AWP Implementation

October 11, 2017
Safety Topic
"AWP is probably one of the most important things that we’ve instituted in terms of being able to deliver for our customers"

**David Seaton**, Fluor Chairman and CEO

"With Fluor’s continued focus on construction-driven execution and improving project productivity and predictability – as well as starting with the end in mind – **continuous development and implementation of game-changing solutions** like Advanced Work Packaging is paramount."

**Jack Penley**
Senior Vice President
Fluor Construction & Fabrication
Fluor AWP Process

- Standardized Procedure
- Repetitive
- Consistent
- Results Oriented
People

- Who
- What
- Where
AWP Project Structure

FEED -> DETAILED ENGINEERING -> CONSTRUCTION

- Project Director
- AWP Regional Manager
- AWP Manager

- Project Director
- AWP Regional Manager
- AWP Manager
- WFP Area Lead(s)
- WFP Automation Lead
- Automation Manager

- Construction Director
- AWP Regional Manager
- AWP Manager
- WFP Area Lead(s)
- WFP Automation Lead
- Automation Manager
- CSA Planner
- Piping Planner
- Mechanical Planner
- Electrical Planner
- Instrumentation Planner
• Process Definition

• AWP Process with Fluor
Phases of the Fluor Process

CONCEPTUAL  FEED  DETAILED DESIGN  CONSTRUCTION  TURNOVER
Automation Equation

**INPUT**
- Data
- Work Processes
- Clear Interpretations

**PROCESSING**
- Hardware & Software
- Audit Process

**OUTPUT**
- Desired Output
- Optimized Work Processes
- Objective Realized

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**Fluor®**
## Construction Automation Tool Timeline

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<thead>
<tr>
<th></th>
<th>FEED</th>
<th>Detailed Design</th>
<th>Model Review 1</th>
<th>Model Review 2</th>
<th>Model Review 3</th>
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</thead>
<tbody>
<tr>
<td>Coreworx</td>
<td>Detailed Design</td>
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<tr>
<td>Advanced Work Packaging</td>
<td>3D Model Environment</td>
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<td>SMART CONSTRUCTION</td>
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<td>S3D</td>
<td>3D Model Environment</td>
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<td>InVision</td>
<td>3D Visualization for PM, C, E &amp; MM</td>
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<td>Primavera (P6)</td>
<td>Document Management System</td>
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<td>InSequence</td>
<td>Project Scheduling &amp; Resource Allocation</td>
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<td>MaterialManager</td>
<td>4D Simulation for Execution Planning</td>
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<td>MaterialManager</td>
<td>Purchasing, Expediting, Warehousing &amp; Material Control System</td>
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<td>MCPlus</td>
<td>Plans &amp; Tracks System Turnover</td>
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<td>Smart Construction</td>
<td>WorkFace Planning</td>
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- **Advanced Work**
- **Initial Set-Up of Tool**
- **Data Input**
- **Functional Software**
Establishing data requirements and setting up database structures that **feed seamlessly** into the various Construction Automation tools allowing a smooth development of the IWP.
• Application across business lines – especially on lump-sum, self-perform projects where Fluor has full control and accountability for execution

• Fluor’s standard way of executing work on new projects

• Focused on continuously improving our AWP processes
Deployed on 15 projects

Canada
- Shell Quest
- NWR
- Encana
- Fort Hills
- East Tank Farm

United States
- Sasol
- Lyondell
- LCM
- Citrus
- Greensville
- Vogtle
- Mosaic
- Novo Nordisk

South America
- BHP Billiton

EAME
- TCO
- New Delhi
- Manila

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Activity Analysis Results –
Executive Summary

General

• Direct Activity is 51.6%, solidly within the Target (51.8%) range.
• Fluor Direct Activity Targets are middle of top quartile – not averages.
• Continue to use and improve the WorkFace Planning process implemented at this site.
• Continue to closely monitor the balance of unobstructed workfaces and available workforce craft hours in the mechanical and electrical construction phase.
Let’s Review

- AWP Implementation
- Process
- People
- Technology
Thank you!

Dale A. Adcox
U.S. East Region Manager
AWP SME

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