TISKAŘSKÁ 270/8, 108 00 PRAHA 10, CZECH REPUBLIC

SERVICE LETTER No.: 0013/2014

Refers to : Safety recommendations and information for maintenance organizations, owners and operators re. causes of multiple engine shutdown while flight service of engine types M337/M137. Analogic situation might occur at the engine type M332/M132 family.

Purpose : The cleaning of the locking snap ring (p/n Sc2515) out of the groove in piston pin boss cases while engine service have occurred three times within last 10 years. Follow-up investigations established the reason of the failure: Improper positioning of the locking snap ring into groove in the piston pin boss while assembly works. The freely moving locking snap ring in the space between cylinder internal surface and face of piston pin (at the piston weight scale area) caused the abrasion of piston material due the piston movement (Fig.1). Large volume of the fine metal chips is released on the internal engine surfaces and these pollute the lubrication oil. The metal chips are collected on the main oil filter strain networks (Fig.2); the resulting oil circulation intensity limitation caused the engine shut down. The contamination of the oil filter by foreign particles develops slow oil pressure decline under stabile engine regimes w/o other supporting effects on the smooth engine run.
The cleaned locking snap ring ceases performance of duty of piston pin proper position securing in the in piston pin boss. The moveable piston pin out from its original position defined the new support terms causing additive loads which led in the fatigue fracture of piston and afterwards to substantial engine damages and hazardous conditions while aircrafts services at the investigated cases (Fig.3).

Action : The introduced safety recommendations are intended for skills refresh of the concerned subjects and for the completion of provisions prescribed in the instruction “Operator’s manual M337A,AK, M332A,AK, M137A,AZ, M132A/AK aircraft engines” (further **OMAE**) section No.7, Par. 18. „Piston – cylinder parts replacement procedure”.

Action performed by : Pro maintenance organizations:

- The engine repairs have to be performed by the authorized personnel within the approved maintenance organizations only;
- The detection of metal chips on any from all oil filter strainers gained at the scheduled or preclusive inspections has to resume in chip source identification and its further elimination;
- The procedure of snap ring installation defined in **OMAE** has to be carefully followed; the snap ring has to be installed to the defined position by the using of the approved assembly tooling;
- The verification installation of the snap ring into groove in piston pin boss and its back removal has to assure that the way of assembly tooling using doesn’t damage the snap ring;
- Each locking snap ring p/n Sc2515 is destined for single installation only. The locking snap ring has to be rejected after its removal from groove in piston pin boss after service period and avoided its future installation by its mechanical destruction (by the disruption for instance);
- The brand new – unused locking snap ring has to be employed for securing of

the piston pin only; the rules of the proven traceability of the parts origin and the proper release for service by the dully issued certificate have to be followed. It is strictly forbidden to use the locking snap rings which are mechanically damaged, which shows the corrosion or bruising marks etc. Any attempt of locking snap ring repair is not acceptable.

- The grooves in the piston pin boss have to be free of all damages;
- The proper positioning of the locking snap ring up to bottom of groove in the piston pin boss after its installation has to be duly inspected. The using of magnifying glass and intensive ambient lighting is recommended. The locking snap ring open end has to persist on the way of the piston movement axis at the remoter end from piston head;
- The properly installed locking snap ring in the groove in the piston pin boss hasn't freely to swing round. All kinds of locking snap ring installed in the groove movements are forbidden;
- To monitor the oil pressure values while on-ground engine test procedure – the non-conformances of oil pressure values searched to figure out by the debugging of identified failure cause;
- It is recommended to inform the staff of maintenance organizations, engines owners and operators with content of this Service letter.

For flight service:

- The values of the oil pressure shall be monitored while pre-flight engine on ground test and while flight operation. Even in the case of the slow oil pressure values downturn under the stabile engine regime it is recommended to land within shortest possible time and to set up the purpose;
- To follow the provisions for engine operation defined in **OMAE** and bulletin No. LOM-IB-4b/2009.
- To assure the reliable information distribution among all operators of the entire engine this showed the oil pressure fluctuation. This principle is generally valid for the other aircraft systems even not affected by this SL (record into Aircraft log-book etc.)

Costs incurred : Not relevant.

Effectiveness: Since date of issue.

Approval date : Prague, 12th November 2014.

Approved by :

Petr Prokop, MBA, m. p.
Head of design organization

The technical content of this document is approved under the authority of DOA ref EASA.21J.306.

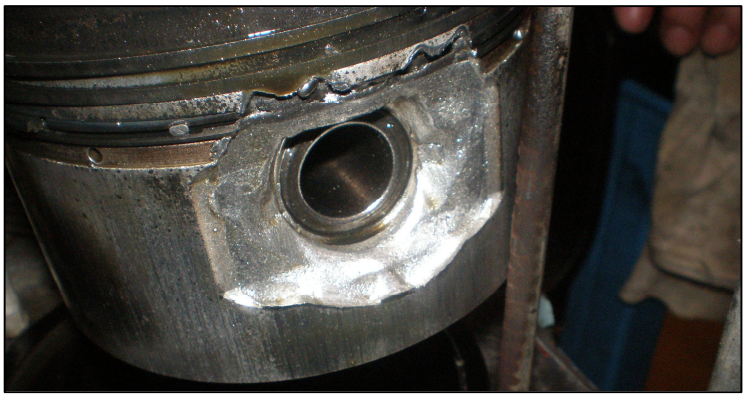

Fig. 1 – Piston side spoiled by the cleared locking snap ring (p/n Sc2515).

Fig. 2 – Aluminum alloy chippings on the three stages oil strainer filter (chippings origin is the piston)

Fig. 3 – Fatigue fracture of the piston pin boss