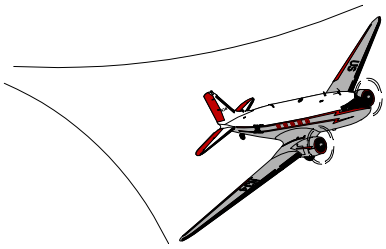
SPECIAL AIRWORTHINESS INFORMATION BULLETIN



U.S. Department
of Transportation
Federal Aviation Administration

AIRCRAFT CERTIFICATION SERVICE
800 INDEPENDENCE AVENUE, S.W.
WASHINGTON, DC 20591

No. ANE-99-18
April 9, 1999

Published by: FAA, AFS-610, P.O. Box 26460, Oklahoma City, OK 73125
SAIB's are posted on the internet at http://av-info.faa.gov

This is issued for informational purposes only and any recommendation for corrective action is not mandatory.

Introduction:
This Special Airworthiness Information Bulletin (SAIB) provides information addressing Textron Lycoming reciprocating engine piston pin plug wear detection for both piloted and non-piloted plugs. By issuing this SAIB, the FAA Engine & Propeller Directorate is providing additional information and guidance intended to facilitate identification of abnormally worn piston pin plugs and describes appropriate inspection/maintenance actions by owners/operators of Textron Lycoming engines, repair stations, mechanics holding Inspection Authorization (IA) and FAA Principal Maintenance Inspectors.

Reference Documents:
The following references document information and guidance regarding Piston Pin Plug Wear Inspection and recommended corrective action.

1. Textron Lycoming Service Instruction No. 1492B, "Piston Pin Plug Wear Inspection", dated February 26, 1999.
2. Textron Lycoming Service Instruction No. 1267C, "Piston Pin Plug Usage" dated February 26, 1999.
3. AC43.13-1B Chapter 8 Section 8.6 "Inspection of Oil Filter".
4. Textron Lycoming Service Bulletin No. 480C dated February 26, 1999, advising early and frequent inspection of the oil filter and spectrographic analysis of the oil system for piston pin plug aluminum deposits.

For copies of referenced documents, write to: Textron Lycoming Product Support Department, 652 Oliver Street, Williamsport, PA 17701; or telephone: (570) 323-6181.

Background:
Textron Lycoming uses piston pin plugs to center the piston pin within the piston, ensuring that the piston is centered within the cylinder barrel. These plugs act as thrust wear surfaces, are made of relatively soft materials, and have two different configurations; piloted and non-piloted. Ref. (2) shows both configurations. Currently, Lycoming uses the piloted version almost exclusively. The plugs, by design, experience some wear on the plug face, which contacts the cylinder barrel. This wear is normal and part of the engine break-in process.

Recently, a number of engines have experienced an abnormal amount of wear on the piloted plug (P/N LW-11775). The root cause of this abnormal plug wear has not yet been determined.

Beginning with engines and cylinder head kits shipped in 1994, piston pin plugs have been experiencing an unusually high wear rate. However, this rate experienced a drastic increase on engines and kits shipped since October 1997. Evidence of excessive wear was discovered between 22 and approximately 700 hours time in service on new or overhauled engines. Engine failure was the consequence on two of these occasions. Certain corrective actions are expected to reduce the incidences of piston pin plug wear.

The following is a description of the two types of plug wear and a brief summary of results and corrective actions to date. The two types of piloted plug wear have been identified as "pilot wear" and "face wear".

1. "PILOT WEAR" (P/N LW-11775 only). This type of wear is characterized by the wearing of the piloted section of the plug. The mechanism for this type of wear is the "wobbling" movement of the piloted section of the plug against the piston pin Inside Diameter (ID) surface. This movement wears the plug pilot diameter near the head of the plug. The plug face contacts the cylinder barrel as the piston oscillates in the cylinder, causing this relative movement or "wobbling motion" of the plug. If unchecked, this wearing could result in the head of the plug breaking off at the worn section, forming a ball and working its way through the piston. Textron Lycoming indicates that factors affecting pilot wear were the piston pin ID surface finish, plug pilot Outside Diameter (OD), and piston pin ID. Based on this finding, the non-piloted piston plug has been incorporated on all new, overhauled, or remanufactured engines leaving Lycoming's Williamsport, PA facility after January 25, 1999.

2. "FACE WEAR" This type of wear is characterized by the face of the plug in contact with the cylinder barrel wearing excessively as though it is being machined by the barrel. Normal break-in wear for this plug is considered to be 1/8 inch or less. Barrels with the surface finish at the upper end of the tolerance (35 RMS) have shown higher wear rates. Engine testing also indicated that face wear rate is a break-in phenomenon and quickly decreases with engine hours and eventually stops. This break in wear is due to the piston rings greatly smoothing the barrel surface finish during the break-in period. Historical reports and test data indicate that the non-piloted plugs have less face wear than the piloted plug and that the aluminum bronze version of the non-piloted plugs have exhibited the least wear. Excessive face wear on field engines can be identified by filter inspection and oil analysis (See Ref. 1, 3, and 4). If excessive face wear is found in an engine, the oil pump screen should be checked, cleaned and the piston pin plugs replaced.

Recommendations:
The FAA recommends actions for both piloted and non-piloted piston pin plugs:

1. It is advised that the non-piloted plug be used under all circumstances. Although Lycoming has incorporated this configuration change on their production/overhaul/remanufacture line, effective January 25, 1999, there are numerous Lycoming cylinder kits in the field which provide both piloted and non-piloted plugs. The non-piloted plugs should be installed because of their superior service record. (see also Ref. 1)

2. Ref. 1 and 3 state that during the recommended oil change intervals (10 hours initially, followed by 25 hours for new, remanufactured, or overhauled engines and subsequently by 50 hours TIS), inspecting the filter and having a spectroscopic oil analysis performed could be very useful in monitoring piston plug wear. Since an engine failure has occurred at 22 hours TIS, more frequent inspections are encouraged.

3. Although non-piloted plugs are expected to provide improved durability compared to piloted plugs, there have been incidences, although less numerous, of excessive wear on non-piloted installations. In this regard, and since the root cause of the wear problem has not yet been determined, it is recommended that these precautions be observed for non-piloted plugs.

4. When inspecting a disassembled engine, check the plug dimensions against Ref. 2. If the plug has worn down more than .125 inches (1/8) or the diameter is below 1.142 inches, this wear is considered excessive, and the plug should be replaced.

FOR FURTHER INFORMATION CONTACT:

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