

# SERVICE LETTER

SUPPORT AND SERVICE DIVISION  
40220 Tarnos – France  
Tel. (33) (0) 5 59 74 40 00  
Fax (33) (0) 5 59 74 45 34

To the attention of  
maintenance  
personnel and  
crews

JFE/MAM/CL

**Service Letter No. 3017/18/ARS2**

**Subject: Arrius 2R engine  
Module M01 (reduction gear). Chip events related to a  
bearing separating cage.**

Dear Sir or Madam,

This Service Letter is sent to inform you of in service engine chip events on the Arrius 2R engine module 01.

The pilots were notified by an "ENGINE CHIP" **ENGINE CHIP** or "ENG CD INOP" **ENG CD INOP** CASE message. After landing without any other incident, "ENG CHIP 1" **ENG CHIP 1** or "ENG CD 1 INOP" **ENG CD 1 INOP** messages were displayed. The inspection of electrical magnetic plug #1 showed the presence of one or several metal particles (XC material), that measure 2mm in length and 1mm in width. They are fragments of the stamped separating cage of the front bearing from the intermediate gear of the fuel pump drive gear in the module 01.

Once chips are detected, you are required to do task 71-02-07-280-803 (refer to the Arrius 2R engine Maintenance Manual). For particles that are fragments of the separating cage fragment, (see photos in the APPENDIX), Safran Helicopter Engines requires the removal of module 01. Information on how to identify this type of material and the request of material removal will be incorporated in the April 2019 update of the Arrius 2R Maintenance Manual.

After these events were first reported in May 2018, Safran Helicopter Engines developed modification TF90 which replaces the bearing that has a stamped cage with one that has a riveted, machined cage. Modification TF90 was certified on 7th September 2018 and is now applied to new and repaired Arrius 2R engines. Application of modification TF90 on engines in service will be the subject of Service Bulletin 319 72 4090.

Please contact us for any further information or assistance. Yours sincerely,

Technical Support Department

A handwritten signature in black ink, appearing to read 'JF. ESCURET', enclosed within a large, sweeping, oval-shaped flourish.

JF. ESCURET

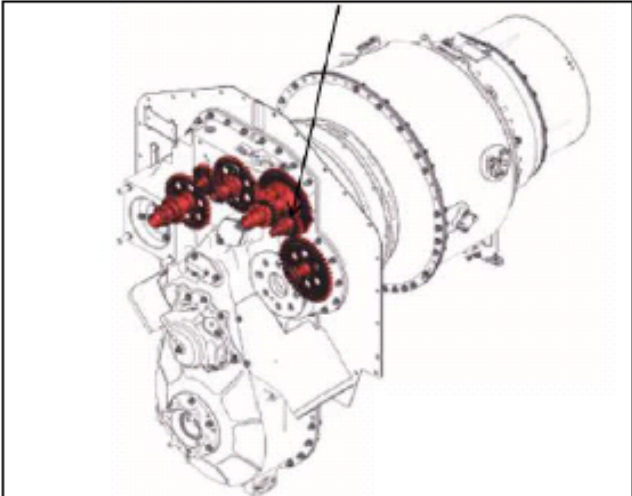
APPENDIX



Bearing cage fragment on the electrical magnetic plug #1



Bearing cage fragment under binocular microscope



Location of the intermediate fuel pump drive gear

HELICOPTER ENGINES

# ARRIUS 2R ENGINE REDUCTION GEAR BOX BEARING TAB RUPTURE

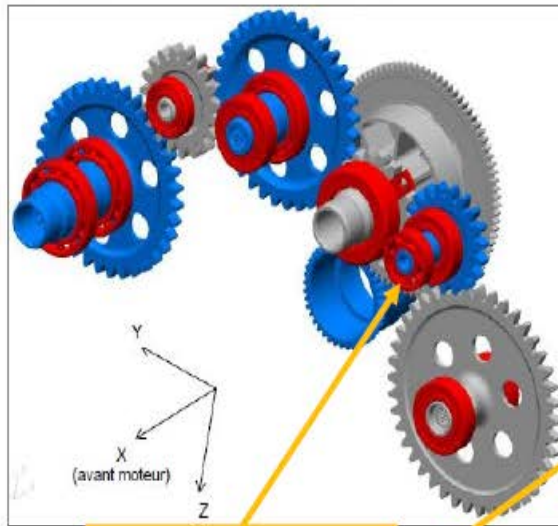
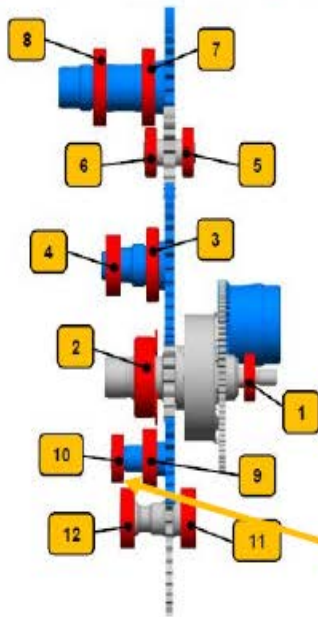
19th of March 2021



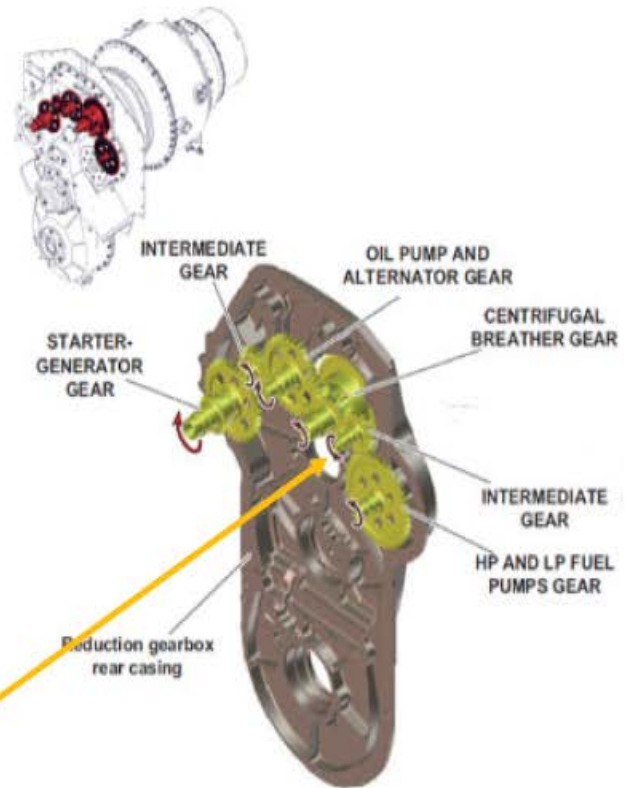
## Context reminder

Some ~30 cases of Reduction Gear Box bearing tab ruptures reported in 2018/2019

All cases are originated from the fuel pump intermediate gear front bearing

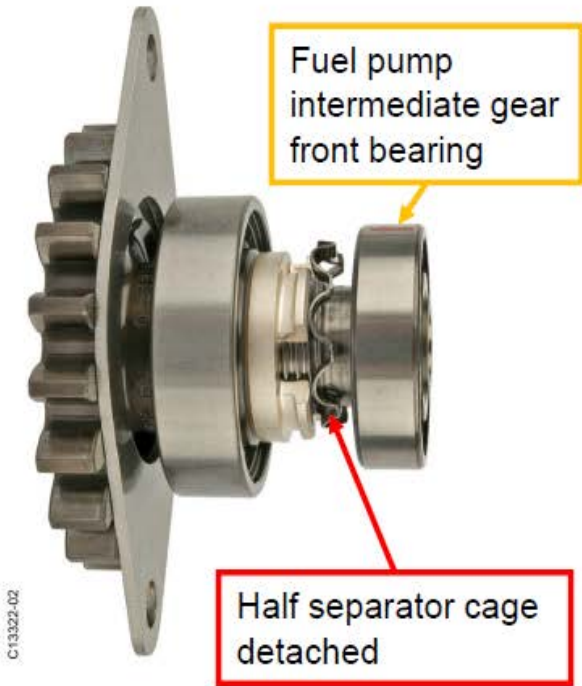


Front bearing  
intermediate gear





## Tab rupture – exemple of damage seen in service



All cases were detected through chip light illumination or during maintenance (visual inspection of chip detector)

## Tab rupture – root cause analysis

**Tab rupture is due to fatigue leading to cracks**

**Origin/source of the fatigue phenomenon could not be identified**

- The tab bearing technology was however into SafranHE in service experience for several years.

**Safety analysis performed : no unsafe situation due to tab rupture**

- Specific test performed on engine bench in October 2018 with a bearing without tabs: no bearing damage after 55 hours
- Ageing test with an other bearing without tabs, more than 250 hours cumulated : led to chip light illumination for bearing cage material. Cage rupture noted without any other bearing damage noticed

**Even in case of tab rupture without detection, engine remain safe for continuous running**

## Modification Tf90

Modification “Tf90” was implemented through SB 319 72 4090.

Service Letter 3017/18/ARS2 was informing the operators of the technical event and the Tf90 implementation.

The new bearing design, the separator cage is now riveted to avoid similar damage than with the stamped one.

