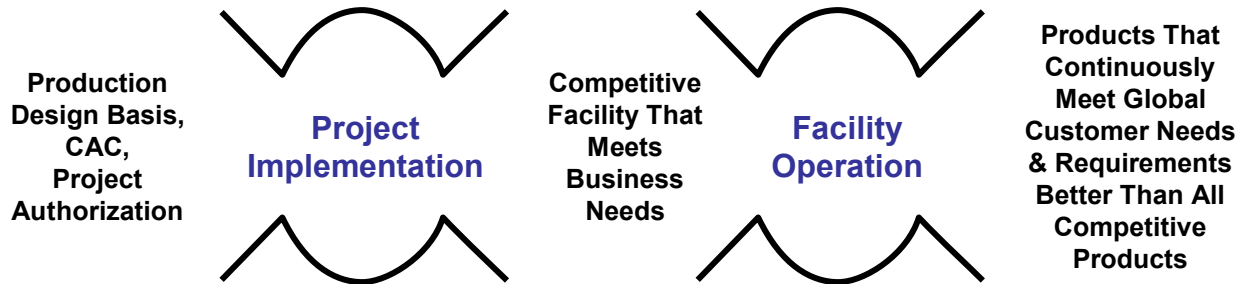
***Plans are of little importance,  
but planning is essential.  
-- Winston Churchill --***



# FEL: Window of Opportunity



# FACILITIES ENGINEERING PROCESS



- Quality Review
- Process Development Letter
- **Production Design**
- **Equipment Procurement**
- **Bid Package Specifications**
- **Contract Quotations**
- **Award Contracts**
- **Build Facility**
- Checkout/Turnover
- Detailed PHA/QA
- Operating Procedures & Safe Work Practices
- **Contractor Safety & Performance**

- **Pre Start Up Safety Review**
- **Energize**
- **Start Up**
- **Audit**
- **Operate**
- Training & Performance
- **Maintain**
- **Mechanical Integrity**
- Improve
- Regenerate
- Incident Investigation
- **Management of Change**
- Emergency Planning & Response

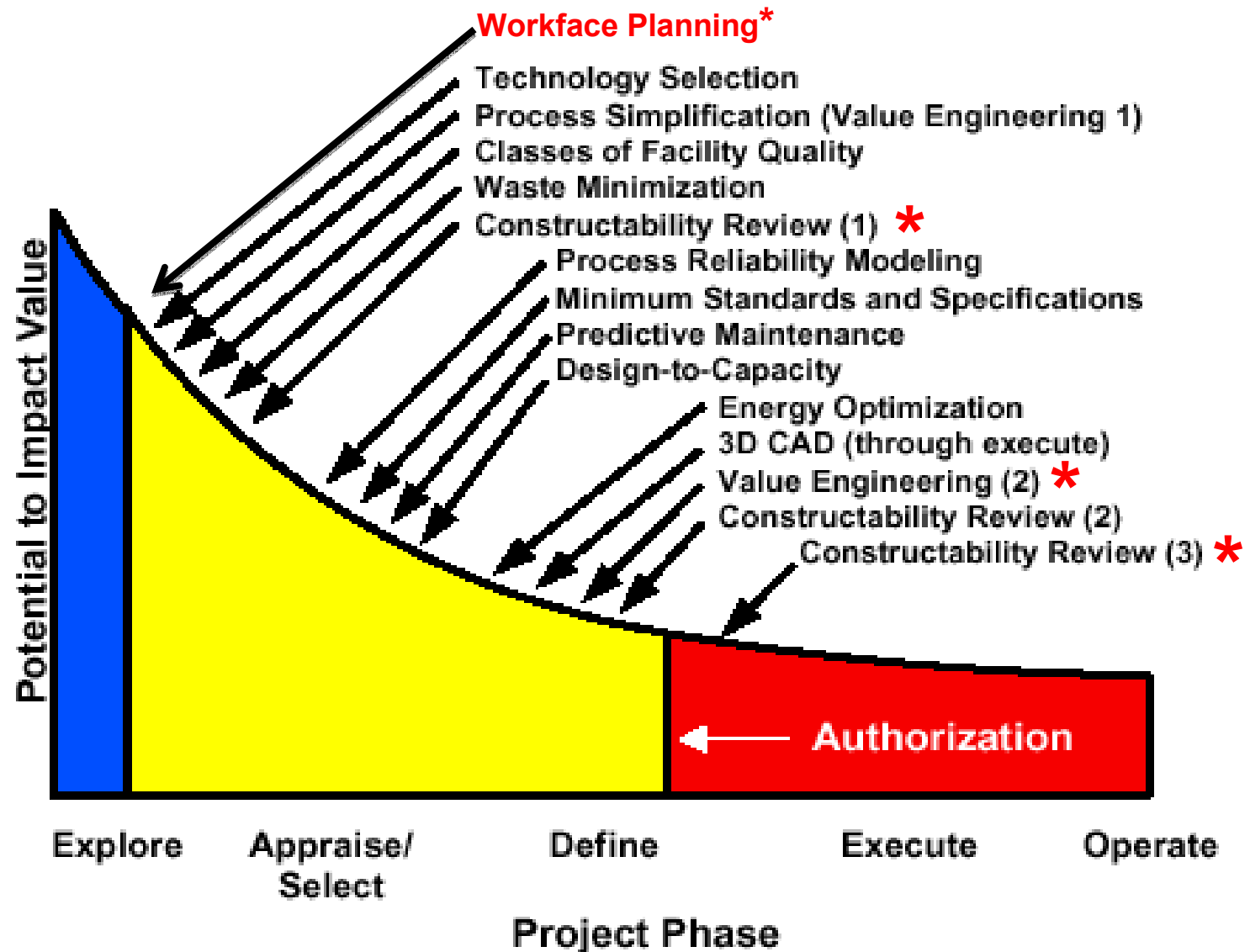




**COAA**  
Construction Owners  
Association of Alberta



# The “Right” Plant Practices



# USING CAPITAL MORE BUSINESS EFFECTIVELY

**From**

Market Research



Product Characteristics



Design



Engineering



Supplier Pricing



**COST**

Settle on target cost early, before doing significant Engineering, Design (and supplier pricing).

If cost is too high, return to design phase



**MANUFACTURING**



Periodic Cost Reduction

**To**

Market Research



Product Characteristics



Planned selling price  
less desired profit



**TARGET COST**



Design

Engineering

Supplier Pricing

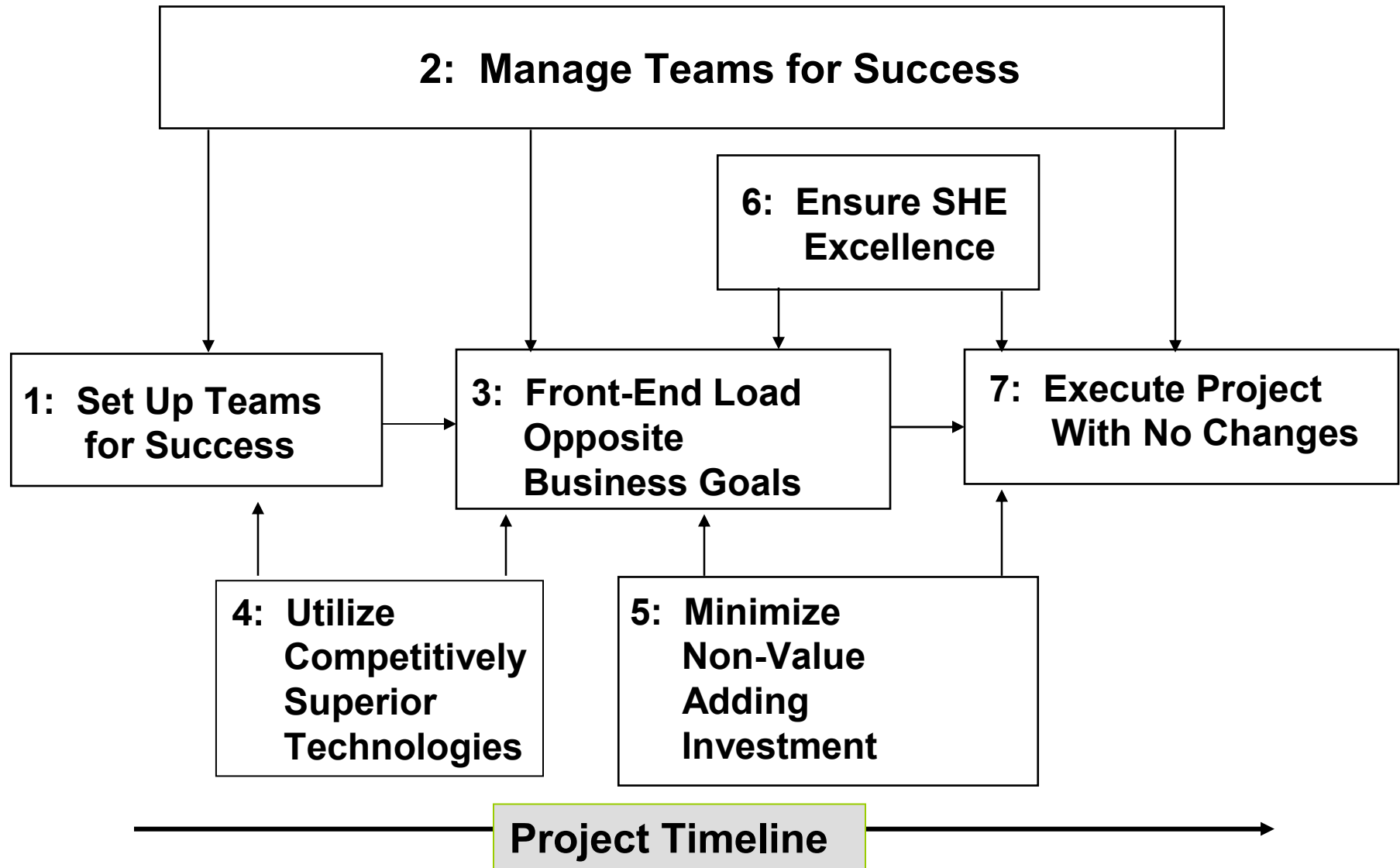
Target costs for each component force marketers, designers, and engineers from all departments and suppliers to struggle and negotiate tradeoffs

**MANUFACTURING**

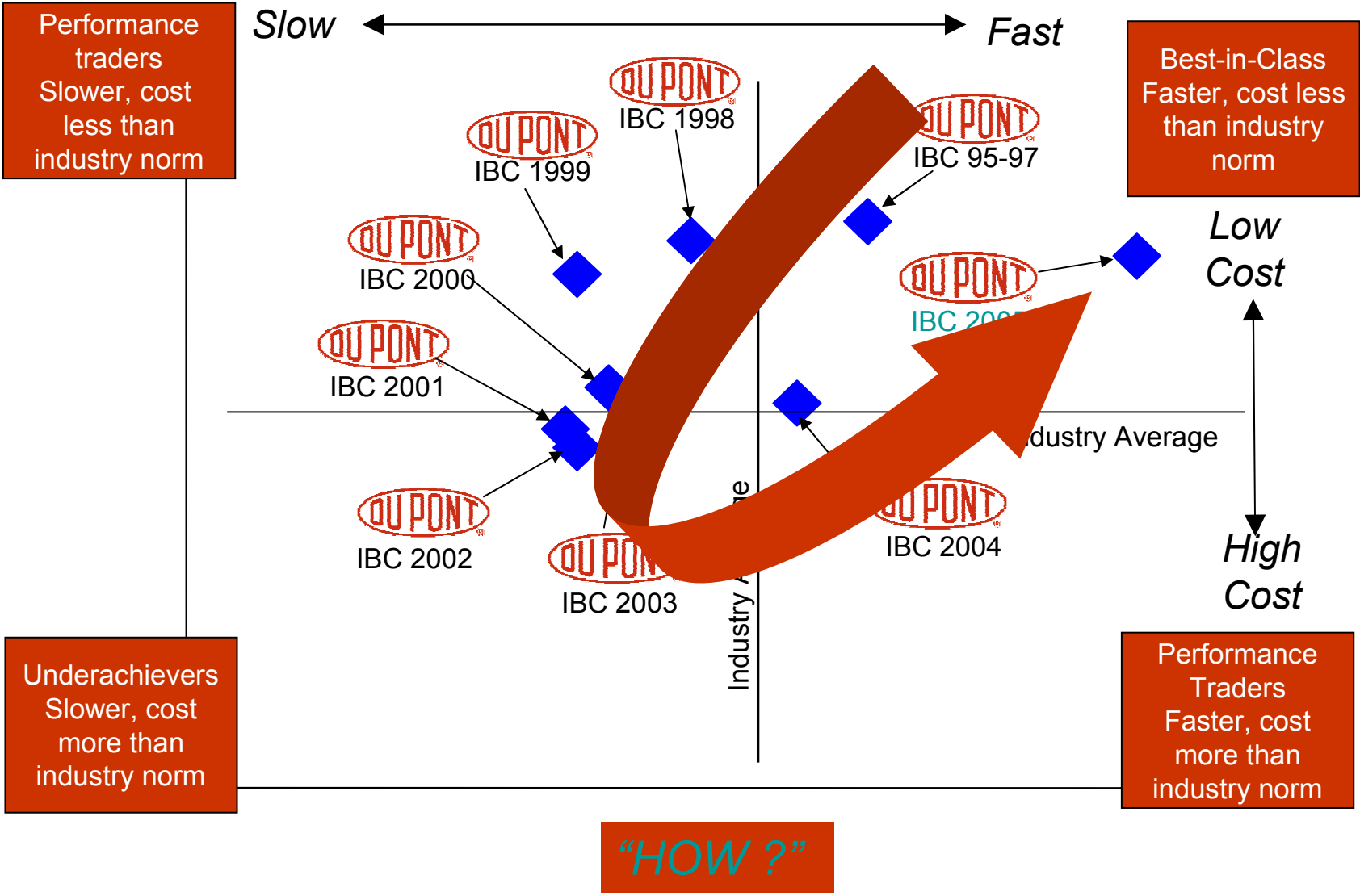


Continuous cost reduction

# Capital Productivity Best Practices



# DuPont Benchmarking Results





Labor Supply/Demand Forecasting Model

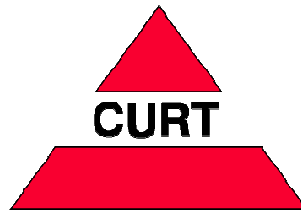


# Supply/Demand Forecasting Model

## Web-Based Labor Market Information Management

Construction Workforce Development Center

In association with:



[www.cwdcforecasting.com](http://www.cwdcforecasting.com)





## Labor Supply/Demand Forecasting Model




### Benefit to Owners

- Reliable tracking system to assist with project planning
- Regional supply/demand summary info
- Easy access to input data on regular basis
- Secure interface & data confidentiality
- Common methodology

### Benefit to Contractors

- Timely data for recruiting & training strategies
- Reliable tracking system to understand supply/demand

**[www.cwdcforecasting.com](http://www.cwdcforecasting.com)**



**Strong Operating  
Discipline Required  
to Deliver a  
Great Project...**



**Strong Operating Discipline**



**Safety**

**Cost**

**Quality**

**Schedule**



# Operational Discipline



*“Goal of WorkFace Planning is to improve performance by getting the right things to the right place at the right time”*





# **“More Business Value for Our Money”**

## **Different Levels of Value From WFP**

- Owners**
- Contractors**
- Industry**

**Owners - Improved safety performance**

- Improved planning**
  - \*Execution strategy**
  - \*Contracting Strategy**
  - \*Optimize cost & schedule**
- More accurate estimates(cost/schedule)**
- Improved control**
- Increased productivity**



# **“More Business Value for Our Money”**

- Contractors** - Improved safety performance
- Improved planning
  - Improved productivity
  - Increased profitability

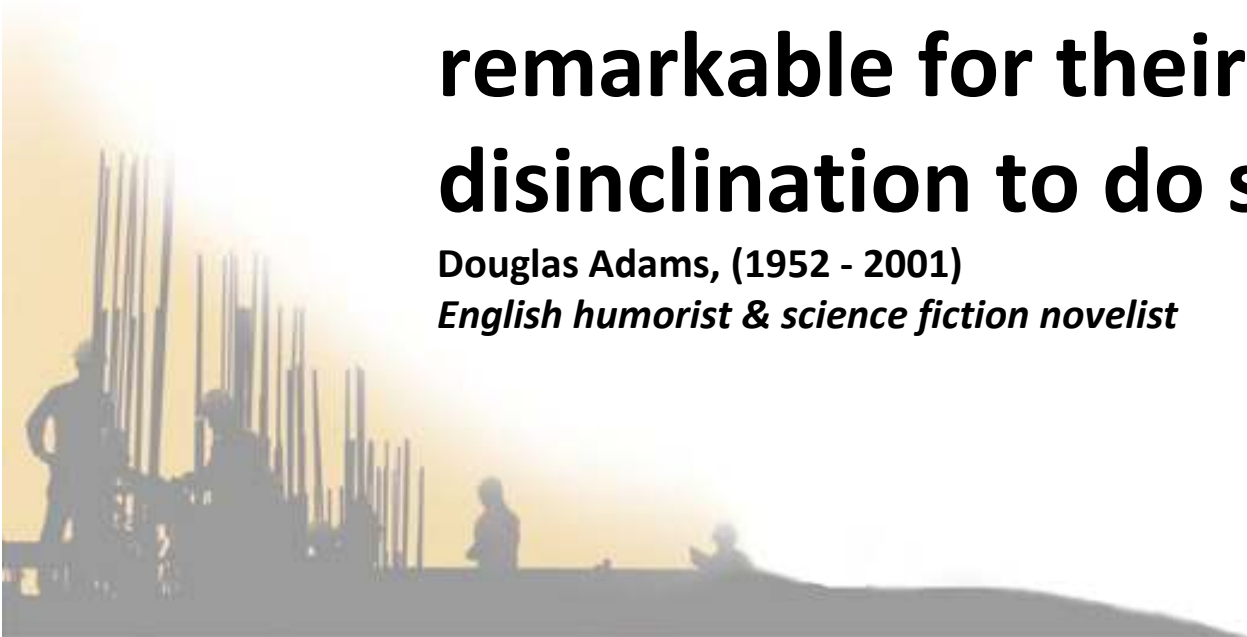
- Industry** - Improved safety performance
- Improved work force development
  - Increased work force availability
  - Increased overall productivity
  - Increased attractiveness of construction jobs



**“Human beings, who are almost unique in having the ability to learn from the experience of others, are also remarkable for their apparent disinclination to do so.”**

Douglas Adams, (1952 - 2001)

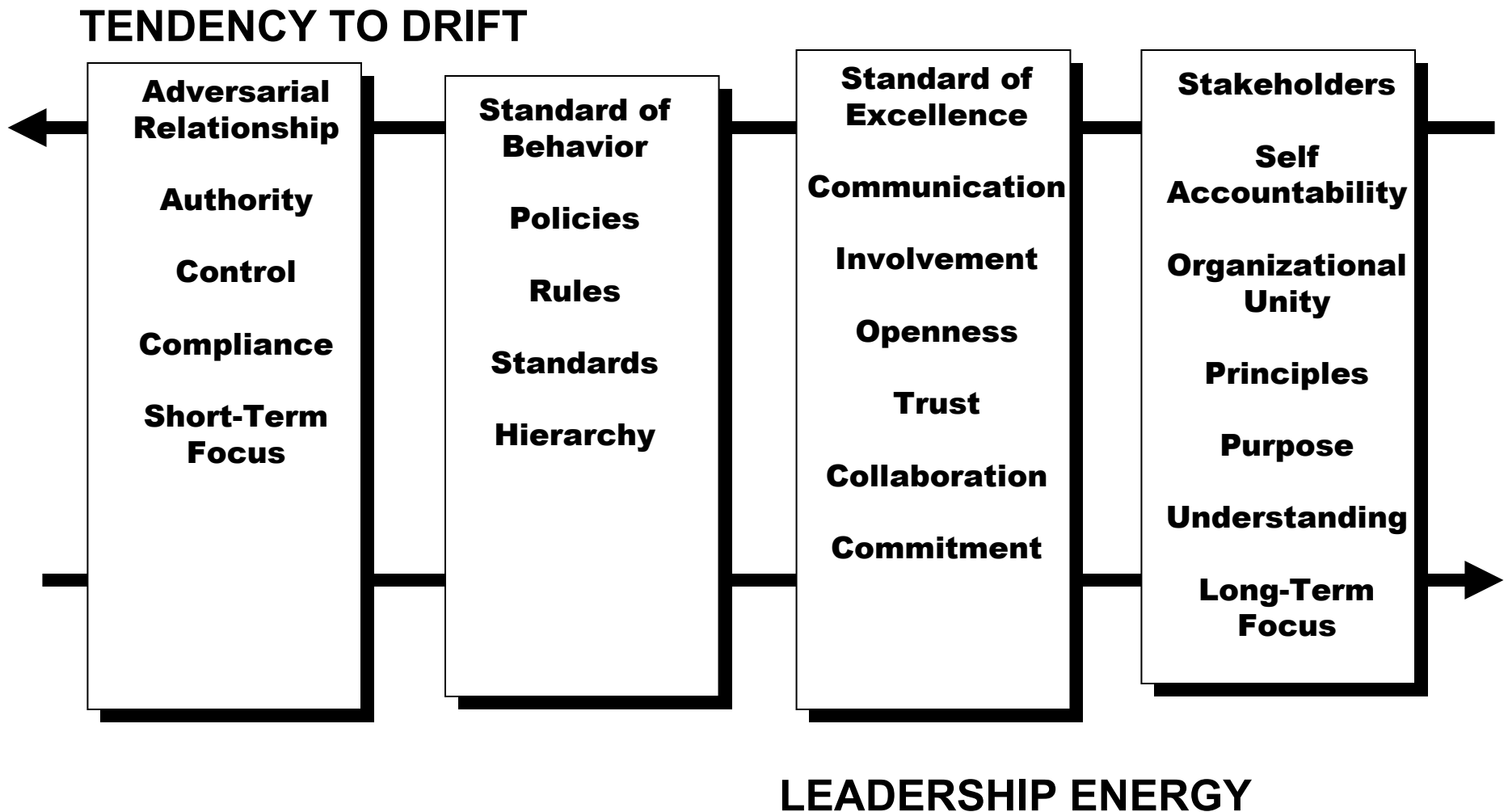
*English humorist & science fiction novelist*



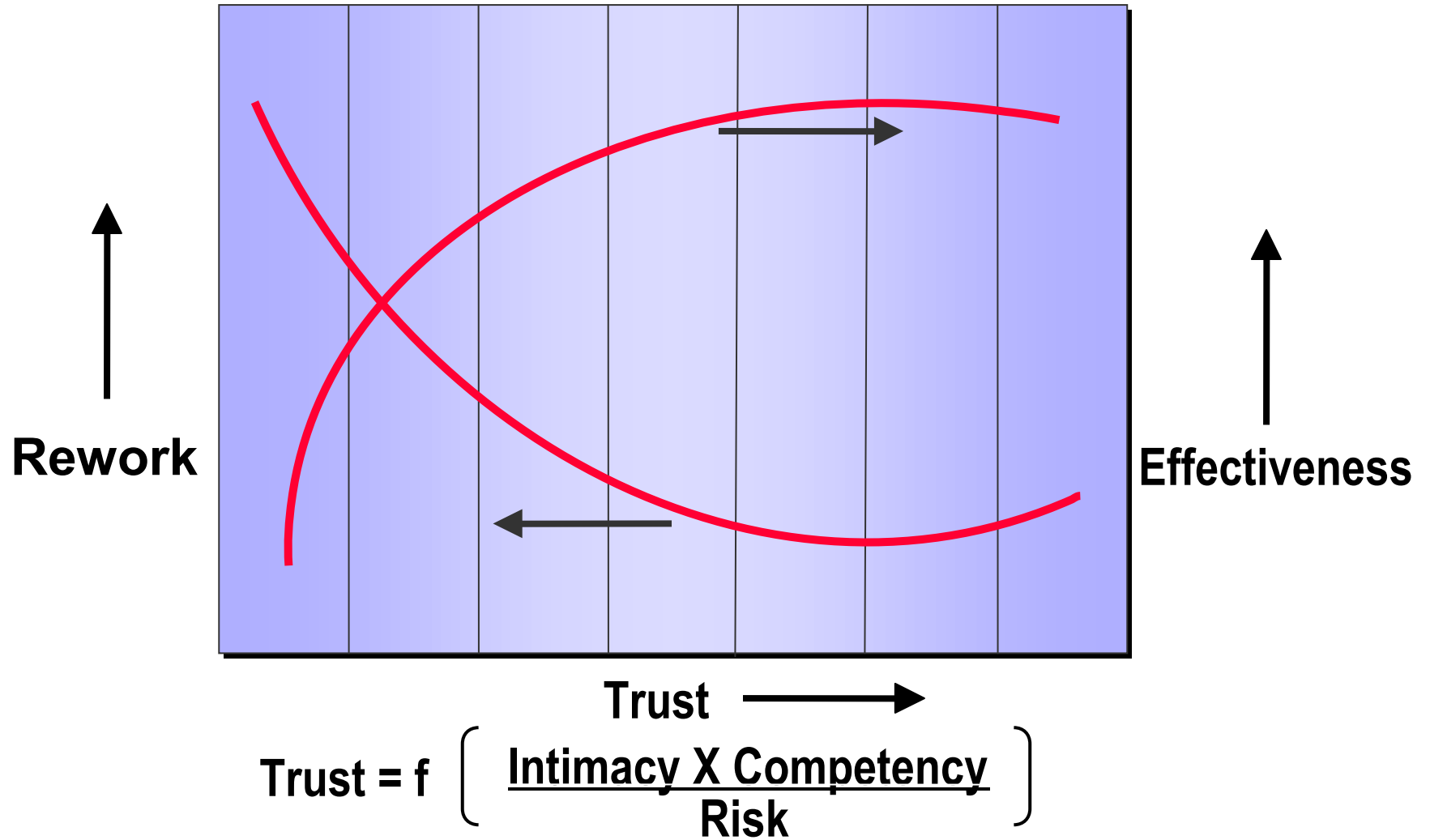




# Cultural Evolution



# Effectiveness / Trust Relationships





# My Reflections

- **Must see project management holistically**
- **Best practices define the pathways**
- **Leadership is learn/teach/learn**
- **It's never over**
- **Positive attitude critical**

***“People don’t resist change,  
they resist being changed!”***





# AUDIENCE FEEDBACK

**NOTE: The information collected is anonymous and may be used for research purposes. By participating, you are giving your consent for the use of this data.**





# **Making Good Projects Great**

**“More Business Value for Our Money”**

**Jim Porter  
DuPont VP Engineering and Operations (Retired)  
Workface Planning Conference  
Calgary, Alberta  
December 1, 2010**



## Transitioning from Area to System Based Construction

Presented by: Sean Przy

COAA Workforce Planning Forum  
Calgary, Alberta December 1 2010





# Opening

## System Based Construction

- The challenges common to most projects can be anticipated.
- Because these challenges can be anticipated, they can be planned for.

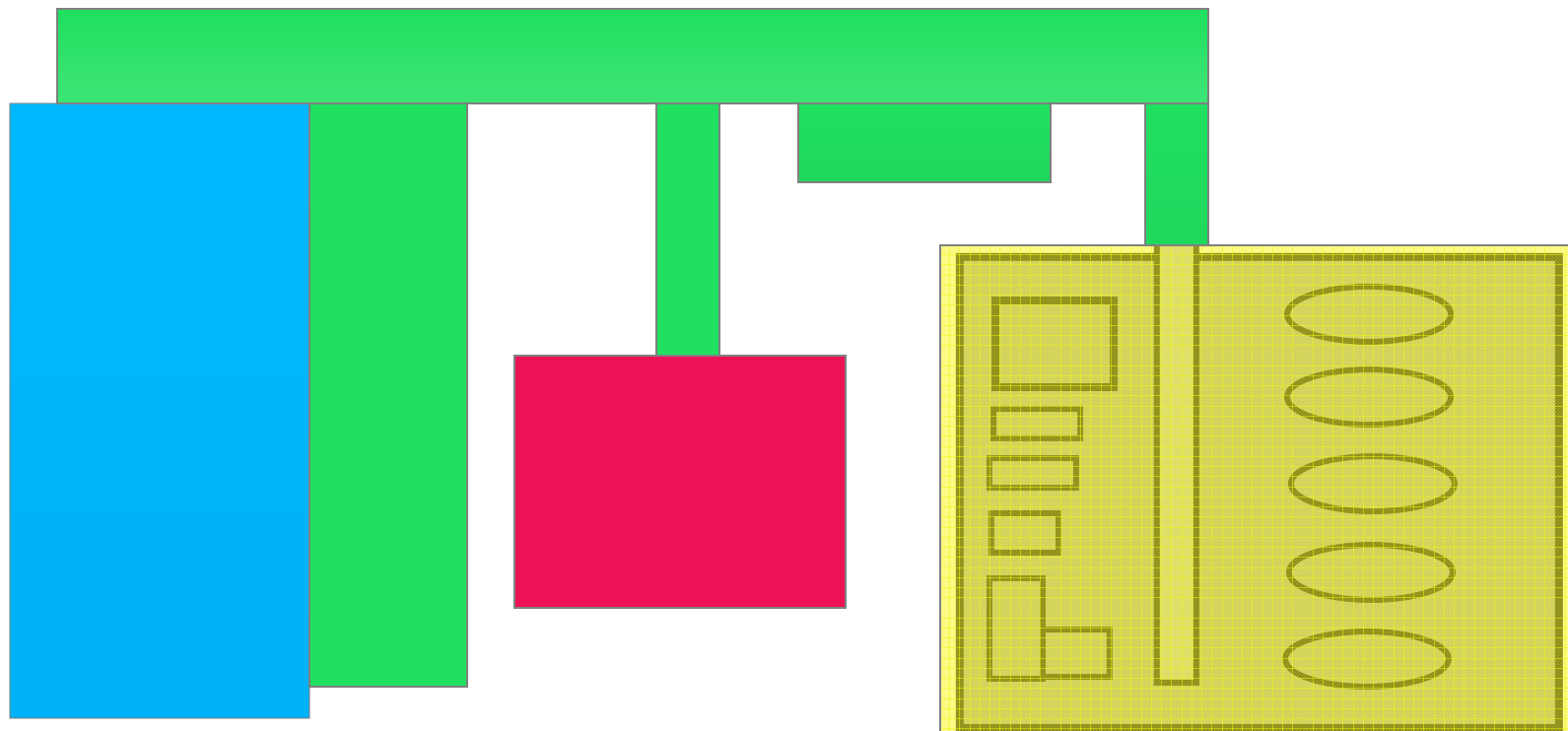


# Presentation Outline

- **Define Area vs. System based Construction.**
- **Why & how the transition occurs. Is transitioning the problem?**
- **What are the significant challenges we face during system construction?**
- **What are some of the mitigating actions we may take to reduce their impact.**

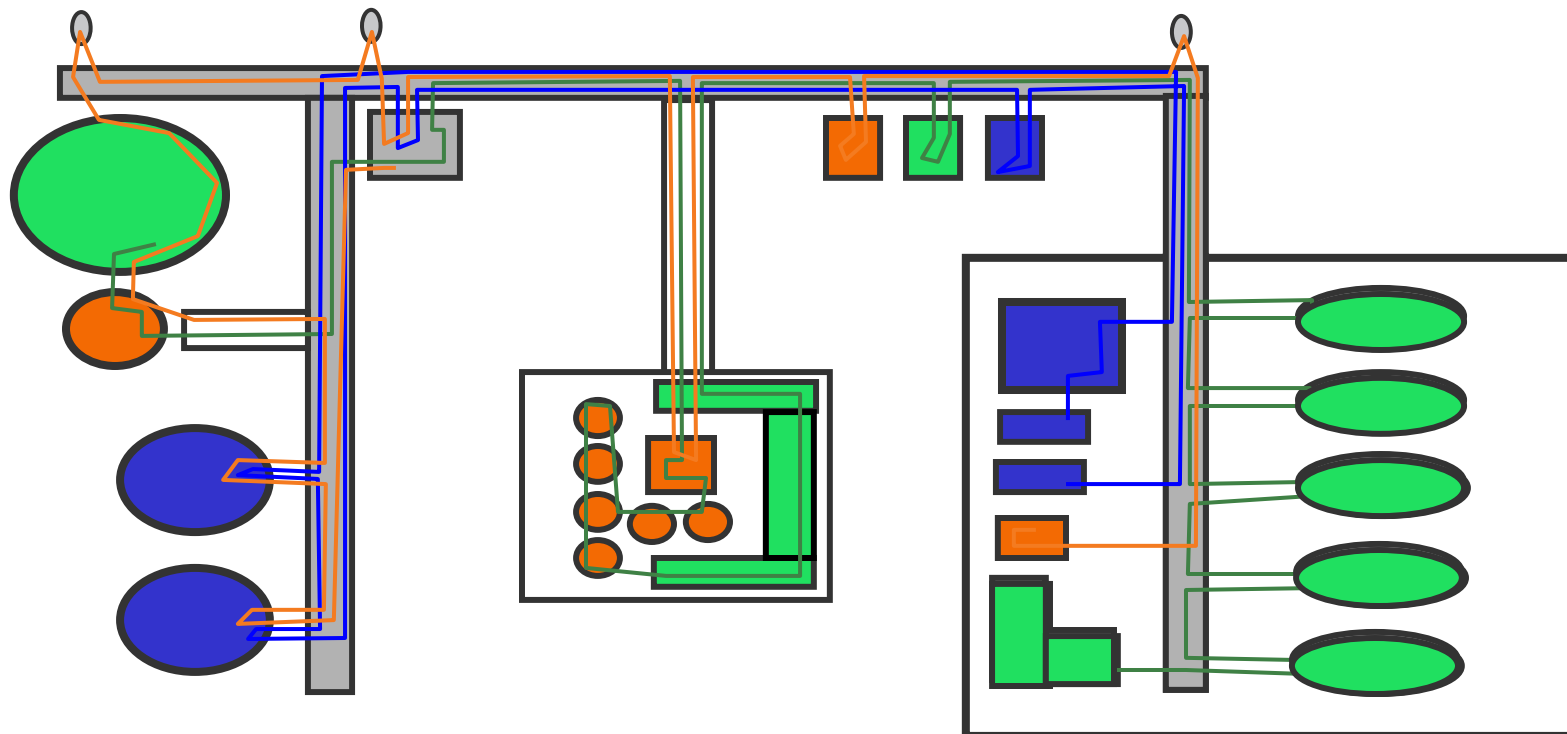
# Area Versus System Based Construction

## Area Construction

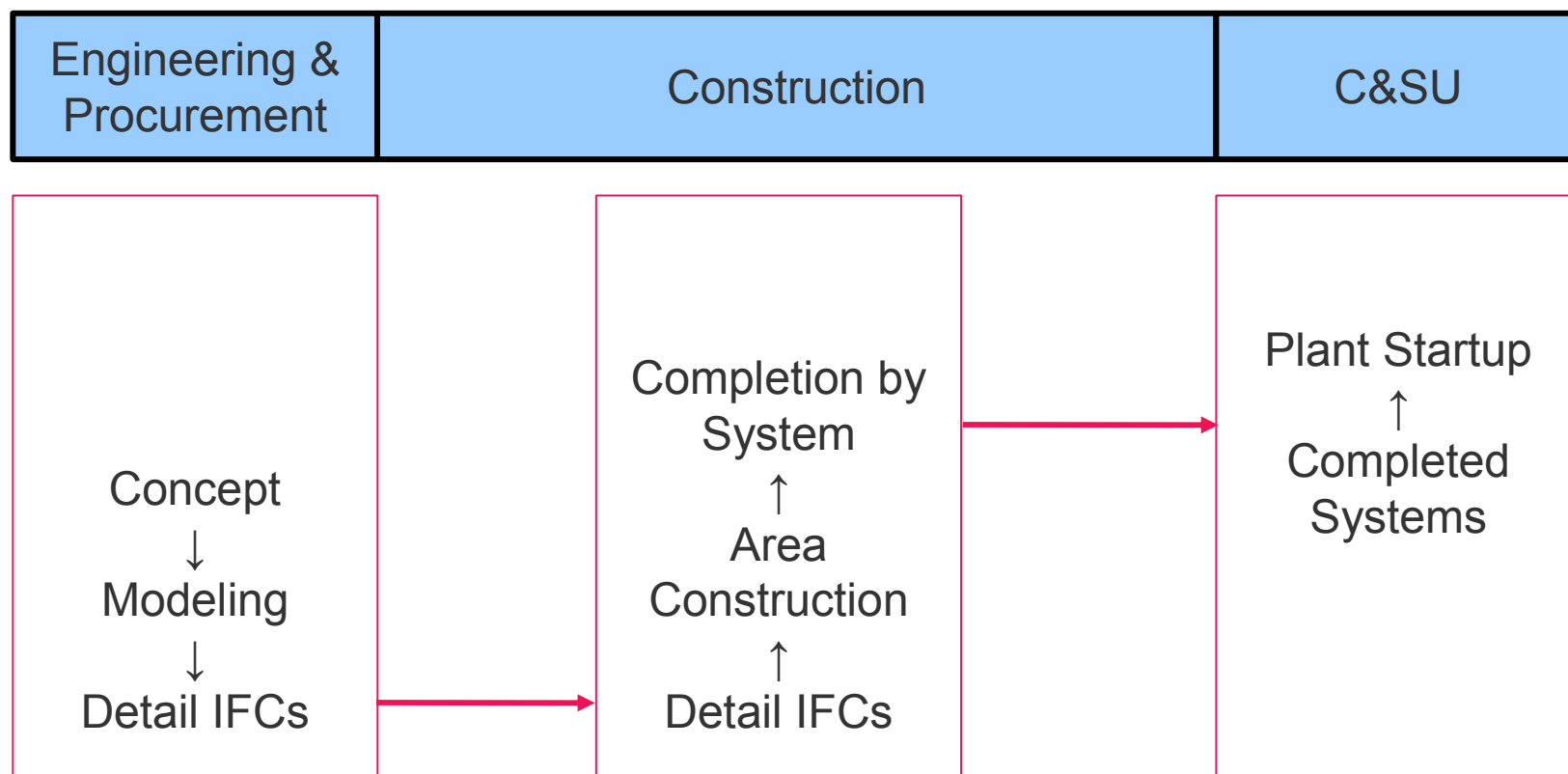


# Area Versus System Based Construction

## System Based Construction



# Area to System Transitioning - Ideal



# Area to System Transitioning - Real

*IFC Work Packages, Materials, etc.*

**Engineering & Procurement**

**Construction**

**C&SU**

Transition to System Based Construction

*System Turnover*



# Common Challenges During System Construction



**Quality Issues**

**Late Engineering & Materials**

**Productivity Issues**

**Progress & Productivity Measurement**

# Quality Issues

## *The Challenge*

- Construction Deficiencies
- Vendor & Fabrication Deficiencies
- Engineering Deficiencies
- Documentation / Turnover Deficiencies

## *Potential Solutions*

- Regular and meaningful Quality Audits. Identify trends early.
- Use of the “Scorecard” to not only verify progress but to perform targeted inspections during construction through In-Process Verification.
- Source Inspection with early involvement from Operations personnel.
- Early identification of RFI during Work Face Planning & Packaging.
- Early system definition which allows for effective packaging of quality records for system turnover.

## Late Engineering & Materials

### *The Challenge*

- Capacity to absorb late engineering changes or material deliveries decreases substantially.

### *Potential Solutions*

- Early identification of pending engineering changes or late material deliveries to permit recovery planning.

# Productivity Issues

## *The Challenge*

- Increased Travel & Support Requirements.
- Increased Safety Awareness Requirements
- Motivational & Territorial Issues

## *Potential Solutions*

- Find a middle ground between system priorities and area based efficiencies through effective Field Installation Work Packaging. Package deficiency work in same manner as original commodities.
- Work under system priority only as needed and accept that productivity will be impacted and plan accordingly.
- Integrated planning that anticipates energized systems, hydro test exclusion areas, etc.
- Work Packaging during System Based Construction adhering to geographic boundaries used during Area Construction.

# Progress & Productivity Measurement

## *The Challenge*

- Rate of progress drops significantly during system construction.

## *Potential Solutions*

- We need to take a closer look at how we measure progress up to and during this stage of the project. Anticipated work is being performed however there is no progress to earn against.

# Closing



These challenges are real and cannot be eliminated.

We can, however plan for them and manage our way through them.



# Automation & Integration:

## WorkFace Planning in an EPC Environment

Lowell Wiles  
VP, Global Construction  
Jacobs  
December 1, 2010



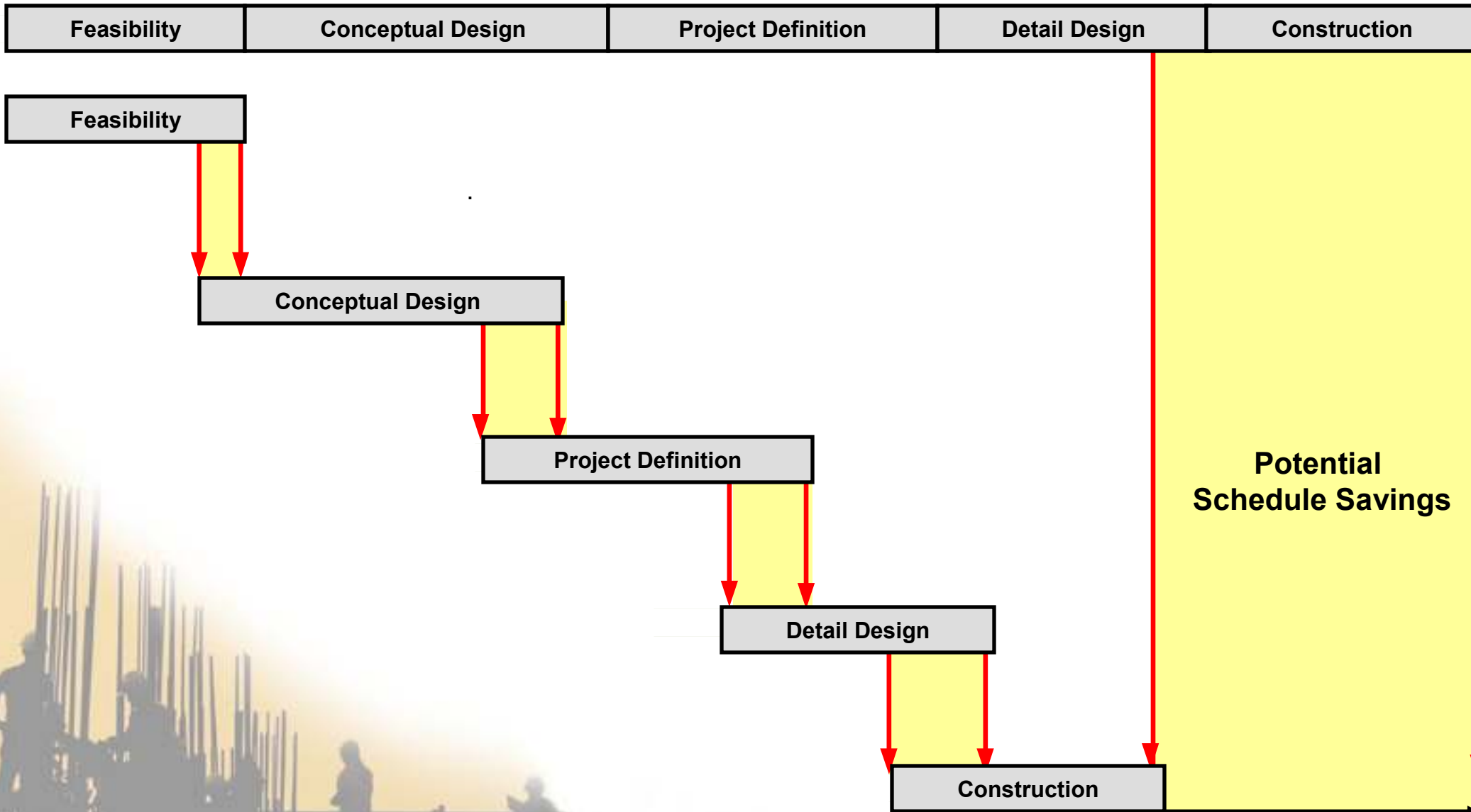


# EPC Execution

- **Benefits**
  - Necessary for compressed Schedules
  - Single Point Accountability
  - Opportunities for earlier, incremental planning
- **Challenges**
  - Phase Overlap
  - Synchronization of Phases



# EPC Phase Overlap



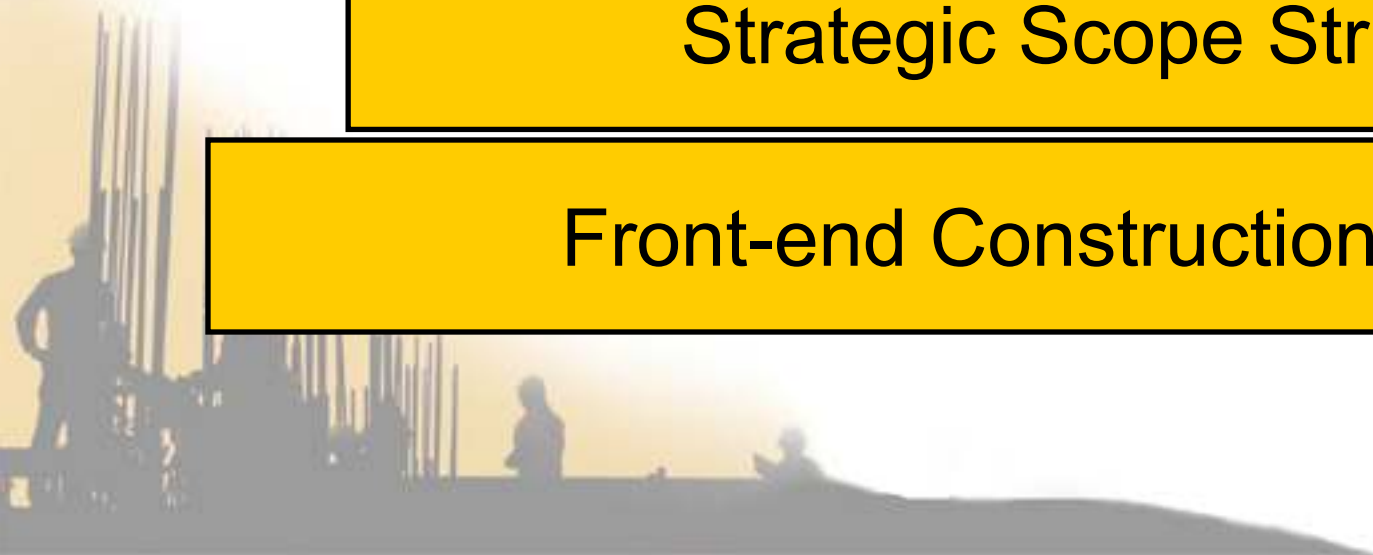
# Model for EPC Success

WorkFace Planning

Integration of Automation Tools

Strategic Scope Structure

Front-end Construction Planning

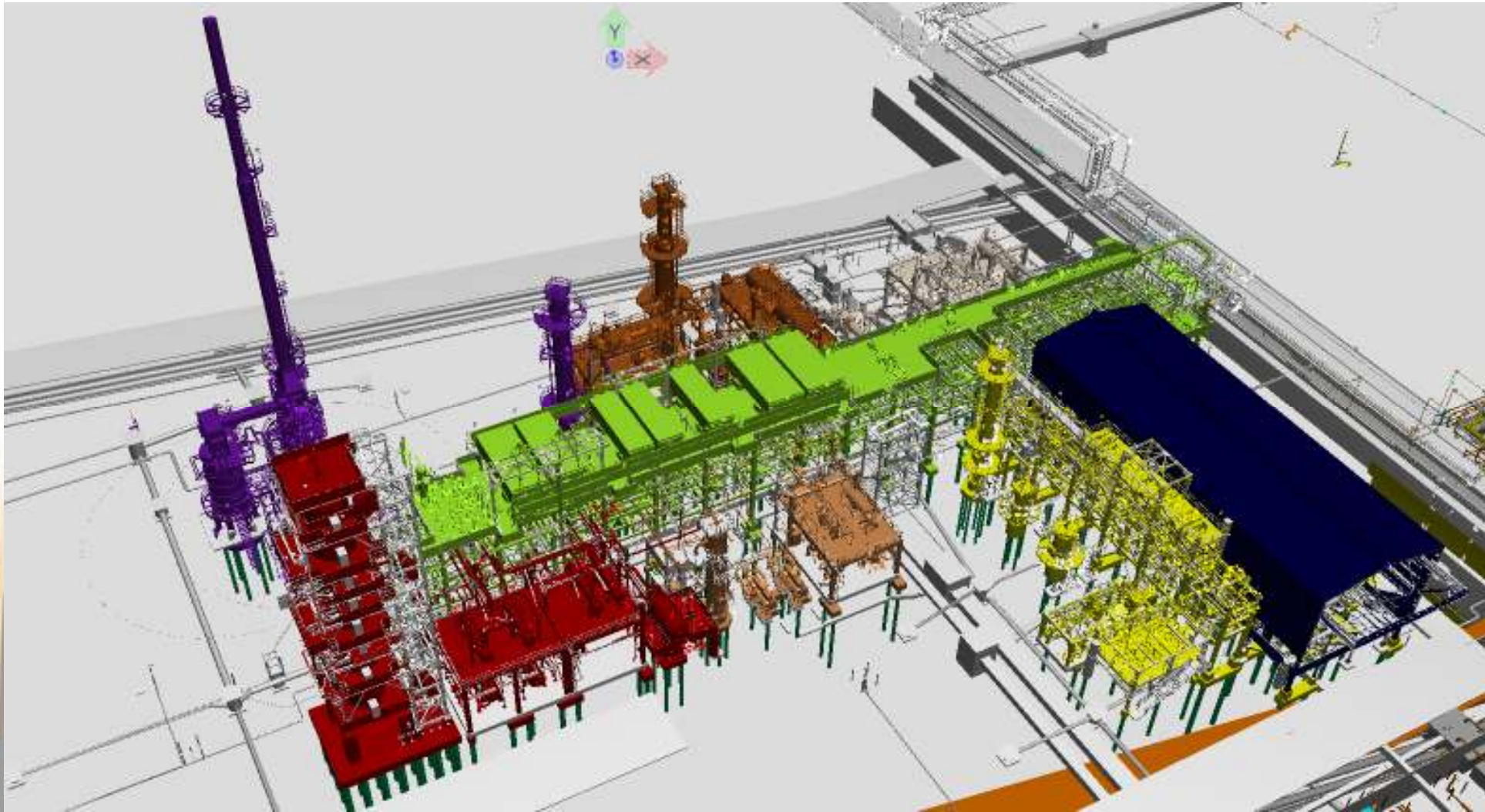


# Tenets for EPC Workface Planning:

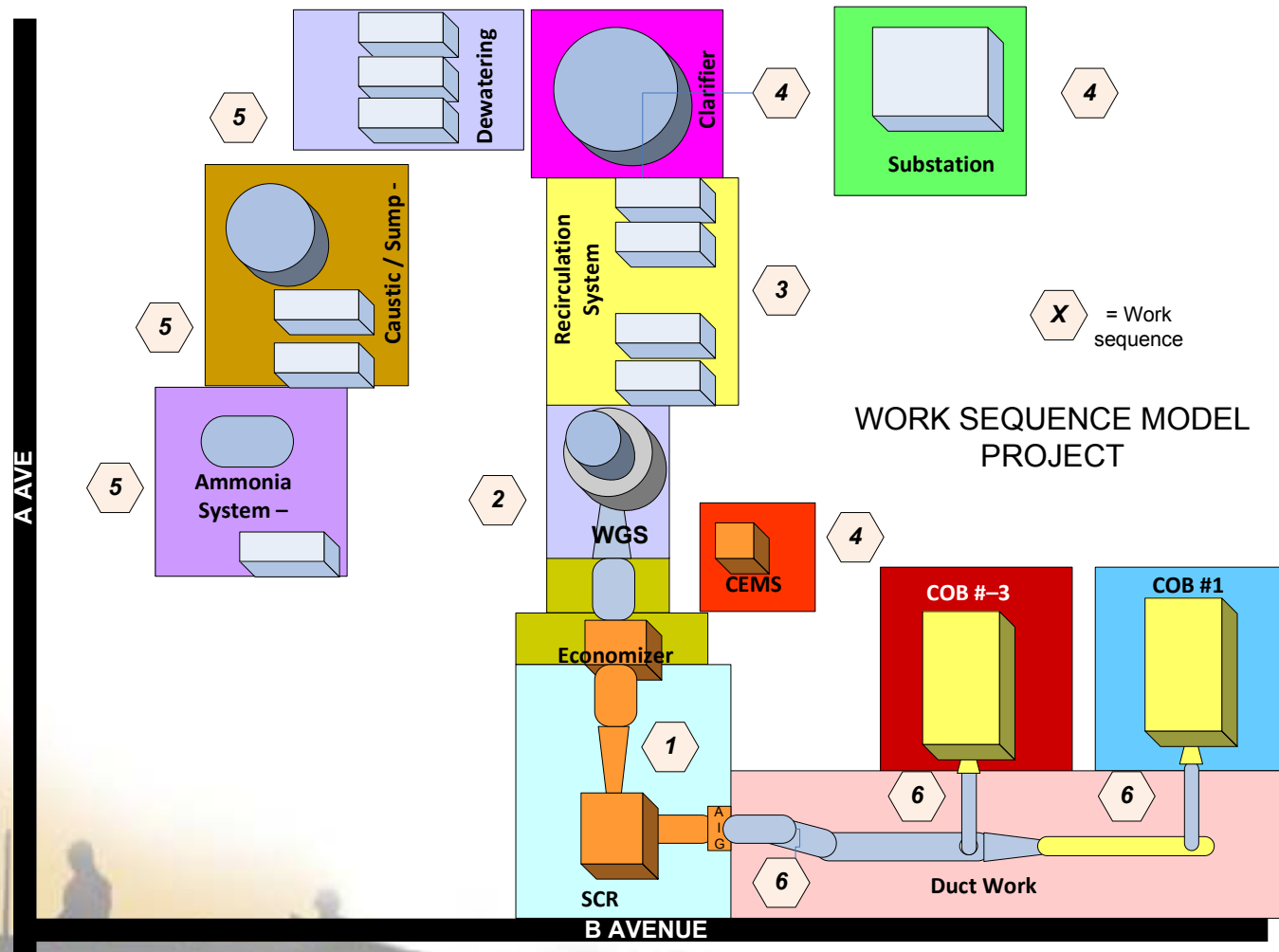
- Scope is organized by Construction
- Construction Plan drives design sequence
- Construction work areas frame FIWPs
- Automation tools integrated to support WFP



# Scope Organised by Construction



# Construction Plan Drives Design Sequence



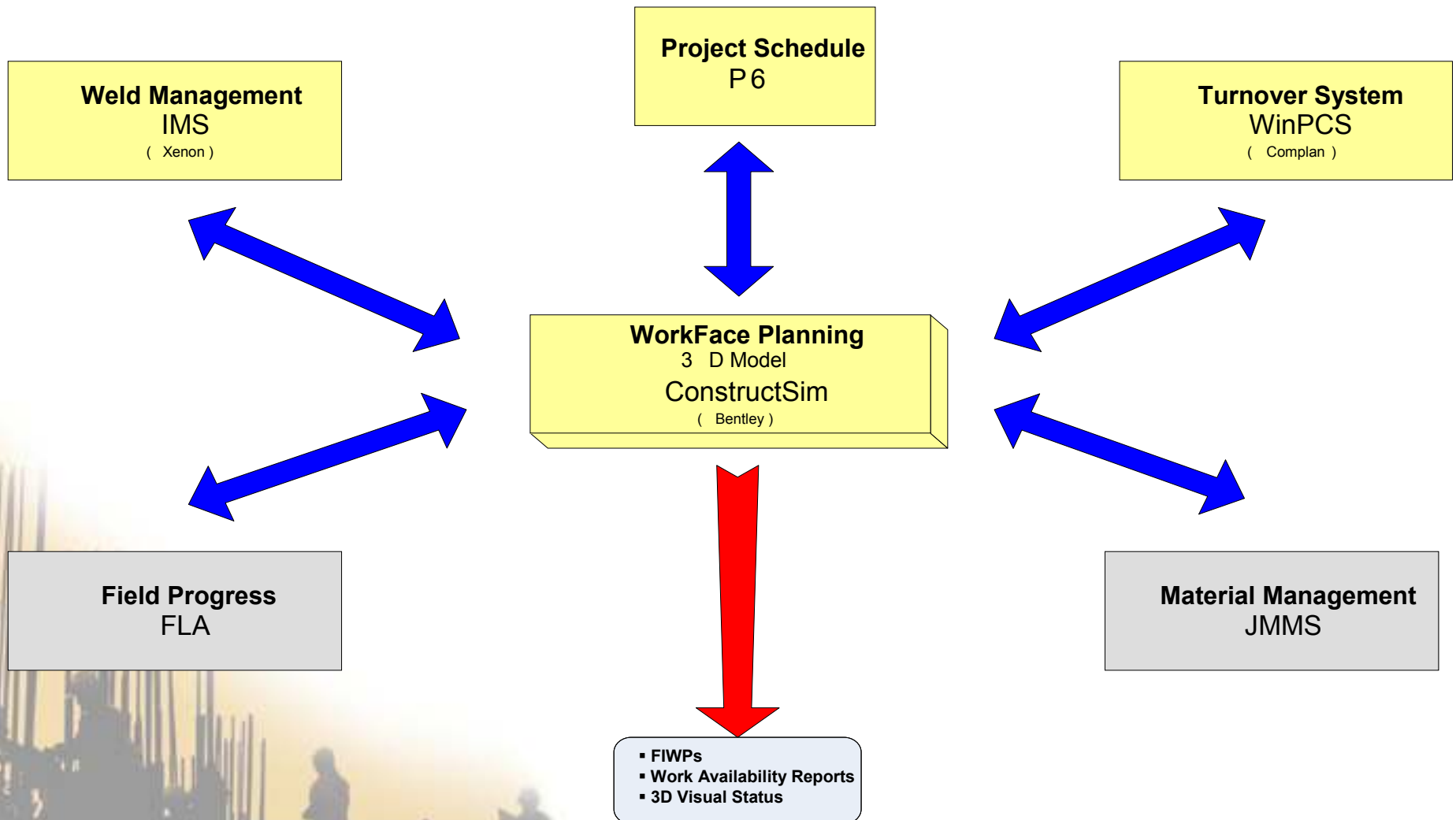




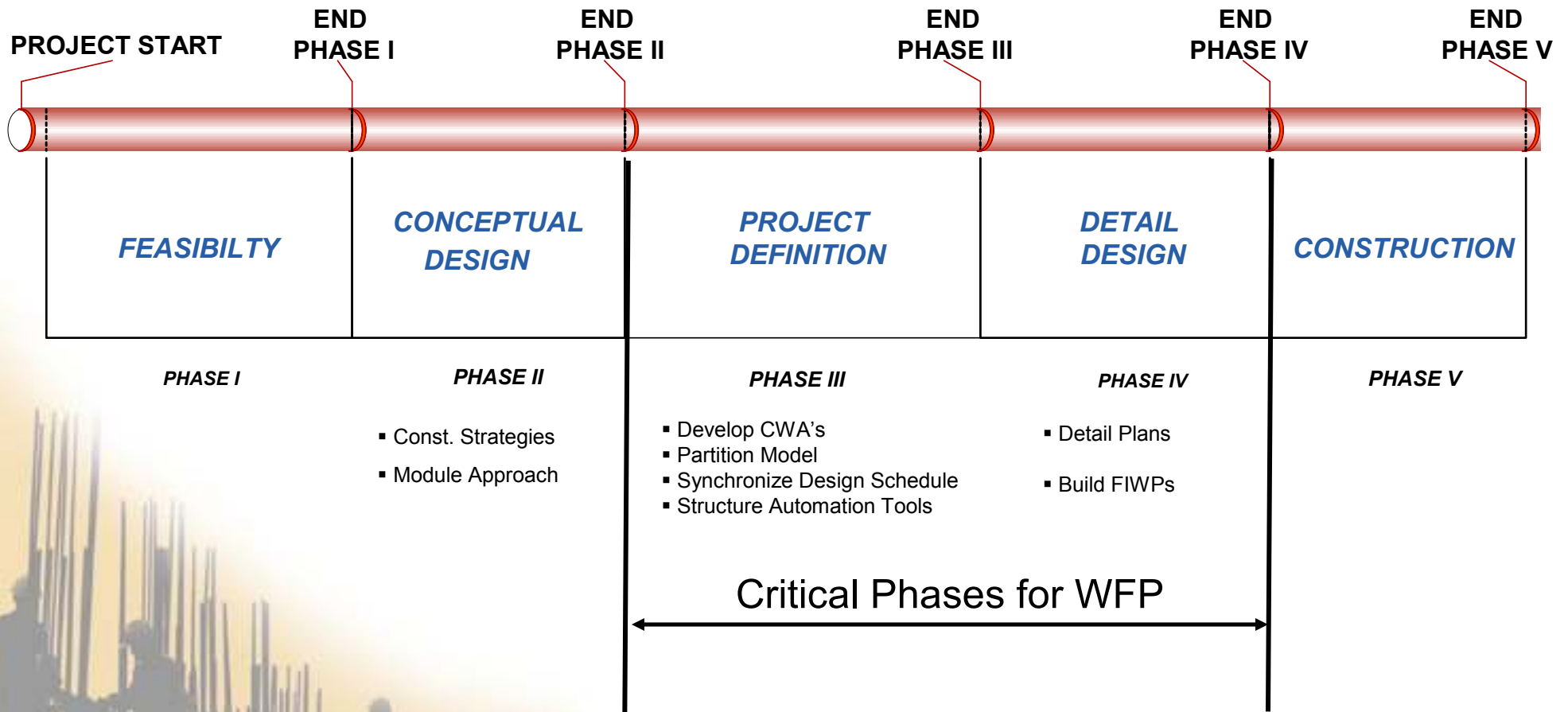


# Automation Tools Integrated

## Data Flow



# WorkFace Planning Begins Early



# Results:

- TRIR .21
- Productivity factor = 11% better than budgeted
- Rework is < 2% and < 0.5% on construction
- Beat original schedule





# What we've Learned:

- **WFP success depends upon proper EP sequence**
- **WFP success depends on timely data integration**
- **Structure scope early, and stay with it**
- **It's never too early to start WorkFace Planning!**



# Audience Participation

1. Based on your experience what is the expected % improvement in labour productivity an effective WorkFace Planning System will provide?
  - a) Less the zero
  - b) 0 to 10%
  - c) 10 to 20%
  - d) 20 to 30%
  - e) More than 30%
  - f) Can't comment





# Audience Participation

2. Does your organization Utilize Front-End Construction Planning?
  - a) Yes
  - b) No



# Audience Participation

3. Can WorkFace Planning be effectively used if it is not implemented during FEED?
  - a) Yes
  - b) No





# Audience Participation

4. Do you believe WorkFace Panning can add value to all projects?
  - a) Yes
  - b) No



# Audience Participation

5. Do you use a 3D Visual Tool to help you assemble FIWPs?
  - a) Yes
  - b) No





# Building Work Packages



# Session Format

- **Introduction**
- **Overview of the COAA approach to building Work Packages**
- **The Graham approach to building work packages**
- **The JV Driver approach to building work packages**
- **The Ledcor approach to building work packages**
- **Audience participation**
- **Questions to panel**



# What is in an FIWP?



# The COAA Approach to Building Work Packages

## Field Installation Work Packages (FIWP)

<b>Page 1</b>	<b>3D Coversheet</b>	<b>Attachments</b>
<b>Page 2</b>	<b>Coversheet</b>	<b>Technical Documentation</b>
<b>Page 3</b>	<b>Contents</b>	○ <b>ISO List</b>
<b>Page 4</b>	<b>Work Scope</b>	○ <b>Spool List</b>
<b>Page 5</b>	<b>EH&amp;S Introduction</b>	○ <b>Drawings</b>
<b>Page 6</b>	<b>EH&amp;S site info</b>	<b>Material Forecast</b>
<b>Page 7</b>	<b>QA / QC Requirements</b>	<b>Score Cards</b>
<b>Page 8</b>	<b>Tools and Consumables</b>	○ <b>Spool Score Card</b>
<b>Page 9</b>	<b>Check List</b>	○ <b>Weld Score Card</b>
<b>Page 10</b>	<b>Scaffold Request</b>	<b>3D Model Shots</b>
		<b>Other</b>
		○ <b>Lessons Learned</b>
		○ <b>Notes</b>



# The COAA Approach to Building Work Packages

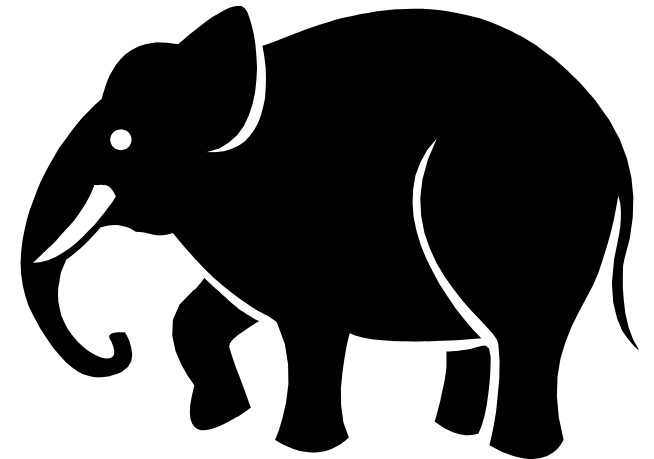
- **Who develops the FIWP?**
- **FIWPs are developed by dedicated planners (crafts people or engineering types with construction experience).**
- **Note: In some cases General Foremen or superintendents may develop the FIWP**





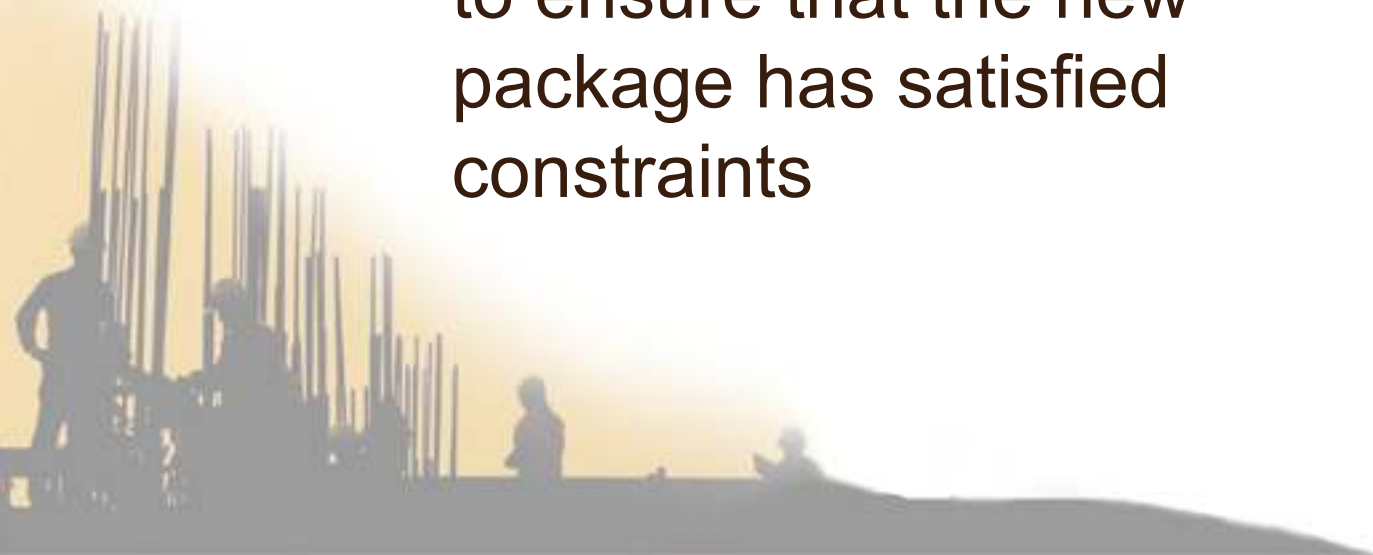
# The COAA Approach to Building Work Packages

- **How big is an FIWP?**
  - Normally 500 to 1000 hours (but varies based on discipline and work being done)



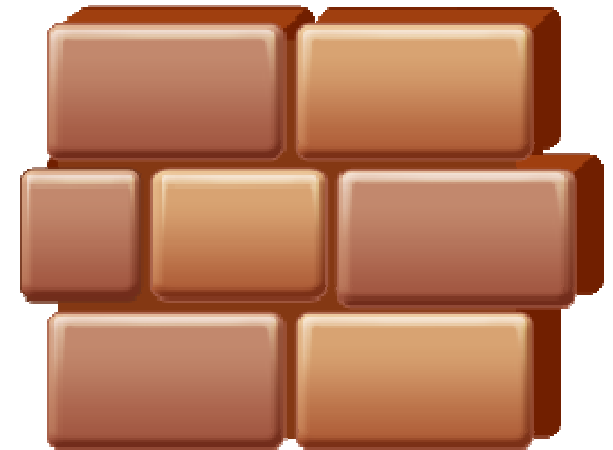
# The COAA Approach to Building Work Packages

- **Can you use an FIWP that doesn't have satisfied constraints?**
  - Not normally, but you can modify the package to ensure that the new package has satisfied constraints



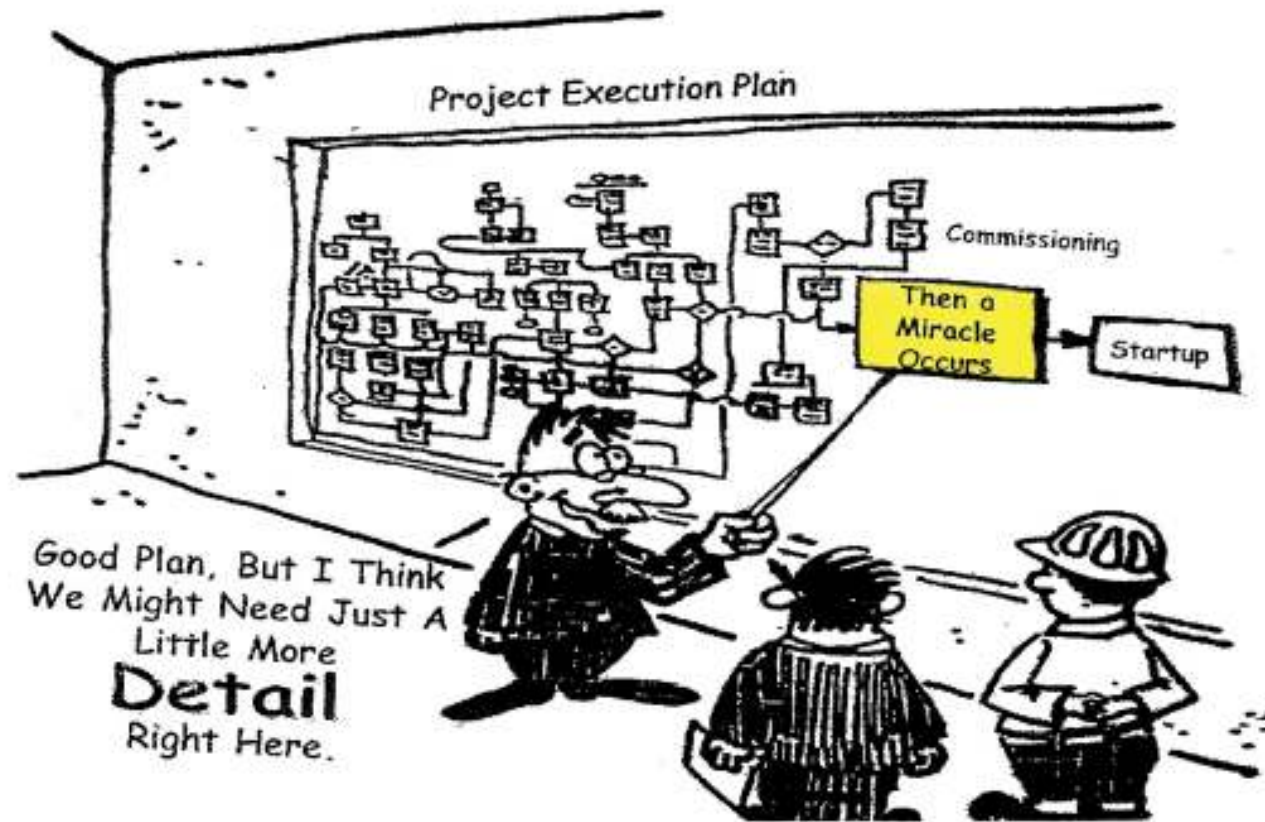
# The COAA Approach to Building Work Packages

- **What are FIWP built from?**
  - Typically FIWPs are developed from Construction Work Packages but we are seeing FIWP developed directly from Engineering Work packages



# The Graham Approach to Building Work Packages

*Traditional execution:*



# The Graham Approach to Building Work Packages



- Information
- Materials
- Tools
- Equipment
- Resources
- Access to the Workface



Scope  
Drawings  
Planned Value  
Schedule Dates  
Material Confirmation  
Construction Equipment  
Scaffold Requirements  
Safety  
Quality Control  
Labour  
Permit  
Requirements

# The Graham Approach to Building Work Packages

## *Workface Planning Applied to Earthmoving*





# The Graham Approach to Building Work Packages

## *Workface Planning Applied to Earthmoving*

- **Standard set of FIWPs**
- **FIWPs applied to a Lift (not to a foreman)**
- **Foremen build daily plans to satisfy the FIWP**
- **Foremen report barriers daily**





# The Graham Approach to Building Work Packages

## *Beyond the COAA Model:*

- WorkFace Planners develop execution plans with their superintendents for each EWP
- EP guides development of FIWPs
- Standard earthmoving FIWPs (procedures)
- Earthmoving FIWPs assigned to the task not the crew.
- Foremen create daily plans
- Barriers are logged and managed daily
- Subcontract FIWPs: built by our planners with guidance from their supervision

# The JV Driver Approach to Building Work Packages

## Wedding Scenario:



# The JV Driver Approach to Building Work Packages





# The JV Driver Approach to Building Work Packages

## ➔ FIWP Stakeholders

- ✓ Planners are in the Field
- ✓ Extract components to build the FIWP
  - HS&E
  - Quality
  - Project Controls
  - Schedule
  - Material Management
  - Document Control



**APPROVED**

# The JV Driver Approach to Building Work Packages

## ➔ FIWP Stakeholders

- ✓ Planners are in the Field
- ✓ Extract components to build the FIWP
  - HS&E
  - Quality
  - Project Controls
  - Schedule
  - Material Management
  - Document Control



**APPROVED**

- TCCC (Turnover, Care, Custody and Control)



COOAA  
Construction Owners  
Association of Alberta

## • ITPs are returned Certified Complete

# The JV Driver Approach to Building Work Packages

- Red Line Drawings
- As Built Drawings
- Construction Punch List
- Signed and Completed ITPs
- Confirmation of Construction Completion
- Precommissioning





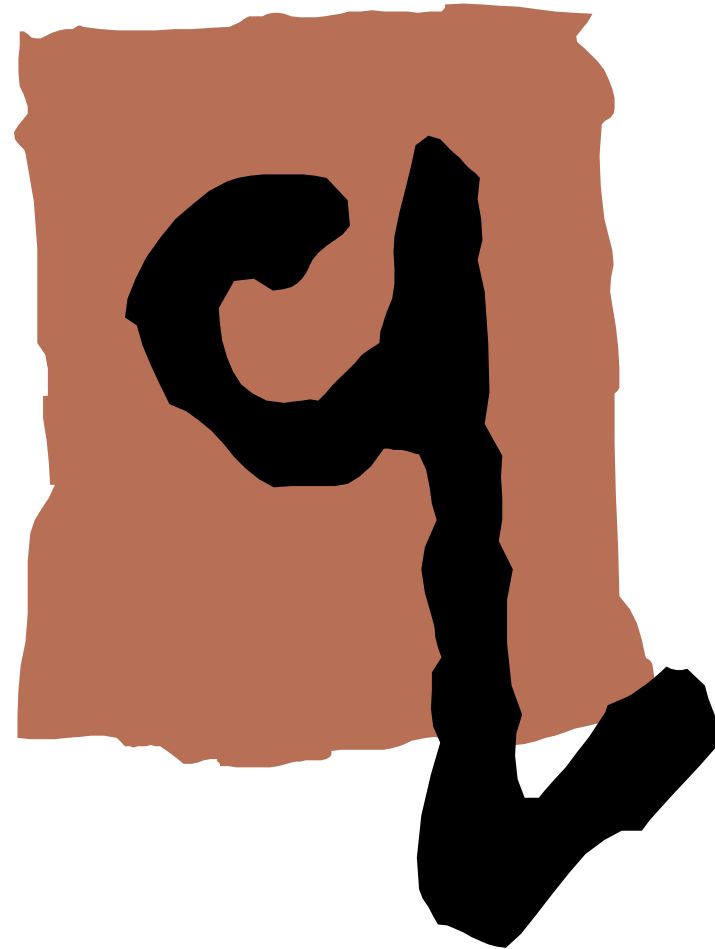
# The Ledcor Approach to Building Work Packages

## *Building Foreman's Workface Packages*





# Question-and-Answer Period



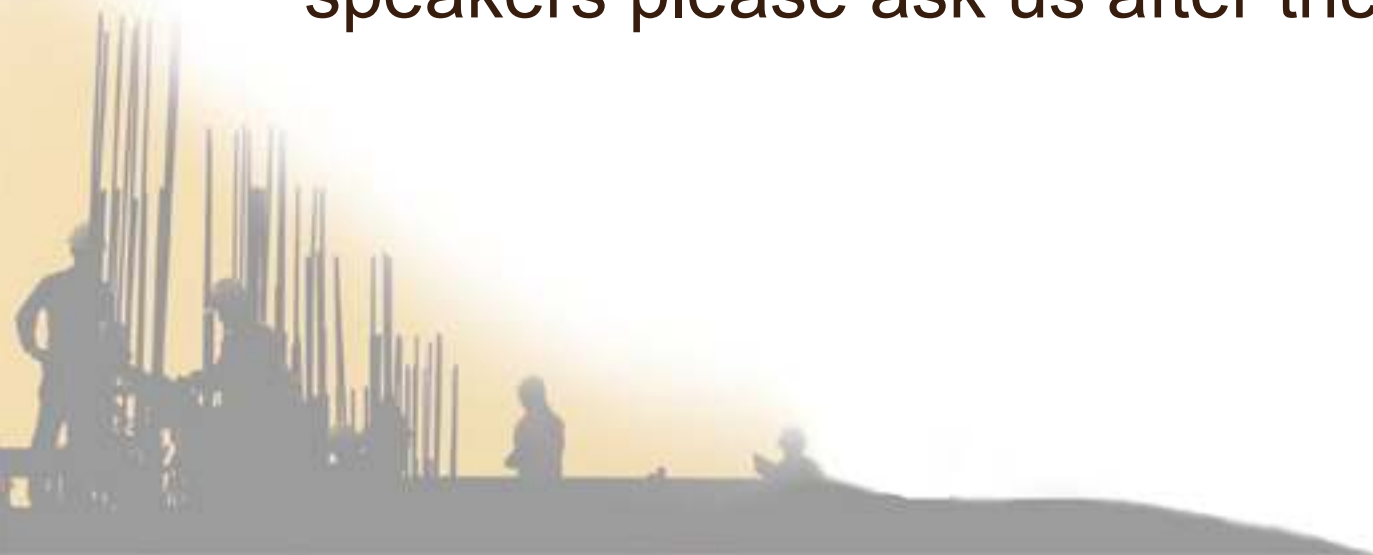
# AUDIENCE FEEDBACK

**NOTE: The information collected is anonymous and may be used for research purposes. By participating, you are giving your consent for the use of this data.**



# Closing Comments

- Thanks for attending this session and providing us with your feedback
- If you have any further questions for any of the speakers please ask us after the session



# Building Foreman's Workface Packages

WFP Conference 2010  
Calgary, Alberta  
December 1, 2010

FORWARD  
TOGETHER

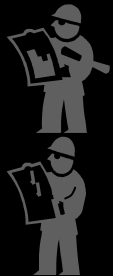


# Introduction to FIWP Planning

“Plan the Work”

“Release the Work”

“Work the Plan”



Dedicated Planner

Materials & Equipment Coordinators



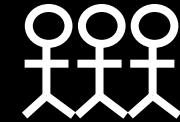
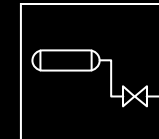
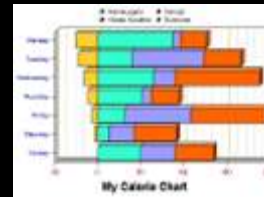
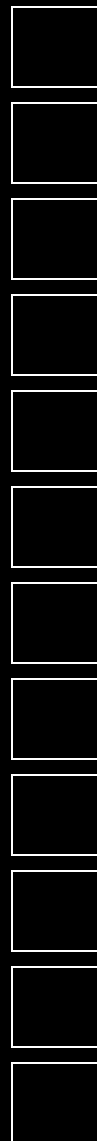
Supervisor

Prerequisites

## Field Installation Work Package

- Materials
- Tools
- Equipment
- Trades/Specialists
- Detailed Plan
- Drawings
- Vendor Info.
- Safety Requirements
- Supervisor Review
- Safety and QA

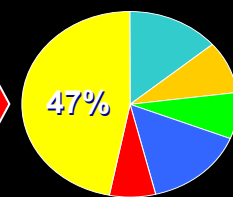
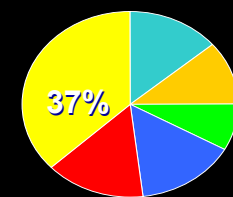
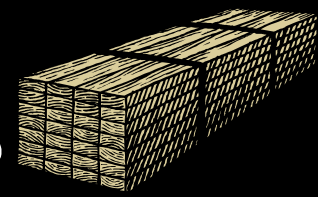
Ready  
✓



Team



Tools



Tool Time Improvement

# GOAL

The goal of Workface Planning is to improve performance by:

- Develop a usable and practical standard planning tool to significantly increase productivity, reduce rework and enhance the probability of project success
- Create and maintain discipline and foster honest communication to proactively resolve issues before and as they arise
- The FIWP process will be a continuously improving body of knowledge
- Based on the COAA Best Practices

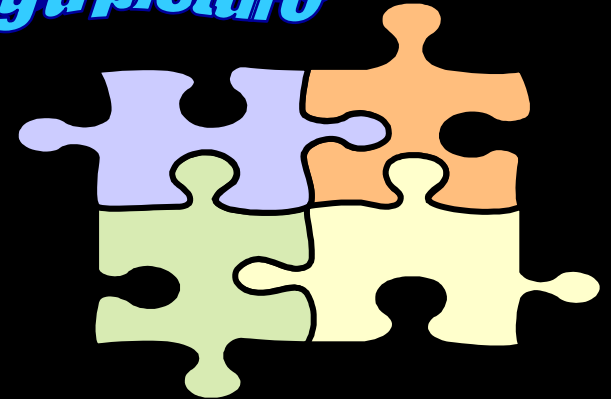


# PLAN THE WORK

*A Field Installation Work Package is a comprehensive package of Information that describes a specific scope of work in detail and typically includes:*

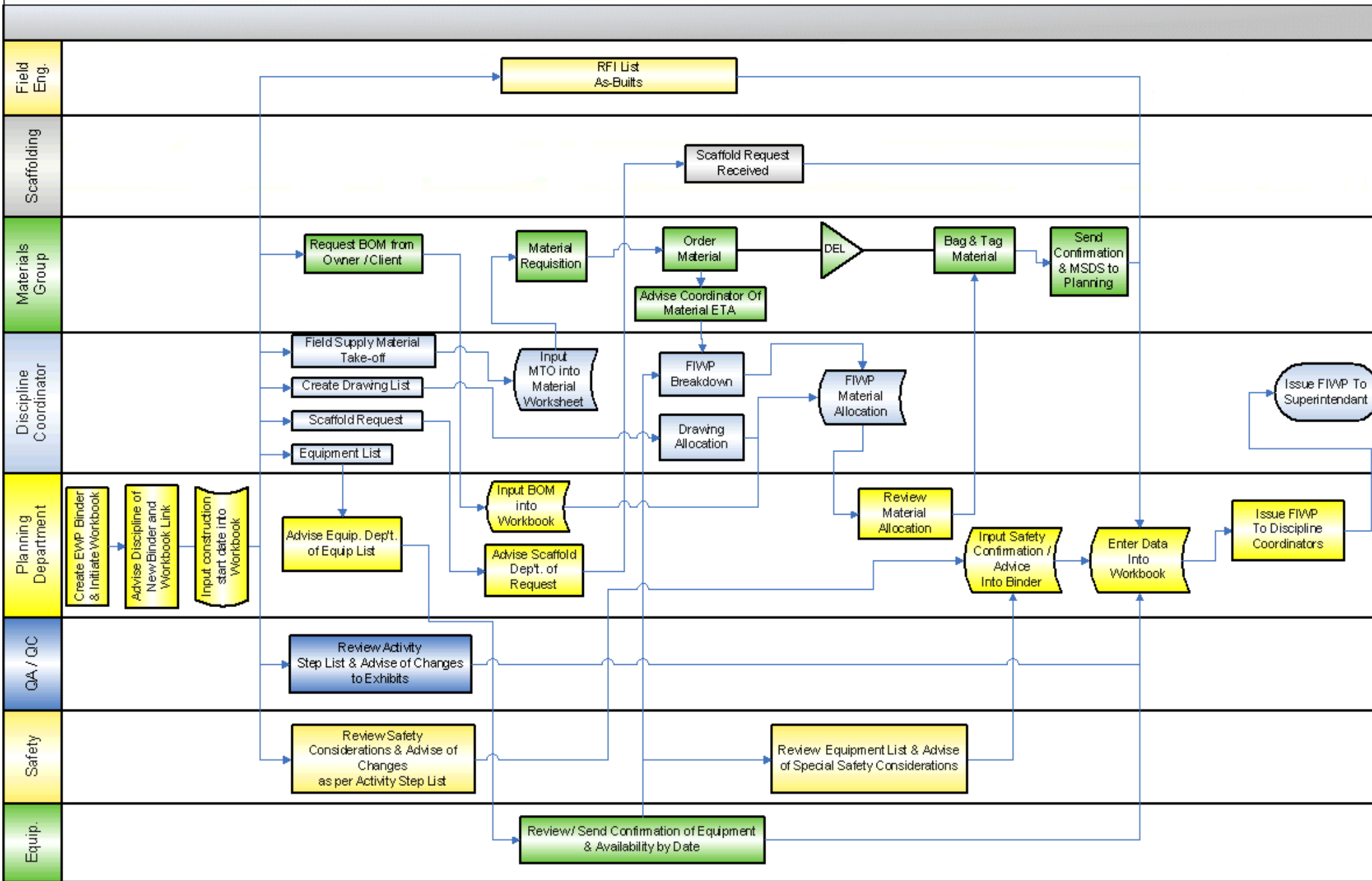
- Safety & Quality considerations
- Discipline Drawings
- Material requirements
- Inspection & Test Certification
- Estimated number of man-hours
- Schedule
- Additional information... (To benefit the construction/ implementation team.)

*Building a picture*

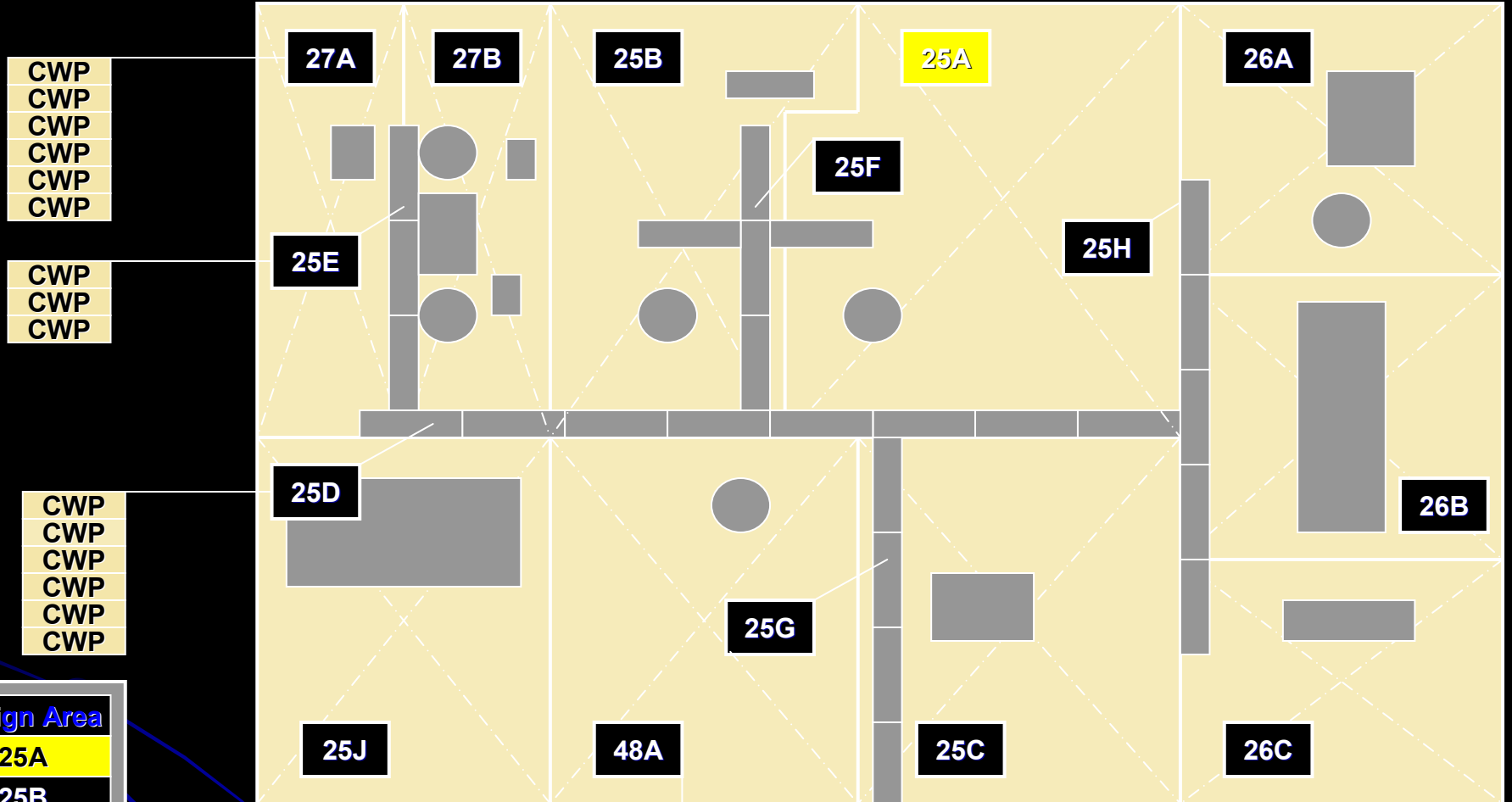




# Ledcor Industrial – Workflow Process - EWP Breakdown Life Cycle



# CWP Demarcation / Identification



Design Area Ref's

Key Plan Diagram

25K Undergrounds

Design Area
25A
25B
25C
25D
25E
25F
25G
25H

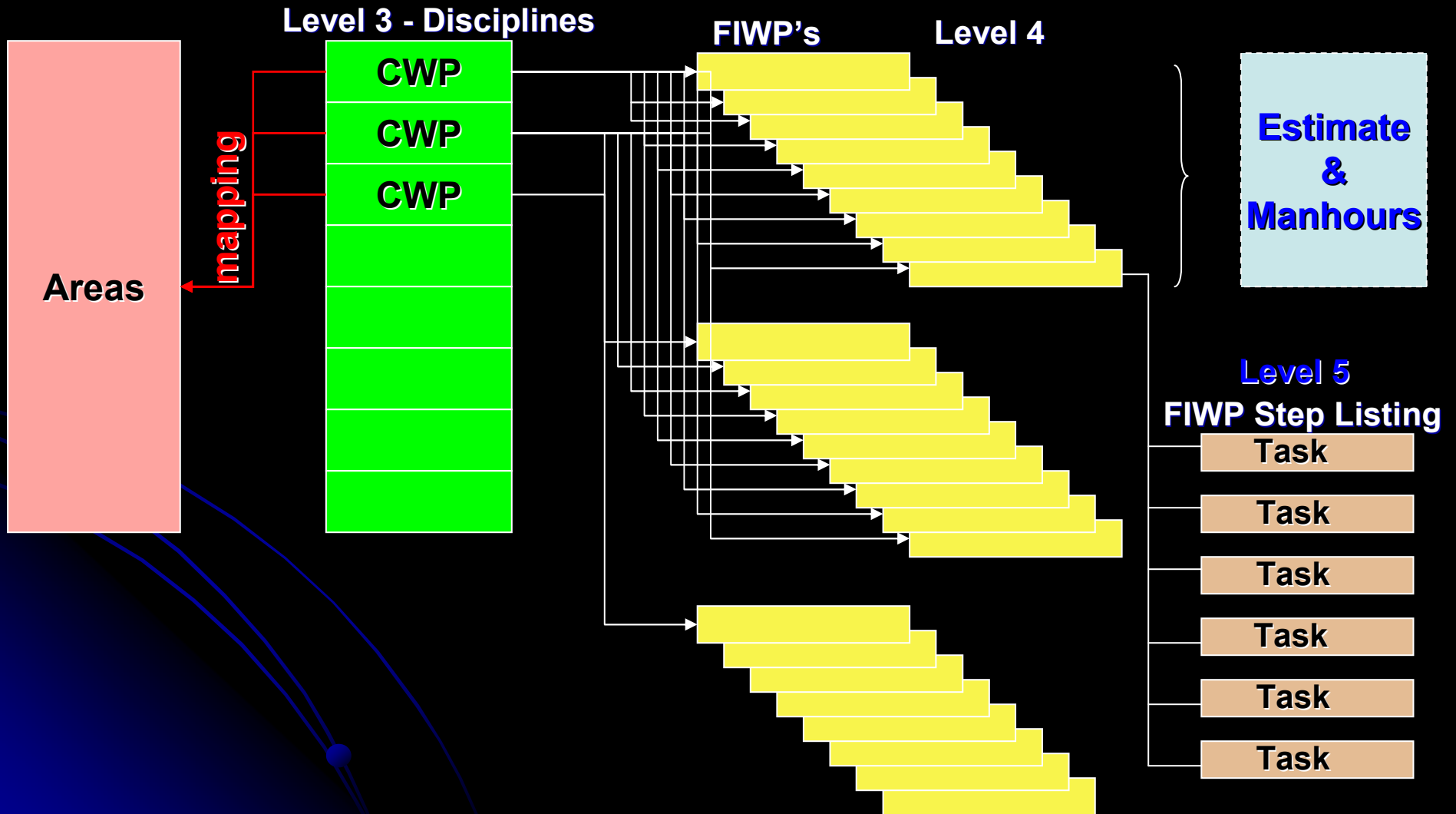
- Design Area(s) are broken into a series of Construction Work Pkgs (CWP)
- CWPs are agreed to with Engineering prior to construction

# Packaging Work for FIWP's

2<sup>nd</sup> Step

1<sup>st</sup> Step (Typically determined by area)

3<sup>rd</sup> Step



# Foreman's Workface Package Preparation Guiding Principles

- Keep it SIMPLE
- Practical and User Friendly
- Understandable
- Standardize Tools
- Continuous Improvement



# Packaging Work for FIWP's (cont')

## 4<sup>th</sup> Step Create FIWP

### FIWP Document Template

1. Introduction
2. Health Safety & Environmental
3. Scope Of Work
4. Drawings & Data
5. Material Data
6. Inspection & Test Plan (QA/QC)
7. Operation & Maintenance
8. Support Information



- Dedicated AND Experienced planners break out CWP's into specific Field Installation Work Packages (FIWP's)
- The consideration for FIWP Packages is commended during the detailed engineering phase

# 1.0 Introduction

General overview of the scope of work to be undertaken with specific attention to any items needing consideration by Construction implementation.





## 2.0 Health Safety & Environmental

- Hazard Management Activities
- Work Pack Risk Assessment
- Material Safety Data Sheets
- Task Risk Assessment
- Manual Handling
- Specialist Safety Requirements
- Provision & Use of Work Equip.
- Toolbox Talks





## 3.0 Scope of Work

- Piping
- Mechanical
- Instruments
- Electrical
- Civil/Structural
- HVAC
- **Job Cards / Activity Sheets**
- Joint Completion Matrix
- Lifting Requirements
- Engineering Queries
- Hydro/ Integrity Testing
  - **Planning**



## 4.0 Drawings & Data

- Piping
- Mechanical
- Instruments
- Electrical
- Civil/ Structural
- HVAC
- Architectural
- Lifting Requirements



## 5.0 Materials

### Material Requisitions

- Piping
- Mechanical
- Instruments
- Electrical
- Civil/Structural
- HVAC



# FIWP - SmartPlant Materials Integration

- Forecasts are created by Field Installation Work Package (FIWP) priority
  - Only Inventory – Identify lines with 100% material on hand
  - Approved Purchase Orders – Create shortage reports
- Shortage reports forwarded to expediting group
  - Identify possible long lead items impacting schedule
  - Focus expediting efforts where most needed
- Material list added to FIWP package and signed off
- Pick tickets for 100% on hand inventory packages forwarded to the warehouse for bag & tag and staging
  - Release Authorization from warehouse
  - Picked heat numbers recorded for later user by Quality Assurance Department

# Buildable List by FIWP



## BOM Summary Status Report

SUNCOR

Forecast Code	Run Number	Short Desc	Description	Type	Job Status	All Positions
9311-14-51	1	Tier 1	Batch B Tier 1	FR	FORECASTED	Yes
Issue Status	List Status	Allocate Level	Shortage	Split Type	Split Attribute	
Best Qty	0	Only inventory	2-Pass Optimized (Any)	None	Only inventory	

### Assigned Warehouses

Order Seq	Warehouse	Short Desc	Description	Company Code	Company Name
1		Mod Yard Warehouse	Mod Yard Warehouse 2		
		2			

### List of Work Packages:

Prio#	1
Work Package	9311-14-51

### BOM Status Report

Prio# 1 Work Package: 9311-14-51 Total BOM's: 10 Total 100% Issued: 0

BOM Path	Issue Progress	% Issued	Total List Qty	Total Allocated Qty	Actual Resv Qty	Total Issued Qty	Available
FIELD PPING ISO/99FR-9311-14/MT99-L-BD9003-14	None	0.0	3,000	0,000	3,000	0,000	Yes
FIELD PPING ISO/99FR-9311-14/MT99-L-BD9008-11	None	0.0	4,000	0,000	3,000	0,000	No
FIELD PPING ISO/99FR-9311-14/MT99-L-NG9035-3	None	0.0	3,000	0,000	3,000	0,000	Yes
FIELD PPING ISO/99FR-9311-14/MT99-L-P9003-3	None	0.0	2,000	0,000	2,000	0,000	Yes
FIELD PPING ISO/99FR-9311-14/MT99-L-P9003-4	None	0.0	1,000	0,000	1,000	0,000	Yes
FIELD PPING ISO/99FR-9311-14/MT99-L-P9003-5	None	0.0	1,000	0,000	1,000	0,000	Yes
FIELD PPING ISO/99FR-9311-14/MT99-L-P9015-26	None	0.0	3,000	0,000	0,000	0,000	No
FIELD PPING ISO/99FR-9311-14/MT99-L-PW9012-3	None	0.0	2,000	0,000	2,000	0,000	Yes
FIELD PPING ISO/99FR-9311-14/MT99-L-PW9012-4	None	0.0	1,000	0,000	1,000	0,000	Yes
FIELD PPING ISO/99FR-9311-14/MT99-L-PW9012-5	None	0.0	1,000	0,000	1,000	0,000	Yes

Reported by FIWP Package at Isometric Level

List of all Lines that are available to begin construction





## 6.0 Inspection & Test Certification

- Owner Specification/ Code Inspection & Test requirements
- Mechanical Completion Certification
- Punch lists
- Joint Integrity Certificate
- Integrity Test Certificate
- Control Completion Certificate (process control items)
- System Handover Certificate





## 7.0 Operation & Maintenance

- Operating Manual Updates
- Maintenance Routine Updates

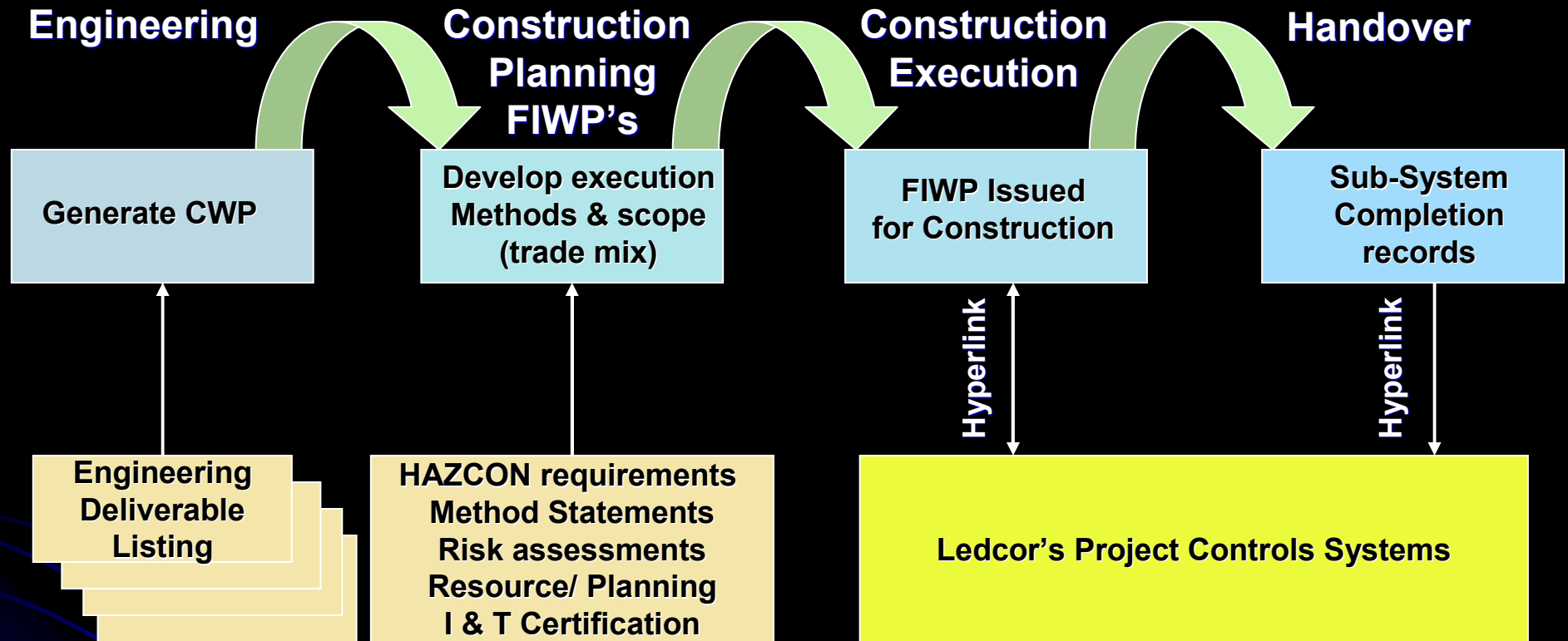


## 8.0 Additional Information

- Procedures/ Work Instructions
- Specifications
- Miscellaneous Data
- Weight Control
- Vendor Data
- Other Data



# FIWP – Release The Work



- Responsible parties, which are to always include the Foreman, review the completeness and accuracy of the FIWP package prior to commencing work in the field
- Superintendents/PMs/Coordinators make final go/no-go decisions on FIWP release
- Foremen execute FIWP's
- Project Controls monitor FIWP's
- Quality Assurance audit FIWP's

# SUMMARY

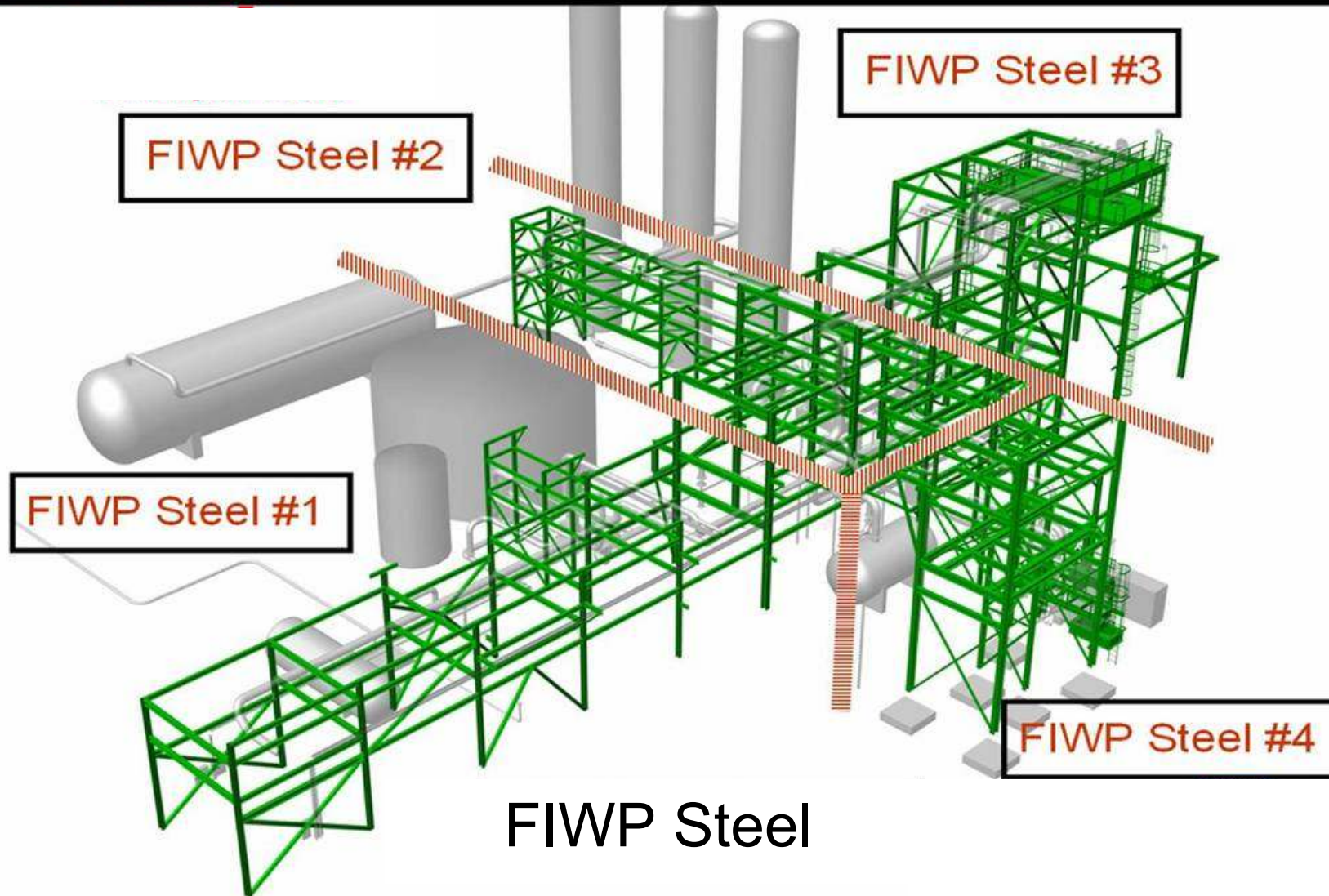
The Ledcor Group...Workface Planning to improve performance by:

- Planning using Practical methods
- Making the “Bar” clear
- Creating discipline
- Proactively resolving issues
- Significantly increasing productivity
- Reducing rework
- Continuously Improving





# OPEN PANEL DISCUSSION



# How Big is an FIWP Package?

Use Common Sense: It is a package of work as would normally be given to a foreman to build.

- Work for an FIWP is to be discipline specific and to a individual Foreman's crew.
- The size of an FIWP can depend on the complexity of the work. Therefore work may be of longer (or shorter) than 2-3 weeks in duration. (example - Large concrete foundation (4 weeks), setting a piece of equipment (4 days).)
- FIWP packaging needs to align with all systems. (i.e. Estimating, FWP, Schedule)
- An FIWP may remain 'open' for longer periods (on hold at <100% complete) awaiting the completion of dependant and integrated activities from another FIWP. (example - Final termination of a group of cables, may be on hold until the equipment is set.)



## Clarifier Base – *Concrete Pour*



# OIL SANDS PROJECT



Heavy lift of rotary crusher at C&C silo



First pipe module being set at U&O silo



# Oilsands SAGD Expansion *Setting OTSG Stack*



# DIAMOND MINE – *Structural Steel*



# Central Processing Plant – *PIPERACK MODULES*



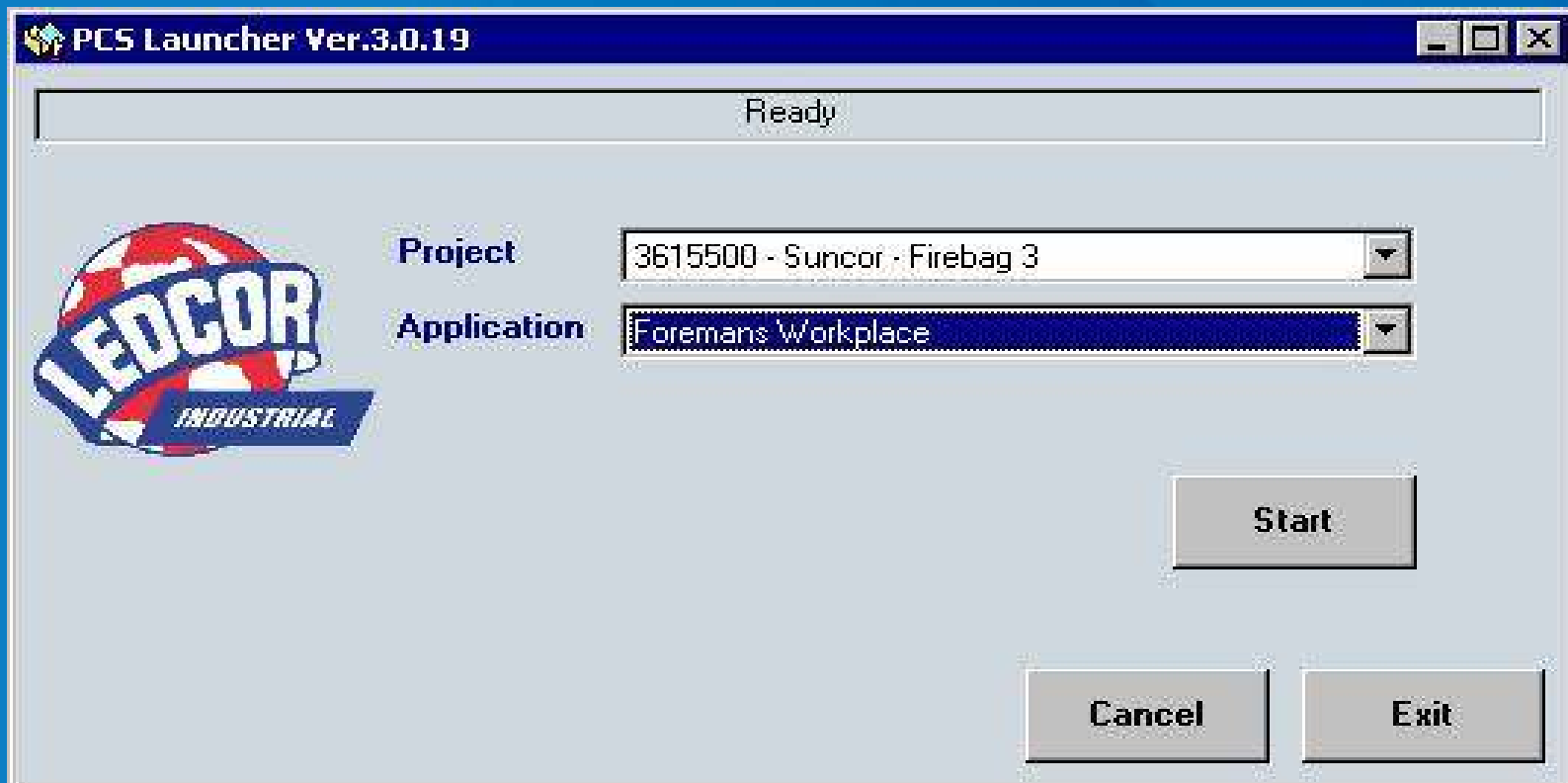


# HEAT TRACING

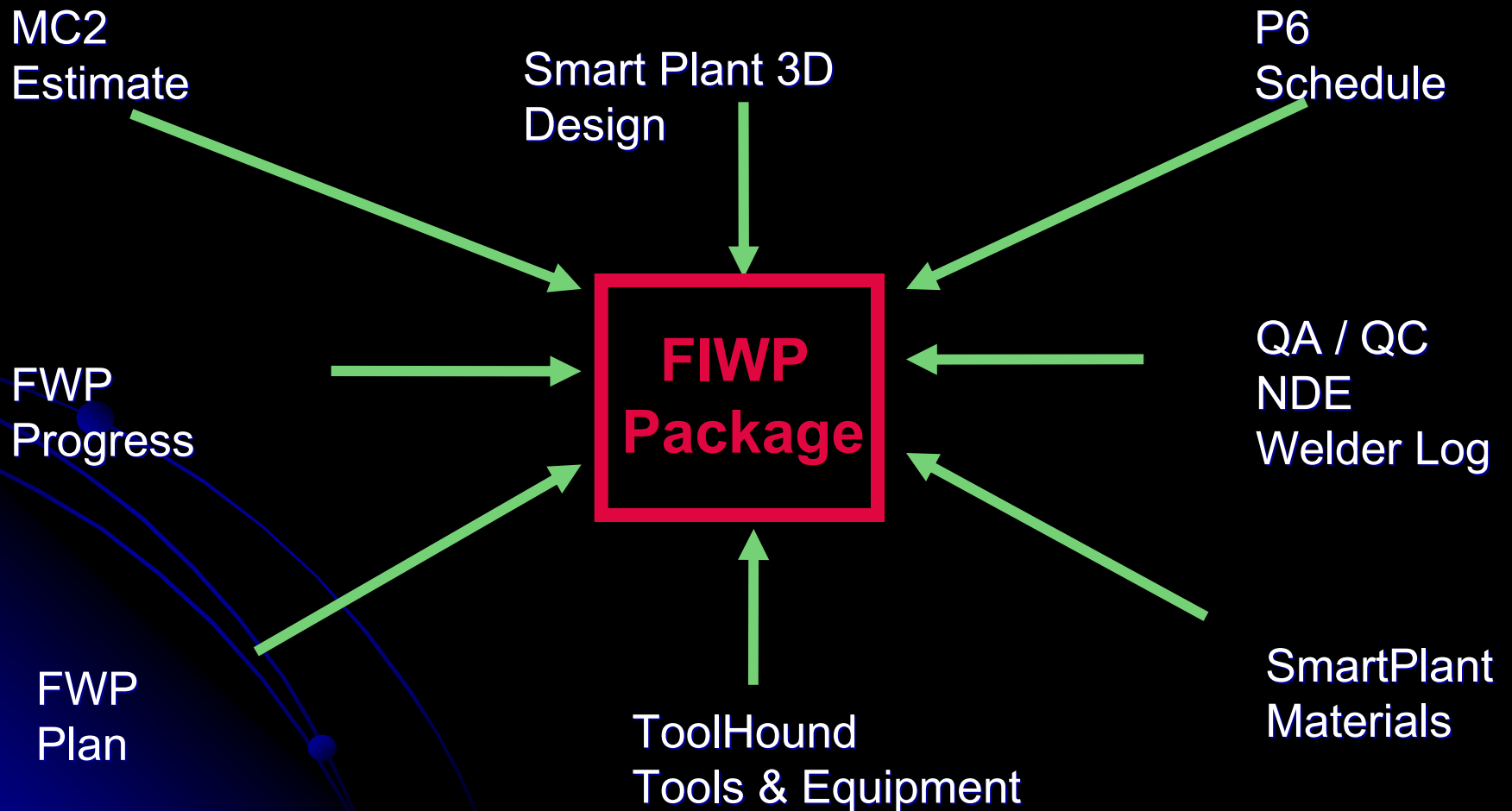




# Progress Monitoring and Control of FIWPs



# Field Installation Work Package (FIWP) Planning Interfaces



# Foreman's Workplace

- Foreman's Planning Tool
- Compile Earned Progress
- Report Earned Progress by
  - Foreman
  - Schedule ID
  - JDE Cost Code
  - System
  - CWP
  - FIWP
- Data from IFC estimate information
- Worksheets continually updated to reflect current scope of work

The screenshot displays a software interface for project management. At the top, it shows 'Project: 000000', 'User Name: lgsu@it', and 'Category: Concrete'. Below this is a table with the following columns: 'Item ID & Prio', 'Description', and 'Attributes'. The 'Attributes' column is further divided into sub-columns: 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'J', 'K', 'L', 'M', 'N', 'O', 'P', 'Q', 'R', 'S', 'T', 'U', 'V', 'W', 'X', 'Y', 'Z', 'AA', 'AB', 'AC', 'AD', 'AE', 'AF', 'AG', 'AH', 'AI', 'AJ', 'AK', 'AL', 'AM', 'AN', 'AO', 'AP', 'AQ', 'AR', 'AS', 'AT', 'AU', 'AV', 'AW', 'AX', 'AY', 'AZ', 'BA', 'BB', 'BC', 'BD', 'BE', 'BF', 'BG', 'BH', 'BI', 'BJ', 'BK', 'BL', 'BM', 'BN', 'BO', 'BP', 'BQ', 'BR', 'BS', 'BT', 'BU', 'BV', 'BW', 'BX', 'BY', 'BZ', 'CA', 'CB', 'CC', 'CD', 'CE', 'CF', 'CG', 'CH', 'CI', 'CJ', 'CK', 'CL', 'CM', 'CN', 'CO', 'CP', 'CQ', 'CR', 'CS', 'CT', 'CU', 'CV', 'CW', 'CX', 'CY', 'CZ', 'DA', 'DB', 'DC', 'DD', 'DE', 'DF', 'DG', 'DH', 'DI', 'DJ', 'DK', 'DL', 'DM', 'DN', 'DO', 'DP', 'DQ', 'DR', 'DS', 'DT', 'DU', 'DV', 'DW', 'DX', 'DY', 'DZ', 'EA', 'EB', 'EC', 'ED', 'EE', 'EF', 'EG', 'EH', 'EI', 'EJ', 'EK', 'EL', 'EM', 'EN', 'EO', 'EP', 'EQ', 'ER', 'ES', 'ET', 'EU', 'EV', 'EW', 'EX', 'EY', 'EZ', 'FA', 'FB', 'FC', 'FD', 'FE', 'FF', 'FG', 'FH', 'FI', 'FJ', 'FK', 'FL', 'FM', 'FN', 'FO', 'FP', 'FQ', 'FR', 'FS', 'FT', 'FU', 'FV', 'FW', 'FX', 'FY', 'FZ', 'GA', 'GB', 'GC', 'GD', 'GE', 'GF', 'GG', 'GH', 'GI', 'GJ', 'GK', 'GL', 'GM', 'GN', 'GO', 'GP', 'GQ', 'GR', 'GS', 'GT', 'GU', 'GV', 'GW', 'GX', 'GY', 'GZ', 'HA', 'HB', 'HC', 'HD', 'HE', 'HF', 'HG', 'HH', 'HI', 'HJ', 'HK', 'HL', 'HM', 'HN', 'HO', 'HP', 'HQ', 'HR', 'HS', 'HT', 'HU', 'HV', 'HW', 'HX', 'HY', 'HZ', 'IA', 'IB', 'IC', 'ID', 'IE', 'IF', 'IG', 'IH', 'II', 'IJ', 'IK', 'IL', 'IM', 'IN', 'IO', 'IP', 'IQ', 'IR', 'IS', 'IT', 'IU', 'IV', 'IW', 'IX', 'IY', 'IZ', 'JA', 'JB', 'JC', 'JD', 'JE', 'JF', 'JG', 'JH', 'JI', 'JJ', 'JK', 'JL', 'JM', 'JN', 'JO', 'JP', 'JQ', 'JR', 'JS', 'JT', 'JU', 'JV', 'JW', 'JX', 'JY', 'JZ', 'KA', 'KB', 'KC', 'KD', 'KE', 'KF', 'KG', 'KH', 'KI', 'KJ', 'KL', 'KM', 'KN', 'KO', 'KP', 'KQ', 'KR', 'KS', 'KT', 'KU', 'KV', 'KW', 'KX', 'KY', 'KZ', 'LA', 'LB', 'LC', 'LD', 'LE', 'LF', 'LG', 'LH', 'LI', 'LJ', 'LK', 'LL', 'LM', 'LN', 'LO', 'LP', 'LQ', 'LR', 'LS', 'LT', 'LU', 'LV', 'LW', 'LX', 'LY', 'LZ', 'MA', 'MB', 'MC', 'MD', 'ME', 'MF', 'MG', 'MH', 'MI', 'MJ', 'MK', 'ML', 'MM', 'MN', 'MO', 'MP', 'MQ', 'MR', 'MS', 'MT', 'MU', 'MV', 'MW', 'MX', 'MY', 'MZ', 'NA', 'NB', 'NC', 'ND', 'NE', 'NF', 'NG', 'NH', 'NI', 'NJ', 'NK', 'NL', 'NM', 'NN', 'NO', 'NP', 'NQ', 'NR', 'NS', 'NT', 'NU', 'NV', 'NW', 'NX', 'NY', 'NZ', 'OA', 'OB', 'OC', 'OD', 'OE', 'OF', 'OG', 'OH', 'OI', 'OJ', 'OK', 'OL', 'OM', 'ON', 'OO', 'OP', 'OQ', 'OR', 'OS', 'OT', 'OU', 'OV', 'OW', 'OX', 'OY', 'OZ', 'PA', 'PB', 'PC', 'PD', 'PE', 'PF', 'PG', 'PH', 'PI', 'PJ', 'PK', 'PL', 'PM', 'PN', 'PO', 'PP', 'PQ', 'PR', 'PS', 'PT', 'PU', 'PV', 'PW', 'PX', 'PY', 'PZ', 'QA', 'QB', 'QC', 'QD', 'QE', 'QF', 'QG', 'QH', 'QI', 'QJ', 'QK', 'QL', 'QM', 'QN', 'QO', 'QP', 'QQ', 'QR', 'QS', 'QT', 'QU', 'QV', 'QW', 'QX', 'QY', 'QZ', 'RA', 'RB', 'RC', 'RD', 'RE', 'RF', 'RG', 'RH', 'RI', 'RJ', 'RK', 'RL', 'RM', 'RN', 'RO', 'RP', 'RQ', 'RR', 'RS', 'RT', 'RU', 'RV', 'RW', 'RX', 'RY', 'RZ', 'SA', 'SB', 'SC', 'SD', 'SE', 'SF', 'SG', 'SH', 'SI', 'SJ', 'SK', 'SL', 'SM', 'SN', 'SO', 'SP', 'SQ', 'SR', 'SS', 'ST', 'SU', 'SV', 'SW', 'SX', 'SY', 'SZ', 'TA', 'TB', 'TC', 'TD', 'TE', 'TF', 'TG', 'TH', 'TI', 'TJ', 'TK', 'TL', 'TM', 'TN', 'TO', 'TP', 'TQ', 'TR', 'TS', 'TT', 'TU', 'TV', 'TW', 'TX', 'TY', 'TZ', 'UA', 'UB', 'UC', 'UD', 'UE', 'UF', 'UG', 'UH', 'UI', 'UJ', 'UK', 'UL', 'UM', 'UN', 'UO', 'UP', 'UQ', 'UR', 'US', 'UT', 'UU', 'UV', 'UW', 'UX', 'UY', 'UZ', 'VA', 'VB', 'VC', 'VD', 'VE', 'VF', 'VG', 'VH', 'VI', 'VJ', 'VK', 'VL', 'VM', 'VN', 'VO', 'VP', 'VQ', 'VR', 'VS', 'VT', 'VU', 'VV', 'VW', 'VX', 'VY', 'VZ', 'WA', 'WB', 'WC', 'WD', 'WE', 'WF', 'WG', 'WH', 'WI', 'WJ', 'WK', 'WL', 'WM', 'WN', 'WO', 'WP', 'WQ', 'WR', 'WS', 'WT', 'WU', 'WV', 'WW', 'WX', 'WY', 'WZ', 'XA', 'XB', 'XC', 'XD', 'XE', 'XF', 'XG', 'XH', 'XI', 'XJ', 'XK', 'XL', 'XM', 'XN', 'XO', 'XP', 'XQ', 'XR', 'XS', 'XT', 'XU', 'XV', 'XW', 'XX', 'XY', 'XZ', 'YA', 'YB', 'YC', 'YD', 'YE', 'YF', 'YG', 'YH', 'YI', 'YJ', 'YK', 'YL', 'YM', 'YN', 'YO', 'YP', 'YQ', 'YR', 'YS', 'YT', 'YU', 'YV', 'YW', 'YX', 'YY', 'YZ', 'ZA', 'ZB', 'ZC', 'ZD', 'ZE', 'ZF', 'ZG', 'ZH', 'ZI', 'ZJ', 'ZK', 'ZL', 'ZM', 'ZN', 'ZO', 'ZP', 'ZQ', 'ZR', 'ZS', 'ZT', 'ZU', 'ZV', 'ZW', 'ZX', 'ZY', 'ZZ'.

# FWP – Levels of Detail

## PIPE



Area



CWP / EWP



FIWP



Line



ISO



Spool



Installation Progress

## CONCRETE



Design Area



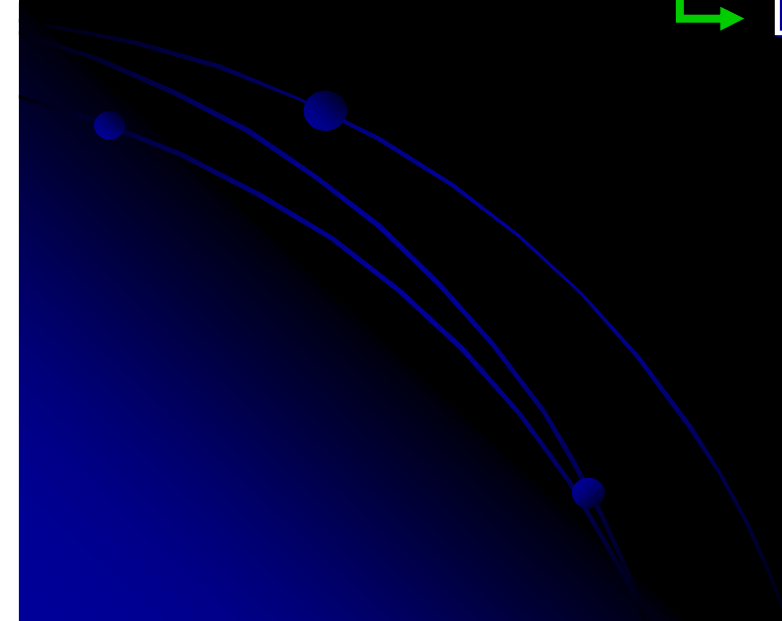
CWP / EWP



FIWP



Foundation



# Scorecard Components

## Concrete:

Item ID & Hrs		Descriptions										Activities													
SCOPEGROUP ID	SCHED	HRS	UM	DESCR	CWP	FWP	AREA	DRAWING	SYSTEM	PRIORITY	EXCAVATE	FORMWORK	ANCHOR BOLTS EMBEDS	REBAR	CC RELEASE	PLACE CONCRETE FINISH	STRIP FORMS	PATCH & RUB	PREBACKFILL PREP	CC RELEASE 2	BACKFILL COMPACT	TURNOVER	COMPLETE		
5	LCC23A08-C	435.3	MB	(#12) N/S Elev Beam-West	23A08		23A	005B-210-03				0%	0%											0%	
10	LCC23A08-C	1,287.2	MB	(#4) Complete E/W South B	23A08		23A	005B-210-03																	0%
15	LCC23A08-C	208.8	MB	(#7) N/S Elev Beam-Central	23A08		23A	005B-210-03																	0%

## Piping:

Item ID & Hrs		Descriptions											Activities														
SCOPEGROUP ID	SCHED	HRS	FWP	AREA	DRAWING	SYSTEM	PRIORITY	SPOOL	SIZE	ISOMETRIC	FLD DIA INCHES	TESTPACK	GLYCOL TRACE	WEIGHT	RECEIVED	SHAKEOUT DISTRIBUTE	RIGGED	BOLT-UPS	FIELD WELD	SUPPORTS	RELEASED FOR HYDRO	PREHYDRO WORK	HYDROTEST	REINSTATE	INSULATE	TURNOVER	COMPLETE
5	LCC14289-C	5.0	321.5	142	E456	CAB			12	142-BW421C	12	321	Y		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			0%
10	LCC14289-C	61.1	321.6	142	E235	CAB			12	142-BW480C	12	331	N		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			0%
15	LCC14289-C	51.1	142			BWS			10	142-BW480C	10	215	N		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			0%

- Itemized scope of work
- Schedule IDs
- Estimate MHs
- Area/System/EWP/Line#/Iso#/Priority/etc...
- Activity steps

# FWP Main Screen

LEDCOR FWP - [Project: 3615500 -> FWP: Concrete -> User: gbarlage -> Version: 4.1.91 ]

Project: 3615500 User: gbarlage 02-Dec-07 08-Dec-07 Change Category Grouping Refresh % Full Collapse

Item ID & Hrs			Descriptions						Activities													
SCOPEGROUP ID	SCHED	HRS	UM	DESCR	CWP	FWP	AREA	DRAWING	EXCAVATE	FORMWORK	ANCHOR BOLTS EMBEDS	REBAR	OC RELEASE	PLACE CONCRETE FINISH	STRIP FORMS	PATCH & RUB	PREBACK/FILL PREP	OC RELEASE 2	BACKFILL COMPACT	TURNOVER	COMPLETE	
215	3550245003	55.1	MG	G.B. Sec.C B-1 to C-1	EWP-E2-10-02-4	E2-10-02-4-02	3615520	D093-0-5042-1	C	C	C	C										51%
210	3550245003	55.1	MG	G.B. Sec.C A4 to B-4	EWP-E2-10-02-4	E2-10-02-4-02	3615520	D093-0-5042-1	C	C	C	C	22%	3%								51%
205	3550245003	56.5	MG	G.B. Sec.C A4 to A3	EWP-E2-10-02-4	E2-10-02-4-02	3615520	D093-0-5042-1	C	C	C	C										50%
200	3550245003	64.4	MG	G.B. Sec.C A3 to A2	EWP-E2-10-02-4	E2-10-02-4-02	3615520	D093-0-5042-1	C	C	C	C	80%	52%	7%							51%
195	3550245003	56.5	MG	G.B. Sec.C A2 to A1	EWP-E2-10-02-4	E2-10-02-4-02	3615520	D093-0-5042-1	C	C	C	C	55%									50%
190	3550245003	55.1	MG	G.B. Sec.C A1 to B-1	EWP-E2-10-02-4	E2-10-02-4-02	3615520	D093-0-5042-1	C	C	C	C	22%	10%								51%
185	3603030000	2,857.4	MG	Floor Slab - Structural	EWP-E1-10-02-4	E1-10-02-4-01	3615510	D093-0-3060-2	C	20%												2%
180	3603030000	3,390.4	MG	Floor Slab - Cellular	EWP-E1-10-02-4	E1-10-02-4-01	3615510	D093-0-3060-2	C	20%												2%
175	3550245003	360.3	MG	F5060-5	EWP-E2-10-02-4	E2-10-02-4-02	3615520	D093-0-5041-6	C	C	C	C	C	C	C	C	C	C	C	C	C	99%
170	3550245003	148.5	MG	F5060-4	EWP-E2-10-02-4	E2-10-02-4-02	3615520	D093-0-5041-4	C	C	C	C	C	C	C	C	C	C	C	C	C	100%
165	3550245003	602.0	MG	F5060-3	EWP-E2-10-02-4	E2-10-02-4-02	3615520	D093-0-5041-5	C	C	C	C	C	C	C	C	C	C	C	C	C	99%
160	3550245003	276.2	MG	F5060-2	EWP-E2-10-02-4	E2-10-02-4-02	3615520	D093-0-5041-4	C	C	C	C	C	C	C	C	C	C	C	C	C	99%
155	3550245003	98.9	MG	F5060-1 FDN TYPE 2	EWP-E2-10-02-4	E2-10-02-4-02	3615520	D093-0-5041-3	C	C	C	C	C	C	C	C	C	C	C	C	C	100%
150	3550245003	98.9	MG	F5060-1 FDN TYPE 1	EWP-E2-10-02-4	E2-10-02-4-02	3615520	D093-0-5041-3	C	C	C	C	C	C	C	C	C	C	C	C	C	100%
145	3550245003	2,484.2	MG	F5060-1	EWP-E2-10-02-4	E2-10-02-4-02	3615520	D093-0-5041-2	C	C	C	C	C	C	C	C	C	C	C	C	C	99%
140	3550245003	360.3	MG	F5045-5	EWP-E2-10-02-4	E2-10-02-4-02	3615520	D093-0-5041-6	C	C	C	C	C	C	C	C	C	C	C	C	C	99%
135	3550245003	148.5	MG	F5045-4	EWP-E2-10-02-4	E2-10-02-4-02	3615520	D093-0-5041-4	C	C	C	C	C	C	C	C	C	C	C	C	C	100%
130	3550245003	602.0	MG	F5045-3	EWP-E2-10-02-4	E2-10-02-4-02	3615520	D093-0-5041-5	C	C	C	C	C	C	C	C	C	C	C	C	C	99%
125	3550245003	276.2	MG	F5045-2	EWP-E2-10-02-4	E2-10-02-4-02	3615520	D093-0-5041-4	C	C	C	C	C	C	C	C	C	C	C	C	C	99%
120	3550245003	98.9	MG	F5045-1 FDN TYPE 2	EWP-E2-10-02-4	E2-10-02-4-02	3615520	D093-0-5041-3	C	C		C	C	C	C	C	C	C	C	50%		72%

- Sort and filter immediately by any column
- Edit information directly on screen
- Progress activities by percentage complete
- Progress by standard sets of activities in a step-by-step manner



# Construction to Production FWP Seamless Transition...

LEDCOR FWP - [Project: 3010068 --> FWP: Piping --> User: gbarlage --> Version: 4.1.105]

Utilities Menu Exit

Project: 3010068 User: gbarlage 07-Oct-2007 13-Oct-2007 Change Cat

Item ID & Hrs				Descriptions					RECEIVED
SCOPEGROUP	SCHED	HRS	QTY	UM	DESCR	CWP	ISOMETRIC	SYSTEM	RECEIVED
5	LR-A20900	83.3	4	M	3100-825	31205110	3900-133-05	4300-6	C
10	LR-A20900	72.2	3	M	3100-826	31205110	3900-133-05	4300-6	C
15	LR-A20900	46.5	4	M	3100-827	31205110	3900-133-05	4300-6	C
20	LR-A20900	35.5	3	M	3100-828	31205110	3900-133-05	4300-6	C
25	LR-A20900	46.5	4	M	3100-829	31205110	3900-133-05	4300-6	C
30	LR-A20900	35.5	3	M	3100-830	31205110	3900-133-05	4300-6	C
35	LR-A20900	46.5	4	M	3100-831	31205110	3900-133-05	4300-6	C
40	LR-A20900	35.5	3	M	3100-832	31205110	3900-133-05	4300-6	C
45	LR-A20900	46.5	4	M	3100-833	31205110	3900-133-05	4300-6	C
50	LR-A20900	35.5	3	M	3100-834	31205110	3900-133-05	4300-6	C
55	LR-A20900	46.5	4	M	3100-835	31205110	3900-133-05	4300-6	C
60	LR-A20900	35.5	3	M	3100-836	31205110	3900-133-05	4300-6	C
65	LR-A20900	42.5	4	M	3100-837	31205110	3900-133-05	4300-6	C
70	LR-A20900	35.5	3	M	3100-838	31205110	3900-133-05	4300-6	C
75	LR-A21780	282.8	119.97	M	3100-840	31205110	3100-133-01	4300-7	C
80	LR-A21780	264.2	116.97	M	3100-841	31205110	3100-133-01	4300-7	C
85	LR-A21780	478.8	209.95	M	3100-842	31205110	3100-133-01	4300-7	C
90	LR-A21780	273.5	116.97	M	3100-843	31205110	3100-133-01	4300-7	C
95	LR-A21780	672.3	346.91	M	3100-844	31205110	3100-133-01	4300-7	C
100	LR-A21780	661.6	346.91	M	3100-845	31205110	3100-133-01	4300-7	C

LEDCOR FWP - [Project: 3010068 --> FWP: Piping --> User: gbarlage --> Version: 4.1.105]

Utilities Menu Exit

Project: 3010068 User: gbarlage 07-Oct-2007 13-Oct-2007 Change Cat

Item ID & Hrs				Descriptions					RECEIVED	SHAKEOUT DISTRIBUTE	RIGGED
SCOPEGROUP ID	SCHED	HRS	QTY	UM	DESCR	CWP	ISOMETRIC	RECEIVED	SHAKEOUT DISTRIBUTE	RIGGED	
16180	LR-A20890	129.3	6.1	M	5100-900-1	5100512	5100-132-900X	C	C	C	
16185	LR-A20890	97.5	4.8	M	5100-900-2	5100512	5100-132-900X	C	C	C	
16190	LR-A20890	176.3	9.8	M	5100-903-1	5100512	5100-132-903X	C	C	C	
16195	LR-A20890	69.8	3.8	M	5100-903-2	5100512	5100-132-903X	C	C	C	
434B											
SYSTEM: 4300-5											
14645	LR-A21770	145.3	7	M	4300-838-1	4000512	4300-132-838X	C	C	C	
14650	LR-A21770	78.9	3.8	M	4300-838-2	4000512	4300-132-838X	C	C	C	
14670	LR-A21770	144.8	6.9	M	4300-840-1	4000512	4300-132-840X	C	C	C	
14675	LR-A21770	79.6	3.8	M	4300-840-2	4000512	4300-132-840X	C	C	C	
17400	LR-A21770	147.4	7.1	M	4300-834-1	4000512	4300-132-834X	C	C	C	
17405	LR-A21770	76.8	3.7	M	4300-834-2	4000512	4300-132-834X	C	C	C	
17425	LR-A21770	147.4	7.1	M	4300-836-1	4000512	4300-132-836X	C	C	C	
17430	LR-A21770	76.8	3.7	M	4300-836-2	4000512	4300-132-836X	C	C	C	
448.5											
SYSTEM: 4300-8											
5	LR-A20900	83.3	4	M	3100-825	3120511	3900-133-0500	C	C	C	
10	LR-A20900	72.2	3	M	3100-826	3120511	3900-133-0500	C	C	C	
15	LR-A20900	46.5	4	M	3100-827	3120511	3900-133-0500	C	C	C	
20	LR-A20900	35.5	3	M	3100-828	3120511	3900-133-0500	C	C	C	
25	LR-A20900	46.5	4	M	3100-829	3120511	3900-133-0500	C	C	C	
30	LR-A20900	35.5	3	M	3100-830	3120511	3900-133-0500	C	C	C	

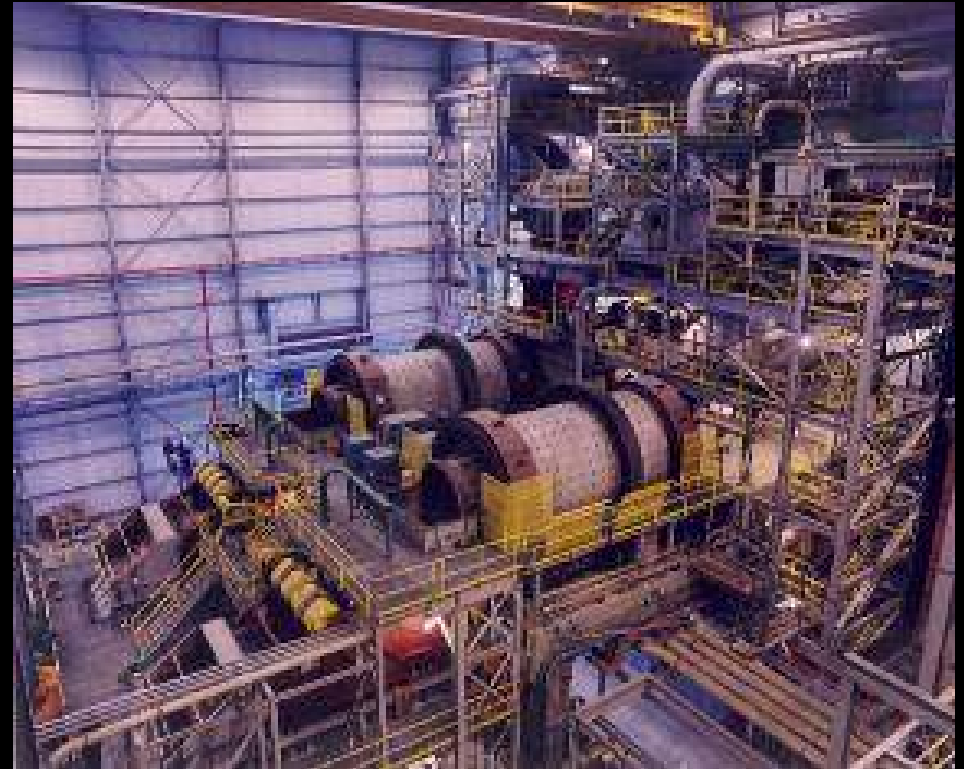
- Typically do not receive complete detailed system definition until 75% complete
- Need system definition as early as possible
- FWP allows system information to be entered progressively as information becomes available
- Greatly enhances ability to plan and execute final system by system turnover

## FWP ADVANTAGE

- Can switch between Standard and System Sorts on the fly

# Construction to Production

- Change the way we approach scheduling execution.
- Use existing Leducor systems to tie in EWP's, FIWP's and turnover packages to achieve optimum balance between construction and start up.
- At the early onset of the project, focus superintendents on the sequence of start up, not mechanical completion.
- Continuous cross discipline interactive planning from EWP release through construction to start up.



# WELCOME





Respect in the  
Workplace



# Committee Members

Rob Cleveland

**Christian Labour Association  
of Canada**

Michelle Devlin

**Creating People Power**

Dale Hildebrandt

**Ledcor Industries Ltd.**

Roland LaBossiere

**Suncor Inc.**

Marla McCready (Co-chair)

**Merit Contractors Association**

Hardy Lange van Ravenswaay

**Progressive Contractors  
Association of Canada**

Shandra Linder

**Syncrude Canada Ltd.**

Cailín Mills

**Alberta Employment and  
Immigration**

Lindsay Osmond

**Canonbie Contracting Ltd.**

Lynne Palumbo (Co-chair)

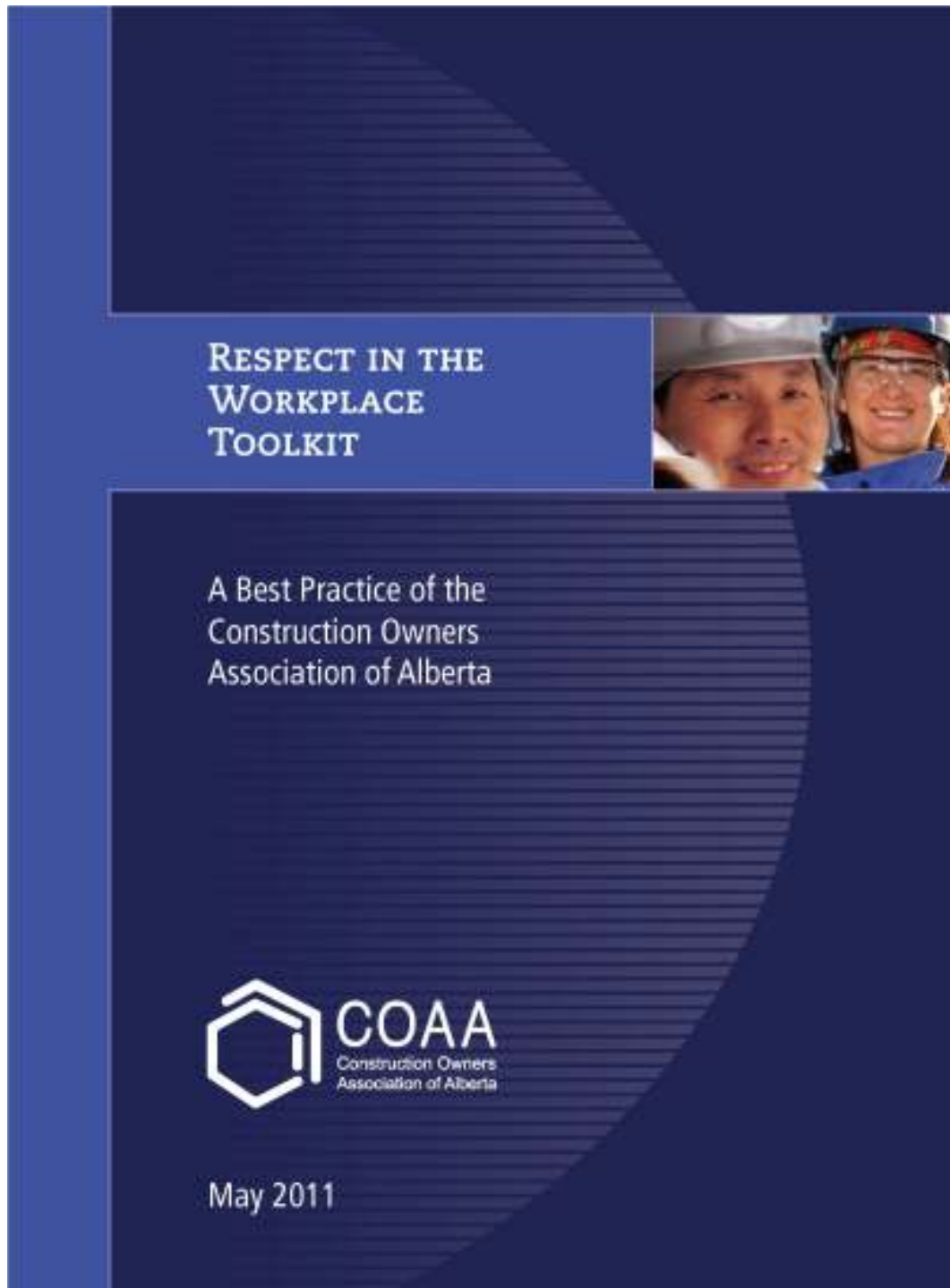
**Construction Labour Relations**

Angie Perras

**Bird Construction Company**

Cara Yu

**KBR Canada**



# Respect in the Workplace Toolkit

A Best Practice of the  
COAA

A collaborative initiative  
developed by the

**COAA Respect in  
the Workplace  
Committee**





## Respect in the Workplace



Respect is defined as the willingness to show consideration for the rights or feelings of others; to treat them courteously, inclusively and safely

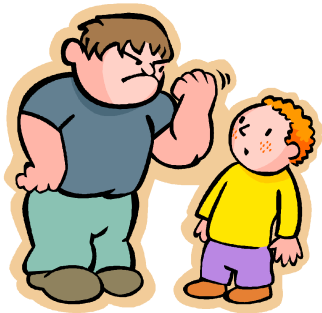




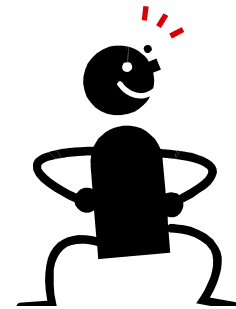
Respect in the  
Workplace



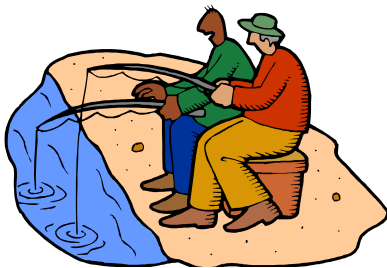
- **Endorsement & Acknowledgements**
- **Tab 1: Respect in the Workplace Guidelines**
- **Tab 2: What is a Respectful Workplace?**
- **Tab 3: Developing and Implementing an RITWP Policy**
- **Tab 4: Sample Policy**
- **Tab 5: Employer Guide**
- **Tab 6: Supervisor Guide**
- **Tab 7: Employee Guide**
- **Tab 8: Forms and Checklists**
- **Tab 9: References and Resources**



## Violations of Respect



- **Unprofessional Conduct**
- **Harassment**
  - **Bullying**
  - **Cultural Insensitivity**
  - **Discrimination**
- **Workplace violence**





## Respect in the Workplace



### **NEW: Unprofessional Conduct!**

- When behaviours, responsibilities and actions fall below the required standard set by the industry or an organization
- These standards referred to as a code of conduct, may be implied or written
- Code of conduct usually focuses on ethical and socially responsible issues

Everyone is accountable for conducting themselves by word, action and gesture in a manner that is reflective of respectful behaviour.

### **NEW: Cultural Insensitivity!**

- Behaviour that is directed towards an individual based on characteristics such as age or communication style that causes humiliation or frustration
- Culture is a code of behaviours, values, beliefs, traditions, customs, patterns of thinking and a way of life that people unconsciously learn



Respect in the  
Workplace



## **TAB 8 - FORMS & CHECKLISTS**

- ✓ **Checklist: Do You Have a Respectful Workplace?**
- ✓ **Checklist: How to Develop and Implement an RITWP Policy**
- ✓ **Checklist: Is Your RITWP Policy Enforceable?**
  - **Incident Statement Form**
  - **Employer Investigation Form**
  - **Investigator's Incident and Corrective Action Report**
  - **RITWP Hazard and Risk Worksite Assessment Form**
  - **Work Safe Alberta Employee Risk Assessment Questionnaire**
  - **COAA Field Level Risk Assessment Form**



Respect in the  
Workplace



## **“Overarching Value”**

**All people have the right to  
be treated with dignity and  
respect.**





Respect in the  
Workplace



## Training Format

**Awareness Workshop**

**Train the Trainer**





Respect in the  
Workplace



# **Can Respect in the Workplace be mandated ?**

# History of Workface Planning at Syncrude

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- **First piloted on Upgrader Expansion 1 (UE-1), 2000 – 2006 (multi-billion \$)**
  - Many learning's helped the formation of the COAA model in 2005
- **Used on Syncrude Emissions Reduction Project (SERP), 2006 – present (\$1B+)**
  - WFP not introduced until detailed engineering was 100% complete and construction 30% complete
- **2008 Prepared formal WFP Application Manual based on the COAA WFP model**
  - This document forms the basis for Contractor expectations
- **2008 – 2010, Some experience on 4 projects valued <\$500M each**
  - 2 projects have been completed and 2 are currently under construction
- **2010 hired a Construction Management Contractor to be a general contractor for a suite of Mining/Tailings projects**
  - WFP a requirement of the contractor
- **2010 Implemented a System for Managing (short interval management) for identifying barriers to executing the daily schedule**
  - SFM requires a daily plan from the Contractor, contractor identification of barriers that have arisen on the day, process for Owner representatives to work with the Contractor to break down barriers
  - WFP is the tool to remove barriers prior to field execution whereas SFM is the tool to collect and address barriers that come up daily

## Key Learning's

---

- **Include Owner expectations for workface planning in contract documents**
  - Set specific expectations with detailed procedures
- **Involve the Construction Contractor in constructability and the path of construction during the Engineering and Procurement phase**
  - EWP's and CWP's constructed with consideration of FIWP's
  - Engineering 3D models support FIWP's
  - Procurement knows the requirements for WFP (electronic information and piece marking)
  - Fabricators required to follow requirements for electronic information and piece marking
- **The Project Management Team must manage to the procedures and take timely actions to correct deviations**
  - Owner PMT must understand the procedures, own the procedures and ensure alignment in the Owner team and the Contractor team
- **Construction contractor needs to drive the application of WFP**
  - Superintendents need to feel ownership for the FIWP's
  - Need to drive FIWP continuous improvement by ensuring field feedback to the planners
- **Manage the application of WFP to the right work – don't default to doing everything**
  - Civil/Earth and Pipeline work (single discipline with separation from other scope) may not require WFP
  - Earthworks does not require FIWP but rather needs daily equipment line up, standard packages for sand haul, sand placement, excavation
  - Consider WFP for mitigating the consequences of cost or schedule on critical scope

# Project Experience

---

- **Expectations**

- **8 weeks of signed off work packs on the shelf ready to go**
- All aspects considered (safety, quality, RFI's, execution plan, materials, scaffold, cranes ...)
- Reflect the execution schedule
- Superintendent, GF and Foreman buy-in sought

- **Went Well**

- **Planners initiate RFI's prior to execution**
- **Minimize Foreman paperwork (helps with less experienced Foremen)**
- Cross trade jurisdictional conflicts almost non existent
- QC requirements identified early so issues can be resolved before work pack is in the field
- QC validates FIWP at completion before progress is earned
- Less rework than historical and shorter punch lists
- Few scaffold delays
- No waiting on materials
- Safety considerations reflected

- **Things to Watch**

- Superintendent buy in is critical for success
- FIWP's initially dissected by foremen to cherry pick activities
- Build in a feedback cycle from the field to the Planner to improve FIWP effectiveness
- **Consider having a planned value for each FIWP for progressing**
- Manage the squad check process for FIWP to avoid too many approvals (restrict to Safety, Quality and Superintendent)



# Onshore Projects Business Improvement

Work Face Planning Update

MRM Flare Upgrade Project

Nov 30, 2010

Upstream Americas  
Heavy Oil Onshore Projects

Duncan Lancaster

## Work Face Planning

COAA – Improve planning of workplace activities to improve productivity and reduce costs

- *better utilization of expensive resources*
- *improve HSE performance*

Implemented COAA model on MRM Flare Upgrade Project with:

- *focus upfront in home office vs field*
- *supplemental resources*



## Process Description

FIWP's are created for each discipline for an average of 10 workers X 10 Days X 10hrs (1000 Hours – Productivity included)

Approx. 600 FIWP will be created for the Flare Upgrade project based on the EWP'S and CWP'S.

Planning started in December, start FIWP's when dwgs IFC

Backlog Target - 8 weeks

One planner (GF level) for each discipline (Piping-Structural-Mechanical- Electrical- Civil-E&I-Scaffolding...etc.)

## Work Packages include:

Work scope

HSE info

Safe work practices

Bowties

Permit info

Sign off sheet

Inspection Test Plan

Materials

Tools / Consumables

Equipment

GF Check list

Drawings

Critical lift plans

3-D Shots

Scaffold request

Lessons learned

## Scaffolding

Upfront plan on scaffold

Scaffolder planner determines multi discipline use

Coordinator tags scaffolding accordingly for use by number of trades

Supervisors sign off when complete

This eliminates needless tear downs and rebuilds

## Planning

Permit Coordinator meetings, planning lead determines priorities (PL performs integrator role)

8 week look ahead schedule reviewed per discipline every Monday

Leading indicators include:

- Number of FIWPs complete 8 weeks prior to field execution
- Number of packs created monthly per planner / discipline
- Graph to show packs completed by due date. (Green, yellow & red)



# Owner Requirements



**COAA Workface Planning Forum**  
Calgary, Alberta December 1 2010

Presented by: Sean Przy





# Owner requires...

**Describe your WFP program  
&  
What projects have you implemented it on?**

# Owner requires...

**What are the contractor's internal procedures for managing key workface planning interfaces with other contractors and owner supplied services.**

# Owner requires...

**Describe the content and purpose of your Field Installation Work Packages.**

# Owner requires...

**How does the contractor organization define and progress the direct field labor scope?**

## Owner requires...

**In the capacity of a General Contractor, describe your processes and procedures to develop WorkFace Plans that address at a minimum the following requirements:**

- *Level 5 multi-discipline look-ahead schedule*
- *Access and Infrastructure Plan (including scaffolding, trailers etc.)*
  - *Crane and Equipment Plan*
  - *Material Handling Plan*

# **COAA Workface Planning Conference**

## **“Panel Discussion - Owner’s Expectations”**

**Andrew Hardy, P. Eng.**  
**Project Execution Leader – Strathcona Refinery**



# Imperial Oil – Owner Expectations

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## **For Project Delivery**

### 1) Safety, Health and Environment

- All individuals and organizations must share safety and protection of the environment as core values.
- Facilities must be safe to construct, operate and maintain.

### 2) Quality and Reliability

- Quality of the engineering and construction directly relates to safety and business results.

### 3) Capital Efficiency

- To create value for the business, optimize life-cycle cost for assets.
- Corporate emphasis globally on increasing field labour productivity.

## **For Workface Planning**

### 1) Improved safety performance

### 2) Fewer quality issues

### 3) Increased field labour productivity

### 4) Improved predictability for cost and schedule

# Workface Planning at Imperial Oil

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- No experience in the downstream. Some experience in other parts of the company.
- Strathcona Refinery is implementing workface planning on work that includes construction of new facilities in operating units as well as during turnarounds.
  - Lessons learned will be shared globally
- Construction Focus areas for workface planning:
  - Aligning project team with workface planning model
  - Contractors to create Field Work Installation Packages and provide additional planning versus historical practice
  - A constraint based system to be used for releasing work to the field
- Turnaround focus areas for workface planning:
  - Historical level of planning already sufficient
  - Increased focus on efficiencies in a geographic area (ie. workface) vs. individual jobs
  - Additional emphasis on “plan B or plan C”; having contingency work available
  - Productivity improvement will help ensure labour availability
- Benefit to contractors:
  - Improved safety performance and productivity
  - Enhanced competitive position

# Owner's Expectations From Workface Planning

**Why Workface Planning?**

# Owners' Expectations From Workface Planning

---

- ▶ What do Owner's Want From Their Projects?
  - ▶ Projects delivered:
    - ▶ On-time
    - ▶ On-price
    - ▶ On-quality
    - ▶ **Executed Safely!**

# Owners' Expectations From Workface Planning

---

## ▶ Why Do Owner's NEED to Be Involved in WFP?

- ▶ Recent Projects' Execution failed to produce On-time, On-price, On-quality performance
- ▶ Design Cycles & Deliverables did not support the Construction Execution Plan
- ▶ The Construction Execution Plan was not "In Sync" with the Owner's Turnover & Commissioning Plan
- ▶ Inadequate FEL left too many gaps for EPC contractors to bridge

# Owners' Expectations From Workface Planning

---

- ▶ When do Owner's need to be involved in Workface Planning?
- ▶ From DBM onward, Owner's must ensure that Workface Planning encompasses all phases of the project life cycle:
  - ▶ **Concept (DBM):** Deciding what to build effectively
  - ▶ **Preliminary Design (FEED):** Engineering the project efficiently
  - ▶ **Construction (Detail/Execution):** Building it productively
  - ▶ **Commissioning:** Ensuring the project comes on-stream in the sequence and way intended



# Owners' Expectations From Workface Planning

---

- ▶ How Does Workface Planning Improve Project Execution?
  - ▶ Aligning Execution Plans to be in Sync with the Owner's Turnover & Commissioning Plan
  - ▶ Tuning Design Cycles & Other Project Deliverables To Construction Execution Plans
  - ▶ Early Planning For Seamless Integration Between Project Silos

# Owners' Expectations From Workface Planning

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- ▶ **In Summary, Owner's Expectations from WFP are Planning Processes that Produce Efficient:**
- ▶ Designs that Support Construction Execution
- ▶ Construction Execution Plans Tuned to Turnover & Commissioning
- ▶ Seamless Interface Management plans between Silos and "Brownfield" Interfaces.

Speaker Notes: Carl Souchereau  
Owners Expectations Regarding Workface Planning  
Wed Dec 1 1:30-2:30pm  
Coast Plaza Hotel & Conference Centre  
1316 – 33 Street N.E., Calgary  
Plaza 5 room

**Introduction:**

- Who I am
- Time in TransAlta
- Background
- What I'm currently doing in the PMO

**Role of TransAlta PMO**

- Governance – TRACT
- Project Management Standards (Project Management Process and Templates)
- Project Management Services

**Briefly outline Current Construction Model**

- 8 Stage Gate process
  - Screening
  - Early Development
  - Mature Development Evaluation
  - Mature Development Definition
  - Construction
  - Integration
  - Commissioning
  - Wrap Up and Lessons Learned

**Describe that TransAlta has not implemented WFP into our construction projects**

- That said, I see our model embedded in the four basic WFP steps. For example:
  - Design Basis Memorandum = TransAlta Screening/Early Development
  - Engineering Design Specifications = TransAlta Mature Development Evaluation
  - Detailed engineering = TransAlta Mature Development Definition and Construction
  - Construction = Construction/Commissioning/Integration/Wrap-up and Lessons Learned
- However, the value in WFP resides in the detail.
- Where TransAlta also sees value in WFP is in how it drives collaboration within the key stakeholders and decision points are very well defined.
- We find the collaboration piece in TransAlta a challenge at times and accountabilities at times get confused. The WFP model is very clear when it comes to accountabilities and I see it can be modified to meet our purposes depending on who has been hired to do each piece of work.own

- Finally, we see that aligning our model more closely with the WFP model will likely benefit us in that the same terminology, timings, and expectations that are used outside the confines of TransAlta are used internally. Speaking the same language!!

### **Challenges**

- Based on what I've seen in the limited time in my current role I make the following comments:
  - Good Processes do not always lead to good work.
    - TransAlta has a lot of very good processes that are clearly defined and mature in nature. Where we tend to have an issue is not with the process, it's getting folks to understand the value of the process and following it because it creates.
    - A solid and mature process is a double edge sword in my opinion. On one hand the process is embedded into our culture so any adjustments will come with some significant change management challenges.
    - To be successful, I'm of the opinion that we need to make the process the path of least resistance because it's easy, and repeatable. As a result, users will naturally migrate to it.
    - I see implementing WFP methodologies into our process will come with those same challenges. I think TransAlta will not be alone in this challenge.

### **Bottom Line**

- TransAlta will be conducting a detailed review of the WFP model in conjunction with our process in January to incorporate as many of the WFP best practices as possible. When we're done, the final outcome may not have the same look and feel as the WFP model but judging from what I've gleaned so far, the majority of the WFP model will be embedded in our process.
- Once this piece of work is complete, the heavy lifting will begin. We will begin the change management necessary to communicate our expectations internally and externally. Similar to what we do now, it will be our intention that contractors and engineering firms will need to conform to our model and planning expectations.

### **Opening Question**

- How can we best implement any changes into our planning model and immediately get the buy-in by the end users?



# Owners Expectations

*“More Business Value for Our Money”*

**Jim Porter**  
**DuPont VP Engineering & Operations (Retired)**  
**WorkFace Planning Conference**  
**December 1, 2010**



# Core Values

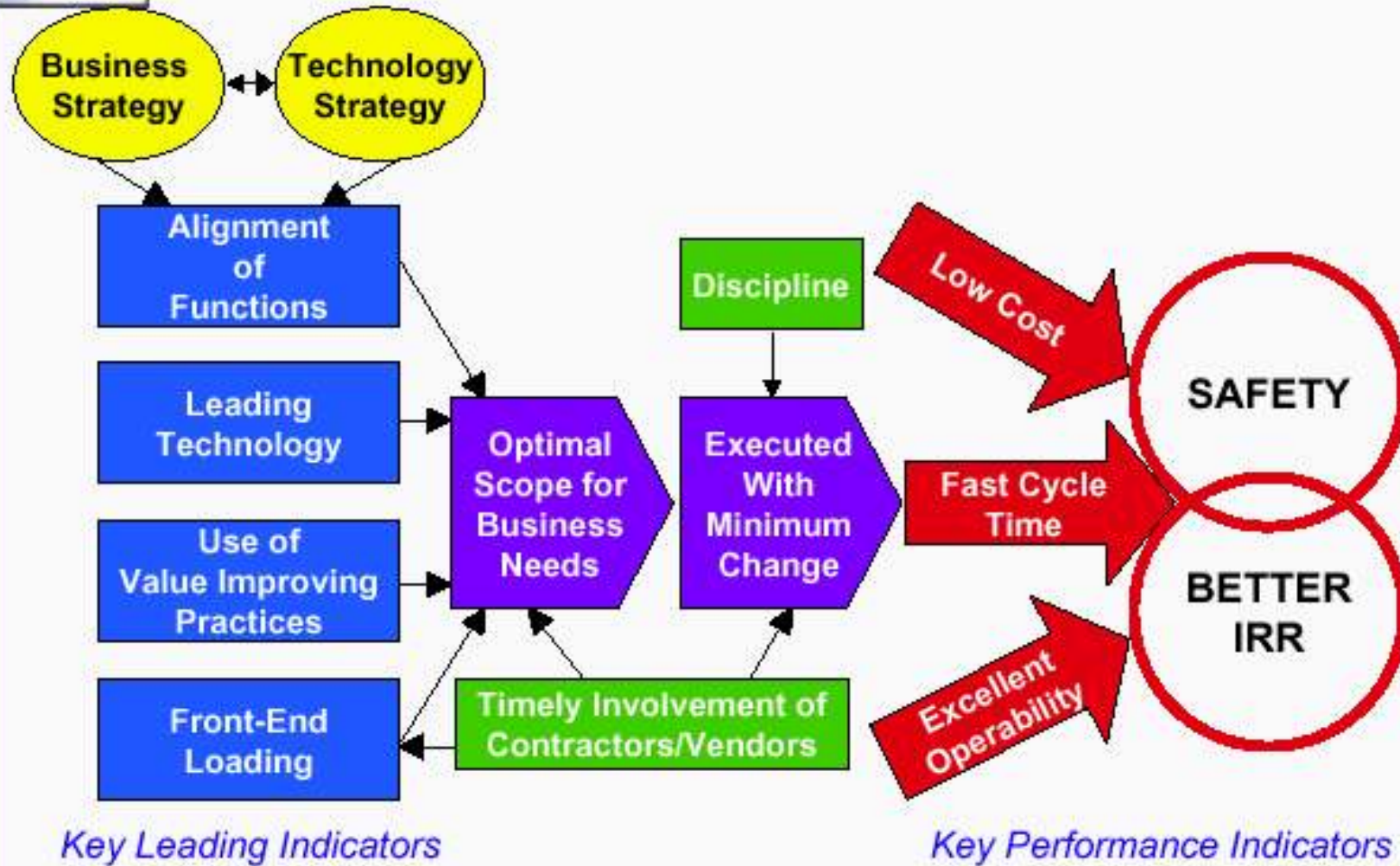
- **Safety and Health**
- **Environmental Stewardship**
- **Highest Ethical Standards**
- **Respect for People**

The Goal is "Zero"

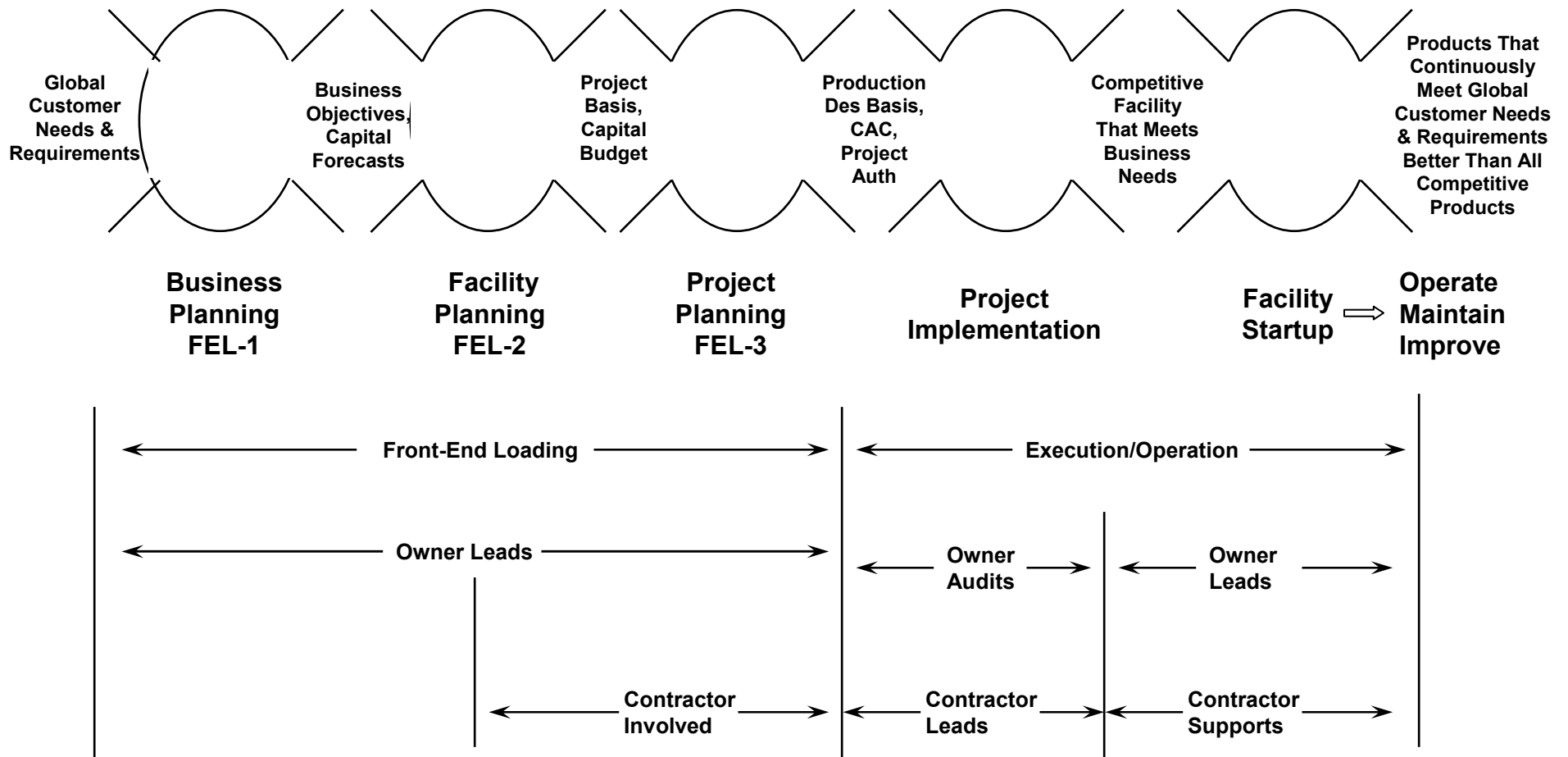




# Elements of Capital Effectiveness



# Facilities Engineering Process





# *“More Business Value for Our Money”*

## Different Levels of Value From WFP

- Owners
- Contractors
- Industry

Owners: - Improved safety performance

- Improved planning

\*Execution strategy

\*Contracting Strategy

\*Optimize cost & schedule

- More accurate estimates(cost/schedule)

- Improved control

- Increased productivity

*How best to get Owners to see the value potential from WFP?*





# ***“More Business Value for Our Money”***

**Contractors:** - Improved safety performance

- Improved planning
- Improved productivity
- Increased profitability

**Industry:** - Improved safety performance

- Improved work force development
- Increased work force availability
- Increased overall productivity
- Increased attractiveness of construction jobs





*The miracles of science™*

# Procurement and Supply Chain In a Work Face Planning Environment



**COAA Workface Planning Forum**  
Calgary, Alberta December 1 2010

Presented by: Bill Somerville





# Overview

- Scope of Discussion
- Owners and Contractors Expectations
- Key Themes / Focus Areas
- Questions
- Wrap-up

Survey : who is here? Owner, Construction contractor, EP contractor

# Table of Contents

## Scope of Discussion – An Owner's perspective

- Procurement (Owner and Delegated)
- Materials Management
- Logistics and Transportation
- Contracting

NB: It should be noted and re-emphasized, all the required project disciplines have requirements to support Work Face Planning, especially Project Management, Construction Management, Project Controls ( Cost estimating and Control, planning and scheduling) , HSE, Quality Management, Document Management.

Successful set up for Workface planning in the Supply Chain areas of responsibilities **WILL** fail if the other requirements are not met

# Table of Contents

## Some examples of Other WFP requirements

Project Management	<ul style="list-style-type: none"> <li>• Early Project Decision to implement WFP</li> <li>• Project Philosophy of Design to Start-up – to construct</li> <li>• EWP’s production to support CWP requirements</li> <li>• project organization design to support WFP</li> </ul>
Construction Management	<ul style="list-style-type: none"> <li>• construction sequencing driving schedule of CWP production which drives EWP production</li> </ul>
Project Controls – Planning Scheduling	<ul style="list-style-type: none"> <li>• appropriate scheduling to ensure engineering deliverables meets cwp’s</li> <li>• appropriate scheduling level of detail to measure progress</li> </ul>
Project Controls – Cost Estimating, Control Productivity Calculations	<ul style="list-style-type: none"> <li>• appropriate WBS and CBS to divide Project scope into CWP’s, FIWP’s</li> <li>• standard rules of credit to grant progress</li> </ul>

# Table of Contents

## Some examples of Other WFP requirements

Quality Management, HSE, Document Management	<ul style="list-style-type: none"> <li>• clear requirements for all CWP's</li> </ul>
Engineering Design	<ul style="list-style-type: none"> <li>• ability to sub divide areas of plant into CWP's</li> </ul>
Quality Management, HSE, Document Management, Other project disciplines	<ul style="list-style-type: none"> <li>• clear requirements for all CWP's what is required to start work, what is required to claim completion</li> </ul>

# Owners and Contractors Expectations

- Clear unambiguous description of expectations – requirements, standards, procedures, responsibilities, roles and position descriptions
  - i.e. the requirements of any good contract!
- From this morning, ensuring the conversations which drives common understanding
- From this morning's session ,survey showed two highest valued areas to focus on are roles and responsibilities of all parties and clear expectations / minimum standards for Work \Face Planning

# Key Themes / Focus Areas - Procurement

## Owners

- Clear description of requirements regarding the identification, procurement of materials and equipment, esp.. tagging to CWP's
- Complete materials responsibility matrix – conveying responsibility for all phases of procurement : ID material requirements, specify, purchase, expedite, transport, receive, manage, issue, surplus management & asset recovery
- Requirement for procurement registers to support provision of materials at work location and/or for engineering design to support engineering schedule -> which is aligned to construction schedule / CWP's

## Contractors

- Clear understanding of procurement responsibilities
- IT application to be used, any interface requirements to Owner Systems, procedures, standards and organization to deliver delegated procurement responsibility



# Key Themes / Focus Areas – Materials Management

- Owner must clearly define to contractor process for reserving and accessing material for work packages.
- Clear understanding and implementation across all contractors re: materials master codes to be used/ conversion tables if required
- Material status information and reports must be made available to contractors and construction management. The information must be current.
- Minimum of notice required for first allocation of material by work package (8 weeks at Nexen).
- 2 week notice required to hard reserve material for work package
- Bag & Tag completed and any deficiencies reported to all within 1 week of requirement.
- Module status and ROS dates must be defined and kept current
- Module received at site dates must be reported immediately
- Module punch list items must follow from mod yard to site.

# Key Themes / Focus Areas – Materials Management

- Owner must clearly define material storage / warehouse/ lay down areas on site to contractor ; location of various commodities / equipment
- Materials Management organization, procedures, processes, standards and IT application in place that support MM and packaging for FIWP's (Owner or contractor managed).
- Early set up of Materials Management database structured to support CWP's, FIWP's
- Agreement between Construction and Materials Management vis. expectations on required on site storage / letdown for "back log"

# Key Themes / Focus Areas - Contracts

## Owners

- Clear description of requirements regarding **owner and contractor** responsibility re WFP, any owner standards in contracts – ALL project disciplines
- Effective contractor prequalification wrt capability to implement WFP, any gaps assessed, plans to close in place -> this will drive finalizing execution / contracting strategy
- Construction contractor front end involvement , but with specific tasks, requirements, deliverables for both owner and contractor
- Inclusion of specific WFP minimum requirements and focus on performance / functional specification approach, not descriptive – The On site general contractor should own the process / organization/ applications for Construction work face planning, whoever that is
- Inclusion of Materials responsibility matrix, owner minimum requirements for Work Face Planning
- Description of IT applications to be used, interfaces and data transfer requirements, esp. EP modeling, to Pipe Fab/Module assembly, to site construction planning

## Key Themes / Focus Areas – Logistics and Transportation

- Transportation providers arranged to support material and equipment transfers (marshalling / warehouse facility to Pipe fabricator, or to Module Assembly, or to Site)
- Clear work processes and responsibilities for requesting, managing, reporting on transportation, especially owner, contractor responsibilities (responsibility should be described in MRM)

# Survey Questions

# Application of Project Control Fundamentals in a WFP Environment

**J. Dees**  
**N. Chavan**

- **OVERVIEW – Jimmy Dees**
  - Organization structure and accountabilities
  - Brief history of the set-up of foundational principles and processes
  - Where we are today and the what we are trying to accomplish with planning effort
  - Set-up learning's
- **PRACTICAL APPLICATION OF SYSTEM FOR MANAGEMENT (SFM) – Niteen Chavan**
  - Syncrude's process of applying WFP principles

**OVERVIEW**  
**Jimmy Dees**

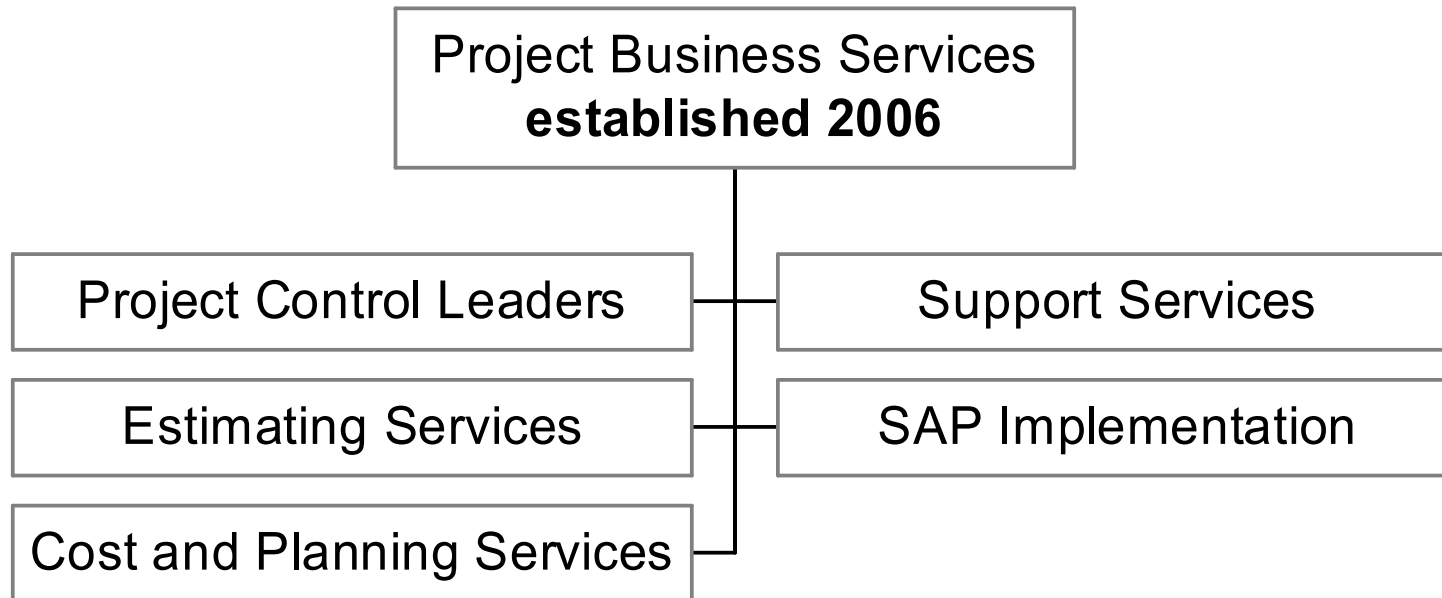


# Project Control Fundamentals

## **PROJECT CONTROLS BASICS 101**

- Know What has to be done... a detailed budget and tracking profiles which provide schedule and cost control baselines
- Know what has been done...reports providing actual performance data consistent with agreed upon baselines... and in a timely fashion
- Know how actual performance compares with performance norms... analysis of performance to date
- Know what remains to be done ... forecast the potential result
- Identify and recommend corrective actions to bring performance in line with expectations ... control
- Check results of corrective action ... verify

## Organization Structure



# What we do

## Goals

Cost  
Predictability  
(portfolio)

## Why?

- Supports long range portfolio planning (how large is the wave?)
- Assures predictable ROI
- No “surprises”

## How?

- Effective Schedule estimate & Cost estimate development process
- Early execution planning...(do-ability)

Cost  
Effectiveness  
(project)

- **Effective management of engineers/suppliers/contractors**

- **Effective cost and schedule work processes and standards**
- **SFM initiatives (planning)**
- **Meaningful stewardship (weather forecaster vs. reporter)**
- **Effective contracting strategy**

Cost Utilization  
(annual)

- Predictable 1<sup>st</sup> ,2<sup>nd</sup> ,3<sup>rd</sup> , & 4<sup>th</sup> QTR forecasts (provide movement & flexibility of annual monies)

- Effective project controls
- Reliable financial information

## **QUICK HISTORY LESSON**

Question?

## How did we get here?

- Painful learning's... back to the future
- Had to re-establish some basic processes and tools
- Implement over the portfolio of projects
- Build confidence in the greater organization

## Assessment Findings (April 2006)

### PAINFUL LEARNING'S

- Identification and Tracking of projects thru the stages is a problem. (Name, TWR#, AFE#, W/O#, Job#, etc)
- Responsibilities of BA's and PC's varies by Strategy Center
- In most cases, costs are being captured by P-code but budgets are **not** being recorded by P-code
- Some PC staff are involved with preparation/coding of CWA's, Workorders, etc. Many are not.
- With the exception of hours, no tracking of quantities is being done by Project Controls
- Reporting by Contractors is non-existent, verbal, or inconsistent
- Progress and earned-value reporting is inconsistent in both methods used to gather progress data and how it is reported
- There is limited information readily available for management decisions based on schedules and costs for Capital projects.
- Not a good handle of costs for projects "cradle to grave" (including reasons for escalation)

## Establish “List of Projects”

### **OBJECTIVE**

- To locate, consolidate and document ALL the lists that currently exist
- Establish some rules around naming and numbering of projects
- Establish rules around adding and deleting projects from the list



## Building Estimating Competency

### **OBJECTIVE**

- Establish estimating as a Core Syncrude Competency
- Establish a Professional Estimator Career Path with Documented Expectations for All Levels
- Establish Estimating Training Strategies and Plans
- Build Internal Estimating Competency to Manage, Direct and Review Estimating Workload
- Supplement with External Resources as Required:
  - Other Owners
  - Contracting agency
  - JV's

## Building Estimating Competency

### **COMPLETED**

- Estimates prepared using standard project code of accounts (P-Codes)
- Estimates prepared reporting key unit quantities by major account
- Estimates prepared using standard Estimate Basis Memorandum and Estimate Confidence Packages
- Syncrude Estimate Tracking System (SETS) used to monitor all estimates prepared

## Standard Estimate Preparation And Reconciliation

### **HARD OBJECTIVES**

- All estimates summarized to ALEX format
  - [WHAT] Construction summarized by Major Code of Account (w/summary of key quantities and direct field hours). Hours tend to remain “static” while costs are “fluid”.
  - [WHY] It Supports “HARD” reconciliation between gates
  - [WHY] Allows for hi-level validation
  - [WHY] Begin to establish “Benchmarks”

### **Concerns**

- Need earlier involvement during the Business Planning cycle
- Educate estimators as to “Why” this information is required

## Standard Estimate Preparation And Reconciliation

### **SOFT OBJECTIVES**

- Establish credibility with owners
  - We are able to communicate scope in way everyone understands
  - Helps identify execution risks earlier in the project life cycle
- Inspire confidence early on with the execution team
  - Team “feels” they have more control
  - Ability to make key execution decisions earlier in project life cycle
  - Puts us in a “planning” versus “reactionary” role

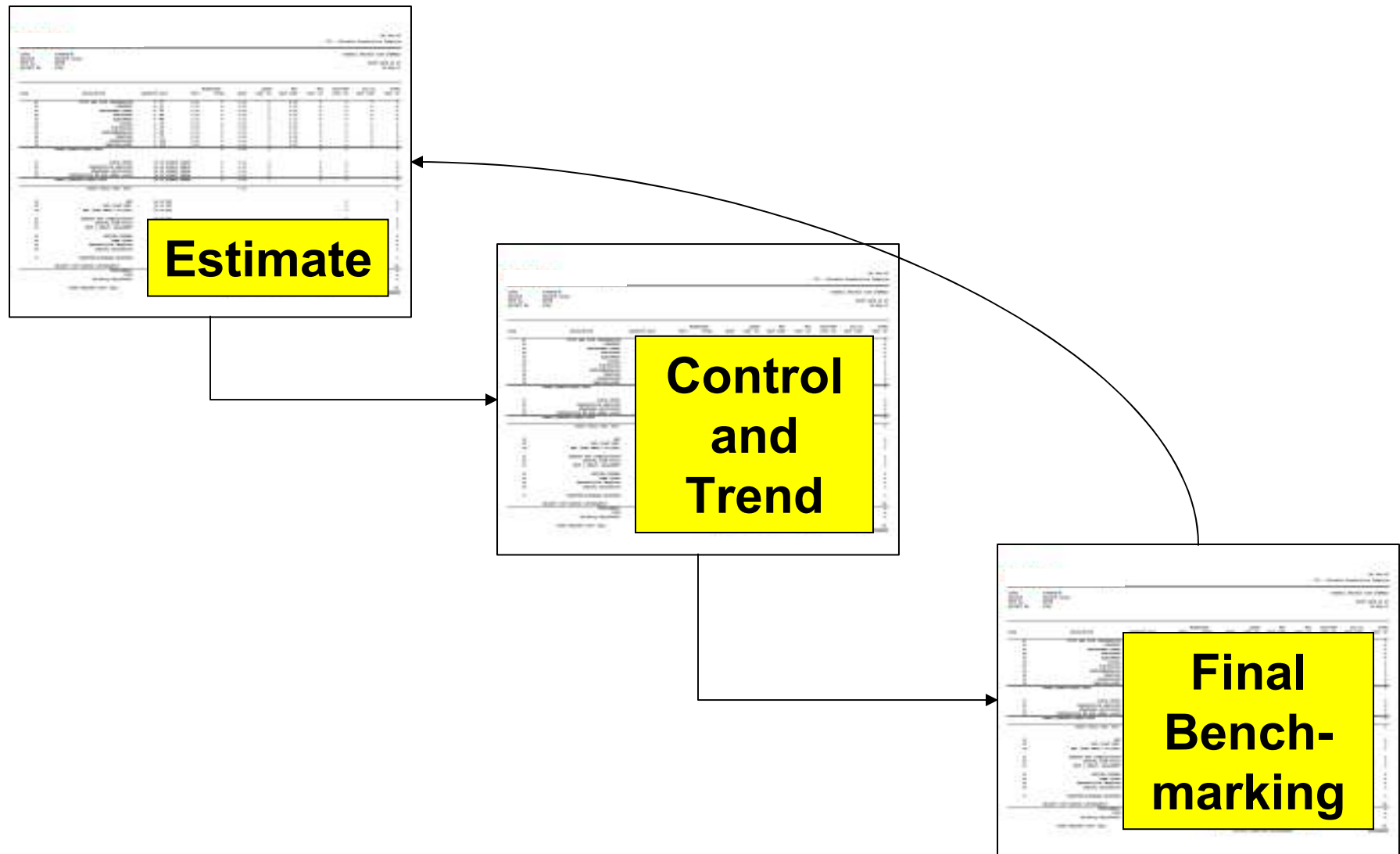
# Estimate Presentation – ALEX Format (T01)

## WHY QUANTITIES?

- Engineer Quantities
- Purchase Quantities
- Construct Quantities
- “Force discipline within the Engineering house to design to the estimated quantities”

rev 003.08 T01 - Estimate Presentation Template												
CLASS SCREENING		OVERALL PROJECT COST SUMMARY										
PROJECT	PROJECT TITLE											
SETS NO.	SETS#	PRINT DATE AS OF										
PROJECT NO.	SIF#	05-Feb-10										
CODE	DESCRIPTION	QUANTITY	UNIT	WORKHOURS	TOTAL	RATE	LABOR	MTL	MTL	SUB/OTHR	ALL-IN	TOTAL
41	CIVIL AND SITE PREPARATION	0.00	CY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
42	CONCRETE	0.00	CY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
43	STRUCTURAL STEEL	0.00	TN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
44	BUILDINGS	0.00	SF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
45	EQUIPMENT	0.00	EA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
46	PIPING	0.00	LF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
47	ELECTRICAL	0.00	LF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
48	INSTRUMENTATION	0.00	EA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
49	COATINGS	0.00	LF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
54	SCAFFOLDING	0.00	LOT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
54	DEMO/RELOCATE	0.00	LOT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL DIRECT FIELD COST					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	FIELD STAFF	0% OF DIRECT LABOR		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32	CONSTRUCTION SERVICES	0% OF DIRECT LABOR		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	TEMPORARY FACILITIES	0% OF DIRECT LABOR		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34	CONSTRUCTION EQ AND SMALL TOOLS	0% OF DIRECT LABOR		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL INDIRECT FIELD COST					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL FIELD COST (FFC)					0.00	0.00						0.00
1X	ENG (POST AFE)	0% OF TEC							0.00			0.00
2X	ENG (POST GATE 2 TO AFE)	0% OF TEC							0.00			0.00
2X	ENG (POST GATE 2 TO AFE)	0% OF TEC							0.00			0.00
51	STARTUP AND COMMISSIONING	0% OF TEC							0.00			0.00
52	INITIAL LINE FILLS	0% OF TEC							0.00			0.00
53	TEST & MAINT. EQUIPMENT	0% OF TEC							0.00			0.00
61	CAPITAL SPARES	0% OF MAJOR EQUIPMENT MATERIAL							0.00			0.00
62	CAMP COSTS	0.00 PER DIRECT HOUR							0.00			0.00
63	FREIGHT/SITE HANDLING	0% OF TOTAL MATERIAL COST							0.00			0.00
64	SPECIAL RELOCATION	0% OF TEC							0.00			0.00
71	COMPUTER/SOFTWARE EXPENSES	0% OF TEC							0.00			0.00
PROJECT COST BEFORE CONTINGENCY \$0.												
CONTINGENCY		0.0%							0.00			0.00
SCSA		0.0%							0.00			0.00
Rounding Adjustment									0.00			0.00
TOTAL ESTIMATED COST (TEC) \$0.												
PRICING COMMITTEE ENDORSEMENT *****												

# Project Control, Trending, Benchmarking Process



**NEXT STEP – CONTRACTOR PERFORMANCE INITIATIVE  
(SFM)**



**2007-08 Status**  
**(re: tools to effectively manage)**

**STATUS**

- Limited metrics are historical, not forward looking
- Current metrics do not drive discussion or continuous improvement
  - Reporting is focused on accounting numbers rather than contractor performance (ie. Wage rate, productivity against agreed target, progress against plan, field in-directs against plan, etc.)
- Limited understanding of performance drivers
- Limited understanding of performance norms

## Case for Change (understanding performance norms and drivers)

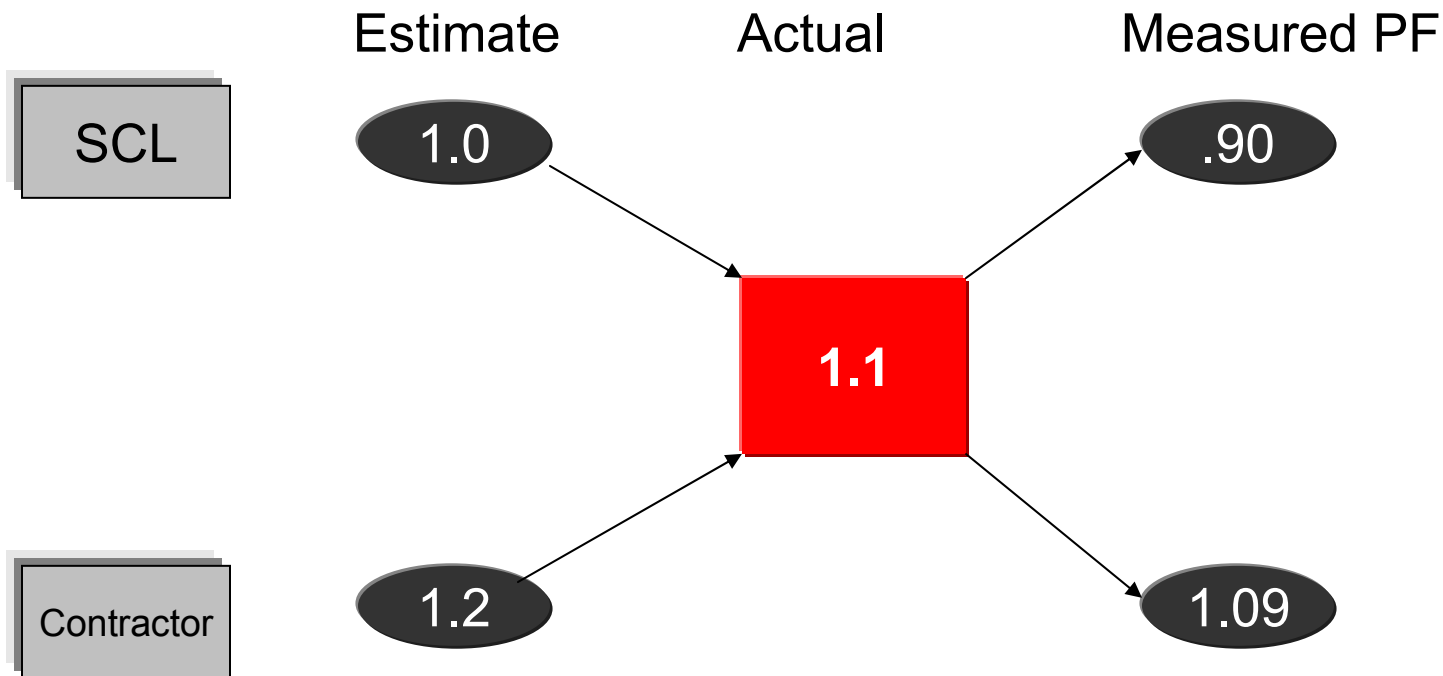
### **CHANGE NEEDED**

- Stewardship reporting is informational rather than changing behaviors and outcomes. Does not address Owner or contractor performance and barrier removal
- Lack of integrated planning / scheduling details (daily / weekly / monthly)
- Contractor planning and execution not validated (quality)
- Limited follow-up on planning and execution
- Unclear roles, responsibilities and accountabilities
- No systematic barrier resolution / continuous improvement process

### **LEARNINGS**

- Had to overcome heavy investment in current processes
  - “this is the way we’ve always done it”
- Need improved teamwork and collaboration between SCL management and contractors
- Roles and responsibilities should be better defined
- Recommended metrics need to be better understood
- Cultures and capabilities varied greatly between contractors
  - Insufficient technical and management skills
  - Need to reward innovation versus compliance

## Measuring Performance



Must measure performance to properly forecast cost and schedule at completion. Formulates achievable target (based on benchmarks) at AFE... health and wellness of project in relation to target

## Stewardship and The SFM

### REPORTING

- Project reporting: Weekly and Monthly
  - Dashboard reporting implemented on all projects utilizing SFM (minimum)
  - Metrics tracked:
    - PF over time
    - Field Indirects over time
    - Progress and schedule attainment over time
    - *Plus other financial metrics*
- Portfolio reporting: Frequency aligned with quarterly scorecard calendar
  - Same metrics as Project reporting

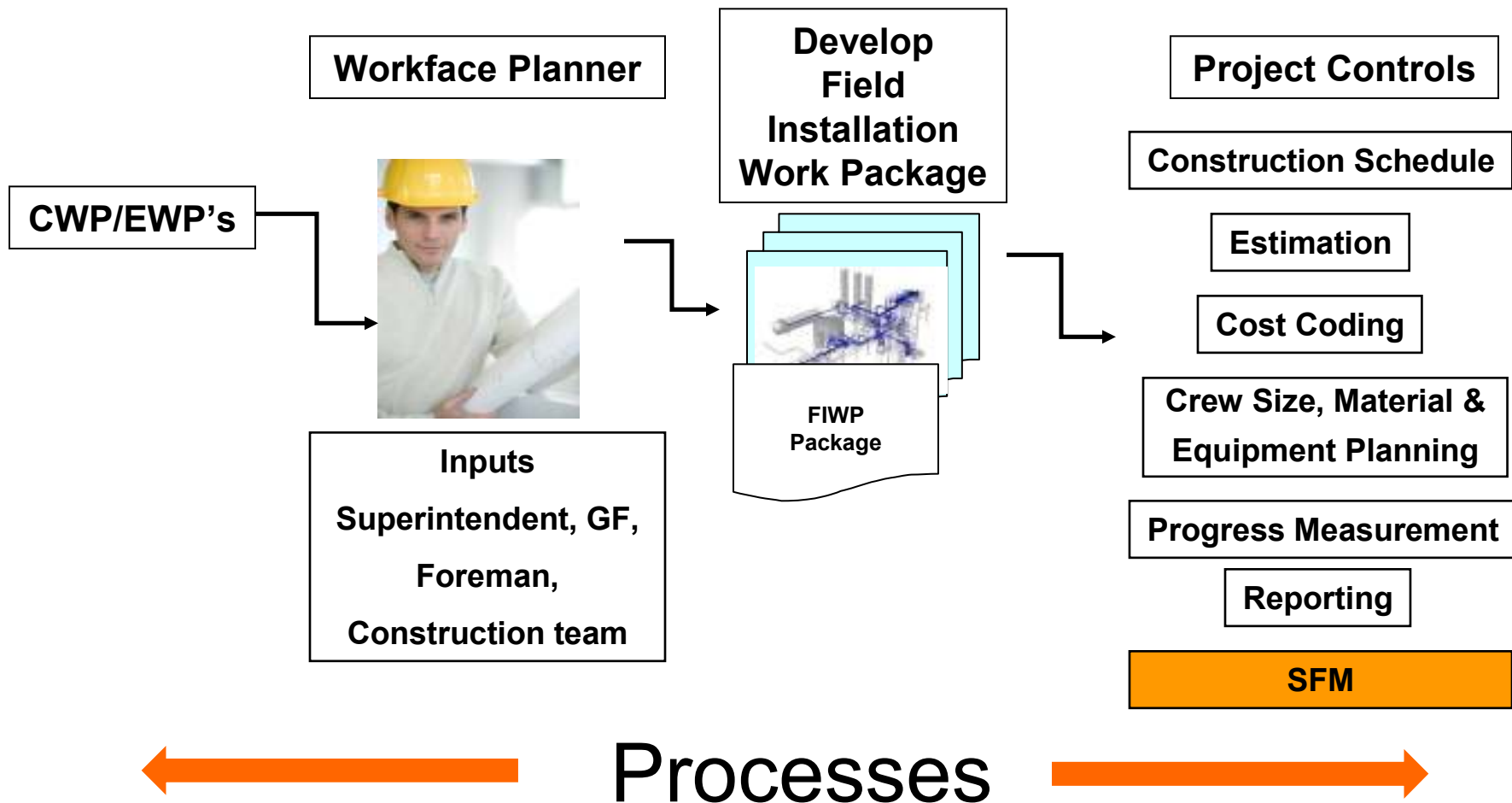
### ACTIONS

- Set benchmark (time on tools)
- Revisited stewardships to align with new focus & direction
  - Move from accounting focus to contractor performance focus
  - Align on metrics (daily, weekly, monthly)
  - All levels (Project, Department, Business Unit)
- Put in place “core” implementation group
  - Retained “key” pilot members to lead effort
  - Empowered them...
  - Finalized tools (use of existing systems +)
  - Prepared training package for contractor, rolled-out, etc.
- Continue to monitor, measure and maintain

**PRACTICAL APPLICATION System for Management (SFM)**  
**Niteen Chavan**



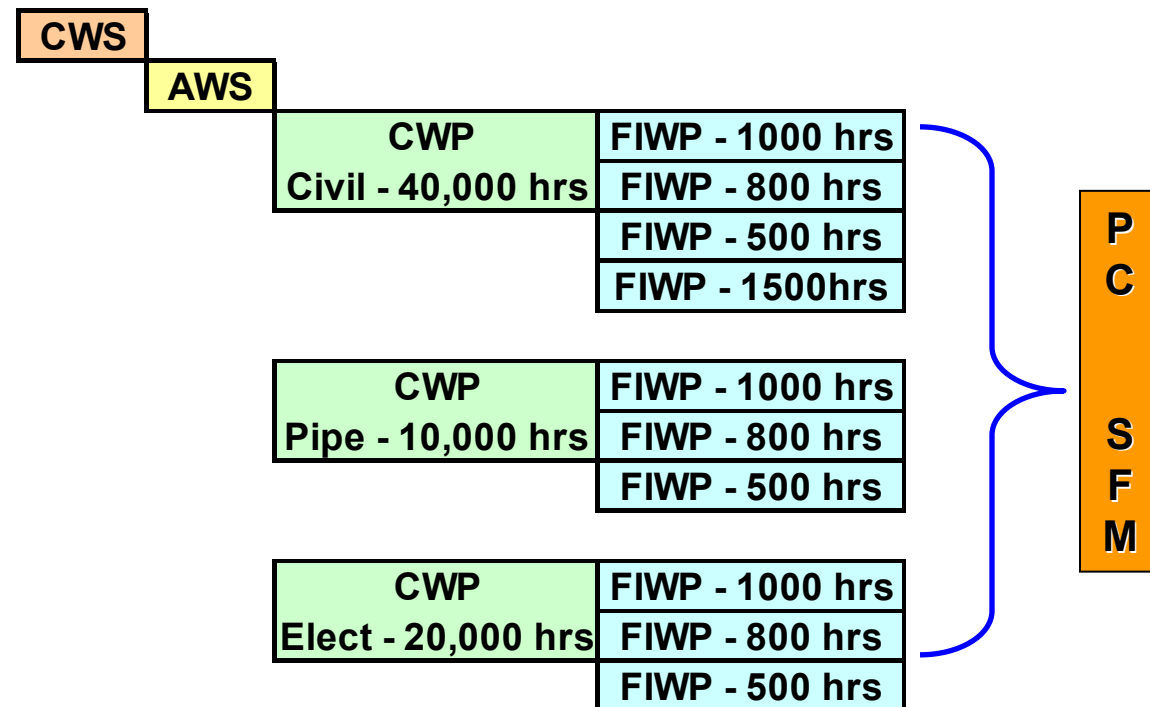
# Workforce Planning and Project Control Process



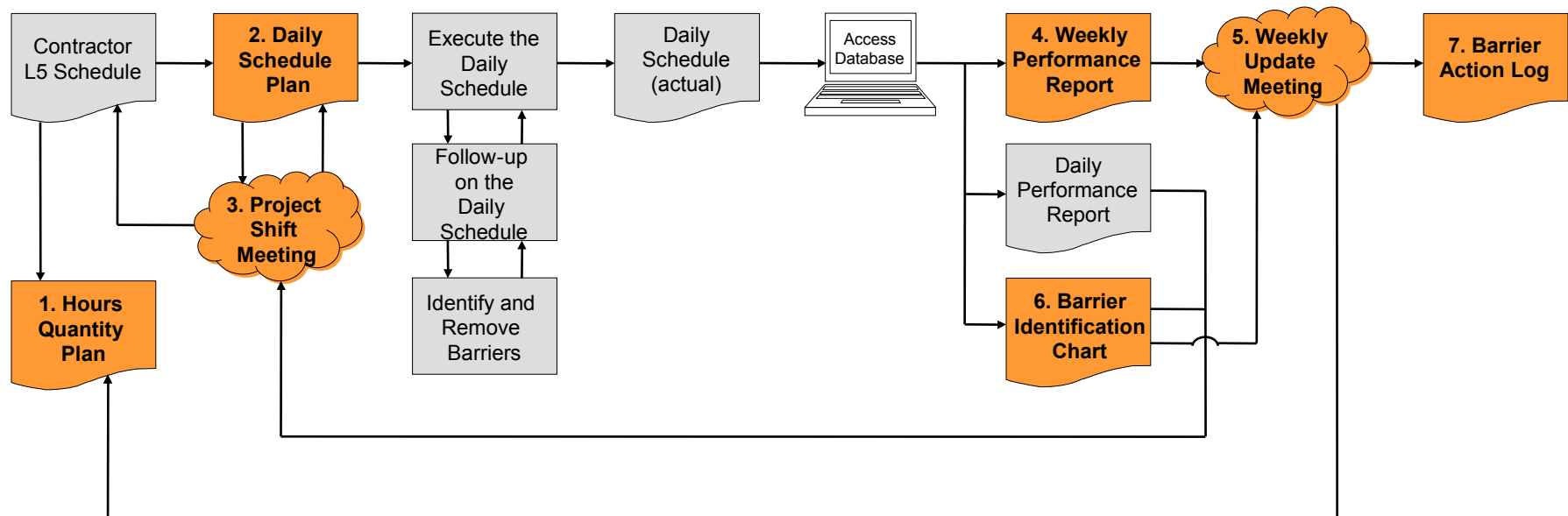
## Work Breakdown Structure

### CWS – AWS – CWP/EWP – FIWP

- CWS – Contractors Work Scope
- AWS – Area Work Scope (Physical area OR plant, OR a specific system/sub-system OR combination of Plant/Area/System)
- CWP/EWP – Construction Work Package / Engineering Work Package



## SFM – System for Managing : PROCESS



Use System for Managing tools to manage the daily work, remove barriers and improve performance

# Our daily Behaviors of detail daily planning makes the difference



Use System for Managing tools to manage the daily work, remove barriers and improve performance

## **7 Key Tools make up the System for Managing**

1. Hours Quantity Plan (HQP)
2. Daily Schedule Control
3. Project Shift Meeting
4. Weekly Performance Report
5. Weekly Update Meeting
6. Barrier Identification Chart
7. Barrier Action Log

## HQP – Hours, Quantity Planning

P CODE	DESCRIPTION	UOM	Current Month Dec'09								
			1st Wk		2nd Wk		Total Month		Jan'10	Feb'10	Total
			Plan	Actual	Plan	Actual	Plan	Actual	Plan	Plan	Plan
<b>Labour Hours</b>											
P41	CIVIL AND SITE PREPARATION	HRS									0
P42	CONCRETE	HRS									0
P43	STRUCTURAL STEEL	HRS									0
P44	BUILDINGS	HRS									0
P45	EQUIPMENT	HRS									0
P46	PIPING	HRS									0
P47	ELECTRICAL	HRS									0
<b>Total Direct Field Hours (Labour)</b>			0	0	0	0			0	0	0
P31	SUPERINTENDENT	HRS									0
P31	GEN. FOREMAN	HRS									0
P31	SAFETY	HRS									0
P31	QA/INSPECTION/SURVEYOR	HRS									0
P31	SITE / FIELD ENGINEER	HRS									0
<b>Total Indirect Field Staff Hours (Labour)</b>			0	0	0	0			0	0	0
<b>Total Dir + Ind Field Hrs (Labour)</b>			0	0	0	0			0	0	0
P34	CONST EQUIP AND SMALL TOOLS	HRS									0
P34	CRANES	HRS									0
P34	LIGHTING PANELS	HRS									0
P34	GEN SETS / COMPRESSOR	HRS									0
P34	PICK UPS / RENTAL TRUCKS	HRS									0
<b>Total (only P34) Indirect Hours (Equipment)</b>			0	0	0	0			0	0	0
<b>Quantity Progress &amp; Measurement</b>			Plan	Actual	Plan	Actual			Plan	Plan	Plan
P410	CIVIL EXCAVATION	CY									0
P410	EXCAVATE TRENCH	CY									0
P420	STRUCTURAL SLAB	CY									0
P430	PIPE RACK	TN									0
P490	COATING	SF									0

**Planning / Scheduling - Assumption / Schedule Basis Memorandum:**

# Daily Schedule Control - Plan

## Daily Schedule Control

**Craft:**                      **Date:**                      **Shift:**                      **G.F / Foreman:**                      **Project:**

Activity / CWP	Schedule Location	Workforce Count		Workforce Hours		Unit Of Work		Equipment Hours		% Complete				OT Hours	Barrier Hours	Barrier Code	Comments		
		Plan	Actual	Plan	Actual	Plan	Actual	Plan	Actual	Plan	Actual	1st	2nd					3rd	4th
Foreman:																			
<b>Shift Summary</b>																			
Notes:									Shift Turnover Comments:										



## **Project Shift Meeting: Analysis, Agreement & Action**

Objective of the Daily Project Shift Meeting is to:

- Review performance variance from last shifts plan
- Prioritize resources on daily schedule control.
- Set clear and specific expectations.
- Identify immediate barriers.
- Review & remove barriers as required.
- Inform Construction Specialist of barriers requiring his/her help

## Weekly Performance Report

	Mon		Tue		Fri		Weekly Total	
	Plan	Actual	Plan	Actual	Plan	Actual	Plan	Actual
Headcount (Dir+Ind Labour)	10	7	10	15	10	20		
Direct Field Hours	100	75	200	150	100	70		
Indirect Field Hours	50	75	50	75	50	75		
Total Equipment Hours	50	50	50	50	50	50		
Total Lost Time Hours		10		50		60		
Quantity (UOM)								
Number of Tasks / Activities	10	20	10	10	10	10		
Overtime Direct Hours	20	30	20	30	20	20		

# Weekly Performance Report – KPI's

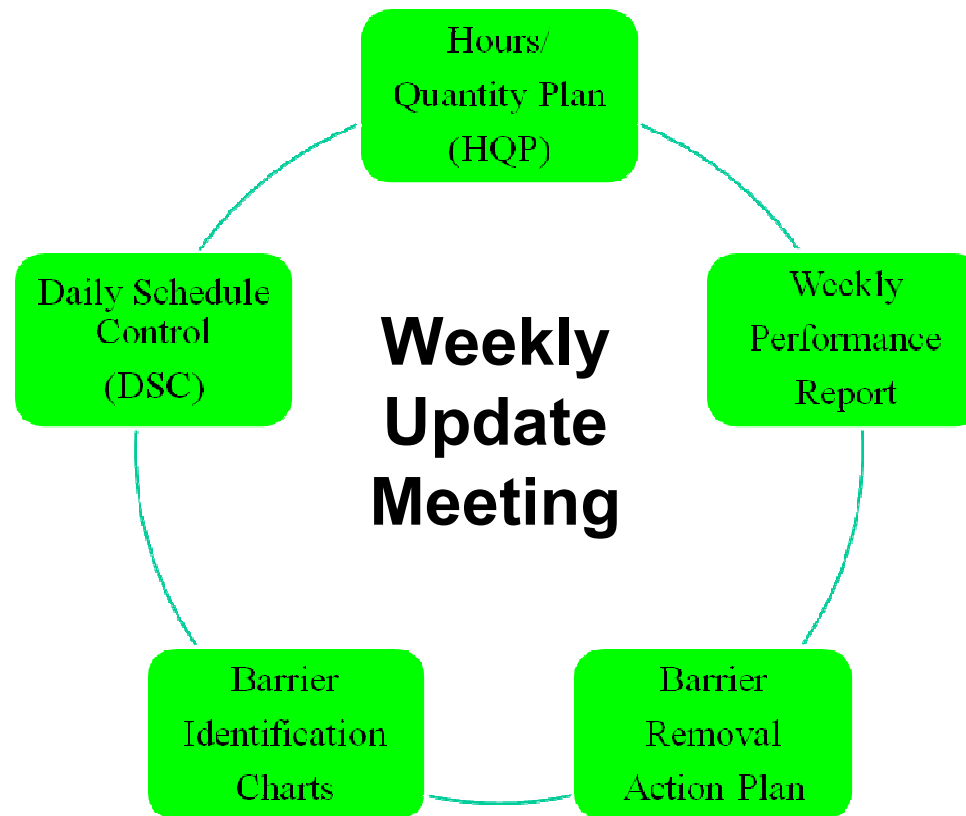
## Key Performance Indicators (KPI) Weekly:

		Tasks						
1	<b>Schedule Attainment (SA)</b>	= $\frac{\text{Actual tasks/qty completed}}{\text{Planned tasks/qty}}$	=	<input type="text"/>	7	<b>Labour Prod. Factor (PF)</b>	= $\frac{\text{Total Hours Earned}}{\text{Total Hours Actual}}$	<input type="text"/>
2	<b>Workforce Utilization (WU)</b>	= $\frac{\text{Actual (Dir + Ind) Hrs}}{\text{Planned (Dir + Ind) Hrs}}$	=	<input type="text"/>	8	<b>Constr. Prod. Unit Rate</b>	= $\frac{\text{Actual Direct Work Hrs}}{\text{Actual Installed Qty}}$	<input type="text"/>
3	<b>Overtime Workhours (OT)</b>	= $\frac{\text{Actual OT Craft Hrs}}{\text{Total Direct Field Hrs}}$	=	<input type="text"/>	9	<b>Prod. Est. Performance</b>	= $\frac{\text{Actual Prod Unit Rate}}{\text{Est. Prod. Unit Rate}}$	<input type="text"/>
4	<b>Equipment Utilization (EU)</b>	= $\frac{\text{Actual Equip. Hrs}}{\text{Planned Equip. Hrs}}$	=	<input type="text"/>	10	<b>Wage Rate</b>		<input type="text"/>
5	<b>Headcount Utilization (HU)</b>	= $\frac{\text{Actual Headcount}}{\text{Planned headcount}}$	=	<input type="text"/>	11	<b>Indirect to Direct Ratio</b>		<input type="text"/>
6	<b>Lost Time Hours (LTH)</b>	= $\frac{\text{Actual Lost Time Hrs}}{\text{Planned Lost Time Hrs}}$	=	<input type="text"/>				

KPI's generated  
through data base

Standard Project  
KPI's generated  
through ALEX

## Weekly Update Meeting



The SFM elements all come together in this meeting

## **Weekly Update Meeting**

The purpose of the Weekly Update Meeting is to review and discuss the status of the project, discuss and address barriers and take a two week look ahead

### **Weekly Performance**

- Analysis of Weekly Performance Report: Schedule Attainment, Headcount Utilization, Workforce & Equipment Hours
- Analysis of Hours, Quantity Plan: Overtime, Workforce Utilization

### **Barriers**

- Analysis of Barrier Identification Chart
- Review and develop Barrier Removal Action Plans

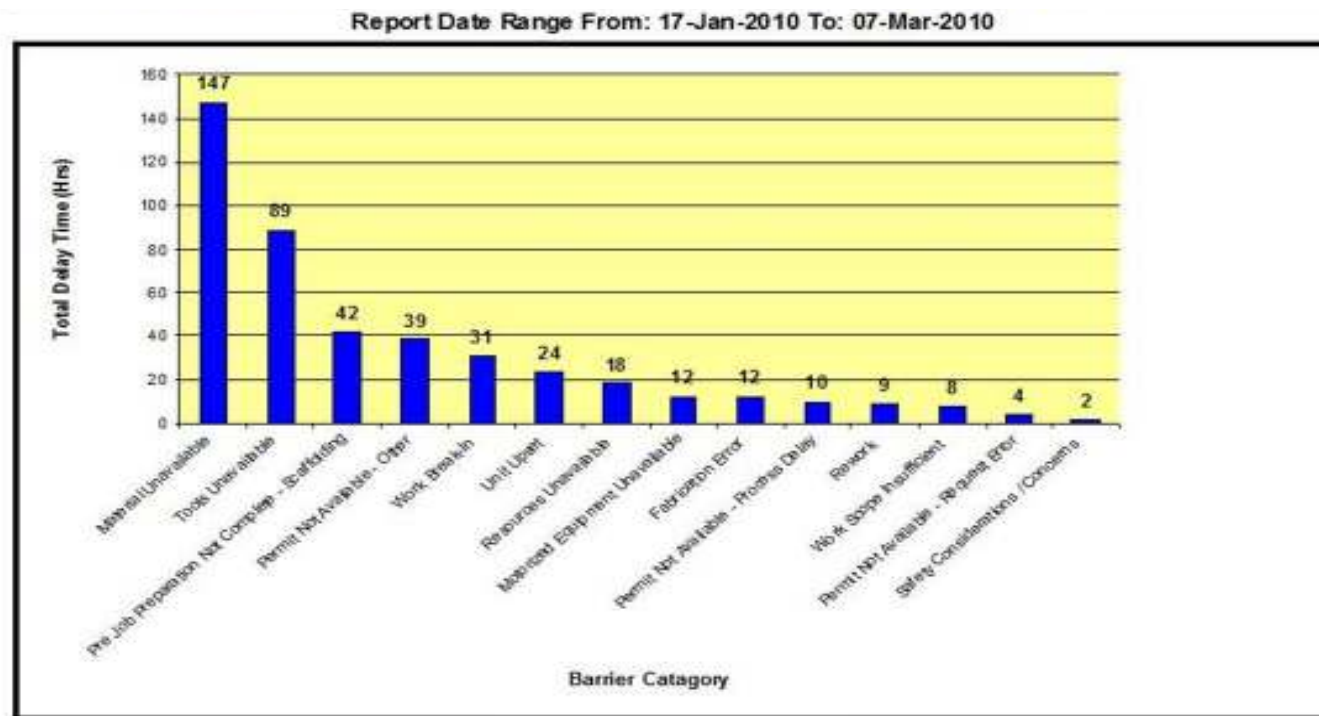
### **Two Week “look ahead”**

- Review of Contractor Schedule

## Barriers

- **Barrier:**
  - Anything which takes time away from the completion of a planned work activity in that shift.
- **Not a Barrier:**
  - Normally scheduled non-work items such as toolbox talks or weekly safety meetings unless their duration is longer than the defined amount of time.
- **Expectation:**
  - 90% of all barriers are solved at the work site by the Foreman/GF/CS

# Barrier Identification Chart - Weekly



INCLUDED BARRIER CODES: ALL BARRIER CODES

Wednesday, March 03, 2010

Chart Total Barrier Hours: 447

Page 1 of 1

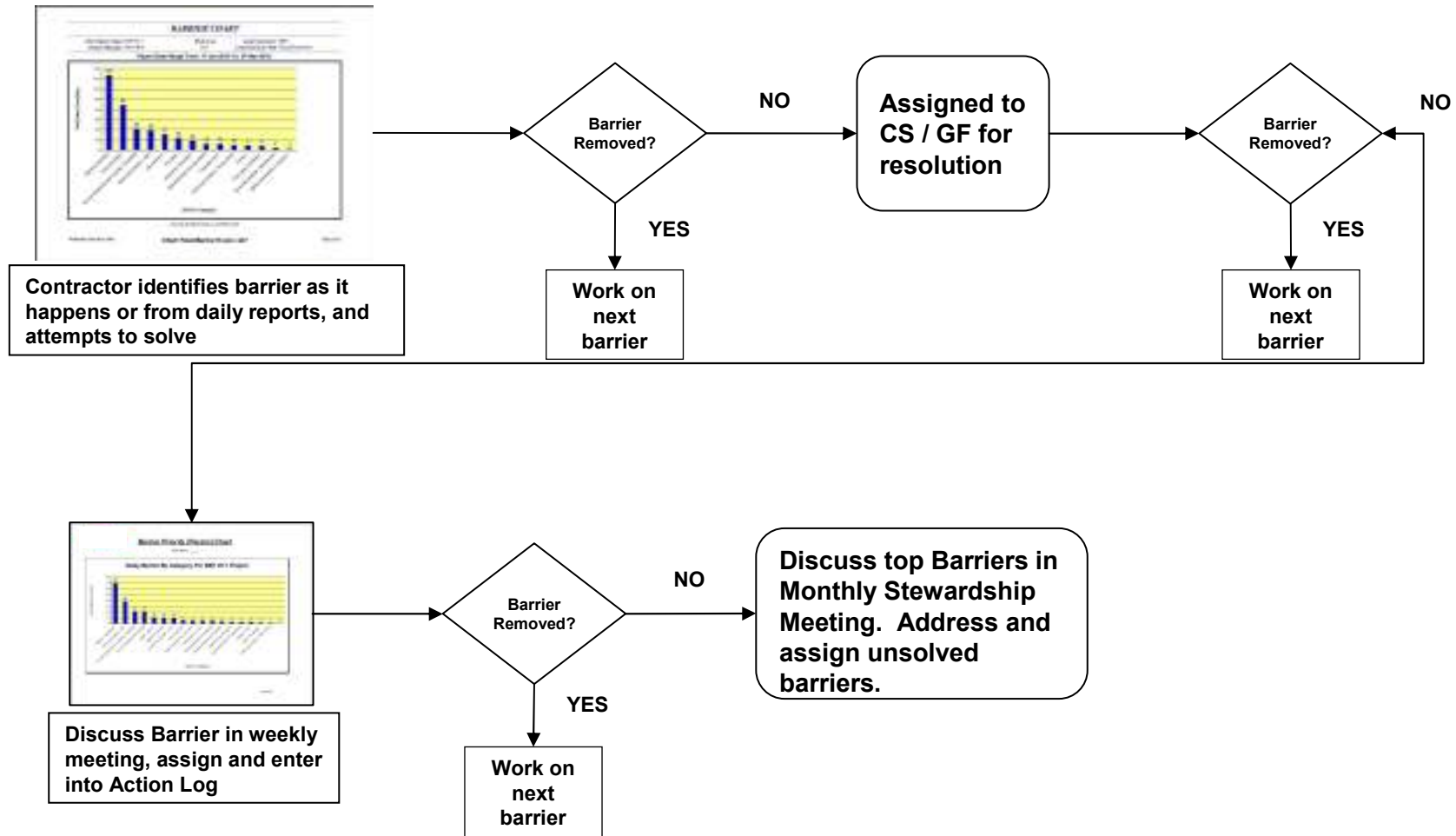


# Barrier Action Log

CAPX_ Project Barrier Removal - Issue & Action Log							Meeting :	Barrier Removal
							Meeting Date:	13-Jan-10
							Today's Date:	03-Feb-10
Attendees :								
Distribution : Attendees +								
#	Meeting Date	Issue	Action	Comments	Responsibility	Due Date	Status	Days Past Due
1	25-Nov-09	MATERIAL	WORK IN PROGRESS - SANFORD	COSYN	SANFORD/ Niel Wilson	JAN 21/10	OPEN	
2	25-Nov-09	O'BRIANS WAY	USE BRLTING	SPARE	DAVE CLARKE	DEC 1/09	COMPLETED	
3	02-Dec-09	Pipe weld Cracking/ weld material	IRA-Ring is to small for the pipe Capitall is currently working to reslove	Capital Group Will impact Schedule	Eng - IRA CORE (Trevor Duke)	ASAP	COMPLETED	
4	09-Dec-09	Neptune stuck in road	Dig up road in Jan	Schedule Delay	Greg Day	12-Jan-10	COMPLETED	Train one outage on Dec 11/09
5	09-Dec-09	IRA-Core heaters	Switch to blanket	3 Day Dilevery	Greg Day	16-Dec-09	COMPLETED	Blankets have arrived
6	09-Dec-09	Delay in welding start Cost 32 WELDS as per schedule	Look at Modified shift or more machines	To pull back schedule	Dave Clarke Neil Wilson	6-Jan-10	COMPLETED	Working day/night Back on Schedule
7	16-Dec-09	Demolition of Fiber & PW	AEPR FHR to repair	Fiber failure waiting on outage	Dave Clarke John Allen	30-Mar-10	OPEN	
8	16-Dec-09	Cold snap for a week	Lost scheduled hours due to cold snap - Syncrude sent contractors home	Schedule Delay	Dave Clarke Neil Wilson		COMPLETED	
9	06-Jan-10	Neptune drill bit worn	Push through sand area and replace head	Schedule Delay	Dave Clarke Doug Geres	13-Jan-10	COMPLETED	Willbros to complete
10	13-Jan-10	Weld Cracks	Aceran to compete test	Schedule Delay	Trevor Duke	20-Jan-10	OPEN	
11	13-Jan-10	Turnover Packages	Why is it taking so long - Greg to talk to John	Turnover delay for operations	Trevor Duke Greg Day	20-Jan-10	OPEN	
12								
13								
14								
15								
16								

Page 1

# Barrier Removal Process



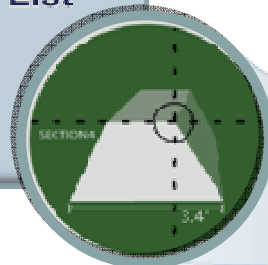
**Wrap-up**

Questions?

## WFP Automation

### Bring your data together in one location

- 3D CAD
- Pipe Isometrics
- Structural Detailing Data
- Line List / Equipment List
- Instrument Index
- Electrical Lists

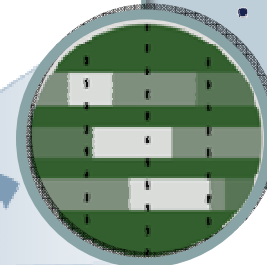


Engineering Data



**Virtual  
Construction  
Model**

- L3 Project Schedule
- Rules of Progress
- Unit Rates
- Quantity Tracking  
(Progress)



Project Controls

- Material Availability
- Material Feasibility
- Offsite Fabricator Status

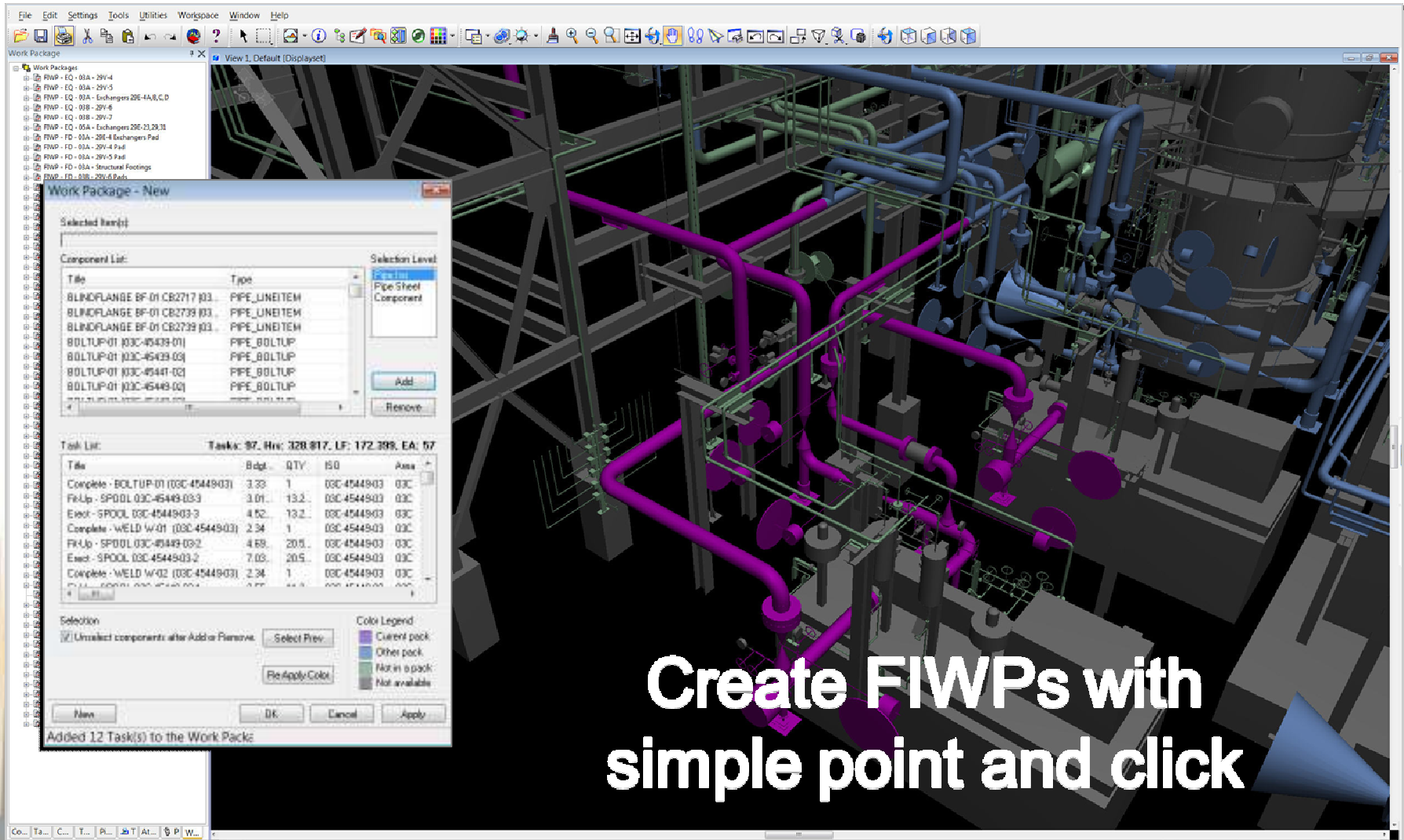


Materials Management

- Weld Tracking / NDE
- TO Systems/Completions
- Hydro Testing



Field Tracking



File Edit Settings Tools Utilities Workspace Window Help

Work Package View 1, Default [Displayset]

Work Package - New

Selected Item(s)

Component List:

Title	Type	Selection Level
BLINDFLANGE BF-01 CB2717 03	PIPE_LINEITEM	Pipe List
BLINDFLANGE BF-01 CB2739 03	PIPE_LINEITEM	Pipe Sheet
BLINDFLANGE BF-01 CB2739 03	PIPE_LINEITEM	Component
BOLTUP-01 03C-45439-01	PIPE_BOLTUP	
BOLTUP-01 03C-45439-03	PIPE_BOLTUP	
BOLTUP-01 03C-45441-02	PIPE_BOLTUP	
BOLTUP-01 03C-45449-00	PIPE_BOLTUP	

Task List: Tasks: 97, Hrs: 328.817, LF: 172.399, EA: 57

Title	Bdgt.	QTY	ISO	Area
Complete - BOLTUP-01 03C-45449-03	3.33	1	03C-45449-03	03C
Fit-Up - SPOOL 03C-45449-03-3	3.01	13.2	03C-45449-03	03C
Exec - SPOOL 03C-45449-03-3	4.52	13.2	03C-45449-03	03C
Complete - WELD W-01 03C-45449-03	2.34	1	03C-45449-03	03C
Fit-Up - SPOOL 03C-45449-03-2	4.69	20.5	03C-45449-03	03C
Exec - SPOOL 03C-45449-03-2	7.05	20.5	03C-45449-03	03C
Complete - WELD W-02 03C-45449-03	2.34	1	03C-45449-03	03C

Selection:  Unselect components after Add or Remove. Select Prev. ReApply Color.

Color Legend:

- Current pack
- Other pack
- Not in a pack
- Not available

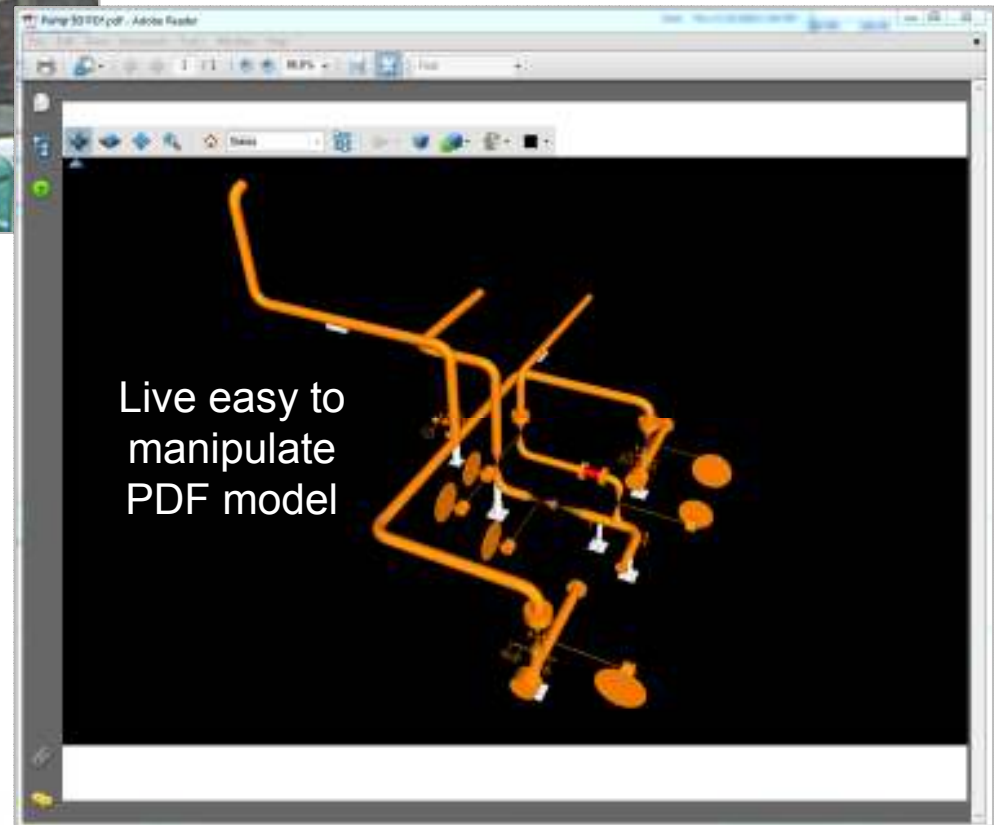
Added 12 Task(s) to the Work Packs

Co... Ta... C... T... Pl... | T | At... | P | W...

## Create FIWPs with simple point and click



3D PDFs for easy  
use in the field





# FIWP Templates







# From Concept to Commissioning

## WorkFace Planning 101





## ***What is Workface Planning?***

***The process of organizing and delivering all elements necessary, before work is started, to enable craft persons to perform quality work in a safe, effective and efficient manner.***



# Introduction

## Agenda

- When?
- Why?
- How?
- Who?
- What?



# When

Ralph Levine

- Runners
- Repeaters
- Renegades



# Renegades



- ✓ Complex
- ✓ Technology
- ✓ Material
- ✓ Labor
- ✓ Interdependencies
- ✓ Unique

# Why

- ✓ Cost
- ✓ Schedule
- ✓ Functionality
- ✓ Risk





# How



*Photo credit: "sidehike"; Flickr.com*

- ✓ Processes
- ✓ People
- ✓ Tools
- ✓ Training
- ✓ Communication



# Who



- ✓ WorkFace Planners
- ✓ WFP Leads
- ✓ Integration Coordinators
- ✓ Resource Coordinators
- ✓ Construction Supervision

# What



- ✓ Faster
- ✓ Better
- ✓ Cheaper
- ✓ Happier?





# WORKFACE PLANNING

FROM CONCEPT TO COMMISSIONING



The logo for ASCI (Ascension Systems Inc.) features a stylized blue 'A' and 'S' that form a continuous shape. The 'A' is a simple triangle, and the 'S' is a thick, rounded curve.

**ASCI** ASCENSION  
systems inc.

**From the Captain to the Cook**





# What do the Captain and Cook have to do with construction mega projects?

**Nothing!**

**But! There is something to be learned**

- **Shared Goals**
- **Shared Training**
- **Shared Language**
- **Well defined organization structure**



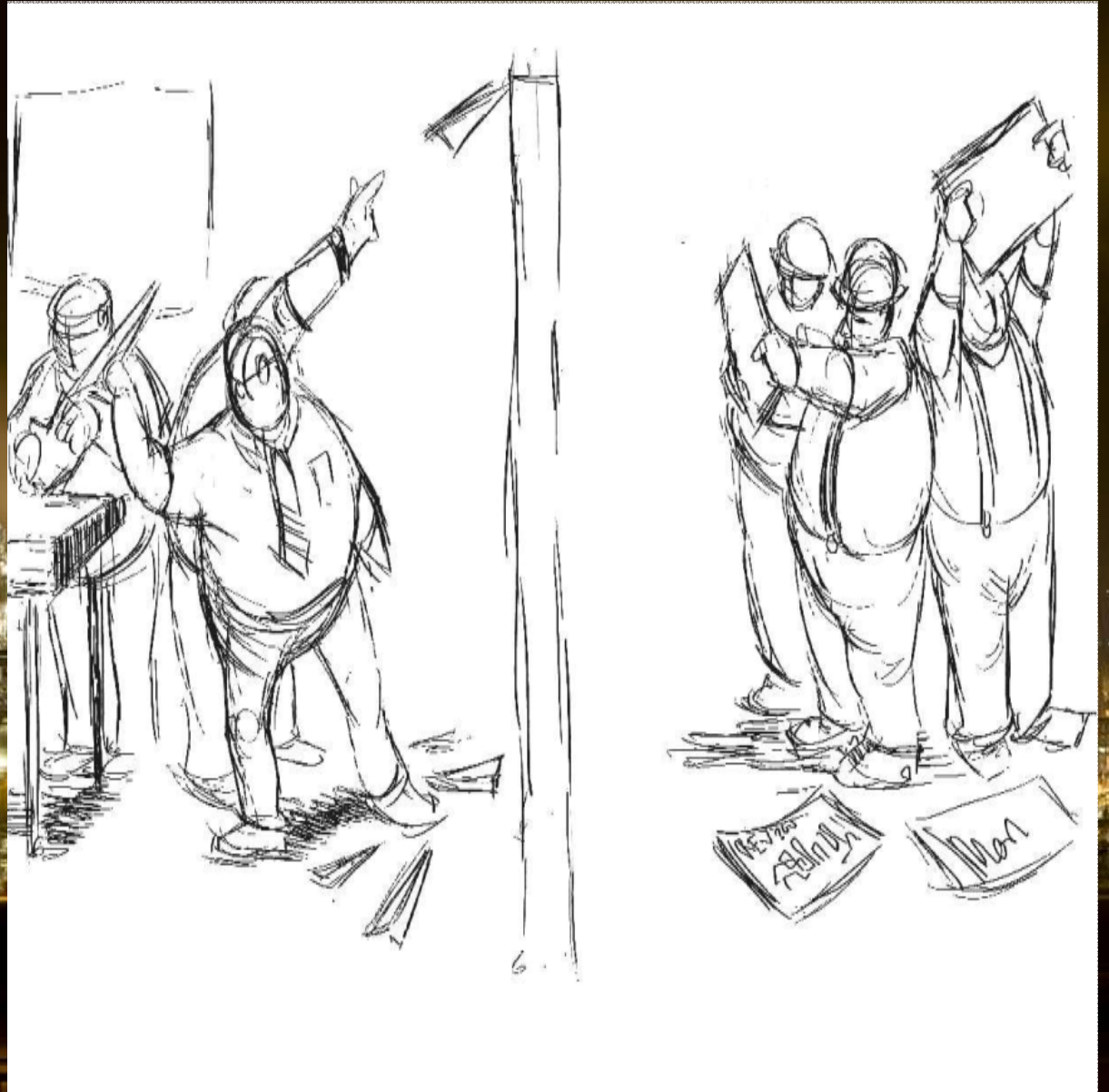
## Problems for Mega-Projects

- **Large cost over runs and schedule delays**
  - *People shortages*
  - *Material shortages*
  - *No shared or at best inconsistent goals*
  - *Little or no shared training*
  - *No or defacto shared language*
- **Litigious**
- **Outdated business model**
  - *Minimize costs*





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## Workface Planning

- **Establish Common Framework**
- **Establish Common Priorities**
  - *Construction Driven*
- **Use of similar terminology**
  - *Is FIWP or FWP*
- **Documentation**





## Workface Planning Issues

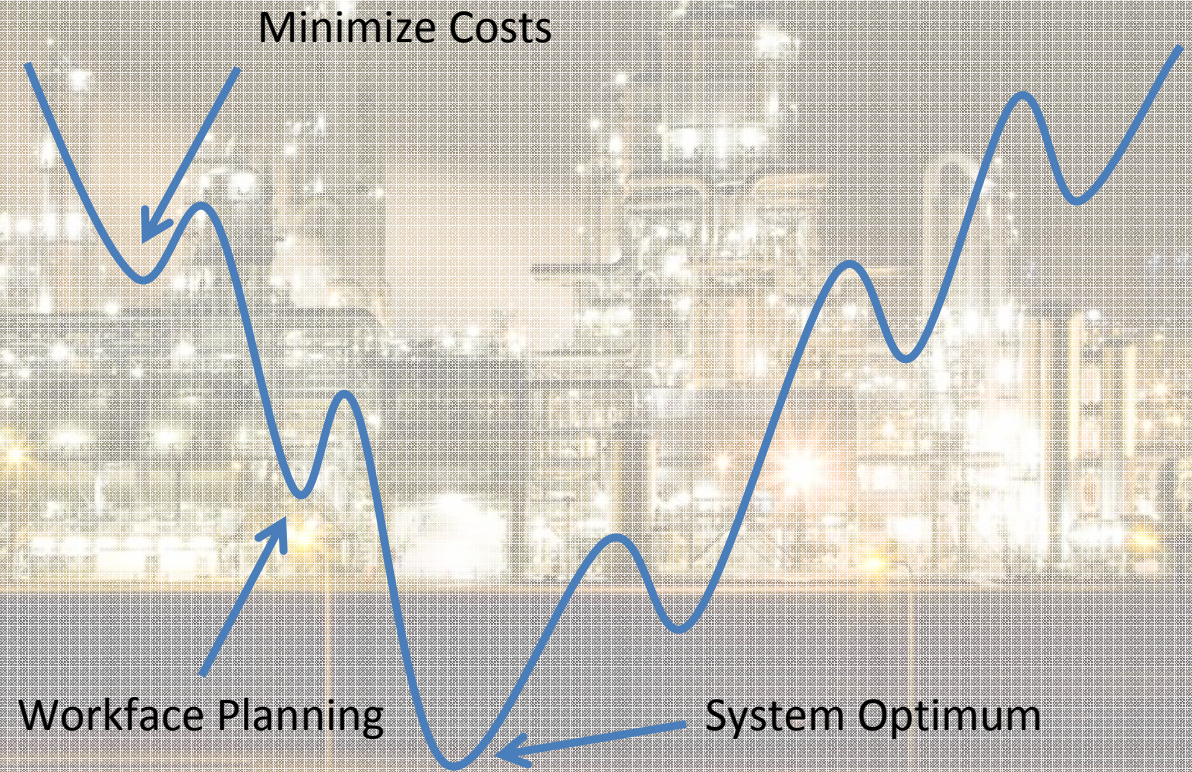
- New concept- not fully developed or proven
- Varies from Org to Org
- No shared training
- No common language
- Support systems
  - *WFP Systems are new and do not address complete scope*
  - *Few standards*
  - *Data integration issues*
  - *Many ad hoc programs*
- Not a complete solution





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# The Multi-Objective Problem







# Captain to Cook Redux

How did we get the Captain and Cook on the same page?

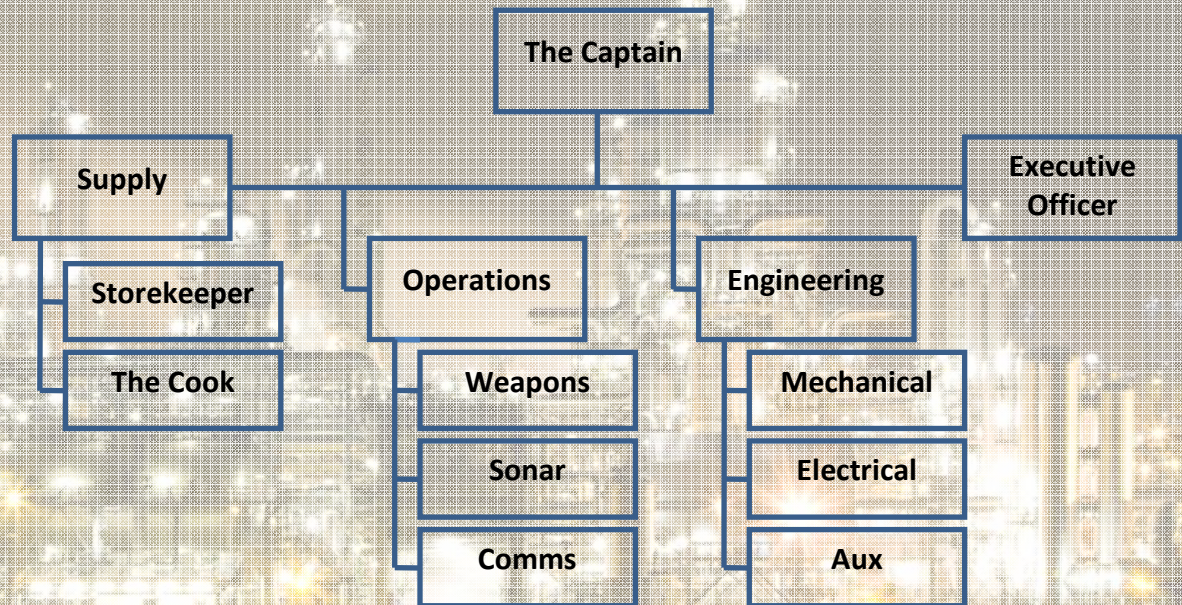
- Training!
- Training!
- Qualification
- Organization!
- And assessment.





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# Organization







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## The Submarine Model

- Expert training – Each prospective crewmember is already trained in a specialty area
- Platform Training – 3 to 6 month Submarine School
- Qualification – One year on board training lead to qualification as Submariner
- Continued training – Leading to increased responsibility
- Assessment





## Expert Training

- **Machinist**
- **Electrician**
- **Electronic Tech**
- **Commissaryman (the Cook)**
- **Engineering (the Officers)**
- **Management Trainees (the Officers)**
- **Management (the Captain)**





## Platform Training

- **Submarine School – All**
  - *Training in all aspects of submarine operations*
  - *Classroom*
  - *Simulator training*
  - *Safety training*
  - *Common Language*





# Onboard Training

## Training

- On board training – All
  - *Overall training on all aspects of operations and systems*
  - *Hands on training on unique systems*
  - *Conducted by senior crewmembers*





## Qualification

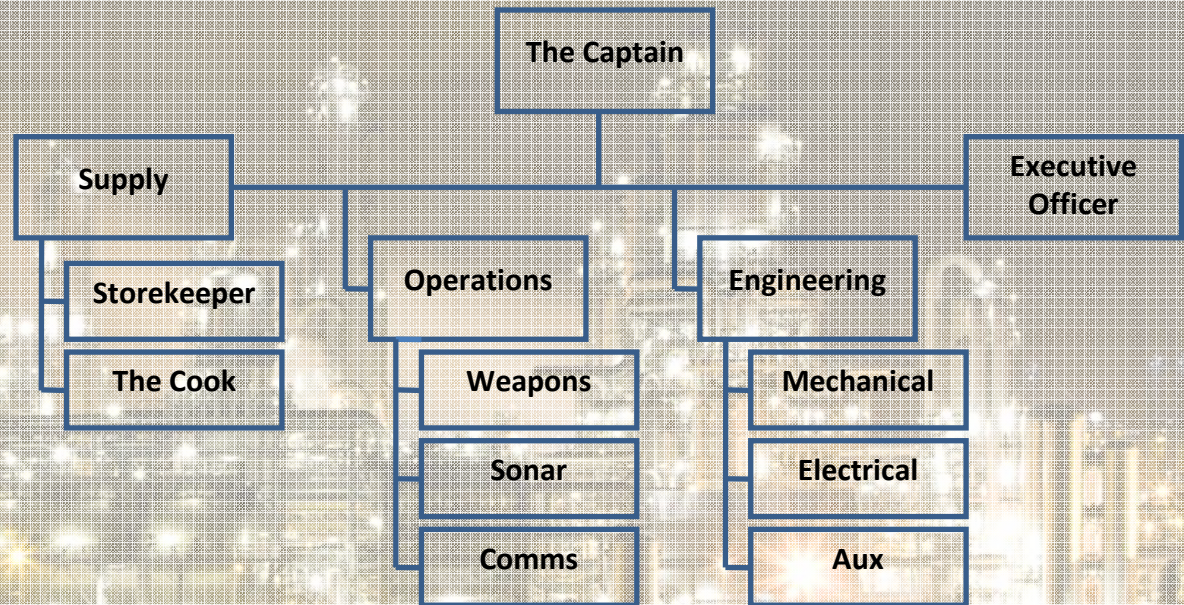
- **Earning your Dolphins**
  - *Written exam*
  - *Oral exams and walk through*
  - *Recognition*





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## Captain Qualification

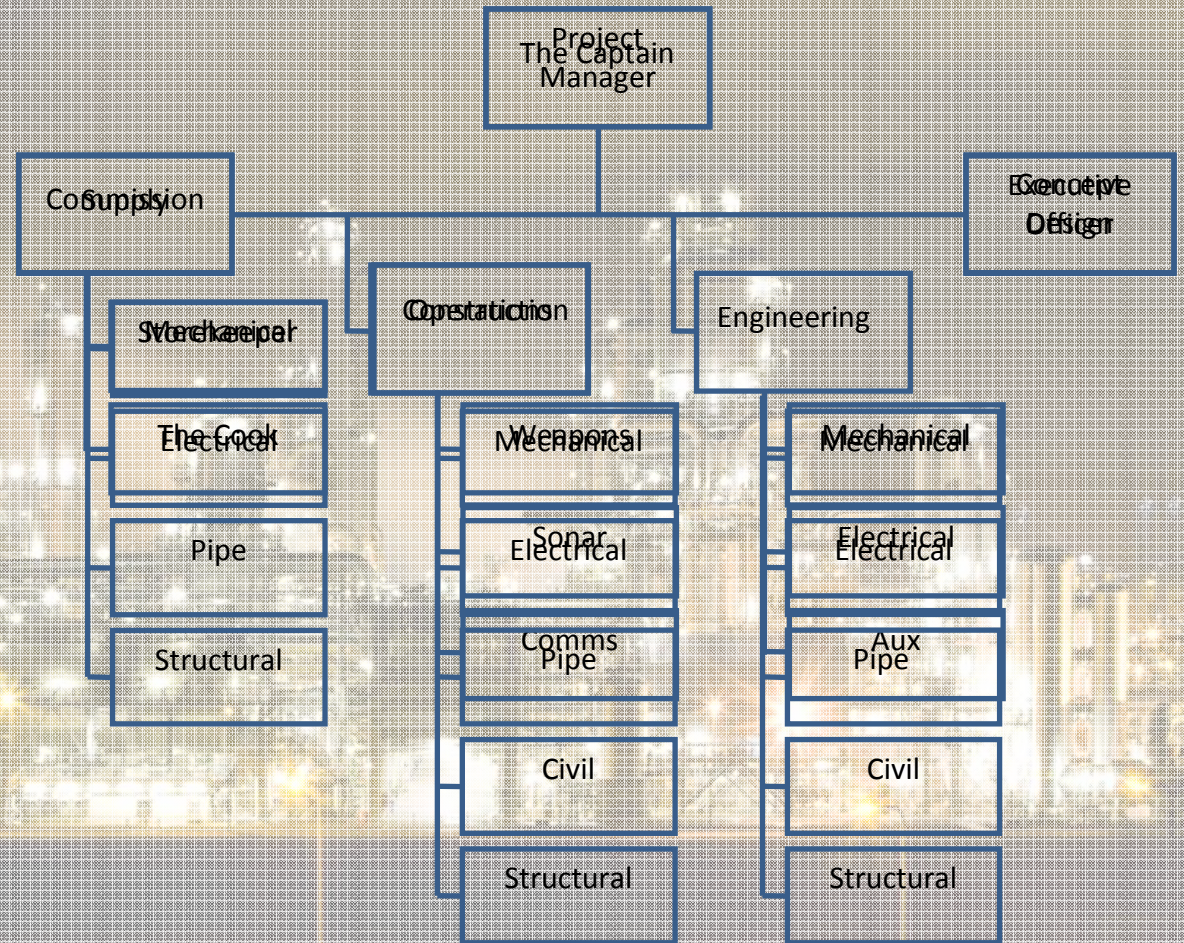
- **Successfully performed in all division officer billets**
- **Served as Executive Officer**
- **Attend Prospective Commanding Officer program – 3 to 6 month assignment**
- **Qualify for Command**





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# Organization







## Recommendation

- Establish universal Workface Planning program
- Establish company specific training programs for all levels
- Develop qualification program for all levels
- Develop Assessment tools for individual and team





## Universal Training

- All must attend
- Standardized across stakeholders
- Available online or through stakeholder networks
- Cost effective
- Continuing education





## Company Specific Training

- All must attend
- Train in company specific implementation
- Available online or through stakeholder networks
- Cost effective
- Continuing education





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## Qualification Program

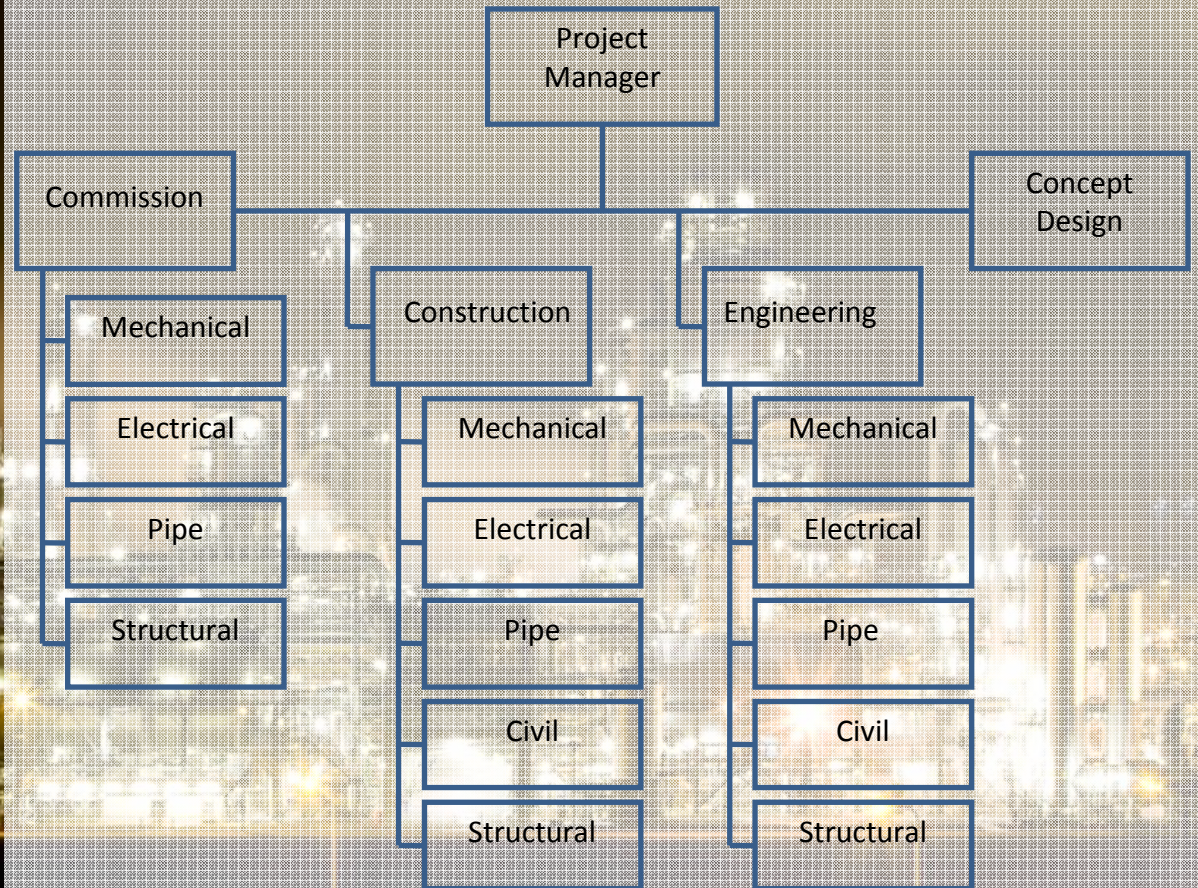
- On the job demonstration of Workface Planning knowledge
- Recognize qualification
- Qualification transferrable
- Renew qualification by project or employer





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# Organization







## Recommendations

- **Establish Project Manager Career Path and Qualification program**
- **Need to move beyond PMI or upgrade PMI training**
- **Develop contact language to give Project Manager “Captain Like” authority over project resources and performance**





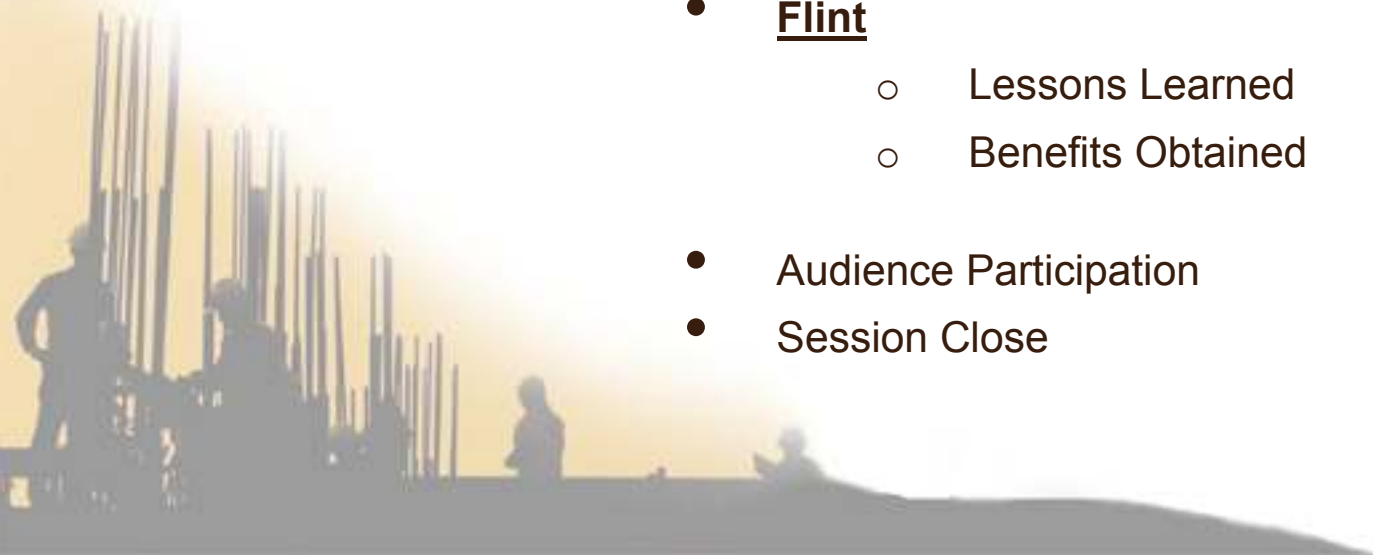
**COAA**  
Construction Owners  
Association of Alberta

# Lessons Learned and Benefits Obtained



# Session Format

- **COAA**
  - Lessons Learned
  - Benefits Obtained
- **Kiewit**
  - Lessons Learned
  - Benefits Obtained
- **Jacobs**
  - Lessons Learned
  - Benefits Obtained
- **Flint**
  - Lessons Learned
  - Benefits Obtained
- Audience Participation
- Session Close



# Introduction of Topic and Panel

## Topic: Lessons Learned and Benefits Obtained

### • Facilitator

- Lloyd Rankin, Facilitator, ASI

### • Panel

- Theresa Hewitt, EPC Manager, Kiewit
- Jim Craig, Director of Construction Operations, Jacobs
- Darrell Coughlin, General Manager, Construction and Planning, Flint



**Kiewit**

**JACOBS™**

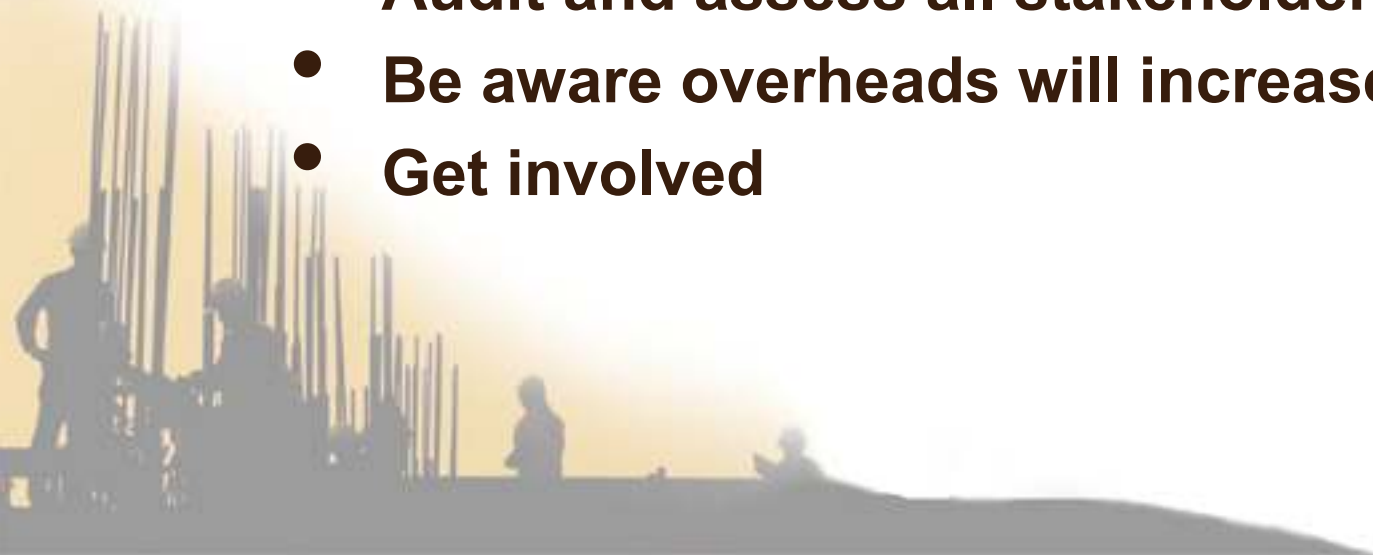


# Lessons Learned

**WFP initiatives need to be driven by the owner.**

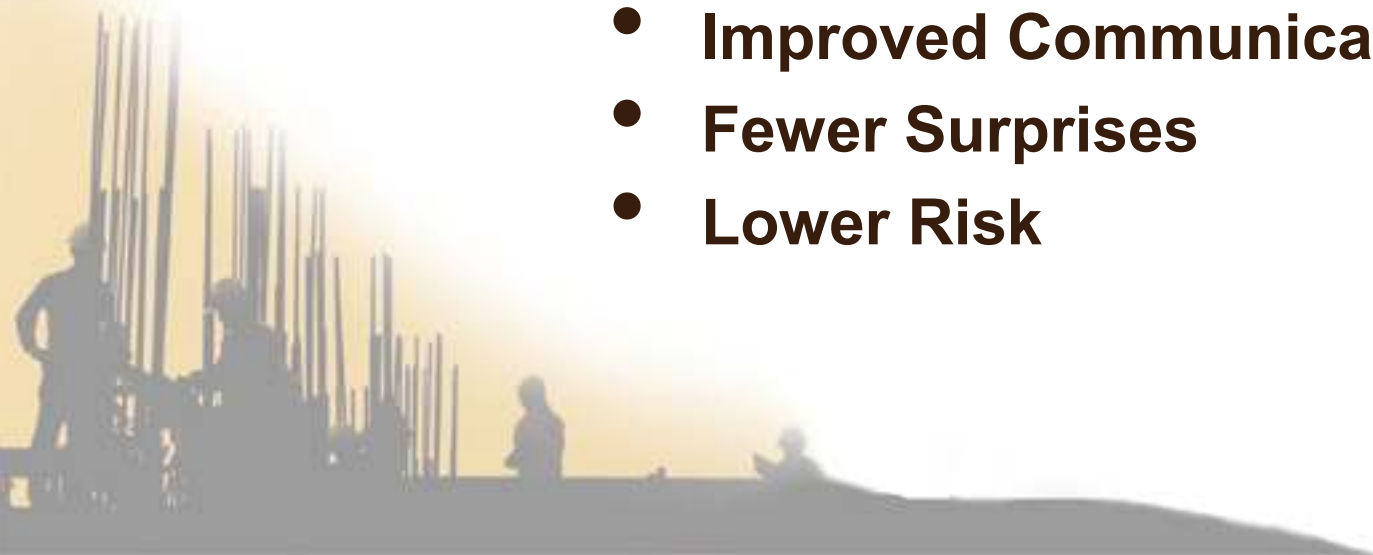
**They need to:**

- **Start early**
- **Assign a WFP Sponsor and Champion**
- **Understand what WFP is**
- **Assign clear deliverables to your contractors**
- **Audit and assess all stakeholders**
- **Be aware overheads will increase**
- **Get involved**



# Benefits Obtained

- **Greater Productivity**
- **Greater Predictability**
- **More Reliable Progressing**
- **More Trust**
- **Less Rework**
- **Better Quality**
- **Shorter Punch-lists**
- **Improved Communication**
- **Fewer Surprises**
- **Lower Risk**





## Lessons Learned: Kiewit

### Set-up for successful WFP:

- ✓ **Early alignment between contractor, owner and engineer on roles and expectations for deliverables**
- ✓ **Construction drives breakdown of work areas**
- ✓ **Construction to develop a scoping document – communicate expectations**
- ✓ **Engineering allocates drawings against the CWP's in their progressing system**
- ✓ **Find a way to schedule engineering to release by CWP**
- ✓ **Method of knowing engineering % complete by CWP**

## Lessons Learned: Kiewit

### Execution of WFP:

- ✓ **Build WFP cycle into the project schedule**
- ✓ **Tailor the FIWP template by discipline**
- ✓ **Keep template simple – only include what you need to execute the work**
- ✓ **Get buy-in from General Superintendents and Construction Managers**
- ✓ **Plan in the engineers office – before going to site**
- ✓ **Plan FIWP documents for turnover – cross reference to system**
- ✓ **Sign off the FIWPs as you go – not all just before turnover**

## Benefits Obtained: Kiewit

### Execution of WFP:

- ✓ WFP on all projects – even if not client mandated
- ✓ WFP can be applied to all work – all trades
- ✓ Scaffold
- ✓ Prep for heavy lift / module setting
- ✓ Material requirements are identified – minimize emergency orders
- ✓ Model shots give crews real visualization of the work
- ✓ Sets up for consistency/organization during turnarounds
- ✓ Work package updates make change management visible

## Lessons Learned: Jacobs

- ✓ **IT WORKS!**
- ✓ **Implement WFP orientation and education on future projects**
- ✓ **Include WFP checklist in construction readiness review**
- ✓ **Implement WFP during Phase I (FEED)**
- ✓ **Package design / procurement to match construction plan**
- ✓ **IFC drawings and material must support workface plans and FIWP sequence and Schedule**

## Lessons Learned: Jacobs

- ✓ **First pass at FIWP complete prior to mobilization**
- ✓ **Implement WFP for all Craft (not just pipe/structural)**
- ✓ **Require workface planning in primary sub-contracts**
- ✓ **Revise work processes around material management systems' updates**
- ✓ **Integrate WFP into weekly Schedule meetings**



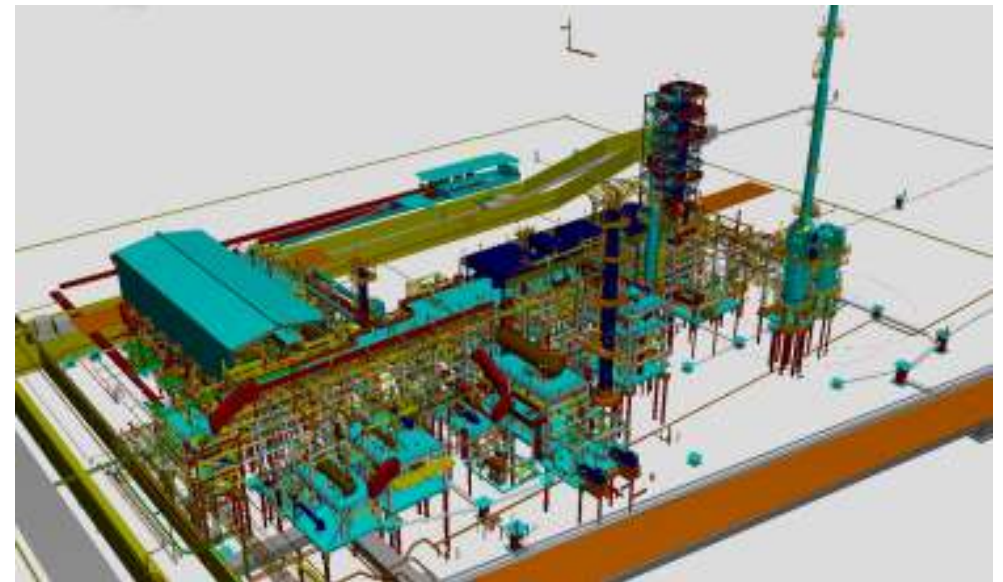
## Benefits Obtained: Jacobs

- ✓ **Discipline Work Package Templates**
- ✓ **Standard work process**
- ✓ **Verified 100% material availability**
- ✓ **Increased productivity**
- ✓ **Early allocation of support craft**
- ✓ **Increased Scaffolding and Equipment utilization**
- ✓ **Synchronization with schedule**
- ✓ **Maintain critical path**
- ✓ **Controlled issuance of work**
- ✓ **Stay on schedule**

**Bottom Line – Improved Productivity & Workforce Utilization**

## Sample Project: Jacobs

- ✓ **TRIR .21**
- ✓ **Productivity factor 11% better than budget**
- ✓ **Cost below budget +/- 10%**
- ✓ **Rework < 2%, < 0.5% on construction**
- ✓ **Beat original schedule**



# Lessons Learned: Flint

- ✓ **Need clear scoping narrative for estimating group and sub-contracts.**
- ✓ **Construction needs clear understanding of their role as it pertains to WorkFace Planning**
- ✓ **Need a backlog of FIWPs before ever going to the field to start construction (always seem to go to early)**
- ✓ **Better communication between fab/mod and the site (RAS Dates)**
- ✓ **Daily productivity reports help keep the superintendents and construction manager on top of what is happening and any recovery required.**
- ✓ **Involve quality in the planning process.**

# Lessons Learned: Flint

- ✓ **The sooner you start to plan the work the more benefits will be realized (involve Work Face Planning / Construction and Operations as early as possible)**
- ✓ **Need to develop the release plan both EWP and FIWP early (Once the equipment is identified and the areas plotted a EWP list can be built, from here break the EWP's into FIWP's)**
- ✓ **Size of the work package is not as important as the content, need to cut scope where it makes the most sense. (As long as the package is by Foreman.)**
- ✓ **Need good scoping narrative, make the scope clearly understood (Use plan view to identify scope location.)**
- ✓ **The more detailed the Construction Schedule is the easier it is to forecast completion.**

## Benefits Obtained: Flint

- ✓ **WorkFace Planning early involvement gives the ability to affect constructability and timely procurement**
- ✓ **Detailed level 5/6 plan gave us the ability to forecast finish dates with accuracy.**
- ✓ **Daily productivity reporting gives construction management confidence in finish dates. Allows timely reacting to items that are lagging**
- ✓ **Proper scoping narratives for subs gives cleaner request for quote responses.**
- ✓ **Detailed planning lead to easier turnover to client (painless!)**



## Benefits Obtained: Flint

- ✓ **Level 5/6 plan (detailed plan) leads to better cost control – no over-runs.**
- ✓ **Morale on job is much higher leading to a happy/productive work force.**
- ✓ **Quality and Construction worked together as a unit towards a common goal. (Planning for turnover starts when planning starts!)**
- ✓ **Cutting the scope in the proper place leads to smoother work flow.**
- ✓ **Productivity Improvement.**
- ✓ **Work Face Planning works on all sizes of jobs...the key is to be planned and have all your deliverables in place prior to execution!**

# AUDIENCE FEEDBACK

**NOTE: The information collected is anonymous and may be used for research purposes. By participating, you are giving your consent for the use of this data.**



# Audience Participation

1. **Based on your experience, what is the expected % improvement in labour productivity an effective WorkFace Planning System will provide?**
  - a) **Less than zero**
  - b) **0 to 10%**
  - c) **10 to 20%**
  - d) **20 to 30%**
  - e) **More than 30%**
  - f) **Can't comment**





# Audience Participation

2. Does your organization use WorkFace Planning?
  - a) Yes
  - b) No



# Audience Participation

3. Who should the primary driver for WorkFace Planning be?
- a) Owner
  - b) Construction Contractor
  - c) Engineering Contractor
  - d) Don't know







# Audience Participation

4. Do you believe projects should be construction-driven?
  - a) Yes
  - b) No



# Audience Participation

5. **Is there enough time provided to effectively implement WorkFace Planning?**
  - a) **Yes**
  - b) **No**



# Closing Comments

- **The presentation slides and voting results will be posted on the COAA website following the conference**
- **Please take a minute to evaluate our session**
- **Thank you for attending this session**
- **If you have any questions please talk to our panel after the session**

