

Design of High-Speed Railway Turnouts

Table of Contents

- Preface
- Chapter 1. Types and Structure
 - 1.1 Main Types
 - 1.2 Technical Requirements
 - 1.3 Technical Features
 - 1.4 Global Overview of High-Speed Turnouts
- Chapter 2. Layout Design
 - 2.1 Design Conditions
 - 2.2 Plane Line Types
 - 2.3 Design of Parameters
 - 2.4 Assessment Methods Based on Wheel–Rail System Vibration [30,31]
- Chapter 3. Structural Selection and Rail Design
 - 3.1 Selection Principles
 - 3.2 Overall Structure Selection
 - 3.3 Design of Rail Members
 - 3.4 Technical Requirements for Rails
 - 3.5 Manufacturing of Rails
- Chapter 4. Wheel–Rail Relation Design
 - 4.1 Wheel–Rail Contact Geometry Relation
 - 4.2 Wheel–Rail Rolling Contact Theories in Turnout Zone
 - 4.3 Assessment of Simplified Models
 - 4.4 Dynamic Evaluation Based on Wheel–Rail Dynamics in Turnout Area
- Chapter 5. Track Stiffness Design
 - 5.1 Composition
 - 5.2 Track Stiffness Design [64–67]
 - 5.3 Distribution Rules of Track Integral Stiffness
 - 5.4 Homogenization Design for Track Stiffness in a Turnout
 - 5.5 Design of Track Stiffness Transition for a Turnout
- Chapter 6. Structural Design of CWR Turnouts
 - 6.1 Structural Features
 - 6.2 Calculation Theories and Approaches
 - 6.3 Regularity of Stress and Deformation of CWR Turnout
 - 6.4 Design and Verification
- Chapter 7. Design of CWR Turnout on Bridge
 - 7.1 Regularity of Longitudinal Interaction of CWR Turnout on Bridge
 - 7.2 Dynamic Characteristics of Vehicle–Turnout–Bridge Coupled System
 - 7.3 Design Requirements of CWR Turnout on Bridge

- Chapter 8. Conversion Design of High-Speed Turnouts
 - 8.1 Conversion Structure and Principle
 - 8.2 Calculation Theory of Turnout Conversion
 - 8.3 Study and Design of High-Speed Turnout Conversion
- Chapter 9. Design of Rail Substructure and Components
 - 9.1 Rail Substructure
 - 9.2 Plates of Turnout
 - 9.3 Components of Turnout Fastenings
- Chapter 10. Theoretical Validation of High-Speed Turnout Design
 - 10.1 Validation of Turnout Dynamic Simulation Theory
 - 10.2 Validation of Analysis Theory of Longitudinal Interaction of CWR Turnout on Bridge
 - 10.3 Validation of Analysis Theory of Vehicle–Turnout–Bridge Dynamic Interaction
 - 10.4 Validation of High-Speed Turnout Conversion
- Chapter 11. Manufacturing Technologies of High-Speed Turnouts
 - 11.1 Manufacturing Equipment and Processes
 - 11.2 Key Processes for Rails
 - 11.3 Key Processes for High-Speed Turnout Plates
 - 11.4 Assembly and Acceptance
- Chapter 12. Laying Technology
 - 12.1 Transport
 - 12.2 Laying of Ballast Turnout
 - 12.3 Laying of Ballastless Turnout
 - 12.4 Accurate Adjustment Technology
 - 12.5 Dynamic Detection and Acceptance of High-Speed Turnout
- Chapter 13. Irregularity Control of High-Speed Turnouts in Operation
 - 13.1 Structural Irregularity Induced by Poor Wheel–Rail Relation
 - 13.2 Geometric Irregularity
 - 13.3 Status Irregularity
- Chapter 14. Maintenance and Management
 - 14.1 Management Policies and Maintenance Standards
 - 14.2 Inspection and Monitoring Technologies for High-Speed Turnouts
 - 14.3 Maintenance Technologies
 - 14.4 Management of High-Speed Turnouts
- References
- Index