Advanced Work Packaging
IMPLEMENTATION

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Advanced Work Packaging

AWP Definition

- AWP is the back-to-front project planning and execution process for defining, aligning, sequencing and pacing the execution of E-P-C packages that allows Clients’ facilities to be designed and built more predictably and add more value to our Clients than our competitors.

AWP Goals

- The three goals we seek to achieve by implementing AWP are:
  1) Align, sequence and pace engineering and procurement with construction to improve safety, productivity, schedule and cost performance on E-P-C projects.
  2) Minimize overall E-P-C duration to allow revenues from the Owner’s completed facilities to be generated as early as possible.
  3) Achieve the targeted project results more predictability with no surprises.
AWP Impact On Project Execution

In addition to the financial impact of AWP on the Client’s business, the back-to-front alignment, sequencing and pacing of E-P-C execution results in:

- Reduction in field rework and its resulting delays because work in each field installation package is completed “right the first time.”

- Lower exposure to construction safety risks because of missing materials and the need to execute field work in multiple passes.

- Higher productivity in executing engineering, procurement and construction activities due to avoiding non-productive work and delays caused by lack of data and other prerequisites needed to complete the work in one pass.

- Faster execution of the work with lower E-P-C execution and time-based indirect costs.

- More predictable completion of deliverables, on-budget performance, and the on-time delivery of the project as a whole.
AWP Process is Organized into 4 Steps

- **STEP 1** – Defining the Voice of the Customers
- **STEP 2** – AWP Definition
- **STEP 3** – EWP and PWP Execution
- **STEP 4** – FIWP Execution
AWP STEP 1 – Defining the Voice of the Customers

- This step focuses on identifying the criteria that will serve as the prioritization parameters for the project. Key steps include:

  1. Understand the Client and Jacobs business drivers.
  2. Define project scope and system completion and turnover requirements and priority.
  4. Identify required specialty construction items (Specialized Critical Lifts, Logistic Restrictions, etc.).

- Optimal Execution Timing: JSTEP – Phase 2: Conceptual Design
AWP STEP 2 – AWP Definition

- This step partitions the work scope into Engineering, Procurement, and Construction Work Packages. Key steps include:

  1. Define Construction Work Areas within the plot plan.
  2. Categorize Work Areas as modular or stick-built.
  5. Define Procurement Work Packages (PWP).
SAMPLE CWA and CWP Structure

- UNDERGROUND PIPE & DUCT BANK
  - CWA-175
  - CWA-600
  - CWP-100U-042

- EARTHWORK & PILING
  - CWA-900
  - CWA-100
  - CWP-100E-041

- CONCRETE
  - CWP-100C-044
  - CWP-100C-043
  - A-700
SAMPLE CWA and CWP Structure

STRUCTURAL STEEL

MECHANICAL EQUIPMENT

ABOVE GROUND PIPING
SAMPLE CWA and CWP Structure

INSTRUMENTATION

ELECTRICAL

CABLE RUNS
1) Document Numbering

All EWP’s, PWP’s, and CWP’s shall comply with the following document numbering system:

- **CWA Number**
- **Sequential Number**

**CWP-16S-01**

- **Package Type**
  - EWP
  - PWP
  - CWP

- **Main Discipline**
  - E = Earthwork & Piles
  - U = Underground Piping
  - A = Architectural
  - C = Concrete
  - S = Steel
  - R = Rail
  - M = Mechanical Equipment
  - P = Piping
  - L = Electrical
  - I = Instrumentation
  - D = Demolition
  - B = Buildings
  - T = Temporary Facilities

Engineering, Procurement, and Construction work packages covering the same work scope, shall share the same numbering system, only changing the Package Type designator within the number:

**EWP-16S-01 = PWP-16S-01 = CWP-16S-01**
AWP STEP 2 – AWP Definition

- Key steps continued:

  6. Identify the priority sequences for CWP’s, EWP’s, and PWP’s based on STEP 1. (ROS Dates)

  7. Establish the EPC Level 2 Schedule integrating the EWPs, PWPs, and CWPs.

- Optimal Execution Timing: JSTEP – Phase 3: Preliminary Engineering
AWP STEP 3 – EWP and PWP Execution

• This step focuses on the execution and completion of the EWP’s and PWP’s. Key steps include:

  1. Assign and review the Roles, Responsibilities, and Performance Expectations of the AWP integrated team.
  2. Establish the EPC Level 3 Schedule detailing for work activities within each EWP, PWP, and CWP.
  3. Support and track the execution of EWP’s and PWP’s.
  4. Start developing the breakdown of CWP’s into Field Installation Work Packages (FIWP’s).

• Optimal Execution Timing: JSTEP – Phase 4: Detail Design
**EWP CONTENTS**

1. EWP Cover Page
2. Model Shots of work scope
3. Design Document List
   a. Design Drawings
   b. Standard Detail Drawings
   c. Vendor Drawings (As applicable)
   d. Specifications
   e. Data Sheets (As applicable)
   f. Line List (As applicable)
   g. P&ID’s (As applicable)
   h. One Line Diagrams (As applicable)
4. Material Requisitions List for engineering purchased materials
## PWP CONTENTS

1. PWP Cover Page

### SAMPLE - PWP Cover Page

<table>
<thead>
<tr>
<th>Item Number</th>
<th>Commodity</th>
<th>Material Description</th>
<th>Requisitioning Authority</th>
<th>Purchasing Authority</th>
<th>Purchase Method</th>
<th>Exediting Required</th>
<th>Delivery Location</th>
<th>Field Installation Support Required</th>
<th>Commissioning Support Required</th>
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<td>Jacobs - Home Office</td>
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<td>Jobsite</td>
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### PWP CLOSURE

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<td>Area Engineering Manager</td>
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<td>Field Procurement Manager</td>
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<td>Site Manager</td>
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AWP STEP 4 – FIWP Execution

• This step focuses on the development, execution, and completion of FIWP’s. Key steps include:

1. Assign and review the Roles, Responsibilities, and Performance Expectations of the FIWP integrated team.
2. Develop FIWP’s a minimum of 90 days before the associated CWP start date.
3. Progressively detail the construction Level 3 Schedule to a Level 4 detail identifying FIWP’s execution within each CWP.
4. Support and track the execution of FIWP’s.
5. Ensure FIWP’s are only closed after Quality Control approval.

• Optimal Execution Timing: JSTEP – Phase 5: Construction
EXPERIENCED RESULTS – of recently completed Project

- TRIR – 0.12

- High Productivity

- Intentionally delayed the start of pipe installation by 3 months
  - Recognized material delays via AWP
  - Fully recovered the 3 month delay within the first 4 months of the pipe installation

- Excellent quality
  - Historically low number of NCR’s
  - Historically low number of punchlist items

- Project Completion date 3 months ahead of schedule
Key Learnings from – AWP Project Implementation

• Need strong and committed leadership
• Need good Interface communication
• Need good change management system in place (field construction to engineering)
• Need good subcontracts management (Integration of subcontractors in the team)
• Need strong procurement and expediting
• Removal of obstacles and road blocks for construction.
Questions
Thank You!