ANDREA SCORDI
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DANIELI CENTRO ALUMINIUM

DANIELI CENTRO ALUMINIUM HOT ROLLING MILL TECHNOLOGY AMAG PROJECT

4TH IIAC IRAN INTERNATIONAL ALUMINIUM CONFERENCE
OLYMPIC HOTEL
TEHRAN, IRAN
11-12 MAY 2016

DANIELI
PASSION TO INNOVATE
AND PERFORM
IN THE METALS INDUSTRY

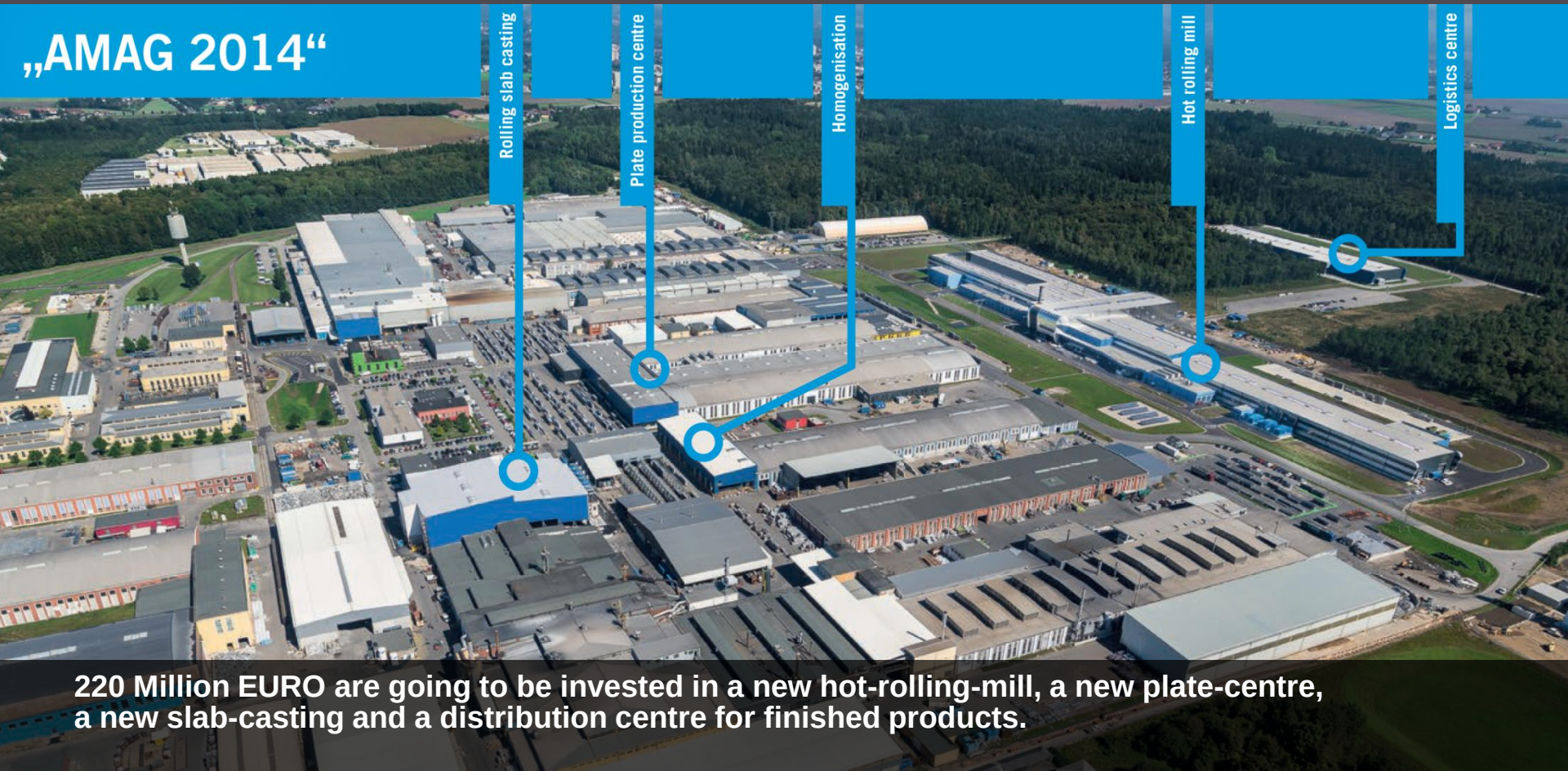
DANIELI TEAM
A CENTURY
OF PARTNERSHIP
EXPERIENCE

AMAG AG is a globally active manufacturer of high quality, rolled aluminium products which are used in high grade final products such as products for the aircraft and automotive industry.

The importance of aluminium in all areas of modern, industrial production, transport and other applications is steadily rising.

AMAG rolling has established a position as a specialist among the rolling mill companies and by means of constant improvements in already high quality standards, is able to provide products, which meet the strictest requirements.

AMAG 2014 PROJECT
LARGE SCALE INVESTMENT IN RANSHOFEN



220 Million EURO are going to be invested in a new hot-rolling-mill, a new plate-centre, a new slab-casting and a distribution centre for finished products.

TWIN-COILER HOT ROLLING MILL PROJECT

Main Features of the project:

> Type of plant — Twin-coiler hot rolling mill
> Productivity — 320,000 tpy
> Productivity target — 80,000 tpy
> Aluminium alloys — from 1xxx to 8xxx

> Plate and coil std production
> Tread coil production
> Plate and coil clad production

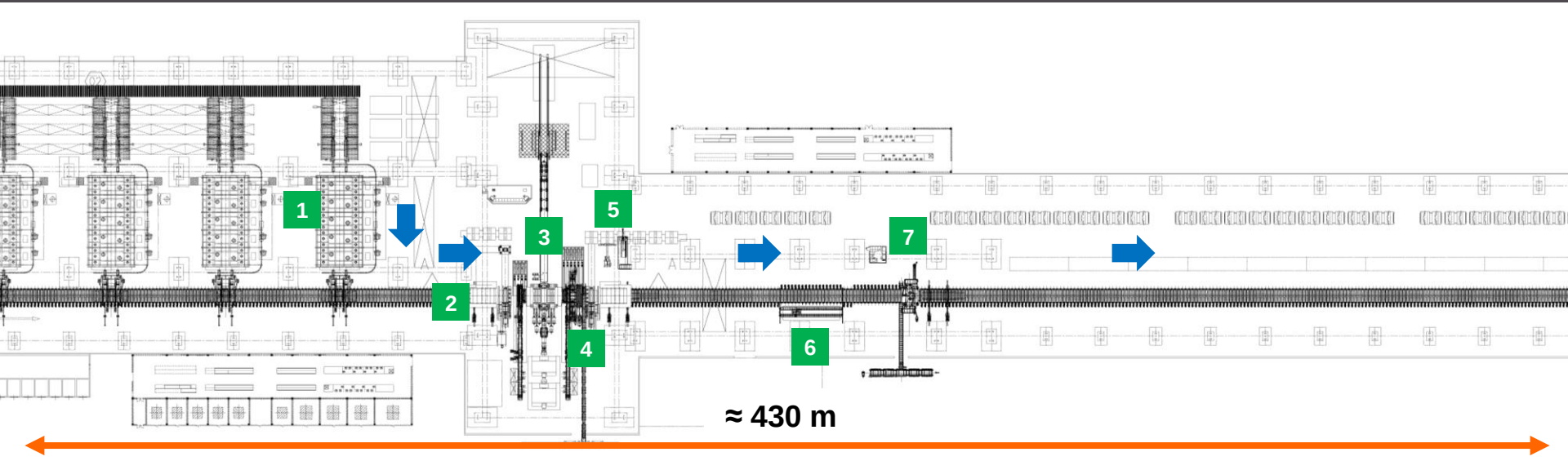
Some applications of the ALU plates are:

> Aerospace;
> Automotive Industries;
> Bright products;

The new hot rolling mill, which produces both plates as well as coils, entered operation on schedule in September 2014.

Best quality achieved especially with aluminium alloy of 2XXX, 6XXX and 7XXX series.

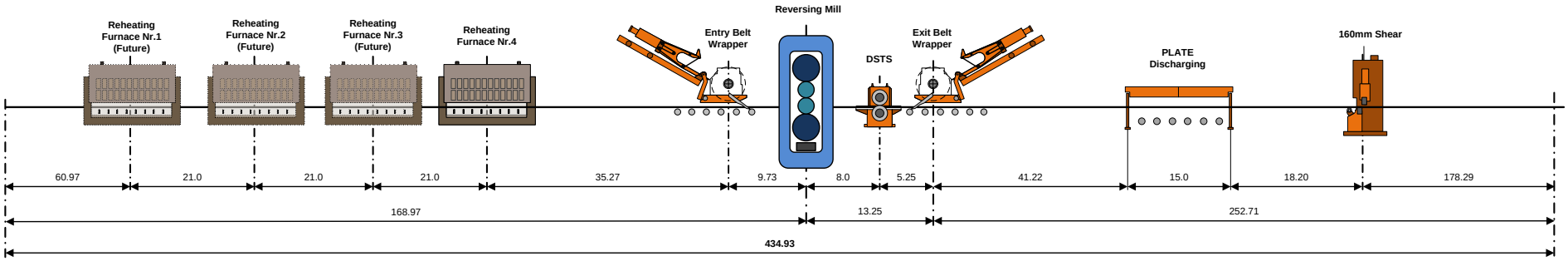
GENERAL LAYOUT



MAIN FEATURES

1. Ingots Reheating Furnace
2. Entry Coiler & Belt Wrapper
3. 4-HI Reversing Rolling Mill
4. Exit Coiler & Belt Wrapper and Side Trimmer
5. Coil Handling system
6. Plate Handling system
7. 160 mm Crop Shear
8. Danieli Automation L1 and L2 system

TECHNOLOGICAL LAYOUT



PLANT PRODUCTION	400,000 tpy
Hot Rolled Coils	280,000 tpy
Hot Rolled Plates	120,000 tpy

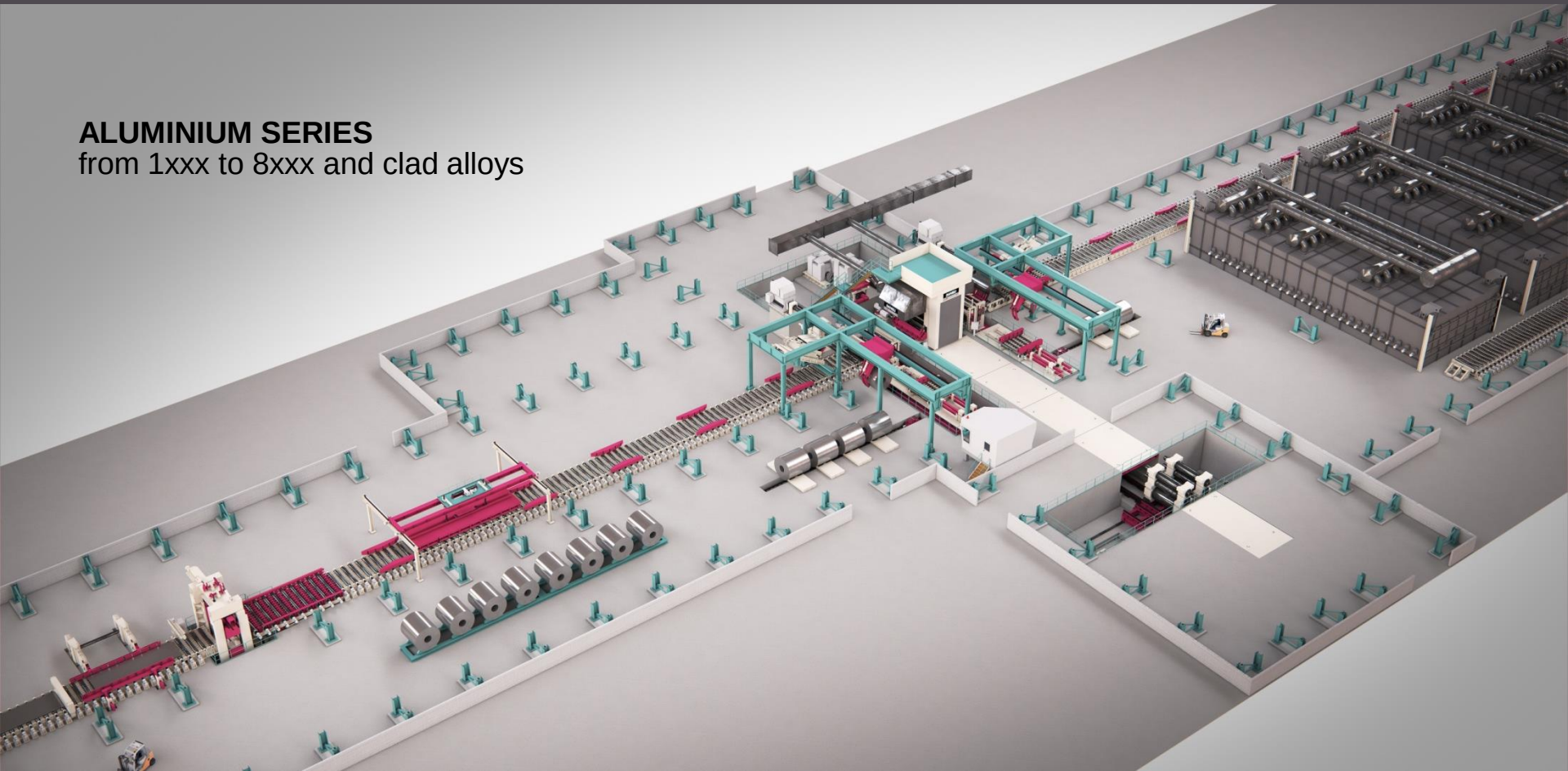
STARTING INGOTS	
Thickness	270 - 620 mm cold-scalped
	280 - 680 mm clad
Width	1000-2300 mm
Length	3.2-7.5 m
Max Weight	20.0 tons

HOT ROLLED PLATES	
Thickness	10-160 mm
Width	1000-2450 mm
Length	4-12.5 m
Max Weight	20.0 tons

HOT ROLLED COILS	
Thickness	3.0-16.0 mm
Width	1000-2450 mm
Coil ID-OD	600 -2800 mm
Max Weight	20.0 tons

3D GENERAL LAYOUT

ALUMINIUM SERIES
from 1xxx to 8xxx and clad alloys



FROM CASTING TO THE FINAL PRODUCT

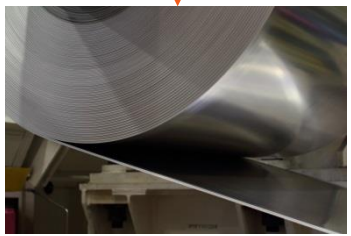
CAST INGOT YARD

INGOT SAWING AND SCALPING

INGOT REHEATING / THERMAL TREATMENT

INGOT HOT ROLLING MILL

TRANSFER BAR CROPPING HEAD & TAIL WITH THE HEAVY SHEAR



FROM CASTING TO THE FINAL PRODUCT

PLATE ROLLING UNTIL ACHIEVING THE THICKNESS FOR COILING PASSES

STRIP PREPARATION WITH THE LIGHT SHEAR

HOT ROLLING COILING PASSES

COIL DISCHARGE

COIL TEMPERATURE MEASURAMENT

PLATE ROLLING UNTIL ACHIEVING THE TARGET PLATE THICKNESS

PLATE MARKING

PLATE CUT TO LENGTH TO THE HEAVY SHEAR

PLATE DISCHARGING AND PILING TO THE STACKING UNIT

PLATE ROLLING UNTIL ACHIEVING THE THICKNESS FOR COILING PASSES

COILING PASSES UNTIL ACHIEVING THE THICKNESS OF THE SECOND LAST PASS

COIL DISCHARGE AND STORAGE TO THE HEATED WAREHOUSE

FAST WORK ROLL CHANGING

COIL CHARGING

ONE TREAD COILING PASS

COIL DISCHARGE TEMPERATURE MEASURAMENT

4-HI REVERSING ROLLING MILL

MAIN FEATURES

> Top mounted electromechanical screwdown;
> Top BUR Balance and WR Scratch Brushes;
> Positive bending in Mae-west block;
> Negative Bending;
> Bottom mounted HAGC and Work Roll Coolant sprays;
> Quick WR/BUR change;
> Fume exhaust system;

MAIN DATA

Max coiling speed	300 mpm
Max plate speed	135 mpm
Max Separating Force	50,000 kN
Max Reduction	50.0 mm
Max Positive Bending Force	5,000 kN
Max Negative Bending Force	3,000 kN
WR Diameter max/min	950/865 mm
WR Barrel length	2600 mm
BUR Diameter max/min	1600/1500 mm
BUR Barrel length	2540 mm
Motor Power	2 x 5,000 kW
Motor Speed	33/105 rpm

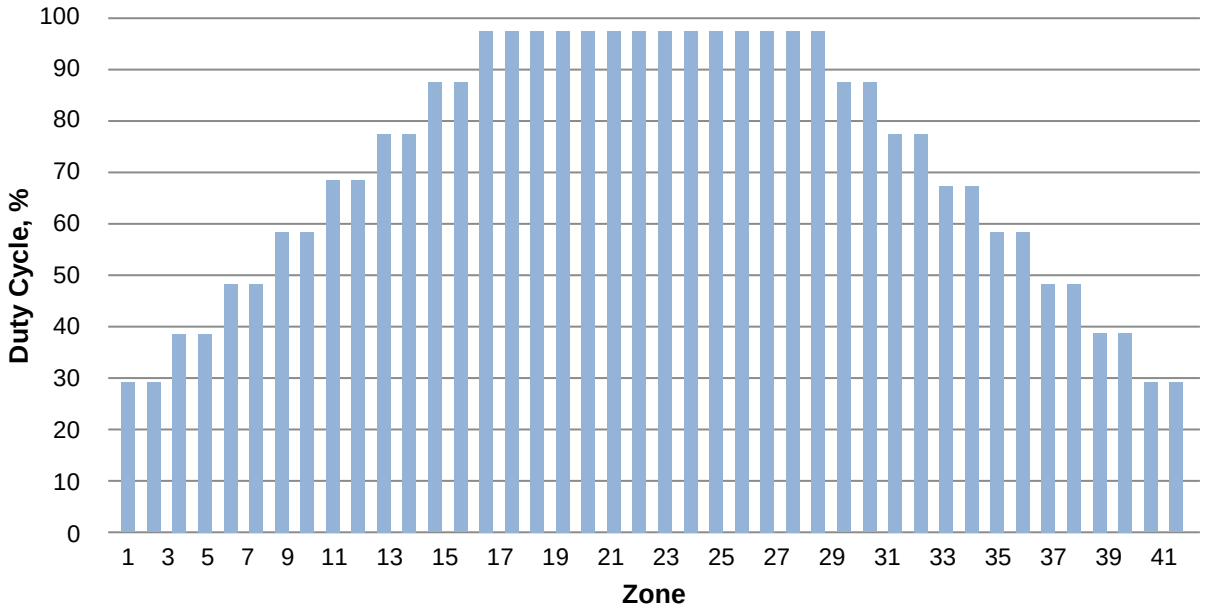
WORK ROLL SELECTIVE COOLING SYSTEM

MAIN FEATURES

> High speed pulse mode
> Selective system
> High profile control
> Predictive Spray System Study

WORK ROLL COOLANT

Reduced coolant application in edge regions (increase profile crown)



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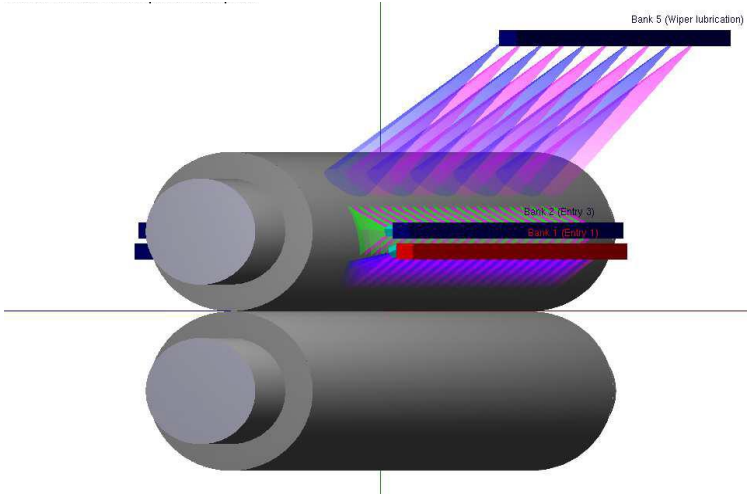
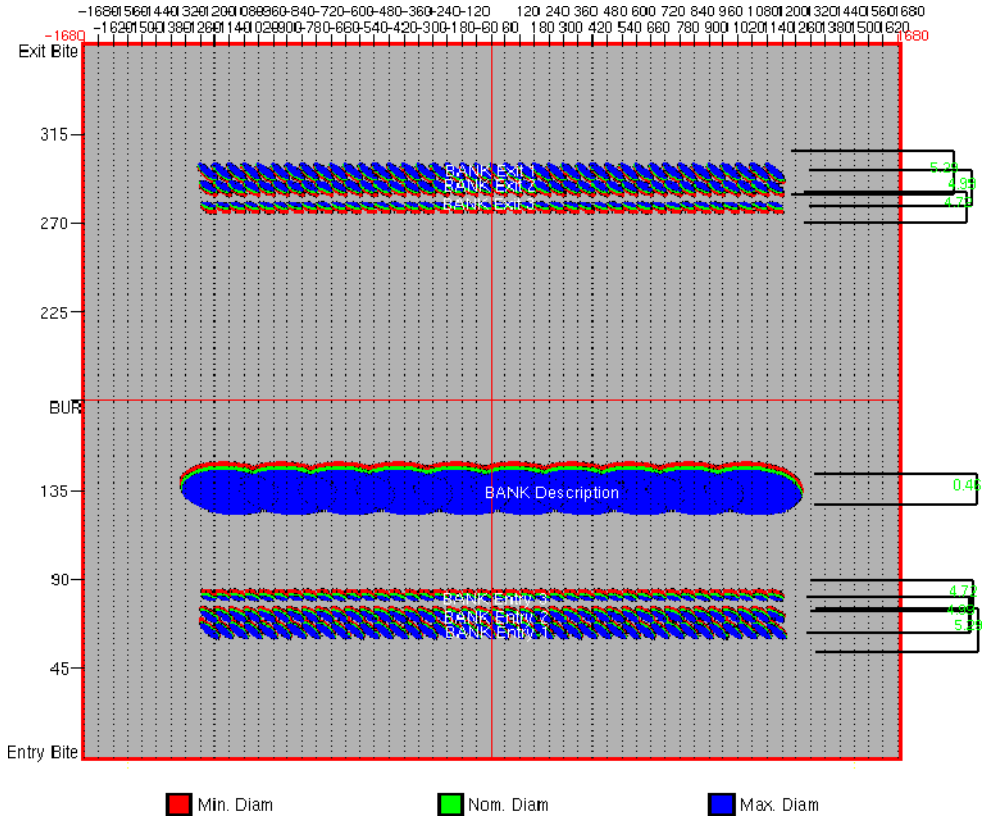




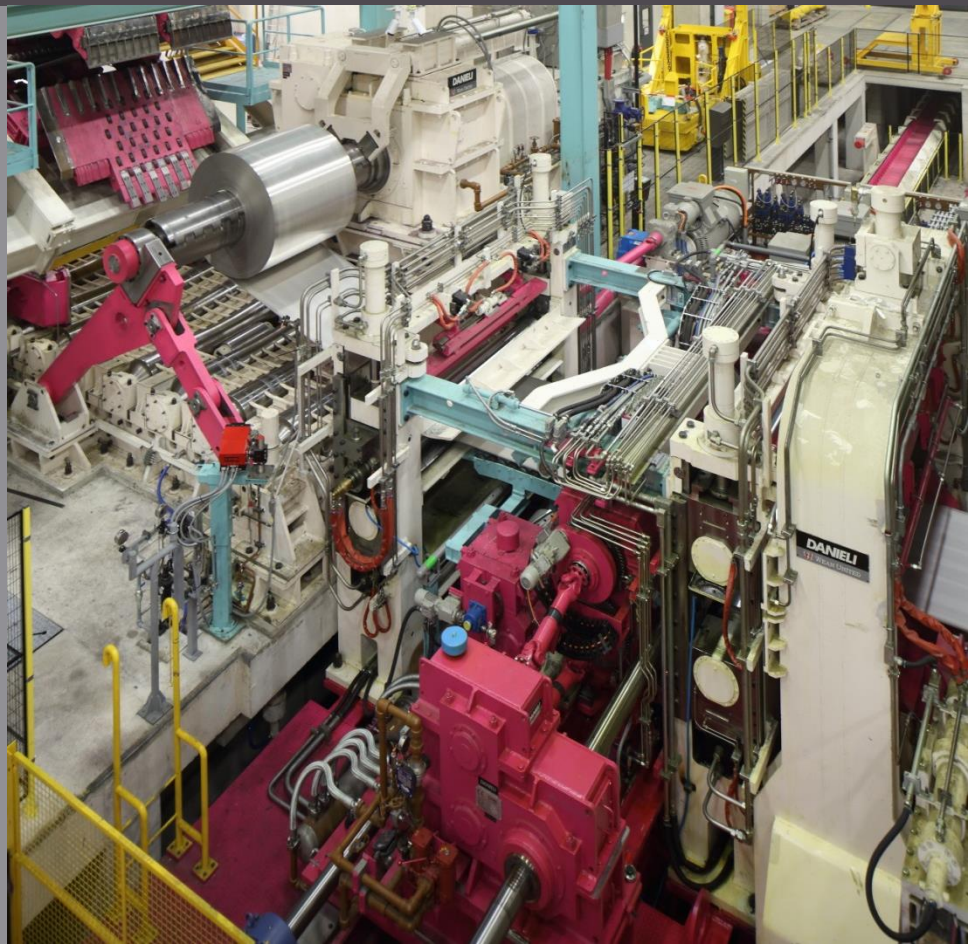
SIDE TRIMMER AND SCRAP CHOPPER

MAIN FEATURES

> Bases locked by hydraulic operated wedges;
> Side trimming heads automatically adjusted for width, clearance and overlap;
> Offset adjustment;

MAIN DATA

Max thickness trimmed	12.0 mm
Max width trimmed	100 mm
Strip width after trimming	1000 - 2300 mm
Knife diameter	610 mm
Max speed	420 mpm
Motor power	350 kW
Motor speed	750/1500 rpm



TREAD COILS AND CLAD PLATES AND COILS

MAIN FEATURES

> Automatic coils charge system for tread coils
> Peeler
> Light preparation shear
> Automatic functions for clad

HEAVY SHEARS FEATURES

MAIN FEATURES

> Fully hydraulic up cut shear
> Single rake
> Adjustable Knife angle
> Adjustable Knife gap
> Quick knife change
> Hydraulic side guides
> Length, thickness and profile measurement
> Scrap handling

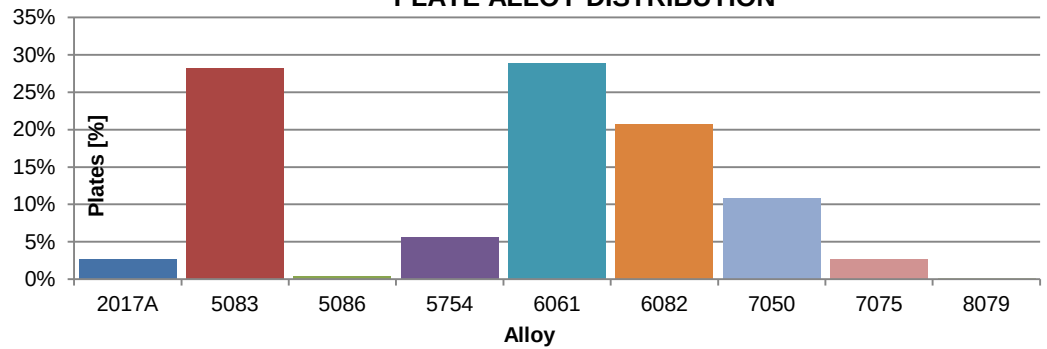
MAIN DATA

Width	1000 - 2500 mm
Maximum Cutting Force	20,000 kN
Cutting thickness	10 -160 mm
Knife width	2800 mm
Cutting angle α	$1° \leq \alpha \leq 3.5°$
Knife gap D	$0.8 \text{ mm} \leq D \leq 8 \text{ mm}$

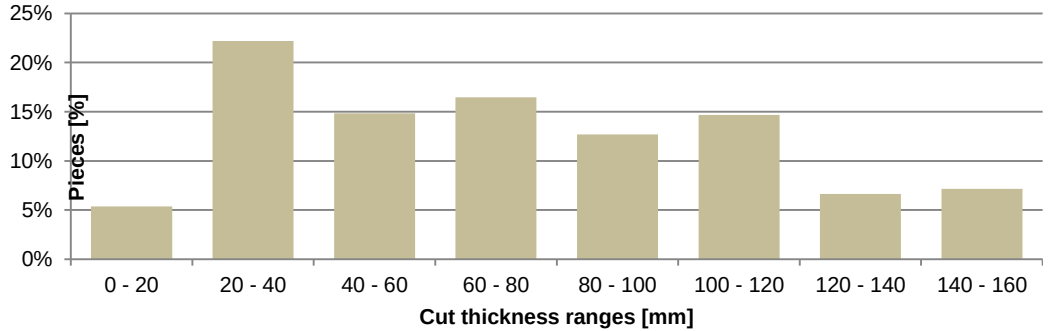
Most critical foreseen conditions for cutting:
AA 5083 at width = 2450 mm and thickness = 160 mm
at minimum cutting temperature of 350°C.

PLATE PRODUCTION DISTRIBUTION

PLATE ALLOY DISTRIBUTION



CUT THICKNESS DISTRIBUTION



WIDTH DISTRIBUTION

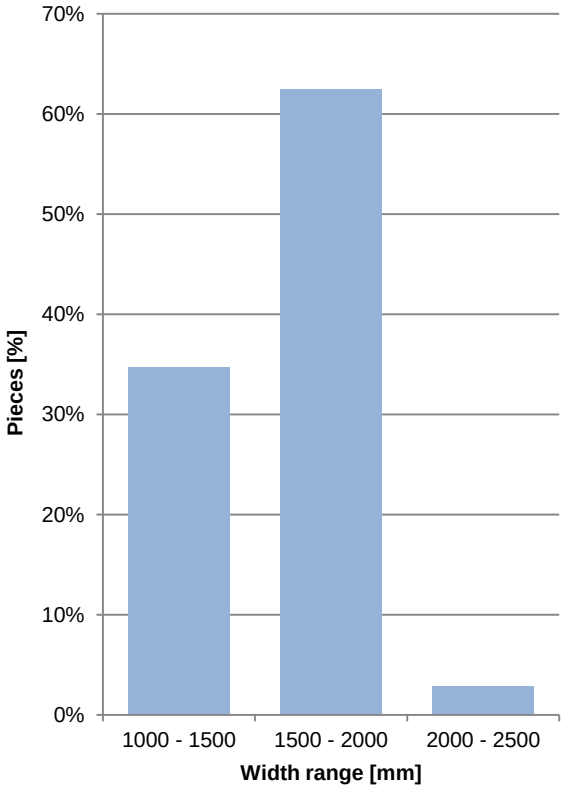
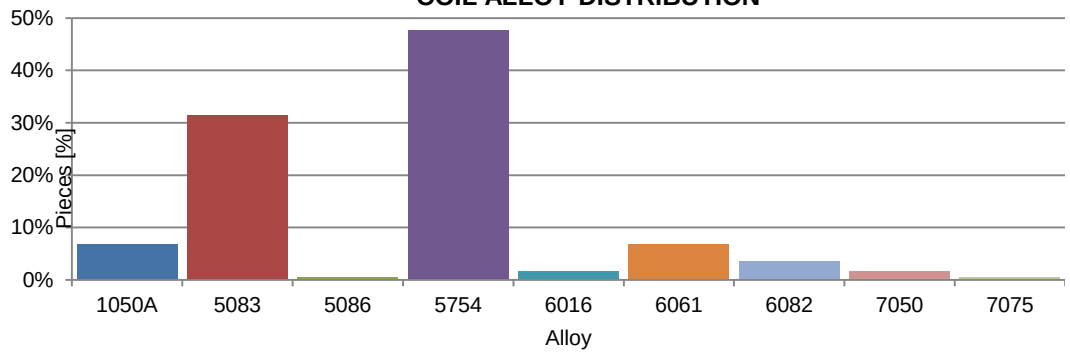
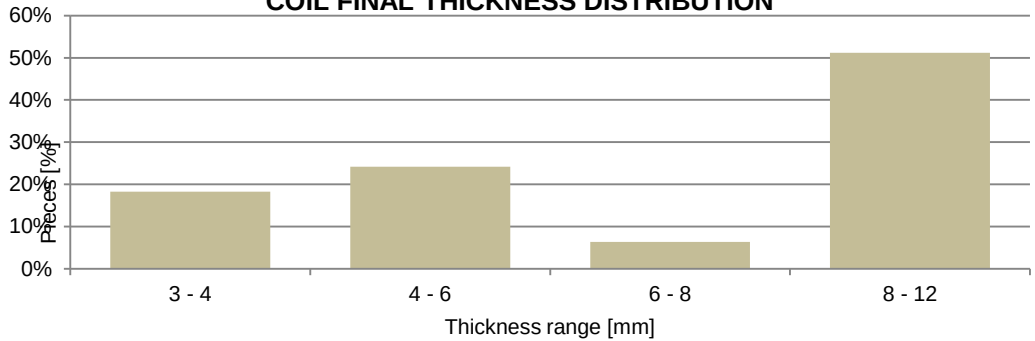


PLATE PRODUCTION DISTRIBUTION

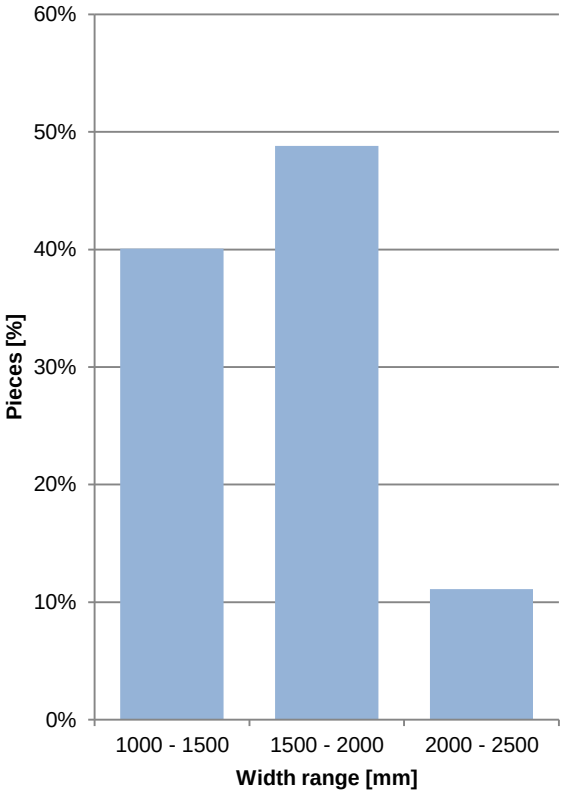
COIL ALLOY DISTRIBUTION



COIL FINAL THICKNESS DISTRIBUTION

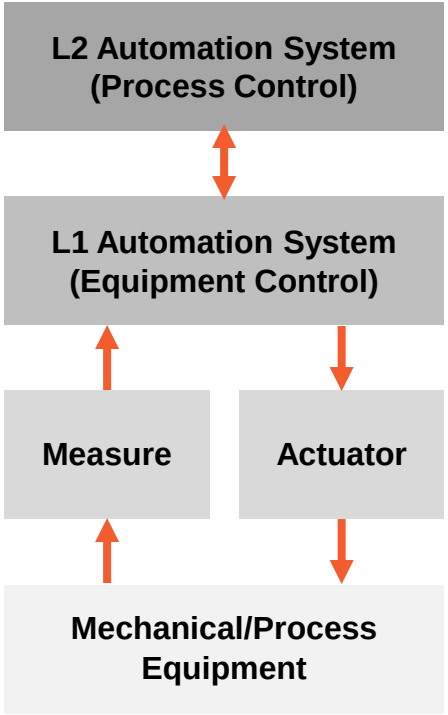


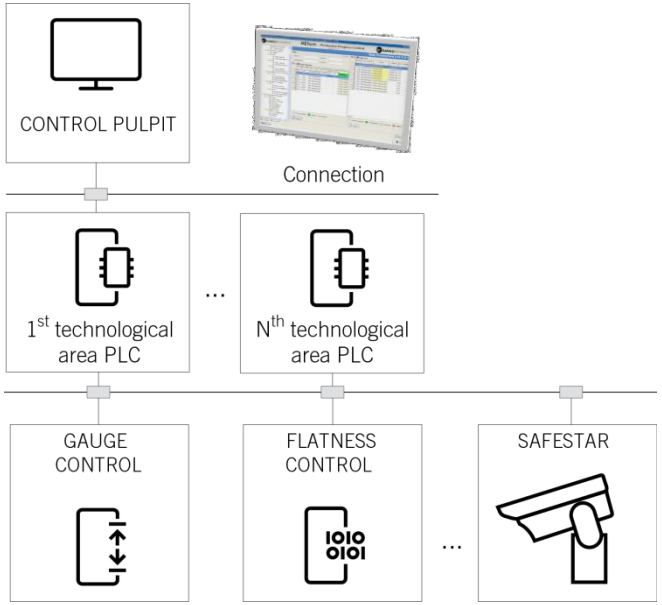
WIDTH DISTRIBUTION



AUTOMATION TECHNOLOGICAL PACKAGES

TECHNOLOGICAL PACKAGE





High-Speed control platform and State-of-the-Art application SW

Standard Market Equipment for open, easy to integrate and scalable Automation and Electrical systems

High degree of integration with process and mechanical design

DANIELI AUTOMATION CONTROL PULPIT

HIGHEST PRODUCT QUALITY

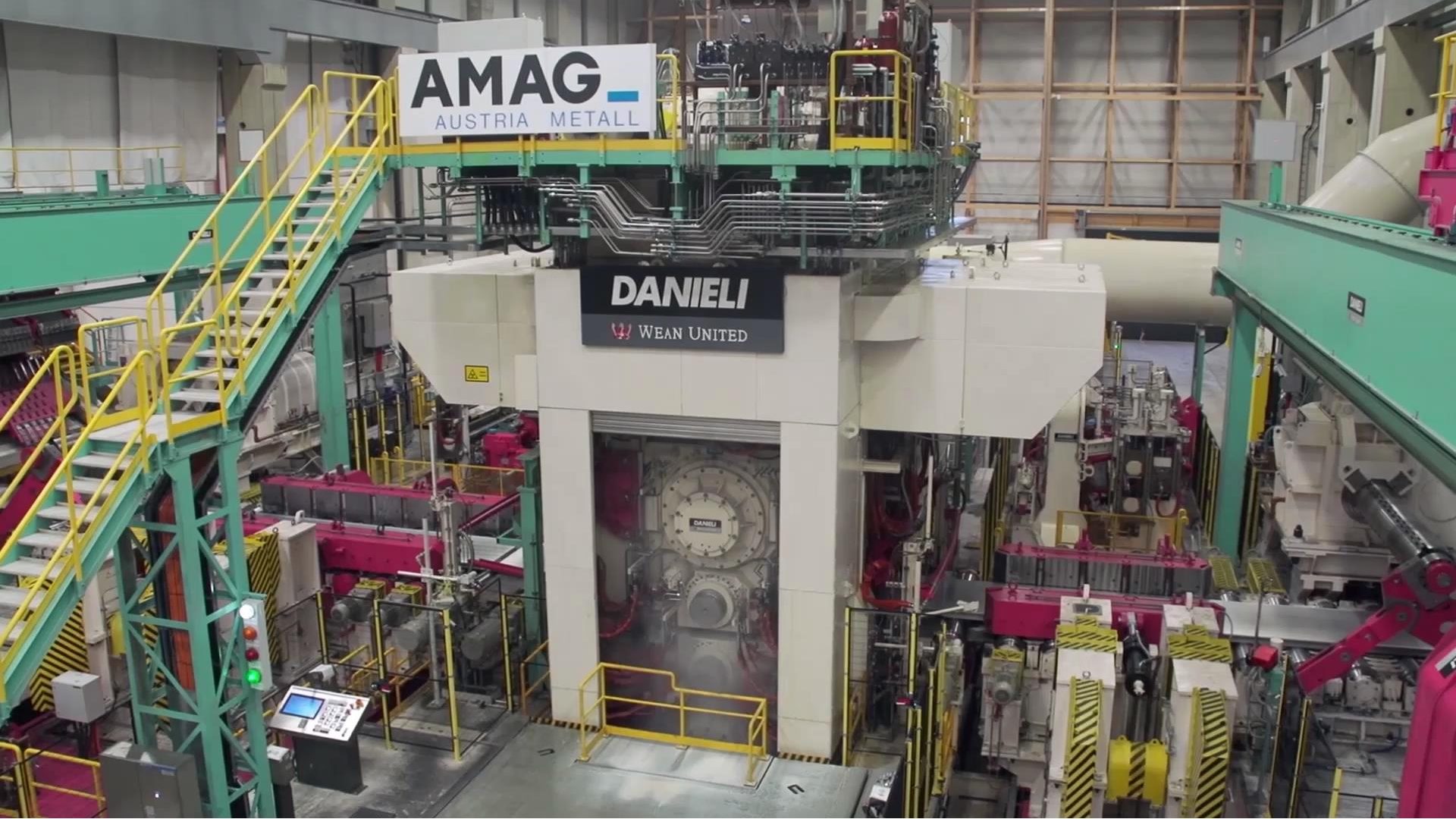
> Thickness
> Profile
> Flatness
> Temperature
> Material Properties

TROUBLE-FREE OPERATION OF THE MILL

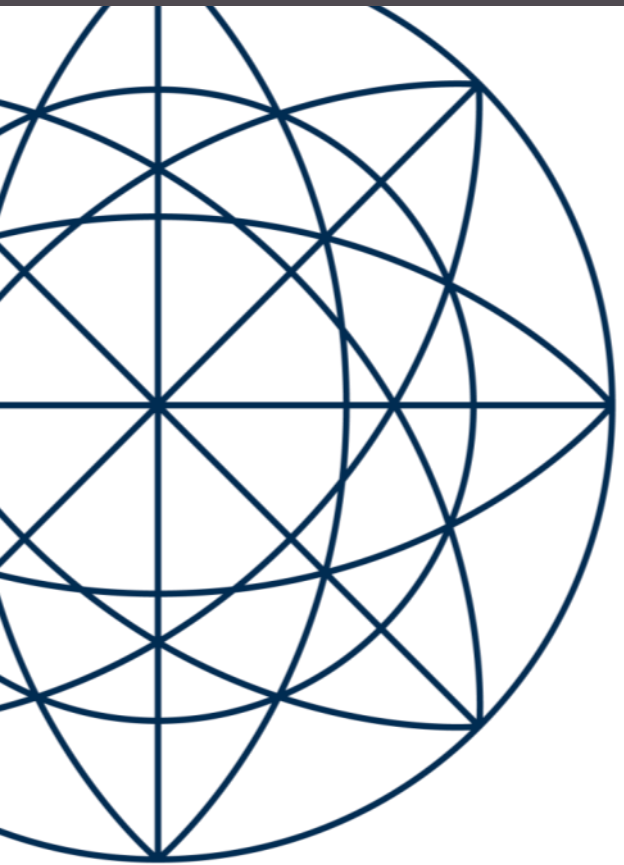
> High Equipment Availabilty
> High Throughput
> Consistency of Mill
> Setup and Operation

FLEXIBILTY

> Schedule Free Rolling
> Intuitive User Interface


AMAG
AUSTRIA METALL
DANIELI
WEAN UNITED

PROJECT CHALLANGE



- > PROJECT INCLUDE TECHNOLOGICAL EQUIPMENT AND ERECTION WORKS
- > FULL DANIELI AUTOMATION L1 & L2 SYSTEM
- > DESIGN INCLUDE EMULSION SYSTEM
- > EQUIPMENT DESIGN WITH SPECIFIC REQUIREMENTS FROM CUSTOMER
- > EQUIPMENT DELIVERY IN 18-20 MONTHS
- > FIRST PLATE/COIL ROLLED IN 29 MONTH
- > FINAL ACCEPTANCE IN 39 MONTHS

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