Autodesk University 2012

BIM for Contractors: Takin' It to the Field

David Epps – Holder Construction Company

Rachel Stalzer – Holder Construction Company

Class ID: CR2694-P

Class Description

Many builders who are implementing BIM are using Autodesk® Revit® and Autodesk Navisworks® for business development and pre-construction, but are missing out on the value of using the model in the field. Learn technical processes and workflows, lessons learned, and implementation strategies from builders who are on the forefront of leveraging BIM in the field. The field uses of BIM, Revit, and Navisworks that will be discussed include visualization, file transfer protocol, coordination and clash detection, 4D construction simulation and scheduling, QC coordination drawings, laser scanning, and building layout. If you are interested in either using or understanding how builders are using BIM on a construction site, this practical class is for you.

Key Learning

- Leverage laser scanning, Revit, and Trimble® Total Station to verify field conditions and enhance quality control.
- Describe basic on-site uses (visualization, clash detection, 4D simulation).
- Describe key points for successfully implementing coordination using various Autodesk products and Autodesk compatible products.
- Reference case studies that can be used to establish and enhance current standards and process using BIM on a construction site.

About the Speakers

David Epps – Manager, Building Information Modeling

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David has been in the construction industry for 13 years and has worked with BIM/VDC technology for 10 years. As a BIM Manager, David develops, integrates, coordinates, and manages digital Building Information Models for design, construction, and field use during design, preconstruction, construction and post-construction. This incorporates: 3D visualization, options analysis,

constructability analysis; Layout, laser scanning, as-built validation; 3D collision detection, coordination and QA/QC; 4D phasing, sequencing, and scheduling analysis; 5D quantity, cost, and attribute data extraction; and the next levels of Facilities Management in '6D' and 'XD'. Services also include regular participation in project pursuit efforts and presentations, and collaboration with owners, executives, design partners, vendors, preconstruction, project managers, superintendents, field BIM coordinators, and trade contractors. Over the past year his focus has been primarily on the integration and consistency of BIM and related technologies across all Holder jobsites.

He has facilitated the construction process on more than 50 projects on and off the jobsite via Building Information Modeling. He plays an integral role in departmental and company training, department recruiting efforts, R&D, and the continual development and refinement of BIM standards and processes.

He is an active member of the BIM Forum Emerging Leaders subforum, a contributing author of the AGC 'BIM 101' & 'Contractor's Guide To BIM' and a frequent presenter at Autodesk University and other national industry conferences.

Rachel Stalzer – Holder Construction Company

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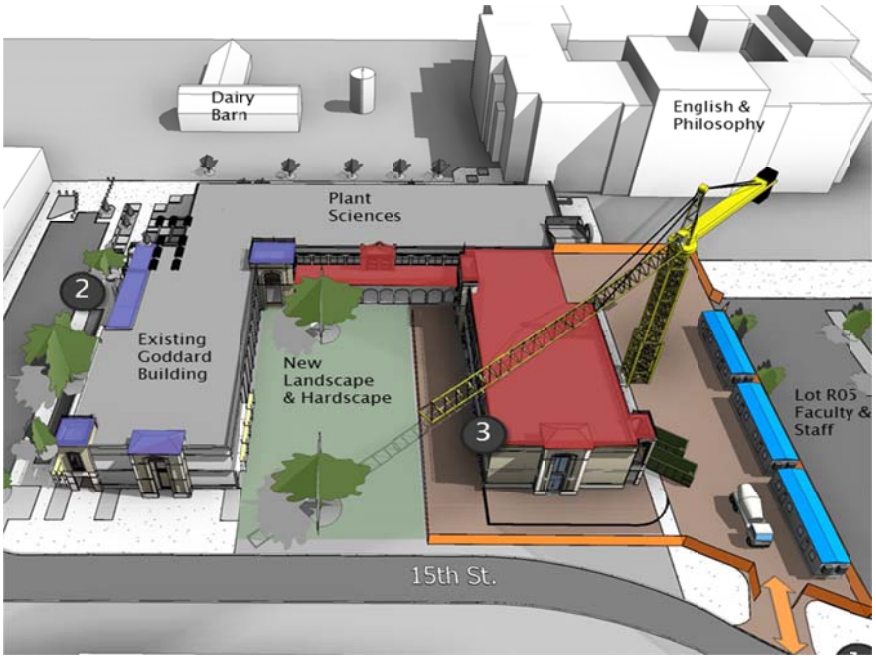
Rachel has experience working in the building information modeling department as well as in operations. She has facilitated the construction process for several projects both from the office and from the field. Her largest project has been a $99 million data center in Colorado Springs. Her responsibilities included model creation, site logistics, 3D RFIs, coordination and collision detection, verification/incorporation of as-constructed conditions, and trade management. In addition, she provides BIM training for onsite project team members. Currently, she is onsite as a project engineer managing trades and supporting the BIM coordination process. Rachel also remains connected to the corporate office playing an integral role in the development of department processes and BIM standards.

Site Logistics



- Use for planning purposes
  - Existing buildings
  - Laydown area
  - Crane location
  - Site access
  - Delivery routes
  - Pedestrian / student protection and routes
  - Installation sequence
  - Pour breaks
  - Recycling center
  - Office location
  - Parking
  - Animations & static images

Notes:

Holder Engineering Services (HES) Integration

- HES handles all layout for Holder
  - Control points
  - Benchmarking
  - Back-checking installed work
- Robotic Total Station
  - Reduces necessary field staff
  - More accurate locating
  - Faster
  - Constantly follows prism pole
  - Expensive
- Revit Integration
  - Internal solution
  - Excitech
  - GTP
- "Best thing to hit construction since the concrete pump!"

Notes:

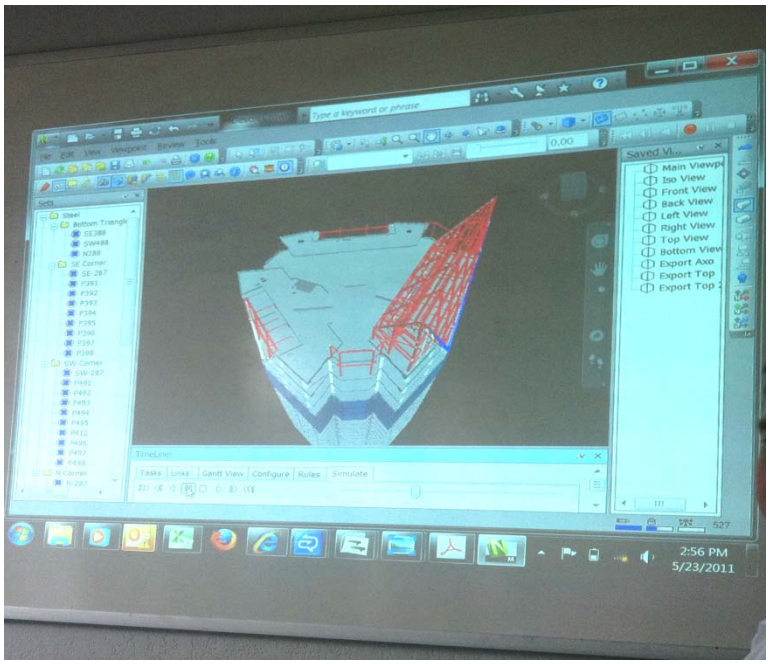
Laser Scanning

- Verify (and model) existing conditions
  - Define 'Setups' locations
  - Establish control points
  - Scan existing conditions
  - Evaluate data
  - Create point cloud
  - Modify in Cyclone
- Import to Revit
  - Use Scan to BIM
  - Create walls/floors/pipes
- Export to Navisworks
  - Use model for coordination & verification
- Kinect Scanning
  - Used for small-scale verification scans

Notes:

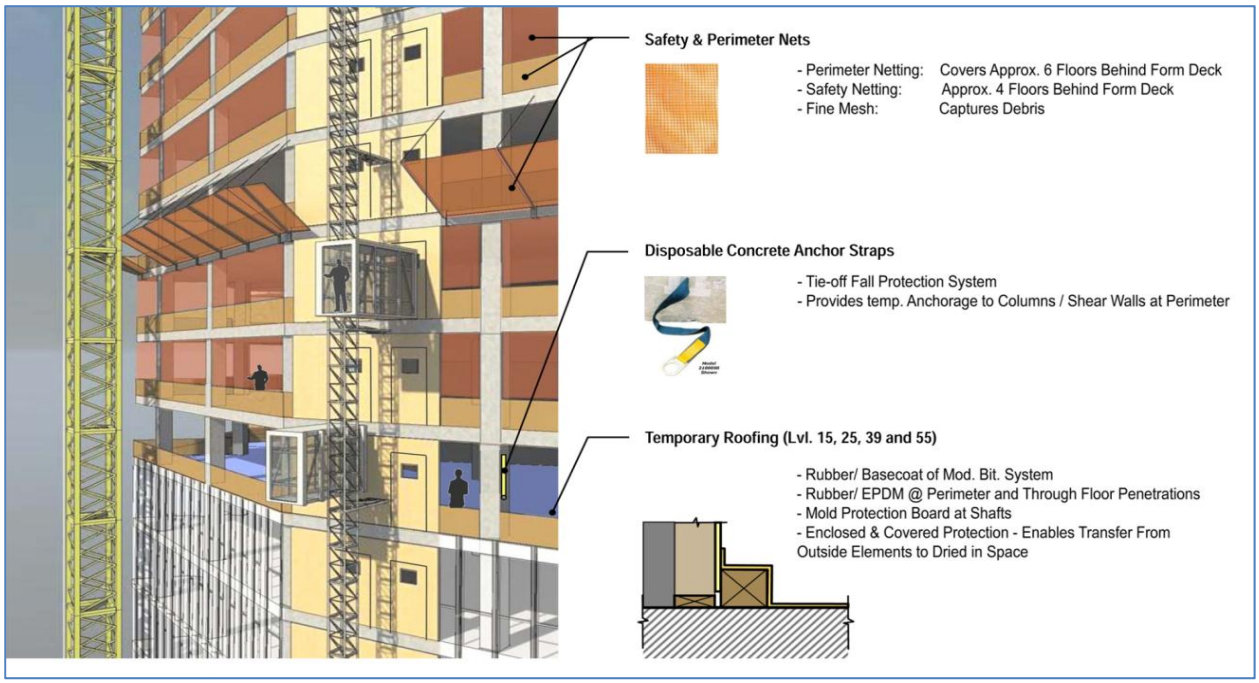
4D Simulation & Planning

- Use for planning purposes
  - Timeliner / Synchro
  - Visual sequencing
  - Building flow
  - Material delivery and staging
  - Crane paths
  - Concrete truck routing



Notes:

Safety



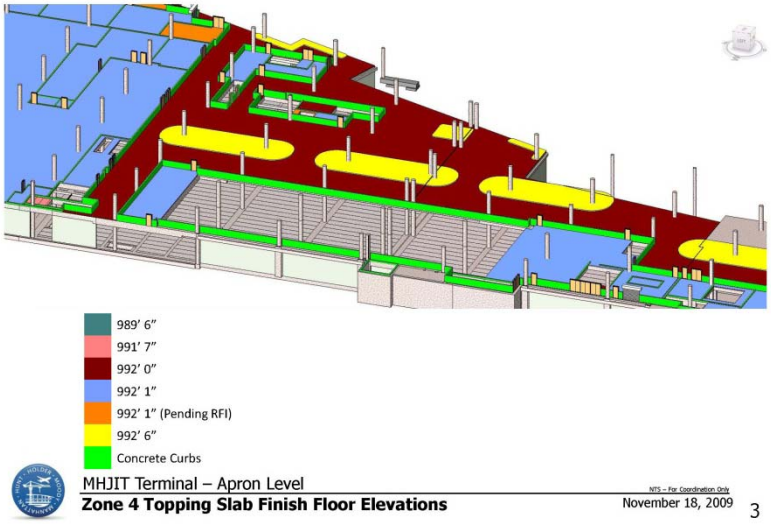
- Communication
  - Model areas of concern
  - 4D simulate conflicting crews

- Workforce Monitoring
  - Safety opportunities

Notes:

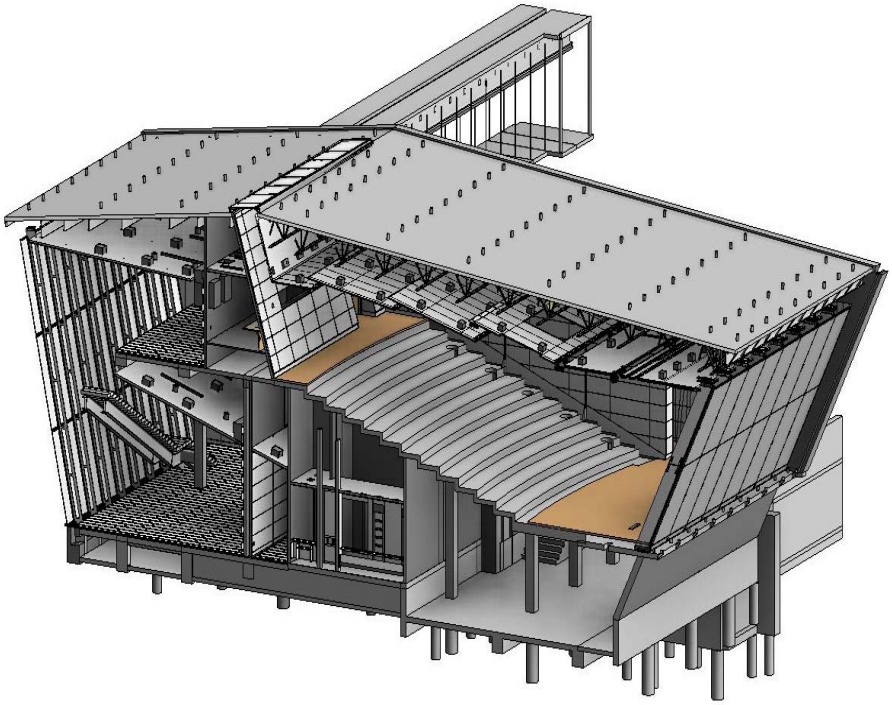
Quantity Extraction & Scope Clarification

- Validate Concrete Pours
- Percentage Complete and Workmanship Verification
- Field Reports/Surveys to Support More Accurate Quantity Extraction
- Multi-Trade Scope Clarifications
- Design Intent Verification
- Concrete Waste Reduction



Notes:

Coordination & Quality Control

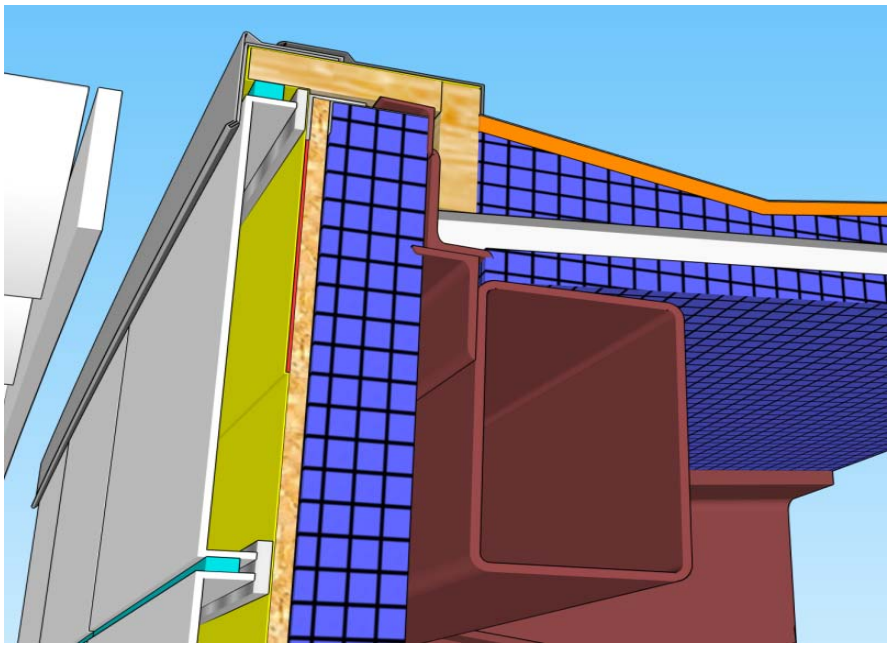


- Digital Mock Ups
  - Field Layout Templates
- Collision Detection
  - Quality Walks
- QA/QC Revit Drawings
  - Fill in the gaps and coordinate the uncoordinated
- Model Comparison
  - Validate installation accuracy…as-builts

Notes:

Communicating Constructability

- 3D PDF
  - Communication
  - RFI support
  - Installation clarity



- Constructability Analysis
  - Detailed scope models
  - Sequenced installation diagrams
- Field BIM Views
  - Print it…get it out there!
- Roof Study
  - High / Low point verification
  - Prevent pooling
  - Visual verification of necessary concrete fill

Notes:

Renderings

- Communication
  - Quality assurance
  - Message consistency

- Owner Understanding
  - Scope
  - Visualization

Notes:

Holder Digital Jobsite

- Linked Plans
  - Always current access for all
  - Reduced printing costs
  - Hyperlinking throughout construction documents
- Holder Plan Room
  - Remote access
  - Less cumbersome and more cost effective
- Digital Job Box
  - Mobile planroom
  - Reduce job trailer trips, time savings
- iPad
  - Fully mobile access to documents / models
  - Superintendent information access
  - Bluebeam App
  - Vela App
  - BIM 360 Glue App

Notes:

Turnover

- Digital As-Built Model
  - Coordinated model
  - Field adjustment updates
  - Laser scanning

- Keep it Digital
  - Reduce paper
  - Extract usable model data
  - Integrate with existing systems

Notes:

Future

- What's next?
  - GPS / model sync
  - Labor / Workforce tracking
  - Paperless jobsite
  - Robotic construction
  - Build from the model

Notes: