

## Schaeffler Global Technology Solutions

Steel and non-ferrous metals

SMS group GmbH, Germany

### Modernization of Four-high Heavy-plate Mill Back-up Rolls

SMS group GmbH offers metallurgical plant and rolling mill technology from one source. The group's plants, machines, services and process know-how are used in the steel, aluminum and other non-ferrous metal industry worldwide. Heavy-plate mills from SMS group GmbH allow steelmakers to cover the entire range of products and to supply plates with tailor-made material properties for every application.

#### Challenge for Schaeffler

At the beginning of 2012, SMS group GmbH received an order from the high performance alloy company VDM Metals GmbH, which produces plates and sheets in Siegen, Germany. The intention was to replace the old plate mill from 1954 with a modern version capable of working with a maximum rolling force of 60 MN and incorporating hydraulic adjustment and work-roll bending. The new rolling mill allows VDM Metals GmbH to supply plates with narrow product tolerances and increased piece weights. Schaeffler was asked to design a bearing for the new plate mill. The introduction of the new stand would result in as few changes as possible to the surrounding structure with reuse of existing plant components.

#### Schaeffler Solution

In order to meet the challenges of higher rolling forces Schaeffler application engineers developed a special four row cylindrical roller bearing (CRB) with larger bore diameter and one-piece steel cage. The bearing was designed with the aid of the Schaeffler calculation program BEARINX. It was particularly important to reuse the existing plant components. To this end, four existing bearings were chromium plated to the new outside diameter of 1 220 mm.

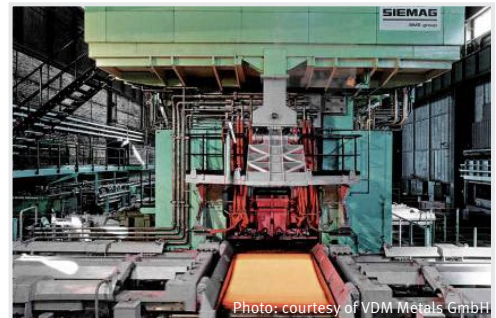


Photo: courtesy of VDM Metals GmbH

**SMS**  **group**

#### Technical Information about the new Four-High Heavy Plate Mill

Max. rolling force:

60 MN

Plate width:

Max. 2 600 mm

Max. plate length / thickness:

13 500 m / von 260 mm to 2 mm

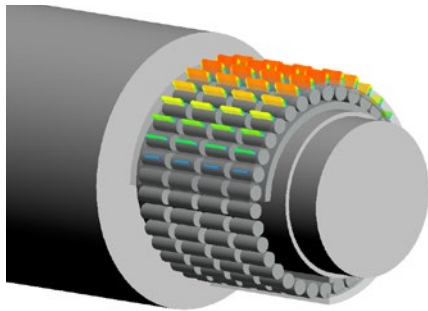
Rolling speed:

1,25 m/s – 2,5 m/s

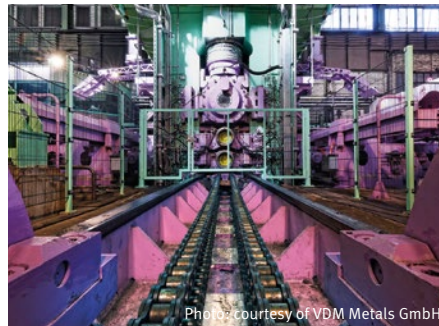
Max. slab weight:

4,5 t

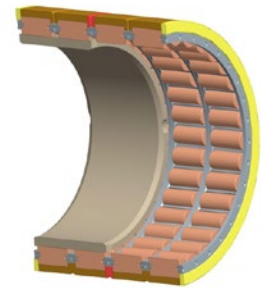




Herzian pressure calculation with BEARINX



Side view of four-high stand



CAD-model F-600047.ZL

## Customer Benefit

SMS group GmbH benefited from Schaeffler's excellent technical support. Using the solution of a special four-row cylindrical roller bearing allowed SMS group GmbH to upgrade the rolling stand operated by VDM Metals GmbH, in order to achieve rolling forces of up to 60 MN. Thereby VDM's future position as a supplier of plates from high-performance materials is secured. The new stand is designed with just minor changes to the surrounding structure and reusing original plant components. For certain rolling programs the reworked existing bearings and rolls can be reused until the rolls will be worn out.

## What's special

The close cooperation maintained between SMS group GmbH (OEM), the various participating Schaeffler departments from the OEM and MRO sectors and VDM Metals GmbH (MRO) for the duration of the project – from the engineering stage through to final assembly – was of vital importance. The application, which posed a significant technical challenge, placed extremely high demands on the know-how and expertise of all employees involved in the project.

### Technical Information about the Solution

#### Existing bearing:

- Type: CRB (Z-524239.01.ZL)
- Dimensions: 863 x 1 219,32 x 889 mm
- Cage: Pin-type cage

#### New bearing solution:

Special four-row CRB (F-600047.ZL)

#### Features of the new CRB F-600047.ZL:

- Dimensions: 900 x 1 220 x 880 mm
- One-piece steel cage
- Can be used for extremely heavy loads, up to a max. rolling force of 60 MN

#### Schaeffler calculation program:

BEARINX