Autodesk Construction Technology for Advanced Work Packaging

Chuck Mies  
Sr. Mgr., Business Development

Cody Austin  
Technical Solutions Executive

Connie McLaughlin  
Operations Manager  
U.S. Construction
Chuck Mies, Senior Manager, Business Development

Chuck is a member of the Autodesk Business Development Team focused on looking at the application of technology to the entire ecosystem of a project, extending from preliminary design through operations and maintenance. In this role Chuck works on a global scale with owners in Industrial and other segments as a resource to assist these clients and the firms that work for them understand the value of Building Information Modeling and the ways to maximize the value of BIM.

Cody Austin, Technical Solutions Executive

Cody is a member of Autodesk’s Technical Solutions Team focused on connecting Autodesk’s solution portfolio with Customer’s challenges, goals and strategic initiatives. He brings with him over 13 years of Industrial Construction experience including 4 Texas Gulf Coast projects with Zachry Group, laser scanning with Hi-CAD/LFM, plant design and engineering with AVEVA and now 6 years in his current role with Autodesk. Cody is also a member of CII RT 344 focused on improving supply chain visibility.

Connie McLaughlin, Operations Manager U.S. Construction

Connie has 35 years of experience in engineering and construction in the chemical, oil and gas sector with emphasis on project execution. She has held various positions in project controls, technical services, information management with most recently being the Operations Manager for U.S. Construction. System development and deployment has been a common theme throughout her career at KBR.
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These statements are being made as of May 27, 2019 and we assume no obligation to update these forward-looking statements to reflect events that occur or circumstances that exist or change after the date on which they were made. If this presentation is reviewed after May 27, 2019, these statements may no longer contain current or accurate information.
Agenda

- Lessons Learned from UK BIM Level 2
- Autodesk AWP Vision
- Autodesk AWP Areas of Focus
  - Scalable AWP
  - AWP Companion / KBR Case Study
- Final Thoughts
Lessons Learned from UK BIM Level 2
What can we apply from this transition to AWP
High Level UK BIM Level 2 Workflow
UK BIM Maturity Timeline Comparison to AWP

1990’s: General BIM Use (ex. T5)
2008: BS 1192:2007
2011: Government Mandate
2015: “Period of Intense Innovation”
2016: Compliance Mandatory
2000’s: Workface Planning
2011: RT-272 Released
2015: RT-319 Released
2018: Owners Requiring AWP
2018: “Period of Intense Innovation”
Advanced Work Packaging
The Autodesk Vision
The Autodesk AWP Vision

Addressing technology challenges with a different approach (Intense Innovation)

Challenges with Traditional AWP Applications

- Not cost-effective to deploy on small projects
- Deployments take months
- On-premises with high administrative cost
- Paper-based, high latency workflows
- Proprietary standards
- Closed architectures, difficult integrations
- Design system dependent

Autodesk AWP Approach Key Principles

- Scalable (cost-effective on all projects)
- Deploy in minutes
- Cloud-based and mobile off-line
- Real-time, paperless workflows
- Industry standards compliant
- Robust APIs, Open Platform, many partners
- Design system agnostic (S3D, PDS, PDMS, etc.)
Advanced Work Packaging
The Autodesk Areas of Focus
Our Focus

What is the Autodesk Near-Term Direction

- **Scalable AWP** - Align the Autodesk platform to scalable AWP processes and workflows

- **AWP Companion** - Increase the return on your legacy WorkFace Planning investment
Scalable AWP
Our Observations from the COAA Report and Customer Workshops
COAA Scalable Report

How does AWP apply to <$100m projects?
Scalable vs. Traditional AWP

What’s different?

▪ Shorter project lifecycle, typically brownfield
▪ Repeatable, programmatic approach
▪ 2D deliverables, may not have a 3D model
▪ Contractors may not have extensive processes and systems
▪ Contract strategies may use maintenance contractors
▪ Packaging requirements & Planner roles may vary
▪ Owner as Construction Manager

The Challenge
Adapting AWP for projects under $100MM
“There is significant opportunity to apply AWP guidelines for projects **under $100 million.**”
“As part of the AWP best practice, there are many templates and tools available. However, they may or may not be applicable on smaller projects.”
“Many of our projects **do not have a 3D model.**”
Scalable AWP Requirements

Autodesk sponsored workshops and white paper
Autodesk Scalable AWP Platform
Aligning the Autodesk platform to scalable AWP processes and workflows
Autodesk AWP Platform Vision

Applying BIM 360 to Scalable Projects

- **Scalable** (cost-effective to deploy on all projects)
- **Easy to Deploy** (minutes, not weeks)
- **Cloud-based** and mobile off-line
- **Design system agnostic** (DWG, S3D, PDS, PDMS, etc.)
- **Paperless** – automated and data-centric
- **Real-time**, single-source-of-truth
- **Robust APIs** with extensive partner integrations
Set permission levels to keep the right information in the right hands

- Set permissions by roles, files, or companies
- Invite and share files with both internal and external team members
- Batch control permissions
MARKUP DRAWINGS

Create and share 2D and 3D markups for collaborative constructability reviews

- Markup and share instantly
- Easy to use mark up tools
- Access on both desktop and mobile
3D COLLABORATION & REVIEW

Create and share 2D and 3D markups for collaborative constructability reviews

- Centrally manage model review comments
- Markup and share instantly
- Easy to use mark up tools
- Access on both desktop and mobile
DRAWING & DOCUMENT REVIEW

Create and manage review packages for greater visibility

- Create and track the status of drawing and document reviews in one central location
- Automated notifications and post-review document control
- Greater visibility means no surprises
SUPPLIER COLLABORATION

Collaborate securely with suppliers, contractors and owners

- Cloud-based collaboration
- Permission-based access
- Simple
MATERIAL VISUALIZATION

Visualize material constraints for better construction planning

- Cloud-based, Web and Mobile viewing
- Integrate with materials management systems or Excel
- Identify opportunities or constraints to drive early completions
- Integrated with Power BI
Build Installation Work Packages leveraging the 3D Model

- Cloud-based, Web and Mobile viewing
- Supports major Industrial Construction 3D model formats
- Calculate quantities
- Integrated with PowerBI
Install above ground piping in 401 piperack.

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Construction Status

- NO PROGRESS
CONSTRAINT MANAGEMENT

Manage constraints in one location to increase visibility and accountability

- Centralize constraint management
- Get rid of spreadsheets
- Increase visibility and accountability
DIGITIZE THE WORKFACE

Empower the field with access to information at the workface

- Access project documents, drawings and 3D models on iOS and Android mobile devices
- Eliminate the time wasted walking back to the construction trailer
- Keep field supervisors in the field with their crew making them safer and more productive
CONSTRUCTION DELAYS & RFIS

Communicate delays and RFIs from the field to the office in near-real time

- Get visibility into issues preventing productivity
- Resolve issues more quickly
- Leverage data to identify project trends
CONSTRUCTION PROGRESSING

Manage and visualize construction progress in the context of a 3D model

- Cloud-based, Web and Mobile viewing
- Integrate with progressing systems or Excel
- Identify opportunities or constraints to drive early completions
- Integrated with Power BI
Capture quality observations in the field digitally

- More accurately support rejection rate, non-conformance and other quality metrics
- Ensure accountability
- Leverage data to identify quality trends
INSPECTION & TEST RECORDS

Digitize your paper-based ITR and Checklist processes for better visibility.

- Remove the restrictions of paper
- Complete Quality ITRs and Checklists in the field
- Digital Signatures
- Access ITPs, work methods and other quality documents and procedures in the field
TEST PACKAGE PLANNING

Leverage data for better test package planning and progress.

- Leverage data in the context of 3D models to:
  - Better plan your test packages
  - Identify opportunities for faster testing
  - Visualize testing progress
- Easily capture test information such as pressure gauge photos
- Integrated with Power BI
Go paperless and digitize your system walkdown and punch listing processes.

- Access system turnover information during walkdowns
- Leave the field with a complete, contextual punch list with assignments
- No more data re-entry or Excel logs
- Increase visibility and close-out speed
Leverage project data to gain powerful insight into project and portfolio trends

- Identify trends related to safety, quality, project controls
- Manage risk and improve project performance
- Transform data into simple and actionable insights
COST MANAGEMENT

Minimize risk by managing all cost related construction activities in a single place

- Flexible and customizable
- Visualize cost-related risk
- Effective change management
Mission

To safely deliver any project, any time, in any environment for the benefit of our customers, shareholders, employees and the communities we serve.

Vision

A leading global provider of full life-cycle professional services, project delivery and technologies supporting the Government Services and Energy markets, creating exceptional value for customers, employees and shareholders.

Motto

We Deliver.
BIM 360 Case Study

Project Approximations

- EPC - $500MM
- Texas Gulf Coast
- 2-Year Construction
- 1M Earnable Hours
- 1.5M Safe Work Hours
- 1000 Employees
- 2000 Tons of Steel
- 4000 Piping Isometrics
- 500 Piping IWPs
- 150 Process Systems
- PDMS, CADWorx, Tekla
Project Timeline
9/5/2016 – 10/15/2018

2016 | Sep | Dec | Mar | Jun | Sep | Dec | Mar | Jun | Sep | 2018

Engineering (Detailed) 9/16 – 11/17

Procurement 1/17 – 4/18

Construction 12/16 – 10/18
Why Change?

Digitization of Project Execution

- Infancy stage of using WorkFace Planning on all projects
- Improve productivity to remain competitive
- Paper-based work processes embedded in construction execution
- Timely delivery of information to the field
- Visual management
Why Autodesk BIM 360?

Digitization of Project Execution

- Compatibility with engineering design tools (PDS, PDMS, S3D, etc.)
- Extends Autodesk Navisworks to Field Managers
- Affordable & scalable
- Easy to configure and implement
- Non-disruptive to current work processes
Autodesk Navisworks & iConstruct
Model Conditioning, Package Planning & Construction Visualization
BIM 360 Implementation Timeline

6/7/2017 – 10/15/2018

2016 | Sep | Dec | Mar | Jun | Sep | Dec | Mar | Jun | Sep | 2018

Engineering

Procurement

Construction

Subscribed to BIM 360
Hardware

Apple iPad Pro Wi-Fi 12.9” 256GB w/ OtterBox Defender
BIM 360 Implementation Timeline
6/7/2017 – 10/15/2018

2016 | Sep | Dec | Mar | Jun | Sep | Dec | Mar | Jun | Sep | 2018

**Engineering**

**Procurement**

**Construction**

- Subscribed to BIM 360
- Published 3D Model & Documents
BIM 360 Case Study
Information Access at the Work Front

- Complete 3D Model
- Work Packages & Test Packages
- P&IDs
- Piping Isometrics
- Detail Drawings
- Instrumentation Data
- Cable Schedule
- 4-Week Lookahead & Plot Plan
BIM 360 Implementation Timeline

6/7/2017 – 10/15/2018

- 2016
  - Sep
  - Dec
  - Mar
  - Jun
  - Sep
  - Dec
  - Mar
  - Jun
  - Sep

- 2018

**Engineering**

**Procurement**

**Construction**

- Subscribed to BIM 360
- Published 3D Model & Documents
- BIM 360 Training & RFI Config.
BIM 360 Case Study

RFI Initiation at the Work Front

- General Foreman implementation
  - Description of issue
  - Photographic evidence
  - Supporting documents
  - Responsible contractor
- Reduced response time
- Simple user interface
BIM 360 Implementation Timeline
6/7/2017 – 10/15/2018

- **2016**: Engineering
- **2017**: Procurement
- **2018**: Construction

**Key Events**:
- **Subscribed to BIM 360**
- **Published 3D Model & Documents**
- **BIM 360 Training & RFI Config.**
- **System Turnover Config.**
BIM 360 Case Study

Paperless System Walkdowns

- Paperless system walkdowns
- Punch, sync, done
- Greater context and visibility
- Faster and smoother system turnover
- Walkdowns in the rain
- Automated reporting and dashboards
BIM 360 Case Study

Real-Time Visibility & Automation
BIM 360 Implementation Timeline
6/7/2017 – 10/15/2018

2016 | Sep | Dec | Mar | Jun | Sep | Dec | Mar | Jun | Sep | 2018

Engineering

Procurement

Construction

- Subscribed to BIM 360
- Published 3D Model & Documents
- BIM 360 Training & RFI Config.
- Interviews
- Interviews
- Interviews
- System Turnover Config.
BIM 360 Case Study

Impact of Digitization

- Cultural change
- 5D mobilization confirmation
- Increased productivity
- Reduced rework
- Reduction of indirect roles
- Easy RFI = $$$
- Paperless system walkdowns
- Increased construction visibility
- Automated reporting

AS OF 9/28/18
Best Practices

What are some lessons we learned?

- Start small and grow from there
- Identify Champions
- Invest in model conditioning & automation tools
- Leverage AWP to increase model maturity
- Continuous training / education
- Establish baselines and KPIs
- Regular cadence (virtual and onsite)
Going Forward

What’s next?

- Extend to subcontractors
- Extend RFI workflows
- Digitize ITRs (Checklists)
- Real-time construction progressing
- Work package management
- Digital timesheets
- Custom real-time dashboards
- Weld and flange management
Final Thoughts
Summary

Key Takeaways

▪ Now
  ▪ Autodesk BIM 360 can coexist and extend your current digital AWP process into the field
  ▪ Autodesk BIM 360 is your technology platform for your scalable AWP projects

▪ Next
  ▪ The recent acquisitions bring new capabilities around cloud-based model conditioning, status visualization, schedule integration, and digital paper.

▪ After Next
  ▪ Stay Tuned, More to come!