



Aluminium Rolling Technology Course

This course contains the following modules:

The Business of Rolling

- Economics of rolling
- Business cycles
- Future trends

Aluminium Casting Overview

- Outline of the process routes continuous casting and direct chill casting
- Metal conditions at various stages during casting
- Machinery used in casting

Machinery and Process Overview

- Outline of Aluminium process routes
- Outline of machinery used
- Major components of reversing and hot mills, tandem mills and cold mills,
- Types of actuator in rolling mills

Finishing Overview

- Outline of finishing line process routes
- Outline of machinery used
- Affects of processing on product quality

Mechanics of Rolling

- Yield criteria
- Friction hill
- Factors determining rolling load
- Closed and open gap rolling
- Attenuation

Process Metallurgy

- Alloy choice
- Microstructure
- Strengthening mechanisms
- Annealing

Thermal Aspects of Rolling

- Heat sources and sinks
- Temperature distributions in rolls and strip
- Design of roll spray cooling systems
- Strip cooling

Surface Generation

- Surface generation during rolling
- Oil entrapment
- Strip brightness control
- Scuffing
- Types of defect
- Reduction marks
- Surface inspection

Mechanics of Profile & Flatness

- Definitions of profile and flatness
- Sources of variation
- In-process specification and targets for control

Data Workshop

- Introduction of data analysis and IBA software
- How to interpret rolling mill data
- How to create meaningful templates

Introduction to Aluminium cars and Visit to JLR

- Overview of Aluminium cars
- Introduction to the manufacturing process
- Visit and tour of Jaguar Land Rover plant

Introduction to Control

- Open and closed loop control systems
- PID control and gain determination
- Ziegler-Nichols testing
- Use of feedback

Automatic Gauge Control

- Total gauge description
- Gauge control loops
- Measurement devices
- Different methods of gauge control in current use

Profile Measurement and Control

- Measurement of profile
- Actuators for control
- An integrated control strategy
- Scheduling, setup, adapted setup & in-coil strategies

Aluminium Rolling Lubrication

- Friction and lubrication basic principles
- Interaction of rough surfaces
- Role of additives
- Hot and cold rolling oils
- System maintenance
- Filtration

Automatic Flatness Control

- Definition
- I-units
- Different types of off-flatness
- Relation with stress
- On-line measurement
- Flatness control actuators
- Strategies to control flatness

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