DZAN TA: So welcome to AU 2016, everybody, woohoo. First class, I hope I do a good job. This is A360 InfraWorks Bridge Design with Revit and Structural Detailing. Just a little bit about us, our speakers. My name is Dzan Ta. I am an application engineer for Repro Products. My co-speaker, and friend, and mentor is also from Repro Products, and he is also an application engineer. I handle the AEC side, and he handles the civil infrastructure side. I'm also a second degree black belt, and I also teach for [INAUDIBLE] National Headquarters in Kennesaw. Dave Young, like I said, is our infrastructure solutions specialist. He's at Yoda level, he keeps me in check.

So before we get into the actual presentation, I want to tell you a little story. I was at my martial arts school teaching one day and going through the typical routine of teaching the students all of their patterns, and techniques, and punches, and kicks. And I noticed I had one student who was having a lot of difficulty going through the motions. And she was like 17, 18 years old, and she was really, really struggling.

So I had to grab another instructor, have him continue the class. And I stepped over to the side and had to dig a little bit and try to figure out what was going on. And she was actually getting bullied in school. She was 17, 18 years old, she was still getting bullied in school. And she had a lot of difficulty with understanding how does she apply what she's learned to her situation? And so I had to teach her, why do we block the way we block? Why do we punch the way we punch? Why do we move the way we move in a given situation? And once I was able to get that through to her, she opened up a little bit. She was able to actually perform properly, and she had a better understanding of why the techniques work the way they work.

The reason I bring this up to you today is because this class is not about pics and clicks. It is a little bit about workflow, but it's more so about understanding the data that you have from one transition to another, and knowing the limitations of what you have, and the advantages of what you have, and how to move that information from one application to another.

Out class synopsis is very, very simple. We're going to use Autodesk InfraWorks 360 and take a look at the bridge design module to do some sight schematic designing. We'll then jump into Revit and move that information into Revit so you can see what data you get and why you get what you get. And also for detailing and things like that. And then we'll take that information and bring it back into InfraWorks work so we can see the end result.

We have some key learning objectives, typical key learning objectives. One is learning the basics of Infrastructure 360, and the bridge design module, the pros and cons. We'll then get into how do we transfer the data? How do we export it out of InfraWorks and into Revit and the data that we get. While we're inside Revit, we're actually going to start looking at how to parameterize the information, or do we need it parameterize the information, or do we need to strip the information? We'll get into the reinforcement aspect as well, since we're there in Revit. And then lastly, we'll bring it back into InfraWorks.

For the purposes of the design criteria, we have a hypothetical company called Bladeville Bridgeworks that is based out of Morgantown, West Virginia, and they've commissioned us, Autodesk and Repro Products, to be their trusted adviser. And we want to come up with a solution and a workflow with the existing tools that they need to work on getting a bridge created. So the workflow design will be in InfraWorks 360, into Revit, and back around.

So InfraWorks 360 for bridge design. How many people here already touching and playing with InfraWorks? Good, that's a good show of hands, I like that. So there are a lot of design approaches when we are looking at bridge design. We can use old, trusted AutoCAD 2D and 3D modeling. We can Autodesk Revit and all the basics of Revit, but also the Revit Adaptive Component Design aspects of it. We can use Dynamo. How many people here have touched and played with Dynamo? Good. That's a very, very powerful piece of visual programming software that actually is tapping into a lot of the Autodesk products. So there's a lot of classes this year and last year on Dynamo. So try to get into that.

My data set, by the way, in the handout that I've created, there are links to specific classes that get into much deeper of InfraWorks bridge design, and also Dynamo, and Revit, even Civil 3D, taking the design within Civil to Dynamo, to Excel, to Revit. We're actually going to obviously look at the bridge modeler within the Autodesk software for InfraWorks 360.

Real quick, I've got some gifts to hand out for trivia. So if you know it, raise your hand first one was, what was InfraWorks called prior to InfraWorks? Yes sir?

AUDIENCE: It was Infrastructure Modeler.

DZAN TA: Infrastructure Modeler, very, very nice. Land Explorer? Galileo. Actually, the last one is Land Explorer. So go ahead, Dave, if you want, you can hand out gift. I got into the InfraWorks stuff just a little bit. Dave really handles this software more than I do. I'm an architect by design, so I

don't do bridge design, I'm not a structural engineer. But we just thought this was a really interesting workflow to approach, and give to students, and to the community. So when it comes to the history of InfraWorks 360, that's our history.

So what is Autodesk InfraWorks 360 for Bridge Design? We know that we have the InfraWorks, we have InfraWorks 360, and you get all these beautiful, great content. And it's a software that allows you to very quickly and very easily design the surrounding landscape-- the bridges, the buildings, the water, things like that-- to get a very good, rough schematic design of what you want. The bridge design module is part of that as well, and it allows you to create bridges very quickly and easily.

That's the first part of the workflow we're going to cover. The second part of the workflow is how do we take the bridge design that we've created in InfraWorks and take it out of InfraWorks so that we can bring it into Revit? Because that's the exporting of the data and importing of the data.

So when we export the data, it's very, very simple. You just select the bridge itself, right click, and say, send to Revit. And what ends up happening is the software will automatically open up Revit and take all the information and display the data to you in Revit. Now when we talk about the data, you can go ahead and right click and do things like quantities and properties to get a better understanding of what data is being exported. And we'll look at this as well when we get into the software.

When we import the data into a Revit, it's actually an automatic process. So the Revit software will open up and you'll get your bridge design inside Revit. And when we take a look at that data, it's going to be obviously lots of different types of families. Some families are going to be very, very basic. Some families are going to have some decent parametric intelligent information. Some families will be adaptive, and some families are going to have a lot of BIM data, but not very usable. And I'll explain this when we get into the Revit software.

AUDIENCE: Are you taking questions after the [? presentation? ?]

DZAN TA: Either way, whatever's-- if you have a question, ask. I'm sorry.

AUDIENCE: So you want [INAUDIBLE] the data--

DZAN TA: Actually, do you want a mic? Test, there you go. That way everybody can hear the question, too.

AUDIENCE: I'll try not to ask too many questions. So on this, when you export this file, I understand the quantities and all that. But what about georeferencing? Is that a georeference file, or just kind of the raw data from what you're doing?

DZAN TA: It is a georeference.

AUDIENCE: It is georeferenced.

DZAN TA: Yes, it is georeferenced.

AUDIENCE: And so the coordinate system that you specified, or whatever you specified for the referencing in the InfraWorks is what comes into--

DZAN TA: Exactly.

AUDIENCE: OK, thank you.

DZAN TA: Any other questions? Yes, I forgot to mention, if you have a question, ask. This is very, very interactive. This is AU 2016. I want you guys to give me feedback, pros and cons. Because it helps us with providing better content.

So the next part of the workflow will be looking at the data within Revit and how to parameterize the data, or to what level of parametrization do we do? Another the quick trivia, because I've got a t-shirt here for those who know the answer. It's a two part question, so if you know the answer, raise your hand. What was the name of the company that founded Revit?

AUDIENCE: Revit?

DZAN TA: Nope. Charles River Software. Is the original company. So the trivia question is this, when was Revit released? First version?

AUDIENCE: 2000?

DZAN TA: 2000, very nice. April of 2000. Oh, nice throw. So when we take a look at the bridge that comes out of InfraWorks and into Revit, what do we get, and what do we need to look at? There are some basic things that we want to look at, which are the shapes and the size of the data that comes over. Is it accurate information? Do we have to use a different cross-section

of information? The materials themselves. Does it have material content? Is it specifying that it's concrete, or cast in place concrete? Or does it have that kind of material definition, or do we need to apply that definition, as well?

Structural analysis. For those who are looking at the bridge design from that context, I know it's still early, it's schematic design. If you need to, the question really becomes, does that information come across and show analytical data? If not, do we put in analytical data? And I'll show you what we get when we're in Revit. And then lastly, for those who want to get into the reinforcement aspect of the bridge design, do we want to put rebar into the initial schematic design?

And so the second to last part of the workflow will be looking at reinforcement itself within Revit. And when we take a look at reinforcing in Revit, we have a standard Revit reinforcement rebar tool. We've got the rebar area pass, so on and so forth. And they work fairly well. Now again, I'm not a structural engineer. I'm not an engineer in training. I come from an architecture background. So when it comes to rebar, I don't know anything. And you're going to see what you're going to get.

Now there's also, for those who are not aware, if you have your software on subscription, you have Revit extensions that you can download and install. You can either go to your Autodesk account and download it, or you can use the Autodesk desktop app, and it will display and show that it's a valuable resource for you to download and install. And in there it has reinforcement for a lot of things. Columns, beams, footings, so on and so forth. We're going to take a look at that tool and the difference between the tools, and see which one makes more sense to use for whatever purpose that we're working with.

And then the last part of the workflow will be how to round trip the data back into InfraWorks. Now when we take the information from Revit and bring it back into InfraWorks, there are several ways to do this. FBX file import, IFC import. How many people know these file formats? OK, good. Internet mapping with the project base point. Obviously using the InfraWorks, but we could just drag and drop, which I tend to find a nice easy way to do it. And then obviously we're going to go into the command itself for importing it within InfraWorks 360.

In the end, this is what a Revit bridge looks like within InfraWorks. And that's kind of the approach. Now, do we have any questions before I actually get into the software? Yes, sir?

AUDIENCE: Is this on? So one thing I notice, there's no ADSK going back and forth. Is there a reason why

that's not? Because you've got the Civil 3D triangle.

DZAN TA: As far as I understand, that's in the works. And you'll see when I get to the closing remarks, the slide of looking at the pros and cons of each of the phases that we went through. You'll understand why you have that question brought up. So easiest just to watch and see, and we'll move forward. Any other questions?

AUDIENCE: I understand that of course, within InfraWorks, it will create the bridge for you. And take it into Revit, you can add reinforcing, do those additional type engineering and analysis. What's the true purpose on bringing it back in?

DZAN TA: Just for contextual purposes. Because when we work with InfraWorks, it's a very easy tool to very quickly design the bridge in its context according to the site. If you didn't have that, and you just had Revit, you would have to build the Revit bridge from the Revit perspective, and not have the site conditions. Which means you have to bring in the site conditions, build the bridge, and then take a look at it from that context. Why not use the powers if InfraWorks to very quickly build the bridge design, and let it give you the base modeling information if you need to to bring it straight into Revit? That's a lot faster than trying to build it from scratch in Revit. Yes, sir?

AUDIENCE: But what if we have to make a modification after you import the [INAUDIBLE]?

DZAN TA: Very good question. So this is awesome, you guys are already looking and thinking ahead. So we'll talk about the limitations when we get to the end, but that is a particular limitation. But don't worry, because Autodesk knows this, and Autodesk is actually in the works of refining that. So all right, any other questions before I just jump into the software? One more over here, Dave.

AUDIENCE: [INAUDIBLE]

DZAN TA: Sorry.

AUDIENCE: What about profile and alignment? We're laying out these long linear structures, obviously we have a profile and alignment. How do you do that within InfraWorks? Utilize those profiles and alignments.

DZAN TA: Within InfraWorks, it's kind of an automatic thing now. If you're using Civil 3D, for example, to do that, that's a bit more accurate. And again, you can use, for example, Dynamo to pull that

data out, and then from there bring it into it and keep, for example, the profiles perpendicular to the alignment, things like that. And I won't to show you that aspect of it, because in the handout there's a link to a great AU class from last year for that specific question. But I'll show you within Revit the ability to create the bridge based upon a profile moving forward, if that helps. Any other questions? All right. So with that we'll jump into the software real fast.

So I'm here in for InfraWorks 360. And one of the biggest advantages of InfraWorks 360 is the ability for you to create as many proposals as you need. And so I've created several proposals for different conditions. The first condition being the pre-bridge condition, and we've just got a typical design road here.

And if I want to create the InfraWorks bridge, I can either head over to the command itself and pick from one of the two choices that we have-- we have pre-cast girder bridge, and we have steel plate-- or I can select the road that I want to put the bridge on and right click and add the bridge. And when you do this, it'll ask you to click to place the start point and the end point of the bridge, and the bridge will get built.

The bridge is associated to that design road. So when you change the design road, the bridge will adapt. And depending on how powerful your workstation is will determine how long it takes for you to have this built. Now just to give you guys context, I'm running a 3 and 1/2 year old laptop, an i7 2.8 processor with 32 gigs of RAM, a K5100 nVidia quadro graphics card, and a one terabyte SATA spinning drive.

My limitation on this workstation is the hard drive. So if you were to switch it to, say, a solid state drive, your speed performance will jump about 80%. And my coworker, his workstation has three solid state drives. And for him to do this, [SNAPS FINGERS] it's like that. It's amazing how much faster it is. So if you're doing this kind of work, it is obviously always beneficial to make sure your equipment is set up properly.

So once you have that bridge placed, you can modify it several ways. You can select it. And depending on how you select it, you're either going to be selecting the road that that bridge is tied to, you can select the bridge itself, you can zoom in and select different aspects of it. If you get disoriented, you have the view cube. My mouse is a little sensitives, so hang on a second. Let's zoom back in here.

And as you select an entity in the bridge, it's either going to select the group of information, or if you select again, it's going to pick the individual information. And you'll always want to select

it, and go to Properties, and take a look at the information that you have and the ability for you to make any design adjustments that you need to make.

Now remember, we are in InfraWorks. So the library and the database that you have is what you have. And one of the limitations that you'll notice is that we don't have a lot of different bridge design database files to work with. We have only so many. And so if you select something, that's what you're stuck with. That's what you have. Yes, sir?

AUDIENCE: Is there any talk to increase that library, even to add your own content, or--

DZAN TA: As far as I understand, it's something that's in development. I would assume so, yes, see?

AUDIENCE: There is a project [? immediately ?] going on for this in which you can shape whatever you want based on the regulation of the [INAUDIBLE]. So it gives you the possibility to add different part of the bridge. For example, you can add the steel girders together with the precast, which is something that may happen honestly. And they have this limitation nowadays. But I spoke with [? Ara, ?] maybe you're in contact with him, and he said that they're going to develop that.

DZAN TA: OK, that's good. My understanding from talking to the Autodesk folks that I'm in touch with the expert at lead program, they say that the software's still fairly young. And this database will increase eventually over time and give you guys the flexibility you need to make different types of bridge designs within the software.

So the objective and the understanding of the part of the workflow that we're talking about today is, use the software to very quickly create your bridge design, selecting the bridge and making any property changes that you need to make. So going in here and making any necessary changes. And if there's a cell in here that you can click and type and make changes to, obviously it will change the bridge design itself.

But there are some cells, for example, that you cannot make design changes to. And that's just data that's given to you automatically. Again, I am not a bridge designer. So for those who are actually doing this kind of work, they have a better understanding of things such as the sole plate height, where does that actually need to sit and rest? The masonry plate width, so on and so forth. So for our workflow purposes for the first phase of this process that we're presenting to Bladefield Bridgeworks is to use InfraWorks to create the bridge.

Other things to note too when you are selecting the components of the bridge, you will get into

different aspects such as the positioning of the object, the rotation of the object, things like that. So the initial ability for you to create and quickly manipulate the initial design is fairly simple within InfraWorks. Does anybody else have any questions before I jump into the next part of the workflow?

Again, like I said, this class is not about pics and clicks. There is a great class that Eric Chappell did from Autodesk for last year on InfraWorks bridge design, and he actually goes to all the little the nitty-gritties. I don't have time for that. But I want you to understand that using InfraWorks to very quickly design the bridge and get the context that you need can be created.

If we select the bridge and right click it, we can go into things like quantity. You'll get into the concrete and the steel data that's captured and can be exported out into Revit, and can be scheduled if you need to schedule that data, as well. If you need to send it to Revit, right click and say, send to Revit.

Once you do this, this is what you get. And what's very interesting is that every single part of this bridge is a family. And when we look at it, you can select any entity, and it's a family. You can click Edit Family to get to that particular family itself. And for this one, for example, we see it's an adaptive bridge. And it's based off of profiles that are perpendicular off of this center line, if you will.

What about the parametric information? So if we head over to the Family Types of window and drill into it, what do we get? We get nothing. It's very interesting that there isn't much data when it comes to this piece of the bridge that gets exported. If we select other objects-- for example, is this one, that's the abutment-- and we edit its family, you can see that it's a very simple family. And again, heading to the Family Types window, it'll give you basic dimension parameters. And again, you can adjust these if you need to.

Now this particular family, when it was created and brought into Revit, one of the things you'll also notice is that the naming convention of all these families that get brought into Revit are very strange names. They're alphanumeric names, long sequences. 15, 20 character sequences. Very, very strange.

I didn't particularly like the initial abutment 2 family that was brought over. It wasn't parametric in the sense of I can manipulate it and adjust the width, the length, the height, things like that. So I went and built it from scratch and still used the parametric information that came across. So this is again, we're talking about understanding the data that you have and seeing whether

is it a viable piece of data to work with.

If we select other entities-- for example, let's head over here-- this one is actually set up right now as an assembly, and I'll talk about assemblies in a second. If I select, for example, this, this is a generic column. And if we had to the family, it's nothing more than a rectangular column. But if we go into the Family Types window, the data that got pushed into it from InfraWorks actually shows quite a bit of structural analysis parameters.

Now the question becomes, is this something we can work with? If we go into any one of these cells, we can input data. But if I try to modify that parameter itself, it'll tell you it's a built in parameter, and I cannot make design adjustments to these parameters. So depending on the level of parametric intelligence you want to build into the family, you may have to rebuild these from scratch.

Now the question really becomes, where did this come from besides InfraWorks? If we take a look at Revit and you head over to the family categories and parameters, they have different things, for example, say section shape. And if you click inside here you can make design adjustments for maybe it's a different shape. Because you pick certain sections shapes, the parameters that you see under structural analysis will change, and that data will be imported into the family.

Let's take a look at a few other objects that were brought over from InfraWorks. If we look at this one, it is denoted as M concrete rectangular beam. And we go to its family, and we can see it has basic information for length, and then actual material.

So we talked about the different categories of things we need to look at in Revit. The shapes, the sizes, the materials, the structural analysis, and then the rebar. So for the material, here we have it denoted as concrete cast in place gray. Why did it pick this? That's a good question. Can we change it? Yes, obviously we can change it. Is it something we need to change? These are the design decisions that you have to make as a bridge designer whether it's viable or not to work with. And obviously we can change it if we need to change it.

Let's take a look at the structural analysis. Actually, let's head over to another family that I have. Let's look at the piers, OK, that's typical. Let's head over to another one. Support section. So this is also one of them that came across. And if we take a look at it, you'll see it's made up of void extrusions and solid extrusions.

And again, it gets into the section shape, and it gets also into the data that you get. Length void end, length one, length two. So there's a lot of data that automatically gets built and put into the family. So the question really again becomes, do we use that data, do we not use that data? How do we massage that data? Can I select any one of these and go into the property aspects and make changes? Yes.

What you're going to notice using this workflow and looking at the InfraWorks bridge that goes out of InfraWorks into Revit is that some of the families are very intelligent, like you're seeing here. Some are not so intelligent. When we take a look at lastly a few other families, let's see. That's the abutment, same as the other one. Let's switch over to-- let's do this one, road by points.

So when we take a look at how do we use Revit, as an example, to create the bridge, say, from scratch? So I've got a spline here that I can use to divide if I need to within the Revit software, I specify the number of divisions. And because I've done this, I have some adaptive profile families that I've created that give me the ability to insert and place on those points. And those profiles have been designed so that they are perpendicular and vertical to those points. Because I have that those profiles in place, I can go through the process of using them to build a bridge quickly and easily.

So that's the first profile. If I select another profile, say, the left side profile, I can place that profile as well. And then other tools, using the Repeat tool, for example, I can repeat it. Selecting this one, this one's not letting me do it. Let's try this one for now. If I break that repeating tool, I can use the create form command to start building the portions of the bridge if I need to. So if I do, say, the right side and put in that profile as well using the repeating tools, I could start to build the bridge, and the road, and things like that.

So the tools within Revit are very, very powerful for you to work with to build. If you want to build the road and bridge from scratch, you can. There is a really good class that was given last year on how to take a Civil 3D road, and grab the profile, and export the data out as points in Excel, and using Dynamo to create the spline within Revit to automate this process and make it a little easier and a little faster.

So we talked about the workflow from creating the information in InfraWorks, then moving it into Revit and seeing what we get. And then understanding, is the data parametric enough or not ? And looking at different aspects such as the shapes, the rebar, the structural analysis.

So let's look at the structural analysis aspect of it. As you can see, not a lot of structure analysis information is carried across. So the question really becomes, as the bridge designer, do you need to put this information in or not? And if you do, you can do so within Revit.

The next part is looking at the rebar information. And let's head over to a wireframe view. And you can see there's a couple of columns that I put rebar in here. The one on my right, this one here, is using the standard rebar commands within Revit. Again, I'm not a structural engineer, so I just threw in tons of rebar. And that process is very iterative. It just takes time. You put in a rebar, you specify things like the divisions, and then the quantity, and so on and so forth.

But then there's also this column here that has rebar that looks very different than this one. And this rebar is based upon the extensions tool. And so if I take, let's say for example, this column. Let's just copy it over here for now and I'll get rid of all the existing rebar. And I want to go ahead and put in rebar. Under the Extensions tab of the ribbon, there's the Autodesk Revit Extensions panel. And in here is the reinforcement command.

And this has grown over time. Literally when I was building the dataset and building the PowerPoint presentation, this grew and even had more capability within the few months that I was working with the software. So if I want to use this tool, for example, to put rebar in the columns, the way the command works is if you try to use the command without having anything selected, it'll fail on you. You'll need to select the entity first, then head over to extensions, and head over to reinforcement and columns.

So once you do this, you get a very simple Windows dialog box that pops up. And you can make adjustments to different aspects of your rebar based upon geometry, the bars, and what type of bar, hooks for the bottom and the top, the number of bars that you need, stirrups, and how your stirrups are placed, distribution, so on and so forth.

So this is a very simple interface for selecting different types of aspects of the reinforcement that you want to work with. And when you're all finished, clicking OK will actually build all the reinforcement for you at one time. And it makes it very easy and quick to build this.

Now the display and the representation of rebar can also be adjusted. So you can select, for example, the rebar and head over things like the visibility states, and make changes to, say, viewing it as a solid. And if I shade it up, you can start to see the rebar has a little bit of 3D content to it. I'm going to switch back to wireframe for a second.

Other rebar you can select and go through that same process and display as 3D solids. And even to the point where it's unobscure so it doesn't get hidden, if you will. It's a great tool, in the sense of if you want quick down and dirty rebar thrown into the family. Is it accurate? I don't know, I'm not an engineer. Can it be massaged and adjusted? Yes, it's easy to adjust, and select, and make design changes to.

And so from the rebar aspect of it you can use these tools very quickly build that information. When we take a look at documentation of the information, let's open up another family. You could take a look and see that all of the grouping of information for the columns and whatnot I have set up as an assembly. How many people here have used the assembly command within Revit? Just a couple? OK.

So the command for assemblies is basically when you tell the software to select all the entities that you want and create a grouping of that information as a single entity. And when you do this, it actually builds views for you automatically. For example, the 3D view, the section view, the elevations, the plan details, even material take offs and parts lists. And then obviously you can create a set of CD sheet and throw all the views onto it to make it look presentable for schematic purposes. And you can get some documentation out of it within Revit. So it's fairly easy, it's not hard to do. And so that's the reinforcement portion of the workflow that we're talking about today.

How do we take the Revit information that we've massaged and adjusted and bring it back into InfraWorks? Let's head over back into InfraWorks. I created several proposals for different ways to bring it in. IFC import, NWC import, the Revit being added as a default, and then even FBX.

So let's look at the Revit bridge that was added. And so this is the bridge that comes in. If we select the Revit file, we can look under Properties and see the data that comes across. If we head over to the data source we can see that the bridge import is here. And if I right click and go to Configure, you can see it has coordinate systems already assigned to it based upon the InfraWorks model information that was already generated. You have the 3D Model tab that gives you a visual 3D representation of the model that's going to be brought in, even down to the level of materials and rebar. And this is what you get.

Now when we talk about bringing the information back into InfraWorks, some file formats work really well. Some for file formats don't work very well. To bring in the Revit file back into

InfraWorks, I can just select Autodesk Revit and go get the file, browse to it, get it, select it, bring it in. Or I can just use Windows Explorer and drag and drop.

And once you do this, over here under status it'll either say Configured or Imported. By default it will initially say Configured. And so you'll have to go into the properties again here to make the necessary adjustments. And then once it's imported you can click Close and Refresh and the data will show up accordingly.

If we look at other file formats that were brought in--

AUDIENCE: What's the difference between importing and configuring?

DZAN TA: What's the difference between import and configure? When you have the information brought in, that information is not configured properly. In other words, things like-- let's head over to the Configure tab-- things like the coordinate system are not set up properly. The type of object has not been assigned, the source has not been assigned, things like that. So by default, when you bring the Revit file into InfraWorks, this information will not be assigned properly. And you'll have to make the necessary adjustments. And then it'll show that it'll say imported.

And like I said, if you pull the handout and go through the step by steps-- because in the handout I have it actually written out step by step what to do even down to the point of the coordinate system-- then you'll understand why does this say import it versus configure it.

If we look at other file formats such as IFC, now, I tried 10 times to try to get an IFC file into InfraWorks and I could not do it. I tried every which way I could and it just would not accept it. What's interesting that I found is that the IFC file format is a pretty stripped down file format. And it gets it all the way down to just basic geometry. And depending on the software that you're working with, some software accepts IFC files much better. For example, NavisWorks accepts IFC files very well.

Taking an IFC file, bringing it into Revit is a 50/50 shot. And it's just very, very strange with the IFC file format. And so for InfraWorks, trying to take a Revit bridge, and exporting it as IFC, and taking the IFC and bring it into InfraWorks, I haven't been able to make it work. So for those of you that later on when you're going to work through the dataset and try it, see what you can do, see if you can get it to come in. I also read that you can actually bring in an NWC into InfraWorks as well, and I cannot get this to work either. I also tried ten times. And it's very,

very strange that the behavior is hit or miss.

And then the FBX format. The FBX file format is something that most people typically default to, because it actually retains material content and a lot more intelligent information. So taking a Revit file and exporting it as FBX is very easy, and taking the FBX file and bringing it into InfraWorks is easy.

And it actually accepts it fairly well. Let's give my machine a second to process. And so you'll see the IFC file is also brought in. And it also has basic capabilities such as grip manipulation, placement, property information, as well. And so it works. The FBX file format works fairly well. Any other questions? Yes, sir?

AUDIENCE: I'm just curious what kind of capabilities it has for bringing Revit structures, like support facilities, like tollbooths, or like dispatch centers, things like that that are going to be support structures for larger bridges. What can you do with those, so just bring them in out of Revit flatly, or are you able to design inside InfraWorks with it?

DZAN TA: As far as I understand, you probably want to do the design work inside Revit and bring it into InfraWorks. I don't think InfraWorks is meant to do that level of design.

AUDIENCE: Positioning?

DZAN TA: For positioning, yes. Positioning is a given. So as far as I understand, the context of InfraWorks is not meant for you to go to that level of detail and design work. It's meant for quick iteration, meant for quick, logical placement and orientation, things like that. And get a general overall sense of what that schematic design is going to look like. You'll have to use other authoring tools to get more granular if you have to. Any other questions?

OK, so let's do this. We're going to jump back to PowerPoint real fast. And so in regards to what we learned using this kind of workflow. From the InfraWorks 360 perspective, the tool for creating the bridge, and very quickly generating it, and manipulating the property information, and manipulating the placement and everything, is very easy. However, the negative aspect is the library content right now is very weak. And it's just a matter of time for that information to populate and so we can use it easier.

The transferring of the data. Exporting the data was very, very easy out of InfraWorks and then and then directly into Revit. However, the negative aspect of that transfer of information is

going to be things like that naming convention, which is kind of weird. But more importantly, the data that gets exported and brought into Revit is either going to be very, very simple, or very complex, or somewhere in between. And you have to really sit down, and look at it, and say, is it valuable data to use?

From the parametric Revit designing aspect of it, the families are generated very, very quickly from InfraWorks. It's really good. I mean, I can very quickly generate the bridge, get an overall sense of the placement, and the shapes and everything, bring it straight into Revit, and I have a design. I can work with what I have. I don't have to build it from scratch. Just think about if I had to build the Revit bridge from scratch. Takes a long time. There's no ifs, ands, or buts about it, it just takes a long time. So using this workflow will give you initial base starting point and makes a lot of sense. However, the negative aspect of this phase of the workflow is that the parametric behavior is kind of hit or miss. It's a little strange, you noticed.

Reinforcement aspect of the workflow. The extensions are very, very helpful. Because it's easy to work with, everybody likes Windows interface. You pick, pick, pick, click, make all your options, hit Go, and it builds it. For somebody like me that's awesome, because I'm not an engineer.

If you use the traditional rebar reinforcement tools within Revit, yes. The reality is, the person who is doing that rebar creation within that Revit file, the knowledge that person has will dictate how that is going to look. So if I was an engineer in training, and I had a licensed engineer shadowing me, they could actually tell me and teach me how to put the rebar in properly, and why we put it in the way we put it in. But since I don't have that, that end result is only going to be so good as the person who's inputting the data.

And then lastly, the last part of the workflow is the contextual design, bringing that information back into Revit. We noticed that there's a lot of ways to bring it back into InfraWorks. We have the Revit, we have the IFC, we have the NWC, we have the FBX. But the problem is going to be not necessarily bringing in different file formats-- as you noticed, you saw some just doesn't work, but others work really well. One of the big flaws that I've seen so far, which is changing because Autodesk knows this, is the round trip redesign.

So what happens if we go through this whole process, and we have this nice looking Revit bridge inside InfraWorks because we went through this process. And the client comes back, says, no, we need to redesign the bridge. It needs a look this shape, and this position, in this

location. What happens to the stuff that we just did? We have to do it all over again. That make sense?

So is there a way to use the Autodesk software so that this change and the redesign changing is faster, and easier, and more iterative, and actually like you would expect a Revit model to behave-- if I make a change in one part of the model everything operates accordingly, and vice versa?

Autodesk is aware of this, and we are looking at ways to make this kind of workflow a bit easier. Because that is the nature of the design, that's the nature of our business. The client and things will change constantly. So if you go through the process of doing this kind of workflow from start to finish, the reality is, at what point do you start to make this transition? Because if your info InfraWorks 360, you may be using it several times and creating several bridge design iterations.

It'll get to the point where the client says, OK, this one is probably the most logical one we need to work with. Let's develop it further. And then I would take it to the next level, and then the next level, and then the next level, and then the next level, and then the next level. Does that makes sense?

A few things left before class is over. I'm not sure if you're aware, [? Autodesk ?] has pushed out as of last Wednesday a brand new initiative to unify all of your Autodesk profiles. So when you log in to the AKN, Autodesk Knowledge Network, or you log into forums, or you log into screencast, or log into your Autodesk account via autodesk.com/account, you'll be requested or asked to pick a specific profile picture, description, and how you want that data to be presented.

And what's going to happen is all of your profiles across all of these different servers will unify, and you'll get a really nice looking profile page that displays who you are, your credentials, all the contributions that you've made, and so on and so forth. It's a really good tool, and it makes a lot of sense now. So if you haven't had a chance to update you on this profile, because it's a good thing to make sure it's up to date and Autodesk has your current information. Not only when doing that is going to help you, but also when you do this, Autodesk is actually going to contribute money to different organizations that need help.

Dave and I want to say thank you guys very much for your time. We appreciate it. A couple other things. The feedback, make sure you fill it out. The AU app actually gives you the ability to fill out the surveys as well. This is our class signature. If you fill it out, you are automatically

entered in to win a pass for next year, and also a $200 Amazon gift card.

How many people here in the audience are in the education sector? Students, things like that? So if you're in the education sector, you get free Autodesk software, if you're not aware of that. To take advantage of. Your students will thank you, because it's not cheap. I mean, that's the reality of it.

And if you can get all of your students to work with the software, I used to teach for Art Institute of Atlanta as well. And I saw how the students struggled with not having the right software. And we had it organized, and it helps quite a bit.

How many people have certifications in Autodesk? Oh, really? Wow. So here as far as I understand is the only place you can go to take your Autodesk desk certifications for free. If not, you have to pay. And I think the last time I checked it was like $225 per certification testing. And you get one chance. And if you fail, that's it, you've got to do it again. You've got to pay and do it again.

Here, they have certification lab open all week, and I think the schedule is really, really nice now. It's like all day. Because in the past it was only open certain times, and we had ridiculously long lines. Try as much as you can to take advantage of this and get your certifications. They have it in AutoCAD, in Revit, Civil 3D, Inventor, InfraWorks, several others. It's a great thing to have on your profile, is to let people know you are at a high level.

There's a couple here that you're not going to get. This one says Autodesk Certified Instructor. Dave and I are certified instructors. That is an actual program you have to go through. It varies between 3 and 5 days of training. And if you get it, you become an Autodesk certified instructor. I know that that ACI program is actually changing, and it's going to become more stringent. And as you continue to keep it up to date, you're going to go higher or higher up into gold, silver, platinum level, as well. And it gives you a lot of benefits. Being certified in the software gives you a lot of benefits.

Lastly, AKN. How many people actually know of AKN and work with AKN? Not that many, I thought it would be a lot more than that. So if you head over to knowledge.autodesk.com-- it's AKN-- you can log in, and you have access to all of this amazing content. The content is going to be things like articles, screencasts, videos, Q&A, just like the forums.autodesk.com. It's a great source for you to go to get information.

If you have a question you don't know, you can do a search for it, and it'll give you an end result list of all the different solutions. And it actually has filtered by different methods of solutions. And one would be screencasts. How many people are using Autodesk Screencast? One, two, three, four, really? Five, and me, six.

So screencasts. Head over to Autodesk Screencast. This is a tool that you can get and you can use for free. You download it, you install it, it's in, it's up, it's running. You can use it to record your content. And it's great, because that information gets pushed up to Autodesk. It's part of your profile, and people use it. They need it for learning, and for finding solutions. And Screencast is meant to be quick, clean and simple.

And that's it. Thank you guys very much. I hope it was helpful. Don't forget to fill out your surveys.