

₹ 65.00 BUY

# EXPERIMENTS IN MECHANICS OF SOLIDS

By B. M. Raval

Edition : 1st Edition : 1995 ISBN : 9789380358321 Size : 170 mm × 240 mm

Binding : Paperback
Pages : 172 + 12 = 184



#### ABOUT THE BOOK

This book presents the clear understanding of the principles underlying Laboratory Experiments in Mechanics of Solids or Strength of Materials. Keeping in view the development of observation power, principles of mechanics of materials, standards and specifications, method of reporting the results and method of investigations as well as other basic experiments, the subject matter of the book is framed. Instruction to teachers, model assessment sheet, assignments and model slips for practical examination are given at the end of each chapter. Some of the models developed by the author are also discussed to inspire the readers to work in the same direction. IS: Index given at the end of each chapter is an additional information provided to study the experiment in detail.

With all the above salient features, this unique and invaluable book will be extremely useful to the Engineering students preparing for the Degree Examinations of Civil, Mechanical, Electrical, Electronics and Computer Engineering of all the Indian Universities. The book will be equally useful to the Polytechnic students and also to the candidates reading for the A.M.I.E. Examinations conducted by the Board of Technical Education Examinations. The Engineers connected with the "Laboratory Testing" would also find this book most useful.

#### CONTENT

- 1 : IMPORTANCE OF LABORATORY TESTS
- 2 : LABORATORY MACHINES
- 3 : TENSION TEST
- : COMPRESSION TEST
- 5 : TORSION TEST
- 6 : TRANSVERSE TEST
- 7 : IMPACT TEST
- 8 : HARDNESS TEST
- 9 : FATIGUE TEST
- 10: BEND TEST
- 11: SOME EXPERIMENTS USING E.S.A. TECHNIQUE
- 12: MECHANICAL EXTENSOMETERS
- 13: PRESENTATION OF REPORT
- 14 : PLANNING A STRENGTH OF MATERIALS LABORATORY
- 15 : SOME WORKING MODELS IN EXPERIMENTAL MECHANICS OF SOLIDS
- 16: OBJECTIVE EXPERIMENTS

**APPENDICES** 

READING REFERENCES

SUBJECT INDEX











#### EXPERIMENTS IN MECHANICS OF SOLIDS DETAILED CONTENTS

#### Chapter 1 IMPORTANCE OF LABORATORY TESTS **Chapter 5 TORSION TEST** 1 - 1General 5-1 Torsion test 1-2 Importance of testing 5-2 Specimen 1-3 Short explanation of mechanical properties of materials 5-3 Torsion testing machine Important factors 1-4 5-4 Test procedure Types of tests 1-5 5-5 For teachers Test design 1-6 Model assessment sheet 5-6 1-7 Specimen 5-7 Assignment to determine mechanical properties in torsion test 1-8 **Testing** 1-9 Specification and standards 5-8 Assignment for practice 5-9 1-10 Testing machines Model assignment slips for practical examination Classification of properties of engineering materials 1-11 Chapter 6 TRANSVERSE TEST 1-12 Laboratory exercises 6-1 Transverse test 1-13 General laboratory testing 6-2 Specimen 1-14 Purpose of different tests 6-3 Supports and loading 1-15 Use of structural materials 6-4 Important point 1-16 Course of study 6-5 Test procedure Chapter 2 LABORATORY MACHINES 6-6 Observation 2 - 1Instruction 6-7 For teachers 2-2 Single lever testing machines 2-3 Static testing machines 6-8 Model assessment sheet 2-3-1 Universal testing machine 6-9 Assignments to determine mechanical properties in transverse 2-3-2 Torsion testing machine test 2-4 Calibration of testing machines 6-10 Assignment for practice 2-5 Procedure for calibration of testing machine 6-11 Model assignment slips for practical examination 2-6 Common instruments for dimension of a specimen measurement Chapter 7 IMPACT TEST **Chapter 3 TENSION TEST** 7-1 Impact test 3-1 Tension test 7-2 Principle of impact test 3-2 Important terms in tension test 7-3 Types of impact test and specimen 3-2-1 Gage length (L<sub>o</sub>) 7-4 Procedure for test 3-2-2 Extension or elongation ( $\delta L$ ) 7-5 For teachers 3-2-3 Stress $(\sigma)$ 3-2-4 Strain (€) 7-6 Model assessment sheet 3-2-5 Modulus or elasticity (E) 7-7 Assignments to determine mechanical properties in impact test 3-2-6 Yield stress (f) 7-8 Assignment for practice 3-2-7 Permanent set 7-9 Model assignment slips for practical examination 3-2-8 Tensile strength Chapter 8 HARDNESS TEST 3-2-9 Percentage elongation Hardness test 3-2-10 Percentage reduction in area 8-2 Types of test Procedure for tension test 3-3 8-3 Brinell hardness test 3-4 Reporting of results 8-3-1 Specimen for test Discussion 3-5 8-3-2 Principle of test Observations 3-6 8-3-3 Procedure for test 3-7 Calculation 8-4 Precautions 3-8 True stress and true strain 8-5 Rockwell test 3-9 For teachers 8-5-1 Procedure for rockwell test 3-10 Model assessment sheet 8-6 Observation (Report) Assignments to determine mechanical properties in tension test 3-11 8-7 For teachers 3-12 Assignments for practice 8-8 Model assessment sheet 3-13 Model assignment slips for practical examination 8-9 Model assignment slips for practical examination **Chapter 4 COMPRESSION TEST** 4-1 Compression test Chapter 9 FATIGUE TEST 4-2 Specimen 9-1 Fatigue test 4-3 Test procedure 9-2 Types of stress employed in fatigue test 4-4 Reporting of results 9-3 Reverse bending type fatigue test 4-5 Discussion 9-4 Procedure 4-6 For teachers 9-5 For teachers 4-7 Model assessment sheet 9-6 Model assessment sheet 4-8 Assignments to determine mechanical properties in compression test 9-7 Assignment on fatigue test 4-9 Assignment for practice 9-8 Assignment for practice 4-10 Model assignment slips for practical examination







#### Chapter 10 BEND TEST

- 10-1 Bend test
- 10-2 Specimen preparation
- 10-3 Method of test
- 10-4 Machine used for bend test
- 10-5 For teachers
- 10-6 Model assessment sheet

#### **Chapter 11 SOME EXPERIMENTS USING E.S.A. TECHNIQUE**

- 11-1 Introduction and experiments
- 11-2 For teachers

#### **Chapter 12 MECHANICAL EXTENSOMETERS**

- 12-1 Introduction
- 12-2 Types of extensometers
- 12-3 For teachers

#### **Chapter 13 PRESENTATION OF REPORT**

- 13-1 Presentation of report
- 13-2 Front page or cover page
- 13-3 Other pages
- 13-4 Special coverage
- 13-5 Final submission
- 13-6 For teachers

#### Chapter 14 PLANNING A STRENGTH

OF MATERIALS LABORATORY

- 14-1 Planning of laboratory
- 14-2 Equipments required for the laboratory
- 14-3 Furniture and other requirements

## Chapter 15 WORKING MODELS IN EXPERIMENTAL MECHANICS OF SOLIDS

- 15-1 Introduction
- 15-2 Model for column buckling concept
- 15-3 Model for concept of stability
- 15-4 Model for concept of elongation
- 15-5 Bracket connection
- 15-6 Model for influence diagram for bending moment
- 15-7 Model for strain energy concept due to suddenly applied load
- 15-8 Working model: springs in parallel
- 15-9 Torsion test

#### **Chapter 16 OBJECTIVE EXPERIMENTS**

- 16-1 Introduction
- 16-2 Tension test
- 16-3 Compression test
- 16-4 Torsion test
- 16-5 Impact test
- 16-6 Transverse test
- 16-7 Hardness test
- 16-8 Test on compound spring
- 16-9 Fatigue test
- 16-10 General questions

#### **APPENDICES:**

- A Some useful Indian Standards for physical tests
- B Elastic constant, Rankine's constant for different Materials
- C Typical properties of material used in engineering
- D Formula useful in material testing
- E Loading arrangement on beam for transverse test
- F Some useful information about SI unit
- G Symbolic use of some useful Greek alphabet

### SUBJECT INDEX









