Building Work Packages
Session Format

• Introduction
• Overview of the COAA approach to building Work Packages
• The Graham approach to building work packages
• The JV Driver approach to building work packages
• The Ledcor approach to building work packages
• Audience participation
• Questions to panel
What is in an FIWP?
The COAA Approach to Building Work Packages

Field Installation Work Packages (FIWP)

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<th>3D Coversheet</th>
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<td>Coversheet</td>
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<td>Contents</td>
</tr>
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<td>Work Scope</td>
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<td>EH&amp;S Introduction</td>
</tr>
<tr>
<td>Page 6</td>
<td>EH&amp;S site info</td>
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<td>Page 7</td>
<td>QA / QC Requirements</td>
</tr>
<tr>
<td>Page 8</td>
<td>Tools and Consumables</td>
</tr>
<tr>
<td>Page 9</td>
<td>Check List</td>
</tr>
<tr>
<td>Page 10</td>
<td>Scaffold Request</td>
</tr>
</tbody>
</table>

Attachments
- Technical Documentation
  - ISO List
  - Spool List
  - Drawings
- Material Forecast
- Score Cards
  - Spool Score Card
  - Weld Score Card
- 3D Model Shots
- Other
  - Lessons Learned
  - Notes
The COAA Approach to Building Work Packages

• Who develops the FIWP?

• FIWPs are developed by dedicated planners (crafts people or engineering types with construction experience).

• Note: In some cases General Foremen or superintendents may develop the FIWP.
The COAA Approach to Building Work Packages

• How big is an FIWP?
  - Normally 500 to 1000 hours (but varies based on discipline and work being done)
Can you use an FIWP that doesn`t have satisfied constraints?

- Not normally, but you can modify the package to ensure that the new package has satisfied constraints.
• What are FIWP built from?
  - Typically FIWPs are developed from Construction Work Packages but we are seeing FIWP developed directly from Engineering Work packages
The Graham Approach to Building Work Packages

Traditional execution:
The Graham Approach to Building Work Packages

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

Scope
- Drawings
- Planned Value
- Schedule Dates
- Material Confirmation
- Construction Equipment
- Scaffold Requirements
- Safety
- Quality Control
- Labour
- Permit
- Requirements
The Graham Approach to Building Work Packages

Workface Planning Applied to Earthmoving
The Graham Approach to Building Work Packages

**Workface Planning Applied to Earthmoving**

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

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

Wedding Scenario:
The JV Driver Approach to Building Work Packages
The JV Driver Approach to Building Work Packages

- FIWP Stakeholders
  - ✓ Planners are in the Field
  - ✓ Extract components to build the FIWP
    - HS&E
    - Quality
    - Project Controls
    - Schedule
    - Material Management
    - Document Control
The JV Driver Approach to Building Work Packages

- FIWP Stakeholders
  - Planners are in the Field
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    - Quality
    - Project Controls
    - Schedule
    - Material Management
    - Document Control
The JV Driver Approach to Building Work Packages

- TCCC (Turnover, Care, Custody and Control)
  - FIWPs are returned Certified Complete
  - Red Line Drawings
  - As Built Drawings
  - Construction Punch List
  - Signed and Completed ITPs
  - Confirmation of Construction Complete
  - Precommissioning
The Ledcor Approach to Building Work Packages

Building Foreman’s Workface Packages
Question-and-Answer Period
NOTE: The information collected is anonymous and may be used for research purposes. By participating, you are giving your consent for the use of this data.
Closing Comments

- Thanks for attending this session and providing us with your feedback

- If you have any further questions for any of the speakers please ask us after the session
Introduction to FIWP Planning

"Plan the Work"  "Release the Work"

Dedicated Planner

Materials & Equipment Coordinators

Field Installation Work Package

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

"Work the Plan"

Supervisor

Prerequisites

Scope

Team

Tools

Ready ✓

37%

47%

Tool Time Improvement
The goal of Workface Planning is to improve performance by:

- Develop a usable and practical standard planning tool to significantly increase productivity, reduce rework and enhance the probability of project success
- Create and maintain discipline and foster honest communication to proactively resolve issues before and as they arise
- The FIWP process will be a continuously improving body of knowledge
- Based on the COAA Best Practices
A Field Installation Work Package is a comprehensive package of Information that describes a specific scope of work in detail and typically includes:

- Safety & Quality considerations
- Discipline Drawings
- Material requirements
- Inspection & Test Certification
- Estimated number of man-hours
- Schedule
- Additional information…(To benefit the construction/implementation team.)
Design Area(s) are broken into a series of Construction Work Pkgs (CWP)

- CWPs are agreed to with Engineering prior to construction
Packaging Work for FIWP’s

1st Step (Typically determined by area)

2nd Step

Level 3 - Disciplines

CWP
CWP
CWP

3rd Step

Estimate & Manhours

Areas

Level 4

FIWP’s

Level 5

FIWP Step Listing

Task

Task

Task

Task

Task
Foreman’s Workface Package Preparation Guiding Principles

• Keep it SIMPLE

• Practical and User Friendly

• Understandable

• Standardize Tools

• Continuous Improvement
Packaging Work for FIWP’s (cont’)

4th Step Create FIWP

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

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

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

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

• Piping
• Mechanical
• Instruments
• Electrical
• Civil/Structural
• HVAC
• Job Cards / Activity Sheets
• Joint Completion Matrix
• Lifting Requirements
• Engineering Queries
• Hydro/ Integrity Testing
  • Planning
4.0 Drawings & Data

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

Material Requisitions

- Piping
- Mechanical
- Instruments
- Electrical
- Civil/Structural
- HVAC
FIWP - SmartPlant Materials Integration

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

## BOM Summary Status Report

<table>
<thead>
<tr>
<th>Forecast Code</th>
<th>Run Number</th>
<th>Short Desc</th>
<th>Description</th>
<th>Type</th>
<th>Job Status</th>
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<td>Tier 1</td>
<td>Batch 5 Tier 1</td>
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### Issue Status

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<td>0</td>
<td>0</td>
<td>Only inventory</td>
<td>2-Pass Optimized (Any)</td>
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<td>Only inventory</td>
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### Assigned Warehouses

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<tr>
<th>Order Seq</th>
<th>Warehouse</th>
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<tbody>
<tr>
<td>1</td>
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<td>Mod Yard Warehouse 1</td>
<td>Mod Yard Warehouse 2</td>
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### List of Work Packages

**Prior# 1**

**Work Package: 9311-14-51**

**Total BOM’s: 10**

**Total 100% Issued: 0**

<table>
<thead>
<tr>
<th>BOM Path</th>
<th>Issue Progress</th>
<th>% Issued</th>
<th>Total List Qty</th>
<th>Total Allocated Qty</th>
<th>Actual Resv Qty</th>
<th>Total Issued Qty</th>
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</table>

**Reported by FIWP Package at Isometric Level**

**List of all Lines that are available to begin construction**
6.0 Inspection & Test Certification

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

- Operating Manual Updates
- Maintenance Routine Updates
8.0 Additional Information

- Procedures/ Work Instructions
- Specifications
- Miscellaneous Data
- Weight Control
- Vendor Data
- Other Data
FIWP – Release The Work

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

- Generate CWP
- Develop execution methods & scope (trade mix)
- FIWP Issued for Construction
- Sub-System Completion records

- Engineering
- Construction Planning
- Construction Execution
- Handover

- HAZCON requirements
- Method Statements
- Risk assessments
- Resource/Planning
- I & T Certification

- Ledcor’s Project Controls Systems

- Hyperlink

- Engineering Deliverable Listing

- System Completion records

- Hyperlink
SUMMARY

The Ledcor Group…Workface Planning to improve performance by:

- Planning using Practical methods
- Making the “Bar” clear
- Creating discipline
- Proactively resolving issues
- Significantly increasing productivity
- Reducing rework
- Continuously Improving
How Big is an FIWP Package?

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

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

First pipe module being set at U&O silo
Oilsands SAGD Expansion
Setting OTSG Stack
DIAMOND MINE – Structural Steel
Central Processing Plant – PIPERACK MODULES
HEAT TRACING
Progress Monitoring and Control of FIWPs
Field Installation Work Package (FIWP) Planning Interfaces

- MC2 Estimate
- Smart Plant 3D Design
- P6 Schedule
- QA / QC NDE Welder Log
- ToolHound Tools & Equipment
- SmartPlant Materials
- FWP Plan
- FWP Progress
Foreman’s Workplace

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

PIPE
- Area
- CWP / EWP
- FIWP
- Line
- ISO
- Spool
- Installation Progress

CONCRETE
- Design Area
- CWP / EWP
- FIWP
- Foundation
### Scorecard Components

#### Concrete:

<table>
<thead>
<tr>
<th>Item ID &amp; Hrs</th>
<th>Description</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
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<td>435.5 MD (212) N/S Elev Beam-West 233428 23A</td>
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<td>10 LCC33408-C</td>
<td>1,287.2 MD (244) Complete E/W South 233428 23A</td>
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<td>15 LCC33408-C</td>
<td>789.8 MD (225) Elev Beam Central 233428 23A</td>
<td></td>
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</tbody>
</table>

#### Piping:

<table>
<thead>
<tr>
<th>Item ID &amp; Hrs</th>
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<tbody>
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<td>15 LCC14290-A</td>
<td>81.9 321-7 142 FDX 12 142-9W1071 315</td>
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</tbody>
</table>

- Itemized scope of work
- Schedule IDs
- Estimate MHs
- Area/System/EWP/Line#/Iso#/Priority/etc...
- Activity steps
• Sort and filter immediately by any column
• Edit information directly on screen
• Progress activities by percentage complete
• Progress by standard sets of activities in a step-by-step manner
Construction to Production

FWP Seamless Transition...

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

FWP ADVANTAGE
- Can switch between Standard and System Sorts on the fly
Construction to Production

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