Building Information Modeling

Teresa Edmisten AIA, LEED AP
VP Information Design and Technology
TVS
showroom
Workplace
convention
convention
planning
on our plate today

• BIM defined – how is it different from current CADD practices?

• BIM's business drivers – why change?

• BIM opportunities and challenges through all phases of the project

• The importance of interoperability in the design / construction / management cycle
recording decisions

• Scale models

• Drawings

• Computer Drawings

• Computer Models

• Building Information Models

• ? [we want Wiki-BIM]
BIM

• The assembled information, both graphical and non-graphical, necessary to DESIGN, CONSTRUCT, AND OPERATE a building project.

• Virtual Building - drawings are views of the virtual building, not disconnected graphics.
BIM - Used by:

- Contractors
- Subcontractors
- Designers
- Clients / Owners
- Consultants
- Code Officials
- Manufacturers / Suppliers
Building Tools

• Autodesk - Revit Architecture
• Graphisoft - Archicad
• Bentley - Bentley Architecture
• Bentley - Generative Components
• Gehry Technologies Digital Project
Analysis Tools

- Navisworks
- Ecotect
- IES
- Constructor
- STAAD
- RAM Steel
not your Dad’s CADD

• 3D [4D time] [5D cost] [6D carbon footprint?]

• Walls know they are walls - less abstraction

• Non-graphical information can be stored and retrieved as schedules and quantities

• Drawings are coordinated at all times

• Systems are more readily integrated

• Implications of decisions are seen earlier and can be understood by more stakeholders

• Foundation for analysis

• Automation allows more time for design and less time for documentation

• More embedded information - more useful throughout building lifecycle

• Use of color and 3D will improve understanding reducing field errors
not vaporware
not yet “practically perfect in every way”

- Some buildings are too big or complex for current software and hardware
- Components must be built - libraries are incomplete and non-standardized
- Rich standards have not emerged
- Interoperability between BIM tools, analysis packages, fabrication tools, presentation tools, and facilities tools is lacking or absent
- No ubiquitous reader - need Wiki-BIM
- WAN collaboration difficult
- Constant need to strategize and monitor the granularity of the model
- Slow adoption of all players
- Need to retool work force, contracts, and business processes
Details from Model

Courtesy HKS - AGC Presentation
why change?
“The BIM Graph”

Graph Courtesy HOK
why change?

• global competition

• sustainability

• shop productivity up, field productivity down

• manpower shortage
change is good

• better decisions, earlier
• platform for just-in-time expertise
• fewer construction changes
• more universal understanding
• potential for as-built drawings on steroids

• captures key information for facility management and operation
• potentially quicker to market
• better cost control - more real-time quantitative information
• performance analysis - more options
• simulation - manufacture
how will we get there?
integrated practice

• A collaborative, integrated design and building process encompassing all project stakeholders with the goal of MAXIMIZING BUILDING PERFORMANCE.
perspective matters

• designers - appearance and performance

• consultants - analysis and performance

• owners - financial, operations, and asset management

• contractors - cost and scheduling

• subcontractors - fabrication and installation

• code officials - compliance
it takes a village...

- buildings are not constructed directly from architect’s drawings
workflow in an integrated practice

- Traditional delivery phases may change
- Program requirements solidify early
- Benefits from expertise early in the process
- Efficient and effective feedback loop required
- Interoperability important

...reducing latency and ambiguity in decision making is key
interoperability

- The goal of interoperability is a relatively loss-less transfer of intelligent building objects and information between software tools for analysis, collaboration, and simulation.

- One BIM tool does not fit all [yet]

- Two heads [or thousands of heads] are better than one

- We need to lengthen the useful life of our building information
interoperability initiatives

• Standards based - IFC, others

• User community based - AGC, AIA, CURT, IFMA

• Software based - open file formats
top things an owner should know

- BIM will result in better buildings

- Manage Expectations - BIM is not a Silver Bullet

  From a 2006 presentation by popular software company:

  BIM software eliminates defects caused by un-coordinated or poorly detailed drawings

  Coordination is assured by the system

  Document sets are more complete and understandable

  Document sets are higher quality reducing construction costs

- BIM process is front-end loaded - timely decisions are critical

- BIM is very early in its adoption and development cycle
what can you do?

• Support BIM standards groups

• Get involved with other industry players

• Encourage the use of BIM on your projects

• Encourage software vendors to open their formats

• Push FM software vendors you may use to adopt standards and leverage BIM information