

CHAPTER IX

CHANGING FINISHED PATTERN SIZES

There are several AutoCAD commands that will aid you in changing the sizes of finished patterns. These commands allow you to change patterns that you have created using C.P.M. or to change patterns that you have digitized into the program. A separate CHANGE SIZE menu, found under the MAIN SEW MENU, has been created to facilitate the task.

C.P.M., at this time, does not have any special commands that will automatically change all of the pattern at once. You will need to perform the changes step by step, much as manual grading is done, but you will discover that some of the steps are quite simple. You may discover that you will choose to use a combination of command methods in the process of resizing according to what is faster in each specific case.

If you are planning to resize pattern pieces save a version of the pattern in a separate file before you add seam allowances and markings.

C.P.M. has a RESIZE menu which is accessed from the MAIN SEW MENU that puts the commands you will use the most together in an easy access place. The commands you will use the most will be **STRETCH** and **OFFSET**.

1. The STRETCH command allows you to "drag" the lines of the pattern to be bigger. The sub-command **CROSSING** allows you to choose a section of the pattern at a time to be **STRETCH**ed. The **CROSSING** sub-command appears to work the same as the **WINDOW** sub-command when you start to use it. The difference is that the computer will only **SELECT** the lines (entities) that the outline lines of the "window" cross.

1.1. A good example of using the **STRETCH** command would be to make a skirt waist wider while the hips stay the same.. Begin with the pattern completely free of markings, other than matching notches.

1.2. **SELECT**ing **STRETCH** from the RESIZE menu takes you to the STRETCH sub-menu. **SELECT** **CROSSING** and make a **W**(indow) that crosses the waist line about $\frac{1}{2}$ way across and crosses the side seam at the hip line. The computer will say:

Base point:

1.3. **SELECT** the **INTER**Section of the side seam and the waist and drag to the desired width.

1.3.1. If you turn **SNAP** and **ORTHO** on before you start to move the point, it will move exactly horizontally in fixed "jumps". If you have set the SNAP increments at the correct size you will be able to add exactly the right amount.

1.4.1. You will discover that you do not have to place your base point exactly at the intersection. You can place it at the nearest grid point and, as long as you move horizontally, using the **ORTHO** function, the correct number of increments, it will stretch correctly.

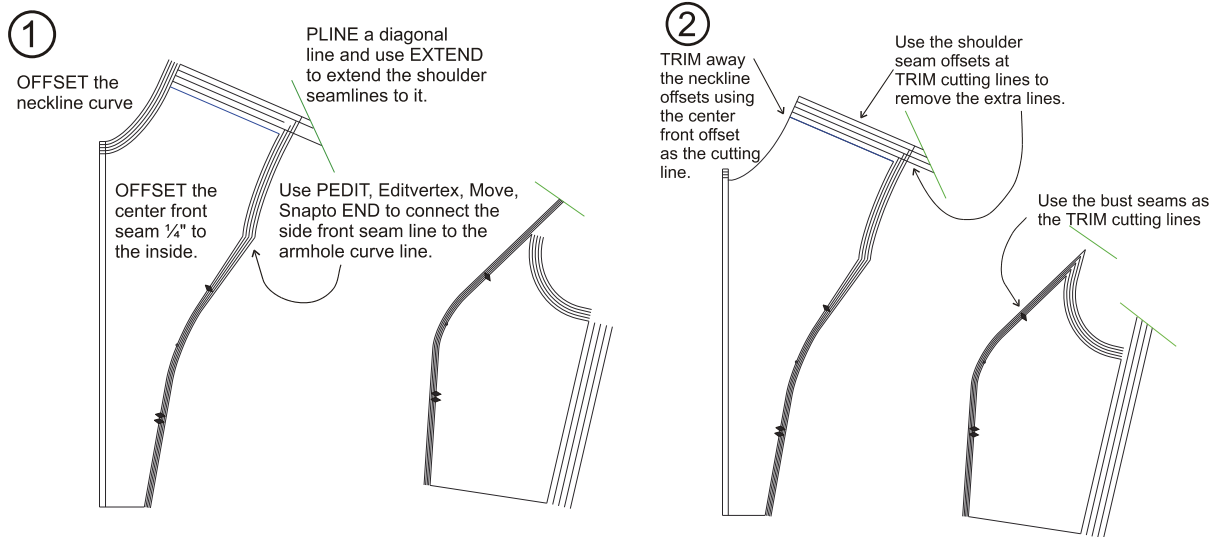
2. **OFFSET** to grade a pattern by fixed increments.

2.1. Begin by **EXPLODE**ing the pattern. **reJOIN** the neck and armhole curves using **PEDIT**.

2.2 **OFFSET** each seam with the appropriate increments.

2.3. **PLINE** a diagonal line in a position where the **(EXT)**ended corner lines would intersect.

2.4. **(EXT)**end the first (either one will do) seam to the diagonal line and **(EXT)**end the other seam to the first one.



2.5. **TRIM** away the excess seam length and **ERASE** the diagonal line.

2.6. Use **XARC** to draw the correct new curve lines for neck. To establish the new necklines:

2.6.1. First **OFFSET** the neckline curve to the outside of the pattern the number of increments desired.

2.6.2. **(EXT)**end the center front line to the outer most neckline curve.

2.6.3. **OFFSET** the center front line c to the inside of the bodice front.

2.6.4. **TRIM** away the neckline curves using the center front offset line as the cutting edge, leaving only the 1/4" segments between the center front line and the offset line. **ERASE** the offset line.

2.6.5. Reestablish the drafting corner-lines for the neckline. To make it easier to see, **SET COLOR** to blue for the "drafting lines" and then **SET COLOR** back to black to draw your curves.

2.6.6.1. Keep in mind that you can easily reestablish the arc drafting corner lines for any neckline just by drawing them. Remember that the joining at the shoulder seam should be straight not peaked, so the beginning of the corner line should be perpendicular to the shoulder seam.

2.6.6.2. Also remember that what appears to be a smooth curve center front needs to be perpendicular to the center front line for 1/4" on either side of the center front seamline.

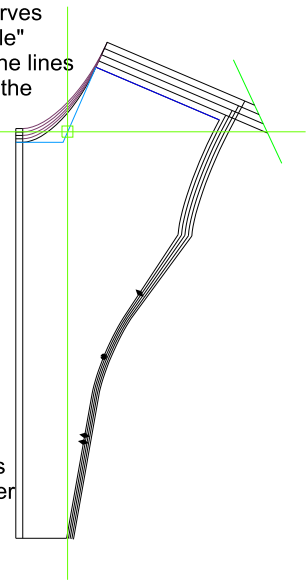
2.6.6. Use XARC to draw the new neckline curves.

Remember, in grading the point at the shoulder-base of the neck stays the same. Make the first point be the shoulder-neck point, the end point is the end of the 1/4" segment. The corner point for each neckline curve is along the upright corner line horizontally in line with the endpoint on the 1/4" line.

③ To create the neckline curves establish the "corner angle" lines. You can "eyeball" the lines using the crosshairs and the "rubber-band" line.

Use XARC to draw the neck curve. Make the shoulder seam the starting point, the end of the 1/4" line the ending point and the corner point is on the "corner angle lines".

To place the corner correctly for each curve, line the horizontal cross hair through the 1/4" endline and the crossing point of the crosshairs on the upright line of the "corner angle lines".



You can make a "standard" series of graded sizes and color code each size. Move each size to a different layer to make it easier to keep all the pieces in the pattern for each size together.

Remember that you can "turn layers off" to make them "invisible"; lock layers to prevent them from being affected by work you are doing with a different layer; and also specify to print/plot only a specific layer.

APPENDIX A :

METRICS

I. Creating a Metric Drawing Page

Currently the automated custom-sized pattern drafts do not run properly when metric measurements are added. This appears to be due to the automatic addition of ease to certain measurements. We will try to create a solution to this ASAP.

Included with C.P.M. are templates set up for drawing pages for use with the Metric System. The dimensions of the drawing pages match the size of the IMPERIAL (fractions and inches) size drawing page templates.

AutoCAD® actually thinks in terms of UNITS. It doesn't really make any difference what you call a unit, it draws, in its mind as a UNIT. The time that it becomes important to tell AutoCAD® a specific size of unit is when you are going to plot the drawing out. The part of the software that interprets the "non-denominal unit" to a specific UNIT system is the "drivers" that talk to the printer or the plotter. Most plotter drivers will accept and plot what ever unit system you tell it to use. Those unit system specifications need to be "embedded" in the drawing file that your are going to plot. You will also need to specify the same unit system in a "plotter configuration".

Use the New Page Wizard Quick Setup option that appears when you select NEW under the FILE menu.

NOTE: In the C.P.M. program the "computer" "talks" to you through the "command prompt area" at the bottom of the program window. It is possible that when you first start up the program that this area will appear to be only a one line high white area running the width of the program window. If you point your cursor at the "window frame bar" just above the blank white area you will see your cursor turn into a vertical line with arrows at each end. While holding your left mouse button down you can drag the frame up and reveal 3 lines of space in the command prompt area. You will need this command prompt area arranged like this for the following steps, in order to be able to see the command prompts.

1. At the start-up of C.P.M., use the Wizard to create a new metric unit page.

1.1. Select the Decimal option for Units, keep the default 4 decimal places after the decimal point.

1.2. Then set up your area. The area you set up should sized in relation to the plotter you are going to use.

E-size plotters will usually handle paper 36" (91.44cm) wide and 48" (121.92cm).

D-size plotters will usually handle paper 24" (60.96cm) wide and 36" (91.44cm).

They usually need a 1 ½" (3.7cm) margin.

When entering metric measurements, enter them in decimal format. For instance:

Width = 91.44 Height= 121.92

2. Next set up the drawing layers. From the MODIFY menu select **CONTROL LAYERS**. This pops up the Line and Linetype Properties control window. The Line properties are:

ON, Freeze in All Viewports, Freeze in Current Viewports, Freeze in New View Ports, Lock, Color, Linetype.

You will probably never use the Freeze properties in pattern making. These properties are useful when doing complex engineering or architectural drawings, or 3D drawings. What you will be using are **ON, Lock, Color** and **Linetype**. You can drag the “title sections” for each column of properties at the top of the window to minimize the space taken up by the freeze properties to make the titles of the properties you will use display better. Also take note of the CURRENT button that is in the upper center of the window. Immediately on it’s right should be the number 0 (zero).

2.1. Click on the **NEW** button on the right side of the window. You will see a new Layer appear in the layer list with the name highlighted. Type in **border** as the name for the new layer. Repeat this to make a **margin** layer.

2.2. Make the color of the **margin** layer CYAN.

2.2.3. Click on the square in the Color column of the **margin** layer. This pops up a color selection window.

2.2.4. Click on the light blue color in the Standard Color bar at the top left of the window. Click on **OK** to accept the selected color.

2.3. Make the Border layer the active layer.

2.3.1. **SELECT** and highlight the Border layer name. Click the **CURRENT** button. You will see Border become the active layer name next to the **CURRENT** button.

2.3.2. Click on **OK** in the Layer Properties window to close it.

3. Next create a rectangle that is the Border of your new drawing page. From the DRAW menu click on **RECTANGLE**.

3.1. You will see in the command prompt area, at the bottom of the C.P.M. window, **Chamfer/Elevation/Fillet/Thickness/Width/<First corner>**: type in **0,0** for the **First corner** and type ENTER.

3.2. You will see in the command prompt area, **Other corner**:

Type in the x,y co-ordinates for the upper right corner of your new drawing page. For example: for a rectangle that is 91.44 cm wide and 121.92 cm high would be typed in as **91.44,121.92**

3.3. You may not see anything happen on the screen after you ENTER. This is not a

problem. On the VIEW menu, click on **ZOOM EXTENTS**. You should now see the rectangle framed on the page.

4. GRID dots need to be set at the increment you want. On the OPTIONS menu select **GRID** to fly out the GRID menu and click on **GRID#**. If you type in 5, that will make the grid at 5 centimeters increments. You will need to determine for yourself what you want the interval to be. We suggest **1**.

NOTE: If you have specified a drawing area during the page set-up using the WIZARD that is larger than the rectangle “border” you specify, the grid will appear outside of the rectangle border. If you specify the drawing area size and the border to be the same, then the grid will just fill the area within the border.

5. To make a Margin, first open **Control Layers**, **SELECT** the Margin layer name and click the **CURRENT** button to make the Margin layer active.

5.1. Under the SNAPTO menu **SELECT SNAP, Incrmnt,#**. You will see:
Snap spacing or ON/OFF/Aspect/Rotate/Style <7.0000>:

5.2. Type the number 1. You should now be able to see that your cursor jumps from grid dot to grid dot.

5.3. Draw the rectangle for the margin “by eyeball”.

5.3.1. Start the base at the dot that is 4 dots over and 4 dots up from the bottom left corner of the drawing page.

5.3.2. Make the upper left corner 4 dots in and 4 dots down from the upper right corner of the drawing page.

5.4. Next open up the Layer Properties window again. (**Control Layers** under the MODIFY menu)

5.4.1. Click on the little “open padlock” icon in the **Border** layer row. You should see it “close”. Do the same for the **Margin** layer. This means the layers are now locked.

5.4.2. Select the layer name **0** and **CLICK** the **CURRENT** button to make 0 the active layer.

5.4.3. Close the **Control Layers** window.

6. **SAVE** the new drawing page format as a template.

6.1. From the FILE menu select **SAVE AS**. This pops up the **Save Drawing As** window.

- 6.2.** Pop down the menu list for the **Save as Type** area and select Drawing Template (*.dwt)
- 6.3.** In the file name area, type in a name for the file. The file must have the suffix .dwt.
- 6.4.** “Browse” to show the computer to save the file in the Template folder (directory).
- 6.5.** Click the **SAVE** button.

II. Converting to metric patterns from Imperial measurements (English inches and fractions).

You will need to **INSERT** a pattern generated by C.P.M. from English fractional measurements into a metric drawing page you have created.

1. Prepare the pattern you are going to convert to metrics.
2. Go into **Control Layers** under the MODIFY MENU
 - 2.1. In the **Control Layers** Control Box, Click on the little padlock symbols that look locked to unlock them.
 - 2.2. Close the window.

3. Erase the page border and margins and the drawing page size title header.

4. Run Delete Drafting lines under the OPTIONS menu. (Don't forget to have any important patterning points that reference to the drafting lines already marked before you delete the drafting lines.)

5. **Zoom Extants** so you can see the whole drawing page.

6. **SAVE** the pattern. Give it a new name so you don't write over the original version. Make a note of the path to where you SAVED it to on the hard drive.

NOTE: If you are going to be doing this conversion as a regular part of your patterning process, you will want to modify your English fractional drawing page to eliminate the need to modify it before inserting it into a metric drawing page.

7. **OPEN** the metric drawing page where you want to **INSERT** the pattern.

8. Select the **Insert Block or Drawing** command is under the DRAW menu. You will see in the command prompt line:

8.1. *insert Block name (or ?):*

8.2. type the location of the pattern file you want. (example:
c:\C.P.M.\patterns\pattern.dwg) and ENTER.

8.3. *At Insertion point:*
TYPE **0,0**

8.4. *At X scale factor <I> / Corner / XYZ:*
TYPE **2.45**

- 8.5.** At *Y scale factor (default=X)*:
ENTER to take the default
- 8.6.** At *Rotation angle <0>*:
ENTER to take the default
- 9.** INSERTED drawings come in as a joined, grouped block. Use **EXPLODE** from the MODIFY menu to turn them back into individual pattern pieces.

III. Creating Tiles for a smaller printer/plotter.

If you are using a smaller plotter, you will want to make the drawing page area a multiple of that size and “tile” it with grid of rectangles that fit the size of your plotter.

1. First change the color you are drawing with (which should look black on your screen.). This way you can make your tile grid a color that is different from the colors of lines used in your pattern drawings. From the DRAW menu select SET-COLOR to fly out the color menu and then select CYAN (this is light blue).

2. Next change the layer that you are drawing upon. Open the **Control Layer** Properties window. CLICK the **NEW** button and TYPE the name **Tile** in the text window. SELECT to highlight the **Tile** layer name and click on the **CURRENT** button. You should see the word **Tile** appear immediately to the right of the **CURRENT** button.

3. Draw a rectangle that is the width and height that your plotter will print on one page. Again make the starting corner **0,0**. (**Don't forget to take into account the normal margin size your printer/plotter automatically uses.**)

4. Next “grid-off” the rest of the drawing area by making multiple copies of the original rectangle. From the MODIFY menu select **COPY**. You will see, in the command prompt area:

Select Objects:

Pick the tile sized rectangle you have just drawn with the “pick box” cursor and then click the right mouse button to stop selecting.

4.1. In the command prompt area you will see:

<Base point or displacement>/Multiple:

4.2. Type **m** and ENTER. You will see:

Base point:

4.3. From the SNAPTO menu select Snapto INTER(section). The cursor will become cross hairs.

4.4. Select the lower left corner of the “tiling rectangle”. As soon as you see the magenta X appear click the left mouse button to select the corner. You will see:

displacement:_int of Second point of displacement:

4.5. From the SNAPTO menu select Snapto INTER(section). Now point to another corner. You will see a “shadow” of the original rectangle following the cross hairs. When you see a magenta X appear at the new corner position, click the left mouse button to select that corner. Repeat these steps as many times a necessary to completely tile your drawing area.

4.6. When all the tiles are in place, go back to the Layer Properties window. Lock the tile layer. Click on the little “open padlock” icon in the **border** layer row. You should see it “close”. Select the **0** layer and make it **CURRENT**. Close the Layer Properties window.