Australian Government
Civil Aviation Safety Authority

AIRWORTHINESS BULLETIN

Cracking of ECI Cylinders installed on TCM 520 and 550 series Engines

AWB 85-006 **Issue** : 1
Date : 14 November 2006

1. Applicability

Engine Components Inc. (ECi) cylinder assemblies, part number (P/N) AEC631397 – cylinder Serial numbers (S/Ns) 7709 thru 33696 - with aluminium head casting P/N AEC65385, installed in the following Teledyne Continental Motors (TCM) series engines.

- *TCM Engine Models IO-520-A, B, BA, BB, C, CB, D, E, F, J, K, L, M, MB, N, NB*
- *TCM Engine Models TSIO-520-A, AF, B, BB, C, CE, D, DB, E, EB, G, H, J, JB, K, KB, L, LB, M, N, NB, P, R, T, U, UB, VB, WB*
- *TCM Engine Models IO-550-A, B, C, D, E, F, L*
- *TCM Engine Models IOF-550-B, C, D, E, F, L*

The above mentioned engines are installed on, but not limited to Cessna Aircraft 185, 206, 207, 210, 310, 340, 401 and 402 series, Beech Aircraft 33, 35, 36, 55 and 58 series as well as Cirrus SR22 model aircraft.

ECi Mandatory Service Bulletin (MSB) 06-2 Revision 2 details the procedure to determine applicability and the procedure to identify affected cylinder assemblies. MSB 06-2 is accessible on ECi website http://www.eci2fly.com

This AWB recommends periodic inspections of ECi cylinder assemblies in the applicability list for cracks in the aluminium head.

2. Background

Engine Components Inc. (ECi) manufactures aircraft piston engine parts, including cylinder assemblies under FAA Parts Manufacturer Approval (PMA). These parts are direct replacement for OEM parts in many engine models including TCM 520/550 series.

A review of the Service Difficulty Reports (SDR) database has indicated that a cylinder head leaking problem exists with the subject replacement PMA cylinder assemblies manufactured by ECi.

The FAA has also received 179 defect reports of cylinder head cracks from engine maintainers and aircraft operators. Metallurgical analysis of the failed cylinders shows that a fatigue crack propagates all the way through the cylinder head wall near the exhaust valve seat. The cylinder head crack causes a loss of cylinder compression, but is unlikely to result in a cylinder/head separation.

Loss of cylinder compression in any one of the cylinder assemblies will result in a partial loss of engine power and will cause the engine to run rough. Reports show that the cylinder head crack with a loss of cylinder compression can occur between 253 and 1,483 hours-in-service (HIS) since new. Based on the reported data, the calculated average time-to-crack is 891 hours in service approx.

ECi Service Bulletin No. 06-2 Rev 2, dated 26 October 2006, presents inspection procedures for the ECi cylinder assemblies, P/N AEC631397, with aluminium head

casting P/N AEC65385 installed. The applicable serial numbers (S/Ns) for the ECi AEC631397 cylinder assemblies are 7709 thru 33696.

Note: This AWB is based on FAA Special Airworthiness Information Bulletin NE-07-09 dated 31 October 2006. Other related documents are ECi MSB 06-2 Rev 2, TCM SB 03-3 and TCM SB 96-12.

3. Recommendation

To detect an air leak on ECi cylinder assemblies, P/N AEC631397, with casting P/N AEC65385, CASA recommends the following tests:

a) Visual inspection; and
b) A standard cylinder compression test; and
c) Soap solution bubble test

The initial inspection should be carried out upon reaching 500 hours in service since new. Recurring inspections are then recommended every 50 hours until the cylinders reach TBO.

If the cylinders installed in your engine have already accumulated 500 hours in service, the initial compression tests are recommended within the next 10 operating hours. After initial inspection, subsequent inspections should be repeated after each 50 operating hours.

Note: The compression tests can coincide with normally scheduled oil and filter changes at 50 hours-in-service.

Any leaking cylinder assembly should be replaced with an approved cylinder assembly, not affected by ECi MSB 06-2.

If a leaking cylinder is replaced in response to this AWB, a corresponding service difficulty report (SDR) should be lodged with CASA through online reporting system accessible on the web http://www.casa.gov.au/airworth/sdr/index.htm

4. Enquiries

Enquiries with regard to the content of this Airworthiness Bulletin should be made via the direct link e-mail address: AirworthinessBulletin@casa.gov.au

Or in writing, to:

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