**Process Control System for Conveyor-type Sintering Machine OK-306**

**Customer:** OJSC «Northern Mining», Kryvy Rig  
**Tech. Improvements:** “TOREX” Ltd, Ekaterinburg  
**Electric Project:** JSC «Mekhanobrchermet», Kryvy Rig  
**Control System Project:** «CSC-Automation», Ltd, Kyiv

**Purpose** – The Control System intended for optimal control of the furnace burning process, air-gas ratio, heat recuperation, waste gases utilization in the process of iron-ore sintering by the conveyor-type machine OK-306.

**SW / HW platform**
- High-reliability redundant process controller Q-System (CPU type - Q25PH) from Mitsubishi Electric to manage a number of plain and cascade PID-loops.
- Distributed controller’s architecture based on a remote I/O’s and a redundant (dual) optical ring network MelsecNet/H.
- Developing Software “PX-Developer” with built-in functions for PID-loop’s auto-tuning procedures (to find an optimal set-up parameters)
- High level Human-Machine Interface (HMI) based on the world first class “Citect-SCADA” visualization and control Software.

**Further details**
- Accurate measuring of gas volumetric flows by ITABAR in-depth probes and high-accuracy differential pressure transmitters Yokogawa.
- High-speed and heavy-duty actuators Limitorque (USA) for air / gas / waste gas control valves.
- Redundant control of PID-loops / actuators with PLC and individual Set-Up stations.
- Full redundant operator workstations based on PC.
- Industrial Optical Network with ring topology.
- “Read – only” access form MES/ERP-level clients

<table>
<thead>
<tr>
<th>Control System Info</th>
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<tbody>
<tr>
<td>Analog Inputs</td>
<td>180</td>
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<tr>
<td>PID-loops</td>
<td>50</td>
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<tr>
<td>Digital Inputs / Outputs</td>
<td>200</td>
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<tr>
<td>Project developing duration</td>
<td>4 months</td>
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<td>Putting into the operation</td>
<td>2008</td>
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**Main results**
- Gas fuel specific rate reduction from 19.0 to 15.5..16 q.m./ton due to a heat recuperation and re-arranging of an air /gas / waste-gas flows;
- Increasing production output from 235 to 280 ton/hour due to the thicker iron-ore layer on the conveyor and sophisticated drying and pre-heating procedures;
- Automatic optimal “air / fuel“ ratio for multiple furnaces;
- Automatic supervisory programs «Slow Down», «Conveyor Runaway», «Emergency Stop and Backup» etc.;
- Generating of the Alarm and Event Lists, Shift / Day / Month Reports, Graphical trends, Archives etc.
- Improved ergonomics, modern HMI approach, full access to all current and archive process data, better production management.
ОАО «Северный ГОК»
Структурная схема АСУТП обжиговой машины ОК-306-1
(реконструкция, II этап)