1. Record Nr. UNINA9910788286803321

Autore	Wang Ping
Titolo	Design of high-speed railway turnouts : theory and applications / / Ping Wang
Pubbl/distr/stampa	Amsterdam, [Netherlands] : , : Academic Press, , 2015 ©2015
Descrizione fisica	1 online resource (481 p.)
Collana	High-Speed Railway
Disciplina	625.163
Soggetti	Railroads - Curves and turnouts - Design and construction Curves in engineering High speed trains
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Front Cover; Design of High-Speed Railway Turnouts; Copyright Page; Contents; Preface; 1 Types and Structure; 1.1 Main Types [3]; 1.1.1 Composition; 1.1.2 Classification; 1.2 Technical Requirements; 1.2.1 Excellent Technical Performance; 1.2.2 High Cost-Effectiveness; 1.2.3 Outstanding Adaptability; 1.3 Technical Features [6]; 1.3.1 System Integration; 1.3.2 Theoretical Basis and Practical Tests; 1.3.3 State-of-the-Art Manufacture and Laying Processes; 1.3.4 Scientific Maintenance and Management; 1.4 Global Overview of High-Speed Turnouts; 1.4.1 France; 1.4.2 Germany; 1.4.3 China 1.4.4 Other Countries2 Layout Design; 2.1 Design Conditions; 2.1.1 Operation; 2.1.2 Rolling Stock; 2.1.3 Tracks [19]; 2.1.4 Laying; 2.2 Plane Line Types; 2.2.1 Design Requirements; 2.2.2 Transition Lead Curves; 2.2.3 Switch Rails; 2.2.4 Clearances [29]; 2.2.5 Geometric Sizes; 2.3 Design of Parameters; 2.3.1 Method Based on Particle Motion; 2.3.2 Method Based on Rigid Body Motion; 2.3.2.1 Application cases; 2.3.3 Design Software [30]; 2.4 Assessment Methods Based on Wheel-Rail System Vibration [30,31]; 2.4.1 Theory of Wheel-Rail System Dynamics 2.4.2 Multi-Rigid-Body Dynamics Analysis Software2.4.3 Application Cases; 3 Structural Selection and Rail Design; 3.1 Selection Principles [32]; 3.2 Overall Structure Selection; 3.2.1 Guiding-Rail Turnouts; 3.2.2 Swing Nose Crossing; 3.2.3 Flexible Point Rail; 3.2.4 Long Wing Rails;

3.2.5 Assembled Point Rails; 3.2.6 Rolled Special Section Wing Rails; 3.2.7 AT Rail Hot-Forged Heel Ends of Switch Rails and Point Rails; 3.2.8 Check Rail Made of Grooved Rail; 3.3 Design of Rail Members; 3.3.1 Selection of AT Rail [35]; 3.3.2 Design of Components at the First Traction Point on Swing Nose Rail
3.4 Technical Requirements for Rails [36]3.4.1 Requirements; 3.4.2 Type, Section, and Length of Rails; 3.5 Manufacturing of Rails; 3.5.1 Refining; 3.5.2 Finishing; 3.5.3 Conditioning; 3.5.4 Centralized Detection; 3.5.5 Long Rail Production; 4 Wheel-Rail Relation Design; 4.1 Wheel-Rail Contact Geometry Relation; 4.1.1 Calculation Methods [39,40]; 4.1.2 Rail Profiles; 4.1.3 Wheel-Rail Contact Geometry (Without Wheelset Lateral Displacement); 4.1.4 Wheel-Rail Contact Geometry in the Diverging Line; 4.1.5 Wheel-Rail Contact Geometry (with Wheelset Lateral Displacement)
4.1.6 Longitudinal Change Along the Turnout (with Wheelset Lateral Displacement)4.2 Wheel-Rail Rolling Contact Theories in Turnout Zone [42]; 4.2.1 Hertzian Theory; 4.2.2 Non-Hertzian Rolling Contact Theories; 4.2.3 Wheel-Rail Rolling Contact in Turnout Area [42]; 4.2.4 Calculation Method for 3D Elastic Body Semi-Hertzian Rolling Contact of the Wheel-Rail System in Turnout Area; 4.3 Assessment of Simplified Models [55]; 4.3.1 Vertical Irregularities; 4.3.2 Lateral Irregularities; 4.3.3 Application Cases; 4.4 Dynamic Evaluation Based on Wheel-Rail Dynamics in Turnout Area [56]
4.4.1 Dynamics Models of Train-Turnout System

Sommario/riassunto

High-speed turnouts, a key technology for high-speed railways, have a great influence on the safe and stable running of high-speed trains. Design of High-Speed Railway Turnouts: Theory and Applications, comprehensively introduces the technical characteristics and requirements of high-speed turnouts, including design theories and methods of turnout layout geometry, wheel and rail relations, track stiffness, welded turnout, turnout conversion, turnout components, and manufacture and laying technologies of turnouts. Analyzing the operational problems of China's high-speed turnout in particular