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Development of Fiber Composites for Strengthening Underwater Structure Materials

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ABSTRACT (NO MORE THAN 500 WORDS:)

In recent years, studies on repair and reinforcement methods for structures exposed to poor environmental conditions over a long period of time have been conducted in safety and durability issues of a structure. Various repair methods have been used for concrete structures depending on the required performance or type of damage. Most of all, fiber composite materials are attached to the surface of the structure to improve the structure's performance. Especially, for repair and reinforcement in water or wet environments, fiber composites have very strong strength, no corrosion problems, high workability, low load, high insulation, and fatigue resistance, not only enhance the damaged strength of structures that have an effect on deterioration or corrosion, but they also have a function to prevent further deterioration. In this study, we have evaluated for glass fibers, aramid fibers, and carbon fibers to develop fiber composite materials suitable for repairing underwater structure materials. The aim of this study was to develop fiber reinforced composites with improved tensile strength, tensile elastic modulus, and rate of resin impregnation. In the result of this study, unidirectional fabrics were suitable for maintenance and reinforcement, and as weft yarns, fabrics using glass fiber and silk were developed and applied. In terms of performance, strength was strong in the order of carbon fiber, aramid and glass fiber. However, when the basalt, PP, and PE were hybridized, the elongation was improved and the elastic modulus was increased. Therefore, this study has improved the strength for unidirectional weaving of each fiber and it was possible to develop various kinds of fiber composite materials.