



BEST PRACTICES COURSE – WEEK 16 – Roof Modeling & Documentation PART 6 - Connecting Roofs in ArchiCAD 14 and Earlier

Hello, this is Eric Bobrow. In this lesson, we will take a look at how you work with connecting roofs in ArchiCAD 14 and earlier. This lesson still applies in ArchiCAD 15 and later as a variation because sometimes you do need you do need to break up the multi-plane roofs into single-plane roofs in order to accomplish certain complex configurations. [0:00:25]

To start out with I will draw a box of walls here, say 60 feet by 30 feet. If you are metric, that would be 20 m by 10 m approximately. That'll go to the Roof tool and activate the automatic hip generation version and magic wand from the corner. Then choose that I want it to be an 8 and 12 slope; 10 feet would match the height of the walls as the plate height, and a 2 foot overhang. So we will just create that, take a look in 3D, and perhaps switch to an axonometric view. [0:01:06]

Now I'm going to select these roofs here, do Command+A or Ctrl+A to select them, and we will change the materials to make it a little easier for the training; to see them. And after I do that, I will use the eyedropper to pick up the settings. So if I draw any additional roofs, they will have the same material. Now, we are going to create a hip extension or a gable extension on the front here. In order to do that, I will zoom in and use the Wall tool and just simply draw a box just about here. Let's say 12 feet by 4 feet. So that's about 4 m by 1.1 m. [0:01:49]

I will get rid of the fourth wall, there is a duplicate. And I'll also use the Command or Ctrl key to get the scissors and trim out this extra piece. Now I'm going to go to the Roof tool and tell it that I would like it to draw some individual pieces. And just for convenience and speed, I will use the rectangular method. I'll click two points to determine the plate line, say it's going in here. And while I could find the midpoint easily, let me just draw this as an arbitrary box. And that I'll use when I'm in starting to connect as a quick practice for connecting two edges of roofs that will use the shortcut in 3D. [0:02:31]

So I will go to 3D here. Then I will take this roof and hold down the Command or Ctrl key and click on the edge of the other one, and you can see how it repositions. Select this one, and Command or Ctrl and it repositions. In the same way, I can select the main roof and Command or Ctrl this edge and it will reposition where it needs to. And while it's still selected, Command or Ctrl click the other one. So now these two roofs are exactly where they need to be. [0:03:01]

Now it looks a little odd because we don't have any overhangs, and this piece of roof here extends. So we're going to fix that right now. I will go and select these two roofs and zoom in a little bit and go ahead and take this edge and extend it and type in 2 feet; that would be 600 mm. So do the same thing, 2 feet. You'll notice that I can have both of them selected and work with one at a time. Here I will extend this 1 m or say 300 mm and snap the other one. [0:03:33]



So at this point I've now got something that looks a little bit more reasonable, but I do need to trim this roof because I don't want it to extend underneath that. Now there are different ways to do it. First I will demonstrate by clicking on the edge here and using the option to add a new node point. I can do it in 2D or 3D, but I will snap it directly onto that. And go to the edge where I have the Mercedes and it remembered this; I don't have to click again. And click on this edge here. [0:04:03]

Now the third time, I'm going to be adding a point and take this not along the current line but snap it directly here. You can see now it has a gap there. And when I go to the floor plan we will see how this roof now correctly is cut out there. If that's a little complex to do it in 3D let's just undo these three steps and go to the floor plan and show you a quick way we could do it on the floor plan. I can select this, go to the edge or corner, and use the Boolean subtract option and click on a series of points. [0:04:37]

I don't want a rectangular cutout, I want a polygon cutout. In this case it's going to be triangular. So I will switch my mode and click on these three points and then click again on the final point, and it will close this shape and cut out the proper hole. So now at this point, we have a gable extension that works quite nicely. We will of course just need to make these walls rise up here, at least tall enough so that they're going to reach the top of the roof. And then we will use the Design menu, Solid Element Operations to make them targets for an SEO. [0:05:20]

Then we will take the two roofs here as operators and use the subtraction with upward extrusion operation and execute. And that will basically remove wherever the roofs are in line with it and everything, all the pieces of the wall that would have gone upward from there. So we are now done with this gable extension. So let's look at some variations of that. What if I were to make these roofs steeper? So instead of 8 and 12, let's take it up to 45° which would be 12 and 12. [0:05:52]

At first glance, it looks almost okay but if I zoom around here you see, well, these really need to be extended. So remember I can select the main roof as the controlling roof, and perhaps zoom in a little bit and Command or Ctrl click on the edge and it repositions. Do the same thing on this edge and you can see how it repositioned. Now at this point here, I could go and move it manually up to there and that is going to be a good point. But I also need to adjust the edge because the entire edge has to reposition. [0:06:25]

So if I select this roof here and perhaps come in a little bit and hold down the Command or Ctrl key and click here, you can see how this edge repositions. If you're not comfortable doing it in 3D, we can go to the floor plan. Say that this roof is the controlling one and tell this other roof to adjust. Now at this point, the overhang needs to be adjusted as well, so I will go and pull this in here. If we look in 3D, we'll see how beautifully that adjusts. And if I rotate this around, we can do the same thing right here in 3D. [0:07:02]



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I can select this, go to the overhang option. You can see how it remembers that, and snap it to that node point. So we can do that just perfectly. We have a couple other little things that we need to clean up. Basically the wall here is not quite tall enough because we've made the roof steeper. So I'm going to tell it to go up a little bit. Let's see, sometimes you have to click on these more than once to make sure ArchiCAD accepts it. If you don't see the actual ghost image do what you want, you may need to click on the pet palette again. [0:07:38]

And then you'll notice there's a little extra shape, sort of an odd one. And it's because this roof edge is not vertical. It originally recorded it, remember when I used the Command or Ctrl click to join them, it recorded it as an angle. And now that I've changed the slope, this angle is incorrect. But I can go to the edge here with it selected and use the special option for the roof to change the slope of that one particular edge to be vertical. And similarly, I can select the other roof and go and click on that edge and again make that vertical. You can see now we've got a good clean result. [0:08:18]

So we now have something that works geometrically, although perhaps it's a little bit asymmetrical or it's just not matching. So let me go back and take the more conventional situation. If I just keep undoing back until we get back where we had it, take it back to there, now we have a conventional one where the actual angle of the roofs are in line. So now let's try some variations. Instead of the slope, let's try the plate height. So in order to demonstrate that, instead of just modifying this one I will make some copies of it. [0:09:00]

So I'll go and select these three walls and the two roofs and then I will multiply them. Make two copies, and take this across say 20 feet. So now we have three to work with. Now we've got the wall sticking through here, so let me just use the Command or Ctrl key to trim it. Notice that it didn't trim all the way across because it stopped at the ridge line of the roof. But I can just do a second trim here to clean that up. If we look in 3D we will have a nice result here, but this roof here is extending all the way through. So we will obviously need to clean that up. [0:09:45]

But I will tell you what. Let's take these two roofs and change their plate height. So from 10 feet or roughly 3 m, we will take it up another meter up, 13 feet. And we'll see how this floats up. We will take these ones and float them down say to 8 feet. And now we will see how we can make all of this work. So again, if we focus on this one, we know that these two roofs have gotten taller. So we need to actually adjust where they go. And I can rotate around and do this right here in 3D, that's my favorite thing rather than doing it on the plan, although you could do it on the plan. [0:10:24]

This particular roof has to be trimmed out. So let me go back to the floor plan and select this roof. And we will again go to an edge or corner. In this case, it's thinking that I might want to change the edge angle. I will cancel that, and that allows me to say choose a different option. For example, the Boolean subtraction here. And I can go and say let's subtract out this shape where the gable extension fits. And



remember, I can click on this point again rather than going all the way back. Either way it will notch this out. [0:11:06]

And when I go to 3D, we will see that it sort of looks okay, but we have a gap underneath here and certainly a very common thing would be to have this roof return underneath there. So let's just make this wall go up and clean that up here. It still remembers its solid element operation relationship here. And let's go and say select this roof and perhaps zoom in on it and go to the edge where we have a Mercedes and use the overhang option here to adjust the offset and perhaps snap it directly into here. See you can see how it's pulled in. It's actually dying into this wall here so it's almost looking correct. [0:11:52]

We can do this on the floor plan, and you can see what this did was it brought in line with the face there. But I can also do it here. I can go to the edge and snap it into position. Whoops, that's really not what I wanted, that's the wrong one. I wanted this roof to extend and not the gable roof. So now if I look in 3D, we will have something that looks pretty good, it's dying in here. We do have a little bit of an issue and that is that there's a gap in here because this wall is stopping at the face of the other one. And we need to fill that in. [0:12:27]

So while there may be different ways you might want to approach this construction wise, I will take one simple one which is to initially just extend this wall in here and go back to 3D. We will see that that now fills in the gap. But we do have an extra piece of wall at the bottom. And maybe we don't want a partition wall; we only want something floating up above, a cripple wall perhaps. So what I can do then is select this wall and perhaps split it by this wall. And now this wall is independent, and perhaps I can take it up so that its base is higher. [0:13:06]

And when I do that notice how it changes its look, because it is now above the cut line. It's a thinner line than the main ones, but it's still visible. You might want to put this on a layer that would be turned off on the floor plan. Maybe you don't want to see it on the floor plan or you want to have it with dashed lines. But let's just look at the modeling. If I go to 3D you can see that the footprint of the wall is no longer there but it just needs to be trimmed a little bit because now it's a new piece and it didn't know that it should be a target for the Solid Element Operations. [0:13:41]

So now we've got this done. I could of course mirror it on the other side and repeat that, but I think you get the idea. So we now have a pretty good result. The only last little tweak I'm going to do is you'll notice that there's no line across here. Well, there are different ways to approach it but perhaps I want to trim this upper piece, so that it's not sticking into the lower one. So I'll make it a target and then select the main roof and make it control the action or be the operator, and subtract. Just a simple subtract wherever they pass through each other, and execute. [0:14:18]



And you can see now there is this line in space that would be drawn. And so that's going to give it a nice clean result. So now let's look at this lower gable situation and see what we need to do. So if we look at this, we know that these roofs here need to be adjusted because they are lower. So they're going to have to actually be pulled down. The other ones were pulled up. These have to be pulled down. So in order to do that, what we might need to do is select the main roof and hold down the Command or Ctrl key and click on this edge. Now you see it repositioned. [0:14:55]

And I will do the other one here. But that's a little odd, because normally it should reposition in parallel to where it was, because it is still the same slope. So that's not quite right, and I haven't figured out exactly why that's happening, other than the fact that there is a corner point that it's fixing on here. But what I will do is realize that this roof needs to have a gap. So I'm going to cut out a gap here. I've just cut out a shape and it's very crude obviously. But one of my favorite things is just to make the gap bigger than it needs to be. So then I can select it, for example this roof, and ask it to reposition that one. And now that looks like it's in line, it's parallel to the other ones. [0:15:49]

Select this roof and Command click on this edge and you can see this line here looks quite clean. Let's look in 3D and we will see that this roof now is matching the other one perfectly. So I'm going to add an extra node point here. So this line, which is incorrect, I will just simply go and add a node point using the pet palette and bring it down in line right on top of that. And let's take a look in 3D and we can see now okay, that looks perfect here. But we do have two problems here. These two walls now no longer have the gable roofs to trim them, at least in this area. So we need to make them a target of the main roofs' operation. And that will trim. [0:16:47]

Actually we need subtraction with upward extrusion; that will trim it. Let's see, we need to select them again because I had the wrong operation. So I will select these two, make them targets, select the main roof, make it an operator, and then with subtraction with upward extrusion, execute. There we go. Now we do have a little bit of an issue here and that is that this roof is not dying into that. Now we have a gap, much like we had - we decided to put this one, return it around. [0:17:19]

So what I'll do is go and select this and perhaps just use the offset here. Now this is actually offsetting the whole thing, so maybe that isn't what I want, I don't want this to extend. So instead what I'll do is just add a shape. I will take a shape here, maybe the rectangular one, and add this piece. And you can see how now it's created that. Let's go to 3D and see what that did. Okay, so that returns it underneath. The only small thing here is that it's got this extra line which wouldn't show up in a rendering but would show up in the elevations. It's because we have an extra node point. [0:18:07]

If I go back to the floor plan and select it you can see there's this extra node. I can use the pet palette to reposition this node, I can reposition it anywhere. But if I put it on top of an adjacent node then it makes that whole edge smooth and we now have a cleaner result. Finally, in terms of the cleanup, you can see there's a little bit of a gap there where there's no line and so we can do the same sort of thing.



We can make this the operator, and this the target and just do a simple subtraction. And then this upper one won't stick into the lower one. We'll have a nice clean line there. [0:18:45]

Now I could repeat the whole operation on the other side, but sometimes what I like to do is simply delete this one and mirror the other in 2D or 3D. I'll select this, mirror a copy, and go on top of here. And you can see how it beautifully fits in and then simply trim off these and make them targets of the new roof and we're done. So we now have three different gable extensions, one with the same plate height as the main roof and one higher and one lower. So let's try a couple of other variations before we finish this lesson. [0:19:27]

Suppose we wanted to make one of these slide over so that it was in line with this. So the gable extension actually extended this hip side. So there are different ways that we could do this. I will go in first of all the slide these over. I will select these elements here, and I will just drag this point over. You can see that these two roof pieces are now in line. And in fact, this roof piece should include the other one. And of course we have to adjust where the original roof is to be cut out. So let's go here. We have an extra piece of wall; let me get rid of that. [0:20:17]

We will go ahead and select this roof, this hip, press down on an edge or a corner and use the plus Boolean addition. Now we can go manually trace this or I can use the magic wand. Hold down the magic wand and click and you can see how it has extended that outline. And I'll go ahead and select just this little piece of roof which we no longer need. You see the main roof is extending. And we have this extra line here because this roof needs to be adjusted. If I go ahead and tell it to adjust by the edge to offset, this will work beautifully just pulling it; and I can pull this one up. [0:20:59]

And you can see how it's now got a very clean result. Now this line across here is the pivot line of this one. This line will not print. If you're concerned about that or wondering about it, if I go to the View menu, Onscreen View Options, and I turn off the pivot lines, we will see that we just have a clean result in terms of the roof plan. Now these two walls should intersect. So I will select them, use the Intersect command here, and we should have a nice clean result except for trimming these two walls to their new end hip gable extension roof. So now we have a very clean result. [0:21:47]

So that is one way to make these roofs slide over and then merge. But let me go back a few steps to where we had it and look at another way that might be very common and that is to just make this bump out wider. Essentially remove these pieces of wall, take these two and intersect it. And then make this wider so that this piece comes over. So the simplest way to do that is to select this piece and drag it over to there. So now this is in line. Now this piece and the other piece of the gable will meet somewhere in the middle. And I can use the Command or Ctrl key to have it automatically reposition and do the same thing. Select this one and tell this to reposition. [0:22:37]



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So now we've got something that's almost working. You can see how it's extending. We will take this wall higher because it needs to go meet the peak of the roof. And we can go and again select this one, and we're going to change this outline to include the additional piece. I can do this right here in 3D. I can press down on a corner or an edge and use the Boolean + and use the magic wand on this. And it didn't actually show the magic wand but I held down the space bar and you can see how it instantly changed that. And then I can go ahead and clean up this main roof here. Again just pull this up and get rid of the extra little piece and now we have the one, what was originally a hip includes the gable extension. And we have this just about done, and now we're complete. [0:23:37]

So this concludes our lesson on connecting roofs in ArchiCAD 14 and earlier, where we take a gable extension and look at different variations of plate heights and geometric arrangement and slopes to see how we can get the result that we need. In ArchiCAD 15 and 16 we'll use some simpler methods to get some of the same results, although there are going to be times when we need to use the same methods, because we need to have individual pieces of roof rather than the multi-plane roof configuration. This has been Eric Bobrow; I look forward to reading your comments and questions on the page down below. Thanks for watching.

[END OF AUDIO 0:24:25]