TOMAS LENDVORSKY: So good morning. It's 8:00. I'll start. So welcome to the session of which we call BIM for Infrastructure-- Manage Your Information. So my name is Tomas Lendvorsky. And the co-speaker will be Vincent Fredon. Both we are a part of EMEA Technical Sales Specialist team.

And apart from what we hope is a very interesting topic about BIM for Infrastructure-- Managing Your Information, you will also learn a little bit of two a little bit strange languages, on my site, it will be Czenglish, on Vincent's side it will be Frenglish. So no, we just are not native speakers, however, of course, we will do our best that we understand each other.

So with that, let's start. It's better to turn it on, just details.

OK, so what we are going to cover during this session. So Civil 3D 2017 introduced a new functionality which enables the user to add user-defined properties. So you will see different possibilities how we can do this. And obviously, then, we will go through the workflow, how you can benefit from this additional information in different products. So we will cover all the workflow to Navisworks, BIM 360 Team, and InfraWorks. Problems And you will see how this additional information can be used within these processes.

Just out of my curiosity, how many people are using Civil 3D 2017? OK, good.

So as far as I can see, not a majority of people are using this. So I believe for most of the people, it will be very new. And I hope that for you who are already using the 2017 release, you will see interesting stuff because will touch up something which I believe is not really visible on the surface. So we will go a bit deeper with this information.

So what are the learning objectives for this session? We want that you really see how to add this information, as I said, using different ways, adding this information to the model, and how this information can be utilized throughout the process because obviously, processes can be to go to Navisworks for quantification, for example, or you want to share this data with other stakeholders using BIM 360 Team, or you want to use this information within InfraWorks as a GIS data.

So and obviously this will give you information of how to share information more efficient way, not only sending information by Excel sheet, or a PDF, or whatsoever. And also, you are adding new value to your project because this additional information is an important part of BIM. And you will improve your deliverables.

So just very quickly, where we are from. So me, I'm from Czech Republic. It's this small country in the middle of Europe. So although this is the country where a real Budweiser has been born, not the local brand, the real Budweiser. Sorry for all this I have to stress. And I believe that we are quite known as beer drinkers. So we have, I believe, the second highest consumption of the beer per capita, just for information. So it's visible on us, on our bodies.

And I believe that it's a small country, however, nice, a lot of culture and history. And also, you might know some Czech hockey players here in the US, for example, Jagr. And in sports, we fight good, also, in tennis, by the way. Last weekend we won Fed Cup. Our women won Fed Cup, beating French girls, just for your information.

[LAUGHTER]

OK, Vincent.

VINCENT FREDON: OK, so good morning, everybody. I'm from France. So it's a little country also in Europe. We are so very good in alcohol production, food production, I think you know that. Specific focus on there's a picture below. It's the picture from La Rochelle, a little town on the Atlantic Coast. It's the town where I'm from, so I think it's the most beautiful town in the world. Of course, you can see that it's very, very beautiful, very touristic place.

TOMAS LENDVORSKY: OK, thank you. So and what we do, as I mentioned, we are technical sales specialists, part of EMEA team. So me personally, I'm covering two regions, one is Poland, and the second one is CHS. So basically, I'm covering Eastern Europe. The specific of this region is really a variety of languages, a variety of the culture. And it's quite interesting to be part of it.

And Vincent?

VINCENT FREDON: Yes, I'm based in Paris. My main country is France, of course, but I also work for Spain and Portugal countries.

TOMAS LENDVORSKY: So this is our introduction. And the last slide before we go to the functionality. So if we are talking about BIM, we believe the important part of BIM is our information. And this session will focus on information, as I said at the beginning. And in fact, 3D model is important, definitely, but within this session, it will be only kind of a container for our information, which we will pass through different products with different workflows.

So just something that you understand, at the beginning, we will not show you how to model stuff, et cetera, we will be using already created models. And you will see how this is done throughout the process because, again, information is very important, and you will learn how to utilize it.

So with that, I will ask Vincent, and he will cover very briefly, at the beginning, we want to give you an overview of what is the new functionality in 2017, which is, in fact, enabling these workflows. And then we will be using this information throughout the process. So the floor is yours.

VINCENT FREDON: OK, the first part of this session, a new civil functionality for BIM infrastructure BIM process. It's not a what's new session. It's just the goal here is to check what are the new functionalities in Civil 3D, and what are the improvements for the BIM process with these functionalities.

First one, corridor data shortcuts. You should know that with Civil 3D we can share a civil object using data shortcuts, which it's a very useful functionality in Civil 3D. Now, we are able to share corridor using data shortcuts, which is very useful.

For the specific BIM workflow, we are able with this specific functionality to separate design drawing and construction drawing. That means that the designer will work for the detailed design in a specific drawing, which is the design drawing. In this design, we will order a geometric definition in details of the conception.

And in another drawing, which we will call it the construction drawing, we will have the detailed geometry, but in reference using the data shortcut functionality. And in this construction drawing, we will do all manipulation we need for the BIM workflow. It's important to separate the data sources and other files.

I will show you. For example, this file with several road corridors, classic design. Here in the data shortcut tree, you have a new family here, corridors. It's new in Civil 3D 2017.

I have already three corridors in data shortcuts, which that means that I'm able in a new drawing-- this drawing is empty-- I'm able to use one of them, for example, this one. Drag and drop, just that, in the drawing. I can check settings. I can modify some settings if needed. Just that, and I'm able to work on this corridor, which is a reference of the original one in this drawing. That is very important.

From this, I could do any manipulation I want. I don't. There's no impact on the source.

Other options that are interesting, I'm able to create further here, for example, roads. And drag

and drop my corridors in folders. You have often a lot of corridors for a specific conception. It will help you to manage all the different corridors in different folders.

And what is interesting, you can also drag and drop to work faster, directly the folder in your drawing, instead of doing references of each corridor in the drawing.

Next, functionality, feature lines and feature lines extraction. Why is it important to be able to extract feature lines from corridors? In the infrastructure BIM workflow, we want to manage, for example, markings, curbs, crash barriers, so linear objects.

For that, we need to extract the feature line corresponding to these linear objects for the workflow. More the tool to extract this object is powerful, more we are able to extract exactly the feature lines as we need for the workflow.

We were able to do this in previous release, but this tool is improved in this release, in the last release of Civil 3D. For example, we are able to extract feature lines for all the corridor, all the length of the corridor, or you can select some specific regions which is important for the management of objects in the BIM workflow. We are also able to extract feature line according to a polygon that you can draw on the main corridor in the design drawing.

We are able, also, it's another option in Civil 3D 2017, to create corridor from feature lines instead of alignment and profile. It's a new possibility in the last release of Civil 3D. When you extract a feature line, corridor feature line, you have some settings very important here. And I think the most important is to get a dynamic link to the corridor, which means that when the corridor will be edited, the feature line extracted from the corridor will be updated. It's very important to get a dynamic workflow.

Of course, you still get classic settings like the style of the feature line layer. And you are also able to join the feature line of different regions if you need it. So different options, very important to get exactly the feature line as you need for your workflow. From

The next.

TOMAS LENDVORSKY: It is important to understand that you can join these feature lines because if you have different regions within the corridor, you can join these into one continuous feature line. Sorry.

VINCENT FREDON: OK, next functionality is style management, which this is new capacity of the last release of Civil 3D. The goal here is to manage style in your drawings using templates. You won't use any more

the list of styles in your drawing, which is sometimes very boring and difficult to manage because you have to import, export styles. And the designer shouldn't waste its time with this manipulation.

Just with a connection to a specific template, DWG file or DWT file, you are able to use the styles in the template, just that.

I will show you in this. So this is the construction drawing. If I want to use this functionality of style management here, you will see that it's very easy to use. I just have to connect this drawing to-- for example, this DWG file, which is one of the templates I have to use. Update. And automatically, the styles in the template will be applied on this drawing.

I don't have to do anything else. It's very easy, very quick to use. For example, this is the template to focus on the geometry definition of this corridor. I can use an other one. Connect to another template.

You'll see that now the last connected is on the top of the list. And then I will have automatically other styles applied to this corridor, just that. You see, it's very, very efficient. And to manage the styles in your drawing, it's very, very useful. You can imagine in your organization that there's a style manager that is in charge to update the different style templates for all the society or the organization. And all designers are connected to these different templates.

An option very important for this functionality, the command quite long, AeccRefTemplateAutoUpdate. You can turn it off or turn it on. If the command is on, you will have an automatic update of the style in your drawing, which means that each time you will close and re-open the drawing, you will have automatically an update of the style in the template you are connected to.

If it's turned off, the designer has to manually update the style, of course, if there is modification in the templates.

Next functionality, very important functionality, automatic property set. This is new in Civil 3D 2017. What is a property set? It's a new functionality to create properties in Civil 3D, property that doesn't exist by default in Civil 3D.

Automatic, why automatic? Because with this process, we will have an automatic attachment of those new properties as objects are created. You don't have to manage anything else.

What do we have in those new properties? First thing, the classification code. You'll see here on

this picture, it's the code style set palette. You have a new entry here called classification code. And to each shape code, for example, you are able to add a specific code.

What you want, it's just text. You can enter here according to a specific code shape. This text, this classification code will be automatically attached to the object you will created using the extract corridor solid functionality.

I will show you in this one. If I select the corridor, the functionality extract corridor solid, which it was possible in the previous release of Civil 3D, but we have a very good improvement in this release.

So this was still existing in the previous release. This is new, property data. This step in the corridor extraction is new. Here you have corridor model information, with basic information automatically attached to the solid 3D extracted, for example, the name of the corridor, the name of the baseline, et cetera.

Something very interesting in the corridor shape information is volume. The volume of all the 3D solids you will extract it from your corridors is automatically attached to the object, to the 3D solids. And you find here, also, the classification code. So all these properties will be attached to all solids you will create it from your corridor.

Next one. Manual property set, so it's almost the same, but of course, it's not automatic anymore here. With this capacity, you can attach any property you create in Civil 3D to any AutoCAD and civil object. A lot of possibilities to manage information to objects. Very, very important in the last release of Civil 3D.

The new properties will be displayed in the classic AutoCAD properties palette. When you create as a user, you want customized properties. You will first in the process select the family of objects you want to use for those properties. Then you will define a list of properties to construct the specific property set. You have different possibilities for those new properties. And you have some advanced properties using formulas if you want to get exactly the properties you need for your BIM workflow.

A lot of possibilities with these functionalities. For example-- it's another drawing with pipe networks. Here I have a structure. Sorry, before, I want to show you this defined property set.

In this drawing, I have a specific property set called pipe networks created for this drawing with very basic properties. I need to know who create all the entities and when. I want also to know

who validated the object and when. So I have created four new properties in this property set. And when I apply those properties to an object like this. Just in the AutoCAD properties, in the tab Extended Data, you find here exactly the four new properties created for those specific objects.

And as a designer, I just have to enter the content for each new properties, the name of the designer who validated, when, et cetera. A very, very powerful functionality.

Last one, labels form property set data. It's also very important to be able to display and to access the data in a classic way. In Civil 3D, I want to display in classic labels the content of the property set.

This functionality is possible with the last package V1 announcements for Civil 3D 2017. It works only for manual properties. You will get in the tool box, in the list of the improvements, the create labels from property set. There's nothing else in this tree because you don't launch the command from the two books, you just have a difference when you want to edit, for example, this label. I'll show you.

Here, when you want to edit the content of the label, here you have, really what this new functionality gets to you, you have a new tab called Property Sets. And in this new tab, you can access here the four properties created especially for this drawing. And I can add the content in the new label. And with this possibility, I can create such labels with the name of the designer, validation, et cetera.

TOMAS LENDVORSKY: So let's continue. So the next one we call data preparation. And the goal here is to show you workflow, how you can edit these different properties, and how you can manage these drawings when you are creating these, what we call construction and drawing, construction model, which later on we will move to Navisworks.

So first I will cover more in detail these properties because you saw that we can use even API within this property set. So I want to give you an explanation of what you can do, how you can achieve that. And then we will reference all styles and data because, as we said at the beginning, according to our opinion, it's important to keep, let's say, drawings clean or separated for design and for construction so that not everything is mixed together.

So we will extract the objects. I will show you how to assign this property, and then how to move this information into Navisworks. And obviously, throughout the entire process, I will give you hints to what I believe is important for this workflow.

So with that, I will dare to sit down. And let's have a look.

So by the way, I already posted additional data for this session. So for example, I posted this DWT file, which I want to explain to you right now. But everything is available for you. So you have it, in fact, on Autodesk University web page.

So this DWT file is a file which is in fact having all this property defined. And you will see that it's a little bit more complicated. And I created several sets because what I want to show you is how we can handle some linear data.

And the example will be create barrier because you want to add more information to create a barrier. And not only what, for example, Vincent was showing, but the workflow will be later on that we will attach the lines. And then later on, that these lines can be used in, for example, Navisworks for quantification.

So I want to show you linear object. So then I want to show you also volumetric object like pavement. And then I want to show you how to deal with daylight because daylight, you want to, for example, know the RF or the quantification, et cetera. So just different examples of what you can deal with, and how we can do this.

And also, we have here what I would say are some generic data, so which should be attached to each and every object which is project data, for example, so who did it, when, et cetera, so different story.

What is important to mention is, we are talking about Civil 3D, property sets for Civil 3D, however, you will learn that these properties can be attached not only to Civil 3D objects, but also to AutoCAD entities, basically to [INAUDIBLE] AutoCAD entities. And we will use this workflow to get information to GIS, basically. And we will send it to InfraWorks later on.

So as it was mentioned here, for example, if you are talking about project data where it applies to, so basically I selected here All Objects, so whatever is the object, so we will attach this information, too. So I just selected everything.

Just one note, I don't know if you are aware of it, Civil 3D is, in fact, based on AutoCAD. But in between AutoCAD and Civil 3D, there is AutoCAD architecture. And in fact, what we did, we are in fact showing some functionality from populating the functionality from AutoCAD architecture and using it in Civil 3D. So just one note, because you will see here not only AEC objects, but you will

see here some other objects as well, related, for example, to AutoCAD architecture.

And here, within the definition, so it's just very simple, here I am a designer, so you have possibility to add a middle property. And I said, OK, this middle property will be designer. And it can be text integral, so you can specify different type. So it's very simple. This is not rocket science. You just have to prepare it.

What might be not very clear from the very beginning, we are using, or I am using, a river handle. And this handle, I'm using because of two things. One thing is GIS workflow. You will see later on why I'm using it, GIS workflow, because then I have to somehow map properties of other stuff so I will use handle to do that. This is one thing.

And second thing why I'm doing it is if I want to calculate something. And it brings me, for example, to crash barrier. So if I want-- the workflow is that we will extract information crash barrier from my corridor. And we want to send it to Navisworks. And in Navisworks, I want to make quantifications. So for the quantification, I need the lengths of the barrier.

So I need this handle because if I go here-- so here I am using API. So and by the way, just for your information, within hand-outs-- if I will find them here, hand-out. So you will find a lot of examples, which we gave there for you. Also, you just have to copy paste. So for example, for gravity pipelines and slope, what you can use is an API formula for feature line lands for a surface, et cetera. So all this information is available there for your reference.

But the point is, I did just simple copy paste. But here is the important part. So obviously from object I'm calculating 3D lines, but here what you have to do, because you have to somehow map the object to this API, and you are doing it via this handle, so what you have to do within your overflow is just select it, and double-click on handle, and connect infected object with this API code. The system is able to calculate it.

And in fact, very similarly, I have here an example, corridor pavement, where I am calculating volume. You can see I'm calculating volume because later on we will use it in our workflow for volumetric calculation.

So lands, volume, as an example. And certain one, is a little bit tricky one, area. It's example of the daylight. If you have some corridor, or you have the daylight, and you want to calculate the area, maybe because of-- I mean, in Europe we are crazy. We are putting some ground there, so we need to know area, what is there, or geotech style you want to put there, so you need to know this

information for quantification.

And in fact, if you are thinking about the daylight, if you are using, for example, generic link, it will later on, if you will extract information from corridor, it will not create shape but-- sorry, it will not create body, but it will create-- no, no, no, it will create body, sorry, in just a little bit. It will create body, but unfortunately, this body we cannot work too much.

So obviously, the workflow could be that you will create surfaces, and from surfaces you will calculate areas. But according to my opinion, it's a very tedious job because if you think that, for example, you need different area, for fill, for cut, et cetera, so then you have to create different surfaces, et cetera.

So because of this, I did something else. So in fact, I'm telling here I'm calculating area, but in fact, I am taking it from volume. So it's kind of a work around which I brought here. Because what I did, what you should understand within the workflow, using Subassembly Composer-- I hope that you are familiar with Subassembly Composer. I did some PKT file where I have daylight. And as daylight, I didn't use just the link, but I'm creating shape. And I'm creating shape with the thickness 0.01 meter, which means 1 centimeter. So in fact, I will create the end shape.

But then, if I'm calculating this in my Civil 3D, so you can see I am dividing it by 001, just slide the border around so that we are capable of getting area. So three different examples-- linear, area, and volume-- that we can do it later on within Navisworks.

And here, I am using object ID, which is, again, some, let's say, connection between an object which we are having because, in fact, we are, in this case, object ID, because we are dealing with shapes. And it is not handle. So this is entity coming from AutoCAD. So as I said, one of the AutoCAD entity we can use as well.

And I have here more information. And then I have, also this will be later on, an example for a crash barrier for GIS when we are sending it to InfraWorks, for example. So all this information is available for you so you can use it.

So this is what I wanted to tell you. Don't forget, always apply it with what it's applying to so you have different stuff. So for example, this GIS I am doing for line, pull a line to [INAUDIBLE] pull line 3D. You just have to go through this list and take what is necessary there.

So with that, I know that I spent some time there, but I believe it's important. So let's do the workflow. So I will create a new drawing based on a standard NCS metric file, which I just slightly

modified because I modified some commands. Because when Vincent was talking here about the possibility to reference the corridor, you will find, also, just a quick note, if you are doing such command, and this I modified. If I find my corridor down here, so within the commands, there is also a new command, Create Corridor Reference.

And just for your information, I modified when I'm referencing corridor, I'm just displaying corridor. And the rest, I am making invisible. Just workflow make it this simpler because if you are maybe CAD manager, or a BIM manager, definitely you want to make life very easy to the user so everything can be prepared using a template and that kind of stuff. He will pick up the template, and everything will be done automatically for the user. So just a note for this.

So the next step, and I will just do what already Vincent covered. So I will reference these corridors done. So alignments are also referenced, by the way. It's just not displayed here. It's just gone. It's not visible.

And what I will also do, I will reference the styles, which are coming from this what I just introduced to you, this properties and definition template.

So within this, I am putting information together, and I am creating what we call here for this session, this, let's say, construction drawing or construction model. So I have all data in starting from scratch from a clean drawing. And now, what I definitely can do, I can extract information.

So what I can do, I can extract feature lines from a corridor using a command which Vincent already mentioned here. So I will say All. And now, within this workflow, I will use only crash Barrier, Left, Right, Extract. Done. Nothing exciting happens. So I have a feature line.

But now what we can do is, within the extended data, I will hit here the button Add Property Set, down here. And system is going through this property set definition, and he is bringing all sets where the feature line has been mentioned here clearly. So now I will attach crash barrier information, object data, et cetera. So done. And I have it here.

Obviously, I could do it much more clever. So I could do it for both at the same time. I didn't do that. So done.

And I have this information here. So if you look loo extended data, all information are here. And I can work with this later on crash barrier.

So let's go further with corridor. Extract solids, already mentioned here. So just one note, you have

this possibility, I will not do it, station range. A good example is how you can split your road, which can be several kilometers, to the construction sections because it will be constructing from station 0 to 300 as the first section, from 300 to 600, et cetera. So with this, just bear in your mind that you can use it to split your design totally independent on design regions. It makes sense. So this is two separate things.

Just one short note, in fact, if you are extracting solids, so it will extract even though you will specify from 0 to 300, but if there in between is a region, so system will split it into two different parts. So maybe you will have to use a union to unify some regions together.

- So do they typically use corridors to break up packages for actual construction?

TOMAS LENDVORSKY: Yes.

- When you implement?

TOMAS LENDVORSKY: Yeah, because the workflow is that then, within Navisworks what you can do, you can use timeline there, for example, how it will be constructed. And you will do it with solids.

- So more or less, you wrap elements?

TOMAS LENDVORSKY: Yeah. So for quantification, for time mining, et cetera. So this can be used for these purposes. But I will do everything, all regions. So all information is here. Property data is mentioned. You can add the property data. So maybe I can add properties. So you can add data also here.

So what I will do, for example, I will type here, customer, and customer will be DOT, whatever, just as simple as that.

Next, extract solids, done. So and then I have here these solids. And obviously what I can do, the very similar way, I can add additional property. But right now, I have to be a little careful because I have here corridor pavement, which is, in fact, in my case corridor payment, but I have always corridor daylight because this is both for these shapes, which is just this 1 centimeter for area.

So what I will do, I will switch this corridor daylight because I don't want this property added to the pavement, and in this particular case. Done.

So I have this information here. So you have it here, all this information.

And the next one is just, very quickly, what we can do is we can select, for example, this daylight, which we know that these are shapes, so what I will do, I will attach corridor daylight information.

And now what I have here are data and not volume, but now I have area just here. Area is attached, apart from additional properties, which are not object code, object state. And I will use it later on within Navisworks, this information for different purposes.

So this is the way how you can prepare the data. And again, I am showing it, in fact, for the objects which are coming from Civil 3D from corridor solids. But again, you can use it for other AutoCAD entities as well.

So this is how you can prepare the data. And now you want to bring this data over to Navisworks because Navisworks is the tool where you will aggregate the data, and can be used, as already mentioned here, for time-lining, for quantification because within, as I said, we are aggregating something, so it will be in one software information, from, for example, Civil 3D, from Revit, et cetera. So everything will be within different software. And it will be available for people which are not necessarily knowledgeable about authorizing products, which means Civil 3D, Revit, but they will have all this information there.

And here, I don't know how familiar you are with Navisworks. Obviously, in Navisworks, you can say and you can append DWG files. So you can do this. But my recommendation is, don't do this. Because of lack of schema in Civil 3D, not all information will be moved over. So this is why my recommendation is not to use it. But if you are in AutoCAD, you can type NWC Out. Basically, you can export NWC file, and in this case, all properties which you edit will be available for Navisworks. Just this is kind of warning for you, don't bring DWG file, but use NWC Out in Civil 3D.

So that's it. So it will say NWC Out. And you will export it. I've already prepared it. And then,

obviously, in Navisworks, I created some solid construction in WD file. And you have here this information.

And for example, if you look here for project data-- I know it's not the correct one, sorry. Open this one. So I have here information like project data, object data, so basically all information is available. And just you will see later on, this information, this additional information will be also available in BIM 360 Team, basically in a large amount of viewers as well.

And now, in fact, in my presentation, I'm moving forward. So we did all the stuff. Well, I didn't freeze unnecessary objects because this is just here a note. If you are exporting something to Navisworks using NVC Out, you should freeze the objects which you don't want to move over. So I wanted to move over only these objects which I was working with. So but the idea of this at the beginning when I used my template, which was, in fact, everything down there.

So and I will show you another part in Navisworks because in Navisworks we can definitely use this information which we added to our model, but even within Navisworks, we get more information. So Navisworks is allowing this.

So with that, let's have a look. So we can get data or information using three different, let's say, functionalities. So user-defined property, we can link the data, and we can use data tool. And I will quickly show you what it means, how you can achieve that, and what are pros and cons.

So if I have here any object in Navisworks, so for example here is this pavement. I didn't use command union in AutoCAD. So this is why I have two different left and right, but it doesn't matter really. So what you can, anytime you can add new user data tab. So basically you can say, OK, this is some user data tab, so user data. And then you can add properties. So basically, you can insert a new property. It can be string, Boolean, float, or integer.

One information, this database which you add here, they will be available through the entire life cycle of the project. So basically, if you go to, for example, for quantification, or for a large amount of viewer for BIM 360, it will be available there.

What I don't like is that you have to do it object by object. So it's a little bit time-consuming. But you can do this, just that you know it will function like that.

What I like is that you can also edit links. So basically, you can add more information. And now, I want to add just hyperlink. So it will be hyperlinks, so [INAUDIBLE].

And what I want to do is that people may be on the construction site, they will click in BIM 360 Team, for example, and they will have some menu, or basically some data coming from, in this case, for example, PDF. So we can do this. You can do this.

And my recommendation is-- and this is why I have somewhere opened-- I posted some PDF to BIM 360 Team. Why I did it? Because I want this data will be available, not only on my computer, because, in fact, it will link information from my computer to the software, and if I will give a Navisworks file to somebody else-- whoops, it's not there. So if I post it to BIM 360 Team, and people have access to this, they will have it.

So this is why I have here some-- I just opened some PDFs which I uploaded. And I have just some information here. And very simply, copy, paste, and will add it here. OK, done. And this information will be available on my computer. And if I will give to somebody, NWD file, so it will be available also on his computer because it will point to the same location in cloud.

And it will be available, also, in, for example, Navisworks Freedom, not only if you are talking about how you can share data-- obviously, cloud is one possibility. Second possibility is to take NWD file and to send it to somebody so he will see it as well. So there's a second possibility.

And the last one is, what I have here, you see here another type, which I call AU 2016. And in fact, what you can do, you can use what we call a data tool within Navisworks. So in fact, what you can do, you can link-- and again, all this information is available in your hand-out.

So basically what I can link, I can link MDB file, for example, external database, I can link it to Navisworks. And then, I have, in an MDB file you can have information. And this is here. I'm just going to show you what is inside, and we will go further.

So if I have some information-- so I have here some MDB file. So I have here table, goal, object information. And then I have here some information. So basically, here what we are telling to system, OK, bring this MDB file, find the table-- this one, because there can be several tables-- and then link object code, this information which are called object code object of which is in fact here.

These are, in fact, additional information which I added in my Civil 3D. I brought it over to Navisworks. And then I'm linking external file, external database to this.

And in fact, then I have, for example, what is the object category, what is the sub-category, which rows I'll be using. So basically, all this information is coming from MDB file, which is nice.

The downside is that I am linking a file which is sitting on my computer. So if it's in your company, definitely what I recommend is to put this file somewhere on network drive that everybody can access it. But definitely, if you will send somebody this information, this NWD file, I mean, outside of the company, this information will not be there, that there will be only in your company because it's pointing to one location on the computer-- I'm sorry, on the network drive.

So with that, I will hand over. So let's move further in our workflow. So go ahead, please.

VINCENT FREDON: We stay in Navisworks. And the next part is about quantification, so specific workflow to get the quantification in Navisworks. Why quantifications specifically in Navisworks? Because as Tomas said, we want to manage the aggregate conception in Navisworks. We are also able to quantify in each Civil 3D design, but it's not interesting. What we want is quantification for the overall project.

Then, in Navisworks, we have all the conception attached, imported in the overall project in Navisworks.

For that, we will have to check those manipulations, project setup, of course. Property mapping, it's we have to manage the property mapping in Navisworks, to do the quantification. We'll see item catalog. How to find items-- very important in Navisworks to go very quick when we want to do this manipulation. And at last, the quantification.

I will actually show you in Navisworks the process. So here we have the same corridor that Tomas has shown previously with some registered view, very important to do that in Navisworks to navigate in 3D.

Here we see very well the different part of the corridor with here the one layer, the layer of the road. And for this layer, I have the specific properties created in Civil 3D. Here I know that-- you see the classification code is asphalt type 1 for this object.

What is very important to do in Navisworks is to create such sets. The goal is to be able to select very quickly all the objects you need when you need to select this object. If you don't do subset, each time you have to manually select the object when you don't know exactly where they are, et cetera. With this here subset, this is the list. I have three such sets defined here. 3D solids, so all the general 3D solids in this Navisworks file.

Crash barrier, so it's the feature line from Civil 3D in Navisworks. And corridor daylight. Each time you'll see that in the tree here, you have the correspondence of the selection with the subset and

the object in the corridor model.

If we look at the quantification model in Navisworks, here I have already prepared first part for the quantification on this corridor. I have a very basic quantification workbook in for quantities with full length the crash barriers with a specific type. It's already quantified.

I know that here I have two entities for this specific corridor. And here I have the details. I have the two objects and the specific lengths for each of them. And here I have the total.

It's exactly the same for area here. I have the quantification for corridor daylight. I know that I have three objects here. And I have the details with the surface in square meter for those objects.

Now, I need to add the volume. I want to quantify the volume of the specific layer asphalt type 1 for this corridor for that. First thing, I have to create subsets for the specific object. If I select one, I remember that it's in the property corridor shape information. And I want the volume. No, I want to make the selection according to the classification code asphalt type 1.

I can-- to go quicker, I select one subset. I open this palette with the settings of this subset corridor daylight. I know that-- I can read that I have two conditions-- item type equals 3D solid. Second condition, it's corridor daylight defined, just that.

TOMAS LENDVORSKY: Just one important note here. Just note that we are, again, using these extended properties which are coming from Civil 3D. So this is how we are extending the workflow, not only going through properties which are standard available, but extended properties. Sorry for that.

VINCENT FREDON: OK, thank you.

I will just modify quickly this property, this selection. I want, also, 3D solids. I'll keep this one. But it's not corridor daylight, it's corridor shape information. And classification code, just this here, classification code equals asphalt type 1. OK, here I have to-- 3D solid.

I apply this, find all objects that are OK with these settings. Sorry. Equals asphalt. Find-- something's wrong. Property type, solid. Corridor shape is fine. No I think it's OK.

And I registered this one as asphalt type 1. This is my subset for asphalt type 1. First thing, it's very important to do this, to be able to select quickly.

Next, I have to create a new entry in my catalog. Then it's a new group for volume. And in this

volume, new item, I want asphalt type 1.

I also need to map properties here. You see, I have the mapping for length, for area. I have to do the same for volume.

TOMAS LENDVORSKY: Here one important note-- again, we are using these extended properties. And even though if you are extracting shape from corridor and the volume is the part of it, we have to add this volume as the extended properties because, in fact, we are capable of mapping only these extended properties. Just a note for you.

VINCENT FREDON: In the list of the type of property available in Civil 3D, I select model volume. And the property category for the object is corridor shape information, I think, and volume.

TOMAS LENDVORSKY: Volume, yeah.

VINCENT FREDON: And now I'm ready to quantify the volume for asphalt type 1. Very simple, just select here, right-click. First I have to select. And here it's important to have the search set. Right-click. Take off selected model items. And it's done. I have the list of 3D sorted. And I have the results here, volume.

From that, I'm able to extract in Excel, for example, the details of all the quantities from Navisworks file.

TOMAS LENDVORSKY: And just, the benefit of this workflow is that really quantification now can be done by a different person. Just, as I said, no idea maybe about Civil 3D, this person can work in Navisworks.

VINCENT FREDON: Here we go, all the details.

Next spot. Data sharing.

Tomas has already speak about BIM 360 Team. We will use this tool to optimize the exchange of the information in our workflow.

BIM 360 Team, it's the cloud-based tool for data sharing and for dynamic collaboration in a specific project team.

Of course, we will share mostly NWC file according to the workflow we are presenting to you this

morning because when you enter the command NWC Out from Civil 3D. You will have to share those results, then it's NWC file. If you add some specific data in Navisworks, then you will have to share NWD file. It's the functionality of Navisworks.

Let's open a session for BIM 360 Team.

Tomas has created a project in BIM 360 Team called AU 2016. And you see, he is the administrator of the project. And he invited me as a stakeholder for this project. I am on the team with Tomas.

I can open the Navisworks file. We use the large model viewer for the visualization, very powerful. For you can view almost any format you need.

It's always the same corridor that we use since the beginning of this presentation. You see that it's the version number two for this file. We are able to manage the version of the conception in BIM 360 Team.

We also have access to annotation here. And if I want details, I have here the list of all the annotation done on this specific file-- another one here. You have different tools to drawing what you want, to actuate on your different annotation. And you can add specific comments. There is a problem on this localization, and you can answer, of course, to all those annotations, which is very useful to exchange and to collaborate on the conception you post on BIM 360 Team.

Another functionality, very, very impressive, is live review. Sorry, for the interface, it's in French, but the tool is very, very easy. Live review, you can open a different session from BIM 360 Team. You see that it's another tab that it's opening here.

The goal here is to-- yes, it's me, Stop-- it's to exchange with other stakeholders dynamically.

TOMAS LENDVORSKY: So basically, you can communicate. You can send the link to somebody, and you can communicate in real time on the same model using BIM 360 Team. And the point is that, obviously, all properties-- and here we are talking about information-- all properties are available.

And although, if you are maybe rotating enlargement of your real model, the person sitting somewhere else he is seeing the same. And also, if you are zooming, his zooming is also the same on both computers.

- It's essentially

screen sharing.

TOMAS LENDVORSKY: Yes. Screen sharing, yeah, that's what it's like.

VINCENT FREDON: It's what I will do.

TOMAS LENDVORSKY: We call it live review.

VINCENT FREDON: The tool provides me a specific link. I copy the link and I open a new session. Of course, I will discuss with myself, but it's still interesting.

TOMAS LENDVORSKY: At least, he's offering nothing else.

VINCENT FREDON: Copy paste. And there is a new life review session. I could change the name here, but it's not very important. I know it's me.

And now, you'll see that I have a direct link between the two sessions. We could be more than two, two exchange on this conception. I can zoom on a specific part that seems very strange. And I can discuss. "Something's wrong here."

I knew that there was one comment here on the other section. "Something wrong." "Yes." "What to do?"

So you see, it's very dynamic. We are really in a collaboration tool, a dynamic collaboration tool, which is very important.

TOMAS LENDVORSKY: Just real quickly.

VINCENT FREDON: OK, yeah.

I will, I think, show you. I stop this session. I close there those also. Sorry, too fast. I will show you here in the Navisworks files the properties in BIM 360 Team. I've missed this part. So right here.

To check that, if I select-- I think we can. Properties are here. If I select one object in the corridor, I

have the information, for example, the volume of this object is here in BIM 360 Team. I can access to all information, all properties, default properties, and properties from properties set added in Civil 3D.

TOMAS LENDVORSKY: As well as this hyperlink, which I added to this, asphalt. So basically, there is also a hyperlink. So if you click on the hyperlink, you will, or a set user will get it, and you'll see it. And obviously, the same, for example, on iPad because we have a team on iPad. So all this information will be there.

VINCENT FREDON: I switch?

TOMAS LENDVORSKY: Yeah, sure. Please.

So time is passing by. So we are going to the last topic, which we call asset management. So what I want to show you is how you can, at the end, send the data to InfraWorks using this extended property, and how it can be visualized.

So what I will do, in fact, I will show you the result. And obviously, I believe everybody knows InfraWorks is in it. So I don't have to introduce InfraWorks. So you see this road, which, in fact, most of the time you saw a road on our Civil 3D, one of these roads. Now it is within the context.

And what I did, in fact, I brought here this barrier, and because we are having the session about extended properties. So basically I added properties, like, OK, what is the barrier type? It's semi-rigid, build by, when someone builds it, what is the barrier of it? So basically, I made some extended properties available also within Infraworks.

And obviously, I did stylisation. And I also have this pavement. So if I go to the property, so I know what type of pavement is, what is the area, for example, who built it, et cetera.

So just an example that this additional property can be also moved to Infraworks, and how it will be done.

Well, I must admit that this is not the most straightforward workflow. I must admit this. However, it is possible. And I want to explain to you how it can be done.

So it is a little bit of gymnastic, sending some things in, out, et cetera, joining. So in theory, it requires some knowledge. And we will be using for this map 3D, in effect.

So we can export these vectors as DF. Then And then, extended properties can be also exported to external database. So this is the first step.

The second step we will connect SDF and NDB. Basically, we will bring it back to Maps 3D. We will connect it together using create a join. And then, we will export it again to SDF. This is the final, final SDF. And then, we can bring it to Infraworks.

And Infraworks, what I did-- this is just an example of what can be done-- I modified schema file. So basically, I added some more information as a pavement, as a barrier. So basically, I have these things available, and then I will import it and visualize it.

So because it's relatively late, so I will not maybe do everything step-by-step, but definitely, I want to show you how to do this, because as I said, I know this is not the most straightforward.

So I have here a very simple drawing. In fact, I have these two crash barriers. And then, what I have here is also a polygon, basically a closed polygon, which is defining for me this pavement here.

So how I got it. So the crash barrier is, I believe, very easy. So we extracted feature lines from corridor. And then I just explode it, as simple as that.

And then what I did is that to this polyline, I added some extended properties. Do you remember when I was talking about properties set? I have there, also, entry for a crash barrier GIS, basically. In fact, I am applying extended properties to polyline. Makes sense? I don't want to repeat it because you already saw it.

And then with pavement, because we are working in GIS, and in GIS, you can work, in Business SDF, with points, lines, and polygons. So this is our limitation, isn't it? So what I did is I created surface from the pavement, and UF Civil 3D surface. And then, I displayed it as a boundary only. And then I extracted this boundary as a polygon. Makes sense? As simple as that.

And then, again, I have entry in my property set. And I added extended properties, which I want to show InfraWorks, as simple as that.

And now, the exercise starts, so the gymnastic. So what I'm using is I'm using map export. So I'm exporting this data to SDF. You can create something. So I will create final, final one, final, final two, et cetera.

And so I will select this manually. And what is important, if you are exporting these to SDF, remember, at the beginning, I set IM to each object attaching E handle. And now, this E handle will become very useful and very important because what I have to do is, if you go to Select Attribute, unfortunately, extended properties are not available. This is why we are doing all this gymnastic.

So but what you have to do is you have to export E handle because later on, when I am putting it back to map 3D, so I will use E handle to join this information together. And then, obviously, the rest is fine. So you will specify attribute E handle. And you will export it to SDF. This is the first step. So map export is the first command.

The second command is property-- sorry, obviously, export property data. This is the second command. This will allow me to select the objects. And you will export information to MDB file. All information, I will export it to MDB file. So nothing else has to be done.

The next part is you have-- because you have MDB file, and to fit in at 3D, we will use FDO providers to bring this back. So what I will do, or what you have to do is you have to go to the rest of the tools, and you have to set up a ODBC driver.

And what I did here, I basically configured this NDB file. So I have this crash barrier and pavement GIS NDB file, I put it as a data source name, a set model, AU. So basically, I am setting up this ODBC driver because later on, I will use, as I said, FDO to bring it to a new file.

And this is the next step, because what you have to do is map W space. So I will open. So you have to do two things. So using FDO provider, you have to connect the data.

So the first thing will be to bring in these vectors. This is geometry. Final, final one, good one. I believe it is this one. So connect. I forgot to specify the coordinate system. So you have to specify coordinate system. Map, see as assigned.

So edit coordinate system. So I have to edit a coordinate system. And basically, this dataset is from another line. So I will specify coordinate system, which is needed.

And I will add it to map. This is the first step.

And the second step is you have to bring this ODBC connection, because do remember, I exported to MDB file as specified, ODBC connection, and then I will do it here. So now I can see, because you saw it, I specified it, I said model underscore AU, so I will select it. I will test the connection. I will log in.

And then, you will have to select which classes should be imported. And basically, my extended properties are at the very end. So this is coming from these extended properties. If you remember, different groups I created, and I signed it. So all this information is here.

So I will connect. And then what you have to do is you have to create a join. And now I will use this E handle to create this connection. so what I will use is, for example, I will show just one, just that you have an idea of what's going on.

So here I will use E handle. And here I will use handle. And I connect it. So, whoops, this, I don't want to see this one. Now, if I show a data table-- so let's put it here.

So I have all of this information here. So you remember, this barrier I specified as a semi-rigid. Vincent will build it, so he has a lot of job to do. So what is the land, et cetera. So it's already connected.

And obviously, you can connect more and more data. So what you have to do if you want to connect more data, just here you have manage your joints. And then you can create new joint. And you can add another property set, so everything basically what you need.

So I will not do this. It's just where it is.

And then, at the end what you have to do is you have to export it to SDF file. That's why I said this would be the final, final one. So this is the final SDF, which we will use in InfraWorks.

Not easy, but doable. Let's put it this way.

And in Infraworks-- and I will not show it, but what I already did here, so I have here this crash barrier. You can see it here. And you can see here this pavement. So basically, what I did, I exported everything to one SDF. And I brought it twice. So you can create separate SDFs. It's really up to you. I just want to show you what I did, or how it can be done.

So you can bring SDF file. And then, obviously, you have to configure it. And just for your information, I expanded information schema file. I will not cover it, by the way, because this is for another session, so how to modify schema file because it's JSON file, et cetera.

Just to give you information, it's doable. Because crash barrier, you don't have by default something like this in such class in InfraWorks, nor you don't have neither pavement, for example, here. So you can add this information.

Just for your information, this schema file which I am using here, you can also find as an AU dataset on the AU website. And just where you have to put it, so you have this schema file which is called im.schema.JSON file. You can use it to your models. Just I would recommend to make backup of your model, but you can use it. And you have to put it, you have just to copy this file where you have your InfraWorks model dot files on there.

Basically, to this directory, you will just copy this file, and the system will use this new schema file which is extended, and you can work with this.

But just for information, I believe last year or a couple years ago, Wes Newman did one nice session about how you can extend a schema file within InfraWorks. And as I said, it could be another 1 and 1/2 hours, which I don't think that you want to stay with us for such a long time.

So just that it is possible. It's doable.

And just what we did here is-- where is my, for example, pavement. So if I go to configure, because I put everything into one file-- obviously, you can stylize it, et cetera-- but what I did is source file, because I have several objects, or several classes there, and I want to bring just one class, so I said, OK, source filter is here. Bring me only the data where pavement GIS area, basically the information is greater than zero.

Basically some selection, so you can use different ones, just an example of what you can do from a zero file. You can have one SDF file, and you can break this part or this part has a different configuration file.

And that's it. Then I stylize it. And you see here this, for example, pavement as I showed it before, properties information are here, these extended properties, so coming from Civil 3D, this a little off. In out, in out, but it can be done here.

So with that, we are done. Three minutes.

So, no, first what I would like to ask you-- obviously, I would like to ask you for feedback. So please provide session feedback-- if you like it and if you don't like it. Because I believe that we could provide good content. And just for your information, I don't want to take me and Vincent, we don't want to take all queries for this session because it was done together with another colleague of ours, Peter Ingels from the Nordics, just that you know.

I hope that it was interesting for you, informative. And if you have any questions, please ask, and I hope that we'll be able to answer.

[APPLAUSE]