Building Information Modeling: A Design Engineer’s Perspective

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By
Frank S. Malits, P.E.
Cagley & Associates, Inc.
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Topics for Today

• How BIM is being routinely used to deliver structural designs TODAY.
• Pitfalls and Lessons Learned
• Benefits Observed from Modeling
BIM TODAY

• Concrete Structures Primarily Modeled for:
  – Construction Documents Preparation
  – Clash Detection
BIM TODAY

• What are we modeling during the design process?
  – Typically geometry for concrete structures

• Not routinely modeled:
  – Embedded reinforcing
  – Small penetrations (for pipe sleeves, etc.)
  – Structural actions: moments, shears, deflections
  – Material properties such as $F’c$, $Fy$

• Concrete BIM models not typically used for shop drawing preparation (except formwork), conveying structural analysis results, or bidding assistance.
BIM TODAY

• Level of modeled precision varies by contract & by client
  – AIA G202 Project BIM Protocol Form
Construction Document Prep
Drawing Creation from Model

• Floor plans – created by cutting horizontal sections

• Details- can be created by creating viewing boxes

• Schedules- geometry can be auto generated, but reinforcing entries are manual or spreadsheet driven
Structural BIM Full Building Section
Construction Document Prep
Clash Detection

• Each discipline creates their own model
• Periodically merged
  – Conflicts are identified for resolution by the party responsible for that element taking the lead.
Clash Detection

ROOF STRUCTURE IS STICKING OUT OF THE ROOF MASS

TREE COLUMNS NEED TO BE AlIGNED AND SYMMETRICAL.
Pitfalls/Minefields/Warnings…

• Understand what you are committing to *prior to negotiating your deal*
  – Understand the architect’s expectations
    • Who owns the slab edge
    • How do you treat typical details
  – LOD beyond 300 adds time and $$$

• Communicate with contractors about expectations/limitations of design model
More Lessons Learned

• Every project needs a BIM Champion for the project duration

• BIM Models are NOT the construction documents
  – Architects tend to rely on the models
  – Still need to produce proper plans and specs
Observed Benefits

• Increased Productivity
  – Designs executed more efficiently
  – Increased Staff flexibility
  – Enhanced ability to react to changes

• Better documents, better projects
  – Fewer problems, less conflict
  – Less time wasted during CA fixing someone else’s problems
Observed Benefits

$$$$$$$
Questions??