

AIRCRAFT IDLE

How to protect your aircraft when it is inactive for a long time.
By Mike Smith

Photos Geoff Cornfort

Pilots can offset some of the skill and knowledge degradation that comes from not flying by a little study, by reading about flying in magazines like *Flight Safety Australia* and by attending safety seminars. Some pilots have access to full motion flight simulators and even PC-based simulators can help to maintain basic skills. Ultimately, a flight review or rating renewal will get us back into the air safely, but what about our aircraft?

By their nature, aircraft are able to withstand some pretty harsh conditions as they are built to weather most weather conditions. However, over time, corrosion, loss of lubrication with its protective properties, and the effects of moisture, sunlight and heat all take their toll on an airframe and engine. Minimising these effects is the aim of any scheme for preserving an inactive aircraft.

Most manufacturers provide limited information for owners who fly their aircraft infrequently. However, the engine maker, Textron Lycoming, does give some fairly detailed advice in its Service Letter L180B, which is available from their website.

Lycoming suggests that aircraft be flown at least once a month for one continuous hour with the engine oil temperature in the normal operating range. Reaching the correct operating temperature, and holding it there for a reasonable time helps eliminate build up of harmful acids and moisture in the engine. Take care and follow the manufacturer's advice, as low operating temperatures can be just as damaging as high engine temperatures.

Unfortunately even regular operation will not prevent some engine corrosion.

Note that an engine with less than 50 hours since new requires particular attention because the cylinder walls have yet to acquire the varnish that protects them from corrosive action. Aircraft operated close to the coast and particularly in warm and humid environments are even more vulnerable.

Some owners are in the habit of pulling the engine through by hand once a week or so if it isn't flown. This practice actually does a lot more harm than good. The engine cylinder walls, pistons, rings, cams and cam followers are lubricated by oil vapour and splashed oil during normal operation. The rings wipe oil from the cylinder walls and the cam load created by the valve train wipes oil from the cam and its followers.

If you pull the engine through a couple of times without starting it, the cylinders, cam and followers are left without a proper oil film. And turning or starting engines without proper lubrication can cause scuffing and scoring of parts resulting in excessive wear.

Engine preservation: If an engine isn't going to be used regularly, Lycoming recommends draining the oil and replacing it with a preserving mixture. The company also advises removal of the spark plugs so the preserving oil can be sprayed into the upper end of the cylinders. In humid environments, dehydrator plugs should be installed in place of the normal top plugs.

Small bags of desiccant should be placed into the exhaust and inlet ports and these openings sealed with moisture-impervious material and pressure-sensitive tape. All other openings from within the engine to the atmosphere, such as breather tubes, should also be sealed.

Screen it: Reflective sunscreens protect your aircraft's interior from sun damage.

Red cloth streamers, visible from outside the aircraft should be attached to any desiccant bags in the engine to ensure they are removed when the aircraft is prepared for flight. The propeller should be tagged, "Engine preserved – do not turn propeller" and the maintenance endorsed with the details.

All the preserving treatments must be removed and the preserving oil drained and replaced with the correct lubricating oil before the engine is started.

Nevertheless, even if you have followed these engine preservation procedures, some corrosion might still have occurred, so you should have the engine inspected.

The Lycoming service bulletin, your aircraft's maintenance manual and your engine's maintenance manual are all good sources of additional information and their instructions, as applicable, should be followed.

Airframe action: Preserving the engine is only a part of the equation. The airframe also needs some special attention if it is to be left idle for any length of time. Rain and wind wash away protective coatings and dust accumulation can trap moisture and aid corrosion of vulnerable airframe components. Sunlight, heat and ultraviolet radiation degrade the plastics and paints used in and on aircraft. But there are things you can do to minimise these effects.

Obviously, keeping an aircraft in a clean, dry hangar is just about the best way to limit the harmful effects of the weather. For those not lucky enough to have a hangar available,



Bung it: Bungs protect larger openings from nesting birds (left) and smaller covers prevent insect infestation in openings like pitot tubes and fuel tank vents (right). Note that bungs need to be clearly marked so that they can be easily identified for removal before flight.



Cover it up: Covers over composite (above) and wooden propellers protect from weather damage.

there's still plenty you can do to keep your aircraft in good shape.

Start by giving it a good wash to remove dirt, grease, bugs and bird droppings – which can all contribute to corrosion and paint deterioration. Rinse carefully and thoroughly with clean water. You'll not only have a clean plane, but you will also have had a good look over the exterior surfaces. If you should find any early signs of damaged paint and potential corrosion initiating points they should be treated before storage.

After washing and drying, apply a good quality wax or polish, following the aircraft and polish manufacturer's instructions. Polishing helps prevent paint deterioration caused by sunlight, rain and other deposits.

Again, following the aircraft manufacturer's instructions, carefully clean away any excess lubrication around the hinge areas of the control surfaces and sparingly reapply the correct grade of lubricant. Build-ups of old oil and grease tend to trap dirt and moisture creating a harmful cocktail which aids corrosion, especially where dissimilar metals are involved.

I once spent a whole day driving out to a client's farm to figure out what was wrong with his Auster. He could start the engine, but it would only run for a few seconds before stopping. It turned out a wasp had built a nest in the engine air intake. Birds and insects can be particularly resourceful when it comes to seeking nesting places. Pitot tubes and fuel tank vents are favour-

rite spots for insects like wasps to nest and engine air intakes and control surface hinge areas seem to attract nesting birds. Keeping these pests out is usually a simple matter of fitting plugs and bungs to the openings but remember to make sure any plugs or bungs are clearly marked and are removed before flight.

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Heat and ultraviolet light are the biggest contributors to the degradation of the plastics, vinyls, fabrics and leathers used in aircraft interior furnishings. Reflective screens installed on the inside of your aircraft's windows will help to keep the interior in good shape and the cabin temperature down on sunny days. These are quite cheap to buy and are available in custom fits for most aircraft.

External covers provide better protection and also look after Perspex windows very well but are generally more difficult to fit and often have to be custom made. They are highly recommended for long-term storage. **Lock and chock:** No matter how long you're leaving your aircraft inactive, you must make sure the controls are protected from the wind with proper control locks. Locking

the control column (and rudder pedals where possible) is generally adequate for short term parking. For long-term storage you should consider the external types of control surface clamps which provide improved protection for the control surfaces and limit the loads placed on the cables, pulleys, bell cranks, rods and brackets that make up the control system.

Finally, an aircraft left in the open should be properly chocked and tied down. For single engine aircraft, tie down ropes should have a tensile strength of 1500 kg; for light twins, 2000 kg is generally recommended. The best ropes to use are ultraviolet resistant braided nylon or dacron tied with a bowline or a reef (square) knot.

Aeroplanes should be tied down only at the tie down rings with 20 or 30 mm of movement in the ropes. Too much slack allows the aircraft to jerk against the ropes, which can cause structural damage or pull the stakes out of the ground. Tie-downs tied too tight can impose inverted flight loads that many aircraft are not designed to withstand.

So, if you can't fly your aircraft regularly, these tips should at least keep your investment in reasonable shape.

Careful inspection following the removal from storage of the aircraft must be carried out before flight. If you have any doubts about these procedures, or about returning the aircraft to flight, your LAME is a good source of advice.

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