

APTI - Technical Committee for Documentation BIM Newsletter



Welcome to Our Very First BIM Newsletter!



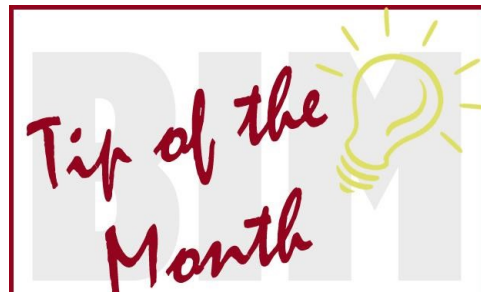
The Association for Preservation Technology's Technical Committee for Documentation is proud to present a quarterly newsletter to discuss all things BIM. This newsletter is intended to provide our preservation colleagues with information, current happenings, thought provoking conversation and useful tips regarding BIM. As BIM grows in popularity and progresses over time, it is important for the Preservation community to stay connected and current so we all have the ability to improve and better our preservation projects by utilizing BIM technology to its fullest extent. We look forward to sharing an exciting year of BIM news and knowledge with

you all!

Building Information Modeling is an idea that has been around for decades, but it wasn't until the early 2000s that we started seeing real changes and development in the Architecture, Engineering and Construction industries. With the introduction of ArchiCAD and then Revit, BIM has been able to emerge and popularize to become a mainstream way of thinking among all individuals in the AE&C Industries. Every design competition, or large publicly funded project, is not fully complete without a grand, over-the-top, futuristic rendering produced from BIM. To many, BIM is new-age, glitzy and most of all has cost-saving potential. The BIM work flow encourages coordination efforts to happen early, rather than later when expenses are high and time is costly. Owners, contractors and even government legislators are noticing these cost-saving benefits, pushing for projects to be done in BIM.

So where does Preservation fit in the BIM mix? Because of the complexities and lack of normalcies found in most historic and existing buildings, BIM can be a challenging tool to use for many preservation projects. Instead of starting with a clean slate, preservation projects require considerable time and energy in order to create the framework and starting point at which a project can finally begin. However, after that initial framework has been completed, the possibilities are endless!

"Information" is the key word in Building Information Modeling. Historic structures consist of several layers of history and Information. Documenting a historic building's physical characteristics is usually not enough for a comprehensive preservation project. The transformations that have occurred over time and the descriptive and annotative information associated with individual buildings components are also critically important aspects requiring documentation. Before BIM the physical, spatial data and descriptive, informational data of our preservation projects were always kept separate. There was no way of joining the different types of data making it more difficult to identify and understand the relationships between them. Today, however, we are fortunate enough to have BIM which provides us the avenue to easily merge spatial and informational data together into one comprehensive database, a BIM model.

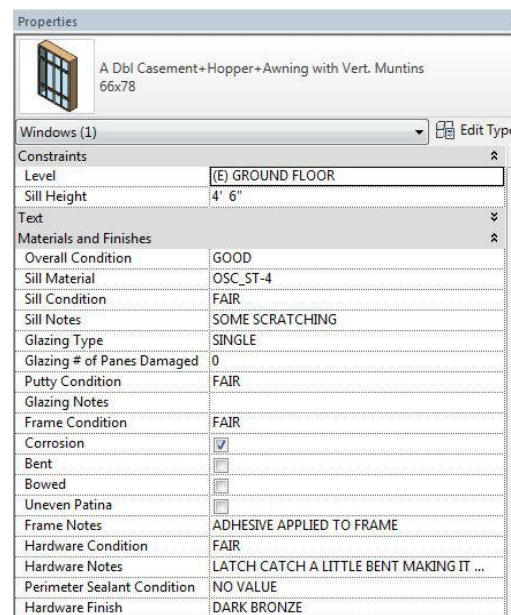


Adding Large Amounts of Survey Data to Your BIM Model

Many preservation projects, whether for Resource Management or Rehabilitation, require the survey or inventory of historically significant building components, such as doors, windows, decorative features, art or furniture. This BIM Tip of the Month is going to explain how the data collected from these surveys can quickly and easily be imported into BIM adding valuable layers of information to your model.

Regardless of the means or methods used to complete the survey for your project, the outcome shall be a spreadsheet of data. Each row will represent a single component (i.e. a single door, window, sculpture, etc.) and each column will represent an attribute or survey characteristic. There are several useful software programs that can be used with an iPad or tablet to quickly and easy create spreadsheets like this from your survey data.

Once the data spreadsheet is complete, the next task is to ensure every building component surveyed exists somewhere in BIM. When all components are accounted for in the model and survey data, a schedule needs to be created in BIM. This schedule will need to exactly replicate the data spreadsheet that was produced from the survey data. Typically it is best to sort the components in the same numerical ascending or descending order for both the BIM schedule and the spreadsheet. Similarly each survey characteristic, or in Revit terms: parameter, needs to appear in the same order throughout the columns. This is likely to require several new parameters to be created within BIM in order to match all of the survey characteristics that were recorded during the survey.



Revit window with several added parameters to accommodate survey data

When the data spreadsheet and BIM schedule are identical, it is time to export the Revit schedule. There are several Revit plugins available that can be used for this task. Using one of these plugins your BIM schedule can be exported into a spreadsheet format, such as Microsoft Excel. When a

spreadsheet is created and exported using these plugins, an extra parameter is created in addition to all of the parameters that were manually added to the schedule within BIM. This additional parameter is a seven digit unique ID number that is provided for each and every individual component. This number is key in allowing Revit to identify each unique building component. Therefore, these unique seven digit numbers should never be changed.

With the BIM schedule now in a spreadsheet format, the next step is to simply copy and paste all of the content from your survey data schedule into the BIM schedule spreadsheet. When all of the data has been copied into the BIM schedule spreadsheet, it is time to import the spreadsheet back into BIM. Using the same plugin used to export the BIM schedule into a spreadsheet format, you will now use that plugin to import your spreadsheet back into Revit with all of the additional survey data added. Voila! Now your BIM model has many more layers of Information.

PARAMETER WRITER DATA										
FILTERING PARAMETERS		EXPORTING/IMPORTING PARAMETERS								
Default is ElementID to itemize every instance, but these can be used to itemize elements by other parameter values. The parameters at the right will only affect Filtering Parameter 1 Near Filtering Parameter		Parameter Names (not case sensitive) to Export/Import (Create additional columns/parameter names as needed). Writing stops on first column that does not contain a parameter name								
ElementID	Column1	Mark	Type Mark	Family and Type	Type	Photos #'s	DoorHistoric	Door Matl	Overall Condition	Finish Condition
4730155		C030-1	2	Single-Flush: 36" x 80"	36" x 80"	815-492	0	Metal	Good	Good
4729990		C030-2	1	Single-Flush: 36" x 80"	36" x 80"	833-455	0	Wood	Good	Fair
4729995		C030-3	17	Single-Flush: 36" x 80"	36" x 80"	810-412	0	Wood	Good	Poor
10088689		C030-4	15	13-17 Single Vision: (A) 21	(A) 25 x 94	613-436	1	Wood	Good	Good
4729992		C031-1	1	Single-Flush: 36" x 80"	36" x 80"	640-442	0	Wood	Good	Poor
4729993		C031-1	1	Single-Flush: 36" x 80"	36" x 80"	629-431	0	Wood	Good	Fair
4729994		C031-2	2	Single-Flush: 36" x 84"	36" x 84"	832-434	0	Metal	Good	Good
4731523		C031-1	1	Single-Flush: 36" x 84"	36" x 84"	623-425	0	Wood	Good	Good
4729991		C034-1	1	Single-Flush: 36" x 80"	36" x 80"	845-648	0	Wood	Good	Fair
4730154		C035-1	11	Single-Flush: 36" x 80"	36" x 80"	884-686	0	Wood	Good	Fair

**BIM schedule exported to a spreadsheet.
The Revit unique ID is located in the far left column.**

This BIM Tip of the Month was brought to you by:

Julia Ausloos - [Architectural Resources Group](http://ArchitecturalResourcesGroup.com) - Pasadena, CA - j.ausloos@arg-la.com



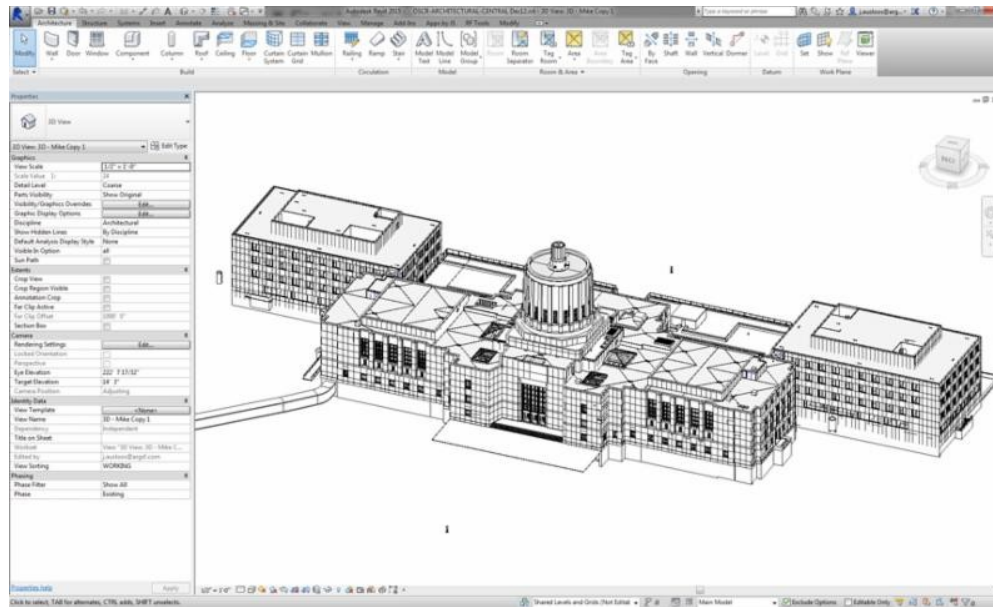


BIM Project in the Spotlight

Oregon State Capitol Renovation Project

The Oregon State Capitol building is the only state capitol building in the country constructed in the Art Deco style. As the third capitol building for the state of Oregon, with the first two succumbing to fire, the modern concrete structure, clad in marble, was completed in 1938. When the \$2.5 million project was completed, the building contained 131,750 square feet of usable space. In 1977 an expansion project took place, adding two new legislative wings on either side of the historic building. The expansion more than doubled the square footage, leaving the entire complex with more than 363,000 square feet. The historic 1938 building was placed on the National Register of Historic Places in 1988, marking the 50th anniversary of the completion of the structure.

In 2009 the Oregon State Capitol underwent a year-long master plan project. The master plan established a series of goals to ensure the continued success of the capitol building, with one of the goals being to ensure the Capitol's longevity through seismic strengthening, code upgrades, and infrastructure improvements. Therefore, as part of the master plan project, a generic spatial BIM model was created. This model was used for preliminary programming, conceptual development and building assessment. In 2014, Architectural Resources Group (ARG), in partnership with SRG (the design architect), was awarded work to complete a major renovation to address and fulfill many of the goals outlined in the final master plan document. During this renovation project, the original master plan BIM model was given new life when a vast amount of data and information was merged into the spatial model.

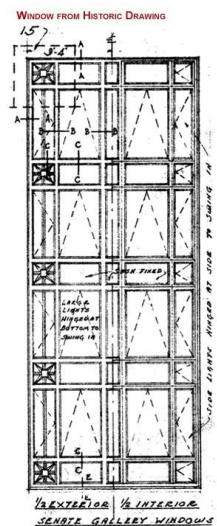


The major goal of the Renovation project was to seismically upgrade the entire building, as well as bring the building up to current accessibility and fire and life safety standards. The project required several different types of documentation and survey. The physical, spatial documentation of the building was completed using mostly hand measuring, with the addition of some laser scanning. Simultaneously, various data collection surveys also took place throughout the documentation process, including a comprehensive door survey, window survey, exterior façade condition survey, and historically significant interiors condition survey.

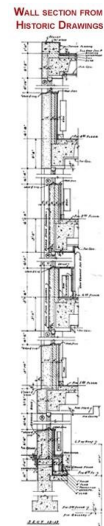
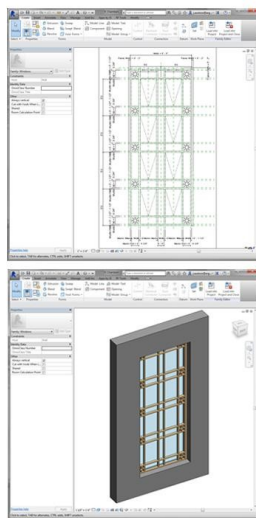
The door and window surveys were conducted using iPads and software that allowed for the data to be easily exported into database spreadsheets. During these surveys data was collected for more than 600 doors and more than 200 windows. The exterior façade and interior condition assessment surveys were done by means of pen and paper, using floor plan and elevation drawings as backgrounds for the survey information.



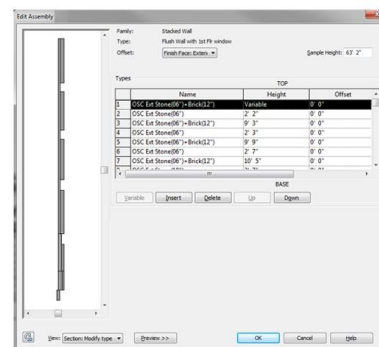
Prior to all of the survey data being added to the model, there was also a significant amount of work that needed to be done to the BIM model in creating the framework and basis for which the data could be added. Each generic wall, floor, ceiling, window and door that existed in the model for master planning purposes, now needed to be given the proper characteristics that are true to the actual existing conditions of the building. Historic drawings and images were used to guide the creation of these building component families.



Window drawing found in historic drawings used to guide the creation of window families



Wall section found in historic drawings used to inform the creation of wall families



After a comprehensive framework was established, the BIM model was then equipped to receive all of the survey data and information. The door and window survey data was imported into the model easily due to the convenient spreadsheet datasets that were produced by the software that was used during survey. This allowed for 65 parameters, with unique data, to be quickly applied to each individual door, and more than 30 parameters applied to each individual window. This data became valuable in guiding decisions that would be made throughout the project, from schematic design to construction documents. The architects and contractors found the data especially useful in understanding the type of inventory of doors and windows that existed, and what the conditions of those doors and windows were. This was key in developing door and window schedules that clearly described an extent of work that required the salvage and repair of historic doors located in significant areas, and the relocation of original, in-tact doors found in less significant areas.

Unlike the door and window survey data, the exterior conditions survey data was not able to be automatically imported into the BIM model. Instead this data needed to be added to the model manually by carefully applying various wall-hosted components to the exterior façade of the model. A series of unique Revit families were created to represent the several different types of deterioration conditions identified on the façade of the building during the survey. When all of the façade deterioration conditions were applied to the model, the data could then be easily scheduled and totaled per elevation, or for the entire building. This information was useful in helping the architects and contractors understand what the true extent of façade deterioration was, thus identify what the extent of conservation will need to be.



Exterior conditions survey data that was attached to the facade of the BIM model

The layers of information added to the Oregon State Capitol BIM model were a vital factor in determining the success of the Renovation project. Due to the large scope of work, requiring many different levels of intervention and design, it was important to have a base model complete with as many layers of existing information as possible. The information helped to inform design decisions and ultimately ensure that the defining character of this grand building remain intact, allowing for the Oregon State Capitol Building to continue its legacy as a historically significant landmark for the state of Oregon.

This BIM Project in the Spotlight was brought to you by:

Julia Ausloos - [Architectural Resources Group](#) - Pasadena, CA - j.ausloos@arg-la.com



**Questions,
Comments,
Advice?**

To ensure the prolonged success of this newsletter, we would like to provide ample opportunity for Questions, Comments or Advice regarding the content of our newsletters.

To do so, please email committee@apti.org



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