

## Success Story

Industry: Steel and Metals

Application: Milling Machine

**Cost Savings: € 35 600**

### Introduction

A steel mill company producing rails for lift equipment needed to machine two flat areas at the rail ends where the rails would be fitted during the assembly. Because of the length of the rails, the stiffness of the spindle was critical. With original bearings, the stiffness was reduced after 3 months making it necessary to change the transmission tools and the motors. NSK was asked to find a solution. NSK engineers visited the plant and analysed the spindle design. As a result, it was decided to change the combination of the High Precision Angular Contact Ball Bearings to a 4 row set with an increased contact angle. After the change, the bearings continued working for more than one year and no failure was experienced in the motor or transmission.

### Key Facts

- Milling Machine
- Short time operation to mill a rough surface of rails
- NSK Solution: High Precision Angular Contact Ball Bearings with 25° contact angle instead of 15°
- 3-row bearing set replaced with 4-row bearings to increase the radial load capacity and the radial stiffness
- Full report to check the improved characteristics
- Increased bending stiffness of the shaft
- Increased lifetime from 3 months to over 1 year



↑ Milling Machine

### Value Proposals

- NSK engineers inspected failed bearings and checked running paths on the raceway
- A spindle calculation was made using the high cutting capacity tools load calculation
- As a result of the analysis, NSK engineers recommended to redesign the spindle with four bearings combination instead of three row bearing set
- The contact angle was changed from 15° to 25° to increase the bending stiffness of the shaft
- Prolonged lifetime and stiffness from 3 months to over 1 year





## Product Features

- Standard Series
- Basic NSK super precision bearings manufactured to conform to ISO standard
- 70xx, 72xx, 79xx series
- Three types of contact angle: 15° (C), 25° (A5), 30° (A)
- Used in matched combinations with preload
- Two types of cage design: Select either phenolic (TR) or polyamide (TYN), depending on application requirements
- Two types of ball materials: Steel and Ceramic (SN24)



↑ High Precision Angular Contact Ball Bearing

## Cost Saving Breakdown

Before	Cost p.a.	NSK Solution	Cost p.a.
 Costs of bearing set	€ 600	Costs of bearing set	€ 800
 Costs due to four productions stops per year	€ 28.000	No production stops	€ 0
 Bearing replacement costs	€ 1.500	Bearing replacement costs	€ 300
 Costs for motors and tools	€ 6.600	No additional cost for motors or tools	€ 0
<b>Total Costs</b>	<b>€ 36 700</b>		<b>€ 1 100</b>