

# **THE ACADEMY OF ELECTRICAL CONTRACTING**

**Paper Presented by  
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**2D AutoCAD® FOR THE ELECTRICAL CONTRACTOR**

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## Does your Company need CAD abilities to Survive in the 21st Century?

**Drawings for design/build, construction drawings, and timely as-built drawings can make your company more profitable.**

Design/build jobs should be more profitable than plan and spec jobs. They give your company an advantage over your competition. Design/build projects may be used to create additional customers and build customer relations. There is a probability of higher profits in design/build projects due to less or no competition.

Preparing construction (field) drawings for your field personnel will make your company more efficient and profitable.

- Savings in design time used by field personnel correcting inaccurate drawings.
- Eliminates field installation errors due to inaccurate drawings.
- Work is installed using drawings that coincide with the estimate.
- Drawings may be done using different colors for the various systems.
- Detailed areas may be done using different scales.
- Larger scale drawings using match points, lowers the possibility of field errors.
- Different systems may be drawn on separate layers.
- Using a CAD estimating program on the field drawings allows for accurate and timely material deliveries and facilitates easier tracking of labor.
- As built drawings will require only minor changes from the field drawings.

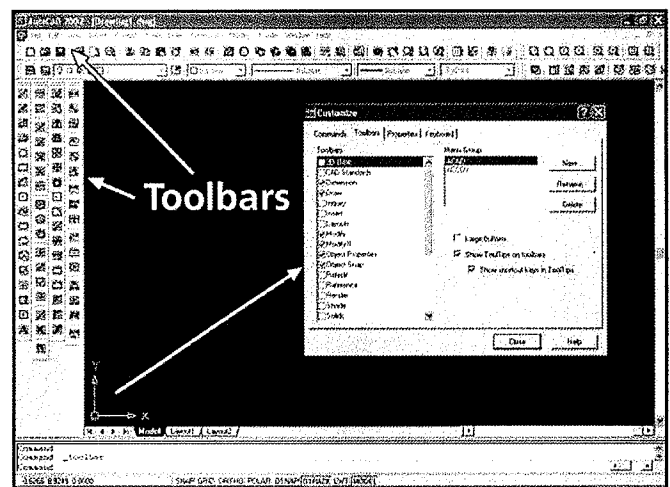
In less than two days, anyone with windows computer experience should be able to learn enough to do the 2D CAD drawings that contractors deal with. AutoCAD? not only has extensive help available using their help files, but the commands needed for drawing can be displayed using the Toolbars.

My CAD experience started on a 386 with 2D Generic CADD. On that system I used a digitizer that had the most used commands shown on an overlay, with the center area saved for drawing. I also could add my own symbols for electrical out-

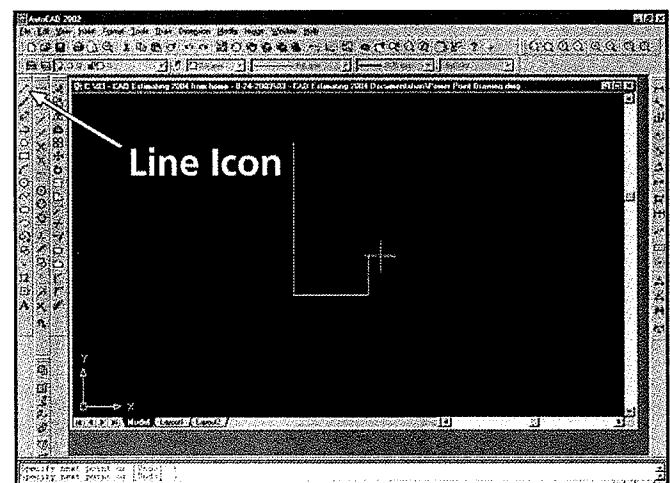
lets, switches, etc. I could just click on the command or symbol on the digitizer and use them in my drawing. One of the disadvantages of using the digitizer was you had to take your eye off the screen and look at the digitizer in order to use it.

With AutoCAD®, the commands and symbols needed for drawing can be displayed on the screen, allowing users to keep their eyes on their work. Any toolbars needed to draw with may be added to the screen by clicking *view* and *toolbars*, then checking the boxes for the toolbars needed.

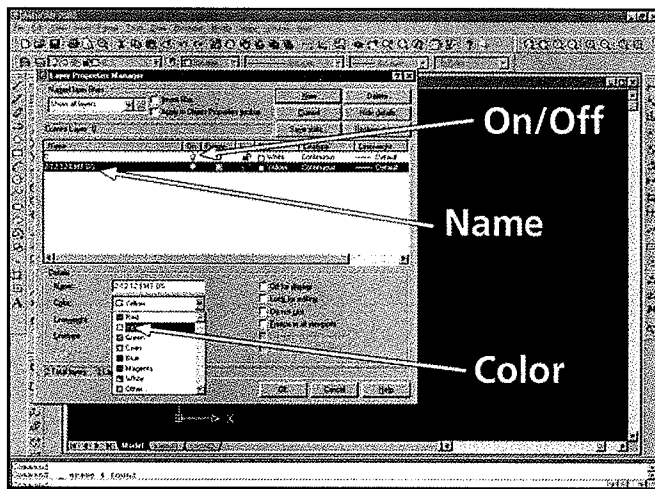
The following shows just a small sample of the commands available to you on screen. You can see how easy it is to draw using AutoCAD with 2D Drawings. The drawing tools needed to draw using AutoCAD are available by inserting toolbars with the icons needed as shown below.



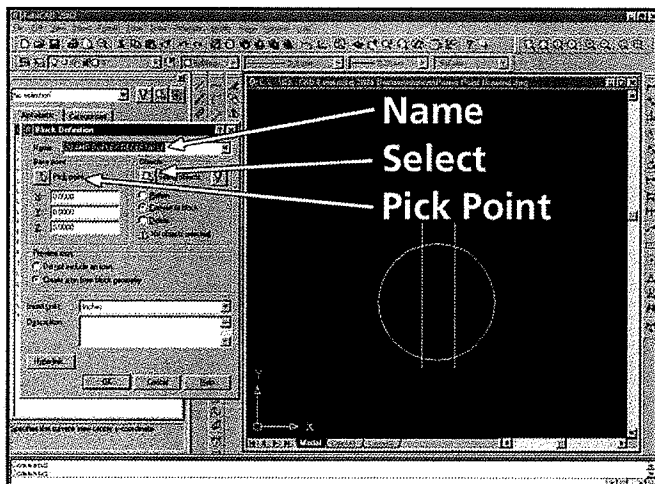
To draw a line, click on the line icon, place it in the drawing and enter the length, then *escape* to stop. The length default is set to inches in the example. To continue the line, start another direction, enter the length, etc., then *escape*.



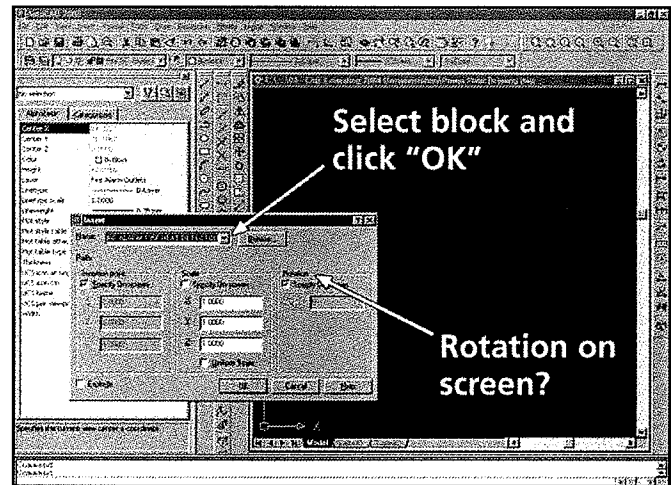
The **Layers Properties Manager** window may be brought up by clicking on *format* and *layer*. Layers may be created by clicking *new*, naming the layer, and naming the color. Layers may be turned on or off.



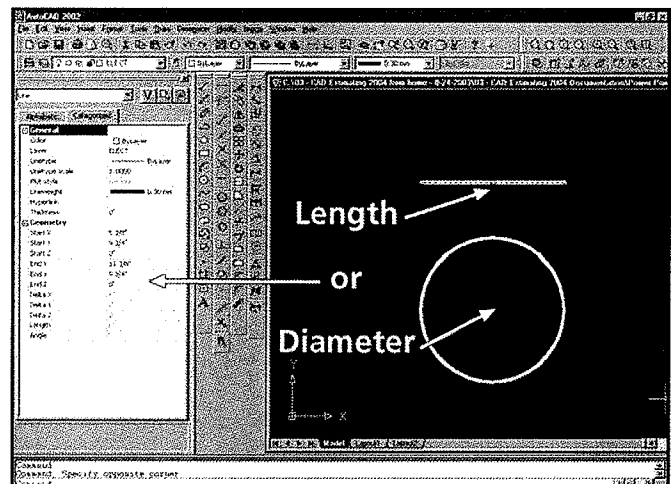
Click on the *make block* icon. Name the block, select the objects by boxing or marking them, and pick a point.



You can put blocks (symbols) into the drawing by clicking on *insert* and then *block*, and the **Insert** window will appear. Pick the block and drop it into the drawing. Click on *insert* and *block*.



The **Properties** window shows the length of a line or diameter of a circle, etc.



## Use Color

Use color to distinguish different systems and to draw attention to notes, areas, etc.

## Layers

Use *layers* to organize the drawings. Put different systems, detailed areas, etc. on separate layers.

## Drawn in real size

CAD drawings are drawn in real size. The drawings are in feet, inches, meters, etc. The drawings are printed (plotted) to scale. Your Estimators should always check the scale of any drawings received because the scale shown may not be the scale the drawing was printed (plotted) in.

Using CAD for design/build, or designing the installation drawings, can make your company more profitable and prepared for the 21st century.

For the full text document and a PowerPoint showing the commands needed for CAD drawing visit NECA's Website, [www.necanet.org](http://www.necanet.org). Click on the *Members Only* section and enter your username and passcode to login. On the left hand menu, click *About NECA* and the Academy site will appear. Scroll down to *Academy Papers*.

*AutoCAD® is a registered trademark of Autodesk*

*Richard E. Manrod worked in the industry as an electrician for four years, and then served a four year apprenticeship. In 1964 Mr. Manrod started the business of Manrod Electric Inc., which he ran for 35 years, becoming a NECA member in 1968. During that 35 year period he developed his own computerized estimating system and taught computerized Electrical contracting at the University of Wisconsin in 1983-85. As a member of NECA, Mr. Manrod participated in many of the NECA classes including ESP, Sales, and the "Win Win" negotiations seminar held at Cornell University. He served on the Northern Illinois Chapter's negotiating committee for over 20 years, served as Chapter President for 10 years, and Chapter Governor for 2 years. Mr. Manrod was inducted as a fellow of the Academy of Electrical Contracting in 1995. He served as President and Board member of the Rock River Valley Electrical Association, a group of Electrical Contractors, Electrical Industrial Members, Suppliers, Electrical Utility members, Electrical Inspectors, and Electrical Workers. Mr. Manrod was a member of the National and local Electrical Inspectors Association. Mr. Manrod is also a member of the American Society of Professional Estimators. He has been instructing on McCormick Systems windows estimating products since March of 1999. He presented a paper "The How, Why and Future of Estimating" to the Academy of Electrical Contracting in June 2003.*