



# SIKA AT WORK

## LINCOLN MEMORIAL REFLECTING POOL

WASHINGTON, D.C.

BUILDING TRUST





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## INTRODUCTION

In 2010, funds from the American Recovery and Reinvestment Act made the \$34 million renovation of the Lincoln Memorial reflecting pool possible. The reflecting pool was slightly redesigned to be shallower and more aesthetically pleasing. Most importantly rehabilitation addressed the water quality and watertightness issues. Thanks in part to the durable products provided by Sika, the Lincoln Memorial reflecting pool will continue to be a treasured national monument for generations to come.

## HISTORY

The old reflecting pool, completed in 1924 and demolished in 2009, held 6.75 million gallons of water, much of which evaporated or continually leaked from the pool. The old reflecting pool was built with an asphalt and tile bottom on poorly supported soil consisting primarily of marshes. The unstable subgrade had deflected twelve inches over the past 90 years under the pressure exerted by the reflecting pool above. In 1980, a new concrete slab was poured over the existing slab, but the added weight simply worsened the soil settlement and subsequent structure leakage. The old reflecting pool could not circulate its often stagnant water and was drawing more than 30 million gallons of city potable water per year.

## THE CHALLENGE

Stabilize the subgrade to minimize the settlement potential and subsequent damage to the new reflecting pool structure.

- Provide a concrete mix design that met the project specifications for durability, shrinkage, and watertightness.
- Provide a cost effective and efficient joint sealing product to ensure watertightness of the entire system at numerous construction joints.

## DETAILS

<b>Location</b>	Denver, CO
<b>Engineer</b>	KPFF Consulting Engineers
<b>Contractor</b>	Saunders Construction Inc.
<b>Concrete supplier</b>	Suburban Ready Mix
<b>Concrete volume</b>	~ 4800 cu. yds.
<b>Conventional concrete</b>	~ 500 cu. yds.
<b>Specialty concrete</b>	~ 3500 cu. yds.
<b>SCC concrete</b>	~ 800 cu. yds.





## THE SOLUTION

The new reflecting pool is founded on 2,133 timber piles driven into the bedrock to providing more stable support. The concrete specifications called for a highly durable watertight concrete, with minimal shrinkage. Corman Construction Inc., the general contractor, decided to utilize a watertight concrete system provided by Sika Corporation in order to meet the project specifications. Concrete for this project was supplied by Aggregate Industries and included commonly used concrete admixtures such as an air entraining agent, Sika AEA 14 and water reducing admixture, Plastocrete 161. Additionally, the high-performance concrete mix also utilized the hydrophobic watertight concrete admixture, Sika Watertight Concrete Powder, shrinkage reducing admixture, Sika Control 40 and polypropylene fibers to increase concrete watertightness and minimize shrinkage potential. Use of Sika Watertight Concrete Powder improved densification and provided the desired hydrophobic protection without negatively affecting plastic concrete properties and setting times. The unique integral concrete solution provided by Sika simplified the construction process and improved overall concrete durability and performance.

In conjunction with Sika concrete admixtures, easily installed Sika Greenstreak hydrophilic joint sealing strip Hydrotite was used at all construction joints to provide a whole system solution for the reconstruction of the Lincoln Memorial reflecting pool. This system approach to watertight construction is referred to as Sika's "Whitebox". During the rehabilitation of Lincoln Memorial reflecting pool Sika was a single source provider of concrete construction products needed to build watertight structures as evidenced by the successful implementation of the "Whitebox" system.

Besides the pool renovation itself, the additional water management improvements included new water re-circulating machinery, a new pump building, which houses a second set of re-circulating pumps, a filtration system and ozone disinfection. 58 outlets are now used to fill the structure, flooding the pool with approximately 800 gallons of water per minute taking approximately 5 days to fill the entire structure.

For two years, the massive reconstruction project shut down a large swath of the National Mall. During this period the new reflecting pool with new walking paths along each side and state of the art supporting infrastructure was built to accommodate millions who visit the site each year. The reflecting pool in front of the Lincoln Memorial on the National Mall reopened Friday August 31, 2012.

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