

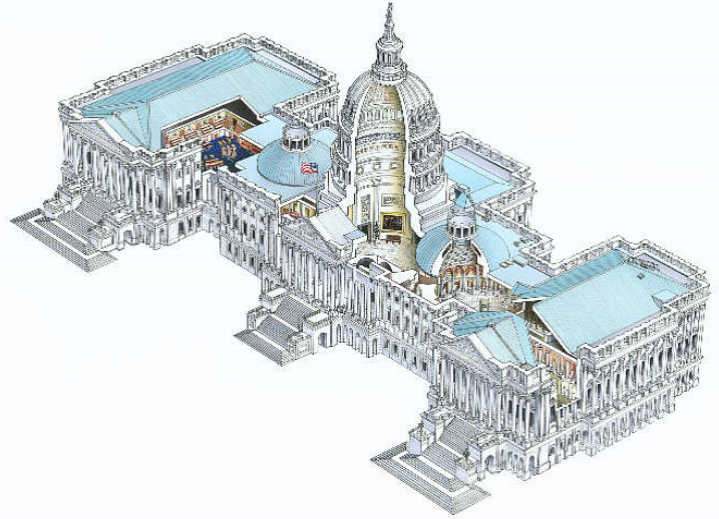
CASE STUDY

**US Capital Building
Washington, DC**



Facility Description

The U.S. Capitol Building in Washington, D.C. is one of the most famous buildings in the world. In 2000, the Architects of the Capitol Building, a federal government agency, contacted PQI regarding the replacement of all distribution transformers in the Capital Building. Their motivation for doing so was based on the age of the transformers, the unsuitability of conventional transformers as a power source for nonlinear electronic loads, and an initiative to reduce electrical distribution system losses and improve energy efficiency.



Challenge

When ordering the transformers, the Architects of the Capitol specified transformers with optional shield windings. Following their installation, PQI learned that the electrical distribution systems were equipped with 'power line carrier' systems. These systems inject a high frequency signal into the distribution systems to set off alarms when the Senators or Representatives are called into chambers for a vote. As might be expected, the new shielded transformer windings blocked the 'power line carrier' frequencies, which rendered the alarm systems inoperable. Realizing their mistake, the Architects of the Capitol called PQI to reorder all affected transformers.

Solution

As an alternative to purchasing new transformers, PQI was able to design a 'shield grounding network' that would allow the power line carrier frequency to pass through the transformers while allowing the shield to function as originally intended.

Impact

Functionality was restored to the alarm systems, the new harmonic mitigating transformers exceeded NEMA TP1 efficiency requirements under nonlinear loading and IEEE 519 power quality recommendations were achieved, reducing system and load losses and improving their efficiencies.