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“Commercial Roofing, Single-Ply and National Monuments”

REROOFING AMERICA’S CROWN JEWELS

How do you rebuild hundreds of skylights directly over top a fragile stained glass (marble) ceiling with thousands of people below without touching the building?

This was the overwhelming task we faced in the unprecedented skylight and roof replacement project at one of the most recognizable mausoleums in the world. Since the skylights of the Lincoln Memorial have never been rebuilt in its history, and it could not be closed to the public, there was no precedence to draw on. CitiRoof Corp. has a reputation for taking on very difficult projects that require a delicate design and thorough engineering.

First thing we had to do was design a load-bearing impact protection system to shield the unique exterior features of the memorial such as the marble terrace walls, stylobate steps, cheneau, antefixae and penthouse walls. This protection was necessary so we could get the materials on top and also inside the Memorial without damaging it. Just repairing any damaged priceless marble wasn’t an option, it simply could not happen. We covered the marble features with 6 mil plastic, then we used a 72 ton crane to install our shields made of 2 ½” E.P.S., wood framing, then it was covered with ¾” CDX plywood, painted and held in place with 50 lb. sand bags. Since the Lincoln Memorial is constantly in use for filming, photographs, etc., we designed the protection to closely match the areas we protecting. With the exterior protection in place, we were ready to start Phase 1 of the project.

PHASE 1 – PROVIDING A TEMPORARY ATTIC FLOOR

In the skylight attic are very thin shear marble panels over top of the main chamber below, where the marble statue of Abraham Lincoln is along with thousands of tourists. To make matters even more difficult, we were not allowed to work in the attic during the hours of 8:00 a.m. to 12:00 midnight because of the public below and the dangers that could propose if a terrible accident were to occur. I designed a very innovative temporary floor that would be installed the skylight attic. To minimize the danger of the amount of I beams and flooring we had to get into the attic, I designed a complicated portable floor approximately 2,800 sq. ft. that could be moved inside the attic five times on top of the concrete girders as we proceeded along with rebuilding the skylights (these moves could be accomplished at night between the hours of 12:00 midnight to 6:00 a.m. when we were allowed to close the Lincoln Memorial). At some points, the temporary floor had to be suspended about the marble ceiling and Main Chamber.

Before we could bring into the attic the components of the temporary floor, we designed and built load-bearing shields made of 2 X 4’s and plywood that had compressed rubber pads on the bottom of them to straddle the 375 thin marble panes so that not damage could occur while we were installing the temporary floor. Well, the

designs looked good on paper but we still had to figure out how to get the components into the attic from on top of the roof of the Memorial since we could not bring the large I beams up through the inside. We couldn't go through the skylight because there was no protection yet underneath for us to work on, so we could not dismantle the skylight. We decided to remove an exhaust fan on the gable side of the south skylight and hand carry the temporary floor components inside and directly assemble it in place starting from that and proceeding across the attic floor as there was no room for storage. Some of the original estimates on how long it would take to install the temporary floor were over a month. During the Thanksgiving Holiday week of 1994, several attempts to start installation were canceled because of high winds. I did not want to take a chance with a 72 ton crane lifting 14' long I beams to a drop area with only 2 feet of clearance on each side of the marble penthouse wall. Finally, on Friday after Thanksgiving the crane started lifting materials to the penthouse roof area at 6:00 a.m. At 12:00 midnight the night crew began the work inside of the attic and finished at 8:00 a.m. on Saturday. We had completed the entire installation in just 26 hours!

PHASE II – THE SKYLIGHT RENOVATION

The original specifications called for the reuse of the existing components of the skylights after the lead base paint was removed and the steel rafters were repainted. Upon disassembling the first of the skylights, we discovered the components (all made of lead and 16 oz. copper) were too corroded to be used. After being told it could take months to replicate the pieces, and with only a temporary waterproof system in place over the skylight, I contacted DHD Metals in Atlanta, Georgia. Within a few days they had a die made in Alabama, flown to them in Atlanta where they poured the metal and put the finished product on a plane to National Airport where we received the pieces and began installing them the next day.

PHASE III – ROOF REPLACEMENT

The flat built up roof was removed with full asbestos abatement procedures. The concrete deck had a residue of coal tar pitch on it that had to be grinded off with concrete rotary slab grinders. All of the drains had to be replaced with new ones as well as adding overflow drains 24" next to the existing drain locations. A good amount of interior drain pipe was also badly corroded and had to be replaced. All spalled areas of concrete had to be patched with a quick-drying Portland cement and new concrete cants installed prior to installing the new hot rubberized asphalt-ram-Tough250 manufactured by the Barrett Company. The ram-Tough250 was an ideal system to use from an application standpoint because it could be installed very quickly at the end of the day after all other procedures were completed. This allowed us to leave the Lincoln Memorial completely watertight at the end of each day without the need or cost of temporary roofing. Over top of the Barrett ram-Tough 250 we installed 2" thick extruded polystyrene board insulation to cover all of the flat portions of the Memorial. All of the 20 oz. copper flashing was replaced and tapered to the slope of the roof. The final covering was 118 tons of 1½" thick slate pavers that were custom cut to fit all areas of the roof. The slate pavers were installed on 5 ½ "X 5 ½" pedestals with shims. The slate

was Pennsylvania Black Slate to match the original design of the Lincoln Memorial from the Structural Slate Company. There was so much slate needed for this job that it had to come from two different quarries but on the same vein of slate. This was to insure continuity of the slate. CitiRoof Corp.'s vast experience and roofing acumen insured a job completed ahead of schedule and under budget.

CITIROOF COPR.'S LINCOLN CREW

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