main supply

Ingeteam Power Technology, S.A. Industrial Systems Division is responsible for the electrical project:

- Project management

- Supply:

  - ✓ Medium Voltage switchgears and transformers
  - ✓ AC MCC, DC MCC and VVVF
  - ✓ Sequential control systems
  - ✓ Technological control systems
  - ✓ Operation and visualization systems (HMI)
  - ✓ Central control pulpit and auxiliary
  - ✓ Motors

- Installation Supervision with Final Client.
- Commissioning.
- Optimization

Low Voltage Frequency Converters

OCS PLC System

Main Control Desk

after-sales services

- Hot-line
- Spare parts in 24 hours
- Direct line with our technical staff
- Remote communication from our offices to the factory automation network

INDAR Main Drive Motor

Ingeteam

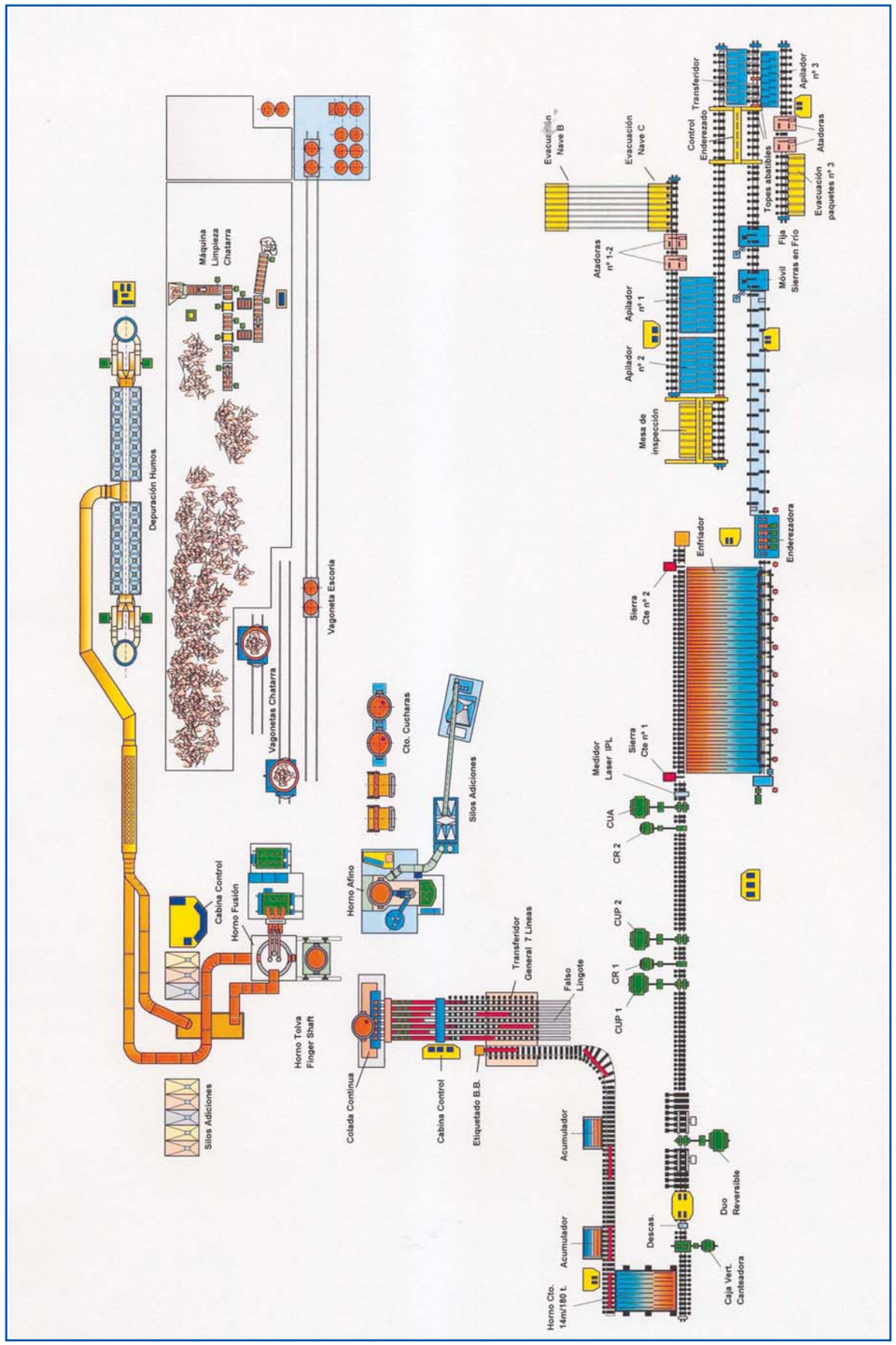
Medium Size Section Mill Plant

ARCELORMITTAL OLABERRIA (SPAIN)

www.ingeteam.com
industry@ingeteam.com

Ingeteam

Ingeteam
industry



Plant lay-out

1.9 cold saw

Installation:

The cut to length of the product is carried out by means of several on line disk type cold saw machines, one on a fixed position, the latter as a mobile one. The cut to length varies from 5 mts to 24 mts. Both cold saws work together for short length programs.

Cut to Length Cold Saw

Electrical Equipment

Complete new electrical and automation supply, including:

- Cold saw drives (disc type).
- Movable cold saw position control.
- Transport roller table up to the pilers.
- Automation and monitoring system.
- Cut to length management.

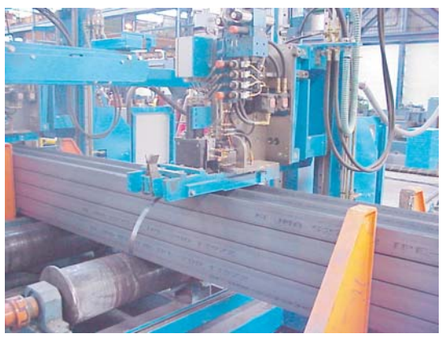
Pilers

1.10 PILERS

Installation:

One of the last improving in this area is the supply of a new piler Nr 3, in order to increase the evacuation capacity of the mill.

- Piler Nr 3 (new).
- Reusing of existing piler Nr 1 and 2. Small modifications to be readapted.



Binding Machine

Electrical Equipment

Complete electrical and automation system, including:

- Piler drive and auxiliary systems.
- Transport roller table drives with frequency converters.
- Interface to binding machine (supplied by thirds).
- Automation and monitoring system.

1.8 straightener machine

Installation

The straightener machine is new and has been revamped once to improve and guide better the material entering. It is just located after the cooling bed. This machine is composed by 4 motor driven main rolls and several auxiliary multirolls for adjustment purposes. The entrance speed varies from 1,5 to 6 m/s.

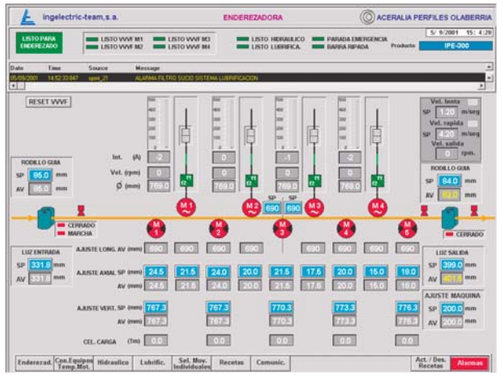
Multirolls for auxiliary adjustments are driven by conventional ac motors and an individual frequency converter per rolls, distributed as follows:

- Vertical adjustment for lower rolls (up-down).
- Axial adjustment for upper and lower rolls (in-out).
- Shifting adjustment for upper and lower rolls.
- Vertical adjustment for the whole machine (up-down).

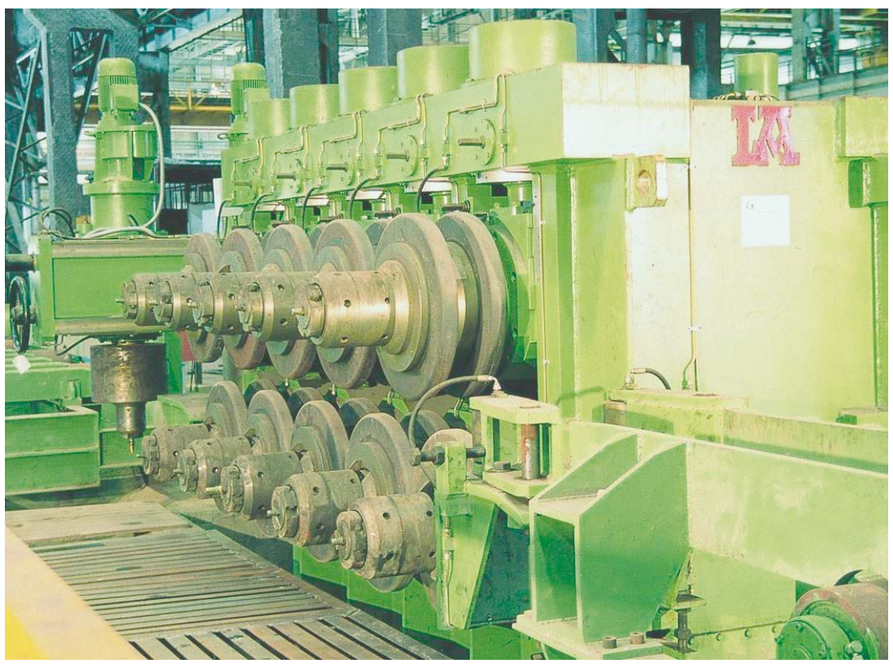
Electrical Equipment

Complete electrical and automation system for the straightener machine, including:

- Main upper rolls, driven by 4 ac motors (4x 250 kW) and controlled by frequency converters.
- Auxiliary lower rolls (3x 110 kW) controlled by frequency converters, to help material entering in the machine.
- Transport roller table from straightener machine to cold saw controlled by frequency converters.
- New automation and monitoring system.



Straightener Data Screen



Straightener Machine Overview

Caster General Overview

Cooling Bed Overview

Mill data

- Plant capability
  - ✓ 1 million ton/year
- Profile type
  - ✓ Profile U: UPN/UPE
  - ✓ Profile I: IPN/IPE
  - ✓ Profile H: HEA/HEB HER
- Size
  - ✓ 100 to 700

1. INTRODUCTION

In 1997, Aceralia Perfiles Olaberría started the progressive implementation of an integral modernization plan of its Melting, Continuous Casting and Section Mill plant in Olaberria (Spain). This plan will end in 2004, with the commissioning of the new compact type Mill stands with hydraulic capsules for the Tandem and Finishing Stands.

The aim of the modernization has been threefold; technological upgrade, increase of production up to 1.000.000 tpy and extension of the product range. In addition to the technological challenges, our engineers had to sort out the added difficulty of working on the existing mill layout and limited to the scheduled plant stillstand periods. In fact, each plant section being upgraded, rapidly goes into full operation in order to avoid the consequent production losses that would endanger the targeted yearly production.

For this purpose Aceralia Perfiles Olaberria has been supported by the following main contractors:

- ✓ Sarralle: as mechanical supplier of the melting shop.

  Lagun Artea: as main mechanical contractor of the section mill plant.

  SMS-Demag Sidernaval: as process engineering and mechanical supplier of the caster machine.
- ✓ Tecoaer: as supplier for the dedusting plant upgrading.
- ✓ Fives Stein: as Reheating Furnace supplier.
- ✓ Ingeteam Power Technology. S.A, Industrial Systems Division: as a global electrical and automatiom system supplier.

The following installation have been up graded by Ingeteam Power Technology, S.A. Industrial Systems Division.

Bundling Evacuation

1.1 MELTING SHOP

Mechanical Modernization

- Modification of dedusting plant, including the furnace 4th hole dust collecting system, filter bags and fan drive aspiration systems.
- EAF shaft system removing.

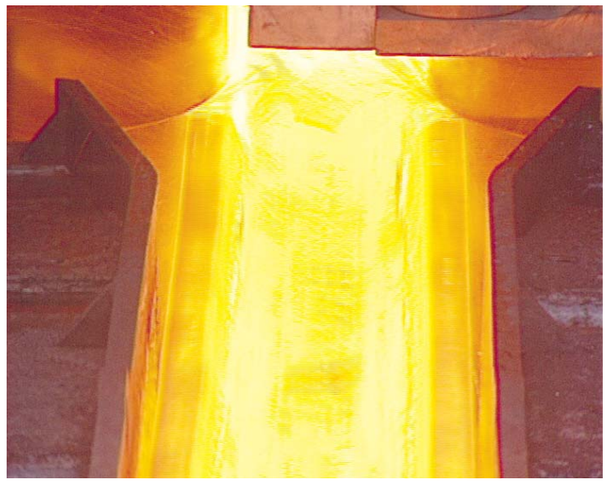
Electrical Modernization

Complete electrical supply for:

- Dedusting plant modernization; 4th hole dust collecting, fan drive and new booster automation system.
- EAF and LF additives automation system modification (to be added).
- New electrode control and auxiliary automation system for ladle furnace.
- Auxiliary Equipment modification in EAF plant.

Billets / Beam Block Storage

Caster Platform Area



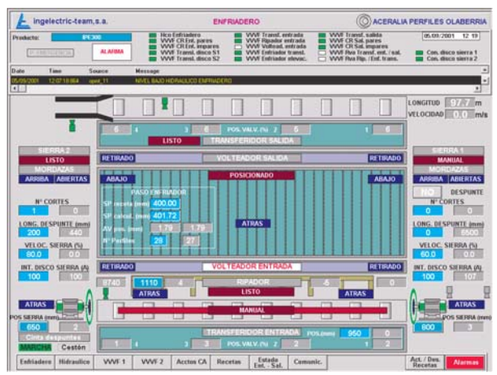
- Modification of auxiliary equipment of electric furnace, changes carried out from shaft to conventional type furnace.

New supply and revamps works of electrical equipment

For the Tandem and Finishing stands, consisting by:

- Modification of the drive control system for the 5 Mill Stands (tandem and finishing group).
  Supply of a new fully digital control system, with better performance features.
  The thyristor power units for the Stands CR1, CR2 and CUA are reused.
- Improving of the tension control system for the tandem mill drives.
- New control pulpit, an ergonomic control desk and HMI monitoring systems are located inside.
- New Motor Control center for variable and fixed speed auxiliary drives (roller table, HP/LP hydraulic pumps, feeders, etc...)
- Powering of thyristor converters CUP1 and CUP2 from 10.000 A to 12.000 A, as nominal continuous current. The new dc motors will be provided by the Client.
- New hydraulic gap adjustment control system, based on fast multiprocessors cards, data acquisition cards for positioning and pressure control, etc. Complete software and monitoring system.
- Roll change PLC control system for tandem and finishing mill. (Roll change time, approach 20 minutes).
- Human Machine Interface systems, including the rolling pass schedule recipes and data monitoring.

Cooling Bed and Cold Saw Overview



Cooling Bed Data Screen

1.7 cooling bed

Installation

The cooling bed has been modified by a new walking beam type unit, air and water cooled, including turning devices at the entrance and exit side, as well as a couple of hot saws at the entry.

New Electrical Equipment

Complete supply of electrical and automation systems, including:

- Cooling bed drive systems, based on AC technique motors.
  Lifting and shifting drives unit, electrically controlled.
- Turning devices control.
- Head and tail hot saw management control.
- Sequential control and HMI monitoring.

1.4 reheating furnace

Furnace features:

New 210 Tons Walking Beam type Reheating Furnace.

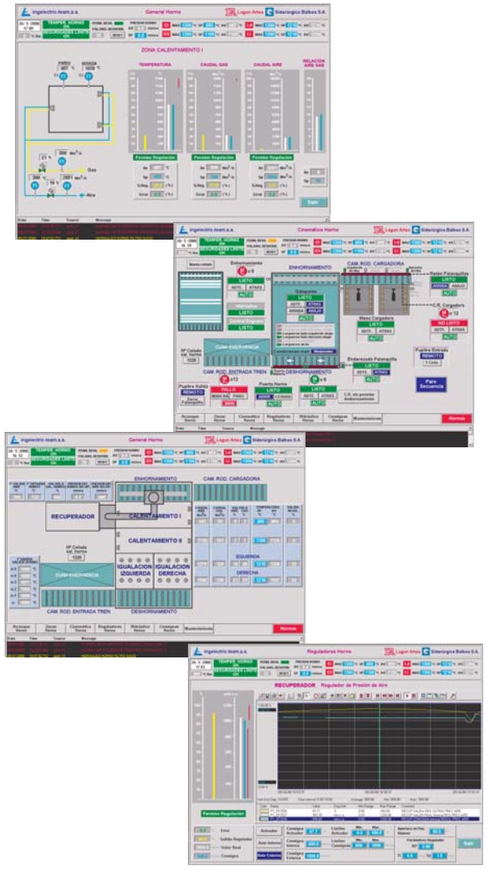
Maker:	Stein Hornos
Type:	Tubular walking beam
Capacity:	210 Tons/hour
Heating technique:	Gas burners
Zone numbers:	7(preheating, heating and soaking zones)
Control:	by PLC A common control system for both sequential logic, drive control and regulation
Actuator/valves:	Analog technique
Dimensions:	20 x 14 mts (Length x Width)

Furnace Entrance Kick-off Device

Electrical Equipment

Complete electrical and automation equipment, including:

- Fan, pumps and auxiliaries drive equipment.
- Integrated PLC control system for drives and regulation. The furnace regulation comprises:
  - ✓ Zone temperature control
  - ✓ Gas-air flow control
  - ✓ Furnace pressure control
  - ✓ Combustion air pressure control
  - ✓ Recuperator protection, combustion air control
  - ✓ Water cooling control
  - ✓ On-off valves control
  - ✓ Motors, fans, start-stop control
  - ✓ Gas consumption measurement
  - ✓ Monitoring of status data and actual valves, trending, etc
- Material tracking into furnace.
- Data interchange between Level 1 and Level 2 H.O.T computer (thermal model).



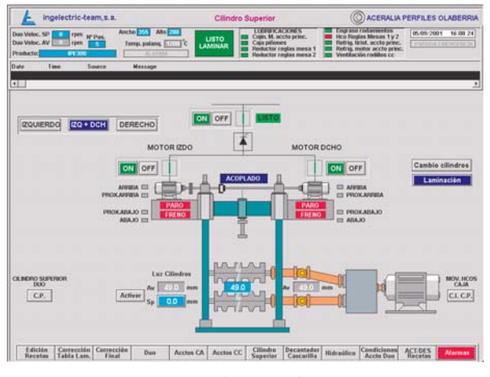
Furnace Control and Regulation Screens

1.5 EDGER STAND / BREAK DOWN MILL

Edger Exit

BD Mill Drive Digital Control

BD Mill Overview



BD Mill General Screen

Installation

Going downstream and before the BD Mill, a new Edger Mill Stand and an on-line high pressure descaler system is provided. Besides, the BD Mill is revamped, modifying the drive control system and the position control of the auxiliary drives.

Features

- Edger Mill Stand (new supply):
  - ✓ Mechanical supplier: Lagun Artea
  - ✓ Cylinders max diameter: 650/670/700
  - ✓ Side guides: Hydraulic ahead/behind stand
  - ✓ Motor power rate: 0-1073-1073 kW (dc motor)
  - ✓ Speed: 0-1000-1100 rpm
  - ✓ Voltage: 0-700 V
- Reversing Duo Mill Stand (reused)
  - ✓ Supplier: ArcelorMittal
  - ✓ Cylinder max diameter/barrel: 965 x 2400 mm
  - ✓ Side guides: Motor driven ahead/behind stand
  - ✓ Upper roll: Motor driven
  - ✓ Motor power rate: 0-5000-5000 kW
  - ✓ Speed: 0-80/180 r.p.m.
  - ✓ Voltage: 0-1160 V
  - ✓ Thyristor converter: 2 x 5000 A (nominal current / connection star-delta)
  - ✓ Trafo power rate: 9000 KVA

Electrical Equipment Modernization

New and revamp electrical and automation equipment, including:

- Main and auxiliary drives for Edger.
- Main drive control system, fully digital, with better performances and parametering features.
  The thyristor power bridges, in regenerative connection, are reused.
- Modernization of synchronizing position control for upper roll, side guides and turning device, by means of a powerful PLC unit.
- Human Machine Interface systems, including rolling pass schedule recipes and actual values monitoring.

1.6 tandem and finishing mill

Within the revamping master planning of the Section Mill, Aceralia has foreseen to carry out the following up-grading on this plant.

Mechanical new supply:

- Liftable roller tables, in front and ahead the Tandem Mill Stands.
- Compact and drawable type Mill Stands with hydraulic gap adjustments.
- Same as above for the Finishing Stands.
- Powerful second hand dc motors for stands CUP1 and CUP2.
- Compact reducer and pinion boxes for each stand.
- Roll changing devices and roll shop facilities at the workshop.
- High and low pressure hydraulic systems for AGC gap adjustment and roll change units.

Installation:

Revamps of the drive control systems for each of the mill stands. Readapt the existing thyristor converters of Stands CUP1 and CUP2.

- Universal stands: CUP1 / CUP2 / CUA
- Edger stands: CR1 / CR2

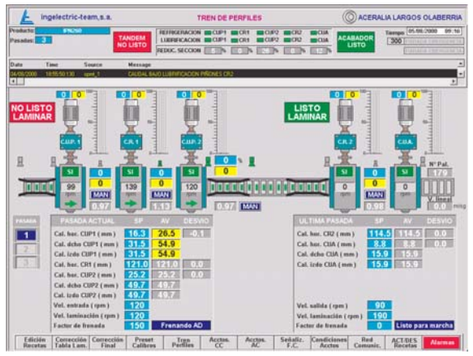
DC Motors main data:

Tandem group

- CUP1 **Universal Stand** — Power: 0-4416-4416 kW; Speed: 0-75-150 rpm; Voltage: 0-700 V
- CR1 **Edger Stand** — Power: 0-2600-2600 kW; Speed: 0-200-400 rpm; Voltage: 0-1000 V
- CUP2 **Universal Stand** — Power: 0-4416-4416 kW; Speed: 0-75-150 rpm; Voltage: 0-700 V

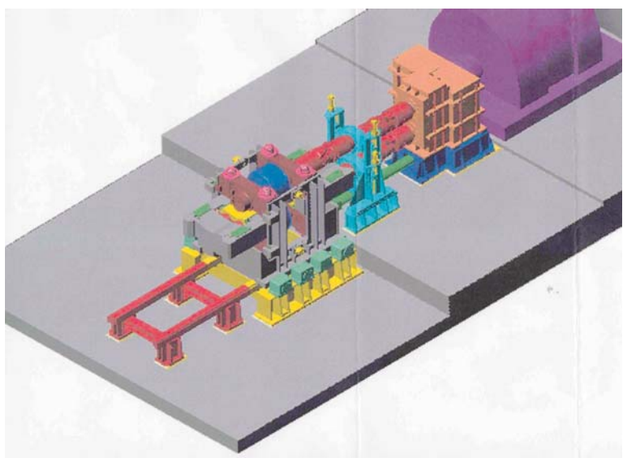
Finishing group

- CR2 **Edger Stand** — Power: 0-1200-1200 kW; Speed: 0-340-1020 rpm; Voltage: 0-970 V
- CUA **Finishing Universal Stand** — Power: 0-3600-3600 kW; Speed: 0-150-330 rpm; Voltage: 0-1000 V



Tandem / Finishing Mill General Overview


Gap Hydraulic Control System


Compact Type Universal Stand

1.2 caster machine


Caster Evacuation Area


Curve Type Roller Table (Hot Charging)

Machine features:

Seven strands beam blank caster machine (strands of different bloom sizes).

- Strand Nr: 7
- Machine radius: 7 mts
- Size: BB0: 170 x 243 mm (height x width)
BB2: 280 x 355 mm
BB3: 320 x 380 mm
- Max. speed: BBO/BB2/BB3: 1,6/1,2/1 m/min

Mechanical Modernization

- Moulds for beam blanks of different sizes.
- Primary, secondary and machine water cooling systems.
- Modification of withdrawal units, new design based on three driven rolls, instead of two.
- Withdrawal rolls.
- Torch cutting machine (1 per strand).
- Evacuation and blooms manipulation.

New Electrical Equipment

Complete electrical supply, including:

- Automatic mould level system, based on RONAN type radioactive measuring device.
- Complete automation for water cooling system, including instrumentation devices such as measuring meters control and on-off valves.
- Drives and motors for withdrawal units.
- Automation for roller table, bloom evacuation and transfer manipulator to carry the bloom to the hot charging circuit.
- Operation and visualization systems (HMIs).

1.3 HOT CHARGING

Installation

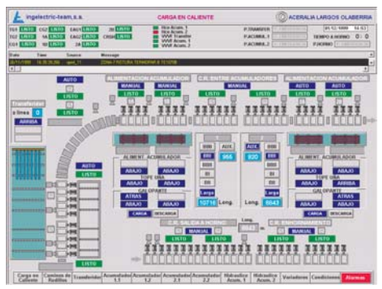
A new hot charging plant to transport the beam blank directly from caster machine to reheating furnace.

A transfer manipulator handles the material from caster machine to transport roller table, which takes through till furnace entrance. Two intermediate accumulator are provided to load-unload beam blanks from this point.

Electrical Equipment

Complete supply, including:

- AC Drive Control Equipment for transport roller table and handling transfer device.
- Material tracking system.
- Complete automation from caster to reheating furnace.
- Operation and visualization systems (HMI)



Hot Charging Main Arrangement Screen