



BEARING FAILURE ANALYSIS

Stratford House,  
4 Plough Drive,  
Market Rasen,  
Lincolnshire LN8 3DW.

Review of Pictures from Failed Electric Motor

Reference EFR XXXX

Your Ref XXXX

Arfon Rewinds

June 2013

## Review of Pictures from Failed Electric Motor

### THIS REPORT IS PREPARED WITHOUT PREJUDICE

#### 1. INTRODUCTION

J A D Associates were asked to review a number of digital photographs taken by Arfon Rewinds to establish a possible cause for the damage that had occurred to a motor being operated by their customer, referred to in this report as "the end user".

#### 2. SUPPLIED DETAILS

The images are of a 90 kW AC motor which runs at 2900 Rpm / 24 / 7, 365.

This was a new motor fitted with an insulated bearing on the non-drive end which has failed. The motor has been running for almost two years. The unit has been 'greased' every three (3) months by a fitter (employed by the end user) who apparently puts a couple of shots of grease into the bearing. The unit is controlled via an inverter and is the prime mover for a fan application.

The motor comes under a six (6) monthly Condition Based Monitoring (CMB) programme. This was recently monitored with no alarms or unusual wear patterns showing, a similar result to the previous two years' readings. The end user also takes temperature measurements to check for rises within the bearing locations. No temperature rises have been evident. There was also no evidence that bearing currents were present, or had been identified.

However; within four days of the CBM data being presented, the motor experienced a catastrophic failure / collapse.

The end user has approximately ten of these units and all have operated for approximately seven to eight years without issues such as this.

The images show the failed bearing. The inner race is fused to the rotor shaft.

## 2. REVIEW OF IMAGES



Image 1

Image 1 appears to show a used electric motor. The condition and amounts of dirt, dust and similar appear to suggest the motor is from a relatively clean environment if the given service life of two years is correct. No evidence of impact damage can be seen in the picture.



Image 2

Image 2 shows what appears to be a deep groove ball bearing between a shaft and housing. We cannot identify the size or manufacture of the bearing from this image. The cage is clearly broken and deformed and evidence of discolouration can be recognised on the cage debris and the ball bearings.

There are no signs of moist lubricant within the bearing voids or the housing area. Some evidence of moist grease can, however, be seen on the outer side of the machined surface



Image 3

Image 3 is not clearly identified but appears to be a bearing or seal end cover.

The picture appears to show a section of damaged cage within the centre of the chamber along with dry dust and evidence of surface corrosion. Once again no evidence of moist grease can be seen.

### 3 DISCUSSIONS AND CONCLUSIONS

The damage to the bearing: On looking at the pictures before we read the narrative our first thought was a lack of lubrication. Please check that the grease nipples or grease feed lines are blocked. The whole assembly looks very dry and generally cage failure is the first sign of the assembly running without grease.

### 3 REFERENCES

British Standard BS ISO 15243:2004 Rolling Bearings –Damage and Failures- Terms Characteristics and Causes.

Rolling Bearing Analysis, Harris & Kotzalas ISBN 100849371821

Bearing Failures and Their Causes. SKF Publication PI 401E

Ball and Roller Bearings Theory Design and Application. Eschmann, Hasbargen & Weigand. ISBN 047126283

Rolling Bearings: Failures, Causes and Countermeasures. Koyo Seiko Co  
Publication 322E

Component Failures, Maintenance and Repair. M J Neale ISBN 075060980

#### UPDATE – OUTCOME OR REPORT AND CUSTOMER FEEDBACK

The client Afron Rewinds sent the following update to J A D Analysis on the outcome of this report:

*We decided to liaise and work with our end user, as to your suggestions in regards to blocked grease ways. Your suggestions were accurate and proved that the motor was in fact not being lubricated as it was originally stated.*

*As a result the end user has in fact accepted that the bearing had failed as a consequence of poor, or lack of, lubrication.*

*Many thanks for your advice, support and the speed of response provided, the quality, service and fair price along with not having to despatch the failed components to you is appreciated.*

*Please accept our sincere thanks.*

*Andy Martin  
Afron Rewinds Ltd.*