

SERVICE LETTER Ref. No.:

0015/2016

Refers to: Safety recommendations and information for approved maintenance organisations, owners and pilots concerning the causes of forced landing of an aircraft due to a serious malfunction of the M137A engine. It also applies to engine types M337/M332/M137/M132 of all models.

Reason: In 2015, a case of destruction of the Sc3755 gearwheel occurred in the scavenge oil pump of the cam housing in the M137AZ engine.
The subsequent investigation identified cumulation of several serious interacting circumstances and factors:

- The replacement of the subassemblies in the scavenge oil pump beyond the manual instructions for maintenance for a pump of unknown origin, at unknown number of working hours.
- The use of worn-down Sc3755 gearwheel of unknown origin, number of working hours and its inversion by 180° so as to engage opposite side of the less worn side of the gear teeth.
- The replacement of the original pump with unit No. 45 for an unknown pump No. 4 has not been recorded into the engine log book.

The worn-down worm wheel with burrs on its sides as well as around the circumference had incorrect radial, axial and tooth clearance. During the engine operation further wear was taking place on the opposite side of the gear teeth, cyclic stress on the teeth in bending direction due to impact caused by hitting into the edge of the chamber and scuffing of the driven wheel. These factors caused the fatigue fracture of teeth, and block rotation of gear set of the pump. The damaged gear set of the pump suddenly made it impossible for the vertical shaft to turn and the central bevel gear broke the teeth on the vertical shaft. The transmission of the torque onto the injecting pump and camshaft was interrupted and the engine cut off suddenly.

Measures: This safety information and recommendation are intended for reviewing and extending the principles laid out in "Operator's manual M337A,AK, M332A,AK, M137A,AZ, M132A/AK aircraft engines" (further **OMAE**).

For engine owners and operators and approved maintenance organisations:

- To entrust the engine maintenance and repairs to authorised personnel in approved organisations.
- The repair of the cam housing of the engine including the built-in scavenge oil pump is not permitted within the scope of the basic maintenance as described in the **OMAE**. To assign the repairs of the cam housing always to approved maintenance organisations authorised to perform engine overhauls on all models and versions of the M132-M337 engines. Within the scope of the maintenance performance in accordance with the OMAE it is permitted only to dismount the complete cam housing – as a whole from the engine and mount it back as a complete set (unit).
- Generally, only the elementary maintenance as described in the **OMAE** is

permitted on the above stated engines, should any doubts arise it is necessary to contact the TC holder.

- To commit repairs beyond the scope outlined in the **OMAE** to the overhaul approved organisations which have the necessary documentation, tools and spare parts.
- To record consistently and legibly the performed maintenance steps into the engine log book, including the serial numbers of parts and their sets, if such set numbers are available.
- The owners to check whether the maintenance organisations keep proper records of the performed maintenance in the engine log book. The records are a key source of information for other maintenance organisations.
- To use the prescribed engine oil in accordance with the principles stated in the SERVICE LETTER No. 0001/2004, and follow the instructions and terms prescribed for the oil change in accordance with the **OMAE** and thus reduce the risk of the engine wear and tear. Shortening the intervals between oil changes contributes towards decreasing the wear and tear.
- To report and notify of incidents and malfunctions to the TC holder and to the relevant authorities in compliance with the legislation in the country of registration.

Expenses: Not relevant.

Effectiveness: Since date of issue.

In Prague on: July 15, 2016.

Approved by:

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Head of Design Organization ref. EASA.21J.306

Technical content of this document has been approved based on the Design
Organisation Approval
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ANNEX TO SERVICE LETTER Ref. No. 0015/2016



Fig. 1 – The material damaged scavenge oil pump of the cam housing, set No. 4.



Fig. 2 – The scavenge oil pump of the M137AZ cam housing with worn-down teeth and abraded edge of the chamber, the green arrows indicate the direction of rotation of the gear, the blue arrow points to the edge of the chamber abraded by the gear burrs.



Fig. 3 – The p/n Sc3755 wheel with the burrs on both edges and the teeth circumference.

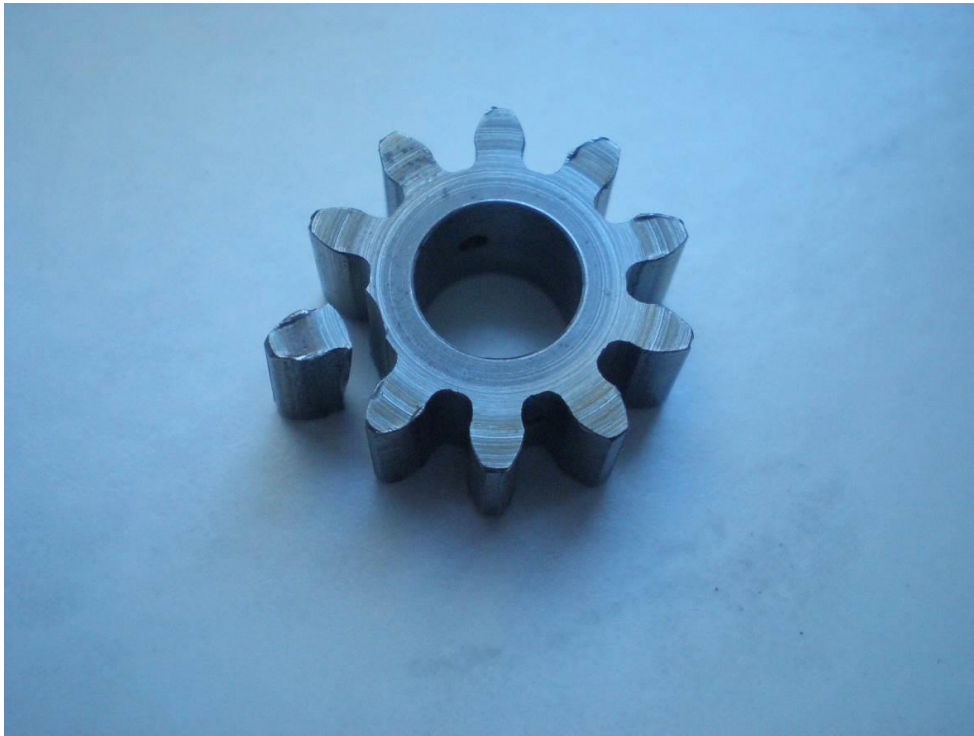


Fig. 4 – The damaged p/n Sc3755 gearwheel with a broken off tooth.



Fig. 5 – The damaged cog wheel of the vertical shaft, consequence of the blocking of the pump.

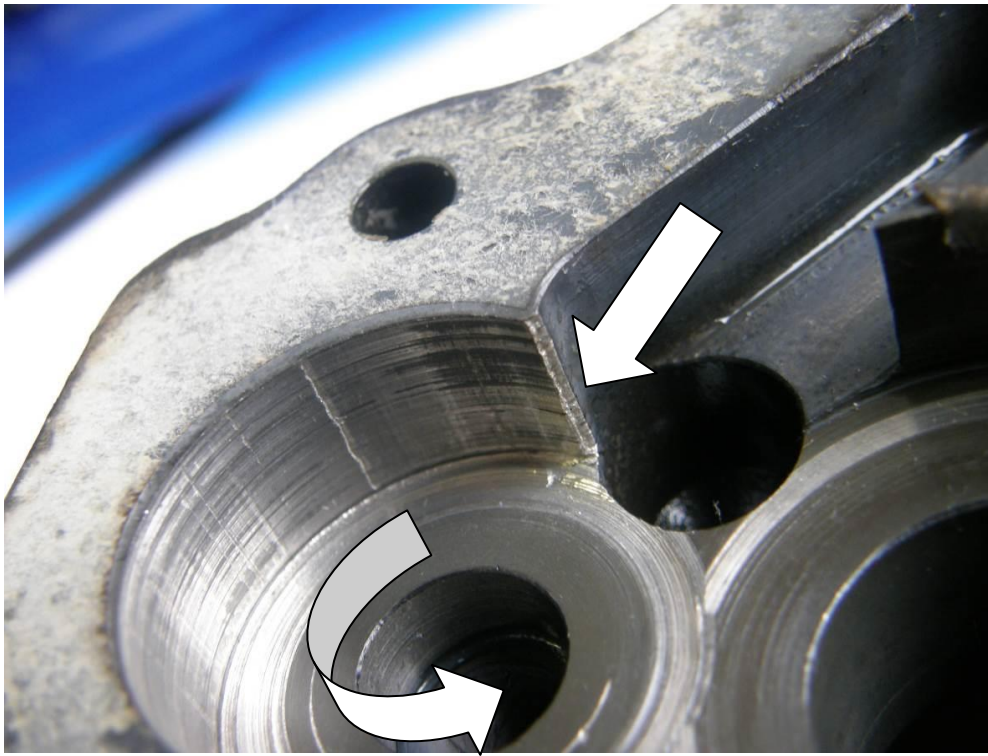


Fig. 6 – Detail of the pump housing, abraded edge and worn-down base of the housing.



Fig. 7 – Comparison of the gearwheel after 1,400 hours of operation (left) and the damaged gearwheel of unknown origin (right).