JASON KUNKEL: Well, I've got 8:30 on the dot, and so I figure we might as well get started. Congratulations. First thing in the morning, last day of AU, you look mostly awake. COBie and Classifications Systems for Revit-- and if this doesn't wake you up, I don't know what will, frankly.

[LAUGHTER]

TJ MEEHAN: Oh, this one's mine.

JASON KUNKEL: It's purple.

TJ MEEHAN: Hey, thanks. So today, we're going to talk about COBie. We're going to learn a little bit about what COBie means. It's not just an actress on *How I Met Your Mother.* If you Google it, that's what comes up.

We're going to talk about classification data. What are classification systems? What are the different systems? How can you quickly pin those to Revit? And we're going to go through these two free utilities from Autodesk to help you with that.

JASON KUNKEL: Is your mic on?

TJ MEEHAN: It is.

JASON KUNKEL: Ah. So these are the objectives that are laid out in your handouts. Hopefully, everybody had a chance to download them. If not, they're uploaded on the AU website. But real quick, again, we're going to talk about COBie, how it can be generated inside the Revit model, how it can be collected and stored inside the Revit model.

We've got connectivity going on between the two utilities. We're going to talk about the COBie extension in the Classification Manager. So we're going to discuss a little bit about how those two can interact and how they can live with each other.

Talk about making your own classification systems. Classification Manager comes with some defaults, some out-of-the-box standards, but we know those aren't the only ones that everybody needs to use. And then, finally, we'll talk about COBie-compliant worksheets, and then how you can pull those out of the Revit model.

My name is Jason Kunkel. I've been working in the AEC industry for over two decades now,

which is a little tough to admit at this point. I started out my career as architectural design, kind of slid over into the IT, CAD, BIM, plug-it-into-the-wall support world. And now, I work for CAD Microsystems. I do training and development implementations and bloggers there. But honestly, at this point, you could just say I breathe air, because I think just about everybody in the world has a blog, at this point.

TJ MEEHAN: So Jason and I have very similar paths in our careers. Both started out as architects, kind of moved over to the technology side. I spent six years as an architect. And I've been working for 16 years as a BIM consultant, working with architects, engineers, contractors, subs, owners, any of them that are involved in BIM.

So let's talk about COBie really quick and what COBie is. How many times have you seen Lyle this week? The picture of Lyle? Anyone? So here's our friend, Lyle. Say hi to him. It's an actual picture.

And what COBie is COBie is a way to solve the problem Lyle is dealing with right here. So typically, at hand-over, the GC hands the keys to the owner, and then drives a pallet full of documents in and dumps them in the basement. And the building engineer gets to go through those, to figure out how to manage this building. Here's all the drawings. Here's all the specs. Here's the preventative maintenance manuals, everything that he needs to manage this building. Of course, there's a lot of time between when he can get through all that data and when he can actually start using it to maintain this facility.

So back in 2007, the Army Corps of Engineers decided to solve this problem, by capturing this data throughout the design and construction process, by capturing it in a standardized format, in an electronic format. And that's where COBie was born. COBie is simply a data format, that's all it is. It is not technically a spreadsheet, but 99% of people deliver it as an Excel spreadsheet. Because it's a standardized format, then, all this data that's been collected in a certain way during design and construction can then be imported into your operations maintenance system, whether that's Maximo, or Tririga, or Archibus, or Builder, or whatever you have that you want to use that data in.

And so COBie is that standard. It's a very strict standard. It can be a very confusing standard sometimes, especially when you're talking about the Attributes worksheet. And so we'll talk a little bit more about that.

Some COBie breaks up the data for that facility into worksheets, which are just tabs in Excel.

And those worksheets each have a name and a function. And most of them make sense. So on the design side, here's stuff about the facility as the whole, and then each floor, and then the spaces on that floor, and the spaces grouped into zones, and then the types of assets that would be on there-- whether those would be mechanical equipment types, or door types, or whatever you're managing-- the individual components themselves, how they're grouped into systems.

And then, assembly is one too, but not used very often in here. Assembly is the pieces inside of a component, whereas a system is a bunch of components that make up a big system, right? Kind of inside out, outside in.

There are some common things, like contact. So what's very strange about COBie is that every line item in a COBie spreadsheet is a unique item in that facility. And every single one has to have a person assigned to it, which is very strange.

There are also things called picklists. So some fields in COBie only allow you to pick a certain value for them. Sometimes, that's a classification value, an OmniClass Table 21 value, let's say. Sometimes, it's-- for example, on zones, there's a way to categorize zones. There's only six options you can ever pick for zones to categorize them. And so picklists is just one of the spreadsheets that has all those default values that you can pull from.

Attributes, we'll get into a little bit later. That's if you want to add your own custom parameters, which everybody needs to for COBie. Coordinates is probably going away. But ultimately, when you look at this whole system, only the ones in black are the ones that are required for a COBie deliverable. All the other ones are optional. It's up to the owner, if they want that data or not. And of course we're talking about Revit, which means that we're going to focus on the design side, and not the build side, when we're gathering this COBie data.

This PowerPoint is up on the AU website. You guys can download it. We made a couple of tweaks this morning, so I'm probably going to upload a newer version for that. The handout's been up for three weeks. It has all the same data in it.

So let's talk about that COBie spreadsheet. What does it look like, often? Again, Excel is not the only method you can deliver COBie. It's supposed to be a step database, but this is what everybody uses. And you'll see, in a COBie Excel file, how the tabs down below equate to those, the way that it's organized. These names right here equate to the tabs. So here's

Contact, Facility, Floorspace, Zone, Type, Component.

They're color coded. Each color means something in COBie. So I mentioned before that only the ones in black are required, those worksheets as a whole. But when you get to that worksheet, only certain columns are required in COBie. So the green ones are optional in here. The yellow ones are required. The purple ones are what's automatically generated by the software. And then, the orange ones refer back to a picklist value, or to a value on a different tab. So they're required, but they're essentially a duplicate from somewhere else.

You'll notice, too, that this is the COBie spreadsheet that we have as a template in the COBie extension when you use it. And we've color coded the tabs too, to make it easier to see. You guys can change those colors. You don't have to deliver it with the colors. That's how people typically use it.

Some other key things to think about with COBie, right? We're just talking about databases. Revit is a database. It just happens to have a graphical interface with it as well. COBie is a database. It is a relational database with those picklists. And then, this is key here. Each row of data must have a unique identifier. For every one of the worksheets that are in COBie, the very first column is almost always called Name. And that is the unique identifier for that item in the facility. You cannot have duplicate data in those columns. That can be a challenge, especially with Revit. And we'll explain why in a little bit.

So I mentioned before that every element has to have a contact associated with it. But you also have to have another contact, if you're dealing with warranty information. A lot of people miss that. So I might call out that a piece of equipment has a warranty start date and end date, which are standard COBie parameters and what people usually want anyway. I also have to have a contact to say, well, who do you call for warranty information? And that contact has to have all their data on the Contacts tab itself. Contacts-- their unique identifier is actually their email address. It's a little strange.

Attributes, versus added columns-- this is a big thing in COBie. So let me go back to the spreadsheet. So here's the Type spreadsheet, right? Here's a cabinet, a wall-mounted bracket. So that's the type of component that's in this building that they're tracking. There might be 500 of them installed. But as I move over, I'll start to see columns of data that I want in here.

Think if this was a VAV box, and I want to know the amperage it's pulling. That's not an actual

standard COBie field, so I would want to add Amperage as a field in there. What you can't do is you can't just go add a column over here and put the data in it. In COBie, what you have to do is go add amperage as an attribute, and then call out which rows on the Type tab it references and put the data in there. That can be very confusing. And it means that the Attributes spreadsheet gets a lot of data in it, because it has to have a separate row for every element in here.

And that brings us to this last part. And this is a thing that people find an issue with when they're dealing with COBie is, Excel has a million row limit. And you can get to a million rows of data very quickly in Excel. It seems like a lot, but if I add 120 attributes that I've called out as my standard maximal attributes, let's say, and I have 10,000 pieces of equipment I'm tracking, I'm already over a million rows of data on the Attributes tab. And people will run into this all the time. So either you have to have multiple COBie spreadsheets, or you have to use a different format that doesn't have a limit in it. The COBie extension only uses Excel, because you can still manage it, as long as you understand where that problem is.

JASON KUNKEL: So that brings us to the COBie extension. We've found a lot of issues in collecting COBie data. We've found a lot of issues in organizing COBie data. We've found a lot of issues in getting it consistent. So we built the extension to try to address some of those issues, like TJ said, more along the design end of things. It's inside of Revit. It's going to live there. It's consistent. Anybody can grab it. And as soon as you grab it, you've got the same interface, the same tools. And we try to build it in such a way to make it easy on the Revit user. Because a lot of times that early on, the person who's building the model is not going to be extremely familiar with COBie and how it works.

We've got a couple of slides here to kind of walk through the interface a little bit. Then, we're going to peek inside of the extension itself for a couple of the parts. Notice at the top, that's the add-in. You install it. Those are the buttons you get-- the three major ones, Setup, Modify, and Export, and then Help and About, obviously.

We've tried to set this up in a wizard-y workflow way. So you want to start on the left, and work your way to the right. So the first one we're going be talking about here is Setup. And we click in there, and this is your landing page for Setup. You've got these three buttons. You've got some Import, Export, and Finish, and Save, which we can discuss a little bit. But again, once I start on that leftmost button in Setup, I'm going to start on the leftmost button of my Setup landing page, which is Contacts.

And like TJ said, every single line item in your COBie spreadsheet needs to be associated with a contact. Now, the unique identifier for those contacts is the email address. There are some other required pieces of information in there. And I'm assuming, if you're in here, you're pretty familiar with Revit and how it works. You'll also know there is no Contact, or human, or user category inside of Revit.

So the COBie extension utilizes what's called Extensible Storage inside of the Revit model, which is essentially just kind of an empty spot you can build your own database tables. So there's a couple of places we have to do this. A lot of the spots within the extension, are within the COBie standard, relate pretty well to Revit elements. There was component, there was component. There was type, there was type. They match up nicely. Contacts in the first place we find where it doesn't match up, so we've got to leverage that extra storage, that extra database, and build that up.

So this is a snapshot of what you see when you open it up. Up top, it should be pretty regular Windows-y, standard-- New, Save, Cancel, Delete. Pretty self-explanatory on there. We've broken it up, so the five fields at the top there are the only required fields when you create a contact. And you will get prompted, if you try to save a contact and one of those fields is empty.

There's a little bit of validation on the email. In fact, if you don't write in a proper email address, it's going to say this isn't a proper email address. It's not going to validate that email address exists, but it knows that there's got to be an @ symbol, and a dot, and you know, the basic formatting of an email in there. Company Phone and Classification is required as well. And I'll get back to Classification in a second.

On the left-hand side, those are all the contacts that you have inside of your Revit model. You can associate the contact record with a Revit user. So if you have come in-- if you have created the user, and it's you, you can claim that user. So right now, you can see they all say, Claim, Claim, Claim. This user has not associated him or herself with a COBie user yet. If they did, it would say Unclaim. And you could de-select that there, meaning, everything you do inside the Revit model, this COBie user is who it's going to be associated with when you populate that data.

I mentioned the Classification field. We're going to circle back around to this, but this is one of

our first places we find a tie-in with the Classification Manager, which is the second add-in that we're going to talk about later in the hour here. That's Contacts. That one's pretty straightforward.

The next one we've got-- so we're working our way from left to right here-- second one we have here is our Settings. This is where we're going to set up the standards for how the COBie extension is going to generate and organize the information inside of our Revit model. We try to set up with the wizard interface. When we bring up the window, you'll notice at the bottom, there's buttons. Those buttons match the same order as the tabs in the COBie spreadsheet. So that's one of those places we're trying to hold the hand or educate the Revit user on how COBie is set up and works. There's a couple of buttons that don't match up directly, but we kind of tuck those onto the end.

If you see over here, on the Contacts, we've got a bunch of yellow dots with exclamation points. That continues along. We've got these pop-up helps. You mouse-over, wait half a second, or whatever the delay is, you get a pop-up giving you a little more information on how it works. Pretty straightforward Windows application stuff. And again, these settings, there's no good Revit place to store them, so we've got them stored in the Extensible Storage as well.

So when I click on Settings, I come into my first tab, and it's General. So again, we're going to start here. We're going to work our way down. General tab, this information didn't really fit anywhere else, so we stuck it over here.

We've got a US and UK database Excel template that is sitting in the Install folder. So as soon as you install the COBie extension, two Excel files are sitting in there. And picking this one just tells the extension which one am I going to grab to populate.

The Area Measurement Standard-- this is simply a reference field. I know, if you've used area plans inside Revit, you get to pick if it's Gross, or Rentable, or whatever. These two do not talk to each other. This is just going to be filling in a piece of data in the spreadsheet as it's spat out. It doesn't change anything in your model, and your model is not going to read this when it does it as well. Just basically a text field that it's going to refer to there.

So TJ mentioned also that every single item has to have a unique identifier, has to have some piece of information that is unique to itself. As we are building names, as we're referring to things inside of the Revit model, your Revit instances and your Revit types, they have element IDs. You probably have seen the element ID. It's usually a six-digit long character in there.

When we are identifying things, we give you the option of selecting between either the element ID, or there is a hidden global unique identifier in the Revit database as well. And we strongly recommend you go ahead and use the GUID. The Revit element ID can actually change on. And it can change pretty frequently. If you're syncing to central with work shared models a lot, that can hop back and forth. The GUID is not going to update or change on you that often. We thought of a couple of instances where it may be an issue. But overall, I mean, it's a 24-digit long?

TJ MEEHAN: 42

JASON KUNKEL: 42. I had it backwards. I apologize.

It's alphanumeric. It just randomly grabs it. So there is absolutely a chance that you may have to GUIDs that are exactly the same, but it is some insane, infinitesimally large chance that that's going to happen.

TJ MEEHAN: It rounds to zero, essentially.

JASON KUNKEL: So I'm working my way across. I go to my Space tab. This is the first tab that's going to line up and directly relate to a tab inside of my COBie extension. COBie has Spaces, Revit has Rooms and Spaces. So we've got to start making some decisions about where we want that information from my Revit model to pull from, and this is the first place I'm going to start making those decisions.

When I'm naming my space, we've got our naming tool. I'm going to hop into Revit in one second and kind of walk through that, to give you idea there. You'll see that interface kind of reflect on a couple of other tabs as it goes along.

But over here is how I'm picking what categories in Revit know where they come from. Do they come from my Architectural room? Or do they come from my MEP space? And I can select and say, give me all rooms, give me all spaces. We've got some toggles there that allow you to switch quickly between spaces from MEP and rooms for everything else.

There's a little tab down in the corner. This is referring to my zones, my Zone tab. So a zone is a collection of COBie spaces. And we'll get to Zone in a little bit. There is no real equivalent of zones inside of Revit, so we had to build a utility in there. TJ's going to walk through the utility.

When you export your Zone tab, with this toggle, I can tell it to either list all of my spaces in one row in that zone, comma separated, or I can tell it to list each space individually, associated with a zone on that tab. Different software likes to consume that data differently. So if you remember, COBie is just that Rosetta Stone of getting information out of one piece of software into another. So before you toggle that, you've got to find out who is consuming that COBie data and which format would they rather have it in. Do they want that comma separated list? Or do they want the individual items of the spaces in that Zone tab?

So I think, now, is the first time we go in-- excuse me, while I sit. So here's my good old Revit model. Here's the COBie extension. It's been installed up top. There's those three buttons. And like I mentioned, we're going to walk from left over to right.

And right now, I am just going to come in here and kind of walk you through the naming utility we have. Coming into Settings-- there we go-- and over here on my Space tab. So just like that snapshot, here is that Name Builder over here. This is going to allow me to collect different parameters, different pieces of information, and generate a unique name for this space.

So the example TJ gave, if I'm just going with number-- and I'm talking about a door-- I may have a door that's 101 and a window that's 101, so I want to go beyond number over here. This is going to be either my Room number, or my Space number, depending on what it's looking at over this column. We get a little preview down here of what it's looking for.

If I hit this dropdown, these are all the different items we have in here to let you build up a unique name for this space when you export it. So element ID is going to refer to that six-digit element ID. The GUID is that hidden number in there, 42 digits. Revit Category should be pretty straightforward. It's going to say Room or Space. Manual lets you just type in anything you want. So I can say, SPC, I can say whatever I need it to say. If I need to add another field, I just click the button there, say add.

Custom a pretty recent addition we have. I can type in a parameter name here, and the Name Builder is going to pull that parameter from the element, and then put it into this new COBie name. So I may have a parameter called-- oops, I misspelled type. I don't think I did for my Rooms or Spaces, but there we go. You've got to make sure it's typed correctly. You've got to make sure your capitalization is correct. This does not validate to make sure that this parameter exists. It will not error out, if the parameter exists, it will simply skip it.

So I can keep adding and build this up. We've got the name, so that's going to be the Room or the Space name, and then the level that it's associated with as well. We've got a field separator up here. So you'll notice, down here, it is building up underscores between these different fields. I can use it, or not use it.

We've had some clients who want a field separator between, say, the number in the manual, but not between the next two. So what we're recommending at that point is you just uncheck the field separator. I can add in another manual field, have that be my underscore. Scoot it up. Scoot it up. Scoot it up. And now, I've essentially just built my own field separator as a manual field.

So we've got the Name Builder in a couple other spots within the interface. Pretty straightforward. Pretty simple to use. I highly recommend watching your preview down there, keeping an eye on that. And that should give you a good idea of what your name is going to look like, once it's done in the element there.

Back to my presentation. All right, so we're moving along the way. Space-- COBie Space, Revit Room and Space. Type-- COBie type, Revit type. Matches up pretty efficiently.

We've got the Naming Tool that we just talked and walked through there. It's pretty effective, pretty efficient. Over here is the category. This is the COBie category for the type. This is our second place we find that we tie directly into the Classification Manager. We're going to talk about this in a little more detail, when we get to the Classification Manager. But just keep in mind there's an organization and priority here of how the extension is trying to fill in this information. So it's going to start with the first priority. If I can't find that information there, it keeps working its way down. And then, ultimately, if it can't find anything, you get a big NA on your category field.

Component-- not much over here on Component tab. I just need to know what I'm going to name it. COBie Component is going to be my Revit instance. Systems-- this is my Revit Systems category field again, Classification Manager integration. We can assign our-- we can pull the information from the Classification Manager that the Classification Manager assigns to the system. Naming again, the exact same naming interface we had.

Down here, we've got a checkbox to export the components and their corresponding types that are part of the system. So Revit system, COBie system, pretty much the same thing. In Revit, I've got a system. I've got a bunch of elements associated with that system.

Now, in the Revit file, I can specify what instances and what types I want to export into my spreadsheet. What this checkbox is saying is that, if I have this checked, and I'm exporting the system, export every single type that is associated with that system, even if I didn't exclusively say to export that type.

We usually recommend just keeping this cleared. It can add a little bit of confusion. We highly recommend you be really granular and specific about what information you want to get out into your Excel file, because it can really snowball and kind of get out of hand on you. And then, you're going to run into that 1 million, 024,736 row limit. Whatever [INAUDIBLE].

TJ MEEHAN: I think that's why this is a great QC check, because I could check that and just export the system spreadsheet. And when I see a whole bunch of components and types that have no other data assigned to them, now I know that I need to go back to those components and types in the model and start to fill them out, because they are part of a system that needs to get exported as well.

JASON KUNKEL: Working my way down. Here's my Attribute tab. Attribute and COBie are my parameters inside of Revit. Basic tree structure-- you're going to expand the tree. You're going to see your families, you're going to see your types. You're going to go down and see your actual individual instances of those types placed as well. The list is kind of nice to take a quick look at here. If the category is grayed out, that means you do not have any of those elements placed in your model of that category.

We've got Select All, we've got Select None. We've got Expand All, we got Expand None-- or Collapse All, I should say. Hitting Select None is fine. Hitting Select All, that's going to be difficult. That's going to be problematic for you. You are going to export a lot of information, if you tell it to include every single parameter in your file. So again, you want to be really, really specific about drilling down and finding the parameters you actually need to spit out of your Revit model. Be careful. Be very careful. Yeah?

AUDIENCE: Does it include linked files?

JASON KUNKEL: It does not include linked files yet. Right now, when you export the spreadsheet, it's going export only the active file. Very soon, it will export information for the linked file. However, even when we do that, this is only going to read the active file. So you've got to make sure your multiple files you have linked in are kind of already thought ahead that you've got planned and

have the information set up. Does that make sense? Yeah?

AUDIENCE: [INAUDIBLE]

JASON KUNKEL: There absolutely is. I'm going to get to that in just a couple of slides. We have an import and export settings functionality. So yeah, you set it up once, and you can save a lot of time down the road.

Another QC tip here. This is a great way to see what parameters are mapped to categories. You've got a whole list of all your parameters, and all your categories, and all your types, and all your instances inside your model. Just start expanding, you can see what's connected up to what.

My Coordinates tab-- I'm not going to spend a ton of time on this tab mainly because of that they're not required, and they may be removed. So basically, for these different items, am I selecting my bounding box? Or am I selecting my insertion point? The bounding box, you actually get two points. If you've used the Revit API at all, a bounding box is just a box that-- you know, a big cube around your element. And you're going to get the placement point and then the diagonal point away from that as well. So it just depends on what information you need to get out of there.

My Schedule tab and my Finalize tabs, the last two buttons on the wizard over here in my setup. These do not have associated tabs within my COBie spreadsheet, but they're critical. So Schedules is going to refer to my Revit schedules. When I save my settings and activate the COBie extension in my model, it is going to read our sample file we have in the install, and it's going to copy over a bunch of schedules. So we can say, copy that schedule, don't copy that schedule, copy this schedule, don't copy that schedule. Usually, people just leave them all checked and just ignore the schedules that they don't want.

One thing to note, one big thing to note here, the schedules that are inside of the Revit model are not the schedules that are getting exported and populated into the Excel sheet. They're just there for reference. And they're just there to kind of help you see what your data is, and manually, individually, kind of manage that information in there. So it's in your Revit model. That information may get exported, but it may not. So you can add columns. You can remove columns. You can filter. You can do whatever you want to in those Revit schedules. It's not going to have any impact on the information that's getting exported out to your COBie worksheet.

Map Parameters is another tab we have. You can add those map parameters in your schedules. And we're going to talk about map parameters in a second. But by default, it's only going to pull in and show the COBie parameters that we have set up in here.

So my last tab here is Finalize. Once I've worked my way across, I've got everything set up the way I want, I come to Finalize. I'm going to hit Save. I'm going to Finish. If I need to, I can hop back over to Contacts.

One thing I want to mention about this tab. If you are topping into the COBie extension, just kind of playing with things, and you just want to accept the defaults, you still need to come into settings. You still need to hit Finish and hit the checkbox. Because until you do that for the first time in your model, the COBie extension is not going to pull over those shared parameters. It's not going to pull over those schedules. And it's just not going to be ready for the COBie extension to run. So don't skip over this second button, if you want to play around with it.

And I think I'm hopping back into Revit real quick here, just to show you-- I'm not going to go to the Finalize tab. But when I do hit Finalize-- I'll cancel and I'll close that-- these are the schedules that get pulled over. So take a look at the component again. These do not directly impact that information that gets exported. I can delete this column. I can add another column. I can filter and do whatever I want to here. Get out of that.

Now, if I go back in here and grab this door and look at the properties, COBie dot, COBie dot, COBie dot, COBie dot, COBie dot, COBie dot. Instance parameters, type parameters, we have different parameters, you'll see, with different categories. And they're going to get pulled in to your model. That's the major thing that's going to happen when you get that Finalize tab.

And you want them in here. This is the default place that the COBie extension is going to pull its information from. It will read information from other parameters to generate this. But ultimately, we wanted a different location for this information to be housed for you to export, because usually, it's not a direct one-to-one from a Revit parameter to COBie piece of information. Or you may need to tweak and massage your COBie piece of information, and you don't want to mess with your Revit parameters. Where is the presentation?

All right. My last button here on my setup is my Parameter Mappings. We had a lot of clients who did not want to use the default COBie parameters. They already had set up their own parameters that they were using to collect this information. The Parameter Mappings allows

you to connect the bridge there, allows you to kind of ignore the COBie parameters and use your own parameters at this point. Again, it's stored in Extensible Storage.

Coming soon, we're going to let you define your own unique identifier in there. Right now, we just kind of generate it in the back end. We are also going to allow parameter concatenation inside of the parameter mapping, like they introduced for 2017 in the schedules and the tags. So that was a big ask, and we're throwing that in here.

This is the only window you get in Parameter Mapping. If I select the piece of information in COBie that I want, it's going to show me which categories I need to have that parameter mapped to. So if I'm working through my column, by default, it's showing me the default COBie extension parameter. I clear out that field, I type in my own parameter. Now again, there's not going to be any validation on this. I've got to make sure it's spelled correctly. Got to make sure my capitalization and punctuation is correct, if I have any punctuation in there.

Over in these columns, it's telling me if it's Type or Instance. It's a little hard to read, but the first column is, is it an Instance parameter? Is it a Type parameter? The next column is, what type of information? And typically, it's a text field. We've got a couple of yes, nos in there.

And then, we've got the little Recycle button. If I mess something up, I hit the Recycle. It's going to take me back to the COBie default parameter. And that's the one it's going to use. Now, as the COBie extension gets run, you're going to let the COBie extension push in information. It's going to push information to your parameters, so just keep that in mind. It's not just a read, it's a push as well.

All right, the last item we've got here over on the setup-- and this was going back to your question-- we've got Imports and Exports. If we're just going through my settings, if we're going through my contacts, I can do an export of everything, or I can go to the individual ones and import and export there as well. It's going to save as an XML file, so I can send it. I'm at work, I can email to people. Then I can easily pull that information back in there. This is the Import, Export dialogue. I can pick and choose which categories I want to import and export.

Let's roll through. All right. Second tab-- modify.

TJ MEEHAN: So now that you've got your model set up, the middle button modifies how you make changes, as you move along. So one key thing in here is that COBie has these parameters, and we're adding values to those parameters to export. Sometimes, those parameters are pulling data

from standard out-of-the-box Revit parameters, sometimes they're pulling from your parameters, sometimes you've mapped them to other things. So this sequence is key in making sure you're going to get the export that you want with it, now that it's set up.

So as Jason mentioned before, Revit doesn't have a Zone utility. It has an HVAC Zone utility, but that only works with Spaces. It doesn't work with Rooms. So COBie has a requirement to have Zones. So how do we group them together?

So we built this Zone Manager in here. And the Zone Manager allows me to visually see my whole model in 3D, all the Rooms and Spaces in it, and grab different Rooms and Spaces and group them together into Zones. You could certainly do this with shared parameters. And you know each room has a shared parameter, and you could assign a Zone to it. But the problem is COBie allows you to have a COBie Space assigned to more than one Zone. So how would you deal with that in Revit? And so that's why we built this the Zone Manager. And we're going to add some multiple drag-and-drops here soon.

This is what it looks like. You could see you get a 3D view of the whole building. Here's a list of all your Rooms and Spaces together, but you can filter that list with the buttons. If you have too big of a building, you can choose when you open this dialog box to not have the 3-D view, so that it can go faster. And it will prompt you. If you have more than 100 rooms, it will just say, do you want to see the view or not?

And then, here's some of that COBie data-- Name, Category, Description. Category only has certain values that are allowed. And then you can filter through the different things. Let me show you really quick how this works. So if I go to my Add-ins, I hit Modify, and I hit the Zone Manager. I'm going to let it-- oh. We didn't grab a contact. It's prompting me right now to be somebody here. Let me make a new one really quick. I'm going to cheat and just put those in.

OK, so here's what saying. Do you want to do the preview? I'll load the preview, just so you can see it. And so it's going to go through and essentially build this cool little 3D model. And then you can zoom around that 3D model. You can select the different elements in it. So it'll actually highlight them. If I grab a Zone, it will highlight all the Spaces in the 3-D view that are part of that Zone. I'll show that to you here in a second.

It's actually a great tool that people who aren't even doing COBie use to visualize their Spaces, and how they're organized, and to group them together into Zones. We've actually been talking about pulling that out and making it a separate utility for people to use, and to report

on, and build schedules off of, things like that.

So just to see a little bit easier, I'll just maximize it. Uses the standard commands. So if I go down to Second Floor and pick on that corridor, and hit my highlight button, there it is. You can see it right in there. There's some of those corridors.

If I go grab an entire Zone, let's say what's a good second floor zone? Mental Health, here we go. So there's Mental Health Zone right in there. Highlights it. It's a great way to visualize what's going on. And then, I can go edit the data for that Mental Health Zone.

All right, select elements-- so this is key. What are you exporting to COBie? Anybody know the answer to that question?

AUDIENCE: Data.

TJ MEEHAN: [CHUCKLES] Anybody know what you should not say to that question? All. That's the wrong answer.

OK, so all this is doing is a quick way to go into each element. And now there's a new parameter just called COBie at the Instance level, and COBie.Type at the type level. And it's a checkbox. It's a yes, no. You can go into those and check those boxes. Say yes, export to COBie that component, export that type. This just gives you a little more global view to see it. You could do it through Schedules.

So this will break it down by the family categories, and then it will show the different types. And then, underneath that type, it actually shows each instance, including where it's located, which is pretty cool. Another nice utility that you could use and expand. You can see where everything is.

If anybody are developers in here, you'll realize that the Revit API just doesn't play well with Groups. And so, you generally, before you want to export, need to ungroup your elements, in order to export to COBie effectively. And that's an unfortunate thing. But hopefully, as the API matures, we'll be able to avoid that.

OK, the last part is batch modifying the other fields. So in other words, there's a lot of data. And in COBie, a lot of COBie fields that you can just auto-populate a bunch of stuff. So we built a dialog box to do that.

So you find where there is no data in there, where it's blank, and just add to it. Or I can do everything, so overwrite what's in there, or skip them. So I could do some or all of these. But all of these COBie fields-- here's the COBie sheet, and here's the field on that sheet-- can be auto-populated-- things like the date and time stamp which is Created On. And Created By is the email, so you just choose your contact right from there and just go populate your whole model really quick. So you don't have to think about that. More group issues here. So let me turn it over to you.

JASON KUNKEL: So the last one we got here is Export. Now, we have set up our information over here. We have run through and filled in our information over here. Now, it's time to spit out our Excel sheet. And that's it. You click the button, and that's what it looks like.

I've got which tabs do I want to export on the left. Do I want to create a new file? Do I want to append a different file? Click my little [INAUDIBLE] button, I select where that Excel file is, where I want to save it. I click the Export button. That's about it.

As we mentioned, coming soon, you are going to be able to pull that information from your linked files and export that as well. You've got to set it up first. It's not going to populate that linked information, but it is going to be able to read it and spit it out.

Back there real quick. One thing I want to mention. This can take a while. You know, if you've got a little bit information, it's going to pop up and be done in five minutes. If you've got a lot information, you might want to go make a sandwich. Yeah, go real quick.

[LAUGHTER]

AUDIENCE: We've got [INAUDIBLE]. We found that the [INAUDIBLE] divisions for the stuff we have for [INAUDIBLE] seems like [INAUDIBLE] Is that a problem? You can still use the [INAUDIBLE]

JASON KUNKEL: I think, according to COBie teachers, the COBie expert, as long as it's unique, that's all that matters.

TJ MEEHAN: Yeah. It's no problem to change your naming convention. It's typically governed by your contract with the owner and what they're asking for with their COBie deliverable. So their ONM system might say, well, we prefer this as the naming convention for that Name field, that unique identifier. So it's really just dependent on that.

JASON KUNKEL: There was one other real quick--

TJ MEEHAN: The great-- well, I just want to mention--

TJ MEEHAN: Yeah.

TJ MEEHAN: The great thing is, if you go back into your settings and change that whole naming setup, and then go back to the Modify and say Repopulate, it just updates the whole model.

AUDIENCE: And one question just about the [INAUDIBLE]

JASON KUNKEL: Yep. So the question-- I'm going to repeat the question, because we're recording-- was, if you are doing multiple models, can you keep appending to the same Excel file from different models? And the answer is yes. And that was one of the reasons the Append was here.

I'd also like to mention, don't heavily rely on this. I mean, it's just an Excel spreadsheet. You can go and just copy/paste fields right out of it. So don't forget, you've got that extra tool to kind of manage this exported data in there as well. Yeah?

AUDIENCE: [INAUDIBLE]

JASON KUNKEL: It's all right.

AUDIENCE: [INAUDIBLE] for multiple [INAUDIBLE]. So actually [INAUDIBLE]. What happens if you [INAUDIBLE]? [INAUDIBLE]?

JASON KUNKEL: So this was the kind of the-- oh, question is about the GUIDs with multiple models. This was the only instance we could brainstorm you might have issues of having overlapping GUIDs. But even in that case, you kind of would have had to start from the same template, with the same elements in that template, and just kind of move those elements around.

I'm not going to say it's not going to happen, because there's a great change it might happen. I would, again, go back to using Excel. You-- whoa. Did your machine go to sleep? Use Excel. You can run Excel. You can look for unique fields. And just to use Excel to validate that information as kind of one last step.

All right. So we've got some deeper dive stuff here. We've got this all laid out really extensively in the handout. So I'm going to go through this relatively quickly, because part of this won't make a lot of sense until you actually get in the tool here.

Schedules versus parameter data-- again, like we mentioned, the schedules that are in your

Revit model, this is not the format that's getting exported to COBie. So you can change your schedules up here. Now, you can go in here and update the data right to your schedule. And that's why we have it there, to make it easy to kind of go in and tweak that. Like I said, it does not export the schedules, just the data. They don't work with the map parameters, but you can add those map parameters manually to your Revit schedules.

So selecting your elements for export-- TJ meant the COBie and the COBie.Type parameters. If you use checkboxes in Revit, you know about this null. You know about this limbo state here of this grey checkbox. You want to make sure you've got the solid black checkbox on your COBie or COBie.Type. That's what the COBie extension is going to look for. If it's blank or if it's null, it's going to ignore it.

TJ MEEHAN: So we've talked a little bit about Spaces and Rooms. And essentially, what we're talking about is Revit will allow me to have Room 101 and Space 101. They're both number 101. And Revit could care less about that. COBie freaks out about that, so you have to make them unique.

A great way to make them unique is to choose Revit Category for your space name, because you're going to have a mixture of Spaces and Rooms, depending on the equipment. And that way, it'll say Room_101, or Space_101. And you get around that unique identifier with it. Areas don't matter, because Revit doesn't locate elements per an area, only through Rooms and Spaces.

All right, let's move forward. Let's talk about classification systems really quick. So we have about 15 more minutes. I'm going to put up the big three.

When we're classifying elements, when we're classifying things that are used to build a building, these are the big three that are used. Systems-- and this is typically what happens during design. Here's the American version, here's the UK version of those. They're essentially the same type of database. Materials-- this is what the contractors really care about. That concrete is going to be used to make a floor, versus a column. And that's a way to use the American version, OmniClass Table 22, which is also called MasterFormat, or Uniclass Table En. And then, for products, products is what the owners care about. These are the individual pieces in that building. That's Table 23, or Table Pr, for Uniclass.

So the Classification Manager supports all of these systems. And not only that, if I go into and assign, let's say, it's a Table 22 number to an element, it will automatically find the equivalent Table 21 number and assign it at the same time, if you choose, and frankly, if it exists. One of

the issues there is that there are 700 or so options in Table 21, and there are 7,000 in Table 22. So there's not a one-to-one relationship. And there shouldn't be. But whenever there is one, we can set that up.

Some other classification systems that will help you out. So you can classify your facility as a whole, your building as a whole. And there's the US and UK versions of those things. You can classify the Spaces within it-- that's Revit Rooms and Revit Spaces equate to spaces in the general. And then the people involved in the project-- who are the designers? Who are the engineers? Who are the contractors? Who are the owners? So those people can be classified. Obviously, with our Contacts tab in the COBie extension, one of the things is pick a category for each contact. And then, those are the databases it can pull from when it does that.

A couple of other ones-- you know, there's older versions of Uniclass that are still being used. Uniclass 2 is actually still being used quite a bit. There are even, sometimes, people using 1.4. You know, that UK BIM mandate, I don't think, allows for version 1.4. I could be wrong there. If anybody knows, you can correct me.

AUDIENCE: [INAUDIBLE]

TJ MEEHAN: What's that?

AUDIENCE: [INAUDIBLE]

TJ MEEHAN: Yeah. Just 2015?

AUDIENCE: [INAUDIBLE]

TJ MEEHAN: Yep. And then Boma is a great way to categorize Spaces. Natspec's in Australia. And they have their own version of these databases. We don't have these databases in the Classification Manager, but it's really easy to copy and paste the data into an Excel spreadsheet with the template we give you. And all of a sudden, you have them. It's easy to do. So he will show you.

JASON KUNKEL: So the Classification Manager, if you've seen the Assembly Code field in your Revit elements, that's where you're supposed to put your classification. And that's one field. And as TJ mentioned, there's a bunch of different classifications. There's different times you want to assign those classifications.

So at its core, those are your two buttons-- Setup and Assign Classification. You come into Setup, you run it once in your model. You pick the database, which is just an Excel spreadsheet. And then, you go and you assign your classifications.

Click that button, this is the default one that pops up. You can pick the US default there, or the UK default, or a custom one that you've created. All three of these Excel files are going to be in that Install folder. And you can go and mess around with them all you want. They're sitting in there-- yeah?

TJ MEEHAN: Well, not all you want. There's a lot of flexibility.

AUDIENCE: [INAUDIBLE] point out that the [INAUDIBLE]

TJ MEEHAN: So the comment, which is spot on, is that the OmniClass, which is Table 23 database, and the uniform [INAUDIBLE], which is what's used for assembly code-- which we'll address here in a second-- that comes out of Revit, our old, out-of-date, missing line items in it. These databases are not. And you can actually, very quickly, copy the data in these Excel files and repopulate those text files that come with Revit, and have them updated in that way.

JASON KUNKEL: So I come to my first setup. I'm going to pick US/UK, or select my default. Again, I'm going to browse out to my network and find that custom classification Excel spreadsheet that I created. We've got the custom one in the folder as well. We recommend making a copy of it, before you make any changes to it, just to go back to the initial one, in case you mess something up there.

The dialog box is pretty straightforward. So I've set things up, and now I'm going to select my Revit elements. And I'm going to click Assign Classification. We've got the four tabs up top. You've got your People. You've got your Facility-- it's a little hard to read-- Space, and then Element. It's just going back to exactly what TJ was pointing out in the different classification systems. Interfaces 98% the same on all of them.

When I'm clicking through here, here's my Contact tab. This is the list of all my people. It's a tree structure. So I select my Revit thing, I click on the classification I want, and I click Finish. And it's going to assign that classification to that element-- either the contact, or my Revit type, or my Revit facility information.

Here's that Facility tab. This tab will always show up, even if you have nothing selected. This is going to go into your project information here. We've got a checkbox down there-- Set COBie

Parameters. This is one of those places they talk back and forth. So I can push my classification into the appropriate field in my COBie parameters that I've set up. I have to be sure that I have run my COBie setup already. So I've gone through that setup step. I've hit that Finish checkbox, and my COBie parameters are all in there.

Space tab-- it looks exactly the same. The only additional thing we've got up here is my filter category up top. I don't know if I've got a call out there. Yeah?

AUDIENCE: If you didn't have [INAUDIBLE], where would [INAUDIBLE].

JASON KUNKEL: So the Classification Manager has its own parameters.

TJ MEEHAN: So there are parameters defined in that--

AUDIENCE: [INAUDIBLE]

JASON KUNKEL: Yep.

TJ MEEHAN: Yep.

JASON KUNKEL: Exactly.

TJ MEEHAN: They're defined in the Excel spreadsheet. So when you load that Excel spreadsheet, the parameters are defined in there. They get created, and the data gets populated to them. You can edit that in Excel spreadsheet, and they go somewhere else.

JASON KUNKEL: I mean, that's one of the things the Setup button does is set up copies of those shared parameters over into my model and assigns them to the right categories. So they're sitting there waiting.

I can tell it blanks only, so I can not overwrite information that I have already in there. Apply All is going to try to do that relationship TJ was talking about. And even though I may only have Uniform At selected up top, if I have Apply All checked, it's going to see what corresponds from those other tabs and pull the information over there.

Now, the difference you may see from the element, versus the other guys-- and nothing came up. There we go. I'm in my Element tab. We've got a filter drop down here. So if I have a door selected, that's going to go to Doors, by default. I can change that. I can go to All. I can go to Wall. I can go to Windows. So the filter list is going to filter out what we've decided

corresponds to the Revit category properly.

Oh, one thing we discovered recently. You can assign a keyboard shortcut to assign a classification, which was kind of nice there. And the last thing I want to point out-- the first three tabs, you can have one classification associated with them in your spreadsheet. For this final tab, for the Element tab, you can have up to five. So just keep that in mind, as you're working through it.

I'm going to skip Revit for now, and we're going to hop over here. In our deeper dive, I don't want to get into this too deeply, because again, it really makes more sense if you use Classification Manager and use COBie. We laid this out really extensively in the handout, like painfully extensively.

But there's a couple of ways you can get that information between COBie and Classification Manager working. This is the order we kind of recommend of the ease and not stepping on your own toes. Best advice we have is pick one of these methods, and stick to it. Don't be hopping around between different methods of getting that information dancing back and forth between the systems.

TJ MEEHAN: And really, one and two are your easiest methods. Three and four are possible, but there are just a lot more hoops to jump through.

OK. So when we're talking about the spreadsheets, if you open up those spreadsheets that are in the Install folder, this is what you get. And you'll notice that row 7 is the headers of all the data. So here's the number that you want to put. In this case, this is OmniClass Table 21. And here's the description of it. And this is the data that you're concerned about.

When you look over here, you'll see the level. So it's organized just like the AutoCAD one if you-- or, the AutoCAD one-- jeesh.

JASON KUNKEL: Ooh. Ooh.

[LAUGHTER]

TJ MEEHAN: That's terrible.

JASON KUNKEL: Oh. Whoa.

TJ MEEHAN: The Revit one.

[LAUGHTER]

I can't believe I said the A word in a Revit presentation.

So this is the fourth level down, the fifth level down. So it can go, you know, zero, one, two, three, four, five. And that's the tree structure. And then, here, we have the equivalent. So if this is OmniClass Table 21, then the Uniformat equivalent is here. The master format is here. The OmniClass Table 22 is here. There is no Table 23 equivalent.

And then, sometimes, you'll actually see multiple values, because it could equate to multiple values when it's translating. So it can't fill that in. And it'll actually prompt you, if you try and do it. It'll tell you, there's multiple values. You're going to need to go back to those and fill them in.

So when you open up the custom one, this is all blank, obviously. And then, these are blank as well. You can fill them in with whatever you want. Here's the parameters it's using. You can just type in whatever parameter you already have set up in your model that you want to use. You can give it a title, description.

And then, under Function, you have to pick one of those four functions. Is it for contacts? Is it for a facility? Is it for elements? Or is it for spaces? And you choose. It's a dropdown. You just choose one of those. And so you can build your own custom databases that way. You can add tabs, duplicate this tab, and keep going. So it's really easy to do in Excel. I'm not actually going to jump in it, because of time.

You've mentioned this before. You can actually-- and I think-- do we talk about it in the handout?

JASON KUNKEL: Yeah.

TJ MEEHAN: Pretty sure?

JASON KUNKEL: Yep.

TJ MEEHAN: You can update the assembly code in the OmniClass. These are text files that come with Revit. You can actually open up our database copy, overwrite the text file in there, and save it. And you're done. You've updated it.

So this one, I do want to get into Revit and show you. So Classification Manager is great for

assigning classifications, but it has kind of a great little side effect. Revit doesn't let you just build a list of values that you want people to choose from to fill in a parameter, right? There's one exception to that. You can do a key schedule. But key schedules have some very big limitations. They only use custom parameters, so you can't update a standard Revit parameter. And they only work for one category.

So I can certainly build a Door key schedule, but let's use this fire rating example. I need to update both Doors and Walls, and I want them to be the same. I want to be able to select both Doors and Walls and assign them a fire rating in one shot, so that they're always the same, and I don't have differing fire ratings. And that's where you can actually use the Classification Manager to help you with something like this.

So just to show you here, I've put together, in my documents, in my OneDrive documents, I built this little custom database. You can see how simple it is. So I called it Fire Ratings. I said this is what it's for. This is the version I gave it. It's for Elements.

Look at the parameter-- Fire Rating. That's a standard, out-of-the-box parameter. That's not a custom parameter that I'm creating. Same with Type Comments. And so now, I can list what I want people to use for the fire rating, so I don't have somebody using One HR, and the next one spelling out one hour, and the next and spelling out one hours, and have a whole mess, and capital, and lowercase. So I can have it prescribed already.

And that way, when I go into Revit, I go to my Classification Manager Setup. I'll grab my-- I've made that mistake before, having the database open while I try and assign it. I'll grab that database as custom. And now, let me go grab this area. Let me filter it out.

Oh, by the way, if you haven't seen the filter utility we've created, you guys would love that. It's free, by the way. Come find me afterwards, and I'll tell you how to get it.

So I've selected all my doors and walls. And I go to assign the classification, and I can choose, now, my fire rating. Maybe they're 45-minute. And I'll hit Finish. And now, if I go look at either of them, the Door Type, you can see now, it says 45-minute. And it plugged in the data for me right away.

What a great, easy way to standardize how people are filling in fields in Revit, to use the Classification Manager. Just toggle between databases. Like we said, you can assign it two-letter key-ins, to make it fast.

All right, let's wrap it up. We have negative 30 seconds left. So where do you get these tools? I think a lot of you know that-- the BIN Interoperability Tools website.

I just want to point something out here. These are Autodesk products. These are branded and owned by Autodesk. But in a unique situation, our company was hired by Autodesk to build them, because of our expertise. So we designed them, built them, maintain them for Autodesk.

And you can get them on the Autodesk website, on the Revit page. But if you go to this website instead, we have more control to keep it more up-to-date. But we also have all this other stuff that you can get-- sample files, installations. We've only talked about COBie extension Classification Manager, but the whole Model Checker is up there, and the configurator for it. That's a completely different session. But so, I encourage you to go up there.

There's the website. Here's the email. If you guys have any questions, please come up and grab one of our cards. We'd be happy to talk to you directly, too, about anything. And then, we have training videos now on YouTube that we just uploaded this weekend. Search for BIM Interoperability Tools, and you can see the training videos on COBie extension.

And two minutes over. All right. But nobody left. Nice.

JASON KUNKEL: There you go.

TJ MEEHAN: So thank you, everybody.

JASON KUNKEL: Thank you, very much.

[APPLAUSE]