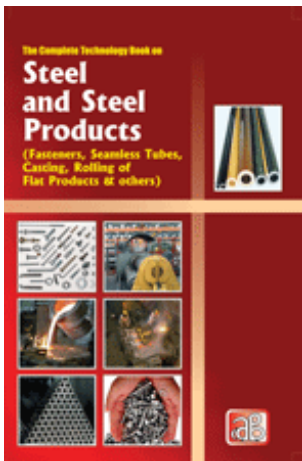


The Complete Technology Book on Steel and Steel Products (Fasteners, Seamless Tubes, Casting, Rolling of Flat Products & others)



Author: NPCS Board of Consultants & Engineers

Format: Paperback

ISBN: 8178330180

Code: NI206

Pages: 576

Price: Rs. 1,625.00 **US\$** 150.00

Publisher: Asia Pacific Business Press Inc.

Usually ships within 5 days

Iron and steel have played a leading role in the development of human civilization and their techniques. Together with its derivative, steel, iron has no real rival in its particular fields of application and has become a synonym of progress, being an essential element in mankind's greatest technological achievements. It was at the origin of the industrial and scientific revolutions and at the heart of all the great discoveries which have marked the history of humanity from the manufacture of high quality swords in ancient times to today's architectural wonders. Steel is an alloy that consists mostly of iron and has carbon content between 0.2% and 2.1% by weight, depending on the grade. Carbon is the most common alloying material for iron, but various other alloying elements are used, such as manganese, chromium, vanadium, and tungsten. Rolling is a metal forming process in which metal stock is passed through a pair of rolls. Rolling is classified according to the temperature of the metal rolled. Steelmaking is the second step in producing steel from iron ore. Processing of steel results in special steel products with required properties, for example; vacuum treated steel for forging ingots; pre-strengthened stress-relieved elongated steel, metallurgical addition products, forging powder alloy steels, etc. Fasteners are used to join and hold two or more pieces of metal either temporarily or more pieces of metal either temporarily or permanently. Some of the most common are bolts, screws, nuts, rivets and pins. Packaging steels differ from other sheet products particularly in terms of their thickness, mechanical properties and coatings, together with their aptitude to satisfy specific industrial and marketing requirements related to high production rates, design factors etc. Small gauge welded tubes have an extremely wide range of applications, including metallic roof frames, mechanical construction in public work and industrial engineering sector, agricultural machinery, fluid distribution circuits, pistons, etc. India is among the top producers of all forms of steel in the world. Easy availability of low cost manpower and presence of abundant reserves make India competitive in the global setup. The steel industry in India has witnessed an increase in demand due to expanding oil and gas sector, huge spending on infrastructural facilities coupled with growth in housing, consumer durables and auto sectors.

This book basically deals with structural changes in steel during hot rolling, structural changes during reheating, kinds of grain restoration process, dynamic restoration process, static restoration process, effect of initial grain, size of static recrystallization, effects of temperature and micro alloying, fundamental principles

of the metal rolling process, preparing and heating the initial materials, preparations for rolling heating before rolling operations, bolt and nut manufacturing technology, casting of steel for flat products etc.

The present book covers different important aspects of steel processing with the casting method of steel for flat products, rolling of rails, wheels and rings, rolling of different steel products, production of fasteners, welded pipes, steel products for the building trade and many more.

The book is very useful for everybody who wants the thorough study on steel and steel products or wants to diversify in to this field.

Contents

1. Structural Changes in Steel during Hot Rolling
 - Structural Changes during Reheating
 - Kinds of Grain Restoration Process
 - Dynamic Restoration Process
 - Static Restoration Process
 - Effect of Initial Grain Size of Static Recrystallization
 - Effects of Temperature and Microalloying
 - Effect of Amount of Deformation
 - Factors Affecting Critical Reduction for Recrystallization
 - Grain Growth after Deformation
 - Structural Changes in Steel during Cooling
 - Effect of Steel Structure on Flow Stress
2. Fundamental Principles of the Metal Rolling Process
3. Steels for Magnetic Applications
 - Electrical Steels-Metallurgy and Properties
 - Introduction
 - Utilization and Property Requirements
 - Optimization of Magnetic Properties
 - Type of Electrical Steel
 - Classification
 - Steel Grades
 - Market Segmentation
 - Conclusions
4. Preparing and Heating the Initial Materials
 - Preparations for Rolling
 - Heating before Rolling Operations
5. Hot Seamless Tube Rolling Processes
 - Elements of Skew Rolling Theory
 - Tube Rolling in Plug Mill Type Seamless Tube Mills
 - Tube Rolling in Continuous Seamless Tube Mills
 - Tube Rolling in Three-Roll Mills
 - Tube Rolling in Pilger Mills
 - Seamless Tube Production by the Extrusion Process
 - Seamless Tube Finishing Operations
6. Bolt and Nut Manufacturing Technology
 - Introduction
 - Fundamentals of Mechanically Working and Cutting Metals
 - (a) Cold Forming
 - (b) Hot Forging

- (c) Metal Cutting
- Manufacturing Technologies
 - (a) Cold Forming of Bolts
 - (b) Cold Forming of Nuts
 - (c) Hot Forging of Bolts
 - (d) Hot Forging of Nuts
 - (e) Machining of Bolts and Nuts from Hexagon Bar
- Steel Pre-Processing
 - (a) Steel Making
 - (b) Surface Treatments and Wire Drawing
- Fastener Steels and Heat Treatments
 - (a) Alloying Elements
 - (b) Heat Treatments
- Finishing Operations
- 7. Casting of Steel for Flat Products
 - Type of Cast Products
 - Casting of Ingot
 - Types of Ingots
 - Methods of Continuous Casting of Thick Slabs
 - Continuous Casting of Thick Slabs
 - Slab Width Control
 - Continuous Casting of Thin Slabs and Strip
 - Requirements for Continuously Cast Steels
 - Oxide Inclusions in Concast Steel
 - Formation of Oxide Phases
 - Influence of Caster Type on Steel Quality
- 8. The Rolling of Rails, Wheels and Rings
 - Introduction
 - Early Types of Rails and their Production
 - The Evolution for the Rail Mill
 - Modern Rail Mills
 - Rail Joints and their Manufacture
 - The Forging and Rolling of Wheels
 - Ring Rolling
- 9. Mill Automation for the Rolling of Flat Products
 - Automation of Flying Shear Operation in a Continuous Hot-Rolling Mill
 - Automation of Coiler Operation for Hot Strip
 - Automation of Strip Measuring Gauges for Hot Rolling
 - Automation of Continuous Pickle Line Operation
 - Automation of Strip Thickness Gauges for Cold Reduction
 - Automation of Strip Thickness Control by the Screw-Down Gear
- 10. General Steelmaking Processes
 - Welding Material for Super Low Temperature Steels
 - Refining Steel by Blowing Oxygen Beneath the Surface
 - Cold Reduced Aluminum Stabilized Steel having High Drawability
 - Sulfide Modification of Steel
 - Steel Sheets having Excellent Enamellability
 - Liquid Sintering with Titanium Alloys
 - Liquid-Solid Alloys for Casting
 - Rimmed Unkilled Enamelling Steel

Producing an Enamelling Steel Sheet
Deep Drawable Deoxidized Steel
Alloying Steel with Highly Reactive Materials
Prevention of Surface Cracking during Steel Reheating
Prestrengthened Stress Relieved Elongated Steel
Vacuum Treated Steel for Forging Ingots
Metallurgical Addition Product
Uncropped, Unworked, Elongated Leded Steel Casting
Adding Alloys to Steel
Production of Low Carbon Ferroalloys
Forging Powder Alloy Steels
Production of Leded Steel
Low Carbon Ferrochromium
High Explosive Fragmentation Munition
11. Varnishing and Printing of Packaging Steels
Introduction
General Aspects of Organic Coatings used for
Varnishing and Printing
Definition
Types of Organic Coating
Organic Coating Constituents
Application and Curing of Organic Coatings
Application with Roller Varnishing Machines
Curing
Other Application Techniques
Inspection Methods
Printing and Decoration of Metallic Packaging
Conclusions
12. Phase Transformation in Steel
Phase Diagram
Constituents in Steels
Austenite
Ferrite
Graphite
Cementite
Eutectoid
Pearlite
Eutectic
Ledeburite
Transformation Temperature
Phases in Hypoeutectoid Steel
Phases in Eutectoid Steel
Phases in Hypereutectoid Steel
Phase Transformation Hysteresis
Supercooling of Austenite
Bainite
Martensite
Isothermal Transformation Diagram
Continuous-Cooling Transformation Diagram
13. Optimization and Modernization of Hot Strip
Mills
Main Strategy in Optimization of Rolling Process
Metallurgical Requirements

Energy Consumption Requirements
Yield Requirements
Product Quality Requirements
Analysis of Temperature Conditions in Hot Strip Mill
Methods of Optimizing Temperature Conditions
Optimizing Operating Parameters
Close Coupling of Continuous Rougher with Finishing Mill
Close Coupling of a Reversing Rougher with Finishing Mill
Combining a Reversing Rougher with Finishing Mill
Coilbox
Intermediate Steckel Mill
Reradiating Thermal Cover System
Main Objectives in Modernization of Hot Strip Mill
Requirements for the Evaluation Models
Evaluation of the Solutions for Mill Modernization
14. Low Carbon Constructional Alloy Steels
Low Temperature High Strength Tough Steel
Alloy Steel for Arctic Service
High Strength Cold Rolled Steel with High Press Formability
Production of High Strength Cold Rolled Steel Sheet
Low Alloy Steel for Low Temperature Services
Full Continuous Annealing Process
High Strength Killed Wire Rods and Bars
High Formability High Strength Steel
High-Strength Cold-Workable TI Added AL Killed Steel
Improving Strength and Toughness by Controlled Cooling
High Strength Notch Tough Steel
Hot Rolled High Strength Low Alloy Steel
Preparation of Hot Rolled Niobium Structural Steel
Hot Rolled Flat Steel for Cryogenic Service
High Strength Structural Steel with Good Weldability
15. Hot Rolling of Plate, Sheet and Strip
Types and Sizes
Initial Materials and Reheating them for Rolling
Hot Rolling Sheet and Plate Mills
Hot Rolling Processes for Plate and Sheet in Various Types of Mills
Rolling Steel Strip in a Planetary Mill
Finishing of Hot-Rolled Flat Products
16. Rolling of Section Steel, Bars and Rods
Types and Sizes
Initial Materials and Reheating them for Rolling
Section Mills
Rod Mills
Strip Mills
Roll Pass Design for the Rolling of Rounds
Roll Pass Design for the Rolling of Squares
Roll Pass Design for the Rolling of Flats and Strip
Roll Pass Design for the Rolling of Angles

Finishing Operations on Bars and Rods

17. Modern Rolling Plant

Mills for the Continuous Rolling of Wide Strip

Modern Plant for the Rolling of Non-ferrous Material

Copper and Copper Alloys

Nickel and Nickel Alloys

Aluminium and Aluminium Alloys

18. Metal Fasteners

Machine Bolts

Cap Screws

Machine Screws

Set Screws

Thread-forming Screws

Stove Bolts

Carriage Bolts

Stud Bolts

Nuts

Castle Nuts

Jam Nuts

Cap or Acorn Nuts

Wing Nut

Washers

Rivets

Machine Pins

19. Production of Welded Pipe

Continuous Furnace Butt-Welded Pipe Manufacturing Processes

Electric Resistance Welded Pipe and Tubing Production

High Frequency Electric Resistance Welding in Pipe and Tubing Production

Submerged-Arc Welded Pipe and Tubing Production

Production of Submerged-Arc Welded Straight-Seam Pipe

Production of Submerged-Arc Welded Helical-Seam Pipe

Other Welded Pipe Production Methods

Inert-Gas Metal-Arc Welding of Pipe

Induction Welding of Pipe and Tubing

20. Sheet Forming for Packaging Applications

Drawing of Packaging Steels

Specific Aspects of Packaging Steels

Characterization of Packaging Steels

Parameters Affecting Drawing Behavior

Example Applications

Drawing and Wall Ironing of Packaging Steels

Preliminary Drawing

Wall Ironing

Necking and Flanging

Full Operture Easy-Open Can Ends

Score Line Profile (Tool Geometry and Residual Thickness)

Score Line Shape in the Plane of the LID

End Profiles

Steel Grades
Can End Seaming
Principle of Double Seaming
Seaming Tools
21. Mill Automation for Pipe and Tubing Production
22. Steels for Small Gage Welded Tubes
The Small Gage Welded Tube Market
Manufacturing Processes
Steel Products used in the Manufacture of SWTâ€™s
Major Property Requirements
Conditions to be Met in SWT Manufacture
Geometry Control
Principal Grades Employed
23. Steel Products for the Building Trade
Statutory Requirements
Building Steels and their Coatings
Steel Selection
Galvanized Steels
Coil Coated Steels
The New Solissime Range
Coating Selection Guide
Utilization and Maintenance Precautions
Additional Products
â€œCondensation-proofâ€• Coatings
Acoustic Insulation
Thermal Insulation
Solconfort Sandwich Sheets
Isofran Sandwich Sheets
Typical Applications
Walling and Roofing
Facing Systems
Flooring
Conclusions

About NIIR

NIIR PROJECT CONSULTANCY SERVICES (NPCS) is a reliable name in the industrial world for offering integrated technical consultancy services. NPCS is manned by engineers, planners, specialists, financial experts, economic analysts and design specialists with extensive experience in the related industries.

Our various services are: Detailed Project Report, Business Plan for Manufacturing Plant, Start-up Ideas, Business Ideas for Entrepreneurs, Start up Business Opportunities, entrepreneurship projects, Successful Business Plan, Industry Trends, Market Research, Manufacturing Process, Machinery, Raw Materials, project report, Cost and Revenue, Pre-feasibility study for Profitable Manufacturing Business, Project Identification, Project Feasibility and Market Study, Identification of Profitable Industrial Project Opportunities, Business Opportunities, Investment Opportunities for Most Profitable Business in India, Manufacturing Business Ideas, Preparation of Project Profile, Pre-Investment and Pre-Feasibility Study, Market Research Study, Preparation of Techno-Economic Feasibility Report, Identification and Section of Plant, Process, Equipment, General Guidance, Startup Help, Technical and Commercial Counseling for setting up new industrial project and Most Profitable Small Scale Business.

NPCS also publishes various process technology, technical, reference, self employment and startup books, directory, business and industry database, bankable detailed project report, market research report on various industries, small scale industry and profit making business. Besides being used by manufacturers, industrialists and entrepreneurs, our publications are also used by professionals including project engineers, information services bureau, consultants and project consultancy firms as one of the input in their research.

Our Detailed Project report aims at providing all the critical data required by any entrepreneur vying to venture into Project. While expanding a current business or while venturing into new business, entrepreneurs are often faced with the dilemma of zeroing in on a suitable product/line.

NIIR PROJECT CONSULTANCY SERVICES , 106-E, Kamla Nagar, New Delhi-110007, India. **Email:** npcs.india@gmail.com **Website:** NIIR.org

Tue, 22 Sep 2020 19:13:59 +0530