Australian Government
Civil Aviation Safety Authority

Airworthiness Bulletin

AWB 85-027 Issue 1 - 22 March 2022

Engine Inspection in Event of Water Immersion

An Airworthiness Bulletin is an advisory document that alerts, educates and makes recommendations about airworthiness matters. Recommendations in this bulletin are not mandatory.

1. Effectivity

This airworthiness bulletin (AWB) is applicable to installed or uninstalled piston engines recovered from immersion in water.

2. Purpose

This AWB identifies the recommended maintenance actions before the return to service of a piston engine that has been soaked or immersed in water.

For the purpose of this AWB water immersion is defined as the complete or partial submersion of an engine for any period of time, and results in almost certain water ingress and damage.

3. Background

When a piston engine is soaked or immersed in water, moisture and foreign materials can cause damage to all systems of the engine. The circumstances of an immersion cannot always be used as a predictor for the extent of engine damage or its future reliability. There can be varying degrees of damage to an engine which can remain hidden and become progressively worse with time.

Prompt maintenance action following engine recovery is an important factor as the composition of the substances that the engine has been exposed to will also affect the type and extent of damage. The following recommendations only apply to an engine that has been immersed in water not contaminated with, chemicals, petroleum products, fertilizers, biological products or salt water.

NOTE: A purported freshwater immersion may contain varying amounts of salt and, as drying occurs, the salt concentration is increased and corrosive attack accelerated.

If the engine has been immersed in contaminated water or a substance other than water, contact the engine manufacturer for additional technical support and guidance.

The registered operator is responsible for continuing airworthiness of the aircraft and engine. The final work-scope should therefore be finalised in consultation with the registered operator and an approved maintenance organization.

4. References

FAA AC No. 43-4B - Corrosion Control for Aircraft

FAA AC No. 43.13-1B, Ch.6, Sec.14 - Handling & Care of Aircraft Recovered from Water Immersion

Lycoming Service Bulletin No. 357 - Engine Inspection in Event of Immersion

Continental SPMM, M-0, Ch.6-5 - Foreign Object Contamination Inspection

AWB 02-066 Issue 1 - Maintenance - Aircraft Immersed in Water

AWB 85-017 Issue 1 - Reciprocating Engines - External Corrosion

5. Recommendations

The following actions are recommended by CASA before the return to service of an aircraft piston engine that has been soaked or immersed in water. All steps should be performed in accordance with the engine and component manufacturer's published procedures; and / or other approved data, where manufacturer's data is not available.

a) DISASSEMBLE - bulk-strip the engine to enable visual inspection of all internal parts for contamination and condition.

NOTE: For the purpose of this AWB a bulk-strip is defined as the disassembly of the engine for the purpose of inspection; the extent of which requires the separation of the crankcase parting flange or removal of the crankshaft. The engine bulk-strip shall be carried out by an organisation approved for the purpose and in accordance with approved data.

Complete an inspection of all engine mounted components, accessories and actuating mechanisms for contamination and condition per the component manufacturers instructions for continuing airworthiness (ICA). Where a manufacturer's published ICA are silent on inspection requirements in the event of immersion, contact the manufacturer for technical support and guidance.

b) CLEAN - the engine, especially all recessed areas where debris or silt can get trapped. Refer to the engine manufacturers cleaning instructions and approved solvents, chemicals and consumables list.

NOTE: When cleaning parts removed from the engine, especially ferrous (iron) metals, do not use hot acidic cleaning agents or electrolytic cleaning methods (such as cathodic cleaning) since they can cause hydrogen embrittlement. This embrittlement can cause a metallic part to weaken and fail. Additionally, acids can generally attack the metals and cause pitting or other corrosion damage.

Be sure to remove all cleaning agents. Rinse and dry each part thoroughly.

c) EXAMINE - visually examine each removed part for visible corrosion or rust, (or evidence thereof). Pay particular attention to bearings, working surfaces, mounting flanges and any aluminium, magnesium or bronze surfaces that may contain imbedded contaminants.

Where possible, remove any rust, corrosion or silt imbedded in porous surfaces in accordance with engine manufacturers approved data.

Look for evidence of pitting in all stressed areas of the engine drive train. If pitting is found, the component should be replaced.

Visually examine components for embedded silt or debris contamination on bearing surfaces, pistons, mounting flanges, or on any porous surfaces. Remove all silt and debris from the component. If the embedded silt or debris cannot be removed, replace the component.

Make sure all oil passages, bored holes, and any similar openings and recesses are free from contaminants. oil and fuel hoses are clean and unobstructed and have no debris.

d) RE-ASSEMBLE - the engine in accordance with the manufacturer's instructions, making sure it is in conformance with required fits and clearances.

Parts identified by the engine manufacturer for replacement upon removal or regardless of their apparent condition, are to be replaced. For example, see Lycoming Service Bulletin (SB) 240 (latest revision) or Continental SPMM, M-0, Appendix 'C'.

Replace all consumable parts and elastomers which are disturbed during the course of engine bulk-strip (e.g. gaskets, seals, packings, o-rings, cotter-pins, lock-washers, lock-plates, safety-wires and circlips, as applicable).

For the replacement of parts for accessories such as magnetos, carburettors, fuel injectors, fuel pumps, turbocharges etc, refer to the applicable manufacturer's ICA's.

NOTE: Prior to engine re-installation refer to the aircraft Maintenance Manual (MM) and make sure all airframe interface fuel and oil lines, oil cooler, induction and exhaust systems are clean and have no debris or silt to prevent re-contamination of the engine after re-installation.

e) TEST - complete an operational ground check and engine performance run to ensure the engine is operating correctly before returning the engine to service.

6. Enquiries

Enquiries with regard to the content of this Airworthiness Bulletin should be made via the direct link email address:

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or in writing, to:

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