**AUXILIARIES CONTROL**

- 32-bit multiprocessor to control the following subsystems:
  - hydraulic and pneumatic subsystems.
  - greasing subsystems.
- Communication with other control systems is carried out by:
  - TCP/IP local bus for communication with other control systems belonging to level 0 and communication with level 2.
  - Interbus S field bus for the communication with the drive control systems.
  - Interbus S field bus for the communication with the inputs/outputs remotes.

**SUPERVISION SYSTEM**

Man machine interface for process control and supervision based on compatible PCs. It realizes the following functions:

- process data handling and visualization.
- process diagnosis.
- start-up condition displays.
- alarm display and management.
- trending of process variables.

**DRIVES CONTROL SYSTEM**

*Ingeteam Industry* has developed a family of products for controlling drives:

- MOTOCON DC for d.c. motors
- MOTOCON AC - frequency inverters with scalar and vectorial control - for asynchronous a.c. motors.
- MOTOCON Direct for cycloconverter control of very large a.c. motors.

MOTOCON products carry out the following standard functions: speed, current and torque control. These functions are subordinated to others in the master control and auxiliaries control.

**SCOPE OF SUPPLY**

*Ingeteam Industry* supply includes:

- electrical equipment:
  - Motors.
  - Drive control.
  - Auxiliary electrical equipment.
  - Master control system.
  - Technological control system.
  - Auxiliaries control (PLCs).
  - Supervision system.
- and also:
  - Engineering.
  - Erection.
  - Commissioning.
  - Project coordination.
  - Documentation (EPLAN and AUTOCAD).
  - Training.

-Ingeteam Industry-
Reducing maintenance and operating cost, increasing productivity and improving product quality are the imperatives of today’s iron and steel industry, which INGETEAM INDUSTRY fully shares with its customers.

**MAIN FEATURES OF THE CONTROL SYSTEM**

Ingeteam Industry automation system for cold rolling mills presents the following characteristics:

- **Functionally hierarchized**
  - Level 0: functions for drive control
  - Level 1: functions for control of all actuators according to level 2 setpoints in order to obtain a high quality product.
  - Level 2: functions for optimization and presetting of mill conditions, pass schedules, data logging, reports ...
  - Level 3: functions for production management.

- **Flexible**
  - Decentralized and distributed control as well as modular architecture.

- **Standard**
  - Based on open systems with interfaces to other control systems.

**TECHNOLOGICAL CONTROL SYSTEM**

The technological control system has a direct impact in the product quality and process efficiency. In addition to its fast loop control, it integrates in a very precise and efficient manner the sensors and actuators utilized in the process considering compensation functions.

The main features are the following:

- A 32-bit multiprocessor control system to perform the **flatness** fast closed loop control:
  - Tilting control.
  - Bending control.
  - Shifting control.
  - Cooling control.

- Interfaces to transducers:
  - Position.
  - Pressure.
  - Thickness.
  - Speed.
  - Flatness.

- Communication with other control systems is carried out by:
  - TCP/IP local bus for communication with other control systems belonging to level 0 and communication with level 2.
  - RS232/RS485 for communication with the diagnostic and parametrization system - DIPAS -.

**MASTER CONTROL**

The multiprocessor control system ensures a good digital control of both the tension and the speed of the strip.

- It realizes the following functions:
  - Generation of setpoints and ramps for speed and torque.
  - Additional regulation fast loops.
  - Automatic sequences.

- Communication with other control systems is carried out by:
  - TCP/IP local bus for communication with other control systems belonging to level 0 and communication with level 2.
  - Interbus S field bus for communication with the drive control systems.
  - Interbus S field bus for the communication with the inputs/outputs remotes.