

## PRELIMINARY REPORT 1 JUNE 2016

### ACCIDENT AT TURØY, NEAR BERGEN, NORWAY ON 29 APRIL 2016, INVOLVING AIRBUS HELICOPTERS H225, LN-OJF OPERATED BY CHC HELIKOPTER SERVICE AS

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*This report is a preliminary and incomplete representation of AIBN's investigations in connection with the relevant aircraft accident. The report may contain faults and inaccuracies. The final report will be the Accident Investigation Board's official document concerning the accident and investigation.*

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Aircraft:	
- Type and reg.:	Airbus Helicopters H225, LN-OJF
Serial No.:	2721
Call sign:	HKS241
No. and Type of Engines:	2 x Turbomeca Makila 2A1 turboshaft engines
Date and time (local):	Friday 29 April 2016 at 11:55 hours
Year of Manufacture:	2009
Accident site:	Turøy, Hordaland county, Norway (Pos. 60,45234°N 004,93028°E) Radial/Distance from ENBR: 330°/13 NM
Weather conditions:	METAR ENBR 290950Z 20017KT 9999 SCT018 SCT023 07/03 Q1005 NOSIG RMK WIND 1200FT 19020KT=
Light conditions:	Daylight
Operator:	CHC Helikopter Service AS
Type of Operation:	Commercial Air Transport (CAT), Non-scheduled operations
Persons on board:	Crew - 2 (Fatal)      Passengers – 11 (Fatal)
Nature of damage:	Helicopter destroyed
Information Source:	AIBN Field Investigation

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*All times given in this report are local time (UTC + 2 hours) unless otherwise stated.*

#### Introduction

This preliminary report is published to disseminate new and significant findings from the on-going metallurgical examinations. The report contains one safety recommendation to the European Aviation Safety Agency (EASA).

Reference is made to the AIBN preliminary report dated 13 May 2016, which was updated on 27 May (ref. [Preliminary Report 27.05.2016](#)). At that time, the AIBN considered three possible failure scenarios: Failure of epicyclic module, suspension bar (lift strut) attachment and MGB conical housing.

## Metallurgical Examinations

Detailed metallurgical examinations have been ongoing since 19 May. Several parts from the second stage epicyclic module were retrieved from the accident site. The epicyclic module planet gears are designed as a combined gear and bearing assembly. Figure 1 shows one of eight second stage planet gears.

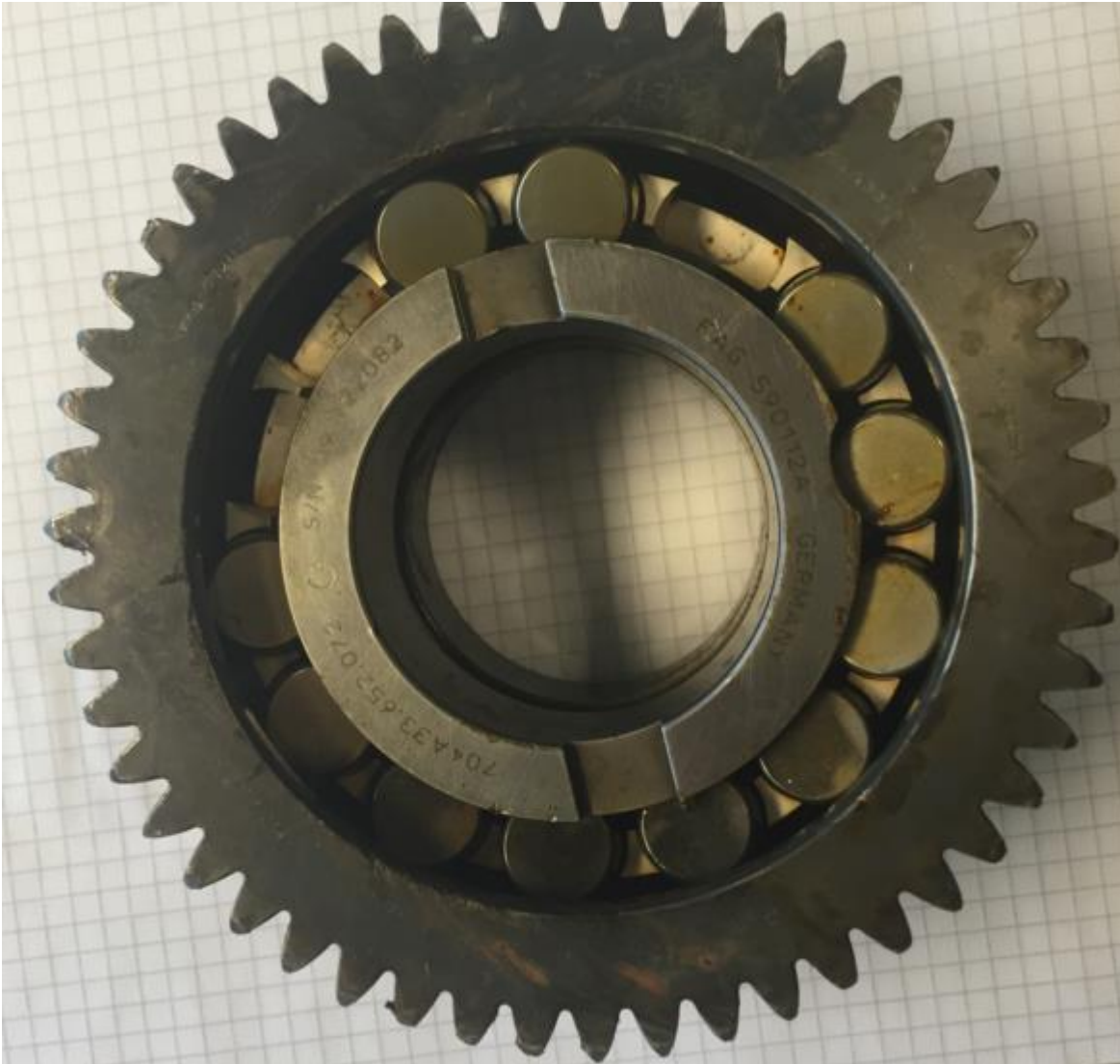


Figure 1: Second stage planet gear (as found with three rollers missing). Photo: AIBN

Planet gears have a double function, acting as a gear on the outside while at the same time functioning as the outer race of a roller bearing on the inside. In order to improve wear resistance it has been given a hard outer surface through a carburization process.

Among the recovered parts were two pieces which together form approximately half a second stage planet gear (ref. Figure 2). Examinations of these parts have revealed features strongly consistent with fatigue. The fatigue appears to have its origin in the outer race of the bearing (inside of the gear), propagating towards the web of the gear teeth. There is sign of spalling in front of the fracture surface.



Figure 2: The two pieces of the second stage planet gear prepared for metallurgical examinations.  
Photo: QinetiQ

The investigation of these particular parts is still ongoing, and thus no photos of the fracture surface are enclosed in this preliminary report. All stakeholders in this investigation have been informed about these significant findings.

Although preliminary, the AIBN considers these findings to be of such significance that it has decided to issue the following safety recommendation to ensure the continuing airworthiness of the Main Gear Box (MGB).

### Safety Recommendation

Recent metallurgical findings have revealed features strongly consistent with fatigue in the outer race of a second stage planet gear in the epicyclic module of the MGB. It cannot be ruled out that this signifies a possible safety issue that can affect other MGBs of the same type. The nature of the catastrophic failure of the LN-OJF main rotor system indicates that the current means to detect a failure in advance are not effective.

The AIBN therefore recommends that EASA take immediate action to ensure the safety of the Airbus Helicopters H225 Main Gear Box.

The investigation is ongoing and updates will follow.

The Accident Investigation Board Norway

Lillestrøm, 1 June 2016