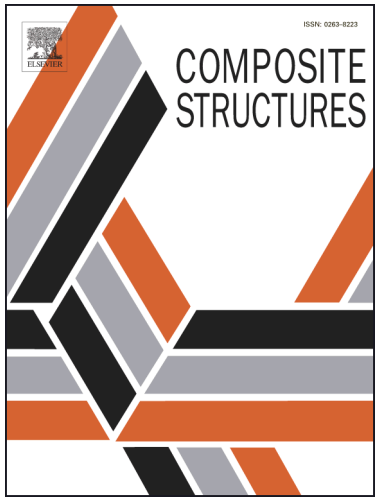

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Development of cost-effective composite repair system for oil/gas pipelines

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Abstract

Fiber-reinforced composite repairs are becoming widely used as an alternative to the installation of welded, full-encirclement sleeves for repair of oil and gas transmission/transportation pipelines. The primary advantage of this repair over welded, full-encirclement sleeves is that the need for welding is precluded. However, the composite repairs are fabricated by hand lay-up, which lacks fiber tension and resin content. A four-phase program to improve the pressure capacity of internally pressurized composite overwrapped damaged metallic pipes was undertaken. In the first phase, designing, fabricating of automated cost-effective composite repair system was carried out. The second phase focuses on the effects of composite overwrapped metallic pipes to understand the influence of fabric orientation angle on their responses of to the internal pressure. Phase three evaluates the improvement in pressure capacity of overwrapped damaged pipes by varying the fabric orientation. The fourth phase is devoted to investigate the corrosion resistance of the pipes. The results demonstrated the strong potential benefits of using new repair system. The fabric orientation of composite overwrapped exhibited a pronounced effect on the damaged pipes capability to carry high internal pressure. Composite overwrapped damaged metallic pipes exhibited high pressure capacity compared with externally damaged and non- damaged metallic pipes.

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Keywords: composite repair system; pipeline; damaged pipe; corrosion