



# Project Overview

## FRP RETROFIT OF REINFORCED CONCRETE BEAMS IN HISTORIC BUILDING

**Name: Art Gallery**  
**Type: Historic Building**  
**Location: Phoenix, Arizona**

### PROBLEM

This building was constructed in downtown Phoenix during the early 20<sup>th</sup> century and was scheduled for demolition to make room for a public park. Due to the historical value of the building, the city authorized only a partial demolition.

As a result, a few reinforced concrete beams that were previously located in middle spans were now located on end spans. Additional flexural reinforcement was needed to withstand the increase in positive and negative flexural moments in these spans. Moreover, during site inspection, no shear reinforcement was found, so shear retrofit was also needed.



### SOLUTION

QuakeWrap<sup>®</sup> Fiber Reinforced Polymer (FRP) Retrofit System was selected to provide the additional reinforcement needed in the concrete beams. Strips of FRP carbon fiber fabrics were placed on the bottom face and on the top slab to provide for positive and negative flexural retrofit, respectively. For shear retrofit, “U” shape FRP carbon fiber fabrics were placed on bottom and lateral faces of beams.



## Technical Highlights

- Structural FRP Retrofit of Reinforced Concrete Beams in a Historic Building in downtown Phoenix.
- FRP Retrofit needed due to partial demolitions in the structure.
- FRP Retrofit of 7 beams to increase flexural and shear capacity.
- FRP system installation completed in 3 days with a 4 man installation crew.

### Credits

Structural Engineer: Paul Koehler Consulting Structural Engineers, Scottsdale, Arizona  
General Contractor: DPR Construction, Inc., Phoenix, Arizona

