

online calculator (like entering $= (3/32)/12$), when you input values, they will be calculated in decimal format out to an accuracy of eight decimal places. But in other locations in DataCAD, when you are entering a distance, it uses fractions (down to $1/32$ " [0.8]) and will only display decimal values out to three decimal places. So different fields use different expression calculators. Sometimes a good hand held calculator is just the best solution.

Drawing Walls

This topic is covered in more depth in Chapter 11, but it is worth touching on here since the drawing of walls, just like lines, arcs, and circles, is based on the four input methods (Relative Polar, Absolute Polar, Relative Cartesian, and Absolute Cartesian). And like a line, a single wall needs only two points to describe it: a start point and end point. Because walls are often strung together to form a room or a building, however, some additional considerations are important to keep in mind.

What is a "wall" in DataCAD? A wall is simply two to four parallel lines or arcs. The lines that make up the wall can be simple, solid lines, or they can be made up of complex linetypes. Figure 5-64 shows some examples.

Two methods exist for turning on the automatic Walls feature:

- Select **Edit/Architct/Walls**.
- Press the = sign on the keyboard. This should be easy to remember since the = sign looks like a two-line wall.

While in Walls mode, the W in the SWOTHLUD acronym at the lower corner of your screen will be shown in upper case. When you are in single-line mode (with Walls toggled off), the w will be shown in lower case (see Figure 5-65).

You will remain in the Walls mode until you turn it off, either by selecting **Edit/Architct/Walls**, or by pressing the = sign again.

Figure 5-64
Some example of
DataCAD walls

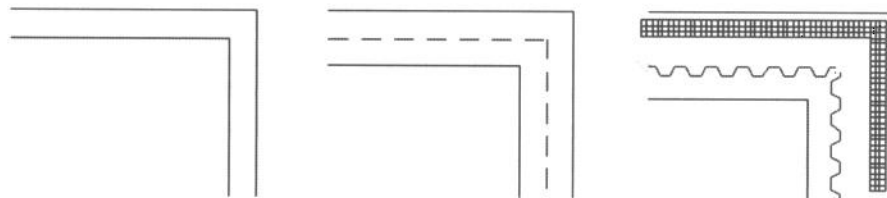


Figure 5-65
Walls mode on
and off

SWOTHLUD

SwOTHLUD

Although a curved wall is still a wall to DataCAD, some of the automatic drawing features in DataCAD, such as the insertion of doors and windows, will only work in straight walls.



NOTE: *It is very much worth nothing that there is really nothing special about a wall in DataCAD. If two or four lines or arcs are parallel to one another, they are automatically considered a wall. DataCAD does not label or treat those lines differently within the program.*

*So conversely, you can use the **Walls** command to draw anything that needs to be shown with two to four parallel lines. For instance, you can draw plumbing pipes, a sidewalk or road, a lamp post, or trim on a building elevation. One of the benefits to this methodology is that you can use all the wall cleanup features for these entities.*

Everything in Real Scale

Perhaps the most difficult thing for new CAD users to get used to, after drawing with paper, pencil, and a scale, is drawing everything in real scale. In the old days of paper drawings, if you wanted to draw details of, say, the exterior wall of a house, you perhaps drew a complete wall section, roof to foundation, at a scale of $\frac{3}{4}'' = 1'-0''$ [1:20]. You then drew details of the foundation, the windows, and the roof at a larger scale, such as $3'' = 1'-0''$ [1:5]. With CAD, however, you draw everything at true scale, as if you were drawing the house on a giant, 20-foot tall piece of paper. You then decide at which scale you want to display your details and then lay them out on “real-size” sheets of paper within DataCAD, telling the program what scale to “display” the details at.

By drawing everything in real scale, you never have to make calculations to scale entities up or down. You never have to pull out your scale to figure out that a line of 3'-9" [1143] at a $\frac{3}{4}''$ [1:20] scale would have to be drawn at a length of $2\frac{13}{16}''$, as you would if you were drawing with paper and pencil. Instead, you draw the detail at real scale (3'-9" [1143] in this case). Then tell

the computer to display the detail at a $\frac{3}{4}$ " [1:20] scale when it is printed or plotted. Here is a short example:

1. Draw a line 10'-0" [3048] long in the Drawing Window.
2. Go to **Utility/Plotter/Scale** and set the current scale to a $\frac{1}{4}$ " [1:50].
3. Print this line on your printer.
4. Measure the line on the printout with an architect's scale and you will see that at a $\frac{1}{4}$ " [1:50] scale the line is 10'-0" [3048] long.
5. Now go to **Utility/Plotter/Scale** and set the current scale to 3" [1:5].
6. Print this line on your printer.
7. Measure the line on the printout with an architect's scale and you will see that at a 3" [1:5] scale the line is again 10'-0" [3048] long.

Multiple Scales on One Drawing Sheet

Because everything is drawn at real scale, you may be wondering how to show drawings and details of different scales on the same drawing sheet. A couple of methods exist for this, the better of which is called *Multi-Scale Plotting* (MSP) and is covered in depth in Chapter 12. The other method involves enlarging (scaling up or down) your drawings and details so that they are not at real scale anymore (not a good idea). This is touched on in Chapter 11.

Multiple Drawing Technique

DataCAD excels at the Multiple Drawing technique of CAD drawing. This involves keeping the entire project, or at least multiple drawing sheets, in one drawing file, and reusing and copying entities as much as possible to avoid inefficiently wasting time and effort redrawing repetitive information or switching between drawings. The key to this technique is proper layer management and the use of 3D GotoViews (see Chapter 10).

Entities that are exactly the same on multiple drawings or details should only be drawn once whenever possible. For instance, even if you have five drawing sheets, your title block and sheet borders are the same from sheet to sheet, so you should have one layer with one border/title block on it. You can then make five new layers, each with only sheet-specific text information on it, such as the sheet number and sheet title. This keeps the drawing

file small while eliminating repetitive information, the very foundation of CAD productivity.

Let's use a medium-size project to demonstrate. You can follow along if you'd like by copying the **Ymcapln2.dc5** file to your hard drive from Chapter 5 of the CD-ROM. You may even have this drawing on your hard disk already if you opted to install the sample drawings when you installed DataCAD.

When you first open the **Ymcapln2.dc5** drawing, you will see a Lower-Level plan, sheet number A-2, with dimensions and text. The plan was set up on multiple layers: 14B-BDR, 14B-BLK, A2-BLK, A2-COL, A2-DIM, and so on. These layers represent both the 1/4" scale titleblock layers and the lower-level plan information displayed on sheet A-2. This one drawing file actually contains a total of 12 drawing sheets! Let's turn some of these layers on and off to see how this drawing file works.

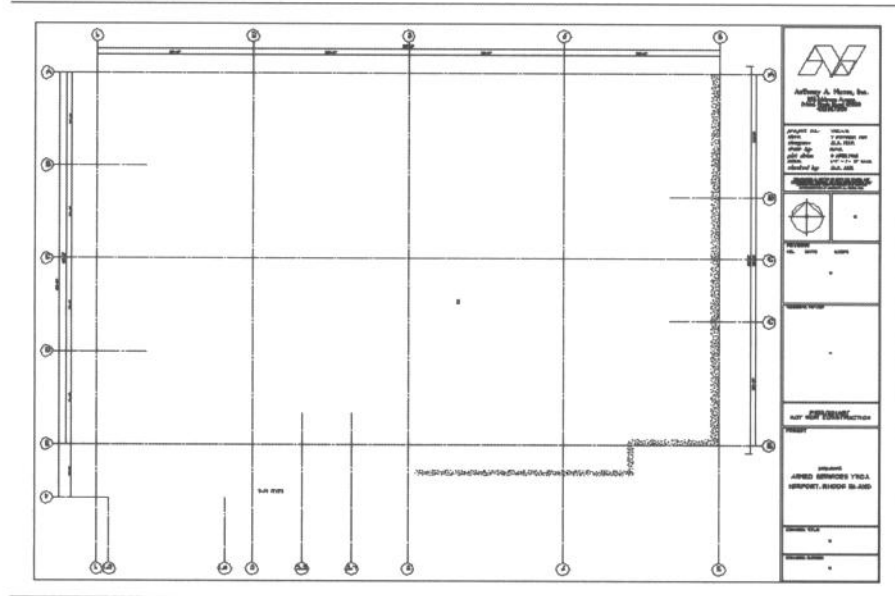
Sheet A-3: Upper-Level Plan

When the file is first opened, all the layers required to display sheet A-2 are turned on. Let's see how some of the layers for sheet A-2 are also used for sheet A-3:

1. Go to the **Utility/Layers** menu. Note which layers are on in the first page of layer names:
 - a. **14B-BDR**
 - b. **14B-BLK**
 - c. **14B-LOG**
 - d. **14B-NOR**
 - e. **14B-PRE**
 - f. **14B-SHT**
2. Go to the next menu of layer names using the **ScrIFwrd** button, and again note which layers are on:
 - a. **14B-TXT**
 - b. **14G-DIM**
 - c. **14G-GRD**
 - d. **14G-HCH**
 - e. **14G-SYM**
3. **ScrIFwrd** again to the third menu of layers. All the **A2** layers are currently turned on. **ScrIFwrd** to the fourth menu of layers and you will see the remainder of the 15 **A2** layers, all of which are on.

Figure 5-66

The building with only selected layers turned on



4. Select each of the 15 **A2** layer buttons to turn them all off, so that only the **14B** and **14G** layers remain on (see Figure 5-66).

To see which entities are on each of the remaining layers, turn each one off and then back on. Notice that all the **14B** layers contain all the entities associated with the sheet border and titleblock. As you will see, the remaining **14G** layers contain entities that are shared between both sheets A-2 and A-3.

5. **ScrIFwrd** to the fourth and fifth menus of layers and turn all the **A3** layers on.

Notice how the **14G** layers are applicable to the floor plan on sheet A3. This is a key concept not only for the Multiple Drawing technique, but for CAD in general, *never draw anything twice!* Since it's so important, let me say that again: *never draw anything twice!*

So let's take a quick inventory here. Here are all the entities that are on shared layers between sheets A-2 and A-3:

- Sheet outline
- Titleblock lines, text and north arrow
- Dimensions

- Column grid lines and bubbles
- Concrete wall hatching

The **14B** layers are also used for the A-1, A-4, A-5, A-8, E-1, E-2, P-1, and P-2 sheets. Hopefully, you can see the speed and efficiency gains here. The more you can reuse entities between sheets, plans, elevations, and details, the faster you can finish your drawings, and the better coordinated they will be.



NOTE: *If you are flustered by constantly scrolling forward and backward to turn layers on and off, and getting equally frustrated trying to remember which layers are supposed to be on and off for each drawing sheet, then you are in luck. There is a better way!*

Now might be a good time to skip ahead to Chapter 10 to check out a DataCAD feature called GotoViews. It's a way of saving all the layer information for each drawing sheet so that you can instantly display a complete sheet or a detail with only a few mouse clicks.

Coordination

With the multiple drawing technique, if you stretch the building by 10 feet, you can turn on both the first- and second-floor layers prior to making the stretch. Now you can be assured that the first and second floors remain perfectly aligned. If you want windows to align between the tenth and second floors, simply turn on the tenth and second floor layers so you can be sure they are aligned. If you draw ductwork or plumbing fixtures on one floor, you can immediately see where and how they impact the other floors.

Drawbacks

The idea of the Multiple Drawing technique is to achieve better accuracy, coordination, and speed. A drawback can occur, however, if more than one person in your office is sharing drawings over a network. Take the Ymcapln2.dc5 drawing file, for instance. In DataCAD, two people cannot work in the same drawing file at the same time, so only one person can work in the Ymcapln2.dc5 drawing file at one time. You can see that this would not work at all in an office of more than one person.