

## **COMPOSITES – ARE THEY THE ANSWER TO YOUR MAINTENANCE PROBLEMS?**

By Alan R. Westfall

Composites, such as fiberglass reinforced plastics, are an emerging material for municipalities wanting to use the latest technology in fighting traditional problems. A composite, by definition, is a single product made up of two or more materials. Taking advantage of the most desirable properties of each material and minimizing their weaknesses creates a strong, lightweight, non-conductive, non-corroding material. Eliminating maintenance, controlling corrosion, and aesthetic considerations are just a few of the many benefits of using composites for municipal projects.

Composites have been used for thousands of years to enhance products. The Hebrews added straw to clay to manufacture a brick that would not crack. In modern times, fiberglass products have been used for sporting equipment such as boats, fishing rods, and tennis rackets, to name a few. The chemical, water and wastewater industries have used fiberglass tanks, pipes and structures, weirs, baffles and siding. The armed forces now use the strong, lightweight stealth composite material for bombers and fighter jets.

Recently, cities like St. Louis, Chicago and New York have used fiberglass reinforced plastic for their civil projects. We will briefly discuss areas in which municipalities may consider the use of this product.

### **Wind Screens and Bus Shelters**

The Metro Link system in the City of St. Louis quickly tired of painting their windscreens, handrails and benches. Fiberglass screens were proposed to control expensive maintenance procedures like scraping, painting and replacing corroded components. To date, 80 screens with benches have been installed with additional structures coming. St. Louis's Metro Link, New York City Transit and Chicago Transit Authority rail systems use fiberglass grating between the tracks on bridges and use FRP handrails. Controlling corrosion with the use of non-conductive components was an important benefit for these electric rail systems.



Ü Metro Link in St. Louis, Missouri

## **Sewer Pipe - Centrifugal Cast**

Centrifugal Cast Fiberglass Reinforced Polymer Mortar (CCFRPM) pipe has eliminated corrosion due to hydrogen sulfide commonly found in sanitary sewer line. CCFRPM pipe offers a high strength to weight ratio making this product ideal for slip lining through existing sewers, micro tunneling and jacking. The lightweight, easily installed 20' lengths of pipe make this product cost competitive with heavy concrete or steel. The life cycle cost savings is substantial when replacement and social costs are considered.



← Sanitary sewer pipe made with composites.

## **Swimming Pools, Docks & Parks**

Several designers of swimming pools and recreational equipment use fiberglass stair treads and grating around the perimeter of pools and fences. This provides corrosion resistance and adds to the aesthetic appeal of their projects. Chlorine, moisture and pool chemicals have no adverse affect on composites. Many parks and pools have utilized all fiberglass doors for their chlorine buildings, salt storage buildings and maintenance sheds. Docks have benefited from fiberglass decking, siding and roofing as well.

## **Bridges and Drainage**

The newest trend in composites is the use of reinforced plastics for bridges. Many non-metallic vehicular and pedestrian bridges have been in use for golf courses, parks and playgrounds. Several states are actively researching composite bridge projects. Departments of Transportation (DOT) have successfully installed highway bridges made with composite girders, decking and railing. To eliminate rusted, heavy drains from bridges and approaches, an all-fiberglass bridge drain system has been developed.



Ü Graphite composite bridge over Toms Creek in Blacksburg, VA.

## **Telecommunications and Utility Poles**

Cellular towers, communication enclosures and utility poles are the fastest growing industry for the composite manufacturers. Radio Frequency waves and electromagnetic waves pass through fiberglass without interference. Many telecommunication dishes and antennas are “hidden” behind shelters or camouflaged behind fiberglass reinforced plastic equipment. Electrical power poles are now manufactured to replace poles made of heavy, traditional material. Fiberglass utility poles are 15% or less the weight of concrete poles, 30% less than wood poles, and 60% less than steel’s weight.

## **Signage**

Sandblasted wood signs are attractive, but are subject to rotting. Sandblasted, lightweight fiberglass signs offer the same texture and look, but are not affected by moisture or sun. The signs are gel-coated to provide a long lasting, weatherproof finish. These signs are ideal for parks, pools, golf courses and city boundaries.



Ü Fiberglass reinforced sandblasted signs

Consider using fiberglass-reinforced plastics when any of the following criteria are needed:

- Corrosion is a problem.
- Eliminating maintenance is a concern.
- Aesthetics is important.
- Lightweight is an issue.
- Non-conductive properties are beneficial.
- Transparency to radio frequency & EMI waves is needed.

Modern methods of manufacturing composites have made this material a cost efficient material to use on civil projects. When considering the cost of ownership, composites will come out the winner every time.

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