

# COAA WORKFACE PLANNING CONFERENCE 2011

## INDUSTRY EXPERT PANEL [MINUTES]

### *SPEAKERS*

Andrew Hardy | Project Execution Leader, Imperial Oil Ltd.

Mark McCabe | Sr. Project Controls Specialist, Jacobs Industrial Services Ltd.

Lloyd Rankin | President, Ascension Systems Inc.

### *MODERATOR*

Dr. Jim Lozon | President, The Collaboration Group Inc.

## PANEL DISCUSSION

### **QUESTION 1: What are two or three keys to successful WorkFace Planning Implementation?**

Andrew Hardy	Buy-in factor is number one on my list How do you get people to embrace the methodology? It's like safety - it is a priority; a better-planned job is a safer job. Focus on softer skills, not just rolling out a work process and say "do it". Getting enthusiasm and buy in once you get the "wins". Getting people to really want it is the way to go. The second part of it is the leadership part – working with all stakeholders, providing leadership and setting the expectation.
Mark McCabe	Pretty much echoing what Andrew said. You need buy-in from top down, right from owner to the field. Alignment and integration between different silos; procurement to project controls; safety and quality. With buy-in you'll have a superior product. The final thing we need is enough lead-time before construction starts. Reduce wait time. Currently not enough time to do proper planning ahead of time.
Lloyd Rankin	This has to be an owner initiated and led program. It's the owner who can really influence the stakeholders. They have to understand what they really want and how to implement when they say they want WorkFace Planning. We have to make sure that everyone understands WorkFace Planning. Broad motherhood statements not enough; must be specific. Must also check – is everybody doing what they said they were going to do? Must also pre-qualify our vendors. When somebody says they do WFP... show me! Do you have training records, policies, previous customers?

### **QUESTION 2: Where can and should WorkFace Planning be applied?**

Mark McCabe	Anywhere and everywhere! WFP is packaging and managing executable chunks of work; small pieces of the puzzle to big pieces of work. Everybody
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	is immensely focused on safety; everything is focused on safety and quality and that extends to the workplace... there's no reason we can do WorkFace Planning in everything we do today.
Lloyd Rankin	We're seeing it can be applied from nuclear to airports, hospitals and resorts...if it's big yeah it probably can be more effective; can be used in pre-commissioning, startup, commissioning, through the project. It's getting bigger and better and as it continues to get results, we'll continue to apply it to new projects.
Andrew Hardy	Everything will benefit from an efficiency and productivity point of view if it is well-planned. I had a victory recently about this with a supervisor who had been doing this but hadn't written it down, so transferring the knowledge is important.

**QUESTION 3: What is the one thing you would like to challenge the audience to consider?**

Lloyd Rankin	Think back to when safety was something that COAA did an initiative on. A decision was made to try and make the workplace safer. People assumed that if we just thought about it, things would get better, but actually it required a culture and behaviour change to make people safer. It took 15 years to get to a 70% improvement in safety. We're getting early gains in WFP but if it took 15 years for safety, it will probably take us a few more years to get WFP to that level, in spite of early gains.
Andrew Hardy	To some extent, this is not rocket science. A lot of elements have been done but pulling it all together to ensure it's constrained and disciplined and gets to the field is a culture change. We did a classroom on this and the group was building a model; as soon as the model-building started, the pre-planning talk when out the window and the group became instantly task-oriented. We had to work to tweak their culture to slow down, plan the work, talk about it, get the alignment, and that takes time even in leadership groups.
Jim Lozon	I often use a training exercise with lego bricks. We say "build a bridge". It's a speed and quality competition. We give the bricks to the groups and say "go". What do they do first thing? They build a bridge! But they don't know I have the specs in my back pocket. Knowing I'm the owner and it's my project, the groups don't get the bridge right. They say why? I say here are the specs. They find that lack of planning caused them to restart, rework and so-on. The best group to do this with is engineers, but it happens almost every time: You give someone something to work with, and something to do the work with, so they do the work.
Mark McCabe	Safety, quality and cost means nothing if someone is hurt or killed on the project. How do you execute a safe job? Planning. Realistic and solid planning. If you take the time to identify the hazards, you can mitigate or eliminate them as the project goes on, and I think as WorkFace Planning goes on, that's what it is about and that's our goal.

**QUESTION 4: What are some of the signs owners should look for to assess a contractor's knowledge and competence in WorkFace planning?**

Andrew Hardy	As an owner representative, I do believe WFP is a competitive advantage for a contractors and it's something we're going to look for in the future. As a hands-on project manager in the field with the tradesmen, we are diligent on stewardship in terms of how the workface packages are coming along; where we're at throughout the job to make sure going forward we take our learnings and look for those work processes, interview potential planners and managers and getting a competitive advantage from a safety and quality point of view for a contractor.
Mark McCabe	Policies and procedures and how you follow them. Look at reports, audits, talk to staff... You've said it, now prove it!
Lloyd Rankin	Where I've done vendor pre-qualifications, it gets details: have you trained your people, do you have descriptions? Can you show me who your planners are? Do these details match the COAA model? Do you have audit and assessments done? Do you have WFP experience? Can I talk to references? Evidence, evidence and more evidence.

**AUDIENCE QUESTION-AND-ANSWER**

<b>Names</b>	<b>Question and answer</b>
Ash Mohammed (AECON) (sp?)	Regarding WorkFace Planning implementation: What causes WFP to fail, and what does it cost?
Lloyd Rankin	<p>I recently was supposed to audit and assess their WorkFace Planning system. I showed up, and asked the contractor when they found out they were supposed to do WorkFace Planning? They said "Friday". I asked if they had people, he said no. I asked if they had any procedures, he said no. I asked when they started construction, he said last week. I told the owner we needed a phased implementation plan based on where we were right then, but to do an audit on where we're at, it would be a demoralizing waste of time. Without time on a project to do full implementation, partial implementation is recommended.</p> <p>Put mechanisms in place where you can see what the costs of WFP are and how they affect the budget. This is very difficult on in-progress non-WFP project. The cost of the people is 1-2%. Training those people is expensive. For example, Andrew trained 50 people...</p>
Andrew Hardy	Yeah, in terms of actual numbers we're not that far yet but training was the big up-front cost. In terms of the work itself (putting the packages together, doing the plans), someone is doing that anyway, but we want to make sure it's being done four weeks before project starts. In terms of cost once you're in it, I have no doubt a functioning WorkFace Planning system will pay for itself many times over. I haven't seen it fail yet, but if you don't implement properly you can set the teams up for failure.

<b>Names</b>	<b>Question and answer</b>
Dan Slate (Jacobs) (sp?)	If a project is already going and hasn't been using WorkFace Planning, the question is when is it too late in the project lifecycle to go forward with it?
Mark McCabe	I think I've learned the big picture to see what's left. As Lloyd said you can do systems turnover packages, for example... there are many things you can do not related to construction, so look at the big picture. If you start WFP late, you have to look at what you should do the old-fashioned way and where you can apply WFP going forward. Focus and zero in on the percentages of the CWPs or the other areas that aren't complete. No time would be too late, to be honest.
Andrew Hardy.	No, I agree. Depending on what makes sense, there's always areas to implement WorkFace Planning. Anytime you can do that there's going to be a benefit to the organizations involved.
Lloyd Rankin	As a warning: If you're producing packages so you can show the owner you can do it without planning on actually using it in the field, it is probably a waste of time. I've seen it on the job where the field isn't actually using some of the nicest work packages.
<b>Names</b>	<b>Question and answer</b>
Yogi Shavasto (sp?)	When to start WorkFace Planning  How do you reconcile two types of packaging which merge toward construction
Mark McCabe	Code appropriately; start at the very beginning, when you're designing and detailing. Need to tag correctly, code appropriately. Project controls should talk six-months to a year out. Start planning at that time and as you transition to construction the planning force will grow. Hitting the field with an abundance of packages in place is good.
Andrew Hardy	There are big consequences to lack of planning early on in terms of constructability. Decisions early can make a big impact in the field so starting planning early is what you want to do.
Lloyd Rankin	Start your planning early for transition from area to systems. Often the owner and engineer talk about how the systems will be created; often the contractors aren't part of that discussion so they're walking lines in terms of deciding how those will be produced. The other thing to say is: the owner very early has to decide who is going to be the champion in our organization, and who is going to sponsor this?
<b>Names</b>	<b>Question and answer</b>
Gary Orton	Will there be plans for accreditation as a WorkFace Planning organization?  If there is, in order for anything to be accredited, so it needs to be an honourable result, so will there be an organization for this?
Lloyd Rankin	We absolute believe in the WFP committee that there should be a certification process for WorkFace Planners. Now that projects are starting up again after 2008, we're fairly certain we'll be looking more closely as the accreditation process. We have a scorecard that can be used... we



	need to start developing audit tools... My company ASI is doing that as a business, but I do think that we will see some of that being developed through COAA as well. The members of the WFP committee are working on an incredible amount of things.
<b>Names</b>	<b>Question and answer</b>
Stewart Connell (Burns and McDonald)	Do we have any statistics in terms of how the WorkFace Planning system has improved safety?  Where do you find the core model for the WorkFace Planner?
Lloyd Rankin	The most recent safety information comes from the Construction Industry Institute. They did see a significant improvement in safety and its been properly documented through the University of Austin in Texas.  We have job descriptions on the COAA website and through our training programs we provide details on the skillsets and backgrounds required.
Andrew Hardy	An ideal WorkFace Planning candidate is someone from the trades – foreman, general foreman level is a pre-requisite. Finding good leadership on the construction site , one of the pushbacks we get is we’re taking good experience out of the field. But we’re getting their knowledge transferred and putting more knowledgeable foremen out in the field.
<b>Names</b>	<b>Question and answer</b>
Frank Engli (Shell Canada)	What has been done to sustain WFP successes in future projects and what has been done to carry over into on-stream maintenance, routine maintenance and turnaround?
Lloyd Rankin	Imperial Oil approached ASI and SAIT to assist in putting together training in turnarounds and what we found was many of the principles that apply to new construction can easily be modified to work in a pre-turnaround/turnaround environment.  How have we attempted to sustain? Most of the companies which have implemented WFP have developed policies and procedures around it and many have used their Lessons Learned going forward. Many companies have used it in Alberta and now routinely use it outside of Alberta where owners haven’t necessarily requested it...
Mark McCabe	COAA’s model for WorkFace Planning is a bigger, better model than what your normal turnaround model would be. We continue to do our own model better and better in terms of safety and quality through improvements in policies and procedures, encompassing every department.
Andrew Hardy	In terms of applicability, it comes back to the question of where can you use WorkFace Planning: the answer is everywhere. Put together Work Packages any time you’re doing work in the field.
<b>Names</b>	<b>Question and answer</b>
Jin Pang (U of A)	I am a strong supporter to promote GFs, superintendents or foremen to become WorkFace Planners, but usually these trade supervision staff are

	<p>not trained for computer skills; packages require compute skills. Where this might be too much to ask to learn computer skills, would you consider breaking a planning job into multiple tasks to mitigate this?</p> <p>Human factors play a big role in construction and in many cases there isn't one best way to slice the same work into different pieces. Where one superintendent approaches one way and another approaches it differently, how do you address this? What about handling turnover?</p>
Andrew Hardy	<p>In terms of computer skills, we're pushing that as NOT a barrier. Outside of things like primavera, the computer skills are minimal. The right person who understands the trade skills are far more important than the computer skills. I wouldn't separate the trade skills and computer skills.</p> <p>The WorkFace Planner talks to these folks up front, there is alignment, there are management of change procedures that project leadership manages. How much reinventing the wheel can you tolerate?</p>
Mark McCabe	Turnover happens. We try to sit down in advance and talk about how to proceed and the superintendent and planner work together...
Lloyd Rankin	Within the WorkFace Planning group, the varying skill sets complement one another; the differences in computer skills can be managed within the group. The bias has to be toward having really good construction knowledge and hands-on experience.

**Final Comments**

<b>Panel Member</b>	<b>Comments</b>
Andrew Hardy	Key themes are: really think about the cultural change. How do you get buy-in? Let people see what's in it for them? And don't forget about the link to safety. A well-planned job is a safe job.
Mark McCabe	We all come from different areas but we all have the same message today: the buy-in is the key. Getting people to follow through and stick to it... there will be pain before the gain.
Lloyd Rankin	We have to understand what the implications will be of making this cultural change. Overheads will increase with implementing WFP, but overall costs and safety will improve. There will be false starts and learning curves, but that needs to be managed through the implementation process.
Mark McCabe	Everybody pulling in this direction benefits everyone in the industry. Going back to the old ways isn't going to benefit Alberta in the long term.



# **My Three Lessons on Craft Productivity**

## **Keynote Presentation**

**E. Chris Buck**

**President**

**Productivity Enhancement Resources, Inc.**

**COAA WFP Annual Conference**

**Calgary, Alberta**

**September 19, 2011**







# Lesson 1: Breaking Down Productivity into Basic Elements

- Challenges are more easily addressed when broken down to basic elements.
- Craft productivity boils down to craft labor utilization.
- Craft labor utilization can be broken down to two basic elements:
  - ▶ Craft labor utilization effectiveness
  - ▶ Craft labor utilization efficiency
- Traditional productivity management tools measure craft utilization in a composite manner.

# Lesson 1: Breaking Down Productivity into Basic Elements

- Items that impact craft productivity:
  - ▶ Execution Plan Quality
  - ▶ Craft Methods
  - ▶ Tool/ Equipment Quality
  - ▶ Tool/Equipment/Material Access
  - ▶ Work Environment
  - ▶ Crew Coordination
  - ▶ Site Logistics
  - ▶ Estimate Basis
  - ▶ Staffing Levels
  - ▶ About 1000 other variables



# Lesson 1: Breaking Down Productivity into Basic Elements

- Traditional productivity management/measurement methods is a composite of ALL these variables.
  - ▶ Declines in any variable or combination of variables takes this overall composite in bad direction.
  - ▶ Due to the volume of impactful variables, it can be difficult to zero in on root causes.
  - ▶ By combining traditional methods with a method to separate a portion of those variables from the others, it allows Project Management a way to more quickly identify and mitigate those variables effecting the project.

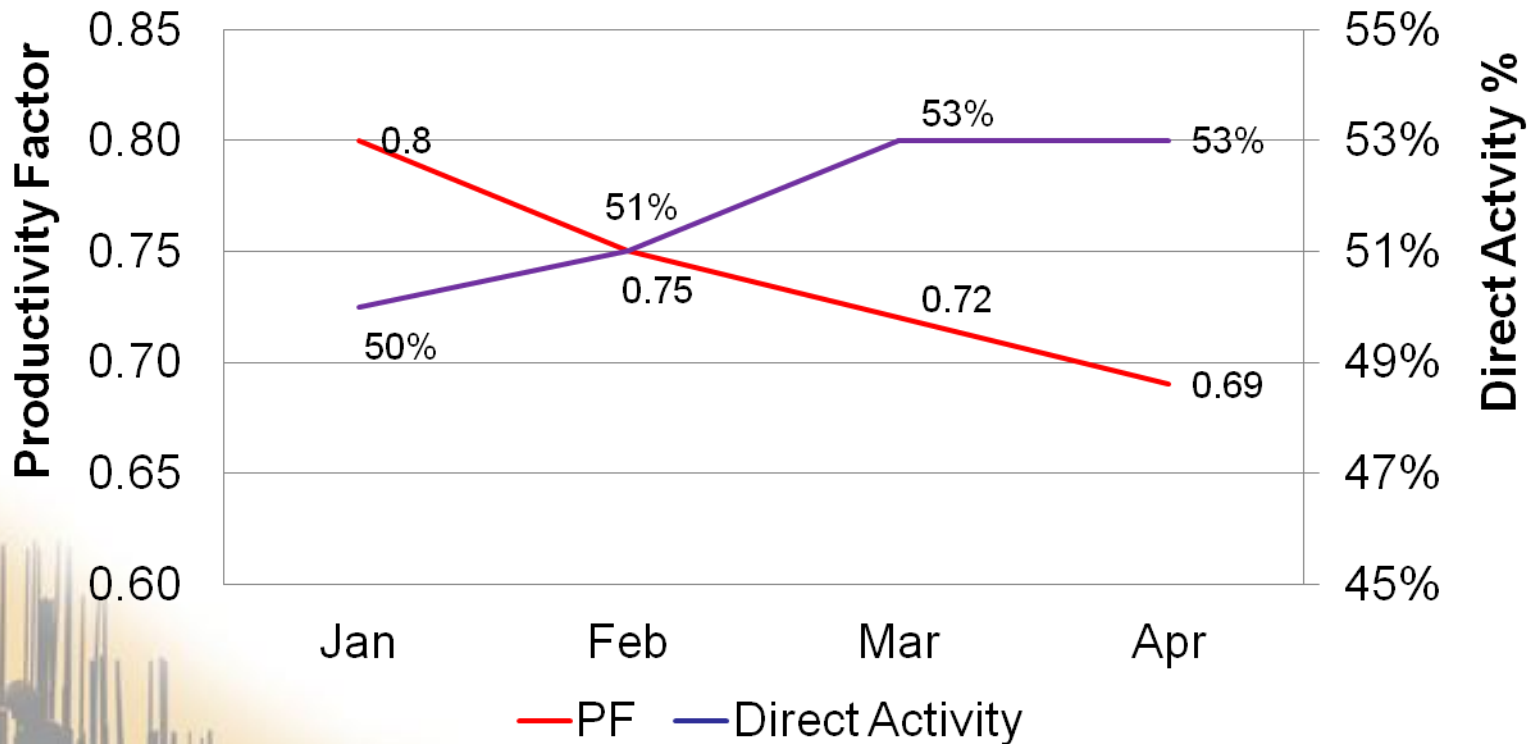
# Lesson 1: Breaking Down Productivity into Basic Elements

- Historical data may indicate it takes 3.5 labor hours per linear foot of pipe to install.
- Estimate would show 100 LF to take 350 hours to install.
- The ratio of actual hours compared to 350 hours is how PF is calculated for that task.
- If the 100LF of pipe actually takes 375 hours to install, the PF would be calculated as follows:
  - ▶  $350 \text{ hours} / 375 \text{ hours} = .93$ .
  - ▶ Some companies measure PF ratio inverted. For the example above, the PF would be 1.07.



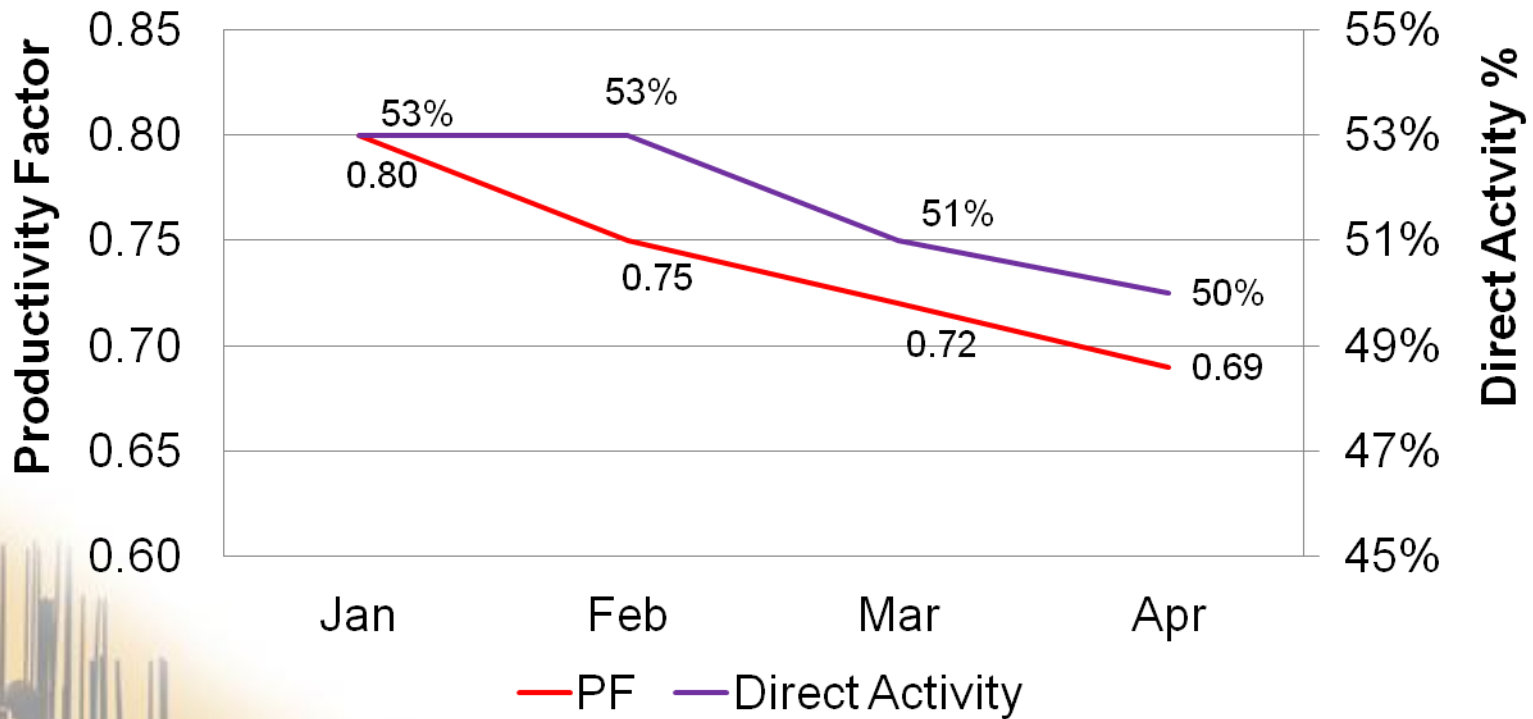
# Using a Combination of Measures to Manage Craft Productivity

## PF vs Direct Activity



# Using a Combination of Measures to Manage Craft Productivity

## PF vs Direct Activity



# Lesson 1: Breaking Down Productivity into Basic Elements

- Every project should develop a **comprehensive productivity plan**.
  - ▶ That plan should address how the project will manage effectiveness and efficiency on the project.
    - Will the project require certified craftsmen?
    - How to ensure tool and equipment quality is satisfactory?
    - Will there be supervisor training?
    - How will productivity information be used/shared?
    - How will efficiency evaluation be used?
    - How can craft travel be minimized or in some cases, eliminated?
    - Etc.

## Lesson 2: Budgetivity

- Major industrial projects use estimate-based measurements to manage craft productivity.
- A 1.0 PF may or may not mean the project is performing productively.
- Technically, a 1.0 PF means the project is performing exactly as estimated/budgeted.
  - ▶ If estimate is tough or fat, it has as much or more impact on PF as performance.

# Lesson 2: Budgetivity

## Consider Two Projects

- Project A
  - ▶ Lump Sum
  - ▶ Competitively Bid with 4 Bidders
  - ▶ 2 Future Projects Planned By Client in Next 2 Years
- Project B
  - ▶ Reimbursable
  - ▶ Capital Project on an Evergreen Site
  - ▶ Sole Source Award to Established Contractor

**Does an equal PF between these projects mean they're equally productive?**





# Lesson 2: Budgetivity

Good “Budgetivity” Does Not Necessarily Equal Good “Productivity”.

- Commercial structure, Contractor financial position, local labor force and other factors and variables that may effect the project estimate.
- Productivity improvements will usually manifest in the PF as upward trends, but comparisons between projects shouldn't be viewed as an “apples to apples” comparison.

## Lesson 3: Foremen Availability

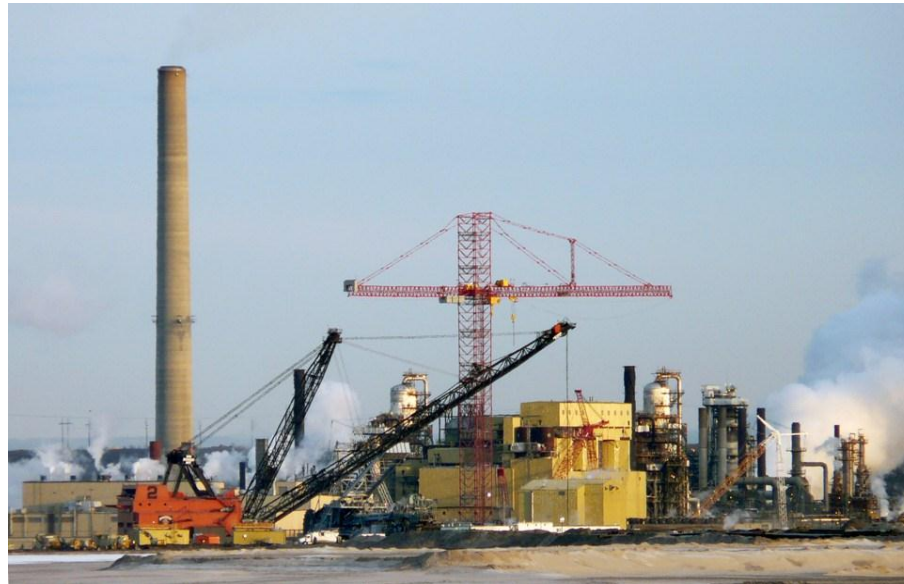
No Single Issue has a Bigger Impact on the Most Important Measurables of Construction Performance; Safety, Productivity, and Quality

- Managing foreman availability (FA) is more than improving the supervisor to craft ratio.
- Projects need to take a hard look at the roles and responsibilities of foremen.

## Lesson 3: Foremen Availability

- If projects were to measure foremen availability, each would be able to draw clear correlations between increases and decreases to FA to respective Safety, Productivity and Quality metrics.
  - ▶ Which roles/responsibilities of foremen can be shifted up, down or across the chain of command to facilitate the optimum available time to their crews?
  - ▶ Can foreman shacks be installed closer to the workface to minimize time away from crew for necessary admin duties?
  - ▶ Is the project operating with the optimum foremen to crew ratio from a productivity standpoint?
- A Tri-partite Study was recently completed on the SER Project for Syncrude focusing on Foreman Availability.

# SERP Joint Workface Study - A Tri-Partite Approach to Improved Performance



Niels Frederiksen - Jacobs  
Robert Blakely - Building and Construction Trades  
Iain Howieson - Synocrude

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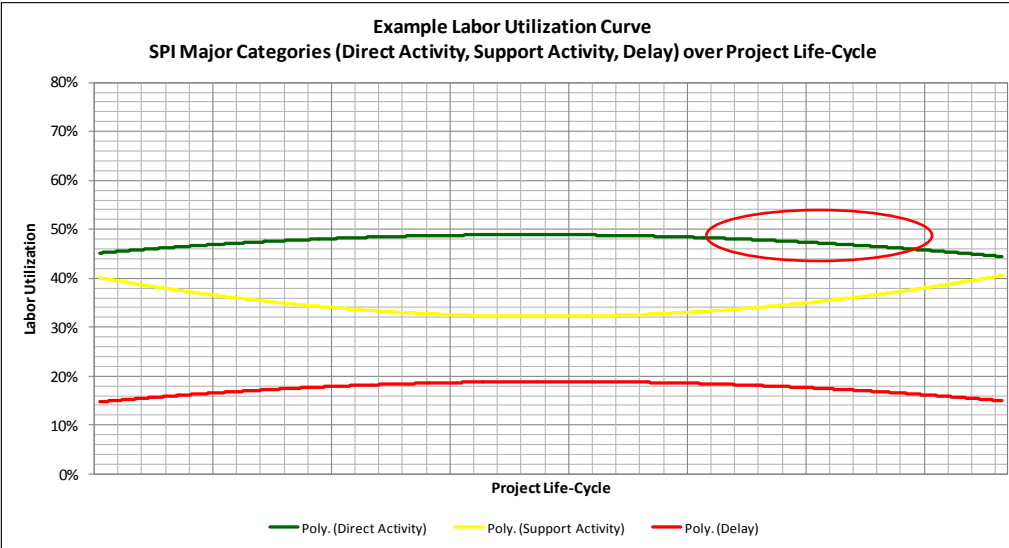
# Background

- Productivity on the Syncrude Emissions Reduction Project was a concern.
  - Earlier quantitative “Time on Tools” studies had indicated high craft travel, low direct activity
  - Qualitative views had indicated low levels of foreman time at the workface
- In the fall of 2010, the Building Trades were approached by Syncrude to assist in funding a study on “Foreman Time at the Workface”
- A Tri-partite study was jointly funded by Syncrude, Jacobs, and the Building Trades
  - Conducted by Productivity Enhancement Resources Inc.
  - Baseline study in Jan/11. Follow-up study May/11

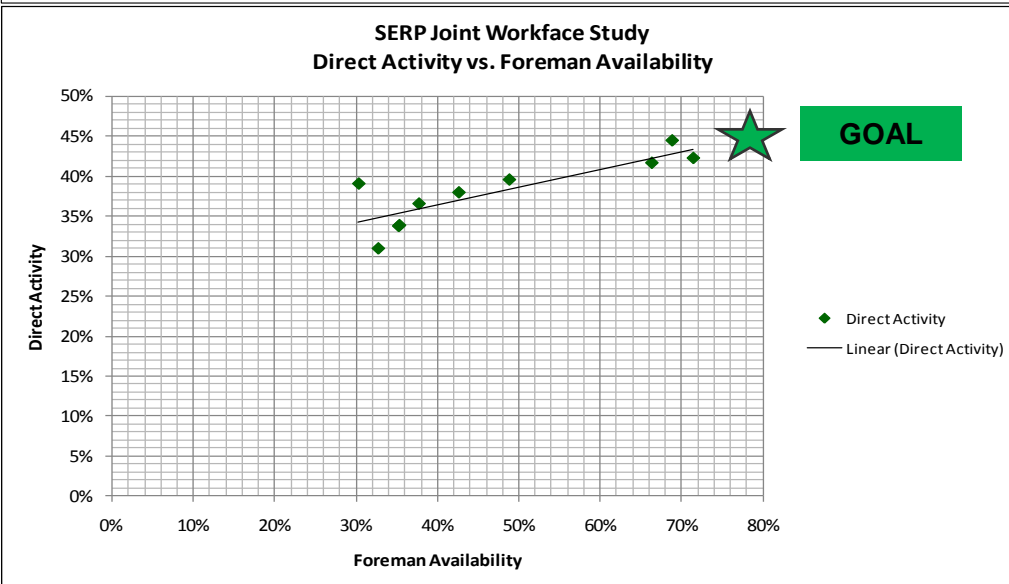
# Findings

- **Baseline Data** - January 2011 results indicated foreman availability of 34.7% corresponding to direct craft activity of 36.9%
  - Foreman choosing to conduct administrative duties elsewhere
  - Time at workface not considered a high priority
  - Erosion of standards
  
- Joint improvement initiatives conducted to drive accountability and engagement
  - Communications and alignment of expectations
  - Logistics Improvements
  - Building Trades Business managers meetings with craft.
  - Positive feedback, recognition, and promotion
  
- **Final Data** - May results saw a 32% improvement in foreman availability to 45.9%
  - Corresponding 21% drop in craft travel time and 4% improvement in direct activity
  - Corresponding reduction in number of safety incidents and improved productivity

## Direct Activity vs Foreman Availability



- Overall Direct Activity improved 1.4 percentage points (4%) during study period (36.9 to 38.3%)
  - Normally expect to see a decline in direct activity of 5.3% during this period of the project
  - Net improvement 9.3%

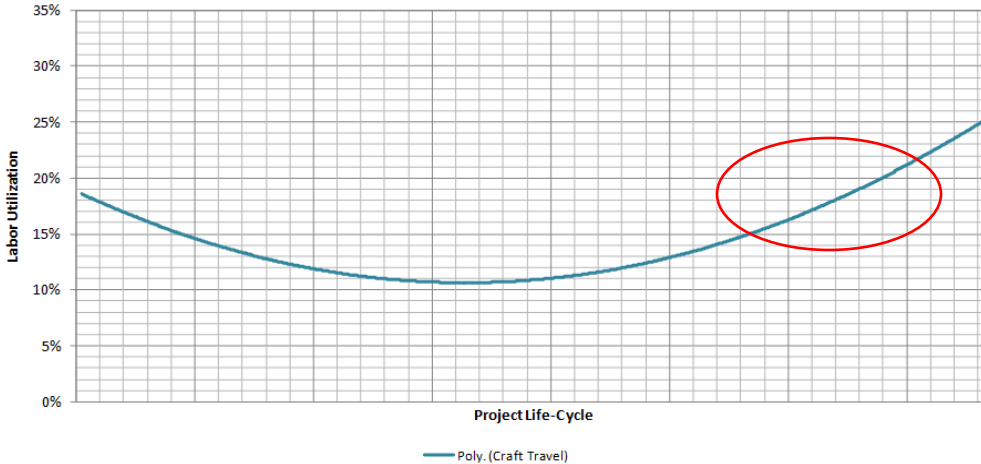


- A linear relationship was found between foreman availability and direct activity
  - Trades with lower foreman availability worked at ~ 35% Direct Activity
  - Trades with higher foreman availability worked at ~ 43% Direct Activity



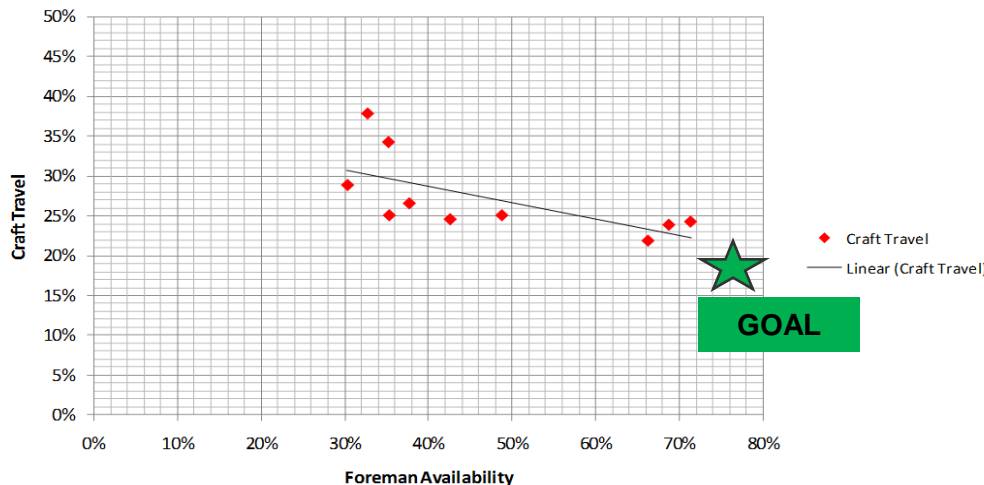
## Direct Activity vs Foreman Availability

Example Labor Utilization Curve  
Craft Travel over Project Life-Cycle



- Overall craft travel dropped 5 percentage points (21%) during study period (29.1 vs 24.2%)
  - Normally expect to see an increase in craft travel of 26% during this period of the project
  - Net improvement 47%

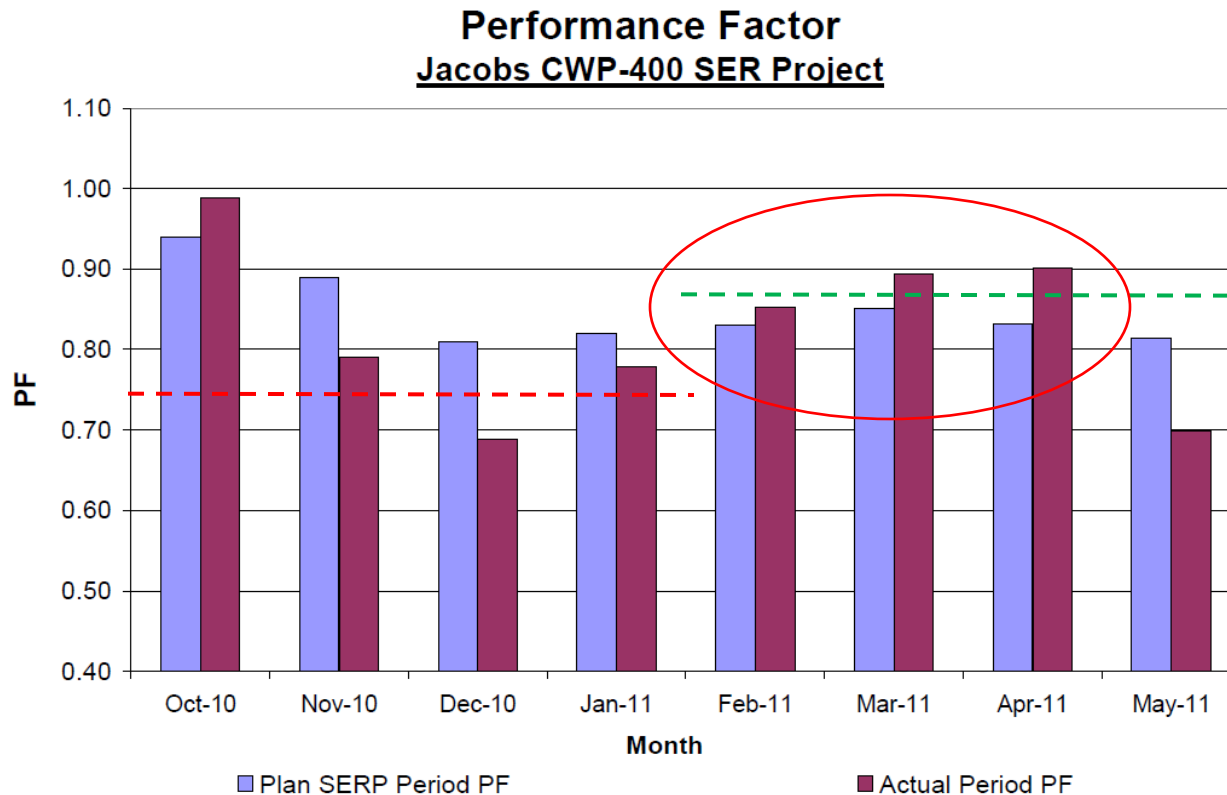
SERP Joint Workface Study  
Craft Travel vs. Foreman Availability



- A linear relationship was found between foreman availability and craft travel.
  - Trades with lower foreman availability had ~ 31% Craft Travel
  - Trades with higher foreman availability had ~ 23% Craft Travel

## Productivity vs Time

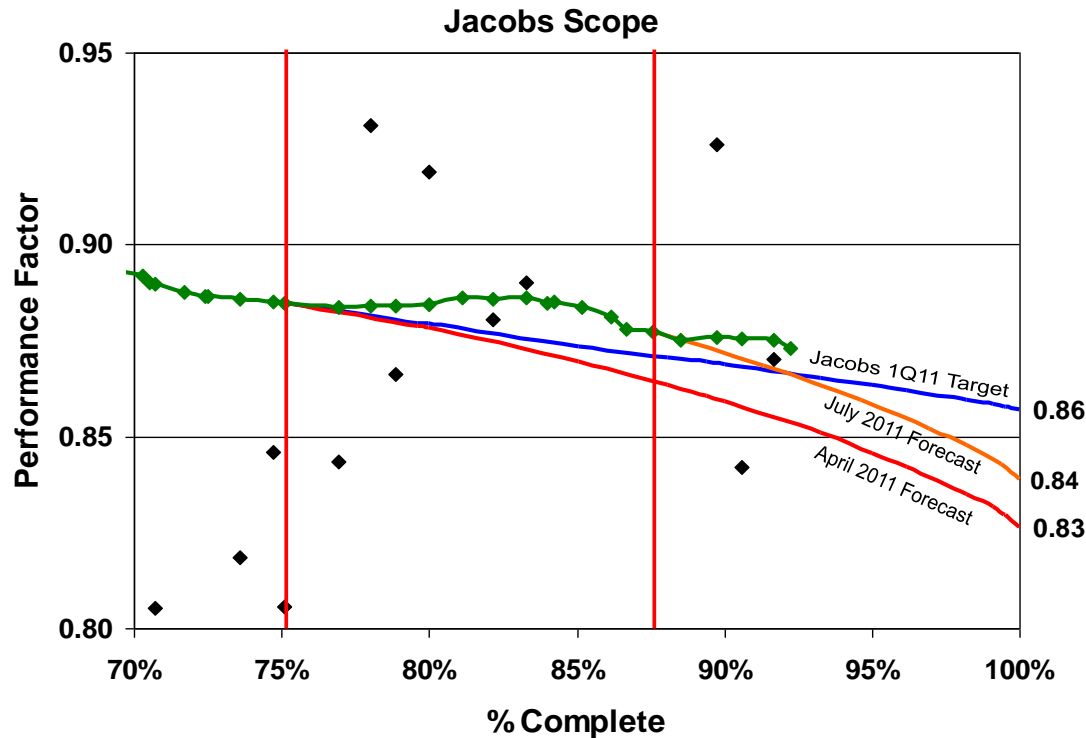
- PF rose from a nominal 0.75 PF to 0.86 PF, partially attributable to increased foreman time at the workplace, resulting in greater direct activity and reduced craft travel
- Productivity during the improvement period exceeded plan numbers for 3 out of 4 months
  - May was impacted by environmental conditions (forest fire smoke)



## Productivity vs Percent Complete

- Productivity levels did not follow the typical decay curves experienced on most projects
- PF levels continuously exceeded plan numbers during improvement cycle
  - Overall cost outlook reduced by \$11M due to better than plan PF

### Productivity vs. Progress

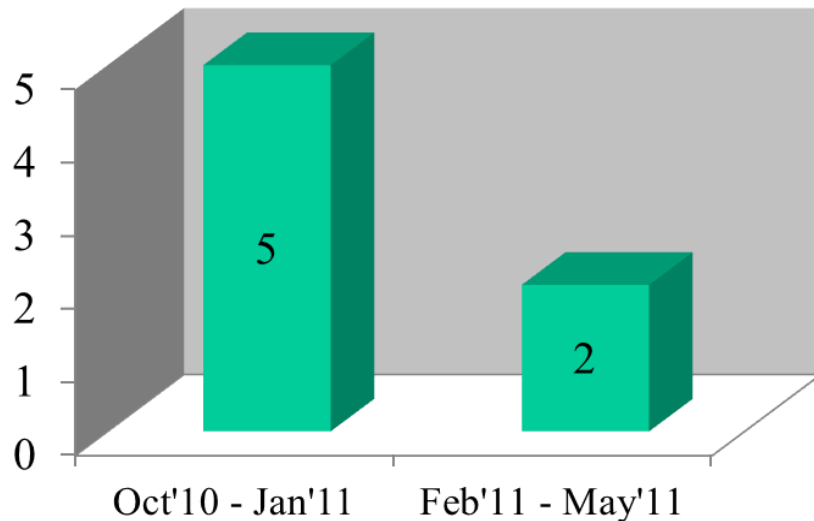


— Jacobs 1Q11 Target    — April 2011 Forecast    — July 2011 Forecast    —♦— SER Cum PF    ♦ SER Period PF

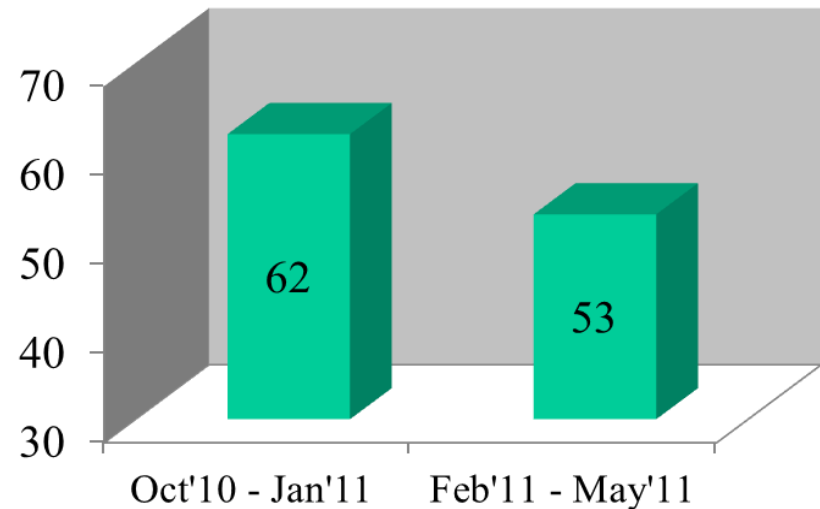
## Additional Observations

- Improved incident rates occurred, partially attributable to improved foreman time at the workplace
  - Recordable injuries vs previous period reduced from 5 to 2
  - Total incidents reduced from 62 to 53.
- Project went 87 days with no recordable injuries during period, one of the longest stretches on the project

### Recordable Injuries



### Total Incidents



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# Summary of Findings

- Higher field presence of foreman at the workplace has a direct relationship to increased craft work activity and to decreased craft travel
- Improved safety and productivity performance on SERP during the study phase can be partially attributed to increased field presence of foreman at the workplace
- Joint participation and ownership of results by Owner, Contractor and Labour is key in improving the foreman time at the workplace
- Improved foreman training, role definition, and accountability is required to continuously improve craft performance
- Implementation of efficiency metrics (Time on Tools) as a supplement to traditional execution measures has proven to be an effective tool in continuous improvement of overall project productivity

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## Key Learnings

- Tripartite approach to problem resolution can create significant performance improvement if all sides are aligned to a common goal
- Syncrude has always been a supporter of Building Trades and were pleased to see them actively pursuing improvements to increase their value
- Ongoing, continuous improvement of craft productivity is essential to the success of the Oilsands Industry in Alberta and the Organized Construction Industry as a whole

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## Our Common Challenge

The results of this study indicate that we can work together to improve foreman time at the workplace.

However to obtain the maximum benefit, we must continuously improve until we consistently achieve 70-80% of foreman time at the workplace



# Summary

- With so many variables impacting craft production, using tools to help break productivity performance into more basic elements assists project management in determining root cause(s), enabling them to act more quickly and effectively.
- While traditional productivity measurement methods are influenced by increases and decreases in productivity, their true purpose is to measure the accuracy of the estimate.
  - ▶ Project comparisons using traditional methods alone may not provide an equitable evaluation.
  - ▶ The best solution is to use a combination of traditional methods with efficiency evaluations (such as work sampling).
- No single item impacts craft safety, productivity and quality as much as **Foreman Availability**.
  - ▶ Projects should implement tools to optimize foreman time at the workplace.



# **My Three Lessons on Craft Productivity**

## **Q & A Session**

**E. Chris Buck**

**President**

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# COAA WORKFACE PLANNING CONFERENCE 2011

## TECHNOLOGY EXPERT PANEL [MINUTES]

### *SPEAKERS*

*Shaheel Hooda | Director / Advisor, Element Industrial Solutions Inc.*

*Dr. Ted Blackmon | Vice President, Construction Solutions Executive, Bentley Systems Inc.*

*Michael Buss | Vice President, Materials & Construction Global Business Development, PPM, Intergraph Corporation*

### *MODERATOR*

Lloyd Rankin | WFP Committee, Construction Owners Association of Alberta

## PANEL DISCUSSION

### **QUESTION 1: What are some of the main ways that technology can support a WFP initiative?**

Michael Buss

There are several ways technology can help: Technology comes from integration. Second, technology is important for user experience. Thirdly, performance of the system. I can tell you the technology is available today for creating the work package in a user friendly environment, so you can know where materials are, for example. We specifically spend a lot of effort on user experience. Number 1: it needs to be easy. Number 2: Performance. Bigger projects mean we need bigger models.

Ted Blackmon

This is a scenario I'm passionate about. To the audience: on one hand, everybody here is idly committed to WorkFace Planning, but on the passionate side I feel that without automation tools, it's very difficult to do WorkFace Planning. The amount of time it takes to develop and the rigidity in the packages without the use of an automation tool is considerable. Construction is by nature a wicked problem. What we suffer from is it's difficult to determine the level of detail until you're out in the field. Primavera for example only takes you down to a certain level, so what do you do? You need a better tool and I believe the WorkFace Planning automation software is that better tool.

Shaheel Hooda

I'm going to take a slightly different approach: there are some great tools and they're great at what they do, but to do WFP properly, you need to take it to a level of detail that is needed. The volume of data and complexity of projects along with turnover, you can't do WFP without automation tools. It's really that simple.

Lloyd Rankin	So, the technology that we have today isn't the problem. It's the fact that the industry thinks we don't have the technology to help them, correct?
Shaheel Hooda	Not necessarily. Complexity has increased to such a level, perhaps the technology that is available isn't necessarily meeting the needs of planners. What we need are technologies that bring everything together in real time.
Michael Buss	Twenty years ago, technology was restricted by hardware. 3D used to be disregarded but today is standard. The same is happening with WorkFace Planning. The tools and technology are available that reduce the burden of implementation now.
Ted Blackmon	I agree and will add it's far easier to take someone from the field and teach them to use a computer than it is to teach someone with computer knowledge to put together a work package. I think there's a point we're missing, where technology is an issue and that's in the data integration side. The data that goes into WFP is way beyond just a 3D model. At the end of the day, there's a significant problem around data interoperability, but it's hard to justify having a workforce planning automation lead out on the project today. But it's beginning to happen where teams that used to be focused on design automation are starting to focus on construction automation. There's a need for responsibility for data integration and automation for templatization and reuse across projects. That's a challenge.
Shaheel Hooda	I agree with you completely and something that strikes me is the tendency to build and use in-house tools. But if you build your own tools, you'll spend a lot more money than third-party licenses but as you get staff turnover nobody knows how to support that and people forget how to use the tools.
Ted Blackmon	The ROI on software is in the lifecycle maintenance of that software.
<b>QUESTION 2: What do you see as some future applications of technology that could improve productivity in the construction industry</b>	
Ted Blackmon	<p>I've got two areas to highlight. One is around automated constraint identification and then tying those constraints to workforce packages.</p> <p>We'll see more and more around automated constraint management.</p> <p>We'll also see increasing use of auto-information for automated machine guidance.</p> <p>More toward modularization, laser scanning to guide modules into alignment...</p>
Shaheel Hooda	I think I'm going to bring it a little closer to what we can relate to: given what we're seeing in the mass market with individuals being

	<p>trained to use smart devices, I think we'll see the proliferation of those devices working their way into the construction field. I think the solutions we're all pitching will be working on those platforms and the reason is you want information from back-end systems going into the field as quickly as possible.</p> <p>Further, the systems we're building are not just going to be used for managing the current project but we're going to be doing data-mining to analyze and learn from previous projects.</p>
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Michael Buss	<p>From my side I see issues on the logistic side of construction. I see RFID coming in. This will be enhanced. The other one is in modular construction. In oilsands you see this more and more. The whole logistic of these items and the measurement technology around this will improve. We need more technology for construction reporting. Reporting will come from the 3D model. Progressing, visualizing problems...</p>
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**QUESTION 3: Could you show an example of your technology that could help a project manager execute a project?**

Shaheel Hooda	<i>Demonstration of Reveal Suite</i>
Ted Blackmon	<i>Construction Field Mobility example</i>
Michael Buss	<i>3D modelling / user experience example</i>

**Questions from the audience**

*No questions from audience, but discussion around the current state and future direction of automation technologies occurs...*

<b>Names</b>	<b>Questions / Comments</b>
Geoff Ryan (Insight-WFP)	Can you talk to us about the generational growth of your customers. How complex or complete is the use of your tool today?
Michael Buss	Currently we have several customers – two here in Canada- using this software in projects but also worldwide where WorkFace Planning isn't quite there but they are getting it. So we're seeing some companies having basically nothing in this regard but our tools are being used and they're gaining experience. A bit more in the U.S. and China.
Shaheel Hooda	As mentioned earlier we're releasing our first product in the next little while. That said, the processes built into the technology have been used for decades. A year from now we'll be telling you that we're helping some large owners solve big problems.
Ted Blackmon	As a startup, we didn't have a marketing/sales team but we had a grassroots effort to establish a base of users and had ups and downs. Requiring alignment across project controls, engineering, QA/QC, turnover... companies that have gone through the effort of aligning efforts in their projects in combination with establishing a construction automation group who can make use of the tool on the

	<p>project have the most success in managing complex problems. Another major point is in regards to implemented scaling: it's a serious uphill battle. You need to pick the right areas that will provide the proper return on investment... you're able to leverage what you've put in place on previous projects and get a successful return on investment over projects and then introduce additional capability.</p>
Rachelle McNeil (Shell)	<p>What I struggle with is the applicability of an automation tool to a mid-sized project. The Ferrari is for a race track but what do I need to get to work in the morning, for example... you said "scale it down" but still how do you support this on a \$200-300 million project or is this really for the mega-projects?</p>
Ted Blackmon	<p>I think it's related to the partnership between multiple contractors and where they're at with the repeated implementation of the technology. If it's the first implementation of the tool, it's a risk with larger or smaller projects, whereas when the processes are automated it's a lower cost to utilize it. Our first user was an owner-operator who worked closely with a member of the Lean Construction Institute and there are similarities with the Last Planner... there were good procedures defined and once they got the automation system in place, they began to utilize the tool on small-cap projects as an ongoing set of larger projects... so they got it down enough to use it on smaller projects. So I think it's applicable to the smaller job once the company gets over the hump of getting the data interfaces in place. Given that the WFP system is largely data-driven, if repeatability is not in place then something that worked before may not work again...</p>
Michael Buss	<p>It's about what you want to achieve... calculate limitation costs, software costs and savings once you've scaled and adjusted based on the size of your project.</p>
Shaheel Hooda	<p>I can only answer from our company's perspective which is: our technology is designed to be used on large and small-scale projects. We're trying to insert our technology into this stream (that is, in the field). It depends on the number of disciplines you want to roll it out to. We don't require that it has to be enterprise-wide to begin with, but we encourage you to try it out on smaller-scale projects to begin with and then scale up over time.</p>
Frank Engli (Shell Canada)	<p>On projects where you've applied automation tools, has it extended to turnover And do these automation tools consider the 3d modelling we didn't always rely on?</p>
Michael Buss	<p>Yes for system completions and turnaround planning we're using the same technology. Data is flowing from engineering, through construction to – for example – monitoring.</p>
Shaheel Hooda	<p>Yes the data can be migrated over, no question about that. And yes it can be used in older models where 3D models don't exist.</p>
Ted Blackmon	<p>I can say one area I think is a high-priority win we should be looking</p>



	to leverage is the transfer to inspection packages and thickness measurement packages.
--	----------------------------------------------------------------------------------------

# **Constraint Satisfaction: Scaffolding**

**Mick Herke  
Director & General Manager  
Aluma Systems**

**Frank Engli, P.Eng.  
Turnaround Manager  
Shell Canada Limited**

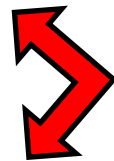
**Workface Planning Conference 2011  
Calgary, Alberta  
September 20, 2011**

# Constraint Elements

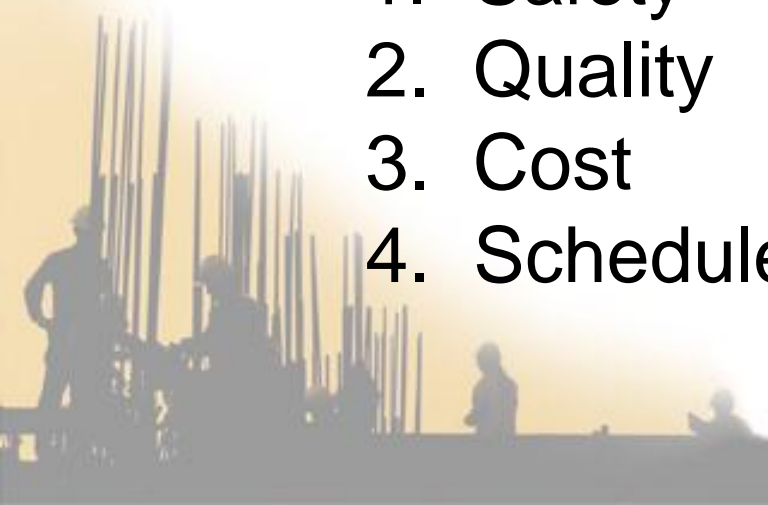
## Client Perspective

- Scaffold is the foundation for successful execution for others work

1. Safety
2. Quality
3. Cost
4. Schedule



Interchangeable depending on Client



# Constraint Elements

## Safety

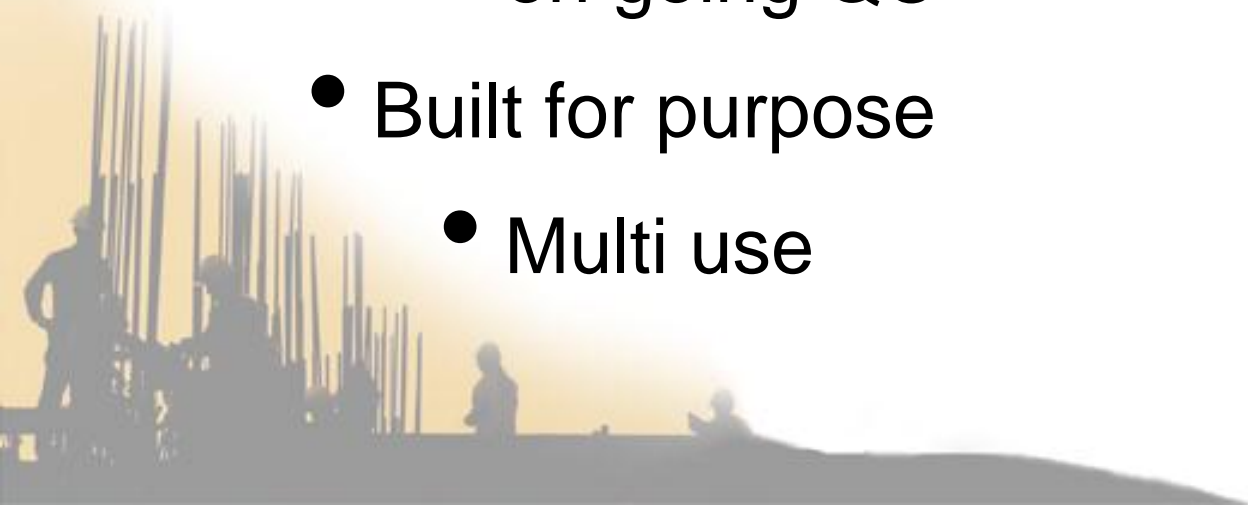
- Ensuring safety of scaffold provider
- Ensuring safety of scaffold user



# Constraint Elements

## Quality

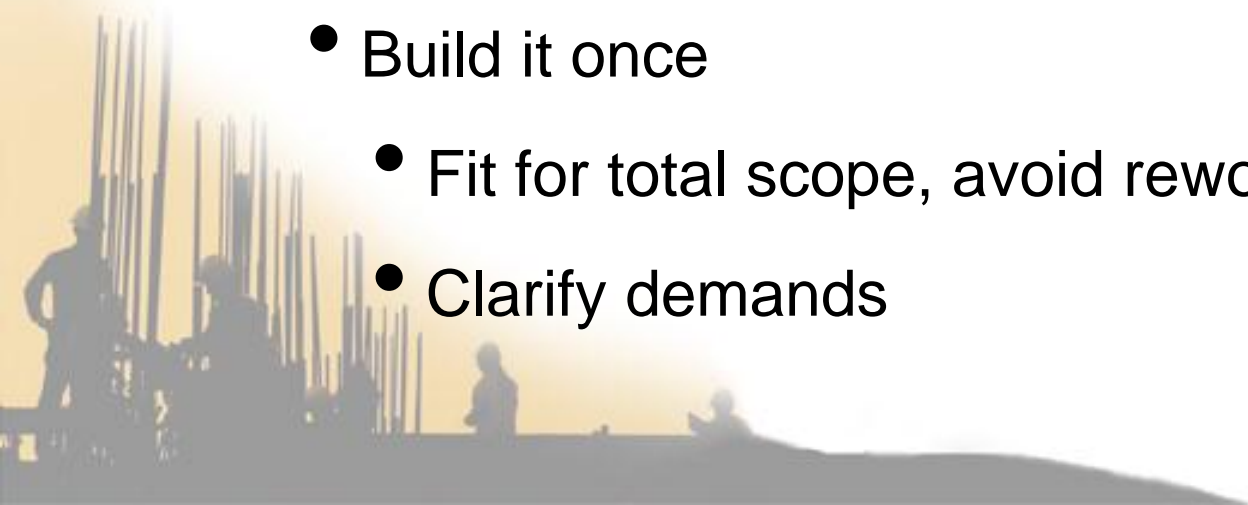
- Scaffold integrity
  - QC and tagging
  - on going QC
- Built for purpose
  - Multi use



# Constraint Elements

## Cost

- Alternatives to scaffolding
  - Rope Assess, man lifts, steps/ladders
  - Horses, portable shields
- Build it once
  - Fit for total scope, avoid rework
  - Clarify demands

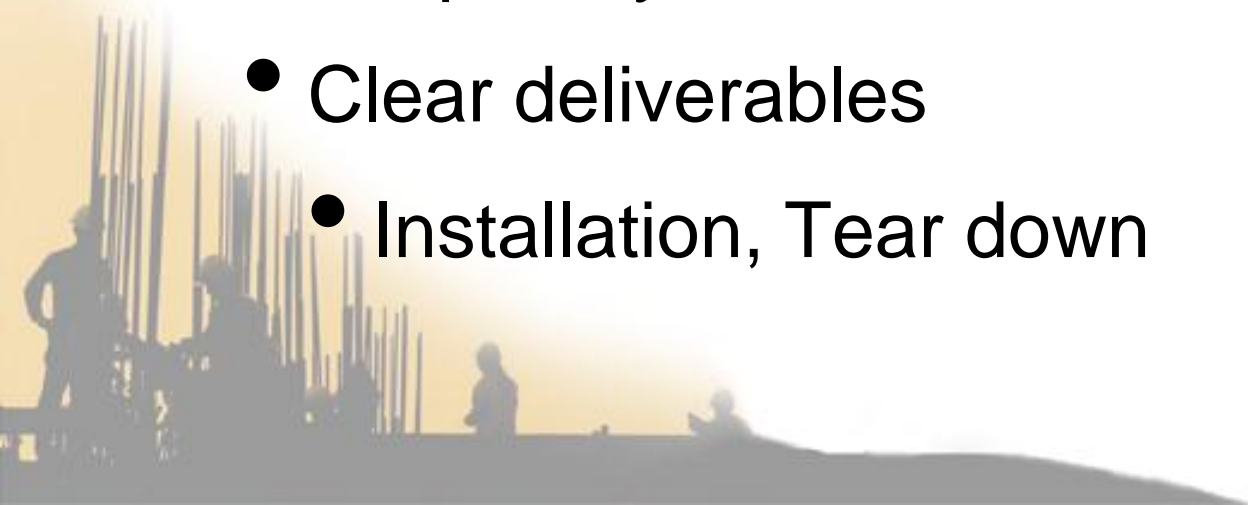




# Constraint Elements

## Schedule

- Preplanning (WFP)
- aligning with other parties
  - priority, schedule and scope
- Clear deliverables
- Installation, Tear down

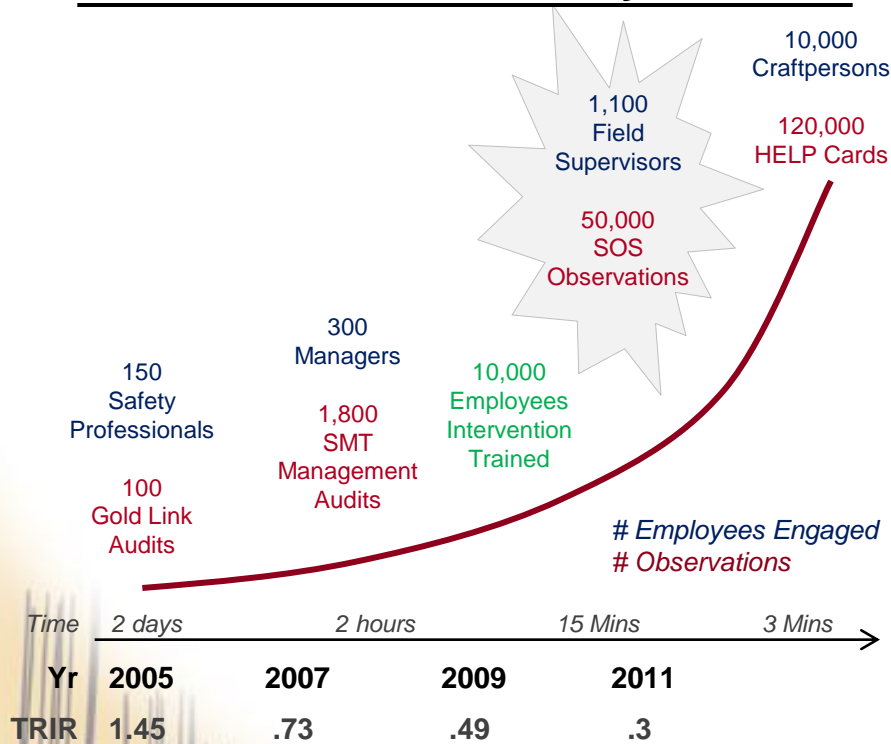


# Holistic Operational Model



# Safety Observation System (SOS)

## Building an Observation / Intervention-based Safety Culture



### SOS is part of Aluma's evolution to ...

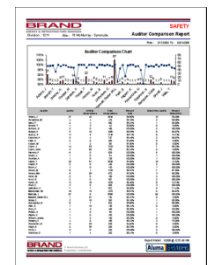
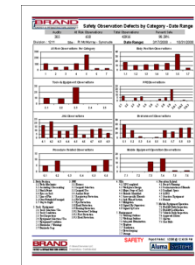
- Engage entire workforce in Site Safety
- Drive proactive Risk Management
- Collect data for focused Safety improvement
- Reduce Incidents through Observation / Intervention
- Objectively Measure our Safety Culture

## SOS Program

### 5-Step Overview / Advantages

1. Setup & Train Site Team on SOS
2. Conduct Observations using standard 7-Area Form

3. Enter Observation data in SOS database
4. Review Reports / Trends



5. Develop Action Plans addressing At-Risk Trends

### Advantages

- Proactive Identification of At-Risk Behaviors
- At-Risk Trend Analysis (At Site, Brand-wide, Over Time)
- Assists in developing focused safety improvements
- Formalizes managing 'bottom of the Incident Pyramid'
- Measuring Intervention and Supervisor accountability

# Total Cost Savings

## *Wrench Time Improvements*

### **Boiler Founding Sys:**

Reduces one shift in I&D

### **Open center Boiler:**

Saves 25% on T&M

### **Metal Toe-board:**

60% on T&M

### **Floating Boiler Deck:**

Saves 75% on labor & 85% on material

### **Boiler Bracket:**

Eliminates entire scaffold lane

### **Clamp on Leg:**

Reduces 4 peices & 50% on labor

### **Guardrail Base:**

Increases safety & productivity

### **Heavy Leg:**

Capacity increase 66%, 50% reduction in material

### **Plank Infill:**

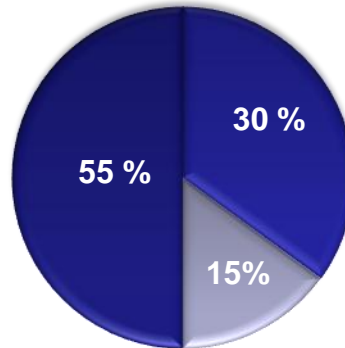
Eliminate wires and saves 50% on Labor

### **Generator Deck:**

Reduces cycle time by two days

### **Aerogel Insulation:**

70% on labor & 30% on material



## *Indirect Overhead Cost-Savings*

### **Multi-craft:**

Reduces 45% of OH

### **SIMS:**

Overall 5% + increase in project productivity

### **BrandNet:**

Most advanced Scaffold Management, Estimating, Scheduling & Forecasting

### **Profield & P6:**

Superior resource allocation and cost tracking

### **New Carts/Scaffold Mobile Yards:**

Reduces labor hours by bringing material closer to units

## *Non-Wrench Time Improvements*

### **Schedule Of Discounts:**

Prepaid or Net 10 Terms..1% to 1.5% Saving

### **Client Overhead /Craft Reductions- Multi-craft:**

- Over 7.5% Savings!
- Reduces 200 Plus Permits Per Year Per Craft over 1% savings

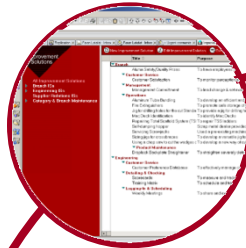
### **Contractor Execution Premiums / Productivity**

Reduces craft support personnel, maximize craft ... 10% Savings!

# Execution Excellence - Product Quality Management System

## Quality Improvement Reporting

*Documented problems, solutions and corrective actions allowing multi-user input to continuously control and improve quality*



## Vendor Qualification Program

*Rigorous evaluation process to ensure delivery of high quality products*



## Field Assembly & Maintenance Manuals

*A series of instructions to assemble, service, and repair rental equipment in a consistent manner. Point-of-use continual inspections assure compliant materials.*



## Vendor Audits

*Periodic auditing to ensure compliance to established manufacturing guidelines*



## 6-Sigma Quality Improvement

## Quality Manual / ISO

## Product Testing

*Recorded Execution Excellence - Product Quality Management System  
In-house testing of components and assemblies using industry best practices for load testing assures maximum safety and productivity*



## Lot Tracking

*Traceability Stamps on every piece of equipment for tracking to implement corrective / preventive measures when needed*

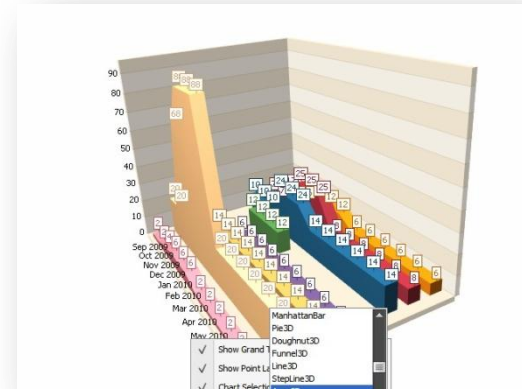
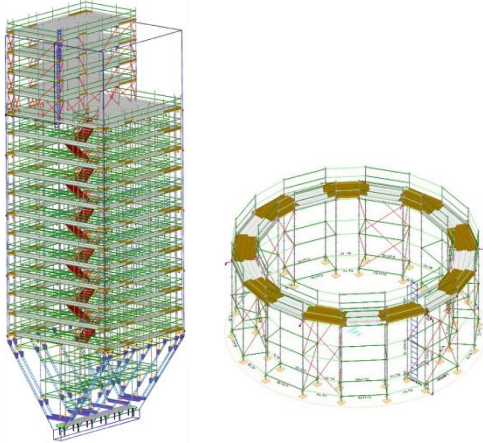


**A Commitment to Excellence**

# BrandNet - Scheduling

Scaffold Industry's most Advanced Software

**Scaffold Design – Estimation - Planning & Forecasting - Project Management**



## 1. Scaffold Design

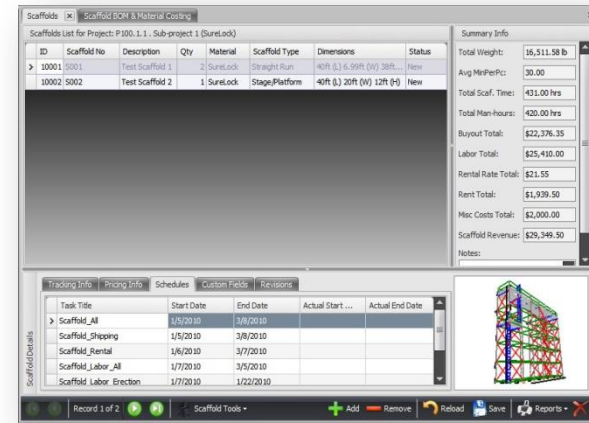
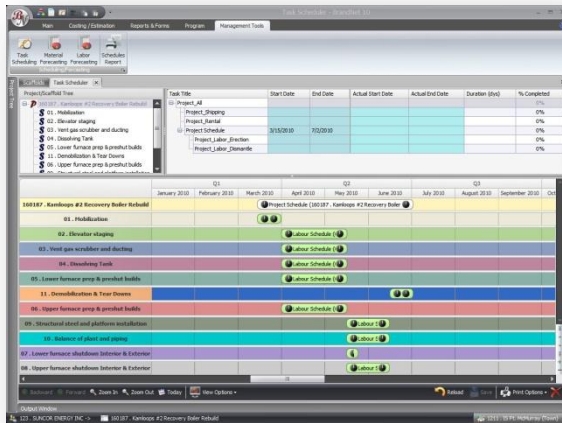
- Supports all types of scaffold
- Designs with simple parameter inputs
- Accommodates any configuration
- Easy to design/change...deck levels, guardrails, ladders, toe-boards, cages at various heights
- Accommodates towers, straight runs, inside /outside circular, birdcage, redcross etc designs
- 3D design capabilities

## 2. Estimation

- Detailed Material and Labor costing estimates at project and scaffold Level
- Labor rate packages estimates with varying crew mixes
- Detailed reports



# BrandNet - Scheduling



### 3. Planning & Forecasting

- **Material Forecasting** on component quantities, weight or total time for duration of project and for each time interval
- **Labor Forecasting** on man-power requirements for the duration of project and for each time interval
- Gantt charts, task tree table, forecasting charts
- Ability to integrate forecasting data to customer project management software

### 4. Project Management

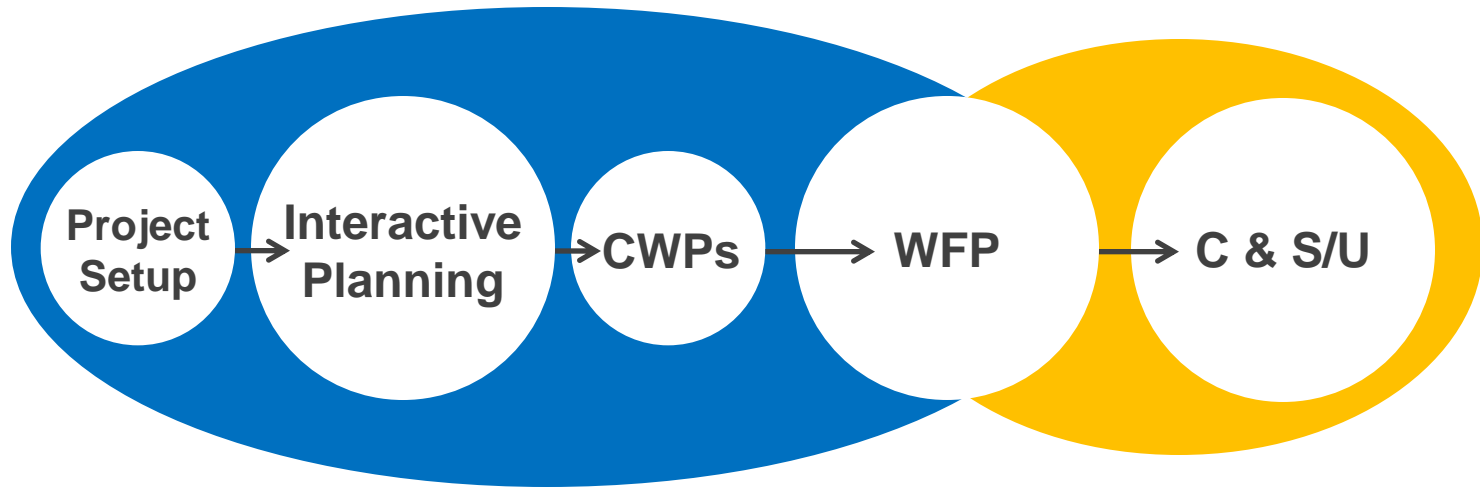
- Comprehensive schedule and plan for scaffold erection and dismantling
- Ability to break down entire project into smaller projects
- Detail and summary reports on all project level.... BOM, Count Sheet, Labor Timesheet, Bottom-line, Scope of Work.
- Accountability & comparisons with actuals vs estimates

# **Construction Planning**

## **How WorkFace Planning Fits In**

**Glen Warren (retired)**  
**Vice President, Major Projects**  
**Ledcor Industrial Group**  
**COAA WorkFace Planning Conference 2011**  
**Calgary, Alberta, Canada**  
**September 19 & 20, 2011**

# Construction Planning



**Front-end and  
Detailed Engineering**

**Construction and  
Start-up**

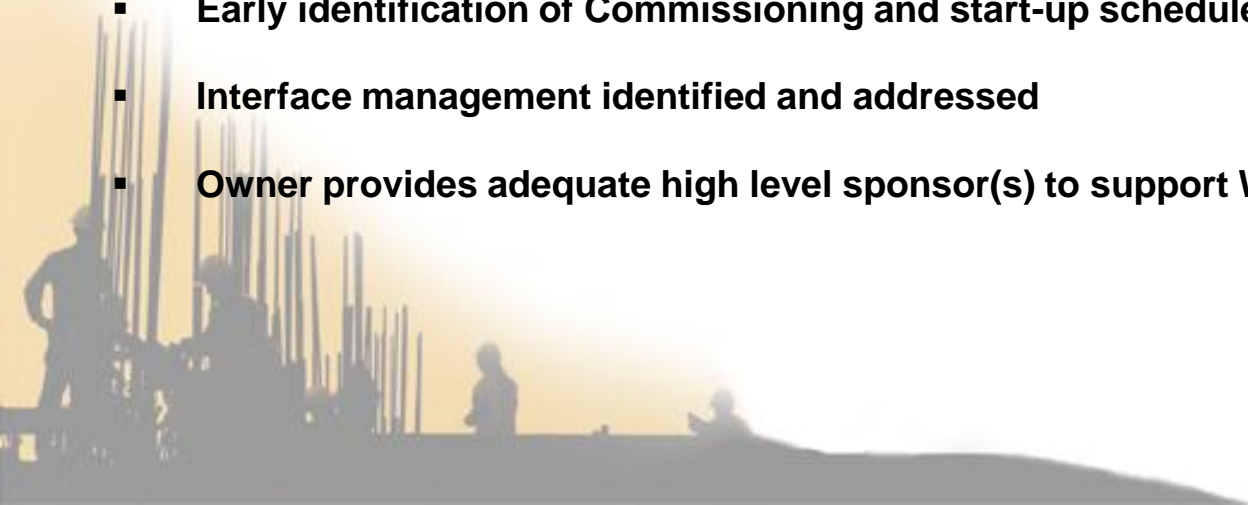


# Goal of Project Front-end Process

**Goal: to ensure WorkFace Planning is used during the construction, commissioning and start-up phases of the project.**

**To accomplish this goal, all of the following are required:**

- **Early and complete construction input**
- **Contracting strategy identified early**
- **Procurement strategy that supports the Path of Construction**
- **Early identification of Commissioning and start-up schedule and activities**
- **Interface management identified and addressed**
- **Owner provides adequate high level sponsor(s) to support WFP start of project**



# WorkFace Planning (WFP)

## WORKFACE PLANNING

### WFP PRODUCT

- Rules
- Flow Chart
- Roles and Responsibilities
- FIWP Format
- FIWP Examples
- WFP Discipline Checklist
- WFP Contract Language
- Audit Score Card
- Training

# Audience Participation



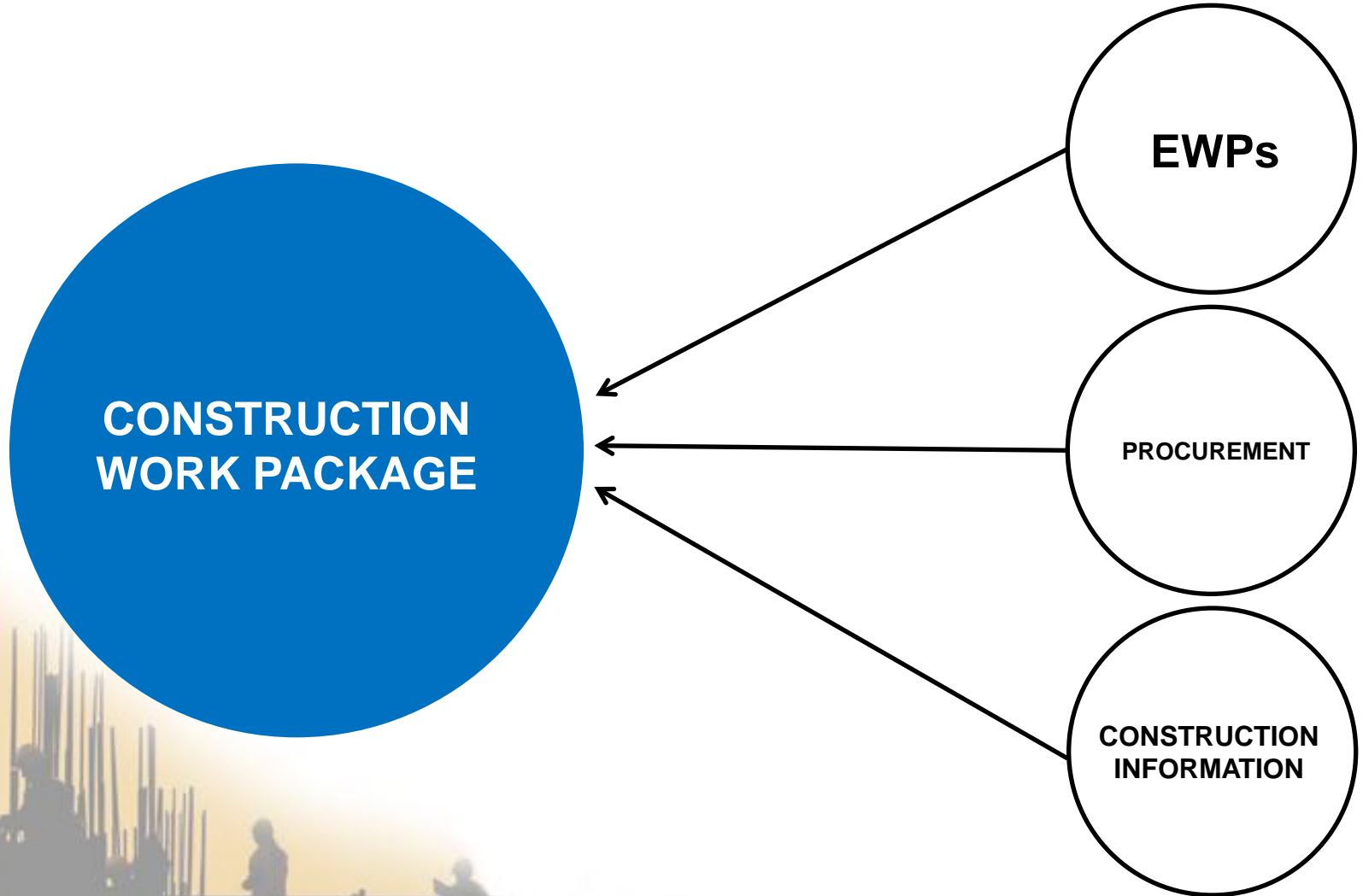


**CODING**

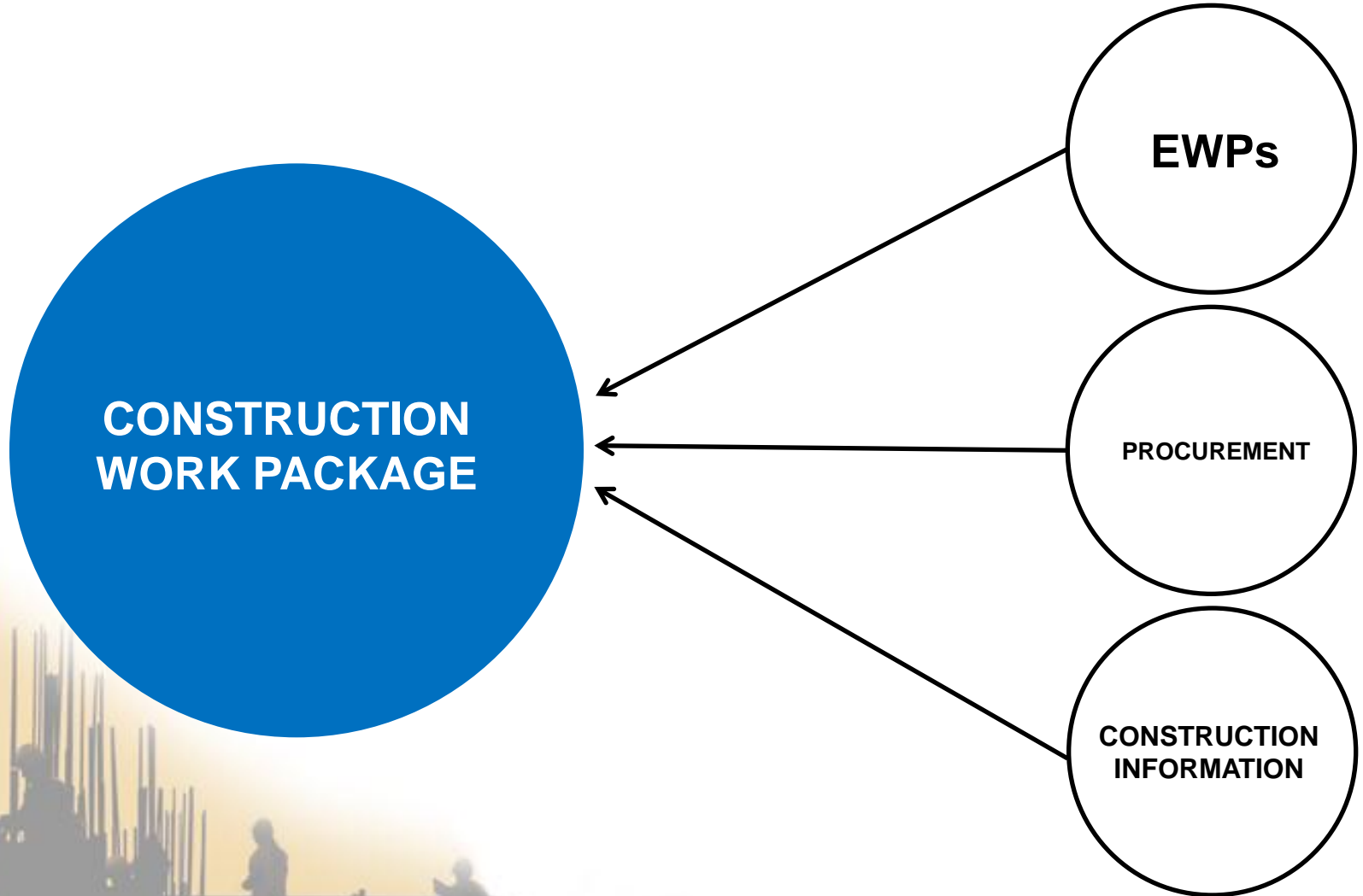




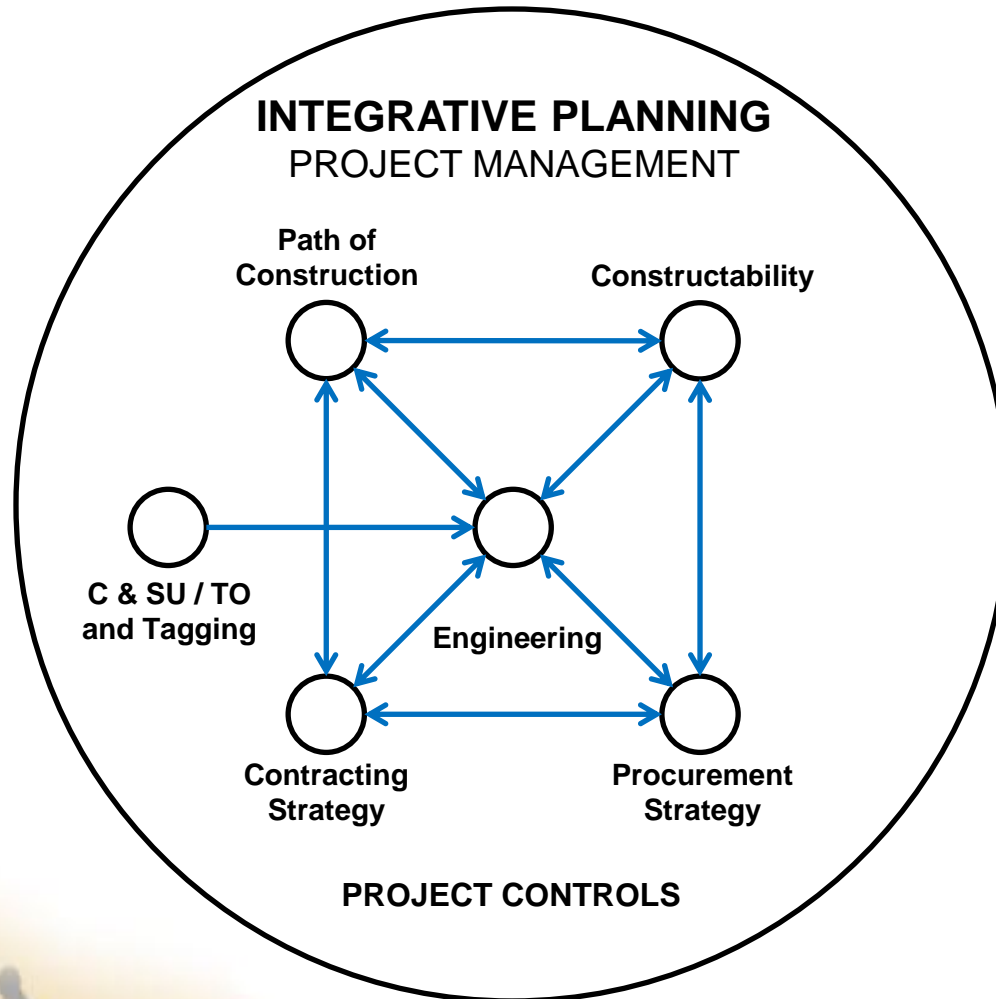
# Construction Work Package Creation



# Engineering Work Package Creation



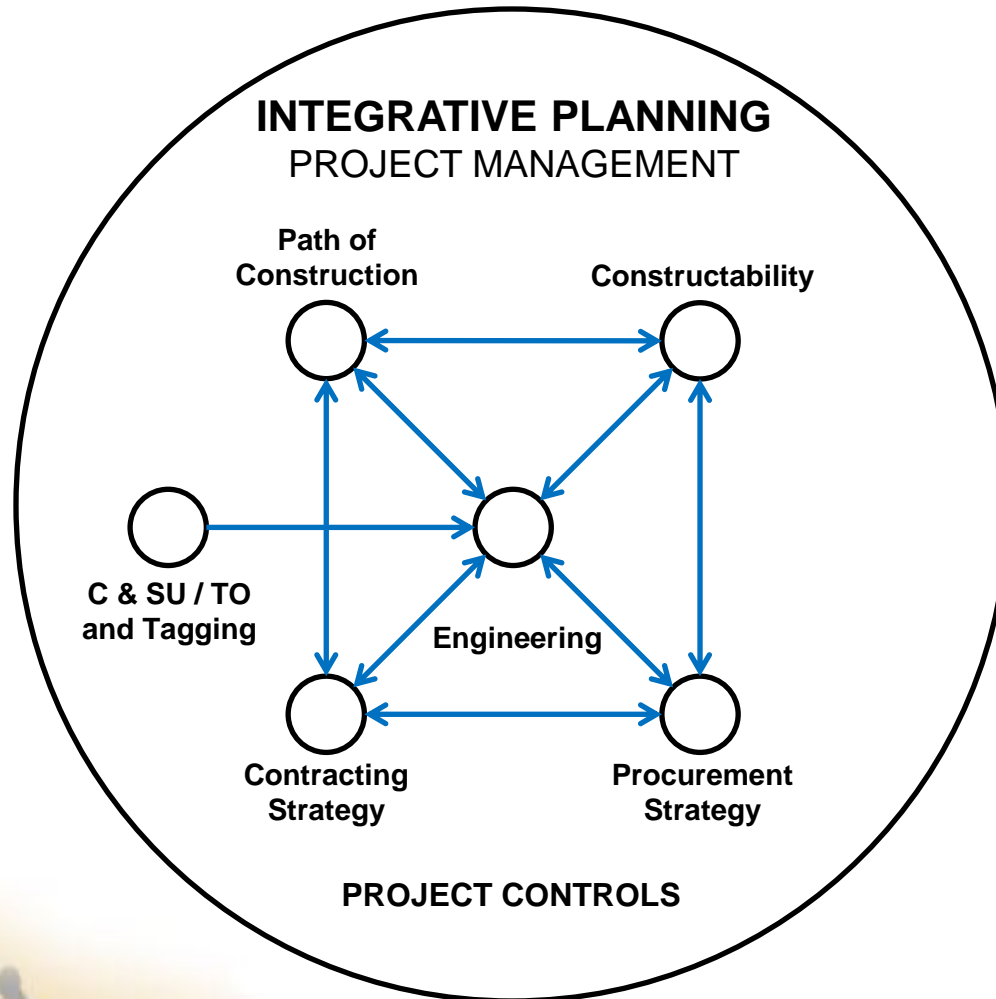
# Integrative Planning



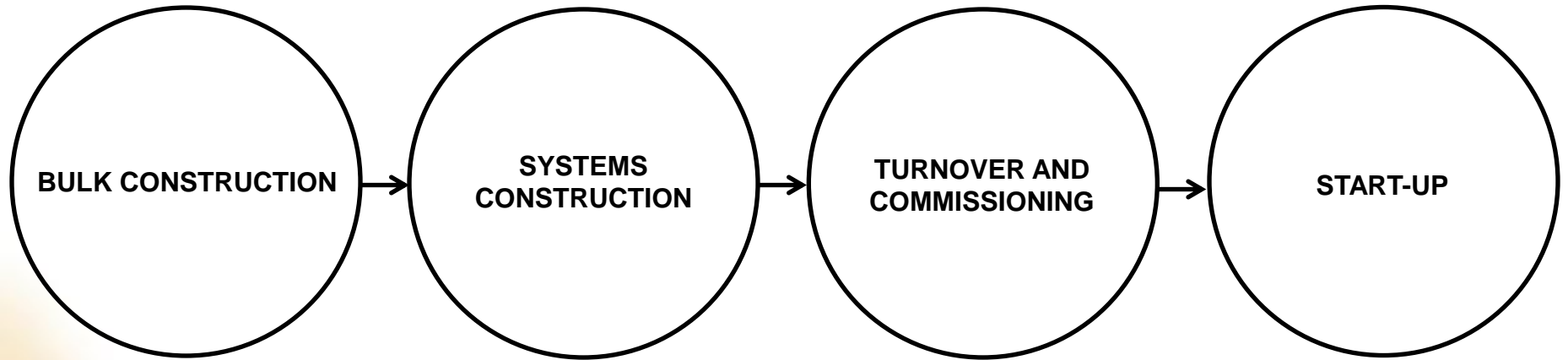
# Audience Participation



# Integrative Planning



# Integrative Planning





# New swim-lane flowchart

<b>STAKEHOLDERS</b>	Owner, PM, CM, Engineering, Supply Chain, Construction Contractor
<b>PHASES</b>	Pre-Project, DBM, EDS, Detailed Engineering, Construction, Commissioning, Start-up, Close Out
<b>TYPE</b>	WorkFace Planning, Standard Project Procedure, Integration of WFP and Standard Project Procedure





# Feedback?





# Creating Project Alignment

Lloyd Rankin of ASI Group

Geoff Ryan of Insight-WFP

Laurent St Louis of ASI Assessments

# Introductions

**Lloyd Rankin**  
**President**  
**Group ASI and**  
**Ascension Systems Inc.**

**Geoff Ryan**  
**President**  
**Insight-WFP Inc.**

**Laurent St Louis**  
**President**  
**ASI Assessments Inc.**



# AGENDA

- **WorkFace Planning (WFP) Defined**
- **Owner**
  - Why WorkFace Planning?
  - What is required for effective implementation?
- **Construction Contractor and Tradesperson**
  - Why WorkFace Planning?
  - What is required for effective implementation?
- **Engineering Contractor**
  - Why WorkFace Planning?
  - What is required for effective implementation?
- **WorkFace Planning Resources:**
  - COAA Website, Group ASI Inc., Ascension Systems Inc., ASI Assessments Inc., Insight-WFP

# WORKFACE PLANNING DEFINED

**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.**

# WORKFACE PLANNING

## Implications

- **Work is Packaged in Field Installation Work Packages (FIWP)**
- **Resource constraints need to be identified and satisfied**
- **Early construction input**
- **Front end changes**
- **All stakeholders need to understand their new roles and responsibilities**

# ALIGNMENT





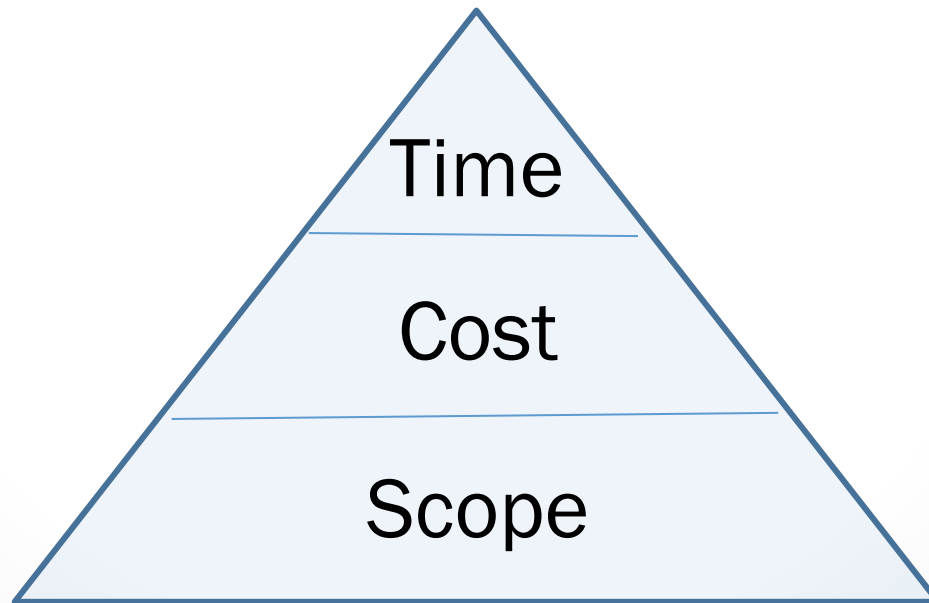
# WORKFACE PLANNING KEY STAKEHOLDERS

- Owner
- Construction Contractor and Tradespeople
- Engineering and Procurement



# WORKFACE PLANNING - OWNER

## Why do they want WorkFace Planning?



# WORKFACE PLANNING - OWNER

What do they need to do?

- **BE THE LEADER**
- Understand WFP
- Establish sponsors and champions
- Establish policies and procedures for WFP



# WORKFACE PLANNING - OWNER

What do they need to do?

- Make WFP a contractual requirement
- Verify that others have the capability to do or support WFP
- Staff for WFP
- Audit the WFP systems
- Recognize Success



# WORKFACE PLANNING – Construction Contractor and Tradespeople

## Why do they want WorkFace Planning?



- Their clients want it
- It will lead to more projects
- To gain a competitive advantage
- To retain existing business

# WORKFACE PLANNING – Construction Contractor and Tradespeople

What do they need to do?

- Understand WFP \*
- Establish sponsors and champions
- Establish a policies and procedures for WFP
- Make WFP a contractual requirement



# WORKFACE PLANNING – Construction Contractor and Tradespeople



## What do they need to do?

- Verify that others have the capability to do or support WFP
- Staff for WFP
- Audit the WFP systems
- Recognize success



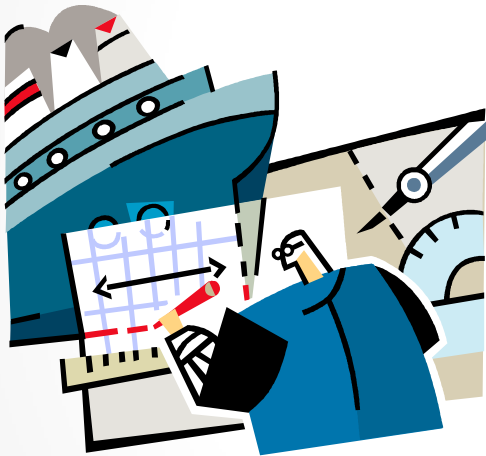
# WORKFACE PLANNING – Engineering Contractor

## Why do they want WorkFace Planning?



- Their clients want it
- It will lead to more projects
- To gain a competitive advantage
- To retain existing business

# WORKFACE PLANNING – Engineering and Procurement



What do they need to do?

- Understand WFP
- Establish sponsors and champions
- Have a policies and procedures for supporting WFP (Align deliverables with POC)
- Staff for WFP
- Audit the WFP Systems
- Recognize success

# WORKFACE PLANNING: RESOURCES

**COAA**  
Construction Owners  
Association of Alberta

CREATING AND PROMOTING  
**BEST PRACTICES**  
FOR HEAVY INDUSTRIAL CONSTRUCTION

Search

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» Safety

» Workforce Development

» Productivity

» Rework Reduction

» Benchmarking

» WorkFace Planning

## WorkFace Planning

### WorkFace Planning is Here.

It's considered a Best Practice of the Construction Owner's Association of Alberta.

It's about getting the right things to the right people at the right time to save money and improve productivity in your large-scale construction projects.

Take a few minutes to click through this website and get an overview & executive summary of WFP as well as in-depth information about the WFP model and processes (from high-level theory to practical application) with implementation guides and sample WFP-specific document templates and reference sheets.

[coa.ab.ca/productivity/workfaceplanning.aspx](http://coa.ab.ca/productivity/workfaceplanning.aspx)

# WORKFACE PLANNING RESOURCES

## Group ASI and Ascension Systems Inc.



- Classroom based courses from basics to detailed courses in WFP available throughout North America
- On-line courses for Owners, Construction and Engineering Contractors, Tradespeople, and Executives available worldwide

# WORKFACE PLANNING RESOURCES

## Insight - WFP



- **Developing policies**
- **Creating procedures**

# WORKFACE PLANNING RESOURCES

## ASI Assessments Inc.



- **WFP Assessments**
- **WFP Staffing**







# Engineering Support for WFP: A Detailed Examination [MINUTES]

---

*Sarab Bhogal | Construction Manager / Technical Support Manager, Bantrel Co.*

*Scott Hussey | Field Engineering Manager, Jacobs Industrial Services Ltd.*

*Gary Semaniuk | Planning and Scheduling Lead, Stantec Consulting Ltd.*

## Panel Discussion (Q&A)

### Question 1:

“Adapting Processes to Meet Customer Requirements”, how is this different in a WFP environment and what will engineering firms need to do to provide support?

### Answers:

Scott: Basically, if the successful contractor lands an EPC contract the number of internal processes they need to change shouldn't have that much of a dramatic effect. They can bring in some early construction input from personnel that they have from previous construction projects and realign their internal structure to align themselves with the workface planning model. For a company that lands an EP or CM contract their would need to be improved alignment and integration between the EP and CM contractors as laid out by the owner in order to facilitate the workface planning model.

### Question 2:

“Data Requirements” how does this change in a WFP environment and what are the implications?

### Answers:

Scott: With the core of WorkFace Planning being the 3D model which could have the capability to link all aspects of the project, data requirements are now becoming more weighted electronically. Materials Management and Procurement can now have electronic input into the 3D model and it is important to know and understand your WFP software and 3D model so that data input will go smoothly

### Question 3:

3D models are being used on most projects these days what are some of the implications and how should they be addressed?

### Answers:

Scott: In my opinion one of the implications for using 3D models are that a lot of people are not aware of the software's capabilities. Ideally the 3D model can and should contain almost every aspect of information required to build your project. The model can have the capability to link to all the drawings

associated by clicking on an element within it as well as the materials required (and availability) within an FIWP defined within the model. Some fabricators can even provide electronic files of what they've built which can be used to populate the model; it can be made one of the deliverables in the contract. The model can also be used for tracking the progress of each FIWP for Project Controls purposes. Consistency across file names and types are key as well as a good 3D Model Administrator. Models may be also used for tracking daily progress by FIWP. Great idea to stay neutral of brands as most of the Modeling companies will be present.

#### **Question 4:**

Projects are becoming more complex. How should engineering firms deal with the issues of Integration, Change Management and RFIs in a WFP world?

#### **Answers:**

Scott: Most firms and owners probably don't want to hear this but budget and hours need to be allocated to effectively deal with these opportunities. Change and design clashes and interfaces are inevitable and often times construction is held up by waiting on responses to RFI's or a path forward on an upcoming change. The firm that is equipped to deal with these issues promptly is better than the one that cannot allocate any time to resolving these opportunities. The way to think is that the ultimate client is construction, they need to be kept satisfied and moving, especially with the costs of labour in Alberta. The owner will not only see the hours wasted on a non-productive labour force but also any extra hours from a trend that the engineering firm may submit to cover the costs of handling change.

Sarab: At this day and age all design activities are supported by electronic means. Each smallest measurable field installation component is uniquely identified in engineering databases. Its at most important to integrate engineering information with construction tracking tools. Once the design parameters are 'tagged' with FIWP information these provide a unique integration of Engineering efforts with Construction. This approach allows a simplified grass root level approach to complex project.

A detailed plan needs to be implemented by Project Management Group to provide guidelines to engineering and document control groups to track and distribute any changes against FIWP. Any change is critical and impact of these changes can be softened through adequate communication with parties. Similarly field generated RFI's can be tagged to WFIP and back to design deliverable.

#### **Question 5:**

Integration and Change management in a time of increasing complexity (Multiple Models, Owners, Engineers, Contractors) how should engineering firms deal with this issue?

#### **Answers:**

Scott: For an EP contractor it should be very straight-forward. It's easy to bring those guys in for early construction input. Just lay out the Path of Construction. Obviously when you have EP and C it's a little more different in that the constructor isn't always identified until later down the road. That said, trying to identify the constructor as early as possible is quite critical in making it easier for the engineer to accommodate workforce planning.

Gary: We live in a complex and changing world. What works today may not work tomorrow. We have to be flexible and work together in this dynamic situation to adapt our processes. Nothing is cut-and-dry and everyone is asking and demanding more: faster, better, cheaper. Exponential growth of the players in the game. Take what you're doing, figure out what worked and what didn't, but keep it simple. Don't develop a Ferrari for a Volkswagen scenario. Open communication with owner. Owner may decide to give you the construction input early, right or wrong. The point is discussion at square one and both parties must be open enough to discuss openly without fear of retribution to ensure alignment. Nail scope from the beginning is important but doesn't always happen.

## Questions from the audience:

### Question:

Do you see the price of EP contracts going up with the need to adapt to WorkFace Planning?

### Answers:

Gary: Ultimately everything we're trying to work on is getting better, quicker and cheaper. We're always looking to lower our costs so I think we have to be flexible and adaptive, but we have to find ways to meet demands.

### Question:

But have you seen EP prices go up? Have you captured any data on that?

### Answers:

Lloyd: A number of owner companies are reluctantly finding that as they start asking for more information and seeing the impact of going to the field with less engineering than they need, they're spending a little more (strategically) on engineering. Strategic spending on engineering can get benefits on execution.

Scott: I agree with Lloyd, the essence of WorkFace Planning is doing planning at the front-end so it's probably smart money to spend a little more on your engineering. The cost of labour in Northern Alberta for example can get very expensive.

### Question:

Owners are a little more reluctant to spend that up-front cost but it sounds like it's progressing that way...

### Answers:

Lloyd: it's a slow progressing.

Gary: You have to be able to show the savings after the spending. I believe a lot of owners will see there is a return / benefit for them.

### **Question:**

As an owner we're encountering resistance to doing this up-front planning from a firm. What would motivate a firm to do this?

### **Answers:**

Sarab: There are obviously rejections made but I think the approach is you need to sell it – what is in there for engineering from construction input. Providing the input and how the sequence needs to come out and synergy as deliverables are coming up; problem is always we don't have the right tools to install... that's where selling the job comes in; we're not going to tell you how to do the engineering; we're trying to bring an EPC structured schedule...

Lloyd: it does take an extra effort to motivate them to do things this new way. I'm confident this new way introduces improvements. I think they fight because they're comfortable with how they used to do it but it takes them time to adjust and be comfortable with this new way. We're further ahead on this with the contractors but with the engineers we're still seeking traction.

### **Question:**

Have we done any economics in doing construction input as early as possible?

### **Answers:**

Lloyd: our previous co-chair said: we're talking about projects so much bigger than we're used to talking about, it kind of jars the senses, but we're finding that projects continue to get bigger and bigger and therefore so do the planning efforts.



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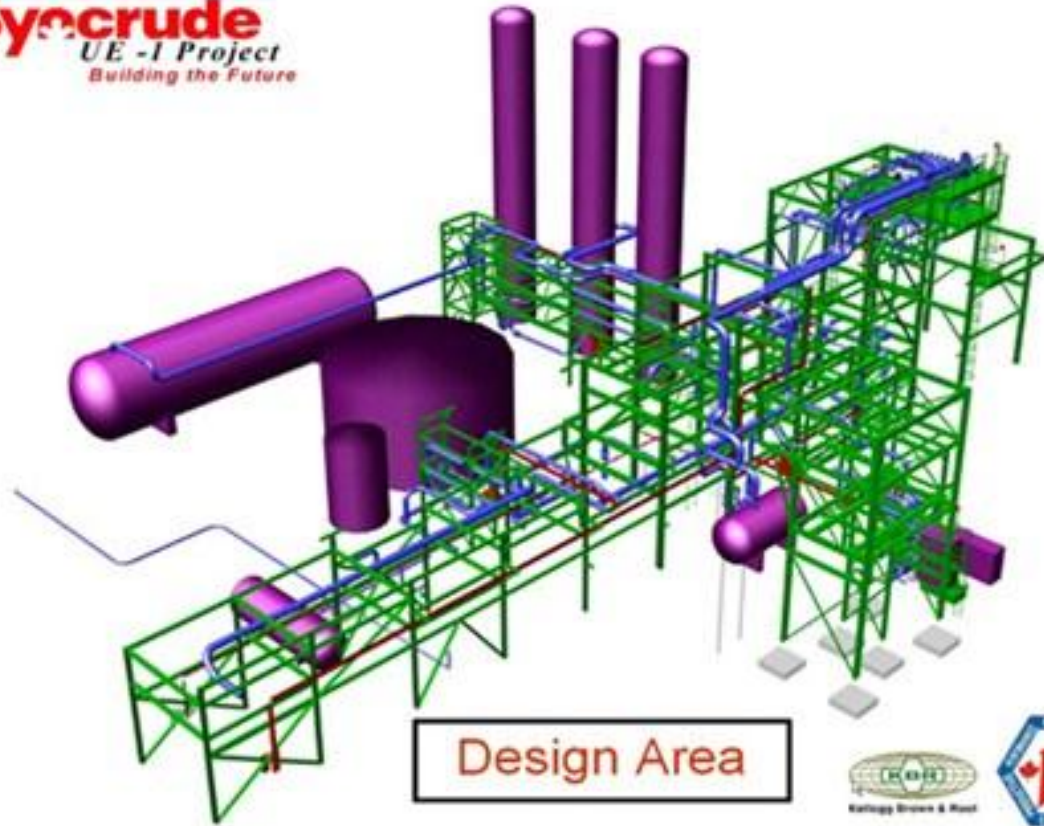
## WorkFace Planning Conference

# Engineering Support for WFP: A Detailed Examination

Gary Semaniuk Stantec  
Sarab Bhogal Bantrel  
Scott Hussey Jacobs  
Facilitator – Lloyd Rankin  
COAA WFP Committee

# 3D Models, Creating, Supporting, should we BIM?

**Syncrude**  
*UE -1 Project*  
*Building the Future*

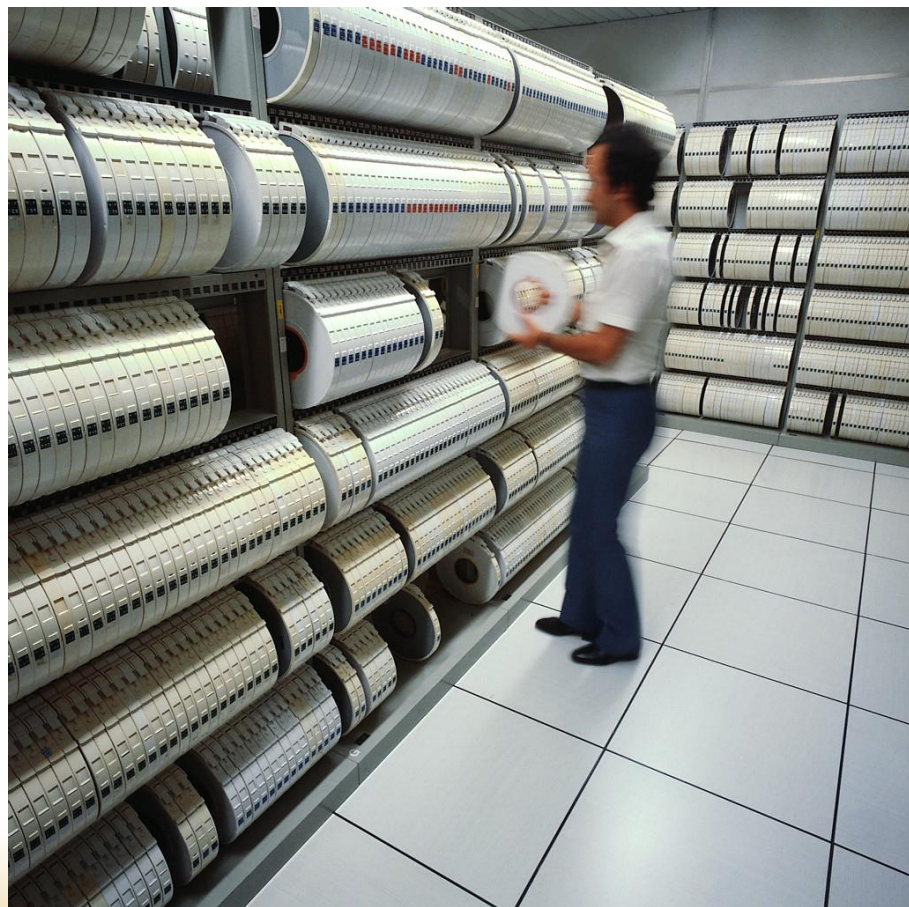




# Integration and Change Management in a Time of Increasing Complexity



# Data Requirements: How rich do you want your data?





# Adapting Processes to Meet Customer Requirements





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## Engineering Support for WFP: The Basics

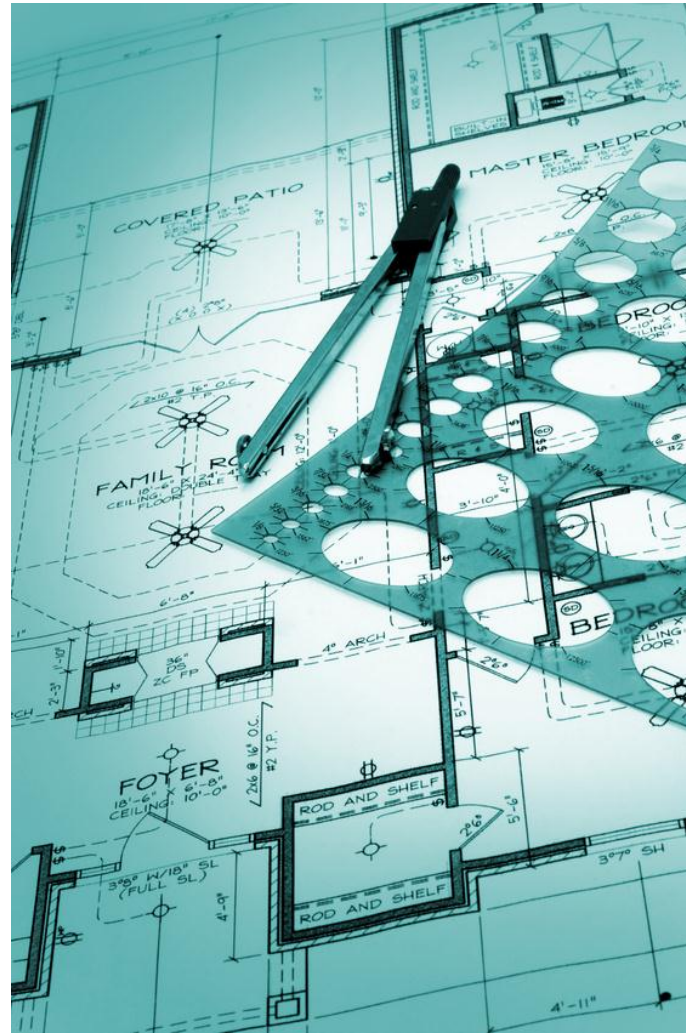
Gary Semaniuk Stantec  
Sarab Bhogal Bantrel  
Scott Hussey Jacobs  
Facilitator – Lloyd Rankin  
COAA WFP Committee



# Early Construction Input



# Engineering Delivery Priorities

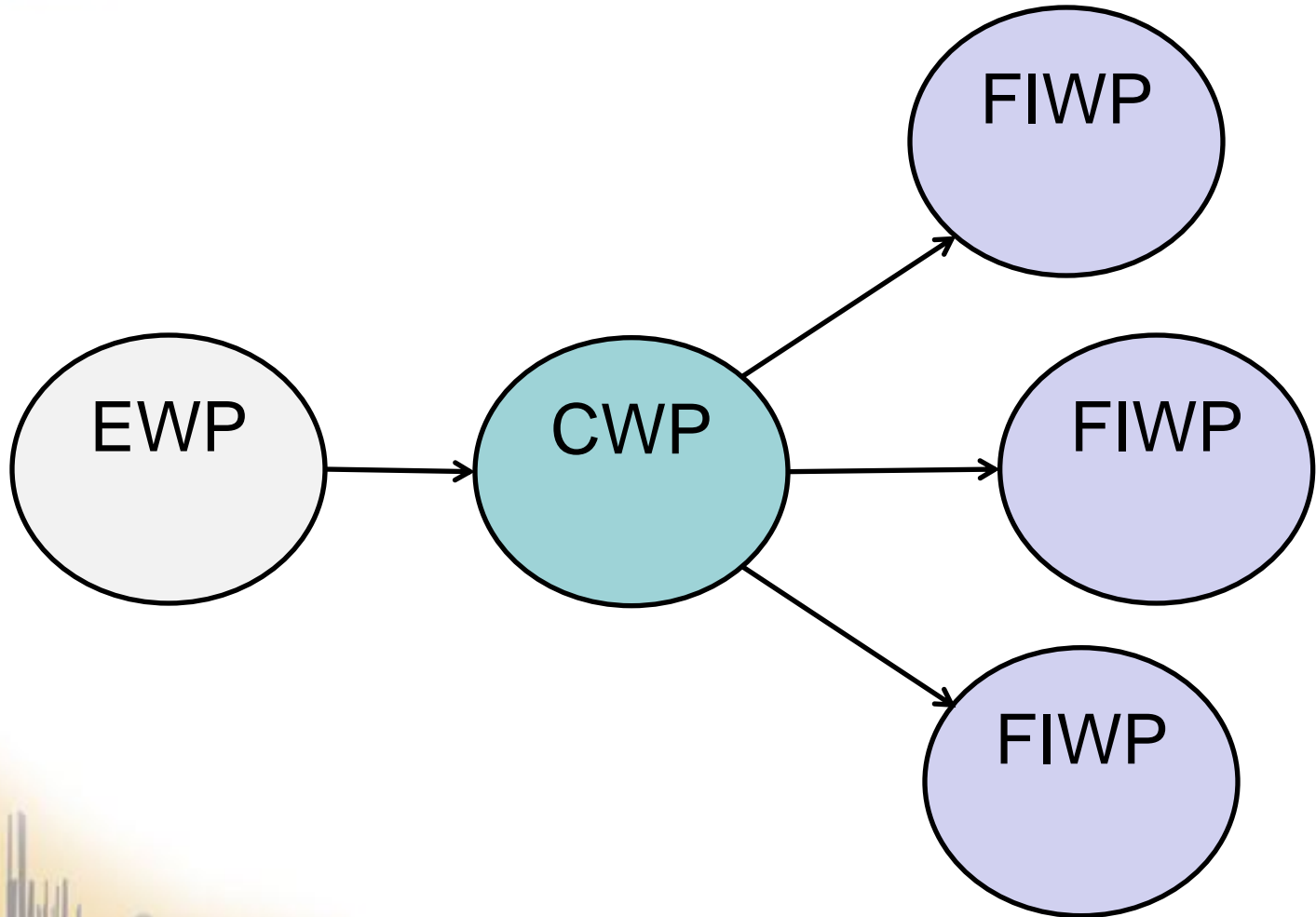




# Procurement Delivery Priorities



# Coordinating EWP and CWP to Support Development of FIWPs



# Level 3 and 5 Schedules, and Why You Care?

**Level 5**



**Level 3**





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# WorkFace Planning Conference

## Engineering Support for WFP: The Basics

Gary Semaniuk Stantec  
Sarab Bhogal Bantrel  
Scott Hussey Jacobs  
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COAA WFP Committee

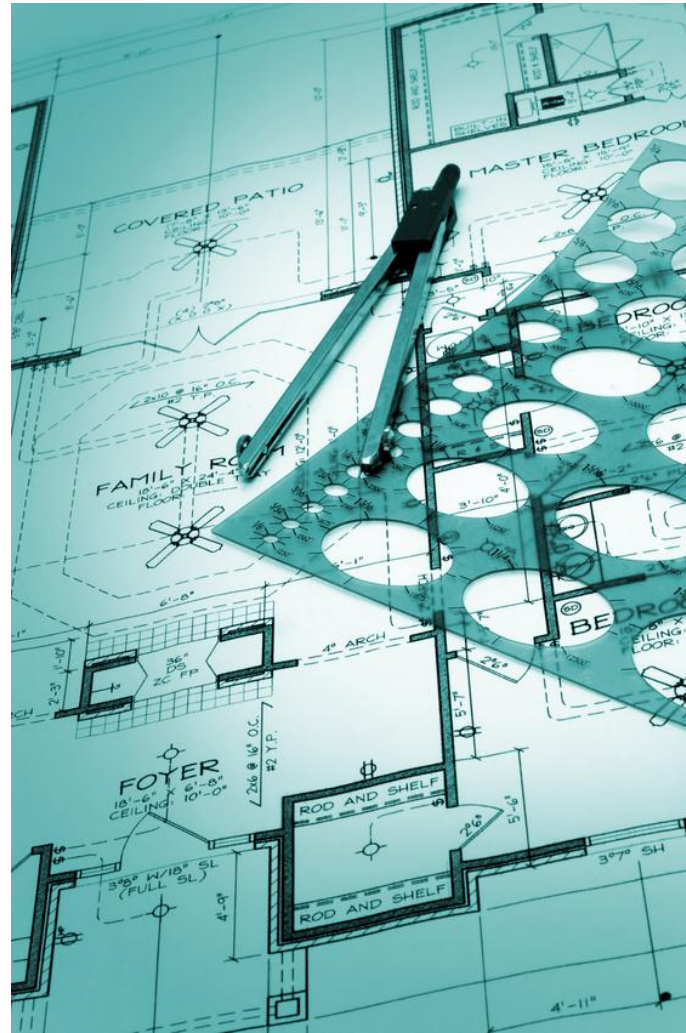




# Early Construction Input



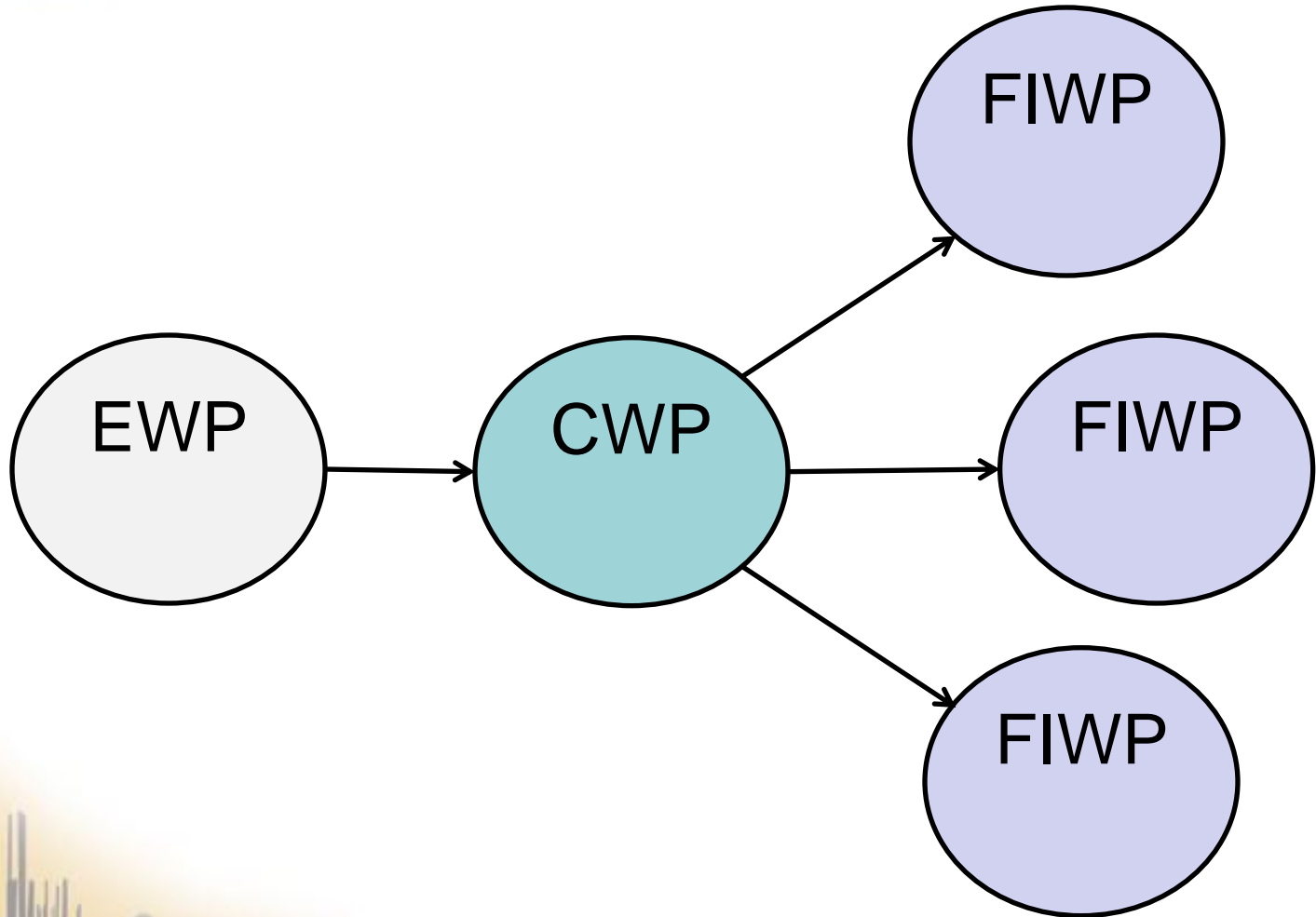
# Engineering Delivery Priorities



# Procurement Delivery Priorities



# Coordinating EWP and CWP to Support Development of FIWPs





# Level 3 and 5 Schedules, and Why You Care?

**Level 5**



**Level 3**





# Evaluating the Health of Your WorkFace Planning System

**Laurent St Louis President ASI Assessments**  
**Robin Mikaelsson Senior Consultant Bentley Systems**  
**COAA WorkFace Planning Conference 2011**  
**Calgary, Alberta, Canada**  
**September 19 & 20, 2011**

# Evaluating the Health of Your WFP System - Agenda

- **Goal of an Audit**
- **Types of Audits**
- **Benefits of Audits**
- **Audits in Detail**
  - **Who**
  - **When**
  - **What**
- **Audit Exercise**
- **Group Findings**



## Goal of an Audit

To express an opinion on the system in question, under evaluation based on work done on a test basis. An audit seeks to provide only **reasonable assurance** that the statements are free from procedural error.





# Goal of an Audit

(continued)

- The goal of WFP is to improve performance techniques
- Auditing is to ensure this performance.
- The audit is a comprehensive and objective review
- Audits verify the degree of WFP implementation



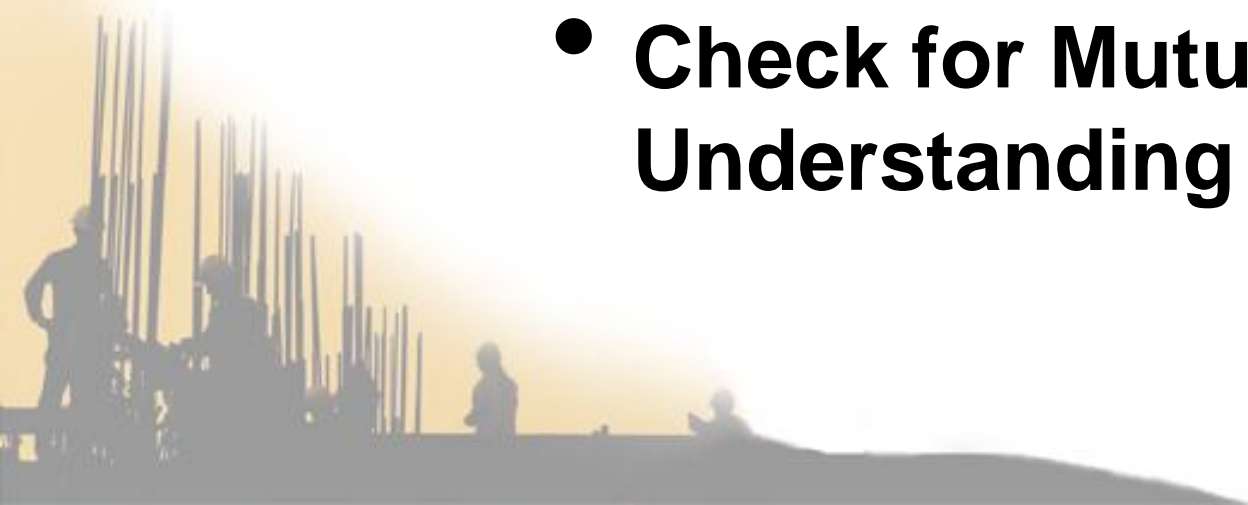
# Types of Audits

- **Self**
- **Construction Management Team (CMT)**
- **Third Party**



## **Benefits of Audits**

- **Compliance Check**
- **Opportunity for Improvement**
- **Improved Integration**
- **Check for Mutual Understanding**



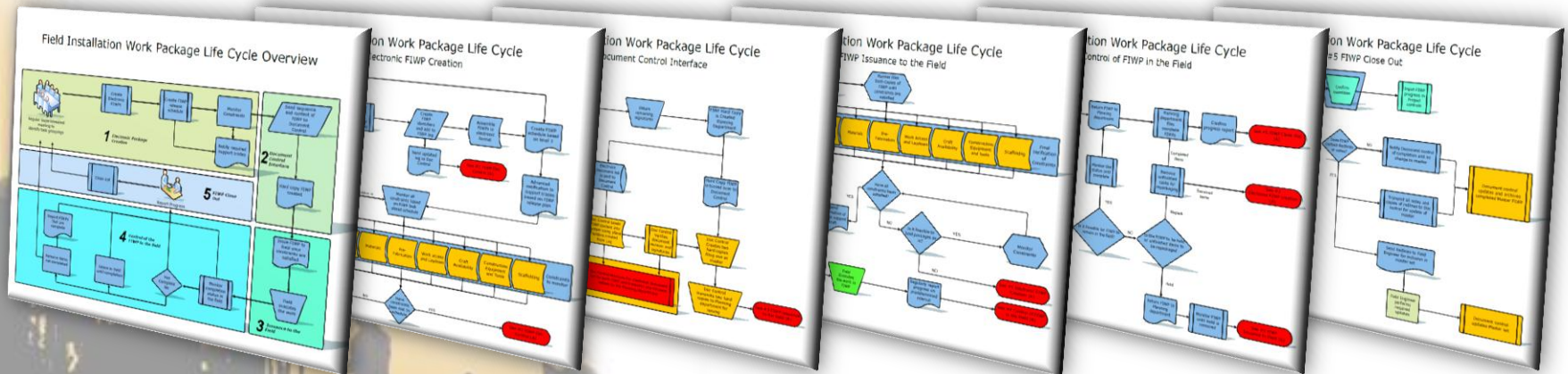
# Audits In Detail

- **Who**
- **When**
- **What**

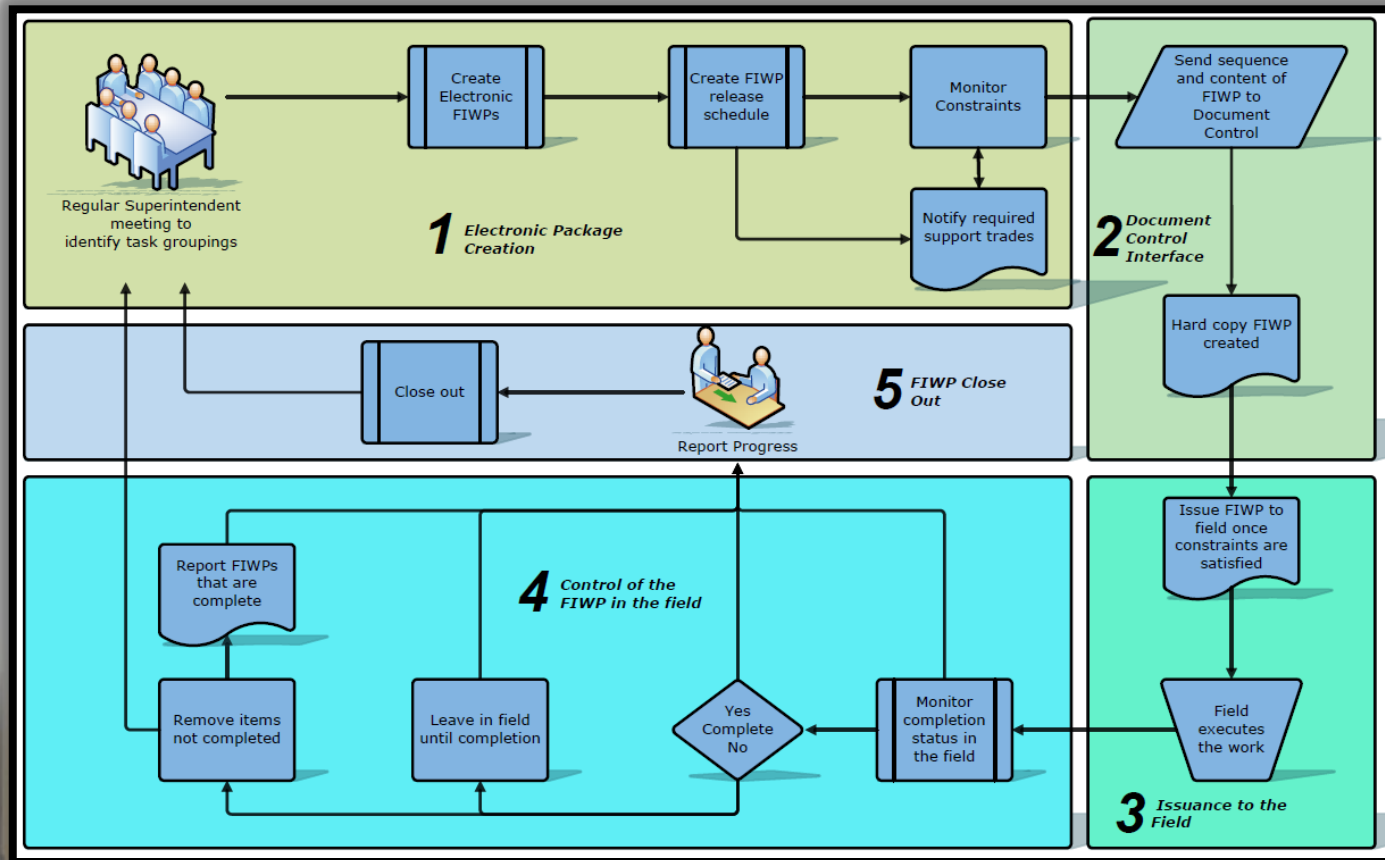


# FIWP Lifecycle Flowchart

<p><b>Master Flowchart</b></p>	<p>Overview Flowchart showing Virtual Creation of FIWP, Document Control of FIWP, Issuance to Field, Monitoring and Control of FIWP, Closing FIWP</p>
<p><b>Five Detailed Flowcharts</b></p>	<p>Detailed Flowcharts on each area</p>
<p><b>Narrative Document</b></p>	<p>Narrative to support the Flowcharts</p>

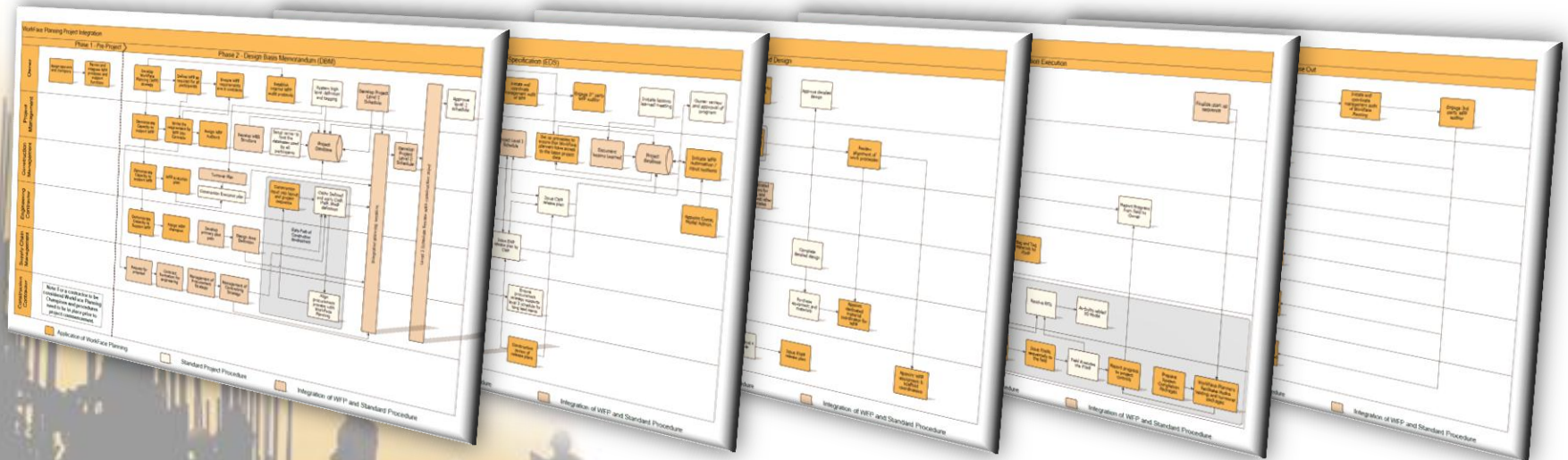


# FIWP Lifecycle Flowchart



# New swim-lane flowchart

<b>STAKEHOLDERS</b>	Owner, PM, CM, Engineering, Supply Chain, Construction Contractor
<b>PHASES</b>	Pre-Project, DBM, EDS, Detailed Engineering, Construction, Commissioning, Start-up, Close Out
<b>TYPE</b>	WorkFace Planning, Standard Project Procedure, Integration of WFP and Standard Project Procedure

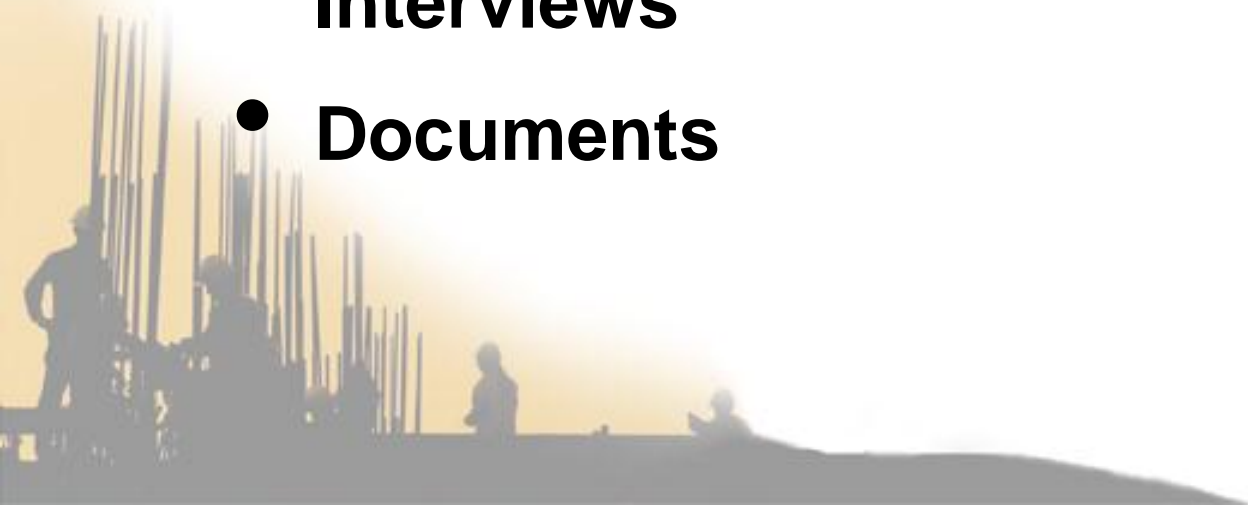




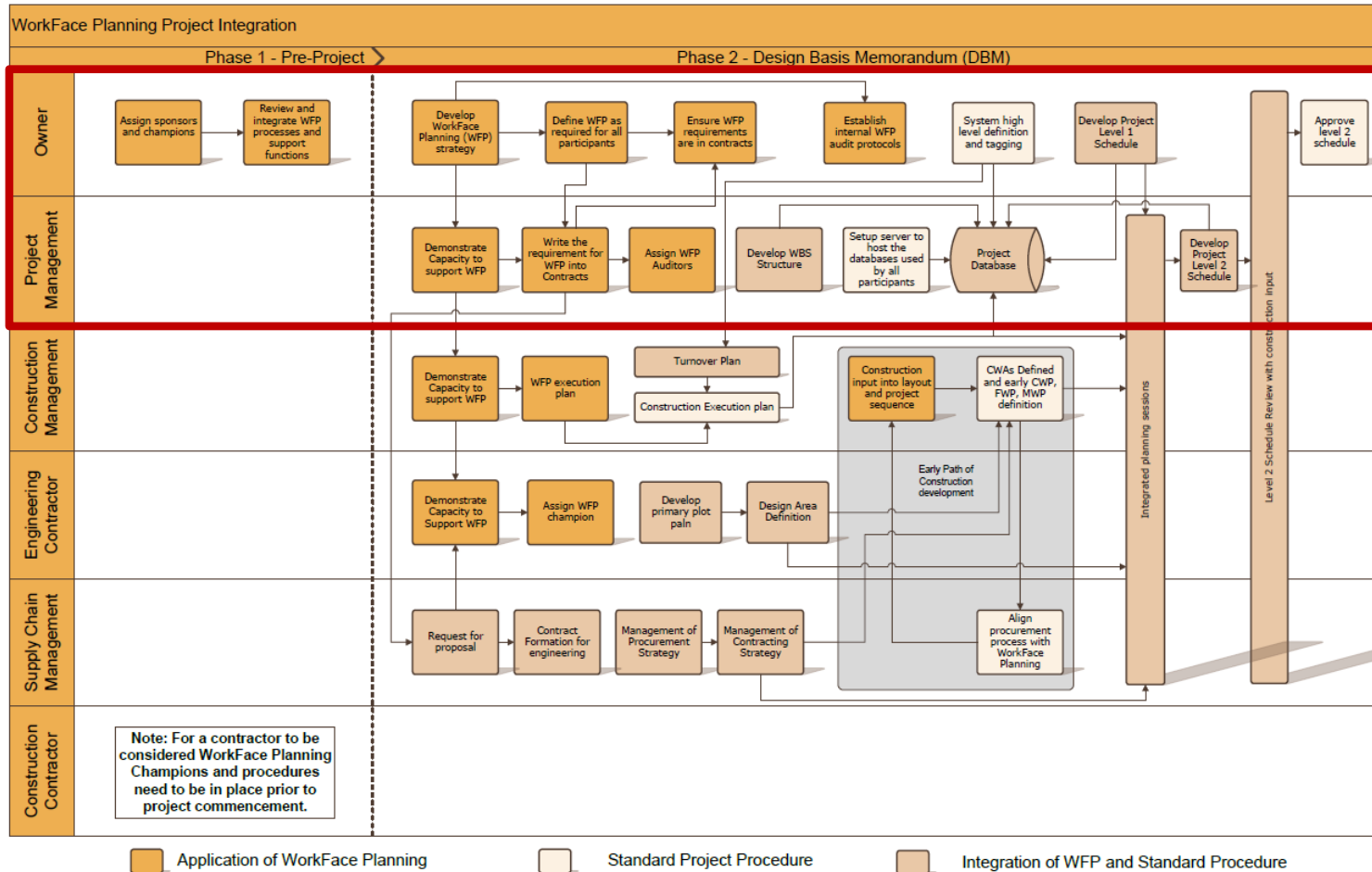
## Exercise

**For each of the swim lanes highlighted on your groups flow chart, discuss and record what you need to conduct an audit in regards to;**

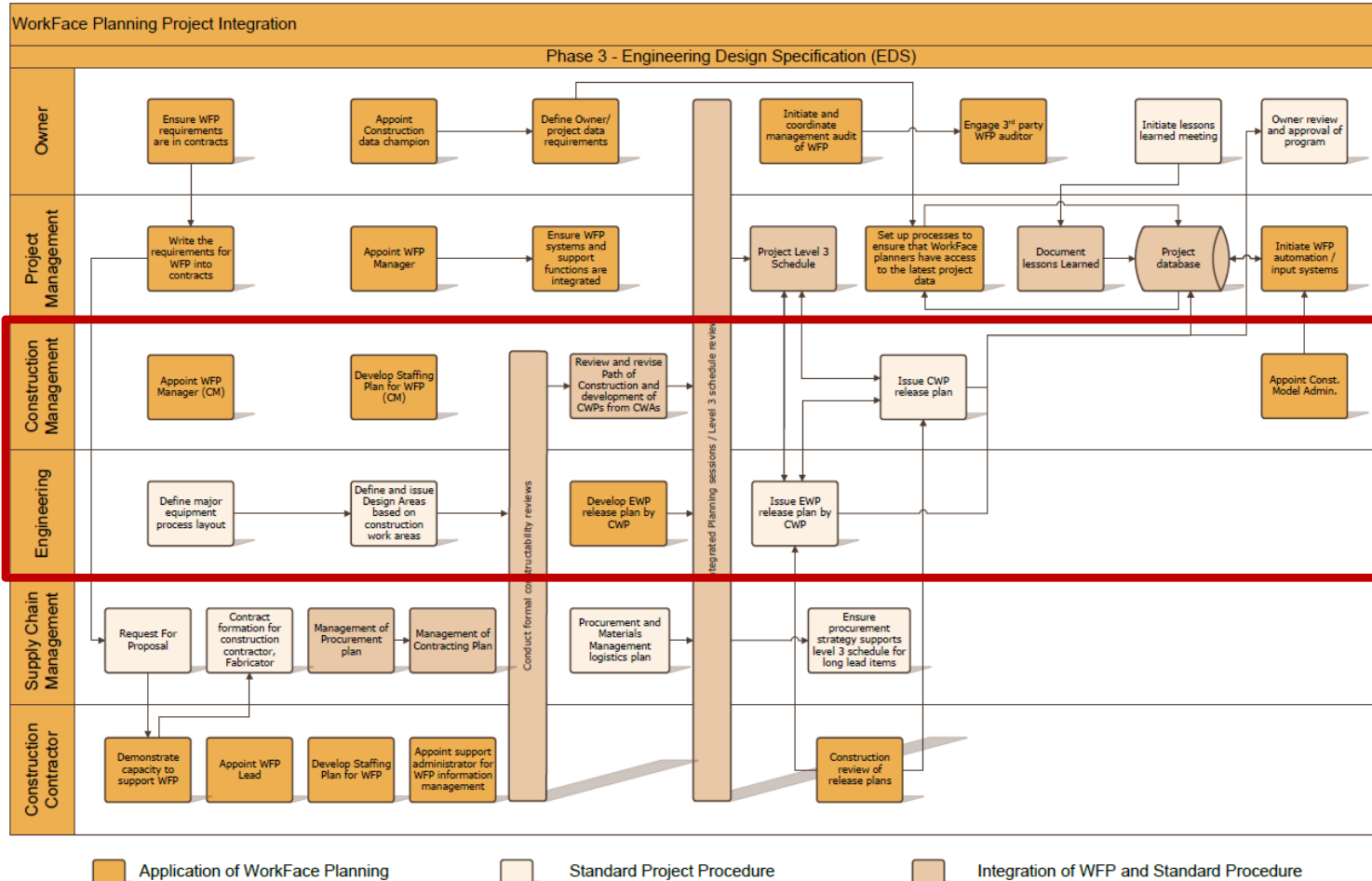
- **Observations**
- **Interviews**
- **Documents**



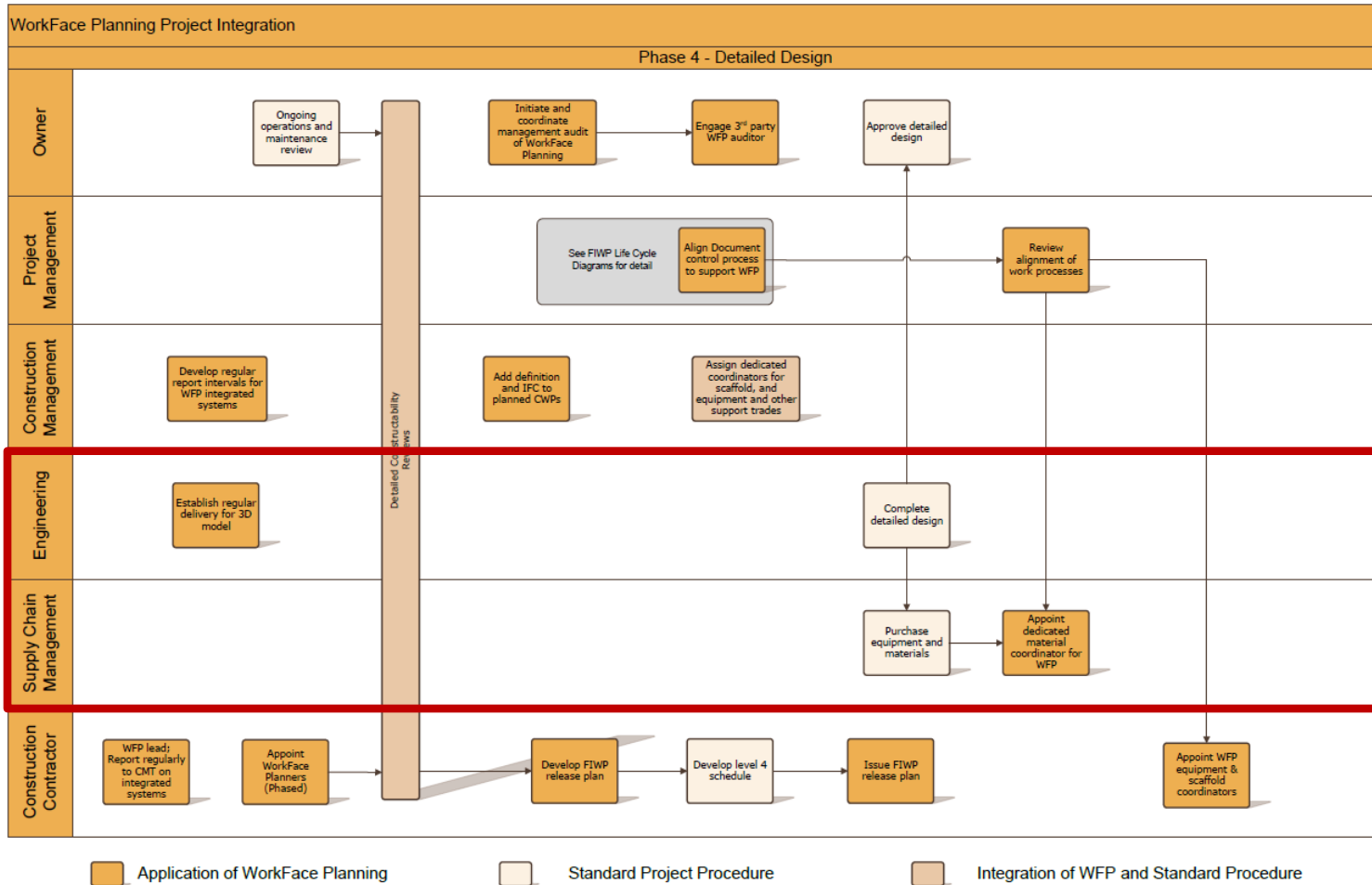
# Group #1



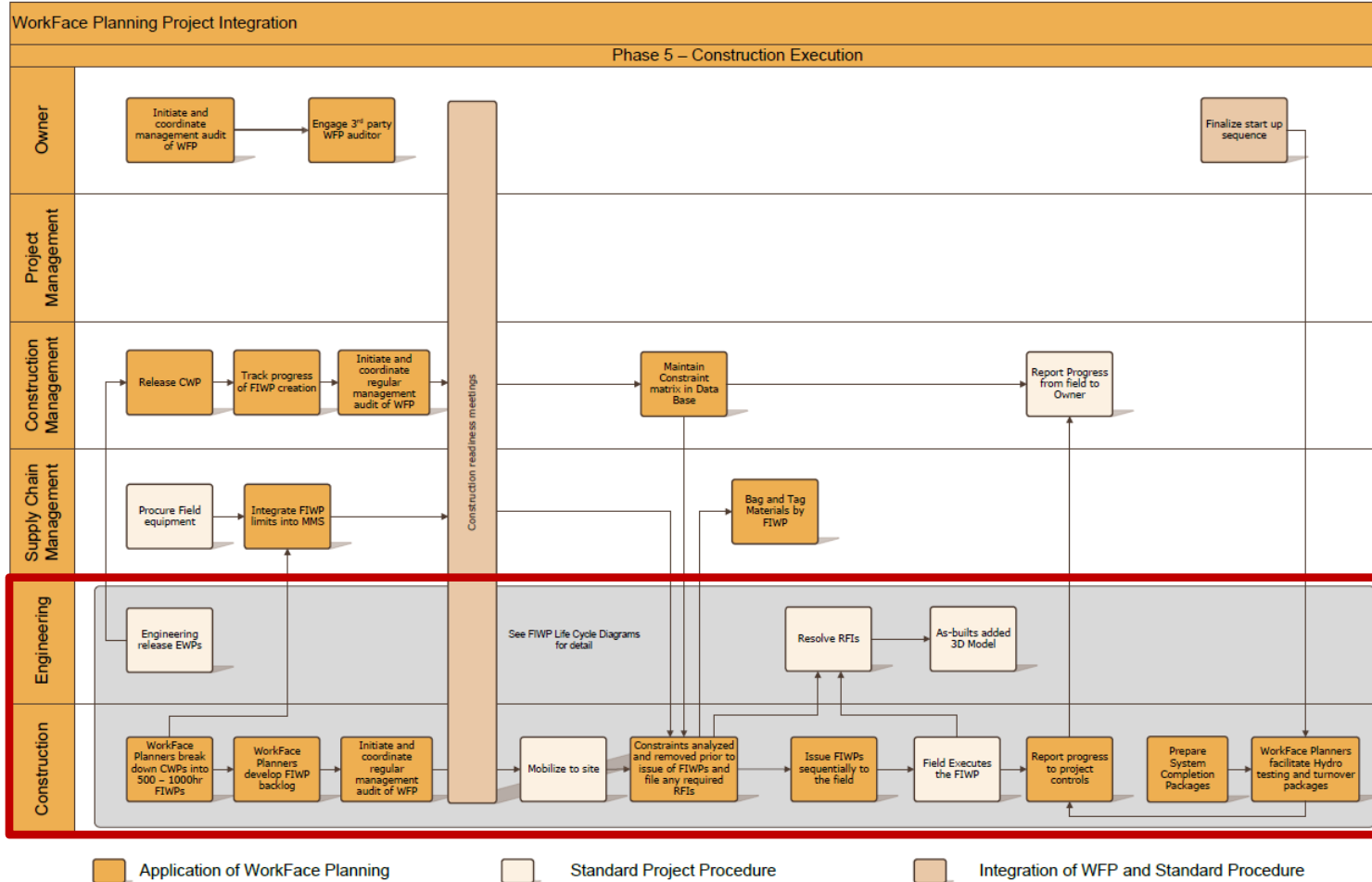
# Group #2



# Group #3



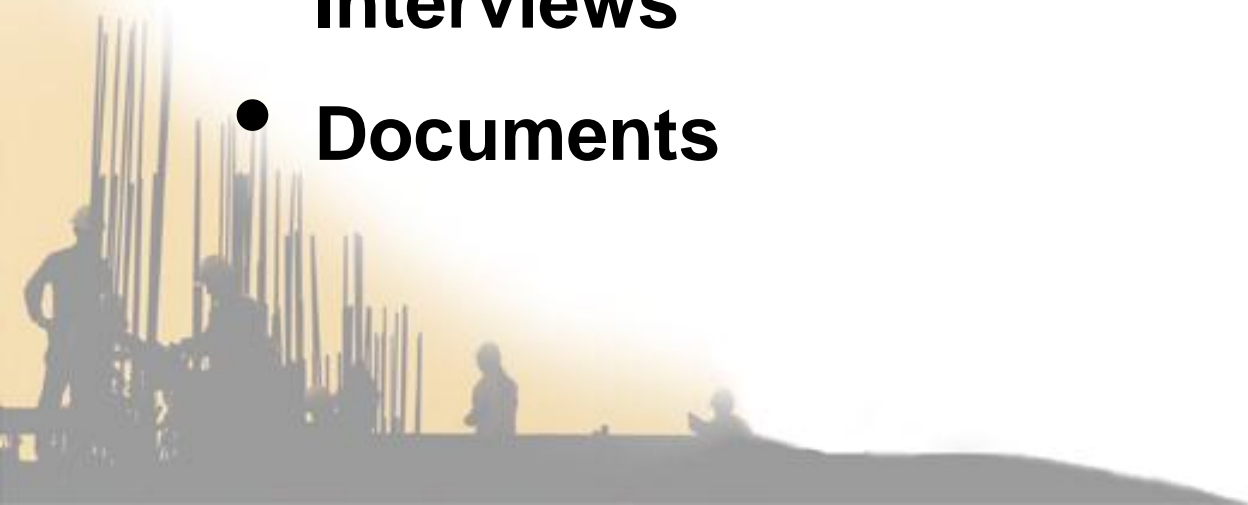
# Group #4



## Exercise

**For each of the swim lanes highlighted on your groups flow chart, discuss and record what you need to conduct an audit in regards to;**

- **Observations**
- **Interviews**
- **Documents**



# Exercise

**Presentation of each groups findings**





# Question and Answer



# Management of Change

## Preparing for a new Paradigm

**Stephen Revay**  
**VP Western Region**  
**Revay and Associates Ltd.**  
**September 20, 2011**

# **SAFETY MOMENT**

# **CONTROLLING STRESS**





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***Stressed out my ASS!  
I am going to KILL the next Son of a  
Bitch who says I look STRESSED!***



## **STRESS**

**We are faced with it everyday and might not know how to deal with it.**

**Important to learn how to deal with it as it affects performance and relationships at work and home**

**Can lead to distraction that can cause safety incident.**

**Can also make you more susceptible to illnesses.**

## **STRESS**

**First step to manage stress is to identify your “Stressors” and determine if they are controllable or uncontrollable such as:**

- **Not enough time**
- **Unexpected change**
- **Family problems**
- **Extra responsibility**
- **Personality clashes**
- **Money difficulties**



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## **STRESS**

**Next step is to deal or cope with stressors in positive way**

- **Acceptance**

**Some things we have no control over so accept them  
e.g. “Someday I’ll laugh about this!”**

- **Attitude**

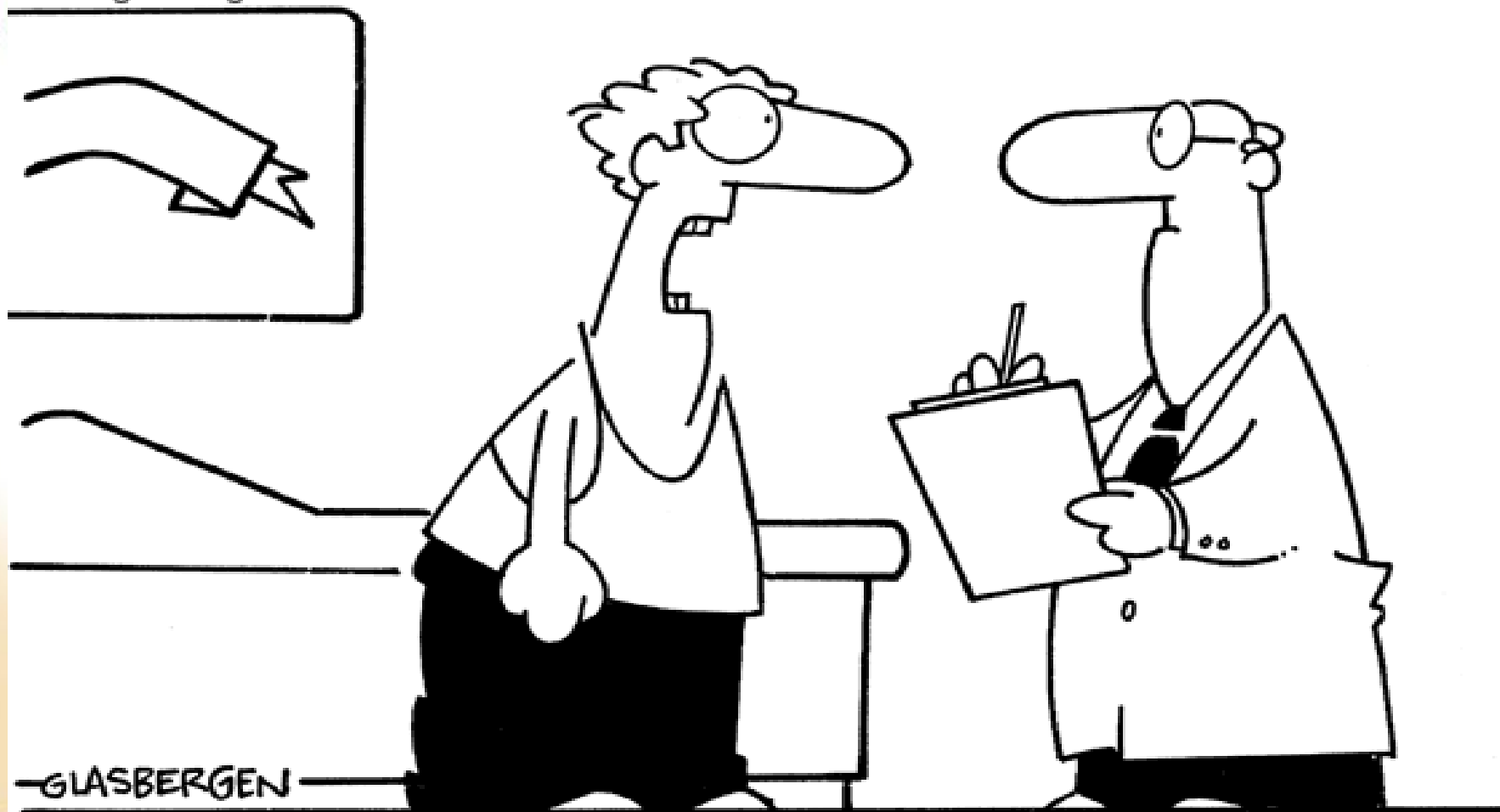
**Try to focus on positive  
e.g. “What can I learn from this?”**

- **Perspective**

**Ask yourself “How important is this situation?”  
Or “Will I even remember this in 5 years?”**



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www.glasbergen.com



**“I’m learning how to relax, doctor —  
but I want to relax *better and faster!*  
*I want to be on the cutting edge of relaxation!*”**

# Agenda

- **Steve Revay's Background**
- **Test Hypothesis**
- **Interviews with change agents**
- **Literature Search**
- **Work Face Planning**
- **Benchmarking**
- **Conclusions**

# Background

- **Construction Claims Consultant**
- **Forensic analysis of construction projects**
- **Most projects in trouble experience significant changes**



## Ingredients – Fixed Price Contracts

**Poor Scope Definition: Extensive Growth / Rework**

**Acceleration: Overtime / Congestion**

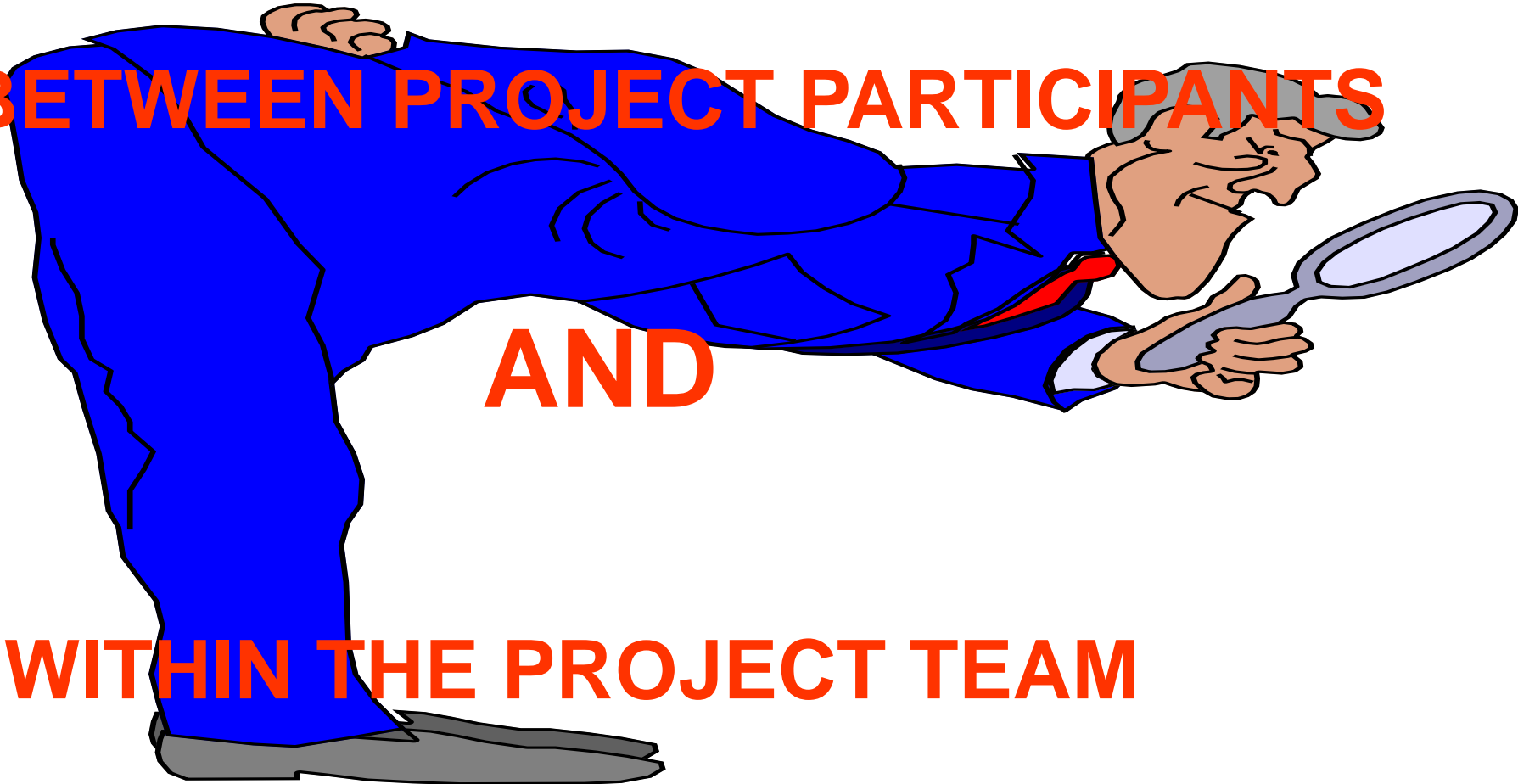
**People : no communication and NO**

# TRUST

➤ BETWEEN PROJECT PARTICIPANTS

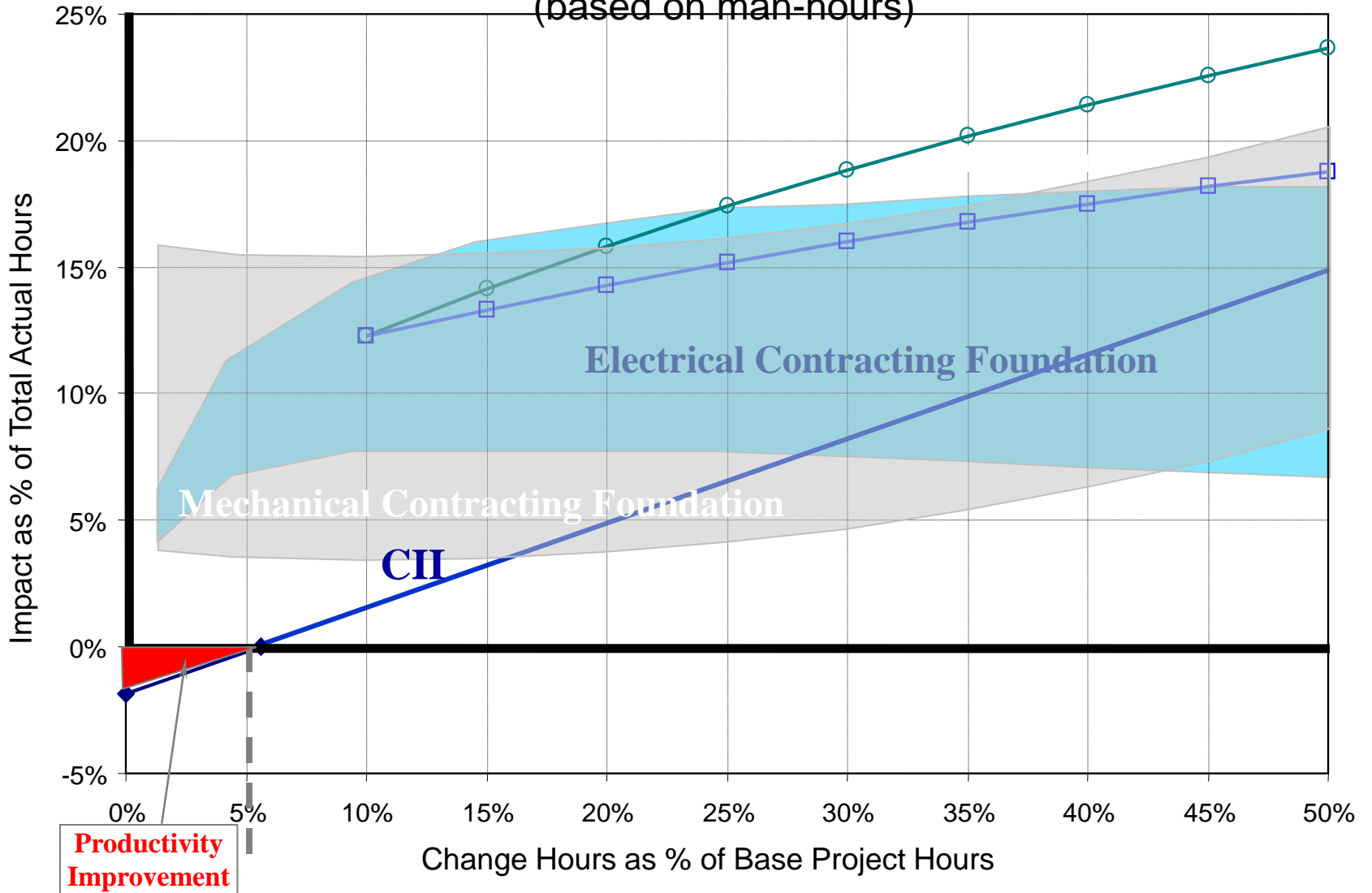
AND

➤ WITHIN THE PROJECT TEAM



# Quantity of Change vs. Impact

(based on man-hours)

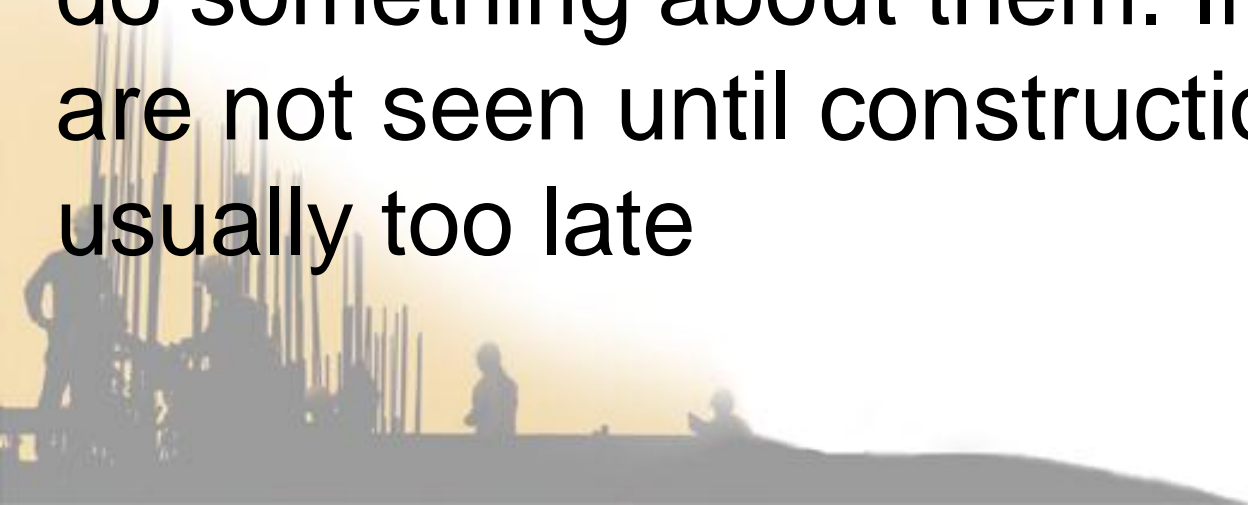




# Industrial Megaprojects

## Edward Merrow

It is far more important to be carefully monitoring engineering than construction! When problems start to show up in engineering, it actually may be possible to do something about them. If the problems are not seen until construction, it is usually too late





# Hypothesis

- Organizational changes can be just as disruptive as scope changes
- Implementation of organizational change is similar to planning a project
- Particular emphasis on the team

# Interviews

# Change Agents





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# Human Consequences of Change

- Dissatisfied
- Frustration
- Obstruction
- Resistance
- Talent flight



- Loss of experience
- Burnout
- Stress
- Destruction

# Why do people resist change?

- Loss of authority or control
- Fear change creates more work
- People generally do not have open minds
- Seasoned employees fearful to level playing field with less experienced peers



# Proving why change is good

- New approach saves time and money
- Use of new technology
- Opportunity to redeploy personnel in more productive positions

# Facilitating Change

- Decide the change management desired process. Management Driven vs. Cultural Driven
- Need tools to facilitate/gauge cooperation
- Need experienced people/champions, management sponsorship, and facilitators





# Organizational Change Management Roles

## ➤ Initiator

- Who initiated the change?
  - How was it provoked?

## ➤ Facilitator

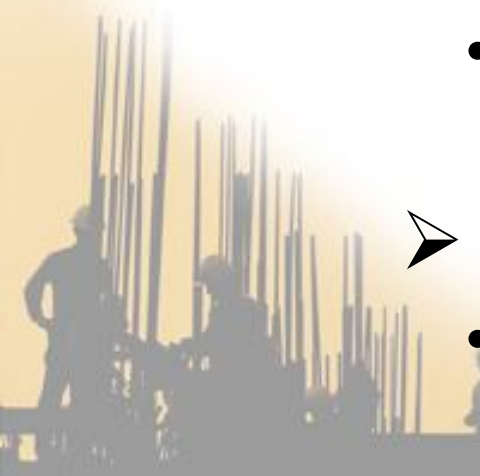
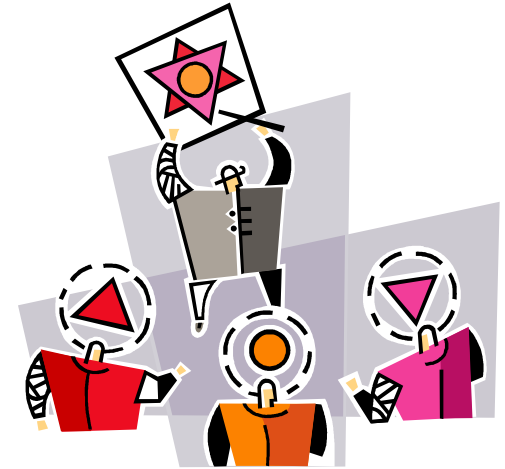
- Who is the facilitator?
  - Look for internal facilitators, if possible

## ➤ Champions

- Utilize and promote champions
  - Sustain enthusiasm about positive changes

## ➤ Sponsor

- Look for executive sponsorship
  - Officer responsible for change





## Management Driven Change Process –

High Level managers decide requirements

—Final solution rolled out

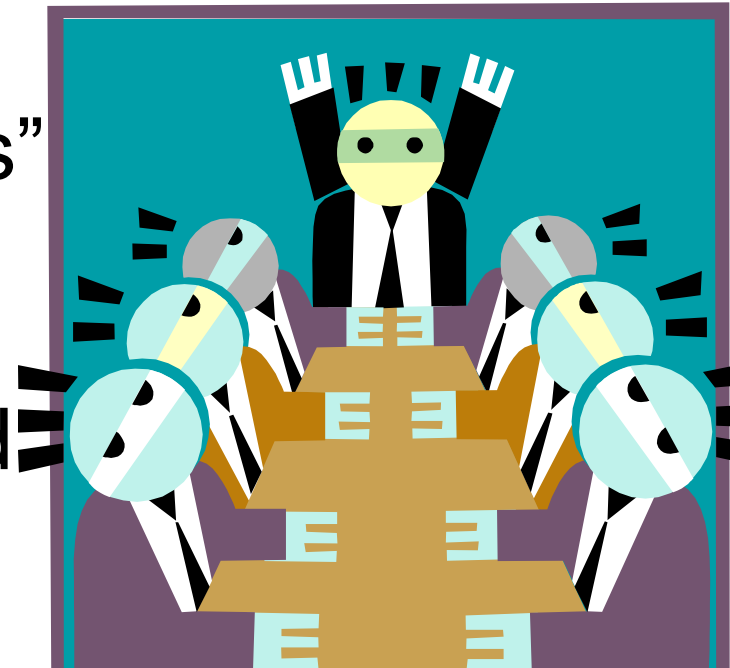
—End users told “here it is”

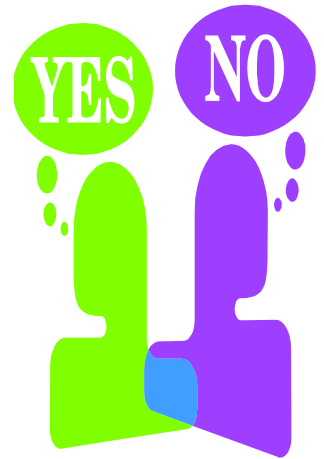
—Advantages

- Implementation Speed

—Drawbacks

- End user buy-in





## Cultural Driven Change Process

Project core team.

- Advantage is buy-in from end users.
- Disadvantage takes time to implement.
  - More persons with opinions.
  - Consensus takes time.

# **Worst Case**

**Start with Cultural Change**

**Run out of time / money /  
patience**

**Switch to Management Driven**



# Change requires strategic thinking and evaluation

- Establish direction and vision
- Empower staff through education and training
- Provide opportunities for visibility and growth
- Achieve outcomes
- Satisfy stakeholders
- Keep moving forward



# Continuous Improvement

## Growing together establishing goals

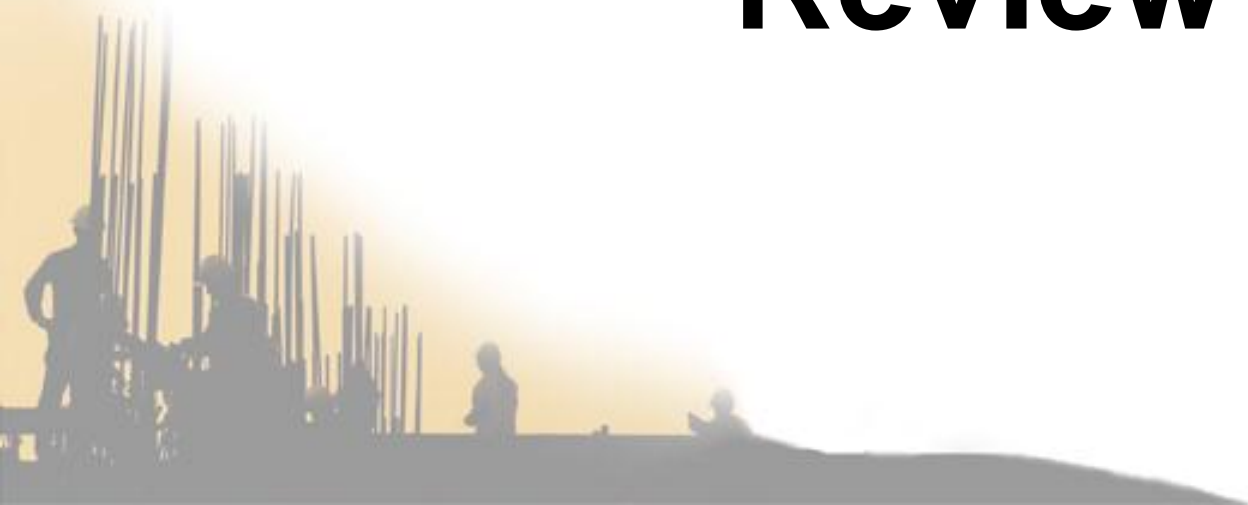
- Interviewing Staff and determining areas for process improvement
- Establish system design / test data with team members
- Incorporating comments moving forward

## Moving forward past prior mistakes

- Develop strategies to move forward for continuous improvement
- Build and support staff to embrace new concepts

# Literature

# Review





# Change Implementation

**Thomas Edison quote: Genius is 1%  
inspiration and 100% perspiration**

**“Company executives frequently rate  
themselves high generating ideas and low in  
the implementation of the ideas”**

**“The other side of innovation” – Govindarajan  
& Trimble**



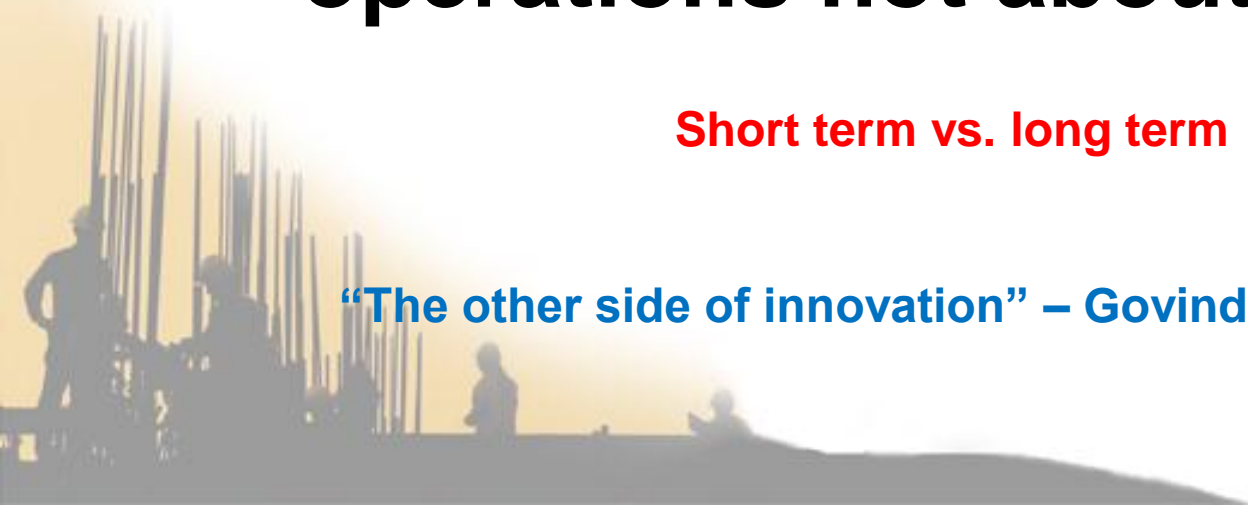


# Why do organizations resist change

**Organizations are about ongoing operations not about change**

**Short term vs. long term**

**“The other side of innovation” – Govindarajan & Trimble**





# The Biggest Mistakes in Managing Change

by Carol Kinsey Goman, Ph.D.

1. *Not understanding the importance of **people**. 60-75 percent of all restructuring failed -- not because of strategy, but because of the "human dimension."*
2. *Not appreciating that **people** throughout the organization have different reactions to change. Lesson learned: Some people are naturally more "change-adept."*
3. *Treating transformation as an event, rather than a mental, physical and emotional process.*



## The Biggest Mistakes in Managing Change by Carol Kinsey Goman, Ph.D.

*4. Being less than candid.* Under the rationale of "protecting" people, we presented change with a too positive "spin."

*5. Not appropriately "setting the stage" for change.*

*6. Trying to manage transformation with the same strategies used for incremental change.*



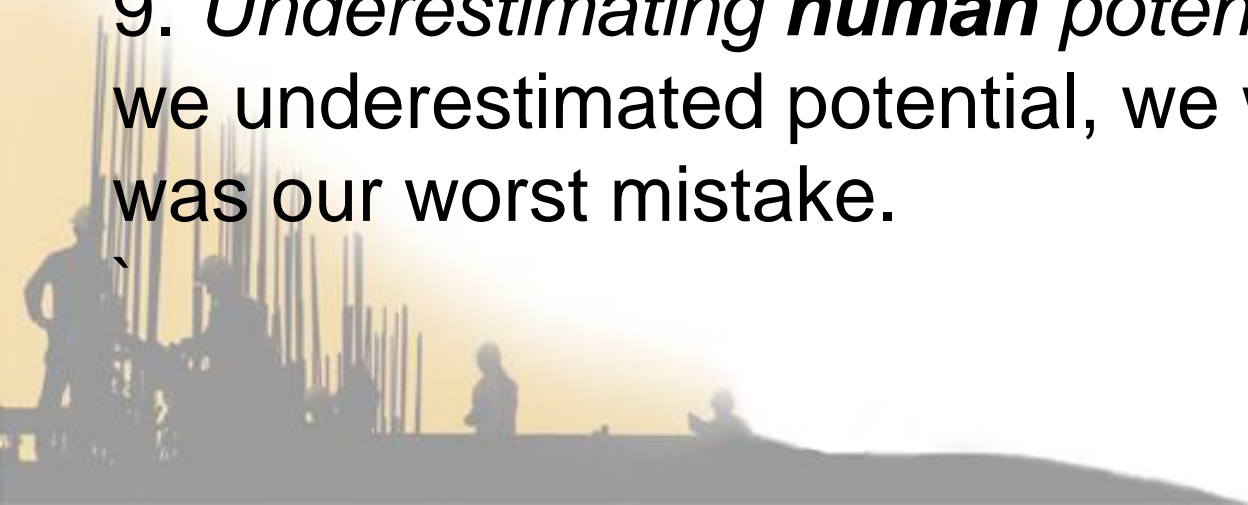
# The Biggest Mistakes in Managing Change

by Carol Kinsey Goman, Ph.D.

*8. Believing that change-communication was what employees heard or read from corporate headquarters.*

Bulletins vs. water cooler

*9. Underestimating **human** potential.* And when we underestimated potential, we wasted it. This was our worst mistake.



# **Change Management 101**

## **Fred Nickols**

**Unfreezing – changing – freezing**  
                                          ↑  
**unstable**

- **Transform ( A to B)**
- **Reduce (differences between A – B)**
- **Apply – (implement)**



# **Change Management 101**

## **Fred Nickols**

### **Empirical – Rationale**

**People are rationale and will follow self interest once revealed**

### **Normal – Reductive**

**People are social beings and will adhere to cultural norms and values**





# **Change Management 101**

## **Fred Nickols**

### **Power – Coercive**

**People are generally compliant and will generally do what they are told**

### **Environmental – Adaptive**

**People oppose loss and disruption but they adapt readily to new circumstances**





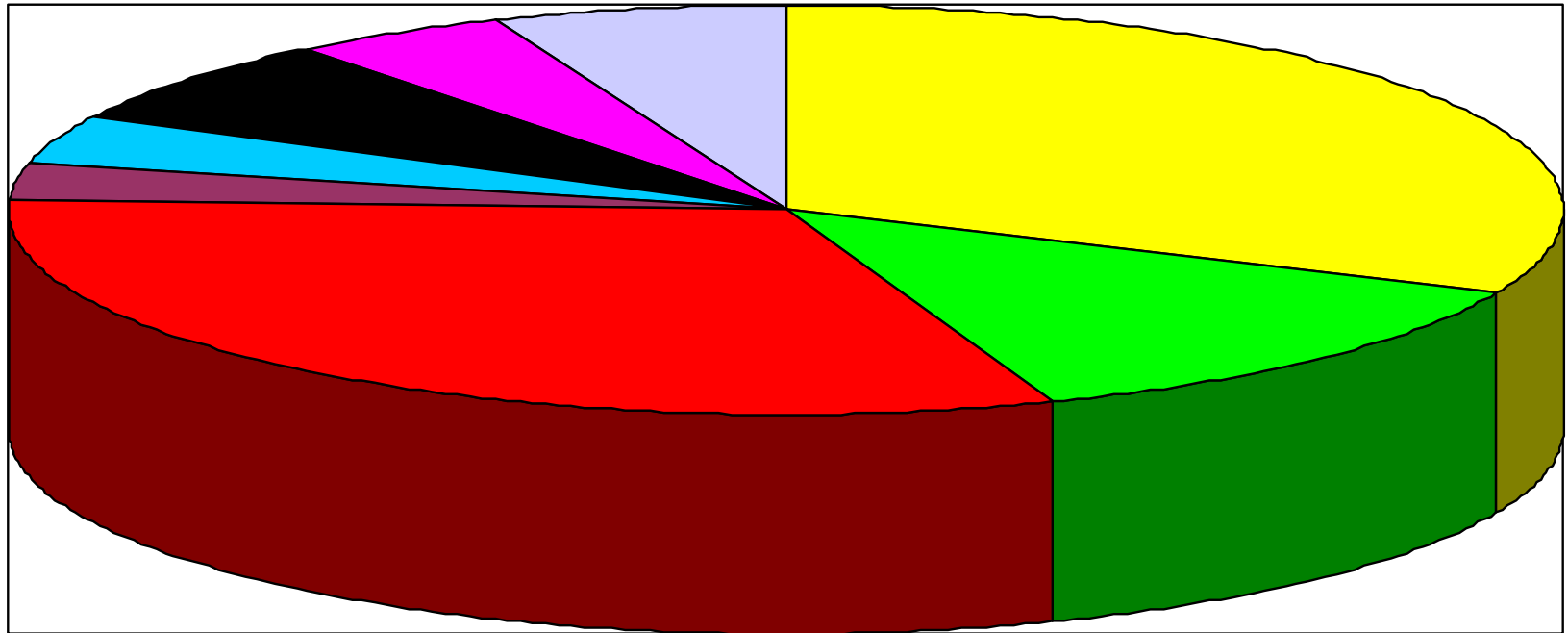
# Workface Planning

**Obvious cost**

**Benefits not readily apparent**



# WorkHour Study CII



■ Direct Work - 32%

■ Waiting - 32%

■ Personal Breaks - 4%

■ Transporting - 4.6%

■ Travelling - 13%

■ Late & Early - 3%

■ Tools/Materials - 7%

■ Drawings - 6.4%



# Why Benchmarking in Alberta

## **The Alberta Report – a Government/Industry Partnership**

Construction Owners Association of Alberta

Alberta Finance and Enterprise - Industry Development Branch

- Alberta was experiencing major cost overruns on its mega-projects
- Many of these mega-projects were in Alberta's oil sands sector
- Oil sands are an important and growing sector of Alberta's economy
- Something had to be done to rein in rising construction costs, Alberta was being viewed as a high cost jurisdiction in which to do business

# Top 5 Factors

Rank	Cost	Schedule	Productivity
1	Amount of Unplanned Overtime	% Engineering completion prior to Construction Start	% Engineering completion prior to Construction Start
2	% Engineering completion prior to Construction Start	Business Market Conditions	Amount of Unplanned Overtime
3	Business Market Conditions	Craft Labour Skill	Business Market Conditions
4	Craft Labour Skill	Quality of Field Level Supervision	Quality of Field Level Supervision
5	Coordination with Plant Shutdown	Weather Conditions	Craft Labour Skill



# Working Together

**Benchmarking**

**&**

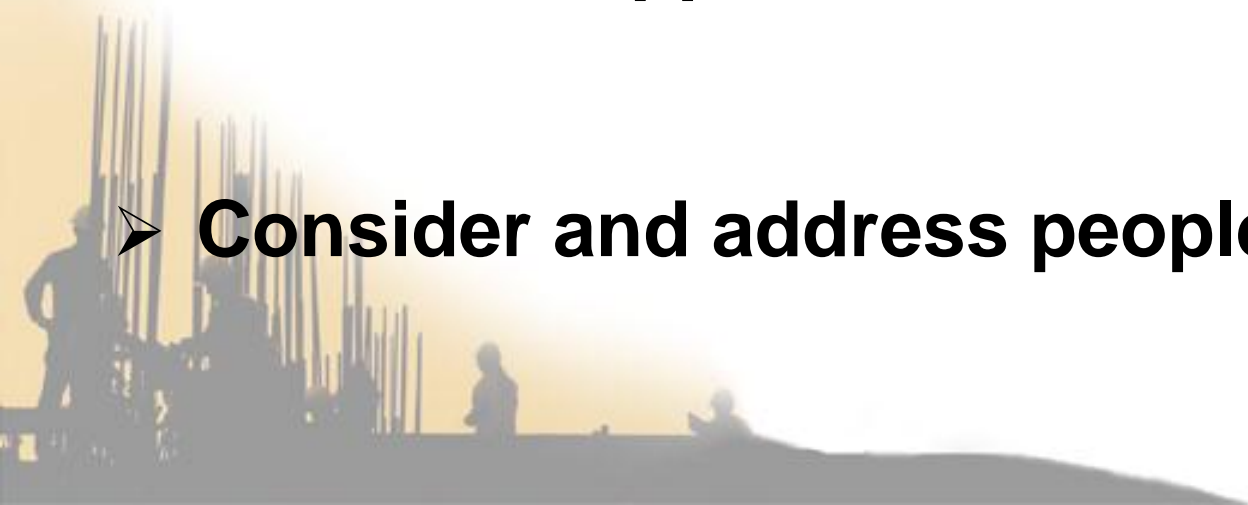
**Workface Planning**



# Conclusions

## Implementing change

- **Treat like a project**
- **Decide on approach**
- **Consider and address people issues**





- Develop the process inventory: identifying and prioritizing the process list
- Establish the foundation avoid scope creep
- Draw the process map; Flowcharting and documenting
- Estimate time and cost and verify the process map introducing the process and cycle time and gaining buy-in
- Apply Improvement techniques: Challenge everything

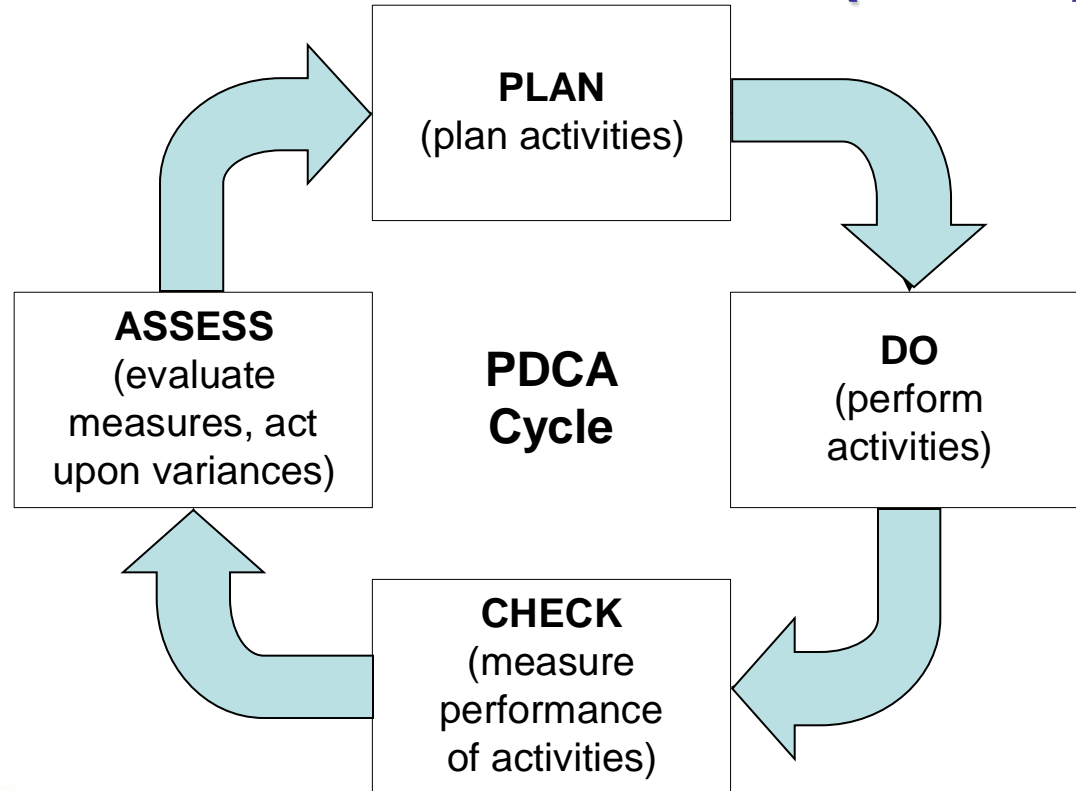


# The Power of Business process Improvements

Susan Page

- Create internal controls. Tools and metrics making it real
- Test and rework making sure it works
- Implement the change: preparing the organization
- Drive Continuous: embracing the new mindset

## Plan-Do-Check-Assess (PDCA)



**Based on the time-tested Deming or Shewhart cycle..**



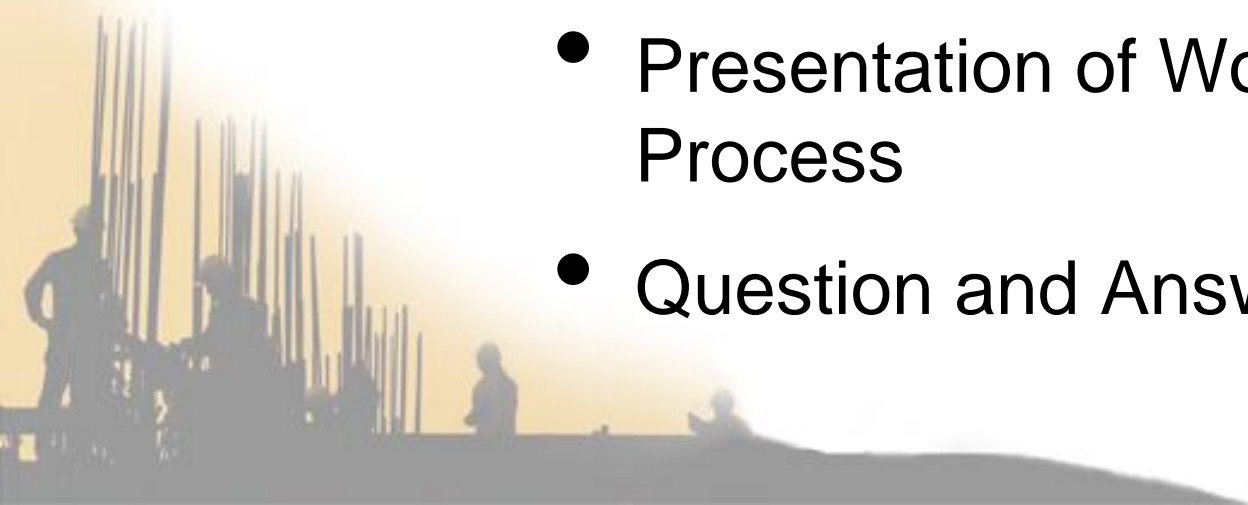
# Managing the Lifecycle of a FIWP

**COAA WorkFace Planning Conference 2011  
Calgary, Alberta, Canada  
September 19 & 20, 2011**



# Managing the Lifecycle of a FIWP - Agenda

- Introductions
- Background
- What is an FIWP
- Overview
- Presentation of Work Process
- Question and Answer





# Introductions



**Robin M. Mikaelsson** PMP

**Senior Construction Consultant, Bentley Systems**



**Tannis Liviniuk**

**Lead Construction Analyst, Cenovus Energy**



**Jake Coughlin**

**WFP Div. Implementation Process Lead, Flint Energy**



# What is an FIWP



A Field Installation Work Package (FIWP) is a grouping of tasks targeted at one shift in duration (500 -1000hrs). These FIWPs will contain all of the necessary documents and descriptions required to carry out the tasks required”

-COAA



Typical Contents of one FIWP

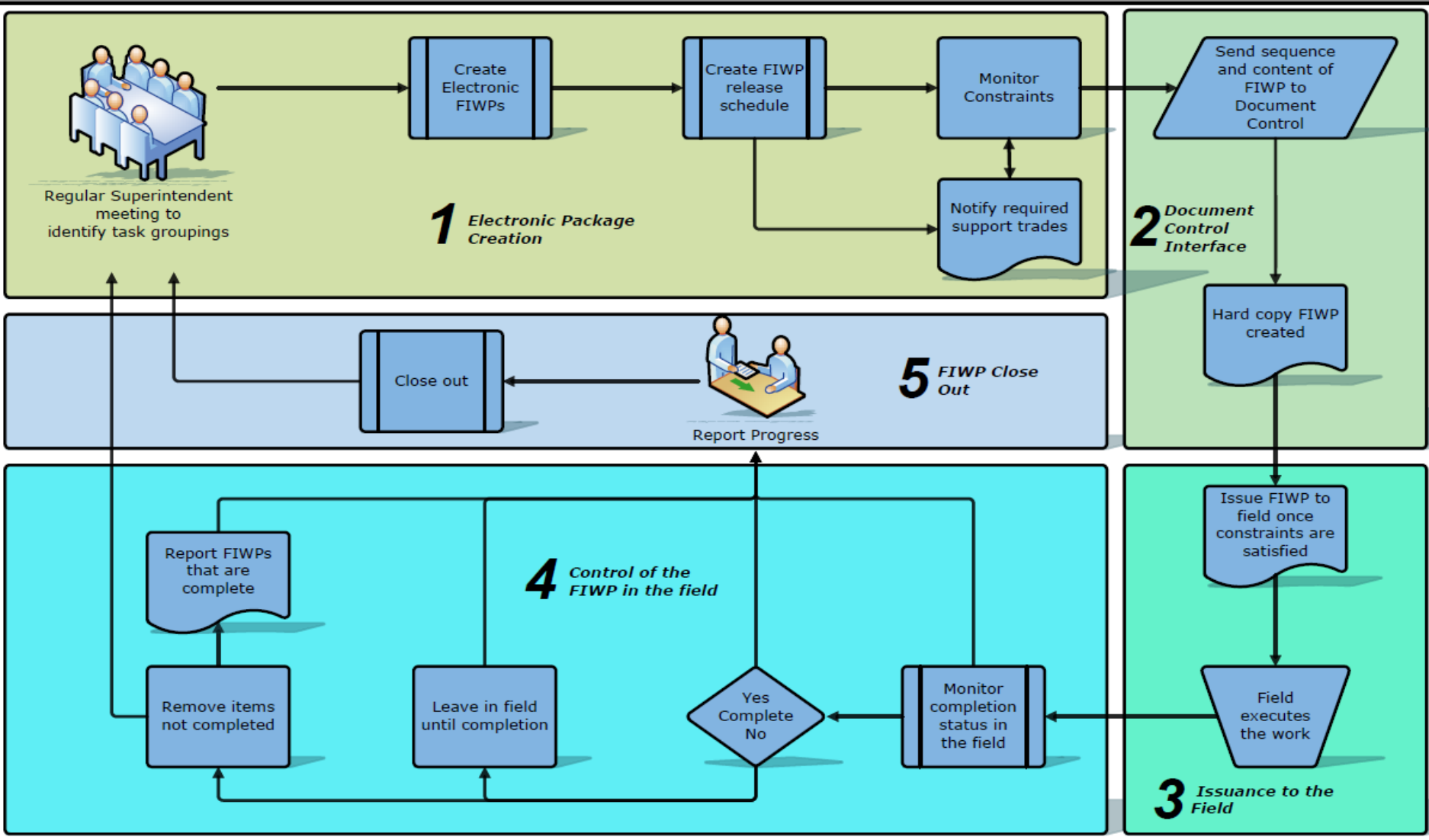


# Background

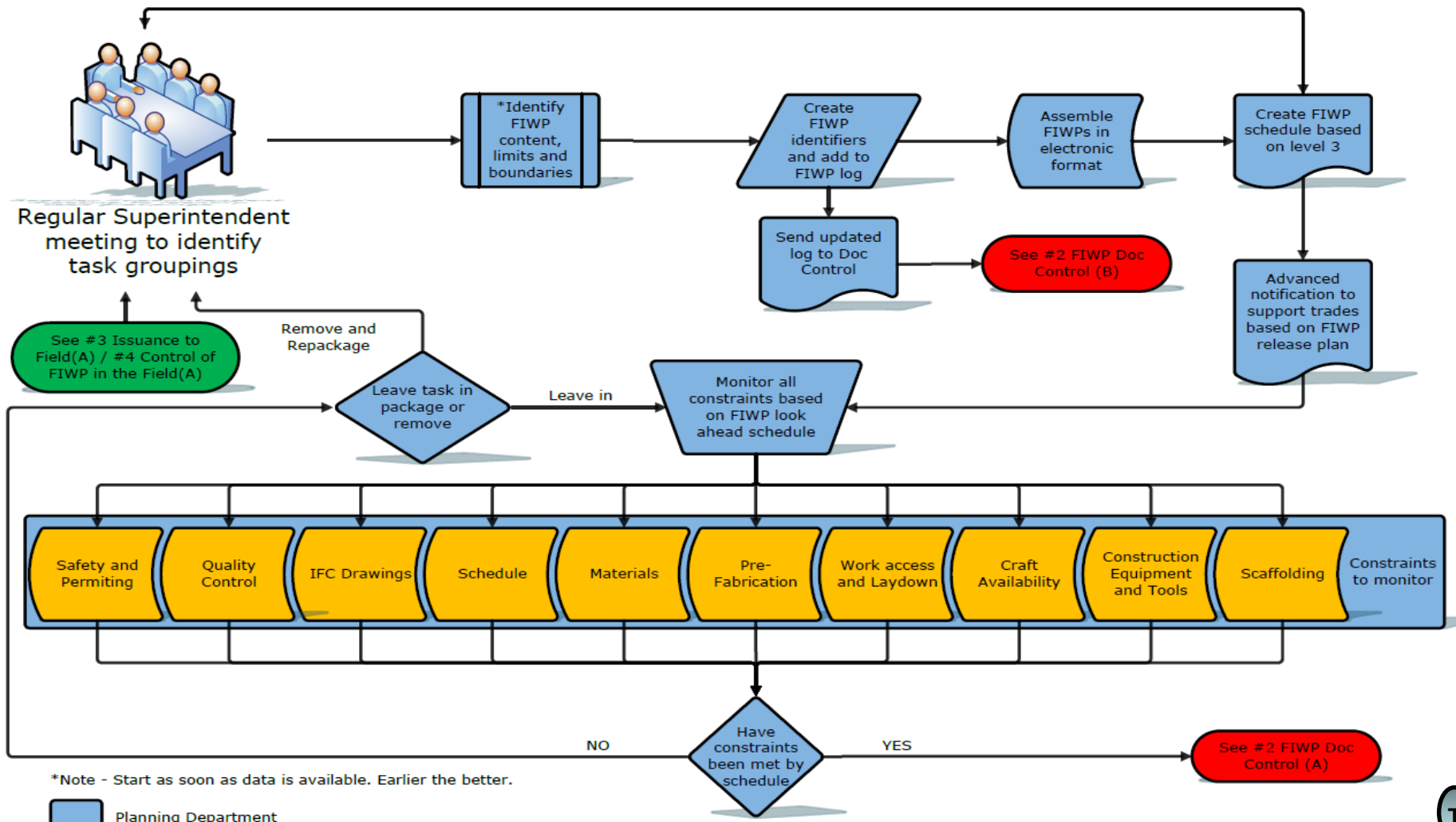
- **Work Process** was developed in the field
- **Projects** from all over the world were interviewed
- **Built from Lessons** learned
- **Work Process** is scalable for project size
- **Flow Charts** and a full narrative can be downloaded from the **COAA** web site
- **Developed** as a joint effort between **COAA** and **CII**




# Overview



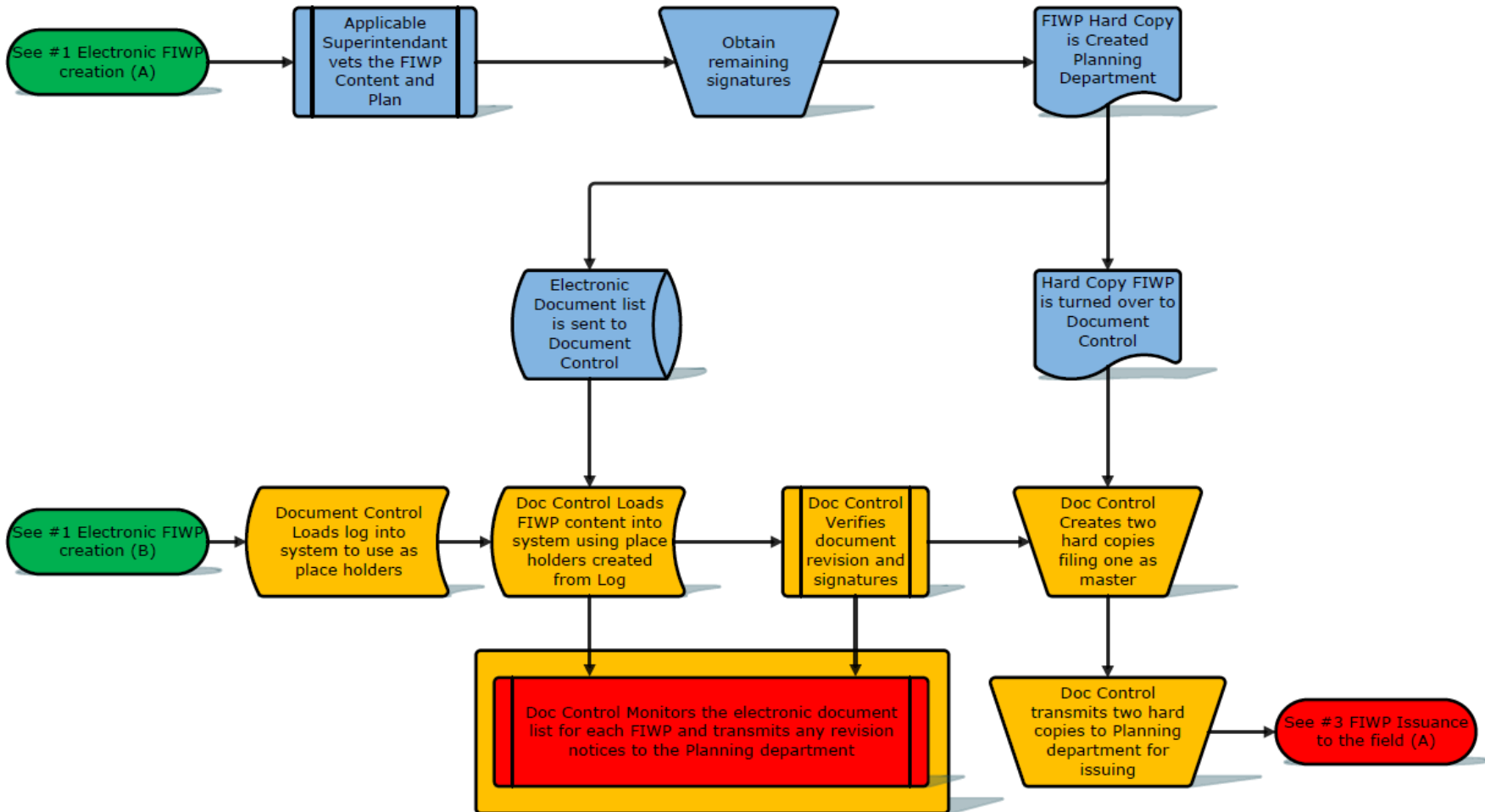
# #1 FIWP Creation



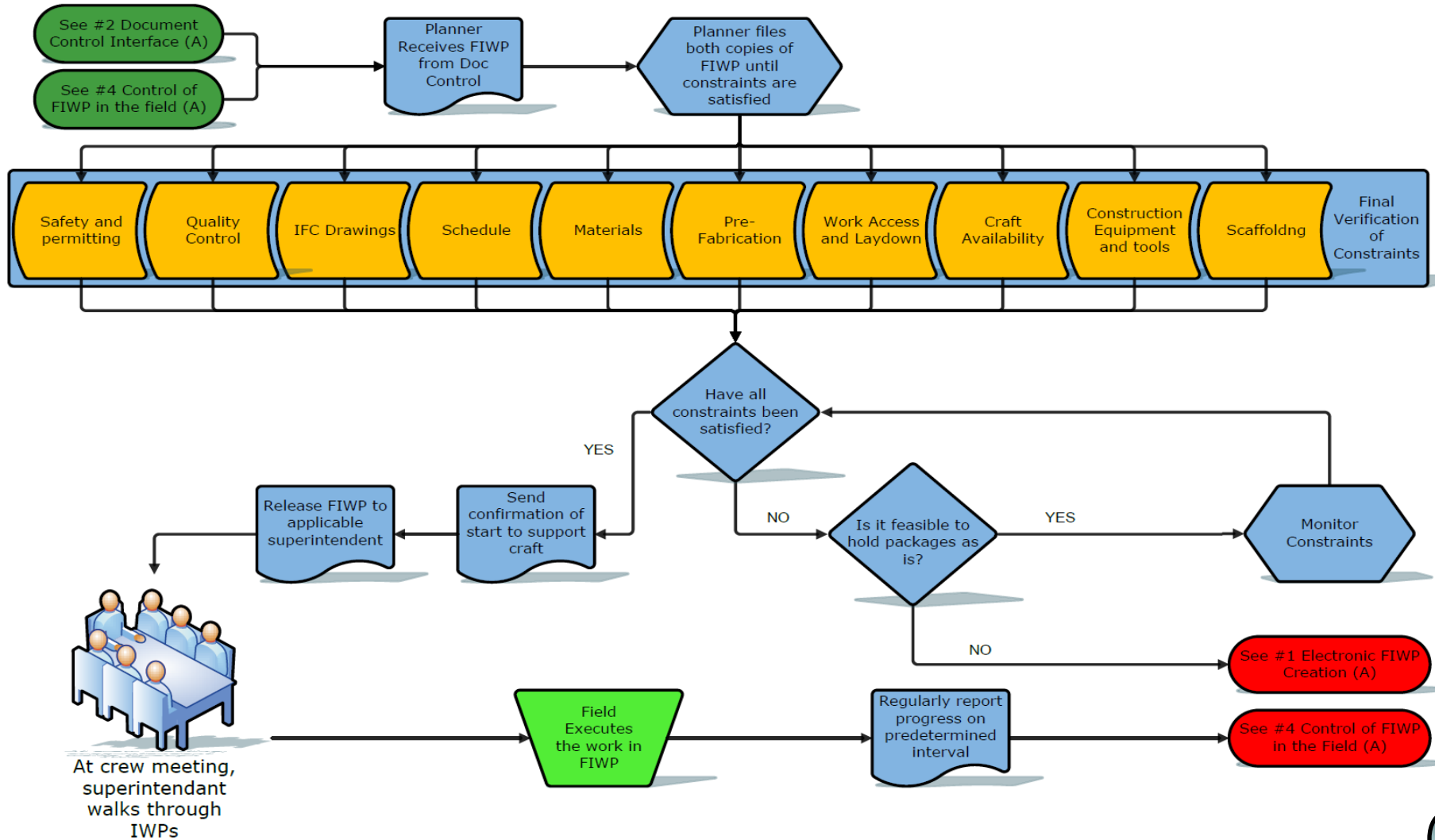
\*Note - Start as soon as data is available. Earlier the better.

 Planning Department

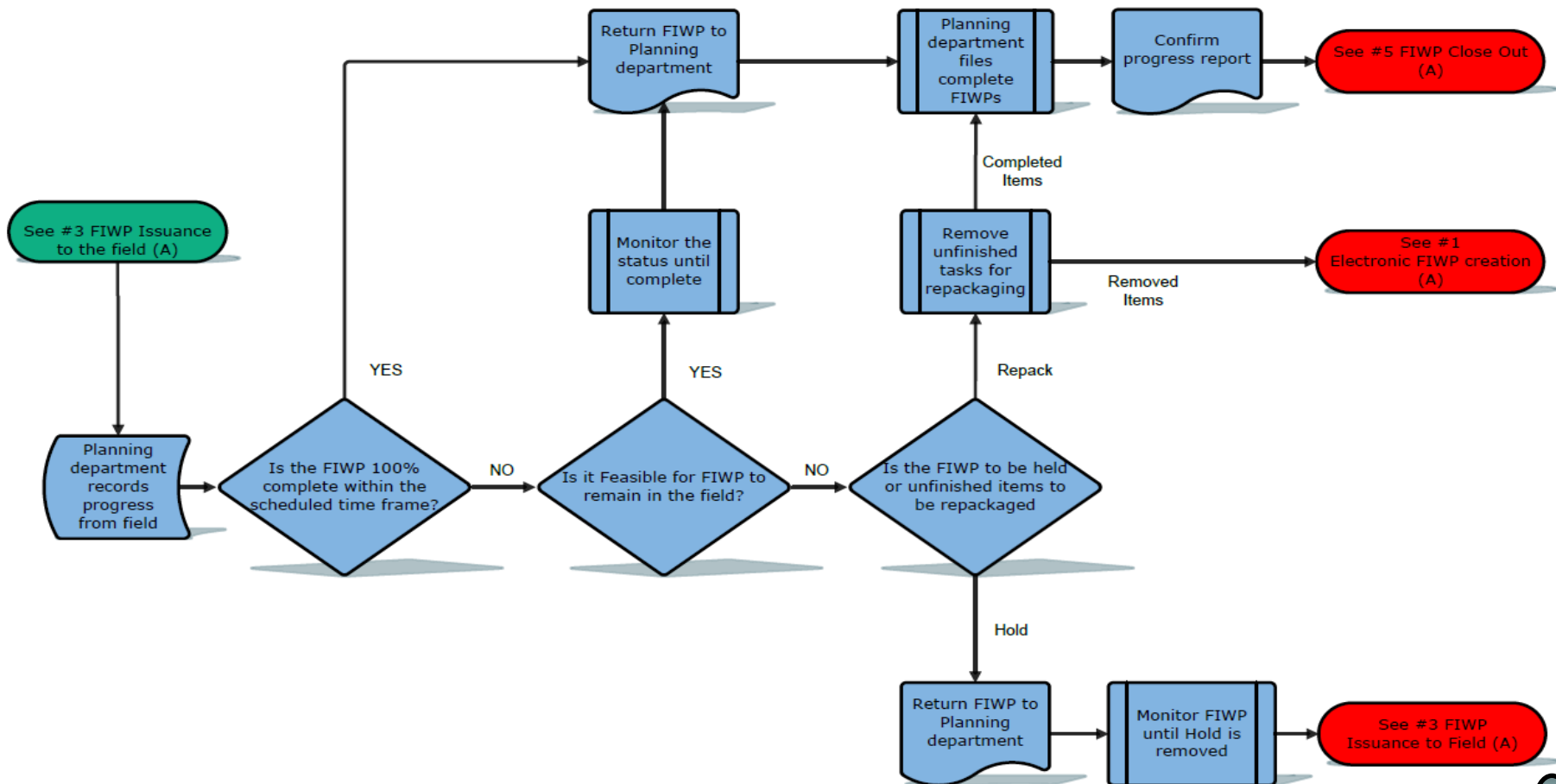
# #2 Document Control



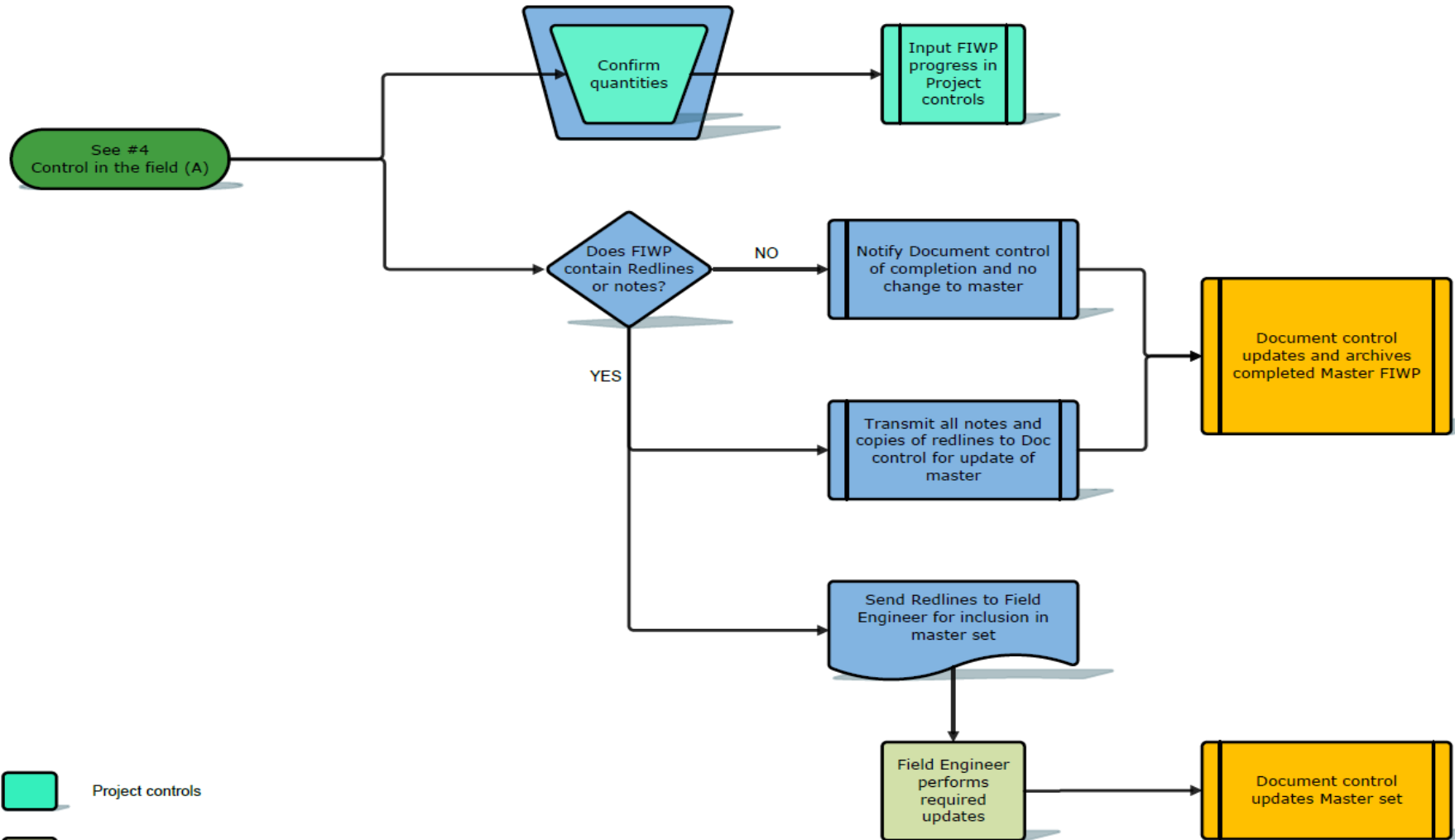
# #3 Issuance to the Field



# #4 Control of FIWP in the Field



# #5 Control of FIWP in the Field



 Project controls  
 Field Engineering



# Question and Answer





# **WFP a Case Study**

## **Implementation and Lessons Learned**

**Linda Clary  
Construction Planning Manager  
WorkFace Planning Conference  
September 20 2011**

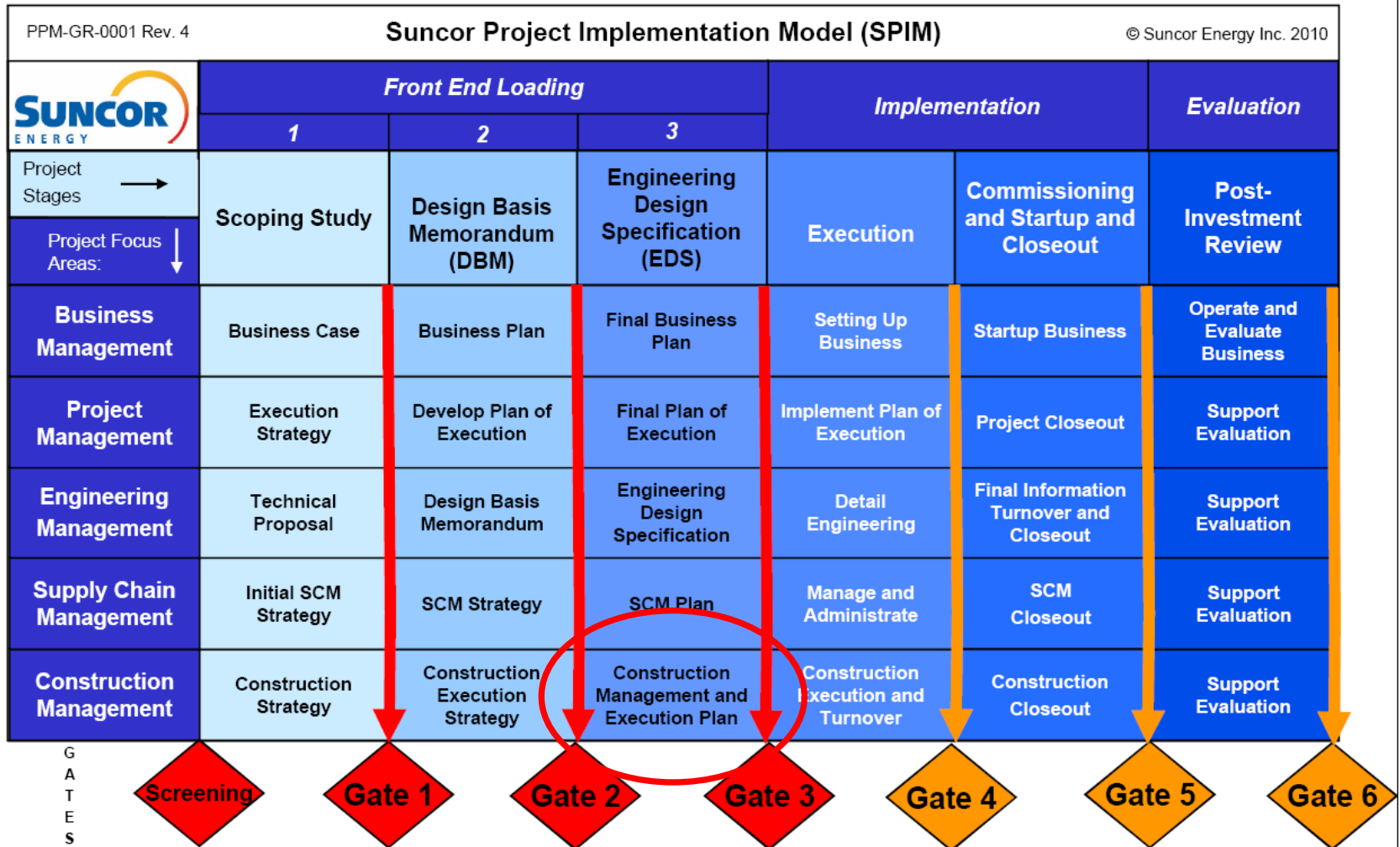
# Implementation

- Implementing WorkFace Planning as an owner company requires a commitment to the development of new processes
- It also requires change to existing processes
- This is separate from Project Implementation that will ultimately follow the developed and changed processes to affectively implement WFP

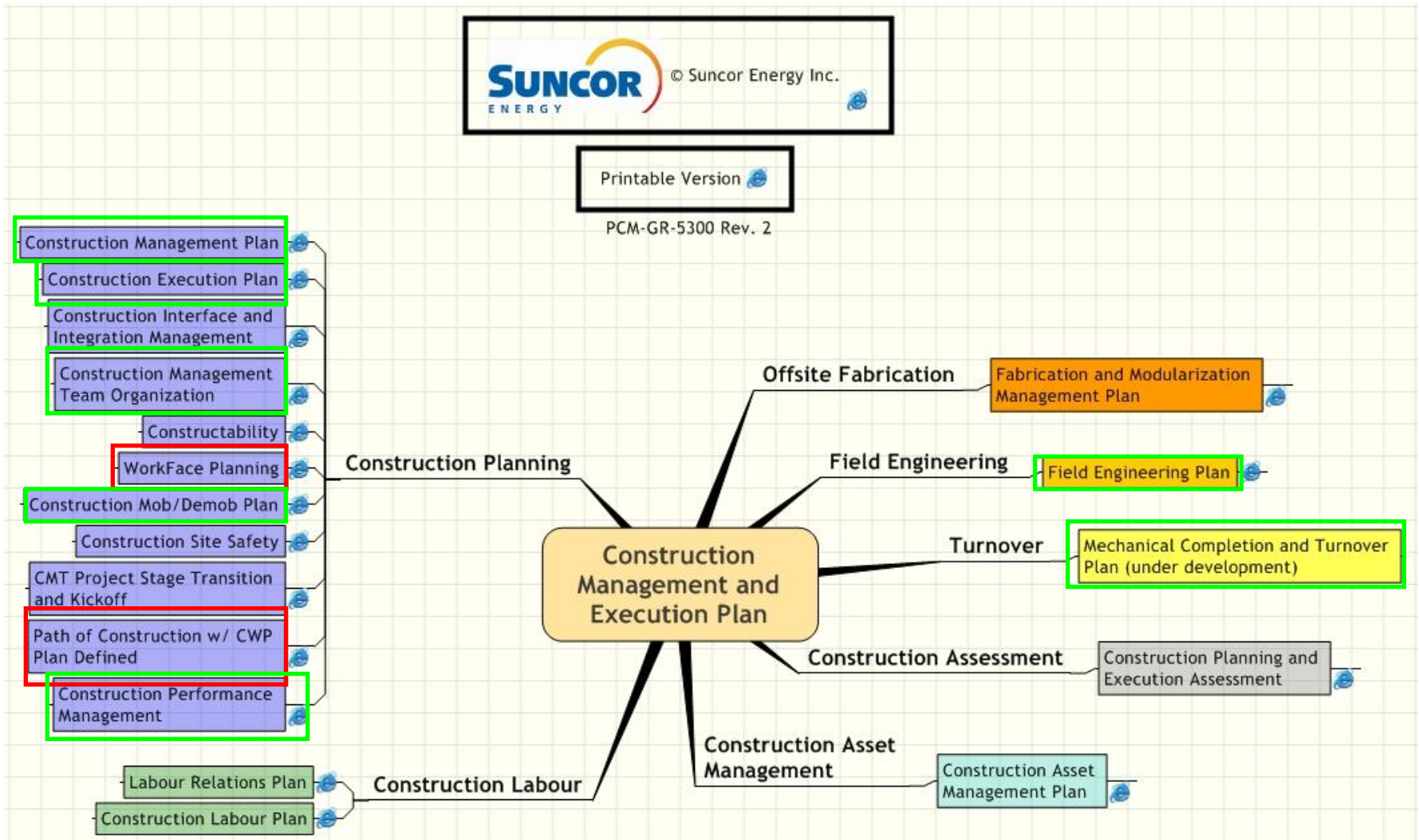
# Examples of Processes Impacted

	<b>Process/Standard/Procedure</b>	<b>Group</b>
✓	Performance Management	Construction
✓	Construction Execution Plan	Construction
✓	Construction Work Package Template	Construction
✓	Coding (WBS) – Work Packaging/Systems/Tagging	Project Management
✓	Integrative Planning	Project Management
✓	Materials Management	Supply Chain
✓	Contract Formation	Supply Chain
✓	Performance Reporting	Project Controls
✓	Progress Payment	Project Controls

# How WFP “fits” into Planning



# How WFP “fits” into Planning



# How WFP “fits” into Planning



<b>Title</b>	<b>PCM-SP-5109 Rev. 1 – WorkFace Planning</b>
<b>Objectives</b>	<ul style="list-style-type: none"><li>• Ensure implementation of WorkFace Planning on the Project. This shall be achieved by following the “WorkFace Planning Implementation Manual”.</li><li>• Embed the “WorkFace Planning Implementation Manual” and the “Field Installation Work Package Development and Control Procedure” into the Project Technical Library. This allows for the development of Project Documents with sections identifying the inclusion and use of WorkFace Planning</li></ul>
<b>Key Assumptions</b>	<ul style="list-style-type: none"><li>• Suncor Executive Management has established WorkFace Planning as required for all participants of Suncor Major Projects.</li><li>• There is an operational Project Technical Library to be populated</li></ul>
<b>Inputs</b>	<ul style="list-style-type: none"><li>• Suncor Construction Management End to End Process</li><li>• WorkFace Planning Implementation Manual</li><li>• Field Installation Work Package Development and Control Procedure</li></ul>



# How WFP “fits” into Planning



Procedure No. PCM-GP-0003

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**MAJOR PROJECTS  
CONSTRUCTION MANAGEMENT**

**FIELD INSTALLATION WORK PACKAGE (FIWP)  
DEVELOPMENT AND CONTROL**

**SUNCOR ENERGY INC.**

**CANADA**

# How WFP "fits" into Planning



## WorkFace Planning

### The COAA Definition of Workface Planning:

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

### Suncor Definition: 6 Degrees of Workface Planning

#### Degree 1 – Planning

The proposed facility is defined and viewed in its entirety. The major facets of the facility are acknowledged and its processes are defined through a system wide focus. Owner representation from Construction, Engineering and Procurement come together to discuss the initial plot plan, general arrangements and viewpoints on project management and execution. Strategically, the first draft of the start-up, turn-over and path of construction plans are struck. There is a possibility of long lead items being secured at this point of time.

#### Degree 2 – Development

The systems view of the facility is decomposed into work packages starting with the definition of Construction Work Areas and then into Construction Work Packages. Definition of the Construction Work Packages begins to fix the scopes for the Field Installation Work Packages. A delivery schedule will be developed for the Construction Work Package development. This too will further define the Field Installation Work Package scopes as well as their delivery schedule. Work will start on the identification of the individual Field Installation Work Packages. The Field Installation Work Packages will be mapped back to their respective facility system. System lists will be dependant on P&ID development. The procurement group will have identified the long lead items and started requests for vendor data and technical information.

#### Degree 3 – Into EDS

From the development of the Construction Work Packages and the identification of the Field Installation Work Packages the supporting Engineering Work Packages and their release schedule is developed. The engineering house(s) will begin work on their technical data allowing for population of the Field Installation Work Packages. Details such as work scope, engineering drawings, engineering specifications, vendor documentation, model captures, work constraints and so forth are available to the development of the Field Installation Work Package. The Field Installation Work Package development is performed by the Suncor Construction Management Team. The Construction Management Team will be responsible and accountable for the mapping of full systems definition to Construction Work Packages and Field Installation Work Packages through Tag and Line numbers. The Construction Management Team also identifies the Workface Planning requirements of the Construction Contractor and places the requirements in the contract language. In the contract it will clearly state the Contractor is required to make use of Workface Planning and the Contractor will progress and receive payment based on Field Installation Work Package Completion.

#### Degree 4 – Ensuring Success

The Field Installation Work Packages are handed off from the Construction Management Team to the Construction Contractor for Completion. The Contractor will complete the Field Installation Work Package with the field and site specific information such as equipment and craft resource loading. All work shall follow the 80/100 rule where:

- Unit overall detailed engineering shall be 80% complete prior to the start of major construction work.
- No work will start in the field on a particular work package until 100% of detailed engineering is available and 100% of the equipment and material required to construct that particular package is available and at site.

The work will also follow the Ready For Fabrication & Construction Rule:

- 100% of the Engineering Work Packages for and construction Category of a process unit or area must be Issue For Construction at least 4 weeks prior to the Issue For Construction issue date of the associated Construction Work Package.
- The Construction Work Package, in turn, will be issued 4 to 8 weeks prior to the required Field Installation Work Package Issue For Construction date to allow time to develop the Field Installation Work Package.
- The Field Installation Work Package will be issued for construction 2 to 4 weeks prior to start of construction, module fabrication for shop fabrication.
- 100% of the material required for and Field Installation Work Package must be at site or have confirmed availability for installation 4 weeks prior to the start of Construction or Shop Fabrication of that category.

#### Degree 5 – Execution

The Construction Contractor uses the Field Installation Work Packages in execution of the erection of the work. The Contractor reports progress via completed Field Installation Work Packages. The Contractor will also invoice and receive payment via completed Field Installation Work Packages. The Contractor will complete the Quality and Turnover documentation as the Field Installation Work Packages are installed.

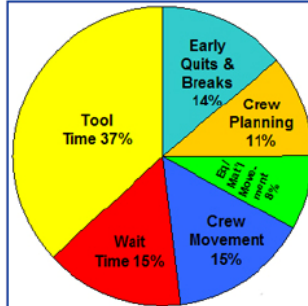
#### Degree 6 – Completion

Upon the completion of the bulk construction Field Installation Work Packages the focus of the facilities construction will return to a systems level view. Field Installation Work Packages will be created to describe the punch out, commissioning and turn over of each system from the contractor to the owner.

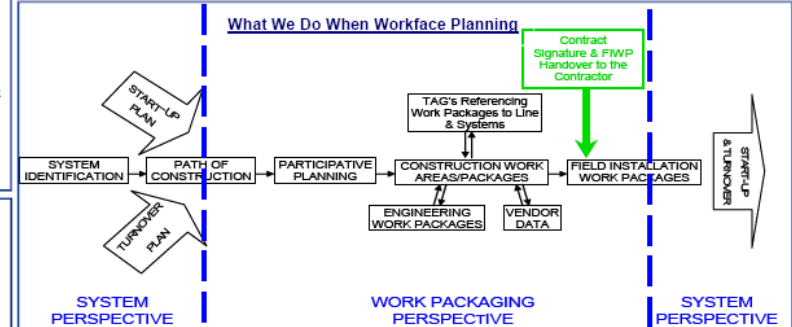
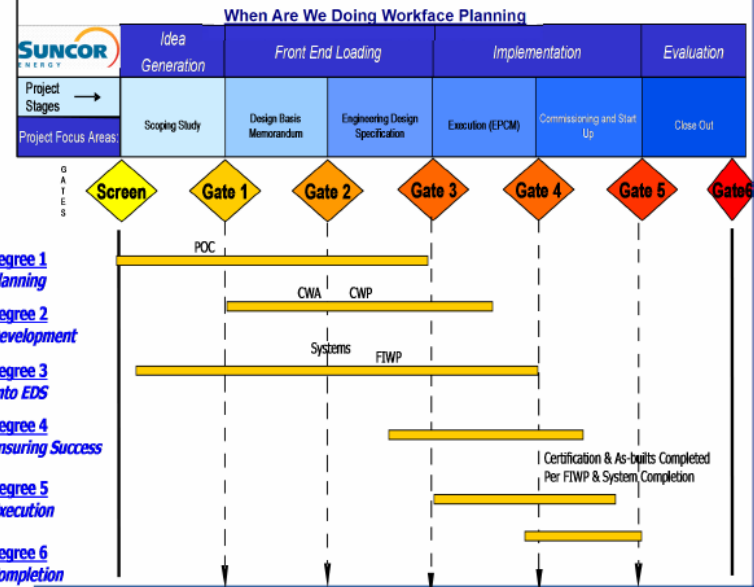
### How Do We Plan To Implement Workface Planning

- Propose to identify a new project where we can apply Workface Planning through its' entirety
- Identify 1 project in EST&D & follow it through with WFP
- Ensure Path of Construction and Participative Planning are executed
- Make sure the system identification and TAG references happen
- Decompose the scope into work packages
- Establish contract requirements (language) for the Engineering and Construction contractors to follow
- Execute, Audit & Support
- Driver:** Progressing & invoicing only to FIWP completion

### The Reason Behind the Implementation of WFP



Productivity on large oil & gas construction projects is typically quite low (about 35 to 40%).



# How WFP “fits” into Planning



## Quick Reference Guide

### WorkFace Planning (WFP)

#### The COAA Definition of WorkFace Planning

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

#### Where to Access WorkFace Planning Information

WorkFace Planning material can be accessed through the sunnet project center > Major Projects > MP Functional Areas > Construction Management

Additionally, you can contact Anthony Van Tol if you have any questions or feedback regarding WorkFace Planning.

[avantol@suncor.com](mailto:avantol@suncor.com)  
403-269-5692

#### Suncor Definition: The 6 Degrees of WorkFace Planning:

##### Degree 1 – Planning

The proposed facility is defined and viewed in its entirety. The major facets of the facility are acknowledged and its processes are defined through a system wide focus. Owner representation from Construction, Engineering and Procurement come together to discuss the initial plot plan, general arrangements and viewpoints on project management and execution. Strategically, the first draft of the start-up, turn-over and path of construction plans are struck. There is a possibility of long lead items being secured at this point of time.

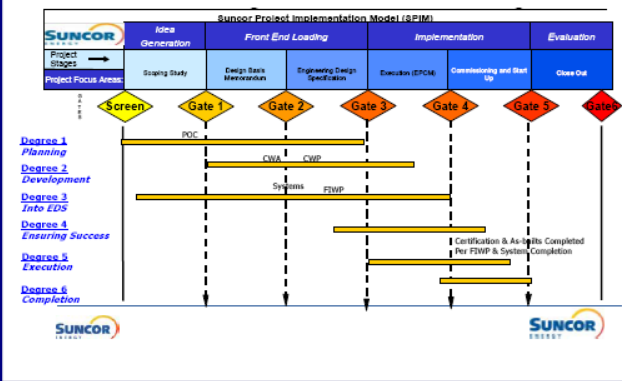
##### Degree 2 – Development

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#### When Are We Doing WorkFace Planning



# Project Implementation

## Front End Planning

- Path of Construction
- CWPs
- WorkFace Planning Contract Language for Engineering and Construction
- Support Contractor development of FIWPs before mobilization to ensure templates are complete and a realistic backlog is created
- Tracking log (ensure their system supports FIWP tracking and reporting)

# Project Implementation

## Engineering

- WorkFace Planning Contract language
- Participate in integrative/participative planning and drive the path of construction with engineering
- Ensure Path of Construction is communicated to Engineering and the EWP Schedule reflects the Path of Construction

## Procurement/Material Management

- Participate in integrative/participative planning and drive the path of construction with procurement
- Ensure procurement plan is also in line with the Path of construction
- Ensure materials management understands WorkFace Planning and releases bagged and tagged items according to the FIWP schedule

# Project Implementation

## Project Controls

- Tracking by FIWP
- Progressing by FIWP
- Paying by FIWP

## Before contractor mobilization to site to check:

- Their WorkFace Plan
- Their FIWP template and backlog
- Number of Planners
- Planners experience
- Constructor CMTs understanding of WFP
- Supporting roles, Scaffold, Material and Equipment Coordinators
- Audit Constructor, Engineer and Project Team

# KEY Lessons Learned

- Owner must change and or develop processes that support WorkFace Planning BEFORE projects start
- Not only must the field level process of WorkFace Planning be implemented correctly but ALL project support services must understand and do their part to support the success of WorkFace Planning
- Training for all project personnel
- Training for all support functions



# COAA Update – Who was missing?

## OLD MODEL

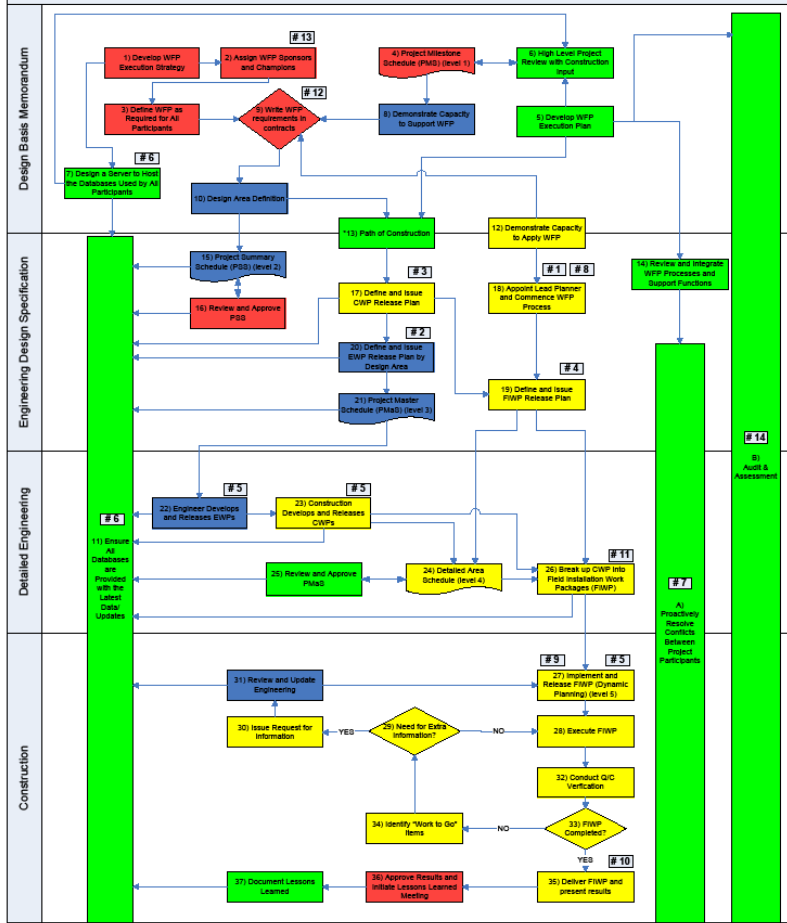
- Owner
- Construction Management
- Engineering
- Construction Contractor

## NEW MODEL

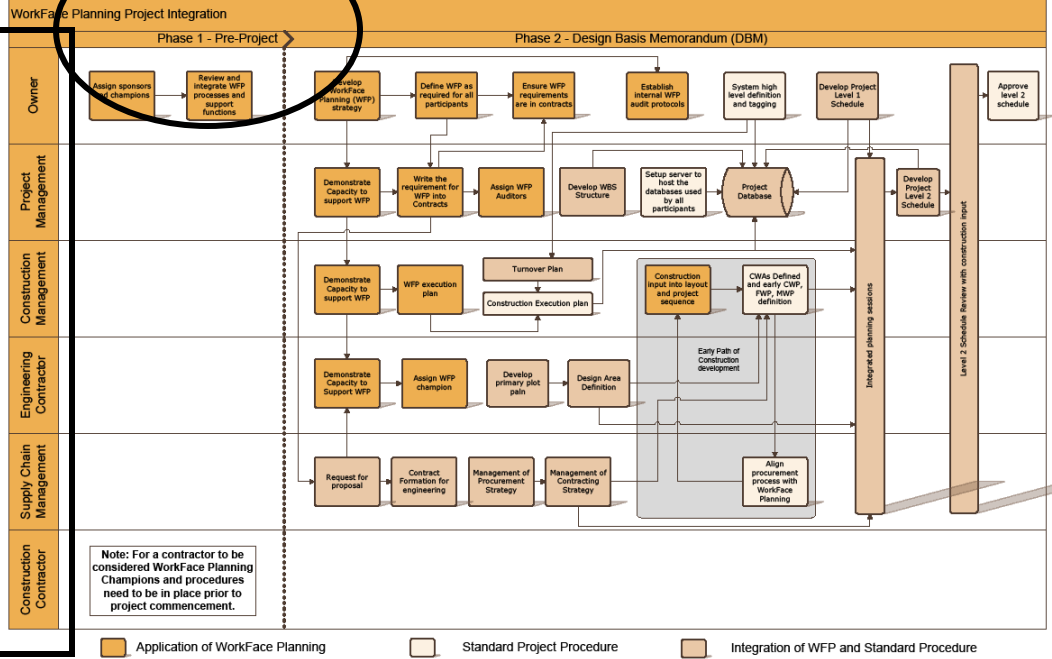
- Owner
  - Operations
- Project Management
  - Project Controls
  - Document Control
- Construction Management
- Engineering
- Supply Chain
  - Contracts
  - Materials Management
  - Procurement
- Construction Contractor

**WorkFace Planning Flowchart:**  
An Example of the Processes that are Involved in WorkFace Planning

Contract is Cost Reimbursable



\*13) Path of Construction activities are led by the Construction Management Team and involves the Construction Contractor, Owner and Engineer. This means the Construction Contractor is engaged in late CD/Early EDC. In the absence of the Construction Contractor the Construction Management Team will take his role.



# Group Activity

What if.....

- Project Controls was not involved in or aware of WFP?
- Engineering doesn't know what the Path of Construction is and how it impacts construction execution?
- Document Control doesn't know what an FIWP is or who needs what information to complete one?
- Contracts doesn't know what WFP is or what the requirements are for Engineering or Construction Contractors?
- Supply Chain Materials Management doesn't know how to bag and tag by FIWP?
- IT didn't know you what WFP software was?

# ***Groups***

<b>1</b>	<b>Information Technology</b>
<b>2</b>	<b>Project Management</b>
<b>3</b>	<b>Project Controls</b>
<b>4</b>	<b>Materials Management</b>
<b>5</b>	<b>Contracts</b>
<b>6</b>	<b>Engineering</b>
<b>7</b>	<b>Document Control</b>
<b>8</b>	<b>Owner</b>

# Objective

- Top 3 consequences of your group not being aware of WorkFace Planning...What if?
- Share with the rest of the groups
- You have 10 minutes.



# What's Next for Suncor?

- A Task Force
  - to make sure we “connect” to all the stakeholders and support functions
  - to ensure we have a common understanding and commitment
  - to scope what process changes are required
  - to action an implementation plan that will effectively implement WorkFace Planning into Suncor processes, standards and procedures to reflect our unique owner needs and clearly define integration requirements, roles and responsibilities, procedures, process training and metrics.

# Partial Commitment



Partial Results

**Thank You!**



# **CASE STUDY of WORKFACE PLANNING**

Rachelle MacNeill

Construction Engineer, Shell Canada

COAA WFP Committee

Linda Clary

Construction Planning Manager, Suncor Energy

COAA WFP Committee

# SESSION OVERVIEW

Lessons from implementation on real projects

Shell: Mid-size projects

Suncor: Larger projects

- “What-if” session: effects of lack of awareness by specific groups



# WorkFace Planning for Mid-Size Projects

## Lessons Learned

Rachelle MacNeill

Construction Engineer

Shell Canada Energy

Sept. 20, 2011

# WorkFace Planning – Lessons Learned

- Goal: Improve Productivity at the WorkFace




- Realized benefits on Cost/Schedule, Quality & Safety with ongoing projects
- Lessons Learned along the way.....

# Outline

- WorkFace Planning – Current Status
- Types of projects to implement WFP
- Focus Areas
- Lessons
  - Owner Roles
  - Front-end Preparations
  - Construction Scope of Work / Contractual Requirements
  - Safety
  - Organization & Support
  - Training
- Benefits Realized

# Shell Canada Energy – Project Divisions

- Major Projects (>500 Mln\$)
  - Incorporating WFP
  - Leveraging COAA and systems of EPC/Construction Contractors.
  - No 'Global' guideline developed for WFP
-  ■ Onshore Projects (<500 Mln\$)
  - Range of Complexity & Size
  - <\$10M to \$200-\$300M+
- Site Projects (smaller, less complex)

# Onshore Projects – Incorporating WFP

- Onshore Projects
  - <500 Mln\$
  - Range of complexity & risk
    - a) One-off (tailings, infrastructure, pilots, plant mods etc.)
    - b) Field Development ( gas plants, pipelines, compressor stations)
    - c) Small, Repeater Projects (e.g.wellsites)
- “Right-Sizing” WFP model to fit the size/complexity of the project.
- Improving key Supporting Deliverables in the Front-End

# WorkFace Planning - Implementation

- Begin with the End in Mind
  - System turn-over drives Construction
  - Construction drives Engineering & Procurement



- EWPs are Engineering deliverables
  - CWPs & FIWPs are **Construction** deliverables
- WFP Model is process based with:
  - Organizational Framework
  - Rules & Process Flowchart
  - Templates, Tools, Tracking & Reporting



## Current Status – WFP Uptake

- Different uptake, understanding and capacity across our businesses wrt WorkFace Planning.
- WFP Procedures developed for each project/development area
  - Builds on COAA guidance
  - Shell specific requirements (Safety, QC, tracking/reporting & audit)
  - Include Front-end requirements, precursors to FIWPs.
- Improve on key pre-requisites:
  - EWPs – Engineering Work Packages (Engineering Deliverable)
  - CWPs – Construction Work Packages (Construction Deliverable)

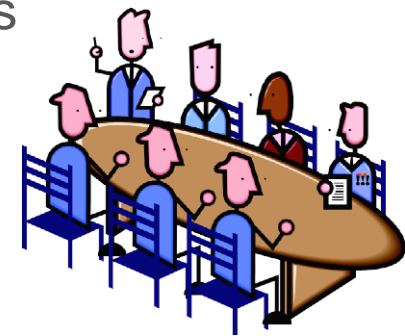
# Lesson: Owner Involvement and Leadership

- Owner involvement and leadership is key
- Owner needs to understand WorkFace Planning model and front-end support requirements.  
(don't **just** refer to the COAA website & walk away



- Engage Engineering and Construction Contractors as early as possible to address WorkFace Planning needs

- Owner Facilitated “Workshop” Sessions

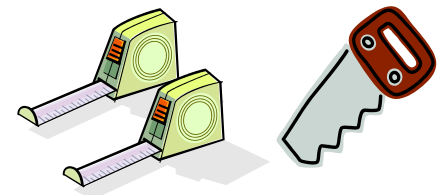


- Start with manageable steps....



# Lesson: Clearly Define Path of Construction & Methodology

- Owner has primary responsibility in developing the Path of Construction or Construction Sequence.
- Input from disciplines & contractors
- Incorporates various constraints (seasonal, environmental/regulatory, procurement etc.)



# Lesson: Understand Engineering Work Packaging vs. Construction Work Packaging

# CWP



Engineering

Procurement

Construction

# CWP

## Engineering

- Scope of Work
- IFC drwgs
- Eng.Specs&Stds
- Equipment/Materials
- Vendor info
- Quality Instructions
- Regulatory approvals/permits
- Turnover Documents
- Schedule (Level 3)

## Procurement

- Long Leads
- RAS dates
- Material Mgmt
- Expediting
- Transportation
- Special Requirements

## Construction

- HSE/Safety
- Manpower req.
- Level 4 Schedule
- QA/QC
- Construction Tools/Equip
- Heavy Lift Plans
- Scaffold
- Waste Mgmt
- Interfaces/Coordination

# Lesson: Quality Engineering Work Packages (EWP)

- **Workshop** with Engineering contractor to clearly specify content and quality for EWPs.
- Set expectations around EWP release plans:
  - Aligned with the Construction Sequence
  - Contracting strategy incorporated
  - Preliminary-EWP release to construction
- Tracking and Reporting on EWP progress
- KPIs for EWP completion & quality

# Lesson: Quality Construction Work Packaging

- Prior to mobilization, Construction contract awarded, hold an engagement session with:
  - Owner (PM/PE, HSE, CM, C&P, PS etc.)
  - Engineering firm
  - Construction contractor...to clearly specify **content** and **quality** for CWPs
- Build upon EWPs incorporating:
  - Safety, Quality Control, Manpower estimates, Scaffolding, Special construction equipment etc.
- Set expectations around interface with Engineering, preliminary-EWP release, and CWP development and release plans.
- Understand & agree on tracking/reporting & KPI requirements

## Lesson: Construction Scope of Work includes WFP

- As part of the bid process, include specifics on requirements for WorkFace Planning in the Scope of Work.
- Refer to **COAA** website, BUT....don't stop there.
- Company/Project specific expectations include:
  - Organization, including Roles & Responsibilities
  - CWP content & quality
  - FIWP content & quality
  - Tracking & Reporting, including KPIs (e.g. FIWP backlog req'm)
  - Audit Requirements
  - Sub-Contractor requirements



# Lesson: Safety details for Field Installation Work Packages

- Construction Practices/Procedures (CPPs)
  - SimOps review for Construction
  - Catalogue of required CPPs (ID and Develop early)
- Sufficient detail in each Job Hazard Analysis (JHA);  
Reference in FIWPs



# Lesson: WorkFace Planning Organization

- Ensure sufficient planners have been assigned to the project
  - WFP Lead
  - Enough of the right Planners
  - Adequate competency



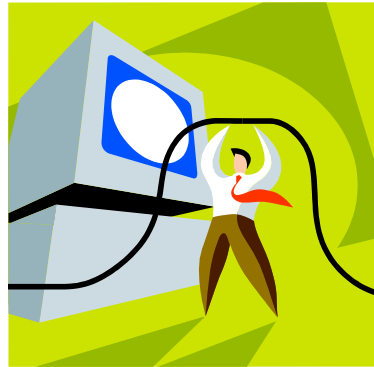
- Ensure planners are brought on board in time & trained in the systems/tools required.



- Minimize Turnover of Planning staff
  - Better understanding needs, roles & responsibilities

# Lesson: WFP Support Requirements

- Ensure sufficient support is provided including:
  - Planners sit together in the same trailer
  - Admin & data entry
  - Document control
  - Tools in place (databases, 3D models etc.)



# Lesson: Training

- Training for Owners Team
- Training for Construction Contractors
  - Supervisors, GF, Foreman on WFP fundamentals
- Training for Sub-Contractors
  - Understand WFP fundamentals
  - Specific requirements for project (QC, tracking, reporting etc.)



# Lesson: Benefits are Real

- Foremen are getting more time with the crews
- Direct impact on productivity
- More predictable Cost & Schedule
- Better morale, less frustration
- Improved Safety performance



# Summary

- Right-size for Mid-size projects
- Owner has a key role in driving WFP
- Front-End preparations
- Contractors are aligned
- Clarity in Contracts & Construction Scope of Work
- Staff Owner and Contractor organizations adequately to support WFP (capacity & competence)
- Safety is adequately addressed in work packages
- Support is in place (admin, hardware, software, DCC)
- Training
  
- **Realize Benefits**

Thank-you





# Work Packaging Versus WorkFace Planning

COAA WorkFace Planning Conference  
September 20, 2011

Tannis Liviniuk, Cenovus Energy  
Scott Wilson, JV Driver







# Welcome

- Introductions
- Today's objective
- Yeah No



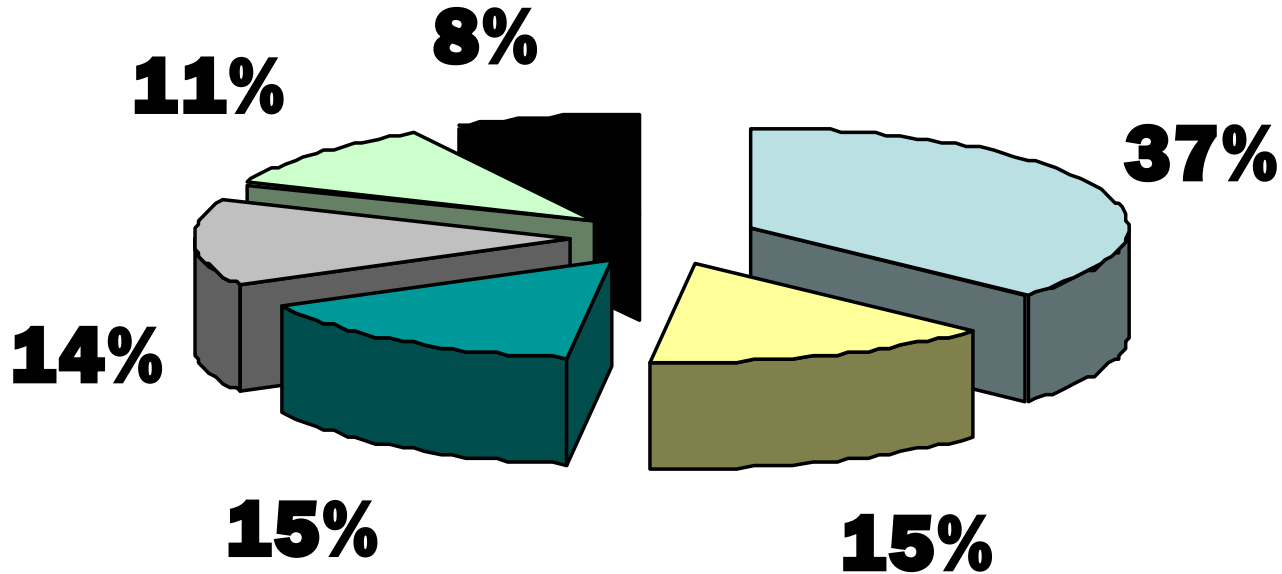
# What is Work Packaging?

- Work packaging is the division or breakdown of Construction Work Packages (CWP's) into smaller manageable chunks of work
- Primarily discipline specific
- Often completed by the General Foremen
- Simply sequenced
- Little or no interdependent planning between trades to sequence work
- Not a controlled document (exist as field packages)

# Why Package Work?

- It is difficult for Foremen to execute a CWP in its entirety due to the large scope and many possible execution strategies
- Crew productivity averages 35-40% time on tools
- Allows a definitive breakdown of manageable work 'chunks'
- CWP's are sometimes incomplete / unclear, therefore packaging identifies missing documentation / information
- Allows the General Foreman to sequence packages rather than tasks
- Provides an easy to use collection of required drawings for crews

# Average Crew Activity Time



**Tool Time**  
 **Crew Movement**  
 **Crew Planning**

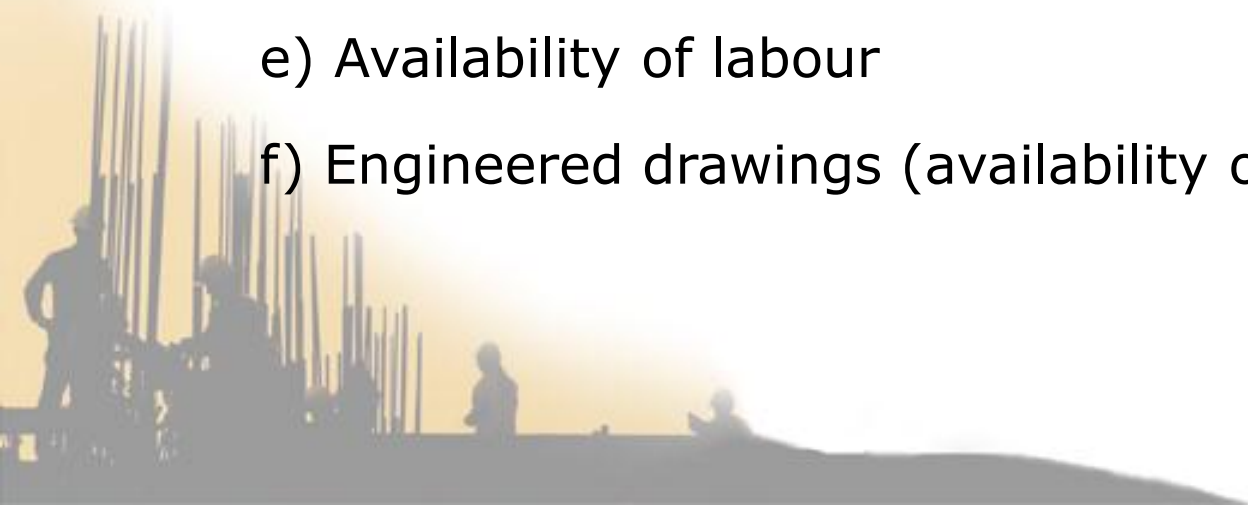
**Wait Time**  
 **Early Quits / Breaks**  
 **Eq/Mat Movement**

# Concerns with Work Packaging

- There is often little or no sequencing of work packages
- Often these packages are not integrated with schedule sequencing (disconnected from project controls)
- Rarely reviewed and signed off by foremen, quality control or HSE personnel
- Order of issue may not reflect the path of construction
- Not easily progressable
- Little or no focus on constraint satisfaction
- Minimal traceability

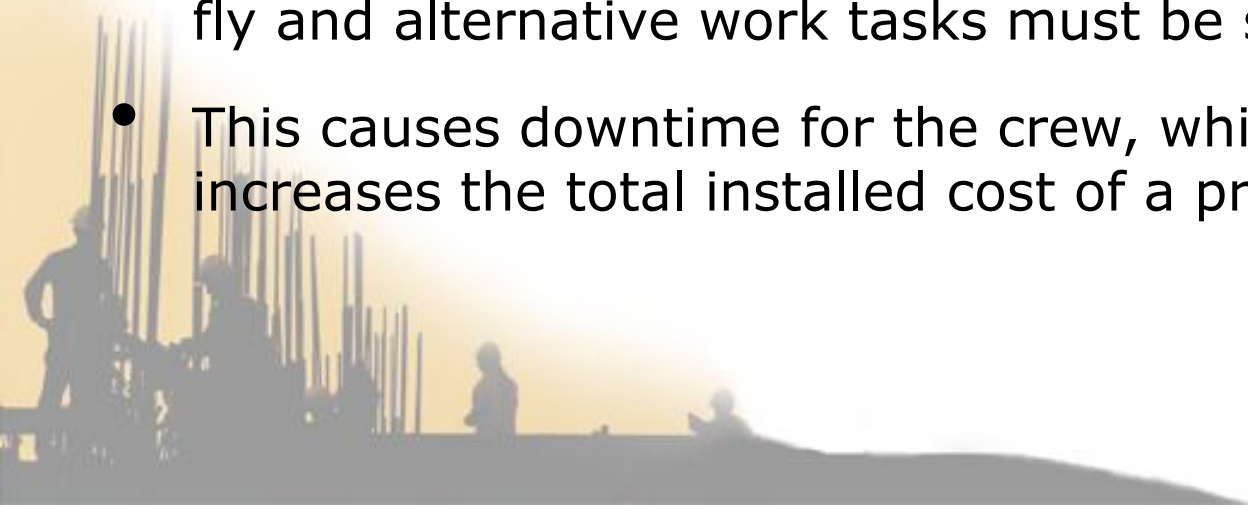
# Audience Question

- The most difficult constraint to manage on our projects has been:
  - a) Material availability
  - b) Work force density / Access to area
  - c) Scaffold completion
  - d) Availability of equipment
  - e) Availability of labour
  - f) Engineered drawings (availability or revisions)



# Material Management

- Work Packaging places little emphasis on managing constraints, including materials
- Although the package has been issued to the foreman, rarely has anyone verified that the materials are all available.
- This places the burden on the foreman to verify the availability of materials.
- If the materials are not available, plans must change on the fly and alternative work tasks must be sourced.
- This causes downtime for the crew, which inevitably increases the total installed cost of a project.



## Did you know?

***"A \$2.5 billion mega-project in Alberta required 3.5 million person hours of engineering and 15 million construction hours. Between 40,000 and 50,000 design drawings and 10,000-20,000 vendor and shop drawings were also needed."***

***~ Colwell, 2008***





# Documentation Management

- Work Packaging inherently limits efficiency in managing drawing revisions or additions.
- As these packages are not controlled, and there is often no master copy of the package, document management becomes difficult and untraceable.
- Revisions may be released and not make it to the field
- This creates the potential for extensive amounts of rework





**COAA**  
Construction Owners  
Association of Alberta





# A Comprehensive Approach

- FIWP's are electronically packaged early in engineering (EDS)
- FIWP's are packaged according to an FIWP release plan developed at the end of the DBM stage
- This plan is developed to reflect that path of construction developed during DBM
- The path of construction is determined early to ensure alignment with the path of engineering
- Constraints are constantly monitored, and if cannot be satisfied tasks may be moved to another FIWP
- Package content is vetted by construction teams and stake holders



# FIWP's & Project Management

- Stake holders include; Safety, Schedule, Project controls, QAQC, Turnover, Hydro Testing, Materials, Change management, Construction Management and Document Control
- During FIWP development BOM's are created based on drawings and details and issued to the materials group by the construction coordinator/Workface planner
- The BOM's are utilized to gather, bag and tag materials per FIWP
- Confirmation of material availability is then sent to the WorkFace Planning group
- Tasks within an FIWP may be redistributed if material availability does not support the FIWP release date
- Release of the FIWP complete with IFC drawings is based on being ready

# Differences

## **Work Packaging**

- No requisite mhrs
- Not integrated with project controls
- Not monitored and controlled for progress
- Contains engineered drawings and other documentation from the CWP

## **WorkFace Planning**

- 500 – 1000 man hours
- Integration with project controls
- Monitored and controlled
- Contains all documentation that a foreman requires to complete the work

# Differences

## Work Packaging

- Material not controlled to package
- Packages are often built without planning for contingencies
- Packages built by Foreman or General Foreman

## WorkFace Planning

- Materials bagged and tagged per FIWP
- Contingency packages are built to cover plans B & C
- FIWP's built by dedicated WorkFace Planner with General Foreman
- Completed FIWP's are transferred to QAQC Complete with Red lines





# Audience Question

- Does your organization utilize:
  - a) Work Packaging
  - b) WorkFace Planning
  - c) Both systems on different projects
  - d) Other
  - e) I am not employed with an organization that executes construction projects





# Audience Question

- Does the method you utilize depend on the project size?
  - a) Yes
  - b) No
  - c) We only use one method
  - d) We don't use either method





# Audience Question

- What roadblocks does your organization face in the use of a work packaging or workface planning system ?
  - A) Good Ol' Boy mentality – we've done it this way for 30 years, why change it?
  - B) Unmanageability of package monitoring and control
  - C) Shortage of skilled trades people to package work
  - D) Lack of information sharing
  - E) Undefined or poorly defined packaging processes
  - F) Poor training of craft / supervision / management
  - G) Engineering revisions

# Audience Question

- The most significant benefit that I feel may be achieved by my organization through the use of WorkFace Planning is:
  - a) Increased craft productivity
  - b) Improved safety performance
  - c) Better morale within supervision
  - d) Better efficiency of integrated systems
  - e) Better organizational collaboration

