

Section 5

Productivity Macros

References & Resources	Chpt/Sect
1. Advanced Construction Drawing & Visualization CD-ROM	5

OBJECTIVES

- Make you aware of, and teach the basics of, six **Toolbox** macros to enhance productivity in 2D construction drawings, including:
 - DataCAD AEC (DCAD_AEC.DCX)
 - EZ Tools (EZTOOLS.DCX)
 - Steel Pro (STEELPRO.DCX)
 - Duct Pro (DUCTPRO.DCX)
 - Annotate (ANNOTATE.DCX)
 - Window Master (WDWMASTR.DCX)
- Be able to use these macros to more quickly produce professional quality construction drawings.
- A homework project is included on the Advanced Construction Drawing & Visualization CD-ROM.

NOTES

The first two macros, DataCAD AEC and EZ Tools, are standard macros that are installed in the \DCX directory in your DataCAD program folder. The remaining macros are not installed with DataCAD, but are available for free from the DataCAD web site. To avoid having to download the macros we've included them on the Advanced Construction Drawing & Visualization CD-ROM, located in the *Section-05* directory.

To install them simply copy the macro files (they each have a .DCX file extension, as listed in the OBJECTIVES, above) to the \DCX directory in your main DataCAD program folder (see the Read Only description at the top of page 14-1 in this manual). They will then be available to you in the list of macros when you select the **Toolbox** option in the **Edit** menu.

DataCAD 10 has replaced its old, Windows style Help files with a new Adobe Acrobat .PDF file called *DataCAD 10_Manual.PDF*. See the end of the "How to Use This Manual" Section for a description of how to install and access this file.

DATA CAD USER'S GUIDE CORRELATION

Although there are brief descriptions of some of these macros in *The Official DataCAD User's Guide*, none are covered in depth. Therefore they are covered here.

“DCAD_AEC” MACRO

This macro is one of the standard macros found in the DataCAD macro **Toolbox**, and actually contains several sub-macros that can help speed up your 2D drawing tasks, including:

- **DwgSheet**
- **Columns**
- **Walls**
- **Windows**
- **Doors**
- **Elevator**
- **Stairs**
- **RmLabels**
- **SqFtCalc**
- **Furnitur**
- **Plumbing**
- **Mechanic**
- **Electric**

Note that these macros are for 2D work. Although objects like windows, doors and elevators are drawn with some level of pseudo 3D abilities (called 2-1/2D in DataCAD), for true 3D windows and doors you will want to use the **AEC_Modl** macro, instead.

Some of these **DCAD_AEC** macros are more useful than others, and some are just shortcuts to standard DataCAD features outside of the macro. There are fairly good instructions on how to use each feature of the **DCAD_AEC** macro in the *DataCAD 10_Manual.PDF* file, available in the *Section-14* directory. Rather than duplicating that text, this Section will concentrate on an overview of each sub-macro, with some added notes and illustrations in areas where the *DataCAD 10_Manual.PDF* falls a little short.

DwgSheet

Since most users will develop their own drawing sheet over time, this macro may not be terribly useful, but if you are creating one for the first time you might want to try it out to get the basics of a drawing sheet done quickly. Instructions for this macro can be found on page 362 of the *DataCAD 10_Manual.PDF* file.



Figure 5-01: The DwgSheet menu.

Below, in Figure 5-02, is a drawing sheet created with the macro, and some of the settings that were used to create it.

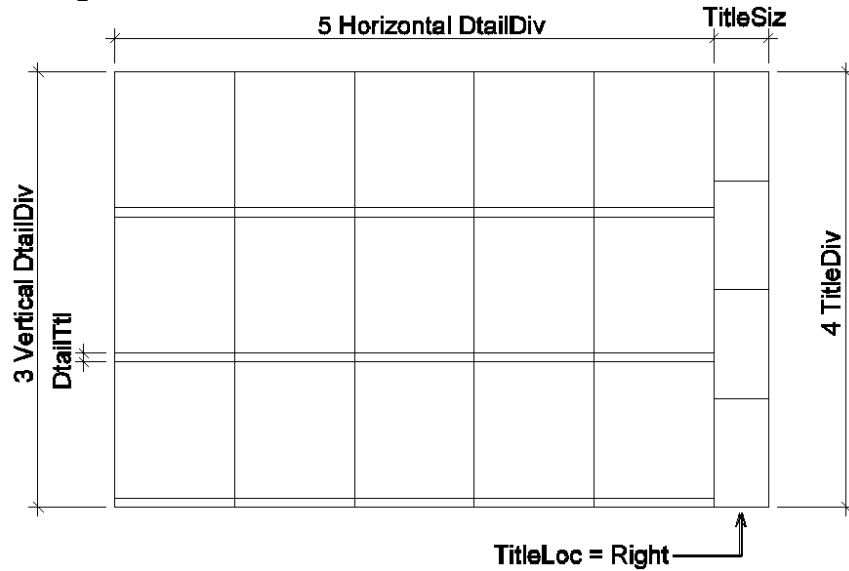


Figure 5-02: A 24"x36" drawing sheet with a right-side title block.

Columns

OneColumn (One Column): Page 227 of the *DataCAD 10_Manual.PDF* file has instructions for using this macro. The **OneColumn** option allows you to draw a single column by opening the standard *COLUMNS.TPL* symbol template, from which you can choose a column symbol for placement in the drawing.

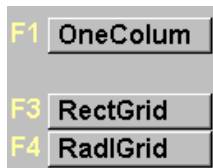


Figure 5-03: The Columns menu.

RectGrid (Rectangular Grid): This option allows you to automatically draw a rectangular grid of columns, also using the *COLUMNS.TPL* template. But this part of the macro is much more impressive than the **OneColumn** option, as you can not only place the columns on a grid, but the macro will draw the grid lines, draw the alphanumeric text and bubbles, and even put all the parts on one or more layers of your choosing.

Page 227 of the *DataCAD 10_Manual.PDF* file begins the instructions for using this part of the macro, but here are some notes about some of the specific features that are not detailed in the instructions:

SymbName

With the **OneColumn** option the *COLUMNS.TPL* template file is displayed so you can pick a column symbol. In a bit of a twist, the **SymbName** option forces you to pick a symbol directly from a *symbol* folder (not a template file). To do this, navigate to your \SYM folder, then to the subfolder with the COLUMNS folder in

it. From within that folder you directly pick the symbol you want. For instance, the *06x06S.SM3* symbol is a 6"x6" Square column, which you can see in the preview window at the right of the dialog box (make sure **Show Preview** is turned ON).

If you do not pick a symbol at all, then the macro will draw the full grid but without the columns, which is something you may want to do anyway, especially if the column symbols do not match any that you require. And you do not have to use the standard DataCAD column symbols. You can use your own symbols as well.

Layers

Use this option to set which layers the grid lines (**GridLayr**), circular label bubbles (**Sym Layr**) and the column symbols (**Col Layr**) are drawn on. You cannot create new layers from within this macro option, so the layers you want to use must already exist in the drawing file.

LnFactor

The grid lines will be drawn with whatever linetype is currently active in DataCAD. Therefore it is important that if you want your grid lines to be drawn with a **Dashed**, **PropLine**, or **CentrLin** linetype, you make that the current linetype *before* having the macro draw the grid lines. The **LnFactor** option in the macro allows you to set the spacing between the repeat of the linetype (Figure 5-04).

LnExtnsn

This defines the extension of the column grid lines past the center of the outermost columns. The setting will be applied identically to the left, right, top and bottom grid lines (Figure 5-04).

LbIOfst

This option draws a solid line of a specified length from the label bubbles to the grid lines (Figure 5-04). You might be tempted to set a value of zero (0) so you don't have any offset line, but the reason this option is there is because depending on the **LnFactor** of some linytypes, they may not be drawn with a clean connection to the label bubbles. Having a solid **LbIOfst** line ensures that there is always a good connection.

CharSize

Unlike the rest of DataCAD, **TxtScale** does not work with this macro. Instead you have to figure out the real world height of the text you want, just like in the "old days", as described on page 229 of the *DataCAD 10_Manual.PDF* file.

CharName

This defines the starting number for the horizontal labels, and the starting letter for the vertical labels. The macro only creates numbers horizontally and letters vertically. You do not have the option of creating numbers vertically and letters horizontally (Figure 5-04).

CharFont

As this is an older macro it can only use DataCAD .CHR fonts. True Type fonts (TTF) are not supported, though you can of course change them to a TTF after the fact.

Note that the size of the circular label bubbles is determined in proportion to the size of the text, so you don't have direct control over the shape or size of the bubbles.

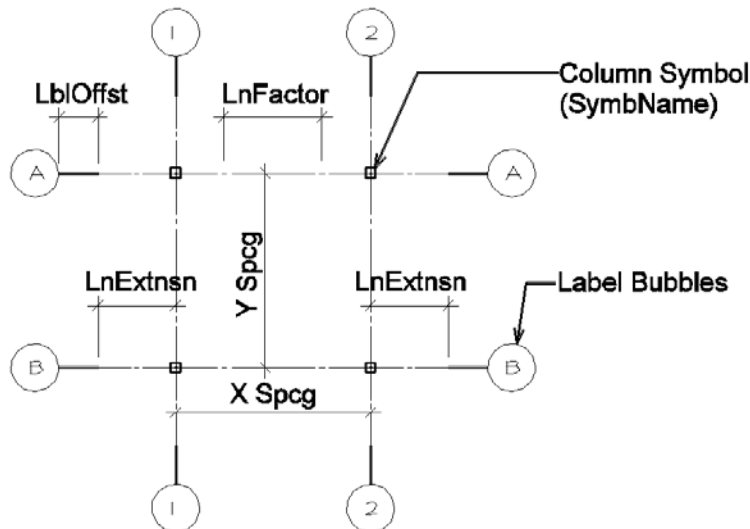


Figure 5-04: Label and grid line settings

RadiGrid (Radial Grid): This option allows you to automatically draw a circular or radial arc grid of columns, also using the *COLUMNS.TPL* template. Like the **RectGrid** option, you can place the columns on a grid, and the macro will draw the grid lines, draw the alphanumeric text and bubbles, and even put all the parts on one or more layers of your choosing.

Page 229 of the *DataCAD 10 Manual.PDF* file begins the instructions for using this part of the macro, but here are some notes about some of the specific features that are not detailed in the instructions:

SymbName

See the notes about this option in the **RectGrid** descriptions, above.

Layers

See the notes about this option in the **RectGrid** descriptions, above.

LnFactor

See the notes about this option in the **RectGrid** descriptions, above. (Figure 5-05).

LnExtnsn

See the notes about this option in the **RectGrid** descriptions, above. (Figure 5-05).

LblOffst

See the notes about this option in the **RectGrid** descriptions, above. (Figure 5-05).

CharSize

See the notes about this option in the **RectGrid** descriptions, above.

CharName

This defines the starting number for the radial labels, and the starting letter for the curve row labels. The macro only creates numbers for the radials and letters for the curved rows. You do not have the option of creating numbers for the curved rows and letters for the radials.

CharFont

See the notes about this option in the **RectGrid** descriptions, above. (Figure 5-05).

Note that the size of the circular label bubbles is determined in proportion to the size of the text, so you don't have direct control over the shape or size of the bubbles.

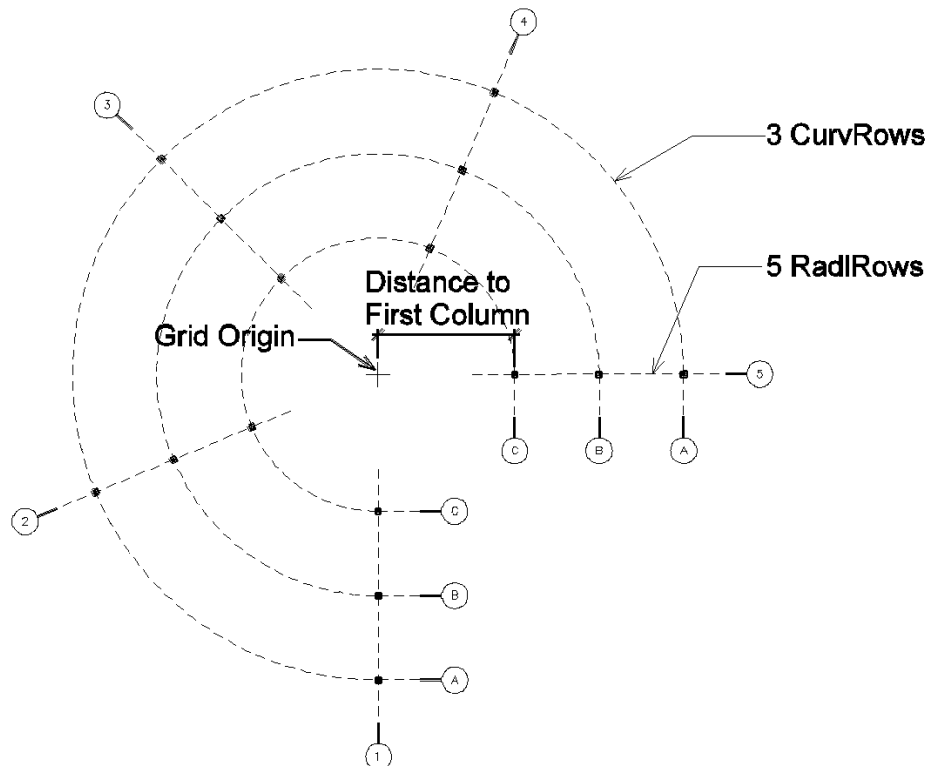


Figure 5-05: Label and grid line settings with an **IncAngl** of 270 degrees

Walls

This duplicates the standard DataCAD **Architct/Walls** option, but has fewer settings to customize walls. Its function here is just to add the convenience of accessing some of the basic wall commands while running the **DCAD_AEC** macro.

Windows

The **OneWindw** option accesses the standard DataCAD **Architct/Windows** option. But the **LinrWndw** (Linear Window) and **CircWndw** (Circular Window) options add features that cannot be found in the standard **Windows** option. In all cases, these are 2D, plan-view windows, and not 3D windows.

LinrWndw and CircWndw

Beginning on page 192 of the *DataCAD 10_Manual.PDF* file are instructions for using these options. With them you can create strips of linked straight and curved windows, as you might see in curved wall, or a commercial aluminum storefront. Figure 5-06 contains some examples of windows created with this macro.

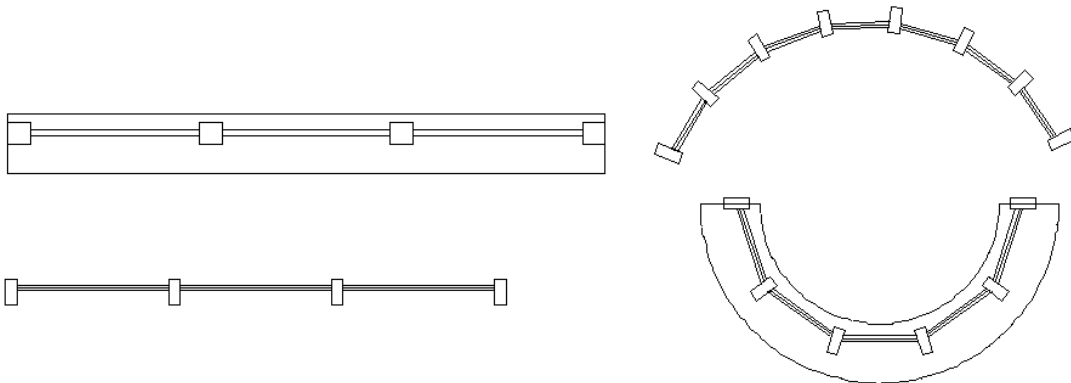


Figure 5-06: Linear and circular windows, with and without sills.

HeadHght and **SillHght** are the standard options from the **Architct/Windows** option, used to set the heights of the windows for viewing in 3D. But keep in mind these are 2D windows that have very limited 3D viewability.

Doors

This is simply a shortcut to the standard DataCAD **Doors** option in the **Edit/Architct** menu. Its function here is just to add the convenience of accessing some of the basic door commands while running the **DCAD_AEC** macro.

Elevator

Page 232 of the *DataCAD 10_Manual.PDF* file has instructions for using this macro, which will create the shaft walls and cabs, including doors, for one elevator or a bank of elevators. The basic set of options are deceptively simple. Figure 5-07 shows several elevators created with this macro.

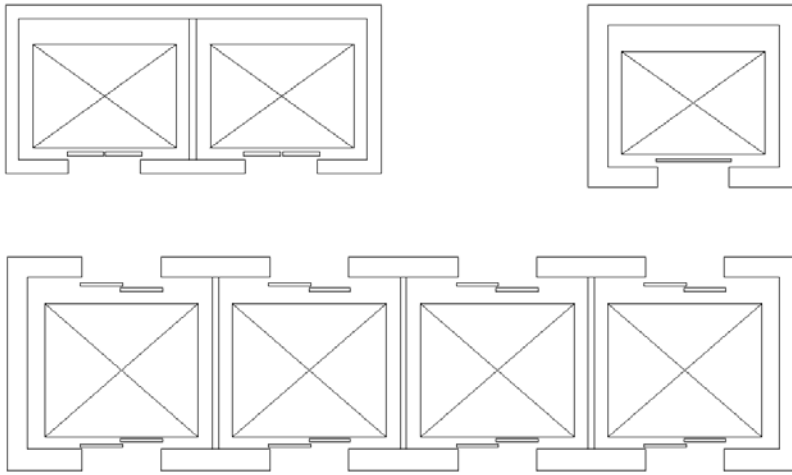


Figure 5-07: Elevators created with the macro.

Figures 5-08 and 5-09 show the various settings for the elevator cabs and shaft walls.

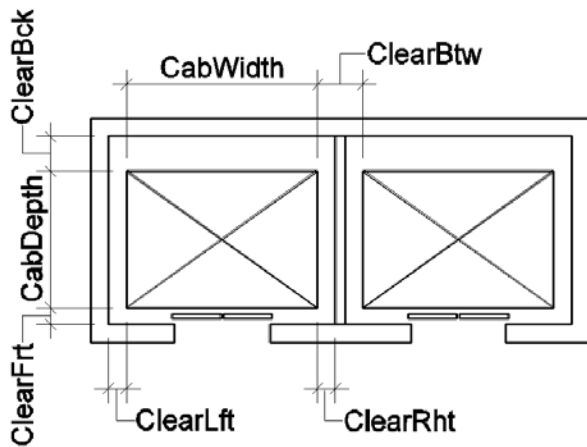


Figure 5-08: Elevator cab options.

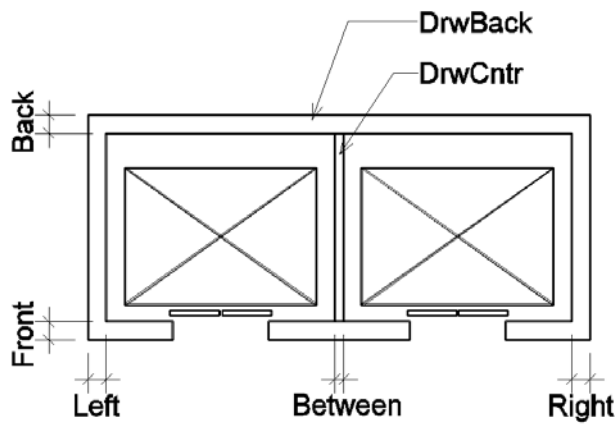


Figure 5-09: Elevator shaft wall options.

Stairs

Beginning on page 225 of the *DataCAD 10_Manual.PDF* file are instructions for using this macro. Figure 5-10 shows several stairs created with this macro. Interestingly, there is no way to create a straight run of stairs. The macro always creates a double-back stair type. For a straight run you could double the number of risers needed, create the stair, then erase half of it.

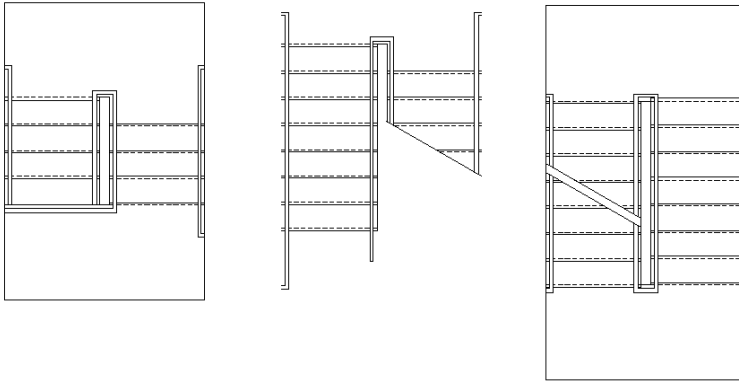


Figure 5-10: Stairs created with the macro.

The macro options in the *DataCAD 10_Manual.PDF* file are fairly self-explanatory. A little experimentation will have you creating stairs in no time.

One other way to create 2D stairs with more options is to use the **3Dstairs** macro. View the results in **Ortho** view, then use the **3DEdit/Hide** option and save the 2D results. One of the benefits to this method is that you can also do the same thing to view and save a 2D view of the stairs in elevation view as well.

RmLabels

This is a great macro for creating a series of tags for room numbers, door numbers, or anything else that needs a sequential set of alphanumeric tags. Figure 5-11 shows three series of sequential tags created with this macro.

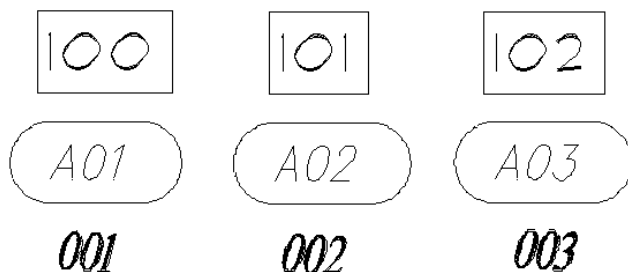


Figure 5-11: Room labels.

In Figure 5-11 the top two sets of labels were created with the **Box** and **Capsule** options, while the bottom set was created with the **None** option. But it's the *sequential* aspect of this macro that saves so much time. In the first example we used "100" as the first tag number. After that, the macro automatically created the rest of the sequence, 101, 102, etc., with each new tag we placed. In the second example we used "A01" as the first tag number, then the next alphanumeric numbers were created

automatically. The is also true of the last example. If I were placing room numbers in a 500 room hotel I would sure want to use this macro.

As this is an older macro it can only use DataCAD .CHR fonts. True Type fonts (TTF) are not supported, but of course you can change them to a TTF after the fact.

SqFtCalc

You can use this to outline any zone, space or area. The macro will calculate the square footage of those areas and create a .TXT file with that information (in the Common Area Factor column). That .TXT file will also have a number of other columns like Net Rentable, Floor Common Service, and a other columns used in commercial real estate calculations. Unfortunately the macro does not fill in those other columns for you.

You might find some uses for this macro, but I never have.

Furnitur

This macro is simply a shortcut to your \TMP (Template) file folder, where you can pick a furniture symbol and place it in the drawing.

Plumbing

This macro is much more interesting and complex than the **Furnitur** macro. It not only has a shortcut for picking plumbing symbols, but it allows you to create lines of multiple plumbing fixtures and toilet partitions.

After selecting this macro a single **PlumbSym** button appears. Like the **Furnitur** macro selecting this option will open your \TMP (Template) file folder so that you can pick any plumbing fixtures you want to place in the drawing file. But if you do NOT pick the **PlumbSym** button you will see a message at the bottom of your screen that says, *“Enter first point along fixture wall.”*

To create a line of fixtures:

1. Select or snap to the first point where you want the line of fixtures to be drawn. You will be prompted to *“Enter second point along fixture wall.”*
2. Select or snap to the ending point for where you want the line of fixtures to be drawn. You will be prompted to *“Point to side of wall on which to add fixtures.”*
3. *Click* on the side of the line where you want to fixtures to be placed.
4. A new menu appears, as shown in Figure 5-12.

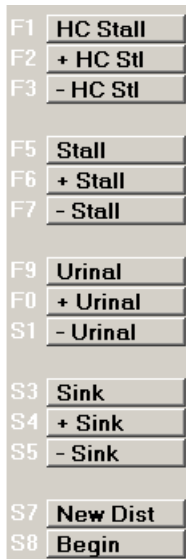


Figure 5-12: The Plumbing fixture menu.

- Use the **+** and **-** options to add and delete fixtures from the list of fixtures to be drawn. For instance, click on the **+ HC Stl** option to add a handicap toilet stall to the list. The current list of fixtures is shown at the bottom of the screen, as in Figure 5-13. Notice that you are also given the “*Space left*” so you can see how the addition and subtraction of fixtures will fit within the two points selected in steps 1 and 2.

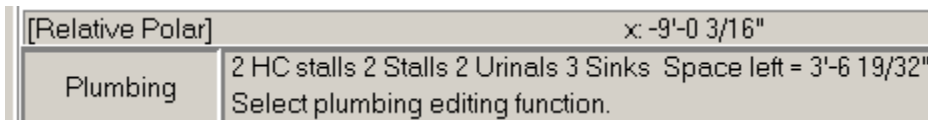


Figure 5-13: The current fixture count.

- Once you have the list of fixtures that you want, select **Begin**. The stalls and the selected plumbing fixtures will be drawn. Figure 5-14 shows one series of fixtures drawn with the macro.

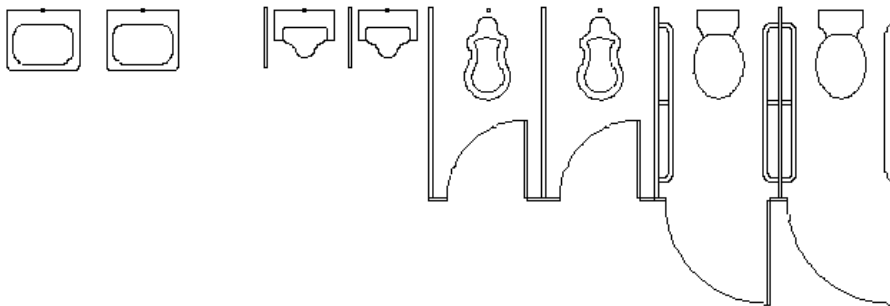


Figure 5-14: A line of fixtures drawn with the Plumbing macro.

To edit the parameters of the fixtures:

- Select either **HC Stall**, **Stall**, **Urinal** or **Sink**.

2. Select and change each parameter as required. The **ToiltSym**, **ToilSym**, **UrnlSym** and **SinkSym** options allow you to pick the appropriate bathroom fixture symbol from your DataCAD \SYM folder.

This method forces you to pick a symbol directly from a *symbol* folder (not a template file). To do this, navigate to your \SYM folder, then to the subfolder with the appropriate bathroom fixtures in it. From within that folder you directly pick the symbol you want. For instance, the *WALLHUNG.SM3* symbol in the \TOILETS folder is a wall hung toilet fixture which you can see in the preview window at the right of the dialog box (make sure **Show Preview** is turned ON).

Mechanic

This macro is simply a shortcut to your \TMP (Template) file folder, where you can pick a mechanical equipment or device symbol and place it in the drawing.

Electric

After selecting this macro, **ElecSym** and **CeilGrid** buttons appear. Like the previous macros, selecting the **ElecSym** option will open your \TMP (Template) file folder so that you can pick any electrical fixtures you want to place in the drawing file. But if you pick the **CeilGrid** button you will see another set of menu options for creating suspended ceiling grids (Figure 5-15).

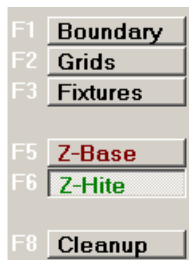


Figure 5-15: The **CeilGrid** menu options.

Page 345 of the *DataCAD 10_Manual.PDF* file begins the instructions for how to use the **CeilGrid** macro, and describes all the options. But some of the highlights in the **CeilGrid/Fixtures** sub menu are worth noting here.

UseSymb

With this option turned ON, **SymbName** will be available in the menu, allowing you pick the electric light or other fixtures to be placed in the ceiling plan from your DataCAD \SYM folder. With this options turned ON, the **UsePoly** option will automatically be turned OFF.

Use Poly

With this option turned ON, **PolySize** will be available in the menu, allowing you to place a polyline in the ceiling plan to represent a light fixture, rather than using a symbol.

PolySize

This option will only be visible if the **UsePoly** option is turned ON. Selecting it will show you a list of standard rectangular and round ceiling light fixture sizes, along

with options to create custom sized polyline fixtures. You will want to select a **Color** and/or **LineWdth** that will print dark enough to be seen and recognized as a light fixture in your ceiling plan.

SymbName

This option will only be visible if the **UseSymb** option is turned ON. It allows you pick the electric light or other fixtures to be placed in the ceiling plan from your DataCAD \SYM folder.

This method forces you to pick a symbol directly from a *symbol* folder (not a template file). To do this, navigate to your \SYM folder, then to the subfolder with the appropriate electrical fixtures in it. From within that folder you directly pick the symbol you want. For instance, the *RECT4X2.SM3* symbol in the \ELEC folder is a 2' x 4' fluorescent light fixture which you can see in the preview window at the right of the dialog box (make sure **Show Preview** is turned ON).

Cutout

This option will automatically remove the ceiling grid spline that would otherwise run through something like a 2'x4' ceiling fixture placed in a 2'x2' grid (Figure 5-16). The cutout is made when a symbol or polyline light fixture is place in the ceiling grid.

Figure 5-16 shows a ceiling grid created with the macro, including symbol and polyline light fixtures. In this example the **Cutout** option was used to remove the ceiling splines that would have otherwise run through the 2'x4' and round ceiling fixtures. Note that the interior lines of the ceiling grids are individual 2D lines, and not an associative hatch pattern.

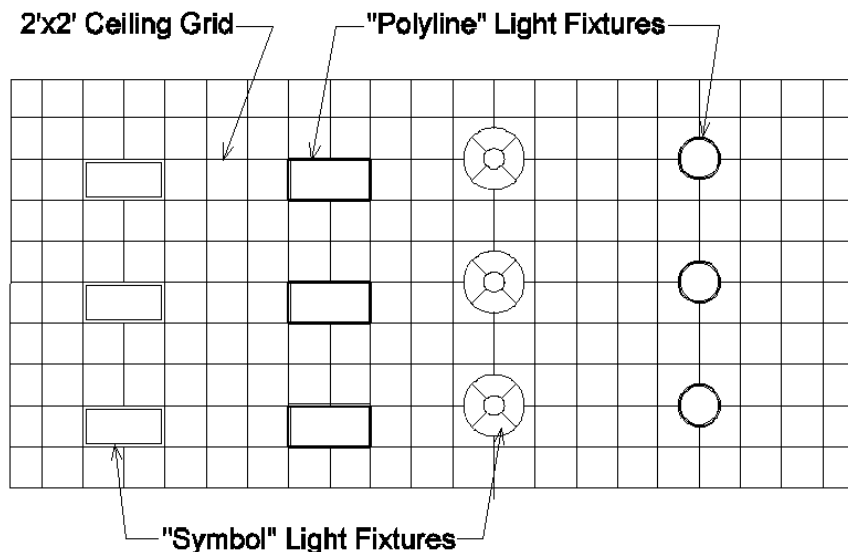


Figure 5-16: A ceiling grid created with the macro.

“EZ Tools” MACRO

This macro is also a standard DataCAD macro, and allows you to parametrically draw 2D residential or commercial elevations and sections of the following objects:

Elev (Elevations):

- Exterior elevation views of residential structures, including walls and roofs.
- Elevation views of doors.
- Elevation views of windows.
- Elevation views of interior cabinets.

Section:

- Sections through interior cabinets.

Instructions for this macro begin on page 365 of the *DataCAD 10_Manual.PDF* file. Figure 5-17 shows some examples of what you can do with this macro. Sub-menus include those shown in Figures 5-18 and 5-19.



Figure 5-17: These were all crated with the EZ Tools macro.

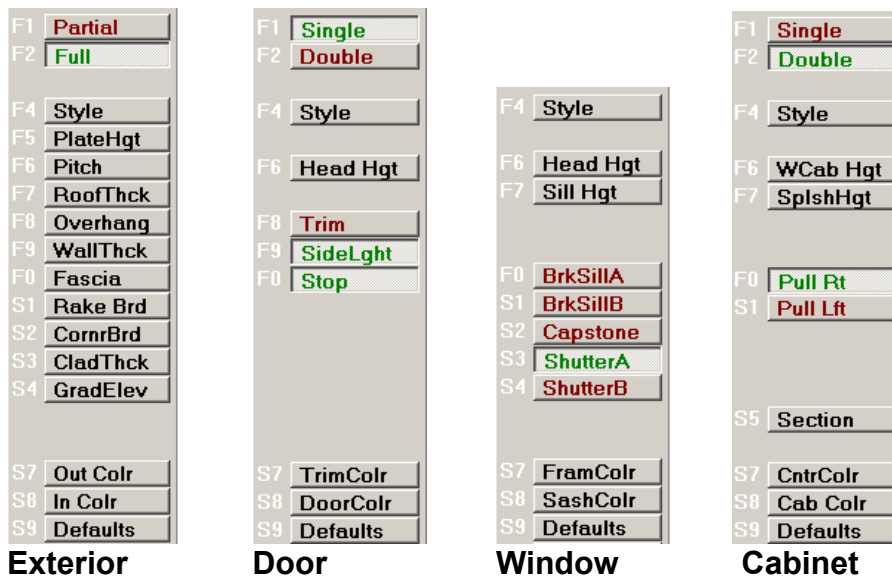


Figure 5-18: The Elev menus.



Cabinet

Figure 5-19: The Section menu.

“SteelPro” MACRO

This macro is one of my absolute favorites, since in my own practice we do a great deal of commercial construction using steel columns and beams. The macro is not one that comes with DataCAD, but it is available for free from the DataCAD web site. Of course, to make it easier for you we’ve included it on the [Advanced Construction Drawing & Visualization](#) CD-ROM, located in the *Section-05* directory. Figure 5-20 shows some examples of what you can do with this macro.

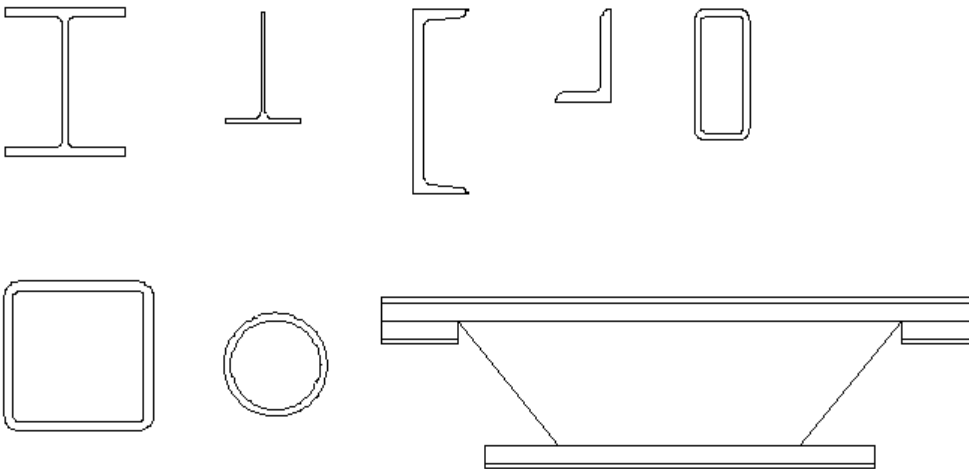


Figure 5-20: These were all crated with the **SteelPro** macro.

This macro will draw every piece of industry-standard steel, in section, elevation and plan. Over time I have verified that every dimension is exactly accurate. All the shapes are drawn with 2D lines and arcs, but if you want the sections filled with a cross hatch pattern you will have to do that yourself, manually.

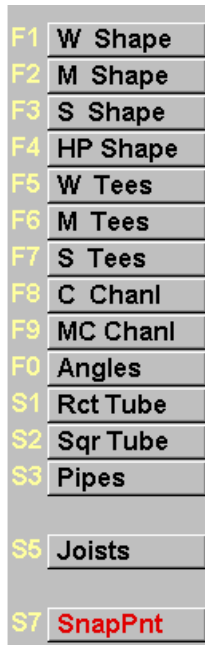


Figure 5-21: The main **SteelPro** menu.

Each option in the main menu shown in Figure 5-21 works like the next, so we'll go over the **W_Shape** option as a typical example. To create a section of a steel W12x30 shape (a 12" tall wide-flange steel section, weighing 30 pounds per linear foot):

1. *Click* on the **W_Shape** button. The **W_Shape** menu will appear.
2. *Click* on the **W12** button. The **W12** menu will appear. Here is where you select what view the steel shape will drawn in, and which size W12 to draw.
3. *Click* on the menu button next to the **F1** label. It will toggle between **Centjst** (center of joist) and **Topjst** (top of joist). As you hold the cursor over the button you will see a description of the current selection. **Centjst** will insert the steel shape by its center point. **Topjst** will insert the steel shape by the top-center of the steel. For this example select **Topjst**.
4. *Click* on the menu button next to the **F2** label. It will toggle between **SectVw** (section view), **SideVw** (side view), and **TopVw** (top view). As you hold the cursor over the button you will see a description of the current selection. For this example select **SectVw**.
5. At the bottom of the screen the message line will say something like, "*Enter TOP of steel shape.*"
6. Locate the cursor in the Drawing Window and *click* to locate the top-center of the joist (in this example). An outline of the steel shape will be displayed.
7. Move the cursor until the steel shape is in the proper orientation. *Click* the mouse again and the steel shape will be drawn, as in the first image in Figure 5-22.

If you also choose the **SnapPnt** option, a snap point will be drawn at the point where the steel shape is inserted.

Figure 5-22 also shows the same W12x30 steel shape drawn with **SideVw** and **TopVw**. In the top view, the 2 hidden lines of the flange are automatically drawn as dashed lines. However, the spacing of the dashed lines is determined by the current linetype spacing.

If that spacing is too large the two lines may appear solid, and you might have to manually change the spacing to look right.



Figure 5-22: The W12x30 shape in section, elevation and plan views.

“DuctPro” MACRO

This macro will draw ductwork in section, elevation and plan. All the shapes are drawn with 2D lines and arcs. Like the **SteelPro** macro, this one is not one that comes with DataCAD, but it is available for free from the DataCAD web site. Of course, to make it easier for you we’ve included it on the [Advanced Construction Drawing & Visualization](#) CD-ROM, located in the *Section-05* directory. The description of the macro from the DataCAD web site reads:

DuctPRO is an easy-to-use drafting package for inserting HVAC ductwork in your drawings. By simply selecting a width and depth (for rectangular ductwork), or a diameter (for round ductwork), and then locating the points on the duct run, the user can create a full 2D or 3D ductwork drawing. Choices for duct type (rectangular or round), sizes, Z elevation, elbows and branches are all available from the menu. In addition, the user can set DuctPRO to draw ductwork to the left, center, or right of given points as well as flat-on-bottom, flat-on-top, or centered on the Z elevation. The ductwork elbows, reductions, branches, vanes, and text are all drawn as you select points.

Figure 5-23 shows two examples of what you can do with this macro, in both 2D and 3D.

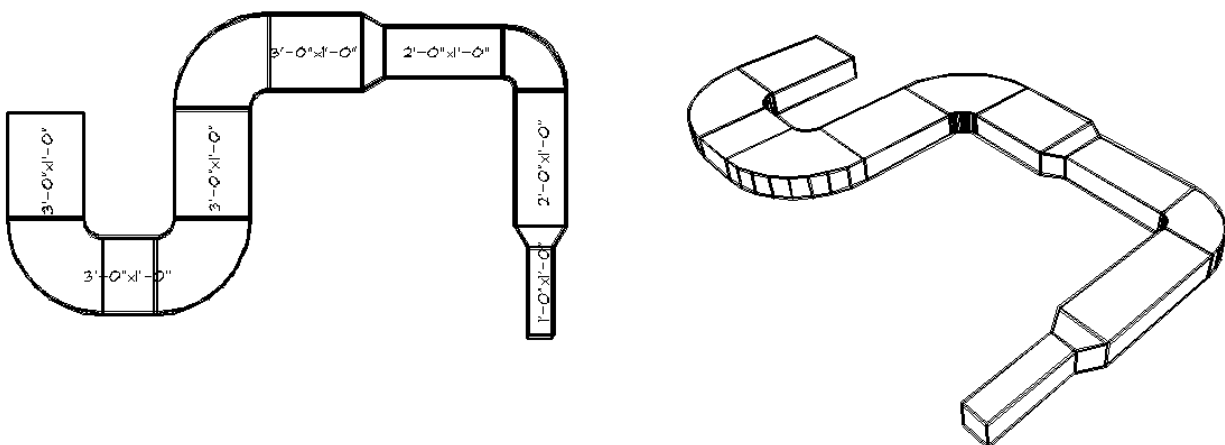


Figure 5-23: A 2D and 3D duct run drawn with the **DuctPro** macro.

The text parameters (size, font, color, etc.) will be drawn according to the current text settings, so be sure to set your text appropriately prior to running the macro.

Rctangle

Select this option to draw ducts with rectangular shapes. This option will only be visible when the **Round** option is not.

Width

Set the width of the rectangular ducts. You can change this setting on the fly as you draw a duct run. The macro will automatically create an elbow or a straight transition between the two different sized ducts (Figure 5-23).

Depth

Set the depth of the rectangular ducts. For 2D ducts this setting will only matter to you if you are inserting text with the ducts. For 3D ducts this value is used to draw the z-height of the duct. You can change this setting on the fly as you draw a duct run. When drawing a 3D duct run the macro will automatically create an elbow or a straight transition between the two different sized ducts (Figure 5-23).

Round

Select this option to draw ducts of round shapes. This option will only be visible when the **Rctangle** option is not. The macro will NOT draw round ducts in 3D, however.

Diameter

Sets the diameter of the ducts.

Z_elev

Sets the z-elevation of the 2D or 3D ducts to be drawn. 3D ducts will be drawn relative to the **FOB**, **FOT** or **Equal** options as set in the **Defaults** menu.

ShowTxt

If turned ON, text will be drawn on each straight run of duct, describing the size (width, depth or diameter) of the duct section. If turned OFF then no text will be drawn.

w/Slash

When selected, this option will place a forward slash (/) to separate the width and depth values of the duct run, and the inch symbols (") will not be shown, like this: 1'-0/1'-0.

w/Inch

When selected, this option will place an "x" to separate the width and depth values of the duct run, and the inch symbols (") will be shown, like this: 1'-0"x1'-0".

NewDuct

Select this option to draw main duct lines. This option will only be visible when the **Branch** option is not.

Branch

Select this option to draw branch duct lines off of the main duct lines. This option will only be visible when the **NewDuct** option is not.

BrnchTyp

Select this option to pick the type of transition ductwork to be shown when drawing the branch line off the main duct line.

Wye, 45Entry & Tee

Select the type of transition. A Wye is a curved transition; a 45 Entry is an angular transition; a Tee is a straight transition. With **Tee** selected you have an additional option for extractor vanes.

ShwExtr

With this option turned ON, curved extractor vanes will be drawn at the branch transition. When turned OFF the extractors will not be drawn.

Defaults

Select this to set the major options for rectangular and round ducts, including whether they are to be drawn in 2D or 3D.

RndElbw

Selecting this option will draw round elbows between duct runs. This option will only be displayed when **SqrElbw** is not.

Ratio

Sets the ratio of the elbow radius to the width (0.5 to 1.5 is standard).

Arc_Div

Sets the number of arc divisions for round elbows.

SqrElbw

Selecting this option will draw rectangular elbows between duct runs. This option will only be displayed when **RndElbw** is not.

ElbLng

Sets the length for the elbow turn (the straight run between the curved part of the elbow and the following straight run of the elbow).

ShwVane

With this option turned ON, curved vanes (to direct the air flow) will be drawn in the square elbows between duct runs.

Left, Center & Right

Determines whether the duct runs will be drawn to the left, right or center of the given direction of the ductwork. In other words, when you specify the start and end points for a run of ductwork, the ductwork will be drawn to the left, right or center of the line described by those two points.

Draw_2D

With this option displayed, all ductwork will be drawn orthographically in 2D. This option will only be displayed when the **Draw_3D** option is not.

Draw_3D

With this option displayed, all ductwork will be drawn in 3D, but you can only draw the ductwork while in **Ortho** mode. It will only be displayed when the **Draw_2D** option is not.

FOB (Flat on Bottom)

With this option turned ON, ductwork will be drawn with the bottom of the ductwork at the z-elevation as set with **Z_elev**.

FOT (Flat on Top)

With this option turned ON, ductwork will be drawn with the top of the ductwork at the z-elevation as set with **Z_elev**.

Equal

With this option turned ON, ductwork will be drawn centered on the z-elevation as set with **Z_elev**.

RedLng (Reduction Length)

With this option turned ON, you can set a specific value for the length of the duct reductions between dissimilar sized ducts. With it turned OFF, the macro will calculate a standard duct reduction based on the difference between the dissimilar sized ducts.

Colors & Weights

Use these two options to set the color and the line weight of the ducts (**DuctCol**, **DuctWgt**), text (**TextCol**, **TextWgt**), and vanes (**VaneCol**, **VaneWgt**).

Settings

Click on this button and many of the current settings will be shown in the message line at the bottom of the screen, including the Width, Depth, Z-elev and type of Elbow.

ScaleTyp

When text is to be drawn over the duct runs, this option sets the scale type to be inserted. After clicking on this option you can pick from the menu shown in Figure 5-24.

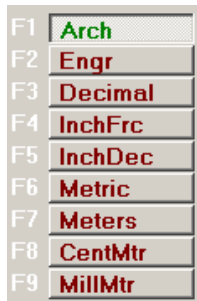


Figure 5-24: The ScaleTyp menu.

“Annotate” MACRO

This macro is another one that does not come with DataCAD, but it is available for free from the DataCAD web site. To make it easier for you we’ve included it on the [Advanced Construction Drawing & Visualization CD-ROM](#), located in the *Section-05* directory. With you can create a variety of typical construction drawing notation elements.

Titles

This option inserts drawing detail titles with or without detail bubbles, horizontal lines, north arrows, detail reference numbers, and/or the scale of the detail. The menu looks like Figure 5-25.



Figure 5-25: The Titles menu.

And Figure 5-26 shows some detail titles created entirely with the **Titles** option. Note that they were each created in a size that matches the selected detail scale.

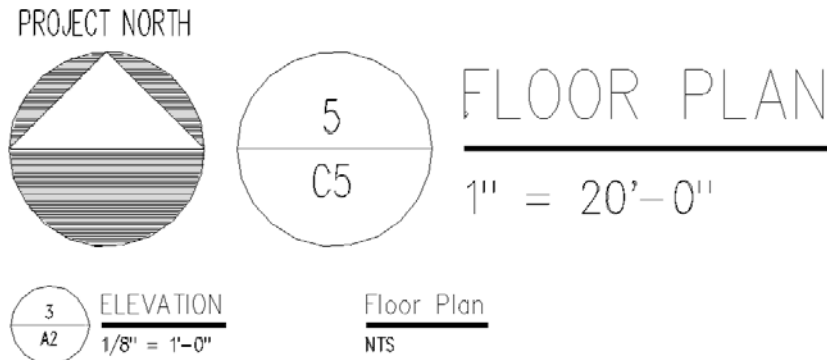


Figure 5-26: Titles created by the Titles macro.

Unfortunately you don't have any control over things like the font name or line weights, but if you need some reasonably good looking titles in a hurry, this macro can help. The various options are as follows:

UndrLin

With this option turned ON, a horizontal line will be drawn under the title.

NTS

If turned ON, the letters "NTS" (not-to-scale) will be shown below the title, rather than the actual scale. With this option turned OFF the actual scale (selected with the **Scale** option) will be displayed.

Detail

When turned ON, the detail bubble (the circle with the reference numbers in it) will be drawn. With this option turned OFF the detail bubble will not be drawn at all.

North

If turned OFF, no north arrow will be drawn. With this option turned ON, a north arrow will be drawn. The following options will also be displayed when this option is ON.

Up, Down, Left, Right

Determines if the arrow will be drawn pointing up, down, left or right.

Angle

Select this if you want to enter your own direction for the north arrow to point to.

NrthWord

When turned OFF, no text will be drawn with the north arrow. If turned ON you will have 6 options for the text to be printed with the north arrow:

PlnNrth (Plan North), **TruNrth** (True North), **MagNrth** (Magnetic North), **BldNrth** (Building North), **PrjNrth** (Project North), **North** (North).

RefNmbr

With this option turned ON, you will be prompted for the detail and drawing sheet numbers. If turned OFF, you will not be prompted to enter any values, and the last values that were entered will be used by default.

Caps

If you turn this ON then all text will be drawn in upper case (CAPS) letters, no matter what case you type the text in. If turned OFF, text will be drawn in whatever case you type.

Scale

Use this to select what scale the title should be drawn at. Not only will the macro draw the title and detail bubble at a scale to match your detail, but the text of the selected scale will also be inserted. You can pick either an **Arch** (architectural) scale, or an **Engineer** scale. All text is drawn at a relative size of 1/8", based on the identical **Plotter/Scale** setting. In other words, if you select a **Titles/Scale** of 1/4", the text will be created so that it will measure 1/8" high when printed/plotted at a **Plotter/Scale** of 1/4". And if you select a **Titles/Scale** of 1-1/2", the text will be created so that it will measure 1/8" high when printed/plotted at a **Plotter/Scale** of 1-1/2".

SectCut (Section Cut)

With this you can create a section cut symbol, as in Figure 5-27.

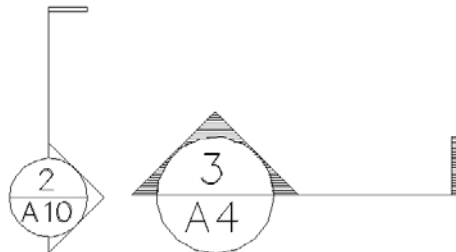


Figure 5-27: Section cuts made with SectCut.

The **SectCut** menu has five options, as follows:

CrcIDia (Circle Diameter)

Select this option, then enter a value for the size of the circle of the section cut tag. It works in conjunction with the **Scale** option to give you a circle sized to match that scale when plotted. But this option does not work like you might expect. The **CrcIDia** number you enter here determines the diameter of the circle in increments of 1/8". In other words, if you enter a value of **1.0** the circle will be drawn at a diameter of 1/8". A value of **2.0** would draw a circle with a diameter of 1/4" (2 x 1/8").

You must also keep in mind that depending on the plot scale (**Plotter/Scale**) used, the size of the circle and the text inside will vary. In order for the above rule to apply, you must plot the circle at the same scale you selected in the macro's **Scale** option (described below). For instance, if the **Scale** is set to **1/4"** and the circle diameter is set to **4.0**, the circle will be drawn at a real world size of 1/2" in diameter (4 x 1/8") when plotted at a scale of 1/4" (**Plotter/Scale** = 1/4").

All the text in the circle is created at a height of 1/8" (by default), relative to the selected **Scale**.

Hatch

With this option turned ON both the arrow and the flag will be hatched, as in the image on the right in Figure 5-27. The hatching is non-associative, so it is just a bunch of individual lines.

RefNmbr (Reference Number)

With this option turned ON, you will be prompted for the detail and drawing sheet numbers. If turned OFF, you will not be prompted to enter any values, and the last values that were entered will be used.

Caps

If you turn this ON then all text will be drawn in upper case (CAPS) letters, no matter what case you type the text in. If turned OFF, text will be drawn in whatever case you type.

Scale

Use this to select the plot scale (**Plotter/Scale**) that the circle tag will be plotted at. You can pick either an **Arch** (architectural) scale (1/8", 1/4", etc.), or an **Engineer** scale (1:20, 1:100, etc.). All the text in the circle is created at a height of 1/8" (by default), relative to the selected **Scale**.

To use the macro, after setting the values above:

1. *Click* once to define the center of the circle.
2. *Click* a second time to define the end of the line with the flag on it. The cursor will then have two rubber-banding lines attached to it, allowing you to define in which direction to point the arrow and flag.
3. *Click* a third time to set the direction of the flag and arrow.

4. If you turned ON the **RefNnbr** option then you will be prompted for the top and bottom values. Type in the values and press **Enter**.
5. The section cut will be drawn.

ElevMark (Elevation Marker)

This feature is very similar to the Section Cut macro, but it does not draw a line and a flag. Instead it will draw only the circle, text, and arrow. You have the additional options to draw or not draw the arrow, or to draw the arrows on all 4 sides of the circle (some designers use this to denote 4 interior elevations by adding a letter or number in front of each point of the arrows). Figure 5-28 shows several examples. The one farthest to the right has been embellished by adding numbers to identify interior elevations, as described previously.

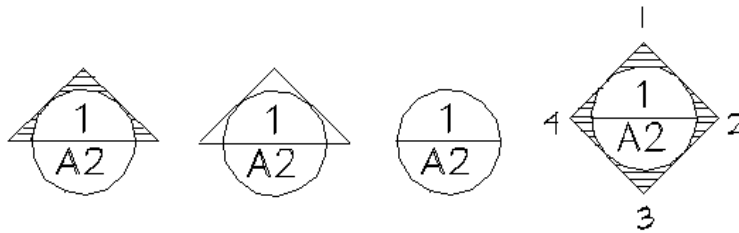


Figure 5-28: Elevation Marker examples. The far right one, drawn with **4-way**, has had additional text added manually to the arrow points.

The **ElevMark** menu has seven options:

CrcIDia (Circle Diameter)

Select this option, then enter a value for the size of the circle of the elevation tag. This option works in conjunction with the **Scale** option to give you a circle sized to match that scale when plotted. But this option does not work like you might expect. The **CrcIDia** number you enter here determines the diameter of the circle in increments of 1/8". In other words, if you enter a value of **1.0** the circle will be drawn at a diameter of 1/8". A value of **2.0** would draw a circle with a diameter of 1/4" (2 x 1/8").

You must also keep in mind that depending on the plot scale (**Plotter/Scale**) used, the size of the circle and the text inside will vary. In order for the above rule to apply, you must plot the circle at the same scale you selected in the macro's **Scale** option (described below). For instance, if the **Scale** is set to **1/4"** and the circle diameter is set to **4.0**, the circle will be drawn at a real world size of 1/2" in diameter (4 x 1/8") when plotted at a scale of 1/4" (**Plotter/Scale** = 1/4").

All the text in the circle is created at a height of 1/8" (by default), relative to the selected **Scale**.

Hatch

With this option turned ON, the arrowhead (if selected) will be hatched, as in the first and last images in Figure 5-28. The hatching is non-associative, so it is just a bunch of individual lines.

ArrHead (Arrow Head)

With this option turned ON an arrowhead will be draw off of the circle. If turned ON, the **4-way** option will also be displayed underneath.

4-way

This option will draw 4 arrowheads around the circle, as seen at the far right of Figure 5-28.

RefNubr (Reference Number)

With this option turned ON, you will be prompted for the detail and drawing sheet numbers. If turned OFF, you will not be prompted to enter any values, and the last values that were entered will be used by default.

Caps

If you turn this ON then all text will be drawn in upper case (CAPS) letters, no matter what case you type the text in. If turned OFF, text will be drawn in whatever case you type.

Scale

Use this to select the plot scale (**Plotter/Scale**) that the circle tag will be plotted at. You can pick either an **Arch** (architectural) scale (1/8", 1/4", etc.), or an **Engineer** scale (1:20, 1:100, etc.). All the text in the circle is created at a height of 1/8" (by default), relative to the selected **Scale**.

To use the macro, after setting the values above:

1. *Click* once to define the center of the circle. A square or house-shaped bounding box (depending on which options you have selected) representing the symbol will be displayed.
2. Rotate the bounding box until the symbol is pointing in the direction you want, then *click* a second time to select the direction.
3. If you turned ON the **RefNubr** option then you will be prompted for the top and bottom values. Type in the values and press **Enter**.
4. The elevation mark will be drawn.

CrcIMark & RectMark (Area Markers)

These two macros are basically identical except for the shapes they create, and are used to denote and tag an area of a plan or detail with either a rectangle or a circle. In Figure 5-29, the first image was created with **CrcIMark**, and the next two with **RectMark**.

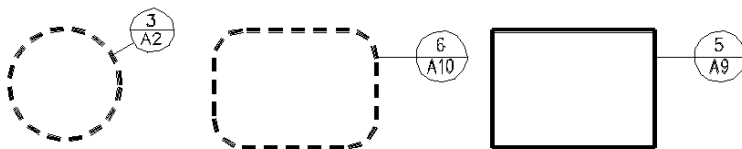


Figure 5-29: A circular area marker, and two rectangular markers,

The available options are:

CrcIDia (Circle Diameter)

Select this option, then enter a value for the size of the circle of the detail tag. This option works in conjunction with the **Scale** option to give you a circle sized to match that scale when plotted. But this option does not work like you might expect. The **CrcIDia** number you enter here determines the diameter of the circle in increments of 1/8". In other words, if you enter a value of **1.0** the circle will be drawn at a diameter of 1/8". A value of **2.0** would draw a circle with a diameter of 1/4" (2 x 1/8").

You must also keep in mind that depending on the plot scale (**Plotter/Scale**) used, the size of the circle and the text inside will vary. In order for the above rule to apply, you must plot the circle at the same scale you selected in the macro's **Scale** option (described below). For instance, if the **Scale** is set to **1/4"** and the circle diameter is set to **4.0**, the circle will be drawn at a real world size of 1/2" in diameter (4 x 1/8") when plotted at a scale of 1/4" (**Plotter/Scale** = 1/4").

All the text in the circle is created at a height of 1/8" (by default), relative to the selected **Scale**.

Solid, Dotted, Dashed

Select one of these options to set the linetype that the round or rectangular area markers will be drawn with. The current linetype spacing will be used for the dotted and dashed markers, so be sure you set the spacing prior to running the macro.

CrrrRad (Corner Radius)

This option only applies to the **RectMark** macro, and determines whether a rectangular area marker will have square corners (radius = 0), or rounded corners (radius greater than 0). Turning **CrrrRad** ON allows you to select or type a radius for the corners. But the macro will not let you enter fractions. If you want a radius of less than 1" you will have to pick it from the menu, or type in your own decimal value.

RefNmbr (Reference Number)

With this option turned ON, you will be prompted for the detail and drawing sheet numbers. If turned OFF, you will not be prompted to enter any values, and the last values that were entered will be used. All the text in the circle is created at a height of 1/8" (by default), relative to the selected **Scale**.

Caps

If you turn this ON then all text will be drawn in upper case (CAPS) letters, no matter what case you type the text in. If turned OFF, text will be drawn in whatever case you type.

Scale

Use this to select the plot scale (**Plotter/Scale**) that the circle tag will be plotted at. You can pick either an **Arch** (architectural) scale (1/8", 1/4", etc.), or an **Engineer**

scale (1:20, 1:100, etc.). All the text in the circle is created at a height of 1/8" (by default), relative to the selected **Scale**.

To draw an area marker with the **RectMark** macro (the **CrcI** macro works the same way), select the appropriate options from the above list, then:

1. *Click* once to define the lower left corner of the area box. A bounding box representing the area rectangle will be attached to your cursor.
2. *Click* a second time to select the upper right corner of the area box. The area box is drawn, and a square bounding box will be attached to the center of your cursor.
3. *Click* a third time to place the detail circle.
4. If you turned ON the **RefNmbr** option then you will be prompted for the top and bottom values. Type in the values and press **Enter**.
5. The detail circle will be drawn, along with a line connecting the detail circle with the area box.

RoomNo.s (Room Names and Numbers)

Similar to the **RmLabels** macro in the **DCAD_AEC** macro (page 5-9), this one allows you to have a two line room label with the room name on top, and a room number below it in a box, a capsule, underlined, or by itself. Room names/numbers can be either left or center justified, and room numbers can be created sequentially.



Figure 5-30: Room numbers/labels.

In Figure 5-30 the top two labels were created with the **Box** and **Capsule** options, while the bottom set was created with the **UndrLin** and **None** options. It's the *sequential* aspect of this macro that saves so much time. In the first example we used "102" as the first tag number. After that the macro automatically created the rest of the sequence, 103, 104, and 105, with each new tag we placed. Whether you are placing room names and numbers in a 500 room hotel or a 10 room house, this macro can save you time.

As this is an older macro it uses only the ROMAN2.CHR DataCAD font. True Type fonts (TTF) are not supported, but you can of course change them to a TTF after the fact.

The available options are:

ShwName

With this option ON, you will be prompted to enter a room name. You have the option of entering only one line of text, or two. Look for the prompts at the bottom of your screen. If turned OFF, a room name will not be displayed.

Box, Capsule, UndrLin, No_Box

Select one of these options for the outline around the room number. All four options are shown in Figure 5-30.

DynRot (Dynamic Rotate)

Turn this option ON if you want to insert the room names and numbers rotated (as in the last example in Figure 5-30).

IncrNo

After entering an initial alphanumeric room number the macro will automatically create the rest of the sequence, 101, 102, 103, etc., with each new room tag placed. For example, if we typed in "A01" as the first tag number, the next alphanumeric number, "A02" would be created automatically when the next room tag was placed.

CJText (Center-Justify Text)

Turn this option ON if you want the room name and number to be centered on one another. The top left tag in Figure 5-30 was created with **CJText** turned OFF, while the top right tag was created with **CJText** turned ON.

Caps

If you turn this ON then all text will be drawn in upper case (CAPS) letters, no matter what case you type the text in. If turned OFF, text will be drawn in whatever case you type.

Scale

Use this to select the plot scale (**Plotter/Scale**) that the circle tag will be plotted at. You can pick either an **Arch** (architectural) scale (1/8", 1/4", etc.), or an **Engineer** scale (1:20, 1:100, etc.). All the text in the circle is created at a height of 1/8" (by default), relative to the selected **Scale**.

For this example we will create the Bedroom 103 tag from Figure 5-30:

1. Select the **Capsule** option, first.
2. Turn the **DynRot** option OFF.
3. Turn **IncrNo** ON.
4. Turn **CJText** ON.
5. Select the **Scale** option and pick a scale of 1/4".
6. If **ShowName** is not already turned ON, *click* on it to do so. You will be prompted to "Enter room name (line one):xxxx.
7. Enter the text, **BEDROOM**, and press **Enter**.

8. You will then be prompted to “*Enter room name (line two):xxxx*. For this example we don’t want a second line of text, so leave it blank and *click* **Enter**.
9. The next prompt will tell you to, “*Enter room number: xxx*. Enter the number **103** and press **Enter**.
10. An outline of your entire room name and number text will now be attached to your cursor. Locate it in the Drawing Window and *click* once to place it.

SpotElev (Spot Elevations)

This macro allows you to draw an elevation marker and its associated text, as shown in Figure 5-31.

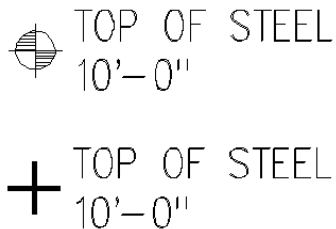


Figure 5-31: **New** (top) and **Exist** (bottom) elevation marker examples.

As this is an older macro uses the ROMAN2.CHR DataCAD font. True Type fonts (TTF) are not supported, but you can of course change them to a TTF after the fact.

The macro has the following options:

CrcIDia (Circle Diameter)

Select this option, then enter a value for the size of the circle of the elevation tag. This option works in conjunction with the **Scale** option to give you a circle sized to match that scale when plotted. But this option does not work like you might expect. The **CrcIDia** number you enter here determines the diameter of the circle in increments of 1/4". In other words, if you enter a value of **1.0** the circle will be drawn at a diameter of 1/4". A value of **2.0** would draw a circle with a diameter of 1/2" (2 x 1/4").

You must also keep in mind that depending on the plot scale (**Plotter/Scale**) used, the size of the circle and the text inside will vary. In order for the above rule to apply, you must plot the circle at the same scale you selected in the macro’s **Scale** option (described below). For instance, if the **Scale** is set to **1/4"** and the circle diameter is set to **2.0**, the circle will be drawn at a real world size of 1/2" in diameter (2 x 1/4") when plotted at a scale of 1/4" (**Plotter/Scale** = 1/4").

All the text in the circle is created at a height of 3/32" (by default), relative to the selected **Scale**.

Hatch

With this option turned ON, two opposite quadrants of the “pie” in the circle will be hatched, as in Figure 5-31. The hatching is non-associative, so it is just a bunch of individual lines.

New

With this option turned ON, the marker will be drawn as a circle with a cross in it (the top example in Figure 5-31).

Exist

If turned ON, the marker will be drawn simply as a thick cross, with no circle (the bottom example in Figure 5-31).

Txt_Rgt

With this option turned ON, the marker text will be drawn on the right side of the circle or cross.

Txt_Lft

With this option turned ON, the marker text will be drawn on the left side of the circle or cross.

ElvOnly

With this option turned OFF you will be prompted to enter two lines of text: the top, “reference text”, and the bottom, “elevation text.” *Clicking* on this toggle to turn it ON will cause an additional menu button called **Center** to appear below.

Center

This option will only be displayed if the **ElvOnly** option is turned ON. When ON you will be prompted to enter only the “elevation text.”

Caps

If you turn this ON then all text will be drawn in upper case (CAPS) letters, no matter what case you type the text in. If turned OFF, text will be drawn in whatever case you type.

Scale

Use this to select the plot scale (**Plotter/Scale**) that the elevation tag circle will be plotted at. You can pick either an **Arch** (architectural) scale (1/8”, 1/4”, etc.), or an **Engineer** scale (1:20, 1:100, etc.). All the text in the circle is created at a height of 3/32” (by default), relative to the selected **Scale**.

For this example we will create the “new” spot elevation marker at the top of Figure 5-31:

1. Select the **CrcIDia** option, select or enter a value of **1.0** and press **Enter**.
2. Turn the **Hatch** option ON.
3. Turn **New** ON.
4. Turn **TxtRgt** ON.
5. Turn **ElvOnly** OFF.
6. Select the **Scale** option and pick a scale of 1/4”.
7. The prompt at the bottom of your screen will say, “*Enter center of spot elevation.*” Snap or *click* where you want the center of the circle for the tag to be drawn.
8. You will then be prompted to “*Enter elevation reference: xxxx.*” Enter the text, **TOP OF STEEL**, and press **Enter**.

9. The next prompt will tell you to, “*Enter elevation: xx'-xx*”. Enter the text, **10'-0** and press **Enter**. The marker and text will be drawn.
10. If you then print the marker at a scale of 1/4”, the circle will be 1/4” in diameter, and the text will be 3/32” in height.

Brackets

This is a cool little macro that you might not use too often, but when you do you’ll be glad it was there. With it you can make brackets as shown in Figure 5-32.

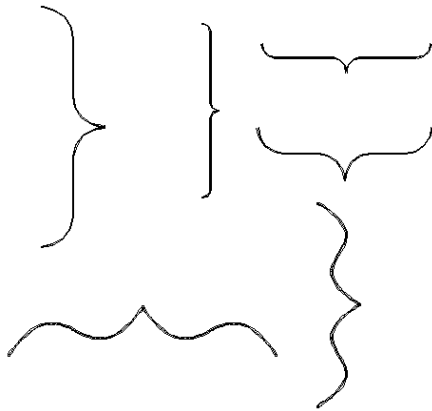


Figure 5-32: Examples of brackets.

To use the macro:

1. Select **Vrtical** or **Horzntl** brackets.
2. Choose to draw them as **Lines** (2D arcs and straight lines) or **Curves** (3D countour lines).
3. Draw the bracket by defining two opposite corners of a rectangle. The bracket is drawn within those boundaries.

CutLines

Use this macro to draw cut lines like the ones shown in Figure 5-33. The first one is drawn entirely with straight line segments. The second example has the zig-zag drawn as a single curved 3D contour line. The zig-zag of is always drawn in the exact center of the cut line, and by default, all entities are drawn with a line weight of 3.

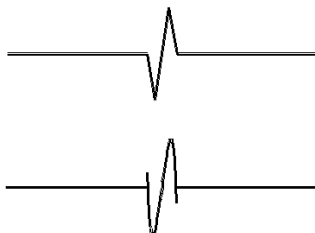


Figure 5-33: Two examples of cut lines.

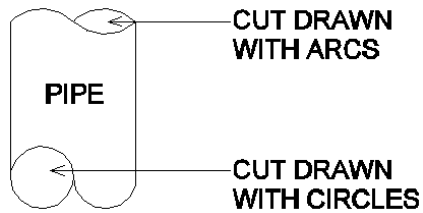


Figure 5-35: Two types of pipe cuts available.

ColMark (Column Bubble Indicators)

This macro will create sequential series of round column line bubbles. You have the option of automatically aligning the bubbles horizontally or vertically, or of placing them dynamically. This macro does not draw column grids (as does the **DCAD_AEC/RectGrid** macro), only the column line bubbles, as in Figure 5-36.



Figure 5-36: Two series of column line bubbles, aligned horizontally and vertically.

As this is an older macro it uses only the ROMAN2.CHR DataCAD font. True Type fonts (TTF) are not supported, but you can of course change them to a TTF after the fact.

The macro has the following options:

CrcIRad (Circle Radius)

Select this, then enter a value for the size of the circles. This option works in conjunction with the **Scale** option to give you a tag size to match the current plot scale. Depending on the scale used, the circle drawn will vary. The size of the circle is based on a 1/8" scale. For instance, if the scale is set to **1/8"** and the circle radius is set to **1.0** (1'-0"), the circle will be drawn with a real world radius of 1'-0". If the scale is set to **1/4"** and the circle diameter is set to **1.0** (1'-0"), the circle will be drawn at a real world diameter of 6".

Top, Right, Bottom, Left (Alignment Options)

These options work in conjunction with the **Align** option. If **Align** is turned OFF then these four options will have no affect on the macro and the column line bubbles. If **Align** is turned ON, after setting the first column bubble, all subsequent bubbles will be draw aligned with the first one. The type of alignment is determined by one of these four options.

Align

With this option turned ON, after setting the first column bubble, all subsequent bubbles will be drawn aligned with the first one. The type of alignment is determined by one of the four alignment options listed above.

IncrNo (Increment Number)

With this option turned OFF you will be prompted to enter the new text and press **Enter** for each column line bubble. With it turned ON, each column line bubble will be filled with the next alphanumeric characters in a sequence (though you will still have to press **Enter** to accept the value). For instance, if the first value entered is the number **2**, subsequent bubbles will automatically be created with a 3, 4, 5, etc.

Fast (Automatic Incrementing)

This option will only be displayed when **IncrNo** is turned ON. With this option turned ON, each column line bubble will be filled with the next alphanumeric character in the sequence, without any prompting from the macro. With this option turned OFF you will be prompted to enter a new value, or press **Enter** to accept each incremented value.

Caps

If you turn this ON then all text will be drawn in upper case (CAPS) letters, no matter what case you type the text in. If turned OFF, text will be drawn in whatever case you type.

Scale

Use this to select what scale the column line circles should be drawn at. The macro will draw the bubble and text at a scale to match your drawing. You can pick either an **Arch** (architectural) scale (1/8", 1/4", etc.), or an **Engineer** scale (1:20, 1:100, etc.). All text is drawn at a relative size of 3/32", based on the current **Scale** setting.

NoteMark (Note Markers)

This macro creates tags of varying shapes, into which letters or numbers are inserted. A leader and an arrowhead are then drawn from the tag to a user defined point. Except for the **FreeRct** option, the tags created are of a fixed size for a given **Scale** setting, so if the alphanumeric characters are too big, they will not fit fully within the tags (as in the "star" tag in Figure 5-37). Figure 5-37 shows several examples of various tags. Tag shapes include:

Round	Hexagon	Triangle
Square	Octagon	Diamonds
Rectangle	Capsule	Chevron
Ellipse	Stars	Free Rectangles

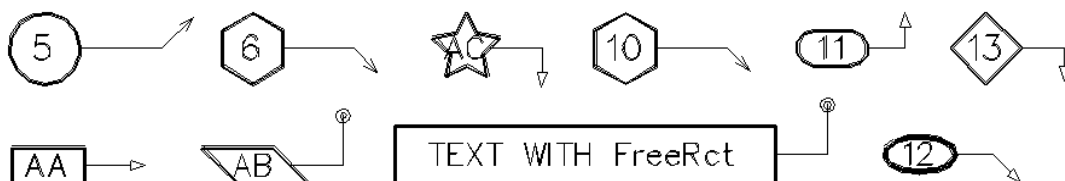


Figure 5-37: Various note markers.

The options for this macro are:

TagRad (Tag Radius)

Select this, then enter a value for the outside size of the tags. For tags that are not round, the value you enter will define the outermost edge or corner of the widest part of the tag. For comparison, in Figure 5-37 the **TagRad** remained the same for all tags. This option works in conjunction with the **Scale** option to give you a tag size to match the current plot scale. Depending on the scale used, the tag size will vary. The size of the tag is based on a 1/8" scale. For instance, if the scale is set to 1/8" and the tag radius is set to 1.0 (1'-0"), the tag will be drawn with a real world radius of 1'-0". If the scale is set to 1/4" and the tag diameter is set to 1.0 (1'-0"), the tag will be drawn at a real world diameter of 6".

Arrow

Turn this option ON to draw an arrowhead at the end of the note leader. The additional **Open**, **Closed** and **Dot** options will only be displayed if this option is turned ON. If turned OFF, the leader will be drawn without an arrowhead.

Open, Closed, Dot

These arrowhead options will only be displayed when the **Arrow** option is turned ON. Select the type of arrowhead you want to be drawn at the end of the note leader.

IncrNo (Increment Number)

With this option turned OFF you will be prompted to enter the new text and press **Enter** for each tag. With it turned ON, each tag will be filled with the next alphanumeric character in a sequence (though you will still have to press **Enter** to accept the value). For instance, if the first value entered is the number 2, subsequent tags will automatically be created with a 3, 4, 5, etc.

Fast (Automatic Incrementing)

This option will only be displayed when **IncrNo** is turned ON. With this option turned ON, each tag will be filled with the next alphanumeric characters in the sequence, without any prompting from the macro. With this option turned OFF you will be prompted to enter a new value, or press **Enter** to accept the next incremented value.

Caps

If you turn this ON then all text will be drawn in upper case (CAPS) letters, no matter what case you type the text in. If turned OFF, text will be drawn in whatever case you type.

Scale

Use this to select what scale the column line circles should be drawn at. The macro will draw the bubble and text at a scale to match your drawing. You can pick either an **Arch** (architectural) scale (1/8", 1/4", etc.), or an **Engineer** scale (1:20, 1:100, etc.). All text is drawn at a relative size of 3/32", based on the current **Scale** setting.

“Window Master” MACRO

The **WdwMastr.DCX** macro will draw various 2D windows in elevation. All the shapes are drawn with 2D lines and arcs. Like several of the other macros in this section, this one is not one that comes with DataCAD, but it is available for free from the DataCAD web site. Of course, to make it easier for you we’ve included it on the Advanced Construction Drawing & Visualization CD-ROM, located in the *Section-05* directory.

The description of the macro from the DataCAD web site reads:

Window Master draws windows in elevation. It can draw awnings, casements, picture, double hung, sliders, quarter round, half round and full circle window types. You can set all the settings of the windows to match your office standards. From color to width of the sashes it is all customizable. Optionally you can insert sills, headers, trim and shutters. All the settings can be saved to and loaded from settings files allowing you to develop a library of standard window types. Window Master features multiple input modes to allow you to insert the window the way you like. Up to 12 units can be mullered together at any one time.

One important aspect of this macro is that unlike the **Windows** portion of the **EZ_Tools** macro, this macro allows you to save the settings for the various window types you create, allowing you to select and repeat specific window types and/or sizes of future projects.

Figure 5-38 shows some examples of what you can do with this macro.

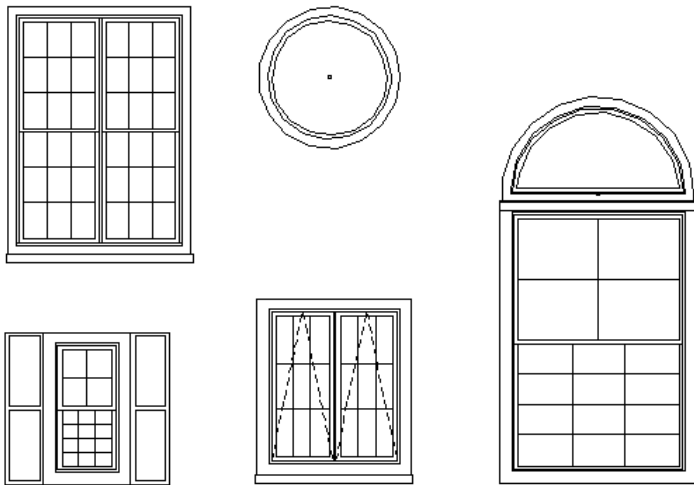


Figure 5-38: Windows created with the Window Master macro.

Figure 5-39 shows some of the macro’s menus. Most of them have sub menus for particular options. We’ll go over some of them here.

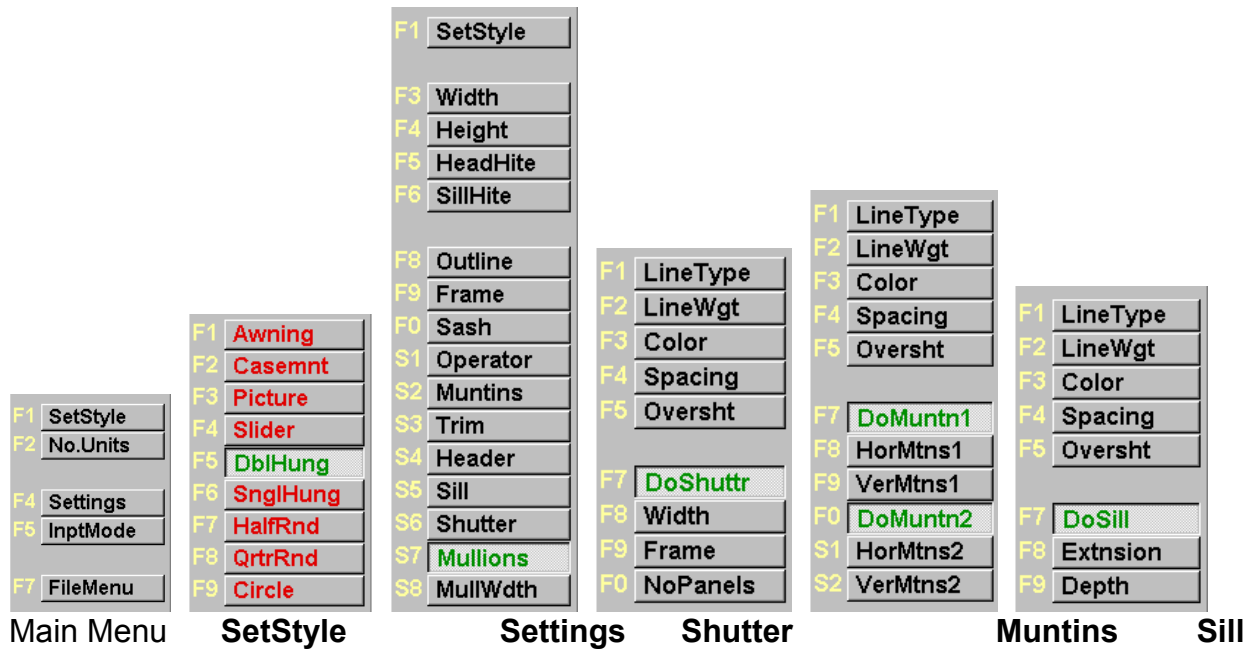


Figure 5-39: Some of the Window Master menus.

To illustrate how to use the macro let's create two side-by-side double hung windows (see Figure 5-40), then save the window settings so we can create identical windows later by reloading them.

1. From the main menu of the macro select **SetStyle**. A new menu will be displayed with 9 options for various window types (the second menu in Figure 5-39).
2. Pick the **DbIHung** option to select a double hung window.
3. Pick the **No.Units** option. Pick a value from the menu, or type in your own number. For this example select **2**, then press **Enter** to accept it.
4. Now pick **Settings**. A new menu will be displayed with 16 options for your windows (the third menu in Figure 5-39).
5. Pick each option in the the list and set the following values:
 - a. **Width** = 5.4 (5'-4")
 - b. **Height** = 5 (5'-0")
 - c. **HeadHite** = 6.8 (6'-8")
 - d. **SillHite** = 3.0 (3'-0")
 - e. **Outline**
 - **LineType** = Solid
 - **LineWgt** = 1
 - **Color** = Red
 - f. **Frame**
 - **Color** = Green
 - **DoFrame** = ON
 - **FrmWidth** = .1.1/2 (1-1/2")
 - **ExtdSill** = ON
 - g. **Sash**
 - **SashWdth** = .3 (3")
 - h. **Operator**

- **Color** = LtRed
 - **DoOpertr** = OFF
 - i. **Muntins**
 - **DoMuntn1** = ON
 - **HorMtns1** = 3
 - **VerMtns1** = 2
 - **DoMuntn2** = ON
 - **HorMtns2** = 2
 - **VerMtns2** = 1
 - j. **Trim**
 - **DoTrim** = ON
 - **Width** = .5 (5")
 - k. **Header**
 - **DoHead** = ON
 - **Extnsion** = .2 (2")
 - **Height** = .7 (7")
 - l. **Sill**
 - **DoSill** = ON
 - **Extnsion** = .2 (2")
 - **Depth** = .5 (5")
 - m. **Shutter**
 - **DoShuttr** = ON
 - **Width** = 1.8 (1'-8")
 - **Frame** = .1.1/2 (1-1/2")
 - **NoPanels** = 2
 - n. **Mullions** = ON
 - o. **MullWdth** = .3.3/4 (3-3/4")
6. When you are done with all the settings, *right-click* once to exit the **Settings** menu, back to the main menu.
 7. *Click* on **InptMode** to determine how you will define the outline of the window.
 8. For this example, select **ByHead**, so the window will be placed by the head of the window sash.
 9. Now select **1_point**. Three more options will appear underneath.
 10. Select the **Left** option (this, in conjunction with the **ByHead** option will cause the window to be placed by the upper left corner of the window frame).
 11. *Right-click* once to exit the **InptMode** menu, back to the main menu.
 12. You will see a bounding box attached to your cursor. This represents the outline of the window frame as you defined it in the **Settings** menu. *Click* in the Drawing Window and the window will be drawn complete, as in Figure 5-40.

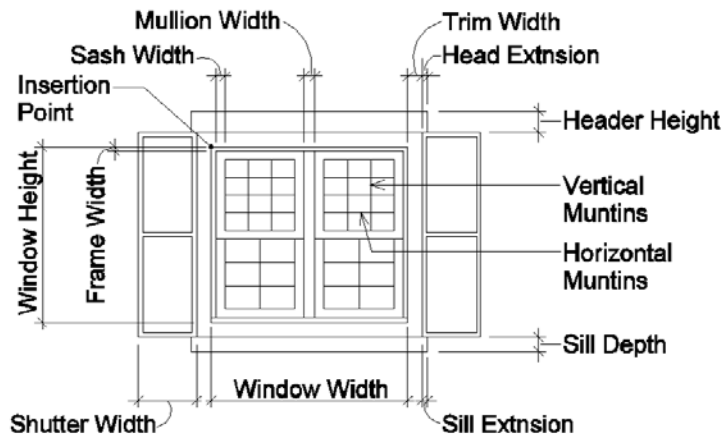


Figure 5-40: The window created with our settings.

Note that the size of the window is defined by the outside of the frame around the window sash.

Although I had you go through most of the settings for this window, there were a few that you actually did not need, given the way we chose to input the window (via **ByHead**, **1_point**, and **Left**). With those settings we did not need to define **HeadHite** or **SillHite**, since we placed the window by its upper left corner with the cursor. And since these were double hung windows you did not need to set any of the **Operator** settings (this option refers to the “V” shaped lines that show how a hinged window opens).

So let’s change just the input method to see how this affects the way this window is defined and drawn (see Figure 5-41). Use the same settings as in the first example, but do the following:

1. In the main menu *click* on **InptMode**.
2. For this example keep **ByHead** selected. This will cause the window to be placed by one of the upper corners of the window frame.
3. Now select **3_point**.
4. *Right-click* once to exit the **InptMode** menu, back to the main menu.
5. *Click* inside the Drawing Window to define the first corner of the window.
6. Now move the cursor horizontally to define the width of the window you want. This represents the top edge of the window frame, completely ignoring the window **Width** setting.
7. Now drag the cursor downward. A bounding box is formed off of the line defined in steps 5 and 6. This is how you define the height of the window. Here again the window **Height** setting will be ignored in favor of the window outline being defined by your cursor.
8. *Click* in the Drawing Window and the window will be drawn complete, as in Figure 5-41 (this window was purposely drawn out of proportion to the first window we drew, for comparison purposes).

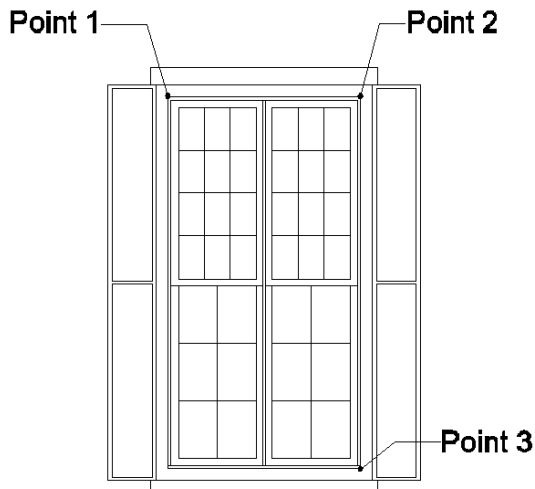


Figure 5-41: The window created with the **3_point** input mode.

HOMEWORK

Open the *Macros-Homework.DC5* file, included on the Advanced Construction Drawing & Visualization CD-ROM. You will see two elevations, and a floor plan with some notes next to it. Your homework assignments are as follows:

1. Infill the exterior elevations with 2D windows and doors, using the *EZ_Tools* and/or *Window Master* macros.
2. Use the **DCAD_AEC** and/or **Annotate** macros to add room names and numbers to the floor plan. Then use the **Annotate/NoteMark** macro to key in the notes to the floor plan. Two notes are done for you as an example.
3. From scratch, use the macros in this section to create a structural grid, like the one in Figure 5-42 on the next page.

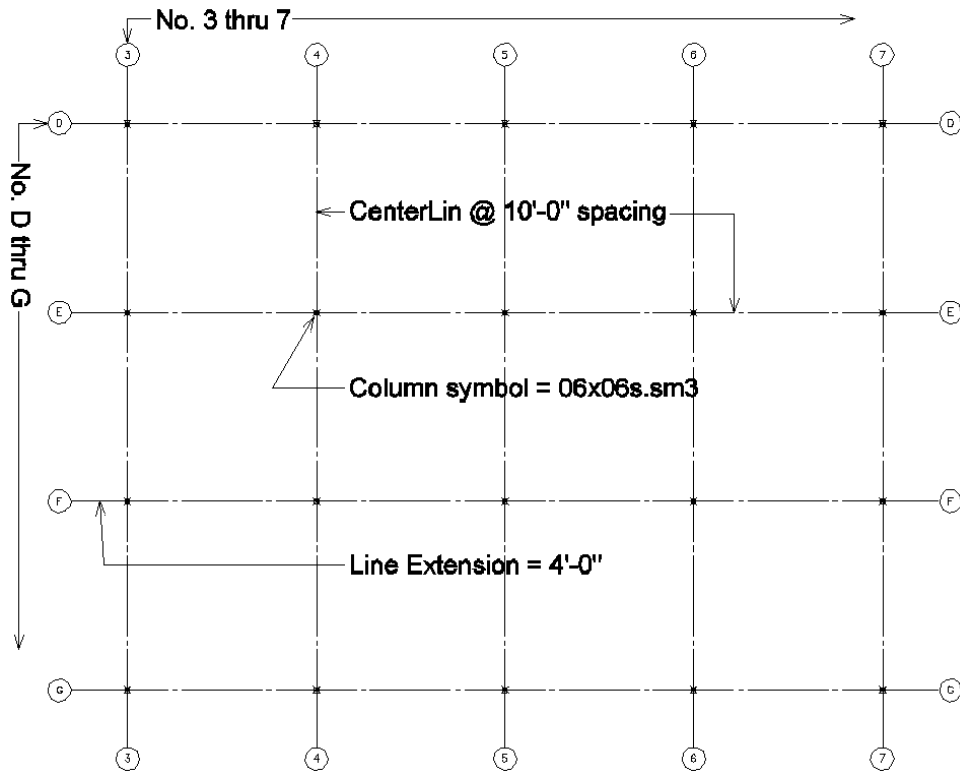


Figure 5-42: Create this grid with columns.

- From scratch, use the macros in this section to create the steel detail in Figures 5-43 and 5-44:

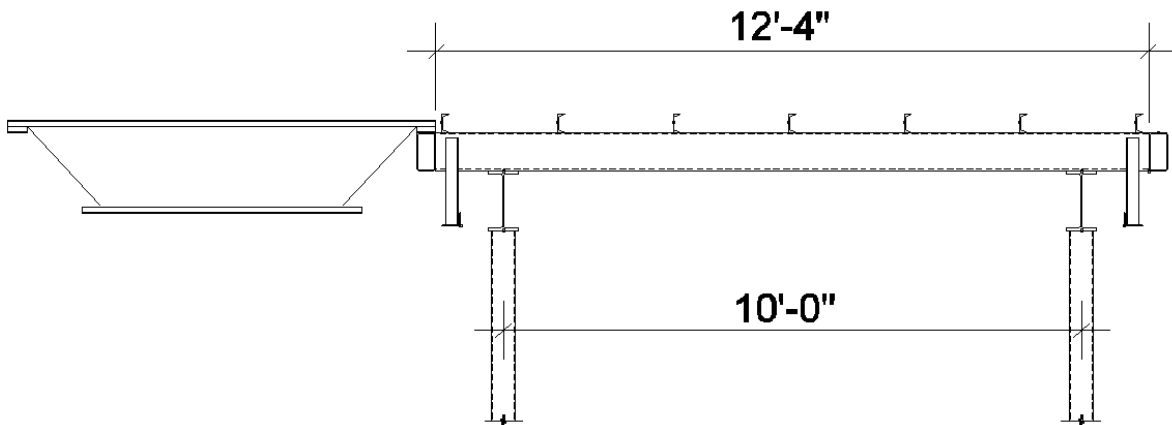


Figure 5-43: Create this steel detail.

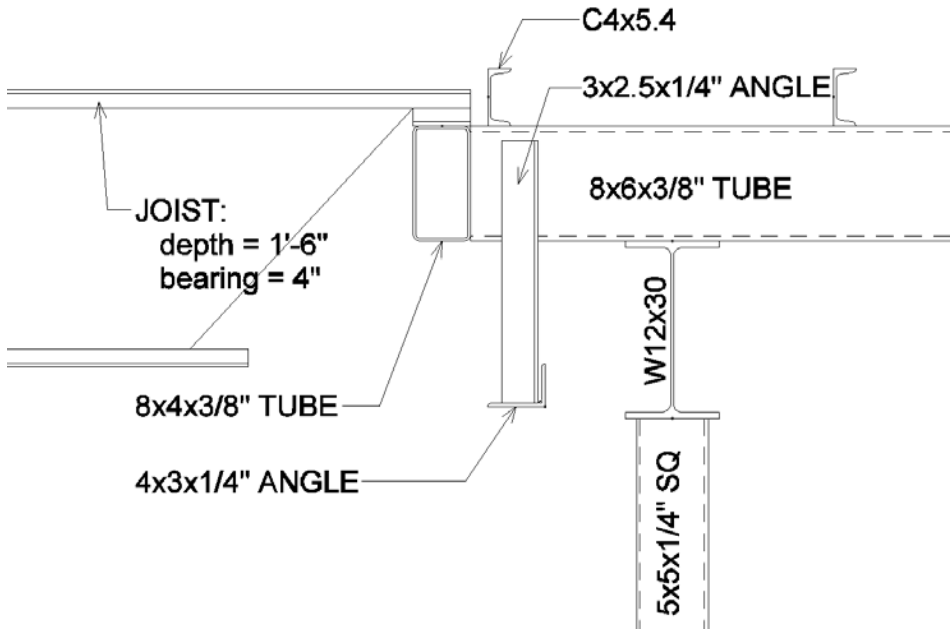


Figure 5-44: An enlarged area of the steel detail from Figure 5-43.

- From scratch, use the macros in this section to create 2 lines of plumbing fixtures, as in Figure 5-45 (pick your own plumbing fixture symbols):

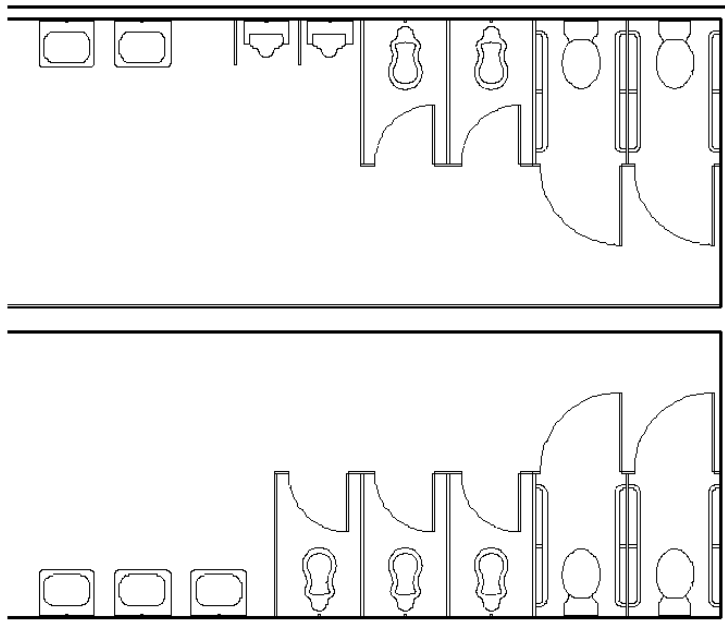


Figure 5-45: Create these two walls of fixtures.

SECTION 5 – REVIEW QUESTIONS

1. Which macro in this section will draw a suspended ceiling grid?
 - a. **EZ_Tools/Ceiling.**
 - b. **DCAD_AEC/RectGrid.**
 - c. **DCAD_AEC/Electric.**
 - d. **EZ_Tools/Grid.**

2. *Circle one:* The **DCAD_AEC** macro will draw straight run and double-back stairs.
 - a. TRUE
 - b. FALSE

3. *Circle one:* **SteelPro** draws 2D and 3D steel shapes.
 - a. TRUE
 - b. FALSE

4. Which macro allows you to create linear or curved aluminum storefront windows in plan?
 - a. **DCAD_AEC.**
 - b. **Window Master.**
 - c. **EZ_Tools.**

5. In the **DuctPro** macro, how do you set the Z-height of the ducts?
 - a. With the **Depth** option.
 - b. With the **Z_elev** option.
 - c. With the **FOB, FOT** and **Equal** options.
 - d. A and B.
 - e. B and C.
 - f. A, B and C.

6. In the **EZ_Tools** macro, which of the following window options is not available?
 - a. **Picture.**
 - b. **CasemntD.**
 - c. **DH 5/5.**
 - d. **HSliderA.**

7. In the **Annotate** macro, which option will automatically fill a tag with a sequential alphanumeric character?
 - a. **IncrNo.**
 - b. **Auto.**
 - c. **RefNmbr.**
 - d. **Fast.**
 - e. **AlphaNum.**

8. Which macro will allow you to save an unlimited number of your own custom settings and recall them later?
- a. DCAD_AEC.
 - b. EZ_Tools.
 - c. SteelPro.
 - d. DuctPro.
 - e. Annotate.
 - f. Window Master.