

A 3D architectural rendering of a building's interior systems, likely a data center or office building. The model is rendered in a dark grey color. Overlaid on the model are several prominent red and green lines and shapes, representing different types of infrastructure such as piping, conduits, or structural elements. The red lines are thicker and more prominent, while the green lines are thinner and more numerous. The overall scene is viewed from an elevated perspective, showing the layout of the building and the complex network of systems.

# BIM

*improving efficiency through an  
advanced technology*

IPRO 338

Sponsor: Electrical Contractors Association (ECA)

Advisor: Dr. Dan Tomal

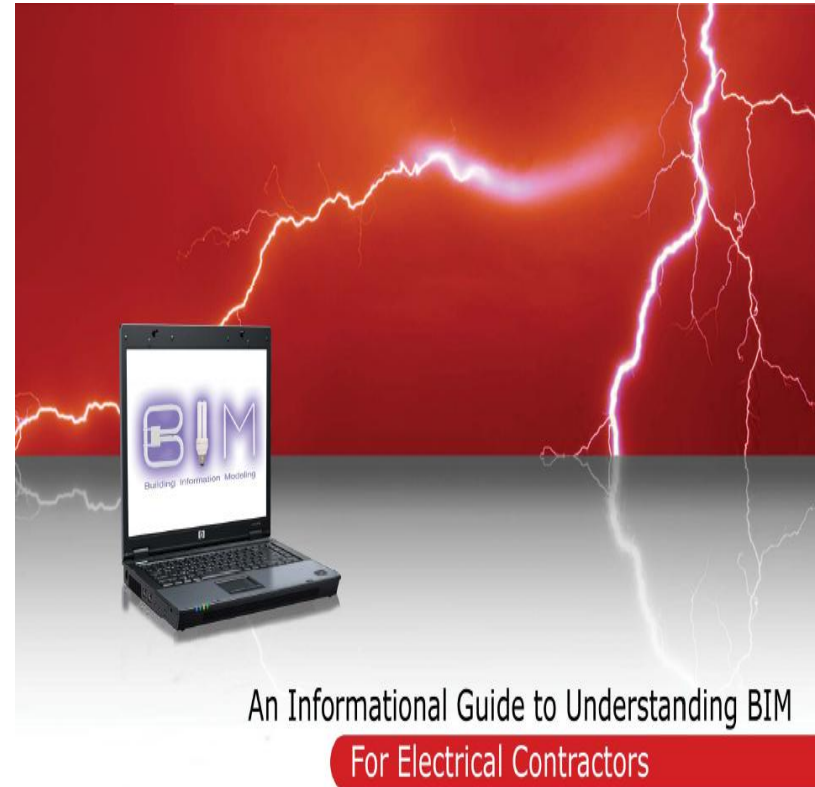
- ECA represents more than 1,000 professional contractors
- The headquarters are located in Westchester, IL
- The organization is for the benefit of electrical contractors involved in it



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Representing the best in electrical engineering and building services

- Assist the ECA electrical contractors to understand BIM and its implementation process.
- Create a user guide that will focus on the following items
  - ▣ background information of BIM
  - ▣ benefits of using BIM
  - ▣ methods of implementing BIM into one's company



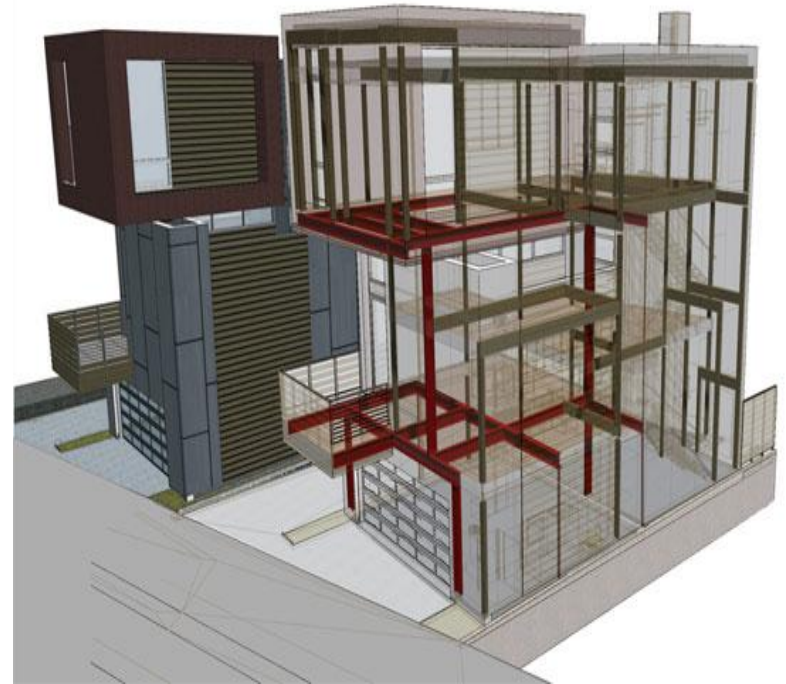
- What is BIM?
- Cost of BIM
  - ▣ Hardware
  - ▣ Software
- Benefits to:
  - ▣ Industry
  - ▣ Electrical Contractors
- BIM Training
- BIM on Job
- Regulations





- BIM is not a software, but an ideology.

Building Information Modeling (BIM) is a building design methodology characterized by the creation and use of coordinated, internally consistent computable information about a building project in design and construction.



BIM Software	Software Cost
Autodesk® Revit® Architecture 2010	\$5,495.00
Autodesk® Navisworks® Manage 2011	\$9,995.00
Autodesk® Navisworks® Simulate 2011	\$2,495.00
AutoCAD® MEP 2011	\$4,995.00
AutoCAD® Revit® MEP Suite 2010	\$5,995.00
Autodesk® Revit® Structure 2010	\$5,495.00



- High-end workstation
  - ▣ Multi-core 64 bit Processor
  - ▣ RAM 8GB min
  - ▣ Graphics accelerator 1GB
  - ▣ Two 24" monitors
- Total Cost = \$5,000-\$6,000



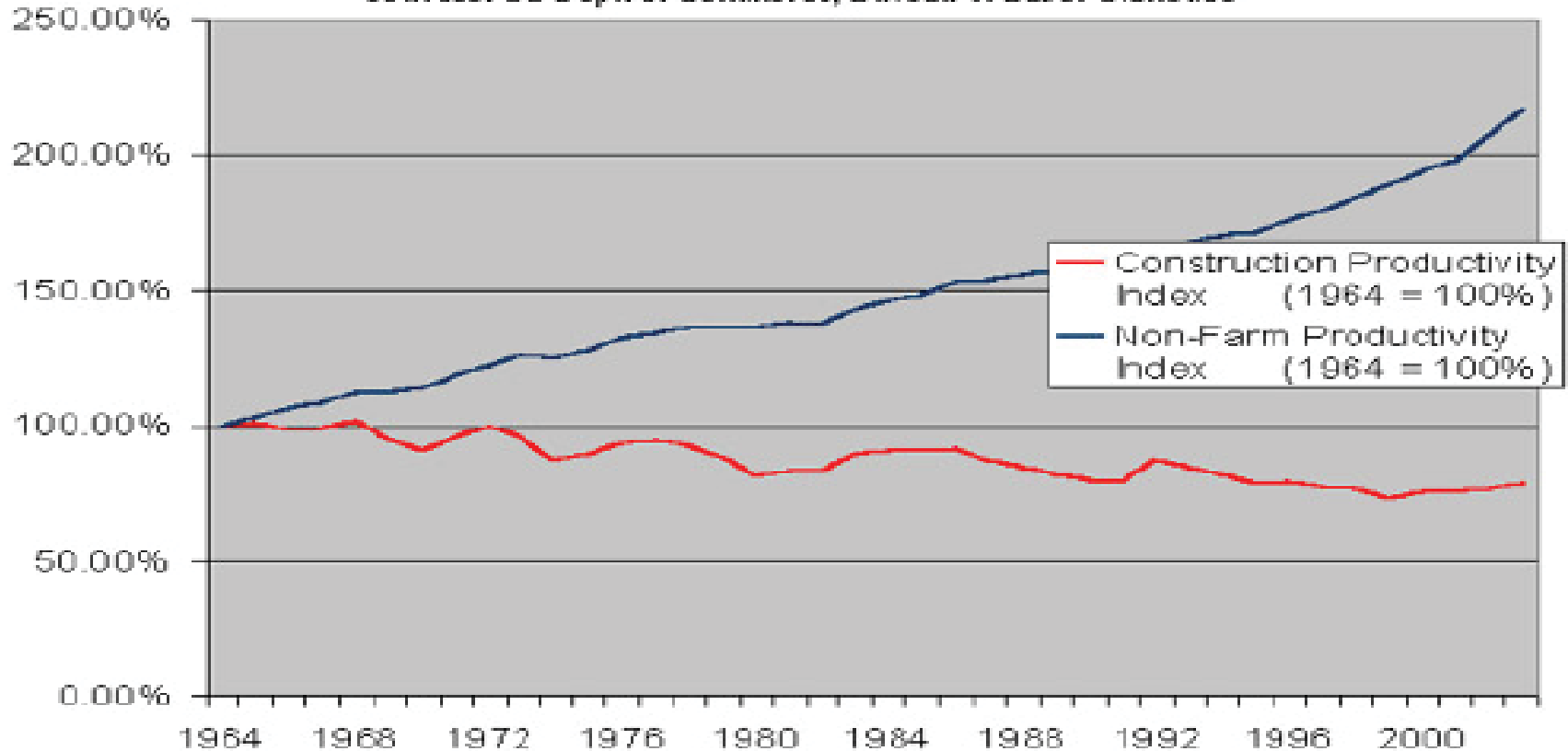
- Model-to-Design integration
  - ▣ Increases cost efficiency
- Automates tasks
  - ▣ reduced work for design and construction professionals
- 3D visualization, construction and geometry
  - ▣ reduced rework, labor costs, RFI's and Change Orders
  - ▣ high quality work and accelerated schedules
- 4D models
  - ▣ optimize project phasing and construction sequencings
- Teamwork and coordination



# Increased Productivity

## Construction & Non-Farm Labor Productivity Index (1964-2003)

Constant \$ of contracts / workhours of hourly workers  
Sources: US Dept. of Commerce, Bureau of Labor Statistics



- Times saving
- Detection of design problems easily found
- Prefabrication
  - ▣ controlled environment
  - ▣ specialized tools
  - ▣ safety at work





# BIM Training

bim*it*

**Autodesk Authorize Training Centers, IL**  
**Avatech Solutions Inc.**  
**Chicago, IL**

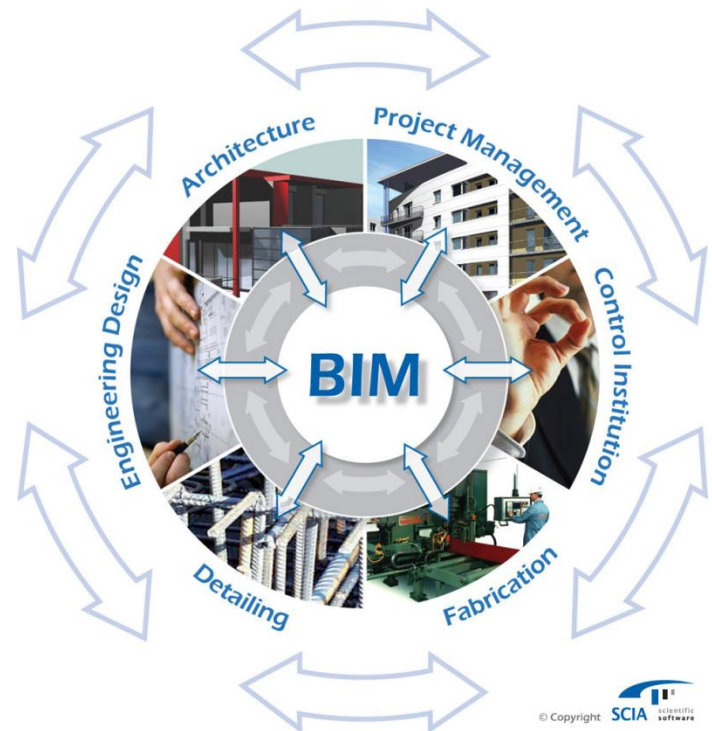
**Hagerman & Company, Inc.**  
**Mt. Zion, IL**

**IMAGINiT Technologies Inc.**  
**Schaumburg, IL**

**IMAGINiT Technologies Inc.**  
**Schaumburg, IL**

**MasterGraphics**  
**Rolling Meadows, IL**

**Moraine Valley Community College**  
**Palos Hills, IL**



- Project designed and engineering for the owner
- Implementation into a 3D model
- Approval of building by engineers
- BIM process really begins.
- Project contracts
- BIM team consists of subcontractor working on the project
  - ▣ team reviews the model daily
  - ▣ team works together (MEP coordination) for the various areas of the project
  - ▣ Each MEP contractor designs their needs in the area.
  - ▣ MEP contractors implement design into the model for clashes detection
- Clashes resolved virtually until the model is clash free.
- Scheduling implementation
- Workers begin installation
- The goal is to have an area completely modeled before any trade begins working in the area.



- The American Recovery and Reinvest Act
- GSA
  
- California's Energy Efficiency Standards for Residential and Nonresidential Buildings
  
- LEED standards and certification
  
- Professional Service Provider Guidelines and Standards created by Texas Facilities Commission



- BIM empowers design and construction professionals to focus their energy on higher order functions such as creativity and problem solving while computers perform the tedious tasks of counting and checking
- BIM brings subcontractors onto project collaboration at an earlier stage than standard construction
- 4D models allow customers to visualize and optimize project phasing and construction sequencings

