

RAILWAY ENGINEERING

By
Rangwala

Edition : 24th Edition : 2013
ISBN : 978-93-80358-77-2
Size : 135 mm × 210 mm
Binding : Paperback with Four color Jacket Cover
Pages : 480 + 16



₹ 130.00

ABOUT THE BOOK

This well-known text-book now in its Twenty Fourth Edition, provides an up-to-date account of the basic principles on various functions and working of Railways. Its excellent material fills a significant void in the literature of Railway Engineering. Chapter of Rapid Transit System which contains latest information on Delhi Metro, Kolkata Metro, Dubai Metro and Tube Railways.

The substantial matter with sufficient solved problems covering the new syllabus in railway engineering of almost all the Indian Universities as well as Polytechnic Institutions and also examples of latest and modern railways and tunnels constructed during past decade are cited at appropriate places.

Appendix-I covers updated information regarding "Units of the Indian Railways" and Appendix-II gives information about "Training Institutions of the Indian Railways". Appendix-III describes some of the "Famous Indian Trains", Appendix-IV contains the list of "Abbreviated Terms" used in the book and in Appendix-V "Multiple Choice Questions". All the articles have been given the numbers to enhance the readability and convenience of the reader.

The topics of the subject are covered in 23 well-arranged chapters and 5 appendices; it now contains:

- * 233 Self-explanatory and Neatly Drawn Diagrams
- * 26 Useful Tables
- * 27 Solved Illustrative Problems
- * 191 Multiple Choice Questions
- * 371 Questions at the end of the chapters.

The book should prove to be extremely useful to the Civil Engineering students preparing for the Degree Examinations of all the Indian Universities, Diploma Examinations conducted by various Boards of Technical Education, Certificate Courses as well as for the A.M.I.E., U.P.S.C., G.A.T.E., I.E.S. and other similar competitive and professional examinations. It should also prove of interest to the practising professionals.

CONTENT

- 1 : INTRODUCTION
 - 2 : RAILWAY SURVEYS
 - 3 : TRAIN RESISTANCES AND ROLLING STOCK
 - 4 : RAIL GAUGES
 - 5 : RAILS
 - 6 : RAIL FASTENINGS
 - 7 : SLEEPERS
 - 8 : BALLAST
 - 9 : PLATE-LAYING
 - 10 : MAINTENANCE
 - 11 : CREEP
 - 12 : CURVATURE OF TRACK
 - 13 : STATIONS AND YARDS
 - 14 : STATION MACHINERY
 - 15 : POINTS AND CROSSINGS
 - 16 : COMBINATIONS OF POINTS AND CROSSINGS
 - 17 : SIGNALLING
 - 18 : INTERLOCKING
 - 19 : RAILWAY TRACTION
 - 20 : EARTHWORK AND DRAINAGE
 - 21 : TUNNELLING
 - 22 : RAPID TRANSIT SYSTEM
 - 23 : MATERIALS MANAGEMENT
- APPENDIX I : UNITS OF THE INDIAN RAILWAYS
APPENDIX II : TRAINING INSTITUTIONS OF THE INDIAN RAILWAYS
APPENDIX III : FAMOUS INDIAN TRAINS
APPENDIX IV : ABBREVIATED TERMS
APPENDIX V : MULTIPLE CHOICE QUESTIONS
BIBLIOGRAPHY
INDEX

Checklist



Charotar Publishing House Pvt. Ltd. Opposite Amul Dairy, Civil Court Road, Post Box No. 65, ANAND 388 001 India
Telephone: (02692) 256237, Fax: (02692) 240089, e-mail: charotar@cphbooks.com, Website: www.cphbooks.com

RAILWAY ENGINEERING
DETAILED CONTENTS

Chapter 1 INTRODUCTION

- 1-1. Brief history of railways
 - 1-2. Future of railways
 - 1-3. Trains of tomorrow (Maglev Trains)
 - 1-4. Automatic train operation
 - 1-5. Indian railways
 - 1-6. Development of the Indian railway
 - 1-7. Classification of Indian Railways
 - 1-8. Achievements of Indian Railways
 - 1-9. Future plan of Indian Railways
 - 1-10. Summary
- Questions 1

Chapter 2 RAILWAY SURVEYS

- 2-1. Reasons for laying a new railway line
 - 2-2. Factors influencing the proposed route
 - 2-3. Railway surveys
 - 2-3-1. Reconnaissance survey
 - 2-3-2. Preliminary survey
 - 2-3-3. Location survey
 - 2-3-4. Railway Electrification Survey
 - 2-4. Project report and drawings
 - 2-5. Construction of new lines
- Questions 2

Chapter 3 TRAIN RESISTANCES AND ROLLING STOCK

- 3-1. Train resistances
 - 3-2. Rolling stock
 - 3-2-1. Locomotives
 - 3-2-2. Coaches
 - 3-2-3. Wagons
 - 3-3. Train-brakes
 - 3-4. Dynamometer car
- Questions 3

Chapter 4 RAIL GAUGES

- 4-1. Definition of gauge of track
 - 4-2. Gauges in different countries
 - 4-3. Uniformity in gauges
 - 4-4. Unigauge project of Indian railways
 - 4-5. Loading gauge and construction gauge
- Questions 4

Chapter 5 RAILS

- 5-1. Permanent way and its requirements
 - 5-2. Functions of rails
 - 5-3. Requirements of an ideal rail
 - 5-4. Types of rails
 - 5-5. Steel for rails
 - 5-6. Weight and section of rails
 - 5-7. Marking on rails
 - 5-8. Corrugated or roaring rails
 - 5-9. Corrosion of rails
 - 5-10. Length of rail
 - 5-11. Welding of rails
 - 5-12. Wear of rails
 - 5-13. Methods adopted to reduce wear of rails
 - 5-14. Measuring wear of rails
 - 5-15. Renewal of rails
 - 5-16. Failure of rails
 - 5-17. Coning of wheels
 - 5-18. Hogged rails
 - 5-19. Buckling
- Questions 5

Chapter 6 RAIL FASTENINGS

- 6-1. Rail joints
 - 6-2. Avoidance of rail joints
 - 6-3. Types of rail joints
 - 6-4. Requirements of an ideal fastening
 - 6-5. Fastenings for rails
 - 6-5-1. Fish-plates
 - 6-5-2. Spikes, fang-bolts and hook-bolts
 - 6-5-3. Chairs and keys
 - 6-5-4. Bearing-plates
- Questions 6

Chapter 7 SLEEPERS

- 7-1. Functions of sleepers
 - 7-2. Types of sleepers
 - 7-3. Requirements of an ideal material for sleeper
 - 7-4. Materials for cross-sleepers
 - 7-5. Sleeper density
- Questions 7

Chapter 8 BALLAST

- 8-1. Functions of ballast
 - 8-2. Requirements of an ideal material for ballast
 - 8-3. Materials used as ballast
 - 8-4. Size and quantity of ballast
 - 8-5. Screening of ballast
- Questions 8

Chapter 9 PLATE-LAYING

- 9-1. Meaning of the term
 - 9-2. Methods of plate-laying
 - 9-3. Materials required per unit length of track
 - 9-4. Ballast trains
 - 9-5. Relaying of track
- Questions 9

Chapter 10 MAINTENANCE

- 10-1. General
 - 10-2. Necessity for maintenance of track
 - 10-2-1. Maintenance of track proper
 - 10-2-2. Maintenance of railway bridges
 - 10-2-3. Maintenance of rolling stock
 - 10-3. Accidents
 - 10-4. Signalling during maintenance
 - 10-5. Estimating speed of a running train
 - 10-6. Speed restriction
 - 10-7. Tools required during maintenance
 - 10-8. Packing
 - 10-9. Rail inspection
 - 10-10. Track inspection
 - 10-11. Maintenance and boxing of ballast
 - 10-12. Track imprest
 - 10-13. Trackwork for high speeds
 - 10-14. Speeds on the Indian railways
 - 10-15. Emergency measures
- Questions 10

Chapter 11 CREEP

- 11-1. Definition
 - 11-2. Causes of creep
 - 11-3. Factors determining magnitude of creep
 - 11-4. Results of creep
 - 11-5. Method of measuring the creep
 - 11-6. Methods of correcting the creep
- Questions 11

Chapter 12 CURVATURE OF TRACK

- 12-1. Objections to curvature of track
 - 12-2. Designation of a curve
 - 12-3. Types of curves and Limiting radius or degree of curvature
 - 12-4. Transition curves
 - 12-5. Super-elevation or cant
 - 12-6. Factors affecting super-elevation
 - 12-7. Speed of trains on curves
 - 12-8. Cant deficiency and Negative super-elevation
 - 12-9. Cant excess
 - 12-10. Grade compensation on curves
 - 12-11. Bending of rails on curve
 - 12-12. Cutting of rails on curves
 - 12-13. Widening gauge on curves
 - 12-14. Spirals
 - 12-15. Switch-backs
 - 12-16. Rack railways
 - 12-17. String-lining of curves
 - 12-18. Tilting train
- Questions 12



RAILWAY ENGINEERING
DETAILED CONTENTS

Chapter 13 STATIONS AND YARDS

- 13-1. General
- 13-2. Definition of a station
- 13-3. Purposes of a railway station
- 13-4. Selection of site for a railway station
- 13-5. Features of a railway station
- 13-6. Types of stations
- 13-7. Platforms
- 13-8. Staff quarters
- 13-9. Goods traffic at wayside stations
- 13-10. Catch sidings
- 13-11. Definition of a yard
- 13-12. Types of yards
- 13-12-1. Passenger yards
- 13-12-2. Goods yards
- 13-12-3. Marshalling yards
- 13-12-4. Locomotive yards
- 13-13. Level-crossing
- Questions 13

Chapter 14 STATION MACHINERY

- 14-1. Meaning of the term
- 14-2. Engine sheds
- 14-3. Ash-pits, ash-pans and examination pits
- 14-4. Drop pits
- 14-5. Water columns
- 14-6. Triangles
- 14-7. Turntables
- 14-8. Traversers
- 14-9. Cranes
- 14-10. Weigh-bridges
- 14-11. Scotch blocks
- 14-12. Bufferstops
- 14-13. Derailing switch or trap switch
- 14-14. Sand hump on snag dead-end
- 14-15. Cow catcher
- Questions 14

Chapter 15 POINTS AND CROSSINGS

- 15-1. Purpose for providing points and crossings
- 15-2. Some definitions
- 15-3. Sleepers laid for points and crossings
- 15-4. Steel for points and crossings
- 15-5. Switches
- 15-6. Shapes of switches
- 15-7. Lengths of stock rails and tongue rails
- 15-8. Heel divergence or heel clearance
- 15-9. Switch angle
- 15-10. Throw of switch
- 15-11. Crossings
- 15-12. Types of crossings
- 15-13. Theoretical nose of crossing (T.N.C.) and actual nose of crossing (A.N.C.)
- 15-14. Crossing clearance
- 15-15. Crossing number
- 15-16. Crossing angle
- 15-17. Different types of leads and their calculations
- 15-18. Laying of points and crossings
- 15-19. Maintenance of points and crossings
- Questions 15

Chapter 16 COMBINATIONS OF POINTS AND CROSSINGS

- 16-1. General
- Questions 16

Chapter 17 SIGNALLING

- 17-1. General
- 17-2. Objects of signalling
- 17-3. Types of signals
- 17-3-1. Classification according to function
- 17-3-2. Classification according to location
- 17-3-3. Special signals

- 17-4. Typical layouts
- 17-5. Control of movements of trains
- 17-6. Telecommunication
- 17-7. Compensators
- 17-8. Fouling marks
- 17-9. Track capacity
- 17-10. Electrification on the Indian railways
- Questions 17

Chapter 18 INTERLOCKING

- 18-1. Definition
- 18-2. Essential principles of interlocking
- 18-3. Methods of interlocking
- 18-4. Slotting of signals
- 18-5. Detectors
- 18-6. Point lock and treadle or lock bar
- 18-7. Interlocking of level-crossings
- 18-8. Interlocking standards
- 18-9. Improvements in interlocking and signalling
- Questions 18

Chapter 19 RAILWAY TRACTION

- 19-1. Tractive effort of a locomotive
- 19-2. Track stresses
- Questions 19

Chapter 20 EARTHWORK AND DRAINAGE

- 20-1. General
- 20-2. Usual forms of cross-sections
- 20-3. Features of railroad bed level
- 20-4. Drainage
- 20-5. Stabilization of track on poor soil
- Questions 20

Chapter 21 TUNNELLING

- 21-1. General
- 21-2. Definition of a tunnel
- 21-3. Advantages and disadvantages of tunnels and open cuts
- 21-4. Setting out of tunnel
- 21-5. Tunnelling through rock
- 21-6. Tunnelling through soft ground
- 21-7. Methods of tunnelling through sub-aqueous strata
- 21-8. Drainage of tunnels
- 21-9. Ventilation of tunnels
- 21-10. Dust control in tunnels
- 21-11. Lighting In tunnel
- 21-12. Shafts
- 21-13. Mucking
- 21-14. Hauling
- 21-15. Lining of tunnels
- 21-16. Size and shape of tunnels
- 21-17. Maintenance of railway tunnels
- Questions 21

Chapter 22 RAPID TRANSIT SYSTEM

- 22-1. General
- 22-2. Underground railways
- 22-3. Kolkata Metro
- 22-4. Delhi Metro
- 22-5. Dubai Metro
- 22-6. Tube railways
- Questions 22

Chapter 23 MATERIALS MANAGEMENT

- 23-1. Meaning of the term
- 23-2. Necessity in railways
- 23-3. Stores
- 23-4. Purchasing department
- 23-5. Store keeping
- 23-6. Stock control
- 23-7. Spare parts management
- 23-8. Importance
- Questions 23



RAILWAY ENGINEERING
DETAILED CONTENTS

Appendix I UNITS OF THE INDIAN RAILWAYS

- (1) Chittaranjan Locomotive Works
- (2) Integral Coach Factory
- (3) Diesel Locomotive Works
- (4) Rail Coach Factory (RCF), Kapurthala
- (5) Research, Designs and Standards Organization
- (6) Rail India Technical and Economic Services Limited (RITES)
- (7) Indian Railway Construction Company Limited (IRCON)

Appendix II TRAINING INSTITUTIONS OF THE INDIAN RAILWAYS

- (1) The Railway Staff College, Vadodara
- (2) Indian Railways Institute of Civil Engineering (IRICEN), Pune
- (3) Indian Railways Institute of Signal Engineering and Tele-communications (IRISET), Secunderabad
- (4) Indian Railways Institute of Mechanical and Electrical Engineering, Jamalpur
- (5) Institute for Signal and Civil Engineering Officers at South Lallaguda, Secunderabad
- (6) Indian Railways Institute of Electrical Engineering (IRIEEN), Nasik
- (7) Indian Railways Institute of Transport Management (IRITM), Lucknow
- (8) Jagjivan Ram Railway Protection Force Academy, Lucknow

Appendix III FAMOUS INDIAN TRAINS

- (1) Palace on Wheels
- (2) Royal Orient
- (3) Fairy Queen
- (4) Kangra Queen
- (5) Desert Queen
- (6) Deccan Odyssey
- (7) Darjeeling Himalayan Railway (DHR)
- (8) Nilgiri Mountain Railway (or Ooty Rack Railway)
- (9) Toy Trains
- (10) Rajdhani Trains
- (11) Shatabdi Express Trains
- (12) Frontier Mail
- (13) Flying Ranee
- (14) Deccan Queen
- (15) Boat Mail
- (16) Janata Express, Jansewa Express, Matrubhumi Express, Jana Shatabdi Express, Garib Rath trains
- (17) Samjhauta Express
- (18) Lifeline Express
- (19) Patiala State Monorail
- (20) The Presidential Saloon
- (21) DEMU, MEMU, EMU trains

Appendix IV ABBREVIATED TERMS

Appendix V MULTIPLE CHOICE QUESTIONS

