

Refinishing Outer Wood Paneling of the Simpson Strong Tie Building

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This paper outlines the refurbishment of the exterior wood panels located on the Simpson Strong Tie Building on the Cal Poly San Luis Obispo campus. This project focuses on the two large 50 square foot wooden panels that act as an exterior skin for the Simpson Strong Tie Building. This project is an individual project that was broken up into 4 phases. This paper will cover all 4 phases of the refurbishment process. These phases include the removal, sanding, staining and reapplication of wood panels onto the Simpson Strong Tie Building. Furthermore, this paper will go in depth about the building permit process and the struggles experienced communicating with the owner and architect during the preconstruction phase. Many struggles had to be overcome during the refurbishment process such as managing a project on an active campus, as well the refurbishment process itself. There were many unforeseen conditions that were experienced during the construction phase due to inadequate project details from the architect, OMNI Design Group. The purpose of this project is to give back to the Cal Poly San Luis Obispo Construction Management Department by refurbishing the weathered and aesthetically unappealing exterior wooden panels on the Simpson Strong Tie Building.

Key Words: Wood Panels, Refurbishment, Weathered, Unforeseen Conditions, Cal Poly

Introduction

This project is located in Building 187 on the Construction Management courtyard at Cal Poly San Luis Obispo. This building is used as a demonstration lab for various lab-based classes that the Construction Management program has to offer. These labs include a Residential, Commercial, Jobsite and Heavy Civil which utilize the space for projects that relate to the course material. This building is a high bay structure that has plenty of floor space for labs to take place. The inside of the lab is equipped with two large toolboxes and sheds that contain all equipment that is necessary for assigned labs to be completed. One lab instructor, Tom Kommer, presented this project to the class; pointing out how weathered and aesthetically unappealing the Simpson Strong Tie building looked

from the exterior. This sparked interest in the project and soon enough the on-campus Facilities Services department was contacted discussing this refurbishment of the wood panels.

Due to previous employment with facilities sophomore year, Austin Creel, one of the project managers that works in Facilities, was contacted and he provided the contact of Jessica Hunter's email. She oversees building permit operations that happen on campus. During this time, discussions with the Construction Management Department Head, Jeong Woo, were made to specify his vision for the final product. Coordination with Tom Kommer, and Phil Barlow was necessary to ensure that this project is adequate to complete for a senior project. Once the project proposal was approved by Mr. Barlow and signed by Mr. Kommer, the process for completing the on-campus building permit began. With the help of Mr. Kommer, getting into contact with the architects who designed the wood panels was very easy. OMNI Design Group is located in San Luis Obsipo and they provided the details and project manual of the Simpson Strong Tie project; this was needed for the building permit. Once completed, the permit was submitted to Jessica Hunter who later approved the document.

Preconstruction

Now that the project was approved as a Senior Project and the building permit is completed, it was time for the preconstruction phase of the project to begin. Fortunately, this project was going to be funded by the University so there is no need to seek outside financial support during the preconstruction phase. This phase included many jobsite walks with Mr. Kommer, coordination with campus, gaining access to the Simpson Strong Tie Building, as well as discussing a site logistics plan and where the laydown area would be. During this phase, Mr. Kommer and the project team completed about 2 jobsite walks and discussed what would be expected from the project, the order and steps needed to properly remove the panels off the mounted frame, as well as how to properly sand and stain the panel once off the mount. Coordinating times of operation was the main struggle in the beginning due to the constant labs that take place in the demonstration lab during the day. The lab is usually occupied with students and instructors from the times of 8am-4pm Monday-Thursday, which is most of the week. Due to this, work would be conducted during the weekends or after 4pm. Professor Andrew Kline gave access to the Simpson Strong Tie building so access to the building can be granted whenever needed. Site logistics was a hassle as well due to the Residential lab's assignment taking most of the floor space. After discussing with Mr. Kommer, an area in the Simpson Strong Tie building was identified that would not affect the in-person labs during their operations. This would be the area where majority of the refurbishment will be taking place during the construction phase. Overall, the preconstruction phase did not cost the University any amount of money due to the fact that it mostly consisted of planning.

Construction

Removal of Panels

The first step of the refurbishing process is to remove the wood panel from the large metal barn doors. The first panel removed was on the left-hand side, when facing the Simpson Strong Tie Building from the exterior, before removing the wood panel on the right side. The wood panel is sandwiched between two metal frames on either side to keep it in place. The metal frame that faces the exterior has caulking/ sealant that keeps the interior insulated. This sealant lines the perimeter of where the metal frame meets the large metal doors. Thus, to remove the metal frame we must remove the metal sealant first to ensure that the metal frame comes off with ease. As seen in *Figure 1*, a utility knife was used to remove the sealant to ensure a smooth removal of the metal frame to access the wood panel. The next step was to remove the nuts from the bolts that held the wood panel sandwiched between the two metal pieces. This process was very tedious due to the many nuts and bolts that were surrounding the perimeter of the metal frame. Executing this step by myself was very difficult because the bolts were not supposed to rotate while removing the nuts; therefore Evan Tookey was called to assist.

Once the bolts were removed from the two metal frames that resided on either side of the wood panel, it was time to remove the metal frame itself. This process was very interesting because even though the caulking was cut, the exterior metal frame was not coming off as planned. Thus, the interior metal frame was removed from the metal door to access the wood panel. As seen in *Figure 2* the wood planks were connected by multiple large bolts that ran horizontally through the wood panel, therefore the wood planks were connected. This was an unforeseen condition as expected each wood plank to be removed one at a time. This unanimous wood panel weighed close to 500 pounds and was very difficult to move, therefore a few people assisted in carrying this panel to the desired area inside of the Simpson Strong Tie Building. Due to the unforeseen conditions experienced on the left panel, the right-hand panel remained on the metal door. There is metal lettering that resides on the exterior portion of the wood panel, thus removal of the panel may warp and damage these letters as seen in *Figure 3*.

Sanding of Panels

In order to remove the weathered stain, it was crucial to sand the wood panel prior to applying the new finish. Mr. Kommer lent his palm sander as well as his belt sander to effectively remove the existing stain. The preexisting stain was very weathered and thus easily removed with the palm sander. The palm sander was used for much of the sanding process. With the use of 220 grit sandpaper attached, the pre-existing stain was eliminated while not effecting the wood itself as seen in *Figure 4*. The sanding process of the left-hand wood panel went very smoothly due to the fact there were no items that needed to be sanded around. On the contrary, the panel that resided on the right-hand side of the Simpson Strong Tie building was much more difficult. Due to the metal lettering that located on the exterior portion, the challenge of getting between and behind the lettering was present. As seen in *Figure 5*, the attempt to use a hand and a small piece of sandpaper to get between the metal lettering as well as the back of the letters had taken place. This process took many hours and did not seem to be very effective. When discussing my troubles with Mr. Kommer, he lent his Dremel tool and various fittings to remove the stain in hard-to-reach areas as you can see in *Figure 6*. The use of

the polishing brush was seen as the most effective and thus, successfully removing all the existing stain from the panel.

Staining of Panels

The staining process began with purchasing the proper stain. The exterior finish was approved by the on-campus Facilities Department and was included in the original building permit that was submitted. The specifications from the original project manual called out for a clear, polyurethane gloss coat. When discussing with the BEHR specialists at Home Depot, where the finish was purchased, they expressed that this type of stain is not as effective against UV rays in comparison to the spar urethane finish. Mr. Kommer was provided this information and he approved of this finish. Thus, the finish applied was a spar urethane gloss coat exterior finish to both panels because of the added protection. This was a fast-acting stain that only required 1 hour between coats. Due to this, 3 coats by brush were applied in one day to the left-handed wooden panel. Again, due to the fact this panel was bear, there were no challenges faced with applying these three coats. *Figure 7* depicts the wood panel after the 3-coat process. Taping along the metal frame was necessary for the wood panel that resided in the metal door as seen in *Figure 8*. This was done to ensure that no stain was to get onto the metal frame or door. The staining process that took place on this panel was difficult. The large areas beneath the metal lettering were simple but applying stain between and behind the letters was very challenging. Being forced to use a much smaller brush while getting between the lettering made this application more time consuming than the previous. This made for 3 different workdays to apply the three different coats.

Reapplying Panels

Being close to 500 pounds, the reapplication of the left-hand panel was very dangerous, and many safety precautions were taken. Assisted by two other people, and it was necessary that all three of the workers were equipped with steel toe boots in case this panel were to fall. First, the metal frame was rested on the ground that was previously removed when gaining access to the panel. Marking both the panel and the frame indicating which side was up and down to ensure that once reapplied, the holes would line up with their exterior counterparts was the next step. Secondly, all at once the three of the workers placed the wood panel inside of the metal frame according to the markings that we had made. Thirdly, the metal frame was propped up by placing the four corners onto scrap pieces of wood that were found in the Simpson Strong Tie Building. There was a Lift Pallet Jack that was inside of the high bay at the time, and the team decided to take advantage of the lifting/ maneuverability capabilities of this jack. Ensuring that the panel and frame were at the proper height, the jack slid under the panel to then move the panel to the foot of the opening where it used to be located. Once there, two 2x4s were placed in the areas of where the metal frame would come in contact with the floor to ensure that there is not damage to the frame itself. The jack was removed from the metal frame and was resting on the two 2x4s. The next step consisted of placing the underside of the metal frame onto the bottom ledge of the metal doors. Once placed, the top end of the metal frame was picked up with the wood panel resting inside of it and propped into its original position inside of the

door opening. The two colleagues held both the metal frame and wood panel in place while the nuts and bolts were inserted into the drilled locations. As stated earlier, the panel that consisted of the metal lettering remained on the doors, thus there was no need to reapply this panel. The final product is shown in *Figure 9*.

Cost

When submitting the building permit, the estimated cost of the project was \$500. This was overestimated and the total cost of the project was \$183.27. The original estimate was very high because the rental of equipment such as sanders and a Dremel were expected. Due to Mr. Kommer lending his equipment, the price of the project decreased significantly. The most expensive items included the two quarts of finish that were purchased from Home Depot costing \$33.98 each. Other items included sandpaper, tape, ratchet screwdriver, fittings for screwdriver, various paint brushes, utility knife and a paint tray. Pictures of receipts have been sent to the Construction Management office for full reimbursement.

Schedule

This project duration lasted 8 total weeks. Of these 8 weeks, 9 total workdays were necessary to complete this project. The duration would have been much shorter if the days of operation were not affected by ongoing labs taking place in the Simpson Strong Tie building.

Lessons Learned

The lessons learned include mostly the permit process and preconstruction phase of this project. The ability to coordinate between the owner and architect to propose a well-developed building permit is something that is new and never experienced before this project. Another lesson learned was how to properly conduct construction on an active student campus. Communication and timing were crucial for completion of this project. The act of coordinating times and days with university staff is something that was never experienced before. The refurbishment process was something new that was surprisingly challenging. The removal of the existing stain is essential in ensuring that the new stain sticks to the panel and is absorbed into the wood.

Conclusion

At the end of it all it was a very successful project that allowed me as a student to learn a lot about the permit process, how to properly coordinate with owners and architects, plan for hours of operation during an active campus as well as experience this type of refurbishment firsthand. The ability to apply several aspects of my construction knowledge to this project in regard to communication, phasing and schedule was something that was very interesting for me because I have mainly utilized

these skills in the classroom. All these aspects can and will be applied to my future in the construction industry.

Photos



Figure 1 – Utility Knife Cutting exterior Sealant



Figure 2- Removal of Interior Metal Frame/ Identification of Horizontal Bolts



Figure 3- Right-Hand Panel Lettering



Figure 4- Existing Stain Removed From Left-Hand Panel



Figure 5- Hand Sanding Between and Behind Metal Letters



Figure 6- Use of Dremel to Remove Stain Behind/ Between Letters



Figure 7- Third Coat Applied to Left-Hand Panel



Figure 8- Taping Prior Application of Stain



Figure 9- Final Product