

IPRO 338

IMPROVING ELECTRICAL EFFICIENCY WITH BUILDING INFORMATION MODELING (BIM)

Sponsor: Electrical Contractors Association (ECA)
Advisor: Dr. Dan Tomal



bimiiit

Electrical Contractors Association of the City of Chicago, Inc.

- ECA represents more than 1,000 professional contractors
- Its headquarters is located in Weschester, IL
- The organization is for the benefit of its members

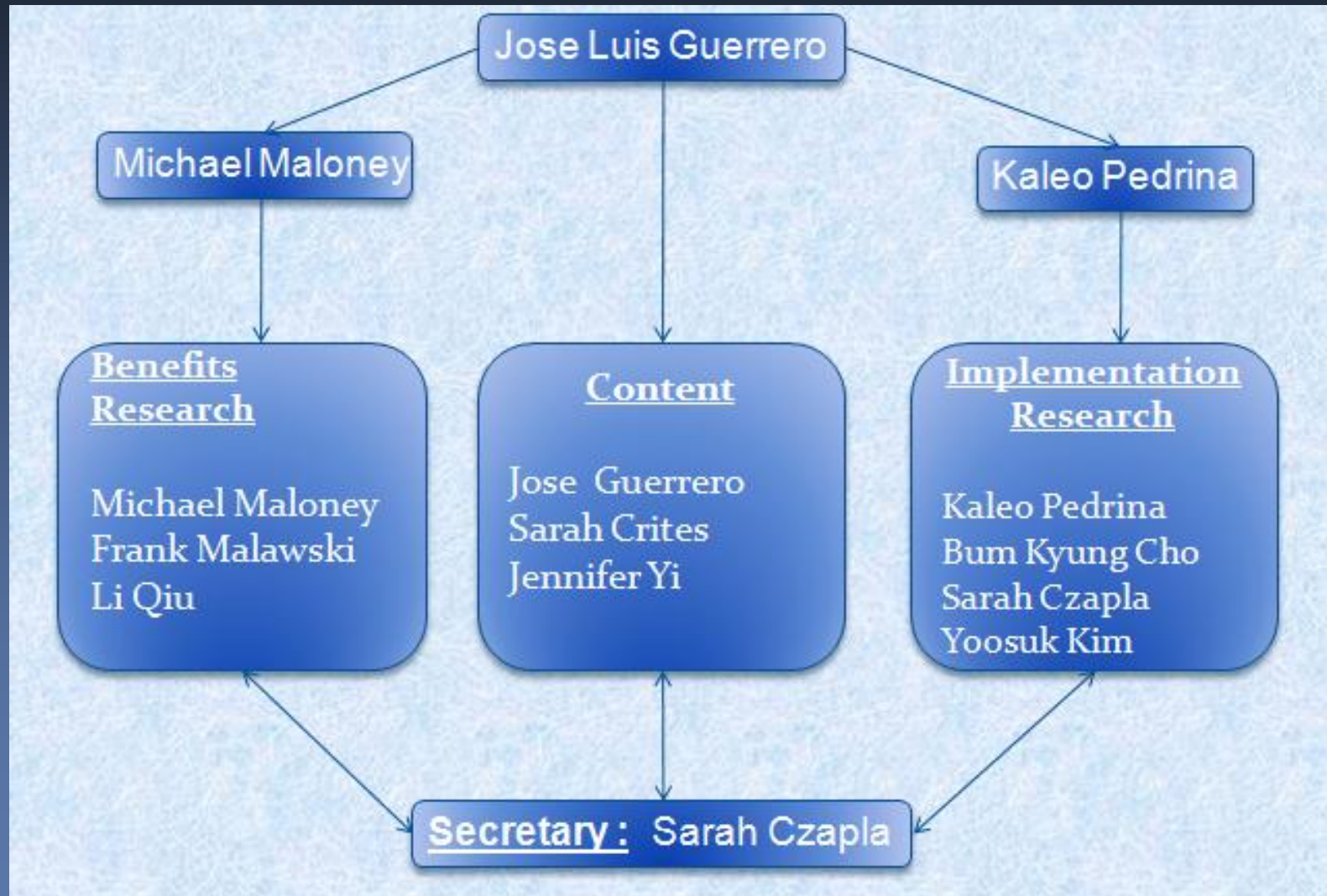
The logo for the Electrical Contractors Association (ECA) of the City of Chicago, Inc. It features the letters "E C A" in a bold, red, serif font. The letters are superimposed on a circular background composed of horizontal lines, creating a textured, globe-like effect. The entire logo is centered within a white rectangular box.

E C A

Objective

- Create a users guide booklet that will focus on the following items
 - Background information of BIM
 - The benefits of using this program
 - Methods of implementing BIM into a company

Team Organization

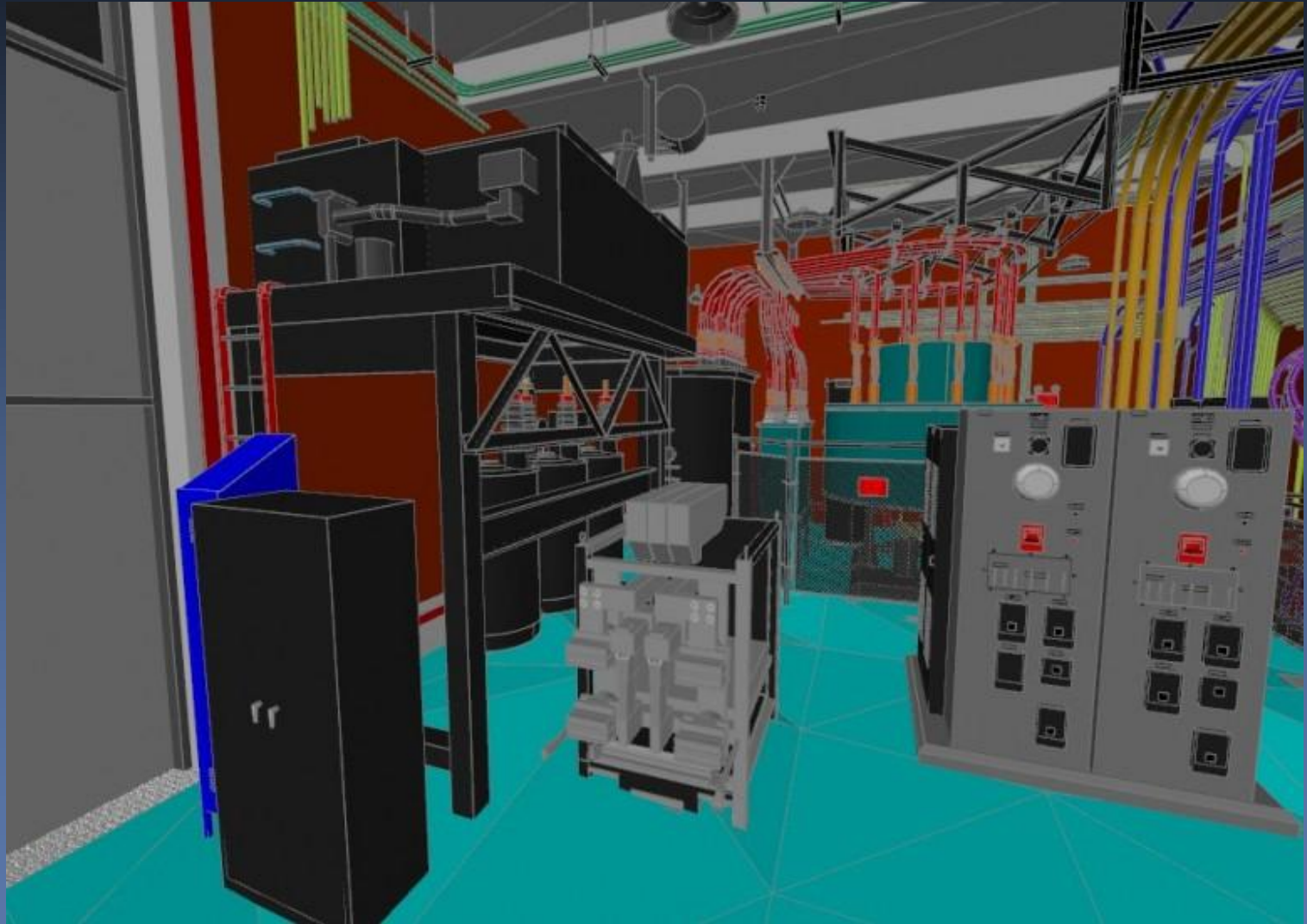




Background of BIM

- BIM refers to a methodology for storing complete information about a building in a computer model rather than relying on static two-dimensional drawings to communicate design ideas and guide construction
- 3D geometric representation is only part of the BIM concept. The fourth is time and the fifth is costs and resources
- Its purpose is to make the design information explicit, so that the design intent and program can be immediately understood and automatically evaluated

Building Information Modeling

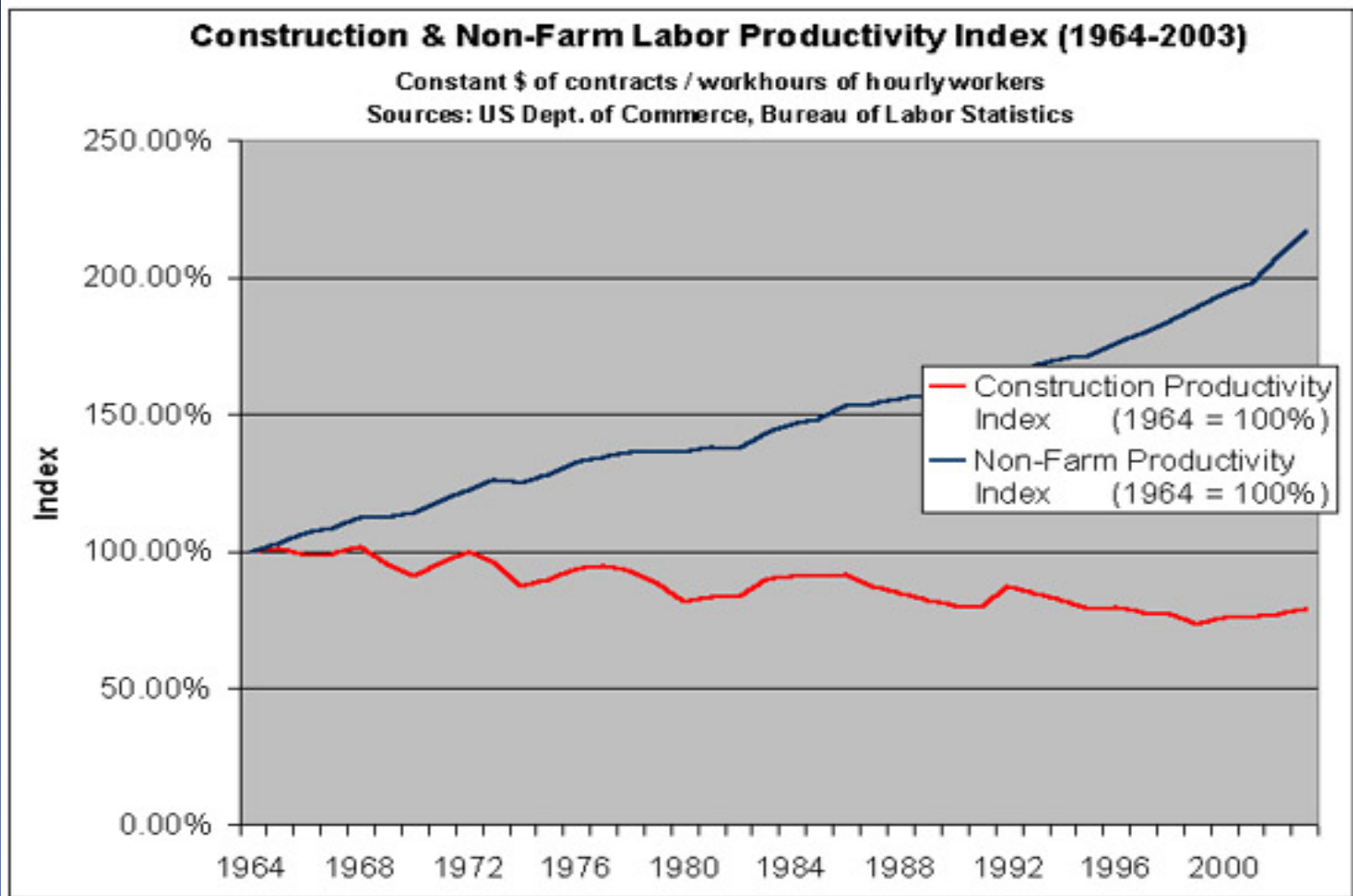


System View




Why use BIM

- Increase productivity




Why Use BIM (Continued)

- BIM empowers design and construction professionals to focus their energy on higher order functions such as creativity and problem solving, while computers do the tedious tasks of counting and checking
- BIM brings subcontractors onto project collaboration at an earlier stage than standard construction
- 3D models allow customers to visualize and optimize project phasing and construction sequencing


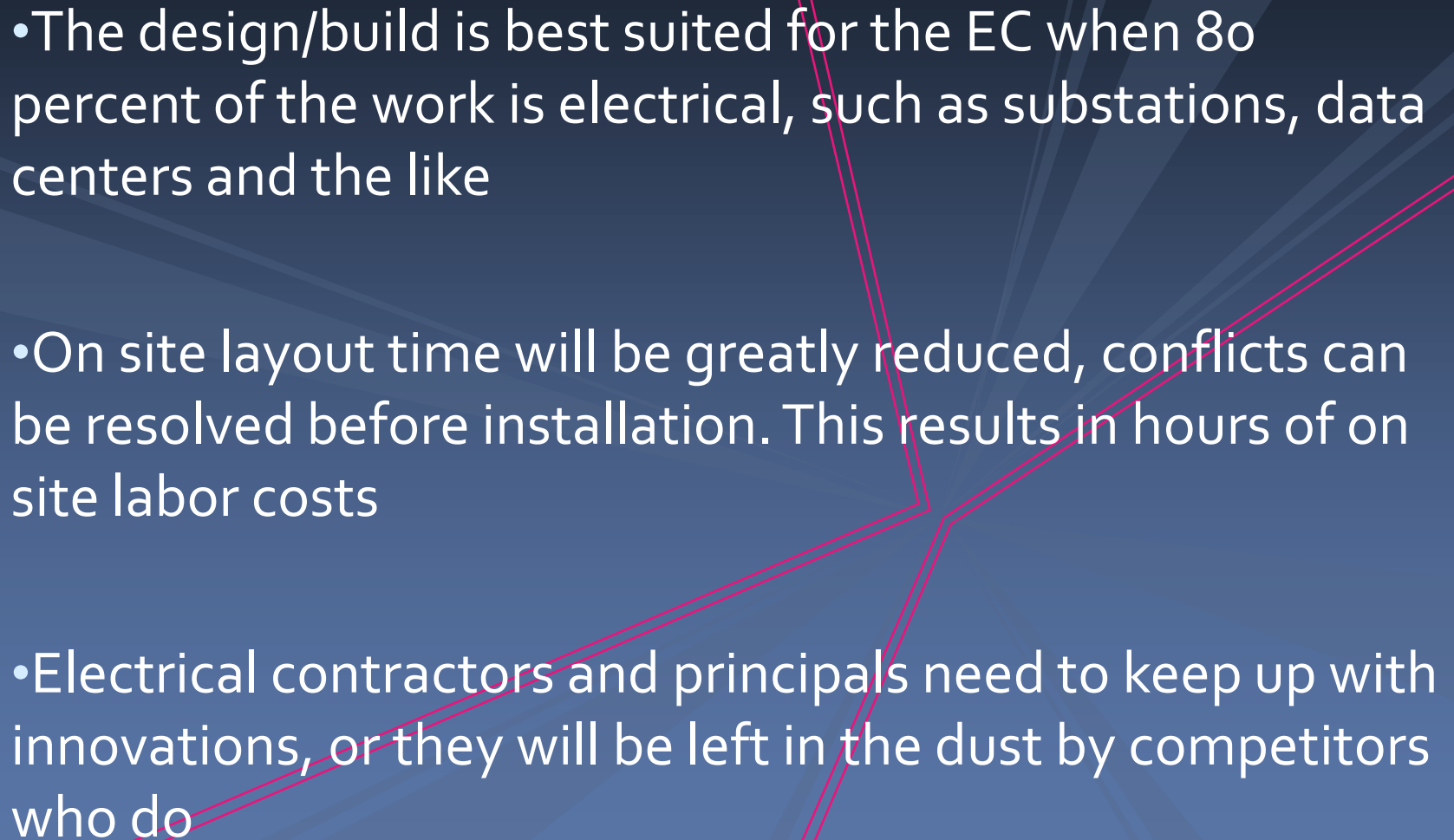


BIM in the Construction Industry

- BIM adoption rate exceeds 80% among nation's largest AEC firms
 - 42% of users are at an expert or advanced level
 - Contractors reap the highest value from benefits related to cost
 - The design/build will overtake traditional design/bid/build in five years
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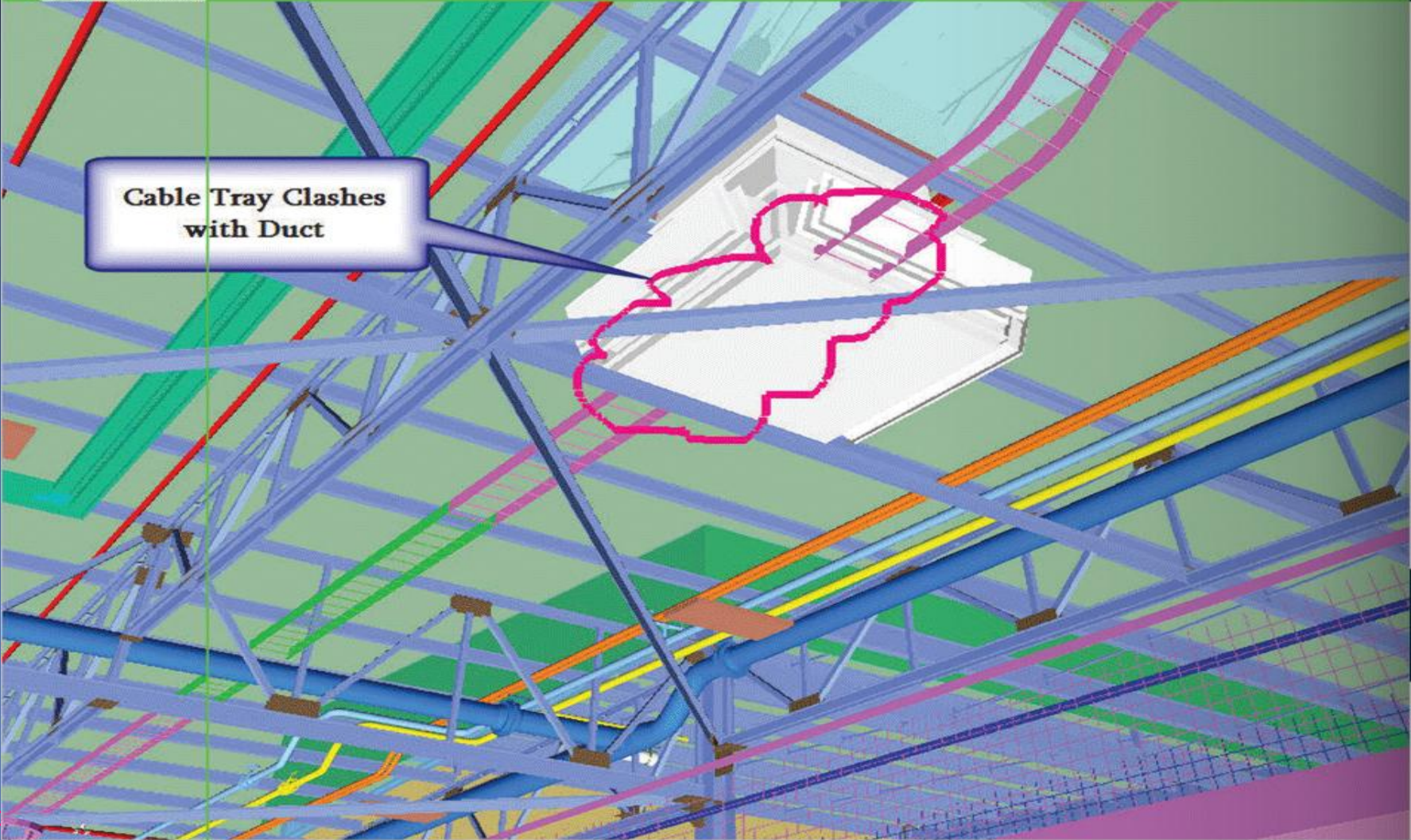


BIM and Electrical Contractors

- The design/build is best suited for the EC when 80 percent of the work is electrical, such as substations, data centers and the like
 - On site layout time will be greatly reduced, conflicts can be resolved before installation. This results in hours of on site labor costs
 - Electrical contractors and principals need to keep up with innovations, or they will be left in the dust by competitors who do
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Cases

GHAFARI Associates, LLC and General Motors Corporation
Enabling Integrated Project Delivery Using ProjectWise and BIM
Dearborn, Michigan, United States



**Cable Tray Clashes
with Duct**

The image displays a complex 3D BIM model of a building's ceiling infrastructure. It features a network of blue structural beams, various colored pipes (red, green, yellow, orange, purple), and a white cable tray. A red outline highlights a specific area where the cable tray and a duct intersect, indicating a clash. A callout box with a pointer identifies this clash.



Company Growth

- Ability to enter new markets
 - 82% of the construction industry believe BIM to have a successful impact
 - Construction is typically 25% faster compared to traditional AutoCAD
 - Larger firms also have recorded a 25% increase in productivity
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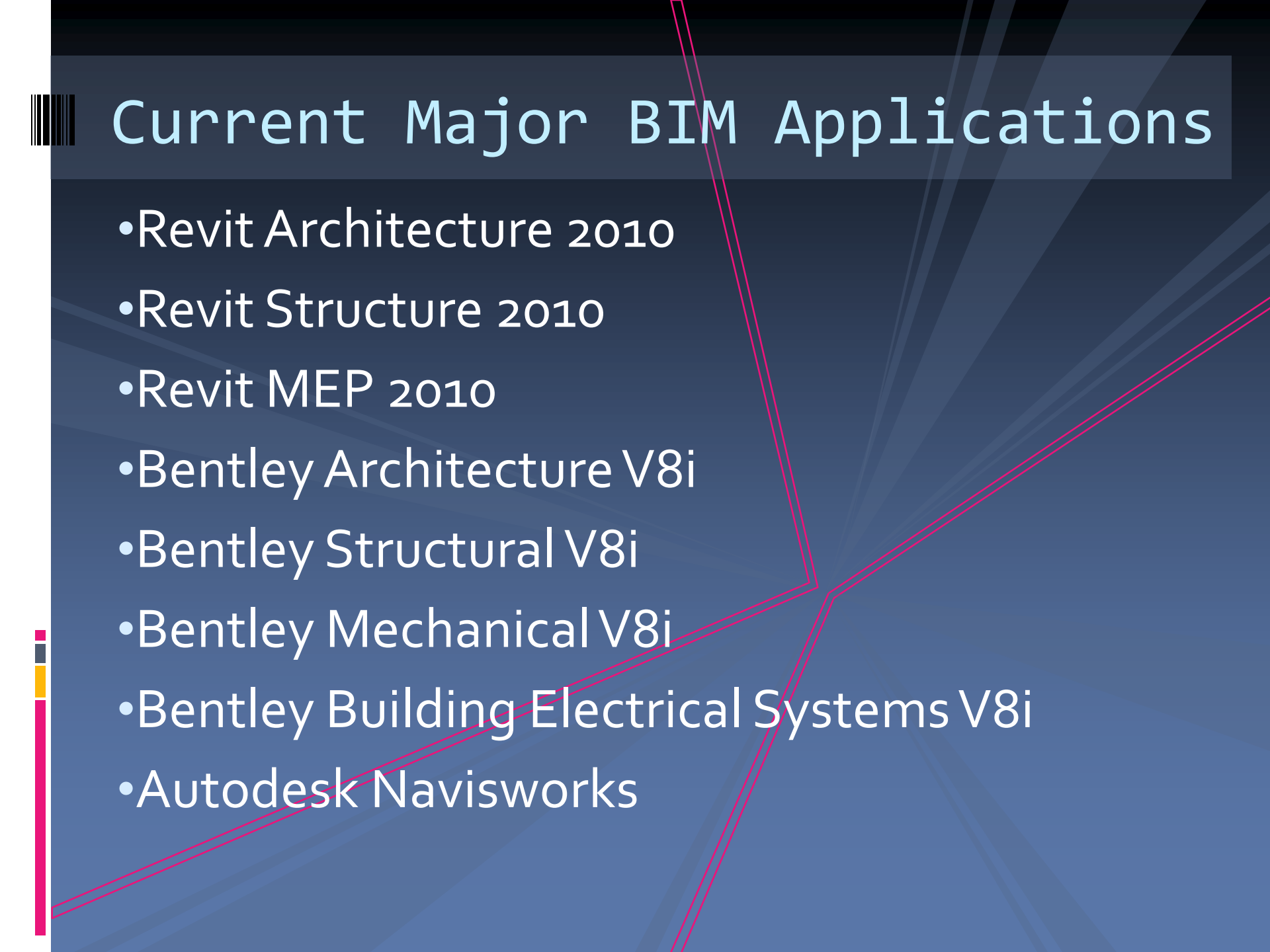
Cost Associated With BIM

- Hardware and software cost per company at \$20,000 to \$30,000

| | |
|---------------------------------|--------|
| CAD MEP with BIM function | 4,500 |
| Naviswork | 10,000 |
| Desktop , Laptop | 8,000 |



Current Major BIM Applications

- Revit Architecture 2010
 - Revit Structure 2010
 - Revit MEP 2010
 - Bentley Architecture V8i
 - Bentley Structural V8i
 - Bentley Mechanical V8i
 - Bentley Building Electrical Systems V8i
 - Autodesk Navisworks
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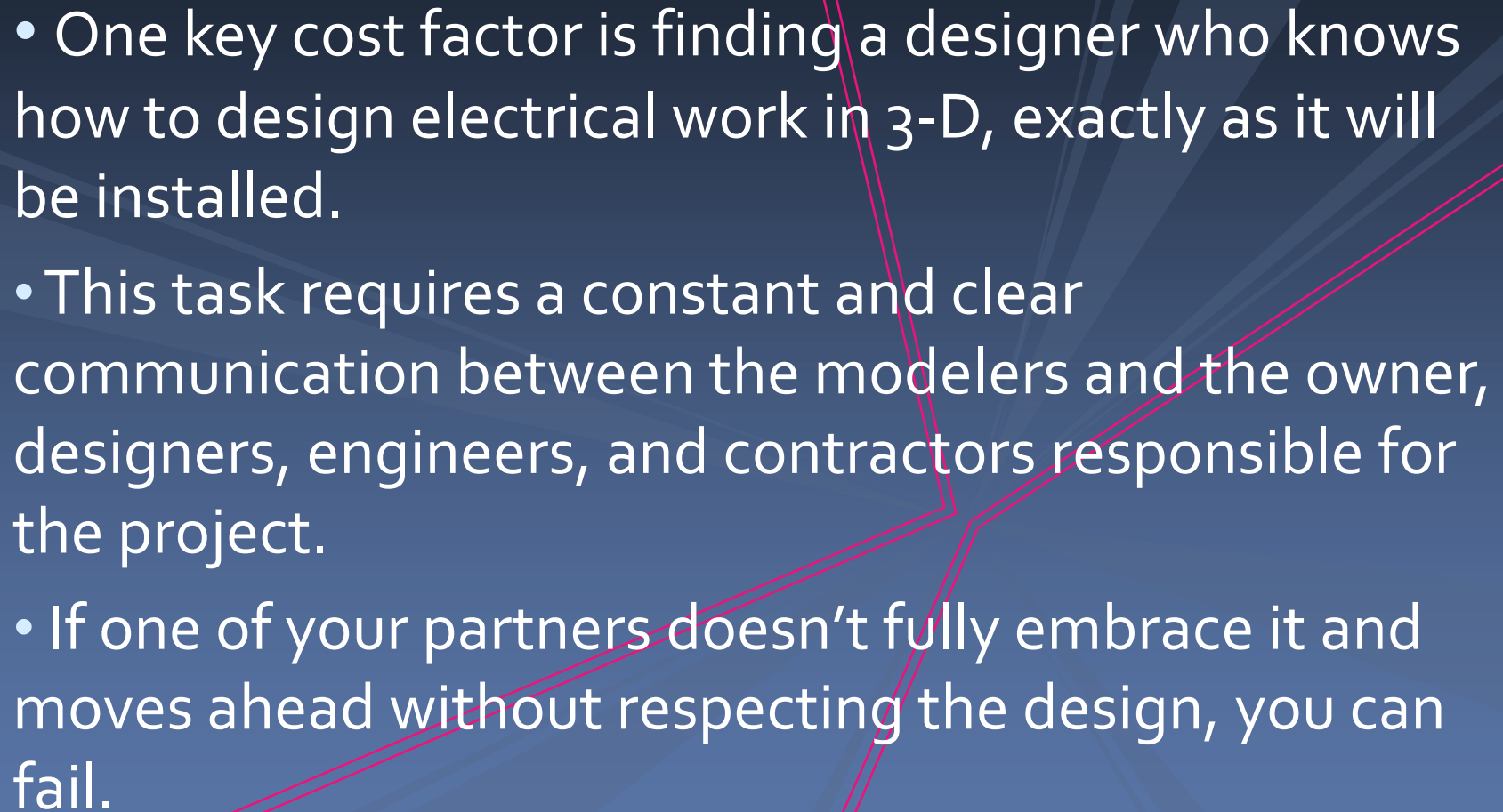


Training

- Bentley has Online Seminars and Academic Program
 - Bentley Institute provides both Live Training and OnDemand eLearning
 - AutoCAD
-
- For small firms start with a project that your staff already knows so there's only a single dimension of learning
 - For large firms focus initial training efforts on must-have functionality, then roll out the rest



Conclusion Facts & Stats

- One key cost factor is finding a designer who knows how to design electrical work in 3-D, exactly as it will be installed.
 - This task requires a constant and clear communication between the modelers and the owner, designers, engineers, and contractors responsible for the project.
 - If one of your partners doesn't fully embrace it and moves ahead without respecting the design, you can fail.
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Next Steps

- With more time a future IPRO team can expand on our product and find more detailed information
- Form a marketing team to help the ECA promote BIM to their users even further.

Ethics

- External
 - Will people lose jobs as a result of contractors switching programs?
 - Is BIM an option for every contractor?
- Internal
 - Will the team function well together and everyone do their part to make the project a success?

Acknowledgements

- Advisor: Dr. Dan Tomal
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- McWilliams Electric
 - Technology center job site tour
- Gibson electric
- Technology solutions

Questions?

