The Unlikely Marriage of Horizontal and Vertical Construction in Infraworks 2018

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Learning Objectives

• Discover the best-use case for InfraWorks
• Understand how both vertical and horizontal construction can benefit from InfraWorks
• Learn how using InfraWorks breaks down silos during project lifecycle
• Discover how InfraWorks ties in with all project data

Description

This energetic and engaging session presented by industry experts will share the lessons learned throughout the project lifecycle using InfraWorks software on both horizontal and vertical projects. InfraWorks has been around for 3 years, and the 2017 release finally gives it the opportunity to become more than a planning or marketing tool. The new features enable increased productivity and project collaboration with new additions of multiple data sources like native Autodesk files, as well as various other external nonnative popular file formats that make this a powerful application. From conceptual design, marketing, client relations, and traffic control plans, to as-builds and point cloud data, InfraWorks is an amazing collaboration tool. If you looked at InfraWorks previously and saw potential but couldn’t find how it was applicable to your workflow, take the opportunity to learn how the program has evolved!

Speaker(s)

Kris Lengieza
Stiles Construction

Kristopher M. Lengieza, Vice President of Operational Excellence (OpEx) at Stiles Corporation in Fort Lauderdale, Florida, has been instrumental with the integration of VDC, lean and LEED principles in several companies over the course of his career. Lengieza has earned a multitude of awards for his work, and he was nationally recognized by both ENR (Engineering News Record) and BD&C (Building Design and Construction) as one of the top 40 construction professionals under 40. He is constantly seeking to further the use of technology and foster innovation in the construction industry, most recently as part of the Construction PDF Coalition. As such, Lengieza has been a sought-after speaker for national conferences, including Autodesk University, BIMForum, Ecobuild, SPAR, and many other regional events. More importantly, Lengieza is always willing to volunteer and share his knowledge. He has taught for numerous organizations over the past 5 years, including Associated General
Contractors and American Institute of Architects to name a few. Lengieza earned his civil engineering degree in 2004, from Lehigh University.

**Brian Smith**  
**Product Manager - Emerging Technologies**  
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Brian Smith is a leader in construction technology in the West coast. He has overseen the IT, GPS/Survey groups and modeling groups, and he specializes in Virtual Design Construction (VDC), 3D design, modeling, and Building Information Modeling (BIM) coordination, implementation and strategy. Brian has been designing and working on heavy civil projects for over 20 years, including hydroelectric, water/wastewater, industrial, road, bridge, residential and commercial. He specializes in Autodesk, Inc., products and is proficient in AutoCAD Civil 3D software, Revit software, Revit MEP software, and Navisworks project review software. He enjoys teaching at Washington Engineering Institute, speaking at conferences across the country, advising for software start-ups and leading industry software platforms. He is also pioneer in utilizing UAV's on the construction site and is a FAA licensed small UAS pilot.

**Infraworks Use Cases**

Throughout their careers both Brian and Kris have been challenged with communicating complex problems on jobsites and in the boardroom. Until each of them stumbled upon Infraworks separately they did not have a tool which could quickly create a stage to tell a story of how their projects would unfold. The difficult dance of site logistics, traffic control, site planning and even early civil design work was often left to 2D sketches drawn in high lighter and pen on top of a drawing. Each new their had to be a better way and found a unique solution in Infraworks. Infraworks is a versatile tool that can be used throughout the planning, design and construction phases of any or multiple projects. With the ability to quickly spin up project environments using the model builder, Infraworks provided a solution to some of their biggest challenges in a short amount of time. How they came to pull together experience from both the heavy civil construction industry as well as the vertical commercial construction space is a story in itself. With all of this knowledge they decided that they had to work on a project together to truly push infraworks to the limits of what it is capable of.

**How do we use Infraworks**

**Site Logistics**

Having one common environment where you are able to not only view the job site but the surrounding blocks, roads, rivers and other geographical features helps provide a much greater sense of perspective on site access, hoisting, hauling, deliveries, staging and effects on nearby traffic and neighbors. Drilling down with Project Managers and Superintendents with a 3D visual engages them in a deeper conversation and allows for better decision making and a more clearly communicated plan to the project team.
Traffic Control
Providing the traffic control plan from the same software that was used for site logistics reduces the risk of incomplete plans or using a previous Traffic control plan stage. Engaging all parties involved from, flaggers, stripers, to civil service helps reduce the confusion when closing roads or making traffic flow modifications. Infraworks can add in additional traffic control elements like, cones, restriping, barricades and even new signage. The number of objects that can be easily placed in Infraworks is huge.

Development Planning
The ability to quickly import various data sets from engineers, planners and government makes this a fantastic tool for planning. You can see the existing GIS zoning boundaries, use descriptions and even property owner information all in one place. If you wanted to get really nerdy you have the ability to plug into the parcel sales data base and city auditor to gain quick insight to costs and impacts for a given parcel or project.

Site Planning
On an active construction site, the world is never simple. Providing simple tools for safety to see where overhead work is going on and the impacts it will have to job site movement is very clear using to scale models and buildings. Integrating Civil 3D plans into this for phasing is also a great opportunity to save some time and money making sure there are not any unforeseen incidents that could have big impacts to the schedule. As sites are never static it also allows for many phases of the project to be developed quickly and accurately.
Early Civil Design
Utilizing the latest GIS data sets from various government data bases you can start developing a fairly accurate model inside Infraworks. Depending on where you get the surface or road profile information from it can be impressive. You also have the ability to add in point clouds to the surface. The roadway geometry is intelligent as well and can run ASHTO standards for all design considerations. The best part is you can run multiple scenarios on the same 3D model allowing you to truly determine the best fit for your clients need. To top it all off after the design review is complete the time and design doesn't go to waste. You can export from Infraworks to Civil 3D and back!

Importing Data Sets
Types of Data you can bring into Infraworks

3D Models

For the longest time we could not figure out where Infraworks was going to fit into the Autodesk family of design tools. It was cute and had the GIS perspective but what was it intended for? In 2017 Autodesk answered that with a huge list of added modules, reduced prices and increased workflows. If anyone has lived in a cave for the last 10 years you might not know of Navisworks but if you do then we would say Infraworks is getting to be almost as good of a multitool for macro site level coordination and visualization. The ability to use the embedded design tools for Infrastructure, bridges, hydrology, BIM and planning is fantastic. Part of what makes it such a good multitool is the ability for it to consume so many sources and data types. Point clouds, no problem, large native Revit models, bring it, and the Icing on the cake, native import and export of Civil 3D files. I didn't forget to mention the database and GIS inputs I just write them off as standard workflows that ESRI users have come to know for years.

As you can see from some examples below stand alone 3D models can be boring and lack context that could be critical to the project. Planning the logistics for these buildings would seem to be a simple task if you looked at them individually.
Bring in some context to the site and you can see it is a completely different ball game. We find that the site is in a dense urban environment and these two projects are literally right on top of each other. This is why site context is so important to 3D models and why Infraworks is a great way to utilize it.

Point Cloud Data
If you need more accurate information about the site or surroundings laser scanning is a great solution to provide it. You could also utilize tools like Recap Pro to generate point clouds and meshes from drone imagery. These point clouds can be imported directly in Infraworks as well continuing to elevate the level of accuracy as well as the level of detail.
of the model environment. Infraworks handles large point clouds surprisingly well and even allows for fly through animations that render the point cloud with enough density and detail that is usable. Integrating point clouds into Infraworks is a great way to include more reality capture data into your project site.

Database files

Web Links
Another powerful tool in Infraworks is its ability to handle data. Infraworks is a database at heart. This allows for us to pin or tag key information to visible models and locations within the model. This allows us to link URL’s to project locations to open and access additional key project data with the click of a button. This truly expands the information that can be accessed from within Infraworks infinitely.
GIS Data

Collaborating inside and out of Infraworks

After all of your hard work of assembling the model of your project you need to engage other individuals in the decision making process. Fortunately Infraworks has some great ways to coordinate bot inside and outside of infraworks.

Collaborating Inside Infraworks

Infraworks has a great set of collaboration tools built right into the platform. Models can easily be pushed to their web viewer for review and comment by team members on the project or even general public. They also have the ability to integrate Virtual Reality exploration in the model as well by integrating with the Oculus Rift and creating 360 panoramic views that will work with most VR viewers. Infraworks also has a design feed built right into the software as well. Available both on the desktop version and the iPad version, users can provide commentary on the model. With these built in tools exploring and collaborating on the model has never been easier.
Collaborating Outside Infraworks
However some times there is a need to coordinate with team members outside of Infraworks or in a more mass scale. Using the export tools available within the software we can create rendered images and animations as well as push design information to other design softwares such as Civil 3D, Revit, Stingray, and 3DS Max. Each of these tools can be used to further the design or reach a higher level of deliverable. Infraworks has made it easy to continue your work on the project long after the initial site and project planning has been completed.

Bringing it all together
We will show some examples of deliverables in the live presentation at AU.

Thanks for joining our class.