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TCM General Information Release to COPA Web Site

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The COPA website has recently included exchanges regarding engine camshaft and lifter wear characteristics. This activity has resulted in ad hoc recommendations for engine inspections not considered necessary or sanctioned by TCM.

This unapproved inspection program requires a partial disassembly and reassembly of the engine installation and engine components, and a subjective assessment of the camshaft/lifter wear surface. Unfortunately, this has led to complete removal and disassembly of engines for which no sound technical justification exists.

It is the position of TCM that the COPA website, as with any open communications forum, may contain opinions that are technically inaccurate and/or are out-of-context information that should not be relied upon for engine maintenance decisions. Engine inspections should be performed on recommended inspection intervals, or as required to address engine operational needs. TCM will not be responsible for costs associated with or resulting from these inspections without the prior knowledge, and written approval of TCM. TCM strongly suggests that any questions regarding camshaft and lifter wear be directed to the TCM Cirrus support desk at 1-877-529-1582. This number will be available effective Wednesday, January 5, 2005.

Teledyne Continental Motors, Inc. will increase the dissemination of factory information on this subject and others of interest to COPA. TCM has proposed to COPA a web utility specifically tailored to the Cirrus aircraft and TCM has solicited COPA leadership to assist with the development of this service to maximize its value to Cirrus owners with respect to engine information.

To assist COPA with the dissemination of accurate technical information regarding camshaft and lifter performance, the following brief summary is provided. To further supplement this information, TCM is releasing a camshaft / lifter Service Information Bulletin, SID05-1, providing detailed service information to FBOs and repair centers performing service and maintenance on TCM engines. The brief summary given below contains active web-links to the appropriate sections of the SIB.

Camshaft and Lifter Function: The function of the camshaft/lifter combination is to control the intake and exhaust air valve actions of the engine cylinders. The lifter provides the connectivity between the camshaft and the cylinder valve operation by "riding" on the engine camshaft, which in turn is driven by the engine crankshaft.

The Camshaft/Lifter Surface is Designed to be Robust: Camshafts and Lifters are designed to wear in together. This wearing can include minor spalling which will stabilize and continue on to full TBO. This effect has been observed in engine testing and on inspections of returned engine cores. Subjective visual inspections of camshaft and lifter surfaces may not be indicative of cam/lifter durability and may lead to unwarranted maintenance actions.

TCM Monitors Camshaft and Lifter Performance: TCM routinely monitors camshaft and lifter performance as an element of its product integrity programs for the entire TCM fleet. Historical trends in camshaft and lifter performance have remained materially unchanged over the past decade. The majority of camshaft and lifter performance issues in the TCM fleet can be traced to corrosion pitting associated with engine use patterns.

Camshaft and Lifter Wear is Not a Safety of Flight Issue: Although extreme cam and lifter wear may result in the need for engine maintenance, even extreme wear is not a safety of flight issue when scheduled maintenance and service is performed. The lifter and valve train is designed to accommodate substantial wear and then produce audible noise in the case of extreme wear.

TCM Continually Does Development Testing for New Lifter Technologies: As part of TCM's continuous product improvement activities, a new lifter concept is being evaluated which may provide some additional corrosion resistance and material toughness. Initial testing has been promising and more extensive tests are being conducted. As with most aircraft piston engine components, supplier options are limited and extensive testing and evaluation are required before release of new components to the field.

TCM Stands Behind the Cirrus Engine: In those limited cases where camshaft/lifter wear is excessive and corrosion is not the cause, TCM has and will continue to stand behind its products and warranties. For those with concerns about long term damage to the camshaft detected at overhaul, TCM will offer Cirrus owners full camshaft core credit for new, rebuilt, or overhaul engines purchased from TCM or our overhaul/repair facilities.

Internet Chatter Should Not Replace Recommended Maintenance Practice: The manufacturer's recommendations regarding service and maintenance should be followed. Factors affecting camshaft and lifter operation and condition are influenced by operational and utilization patterns as well as oil selection and maintenance. Opinions expressed on the Internet may not be factual due to insufficient technical background or lack of adequate scientific analysis and root cause problem solving. Statements may also contain opinions, which are intended to further agendas other than proper engineering analysis.

Camshaft and Lifter Wear Patterns: Because the lifter is in contact with the camshaft, the cam and/or lifter surface wears during normal operation of the engine. Operational signature on the camshaft and lifters can vary based upon a number of operational factors. If deemed necessary as a result of proper engine service and maintenance, evaluation of camshaft and lifter wear should be conducted by an objective and experienced engine technician, in consultation with factory technical staff to avoid unnecessary maintenance costs.

Camshaft and Lifter Service Issues are Identified Through Regularly Scheduled Inspection of the Oil Filter and Oil Analysis. Camshaft and Lifter Inspections should be conducted as warranted based upon the results of oil analysis, oil filter inspections, or engine operation issues. Extreme cam/lifter wear can also be identified by engine tappet noise at cold engine startup, or ultimately by engine roughness.

Operational Knowledge Can Help Protect Your Engine: Corrosion remains one of the largest threats to your aircraft engine. Fleet operators of piston aircraft engines regularly operate engines to TBO and well beyond in some cases. Engines should be flown regularly, operated at oil temperatures adequate to remove moisture, and oil changes should be conducted on calendar times as a minimum. Rust induced pitting to camshaft and lifter surfaces accounts for the majority of cam/lifter maintenance issues.

To remove moisture that may build up in the oil, the engine should be regularly operated in cruise flight for at least 60 minutes with oil temperatures in the range of 170 to 200 degrees F. In addition, oil should be changed on a frequent calendar basis to avoid the amount of time the engine is subject to oil with retained moisture. Each operator should understand that oils do not classically "break-down" but that aviation oil must be managed to keep the oils clean and free from moisture and the acids that result. Frequent operation, as in fleets or schools, accomplishes this requirement. In the absence of frequent utilization, different oils may react differently, with the common factor for protection being the elevation of oil temperature on a regular basis and frequent oil changes.

Each Owner Should Be Aware of the Possibility for Unwarranted Engine Maintenance: The light aircraft maintenance industry remains a challenging business. Fixed Base Operators continue to face significant business challenges with the decrease in flying and the replacement parts business is highly competitive. Owners should be aware of the possibility and on guard for unnecessary maintenance costs resulting from unwarranted engine maintenance recommendations. Maintenance should only be performed as indicated by approved inspection and maintenance practices. TCM should be contacted prior to any extensive engine work and we will be glad to assist with your evaluation of the proposed work. TCM also conducts a highly regarded one week engine maintenance training class and maintains a list of those aircraft mechanics who have taken advantage of this service. TCM will make this list available on the web site designed to provide specific information to Cirrus owners.