



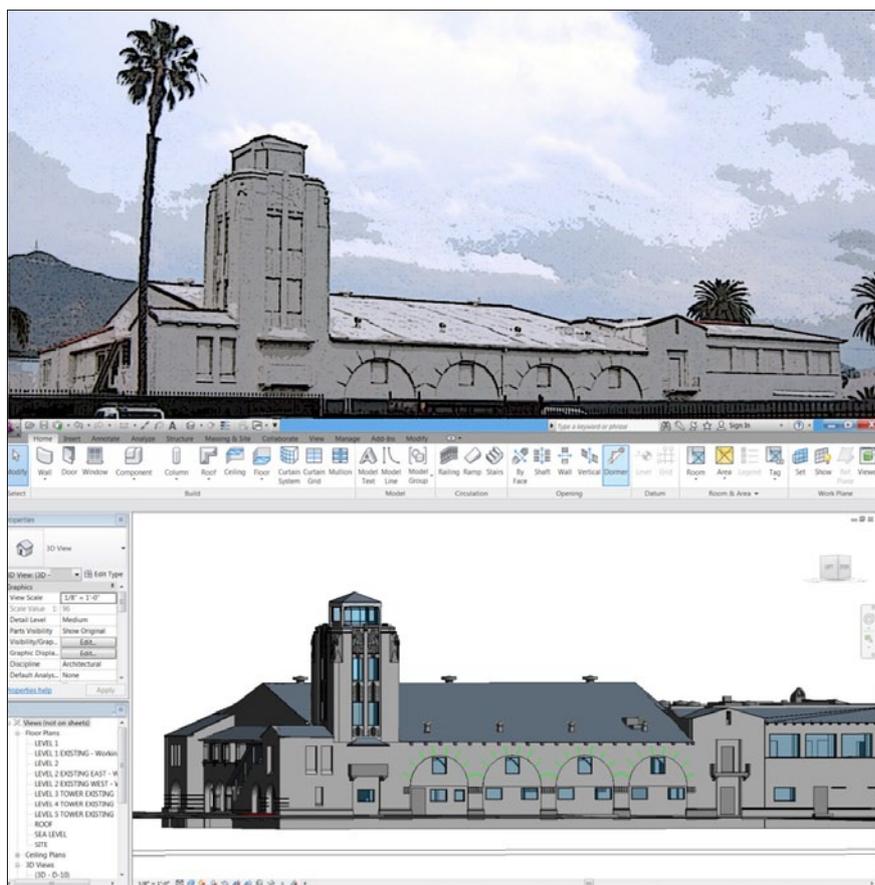
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Coordinates and BIM

Another scan to BIM modeling project is getting underway and I know it's just a matter of time before the monster rears its ugly head. It's so predictable, but it seems that no matter what I do to avoid it, no matter how hard I try to deal with it up front, the monster keeps re-appearing. If I could only find a way to make it go away and never re-appear again, but for now I've come to accept it.

At first there's the excitement of a new prospective job. "This one will be a good one," I thought. It's for an architect who is renovating an historic building. They want the building laser scanned with a BIM deliverable. "This is something we are really good at," I think to myself. As we start to review the information for the existing building that the architect provided, I notice something strange. They've provided us with an existing as-built model in Revit. Hmmmm, why would they want us to scan and create an existing conditions BIM when it appears as though they already have an existing conditions BIM?

The client explained that they had another company recently as-built the building, but that company was unable to provide neither the level of detail nor the level of accuracy required. The company performed their as-built primarily with hand held "Disto" lasers. Due to the historic nature of the building and the ornate detailing



Subject building (top). "Scan-to-BIM" as-built model (bottom).

of the early 1900's architecture it just wasn't possible to adequately capture the required level of detail with this method so the architect decided scanning should be employed.

This would be their first scan job so they had a lot of questions. We met and I gave my standard scan-to-BIM

101 presentation. During the meeting I learned that a contractor was being brought in early as the design was still being developed. As an architect myself, I understand that design often begins without much concern over coordinates. However, I have also come to realize how important coordinates

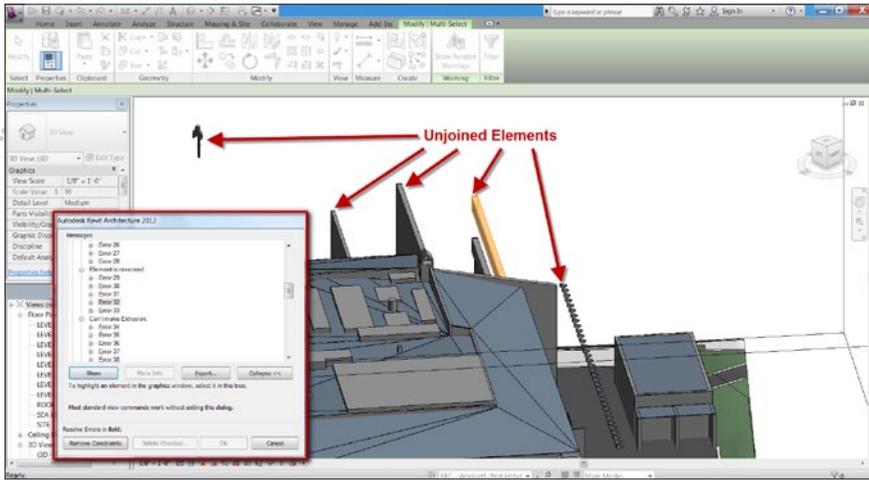


Illustration of unjoined model elements while attempting to move the Revit model.

can be to the contractor and the project team downstream.

Ughhh, here comes that feeling that the monster is about to make its appearance. “Not this time!” I think to myself. I’ve been through this too many times before. This time it’s going to be different. I’m not going to let the coordinate monster get me again.”

Coordinates on the surface seem to be a rather simple concept. Basically, an identifiable origin point with an x,y and z value based on a known benchmark and control, in this case tied to the State Plane Coordinate system.

Although the architect didn’t seem to care, I knew the contractor would want the as-built model set up on a real world coordinate system. This meant survey control would be required vs. using just a targeted registration process. This was going to be a hard sell since the architect had already spent their entire as-built budget on the Disto team. The added cost to have the site surveyed in addition to the cost for the scanning and modeling wasn’t going to go over well. It was going to be important to get the contractor involved *now*, before we get too far down the road”, I thought.

As I suspected, the contractor was a strong proponent for having the model delivered on a real world coordinate

system and the decision was made to include the survey control. The scanning commenced, the scans were registered to the survey control and the modeling effort was under way.

When we gave the architect our initial draft deliverable of the site and building shell the coordinate monster came roaring to life. “This as-built model doesn’t line up with our existing Disto model”, the architect said. “We’ve already begun our design process using the existing model and need to incorporate your scan-to-BIM model with what we’ve already been developing. You’re going to need to move your model”, I was told. “ARGHHH!” I screamed inside. We had specifically excluded moving our data to any other coordinates and had the discussion, up front, of the importance of being on real world coordinates.

So the battle had begun. Somehow I had to convince the architect that the proper thing to do would be for them to move their model to the location of the real world coordinates. Of course it gets more complicated, because now, not only is the architect designing off of the old model coordinates which are based on some random point the creator of the model chose as he set up his initial model, but his entire consulting engineer team is doing so as well, so all of their models will need to be moved.

O.K., so what’s the big deal, right? We’ll, normally it wouldn’t be a big deal, but Revit doesn’t like moving things. First of all, when a Revit model is moved, the modeled elements tend to fly out, break apart, and become “un-joined” requiring a significant amount of rework to get things back in place. Secondly, getting an existing Revit model moved to another coordinate and aligned properly can be difficult at best, and near impossible at least. Of course, as one might expect, the Disto model doesn’t match up with our scan-to-BIM model either.

Dealing with this scenario has become common place for my business. No matter how much we explain things up front and exclude moving data in our contracts, it is almost certain that we get dragged in to spending dozens of un-budgetted hours dealing with reconciling models on different coordinate systems. Sometimes the design team decides to move their existing models and sometimes they require us to move our model off of the real world coordinates. Either way, it seems the coordinate monster goes strutting off if only to say, “see you next time.” ■

John M. Russo, AIA is an experienced architect with over 28 years of experience. He founded Irvine, California based, Architectural Resource Consultants (ARC) www.arc-corporate.com, a firm that specializes in building documentation. Mr. Russo successfully led his team in a nationwide competition for a 5 year, \$30 million IDIQ contract with the U.S. General Services Administration (GSA) for Nationwide Laser Scanning Services. Mr. Russo is an active member of the Orange County Chapter of the American Institute of Architects (AIA), and also is a member of the BuildingSMART Alliance. Currently Mr. Russo, together with other industry leaders, founded the U.S. Institute of Building Documentation (USIBD) www.usibd.org. Mr. Russo holds a Bachelor of Arts in Business Administration from California State University, Fullerton and an Associate of Arts degree in Architecture from Orange Coast College.