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Cut 3d model revit to autocad

During my daily routines in the office, I often get certain questions from colleagues which by their nature should be fairly easily resolved. As is the way with all things Revit and BIM, there are always nuances that become nuisances, which inevitably eat too much of what was already a limited time investigation on a particular project. One such case happened a few years ago when a colleague asked why CAD DWG's they had plugged into their Revit file did not cut and present correctly. I immediately found a workable solution and we all then moved on with our lives; But this week a junior colleague once again asked the same question – Why is the linked CAD DWG not cut into the Revit Plan and the view of the height? Again, I went down the rabbit hole (which is my job) but emerged thinking that it might just be a valuable online resource to someone (and have looked around at nothing but sub-par forum posts for answers to this question I might be right). So again, the question is – Why not enter CAD objects present or cut properly within Revit 2D views such as Plans, Heights and Sections? What exactly can users do to solve these problems? Here's the answer – Imported and Linked CAD objects are not cutting into your Revit Plan, Section, and Height Views as you'd expect because they're not categorized within your Revit Model. As Revit is an object based design software it has a set of rules (in Revit's case, parameters) embedded in the API that describe how each object category and type should present depending on the view type and how it interacts with the object. For example, a Revit Door will show the door swing symbol in Plan when the Plan Views Cut Plane cuts somewhere through the door. If the Cut Plane was above the door height, no door swing symbol would appear. This is an example of a view that is controlled on/off parameters in action. So, here in lies the solution – we need to categorize CAD DWG that has been imported into Revit so that it can cut and present properly. As far as I can identify, there are two quick solutions to this. The first is to create an In-Place Mass or In-Place Component and load your file into The Mass/Component directly within the active Project file. Alternatively (and arguably more appropriate) to create a new Family that you import the CAD file into and then load into your active Revit Project File. The latter of the two solutions is my recommendation, and below I list the processes and reasons for creating independent families to resolve DWG presentation issues, as well as highlighting some notes worth considering before this is exercised. Note: I've created an accompanying video illustrating the steps listed on this post on Why Won't enter CAD DWG cut in Revit Plan and Views section. It is embedded below if it is your learning format. Enjoy! If video isn't your thing, continue passing the video for a more linear, step by step breakdown of the process. Understand why the Inset CAD DWG is not Cutting Correctly As I alluded to in the introduction of this post, the reason why all Imported/Linked CAD drawings do not cut correctly once demonstrated in your Revit Plans, Sections or Elevations is that Revit needs items that are clearly categorized into a known family type to follow the predetermined presentation parameters assigned to each category/family within the Revit model environment. Referring to the images below, you can clearly see that we must of the same CAD DWG is loaded into our Revit Model in 3D Space, but within the same view of the plan they present differently than on another. Why is that so? Firstly, we need to understand what we are looking at. These are a collection of ships shared to us by an external process designer so that we can realize our related design elements. We need to design and construct a platform around these ships, as well as integrate the various Piping and HVAC systems to support the processes. The ships stand above ground level on raised racks, which will then ascend through an access platform (flushed in accordance with flashing rings and profiles) so that they can be freely serviced. In the plane view shown below, we have set our View Range properties so that the Top of the View Range and Cut plane are the same, dormant 300mm above the agreed on top of platform level. The view extends downwards to meet the Platform Level, but cuts off at that point and should show any geometry below that point. In our test plan you can clearly see that the top image is effectively cutting and only shows 300mm slice of a view area over the platform, where as the lower CAD link shows everything regardless of whether the geometry is beyond the scope of the view plan. These are inconveniences people talk about when their inserted CAD drawings won't cut or present properly in revit plan and section opinions. Example of Same CAD Link normally appears in Revit 3D View Although it is the same CAD File, you can clearly see in plan as the top file cuts correctly to 300mm slice dictated by the View Range settings above platform where the bottom CAD file is not cut at all in Revit Plan As you can see, the view range settings for the plan view in this example was set for 300mm above the platform down to the platform only level. Visual representation of plan view range, create 300mm slice that cuts through imported ships DWG. So the question is, what did I do to present Top DWG on the Plan correctly? Well it's pretty simple, I applied a Category to CAD Data by inserting it within an already definite family type within using the following process: How to categorize your CAD data by importing it into a new family: So, what is the best way to categorize your Inline CAD dwg so that it will cut properly into your Revit Plan or Elevation views? Well, as I've said before you could just start an On Site Mass or On-Site Component Family and import your CAD files directly into one of them. I personally don't think of this as an intelligent option from a workflow and control perspective for reasons I can go into detail on request. I have found, through attempts and mistakes in professional practice, that in order to import CAD DWG into a new Family file offers both the largest model integrity and the optimal workflow for hot-swapping cad DWG data as the project progresses. So, what's the best way to do this? To start, you need to create your newly selected family to assign a category to DWG. This is obviously completely dependent on your use case and how you would like to present your CAD in Revit; A DWG of something similar to a custom made electrical cabinet should be placed in an electrical bias family type and so on. This is just loosely important, but the only rule to remember when choosing your family type to best present your CAD Data within is this; when in doubt, use Generic Model Families (like these present in the most predictable and intuitive ways within Revit). In our example, we have used a Generic model to load our DWG ships in. To do this, go to Revit – New – Family, and then browse through your particular family folder structure that could be derived from your specific office family templates or a national standard. In the example, I've used the UK Metric Family Library and selected generic model as family type. Once you've opened your new family, we'll now need to insert CAD data within the Family Model. To do this, go to Insert – Import CAD and navigate to your CAD file. In the Import Options list, select Manual Center and place the CAD file centrally within the Family. Note – you have very few Insert options within a family, so unfortunately you can only import CAD files, as if you were to link them they would act as nested links in each Project file after being inserted into the overall Project file and would be lost after some steps were taken to migrate the model outside revit (I know, clearly as mud). You should make sure that you choose the right family type for your needs. If cad dwg you need to insert has a specific function that is adjusted to a standard family type then you should use it. In the example I used a Generic Family. As you can see the insertion options within the family model are essentially limited compared to a project file, so we need to use Import CAD to place our DWG in the family file. One you have placed your CAD file in your Generic (or other) category, use Save-As to name and date your family and then load it into your Revit Project where you can now place it accordingly. This inline family with the imported CAD DWG should cut and present in a predictable way now, as can be seen in our example where the top Platform Cuts appropriately because it is now categorized within a family and bottom platform that is the same file directly linked to the Revit project (therefore remains uncategorized) does not. Things to know before importing your CAD data into a new family: As with all these workflows, there are a few things that should be considered before proceeding with the proposed method. While I understand this to be my preferred method of resolving the issue of CAD files not cutting into Revit's opinions, it is no means the only method and is also not devoid of pain points. Below I list what these are and what the working solutions to each of these pain points have been in my experience. It's a time in time – you can't use reload functionality as you could via CAD Linking As listed in the above paragraph on how to categorize your CAD data by importing it into a New Family, there are limitations with insertion options to how you can effectively include a CAD file in a Revit Family. The primary limitation that I see it is that you are only allowed to import CAD Dwg's into Revit Families and that there is no possibility of link them, meaning an update or reload of DWG is not possible should a new version of it become available. This may present something of an issue that now you have a static family in your Revit Project that is not updated as design data changes, acts as a desktop time. So how do we minimize revisions to this to make the update of the imported seller CAD information as seamless and painless as possible? Working Solution: The workable solution to this in my experience is actually based on common sense. In my example you can see that we have received Ships from an external Process Designer. These ships were originally sent in isolation, with no reference point to the building that they would be housed within. Luck would get it that this project was a retrofit of an existing fallow space so all design stakeholders worked to known building scope. In response to the first DWG I received (irrelevant to the building) I exported the Building Grids and some known relevant geometry, in this case a column and two overhead beams that the new platform had to tie to. I sent these back to Process suppliers and requested that they include these items in their CAD exports with ships placed correctly in relation to them. This is an absolutely fair request to make by another design stakeholder as they only provide setout for their own design elements Space. When we the cad export process with grids and columns included we were then able to conveniently place them within the building footprint after generic family had been loaded into our project. The generic model family of the ships was attached to the site once correctly placed within the Revit Project File. When the next CAD Export of the ships with the agreed Column, beams and grilles was issued to us, I was able to open the Generic Model family again, place the new CAD data over the existing using the agreed reference elements common to both and then simply remove the existing import. Then I was able to save Generic Family again with a name and date (the date is important that you understand what version of CAD data was received you are working on in your live project) and then loading that family into the project, overwriting the previous family and that's parameter values. Since the previous family had been attached, the new imported CAD DWG within the generic model updated to the correct position without further modifications. This whole process is less than 5 minutes and has little-to-no impact on users greater productivity. As you can see in the photo, the imported CAD DWG includes the agreed Column and Beams, as well as the Structural Grid so that the family can be precisely positioned and coordinated within the building model. Another potential issue that can be derived from the solution I have outlined above is what happens when the newly created Family that plays host to the CAD import is then exported for external use. A particular area I've noticed problems are occurring is in the process of running Clash Detection exercises in other software, such as Navisworks or Solibri. The question is a fairly simple one but depending on the type of CAD data you have imported may be worth considering. The family to which the CAD file is imported is recognized as a single object in conflict detection exercises rather than a series of CAD objects or meshes. This means, at least in our example, that a clash with a ship will highlight the whole family of ships as a conflict zone rather than the specific interface that causes problems. Thankfully I have a solution that solves this problem for all clash detection exercises implemented after the introduction of CAD DWG in Family. Workable Solution: Similar to the solution for the previous pain point, the solution for this problem can be solved by requesting that DWG be formatted with additional data prior to receipt. In this case, we should request that the CAD files include a project coordinate system/specific building ordnance. This allows us to turn off or hide the Revit Family in Navisworks (or an optional alternative external review platform) and directly add CAD DWG to the coordination review model to conduct clash detection exercises. This will make it possible to get an accurate position where cad model geometry collides with other objects but also allows us to maintain CAD DWG independently in the Revit file so that it can be presented exactly in living model and drawing data. That concludes this tutorial on how to make sure that your inserted CAD files cut into Revit views properly. Hopefully by now you have a good grasp of what it takes to move forward to resolve any CAD cutting presentation issues in your Revit plans, heights and sections, as well as the understand and the other less obvious warnings that may present themselves and how to navigate these issues comfortably and effectively. If you have any comments or useful tips/tricks that were omitted in the above please leave a comment below and we will add this post over time. Be sure to subscribe to the 8020 BIM Newsletter to get great notifications of my personal Revit revelations and notes on upcoming practical tutorial posts just like this one. A.

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