

BEARING ROOT CAUSE FAILURE ANALYSIS WORKSHOP

PTC ASIA EXHIBITION IN SHANGHAI
ON 8TH OF NOVEMBER 2018

Presented by **PER ARNOLD ELGQVIST**

- ◆ To emphasize the importance of Bearing failure root cause analysis as a tool to improve the efficiency of Maintenance: Identifying the root causes for the failures and determining the exact required corrective actions, in order to avoid further failures for the same cause will help maintenance to perform a precise repair and avoid waste of time and unnecessary use of spare parts.
- ◆ To terminate the workshop blindness of accepting bearing failures as “normal” and the simple replacement of bearings as consumables without implementing any corrective actions as “let’s hope that this bearing will last longer”.
- ◆ To describe the most common causes for bearing failures, in order to easier determine and understand the required corrective actions.
- ◆ To emphasize the importance of understanding the different bearing failure modes according to the ISO 15243 will also be pointed out as these, in many cases, will clearly and directly indicate the failure causes.
- ◆ This workshop will also cover a simple and practical procedure on how to perform a bearing root cause failure analysis and some relevant success stories will be solved in an interactive way.

Content of the Workshop

- ◆ First determination to be made: Natural or premature failure?
- ◆ Why should we do Bearing Root Cause Failure Analysis?
First of all, in order to avoid further repetitive failures and unplanned downtime.
Second, to perform no more nor less than the required repair, which means increased efficiency.
Reduction of both unplanned and planned downtime.
- ◆ Benefits:
Reducing unnecessary downtime, both planned and unplanned (OEE+).
Extended bearing life increasing the availability of the process (OEE+).
Reduced total cost by reducing the failure cost and avoiding further repetitive failures.
- ◆ Example: Success story at a cement mill
Failure cost: 40,000 USD
Lost production value: 28'000,000 USD

Failure of a large bearing in a cement mill:



Service life:
;105 hours!

It may be very simple when you have the knowledge. By knowing the most common causes for bearing failures and the different bearing modes it will, in many cases, be very easy to identify the failure root cause and logically to immediately indicate the required corrective action.



Example of a simple analysis:

Vertical pump

Bearings: 6215 + 51115
Lubricant: Grease ISO VG460 Moly.
Speed: 1500 RPM
You got 10 seconds!



ISO 15243 established Bearing Failure Modes.

The following failure modes will be described:

Fatigue:

- » Subsurface initiated fatigue
- » Surface initiated fatigue

Wear:

- » Abrasive wear
- » Adhesive wear

Corrosion:

- » Moisture corrosion
- » Fretting corrosion
- » False Brinelling

Electrical erosion:

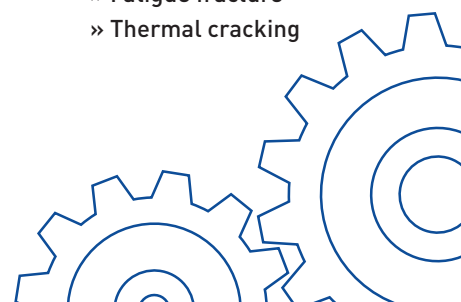
- » Excessive voltage
- » Current leakage

Plastic deformation:

- » Overload
- » Indentation from debris
- » Indentation by handling

Fracture and cracking:

- » Forced fracture
- » Fatigue fracture
- » Thermal cracking





The Procedure of Bearing Root Cause Failure Analysis. A complete Failure Analysis Process should include:



1. Determination of the most complete information on the operating conditions.
2. Relevant photos during the process.
3. Samples of the lubricant from the application and sample of unused lubricant for comparison.
4. Marking of the bearings and their position in the equipment.
5. Careful dismounting of the bearing avoiding unnecessary additional damages.
6. Inspection of the other machine components to determine collateral damages.
7. Verify bearing seating on shafts and in housings.
8. Verify the condition and distribution of the lubricant inside the bearings. If possible, take additional samples.
9. Clean the bearings and the components and take note if possible of the markings, brand and complete designations.
10. Realize the analysis of the bearing and corresponding components. Take additional photos.
11. Determine the causes of the failure comparing the failure patterns with available standard photos from ISO 15243 and/or bearing manufacturers.
12. Determine the necessary corrective actions required in order to avoid the recurrence of the same failure.
13. Protect and keep the failed bearing for future use as comparison.
14. Example: Some examples of the above will be shown.
15. Interactive exercises: During the workshop, several interactive examples of bearing failure analysis will be performed.
16. Conclusions and recommendations.

Register today as **there are only 100 seats available.**



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WORKSHOP REGISTRATION

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