HARBOUR DOCK AND TUNNEL ENGINEERING

By R. Srinivasan

Edition	: 26 th Edition : 2013
ISBN	: 978-93-80358-74-1
Size	: 135 mm x 210 mm
Binding	: Paperback with Four Color Jacket Cover
Pages	: 408 + 16





₹ 125.00

ABOUT THE BOOK

This text-book concisely formulates the basic principles of the subject matter in simple language presented in two sections.

The Section I —

Harbour and Dock Engineering, is well-divided in twelve chapters including chapter on 'Planning and Layout of Ports'. Also the approach of the write-up has been changed according to the form of facilities and requirements of Harbours and Ports.

The Section II -

Tunnel Engineering, is also well-divided in twelve chapters including newly developed methods like New Austrian Tunnelling Method (NATM), Shield methods and chapters on 'Stages in Tunnel Construction', 'Tunnelling in Water Bearing Soils' and also 'Health Protection in Tunnels' have been incorporated.

Salient features of this book:

- * 230 Self-explanatory and neatly drawn sketches, photographs and more than,
- * 310 Examination questions at the end of each chapter.

The book in the present form will prove to be extremely useful to the students preparing for the Degree examinations in Civil Engineering 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 be of an immense use to practising Civil Engineers.

CONTENT

SECTION I : HARBOUR AND DOCK ENGINEERING

- 1 : HARBOURS AND PORTS
- 2 : NATURAL PHENOMENA : TIDES, WIND AND WAVES
- 3 : PROTECTION FACILITIES : MOUND BREAKWATER
- 4 : PROTECTION FACILITIES : WALL TYPE AND SPECIAL BREAKWATERS
- 5 : PLANNING AND LAYOUT OF PORTS
- 6 : DOCKING FACILITIES
- 7 : REPAIRING FACILITIES
- 8 : APPROACH FACILITIES
- 9 : LOADING UNLOADING FACILITIES
- 10: STORING FACILITIES
- 11: DREDGING FACILITIES
- 12: GUIDING FACILITIES
- SECTION II : TUNNEL ENGINEERING
- 13: GENERAL ASPECTS
- 14: STAGES IN TUNNEL CONSTRUCTION
- 15: SOIL CLASSIFICATION AND TUNNELLING METHODS
- 16: OTHER METHODS OF TUNNELLING IN SOFT SOILS
- 17: TUNNELLING IN WATER BEARING SOILS
- 18: TUNNELLING IN ROCK
- 19: THE NEW AUSTRIAN TUNNELLING METHOD (NATM)
- 20: SHAFTS
- 21: TUNNEL LINING
- 22: DRAINAGE OF TUNNELS
- 23: TUNNEL VENTILATION, DUST PREVENTION AND LIGHTING

24: HEALTH PROTECTION IN TUNNELS INDEX





SECTION I : HARBOUR AND DOCK ENGINEERING

Chapter 1 HARBOURS AND PORTS

- 1-1. Introduction
- 1-2. Water transportation
- 1-3. Classification of harbours
- 1-4. Accessibility and size of harbours
- 1-5. Ports
- 1-6. Indian ports
- 1-7. Requirements of a good port
- 1-8. Facilities at a major port
- 1-9. Port design Questions I

Chapter 2 NATURAL PHENOMENA: TIDES, WIND AND WAVES

- 2-1. General
- 2-2. Littoral drift
- 2-3. Sea water waves
- 2-4. Tide generation
- 2-5. Lunar tides
- 2-6. Solar tides
- 2-7. Tides due to Moon and Sun
- 2-8. Total number of tides
- 2-9. Major tides
- 2-10. Water levels of sea during tides and tidal ranges
- 2-11. Uses of tides
- 2-12. Effect of tides
- 2-13. Age or establishment of tide
- 2-14. Tide prediction
- 2-15. Wind and waves
- 2-16. Dynamical effect of wave action
- 2-17. Modification of sea waves
- 2-18. Air compression
- 2-19. Water hammer
- 2-20. Shore protection works Questions II

Chapter 3 PROTECTION FACILITIES: MOUND BREAKWATER

- 3-1. General
- 3-2. Classification of breakwaters
- 3-3. Heap or mound breakwater
- 3-4. Selection of type of breakwater
- 3-5. Details of energy dissipation in mound breakwater
- 3-6. Characteristics of mound breakwater
- 3-7. Rubble mound breakwater
- 3-8. Concrete block mound breakwater
- 3-9. Rubble mound breakwater supplemented by concrete blocks
- 3-10. Rubble mound breakwater supplemented by patented stones
- 3-11. Mound with superstructure or composite breakwater
- 3-12. Mound construction Questions III

Chapter 4 PROTECTION FACILITIES: WALL TYPE AND SPECIAL BREAKWATERS

- 4-1. Wall type breakwater
- 4-2. Types of wall breakwater
- 4-3. Causes of failure
- 4-4. Forces on upright wall breakwater
- 4-5. Essentials for wall type breakwater

- 4-6. Advantages of wall breakwater
- 4-7. Disadvantages of wall breakwater
- 4-8. Typical cross-section of wall breakwater
- 4-9. Method of construction Staging system
- 4-10. Bonds
- 4-11. Wall type breakwater of larger units
- 4-12. Breakwater height
- 4-13. Breakwater failures
- 4-14. Comparison of mound type and wall type breakwaters
- 4-15. Special breakwaters Questions IV

Chapter 5 PLANNING AND LAYOUT OF PORTS

- 5-1. General
- 5-2. Facilities at a port
- 5-3. Layout of ports
- Questions V

Chapter 6 DOCKING FACILITIES

- 6-1. General
- 6-2. Classification of docks
- 6-3. Classification of wet docks
- 6-4. Advantages and disadvantages of tidal wet docks
- 6-5. Advantages and disadvantages of enclosed wet docks
- 6-6. River ports
- 6-7. Form and arrangements of basins and docks
- 6-8. Design and construction of basin or dock walls
- 6-9. Other aspects of construction details
- 6-10. Dock entrances
- 6-11. Sizes of dock entrances
- Questions VI

Chapter 7 REPAIRING FACILITIES

- 7-1 General
- 7-2. Classification of repairing facilities
- 7-3. Graving dry dock
- 7-4. Facilities to be provided at a graving dry dock
- 7-5. Method of dry docking
- 7-6. Size of graving dock
- 7-7. Forces acting on a graving dock
- 7-8. Conditions for design of graving dock
- 7-9. Scheme of constructing graving dock
- 7-10. Design of graving dock floor
- 7-11. Marine railway dry dock
- 7-12. Slipways
- 7-13. Lift dry dock
- 7-14. Floating type dry dock
- 7-15. Types of floating docks
- 7-16. Design considerations for floating docks
- 7-17. Advantages and disadvantages of floating dry dock Questions VII

Direction of entrance for river harbours

Dimensions of entrances and locks

Chapter 8 APPROACH FACILITIES

Direction of an entrance

Dimensions of entrances

Construction of lock gates

Types of entrances

Lock foundations

Entrance locks

8-10. Forces on the gates

8-12. Support for dock gates

Questions VIII

8-11. Shape of gates

8-13. Working of gates

8-1 General8-2. Directio

8-3.

8-4.

8-5.

8-6.

8-7.

8-8.

8-9.

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

Chapter 9 LOADING UNLOADING FACILITIES

- 9-1. General
- 9-2. Design of quay walls
- 9-3. Types of quay walls
- 9-4. Other details of quay walls
- 9-5. Wharves
- 9-6. Piers
- 9-7. Types of piers
- 9-8. Additional points for piers
- 9-9. Pierheads
- 9-10. Dolphins
- 9-11. Jetties
- 9-12. Differences between wharf and jetty
- 9-13. Fenders
- 9-14. Slip
- 9-15. Moles

Questions IX

Chapter 10 STORING FACILITIES

- 10-1. General
- 10-2. Aprons
- 10-3. Transit sheds
- 10-4. Design of transit shed
- 10-5. Warehouses
- 10-6. Cold storages
- 10-7. Guard houses Questions X

Chapter 11 DREDGING FACILITIES

- 11-1. General
- 11-2. Primary dredging
- 11-3. Maintenance dredging
- 11-4. Disposal of the dredged material
- 11-5. Types of dredging devices
- 11-6. Choice of dredger
- 11-7. Execution of dredging work Questions XI

Chapter 12 GUIDING FACILITIES

- 12-1. Necessity for guiding facilities
- 12-2. Fixed and floating light stations
- 12-3. Lighthouse
- 12-4. Signals
- 12-5. Light signals
- 12-6. Fog signals
- 12-7. Audible signals
- 12-8. Moorings
- 12-9. Mooring accessories
- 12-10. Off-shore moorings
 - Questions XII

SECTION II : TUNNEL ENGINEERING

Chapter 13 GENERAL ASPECTS

- 13-1. General
- 13-2. Categories of obstacles
- 13-3. Definitions
- 13-4. Advantages and disadvantages of tunnels and open cuts
- 13-5. History of tunnels constructed
- 13-6. Developments in tunnelling methods
- 13-7. Important years in tunnel construction
- 13-8. Economics of tunnelling
- 13-9. Selection of route of tunnel

- 13-10. Classification of tunnels
- 13-11. Tunnel approaches
 - Questions XIII

Chapter 14 STAGES IN TUNNEL CONSTRUCTION

- 14-1. Investigations
- 14-2. Setting out of tunnel
- 14-3. Methods of getting extra faces to work upon
- 14-4. Excavation
- 14-5. Blasting
- 14-6. Temporary supports
- 14-7. Permanent supports
- 14-8. Ventilation at the time of construction
- 14-9. Muck removal
- 14-10. Supplementary operations
- 14-11. Design of shape and size
- 14-12. Miscellaneous
 - Questions XIV

Chapter 15 SOIL CLASSIFICATION AND TUNNELLING METHODS

- 15-1. Soil classification
- 15-2. Choice of method
- 15-3. Methods of tunnelling (soft soils)
- 15-4. Forepoling method
- 15-5. Needle beam method
- 15-6. Army method or case method
- 15-7. American method
- 15-8. English method
- 15-9. Belgian method
- 15-10. German method
- 15-11. Austrian method
- 15-12. Timbering in soft soil tunnelling Questions XV

Chapter 16 OTHER METHODS OF TUNNELLING IN SOFT SOILS

- 16-1. Liner plates method
- 16-2. Tunnelling with shield
- 16-3. Parts of shield
- 16-4. Terms commonly used with shield
- 16-5. Primary lining
- 16-6. General steps of tunnelling with shield
- 16-7. Shield tunnelling in different types of soils
- 16-8. Common equipment with shield

compressed air method

Chapter 18 TUNNELLING IN ROCK

18-4. Methods of tunnelling in rock

17-4. Various pipes and conduits

Questions XVII

- 16-9. Stages of using the shield
- 16-10. Mechanized shields Questions XVI

17-2. Well points system

Chapter 17 TUNNELLING IN WATER BEARING SOILS

17-3. Equipment with plenum process of tunnelling or

17-5. Compressors, generators and pressure gauges

18-2. Sequence of operations for tunnelling in rock

18-3. Faces of operation for tunnelling in rock

17-6. Methods of tunneling in water bearing soils

17-1. General

18-1. General

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

HARBOUR, DOCK AND TUNNEL ENGINEERING DETAILED CONTENTS

- 18-5. Mucking
- 18-6. Mucking in steep grade tunnelling
- 18-7. Hauling
- 18-8. Other aspects
- 18-9. Drill-bits
- 18-10. Nipper cars
- 18-11. Explosives
- 18-12. Safety precautions in rock tunnelling Questions XVIII

Chapter 19 THE NEW AUSTRIAN TUNNELLING METHOD (NATM)

- 19-1. General
- 19-2. NATM concept
- 19-3. Main features of NATM
- 19-4. Details of NATM at Loktak
- 19-5. Review of rock bolt system
- 19-6 Conclusion Questions XIX

Chapter 20 SHAFTS

- 20-1. General
- 20-2. Advantages of shafts
- 20-3. Size and location of shafts
- 20-4. Shafts in rock
- 20-5. Shaft construction in rock
- 20-6. Shaft sinking in soft ground
- 20-7. Design of shaft supports
- 20-8. Protection round the shaft opening
- 20-9. Classification of shafts Questions XX

Chapter 21 TUNNEL LINING

- 21-1. Necessity of lining
- 21-2. Objects of tunnel lining
- 21-3. Materials for lining
- 21-4. Design of thickness of lining
- 21-5. The sequence of lining a tunnel Questions XXI

Chapter 22 DRAINAGE OF TUNNELS

- 22-1. General
- 22-2. Pre-drainage
- 22-3. Dewatering
- 22-4. Permanent drainage Questions XXII

Chapter 23 TUNNEL VENTILATION, DUST, PREVENTION AND LIGHTING

- 23-1. General
- 23-2. Temporary ventilation
- 23-3. Dust prevention
- 23-4. Lighting
- 23-5. Permanent ventilation Questions XXIII

Chapter 24 HEALTH PROTECTION IN TUNNELS

- 24-1. General
- 24-2. Safety measures
- 24-3. Health protection Questions XXIV

