

## Success Story

Industry: Steel and Metals

Application: Gas Turbine Blade Casting

**Cost Savings: € 100 095**

### Introduction

A company was experiencing a short service lifetime from the bearings used in the casting of gas turbine blades. NSK undertook an Application Review of the existing design which included an inspection of the failed bearings. An extremely caustic solution combined with high loads and misalignment was causing lubrication and seizure problems. An alternative wheel design was proposed using a cylindrical roller bearing, with improvements in sealing and lubrication. This resulted in significantly improved performance and doubled lifetime.

### Key Facts

- Gas Turbine casting
- Bearing replacement every 6 weeks
- Caustic solution: 50% Sodium hydroxide at 180°C
- NSK solution: Application design change of wheel used on carousel, with bearing substitution to NSK sealed cylindrical roller bearing
- Reduced downtime and maintenance
- Doubled bearing life
- Significant reduction in bearing and maintenance costs



↑ Gas turbine blade casting

### Value Proposals

- The customer was experiencing poor performance on bearings within a carousel application. A Failed Bearing Analysis performed by NSK Engineers showed that this was caused by ingress of extremely aggressive caustic solution, combined with high loads and misalignment
- An Application Review highlighted inadequate sealing as the cause and NSK Engineers designed an alternative wheel design, incorporating improved sealing, easier assembly and an NSK sealed cylindrical roller bearing
- A trial was conducted using the new design and the results were reviewed. The redesign was successful with the remaining lines modified





## Product Features

- High load rating
- Highly corrosion resistant phosphate coating
- Contact seals prevent ingress of foreign particles or water
- Increased radial and axial capability
- Bearings pre-greased with Lithium grease
- Re-lubrication holes for easy maintenance & grease replenishment
- Snap ring (DIN 471) can be applied to the outer ring



↑ Sealed cylindrical roller bearing

## Cost Saving Breakdown

Before	Cost p.a.	NSK Solution	Cost p.a.
 Cost of 1 set of assemblies = € 4.462	€ 133.860	Cost of 1 set of assemblies = €7.089 Cost of 1 bearing / seal kit = €1.487	€ 39.111
 Cost of labour to renew 1 set of assemblies = € 297	€ 8.910	Cost of labour to renew 1 set of assemblies = € 297	€ 3.564
 Bearing life 6 weeks		Bearing life 12 - 14 weeks	
 Total costs per year à 10 changes (x 3 rotators) = € 142.770		Total cost per year for 1 change (x 3 rotators) = € 42.675	
<b>Total Costs</b>	<b>€ 142 770</b>		<b>€ 42 675</b>