Innovative Tile and Stone Installation Systems

The St. Louis Gateway Arch

Project Spotlight: December 2008

LOCATION:
St. Louis, MO

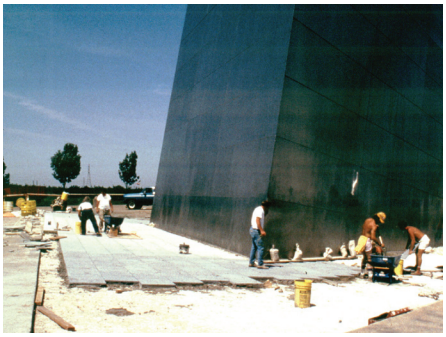
TILE CONTRACTOR:
John Smith Masonry, St. Louis, MO

GENERAL CONTRACTOR:
Greenleaf Contruction, Kansas City, MO

ARCHITECT:
Eero Saarinen

DISTRIBUTOR:
Trends in Tile, Bridgeton, MO

TILE INSTALLATION SYSTEM:
LATICRETE International, Inc., Bethany, CT



LATICRETE System installed at the St. Louis Gateway Arch – Again

By Eric Carson

The LATICRETE® System has been installed in signature buildings, museums, stadiums, hotels, and skyscrapers in virtually every part of the World. From the Dubai desert to the top of Chicago, LATICRETE materials have earned a global reputation for the permanent, problem-free installation of tile and stone.

In other words, properly install ceramic tile or natural stone with the LATICRETE System and forget about it. Whether it's the swimming pools at the Beijing National Aquatics Centre for the 2008 Summer Olympics or the exterior cladding of the new LEED certified Brooklyn Children's Museum in New York, tile contractors can confidently move onto the next job site.

In 1963, LATICRETE supplied a latex admixture for the cement-based mortar used to install granite pavers at each leg of the Arch monument, the now famous inverted catenary structure conceived primarily to celebrate America's Westward Expansion.

After 40 years, the LATICRETE materials installed at each leg were still firmly in place, but a recent need for repairs to the radiant heating cables installed in the mortar to help melt snow and ice from the granite pavers led to an improbable situation: LATICRETE was specified to do it all over again. One good job deserves another.

The Building of an American Destination

The Gateway Arch, designed by the late Eero Saarinen, soars 630 feet above the banks of the Mississippi River, serving as the centerpiece of the Thomas Jefferson National Expansion Memorial. Saarinen's submission was selected ahead of 172 others in an architectural competition to select the most appropriate design to symbolize St. Louis's role as the Gateway to the West. Sadly, the Finnish born Saarinen, a graduate of Yale University, passed away from a cerebral hemorrhage in 1961 and never lived to see his masterpiece. He was 51.

The Jefferson Memorial site was set in motion in 1935 by President Franklin Delano Roosevelt to celebrate Jefferson's role in the Louisiana Purchase and America's territorial expansion to the West, but the lasting effects of World War II and the onset of the Korean War in 1950 halted the completion of the project for several years. During that time the necessary funds were raised to realize the Arch, still the tallest monument in the United States, with Roosevelt chipping in $3 from the government to match every dollar raised by the city of St. Louis. The inverted catenary arch, the shape formed by a chain of flexible cord hung between two points, was finally completed in October of 1965 at a cost of $13 million.

Saarinen's stainless steel Arch is more complex and subtle than the pure geometric form of a catenary arch, with heavier links on its ends and progressively smaller links towards its apex, making its shape much rounder than a pure catenary. The Arch was built in triangular sections with larger sections at the base that continue to get smaller as it works its way up 630 feet. All 142 sections are equilateral triangles of carbon steel on the interior and stainless steel on the exterior, held together by welded steel rods. The small spaces between the double walls are filled with concrete up to the 300-foot level on each side, and each section is welded to the one above it. The result is that the structural framework is the steel and concrete skin itself.

The outer width of the Gateway Arch, from the North leg to the South leg, matches the height of the arch at 630 feet. Each leg at the base is 54 feet in dimension, with the apex piece of the arch at 17 feet. The margin of error to make sure the constructed legs would meet at the apex was a mere 1/64th of an inch, incredibly realized with the relatively crude instruments available at the time. The need for a high-strength, flexible mortar from LATICRETE for the surrounding pavers is magnified by the Arch's need to sway in high winds. In 150 mile-per-hour winds, the Arch will sway a maximum of 18 inches, nine in each direction.

LATICRETE Then and Now: 50 Years of Innovation

LATICRETE, founded in 1956 by Dr. Henry M. Rothberg, was itself expanding during this time. Dr. Rothberg, a chemical engineer, developed the first latex admixture designed to add strength and flexibility to traditional portland cement mortar, two critical components when installing the granite pavers below the 17,426 pound Arch in St. Louis's freeze/thaw environment. In fact, it was Dr. Rothberg's original contribution to the ceramic tile and natural stone industry, LATICRETE 4237 Latex Additive, which was installed at both legs of the Arch over the radiant heating cables.

Over the next 50 years, while visitors flocked to the St. Louis Arch and Americans continued to migrate west, LATICRETE continued its dedication to the research and development of innovative systems for the tile and stone industry, earning a reputation for excellence that triggered global demand for this groundbreaking technology.

As a result, in 2008, LATICRETE manufactures GREENGUARD certified products at seven different locations in the United States, all strategically located to help architects, specifiers and builders contribute to a project's LEED certification by manufacturing products that contribute to healthy indoor air quality within a 500 mile radius of the job site.

Internationally, LATICRETE is manufactured on six different continents and marketed in over 65 countries around the world.

Because the LATICRETE System performed flawlessly the first time, and since the company has continued to improve the materials and methods for installing tile and natural stone, it simply made sense to utilize LATICRETE materials the second time around.

LATICRETE Fortifies the St. Louis Arch – Again

To re-install the large granite pavers in four different sections totaling 6,160 square feet, Alan Reynolds from the Greenleaf Construction Company in Kansas City, the general contractor on the job, worked with the John Smith Masonry Company in St. Louis to first pull up the pavers installed with the LATICRETE System in the early 1960s. The incredible strength of the original LATICRETE® fortified mortar made this an interesting task for Greenleaf Construction and John Smith Masonry, one of the countries top masonry firms.

"The pavers were still down there pretty good," said Reynolds. "It was still in decent shape. We took bars and hammers and popped the granite loose. Once we had the pavers up we had to mill down the old system to get low enough to put down the new cables. When you have to mill it down that means it's still in pretty good shape. In this application, because it's exposed to a lot of foot traffic and it gets cold and hot, and when it is cold we're heating it up, I think the LATICRETE System was the best one to use."

Once the pavers had been pulled up and the new radiant heating system was installed, Joel Tully, owner of Trends in Tile in neighboring Bridgeton, Missouri, supplied John Smith Masonry Company with a slightly different LATICRETE System for the renovation of the Gateway Arch.

To re-install the original 2' x 2' x 1/4' granite pavers that slope down and serve as the entrance walkway for tourists and visitors to the subterranean Arch museums below each leg, Greenleaf Construction Company utilized a GREENGUARD certified, LEED compliant system from LATICRETE.

For the mortar bed, John Smith Masonry mixed LATICRETE 226 Thick Bed Mortar with LATICRETE 3701 Mortar Admix. LATICRETE 226 Thick Bed Mortar is a factory prepared blend of carefully selected raw materials, portland cement and graded aggregates, designed for use with LATICRETE 3701 Mortar Admix for a latex portland cement mortar with exceptional strength and resistance to weather, frost, thermal and physical shock.

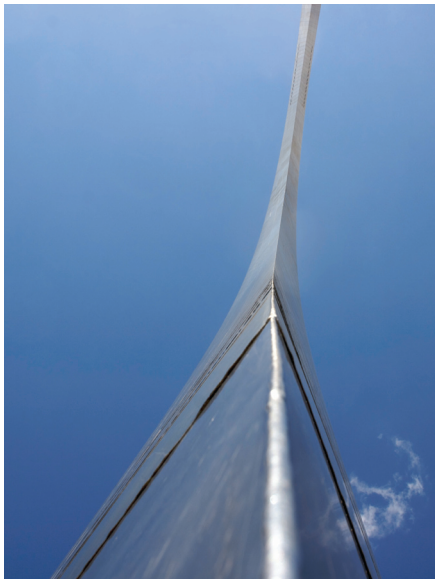
Just prior to setting the granite in the mortar bed at each leg of the St. Louis Arch, the pavers received a slurry bond coat of LATICRETE 211 Powder mixed with LATICRETE 4237 Latex Additive, marking the second time the original LATICRETE latex additive was installed at one of America's signature destination icons.

The same combination of LATICRETE 226 Thick Bed Mortar and LATICRETE 3701 Mortar Admix used for the mortar bed was mixed slightly different to utilize the strength and flexibility of LATICRETE 3701 Mortar Admix and used essentially as the grout for the 2' x 2' granite pavers.

"The LATICRETE System and method was specified by the National Park," said Tully. "It's the system that has worked since day one. The industry specification for that type of install has actually changed. For the slurry coat we would use LATICRETE 254 Platinum today. But it worked the first time so we did it again. It's a tried and true method. If you do it correctly it will last forever. It's impressive because there are no expansion joints in the entire area. St. Louis will go through eight to 12 freeze/thaw cycles a year. One day it's 25 degrees the next it's 80. The fact that they tore up the pavers and the original LATICRETE mortar bed was still there says it all."

Go West Young Man

The St. Louis Arch today attracts more than 4 million visitors annually to the banks of the Mississippi River. To this day, the Arch remains a powerful symbol of America's westward migration and a young nations coming of age. The pioneering spirit of those who went before us and created this great land of opportunity is forever memorialized by its majestic presence, a constant reminder that any American with the courage and commitment to follow a dream can indeed achieve great things.



* United States Invention Patent No.: 6881768 (and other Patents)