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Topic of the Speech:
The Physical Properties of Hybrid Composite Materials for Strengthening Underwater Structures

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Professor Seung Kook An obtained his Ph.D. at the Fiber and Polymer Science Program, North Carolina State University in 1992. He got MS degree at the Department of Textile Engineering, Chemistry, and Science, North Carolina State University in 1988. After working at National Industrial Research Institute for two years, he had been a professor of the department of Organic Material Science and Engineering at Pusan National University until 2020. He served as a director of Research Institute of Industrial Technology from 2011 to 2013, and has been the director of RIS in textile material for transportation vehicle from 2011. He has been the chairman of Korea Association of Tech Textile Industry (KATTI) from 2017. He served as the Korean delegate for ISO TC94/SC13 and ISO TC94/SC14 for 20 years. He served as a Vice President of Korean Fiber Society in 2010 and 2018.

His research areas are protective clothing, physical properties of industrial textile products, comfort properties of industrial fabrics, and production technology of multifunctional flame resistant interior textile products.

ABSTRACT SUBMISSION
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The Physical Properties of Hybrid Composite Materials for Strengthening Underwater Structures

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ABSTRACT (NO MORE THAN 500 WORDS:)

Recently, as interest in safety and durability problems of structures increases, there is a growing interest in researches on repair and reinforcement materials and methods of structures exposed to poor environments. In particular, as the use of fiber composites as a reinforcing material for structures is increasing, research on the development and performance of fiber composites is required. For repair and reinforcement in water or wet environments, fiber composites must have very high strength, no corrosion problems, high workability, low loads, high insulation and fatigue resistance, not only enhance the damaged strength of structures that have an effect on deterioration or corrosion, but also have a function to prevent further deterioration. Fiber composite materials used for structural reinforcement include carbon fiber and glass fiber. Carbon fiber has characteristics such as high strength, heat resistance, nonflammability, and conductivity, but has a disadvantage of expensive price. Glass fiber also has advantages such as high strength, nonflammability, etc., but has a disadvantage in that it is heavy and harmful to the environment or human body when exposed for a long time.

Therefore, there is a need to develop a hybrid fabric that can adopt the advantages of each fiber and reduce the disadvantages. Hybrid composite material has economic advantages by reducing expensive materials such as carbon fiber, and can be expected to improve mechanical properties and functions. In general, the commercial hybrid products are weaved in bidirection using carbon and aramid. However, in this study, carbon/aramid and carbon/bazalt were intersected in unidirection for warp yarn, and silk yarn was used for weft yarn to develop a new hybrid fabric. As a result, it was confirmed that the tensile properties of the unidirectional hybrid fabrics were superior to the bidirectional hybrid fabrics. In addition, it was confirmed that the tensile strength and impact strength of the carbon/aramid were excellent, and the impact strength was better than those of all carbon fibers. Consequently, the hybridization is expected to enable the development of high-quality and high-performance of economical reinforcing materials.