

SEISMIC REHABILITATION OF UCLA LIBRARY ROOF SLAB

BACKGROUND

The construction of UCLA Powell Library was completed in 1929, one of the first four buildings of UCLA campus in west side of Los Angeles. The Romanesque architecture of this building makes it stand out while being used as the main undergraduate library on campus.

CHALLENGES

In 2023, almost 100 years later, Powell Library went through a structural analysis that identified the need for a seismic retrofit of the concrete roof slab. The slab required additional shear capacity for seismic loads.

SOLUTION

This was provided by installing Fyfe®'s FRP composite systems, but before the rehabilitation work could be completed, the contractor needed to repair some light spalling and cracking that had occurred on the concrete deck over a 100 year span.

Loose particles were removed, and cracks were epoxy-injected for the structural repair. Spalled-out and removed concrete parts were repaired using GeoTree Solutions®' GeoStrong®, a geopolymer rapid set repair mortar.

FyfeFRP's engineers, along with the Senior Engineer of Record for the rehabilitation project, carried out the engineering calculations required to identify the appropriate repair. Tyfo® SCH-41 unidirectional carbon FRP was used to add in-plane shear capacity to the roof deck. Tyfo SCH fiber anchors were used with special detailing to develop the required forces and to ensure load continuity. Tyfo RR coat was used as the final finish to provide a cementitious look, as well as to enhance the smoke and flame resistance of the FRP materials. As a part of quality control for FRP, ASTM D4541 and ASTM D3039 were performed for measuring the tensile and bond properties of FRP composite systems, respectively.

