

**Project:**

Mill 5000

**Customer:**

Magnitogorsk Iron and Steel Works JSC

**Project Area:**

130,000 m<sup>2</sup>

**Design Contractor:**

MAGNITOGORSK GIPROMEZ JSC

**Contractor:**

Prokatmontazh JSC

Montazhnik JSC

Stroitelnyi Complex JSC

**Year completed:**

2009

**System Applied:**

MasterEmaco

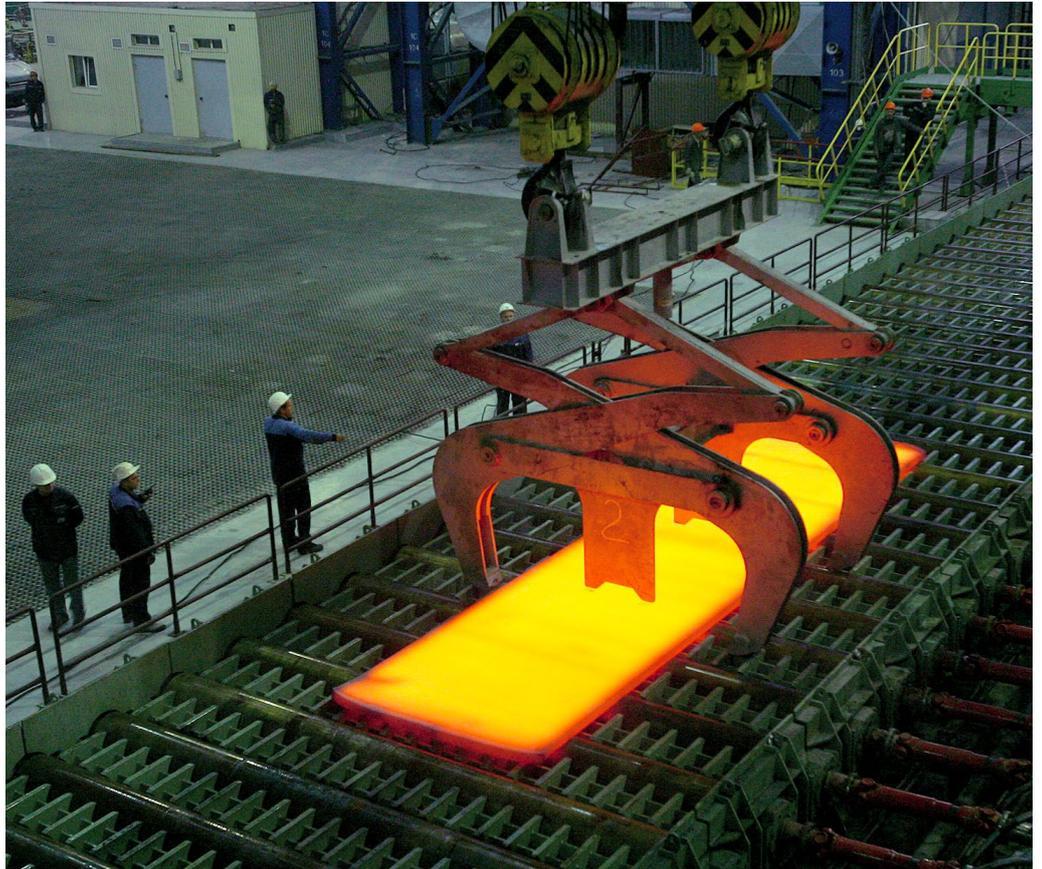
MasterFlow

MasterGlenium

MasterTop

## MILL 5000

MasterEmaco, MasterFlow, MasterGlenium, MasterTop



Our reference in Magnitogorsk (Russia): MILL 5000

### Project Description:

Mill 5000 is the largest investment project in Russia in 2009, having virtually no peers in the world. It includes a complete set of the mill train machines — from the heating furnace loaders to the disposal facilities at the finished product storehouse. The key element of the thin-sheet mill is the unique roll mill with the maximum rolling force of about 12,000 tons. The core equipment for the 1.5 Mtpa shop was supplied by SMS DEMAG Company (Germany). Mill 5000 will enable the production of added-value thin rolled sheets for pipe production, oil and gas industry, machine- and ship-building as well as bridge construction. The project is not only of regional but also of country-wide significance and is aligned with the country's strategic interests.

### Objectives and Requirements:

The main objective during Mill 5000 construction is to assure streamlined operation of SMS DEMAG unique equipment and the entire system without the risk of unscheduled shut-downs of the complex for the repair of foundation and industrial floors. This engineering task resulted in the equipment vendors' (SMS DEMAG) and design contractors' setting very stringent requirements to the materials and technologies used.

The most complicated condition was tough work completion and project commissioning timelines. Mill 5000 was built within record-breaking time — less than 3 years whereas in the world practice these works require at least 5 years.

The works on the Mill construction using materials from BASF were conducted in 3 stages: making foundations, high-precision equipment cement grouting and making industrial-grade floors.

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# MILL 5000

## MasterEmaco, MasterFlow, MasterGlenium, MasterTop

### Solution:

**Stage One:** As per the specifications of the design and construction contractors and capabilities of the concrete mixes' manufacturers on the use of accessible construction materials (cement, sand, crushed stone) to make the foundations and industrial-grade floors research and mix design of the concrete mix with preset physical and chemical properties and rheology were held. As a result, a high-mobility formula with a low water/cement ratio, high maturing rate using MasterGlenium® SKY 505 super-plastifier was selected. This formula enabled significant reduction of the construction time — on Day 7 after the concrete laying the foundations were 100 % mature as per the grade specified and the contractor was able to pass to the new construction stage. The use of the innovative MasterGlenium® SKY 505 super-plastifier enabled eliminating the risks of defects which often arise from inadequate vibration compaction, large quantity of tempering water and excessive use of cement.

**Stage Two:** High-precision equipment cementation was performed using non-shrink fast-hardening high-mobility cement-based formulations MasterFlow® 928 and MasterFlow® 980. MasterFlow® series products' application resulted in the elimination of vibration compaction during the material laying, enabled reliable fastening of the anchors in the anchor wells and distribute the equipment load onto the foundation slab.

**Stage Three:** The industrial-grade floors in the Shop to be operated under high attrition and impact loads were provided using a system of MasterTop® series materials based on high-quality Portland cement, functional additives and metal filler made as per a dedicated technology.

As a result of Mastertop® series materials application the Shop floors have excellent physical and mechanical characteristics and operation properties, are capable of taking up high abrasive and impact loads, have enhanced water-permeability and resistance to aggressive media, produce virtually no dust. The joints were sealed using PCI Elastoprimer® 135 and Masterflex® 474.



Material	Consumption
Making of the basement foundation MasterGlenium® SKY 505	0,5–0,8% by mass of cement
High-precision grouting during the equipment installation	
MasterFlow® 980 — 40–100 mm	2090 kg/m <sup>3</sup>
MasterFlow® 928 — 20–40 mm	1950 kg/m <sup>3</sup>
Making industrial-grade floor	
MasterTop® 210 (heavy loads)	25 kg/m <sup>2</sup>
MasterTop® 230 (super-heavy loads)	45 kg/m <sup>2</sup>
MasterTop® 100 (medium loads)	4 kg/m <sup>2</sup>
Maintenance of the Concrete floor hardened with MasterTop® materials	
MasterKure® 113	0.1 l/m <sup>2</sup>
Floor Joint Sealing	
MasterFlex® 474	≈ 1000 ml/m

### Advantages:

- Assurance of the heavy equipment reliable operation.
- High performance specifications of the industrial-grade floors: strength, resistance to attrition, dynamic loads and oil impact.
- Material high workability during the work completion.
- Work completion time reduction, high cost efficiency.

### Customer's Reference:

All the material systems used at different stages completely meet the specifications of the equipment vendors — SMS DEMAG, FATA Hanter and the Customer. During the work completion by the construction contractor — PROKATMONAZH JSC — such product features as stable quality, simplicity and application convenience — were marked. Prompt delivery, fast response to the issues arising and high process support level also contributed to the successful work completion in the shortest time possible. The on-site process support was provided by the official representative of BASF Construction Systems LLC in Chelyabinsk region — BAU Chemical Engineering Center LLC.

Photos: courtesy of Press Service of the Governor of Chelyabinsk Oblast.

### Master Builders Solutions from BASF

The Master Builders Solutions brand expresses BASF's expertise in providing customized chemical solutions for new construction, maintenance, repair and restoration of structures.

Master Builders Solutions is built on the experience gained from more than a century in the construction industry. At the core of the Master Builders Solutions brand is the combined know-how and experience of a global community of BASF construction experts, who connect with you to solve all of your construction challenges.

Further information is available at:

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