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APT - Technical Committee for Documentation BIM Newsletter

Technical Committee for Documentation



The logo features the acronym 'APT' in white on a blue square background, with the word 'INTERNATIONAL' in small white letters below it. To the right, the letters 'BIM' are written in large, bold, red font. Further right, the word 'NEWSLETTER' is written in a smaller, red, sans-serif font. A dark blue horizontal bar runs across the bottom of the logo elements.



Circa 1970s, Marvin Rand, Photographer. (Library of Congress; Call Number: HABS CAL,19-LOSAN,39-1)

BIM Project in the Spotlight

Scan to BIM - The May Company Building

The May Company Building was designed in 1939 by Albert C. Martin Sr. and Samuel Marx in the 'streamline moderne' style. Located in the Miracle Mile mid-Wilshire area of Los Angeles, it represents a pre-eminent example of high end department stores whereby the main access was by the new automobile. In 1992 it was designated a Historic-Cultural Monument (HCM #566). The structure now forms part of the Los Angeles County Museum of Art (LACMA) ensemble, and is at the center of Los Angeles' Museum District. Recently the building was acquired by the Academy of Motion Pictures Arts and Sciences and is in the process of being re-purposed to a museum dedicated to the motion pictures - the new home of the Oscars.

PHASE 1

In March 2013, a survey of the building was requested, to generate the data needed to analyze, design and develop the structure for the development/design team led by an architect's consortium, SPFA (Los Angeles) and Renzo Piano (Genoa). The specification requirement was for a laser scan survey, with data capture accuracy of 1/4", that would be used to build a Building Information Model (BIM) in Revit, based on the AIA LOD 200/300 specification.

A Site Control using conventional total station was established around the exterior perimeter and baseline on each floor. A laser scan survey was executed of the entire building using Leica P20 and scan targets, generating a point cloud from which the Revit model would be created using Cloudworx.

Due to limited visible and accessible structure, assumptions had to be made in the Revit model. There were also other elements that were difficult to model such as the panels comprising the curved façade, and the partition walls and false ceilings that needed to be accommodated. Additionally challenging was the fact that much of the building was being used by LACMA for storage with large crates of important works of art and artifacts that could not be moved.

During preliminary review of data it was found that there was a wide range of experience and understanding across the design and engineering teams regarding their use of BIM. A key attribute to the success of the survey was to ensure transparent communication, complete collaboration and a consistent flow of information. Rather than resolving issues in-house, the survey team kept in communication regularly with the client team - often virtually, using Skype or Go-To Meeting. By having the surveyors as an integral part of the project team it was possible to have a far better client experience and to successfully manage client expectations.



3D view of the May Co. Building BIM

PHASE 2

After the BIM was delivered, the project entered a second phase with several revisions of scope and design, as well as introducing Gensler as lead architect. An additional scope for the BIM was requested in August 2015, which would include a geo-referenced laser scan survey of the building after 'soft-demo', for verification of the existing Revit model (based on the 2013 as-built model and construction plans).

The work flow on site consisted of relocating and occupying the original survey control from the 2013 survey. Scans from a Leica P20 were predominantly tied together using scan to scan cloud registration, vastly improving the speed of collection, and then also by geo-referencing the data using scan targets located across each floor. The modelling workflow consisted of the scan survey being registered to a single database in Cyclone. After a quality control check, the point cloud data was then split into separate floors before import into Revit. The point cloud data was used to verify the location of existing structural members, which could then be accurately included in the existing condition plans. Anomalies in floor thickness, and structural beam sizes and locations were also identified by using the point cloud data for verification. These anomalies found in the existing conditions plans were then corrected based on the accurate information provided by the point cloud data.



Interior view of the structural members within the May Co. Building BIM

The initial proposal was to verify the model and make changes if the model was inaccurate by $\frac{1}{4}$ " or more. Although the task was attainable, it was estimated that the time frame of just more than 2 weeks would not be achievable. So through continued discussions, priority elements and areas were established. The most effective way to establish the critical floor levels was by linking 2D spot levels and then modelling the floor as flat in the BIM. Much use was made of TruView, a crucial tool that was used by the client to review data quickly, and was also used by Mollenhauer for quality assurance purposes.

A key contributing factor to the success of a Scan-to-BIM project is the constant review, client collaboration and communication throughout the duration of the project.

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

Christopher Gray - [Mollenhauer Group](#) - Los Angeles, CA - cgray@mollenhauergroup.com



Using An Image As An

Underlay in Revit

Many times in order to create a model of a historic building, the only resource available may be a scanned image of an original drawing. Using the image as an underlay allows a modeler to trace an original drawing to create a model. In order to access the most detail possible, the image file should be carefully prepared before

importing the file into the modeling software, in this case Revit. Importing the file is fairly straight forward but the final step in this tutorial is crucial to a successful model. Adjusting the scale of the image insures that the model dimensions will be accurate. The steps to prepare, import and use an image file are as follows:

1. Prepare the Image File:

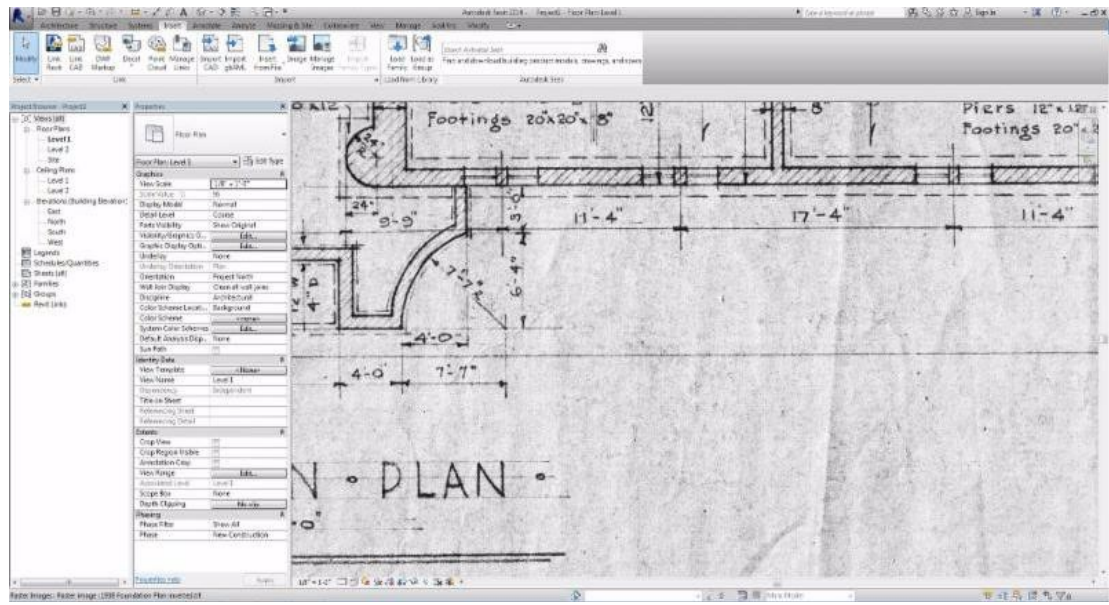
If the image file is dirty, damaged or not in black lines on white background, use a program such as Photoshop to clean it and/or invert it. In Photoshop invert the image first. To invert white on black/blue images to black/blue on white, click *'Image' > 'Adjustments' > 'Invert'*. Clean up the image after you invert it. Adjust brightness and contrast to clean as needed. Regardless of the file type opened in the editing software, save the file as a file type that can be imported into Revit (.bmp, .jpg, .png, .tif).

2. Import Prepared Image into Revit:

Open Revit and import the prepared image file. Click on the *'Insert'* tab along the main menu bar and then find the *'Image'* button. Navigate to the image file in the Import Image dialog box.

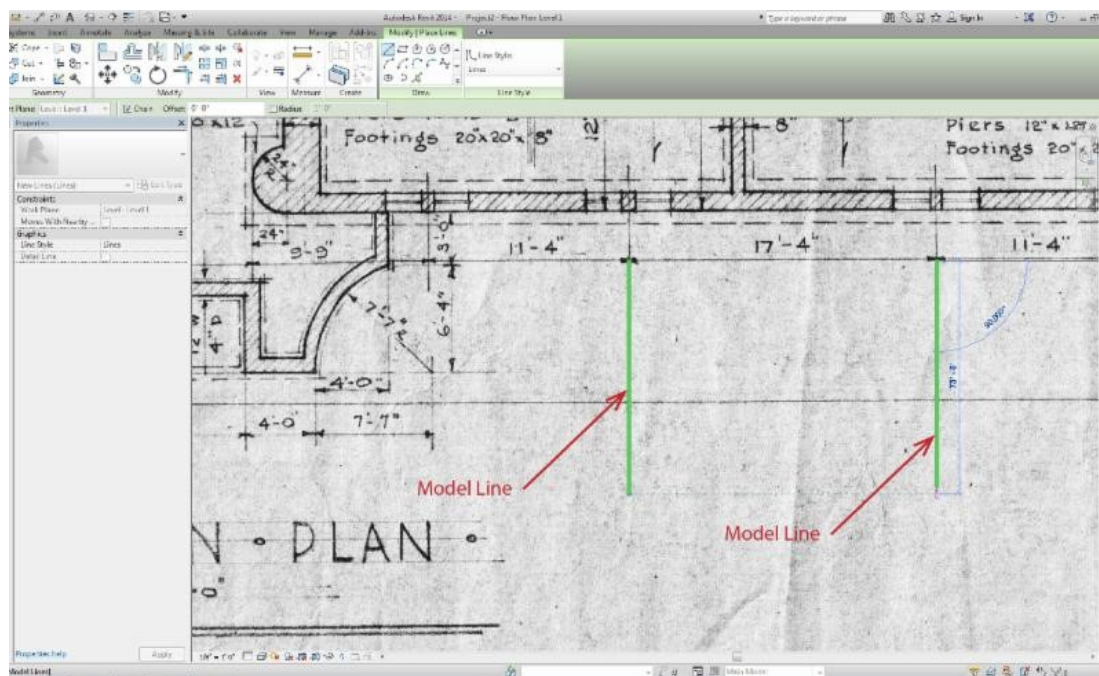
4. Adjust the Image Scale

The scale of the imported image file will need to be adjusted in order to work with the resulting model. Adjust the scale using a manual method.

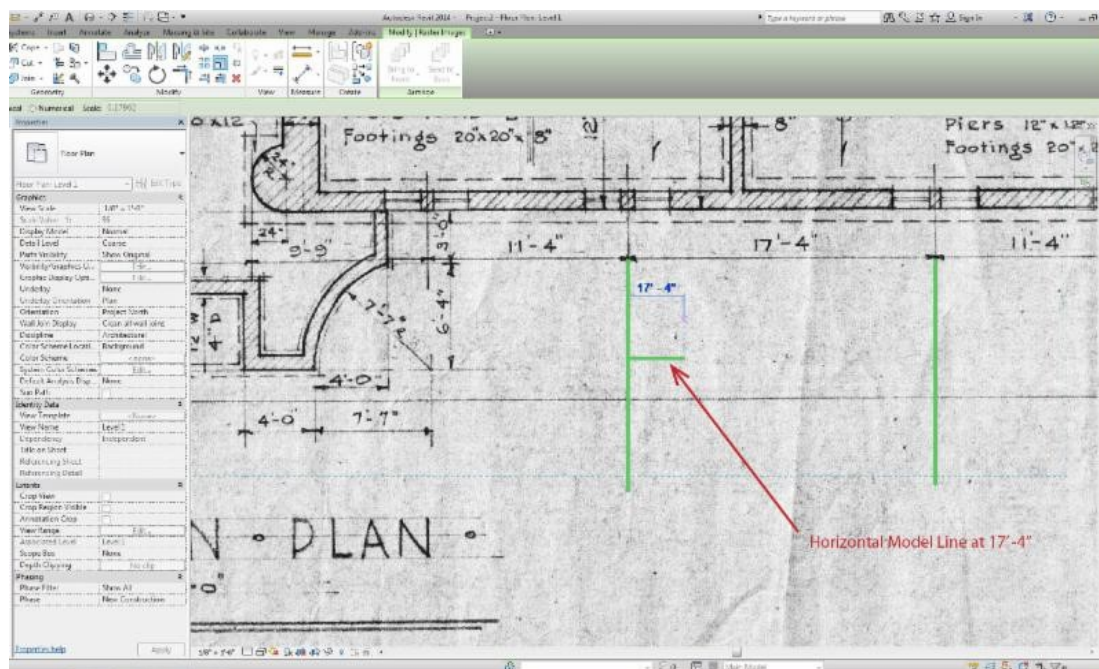


Zoom view to a clear, well-defined dimension on the image file. In this case, 17' - 4".

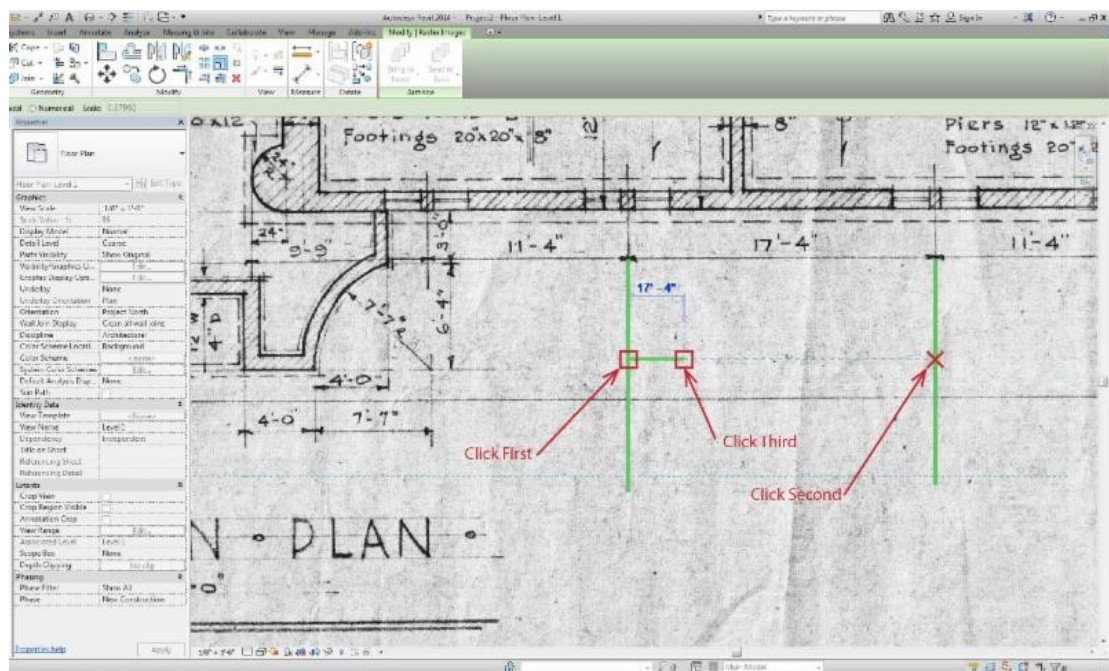
Use Model Lines or annotation Detail Lines to recreate the known dimension. To use *Model Lines*, make sure the 'Architecture' tab across the main menu bar is selected, then find and select the 'Model Line' button. To use *Detail Lines*, make sure the 'Architecture' tab is selected and then find and select the 'Detail Line' button. The major difference between Model Lines and Detail Lines is that Model Lines are 3D objects that will appear in multiple views, Detail Lines are simply annotation lines that will only appear in the One view you are working in.



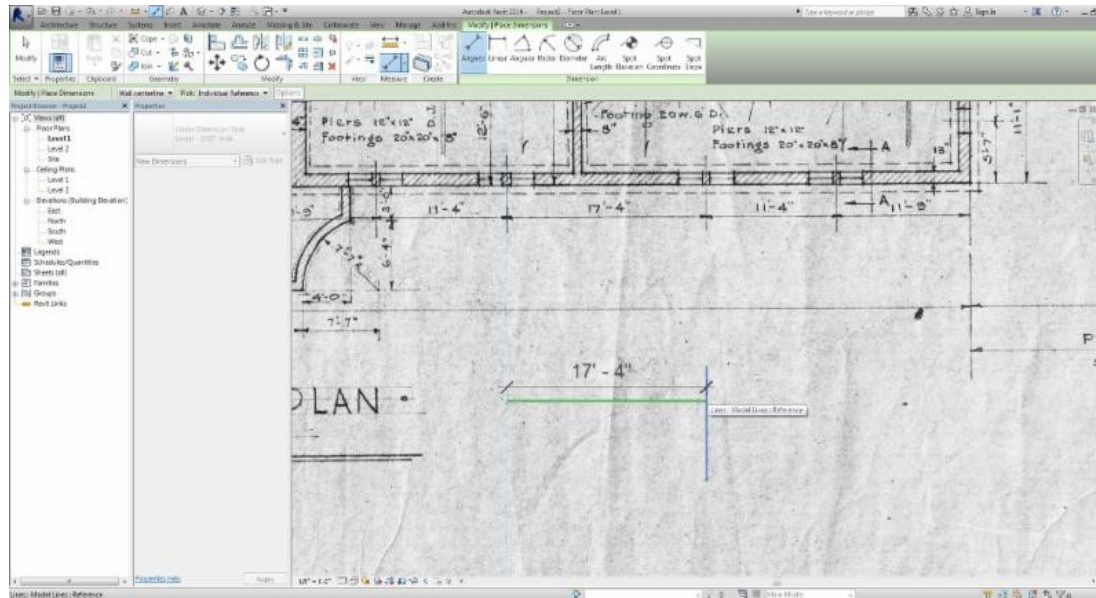
Place two Model or Detail Lines perpendicular to the known dimension line, one at either end of the dimension line. These two lines become the boundary of the scaled dimension line.



Draw a horizontal Model or Detail Line, perpendicular to one of the previous Lines. When drawing this Line, set the length of the Model or Detail Line to equal the known dimension. In order to do this, simply click your starting point of the line, then using your keyboard type in the length you want (17' 4" in this example).



To change the scale of the image file, click on the image to activate the *'Modify/Raster Images'* tab. Find the *'Scale'* tool and click on it. To use the *'Scale'* tool you must first click the intersection of your vertical and horizontal model line. Then drag your cursor to the other vertical model line, an *'X'* should appear, click when you see the *'X'*. Then drag your cursor to the other end of your horizontal model line, a square should appear, click when you see the square.



That's it, your image is scaled! To ensure you did everything correctly, you can use the 'Aligned' dimension tool to check the scale.

Images in Revit are similar to annotation Detail Lines in that the image will only appear in the one view that you imported it into. Therefore, if you wish to create another view with the same scaled image you can either Duplicate the view, making sure "with Detailing" is selected. Do that by right clicking on the view in your 'Project Browser' > hover over 'Duplicate View' > click 'Duplicate View with Detailing'. By duplicating a view with detailing you are not only creating a view with all of the 3D information, you are also copying all of the 2D annotation information into the new view.

The other way to copy your scaled image from view to view is by Copy and Pasting. Select your image in the model, make sure the 'Modify/Raster Images' tab is selected, then click the 'Copy to Clipboard' tool (Not the 'Copy' tool). Go to the new view you would like to copy your image into and make sure the 'Modify' tab is selected. Find the 'Paste' tool and select the part with an arrow to give you more selections, select the 'Aligned to Current View' tool.

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

Marla Holden - Graduate Student, University of Florida - mholden@ufl.edu

What would you like to see in the next BIM Newsletter?

We would like to hear from our readers to learn what they are interested in learning more about in the world of BIM! Do you have any BIM Tip Requests, or have you been having any issues with BIM that we can troubleshoot together? Do you have any great Case Studies or Lessons Learned you would like to share with all APT members? If so, please contact us at committee@apti.org and we will try to include it in our upcoming newsletters.



**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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