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State of Arts in Experimental Testing of TBCs Systems-Literature Analysis; 6.1 Review and Analysis of Currently Utilised Tests; 6.2 Conclusions; References; 7 Proposed Experimental Investigations of TBCs Systems; 7.1 Sample Ageing
7.2 Uniaxial Stretching of Dumbbell Samples with TBC Layers-Author's Own Tests7.2.1 First Batch of Samples Not Subjected to Ageing; 7.2.2 Second Batch of Samples Subjected to Ageing; 7.3 3-Point Bending of Beam Samples with TBC Layers-Author's Own Tests; 7.4 Conclusions; 8 Numerical Analysis of Cracks Propagation Process in Turbine Blades TBCs Systems Under Thermo-Mechanical Loading Based on Experimental Results; 8.1 Formulation of FEM Approach and Brittle Damage of the TBCs System; 8.1.1 Brittle Damage Model; 8.1.2 Cohesive Degradation Model; 8.1.3 Simulation Results
8.2 Application of Submodeling Technique and X-FEM Methods for Detailed Analysis of Cracking Process in Turbine Blades TBCs8.2.1 Submodeling; 8.2.2 X-FEM Method Basics; 8.2.3 Preparation of Model for Simulation; 8.3 Analysis of Results; 8.4 Conclusions; References; 9 Summary

Sommario/riassunto

This book discusses complex loadings of turbine blades and protective layer Thermal Barrier Coating (TBC), under real working airplane jet conditions. They obey both multi-axial mechanical loading and sudden temperature variation during starting and landing of the airplanes. In particular, two types of blades are analyzed: stationary and rotating, which are widely applied in turbine engines produced by airplane factories.