

TECHNICAL REFERENCE SHEET

SYSTEM OF AUTOMATION FOR ZINC PRODUCTION PLANT
JSP "CZP" CHELYABINSK RUSSIA



CLIENT: **TECNICOM-CZP (Chelyabinsk)**

SYSTEM

Through TECNICOM Genoa, SAET recently supplied the company CZP (Chelyabinsk Zinc Plant) in Chelyabinsk in the southern Urals, with a system of automation for the production of zinc by electrolysis. The automation consists of the management of the cells for electrolysis in which anodes and cathodes are immersed. A layered deposit of zinc forms on the latter, after a process that takes about 48 ore, and has to be removed, in slab form, by a device called a Stripping machine. The anodes are taken out about once a month and treated in a Cleaning machine. The cell room is composed of 4 rows of 52 cells each and is served by 3 bridge cranes for the cathodes and one for the anodes, equipped with special clamps for picking up the pack of 42 cathodes.

The pack is placed on a rack that is fastened to the grounds where it is picked up by a shuttle and taken to the stripping machine.



The following operations are performed on the stripping machine:

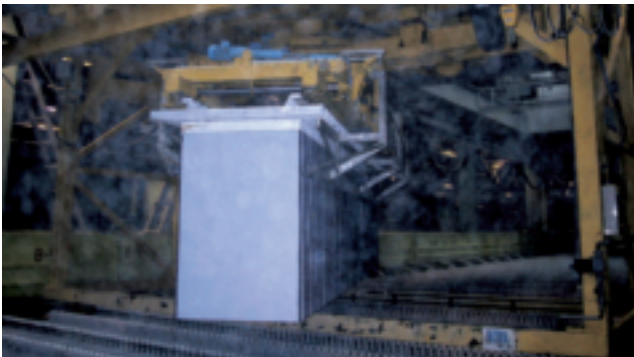
- positioning and centering (stations I[^] and II[^]);
- horizontal penetration in preparation for stripping (station III[^]);
- vertical penetration (stripping bar) (station IV[^]);
- control weighing (station V[^]);

- brush conveyor (station VI^Λ).

If the control (weighing) shows that the cathode has not been satisfactorily stripped, it is replaced with a backup.

The rack with the stripped cathodes is then positioned on the pickup point where it is clamped by the bridge crane and replaced in the cell from which it was taken. This cycle is continuous and is controlled by two supervisory stations located in the control room where, depending on the process of electrolysis, the map of the ripening cells and ripe cells for stripping is managed.

The slabs of stripped zinc are stacked and picked up by small bridge cranes traveling on a monorail, that deposit the slabs in a stockpile from which they are drawn, also by small bridge cranes on monorail, to supply two forging furnaces where the ingots of zinc are forged.



ELEMENTS OF SUPPLY

Electronics:

- Programmable logic controllers
- Remote peripherals on intelligent electric terminal boards via Profibus-DP
- Redundant Ethernet network in fiber optics, for communications between controllers
- Optical switches
- Inverter for movement of bridge cranes
- Stations for supervision based on personal computers and SCADA package
- Activity of service during electrical assembly and startup of installation through the zinc production stage

PLANT

Basic automation:

- manual handling with logical interlock of every machine
- automatic sequences of pickup-stripping-zinc storage
- interfacing with furnace system

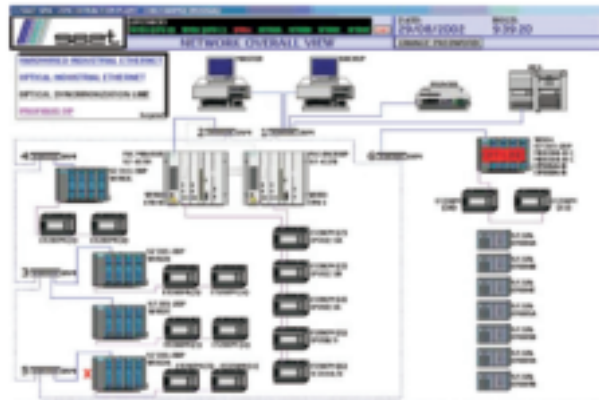
Supervision:

Through two stations of supervision in hot redundant configuration of master/slave to perform:

- Display and control of plant status
- Management/selection of automatic sequences
- Management of alarms and events
- Management of log files

HARDWARE ARCHITECTURE

Can be summarized on three levels:



□ **Level 1:** PLCs equipped with communications processor Ethernet in TCP/IP for the exchange of data with the SCADA stations and Profibus-DP interface for connection to the remote peripherals.

□ **Level 2:** 2 stations of supervision on commercial PCs equipped with Windows 2000 PRO operating system and SCADA WONDERWARE INTOUCH 7.11 package in hot redundant master/slave configuration. Connection to PLC and DCS existing between Ethernet network in fiber optics /copper with protocol TCP/IP.

□ **Level 3:** Communications network in fiber optics between PLCs via Ethernet in TCP/IP in loop configuration, with hot backup.

TECHNOLOGIES

- SIEMENS PLCs series S7-400H mod. 417H-2DP with hot backup
- SIEMENS PLCs series S7-300 mod. 315-2DP
- SIEMENS PLCs series S7-200 mod. 226
- TCP/IP SIEMENS communications processors mod. CP443-1
- TCP/IP SIEMENS communications processors mod. CP343-1
- Remote peripheral Profibus-DP on SIEMENS intelligent terminal boards mod. ET200M
- Ethernet switch with SIEMENS copper/optic interface mod. OSM 6GK1
- SIEMENS inverter series MASTERDRIVE VC Vector Control
- SIEMENS Profibus-DP field bus
- SIEMENS INDUSTRIAL ETHERNET network
- Stations for supervision on IBM personal computers in master/slave configuration equipped with operating system Windows 2000 PRO
- Management software SIEMENS PLC STEP7 v.5.1 developed in AWL
- Supervision software WONDERWARE INTOUCH 7.11



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