BEST PRACTICES COURSE – WEEK 14 – PART 1
Advanced Coordinate Methods

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Hello, this is Eric Bobrow, and in this lesson we'll take a look at some advanced coordinate methods that you'll find useful from time to time. If you need a brush up on the basics of working with coordinates, please refer to the QuickStart course. Module 2 part 1 goes over basic coordinate input and the use of the tracker and guidelines; and module 2 part 2 looks at precise placement of elements and gives quite a few different ways that you can place elements exactly where you need them. [0:00:30]

I'll start with two quick and easy tips that actually are covered in the QuickStart course, but they are so useful that I want to repeat them briefly for everyone, even if you're a veteran. And then we'll go into some of the more unusual or lesser known controls. So if I wanted to place a door a certain distance from this corner, there are ways to set the distance and control it so I can place it precisely in one operation. But often, it's just as quick and certainly a little easier to manage by simply placing it at the reference point, in this case the corner here. [0:01:10]

And then after placing it, just drag it the right distance that you want. Let's say I wanted it to be 3 feet from the corner. I just place it in the corner and drag it 3 feet. Two separate operations but very quick. Now, I'm going to go and place a window end. Let's say I wanted the window to be a certain distance from the door. Well instead of having to figure out how to do that through constraints and snaps and things, I can simply place the window. Let's make sure I'm putting it in by corner first, and then place the window exactly in line with the door or next to the door. And then, go in a separate step and just drag the window over. Let's say I wanted it to be 8 feet away. And I just type in that I want it to be 8 feet off. So very simple. [0:01:57]

Now what if we want to move something in both the X and Y directions from a reference point? Well, here's a column; and I can go in and say click to place the column at the corner. But really I want the column to be a certain distance from the corner. So I place it at that corner and then just drag it. Now initially, this column is showing its distance in polar coordinates. And so it's showing distance and angle. But I'd like to specify this in X and Y. So I simply type in X and ArchiCAD usually will open up the tracker palette and show you what the current coordinate values are. And then I can say -10, because I'm going to the left, and then the Y value, I hit Y, it will accept the X, and then I can type in, let's say, -8 and hit Enter. [0:02:49]

So basically by placing it on the reference point and then just dragging into position can be a very quick way to do it. Now another option that is very quick is to create a guideline. So I can use the Create Guideline Segment here from the Guideline Popup menu. And let's say I want to place that column. Let me just actually be in the Column tool, just so to show you. I can say Create Guideline Segment, click here, type in a value; let's say X 10, Y -8, Enter. That positions my cursor right on that point and then I hit Enter again. So bang, I've got the column exactly where I want it. Or if I wanted to put the door in let's say a certain distance from this corner, I can go and create a guideline segment, but say click at that corner and tell it I want it to be 5 feet away. So I just type in 5, Enter. [0:03:47]

And you'll notice I've now got a check mark and I can just hit Enter again and that starts putting in the door. And I can control it saying which direction I'd like that to be. You can use guidelines to create a line in space that you can measure. So for example if I wanted to put the column halfway between these two corners in the middle of the room or building, I can go and let's say use the guideline option to create a guideline segment between this point and the other point here. And then you'll see that I have a snap. Now the snap is going - this little checkmark is based on the special snap. So whether it's halfway or divisions or distances, I have that available, and then I can simply, having created the guideline, place my column there. So draw a guideline between two points, and then you can snap somewhere along that line at a convenient location. [0:04:41]

Now let's look at how coordinates are handled and understand the difference between relative and absolute measurements. So if I click on the Measure tool and I float around in space, you'll see that it's measuring in some arbitrary numbers, but as soon as I click for example on this column, it's now measuring in relationship to that click point. And when I go to the other column you can see that distance. And as I move around, it will tell me offsets from the previous click point as well as giving me cumulative distance, which would be the perimeter measurement, and area, which would be the shaded area on the current window, the plan in this case, that I have outlined. [0:05:25]

So I can get that information and it makes a lot of sense, very useful. I'll hit the Esc key to cancel. But where is this measurement starting from? In other words, when I'm floating in space, where is it measuring? Well it turns out if I double click, if I go out a little bit, I can see that there's a little X sitting off in space. This is the origin of measurement. In this case, it's the Project Origin, which is a fixed point in ArchiCAD's universe that everything is measured in relationship to. But of course, I might want to measure in relationship to another point. [0:05:59]

Now I don't want to necessarily always have to click on the Measure tool, so I might want the set the user origin for measurement. So this button right next to Measure tool, the X, allows me to position it for example on a point here. In fact, I have to cancel out of the Measure tool to do it. So I have to be between operations, then I can say set the user origin and I'll click. And now you can see the Project Origin is a lighter color, a light gray. It never disappears from the screen and it never disappears from ArchiCAD's thinking, but we can now measure in relationship to this user origin. So if I zoom in a little bit here and I wanted to put a column a certain distance from this, now I can position my mouse anywhere and type in X, and it's going to be measuring in relationship to that. [0:06:54]

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So I can type in 10 and Y8 and you'll see that it positioned it in relationship to this. If I use the Measure tool, you'll see that it is at 10 and 8, and in fact every measurement is in relationship to this user origin. So you can move this user origin in a couple of different ways. You can click on the Set User Origin when you're not in the middle of measuring or drawing, you can click on Set User Origin and move it to a position; let's say I move it to this corner. So I'll click up here and then a click down in whatever point in space, and it will move. And you can actually place this anywhere you like. It will just position wherever you click. [0:07:39]

Now if you put it in empty space, it doesn't have a whole lot of usefulness because it it's measuring in relationship to a point that is rather arbitrary. But there's a keyboard shortcut that you can use quite a bit more efficient by simply holding down the Option or Alt key and the Shift key, and as I hover over any point that has a checkmark, you can see how the X shows up. So I can just hold those keys down and move this, and anywhere that I have a hot spot I can measure. And I will have set the origin point there. [0:08:14]

So this works anywhere where there is a checkmark as opposed to the Set User Origin which allows you to place it in any arbitrary point. But generally you do want to move the origin to a snap point anyway. So hold down the Option and Shift or Alt Shift and you'll get the ability the hover over a node point and move the origin. Now if I want to see the distances or placements before I put this column in, you may want to turn on, under the Options, Work Environment, Tracker and Coordinate Input. You may want to use the option to show the tracker always rather than just on demand. So when I click on that option, as I float around, you can see the tracker. [0:09:02]

It's following me and giving me coordinate feedback. So I can easily then see that when I type in X-10 and Y8 that I'm going to get it into the right location. It's easy to see the minuses and pluses and things like that. So I like doing that sometimes, although of course it would get in the way of other operations just having this thing floating around. So generally I won't use it except for very limited applications. But let's look at some options for understanding how the tracker can show us measurements in relationship not just to the last click point, which is the standard. So if I start a wall here, I can have this showing me the distance. But sometimes I want to measure it in relationship to another point. So how can we do that? [0:09:54]

So let's see that I can switch the tracker here, and turn off Relative Coordinates and Tracker. So when I do that, and let's say that I move my measurement origin to this corner just for simplicity. And let's say that I wanted to start a certain distance over. Let's say X15 and Y8 here. Now that starts the wall. And you can see now the measurements, instead of being in relationship to this starting point, it's in relationship to the other corner. Now I'd like to move it in this case horizontally, so I'm going to type in the letter X here, and you'll notice that the X is not measuring in relationship to the other corner, it's measuring in relationship to the last click point. So I've only got part of the feedback changed. The distance is showing 20 feet, this distance on the diagonal, but the X is only showing 3 feet 5. [0:10:52]

So how do we do this? I'm going to hit the Esc key to get out of it and show you the other half. If I go to the Options menu, Work Environment, Tracker and Coordinate Input, I can click the box to show XY

coordinates relative to user origin in tracker. And when I do that, now if I place this lets say X15 Y8 here, and now you can see that when I type the letter X, it's allowing me to control this in relationship to the other corner. So let's say I wanted it to be 32 feet 6 from the other corner, I can just type in 32 feet 6, and that is going to be a distance measured from the current user origin. [0:11:35]

So these options are useful from time to time, but most of the time I don't want them so I'm going to turn them all back to the default. So I'll go to the Options, Work Environment, Tracker and Coordinate Input, and I'll turn off this show XY coordinates relative to user origin and tracker, and I'll also turn off the on demand for the tracker so it's not on always when I'm in the middle of an operation. And I'll also switch the tracker here to show relative coordinates, which will give me more control most of the time. So let's take a look at another way that we can place elements in relationship to point of interest. So for example, let's say that I wanted to put in a corridor up here. So I'd like to maybe have it centered on the center point, and you can see there's a little checkmark here for the center point. [0:12:30]

Now I'd like to make this corridor 6 feet wide, which would be about 2 m, and so that means I want to make the first wall 3 feet to the right and the second wall 3 feet to the left. So what I will do is position my mouse on this checkmark, on this point here, and then type the letter X. Now you can see that it's showing me currently that I'm at a certain location in space, and I could mathematically say, alright it's 24 3, I need to make it 3 feet more, so I will type in 27 3. But sometimes these numbers are a little tricky, in other words, they have fractions and things like that. [0:13:06]

So how can you have ArchiCAD help you by doing the calculation for you? It's very simple. I type in 3 and I hit the +. And you'll notice how when I do that, it calculates, oh, you need to move over or the final results is, in this case, 27 3. And I Enter and I've started the wall. And I'll just take this down here. Now if I wanted to go to the left I would do the same thing except with a minus. Now you'll notice that the snap point has all the sudden moved over because it's halfway between these two walls. So what I want to do is actually change this to measure the snap along the entire element here. [0:13:46]

And so I can go in, and now that's the halfway point along the entire wall. Now, at this point I'd like to move to the left, so I'll type X. And I'll type in let's say 3-0, because I want 3 feet and no inches, and then a minus. And you can see how it calculates the value. And I hit the Enter key to confirm that. And then I can move down. Now if I wanted it to be clear space, I will in this case need to change the construction method from left to right; and then I'm going to have the wall in the right position there. So I simply position myself wherever I want, type a coordinate name and a value, and either plus or minus to get the effect. [0:14:31]

Now, when I wanted that to be a certain distance shorter, I did use the minus. There is a little complication if you're working in feet and inches. And that is that ArchiCAD expects, for example, if I wanted to stretch this to be a little bit shorter, I can type in that I want it to be 2 feet shorter. But if I just type in a minus, it won't assume that it's going to be a subtraction. It's waiting to see if I'm going to do 2-6 for 2 feet 6 inches. So if I want to make sure that ArchiCAD understands that it's a subtraction, I hit 2-0, 2 feet 0, and then the additional minus, and then you can see how it's positioning the cursor in

the new location, highlighting the distance saying that's the new calculated value, and I hit the Enter key to get it. [0:15:24]

So if you're working in feet and inches and you want to subtract a whole number of feet, just put two minuses together and ArchiCAD will understand it. Now if you're working in metric, you don't have that complication. A single plus or minus will work equally well. Now if I want this length of this wall - and I'm stretching it here to be a certain distance from the other end - it's very easy. I can just simply type in I want this to be 12 feet long. So I just type in the distance and it's measuring from the other end. But suppose that I wanted to measure from the inside face of this. In other words, how far from the inside distance. So what I'll do is I'll move it over to where it needs meets the corner here. [0:16:14]

And you'll notice that it says all right, you've gone 9 inches, which is the thickness of the wall. Well, I can just type in, let's say I wanted it to be 15 feet, I can do 9 inches and 15 feet, that's 15-9. But sometimes these numbers are fractions. Maybe the thickness of the wall is an odd value like 7 3/8, and then the distance I want to take it is an odd fractional thing. So all I do though is simply type in the value, let's say 15 feet 6, and then I do a plus sign. And ArchiCAD calculates that value. And in fact, I can do it more than once. I can hit the plus, it highlights it, then maybe I want it to be a certain distance beyond that. Let me just make it 2 feet 4 inches beyond that. [0:16:58]

So I will type in 2-4, now if I hit Enter, it would make the entire length very short, the 2-4. But if I hit the plus sign or a minus, then I can just have ArchiCAD do all the calculations. So you can continue to type in one or more times a number and a plus or a minus, and ArchiCAD will do the calculations and figure out where you need to be in space or where that calculation takes you. So it's a very convenient thing. [0:17:30]

Now, let's take a look at some of the icons that are available in the tracker that you may not realize are there and see what they're useful for. So if I am drawing a wall here, and let's say that I position myself over this center point of the column, then I can type in a text value or a Y or any of the coordinates in the tracker; and you'll see that in addition to the number that it is showing, it also has a checkmark and a bulls eye. Now if I hit the checkmark, that says I'm done. And so you see how it's drawn this particular wall to that column point. Let me just undo that. [0:18:16]

Now if I do this, and I type in the X for example, instead of hitting the checkmark, I hit the bulls eye. It then instantly gives me a snap along that X value. So it's one other way of getting the guideline to show up to make something in line with something else. So if I wanted to take this up in line with the end of this wall, I can hit a Y and then use the bulls eye to say I'd like to highlight that. And so now, I can easily snap and align it. [0:18:57]

Another option that is similar is that I can go and instead of just clicking on the Y, I can type Option+Y or Alt+Y. And what that does is it creates that guideline. But notice that as I move the mouse around, no matter where I move it, it's locked on that guideline. So it does make it possible to snap to intersection points and things like that, or obviously this perpendicular could be an interesting thing or common point. But basically in locks it on there. Now, if I don't want it to be locked on there, I can right click in empty space and say Unlock from Guideline. And then I now can move this freely as before. [0:19:43]

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Now where would we want to lock it on the guideline? Another option would be let's say I wanted to take something in a certain direction. Let's say between these two columns here. But I don't want to take it all the way to the column; I just want it along that direction. So if I hit A, it highlights the A, and then I can use the creative guideline here. And so now it's created a guideline. And so that of course it makes it very easy to snap and make something along this angle. Another option that is sort of similar is I could go from this point here the other column, hit Option+A, and what that does is it locks it. So it's like using the Shift key to lock it on that angle, if that angle was already a guideline. [0:20:35]

So by holding down the Option and typing in a coordinate X, Y or A, it actually constrains it to that particular value. And I'll go Unlock from Guideline. Now, if you we don't want this guideline around, in ArchiCAD 10 through 14, you can just hit the Esc key and at that guideline will disappear. But hitting the Esc key in 15, the guideline stays there. That is sometimes very useful, but if you want to get rid of the guidelines, you can right click and say Remove All Guidelines, and that will clear up that value. [0:21:10]

The final one I'm going to show you here is if I go and I wanted to make it be able to snap, for example, make this wall go a certain distance along this or to the halfway point between that. I can right click when I'm on top of this other element and say Convert to Guideline Segment. So this is like separately saying I'd like to place a guideline. This now has a guideline here and you can see that I now have a snap at the midpoint, because of the special snap values. So convert to guideline segment says take the last two points that I was drawing, or the rubber band line, and make this a guideline segment that I can then snap to. So that can be a shortcut that you might find useful at certain times. [0:21:59]

There's one other area of coordinate controls that I'd like to explain briefly, and that has to do with setting up the Z heights for useful reference or relationship to sea level or height datum references. So what do I mean by that? We can go to the Options menu, Project Preferences, Levels and Project North, and you'll see that in the default in the U.S. there is a project zero, which inherently always has a zero value, that's just the reference point everything else is in relationship to. And then there's two other levels. One called Datum, which you could use for anything you like, perhaps street level or the level of an existing structure. And then there's sea level, which could be also in the context of other countries, it might be the Australian Height Datum or other references there. [0:23:04]

Now let's say that the project was a certain distance above sea level. Let's say that it was 203' above sea level. So I can type that in. Now if I type into 203, it's saying sea level is above project zero here. So I need to tell it, no, no, it's 203' below my project zero. So this will mean that I can work with the stories in a convenient level, saying that project zero perhaps is the finished floor of the ground floor, the top of the finished floor. Or perhaps it's the grade outside of the building or something very close to the building itself. But that there's a height reference that I'd like to use in many cases for that. [0:23:46]

Now the other datum as I said, you can use it if you wish, you can set it to whatever value that might be useful like the street or existing structures. Now having set the sea level value, it means that if I go into the Wall tool and look at the settings, we'll see that I'm going to be drawing a wall, in this case at the base level of the current story, but in relationship to sea level, it's a certain reference. So often these two will be showing the same thing, project zero and current story. But if you do want to inspect or

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input height levels in relationship to another reference, you can switch that at any time. But please note that anything you place, even though you might type in value in relationship to sea level or an external datum point, will be internally recorded in relationship to the current story. [0:24:42]

So if the current story, perhaps this is the second or the 10th floor, moves up or down, because you've changed the story structure, those elements will float in relation along with that story, even though you typed in a value in relationship to sea level or something else. But we won't use this nearly as much for the walls as we will for things like terrain meshes. And I've explained this and demonstrated it in the section of the course as well as the QuickStart course on creating terrain models. So please refer to that if you want some more explanation on this. [0:25:19]

So this completes our lesson on advanced coordinate methods. I look forward to seeing your comments and questions on the page down below. This has been Eric Bobrow, thanks for watching.

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