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Customer reference case

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Metals industry

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Continuous slab caster strand  
guide rolls

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Full complement CARB toroidal  
roller bearings



## CARB toroidal roller bearings double service life in continuous caster

*SKF engineers develop a customized bearing arrangement to help ThyssenKrupp Steel Europe to improve the productivity by reducing unplanned downtime in the casting machine.*

Capable of producing up to 5.9 million tonnes of steel a year, ThyssenKrupp Steel Europe's Beeckerwerth BOF melt-shop is an integrated steel-making plant located in Duisburg, Germany. The Beeckerwerth site produces top-quality material for the automotive industry, as well as tinplate and steels for the packaging industry with two slab casting machines.

### The challenge

Recurring bearing failures on the continuous slab caster strand guide rolls had been negatively impacting caster maintenance and production for some time. The spherical roller bearing used in the continuous slab caster failed as a result of bearing damage.



## The solution

Working with ThyssenKrupp to determine the cause of the failures, SKF and ThyssenKrupp engineers concluded that the bearing arrangement of the strand guide rolls was inadequate for the application.

SKF suggested installing CARB toroidal roller bearings instead, as they have a higher load-bearing capacity than spherical roller bearings and furthermore combine the self-aligning capability of spherical roller bearings with the axial displacement ability of cylindrical roller bearings.

ThyssenKrupp engineers also designed a new caster roll with three roll bodies, the centre roll supporting two full complement CARB toroidal roller bearings. The new arrangement provided maximum load carrying capacity combined with a dynamic, self-aligning capability.

After installing the CARB toroidal roller bearings in the caster rolls, ThyssenKrupp reported a marked improvement in service life. Additionally, modifying the re-lubrication quantity resulted in improved roll line service life performance. To achieve further performance improvements, the SKF Caster

Analyst System was installed. The system, consisting of a specialized on-line load and temperature unit for advanced, reliable data collection, enables operators to monitor critical temperature and load data during production.

The SKF Caster Analyst System revealed that load peaks during specific casting operations were causing bearing overload. Based on these measurement results, the manufacturing process was optimized to reduce load peaks.

## The results

The customized caster roll arrangement with CARB toroidal roller bearings doubled the service life of the previous, spherical roller bearing arrangement. Subsequent maintenance and lubrication procedure improvements enabled ThyssenKrupp to achieve a stable service life of 3.5 million tonnes in the caster bow segments and straightening zone as well as 5 million tonnes in the withdrawal area already over several years.

### Application

- Continuous slab caster No 1 strand guide rolls
- Segments 1–8 casting bow 9–10 Straightening section 11–18 withdrawal area

### Solution

- CARB toroidal roller bearings in the centre positions of a two-split roll design
- Customized caster roll redesign
- SKF Caster Analyst System

### Customer benefits

- Increased productivity
- Reduced planned and unplanned downtime
- Extended service life
- Lower maintenance costs

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