

MATRIX MARINE, LLC

The Official Newsletter of Matrix Marine, LLC



Fiber Reinforced Polymer (FRP)

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Addressing the ever-growing aging issues in structures and infrastructures with intelligent and economic solutions fiber reinforced polymer (FRP) composites continue to provide engineers with the ability to deliver innovative design to overcome the problem. FRP materials have been introduced over 50 years in construction industry. The use of FRP in advanced new reinforced concrete beams and columns is superior to traditional retrofitting due to possession of high strength capacity and corrosion resistance and can be employed as the main reinforcements in combination with adhesives and anchorages. Also, the FRP composites can be used to recover the strength of damaged and corroded beams and columns with good durability and insulation performance. The common

HERE'S WHAT YOU SHOULD KNOW:

- FRP
- *Innovative Design Approach*



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problems for reinforced concrete beams and columns are loss of strength. These elements are needed to be strengthened to increase their flexural strength, shear strength, fatigue life, and seismic resistance. Beams and columns should be strengthened after a certain period of loading because damage may well be in the form of structural damage or corrosion. The thin polymer layer in FRP may comprise different fibers. Various typical materials are glass, carbon, aramid and basalt. The fiber can be either two or three dimensional. The most common strengthening in concrete repair is glass or carbon. Two techniques are typically adopted for the strengthening of structural elements, flexural and shear strengthening. In some instances, it may be necessary to provide both techniques. FRP can be applied in several configurations depending on the shape and exposed faces of the member and the degree of strengthening. Some examples are side bonding, U-wraps (or jackets) and complete wraps. For all wrap configurations, the FRP may be applied as discrete strips or along the length of the member as a continuous sheet or having minimum width and spacing per design. The cost of the retrofitting using FRP may be as less as 60% of conventional strengthening.

Innovative Design Approach

Matrix Seismic Group Corp. can address all your concerns about different methods of design by utilizing a new design approach to strengthen your structures such as Soft Story, Un-reinforced Masonry, Non-Ductile Concrete, Retaining wall, pile, bridge and seawall, etc. The picture on the right shows a patented strengthening of non-ductile concrete column by QuakeWrap, Inc.

Matrix Marine, LLC & Matrix Seismic Group Corp. can evaluate the structural conditions of your Non-Ductile, UMB, Soft Story buildings in a timely manor .

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