

Uncoiler electric drive of electrotinning line 1200/III

Customer: Karaganda Metallurgical Plant JSC "ARCELOR MITTAL TEMIRTAU"

Technological process specification

Electrotinning line 1200/III is destined for deposition of tin by electrotinning way at the surface of steel cold-rolled strip; the final goal is the production of tin (white) sheet for food industry.

Equipment of electrolyte tinning line includes as follows

- Inlet area
- Chemical area (middle area)
- Outlet area

Inlet area is meant for uncoiling of black tin coil, welding among themselves, also for laying in the supply of strip reservoir which is necessary for continuous working of chemical area during the welding of overlapped strips.

Chemical area is destined for removing of fat and mechanical pollution from the strip surface, covering of tin coating, flowing, passivation, strip washing and drying between separate technological operations, electrostatic oiling.



Outlet area needs for coiling of finished production in coils also for strip reservoir forming, providing chemical area continuous work during rolling change from one coil to another.

Continuous feed of black tin strip at outlet area provides two uncoilers. Uncoilers also make tension at the area till the falling roll. Tension reference quantity is set by the operator from the pulpit.

Electric drive and both uncoilers control structure are duplicated. Due to the fact that it was general automatic control system modernization of the electrolyte tinning line-1200/III with all drives change, it was decided to change uncoilers drives, thereby modernized control structure.

Requirements to control system

- Task calculation at the drive current based on required tension, mill roll reference radius, drive angular rate metal thickness and wideness;
- The choice of strip tension value within 0...0,5 tonne and tension reference value maintenance in all uncoiler working modes with accuracy not worse than 10 per cent
- Two-zone regulation (with field decay at more than nominal speed;
- Armature current task calculation for inertia moment compensation in dynamic modes and for mechanism and motor mechanical losses compensation;
- Coil radius calculation on signals of uncoiler rotation velocity and strip line speed;
- Direct value determination of coil radius;
- Speed regulation at the moment of strip break and strip break control;
- Reducing of motor excitation current on required rate at the moment of motor stop;
- Working possibility of the control circuit with direct and indirect tension regulator;
- Rotation speed regulation in "front charging" modes, "back charging" mode with account of coil radius;
- Strip tension calculation.

SOLUTION AND AUTOMATION SYSTEM CHARACTERISTICS

Uncoiler electric drive automation is formed on the basis of SIEMENS converter SIMOREG DC MASTER 6RA70 in cabinet-type modification with digital microprocessor control, having small size, high reliability, simple and reliable diagnostics system of breakdown and failure, completed with additional baseplates for connection «PROFIBUSDP» in digital information-management environment. Speed modes control system is implemented on the basis of SIEMENS programmable logical controller SIMATIC S7-300 CPU 315-2DP.



Project implementation period

Project implementation period is 5 months, commissioning is November 2007.

