Revit Structure 2016

by: Lola Carbajal

Collaboration Motivation

It's like being in a tsunami… the collaborative environment has arrived in our offices and suddenly we have several tools to make our job efficient and successful. While the tools are very good and easy to manage, the change is not easy at all. We are going to see in this article how Autodesk® Revit® Structure and its users work in this type of environment.

COLLABORATIVE WORK AND REVIT STRUCTURE

Revit Structure has brought us the capability to work collaboratively in a project. It allows all members of the team to work in the same files for calculation, modeling, or analysis. The exchange of information occurs in "real time," allowing full coordination between the other different disciplines involved, the quick visualization of the impacts in the design process, and the facilitation of team decision making.

Revit Structure is a very simple, easy, and complete tool for modeling in 3D. Each component has the right behavior within the model, and the interface is clear and intuitive. The creation of families is also very simple, thanks to the available templates.

With these properties, it would seem easy to make the change from the old structural software to Revit Structure. But, unfortunately, while the advantages of all these features are clear and well-known and can facilitate and optimize our job, the process of implementation is, as I wrote in the introduction, not easy at all.

The use of Revit in a collaborative environment is perfect only when all the members of the team completely understand the new process of real-time collaboration. The process works well when they consider the consequences of their job for the rest of the team, and when they have good educational training about the new way of working.

I could write pages and pages about collaboration within Revit Structure. In fact, for me this is the first and main feature of Revit, maybe for my personal experience as a user, and always in large-scale projects.

I'm going to summarize the collaboration tools, but first I would like to speak briefly about the misunderstandings of this new environment.

THE FIRST MISUNDERSTANDING

When using Revit, your first impression could be that you are making a beautiful 3D model of your discipline. However, the real feature of this software is the amount of information you are inserting in this model and thus, sharing with the rest of the team and disciplines.

The way of working has changed extremely and Revit allows us to work with real-time information. This requires a good understanding and management of in-progress data.

The communication and coordination between all the participants become the main requirements to work in an efficient environment, as well as being proficient enough to use the collaboration tools within the software.

In working with Revit these last few years, I have met many really good Revit modelers, but a very, very small group of good team players. Companies with vast Revit experience, teachers of Revit, experienced users, etc. are often having problems related with the coordination in their project.

While making a good model is important, the understanding of the collaborative behavior is paramount for the success of these projects.

COLLABORATIVE EDUCATION

In my experience, the best way to solve the difficulties of working in a collaborative environment is simply education. The training of the team should be mainly focused on team building, and the use and importance of the collaboration tools.

Nowadays, the best worker is the best team player, and each member has to learn how to fit in for the best efficiency within the team. For the first time in our industry, we have to forget the individual fight for success, the competition to be the best… for the first time we are not doing our best work by ourselves.

This is the more difficult challenge due the big change in our mindset: the fight for power seems to be part of human nature. Who is now the best? Who is going to be the next CEO of the company? I'm not sure at all… but obviously it won't be the disruptive ones. Unfortunately, the collaboration is often affected by the will of power.

We need to train people with high skills to develop their abilities in this environment, and we need leaders capable of encouraging and engaging this kind of person to achieve the best result, the best performance, the best process. To do so, these leaders have to be able to recognize the skills and abilities of each member and help them understand this new way of working.

THE CHANGE IN THE WORKFLOW PROCESS

While good planning of work was a key action when working with individuals, now the results are better, thanks to the training as team players. How, what, and when to exchange information with the rest of the team and understanding the model as a data base in real time for all members is a mandatory skill for a good Revit user.

To achieve this, we must establish fluent communication—through email, instant messages, etc.—and schedule frequent meetings to speak about the progress of the project and coordination issues.

A deep knowledge of the standards, and the establishment of protocols and efficient workflows are other tools to ensure the quality of our project.

THE COLLABORATION TOOLS IN REVIT STRUCTURE

Revit Structure has multiple tools to allow a good collaborative environment. They are located in the Collaborate tab of the ribbon, and they are easy and intuitive to use if you have the training and understand the importance of using these tools (see Figure 1 below).

When we are working in a project as a team member, we use the Worksharing features of Revit Structure. This is possible by creating Worksets, the main tool for worksharing. We'll examine these tools briefly, but I encourage all Revit users to read the Revit Help within the program to learn more about them, giving special emphasis to the best practices in collaboration using Revit.

CENTRAL MODEL AND LOCAL MODELS

Worksharing always requires careful planning and management. If we are working in a Revit file where no one else is going to work, we don't need to enable worksharing through the use of Worksets because they are not justified, and they shouldn't be used for different purposes.

Figure 1: Revit collaboration tools
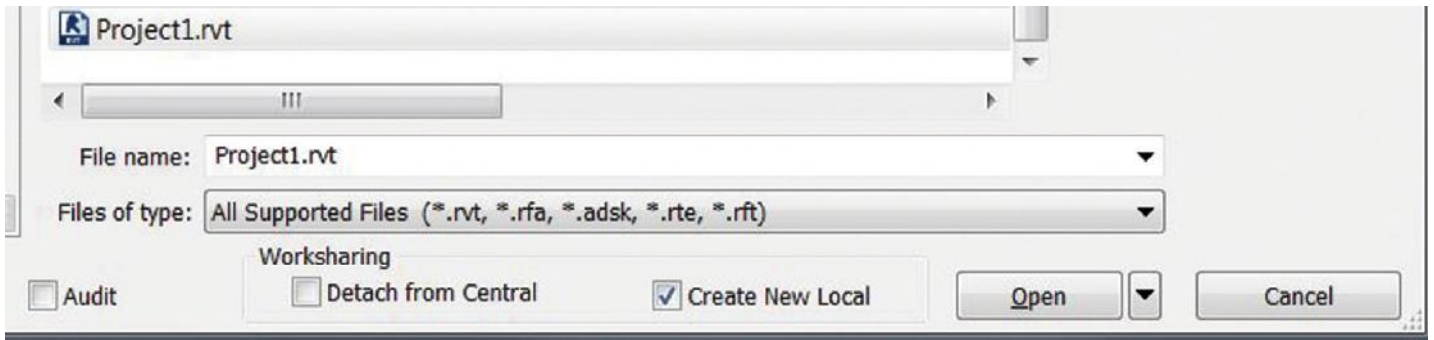
Revit Structure 2016

Figure 2: Creating a new Local File

However, if we are working in a file where other people are going to work, we must enable Worksharing. This is possible at any stage of the model, and allows each team member to make changes and work simultaneously.

To accomplish this, we have to create Worksets and save the project as a Central Model. Every modeler must create a Local File by opening the Central Model, selecting the Create New Local box, and "saving as" a file in a local folder. The Central Model then becomes the master project model for a Workshared project, and the Local Models are the copies of the project model that reside on the computer system of each team member who is working on the model.

When Worksharing is used to distribute project work among team members, each member uses a local model to work on his or her Workset (functional area).

Team members periodically save their changes to the Central Model so that others can see the changes and update their Local Models with the latest project information. We can use the Reload Latest command to update our copy of the project without changing the Central Model. This practice saves time by eliminating the need to reload the model during the save-to-central process.

It is a good practice for Revit users to create a local copy of the Central Model every day, and schedule the sync differently from other users.

It's also recommended to Save to Central with the Compact Central File (slow) option selected. This option is used to reduce file size when saving workset-enabled files. The process of compacting rewrites the entire file and removes obsolete parts in order to save space. Because the compact process takes more time than a normal save, it is strongly recommended that you only do this when workflow can be interrupted.

WORKSET MANAGEMENT

A workset is the collection of elements in a Workshared project. It's important to think about the worksets early in the project, clearing the way to split the model for the best organization of all users who are going to be collaborating for the entire lifecycle of the model.

We can create worksets following different criteria, and in every company, team, or project it will depend on the way of worksharing, as described below.

- For structural models, where there is one person working in steelwork and other one working in concrete components, the worksets could be "Steelwork" and "Concrete."
- In other structural models with a different distribution of the tasks, they could be "Columns," "Beams," "Slabs," "Walls," and so on.
- In other disciplines such as architecture, worksets typically define discrete functional areas such as interior, exterior, site, or parking. For building systems engineering, worksets can delineate functional areas such as HVAC, electrical, plumbing, or piping.
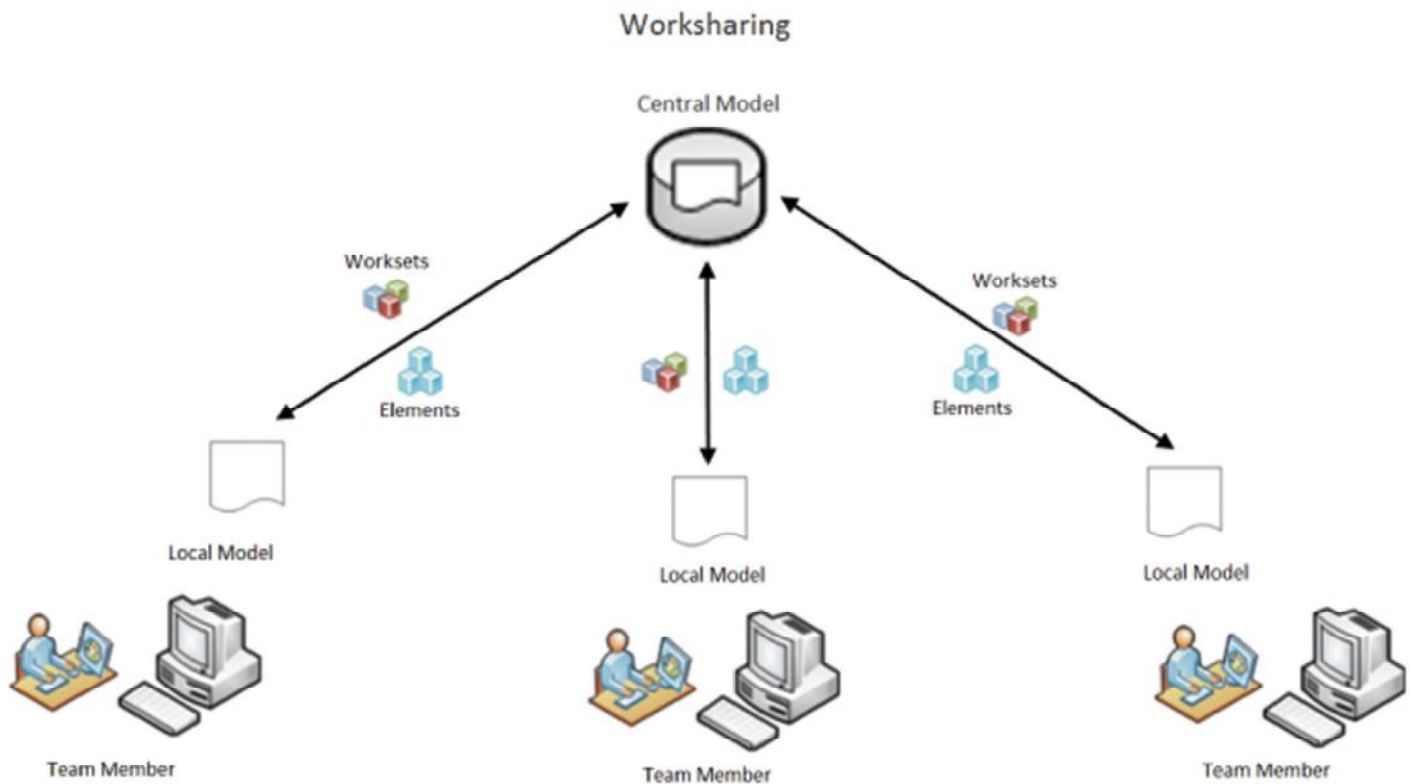
Figure 3: Revit Worksharing

EDITING WORKSETS

Workset Owner

Every workset should have an owner responsible for the content and its consistency within the whole model. This ownership can be temporary while the person is working in a specific group of objects, or can be permanent during the creation of the model. It's recommended to have a responsibility matrix, so that everyone understands work divisions and project schedules.

We control the ownership of worksets through the Worksets dialog box. It's a good practice to make editable only the workset where we are working, taking exclusive ownership of all objects in it. Only one user can exclusively edit each workset at a given time. All team members can view worksets owned by other team members, but they cannot always make changes to them. This restriction prevents potential conflicts within the project.

Workset Borrower

It is possible to borrow an element from a workset that you do not own. When you borrow an element from a workset, your user name is listed in the Worksets dialog as a borrower. Your name also displays on the Properties palette for the Edited By parameter.

The simplest way to borrow an element is to make a change to the element. If the workset to which the element belongs is not owned by another user, you automatically become the borrower of the element and can make changes.

If you are editing an element owned by other team member, a message displays allowing you to place a request to borrow the element. The owner receives automatic notification of your request and you receive a notification message when the request is either granted or denied.

If the element is being modified by its owner, the same message displays indicating that you cannot edit the element until the owner resaves the element to Central, relinquishes it, and you reload the latest.

When you synchronize with Central Model, borrowed elements are relinquished by default.

OPENING WORKSETS

When we are working in a workshared project, we can select the worksets to open. By opening only selected worksets and leaving others closed, performance improves. This is very useful when we are working in large and heavy models and we don't need to see all the elements.

Closed worksets are not visible in a project, so less time is required for common operations such as opening files, opening views, redrawing the screen, and snapping. It's a good practice to close unneeded worksets to release allocated RAM for use in memory-intensive tasks such as printing and exporting.

You can open worksets from the Open dialog when you initially open your workshared project, or you can open them from the Worksets dialog in the project.

Revit Structure 2016

MONITORING COLLABORATIVE WORK

Project coordinators will have responsibility for certain tasks to guarantee the best result in a collaborative environment.

The first thing to do is to ensure that all of the team members know the processes, protocols, standards, and best practices or, in other cases, facilitate the necessary documentation or training.

After that, prepare the files with the objects to share for all the team members such as grid, levels, views, templates, project coordinates, and shared coordinates, etc. This is a very important task for achieving the consistency between the different files of the project.

It is best practice to specify the default view that is opened when the Central or any Local Model is open. Use a simple view where you post project information or notices to share with team members whenever they open the model.

It is recommended to periodically open the Central file with the Audit option selected and then save the file. If corrupted elements are encountered during the audit, they are deleted if possible, and the user is notified.

Ensuring that a sufficient number of backups are being created is also recommended. At a minimum, you should have at least one backup for each member of your worksharing team in order to increase the likelihood that each team member's data is saved as part of the backups.

Checking out a workset may occasionally be of use if certain model elements, such as the building grid or linked files, need to be protected from accidental change. In that event, BIM managers or team leaders can check out a workset containing project elements that should not be casually edited or relocated.

There are different tools within the program to use for the best coordination.

- **Copy/Monitor**, to ensure that design changes to levels, grids, and other elements such as columns, walls, floors, and openings are communicated across teams.
- **Coordination Review**, to review warnings about changes to the monitored elements, communicate with other teams working on the same project, and resolve issues regarding changes to the building model.
- **Interference Check**, which identifies elements that interfere with one another in a project or between the host project and a linked model, and it can be used on all of the elements in a project or specific categories of elements.

For example, by selecting the beams in the current project, and ducts in the linked MEP project, the interference report will identify any interference conditions between those elements. This report can be viewed in the Revit project, or it can be exported to an HTML file. Once the situation has been fixed by either moving the beam or the duct work, the tool can be run again, and the interference will be removed from the report.
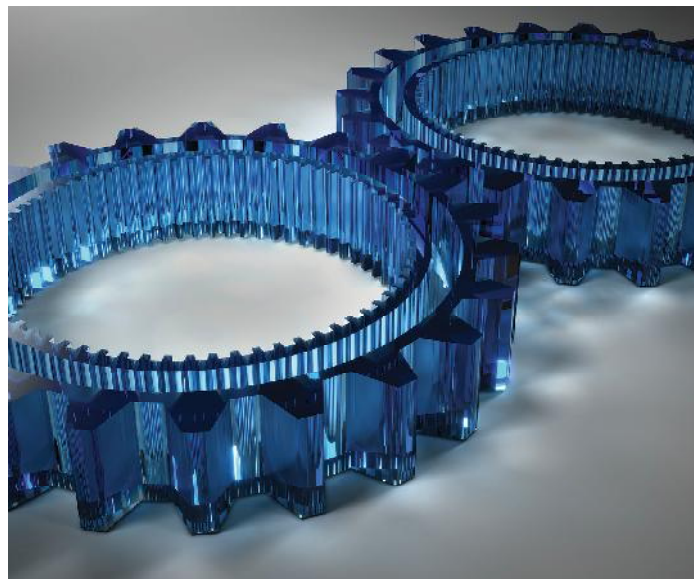
THANK YOU FOR COLLABORATING

The AEC industry is changing and the workflow process has become so different that adoption is challenging. The lack of good workflows and the new problems we are facing every day are balanced with the enthusiasm of the professionals in this sector. Collaboration is not only in the office, but also everywhere around our profession. A new work culture is born and we have great tools to make our job easier.

I would like to thank all the BIM Coordinators in my company because they are always supporting the rest of the people with the same role—sharing their experience, their knowledge, resources, etc. I would like to mention that we are using Slack as a tool to do so.

Thank you to my Google community "Revit Structure" because they share all their information with the rest of the world. To each one of the 555 people—today—that joined the group to learn and share, my apologies for my lack of attention lately!

Thank you to all AUGI members because we are joining our voices, efforts, passions, experiences, and knowledge. Thank you to Kimberly Fuhrman for making possible this Collaboration article, and thank you to Autodesk for making it possible to meet Kimberly and other contacts at AU 2014.

Lola Carbajal works as a BIM Coordinator in Foster + Partners. She first started working with Revit as a Structural Revit Technician and is a passionate user of this software and its capabilities. In her current role, she is implementing Revit in large-scale projects, establishing the best workflows and protocols for the best coordination and collaboration of all the members of a huge team.