

# WHEN HISTORIC STRUCTURES SHAKE

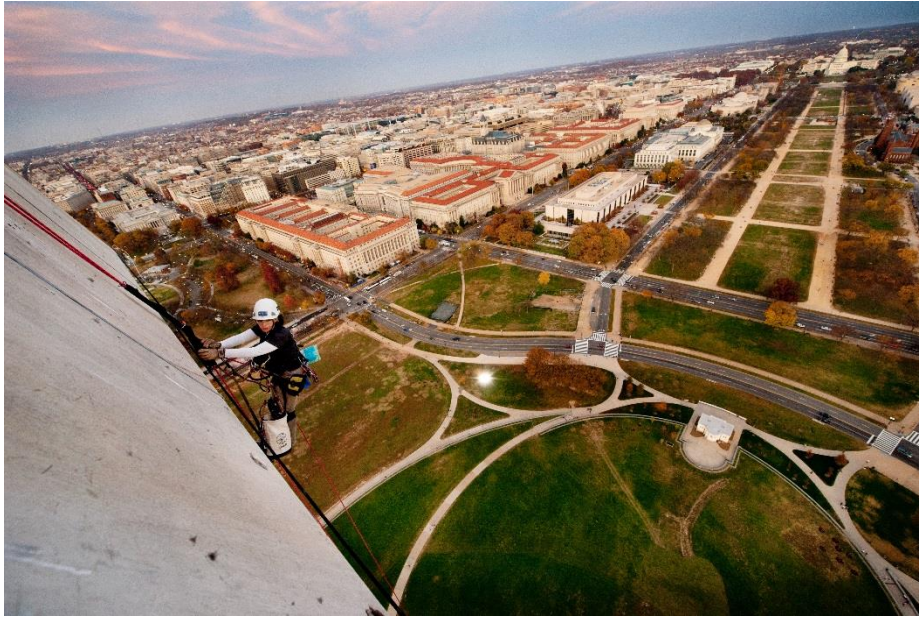
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## ABSTRACT

The seismic vulnerability assessments of many large historic structures require the need for preservationists on the design team along with architects and structural engineers. But many times, it is the wishes of the structural engineer that can dominate the conversation, and “seismic safety” can be used as a rod as a building’s historic fabric is destroyed in a heavy-handed intervention that is neither technically appropriate, nor required by the jurisdiction. This outcome may occur when the engineer conducts an inappropriately sized analysis, does not consider the inherent strengths of archaic building materials, or relies on familiar retrofit approaches that may not be suitable for historic structures.

This presentation will help architects and preservationists identify when the seismic retrofit train has gone off the tracks, and provides steps to maneuver the process back to the fundamental goal of preserving historic buildings for future generations. The roles of the owner, jurisdiction, engineer, architect, preservationist, and contractor will be discussed along with the relevant code documents and triggers for seismic assessment. Next, the steps in an innovative seismic analysis process will be discussed, with an eye towards ways to break the stodgy engineer out of his code-centered box to explore solutions and analysis techniques not commonly implemented.

The presenter will share several case studies including assessments performed on wood-framed residences in San Francisco, a pre-1906 masonry synagogue, a historic banking palace in San Francisco, a historic single-family home in Haiti, and a famous prison (which happens to be constructed of reinforced concrete). The presenter will also share his experience in the seismic assessment and earthquake damage repair of the Washington Monument in Washington, D.C. following the 2011 Mineral, Virginia earthquake.



*Figure 1. A member of WJE's DAT (Difficult Access Team) surveying the Washington Monument*



*Figure 2. Hibernia Bank in San Francisco on opening day following 1906 earthquake.*



*Figure 3. German Consulate in San Francisco*



*Figure 4. Maison Dufort in Port-au-Prince following the 2010 earthquake in Haiti*

## **ABOUT THE PRESENTER**

Owen Rosenboom is a structural engineer specializing in the investigation, assessment and retrofit of existing buildings, particularly historic structures. Owen has travelled to assess buildings for vulnerability to earthquakes, or damage after earthquakes, in places such as Djibouti, Kazakhstan, Greece, Haiti, Japan, New Zealand and Uzbekistan. He also leads forensic investigations of structural failures due to wind, fire, and other causes. Owen received his PhD in structural engineering from North Carolina State University and completed a post-doctoral fellowship at Hong Kong Polytechnic University. He has many years of research experience in the repair and strengthening of concrete and masonry structures, especially related to rehabilitation using fiber reinforced polymer (FRP) materials.

In his free time, Owen enjoys spending time with his family and friends in Oakland.

