



# Project Overview

## FRP RETROFIT OF WOODEN BEAMS IN CONDOMINIUM BUILDING

**Name: Dunes Condominiums**  
**Type: Condominium Building**  
**Location: Charlevoix, Michigan**  
**Completed: May 2006**

### PROBLEM

The four-story condominium building required the least invasive strengthening technique to upgrade the overstressed wooden beams.

Seven wooden beams in the occupied condominium were overstressed and experienced deflections of 1½ to 2 inches. Replacing the 26-foot span beams was very difficult as Lake Michigan blocked access on one side of the building. On the street side, the building was accessible only through a narrow staircase between the third and fourth floors.



### SOLUTION

QuakeWrap® FRP Retrofit System was selected since it allowed for the repair of the wooden beam without disturbing the structure. Each beam was wrapped and strengthened in place with QuakeWrap® composite carbon fabric. This procedure was minimally invasive, which was important in an occupied building. The retrofit system uses virtually odorless epoxy resins which allowed the building to remain occupied during the repair process.



## Technical Highlights

- Seven (5-1/8x18"x26-foot) wooden beams were reinforced
- Design live load was increased to 40 psf
- Access was extremely limited
- Three wooden beams were retrofitted on the fourth floor, three on the third floor, and one above the indoor pool.

### Credits

Consultant: Performance Engineers Inc., Charlevoix, Michigan  
General Contractor: Site Planning Development, Inc., Charlevoix, Michigan



*"The FRP Retrofit Experts"*