



## CASE STUDY

# Helicopter Chip Warning Light Indication



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CONDITION MONITORING EXCELLENCE

The worst case scenario could have been an in-flight shut down with a Starter/Generator replacement, say around £3500 estimated for the generator.

## INTRODUCTION

Helicopter Maintenance on Arrius 2B2. The oil filter was sent in as a result of a chip warning light and, after discussions with Turbomeca, the helicopter continued flying until the the chip detector activated again. Chips from the Master Chip detector and Gearbox chip detector were forwarded to Spectro.

## ANALYSIS

Major:	Carbon, Miscellaneous-Mainly fine particles
Minor:	Nil
Significant Trace:	Flakes and Slivers of a 0.5% Nickel, 12% Chromium steel such as Z12CN13 measuring up to 0.2mm across and 0.4 X0.1mm respectively
Significant Traces:	Aluminium alloys – corroded fragments measuring up to 0.3mm across
Recommendation:	Consult a field engineer with regards to the significant trace presence of Z12CN13 steel flakes

## ACTION/FOLLOW UP

The initial analysis results were passed to Turbomeca who advised the Maintenance Company to examine the magnetic seals on the Engine Output shaft, Centrifugal Breather shaft (Oil/Air separator) and Starter/Generator shaft. Following the second chip detector activation and subsequent investigation it was found that on the Starter/Generator shaft the carbon face on the seal had worn away/broken off, so it was a direct metal to metal contact.

## CONCLUSION

The initial analysis gave Turbomeca an indication of potential areas of concern and would have cut down the time required for investigation by focussing on only certain items. At what point the seal would have started to leak is difficult to assess. The Operator made no comment about the Starter/Generator being covered in oil so it must be assumed that the only item needing replacement was the seal itself. The worst case scenario could have been an in-flight shut down with a Starter/Generator replacement, say around £3500 estimated for the generator.

