Case Study: Using BIM 360 on an Industrial Construction Project

Connie McLaughlin  
Operations Manager, U.S. Construction

Cody Austin  
Technical Solutions Executive

CONNECT & CONSTRUCT SUMMIT

© 2018 Autodesk, Inc.
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.

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.
KBR is a global provider of differentiated professional services and technologies across the asset and program lifecycle within the Government Services and Hydrocarbons sectors. KBR employs approximately 34,000 people worldwide (including our joint ventures), with customers in more than 75 countries, and operations in 40 countries, across three synergistic global businesses:

**Government Services**, serving government customers globally, including capabilities that cover the full lifecycle of defense, space, aviation and other government programs and missions from research and development, through systems engineering, test and evaluation, program management, to operations, maintenance, and field logistics

**Technology**, including proprietary technology focused on the monetization of hydrocarbons (especially natural gas and natural gas liquids) in ethylene and petrochemicals; ammonia, nitric acid and fertilizers; oil refining and gasification

**Hydrocarbons Services**, including onshore oil and gas; LNG (liquefaction and regasification)/GTL; oil refining; petrochemicals; chemicals; fertilizers; differentiated EPC; maintenance services (Brown & Root Industrial Services); offshore oil and gas (shallow-water, deep-water, subsea); floating solutions (FPU, FPSO, FLNG & FSRU); program management and consulting services

KBR is proud to work with its customers across the globe to provide technology, value-added services, integrated EPC delivery and long term operations and maintenance services to ensure consistent delivery with predictable results. **At KBR, 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

- 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
Who was involved?
Autodesk Navisworks & iConstruct
Model Conditioning, Work Package Planning & Status Visualization
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
- Photographic evidence
- Supporting documents
- Responsible contractor
- Reduced response time
- Simple user interface
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.
- System Turnover Config.
BIM 360 Case Study

Paperless System Walkdowns

- Paperless system walkthroughs
- 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

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 walkthroughs
- Increased construction visibility
- Automated reporting

<table>
<thead>
<tr>
<th>1 Federated 3D Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>12,769 Drawings</td>
</tr>
<tr>
<td>20,270 Tags</td>
</tr>
<tr>
<td>433 RFIs</td>
</tr>
<tr>
<td>808 MC Punchlist</td>
</tr>
<tr>
<td>2,281 Photos</td>
</tr>
<tr>
<td>10+ Gigabytes</td>
</tr>
</tbody>
</table>

AS OF 9/28/18
Best Practices

What are some lessons we learned?

- Start small and grow from there
- Identify a Champion
- 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
In Summary

Call to Action!

- BIM 360 provides an affordable and scalable solution for digitizing field execution

- BIM 360 can coexist and compliment existing WorkFace Planning tools and processes

- Low-hanging fruit, can increase construction productivity and reduce rework

- Many paper-based construction processes can be easily digitized