

Night shift

Madsen Roof Co. Inc. performs nocturnal roof system maintenance

by *Krista Reisdorf*

Roof system maintenance is challenging; it involves careful attention to details, safety issues, and determining the best materials and installation methods. However, imagine adding another unique challenge to such a project—performing all work during the night.

Madsen Roof Co. Inc., Sacramento, Calif., faced that challenge when it performed roof system repairs and coating installation on the headquarters building of the California Lottery Commission in Sacramento.

Analysis

The reinforced PVC membrane roof system on the California Lottery Commission headquarters building had shown signs of deterioration, including many cracks and crazes. In fact, the roof had more than 250 documented leaks.

The roof needed a durable coating that could protect it from further weathering, provide essential adhesion to a PVC system and resist plasticizer migration. The facility manager chose a National Coatings Corp. AcryPly roof maintenance coating and hired DC Consulting Services, Sacramento, a roof consulting firm.



Photos courtesy of DC Consulting Services, Sacramento.

The crew of Madsen Roof Co. Inc., Sacramento, begins the "day's" work at sundown.

DC Consulting Services inspected the roof and initially believed it could not be repaired. And 168 heating, ventilating and air conditioning (HVAC) units complicated the possible reroofing options because any fumes resulting from the work would be drawn into the building. Therefore, work would need to be done when the building was unoccupied.

However, after DC Consulting Services researched the situation further, it determined a re-cover and tear-off were not necessary, and the roof could be repaired.

"The solution came from National Coatings Corp. because the AcryPly roof maintenance system marries well to PVC membranes and performs like a new roof system," says Peter Madsen, president of Madsen Roof. "This feature eliminated the need for tear-off, and the acrylic products had little odor. The project still was required to be performed at night during unoccupied hours as an additional safety measure to further reduce any effect on occupants."

Night vision

Madsen Roof has experience using coatings for roof system maintenance and was chosen to perform the specified AcryPly roof system repairs. The original roof assembly consisted of a plywood panelized deck with 1 $\frac{1}{4}$ -inch- (6-mm-) thick DensDeck and a 45-mil- (0.045-inch- [1-mm-]) thick mechanically fastened PVC single-ply membrane.

The HVAC units were a significant reason for performing the nocturnal work when the building was unoccupied.

"HVAC units draw in significant outside air from the perimeter of the units," Madsen says. "The spray application of acrylic coatings would generate odor close to the HVAC units. When the coatings were installed at night, the units were turned off and covered in plastic then uncovered for day use. This was done repeatedly as each coating application was installed."

Although easier for the building's occupants, working on the roof at night was not without its challenges for the crew.

"The largest percentage of work was done at night, and the challenge was adjusting to the swing shift and providing independent power and lighting," Madsen says. "Madsen Roof established a consistent work schedule so workers could adapt to the new work hours. Because there was little 'shop' support from our company at night, we provided backup equipment to prevent downtime. We also had to alternate scopes of work in case we could not spray because of wind. And good visibility was essential for safety and quality control; this required multiple directions of lighting for the detail work on the 168 HVAC units."

"In addition, the HVAC units are supplied by electrical conduits running across the roof," he continues. "The conduits carry 440 volts and had to be lifted while crews worked below."

Working under spotlights, often until dawn, required staging the work areas and relocating all the lighting equipment as work areas were completed. The crew power washed the single-ply membrane with water at 105 F (41 C) to remove all contaminants. Madsen Roof applied National Coatings PVC primer and a base coat of A600 quick-set adhesive. The crew broomed a layer of polyester into the quick-set adhesive and applied another topcoat of A600. Two more topcoats of A600 were applied to increase thickness.

Flashing around penetrations and over parapet walls went smoothly, creating a watertight, monolithic, ultraviolet-protective membrane over the existing roof. For additional protection, walk treads were installed around HVAC units.

Other obstacles

Various safety precautions were taken during the project, especially because the work was being performed nocturnally with limited lighting from halogen light towers. The company used tied-off ladders, twist-lock extension cords, flood lights, insulated gloves for handling electrical conduit, fire extinguishers, safety lines and barricades in areas with gutters or low parapet walls.

"We also always had a backup plan for additional power," Madsen says. "Some power was available on the building, but we kept two generators on-site at all times."



Power washing with hot water to remove algae from the existing PVC roof



The new reinforced coating system in the process of being applied over the old PVC membrane

The nighttime coating installation presented a challenge with regard to moisture, creating issues with material cure times.

Heavy dew that settled on the roof at night slowed the coating's drying rate and threatened to wash it off the roof. AcryShield A600 was used to remedy this issue, allowing the coating to resist dew even when the coating was wet.

Another challenge was installing a sprayed-in-place nonskid walkway system that originated at each roof hatch and led to all HVAC units and their perimeters.

"There were four roof hatches, and the walkway system consisted of 7,000 lineal feet (2129 m)," Madsen says. "The pathway was 'taped-out' and primed, and then a base coat with ceramic granules broadcasted into wet coating was applied. Another topcoat was applied, and the taping was removed at just the right time to prevent the coating from adhering it to the finished roof system."

Fighting the wind during the night was difficult, as well.

"Sacramento is cooled in the summer evenings by the Delta Breeze, a prevailing east wind that begins around 7 p.m.," Madsen says. "Preventing overspray to equipment, cars and canopies was a real concern and required significant planning to shield spray. We had to stop operations when wind gusts were above 15 mph (7 m/sec)."

The company predominately worked at night under spotlights but eventually discovered the coating's low odor allowed workers to work during the day without any concerns about fumes being drawn into the HVAC intakes.

"About 10 percent of the work was completed on Saturdays when the building was not occupied," Madsen says. "The HVAC units were on during the beginning of the walkway application and the building was checked for odor at this time with no odor detected. We began increasing the application during occupation of the building with no adverse effects."

No more leaks

Applying a spray-applied product at night made this project unique.

The crew worked more than 20 hours per day to meet the production schedule. In addition to the night crew, a separate crew worked during the day to power wash and prep the roof. This allowed the night crew to focus solely on the installation of the reinforced coating system.

Madsen says the result was more than satisfactory.

"The National Coatings AcryPly system is fully compatible with the existing PVC membrane, and this proven, reliable system will last for 15 years with periodic inspections.

"The finished product met and exceeded the expectations of National Coatings, the roof consultant and owner," he continues. "And the satisfaction of eliminating hundreds of leaks was particularly rewarding."

Krista Reisdorf is managing editor of Professional Roofing magazine.



The topcoat process and HVAC protection

Project name: California Lottery Commission

Project location: Sacramento, Calif.

Project duration: August 2005-October 2005

Roof system type: PVC membrane roof system with acrylic polyester-reinforced coating system

Roofing contractor: Madsen Roof Co. Inc., Sacramento

Roofing manufacturer: National Coatings Corp., Camarillo, Calif.

Roof consultant: DC Consulting Services, Sacramento

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