Project Execution Excellence
Manufacturing 4.0
Digital Project Execution (DPEx)
Approach Overview - Mimosa

Technical Expertise and Support
Leverage Globally, Act Regionally, Execute Locally – Faster and Smarter
Implementation Success Relies on adoption by Suppliers, Owners and EPC’s

Recommendation:

1. Start by Listening
   Every Supplier, Owner and EPC is in a different place with different goals and different capabilities
   + Digitization is becoming a common goal
   – no common definition of success
   We gather together in groups when there are common goals

2. Transfer the context and the knowledge that is needed to start engagement at our pain point
## DEPx VALUE – 2014

1. Set End to End Work Process – Value Chain Basis

<table>
<thead>
<tr>
<th>Engineering and Management (20%)</th>
<th>Procurement and Materials (40%)</th>
<th>Construction (35%)</th>
<th>Commissioning, Start-Up And Handover (5%)</th>
<th>Turnaround Management (TBD)</th>
</tr>
</thead>
</table>

2. Set Reasonable Productivity Improvement Target By 2020

<table>
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<tr>
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<tbody>
<tr>
<td>10% Productivity Improvement</td>
<td>5% Improvement</td>
<td>10% Productivity Improvement</td>
<td>10% Productivity Improvement</td>
<td>?</td>
</tr>
<tr>
<td>$20,000,000/year per Billion Spend</td>
<td>$20,000,000/year per Billion Spend</td>
<td>$35,000,000/year per Billion Spend</td>
<td>$2,000,000/year per Billion Spend</td>
<td>?</td>
</tr>
</tbody>
</table>

3. Socialized Target – everyone agreed potential value was larger but…
Once target is set…

The Challenge from an Owner’s perspective:

Put together the work process, technology and people pieces to streamline the work and remove 7.75% of the execution costs from an investment while **all** my partners win.

4. Get a multifunctional team of subject matter experts and practitioners who “get it” and are passionate about improvement.
   - IT folks who understand the execution work processes
   - Execution folks who can understand/speak “IT”

<table>
<thead>
<tr>
<th>Dow</th>
<th>EPC/AEC Firms</th>
<th>Hardware Suppliers</th>
<th>Software Suppliers</th>
<th>Service Providers</th>
<th>Labor Providers</th>
<th>Academics</th>
</tr>
</thead>
</table>
Identify the Opportunity Areas

5. Develop an end to end understanding of the opportunity space:

For example- Dow’s capital project work process has 220 steps ...
but they are very “big” steps e.g. Define the Project Execution Plan

It takes thousands of documents to just describe what work each of 26 functions and disciplines need to do at each step to get the job done.

6. Set a “simple” Vision
The Digital Project Execution (DPEX) Vision

Across the Project Life Cycle* we have….

- Single Data entry point
- Clear data definition and ownership
  - Aligned Data Definition and ownership across the facility life cycle
- No Manual Data Re-entry
- Strong data management practices with clear roles
- Data simplification
  (If no-one down stream uses that data and you don’t need it – Don’t generate it)
- Optimized data, document and image “packaging” to drive increased productivity of all Disciplines and Functions
- System simplification and value added integration
- Progress monitoring/ exception reporting occurs without “extra work”
- This vision is true for all Dow execution models.

* Project Life Cycle starts with FEL and goes through Hand-off to Operations and Maintenance and includes Facility Data Maintenance agreements to support “next” project
Develop an Approach

5. Brainstorm the Business Use Cases – where is the inefficiency? Where are the major manual data flows?

7. Start at the Back-End and Move Forward

8. Stay aligned with Strategic Plans and Corporate Initiatives
   - 2016 - Productivity Improvement Goals
   - 2017 – Manufacturing 4.0
   - 2018 – Digital Twin ← DPEx is defining the front end of the Digital Thread
TES Strategic Vision

Dow Resticted 8

DPEx Strategic Alignment

TES Strategic Vision

Technical Expertise & Support

Safety

Reliability

Project Execution Excellence 10/10/10

Cost Advantaged 20/20

Delivery of TES Innovation

Breakthrough Changes in How We Work

Engineering Technology Maintenance Manufacturing 4.0

ONE TEAM

PEOPLE

CAREERS

TECHNICAL EXPERTISE
Digital Project Execution Program Overview

<table>
<thead>
<tr>
<th>FEL (FRONT END LOADING)</th>
<th>PROJECT EXECUTION</th>
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<tbody>
<tr>
<td>FEASIBILITY STUDIES</td>
<td>BASIC ENGINEERING</td>
</tr>
<tr>
<td>DOW STAGE I</td>
<td>DOW STAGE II</td>
</tr>
<tr>
<td>PROJECT IDENTIFICATION</td>
<td>PROJECT DEFINITION</td>
</tr>
<tr>
<td>(Initial/Preliminary Funding)</td>
<td>(Final Full Funding)</td>
</tr>
<tr>
<td>DOW STAGE III</td>
<td>DOW STAGE IV</td>
</tr>
<tr>
<td>DESIGN &amp; CONSTRUCTION</td>
<td>COMMISSION &amp; START-UP</td>
</tr>
<tr>
<td>DOW STAGE IV</td>
<td></td>
</tr>
<tr>
<td>COMMISSION &amp; START-UP</td>
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Operations and Maintenance

Enablers: Project Management, Data Management, Document Management, Metrics, Demand Portfolio and Resource Management

Value Delivery

- ✓ X MM$/yr delivered in 2016
- ✓ Y MM$/yr target in 2017
- ❏ Z MM$/yr target in 2018
- ❏ A MM$/yr target in 2019
- ❏ B MM$/yr target in 2020
Digital Project Execution (DPEx):
Weaving the Digital Threads Together to Deliver the Data Asset

- Procurement
- Construction
- Maintenance
- Operations
- Engineering
- Business

Enablers: Project Management, Data Management, Document Management, Metrics, Demand Portfolio and Resource Management

Making Knowledge Flow

- Integrated Materials Management
- Commissioning & Startup
- Turnarounds
- Facility Data Transfer to O/M
- Advanced Work Packaging
- Engineering Tools Integration
ISDD Data Usage

Engineering Tools

- Materials Management System
- Procurement System
- Construction Management

Vendor Inspection/Expediting

Maintenance System
Why is Dow supporting Mimosa?

• The approach makes practical sense (Datasets are defined and are being used every day)
• Will handle ~ 20% (?) of my dataflow challenges – my engineering tools are already set up to deliver specifications in a datasheet structure
• Once demonstrated- the approach can be expanded to other datasets
Mimosa Challenges

• Vocabulary and Communication – We are still not talking the *Value* Cases
  – Recommendation: Add the current steps and effort it takes to deliver the use case *without* the data exchange standard – dollarize the difference and state the value to be delivered
  – Example: Dow’s cost to load instrument data into SAP

• Multi-level / adjustable knowledge packaging of needed
Mimosa Challenges

• Understanding of the EPC and Owner’s ability to execute – who should we be partnering with inside the organization – it’s not only the IT arm- can they speak execution and bring the execution/ work process owners with them to the table and talk to them so knowledge is transferred and decisions can be made

  Are you assuming that if you build it- I’ll be able to implement it?

• Understand the Partners willingness to participate- where and how do they win?

• Can we change the resourcing model? What could we accomplish with the “right” 30 people in a room for 20 days? Do we have the skills to plan and execute that workshop? Do we have enough credibility to have the right people come?
Questions?