

Strip profile control system at six-stand mill 1400 CRM-3 JSC “Arcelor Mittal Temirtau”

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Continuous six-stand cold rolling mill is destined for getting plate strips by way of endless cold rolling of hot-rolled etched strips with width not more 1250 mm and thickness 0,18 – 0,6mm.



Figure 1

The main instrument of rolling process is rolling stand.

Stand quarto is used at six-stand CRM, it consists of four rolls, two of them are back up and another two rolls are working.

For operating of cross cutting profile and rolled strip form the stand includes the following devices:

- zone cooling system of pins for working rolls (thermal profiling).
- forced hydraulic bending system of working rolls;
- screw Down tilt system.

Maintenance of given strip profile is carried out by means of APCS (automatic profile control system).

Reconstruction argumentation of profile control system:

- physical and moral equipment wearing;
- lack of zone cooling system;
- lack of coolant supply control system;
- availability of human factor in operating;
- limited quantity of information on system operation (indication and signalization lack).

Structural scheme of strip profile control system at six-stand mill 1400 CRM-3

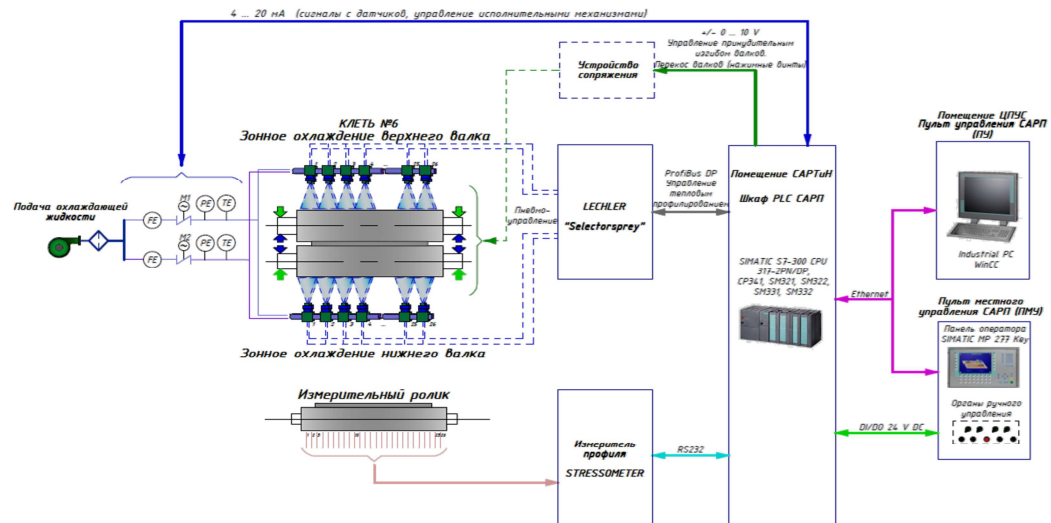


Figure 2

Visualization consists of operator panel MP277 Key and SCADA system (with software WinCC). System allows operator to get required and sufficient information about actuator work, current and assigned strip profile and coolant manifold condition. There is light signaling, warning to operating personnel about falling outside parameter fixed limit and emergency situations.



Figure 3

It is possible to review the work of strip profile control system from archive for any time period. The information is given as diagrams, mnemocircuits and message tables at the monitor screen.

It is possible to change regulator settings and to watch on their work at time-schedule through SCADA system.

Access to regulator settings is possible only through special password.

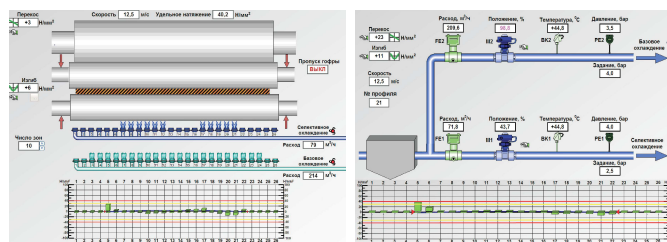


Figure 4

Control system provides:

- connection with available profile measurement system «Stressometr» through the interface RS232;
- connection through digital bus Profibus-DP with coolant supply system from the firm LECHLER GmbH with outputting of control signals to the actuating elements (jets);
- signal reception from hand-operated control;
- signal reception from instrumentation equipment of coolant supply system: pressure, temperature and flow volume;
- outputting of analog control signals $\pm 10V$ to roll deflection.
- outputting of analog control signals $\pm 10V$ to roll skewing;
- regulating valve control of coolant supply.



Figure 5

Coolant supply system was equipped by new regulating valves of the firm «REGADA». It was carried out installation of measuring sensors with microprocessor converters (pressure, flow and temperature sensors).



Figure 6

Effect of implementation system

- improvement of production quality;
- reducing of strip breaking number for six stand;
- reducing of coolant using at the expense of new coolant supply system from the firm LECHLER GmbH and new regulating system;
- reducing of Screw Down operation rate in consequence of regulating algorithm change;
- maintenance of thermal balance in the stand.