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Probabilistic Analysis of a Sic/Sic Ceramic Matrix Composite Turbine Vane

By Pappu L Murthy

Bibliogov, United States, 2013. Paperback. Book Condition: New. 246 x 188 mm. Language: English . Brand New Book ***** Print on Demand *****.To demonstrate the advanced composite materials technology under development within the Ultra-Efficient Engine Technology (UEET) Program, it was planned to fabricate, test, and analyze a turbine vane made entirely of silicon carbide-fiber-reinforced silicon carbide matrix composite (SiC/SiC CMC) material. The objective was to utilize a five-harness satin weave melt-infiltrated (MI) SiC/SiC composite material developed under this program to design and fabricate a stator vane that can endure 1000 hours of engine service conditions. The vane was designed such that the expected maximum stresses were kept within the proportional limit strength of the material. Any violation of this design requirement was considered as the failure. This report presents results of a probabilistic analysis and reliability assessment of the vane. Probability of failure to meet the design requirements was computed. In the analysis, material properties, strength, and pressure loading were considered as random variables. The pressure loads were considered normally distributed with a nominal variation. A temperature profile on the vane was obtained by performing a computational fluid dynamics (CFD) analysis and was assumed to be deterministic. The results suggest...



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