

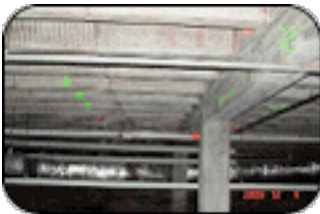


Project: Mark Twain School

Beam
Strengthening



Chicago, IL



Project Description:

The Mark Twain School is one of thirty two similar schools built about 80 years ago. The alleged defects include poor placement of the reinforcing steel, poor concrete consolidation, structurally significant cracking, and structural design and detailing deficiencies. These schools were the first reinforced concrete buildings that were constructed for Chicago Public Schools. The repair scheme involved supporting the roof with a system of steel beams supported by the building parapets. The owner wanted to remove the steel beams and stop the recurring leaks at the hanger penetrations.

Solution:

First of all, WJE performed a complete engineering study of the existing roof framing and steel reinforcement to determine if a repair was required. The existing supplemental steel was inadequate. After load testing the roof, a strengthening scheme was developed using fiber wrap to increase the capacity of the girders and joists. In order to increase the shear and flexural capacity of various members, both glass and carbon composites were applied at different levels in the school. The work was performed during the summer months when the school was empty.

Summary:

The fiber wrap solution allowed the removal of the structural steel support system at the roof level. The hangers were removed and the roof penetrations were filled. This stopped the recurring leaks. The work areas were extremely small and difficult to access. The use of fiber wrap was an advantage in reaching the members to be reinforced. A class 1 fire rating was applied over the FRP.

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