



Location:

Harrisburg, Pennsylvania

Architects:

Vitetta

Construction Management:

Reynolds Construction Management

Waterproofing Contractor:

D. A. Nolt, Inc. of N.J.

Tremco Sustainable Building Solution:

TREMproof® 250GC Cold Fluid-Applied Elastomeric Waterproofing Membrane, TREMDrain® 1000 for the paver areas, TREMDrain® GS in 1" and ½" for the planters, Tremco Protection Mat, Dymonic® 100 Polyurethane Sealant, Spectrem® 3 Silicone Sealant

Pennsylvania Capitol East Wing

Challenge: Classic Majesty of Pennsylvania Capitol's East Wing Restored

When Pennsylvania's Capitol opened in Harrisburg, Pennsylvania in 1906, President Theodore Roosevelt declared it one of the "handsomest buildings" he had ever seen. Designed in the American Renaissance style, it was an "architectural and artistic treasure" with three magnificent front entrances. In 1987, the Capitol's East Wing was opened, adding almost 400,000 square feet of functional space to the Capitol for legislative offices, rooms for public hearings, a large public cafeteria and more. On January 17, 1995, Governor Tom Ridge was the first to hold a gubernatorial inauguration on the East Wing Plaza. This tradition has continued with every subsequent inauguration irrespective of the weather.

Sweeping walkways with granite pavers and planting beds complement the majestic structures. Veterans' Memorial Fountain, located behind the East Wing, generates computerized water displays for visitors and state workers during warm months. A parking garage and Commonwealth offices are located beneath the plaza. After continual exposure to the elements over the years, the sheet-applied waterproofing system below the paver and pedestal system had begun to fail at its numerous seams and moisture had begun infiltrating the occupied spaces.

The existing EPDM waterproofing membrane beneath the sloping walkways had to be demolished down to the concrete substrate and replaced with the TREMproof 250GC Cold Fluid-Applied Elastomeric Membrane to provide a seamless water barrier and the elasticity to endure the movement required.



PA Capitol East Wing ...continued

SPACE-CONSTRAINED SITE AND FULLY OCCUPIED BUILDINGS CREATE LOGISTICAL CHALLENGE

Renovation to rectify the problem required taking up all of the landscaping covering over 260,000 square feet of area. Planters covered nearly half of the plaza. The sloping walkways were comprised of enormous pavers on top of pedestals. Each granite panel was a five foot square and weighed 1200 pounds. The old pavers had to be labelled, set aside and carefully stacked. The EPDM waterproofing membrane was demolished down to the concrete substrate.

In addition, the cast iron drain bodies had corroded over time. During winter months, salt had been used generously to keep walkways clean and safe for those traversing the plaza. The salt-laden water travelled into the open-joint pavers, taking a toll on the more than 300 drains and necessitating the installation of stainless steel inserts into the pipes to retrofit them.

With the Capitol being fully occupied and having numerous public spaces and significant pedestrian traffic, work needed to proceed as quickly as possible while minimizing disruption. Being the state capitol, security and parking were also major issues. Storage space at the site was extremely limited and deliveries of material had to be scheduled in advance as the job progressed. This included two-day notice to the state, tracking the truck driver's name and pertinent information as well as the time required to unload. Logistical planning was critical and material suppliers needed to strictly adhere to scheduling and guidelines.

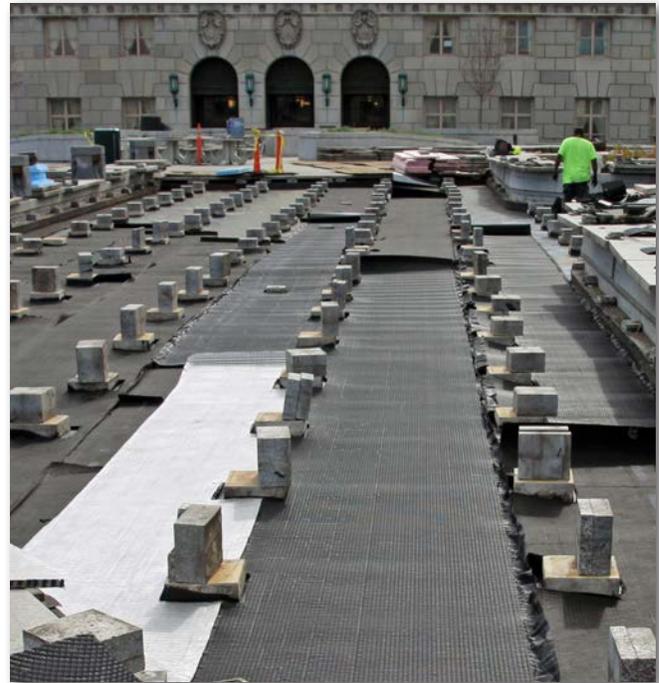
WATERPROOFING SELECTION REQUIRED INSTALLATION EFFICIENCY AS WELL AS UNCOMPROMISING DURABILITY

Work was completed on the design for the renovation and upgrade on the project in September of 2013. Daniel Vodzak, regional director of the architecture and engineering firm Vitetta in Harrisburg, Pennsylvania, wanted to avoid the potential for leaks at seams, so a sheet-applied waterproofing membrane was not a consideration. With the configuration of the plaza including curving walkways and a multitude of planters, the waterproofing needed to be able to conform to any geometry. Another requirement was a 25-year warranty.

Since concrete is naturally porous and fine cracks will occur over time from expansion and contraction due to climate changes, the selection of products for use above inhabited areas is particularly important. The potential for leaks must be eliminated and fluid-applied coatings were the preferred choice for waterproofing due to their ability to provide a seamless water barrier along with the ability to elongate to bridge cracks that develop over the years.

D.A. Nolt, Inc. of NJ, a family-owned and operated construction company specializing in government roofing and construction projects, was selected to do the work. As they evaluated the waterproofing alternatives, time and labor involved was another consideration. Being an external installation, the product utilized needed to be more forgiving in terms of moisture content to minimize

any delays due to inclement weather. Other products require a multiple-stage process, which would add days to the process, and may need reinforcement in the coating to be strong enough to endure anticipated movement without tearing.



Drainage mat was installed over the TREMproof 250GC, then four-inch foam installation, followed by Tremco Protection Mat for membrane protection from ultraviolet degradation and the rigorous conditions in Harrisburg.

The waterproofing that met all the criteria was **TREMproof® 250GC Cold Fluid-Applied Elastomeric Waterproofing Membrane** from Tremco Commercial Sealants & Waterproofing. A rapid-curing, VOC-compliant membrane, TREMproof 250GC is a one-part, moisture-curing elastomer. While other products needed testing and monitoring to ensure moisture content in concrete substrates was within acceptable levels, TREMproof 250GC was designed to enable use on damp and green concrete. This high-solids membrane could also be applied in one pass, which dramatically expedites construction schedules. To compress schedules further, TREMproof 250GC could be catalyzed with water to cure faster.

“By eliminating the multiple stage process, we probably reduced our time and labor by 15% to 20%,” noted Josh McGroarty, Project Manager at D. A. Nolt. “TREMproof 250GC had the elasticity we needed to endure the movement the application required and it also came in a trowel-grade version which facilitated the vertical applications in a single application. Probably 40,000 square feet of the job involved vertical surfaces.”

PA Capitol East Wing ...continued

CLOSE INVOLVEMENT OF WATERPROOFING SUPPLIER HELPED FACILITATE INSTALLATION

With 30 workers on average from D.A. Nolt on-site at one time and limited storage space, it was important to understand how many pails or barrels would be required to achieve the mil depth required for the waterproofing. McGroarty prepared spreadsheets to ensure quality control of the millage and Jim Holler, Tremco Restoration Specialist, kept an eye on the job to make sure application was being done as required. Particularly for the first couple of months, he was on-site two or three times a week.

“A number of the planters had a lead liner in them. The Tremco representative did pre-construction pull tests to determine what might be necessary to ensure the waterproofing would adhere well to the lead. This included use of a non-porous primer,” remarked Vodzak. “By the time the contractor was ready for the planters and repeated the pull tests, he already knew what to use.”

With just about half of the project involving planters, the fluid-applied membrane helped to ensure the planters were properly waterproofed and no areas were left untreated or exposed to moisture infiltration. To protect the membrane from damage during backfilling or garden maintenance while enhancing the performance of the waterproofing system, TREMDrain Drainage Mat was installed over the membrane, followed by 4-inch foam board insulation, another drainage mat and then the trees and shrubs. TREMDrain® GS drainage mat consists of a perforated polystyrene core with fabrics attached to both sides so the roots would not sit in water. Installed with the dimples down, the core also functions as a water retention layer. It also includes a copper hydroxide treatment to prevent root growth within the mat's cone.

Under the granite pavers in the plaza area, the TREMproof 250GC was applied, cured, leak detection was completed and it was ready to walk on within two days. Electronic leak detection was installed everywhere the waterproofing was applied and was left in place. The leak detection system verifies the membrane has no breaches prior to installing the overburden and aids in locating any future breach.

Drainage mat was installed over the waterproofing, then four-inch foam insulation, followed by Tremco Protection Mat. Extremely tough and puncture-resistant, the ultra-lightweight, easy-to-install polyester mat offers excellent membrane protection, making it ideal for even the most rigorous conditions. Tremco Protection Mat is also resistant to ultraviolet degradation.



In the paver areas, the TREMproof 250GC would be applied, cured, leak detection was completed and it was ready to be walked on within two days.

INNOVATIVE POLYMER TECHNOLOGY IN NON-SAG, COMPATIBLE SEALANT HELPS EXPEDITE WORK

At the perimeter of the granite pavers and stairs, Dymonic® 100 high-performance polyurethane sealant was the basis of design. Formulated with an innovative polymer technology similar to TREMproof® 250GC, it is a medium-modulus, low-VOC, UV-stable, non-sag sealant that has the same ability to adhere to damp and green concrete while also being compatible with the waterproofing membrane. It can be used in wider one-inch horizontal joints and resist sag and will not crack, craze or yellow even under extreme UV exposure.

With a movement capability of +100/-50% in typical field conditions, it also met the movement requirements for the job. Exposed to harsh weathering challenges, Dymonic 100 not only resists yellowing but also retains its movement capability withstanding seasonal cyclic shifts imposed by variations in temperature as well as seismic conditions. ASTM C793 Standard Test Method for Effects of Laboratory Accelerated Weathering on Elastomeric Joint Sealants provides an indication of how well a properly installed sealant joint will maintain its integrity and long-lasting prevention of air and moisture infiltration without cracking. Even after 365 days of exposure, Dymonic 100 extended 100% when tested in the lab.

Tremco's Spectrem® 3 Silicone Sealant was used on vertical walls between granite panels. Spectrem 3 has a patented chemistry that has been specifically formulated to seal porous stone, granite and pre-cast concrete joints without staining and dirt pickup so the architectural beauty of the site is not marred.

PA Capitol East Wing ...continued



About half of the project included planters and 40,000 square feet of vertical surfaces so the TREMproof 250GC with its trowel-grade version helped to ensure no areas were left untreated or exposed to moisture infiltration. TREMDrain GS drainage mat was used over the membrane to enhance the performance of the waterproofing system by functioning as a water retention layer while designed to also prevent root growth.

UTILIZATION OF COMPREHENSIVE WATERPROOFING SYSTEM DESIGNED TO PROVIDE LONG-LASTING SOLUTION

While water is clearly an enemy to any part of a building envelope, it is particularly harmful to horizontal surfaces since standing water can accelerate deterioration, particularly when moisture has begun to make inroads. As corrosion began to take place in the drains, drainage also was being negatively impacted. The failing waterproofing membrane and poor drainage had become not only a nuisance to those occupying space below the plaza and to those parking in the parking garage, it was detrimental to the useful lifespan of those structures, as well as the plaza itself.

With the scope of the job being of major proportion and the profile being extremely high, the solution to the problem needed to be as efficient as possible – and lasting. Careful evaluation of the options available to remedy the situation provided a comprehensive system already tested to document performance and designed to extend the useful life of the building exterior and plaza surface. “While we had used the other product being considered and liked it, we needed more efficiency and less room for error,” concluded McGroarty.

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