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Basalt fiber - a promising reinforcement for wind turbine blades

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Due to the increasing amount of greenhouse gases and the market competition the green energy types came into consideration in the last decades. Among the renewable energy types the wind energy develops the most dynamically [1]. A new trend in the wind energy industry is the off-shore wind turbine farms, when wind turbines are linked to each other to maximize the efficiency. Composites of wind turbine structures must resist different environmental effects (temperature, UV light, especially at off-shore turbines saltwater ageing). A new material which is suitable as a reinforcement of composites is the basalt fiber [2]. In view of mechanical properties and chemical structure basalt fiber is similar to the fiberglass, however basalt fiber resists heat and corrosion better than glass fiber.

The aim of this study was the investigation of mechanical properties of basalt fiber reinforced composites with epoxy resin matrix. Mechanical properties was determined by tensile, flexural and Charpy tests. SEM micrographs were taken of the fracture surface of specimens to investigate the fiber-matrix interfacial adhesion.

The results show the saltwater has a high influence on mechanical properties. Saltwater causes ageing of composites. According to the results of different mechanical tests the effect of temperature was proven.

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