



PROJECT PROFILE

Washington Monument

Earthquake Damage Assessment and Repair | Washington, D.C.



CLIENT

National Park Service

BACKGROUND

Constructed from 1848 to 1884, the monument is a tribute to George Washington and is the tallest unreinforced masonry structure in the world. The masonry walls taper from over twelve feet thick at the base to eighteen inches at the top of the shaft. The unique pyramidion that caps the monument is clad in seven-foot-wide hung marble panels with an inscribed block of cast aluminum serving as the apex.

Following a magnitude 5.8 earthquake in northern Virginia in August 2011, the Washington Monument exhibited spalling and cracking of stone primarily in the upper levels of the monument. To fully determine the scope of damage and to ascertain the structural stability of the monument, a team of engineers with specialized expertise in the performance of stone structures subject to seismic loadings was required. The team also had to possess unique skills in rope access techniques in order to complete close-up inspections of the monument exterior.

SOLUTION

WJE assembled a team of engineers and architects with the necessary expertise to quickly and economically assess the structural stability of the monument and overall impact of the seismic event on the natural stone and historic fabric of the monument. Using specialized rope access techniques, engineers and architects that comprise the WJE Difficult Access Team (DAT) rappelled down the monument exterior, documenting the damage and removing loosened stone fragments. The DAT used Tablet PCs (iPads) to record observations on drawing overlays so that interior and exterior conditions could be documented electronically and used to develop repair documents.

WJE developed temporary repairs to minimize water intrusion and then completed a seismic study to assess the monument's vulnerability to future potential earthquakes. Finally, the team developed a comprehensive set of construction document drawings and specifications that guided the permanent repair and restoration of the Monument, which reopened to the public in May 2014.

