

1. Record Nr.	UNINA9910458461303321
Autore	Vasiliev Valery V
Titolo	Advanced mechanics of composite materials [[electronic resource] /] / Valery V. Vasiliev and Evgeny V. Morozov
Pubbl/distr/stampa	Amsterdam ; ; London, : Elsevier, 2007
ISBN	1-281-05585-9 9786611055851 0-08-048817-X
Edizione	[1st ed. -- T.p. verso.]
Descrizione fisica	1 online resource (505 p.)
Altri autori (Persone)	MorozovEvgeny V
Disciplina	620.11892
Soggetti	Composite materials - Mechanical properties Fibrous composites - Mechanical properties Electronic books.
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	"2nd ed." -- On cover.
Nota di bibliografia	Includes bibliographical references and indexes.
Nota di contenuto	Front cover; ADVANCED MECHANICS OF COMPOSITE MATERIALS; Copyright page; Table of contents; PREFACE TO THE SECOND EDITION; Chapter 1. INTRODUCTION; 1.1. Structural materials; 1.2. Composite materials; 1.3. References; Chapter 2. FUNDAMENTALS OF MECHANICS OF SOLIDS; 2.1. Stresses; 2.2. Equilibrium equations; 2.3. Stress transformation; 2.4. Principal stresses; 2.5. Displacements and strains; 2.6. Transformation of small strains; 2.7. Compatibility equations; 2.8. Admissible static and kinematic fields; 2.9. Constitutive equations for an elastic solid; 2.10. Formulations of the problem 2.11. Variational principles 2.12. Reference; Chapter 3. MECHANICS OF A UNIDIRECTIONAL PLY; 3.1. Ply architecture; 3.2. Fiber-matrix interaction; 3.3. Micromechanics of a ply; 3.4. Mechanical properties of a ply under tension, shear, and compression; 3.5. Hybrid composites; 3.6. Composites with high fiber fraction; 3.7. Phenomenological homogeneous model of a ply; 3.8. References; Chapter 4. MECHANICS OF A COMPOSITE LAYER; 4.1. Isotropic layer; 4.2. Unidirectional orthotropic layer; 4.3. Unidirectional anisotropic layer; 4.4. Orthogonally reinforced orthotropic layer 4.5. Angle-ply orthotropic layer 4.6. Fabric layers; 4.7. Lattice layer; 4.8.

Spatially reinforced layers and bulk materials; 4.9. References; Chapter 5. MECHANICS OF LAMINATES; 5.1. Stiffness coefficients of a generalized anisotropic layer; 5.2. Stiffness coefficients of a homogeneous layer; 5.3. Stiffness coefficients of a laminate; 5.4. Symmetric laminates; 5.5. Engineering stiffness coefficients of orthotropic laminates; 5.6. Quasi-homogeneous laminates; 5.7. Quasi-isotropic laminates; 5.8. Antisymmetric laminates; 5.9. Sandwich structures; 5.10. Coordinate of the reference plane  
5.11. Stresses in laminates; 5.12. Example; 5.13. References; Chapter 6. FAILURE CRITERIA AND STRENGTH OF LAMINATES; 6.1. Failure criteria for an elementary composite layer or ply; 6.2. Practical recommendations; 6.3. Examples; 6.4. Allowable stresses for laminates consisting of unidirectional plies; 6.5. References; Chapter 7. ENVIRONMENTAL, SPECIAL LOADING, AND MANUFACTURING EFFECTS; 7.1. Temperature effects; 7.2. Hygrothermal effects and aging; 7.3. Time and time-dependent loading effects; 7.4. Manufacturing effects; 7.5. References; Chapter 8. OPTIMAL COMPOSITE STRUCTURES  
8.1. Optimal fibrous structures; 8.2. Composite laminates of uniform strength; 8.3. Application to optimal composite structures; 8.4. References; AUTHOR INDEX; SUBJECT INDEX

---

## Sommario/riassunto

Composite materials have been representing most significant breakthroughs in various industrial applications, particularly in aerospace structures, during the past thirty five years. The primary goal of Advanced Mechanics of Composite Materials is the combined presentation of advanced mechanics, manufacturing technology, and analysis of composite materials. This approach lets the engineer take into account the essential mechanical properties of the material itself and special features of practical implementation, including manufacturing technology, experimental results, and design chara

---