



## **BEST PRACTICES COURSE – WEEK 20 Managing Attributes, Project Preferences, Work Environment – Part 1-E – Element Attributes: Working with Composites**

Welcome everyone to the ArchiCAD Best Practices Course training lesson. Today's lesson will be focused on composites. We've spent the last few lessons looking at Element Attributes under the Options menu and covering line types and fills. For ArchiCAD 17, Building Materials and Surfaces in ArchiCAD 17 previously called Materials. We're going to be looking at composites which are a fundamental. I think all of these are fundamental but this is truly a fundamental resource within ArchiCAD. This is what you use to manage wall assemblies as well as assemblies for floors and roofs. Now the composites dialogue here in ArchiCAD 17 will look similar to the one in ArchiCAD 16. I will bring that up. There are some significant differences in terms of the way that it's organized here. So we're going to be looking at the way composites worked before 17, and then how it works in 17 since we need to cover both. And some of you are on older versions. [0:01:20]

In earlier versions of ArchiCAD, composites were made of a series of skins that referred to fills. So in other words, where it says 'Brick face' here, the fill down here, the skin pattern, refers to a graphic representation. And of course it says 'Brick face', so it's referring to particular type of construction. We can assume that this is going to be used for something made of brick. But literally it doesn't refer to a building material; it just refers to a graphic representation. So that graphic representation could be things like airspace, saying that there's a cavity for framing. Or it could be something potentially even a poché of 25% or 50% for graphic purposes. [0:02:12]

So we could use any of these graphic options for delineating a skin or component of the assembly. In ArchiCAD 17, this reference in a similar way is pointing to a building material. So although each one of these building materials, like let's say wood framing, has a particular appearance in terms of the fill - or let's go to maybe the concrete. Here is structural concrete. So here is a fill that is being displayed but it's actually referring to the building material. So a fundamental difference in 17 is that we are in an integrated fashion referring to the actual building material that was being used rather than only indirectly referring to the appearance of that. [0:03:10]

So here is 16. Now separate from that fundamental difference, there are a lot of commonalities. In fact, the basic structure of composites has not changed for many years. There are a series of divider lines. So for example, on one side of this wall it has a solid line with a particular pen choice, a particular thickness of pen. And in between every one of these there is usually solid lines, but occasionally we might find something or we want to define something with a dashed line. You might find that if you have a double framed wall, you want to indicate that it's maybe more soundproof or something like that or it has more insulation. So it has two layers of framing in there. [0:04:00]



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You may want to have a dashed line there, or potentially you can even go and say that - here you can see different line types. And there is an option in fact to turn off a skin separator line here. So you can just barely see the difference there. If I go in here you can just barely see the difference visually in the dialog box. But it would actually disappear onscreen. Now if you do turn off the separator line, it is still snappable. If you were to draw that wall assembly and pass your cursor over the intersections it would still be there, but it would not show up. So you could potentially put - one time I've seen in earlier versions of ArchiCAD if you want to have it snap at the center of the core and it wasn't at the center of the actual wall because the wall was asymmetrical, in some rare cases I've created the core in two pieces and essentially had no line there but still it would snap to the center of the core. [0:05:17]

So in ArchiCAD 17 we have other ways of snapping to different components so that wouldn't be necessary. But in general we have this concept of lines separating skins. And each one of these skins has a particular thickness. And in versions before ArchiCAD 17, we might have some very specific controls over the individual cut fill pen and background. So essentially what is the graphic look of this? Now in ArchiCAD 17, what we'll see is this whole dialogue box become simpler. Why? Because the building material has controls over the way that it looks. So let me take a similar brick one that is similar to what we had in ArchiCAD 16 here. Each one of these building materials already has some settings for what it looks like. [0:06:21]

Now, we've spent some time in the previous lesson looking at the building materials. And I think if you refer back to that you'll see that there's going to be a consistency for how brick or insulation is represented in the different wall assemblies or composites. Whereas in ArchiCAD 16 and earlier, while you could have a certain policy or habit of making them look the same, it could easily have differences in terms of which pen or background pen you're using and so on. And that actually can cause problems or challenges when you migrate a project from 16 or earlier into 17 because ArchiCAD will actually create for each composite that it finds in your project when it's migrated to 17 it will create a different building material if it finds that the fill was done differently. [0:07:18]

If there were any differences in the setting in a composite, then it will create separate building materials so that you have the same graphic look. And while that is sometimes useful, it often will just clutter up the building materials in 17. So getting back to the core of this, and the pun is intended, each one of these skins has the option of being specified as 'Core', 'Finish', or 'Other'. So the meaning here is of course in terms of architectural purposes the core is going to be structural. The finish is going to be some type of cladding. And then there is a concept of intermediate skins that are neither structural nor the exterior cladding of the composite. [0:08:11]

Now in terms of the way that this works, if we designate something - if I were to go here and say that it's core. Essentially all the ones in between have to become core. You can't have core here, skipping a gap and then another core. Essentially, core is going to be a connected group of skins. Now we can turn this into finish which is what it was here. And then this one could be finished or other. Basically it starts from



the outside with finish. We can have one or more skins that are considered finish, and then we can have possibly one or more other skins here. But basically we can't skip. It has to start with core and possibly go to the other and then end up with the finish. [0:09:04]

Now the top of the list in ArchiCAD 16 and earlier would be the outside of the wall or the reference line side of the wall. Essentially when you are drawing the wall, you have a reference line. So let me just cancel out of this and go - we are drawing the wall here. So if I zoom in on this, this wall right now is a simple composition here, just background fill. In ArchiCAD 16 and earlier we can choose between simple fills and different types or composites in the same popup menu; which is actually pretty convenient. In ArchiCAD 17, when we are doing a wall - let's just do a single wall here similar - we have only the list of composites if we are in that mode. And we have to switch explicitly to single component if that's what we want. Then we have the choice of just the raw building materials. [0:10:20]

Now it's a little inconvenient, but that also means that the list is shorter so you can make one choice and then focus on which one you want after that. Now in terms of the reference line, you can see that the reference line side with the heavy line that's indicated with the dots at the end is always going to be on what would be the top of that list. So if I go and say 'Edit Selected Composite', which is a command that was added into ArchiCAD 17, we will see that this brick is the first one. And then it has the airspace and the insulation, etc. So that's the sequence there. [0:11:06]

Now in an ArchiCAD 16 and earlier we basically have the choice of putting the reference line on one side or the other or center and possibly having an offset. Now if I switch here, in terms of which side of the reference line, you'll see that it still has the brick attached to the reference line. So whether I flip it one way or the other it's still attached to the brick. Of course if I say it's centered then it's going to be just placed in the center. And arbitrarily which side is which terms of where the brick is or the outside depends on which direction you are going in. In other words, top to bottom or left to right, versus right to left or the reverse. [0:11:51]

In ArchiCAD 17 when I have this, I can be drawing on different faces. So we have more options for this. But still what is considered the outside face would be that first skin in the dialog box. So whatever you have at the top of that list is going to be considered the outside. With ArchiCAD 17 we can say I want to put the reference line perhaps on the inside face. And now you can see that this is the reference line but the brick is on the other side of the wall. So it gives you some more flexibility. And of course we still have the option of the center one there. [0:12:35]

We also have the option in 17 to do core outside. So remember that the core is a structural thing in here and it automatically finds that. In previous versions, ArchiCAD 16 and earlier, what we would need to do is manually put in the offset. I guess it's not showing in the Info box by default, but we can put that in. So if I know that offset to here, I will just guess it's 4 inches and say that, then what's going to happen is



that reference line is embedded that particular distance. So we can look at that definition of this and figure out how far in it would need to meet the face of the framing or the core. [0:13:21]

Now in ArchiCAD 16 and earlier, if we wanted to edit this and change the definition of this composite, I would have to go to the Options menu, Element Attributes, Composites and go manually find which one it is. There's no command like in 17 to say, "Edit the Selected Composite". But as a shortcut, if you are in ArchiCAD 16 or earlier, you can eyedrop an element. Of course when you eyedrop the element using the Option or Alt key shortcut, it will switch to that element type in the toolbox, for example the Wall tool, and set it to be using that particular cut fill in this case. [0:14:02]

Now in addition to the fact that you can now draw more walls like this, it also, as a side effect, under the Options, Element Attributes, Composites or actually for materials or fill types or for several different things it will basically look and say, "Alright, if we want to edit composites, let's bring up the one that is the default setting for the wall," for whatever tool is active. So this is no longer necessary and probably still works the same in 17, but it would be a shortcut for saying I want to edit this particular composite that I've eyedropped that is the default setting for the currently active tool. [0:14:48]

Now let's say if this is the core here, then how much of a distance would we need in between? We would have to manually total it up.  $3 \frac{5}{8}$  plus 1 inch is  $4 \frac{5}{8}$  plus 2 inches would be  $6 \frac{5}{8}$ , which is what I would need to remember and tell it that the offset to the face of framing is  $6 \frac{5}{8}$  inches. So now you can see that line there. So while the option of placing the reference line at the face of framing has existed for a long time in ArchiCAD, you had to manually type in or remember what that distance is in order to do it. Whereas an ArchiCAD 17 of course it now has that direct option to choose the core outside, core center or core inside. So that's certainly a nice improvement. [0:15:49]

Now let's proceed on with some of the other basics here in terms of the composite definitions. We've looked at the fact that for each one of these line separators we have some controls. and for each one of the skins we have some options here. In versions before ArchiCAD 17, we had a priority for each skin and this would be manually set. And the idea is to make intersections between different components or different assemblies to work properly. Now before ArchiCAD 17, in order to get a clean intersection, we would always have one - first of all, it would only work between walls; one wall and another. It wouldn't work between walls and slabs or walls and roofs. So it was limited to essentially plan cleanup. [0:16:50]

Secondly, each particular wall would have - you would connect the end of one wall to the end of the other or the end of one wall to the reference line of the other. And then the skin priorities would affect how they cleanup. So let's just take a quick look at how that works. In ArchiCAD 17 this is controlled not by individual priorities in a composite but by priorities of the building materials, saying brick in general has a certain priority compared to concrete, steel, drywall, stucco or things like that. So let's take a look. I have this particular one here, and if I eyedrop this and then draw another piece - let's see. If I eyedrop



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this, does it still have the 6 5/8? Yes, it does. And this is here. I'm going to connect up here. Okay, now it's clean because obviously these two wall reference lines are connecting. [0:18:02]

If I were to connect this going across, you can see ArchiCAD is doing its best to do some cleanup but this doesn't make sense. We have the exterior walls passing through each other. If I want to trim off the end that's sticking out - let's say this is the interior here - I can use that trim. The Command key or the Ctrl key brings up the scissors, and then go to the edge of piece that I want to trim off and click on it. So now it's a little better but obviously it's still an exterior that's in an interior position. So let's switch this to a different one and we'll look at an interior wall here. [0:18:50]

So now with the interior wall, I did switch it in its wall type, but the offset here was retained because remember I switched something I had already drawn. And here's the 6 5/8. The offset is taking it outside of the body of the wall. So that's crazy. Let's put it back to zero now, just saying at the skin face. Now we can see that the cleanup here in between the components is opening up the framing space and it's having what would be drywall or gypsum board not cleaning up to each other but stopping short at that point. And if we look at the priorities of these elements, if I again eyedrop this one and go into the composite definition, we'll see that this skin is 2x steel framing. [0:19:51]

It has a priority of 10 and the skin below it is the "09 Gypsum Board" which has a priority of 8. Now the lower priority will give way to the higher one, and ultimately you can see the brick face has the highest priority here. That's why this wall is stopping short; it's not penetrating into there. Now why is this not wrapping here? If we eyedrop this one and go into the composite definition, we can see this says "2x Steel Framing 10," which is fine. But this is "09 Gypsum Fire Code"; it's actually a different type of gypsum board. This is a 1 hour fire rated wall. [0:20:42]

So if I were to take this and change it from fire rated to just a regular gypsum board here that is not fire rated, then you can see now the drywall is wrapping around. But of course we have a different - this particular one I just picked - for some reason it's an insulated wall. If it's an interior doesn't make sense for it to be insulated. So in fact let's see if I were to edit that composite how that works. If I eyedrop this then I can go quickly and edit the composite and say I want a simple 2x4 wall. An interior wall should not have insulation. Let's change this to, instead of insulation; we'll change it to the 2x steel framing or 2x wood framing. [0:21:38]

If we were in a project working with steel framed buildings, then we would want to make these all consistent. If I made it 2x wood framing for now, we're going to see that it stops at this point. Whereas if I go in here and make this 2x steel framing then it opens up. So the rule here, and this is true in ArchiCAD 17 as well, is that if the skins have the same definition or the same building material or the same fill reference and they're reaching each other - in other words, they're not being stopped by a harder surface - then it will open up the line in between them. And you can see what's happened there.



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But if I go back to the other type of walls here, then you can see that this has the 2x steel framing but it has a different type of drywall, and that's why it's not cleaning up. [0:22:44]

So this is the same in ArchiCAD 17 except that it's based on the building materials rather than the definition of the individual priorities of the composite. So it becomes a more consistent system. So let me just eyedrop this and draw another piece there. Now I will pick an interior wall like this and draw that. So with this one you can see that the drywall is wrapping. This is clearly a different skin here. So remember with ArchiCAD 17 we can just right click on and say "Edit Selected Composite", and this says "Wood Framing" here. And if we were to look at this one and edit this composite, we'll see that this is steel framing. [0:23:45]

So if I decided that I wanted these to match and I was doing the wood framing then I could change that definition, and all the walls that reference it would then slightly redraw and connect up cleanly. So those are a few subtle differences between the composite definitions and how the cleanups happen. Let me go back into the composite definition here and we'll see a few other things related to this. So for certain types of skins, there's some options here that I haven't explored very much that have to do with whether the end lines are showing; the skin end lines. So if I turn off the end line, you can see how the visual display changes here. And if I say OK then was that the composite that I was just working with here? Yes it is. The end lines are turned off. [0:24:55]

I'm trying to see where that actually shows up, the end lines. I've not really been clear on when end lines show up. I think maybe it does happen when you're putting in doors or windows in terms of the end lines. But if you do need to control the end lines, they're done in - it's the end of any particular skin that you are possibly turning on or off here in this bottom area. For the longest time with ArchiCAD 17 I wasn't sure where that was then someone pointed out that there is a little check box here. So the equivalent would be this end line. You can see this choice. You can see a slight difference here as I uncheck this, then I check it. So that's the end lines here. [0:26:01]

So if you do want to control that then you can use this option here. So this dialog box has gotten more condensed for a couple of reasons. They have visually condensed some of the controls. I think one of the things that is nice is that when we are wanting to switch potentially what building material, we can press down here and immediately get access in the other dialog box. In the older ones if we press down on this, we don't have a popup. We have to go down here and then use the popup. So I've always found that sort of awkward that you couldn't just a switch it up here. Now on the other hand in 17, when I go to - say and let me look at this and I press down on it, it immediately brings up the popup menu which maybe I don't want. [0:26:57]

Maybe I just want to change the thickness of this, and clicking on it actually brings up the popup menu. So what I've found is that if you click over here, you can highlight whichever one of these you want and then go in and change the thickness. So that's a little tip that you may find helpful, just clicking on the



right side as opposed to in this list. Now in ArchiCAD 17, you'll see that each one of these building materials has two color chips or two chips. One refers to the fill and the other refers to the surface. So as you will recall from the previous lesson on building materials, each building material is defined in part by its fill or hatch when you cut through it and its default surface appearance which previously would be called the material for it. [0:27:52]

So this just gives you a preview of that. And if you switch between these, you'll see it gives you a quick glimpse. For example this has a surface appearance that is a tan or brown color, but it has a cut fill that is a honeycomb or crosshatch pattern there. Now let's look at how we create new composites. I've spent a lot of time showing what's in the composite. And by the way here if you want to turn off the separator lines you can do that here. And again this is the end lines and this is the separator lines. The visual representation here is not really immediately obvious, but if you think about it, this is a horizontal line just like these. And these are vertical lines hatch which would be the end lines. So that is a little clue there. [0:28:54]

Of course as you look at different pens - and we're going to be spending some time on pens and pen sets on the next lesson - this determines your default setting for how thick that line is. So in the U.S. settings pen 1 is one of the thick cut lines commonly used for the outside of walls. Pen 2 is a fairly thin line often used for hatching. Pen 3 here is a medium line used for a variety of things. So this is used for separators. So in ArchiCAD 17 in the U.S. version they have standardized this 1, 2, 3 system where one is on the outside, the thick lines. And then we have thinner lines for the hatch, and a medium divider line. And that would be in the case for most of the ones that we find within the standard U.S. template. [0:29:59]

Now in the international version, the pen sets are quite different but still there's going to be the idea of having a heavier line on the outside of these walls and some type of common divider setting. And then a thinner line for the hatch that we would see if we do have a hatch rather than an empty space there. Now if we want to create a new composite, there is a choice of clicking on new and starting from scratch or duplicating. So in general if you have something that you want to create a variation on an existing one, then 'Duplicate' would be good. If I do that and say 'Duplicate', it will copy here. [0:30:46]

And of course we can edit the name, and then we start out with a new one in the list. You can see they are side by side and we can edit these. On the other hand if we say 'New' here, then it starts out with a blank one essentially. When we have a composite and we want to add or work with it, basically remember we are starting from the outside and we're going to define it. So let's say we wanted this outside to be brick or something like that. So I will choose the brick and give it a 4 inch thickness. And you can see how the distance shows up here, the thickness. In order to add more components to it, I need to insert a skin. By default it will duplicate the previous one or the one just above it so that it has the same component and the same thickness. [0:31:43]



And that's why on the right you can see what it looks like. If I'm going to say - let's say this is wood framing here and this is going to be 3 1/2, then you can see how it adjusts visually and it calculates in here. If we say insert another skin it duplicates temporarily the same components and the same thickness. Then of course I can go in and say I want to do gypsum board. And we'll make this 3/4 inch or something like that. So now we have the thickness all defined. [0:32:20]

So to create a new composite from scratch is as simple as that, however I have forgotten to set up the pens. So all of this would be rather thick. All of the hatching would be rather thick. It is good to remember - I think the we are using Pen 2 for a fairly thin hatch line. And Pen 3 for the dividers. And then I can go back and quickly get this set up. So because I did this manually, I started from scratch, I am having to go through this. If I were duplicating an existing one of course it would have certain system there and then I'd be changing the thickness or adding skins to it. [0:33:07]

Now if we did want to add a new skin, there's the 'Insert Skin', which I was using. It will add it below whatever is currently highlighted. So if I click on the brick here, it highlights this. Then say 'Insert a Skin', and it will put it below that. So that's how you can add a skin in the middle in here. And let's say that we're going to have an extra space, or maybe it's going to be some extra insulation. Some type of foam board here like this. So we can define that. The other thing we need to do course is define the function: Core, Finish or Other. This is not a finish, it's other. And in fact actually that's interesting. Because this was set up as 'Core' here, and I changed the one in the middle, it left this one as a priority. [0:34:10]

Let me now change this one from the outside and make this a 'Finish'. Then I will make this a 'Other'. So you can see again the sequence from outer to middle to the core. And of course this one would be a 'Finish' here. So if you're starting from scratch you need to create whatever skins. Make sure that you go through the pens and also make sure that you get the core and finish and possibly other set up. The other thing is that each one of these composites has a use for walls, floors, roofs, or in ArchiCAD 15 or later, shells. So if we don't want it to show up, this composite here is really only for walls, then we want to uncheck it or take off the highlight here. Otherwise this one will show up in all of those lists. [0:35:03]

So this simplifies the dialog boxes for slabs. It will not show that. I said 'New Composite'. Of course I can rename this and say "Wall Type A". So you can name it based on just a sort of listing: A, B, C. Or you can name it based on what its name is, what it's made of: brick, insulating brick, wall, things like that. One advantage to naming a composite in a generic way like 'Wall Type A' is that I could - let's say I will go to the Wall tool. I will say I'm going to be drawing with 'Wall Type A' here. And now I'm going to go at some point later and say all of the walls that I drew with the Wall Type A here, we've decided we don't need this insulation. Or we need more thickness. Let me add more thickness to this insulation. I want to super insulate it here. [0:36:07]

Say OK, and you can see all of these update. So one of the advantages to using composites, even in the early stages - for example, if I were to go to the Options, Element Attributes, Composite and create a





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New Composite, we'll just call it 'Exterior' here, and we'll call it, instead of air space, we may want to use a generic exterior material to start out with and give it some thickness. This is an exterior wall that is a composite. It's only one composition here. And I'm going to go choose this new exterior one that I just did. [0:36:52]

Now I have some walls that I've drawn that are very simple. But if later on I go to the composite and say the exterior walls are going to be made of CMU here. It's going to be 8 inches thick, and we're going to have a skin here that's the gypsum board. And we'll call this "5/8". This is going to be Finish. So I've now defined that my exterior wall is a certain type and everything that I've drawn will update to that. So that's something you may want to consider. If you just selected these walls and drawn them with a plain building material, not a composite, then it wouldn't have automatically updated. [0:37:48]

I could have selected them and changed them to a different wall type, but by changing the definition of exterior to a somewhat different choice, it will automatically update. This is true for all versions of ArchiCAD that have composites. This goes back a great many generations.

There was a question from a few minutes ago by Dave Norman, "In ArchiCAD 17, can we change the surface or cut fill appearance of a composite material? I.e. can we change the line weight of a surface fill as it appears in an elevation?" [0:38:25]

Okay, that's a good question, and a little side diversion here. If I go to the elevation here, you can see that this wall was made out CMU and it has a certain pattern. If I turn on true line weight, we're going to see a particular line weight. If I select this wall and look at its settings, you can see that the surfaces are based on the building materials, because these are gray. So this is something that was added into ArchiCAD 17 saying the surface of any element can be determined by the building material. So right now we're saying it's CMU, and it has a certain appearance. We're not painting it, we're not overriding it, we're not making it a special version of CMU. We're just saying it's raw. [0:39:29]

On the other hand we could go in and say, no I want to change it so that this uses something else. So this would - here's CMU, we have another version of it. I'll just say that maybe it's going to be a beige concrete so it's been covered with concrete there. Now if I do that, you can see that it immediately overrides the surface there. I'm going to undo that, because the question then is, if this as a native surface and we can override the surface, how did the surfaces play a role in the line weights of what we see in an elevation here? [0:40:15]

So this is going back to something that perhaps I didn't cover fully in the previous lesson, Options Element Attributes, Surfaces. And this would be similar for before ArchiCAD 17 for the materials, because surfaces are the same essentially as materials in previous versions. And what you'll see is that the 'Vectorial Hatching 4' - and let's go to the concrete masonry unit here - is done with pen 2. So this is where it's controlled. There's also an option for it to look at the element pen. So this would be one that



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says, anytime we are using this CMU, we're using this pen. And let's just make this a red, and see what happens. And you can see that this CMU - in fact, I guess this was the one that was CMU. I was looking at the wrong one, those were brick here. But this is the CMU and it changed to that red and whatever particular weight. [0:41:16]

If I go back to again that surfaces here and get the CMU and say let's make it a very thin - where is the 0.1... there's a 0.1 somewhere I know. There it is, okay. This hairline is a very thin one. And if we wanted this here and say OK, you can see it's just barely there. It's visible on the screen but very faint. So that is how that is controlled. And essentially it's the control for the surface that says that a particular surface has a hatch and it has a particular pen. Now here is our Pen 2 which is the default in the U.S. version. If I go here and say that this will be controlled by the element pen, then it actually can change depending on what the overall setting for the element was. So let's just do this. [0:42:30]

You'll notice it's much darker here. Because of this wall or all of these walls that I just drew have a particular pen that is controlling that. You can see it's this 'uncut line' pen. Let me change that to this red here and we'll see this uncut line - remember we are not cutting through this, we're seeing this as an elevation - is now going to show up as that color. So that particular control, if you make the surface flexible, then you can control these elements individually. On the other hand, if you want CMU to look the same in every context then you would define the surface or the material to use that. And just to verify, if I go into ArchiCAD 16 or earlier into the materials dialog, we will see the same control for this element pen or a fixed pen. So even though it's called material settings it's exactly the same as the surface settings. [0:43:40]

Dave Norman says, "Got it, thanks, perfect."

Alright, let's see. Where have I gotten to. We are in 16 now and I want to verify that in 16 we didn't have the option to start from scratch. If I say we don't have new, we just have duplicate. So essentially what you had to do was start from whatever might be the most useful reference, create a new one, and then go and edit it. So aside from that slight difference here, where there is a new button, the process would be the same. Because if I go back here we have the 'Insert a Skin'. 'Clear Skin' would allow me to remove a skin if I had some extraneous ones. [0:44:39]

So perhaps we want to remove this extra air space from a copy of it. We can click on clear skin and it will remove that there. So it's pretty intuitive here. I don't think I need to go through every single little choice here. But just in general, in 16 and earlier, you would select it up here and edit it down below. In 17, we would have the controls a little bit more integrated where all of these choices are edited in a single area. So I think that covers the basic idea of creating and editing the composites. I think probably it's worth spending a little time on how the priorities of walls relate to composite skins, because in ArchiCAD 16 and earlier, there was this elaborate set of options for how these would clean up. [0:45:46]



In 17 this has been simplified. So let me go and turn off the true line weights so we can see this little bit more crisply and say, whenever we were in ArchiCAD 16 and earlier, we had the option of making the - actually you know what? We're in 17, sorry. Let's go back to ArchiCAD 16 here. We had the option the floor plan and section to override potentially the ways that the fill pens would be used. So in versions before 17, each wall could be rather uniquely set up. This potentially allowed you to make a priority for certain wall higher. If I take this up higher as a whole and turn off the skin priorities, you can see how this wall cuts through the other one. [0:46:52]

I've basically said, "Ignore the fact that the drywall is a lower priority and just make the entire wall a higher value." Or potentially go the reverse, make the entire wall a lower value and have it trim back. So by turning off the skin priorities, then we can control the wall as a whole and potentially get some differences. You'll notice here I have a clean result. If I bring it up higher it will start to push through. So these options certainly gave some significant control in ArchiCAD 16 and earlier. But was a rather ad-hoc system and you could end up with quite a few inconsistencies. So some walls might've been drawn with - let's just take this one and put it into true line weight. And with this selected we could potentially say I want to apply the structure settings to some things. [0:47:53]

What this does is it's now saying whatever the definition is of the composites complies to all the ways that all these fills are being done. On the other hand if we don't have that turned on, then let's say for the cut fill pen, I could go in here and say I'd like to make this red. And you can see all of this is red. Or the cut fill background, I could say I want to make this a particular color. So again it's a rather flexible system that you could do in ArchiCAD 16 and earlier, but prone to inconsistency and also rather confusing because whether you had this turned on or off would affect the way your drawings would come out. So you would have to essentially understand it well enough to make some choices and try to follow manually some certain settings to make everything work cleanly. [0:48:55]

Whereas in ArchiCAD 17 here, you will notice this dialog box is much simpler. We don't have anything about the priorities. Now it does have the option to override cut fill pens, so we can do this. And this does allow for example this to make the background a different color. So if we wanted to color code, we could select one or more walls and make them have a particular background just to stand out and indicate something graphically. So you have some basic controls over that. You could also say for the foreground, let's forget about that one and go to this because his one has hatching and the other one doesn't have any hatching. [0:49:55]

So if we were to change the foreground we could make them all a particular color. Here's the red; and we will put it back to the true line weight so we can see that. So we could override this and make all of the cut fills a particular color for some graphic communication purposes. So obviously they would all have the same weight and would have a unified appearance. And possibly we would say foreground, background or both, and maybe color code this with some look. So the difference here is that the



graphic overrides for the cut views - and this would affect sections as well as in plan - are simpler in 17 but give you the basic controls to make the whole wall stand out in a certain way. [0:50:59]

In 16 and earlier, these controls, there were a lot more of them. And I guess Graphisoft decided that they were more confusing and caused inconsistencies. So when revamping the building material system it simplified the whole process of control. So I think that probably addresses most of the areas of composites that are needed overall. If we were to look in another tool like the Slab tool, remember that the Slab tool - this is in 16 here - we have a choice a certain - actually I have that wall selected. Let me deselect this. Now the slab tool, if we go in here, the composite structures are only the ones that are designated for use with slabs. [0:52:04]

Similarly if I go to 17 and switch to the Slab tool, the composite structures again are only the ones designated for floors. Remember this exterior one that I created here, you can see how it's set up to be used in all of them. And really I didn't mean that. Let me go and go into the composites and take that one that I defined as an exterior wall and uncheck these guys. And now in the Slab tool, if I go in here, you can see that exterior does not show up. So the same thing with roofs, we're only going to be seeing - the roofs here, certainly "shingles" and "standing seam", these are roofs. It looks like some flooring ones are set up to be available for roofs. [0:53:02]

I guess that makes sense because sometimes you might want to use the roof tool to create something that you would call a floor. There are some occasions where, for modeling purposes, that might be useful. So that would be common to designate a composite for flooring, but also make it available with the Roof tool. Now the Shell tool, which was added into ArchiCAD 15, has a way to do things like vaulted roofs and other more complex shapes. The Shell tool also has the option of either single fills, building materials or composites, so that it basically would have multiple skins as it creates some particular geometry. [0:53:54]

So the Shell tool essentially is a variation of the Roof tool with different geometry options. So in terms of composites, that's I think the end of my presentation for today. I'm open to your questions if there's something that you wanted me to cover and I didn't include it, please write a question and I will wait for a minute to see if there are any questions that come up. I'm also interested in your feedback. Did this clarify your understanding of composites? Hopefully I made things clearer rather than more confusing. [0:54:37]

Okay, so I see Craig Bischke says, "It's worth noting that composite and building material interactions are also impacted by the layer intersection settings." Okay, let's take a look at that. I agree that is something well that interacts with that.

Dave Norman says, "All clear." Great.



Tom Downer, "Can composites be shown showed simpler at different scales?" That's an excellent question.

Todd Hotchkiss says, "Can parts of composites have renovation statuses?" Okay, glad for all these questions. We will continue on for a few minutes. [0:55:15]

Joe Archibald writes, "The tip on changing pen line weights for different surfaces and elevations was great." I'm glad that was something that you found useful.

Louise Broadman, "Very clear, thank you. Seamless presentation of 16 and 17." I appreciate the feedback.

Okay so feel free to keep on adding more comments and questions here, but let me go through the ones that just came up. So Craig Bischke writes, "It's worth noting that composites and building material interactions are also impacted by the layer intersection settings." Okay, so let's go in here. If I take this and we'll say, don't override this. This one I think we don't have override. So now these are cleaning up to each other. This interior wall, I'm going to put it on the interior wall layer as opposed to the exterior wall layer. And of course it's cleaning up as we see here. Now if we were to take this and put it a on a layer that had a different intersection priority, it's possible that this could be isolated. It would basically cut it dead or short, not intersect it. [0:56:32]

So this is something not related to composites, but it does play into this whole understanding of how things clean up to each other. If I go to the layer dialog box, we'll see that there's this number here called the 'Layer Intersection Priority' or the 'Layer Intersection Group'. Because it's really not a priority in terms of higher or lower, it's more in terms of which ones are grouped together. And right now all of these have the number "1", but it is possible to designate at any time that one of these might be a different one. So I will put in a number "2". By doing this, at least temporarily, we are going to see that the interior walls stop intersecting or cleaning up to the exterior walls. You can see now this is not cleaning up at all. It obviously didn't stop dead; it actually connected to the reference line. If I wanted it to stop short, then I could shorten it here. And you can see what it's doing in this point. [0:57:40]

That would not be a conventional thing for how the interior and exterior would connect, but it might be appropriate when this wall is an exterior non-structural wall like for a balcony or for a garden or retaining wall or something like that. So you might create one or more layers that are on a different priority group than these ones here. So by simply designating those layers to have a different number, they will not clean up. Now this layer priority here is something that is recalled in the layer combination. So as I switch to the drafting one or the floor plan or whatever, and you can see that this wall interior is back to the number one. [0:58:34]

So that means that each layer combination potentially could have some different options. The main place where we used this a lot in the past was for remodel context because we would say when we want



to show on existing building without the new ones, we would hide the new stuff, putting them on certain layers. And we'd make sure that those layers that were hidden would be on a different number. And in fact you can see here the reverse, which is if you wanted to use a demo layer for certain information or certain elements that are going to be removed, putting those elements on a different intersection priority will mean that they won't connect to each other. They won't open up holes from one to the other. [0:59:19]

So if this is hidden - and let's just say OK - I'm going to take this. In fact let me undo it back so it's now connected in through here. I'm going to select this and say maybe this is going to be a demo element. Now in here as a demo element, for a moment it left an opening there because it hadn't refreshed or rebuilt. But because I zoomed in or out, it cleaned it up. If I turn back on that layer here manually, then we can see it either not cleaning up or if we turn it on and make the demo have a consistent number here, then it will clean up as you would expect. So this is what we did routinely in ArchiCAD 14 and earlier for demo projects. Having one or more layers that were hidden and put on a different priority so they wouldn't interact. [1:00:27]

We don't need to do that as much in ArchiCAD 15 and later with the renovation tools because essentially when something is hidden, saying it's a demo element that's not being shown in the final design, it doesn't interact with the main ones. There are some controls that say whether to interact, they are part of the renovation settings. Which brings up the question then, and I want to thank Craig for encouraging me to look at that layer intersection priority in this context.

Now Todd Hotchkiss asked, "Can parts of composites have renovation statuses?" And the answer is no. Unfortunately, if we go to the Window Palettes, Renovation, we can designate an element like this. And let's just put it back into the interior, normal, simple context. I can designate this element as a demo element if I wish and then switch to say I'd like to look at the planned status. And now you can see it hides because it's being demolished whereas in the existing plan it's there. But this setting is for an entire element. You can't say that perhaps the core is the same but it has a different cladding. And this might be a common thing for certain types of building refurbishment where you're taking off the outside skin and putting on something else. Or you're adding some new skin on top of the wall. [1:02:05]

So this is a limitation in the renovation system that Graphisoft provides. The elements as a whole are either existing, demo, or new. And you can't designate part of an element or part of a composite as one of those categories. I'm guessing at some point that may be improved, but as of now through version 17 that is not available. So the solution and work around for that is in some cases to create - if you were to add some extra skin to the wall - is to possibly draw that as a new wall, sitting on the outside, and designate that as new. The issue with that primarily is that you have to manually create holes for the doors or windows and make the door and window symbols stick into the exterior additional skin, which is a nuisance. [1:03:04]



Another way that may be a little bit simpler but still has some issues is that you can designate the entire wall as demo even though it's essentially going to stay there. And then have a new wall with the new conditions. So then you are swapping between the old condition and the new one and calling the original condition "Demo" even though it's really just going to be changed. So that's the work around and probably the preferable one, but still not quite ideal. [1:03:33]

Alright Tom Downer wrote a question, "Can composites be shown simpler at different scales?" That's a very important question that again there's no perfect or elegant solution. But let's just take a look. Right now we're at a 1/4 inch scale, roughly 1 to 50 in the metric system. If I change this to half of that, so 1/8 inch scale or close to 1 to 100, we'll see that these line weights start to - particularly for the drywall here - start to blend in. And if we were to take this at say a smaller scale, 1/16 or close to 1 to 200, then these are all really bleeding in. So unfortunately, just by changing scales and having the composite the way they are defined, they won't redraw to have some other version. [1:04:32]

And by the way, this is at five times real scale. If I say give me 100% scale, you can see that the detail is hard to make out for that. What you can do is you can designate that, at a particular scale like this, which might be appropriate for a large overall building plan for a large building or for a site plan, we are reducing it down here. We might want to change our model view options to something like the site or context. You'll notice here that this is showing this much simpler. How was that done? Under the Document menu, Model View Options, Set Model View Options, in Site Context, it's overriding the fills by putting in just a solid color. [1:05:37]

Now if we look at the one this says "Detailing No Fill" - or let's say "Reflected Ceiling". Here is another variation where it has no fill at all and it's looking a certain way. This could be good for a site plan, but it will show if we have a door here. It will show the door without the swing, whereas in the normal construction documents we'll see that door in a certain way. So when you change scales and you're creating a drawing for a particular purpose like the site plan or a reduced overall building plan, you may want to change your model view options to simplify the way the walls look. [1:06:30]

The other possibility instead of simplifying is we can go in and in the model view options say let's override this and put in a solid fill without separators. So this is just a custom change. The other possibility would be to change the pen weights. If we go to the construction documents here and potentially I would go to the pen sets. Now the pens and colors right now are set up based on a certain standard that's used in ArchiCAD in the U.S. from 10 on to 17 at least. If I change this to "Arch Pens Black", you can see how it makes the first 20 pens black. Now this has a somewhat different look. I could have, in terms of the pen sets here, even if I leave the colors, I could select all of these pens. [1:07:34]

I am going to select them all and change the weight to millimeters and let's make them 0.10. So I'll make it a really thin pen. This is a custom pen set just for testing, although I could store it and use it again and



again. Now having done that, I say OK and you can see how the line work is now showing up legibly. Although frankly if we put it back to normal scale, it's going to be pretty tiny. But what that means is that when we change our scale to a smaller scale, we can either override the fills in the model view options or if we wish we can override the pen sets. So one thing might be to make most pens very thin and only a select few of them have some thickness to add some punch to this. [1:08:25]

So those would be some workarounds for getting more legibility at smaller scales given that we can't make the composite smart and say, at a certain scale it should display one way and then another scale it should display a different way.

Okay, so let's see. Ken Brooks writes, "What are the instances where one would choose between true line weight and not? True line weight seems quite crude visually at times."

So this is a question from a few minutes ago. I would say that in general when you're doing final output, true line weight is going to give you drawings that read better. They're going to have differentiation between thicker and thinner lines. If you do it intelligently you can end up with a drawing that just is easier to understand. On the other hand, putting it into hairline with everything as thin as possible, will give you a drawing that you can look at and all the lines are as clear as possible. You just can't see using weights, the thickness and the relative strengths or prominence or importance of different edges. So of course that's the reason why traditionally different thicknesses are used is to help communicate the construction elements. [1:10:01]

Now when you say that true line weight seems quite crude visually at times, essentially because you have to work with it intelligently. I'm not saying you're unintelligent, I'm just saying you need to make sure you're using the controls properly. That means that composites need to be set up so that the line weights are intelligent so that certain pens are thicker and certain are thinner as I showed you the system the 1, 2, 3 system that Graphisoft seems to have standardized in ArchiCAD 17 in the U.S. where the outside pens were thick and the inner pens were set to thin for the fills and medium for the dividers. [1:10:52]

If you are using a different pen set than what Graphisoft set up, then you have potentially a lot of coordination issues and that's why in general I recommend using the Graphisoft pen sets in the U.S. or international use and getting used to it. Because essentially, if you want to go out on your own, you're going to have a lot of customization to do. And it's a little bit easier for beginners and intermediate level people to use what Graphisoft supplies and use it smart as opposed to trying to customize it and potentially making it messy. [1:11:31]

We'll be looking at that in a later section of the course. I'm going to try to spend time talking about the legibility of construction documents and give you some tips as well as being very open to learning from





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those of you who are experts and really have finely tuned your controls. I'd like to see maybe what variations or tricks you've come up with that help you get the clearest drawings possible.

Joe Archibald, "Alright."

Todd Hotchkiss gives me a checkmark for the explanation.

Joe Archibald says, "Having different pen sets at different scale views works nicely, even going to larger scales." Yes definitely. We're going to be talking about pen sets in the next lesson. That's one of the remaining ones for the Attributes that we've been going over this past couple of weeks. We'll be looking at a little more detail of how you set up pen sets and some of the ways that you might find them useful. So I think we've gone through all of the questions that were added. We've gone an hour and a quarter. This is a good point to finish up. Ken Andrews writes, "Great lesson." Thank you Ken, I appreciate it. So we'll finish up for now. Please add your comments and questions to the page down below. This has been Eric Bobrow, thanks for watching.

[END OF AUDIO 1:13:04]