Chapter 16

Filleting individual lines and arcs

*This chapter discusses filleting **individual** lines and arcs as opposed to to the **nodes** or **links** of a **polyline**. Page 70 discusses filleting of polylines.*

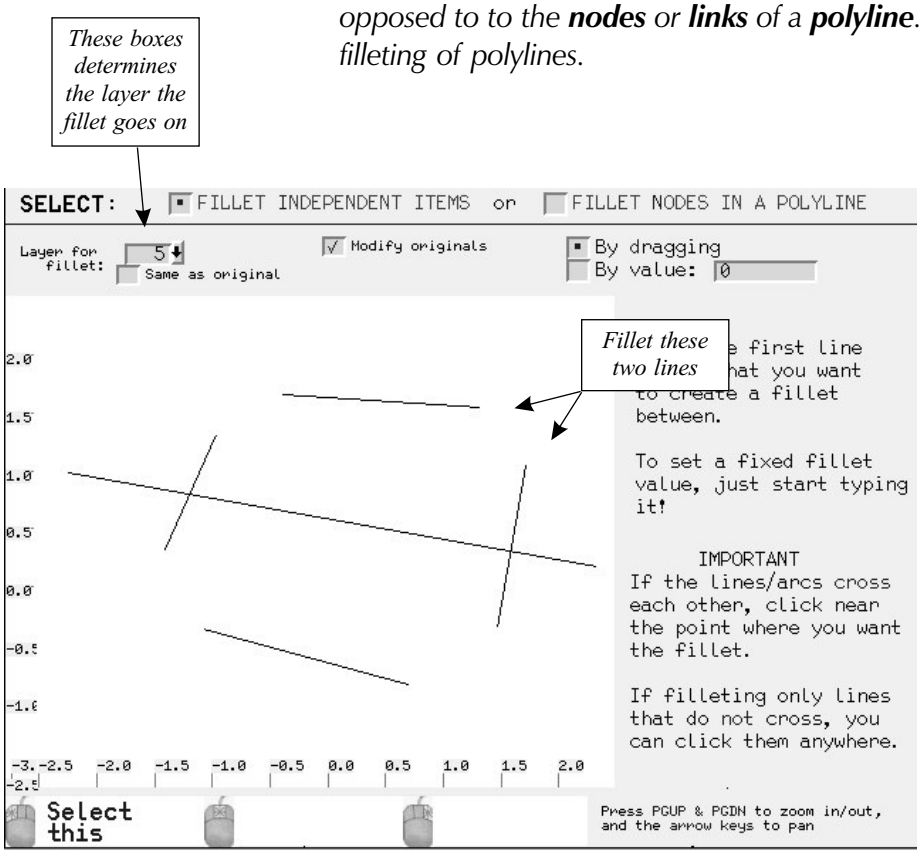

Figure 16-1

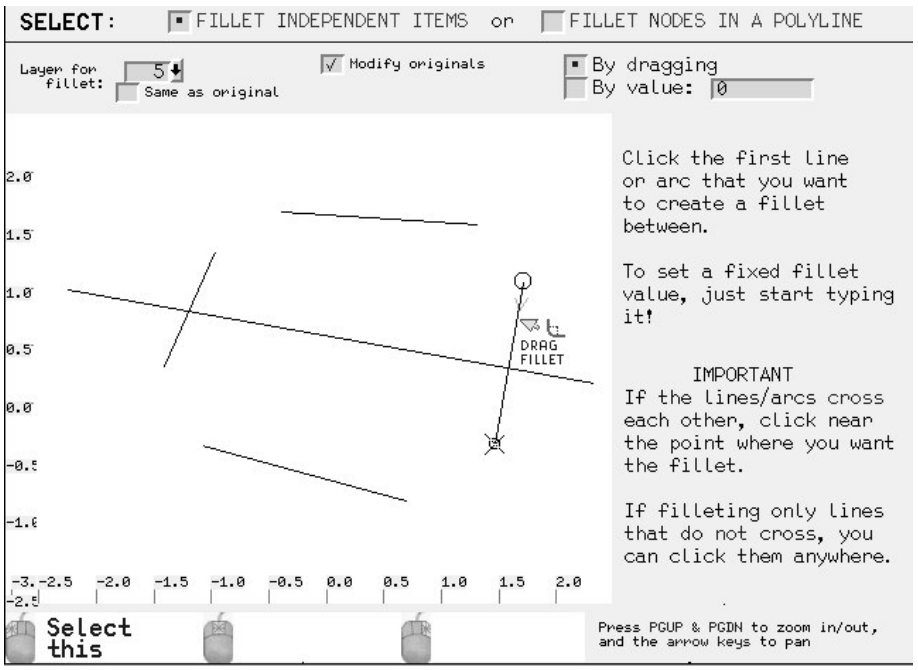

Figure 16-2

Figure was 16-1 shows five lines. These are independent lines rather than links of a polyline.

You start the fillet function either by pressing the F key on the keyboard or selecting the **Fillet** function from the **Edit** menu. The screen will change as seen in the figure. At the top you have a choice between filleting **independent items** or filleting **nodes in a polyline**. Select the filleting of **independent** items.

Modify Originals

Notice that there is a check box labeled "**Modify Originals**" at the top of the screen. If that box is checked, the lines and arcs that you fillet will be modified to fit the fillet. This will be explained more at the end of this chapter, but for now make sure the box is checked because that will give you the type of filleting operation that other CAD systems provide, so you should be familiar with it.

Drag or by value

Notice at the top of the screen you have the choice of selecting between filleting by **dragging** or by **value**. Select the **Dragging** option for this example.

The layer for the fillet

You also have the option of specifying which layer the fillets will go on to. In Figure 16-1 layer 5 has been specified for the fillets. This means that after the fillet has been created, MillWrite will put it on layer 5.

If you check the box that says **Same As Original,** the fillet will be put on whatever layer that the original lines are on. Of course, that doesn't make much sense if one line is on layer 3 and the other line is on layer 4. In such a case, the fillet will be placed on one layer or the other.

Let's now fillet the two lines that the arrows identify in figure 16-1.

A prompt along the right side of the screen will remind you of how to fillet. As the prompt says, click the **first** line or arc that you want to create a fillet between.

There is only one is important concept to keep in mind when filleting individual lines and arcs. And that is **if** the lines or arcs **cross each other**, then there are a variety of possible ways to fillet them. Therefore, to show MillWrite where you want the fillet to go, click the line or arc close to where the fillet it should be.

In this particular example the two lines that we do **not** cross each other, so it makes no difference where on those lines you click. There is only one way to fillet two lines that do not cross each other. So for this example, you can click the lines at any location.

As figure 16-2 shows, when the mouse is touching one of the lines, the mouse icon changes to show the word **Drag Fillet**. This informs you that the mouse is now over the line and you can click the left mouse button to select it.

After you select the first line the prompt on the right side of the screen will change, as seen in figure 16-3. The prompt is now reminding you to select the **second** line or arc. Put the mouse on the second line. The mouse icon will change to show the words **Drag Fillet** to let you realize that the mouse is now over the line. You can then click the left mouse button.

You have just selected the two lines you want to fillet. The prompt on the right side of the screen will change as seen in figure 16-4. As you move the mouse, the mouse will drag the fillet along with it. At both at the top and bottom of the screen the fillet radius will be displayed.

After you have drag the fillet to the radius you want, click the left mouse button.

Switching to a Fixed Fillet

Notice that the prompt along the right side of the screen in figure 16-4 has a message reminding you that if you want to switch from **dragging** the fillet to specifying a **specific value** for the fillet, all you do is type the fillet value. What this means is that if — while you are dragging the fillet — you decide that you want a specific value for the fillet, you simply type it and press the Enter key. This will set the fillet to that specific radius and then create the fillet.

In this particular example, the left mouse button was clicked when the fillet radius had a value of the 0.2152. Figure 16-5 shows the result. The original lines were lengthened and a fillet was put between them. The reason the

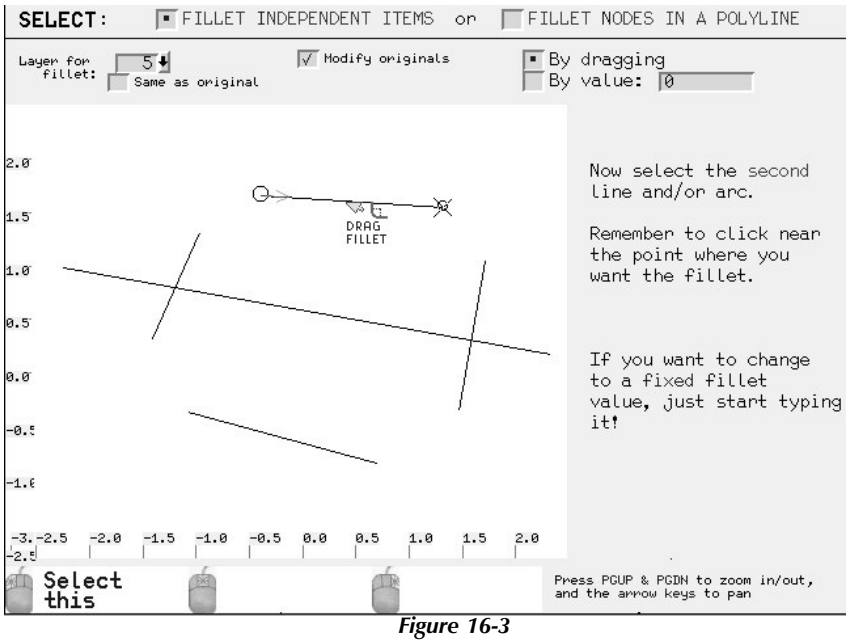

Figure 16-3

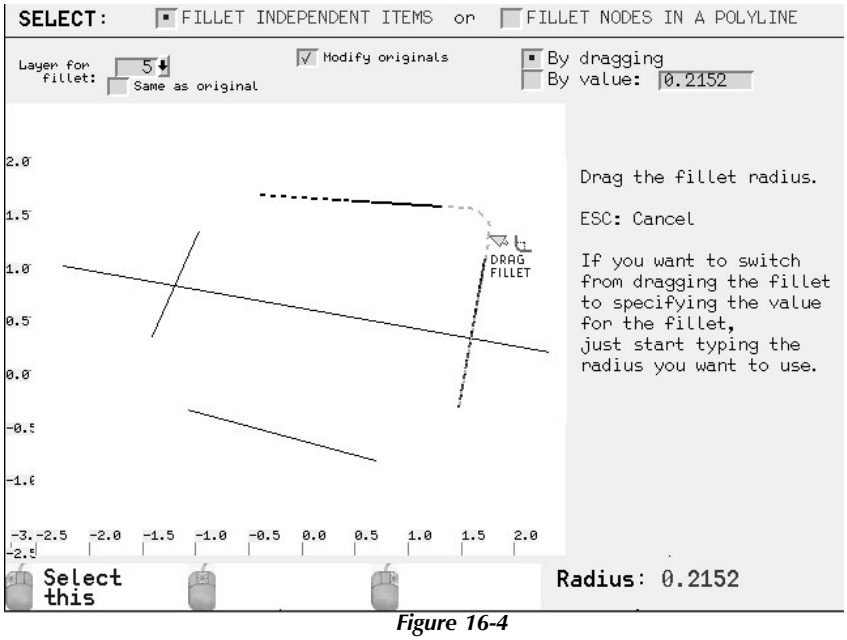

Figure 16-4

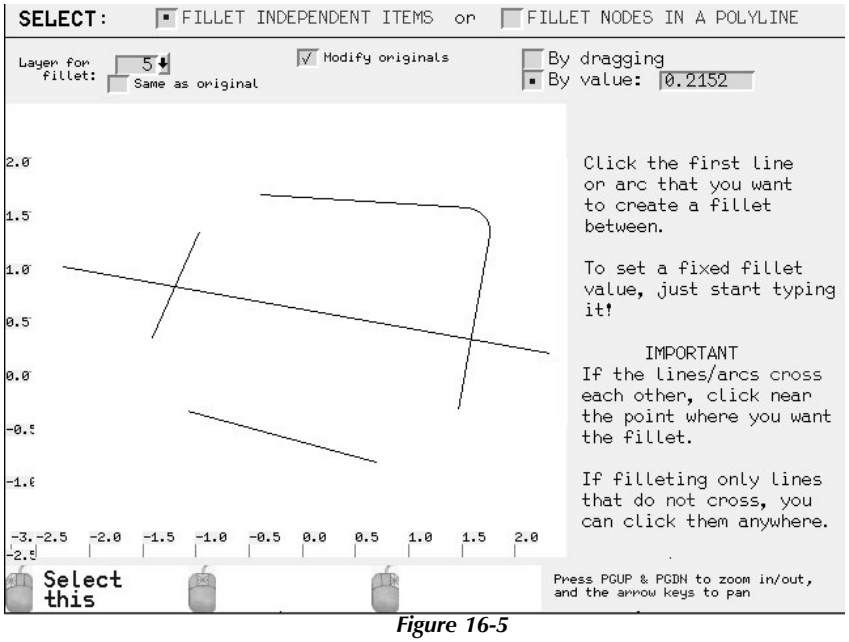

Figure 16-5

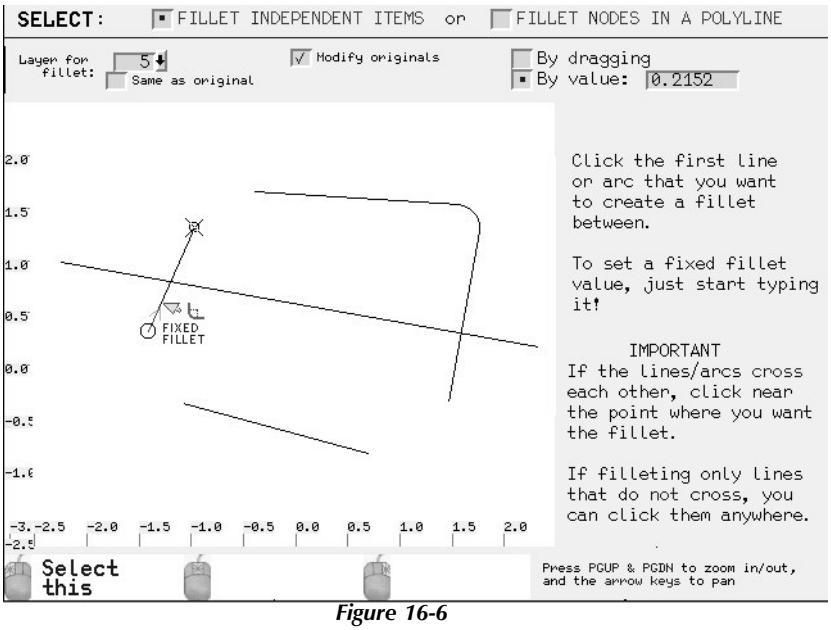

Figure 16-6

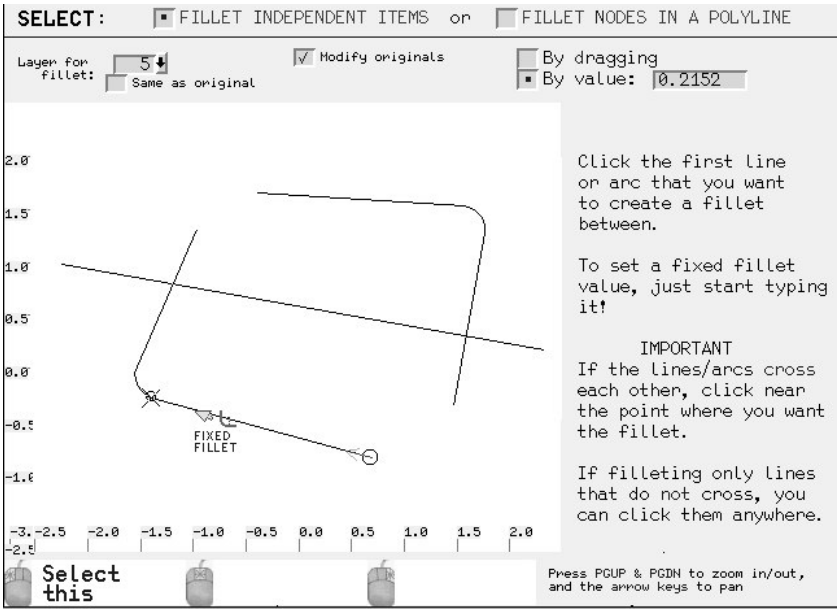

Figure 16-7

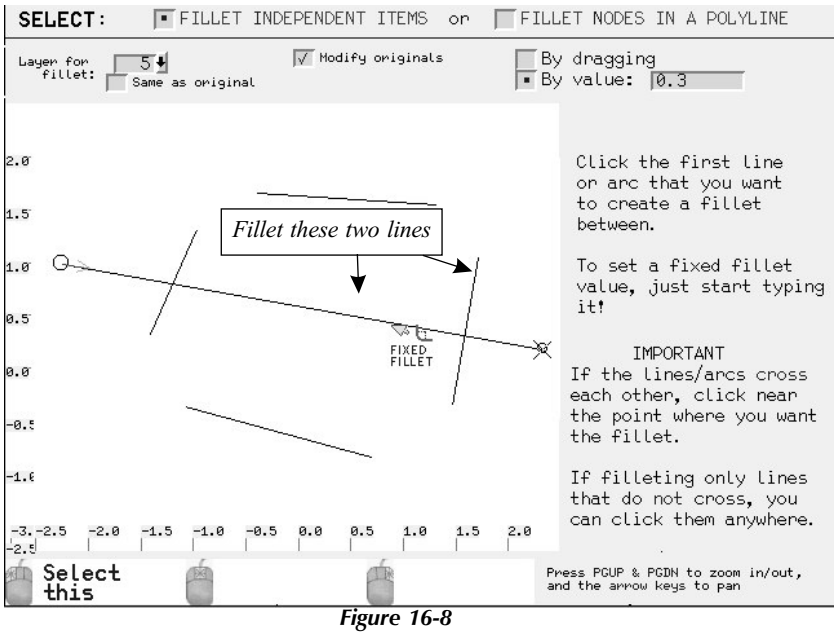

Figure 16-8

original lines were lengthened is because the **Modify Originals** box is checked. If that box had **not** been checked, the original lines would have stayed exactly as they were, and that would have caused a gap between the lines and the fillet. This will be seen later in this chapter.

That completes the fillet between those two lines.

Filleting By Value

Let's assume you now want to fillet the other lines in this drawing. You could do the same operation on the other lines; specifically, you could **drag** a fillet. However, let's assume you want the other lines to have the exact same fillet radius as the radius you just created. It's difficult to drag a fillet to a specific radius, so if you want to give other lines the same fillet radius you need to switch to the "**By Value**" option.

Click the "**By Value**" box at the top of the screen. Then put the mouse on one of the lines you want to fillet, as seen in figure 16-6. Notice that the mouse icon has now changed to show the words "**Fixed Fillet**". When you were dragging the fillet, the mouse icon show the words "**Drag Fillet**".

Click the left mouse button to select this line. Then put the mouse on the second line you want to fillet and click the left mouse button. As seen in figure 16-7, a fillet of that particular radius is inserted between the lines, and the lines are adjusted to fit the fillet.

Filleting lines that cross each other

So far you have seen how to fillet lines that do **not** cross each other. Now let's fillet two lines that **do** cross each other.

Let's start with the drawing as it originally was in figure 16-1. In figure 16-8 you see those same five lines, and the arrows identify the two lines that will be filleted this time. These two lines cross each other. In figure 16-8 a fixed fillet radius of 0.3 was selected, although dragging also works when lines cross each other.

When two lines cross each other there are at a total of four possible locations for a fillet. Figure 16-9 shows a close-up of these two lines at their intersection point. The four dotted arcs show the locations for the four possible fillets for these two lines.

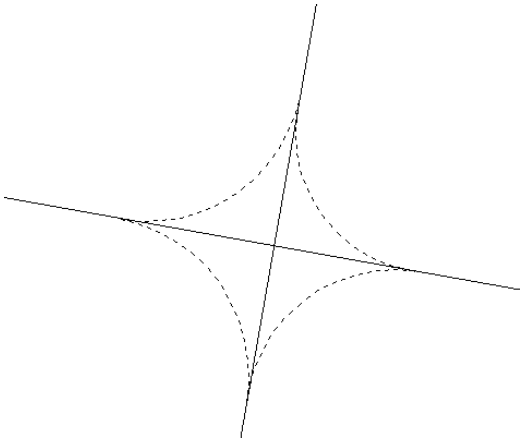

Figure 16-9

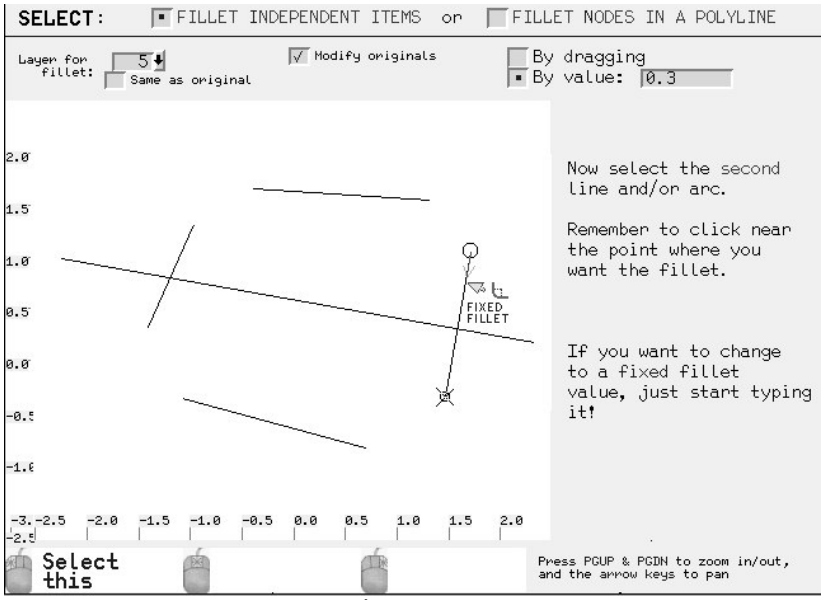

Figure 16-10

When two lines cross each other, each line can be considered to have two sections to it; namely, one section is on one side of the intersection point, and the other section is on the other side of the intersection point. In order for MillWrite to know which of those four fillets you want, you click the mouse on the section of the line **that has the fillet**.

Click the left mouse button on the section of the line that is to the **left** of the intersection point, as seen in figure 16-8. Then move the mouse to the **upper** section of the other line, as seen in figure 16-10, and click the left mouse button. This select the two lines you want to fillet, plus it identifies which section of the lines you want to fillet. The result is shown in figure 16-11.

The sections of the lines that were on the other side of the intersection points were chopped off, and then a fillet was put between the remaining sections.

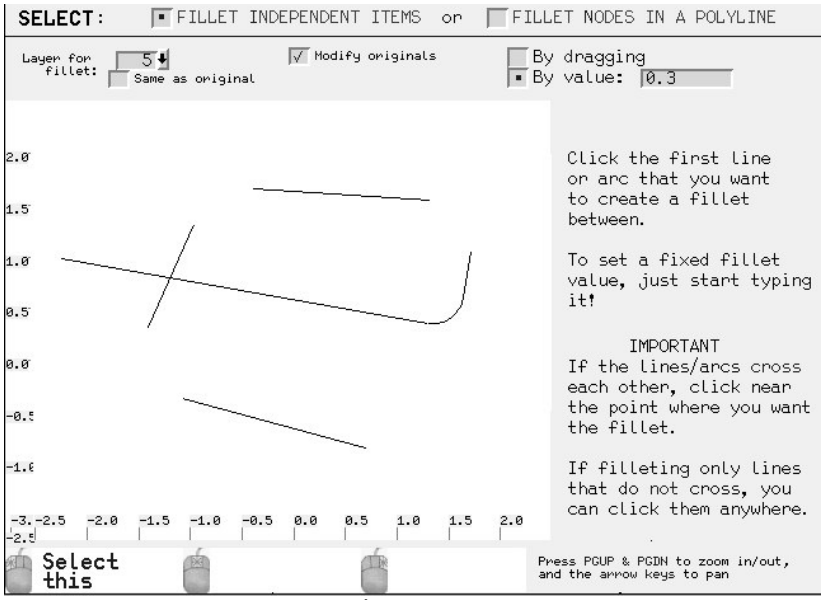

Figure 16-11

Don't Modify Originals

When the "Modify Originals" box is **not** checked, the fillet will be created but the original lines are arcs will remain exactly as they were. To illustrate this, notice in figure 16-12 the **Modify Originals** box is no longer checked. Next we create a fillet in the same way as before; namely, the two lines that are to be filleted are selected with the mouse.

Notice in figure 16-12 the upper section of the line is being selected. In figure 16-13, the **right** section of the long line is being selected. Figure 16-14 shows the resulting fillet. Notice that this time neither of the original lines has been modified.

Figure 16-15 shows the results of filleting the two lines that are identified by the arrows. Again, neither of the original lines has been modified, and in this case it creates a gap between the original lines and the fillet.

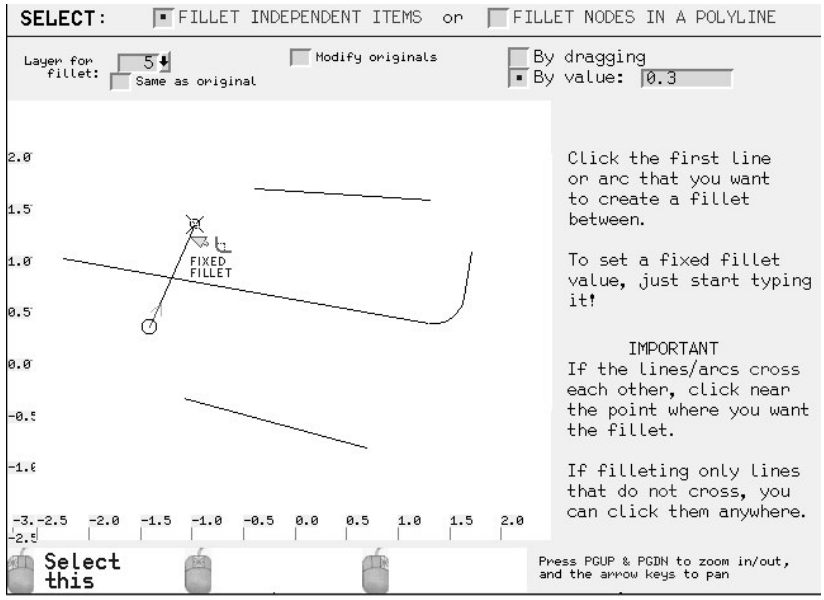

Figure 16-12

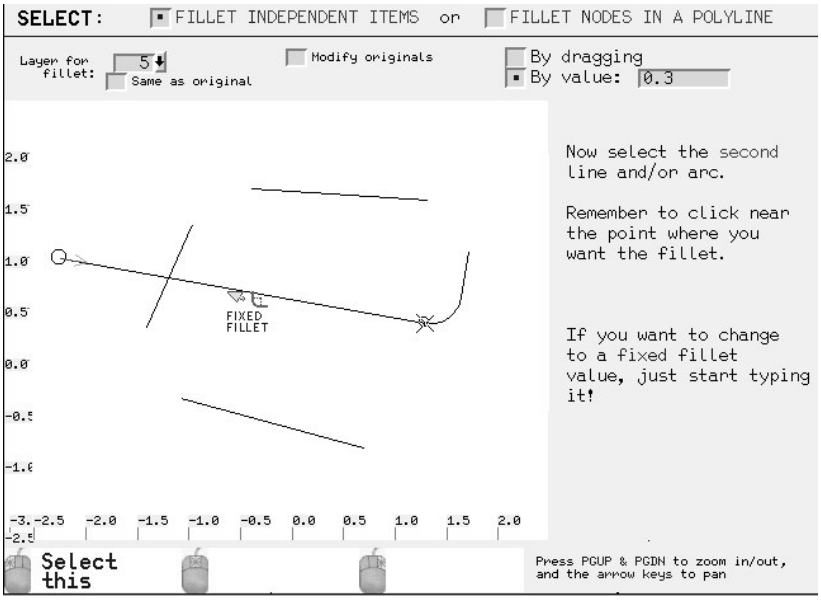

Figure 16-13

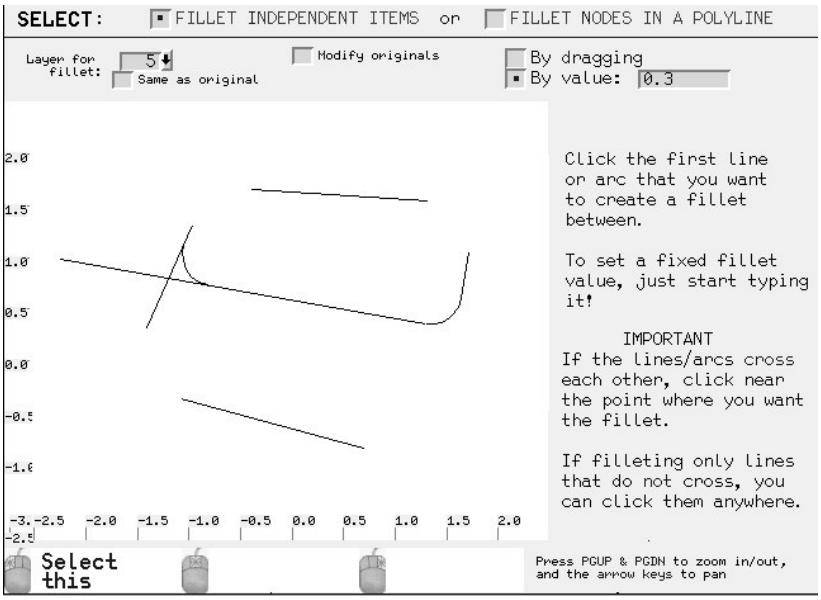

Figure 16-14

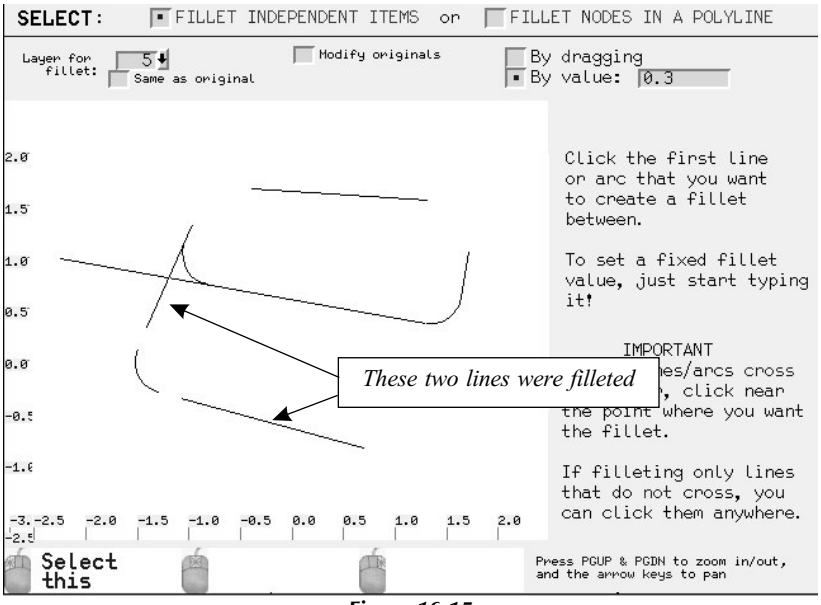

Figure 16-15

Creating loops

If you drag a fillet beyond the intersection point of the lines or arcs that you are creating a fillet for, you can create a loop. In figure 16-16, a fillet is being dragged between two lines. In figure 16-17, the mouse has been move beyond the intersection point and now a loop is forming.

If the **Modify Original** box is checked, the original lines will extend beyond their intersection point and fillet will become a loop, as seen in figure 16-18. If the **Modify Original** box has **not** been checked, the loop will be created but the original lines will remain exactly as they were, as seen in figure 16-19.

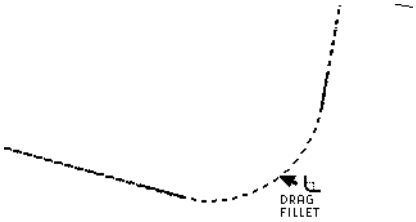

Figure 16-16

Figure 16-17

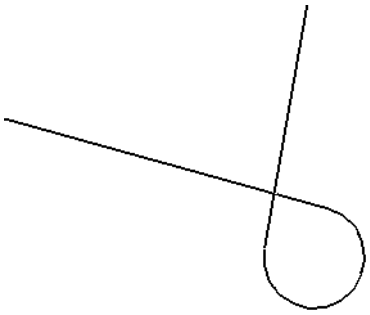

Figure 16-18

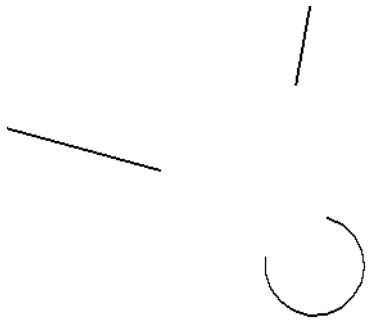

Figure 16-19

Filleting with a Zero Radius

If you set the fillet value to **zero**, you can cause two lines and/or arcs to meet at their **intersection point**.

Figure 16-20 shows two lines that do not touch. If you want both lines to meet at their intersection point, the quickest way to do it is to fillet the lines with a radius of zero. To do this, you start the **fillet** function and select the **By Value** box at the top of the screen. If the value in the **By Value** box is not zero, press the zero key and press enter.

Note that you do not have to first click the By Value box that has the value in it; rather, just press the zero key.

Since these lines are **independent** — as opposed to being **links** of a polyline — you must also check the **Fillet Independent Items** box at the very top of the screen.

Furthermore, you must have the **Modify Originals** box checked because it doesn't make any sense otherwise. (MillWrite will not automatically check the Modify Originals box for you in case you accidentally typed a zero.)

If you forget the check the modify originals box, no harm is done; rather, you will get an error message when you try to do the fillet.

It doesn't matter what you set as a layer for the fillet (at the upper left corner of the screen) because in this case no fillet is actually being created.

After you've checked the appropriate boxes and entered the value of 0, click the two lines that you want to meet at their intersection points. Figure 16-21 shows the result of clicking on the two lines that you seen in figure 16-20. Both lines were extended to the intersection point.

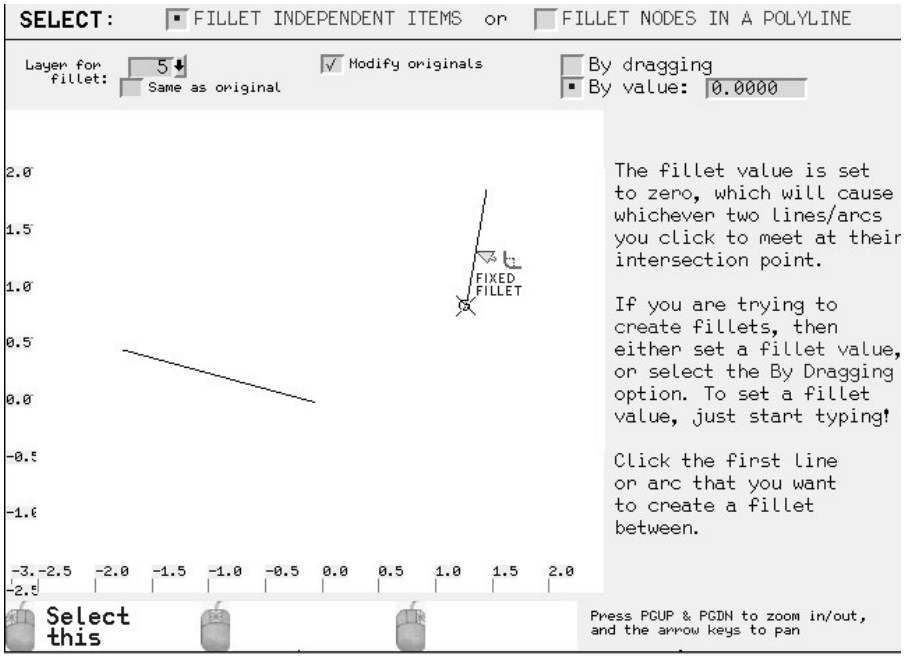

Figure 16-20

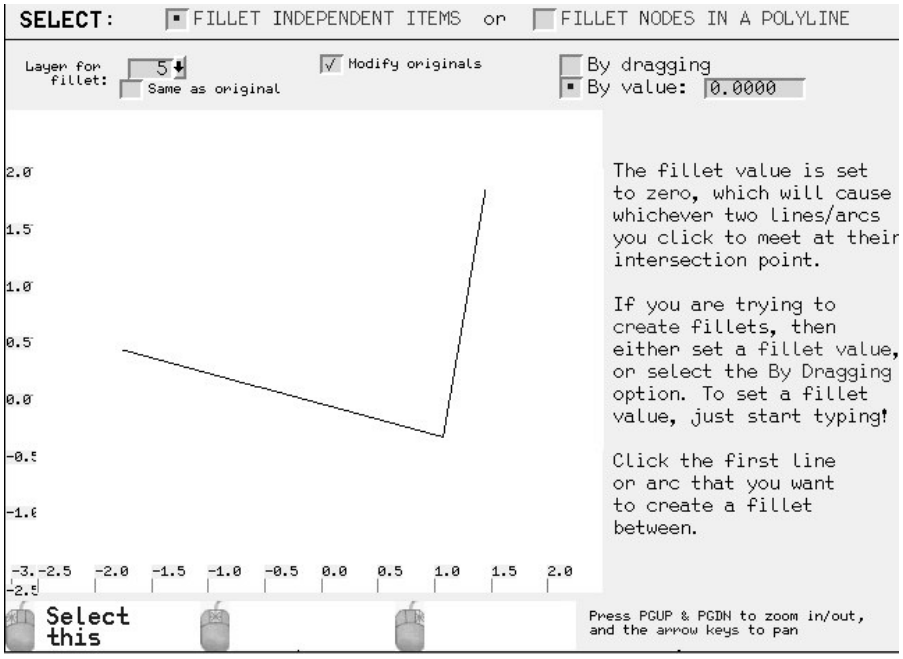

Figure 16-21

Fillet Arcs with Zero Radius

You can make two arcs meet at their intersection point in the same manner. If the arcs already cross each other, then click the section that you want to keep. For example, in figure 16-22 are two arcs that cross each other. In figures 16-23 and 16-24, the two longer sections of the arc have been selected. The result is shown in figure 16-25.

Note that you can click on the smaller ons of the arc if you want to keep the smaller ons; in other words, you do not have to pick the longest sections.

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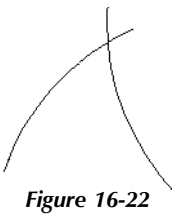

Figure 16-22

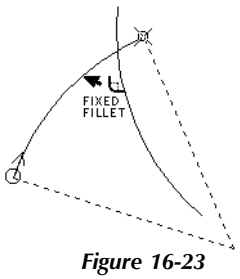

Figure 16-23

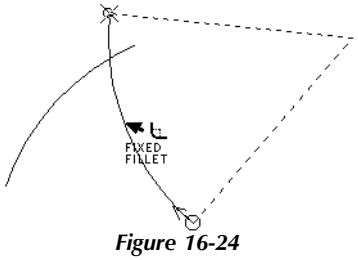

Figure 16-24

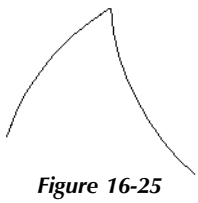

Figure 16-25