



# CASE HISTORY ~ CH-074

## CARBON REINFORCED EPOXY COMPOSITE REPAIR SYSTEMS ABOVE AND BELOW WATER

**THE CHALLENGE:** Carbon fiber reinforced epoxy composites, CFRE's, are widely accepted solutions for repairing or strengthening structures. CFRE can vastly increase the strength and earthquake resistance of civil structures such as buildings or bridges. Sometimes though the CFRE has to be applied under damp or even submerged conditions.

**THE SOLUTION:** TFT has been manufacturing coatings for underwater application since 1988. Using that technology, a saturating resin was developed to be used with fiberglass or carbon fiber reinforcement above or below water. This resin has been used with fiberglass to seal and repair an Offshore riser in Cameroon off the west coast of Africa, with carbon fiber on steel pilings in Rotterdam and concrete bridge bases in the USA. Other projects have included two crude oil storage tanks in Abu Dhabi and the internals of a gasoline storage tank in Jamaica.

**IMPLEMENTATION:** Most projects share the common requirements of proper surface preparation and composite application. In the case of the crude oil tanks in Abu Dhabi for instance there was a safety concern that since the tanks were in service it was not possible to vigorously prepare the surface for composite application. Since mechanical preparation or water jetting was not possible the crews hand scraped exterior tank surfaces to remove loose coatings and corrosion then rolled an initial coat of BIO-GARD 290 as a surface tolerant primer. This served both to provide an efficient "anchor" for the CFRE as well as serving as an electrical insulator against possible adverse cathodic effects.

When working on concrete an assessment is first made of the existing concrete condition.



*Bridge support repairs – above and below water*

Where there is significant wear it is possible to fair the surface prior to CFRE application using initial BIO-SEAL 197 followed by BIO-FILL 456 fairing compound.

In other applications below water it is usually not necessary to do any more than clean by water jetting then apply carbon or glass fiber saturated with BIO-SEAL 204.

**CONCLUSION:** TFT resins allow permanent and sturdy mechanical repairs to be made to structures in dry, wet or even submerged conditions.

For more information regarding these projects, contact:

Jeff Longmore, TFT Technical Director  
Email: [Jeff@thinfilmttech.net](mailto:Jeff@thinfilmttech.net)

PRODUCTS: BIO-SEAL 192 and 204

YEARS: 2018 & 2020

*We go where others fear to spread!*