One of San Francisco’s lesser-known architectural gems by Albert Pissis, the centerpiece of Sherith Israel is an ornately finished vaulted sanctuary topped by a naturally lighted dome that rises more than 100 feet above the sanctuary floor.

On this project, responsibility for preservation was adopted as an explicit structural engineering goal, equal in importance to seismic safety. Without disturbing the historic interiors and without supplementing story shear strength, the design achieved full compliance with required codes via a combination of traditional and innovative techniques, including:

An octagonally-configured tension tie system with super-elastic nitinol “fuses” designed to promote re-centering and control out-of-phase, out-of-plane behavior of the vulnerable gable end walls, parapets, and main arches. This is the first known use of nitinol to resist seismic forces in North America. Though the tension tie system interconnects all four gable end walls, it circumvents the inner dome and causes no disruption to the sanctuary.

Compression-only reinforced concrete pilasters to control outward (i.e., northward) displacement of the thin, essentially planar, north exterior masonry wall without incrementing the demand on floor-to-wall ties when the building sways to the south.

Carbon fiber reinforced polymer (CFRP) catenary to prevent outfall of high b/t wall segment.

System of vertical and horizontal center cores to boost integrity of exterior masonry walls, stitch corners of the building together, and resist the tendency of the plan-articulated masonry walls to unfold under out-of-plane action. An engineered polymer grout was specifically developed for the project to match stiffness of the masonry, reduce thermal cracking, reduce cost, and prevent damage to water-sensitive interior finishes.

Back-up support for heavy plaster ceilings achieved by conversion of gable roof rafters into trusses via addition of threaded rod tension members across the gables, and by addition of secondary suspension wires.

**Project Team**

**Owner** Congregation Sherith Israel

**Structural Engineer** Wiss, Janney, Elstner Associates

**General Contractor** Plant Construction

**Architect** ELS Architecture and Urban Design