AWP: The Silver Bullet for Solving Productivity Problems on Projects?

Jim Rammell, Wood Group Mustang

Panel Discussion
Introductions

Wayne Crew, Director, CII

Bill O’Brien, Associate Professor, The University of Texas at Austin

Jim Rammell, VP Construction Operations, Wood Group Mustang

Glen Warren, Workface Planning Committee Co-chair, COAA
Discussion Panel

• **Moderator:** Jim Rammell

• **CII & COAA Research on Productivity:** Wayne Crew

• **Recent RT272 & RT319 Research Overview:** Bill O’Brien

• **AWP / WFP Applications from the Field:** Glen Warren

• **Wrap Up / Q&A:** Jim Rammell / All
Where We Are...
Summary Benefits

• Productivity

• Predictability

• Safety

• Quality / Reduced Rework

• Alignment / Communication
CII and COAA Joint Effort
Wayne Crew
CII & COAA Research on Productivity

- How does this fit into FEL?
- Also 252, 215, last 5 years of effort
- Holistic approach, 272/319 fits into theme
- Alignment thermometer, front end planning
- AWP fits in here & here, connects the dots through capital project life cycle
Where We Are . . .

ADVANCED WORK PACKAGING

Project Setup → Interactive Planning → CWPs EWPs

WORKFACE PLANNING

IWPs

Front End Planning
Detailed Engineering
Construction Commissioning Start Up
CII and COAA Joint Effort
Bill O’Brien
AWP: So what’s really new?

- We **KNOW** Front End Planning helps projects
  - Statistics, logic, case examples
- AWP is the extension of FEP across the project lifecycle
  - People, processes, tools
- AWP promotes success at the work front
  - Provides pre-requisites for effective short-interval (field) planning
- AWP is a disciplined process to overcome problems resulting from a fragmented and specialized industry
  - Two key ideas: (1) CWP/EWP definition; (2) Role of WorkFace Planners
Documented Benefits

- 25% productivity improvement
- 10% decrease in total installed cost
- Greater schedule & cost certainty
- Improved safety performance
- Improved quality
- Improved contractor profitability
- Improved stakeholder alignment

\[ \textit{multiple case studies} \]

- \textit{No silver bullet – achieving the benefits takes work!}
- \textit{But no reason to wait…}
Preliminary Statistical Results

Compared to poor AWP implementation, effective implementation shows

- 30% increase of Safety performance
- 20% increase in Quality performance

AWP drives **Project Cost and Schedule Predictability**

(25% explanatory power)

Small sample, but robust results from statistical analysis.
The math for the business case:

X% increase in field productivity x %field labor of TIC

= % decrease in TIC

→ 25% field improvement x 40% field costs =

10% decrease in TIC

• Field studies show tremendous opportunity for improvement in tool time on almost all projects.
• Small improvements pay for up front costs.
Why can you trust the research findings?

Multiple Sources of Evidence
- Case Studies
- Expert interviews
- Workshops
- Surveys
- Team deliberation
- External review
Main areas of Enhancement:

- Project definition
- Construction & engineering planning
- CWP & EWP boundary development
- IWP and workface planning capability/discipline
STAGE I
Preliminary Planning/Design

Project Definition
- Define Overall Scope of Work/Project
- Define Contracting and Procurement Plan
  Define Construction Sequencing
  Technical Deliverable Requirements
  Levels of Design

Construction Planning
- Plan for Work Packaging
  Refine Contracting Plan
- Plan for Procurement and Logistics
- Identify Site/Project Constraints
- Consider Weather Risks
- Deliver Construction Plan
- Consider Temporary Structures/Utility Requirements
- Consider Options for Construction Equipment
- System Turnover Sequence

Engineering Planning
- Plan for Work Packaging
  Review Contracting Plan
  Review Sequence of Construction
- Review Project Definition Deliverables
  Review Procurement Plan
  General Arrangement / Plot Plan
  Technology Plan

CWP Boundary Development
- Plot Plan or General Arrangement Drawings
- Construction Plan
- Contracting/Procurement Execution Plan
- Sequence of Installation
- Trades People Available
- WBS
  Geographical Layout of Systems/Areas
  Materials of Construction
  Client/Contractor Contract Milestones
  System Turnover Sequence

Refine Schedule & WBS Development
- Preliminary IWP release plan
- Level 2:
  E > by discipline
  P > by commodity
  C > by discipline

EWP Boundary Development
- Consideration for Modular Construction
- Consider Construction Feedback
  Define EWP Standard
KEY BARRIERS TO AWP/WFP IMPLEMENTATION

FROM 2012 WORKSHOP - SELECTED INDUSTRY EXPERTS

• STAKEHOLDERS DON’T BELIEVE BENEFITS
• STAKEHOLDERS THUS DON’T “BUY-IN”

SOLUTION - REQUIRE MORE CASE STUDIES
CASE STUDIES

DOCUMENTATION OF CASE STUDIES IS GROWING

2 REPRESENTATIVE EXAMPLES

• ALASKA

• ALBERTA OIL SANDS
WHY IS WFP PRODUCTIVITY NOT CONSISTANT

• FRONT END DELIVERABLES
  – NOT COMPLETE
  – NOT DELIVERED IN RIGHT SEQUENCE
PLANNED PATH OF CONSTRUCTION PROCESS

- Issued IFC
- Engineering Produces Bill of Material
  - Engineering Work Package (EWP)
  - Procurement Package (PP)
  - Supplier Equipment &/or Material
- 8 week lag
- Work commences
  - Construction Work Package Executed Using IWPs
  - Equipment/Material arrives prior to work starting
MOBILIZATION OF CONTRACTOR

FORECAST COMPLETION

ENGINEERING WORK PACKAGE (EWP)

PROCUREMENT PACKAGE (PP)

SUPPLIER EQPT &/OR MATERIAL

8 week lag

MOBILIZES RESOURCES

CONSTRUCTION WORK PACKAGE EXECUTED USING IWPs
PLANNED PATH OF CONSTRUCTION PROCESS

ENGINEERING WORK PACKAGE (EP) ➔ Issued IFC ➔ CONSTRUCTION WORK PACKAGE EXECUTED USING IWPs

PROCUREMENT PACKAGE (PP) ➔ SQUEEZES LAG ➔ SUPPLIER EQPT &/OR MATERIAL

CONTROL THIS INTERFACE

Work commences
IMPROVE EWP DELIVERY PREDICTABILITY

• EWP READINESS REVIEW (TIMELY) – INCLUDE SCM
  – CHAMPION DESIGNATED FOR EACH EWP
  – ROLES AND RESPONSIBILITIES FOR EWP DEVELOPMENT / UTILIZE CHECKLISTS
  – ENSURE EQUIPMENT / INSTRUMENTS / MATERIAL CAN BE TRACKED TO EACH INDIVIDUAL EWP
  – VENDOR DATA REQUIREMENTS EMBEDDED IN CONTRACT
  – RULES OF CREDIT
LESSONS LEARNED

• IMPLEMENTATIONS AREN’T EASY

• NEED MANAGEMENT SUPPORT (Note – plan to use DTE Energy as Example – from CII 2113 AGM)

• THE RESULTS ARE DIRECTLY RELATED TO THE EFFORT INVOLVED
IS THIS “THE SILVER BULLET”

• IT NEVER WILL BE UNLESS YOU HAVE THE “GUN” TO PUT IT INTO ACTION.
Wrap Up / Q&A

• Implementation Resources, more at rest of conference
• Additional discussions thru conference
Maturity Model
Resources

CII/COAA AWP Implementation Resource IR 272-2

✓ 400 pages of guidance, tools, and templates