

Statistical analysis of fatigue test in jute reinforced polyester composites using Weibull distribution

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Abstract

The fatigue strength of natural composite material was evaluated under stress cyclic loading with slow speed. The material that was used is a bi-directional jute/polyester composite with 40% in reinforcement. Experimental fatigue results were used to plot S-N curve which is based on Wöhler equation. Two-parameter Weibull probability was used to analysis statistically the fatigue life results of composite samples. Weibull graphics were plotted for each sample using fatigue data. Then, S-N curves were drawn for different reliability levels ($P_s = 99\%$, $P_s = 90\%$, $P_s = 50\%$, $P_s = 36,8\%$ and $P_s = 10\%$) using Weibull data. These S-N curves were introduced for the identification of the first failure time as reliability and safety limits of the material

Biography

Djeghader Djamel has a Doctorate Diploma in Civil Engineering, Option: Materials and Structures. His field of research is devoted mainly to the behavior of composite materials under different stresses types using linear elastic fracture mechanics. The work presented above contains a statistic analysis of cyclic fatigue tests

Using Weibull distribution function with two parameters. This approach is very important and very significant to designers for identification of the first failure time, as reliability and safety limits at the practical applications depend on the confidence index of the material.