A Contractor’s Use of 3D Models

Brian Drueke
John Reese
Brian Drueke  
Director, Virtual Design and Construction  
Kiewit Infrastructure Engineers  

• 23 years Industry Experience  
  • Field Engineer  
  • Construction Estimator  
  • Superintendent / Project Manager  
  • Corporate Quality Director  

• Lead a 25 person VDC organization for Kiewit  
  • Designers  
  • Surveyors  
  • Data/ IT management
John Reese
Senior VDC Coordinator / Lead Designer
Kiewit Infrastructure Engineers

• 37 years Industry Experience
  • Roadway/Highway Designer
  • 3D Geometrics Lead
  • Project Manager

• Active in Industry
  • Lead Virtual Design and Construction Coordinator
  • Member of the USACE BIM/CIM Consortium
  • Presenter at FHWA Every Day Counts Workshops
  • Certified by Association of General Contractors CM-BIM
About Kiewit-

Kiewit is one of North America’s largest and most respected construction and engineering organizations. With its roots dating back to 1884, the employee-owned organization operates through a network of subsidiaries in the United States, Canada and Australia.

Kiewit offers construction and engineering services in a variety of markets including transportation, water/wastewater, power, oil, gas and chemical, building and mining. Kiewit had 2015 revenues of $10 billion and employs more than 25,000 staff and craft employees.
Our Virtual Design and Construction Journey

- **2006-2010**: KECO Engineering - Project One, Internal Cad Staff
- **2010-2013**: KieCore - Tying Business Systems Together
- **2014**: ineight - Focus on Software Development
- **2015-Present**: VDC - Part of KIE Focused on Model Consumption
What is Virtual Design and Construction?

The process of creating, managing and using data-rich intelligent 3D models to optimize design and construction.
A Contractor’s Use of 3D Models

Reduce risk during design and construction-
- Accurate tracking of quantities
- Improved interdisciplinary coordination
- Assist in construction work planning

Improve efficiency-
- Communication via visualization
- Eliminate repetitive modeling efforts
- Improve information exchange

Reduce risk and improve efficiency
VDC (Intelligent 3D Model) Uses

Model Type
- Conceptual

3D Model Coordination
A process is established to detect and correct clashes in the proposed design prior to construction

Model Use Case

Construction Work Planning
3D Models used to help plan, visualize, and communicate the construction work sequence

Quantity Tracking
Construction materials are calculated

Survey/ garment

Machine Control

Machine Control, Staking and Layout
3D Models are produced to provide properly georeferenced design
MnDOT TH-53 Example

TH53_location.mp4
MnDOT TH-53 Example

- Work Planning
- Quantities
- Survey layout
- 3D Coordination
MnDOT TH-53 Example
MnDOT TH-53 Example
Today’s Challenges

• Lack of skillset in organizations

• We speak different languages

• Level of effort necessary

• Infrastructure necessary to operate
Most Common Mistakes

- Modeling without defining the uses
- Model creation that is independent or lagging design
- Job teams must have the ability to consume models
Path Forward

• Collaboration is the key
  • Designers and contractors
  • Subcontractors and vendors

• VDC execution planning

• Define business processes and train staff
The Future...

- Store, consume, filter massive amounts of data

- Today we talk to machines – in the future the machines will be talking back

- Tools like LiDAR scanning or drones will generate real time updates for cost and schedule

- Lenses that show geo-positioned elements with product information