Brownfield Projects: Applying a Scalable AWP Approach with BIM 360 and Forge

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Learning Objectives

- Why Scalable AWP is important to the industry
- How O3 and Autodesk can scale AWP for brownfield projects and portfolios
  - Create and manage work packages digitally on brownfield projects
  - Automate constraints, approvals, and workflows to support AWP best practices
  - Gain visibility into the status and progress of your portfolio of projects
About the Speaker

Josh Girvin, CEO, O3 Solutions

• Serial Entrepreneur
• CII AWP Performance & Benchmarking Co-Chair
• CII Technology Committee Member
• Former SVP Product & Market Strategy for Materials Management / RFID Software
• 12 Technology Patents
• BSE Mechanical Engineering, Princeton University
Presentation Overview

• So What: Why are we here today?
  o Why Scalable AWP for Brownfield Projects is Important
• O3 Experience with Brownfield Projects
• The Background: Advanced Work Packaging & Agile for Construction Primer
• The Challenge: Scaling Project Delivery for Brownfield Projects
  o Why a New Approach is Needed
• The Solution: O3 Leveraging Autodesk Forge Viewer & BIM 360
• The Results: Brownfield Case Studies
  o Scaling AWP from Zero to 50 Small Projects in Less Than 30 Days
  o Work Package Management With & Without a 3D Model
  o Enterprise Productivity Management & Visualization
• Key Takeaways
Why It’s Important:
Scaling Project Delivery for Brownfield Projects
To move the needle, your focus should be on the majority of your spend.

Portfolio Landscape

- **Giga Projects**
  - $10B+
  - 1

- **Mega Projects**
  - $1B+
  - 10

- **Large Projects**
  - $500M
  - 100

- **Small Projects**
  - < $100M
  - 1000s
# The Project Landscape

<table>
<thead>
<tr>
<th>Mega &amp; Large Projects</th>
<th>Operating Facilities</th>
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<tbody>
<tr>
<td>Large-scale</td>
<td>Small projects</td>
</tr>
<tr>
<td>Complex</td>
<td>Short duration</td>
</tr>
<tr>
<td>$1 Billion+</td>
<td>$50k - $100M</td>
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<tr>
<td>Many years to develop &amp; build</td>
<td>Multiple simultaneous projects</td>
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<tr>
<td>Multiple public &amp; private stakeholders</td>
<td>Impact to daily operations</td>
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## Size Matters

**Nuances that Impact Implementation**

<table>
<thead>
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<tr>
<td>Rigid Upfront Requirements</td>
<td>Ability to Crawl, Walk, Run</td>
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<tr>
<td>Multiple Disconnected Stakeholders</td>
<td>Embedded Contractors</td>
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<tr>
<td>Dedicated Project Management Team</td>
<td>Internal Construction Management Team</td>
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O3’s Experience:
Scaling Project Delivery for Brownfield Projects
Who is O3?

O3 is a **modern SaaS platform** that leverages **Advanced Work Packaging** and **Agile** best practices to disrupt the status quo for companies in **industrial construction** who want to improve productivity, safety, quality, and predictability.
O3’s Solution Suite

O3 ENTERPRISE EDITION

MOBILE EXPERIENCE

- ONSafe
- ONDesign
- ONBuild
- ONField
- ONTools
- ONPlan
- ONCourse
- ONStart
- ONTask

O3 Platform

PARTNER NETWORK
O3’s Solution Suite

O3 ENTERPRISE EDITION

MOBILE EXPERIENCE

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ONTask

O3 Platform

PARTNER NETWORK
Sample O3 Experience

Change Management

Managing enrollments and certifications for 4,500+ users across 75+ courses

Collaboration

Supporting 3,500+ users across 30+ contractors on $70B Oil & Gas project

Automation

Connecting 38 data threads across 6 systems to manage data for LNG Project

Scalability

Managing portfolio of 50+ small cap projects across 7 offshore assets

Optimization

Driving Owner engagement from concept through commissioning

Co-Chairs - CII CBA
Performance & Benchmarking, Education & Outreach

AWP Events
Conferences & Summits
Conference Strategist since 2015

CII Technology Committee
Sample O3 Experience

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Fiatech
CII Technology Committee
03’s Operational Facilities Experience

- Multiple Projects
- Multiple Contractors
- Multiple Owners
- Multiple Job Sites
Implementation Scope

- Define Fit-for-Purpose Work Packaging Approach
- Train and Coach Owner and Contractor Personnel
- Manage Packages and Constraints During Execution
- Provide Oversight, Reporting & Analytics
- Develop Portfolio-wide Education Strategy
Advanced Work Packaging Background
Advanced Work Packaging Adoption

More and more owners are adopting and mandating AWP best practices and have included it in their procedures and contract documents.
WorkFace Planning is a Subset of AWP
AWP Process Flow

Construction Work Area
a geographical division of work

Path of Construction
a definition of the most efficient sequencing of work

Construction Work Package
a division of the Construction Work Area by discipline, corresponding to Level 3 Project Schedule activities

Engineering Work Package
scope of work that includes drawings, procurement deliverables, specs, and vendor data typically defined by discipline and area

Installation Work Package
detailed execution plan that is generally 500-1000 work hours

Turnover Package
qualification and process validation activities, and reference materials for the life of a system, process, or piece of equipment
AWP Master Index
## Benefits of AWP

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<th>Benefit</th>
<th>Description</th>
<th>Source</th>
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<tr>
<td>Efficiency</td>
<td>Advanced Work Packaging can reduce project Total Installed Cost by as much as 10%. (CII)</td>
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<tr>
<td>Predictability</td>
<td>Improving “basic” project-management skills offers the most potential to improving site performance.  (McKinsey)</td>
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<td>Cost Savings</td>
<td>98% of megaprojects suffer cost overruns of more than 30%; 77% are at least 40% late.  (McKinsey)</td>
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<td>Quality</td>
<td>Advanced Work Packaging leads to improved safety awareness and performance. (CII)</td>
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<td>Adaptability</td>
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Why A New Approach is Needed: Scaling Project Delivery for Brownfield Projects
Operating Facility Challenges

• Data management and IT investments make introducing legacy solutions cost prohibitive
• 3D models are not always available or are poorly attributed
• Multiple contractors use different engineering authoring tools
• Project Management Teams are stretched thin and forced to operate in a reactive, firefighter mode
• Everyone has “a day job” and other competing priorities
• Change management is greater due to institutional inertia

“I am managing 10 projects and one is always on fire.”

- Construction Manager, Operating Facility
The Solution:
03, Leveraging Autodesk Forge Viewer & BIM 360 Docs
03 + Autodesk = Comprehensive Scalable AWP

- Purpose-built to drive Advanced Work Packaging & Agile Best Practices
- Supports the entire process from Concept through Commissioning
- Modern SaaS platform designed to support an entire portfolio of projects
- Supports 3D models of any type and any size
- Status visualization for 10 types of packages
- Meets the client where they are with a crawl, walk, run approach
The First **Scalable**
**Work Packaging Solution**

**GRAPHICAL SCOPING**
3D virtual construction model for graphical work package development and visualization

**NON-GRAHICAL SCOPING**
Ability to build packages without a 3D model using drawings, materials, equipment, and other non-graphical data

**CONSTRAINT MANAGEMENT**
Identify, visualize and proactively remove constraints that are blocking work from execution

**WORKFLOWS & AUTOMATION**
Configurable workflows and robust automation of package status, approval, progress, and tracking

**STATUS VISUALIZATION**
3D visualizations of key project data including status, progress, blockers, and critical path

**DASHBOARDS**
Interactive views purpose-built for each stakeholder reduce the time it takes to identify issues, make decisions and take action
Creating Work Packages WITH a 3D Model
Creating Work Packages WITHOUT a 3D Model
Constraint Management
Work Package Management
Status Visualization

A screenshot of a computer interface showing a 3D model of a construction site. The model includes various levels and equipment, indicating a detailed status visualization tool for project management.
THE PARTNERSHIP
Forge Viewer & BIM 360

- Document Management
- Forge Viewer for 3D Virtual Construction Model Package Creation
- Status Visualization of Package Status, Constraints, & Materials

Why Autodesk?
- Engineering Tool Agnostic
- Ability to Support Large & Small Models
- SaaS-based to Support Multi-project Setup

“By incorporating the detailed information contained in construction models within BIM 360 Docs, customers can now realize the full benefit of model-based Advanced Work Packaging.”

- James Cook, Head of Integrations, Autodesk
The Results:
Brownfield Case Studies
Case Study 1:
Deep Water Portfolio
Phase 1

- 4 Assets
- 46 Projects: Annualized Project TIC ~$30M
- 78 Construction Work Packages
- 148 Installation Work Packages
- 4,500+ Constraints Identified
- 1,000+ Constraints Closed
- <30 Days to Implement O3

Phase 2

- Added 3 Additional Assets
- 7 More Projects ~$45M Total TIC
CWP Creation & Management
• Development and workflow management of construction work packages

IWP Creation & Management
• Development and workflow management of installation work packages

Constraint Management
• Collaborative constraint management process across contractor and owner

Team Collaboration
• Managing actions in team-specific Kanban boards

“We’ve already added significant visibility to gaps in our delivery as an organization as well as individual projects.”

I’m very pleased with the capabilities of the system, responsiveness of the team, and the structure of implementation that O3 has managed.”

-- Project Manager
Deep Water Portfolio

Visuals

Cross Project Reporting & Analytics

- Determining mobilization readiness offshore with dashboards & real-time reports

“Having these dashboards not only allows the team to be **reactive to past due items** but has also allowed us to be **proactive by clearly highlighting constraints** on upcoming work.”

“Prior to using O3, data was tracked in a spreadsheet and communicated via email.”
Benefits
• Standardization of approach across 100's of small projects
• Consistent definition of progress across multiple contractors
• Real-time visibility into project status allowing for optimization of limited offshore resources

Lessons Learned
• Self-paced, online training for AWP is an excellent alternative to in-person, especially during COVID-19
• Small projects can be managed as CWPs rather than individual projects to reduce overhead effort

Next Steps
• Roll-out across the entire Deep Water business unit
• Incorporation of BIM360 Mobile for access to IWPs in the field
Case Study 2: Refinery Operating Facility
Operating Asset

- Active Projects: 13
- Total Projects: 56
- 1,070 Construction Work Packages
- 1,150 Installation Work Packages
Graphical & Non-Graphical Package Development

- CWP & IWP development using both 3D model components and engineering & materials lists

RFI Tracking

- Transitioned from spreadsheets and email to software and automation resulting in quicker resolution times

SWPs & Scaffolding

- Implemented predecessor constraints / approvals
- Scaffold Supervisor can determine when/where scaffolding needs to be built for predecessor constraints on work packages
- Reduced build costs with approvals for cross discipline reviews and coordinating build locations

Materials

- Automatically creating constraints as part of material analysis
- Cross referencing IWP requirements against material inventory to auto create / clear material constraints

“I was able to evaluate the overall status of the project, highlight that engineering has continued to slip, and ultimately is impacting construction.

I advocated that construction start needed to push a month . . .[to] allow engineering to catch up and create a backlog of constraint free work.

Not an ideal situation, but we had the data to support the decision.“

-- Construction Manager
Sample Productivity Overview
**Benefits**

• 18% increase in field productivity of AWP projects over non-AWP projects

• Enhanced visibility, collaboration, and accountability

**Lessons Learned**

• Change Management at operating facilities is particularly challenging due to institutional inertia

• Engineering tends to be the least motivated to change

**Next Steps**

• Graphical creation and visualization of packages beyond CWPs and IWPs
Case Study 3:
Enterprise Field Productivity Program
Operating Facility A
• 56 Projects in 2019
• 28 Projects in 2020
• 15 Observers

Operating Facility B
• 8 Projects in 2020
• 17 Observers

Multiple Megaprojects
• In Implementation
Mobile Data Collection
• Dedicated iPad application for data collection in the field

Cross-Project Reporting
• Ability to easily compare projects, contractors, areas, disciplines, etc.

Enterprise Roll-Up
• Global roll-up of data across the entire enterprise portfolio
Sample Productivity Overview

For both AWP and non-AWP projects, tool time has an initial ramp up period at the start of the day before reaching average productivity for the day (due to prep etc.). For AWP projects, however, this time is reached much more quickly, reaching the average productivity in hour 3 of the day with AWP instead of hour 3 without AWP.

The quantity of readings is included below each chart for reference.
Benefits

• Apples to apples comparison across projects enables meaningful comparison which drives continuous improvement
• Standardized data collection through purpose-built app reduces human error and increases timeliness

Lessons Learned

• Training on tool time measurement process is critical to standardized data collection

Next Steps

• Extend productivity data status visualization beyond the basic 3D model representation to provide additional context around areas that require attention
In Conclusion:
Key Takeaways
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<tr>
<td><strong>1</strong> Moving the needle for a portfolio requires addressing small cap projects</td>
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<td><strong>2</strong> On premise, thick client solutions are cost prohibitive for scalable AWP</td>
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<td><strong>3</strong> Small Cap Projects have greater change management challenges than greenfield</td>
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<tr>
<td><strong>4</strong> Cross-Project Reporting Requires Multi-Project SaaS Solutions</td>
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<tr>
<td><strong>5</strong> Status Visualization enables context for faster, better decision-making</td>
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<tr>
<td><strong>6</strong> Creating all work packages in one source supports a single view of work packaging program</td>
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<tr>
<td><strong>7</strong> Standardized cross-project reporting enables continuous improvement</td>
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<tr>
<td><strong>8</strong> Autodesk’s solution was ideal for extending O3’s offering into 3D VCM modeling</td>
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