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Trenchless Technology Case Studies

Taking the Mystery out of Trenchless Repair of Pressure Pipes with Carbon FRP

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FRP 101: TAKING THE MYSTERY OUT OF TRENCHLESS REPAIR OF PRESSURE PIPES WITH CARBON FRP

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ABSTRACT: Over three decades ago the author introduced the concept of using carbon and glass Fiber Reinforced Polymer (FRP) to the construction industry. In its simplest form, FRP consists of fabrics made with glass or carbon fiber. The fabric is saturated with epoxy resin in the field and applied like wallpaper to the surface of the structure. Within several hours, the epoxy cures and FRP reaches a tensile strength 3-4 times that of steel. While the original applications were on strengthening of beams, columns and walls, the technique has been used extensively in the US. since the late 1990s to repair pressure pipes.

FRP offers a great solution for repair of pipes. Larger diameter pipes can be repaired internally by man entry. For smaller pipes a packer can deliver the materials to the point requiring strengthening. FRP allows restoration of a deteriorated pipe to its original strength. It can also be used to increase the pressure rating of a pipe to levels far beyond the original design capacity.

Unfortunately most engineering programs do not cover this subject and consequently few practicing engineers know how to exploit the unique advantages of this emerging technology. The presentation will focus on introducing the principles of design, advantages and disadvantages of the system, assuring quality control on the job site, etc. Several case studies covering a wide range of host pipe materials (steel, concrete and fiberglass) and for applications to repair water, sewer and oil and gas pipelines will be presented.