



BEST PRACTICES COURSE – WEEK 20 Managing Attributes, Project Preferences, Work Environment – Part 1-A - Intro to Element Attributes: Working with Custom Line Types

Welcome everyone to the ArchiCAD Best Practices Course lesson. We are starting week number twenty. This whole module will focus on attributes as well as project preferences and work environment. What all three of these have in common is that they are not things in your project. In other words, they are not walls or annotation, but they are the definitions of how the project or how ArchiCAD works with you, such as materials and composites, etc. [0:00:36]

A composite would be a type of wall assembly. And a material, depending on what version of ArchiCAD you are in, would refer to the surface appearance of the elements; so not the actual elements, but the attributes of those elements. The original series that I had laid out had six pieces. I think this probably will get a little modified because we've been going over a few versions and I have to cover more things. But we're starting section 1, and we'll be looking at the basics of attribute management. [0:01:14]

Let me switch over to ArchiCAD, and we'll look at ArchiCAD 17 to begin with, because that's the current version, but I do have ArchiCAD 14 and 12 open in the background so I can show you some differences for those of you who are still on older versions. So what are attributes? Under the Options menu, there is a section called Element Attributes. And all of the items in this menu here are attributes. [0:01:47]

If I open up 'Attribute Manager' at the bottom of that menu, we will see that there are sections here for managing layers:

- Layer combinations

- Pen Sets,

- Actual definitions of individual pens in any particular pen set

- Line types

- Fills

- Composites

- Complex Profiles

- Surfaces (which used to be called 'Materials')

- Building Materials (which are new in ArchiCAD 17)

- Zone Categories

- Cities (or locations on the planet)

- In recent versions of ArchiCAD: Operation Profiles, which have to do with calculating energy usage based on the use of certain areas or zones in a project. [0:02:46]



So these are all handled by Attribute Manager, and we are going to look at how you can create, edit, and manipulate these attributes and why you would want to do so. So I am going to cancel out of attribute manager and just point out that in this menu here, you see 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 things here. Some of them are actually not managed inside the Attribute Manager, such as the Renovation Override Styles which are managed in their own dialog box related to the renovation palette, which was introduced into 15. [0:03:30]

Now if I switch over to ArchiCAD 14 here, and we go to the Options, Element Attributes, you will see 1, 2, 3, 4, 5, 6, 7, 8, 9. So there are fewer of them here because we didn't have Building Materials. We didn't have Renovation Overrides and there may be something else, maybe the Energy Operations Profile. So there are several that are missing. And if we go back to ArchiCAD 12, it's similar here, but we are going to see some differences in the way some of these are defined. [0:04:05]

Let's go back to 17. We are going to start out by just looking at the very first one, Layer Settings, because this is the dialog box that we all should be very familiar with where we are able to turn on and off the visibility of layers, we are able to create new layers here, and we are able to create layer combinations. Now I have dealt with this extensively in other parts of the course, so although this technically is an attribute, I am not going to spend any time today looking at how you create a new layer or layer combination. [0:04:38]

Please refer to some of the other lessons, I think particularly in week 8 and 9 we were looking at layers and layer combinations in the view map and things like that. So there were some changes in this dialog box, just the appearance of it that happened in later versions. If I go to ArchiCAD 12 and we open up that layer dialog box, we are going to see that these were all text things; select all or deselect all. Compared to ArchiCAD 17, well those are text, but you can see the icons. And in ArchiCAD 12, lock unlock, show and hide were all text and now are more compact in terms of the icons. But other than that, the functionality of the layer dialog box is pretty much the same as it used to be. [0:05:38]

Now if we go to the next one down here, we will see Line Types. In line types, these are the lines that we have access to when we go to the Line tool. If we go to the Line tool, these are all the line types currently defined in this project. Now the lines are also used in other places. For example, when we have the Dimension tool or the Wall tool; there are going to be things that define the line types. Even in the Slab tool I think we can draw the slab with a different type of line if we want. So dashed line or outline, things like that. [0:06:24]

The basic Line tool and other 2D tools like Arcs and Poly Lines all share access to the Line Types that are defined here. The line types are extensive in the standard template, and you can add to this. They are divided into the first group which is called 'Dashed Lines'. They start with solid, but then there are all of these different variations of dashed. And then there are 'Symbolic Lines'. We can see the difference



between them when we say New, because it says, 'Do you want to create a dashed line, a symbol line type, or do you want to duplicate something that already exists and modify it?' [0:07:03]

Now let's look at the most basic dashed line here and see that the dashed line has a length for the dash and a length for the gap, and in this case, we can see that they are even. There is a certain distance for each one of them. If we go to one that is longer like the dashed long, you can see the numbers here are slightly different. Now if we go and say New and I say I want to duplicate this, say, dashed long copy, then I can go ahead and edit this. For example, if I make a bigger gap, you will see the dash has more of a space. If I make a longer line here, the dash will be longer. [0:07:49]

So now this particular one I have just defined, and I have created it, and I can say OK. If I draw a line - let's just draw a line here and we will make a few copies of it. I will select this and do Multiply. We will make 5 copies of it here. And I will select this one and we'll make this the dashed here and make this one the dashed long. And the new one, which I just created, will show up at the bottom of the dashed line types. So you can see it's here: "Dashed Long Copy". So this first batch of about ten lines, you can see how that works. [0:08:46]

Now these spaces between the lines are based on a certain size on paper, meaning that it doesn't matter what scale we are drawing at, they will appear a certain way on paper. If I go to the 100% here, this is basically showing a representation of what it might look like when we print that on paper. If I draw a wall here, and I am going to draw a box of walls around this here, and put in the door. Now if I go and switch this to 1/8 in. scale, so half the size for printing or roughly 1:100 for metric, you will see that the building got smaller but the dashed lines still have the same spacing. [0:09:44]

If I go back to that 1/4 inch and you look closely at this, you will see that the dashed line and the long dashed, etc. look the same. Of course, they take up more space, so you are going to have more dashes, but the amount of space between them is constant. So this is based on a setting in the line types for - let's go to dashed here - that is 'Scale Independent'. This distance, and I am not quite sure what .10 refers to, but it actually mentions inches, in. and I assume that if you are working in the international version it would refer to mm. [0:10:24]

So this is scale independent. Now scale with plan would be something that you probably wouldn't do with dashed lines, because it probably wouldn't make a whole lot of sense, but we would want to do that with certain types of lines that represent physical elements like this concrete masonry unit or these stones. So these types of elements may actually have a physical size that we want to coordinate with so they would have a model size rather than a paper size. [0:10:58]

So the basics of creating the dashed lines are pretty simple. You can create a new dashed line or duplicate one and then you can adjust these. And if you did want to have more pieces, like this is a triple dash, then you can see there are several segments. And you can either manually move the flags or you



can type in a new value here. So you can have some finely tuned controls on that. Now let's look at what a symbol line type would be. The simplest one is this zigzag here. And you can see it has this little down and up indicator. It's indicating that it's going to take a certain size on paper and there is no gap. So it's going to repeat. And you can see what that does. So let me just create a new duplicate of it. [0:11:51]

Let's say that I made this a little bit bigger like that. I will say OK. So now if I were to select this one and make it a zigzag line, and then select this one and make it a zigzag copy - which will show up at the very bottom of the popup list - you will see how it's much bigger because I changed the size of it. It kept the same proportions. I guess it's still 45° in each direction, but it changed the size. Now if I were to go into the line types here for that zigzag copy and add a gap by pulling the white flag here out, or typing in a gap value, then you can see how it changes its look here. [0:12:49]

So another thing to realize is that elements that are already drawn with a particular type of attribute will update if that attribute is redefined. So in other words, I changed the definition of this line type and the line that was already drawn looks somewhat different. Now I can also go into the attribute definition and rename it. I can call this "Zigzag 2". This may seem trivial, but if you think about it, the line says that it's "Zigzag copy". In a minute, it's going to refer to "Zigzag 2". It works intuitively. You can see here the name shows up as "Zigzag 2". [0:13:30]

But behind the scenes, what's happening is all the elements like these lines refer to the attribute, in this case the line type, by an internal number or an index number. So if I go to the Options menu, Element Attributes, Attribute Manager, what we are going to see is that for these line types, "Zigzag 2" is line type 51. So it doesn't matter whether I call it "Zigzag 2" or "Zigzag larger", if I change the name here, it will change there. Basically, the line itself says, I'm using line type 51. Whatever it's called, I will show that here. [0:14:14]

I am modifying this here, and you can see how it has a different name. So that's an important part of attributes that you can use to your advantage and flexibly reconfigure things as you need to; to rename them or to possibly to redefine what they look like. Now let's look at how the line types work when they are defined with a certain distance. Let's go and create some more lines. Drag a copy of this and multiply it down same distance just for symmetry. And now let's look some more ornate lines in here. [0:15:08]

So we have break lines like this here. Let's say that we wanted to create a variation of this where the distances for the break was longer or shorter. How would we do that? Well, I am going to show you an option here. I will go to the Options menu, Element Attributes, Line Types. And we will go find that break line. We will see that in addition to being able to adjust the length visually here, there is an option here for the symbol line types to copy the line components. So if I copy this here, and then go and paste here, you can see that this has been brought in as a series of individual lines. And it looks similar to this, although the proportions are not quite the same, or the scale of this is not quite matching. [0:16:17]



Now what I am going to do is let's say change the style. Let me actually go and make this a little different like that here. So I now have a rather different proportion for this. If I select these and copy them and go to the Element Attributes, Line Types, I could duplicate the one that I had earlier or I can say New. I can create a new symbol line type. And we will call this "New Break Line" and say OK. Then use the option here that says 'Paste the line components'. And you can see how it shows up. You can see the taller line here. And if I don't want to have a gap I can just type in a zero for that gap. Then it's going to zigzag like this. [0:17:17]

So I say OK, this is now a new line type that I have created. And if I go and select this line, I can go and choose this new line type. Now you will notice that this line type is offset, meaning that the actual mercedes for it is between these two end points, but the main visual line is not on that. Whereas this line type here you can see is nicely centered. Now you might think it's because this is centered in between here, and it probably is centered in between the extent of it, but let's say I wanted this to be lined up. I want to create this line type that had the main body of the line matching the endpoints there. [0:18:12]

It turns out that if I take these elements here - and before I copy them I have them at the zero point, so I am just going to drag this down to the origin point. So here's the little "X" origin. This is the project origin for this particular project. Every project has an origin point, it's an "X" that shows up in gray somewhere onscreen if you zoom out far enough you can find it. Now these are placed in this location. If I copy them and then go to the line types, and let's just go back to that same one here and we are going to paste the line types. [0:18:55]

Now you can see that it readjusted its position a little bit. And now I can go and make the gap zero here. I am not quite sure about the dash. Let's just see. It looks like this is continuous; it's not reading properly visually here. But let's see what happens when I say OK. I have just redefined that line type. And let's go back now to where we were. You can see now this line has a natural axis or mercedes sensitivity along that edge. [0:19:36]

So the rule here is that you can take any linework that you want and copy it to create a new symbol line type. It will automatically create the axis line along the center. But if you want it to be along one edge or any particular edge, then you want to have this set up when you copy it with the origin point being in the right relationship to it. I am going to move these off to the side and keep them available if I need. And now let's look at something that would be a little bit more elaborate in terms of the symbol line type and the ability for the line to actually represent physical elements such as blocks. [0:20:25]

So if I go and select this line here and change this to this CMU or Concrete Masonry Unit, you can see how it's quite detailed. So this line is set up with the axis along the top in this case, rather than the bottom or the center. And you can see how these are spaced a certain size. If I were to take the wall and



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measure it - let's pick up the wall and draw a little piece of wall here. You can see this is roughly the same thickness. Now the measurement of the wall we can do precisely. I can measure this and it's 8 inches. I can't actually measure this precisely, because if I measure it, you can see there is a snap point here but there is no snap point on the other side along there. [0:21:23]

But you can see that it's not quite the 8". The 8", if I were to zoom in, this is 7 1/2". So it's probably set up so that there is a gap between one course and the next if you were to do that. And the distance along here is about 15 1/2". And here it's about 16". So that's the distance that we would expect for a CMU unit here in the U.S. And in fact, the name was given as 8x8x16"; so 16", 1'4" is that distance. So this is let's say a real world size. [0:22:04]

Now if I change the scale here to 1/8", what happens? The wall gets smaller, this gets smaller. If I change it to 1/16", everything gets smaller because this is physically defined in relationship to the real world, in relationship to the plan. If I switch this back now to 1/4" look at what happens to the dashed lines. The dashed lines still are the same. I will again back up to 1/8" and you can see the dashed lines still have the same gap here between 1/8" and 1/4" visually, so they would print the same. But when we switch between different scales here, the line type that is defined in relationship to plan units will rescale just like physical elements. [0:23:04]

So while you can't snap to this to show the actual coursing or masonry unit points, it is a good way to do certain types of detail drawings. So you could literally go into a wall and have a wall type that has bricks or blocks that you would just draw with that line type. Now how would you define this? Let's go and see. If I open Options, Element Attributes, Line Types, and we go find this CMU unit, you can see it has some lines here. There's no gap. And we can go and copy this. And by the way, it says, 'Scale with Plan'. It also has a mention here of 3/4" equals 1'. So that actually is a 1:16 scale. [0:24:01]

I am going to copy the line components here. And let's see. If we had it as 3/4" to 1', that is 1:16. So that's what that particular one is. Now given that the - if I paste, and let me just make sure - now this is sort of interesting, because I am going to paste now. And you are going to see something very odd with the line types. I guess I hadn't change the default line type. When we copy the lines, remember I just copied this here - and let me zoom out a bit here - when I copy them, it looks to see what is the default setting for the line tool. [0:24:53]

In this case, it's solid line. If it's set up for dashed or some symbolic line, then all of the lines here will be drawn with that dashed or symbolic line type. And you can get a very strange result. So before you copy the line elements, make sure that your line type is set for solid line, otherwise you will end up with some odd things. Now you may notice here that this not the same scale as that. So that's not so much an issue, it's just something you have to know about. The size that is going to end up on the plan is not necessarily the size that you created or edited. [0:25:36]



Now you will notice when I brought it in that there's a little "X" here. That is a snappable point that is a hotspot. The hotspot tool. The reason for that is, if you look closely, you can see that there is the block and then there is a small gap for the next one for the grout or spacing between the blocks. By having a dot, this hotspot is part of the definition of the symbol. It allows us to define precisely what that gap is instead of having to do it using the controls for the dash and the gap. You can use a hotspot and provide no gap so the next one will start at that hotspot. [0:26:25]

Now let's see how we would edit this and what this requires. I am going to drag this down. Remember that if I wanted this to be lined up so that the one edge or another is the axis line, then we would want to make sure that we put this on the project origin on the top or bottom or whatever is the most relevant. Now I am just going to go in and get rid of some of these lines. I am going to simplify this in terms of the type of block. [0:27:09]

We will make this a very hollow piece right now. Not nearly as strong, obviously. Let's just take this and I am going to copy this, and we will go into the Line Types. Actually, before we create the new one, let's look at this one and we will see that it says that the dash is 1". That means that the distance here is 1". Now we know that this is actually as a block, the original block was 16" long. Remember this 3/4" equals 1", that is a scale of 1:16, which is not a super common scale but is one that is used in some detail drawings, so it's available. [0:28:06]

So basically, if I need this to be 16" long, I tell it to be 1" at the scale. And of course, that is going to end up when we tell it to scale with the plan, it will remember the size in relationship to the plan. So let me go here and we are going to make a new duplicate of this. And in this one, I will paste in the line components. You can see that it's a little bit different looking. The gap here we need to turn to zero, because we don't want to have a gap. That will move the two flags next to each other. Now I need to tell it what size this needs to print out at. [0:28:49]

So this is again, I am telling it how big I want this to be at the current scale, and that will define its physical scale for future reference. So I now go and say OK, and that has defined that particular one. And if I go to the line type here, and let's just draw a line and select this and change it to that new line type that I just created. You can see what it looks like. Now if I measure this, and use the M key to measure it from one end to the next. Here is the 1'4", here is the 16" that is what I defined, and this would still be the same 7 1/2 or whatever was the original size there. [0:29:39]

Now again, we don't have any snaps along here, even though there was a hotspot there. We just have the Mercedes symbol that indicates that this is the edge of the line. You can see the hotspot there. I deliberately placed it at the bottom as opposed to the top as a variation on that. So that is the basics of how you can create a custom line type. You can draw these from scratch or take something that already exists in the system, copy it from the dialog and paste it onto the plan and work it. Pay attention to the



scale factor that you are in at the moment that you copy this and figure out what size this should be in order to fit it in properly. [0:30:28]

Now I have found that if I wanted to go into the line types, in some cases there is - well for this CMU here, I know that when I was looking at this in another file there was something that was showing at two decimal points; it was at a different scale. I wanted to do it at 1.33 or 1 1/3". If I type in "33" that's going to be 1/3 bigger, but in order to be exactly 1/3 bigger, I need to type in some additional decimal places here. You will notice how it just drops off those decimal places. So we can't actually control that. What I have found is that if you sometimes need to get it down to 3 or 4 decimal places, you can ask ArchiCAD under the "Working Units" to increase the number of decimals in the dialog boxes from 2 to as many as 4. [0:31:43]

That will give you controls down to 1/10,000 of whatever your unit is. So if I go to the Line Types and take this line, you can see it's now got four decimal places. So it will now retain that. So this is going to make this bigger. Just know now that this is going to be instead of 16 inches, it will be 1 1/3 times that. So obviously, that's not a whole number here in terms of this unit, but you can see how it made that bigger by changing that definition there. And we can go back to this and again just change this back to 1.0 and now it goes down. [0:32:37]

Now these symbol line types are actually more flexible than you would think. We can do them in a straight line, but we can also use them on a curve or a spline. So to give you a real graphic example, I will select this curve and go here and switch it to something like let's say that block. You can see how it's doing its best to create this shape along the edge here. I am not sure why we are missing the top edge here of that. Let's try the other one and see if we get that. [0:33:18]

So for this one, it's working better. I am not sure what the difference was there, but it's doing a credible job here. If I go to the Line tool and do the same one, we will see how they really are in scale. You can see probably it's measuring along this axis line and making it this distance there. Now if we go to these other ones here that have letters or this stone, let's look at how this works with the stone. I will select this and drag a copy of it. Now we will switch this to the stone. You can see how it has this nice edging that you could use on something that is rickrack there. Or you can have something a bit more different feeling, indicating the edge of the defined area. [0:34:23]

So if we look at the definition of this - why are we? We temporarily lost the menu. So if I go back to Line Types and go to the definition of this one, you can see it has the same thing. It says "Scale with Plan". So it was defined at 1/4" to 1', that's when the lines were copied. And it was told to be 2" from this end to that end. So at 1/4" to 1', that is 1:48. 2" would be 96" or 8' long. So this is intended to be 8' in length here. [0:35:12]



Now if we look at the small one here, you can see this is 1/2" to 1', so that means it's going to be 2' long. That means that the sample piece is 2' in length. If we were to copy these line components and paste them in here, you can see these are just a bunch of lines. Now it turns out that what you can copy, what you can work with here and paste into the line dialog box are lines, arcs, and hotspots. So you can have arc elements. If I select this - these are all straight segments and are done more simply. So this may have been drawn originally with arcs and things but then they were converted to lines. [0:36:12]

But you can bring in arc segments if you want, or circles, there. Now there are some lines that look different from these that appear to have text. Here's an "A" for compressed air or "C" for condensate or "D" for drain lines. So let's look at the drain line. Let's copy the line component and go and paste it in here. And what you will see is that this is not actually a letter, this is a series of lines. So in other words, in order to have something that looks like a letter like one of these here, or this fill here, these are actually in the original definition were just a series of lines. [0:37:06]

Of course, that's pretty easy. These are all straight ones. But ones like the "D" had to be simulated with a series of straight segments. So it's not too hard to make these with letters, but it is a bit tedious because you have to draw it out of line segments rather than putting just text down. Now this can be curved, that's a nice thing is that you can curve this, and you can see how it does this elegant smoothing of these elements here. This concludes the section on creating custom line types. We will be looking at how you can define these in a template and define them in one project and move or paste them into another project. That will be in another lesson coming up on the use of attribute manager and related things. So please add your comments and questions to the page down below. This has been Eric Bobrow. Thanks for watching.

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