AWP via ConstructSim and Synchro

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Agenda

• Contractual requirements
• Adding automation to AWP
• Path of construction
• Constraint analysis
• IWP issuance
• Progress collections
AWP: A contractual requirement – Middle East

“IWP’s shall be issued to Company for Approval a minimum of thirty (30) days prior to planned associated Work execution at site.”
AWP: At bidding stage – Asia

"Bidder to provide examples of current and previous AWP implementations (Projects, Scope, Number of IWP’s, number of WFP)"

62 pages of AWP requirements/deliverables by contractors.
The EP Contractor will be required to provide overall leadership of the AWP process and ensure clear delineation of responsibilities between the appropriate parties.

- Advanced work packaging implementation plan
- Past experience with AWP - details of work, lessons learned & realized benefits
- Proposed personnel with AWP experience (resumes required)
- Organization requirements to support AWP
AWP Workflow

1. Extract IWP's with check items
2. Link IWP's with check items
3. Clear constraints
4. IWP approved by Client/Controls
5. Progress collection / reason codes
6. Execute IWP through job cards
7. IWP Closed
8. Set EWP & CWP boundaries
9. Review Path of construction
Data Centric Execution

Bentley Construction Solution

- Engineering models & data management
- Work package management
- Status visualisation, Look ahead planning
- Field based work progressing
- Field based QA/QC
- Dashboards & reports
- Change management
Solutions Components
AWP Workflow

Review Path of construction
Reviewing POC in Synchro (CWA Level)

Video
Reviewing POC in Synchro (Adding Direction of Work)
Reviewing POC in Synchro (Discussing Alternatives)
Reviewing POC in Synchro (Comparing Scenarios)

Video
Reviewing POC in Synchro (Adding Drone Data)
Reviewing POC in Synchro from a 2D plot plan
AWP Workflow

Set EWP & CWP boundaries

Extract IWPs

Review Path of construction
Task – Level 5 Simulation

Video
AWP Workflow

1. Extract IWPs
2. Set EWP & CWP boundaries
3. Link IWP’s with check items
4. Clear constraints
5. IWP approved by Client/Controls
6. Review Path of construction
WorkFace Planning

- WFP Template is created per **IWP type**. Examples:
  - Room_Finishing
  - Regular_Piperack
  - Preassembled_Piperack
  - Cable_trench
  - Road_Works
  - etc…

- Template prepared in consultation with discipline heads and customized as per project requirements
Check list template for IWP type Foundation

<table>
<thead>
<tr>
<th>Category</th>
<th>Check Item - Constraint</th>
<th>Discipline</th>
<th>Doc Type</th>
<th>Period required</th>
<th>Latest to receive</th>
<th>Action By</th>
<th>Default.Doc_ID</th>
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<tbody>
<tr>
<td>QA/QC</td>
<td>ITP for Structural Concrete</td>
<td>Civil</td>
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<td>7 days</td>
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<tr>
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<td>Gen</td>
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<td>Construction</td>
<td>Method Statement for concrete works</td>
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<td>MS</td>
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<td>Designer</td>
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<td>10 days</td>
<td>Designer</td>
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<td>AFC Civil Reinforcement Foundations Details</td>
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<td>Drawing</td>
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<td>10 days</td>
<td>Client</td>
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<tr>
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<td>AFC Civil Foundations BBS</td>
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<td>Drawing</td>
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<td>7 days</td>
<td>Client</td>
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<td>Procurement</td>
<td>Anchor Bolts, Sliding Plates, Templates</td>
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<td>FWR</td>
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<td>5 days</td>
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<td>Procedure</td>
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<td>3 days</td>
<td>Contractor</td>
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<td>...</td>
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</table>
Constraints Management

- Project with a value of 500 M$ will generate around 10,000 IWP’s
- Each IWP has around 20 constraints
- That’s around 200,000 of constraints to follow up on and to clear.
WFP Monitoring System

• A module on WPS accessible by all stakeholders.
  – QA/QC, HSE, Procurement, Administration, PMV, Controls, Engineering, etc.

• Dynamic module (automatically updated) which keeps track of the priority items to be cleared.

• Shows the IWP’s starting dates and the remaining days to clear each of its items=> WFP start date.

• WorkFace planner wouldn’t have to send manual requests. They are automatically triggered.
# WFP Monitoring System – Aligning all “worlds”

<table>
<thead>
<tr>
<th>IWP_No</th>
<th>Category</th>
<th>Action By</th>
<th>Check list item</th>
<th>Total Doc</th>
<th>Linked Doc</th>
<th>IWP Start date</th>
<th>WFP Start date</th>
<th>Remaining days</th>
<th>Status</th>
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<tbody>
<tr>
<td>Rigging</td>
<td>Contractor</td>
<td>Rigging lifting plan</td>
<td>1</td>
<td>1</td>
<td>20-Oct-18</td>
<td>18-Oct-18</td>
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<tr>
<td>Surveying</td>
<td>Contractor</td>
<td>Survey Report for Anchor bolts</td>
<td>1</td>
<td>0</td>
<td>20-Oct-18</td>
<td>03-Oct-18</td>
<td>5</td>
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<tr>
<td>Procurement</td>
<td>Contractor</td>
<td>Welding Consumable</td>
<td>1</td>
<td>1</td>
<td>20-Oct-18</td>
<td>02-Feb-18</td>
<td>-</td>
<td>Closed</td>
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<tr>
<td>PMV</td>
<td>Contractor</td>
<td>Crane, Welding Machines, Manlift, Generators Inspection</td>
<td>3</td>
<td>2</td>
<td>25-Oct-18</td>
<td>15-Sep-18</td>
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<td>IWP-3334-PFB-05E-MP-ACS-0034</td>
<td>Engineering</td>
<td>Designer</td>
<td>AFC for AG Piping Isometric Drawings</td>
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<td>05-Oct-18</td>
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</table>

- Period needed to clear the item

**IWP of type heavy steel with its related constraints**

**IWP of type piping installation with its related constraints**
## WorkFace Planning Monitoring System

**Date:** 13-Feb-2017

<table>
<thead>
<tr>
<th>IWP No</th>
<th>Category</th>
<th>Action By</th>
<th>Check List Item</th>
<th>Total Doc</th>
<th>Linked Doc</th>
<th>IWP Start Date</th>
<th>WFP Start Date</th>
<th>Remaining Days</th>
<th>Status</th>
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<tbody>
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<td>Contractor</td>
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<td>14-Jan-17</td>
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<tr>
<td>Rigging</td>
<td>Contractor</td>
<td>Contractor</td>
<td>Rigging lifting plan</td>
<td>1</td>
<td>1</td>
<td>18-Feb-17</td>
<td>04-Jan-17</td>
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<tr>
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<td>Contractor</td>
<td>Contractor</td>
<td>Survey Report for Anchor bolts</td>
<td>1</td>
<td>0</td>
<td>18-Feb-17</td>
<td>03-Feb-17</td>
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<tr>
<td>Procurement</td>
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<td>Contractor</td>
<td>Welding Consumable</td>
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<td>18-Feb-17</td>
<td>02-Jan-17</td>
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</tr>
<tr>
<td>PMV</td>
<td>Contractor</td>
<td>Contractor</td>
<td>Crane, Welding Machines, Manlift, Generators Inspection</td>
<td>3</td>
<td>2</td>
<td>18-Feb-17</td>
<td>15-Jan-17</td>
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<td>Designer</td>
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<td>Subcontractor</td>
<td>Contractor</td>
<td>QCP for Local Post Weld Heat Treatment</td>
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<td>0</td>
<td>22-Feb-17</td>
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<td>Construction</td>
<td>Contractor</td>
<td>Contractor</td>
<td>Method Statement for piping fabrication</td>
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<td>0</td>
<td>22-Feb-17</td>
<td>15-Jan-17</td>
<td>-</td>
<td>Closed</td>
</tr>
</tbody>
</table>
AWP Workflow

- Review Path of construction
- Set EWP & CWP boundaries
- Extract IWP's with check items
- Link IWP's with check items
- Clear constraints
- IWP approved by Client/Controls
- Execute IWP through job cards
Review in VR
AWP Workflow

1. Set EWP & CWP boundaries
2. Extract IWPs
3. Link IWP’s with check items
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6. Progress collection / reason codes
7. Execute IWP through job cards
8. IWP Closed
9. Review Path of construction
Progress Monitoring and Controls in Synchro

Video

Change Curtain wall panels Status to "Installed"
Progress visualization
THANK YOU