



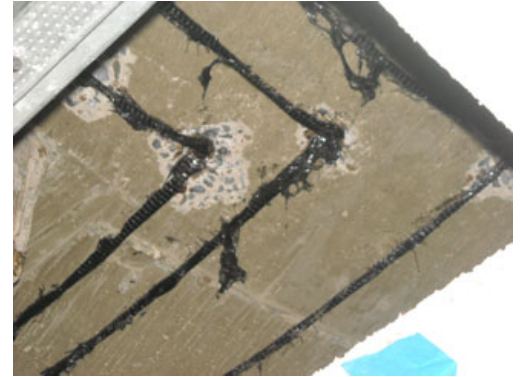
Project Overview

PUNCHING SHEAR REINFORCEMENT WITH FRP

Name: Georgian Towers
Type: Punching Shear & Slab Reinforcement
Location: Silver Spring, Maryland
Completed: December 2008

PROBLEM

A 16-story high apartment building in Silver Spring, Maryland, called the Georgian Towers, experienced additional loads on the roof slab due to the construction of a pool and bath house. The slab therefore had deficiency in bending capacity, as well as punching shear capacity.



SOLUTION

For punching shear strengthening, holes were drilled in the critical area around the columns and FRP anchors were installed.

The flexural capacity was increased by laying 4 ft wide FRP strips along the columns lines on top of the slab. The FRP layers were bonded to the punching shear anchors. No strengthening on the bottom of the slab was needed due to the strengthening of the flexural capacity of the slab over the columns.



Technical Highlights

- Additional punching shear strengthening was needed for 12 columns
- 7,000 ft² of slab were deficient in flexural capacity
 - 4,000 ft² of QuakeWrap[®] carbon fabric were used
 - Punching shear done by drilling holes through slab and applying strips of carbon fabric
 - Punching shear strips were anchored in the FRP layers on top of the slab



Credits

Consultant: Tadjer-Cohen-Edelsson, Silver Spring, MD
General Contractor: Stellar Management, Silver Spring, MD

“The FRP Retrofit Experts”