



PROJECT PROFILE

Gateway Arch

Corrosion Investigation and Historic Structure Report | St. Louis, MO



CLIENT

National Park Service

BACKGROUND

The 630-foot-tall stainless steel arch was designed in 1947 by architect Eero Saarinen to commemorate the city's role in westward expansion. Since its official dedication in 1968, this National Historic Landmark has captivated over one-hundred million visitors. As the tallest man-made monument in America and the largest catenary structure ever built, the Gateway Arch stands as a gleaming model of architectural and engineering innovation.

Observing increasing discoloration, streaking, and surface irregularity of the stainless steel exterior, as well as interior corrosion, the National Park Service sought an expert assessment of the structure to determine the source of the apparent corrosion and staining of the stainless steel; establish repair recommendations based on the structure's historical context; and develop a plan for long-term, sustainable protection.

SOLUTION

During several phases from 2005 to 2015, WJE investigated and documented the history and conditions of the Gateway Arch. Visible stains and blemishes of the stainless steel skin and the condition of the interior of the structure were examined close-up, with samples analyzed in the laboratory. A thermal and relative humidity monitoring system was installed to better understand the potential for microclimates and for causing deterioration within the Arch. A Historic Structure Report for the Arch was completed to serve as a critical planning tool for the long-term preservation of the monument.



During the final phase, areas of stainless steel that appeared discolored from grade were examined close-up for the first time using industrial rope access techniques. WJE architects, access experts, conservators, and engineers worked collaboratively to document and investigate the causes of the discoloration of the stainless steel skin and to conduct cleaning trials to mitigate their appearance. The work of all team members, including the National Park Service, was critical to identify, assess, and develop treatment recommendations for the long-term preservation of the Arch. WJE's expertise in materials conservation, engineering, and extensive experience in preservation techniques contributed to meet the client's goal to develop a long-term preservation plan.