

Steel Hot Rolling

Hot Rolling of Steel, Metal Rolling, Metal Forming Process, Steel Rolling Process, Metalworking, Flat Rolling Fundamentals, Physical Metallurgy, Hot Rolled Steel, Rolling Mills

(Pre-Treatment of Hot Metal, Heat Treatments for Hot-Rolled Products, Steelmaking Refractories, Refining of Stainless Steels, Steel Heating for Hot Rolling, Oxygen Steelmaking Processes)

Introduction

In metalworking, rolling is a metal forming process in which metal stock is passed through one or more pairs of rolls to reduce the thickness and to make the thickness uniform. Rolling is classified according to the temperature of the metal rolled. When the temperature of the metal is above its recrystallization temperature, then the process is known as hot rolling. This makes the steel easier to form, and also results in products that are easier to work with.



Roll stands holding pairs of rolls are grouped together into rolling mills that can quickly process metal, typically steel, into products such as structural steel, bar stock, and rails. Most steel mills have rolling mill divisions that convert the semi-finished casting products into finished products.

Rolling of steel is one of the most important manufacturing processes for steel. It is usually the first step in the processing of steel after it is made and cast either in Ingot or continuous cast product in a steel melting shop.

Hot rolling is used mainly to produce sheet metal or simple cross sections, such as rail tracks. Other typical uses for hot rolled metal includes truck frames, automotive wheels, pipe and tubular, water heaters, agriculture equipment, strappings, stampings, compressor shells, railcar components, wheel rims, metal buildings, railroad hopper cars, doors, shelving, discs, guard rails, automotive clutch plates.

Torque and power are the two important component of rolling. Torque is the measure of the force applied to the rolls to produce rotational motion while power is applied to a rolling mill by applying a torque to the rolls and by means of work piece tension.

In a rolling mill the power is spent principally in the following four ways.

- **The energy needed to deform the steel.**
- **The energy needed to overcome the frictional force.**
- **The power lost in the pinions and power transmission system.**
- **Electrical losses in the various motors.**

Rolling can be done either by hot rolling or by cold rolling. Cold rolling usually follows the hot rolling.

Hot rolled steel typically requires much less processing than cold rolled steel, which makes it a lot less expensive. Hot rolled steel is also allowed to cool at room temperature, so it's essentially normalized, meaning it's free from internal stresses that can arise during quenching or work-hardening processes.

For hot working processes, large deformation can be successively repeated, as the metal remains soft and ductile.

The metal stock is subjected to high compressive stresses as a result of the friction between the rolls and the metal surface. Rolling involves passing the material between two rolls revolving more or less at the same peripheral speed but in opposite directions, i.e., clockwise and counterclockwise. The distance between them is spaced, which is somewhat less than the height of the metal stock entering them. These rolls can either be flat or grooved (contoured) for the hot rolling of rods or shapes.

India witnessed a shift towards increased usage of hot rolled (HR) steel at the expense of cold rolled (CR) steel. The slab and strip casting together with the induction of continuous hot rolling has brought about the change. The major advantage of this technology is the low operating cost as it permits the use of non-coking coal. HR products are expected to maintain a high growth profile in the coming years, with export opportunities in India.

This book provides a descriptive illustration of pre treatment of hot metal, the basic principles of heat treatment, types of hot rolled products, principles of measurement of rolling parameters, steel making refractories, performance characteristics of transducers, causes of gauge variation , main factors affecting gauge performance, gauge control sensors and actuators, automatic gauge control systems, strip tension control system in cold mills, flat rolling practice cold rolling, pack rolling, steelmaking refractories, refining of stainless steels, special considerations in refining stainless steels etc.

This book is a unique compilation and it draws together in a single source technical principles of steel making by hot rolling process up to the finished product. This handbook will be very helpful to its readers who are just beginners in this field and will also find useful for upcoming entrepreneurs, engineers, personnel responsible for the operation of hot rolling mills, existing industries, technologist, technical institution etc.

Table of Contents

1. Pre-Treatment of Hot Metal

Introduction

Desiliconization and Dephosphorization Technologies

Desulfurization Technology

Process Chemistry

Transport Systems

Process Venue

Slag Management

Lance Systems

Cycle Time

Hot Metal Sampling and Analysis

Reagent Consumption

Economics

Process Control

Hot Metal Thermal Adjustment

2. Heat Treatments for Hot-Rolled Products

Introduction

The Basic Principles of Heat Treatment

Quenching and Tempering

Annealing

Normalizing

Grain Refinement

Carbon Restoration and Carburizing

Heat Treatments for Stainless Steels

Facilities for Heat Treating Bars

The Heat Treating of Tubular Products

Equipment for Heat Treating Plates

The Heat Treatment of Structural Shapes, Rails and Wheels

3. Types of Hot-Rolled Products

Introduction

Plain-carbon Steels

Alloy Steels

High-Strength Low-Alloy (HSLA) Steels

Dual-phase Low-alloy Steels

Electrical Steels

Stainless Steels

Slabs, Blooms and Billets

Rails and Joint Bars

Structurals and Other Shapes

Wheel

Small Sections, Bars and Narrow, Flat-rolled Products

Rods

Tubular Products

Hot-Strip-Mill Products

4. Principles of Measurement of Rolling Parameters

Process of Measurement

Basic Methods of Measurement

Direct comparison method

Indirect comparison method

Nature of Measured Parameters in Rolling Mills

Purpose and Classification of Transducers

Purpose and Classification of Sensors

Performance Characteristics of Transducers

Static characteristics

Dynamic characteristics

Environmental characteristics

Reliability characteristics

Theoretical characteristics

Noise characteristics

Static Characteristics of Transducers

Error of measurement

Repeatability

Precision

Sensitivity

Linearity

Hysteresis

Threshold

Dead band

Resolution (Discrimination)

Drift (Creep)

Zero drift

Zero stability

Backlash

Static friction

Error band

Static Calibration of Measuring Systems

Dynamic Characteristics of Transducers

Zero order instrument

First order instrument
Second order instrument
Analysis of Errors
Systematic errors
Random errors
Propagation of Errors
Addition of values containing errors
Subtraction of values containing an errors
Multiplication of values containing errors
Division of values containing errors
Compatibility of Tolerances with
Measurement Technology
Signal sensing errors
Data transmission errors
Signal recovery errors

5. Causes of Gauge Variation

Analysis of Gauge Variation

Effect of roll gap setting

Effect of entry thickness

Effect of mill stiffness

Effect of workpiece stiffness

Main Factors Affecting Gauge Performance

Disturbances from mill mechanical and
hydraulic equipment

Disturbances from mill control systems

Distributions from incoming rolled product

Gauge Variation in Hot Strip Mills

Effect of Strip Tension on Gauge

Effect of Mill Speed on Gauge

Effect of Mill Chatter on Gauge

Torsional mode

Third-octave vertical mode
Fifth-octave vertical mode
Definition and Causes of Roll Eccentricity
Design imperfections
Assembling imperfections
Roll and bearing distortions
Grinding imperfections
Roll gap control imperfections
Effect of Roll Eccentricity on Roll Force
Effect of Roll Eccentricity on Rolled Material
Thickness
Roll force mode
Position mode
Gaugemeter mode
Effect of Roll Eccentricity on Gauge Variation
in Tandem Cold Mills

6. Gauge Control Sensors and Actuators

Classification of Thickness Gages

Optical Thickness Gages

Comparison method

Shifting images method

Isotope Thickness Gages

X-ray Thickness Gages

Methods of Measurement of Roll Gap

Digital Induction Position Transducers

Magnetostrictive Position Transducers

Measurement of Roll Separating Force

Roll Separating Force Transducers

Load cells

Extensimeters

Pressure transducers

Measurement of Strip Tension

Measurement of Strip Velocity
Signal processor error
Fringe flare error
Temperature error of diode laser
Actuators for Roll Gap Control

7. Automatic Gauge Control Systems:

Close-Loop Control of Hydraulic Actuators
Dynamic Characteristics of Automatic
Control Systems
Step-function response
Frequency response
Phase shift
Gaugemeter Control
Gauge Deviation Control
Strip Tension Control System in Cold Mills

Roll Gap and Strip Tension Decoupling Control
Interstand Tension Control in Hot Strip
Mills with Loopers
Interaction of Strip Tension and Roll Gap Control
Looperless Tension Control
Three-Stage AGC for Tandem Cold Mills
Three-Stage AGC for Tandem Hot Strip Mills
Feedforward AGC for Tandem Cold Mills
Flow-Stress Feedforward AGC for Tandem
Cold Mills
Non-Interactive AGC for Tandem Cold Mills
Automatic Tension and Gauge Control Systems
Mass flow gauge calculating system
Gauge and tension control system
Dynamic gauge control system
High/Low Frequency AGC

Effect of Roll Speed Control Response on
AGC Performance
Feedforward AGC for Hot Tandem Mills
Feedforward Head-End Gauge Control System
Features of Advanced Gauge Control Systems
Roll Eccentricity Control Methods
Passive roll eccentricity control methods
Active roll eccentricity control methods
Preventive roll eccentricity control methods
Dead Band Method
Roll Force Method
Fourier Analyzer of Roll Eccentricity (FARE)
Method
Flying Gauge Change

8. Rolling

Introduction

Flat Rolling

Frictional forces

Roll force and power requirement

Example: Calculation of roll force and torque

Roll deflections

Spreading

Flat-Rolling Practice

Cold rolling

Pack rolling

Defects in rolled plates and sheets

Other characteristics

Residual stresses

Tolerances

Surface roughness

Gage numbers

Rolling Mills

Rolls

Lubricants

Shape-Rolling Operations

Ring rolling

Thread rolling

Production of Seamless Tubing and Pipe

Rotary tube piercing

Continuous Casting and Rolling

Minimills

9. Steelmaking Refractories

Refractories for Oxygen Steelmaking Furnaces

Introduction

Balancing Lining Wear

General Considerations

Areas of Severe Wear
Wear-Rate Measurements
Zoned Linings by Brick Type and Thickness
Refractory Construction
Furnace Burn-In
Wear of the Lining
Considerations of Slag Formation
Other Factors Affecting Lining Life
Hot Metal Differences
Scrap Variations
Tap Temperature Requirements
Reblows and Heat Times
Lance/Tuyere Design and Practices
Production Rates
Lining Life and Costs
BOF Slag Coating and Slag Splashing

Slag Coating Philosophy
Magnesia Levels and Influences
Material Additions
Equilibrium Operating Lining Thickness
Other Refractory Maintenance Practices
Laser Measuring
Slag Splashing
Lance Buildup
Slag Splashing Augmented by Gunning
Refractories for Electric Furnace Steelmaking
Electric Furnace Design Features
Electric Furnace Zone Patterns
Hearth
Slagline
Upper Sidewall
Taphole Refractories
Roof

Electric Furnace Refractory Wear Mechanisms

Corrosion

Oxidation

Erosion

Melting

Hydration

Spalling

Conclusion

Refractories for AOD and VOD Applications

Background

AOD Refractories

Life and Wear Rates

AOD Lining Construction and Zoning

Safety Lining

Working Lining

Bottoms

Tuyere Zone Knapsacks

Walls and Slagline
Vessel/Cone Flange and Seal
Cone
Pour Spouts
Preheating of Linings
Process Variables Significantly Affecting life
Slag Control
Transfer Slag
Decarburization Slag
Reduction Slag
Tuyere Knurdle Control
Temperature
Back Titt
VOD Refractories
Lives and Wear Rates
VOD Lining Construction and Zoning
Safety Lining

Backfill
Working Lining
Bottoms
Bottom/Wall Impact Pads
Stir Plug/Blocks and Well Blocks
Walls
Main Slagline plus Sidewall and Slagline Stir Pads
Upper Slaglines
Freeboard
Lip Rings
Preheating of Linings
Acknowledgments
Refractories for Ladles
Function of Modern Steel Ladle
Ladle Design
Ladle Refractory Design and Use

Stream Impact Pad
Bottom and Lower Barrel Refractories
Barrel
Slagline
Ladle Refractory Construction
Refractory Stirring Plugs
Refractories for Degassers

10. Refining of Stainless Steels

Introduction
Special Considerations in Refining Stainless Steels
Selection of a Process Route
Raw Materials
Melting
Electric Arc Furnace Melting
Converter Melting

Dilution Refining Processes

Argon-Oxygen Decarburization (AOD) Converter Process

K-BOP and K-OBM-S

Metal Refining Process (MRP) Converter

Creusot-Loire-Uddeholm (CLU) Converter

Krupp Combined Blowing-Stainless (KCB-S) Process

Argon Secondary Melting (ASM) Converter

Sumitomo Top and Bottom Blowing
Process (STB) Converter

Top Mixed Bottom Inert (TMBI) Converter

Combined Converter and Vacuum Units

Vacuum Refining Processes

Direct Stainless Steelmaking

Equipment for EAF-AOD Process

Vessel Size and Shape

Refractories

Tuyeres and Plugs

Top Lances
Gases
Vessel Drive System
Emissions Collection
Vessel Operation
Decarburization
Refining
Process Control
Post-Vessel Treatments
Summary

11 . The Instrumentation and Computer Control of Hot Mills

Introduction
Pyrometers
Thickness Gaging
Monitoring the Profile of Hot-rolled Strip

Measuring the Flatness of Hot-rolled Strip
Width and Length Gaging of Rolled Products
The Measurement of Rolling Force
Automatic Control of Blooming and Slabbing Mills
The Control of Billet, Rod and Bar Mills using Microcomputers
Automatic Gage Control
Computer Control of Plate Mills
Hot-Strip-Mill Automation
Finishing Mill Setup
Finishing-Temperature Setup
Finishing-Temperature Control
Ciling-Temperature Setup and Control
Roughing-Mill Setup
Edger Setup
Mill Pacing
Reheat-Furnace Control

12. Overview of Steelmaking Processes and their Development

Introduction

Bottom-Blown Acid or Bessemer Process

Basic Bessemer or Thomas Process

Open Hearth Process

Oxygen Steelmaking

Electric Furnace Steelmaking

13. Structural Changes in Steel During Hot Rolling

Structural Changes During Reheating

Grain Restoration Processes

Dynamic Restoration Process

Static Restoration Process

Effect of Initial Grain Size on Static Recrystallization

Effect of Temperature and Microalloying

Effect of Amount of Deformation

Recovery

Partial recrystallization

Complete recrystallization

Factors Affecting Critical Reduction for Recrystallization

Grain Growth After Deformation

Structural Changes in Steel During Cooling

Effect of Steel Structure on Flow Stress

14. Steel Heating for Hot Rolling

Purpose of Heating Process

Requirements for Heating Process

Heat Transfer in Ingots

Mold Cooling Time

Air Cooling Time

Types Of Soaking-pit Furnaces

Regenerative Pits
Continuous-fired Pits
Electric Soaking Pits
Heat Transfer In Soaking Pits
Batch-type Slab Reheating Furnaces
Continuous Reheating Furnaces
Fuel-firing on Continuous Reheating Furnaces
Analysis of a Continuous Heating Process
Hot Slab Charging
Effects of Skid System on Heating

15. Heat Transfer During the Rolling Process

Work piece Temperature Change in Hot Strip Mill
Temperature Loss due to Radiation
Temperature Loss due to Convection

Temperature Loss due to Water Cooling
Temperature Loss due to Conduction to Work Rolls
Temperature Rise due to Mechanical Work
Intermediate Reheat Facilities
Thermal Covers
Heat Transfer in Reradiating Heat Covers
Heat balance for metallic shield
Heat transfer through Insulation
Heat balance for outer metallic panel
Heat Transfer in Coilbox

16. Thermomechanical Treatment Combined with Rolling

Thermomechanical Treatment of Steel
U.S. Classification of TMT
Russian Classification of TMT
Standard Heat Treatment (SHT)

Thermomechanical Treatment (TMT)
Low Temperature Thermomechanical Treatment
High Temperature Thermomechanical Treatment (HTMT)
Combined Thermomechanical Treatment (CTMT)
Preliminary Thermomechanical Treatment (PTMT)
Mechanico-Thermal Treatment (MTT)
Thermomechanical Treatment During Rolling
Conventional hot rolling
Controlled rolling
Low finishing temperature rolling
Types of Controlled Rolling Processes
Structural Changes in Steel During Controlled Rolling
Deformation in recrystallization region
Deformation in non-recrystallization region
Deformation in the gamma-alpha region

Structural Changes in Steel During Continuum Rolling

Structural Changes in Steel During Controlled Cooling

Effect of Alloying Elements in Controlled Rolling

Controlled Rolling in Hot Strip Mills

Precipitation Strengthening

Hot Rolling of Acicular Ferrite Steel

Hot Rolling of Dual-Phase Steel

Finish rolling temperature

Intermediate temperature

Coiling temperature

Controlled Rolling of Arctic Grade Steel

Effect of slab reheating and finishing temperatures

Ferritic Rolling

Accelerated Cooling

Multipurpose Accelerated Cooling System

On-Line Accelerated Cooling (OLAC)
Dynamic Accelerated Cooling
RAC Process
Cold Rolling and Annealing of Steel
Temper Rolling of Steel
Tin mill products
High-strength cold-rolled sheets
Electrical sheets
Deep-drawing Sheet

17. Oxygen Steelmaking Processes

Introduction
Process Description and Events
Types of Oxygen Steelmaking Processes
Environmental Issues
Sequence of Operations Top Blown

Plant Layout
Sequence of Operations
Scrap Handling
Hot Metal Pouring
Hot Metal Treatment
Charging the Furnace
Computer Calculations
Oxygen Blow
Flux Additions
Final Oxygen Adjustments and Dynamic Sensors
Turndown and Testing
Corrective Actions
Quick Tap Procedures
Tapping
Slagging Off and Furnace Maintenance
Shop Manning
Hot Metal

Charging Crane
Scrap
Furnace and Charging Floor
Flux Handling
Maintenance
General Labor
Chemistry Lab
Refractory Maintenance
Relines and Major Repairs
Ladle Liners
Management and Clerical
Raw Materials
Hot Metal
Composition
Determination of Carbon and Temperature
Hot Metal Treatment
Weighing

Scrap
High Metallic Alternative Feeds
Oxide Additions
Iron Oxide Materials
Waste Oxides
Fluxes
Burnt Lime
Dolomitic lime
Limestone
Fluorspar
Oxygen
Process Reactions and Energy Balance
Refining Reactions in BOF Steelmaking
Carbon Oxidation
Silicon Oxidation
Manganese Oxidation
Phosphorus Oxidation

Sulfur Reaction

Slag Formation in BOF Steelmaking

Mass and Energy Balances

Determination of the Flux Additions

Determination of Oxygen Requirements

Determination of the Weight of Iron-Bearing
Materials

Determination of the Gases and Fumes Produced

Determination of the FeO in the Slag

Tapping Practices and Ladle Additions

Process Variations

The Bottom-Blown Oxygen Steelmaking or

OBM (Q-BOP) Process

Plant Equipment

Raw Materials

Sequence of Operations

Process Characteristics

Product Characteristics
Mixed-Blowing Processes
Bottom Stirring Maintenance Problems
Bottom Plug/Nozzle Configurations
Oxygen Steelmaking Practice Variations
Post-Combustion Lance Practices
High Scrap Melting Practices
Slag Splashing Refractory Maintenance
Effects of Desulfurized vs. Non-Desulfurized Hot Metal
Process Control Strategies
Static Models
Fundamentals of the Static Charge Model
Operation of the Static Charge Model
Statistical and Neural Network Models
Dynamic Control Schemes
Gas Monitoring Schemes
Optical and Lasser Based Sensors

Drop-in Thermocouples for Quick-Tap
Sonic Analysis
Lance Height Control
Measurement of Lance Height
Environmental Issues
Basic Concerns
Sources of Air Pollution
Hot Metal Reladling
Desulfurization and Skimming of Hot Metal
Charging the BOF
Blowing (Melting and Refining)
Sampling and Testing
Tapping
Materials Handling
Teeming
Maintenance and Skull Burning
Relative Amounts of Fumes Generated

Other Pollution Sources

BOF Slag

BOF Dust and Sludge

Summary

18. Alternative Oxygen Steelmaking Processes

Introduction

General Principles and Process Types

Specific Alternative Steelmaking Processes

Energy Optimizing Furnace (EOF)

AISI Continuous Refining

IRSID Continuous Steelmaking

Trough Process

Other Steelmaking Alternatives

Economic Evaluation

Summary and Conclusions

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Our Approach

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Thorough analysis of the project



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Report Compilation

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- *Aluminium And Aluminium Extrusion Profiles & Sections,*
- *Bio-fertilizers And Biotechnology*
- *Breakfast Snacks And Cereal Food*
- *Bicycle Tyres & Tubes, Bicycle Parts, Bicycle Assembling*

- *Bamboo And Cane Based Projects*
- *Building Materials And Construction Projects*
- *Biodegradable & Bioplastic Based Projects*
- *Chemicals (Organic And Inorganic)*
- *Confectionery, Bakery/Baking And Other Food*
- *Cereal Processing*
- *Coconut And Coconut Based Products*
- *Cold Storage For Fruits & Vegetables*
- *Coal & Coal Byproduct*

- *Copper & Copper Based Projects*
- *Dairy/Milk Processing*
- *Disinfectants, Pesticides, Insecticides, Mosquito Repellents,*
- *Electrical, Electronic And Computer based Projects*
- *Essential Oils, Oils & Fats And Allied*
- *Engineering Goods*
- *Fibre Glass & Float Glass*
- *Fast Moving Consumer Goods*
- *Food, Bakery, Agro Processing*

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- *Infrastructure Projects*
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- *Leather And Leather Based Projects*
- *Leisure & Entertainment Based Projects*
- *Livestock Farming Of Birds & Animals*
- *Minerals And Minerals*
- *Maize Processing(Wet Milling) & Maize Based Projects*
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- *Rubber And Rubber Products*
- *Soaps And Detergents*
- *Stationary Products*
- *Spices And Snacks Food*
- *Steel & Steel Products*
- *Textile Auxiliary And Chemicals*

- *Township & Residential Complex*
- *Textiles And Readymade Garments*
- *Waste Management & Recycling*
- *Wood & Wood Products*
- *Water Industry(Packaged Drinking Water & Mineral Water)*
- *Wire & Cable*

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