

## Autodesk University | Revit Solutions for Electrical Contractors: How GTP Addressed our Biggest Headaches

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**JARED REGAN:** It's 1 o'clock now, and we're ready to get started here. My name is Jared Regan. I work with GTP Services, and we are a software developer. We work with DeWalt tools, Greenlee. My background is in doing electrical BIM work with Rosendin Electric out in Phoenix, Arizona, where I did a lot of family development, automation, prefab workflows. So I cut my teeth out there for a good number of years before coming over to GTP. I worked in Revit for several years, and I saw that there was a lot lacking on the offering as it came to the electrical contractor. And since then, we've started development on this project. And I have Dan Wilson with me here from Valley Electric.

**DAN WILSON:** Hi, my name's Dan Wilson, and as Jared said, I'm with Valley Electric in Everett, Washington. A little bit of my history. I'm a 25-year electrician and electrical construction, and I've been using Revit for about eight years now in a virtual construction department.

I've worked with Jared, I don't know, several years ago at Rosendin for a while, before I moved to the Pacific Northwest. So I'll hand this back over to Jared, and you're going to--

**JARED REGAN:** We'll get this rolling.

**DAN WILSON:** --take us for a ride.

**JARED REGAN:** So we've got the class summary. Same class summary that was used on the AU site. At the end of this, we're hoping to identify some of the holes inside of Revit as it pertains to electrical subcontractors. Integrating feeder schedules into Revit projects and the value that can bring, as well as how we can minimize data entry, and utilize model information to improve construction workflows.

And so when we look at the electrical construction market, it's unique from the mechanical market in that it has a lot of components that aren't necessarily modeled all the time. The wires specifically is a big part of that. The straps on the unit strut, all the parts and pieces that go into it. A lot of times, it's a lot more generic, and a lot of that is handled by the field. You'll see a very high volume of material used on the installation side, as well as an unfortunate coordination priority.

Most of my experience has been with the mechanical, with running the coordination meetings and the general philosophy of smaller items move out first. We also see mechanical and

plumbing getting early starts, being able to start their prefabrication earlier and lock their parts and pieces in, which has been an unfortunate way of going about it. So we looked at how we can improve the workflows and try to make it a little more intuitive inside the software to hopefully be able to create the information to really be able to stand up in the coordination meetings and identify where you can protect your company's interests.

And so the first thing is that this is all based in Revit. And just on a show of hands, who all in here is currently using Revit? That's really good then.

**DAN WILSON:** Awesome.

**JARED REGAN:** So everyone's probably familiar with some of the problems we'll look at. But they're both drawing tools. There's no one that says you can't do BIM work on AutoCAD, but it has that database associated with it. And that's where we see a lot of the information in BIM being utilized, and the customizable nature of it makes it very flexible, gives you a lot of avenues to figure out how you can innovate and improve your own workflows to better compete in the market.

And so as we work with parameters, I've got a set of custom parameters that I've loaded in here. And so I'm sure everyone's familiar with the joys of if we pump the information in here, and we have to start going through the coordination process as we start changing fittings, deleting things, adding offsets, adding added content, that information is consistently lost. So if I were to delete that fitting right there, it's got all the information in it. If I trim and replace that fitting now, we're going to see that lost the information.

So during the coordination process, you've got these parameters, you want to be able to utilize them, but there's a burden of data maintenance that goes along with it. So it backslides on the value that Excel database or the back-end database that Revit offers to really bring itself above the standard AutoCAD offering. And the same thing will happen if we do that main, just a minor adjustment. We didn't even delete anything, and it still recognizes a new instance. It's a piping software. It assumes that different instances won't share those parameters.

And so we've had a number of problems just having to retype that information. And the more you retype it, the more you're exposed to typographical errors. It's redundant work. And everybody loves the data entry portion of the job. That's everyone's favorite. That's how we like to spend our time. No, we want to keep moving.

And we also have this similar issue inside of Revit, where if we create the feeder schedule or if we created a conduit run schedule-- let's see if this pushes up. I might have put the wrong image on here. But we have the issue of trying to get a hold of the actual information with the overall conduit run length. The parameters don't want to talk to the current run schedule. Most people use the comments parameter, which was the workflow that you were working on. And what we see is that it has the same issues. If the comments are consistent throughout all the parts and pieces, then it will talk to the conduit run schedule. If it's not, then you find yourself having to maintain it. So you have this break between access to information and trying to cut the time between how much am I going to spend inputting information, versus how much do I want to have access to the live information.

And that's where WireWorks came into play. It was initially just a simple solution for being able to push information to the conduit run schedule. So over here is the conduit run schedule. I've got it loaded up, and if I start putting information into the parameters, we're not going to see it populate up. I've also only got one conduit selected. So once the information is loaded in there, we won't see it on the far end. We do have the ability to click the conduit run cleanup button up here, and it QAs the entire project and ensures that information is consistent throughout all the parts and pieces, as well as pushes that information up to the conduit run schedule.

So now if you're associating things like wire, if you're looking at from-to information, you can start pulling that information down and using it for material takeoffs, for if you wanted to assume ads on the other end, you can start looking at circuit drop, things like that. But it's the best way to get access to this overall run length, which is the valuable parameter. But again, it's inhibited by the fact that information doesn't want to flow from the parts and pieces up to the run schedule.

And so we can also set this whole application to run automatically. And so if I started drawing from here, and I placed that information in there, as soon as that information goes in, it's populated throughout the run. It comes up the run ID. So if we're running in an automatic setting, now we can start doing what if scenarios. If you're doing change orders, you can get your length information on it. You can start really capturing instantaneous access to data and being able to pull all that information down. And so now you're not having to retype that information over and over again. And that alone has been a significant time savings for electrical contractors.

And so recently, we've added a feature known as the Master Conduit setting. And so what that is is the ability to mark a conduit as controlling all the information downstream. So if you have information in there, but you're concerned about people updating it throughout the coordination process, what you can do is you can mark one of these and say, this is the master conduit. And now any information input into that conduit will feed down. Any information put into the rest of the conduits will be automatically overridden.

So we'll put in our standard information. You can see we've got the ID, the from and to. And so if I were to start trying to adjust that information, it automatically reverts back. Same thing with the from and to. But if I were to start accessing over here, now I can drive all the information downstream. So we see different contractors taking the stubs out of the top of the panels, marking those as the master conduits so that anything drawn off the end knows exactly where it's going, and now you're not in a position to lose that information on the upstream design.

We've also got workset synchronization. So I'm sure we're all chasing large projects here. There's multiple people in the model. We're doing different worksets. So when you're going through, you're clearing clashes and you're making coordination adjustments, it's easy to have the workset be taken up by your active workset. So this is all being drawn on workset one currently, and I'll switch it over to a different workset.

And the same logic that we've used to approach the parameter data and making sure that it stays consistent along the run is being done inside of here. So even though my active workset is a working workset, as I go through and make adjustments, if I start drawing off the end of it, if I start adding things to do an offset, maybe around a pole, all the information is still live in there, and it's on the same workset. So if you're using worksets to handle your exports, your deliverables, to the GC, now you're not going to have any of those pockets, where a fitting might be missing, or a small section has been added, or copy-and-pasted and ended up on the wrong workset and didn't get exported. Because you don't want to be trying to add that stuff after sign-off.

And so that was the original release. We wanted to figure out a way to get the information so that you didn't have to continue typing it. Just patch some of those holes that Revit can leave there. And so we started looking at the feeder schedules. And so is everybody in here using feeder schedules on their jobs to track from-to information? Is everyone seeing that, coming off of the one lines? It was a workflow that I had seen being implemented on jobs that weren't even haven't been done on them. I thought to myself, I'd love to use that as the design criteria.

And it's nice, because we can externalize a lot of this and a lot of this work on the field, so they can decide if they want to run it as four three inch or three four inch, they have those options. And they can start deciding how they want their job done. And what we've done from here is we've been able to import that directly into Revit to create what we call the intelligent schematic. And it'll go through. This is a 10-story building. And it takes about 60 seconds to load it all in. And it'll go through. It QA/QCs all the information. It'll identify if you have conduit runs that are over 360 without a pull point on it. It'll identify if the conduit trade size in the model isn't aligning with what was requested inside of Revit.

And you can continue to actively update that feeder schedule, so if you're on a job where they're breaking things down into sub-panels, you can just send that back over to the modeling team, and they have visibility to it. And so it has all the requirements of the things that will need to be included in that model. And there's some color coordination. The dashed lines are incomplete runs or disconnected runs. All the red lines have-- here's where it's calling out the conduit size. The red lines represent overbent runs, so it automates a lot of that QA/QC.

And then to take it a step further, we wanted to figure out a way to take even more of the typing out of the equation. So as you can see, we can double-click the nodes inside the feeder schedule, place the equipment from that interface, and it pushes the information into the family and automatically keeps track of it. So anything that's been requested in that feeder schedule will be reconciled in this schedule, and it's got a percent complete up here to help give some visibility as to what the progress is on the distribution system.

We also see-- I think, Dan, you guys were doing where they were calling out the home run boxes outside of the panel so that they could get that overall run length and then be able to prefab that branch panel. Have all the whips coming straight into the box and then be able to deliver that to the site. And you can get all the wire material information on it and then push it from there.

And so now we look at the philosophy of what we're trying to do here. A lot of this is based on the idea of automating the QA/QC in such a way that it makes more sense to engage a skilled tradesman on this. If we can take the typing out of it, it makes it a lot easier to bring someone in from the field. No offense, Dan, but they tend to not the type that fast.

**DAN WILSON:** No, I don't type that fast.

**JARED REGAN:** Are you still doing two fingers?

**DAN WILSON:** Pretty much.

**JARED REGAN:** Yeah, so it's a burden that can be inhibitive, because it takes time. And time is going to be money, so if we can take that out of there, not only can we reduce the exposure to typographical errors and make sure that the information is flowing through as it was requested, but it makes it more easy for someone to come in from the field and engage in this. It's not that we couldn't identify that a conduit size isn't the right one, or that things have more than 360 degrees and bends in it. It's just not a good use of your time, especially if we can get the computer to automatically recognize that on your behalf.

And so we can also recognize disconnected runs. All of this is done without using conduit connectors. Is anybody using conduit connectors on the tops of their equipment families? You are? I usually get nos from everyone on that question. And the reason why is that when you start adjusting that, it wants to reconcile the routing. And it's a piping software, so it just throws 90s in everywhere. And assuming they actually do it in such a way that you can bend it, nobody's going to want to pull it. And so I'll be able to point out how we can recognize, without using any of the connectors, if something's moved. So you can make the decision on do I want to move the conduits to the panel or the panel to the conduits?

It'll also recognize if things are taken out of the feeder schedule and they're left in the model, it'll point that out for you. It'll make sure that what's being requested in that Excel spreadsheet is being driven inside the model, and really framing out that design criteria.

And so one of the most recent features we've been able to add in here is the ability to do a wire length addition on equipment. And so we can turn over a parameter. This works with existing equipment families, pull boxes. We can provide the parameters so you can go to Autodesk Seek, pull down a Thomas & Betts LB, drop that parameter in, and now it's interoperable with this system. And we can define at the instance or the type level what the makeup is inside those pull boxes. So if we start upsizing pull boxes, it automatically accounts for the wire makeup in there. And what that allows us to do is be able to lock in our copper prices sooner and get the buyout done earlier, so that we can go to whatever wholesaler distributor with a larger order and hopefully negotiate a better price. And then if information is undefined, there's a global customizable setting that you can do to just put in there as a backstop.

And so with that, we also have the ability to do wire pull calculations on this. And so it's looking at tension, sidewall bearing pressure, as well as the change in angle. This again is all customizable. So if the job spec says that you can't go over 270, we can program that in. And so you can see that 270 is acceptable here, but when it gets above 270, we start having our issues. It also identifies any tension or sidewall bearing pressure failures. We can expand this out and identify specifically which component is the failure point.

And the philosophy behind that is we could theoretically start placing conduit bodies and things like that, but it makes more sense to be able to identify it, because you're going to have more visibility to the backgrounds to make sure that that box is going to have clearance access, to make sure that all the coordination decisions are still being made by someone with experience in doing this. And so it's very easy to identify it with the hope that if we can put it at the most crucial location, we can reduce the overall number of pull sites on the job, and really bring out some labor savings.

And conversely, when I was talking about the coordination aspects of it, if we can capture what the cost is on the number of pulls, the number of pull sites that are being added throughout the coordination process, it's a more tangible value to come back to them and say, hey, coordination is not about making the electrical system into spaghetti so that the pipe guy doesn't have to move anywhere. And you can actually get tangible values to it to be able to push that information out. It's also exportable, so if you're doing prison jobs, if you're doing government jobs where they want to see all the stuff documented, it can be exported out. It breaks down the straight components as well as the bent components and has all that information in there.

So right now we're looking at this line right here. It's overbent. It's got more than 360 in it. And so if I wanted to drop a pull point in, all I would need to do is come in and split the conduit. I'll delete out that section, and I'll drop in a pull box. And the same way as we didn't need to use connectors for equipment reconciliation, we don't need to use them for pull box reconciliation either.

So that line is still reading out as broken, because it's not up to the face of the box. As soon as it goes through, the line goes complete. I can hover over it and it gives me the change in angle on either side of the pull box. Looks like it cut off a little bit there. So it's got the number of junction boxes as well as the wire length and a conduit length, including the makeup inside the equipment and the panels.

So it gets a much more comprehensive representation of the actual installation, and you'll never find yourself in a position where the inspector comes through and he says, oh well, that's under 360. Well, that's fine, but you can also run those pull calculators. Say if I put a pull box in here, but I've got my fancy lubricated wires or lubricated conduits, we can actually identify whether or not we can just pull straight through. So we can still be code compliant without necessarily having to add labor to the overall workflow. Yes?

**AUDIENCE:** Does it include [INAUDIBLE]?

**JARED REGAN:** Yes. You can program all that in, and that can be done, again, at the instance or the type level. And so if you're parametrically changing those box sizes, as it changes, it can increase. And so it captures all that information in there. And so this one is still red. So that's that line right there. And so as you go through this, it's really easy, again, to identify where you're overbent, where you need to put those components so you're getting a more accurate representation of the final system. And you get a better coordination representation. And you don't get caught up in the [INAUDIBLE] cycles.

And so as I had mentioned we can double-click the nodes right there. And if I were to grab this piece of equipment and move it off, the line's going to update and go dashed. And so that would be the situation where we can decide whether or not we want to move the conduits to the equipment, or move the equipment over to the conduits and be able to capture all that information. And so during the design process, if panels are moving on you again, we don't necessarily want Revit to handle that auto routing for us, because it's going to put in 90s as much as it can. And that's not going to get a good response from the field.

And so now we take this information, and we wanted to make sure it was broadly interoperable, because the electrical contractor has been neglected for so long. Everyone's gone on their own divergent paths. So all of this can be mapped into your existing parameters, existing schedules, existing tags, templates. We've had success on direct integration into active projects, as well as getting integrated into newly. The contractors newly adopting Revit. We can use your existing equipment and pull point families. It also integrates with Schneider Electric's LayoutFAST. We haven't had many issues on, actually any issues at all on the direct interoperability. It's all based off the general parameters. As long as you're using the electrical equipment category, and you're populating that panel name, it's going to reconcile automatically.

We can also map that information of the feeder schedules directly into Revit. And I'll talk about how we can bring value backwards out to that feeder schedule here shortly. We also have direct integration with the Greenlee BendWorks application. And it's not to say that we couldn't place couplings and give you dimensions. It's just that they-- by show of hands, everybody have a Greenlee bender in their shop, I assume? They're dominating the market. So rather than try and create our own solutions that will displace existing partners, we engage with them. And we actually do the development on BendWorks.

And at 4:45 DeWalt is going to be releasing the HangerWorks application. And that does seismic trapeze. And so with all the information on it, it's much easier to capture all that coordination. Be able to create an accurate representation of where my couplings are going to be. Where my hangers are going to be. If I can pull my accurate wire lengths and associate it back to the ID, now we can start spooling our own wire in the shop and cutting down our reel inventory on the job site. If we can aggregate all this information, then we can start really doing the material buyouts and providing value to the management team.

And then just recently we won the Showstopper award out in Boston at the NECA conference for our integration with the ConEst estimation system. And so we have the ability right now to take this information and push it right back into your IntelliBid database, which you're not going to use that to estimate a job, because you're not going to go through and model the whole thing and then give them a bill.

But what you can do is if you're doing value engineering, if you're doing change orders, if you're doing design build workflows, you can just kick out a take off. And inside of ConEst, they have a bid analysis tool. So you can compare your post-coordination information with your original estimate and get an accurate breakdown of what went wrong, how accurate was the original estimate, and what changed throughout the coordination process?

And so if I go to the field and I ask him to compile that feeder schedule, they usually would ask me, what are you going to do for me? And so we created the ability to export all that wire information right back into that same feeder schedule. And so we can capture the conduit, the wire. We can aggregate that in Microsoft Excel to create that buyout and get the accurate materials.

We also have our wirepull documentation loaded in there. We can provide access through a free license if the engineer wants to see what those feeder lengths are, but he doesn't want to

get into the nitty gritty of having to navigate a Revit model. We can kick out that feeder schedule. We can export it as its own separate file, provide him a license, and he can go through or that person can go through and access all that same information.

So it functions as both a project management tool as well as a design tool. And all that information, again, makes its way back into the conduit run schedule. And this is a license that can be deactivated and moved around between multiple users. So when you deactivate that license, it doesn't go through and delete all that information out. It's always going to live inside there. So you still have the ability to access it inside the project, as well as through tags, schedules. Have all that information layout on the sheet. Accurate. The exact information that the field requested with all the coordination lengths that you have designed.

And so now when we think about how we bring value, it's much easier now for us to bring in a skilled tradesman. We are the Autodesk skilled trades representatives, so we work with the JATCs, the IBEW, the UA on getting the software in their hands. Get them training, get them experience with robotic total stations, all that good stuff. But we wanted to make sure that we're making the software more and more user friendly. So it makes more sense to bring those people in. Now that we've got accurate material breakdowns, it's a lot easier to start ordering your materials. You're cutting down the scrap on the site.

It opens up opportunities for other prefabrication avenues as well. We've got accurate circuit lengths, so now we have the doors open to start looking at voltage drop issues, dependent upon the information that's available in the model. It's not unreasonable to believe that we'll be able to do arc flash as well. And the accessible parameter data, this pushes right back in. So if you have existing template schedules, tags, this will be directly interoperable.

And a nice layer of assurance on the code compliance side as well, so that you don't have to deal with the inspector coming through and giving you a headache. And so, Dan, you want to take over and discuss your experiences and the return on investment you've seen?

**DAN WILSON:**

Sure. And I decided to do a little return on investment thing of the most simple part of this, where we find value that most people might even just overlook. So I looked it up. An average person, not being me, would type about 40 words per minute, with typically an 8% error rate. So we figure we run probably 10 to 12 parameters in every conduit. Depending on if it's branch conduit or feeder conduit, the parameters are going to change. And all of that data has to be scheduled out. Goes to our PM for buyout, our field for installation purposes, anything

like that. So we started looking at this a little bit.

Well, if we do 20 words, roughly, per conduit, and we have to update that probably five times minimum during coordination. Like Jared spoke to earlier on, that when you break a conduit, redraw it, you have to re-enter all that data over and over and over. So I'm being on the light side, but five times is probably a good average. During 90 days of coordination, that's 100 additional words that we've got to go back. Doesn't seem like a lot. We're easily doing 100 conduits on a project, because we're modeling everything. We're modeling 1/2 inch conduit in the wall, 3/4 inch home runs. We are modeling everything.

So easily 100 words per project. So that's 100 conduits per project, that's 10,000 words. Error rate at 8%. Now we've got 800 errors. How do you put value to that? Hope you catch it? What if you don't catch it? Then there could be a lot of cost involved in all these errors from retyping.

I used our burden rate. It's a basic rate. \$75 an hour, \$1.25 a minute. That's the burden rate at our shop, roughly. So you start doing some math here. It's 250 minutes. It's only \$312 per project in a quarter. Our company is averaging 12 projects a year that we're using this software on. So just in simple typing and errors, we're saving \$3,700. And we're not even looking at all the other things this does.

When we first met up with Jared and his team, they asked us what we needed. Two things we needed more than anything was fix this problem. And the second thing was allow us to schedule our user-defined parameters on our conduit run schedules. We use pretty much everything. I mean, I get updates from you every couple of weeks. So that's why he really ran through this more than I did, because he knows it. When was your last release? Last week or something? Two weeks?

**JARED REGAN:** Our last release went out about early October. And that was the integration of the wire makeup. This product has been in development for about 14 months, so it's definitely got a lot of room to grow. And in that time we've been able to engage a number of contractors throughout Pacific Northwest, down through Atlanta and New York.

**DAN WILSON:** We're using the schematic on our branch conduits. So we know if we need another four square box somewhere. I mean, we're getting down into the nuts and bolts of things. And it's been a great tool for us. And I was very happy to be here to help share this tool. It solved a lot of our problems for our scheduling needs. Does anybody have any questions?

**AUDIENCE:** MC cable. Does that [INAUDIBLE]?

**DAN WILSON:** So for MC cable, we're currently modeling 1/2 inch conduit. A lot of the stuff we model never goes to coordination. It's strictly for field use. It's for field use so we can tell them exactly how long the runs are, what wire, what circuit. We know how much blue number 12 THHN do we need to order for this job. Because by circuit number, we can tell what color it is. So yes, we're taking it down from the home running box down the walls into the devices. Our goal, where I'm at, is to model 100% of everything. Model and schedule everything. And we're only doing that for prefab reasons. At our company, we're trying to get better at prefab. Trying to stay on top of the current marketplace, and this tool's helped us do it. And you had a question, sir?

**AUDIENCE:** The marking the master conduit that then pushes that data out to all the other conduits. Is there a way where you can see which ones those are, or do you just have to remember which one it is?

**DAN WILSON:** Good question.

**AUDIENCE:** [INAUDIBLE] making those your standard masters, that's easy. But if somebody [INAUDIBLE] and makes their master somewhere down the line, is there a way to find that?

**JARED REGAN:** It'll identify it. It'll turn it off. And then with that, all of these, all the parameters are existing inside the conduits. They're all shared parameters. You can develop, you can export them, develop tags off of them. You can also lock them down through pinning and through workset access. And then also you can do filters, and run all of that as well.

**DAN WILSON:** That was a pretty good update, because before that, we found problems where somebody would change something on the other end of a conduit, thinking it was a different run. And it would drive the data back, and it would be the wrong data. And that master conduit data solved that problem for us.

**JARED REGAN:** Or if you find yourself doing a fair amount of copy-paste work as well, it's easy to take that information and put it on the run. And now you've got different information on either side and you know exactly which one's going to pass straight through. If you're not using that master conduit setting, it'll prioritize what was put in by a user over a copy-paste situation. And so if I copy and pasted some content over, and it connected with something with the information in a line, it would go by majority rules. And so it would assume that the most common data is going to be the more correct data.

**DAN WILSON:** Yes sir?

**JARED REGAN:** Yes?

**AUDIENCE:** What about transition from PVC pipe to EMT? How does it-- does it know when changes [INAUDIBLE]?

**DAN WILSON:** We're using different types of conduit. And when we make that transition, we use the out-of-the-box Revit connector. We cut the pipe. We've just done an Edit Type, change the type to PVC to GRC connector, GRC to EMT. Whatever, so we'll have different connectors that we'll use at those locations.

**AUDIENCE:** And how do you get the wire [INAUDIBLE] wire from point A to point B?

**DAN WILSON:** It's still the same conduit run. So it's just that conduit run now has multiple types of conduit used throughout it.

**JARED REGAN:** And with this as well, there's a fix in there that I didn't include on this, but if you've ever had to go through the Change Type exercise, it has a bug inside of Revit where it'd actually delete the conduit run directly out of the database side, as well as level all the parameter information you might have put in it. And we've been able to solve that as well. So it's a lot easier to make those transitions. And that was part of the integration with the BendWorks application. In that application, you choose your conduit based off of the material in the bender, and it'll size the radius for you, give you inside outside diameters, all that good stuff, and give you your prefab information. But if they decide we're going to use an 855 in the field, and we're going to use an 881 in the shop, if you need to make that transition through, now you're not going to lose any of that information. So you have that flexibility to go in between types without having to retype any of that information.

**DAN WILSON:** Anything else? Everybody enjoying AU?

**AUDIENCE:** Absolutely. Did you guys, I know SysQue the difference between you guys and SysQue. SysQue's [INAUDIBLE].

**DAN WILSON:** I've been through the SysQue demos. They've been to our office a couple of times. There was some things about it that I really did like, and there was some things that I didn't like. I'm not a fluent user of it. But it's almost apples and oranges in some ways. SysQue kind of would relate more into BendWorks than this application here. It comes filled with a library full of stuff that we

didn't want to use was one of the big things. Anybody else?

**JARED REGAN:** Awesome. Well, we are running a little bit early. It only takes 30 minutes to get through the demonstration. We like to think of it as being elegant in that way. If there's any other questions, we'll be at booth 2680, and feel free to come by, drop us a question on any information we can provide you. We'd gladly, gladly have that conversation.

**DAN WILSON:** Thank you, everybody.

**JARED REGAN:** Thank you.