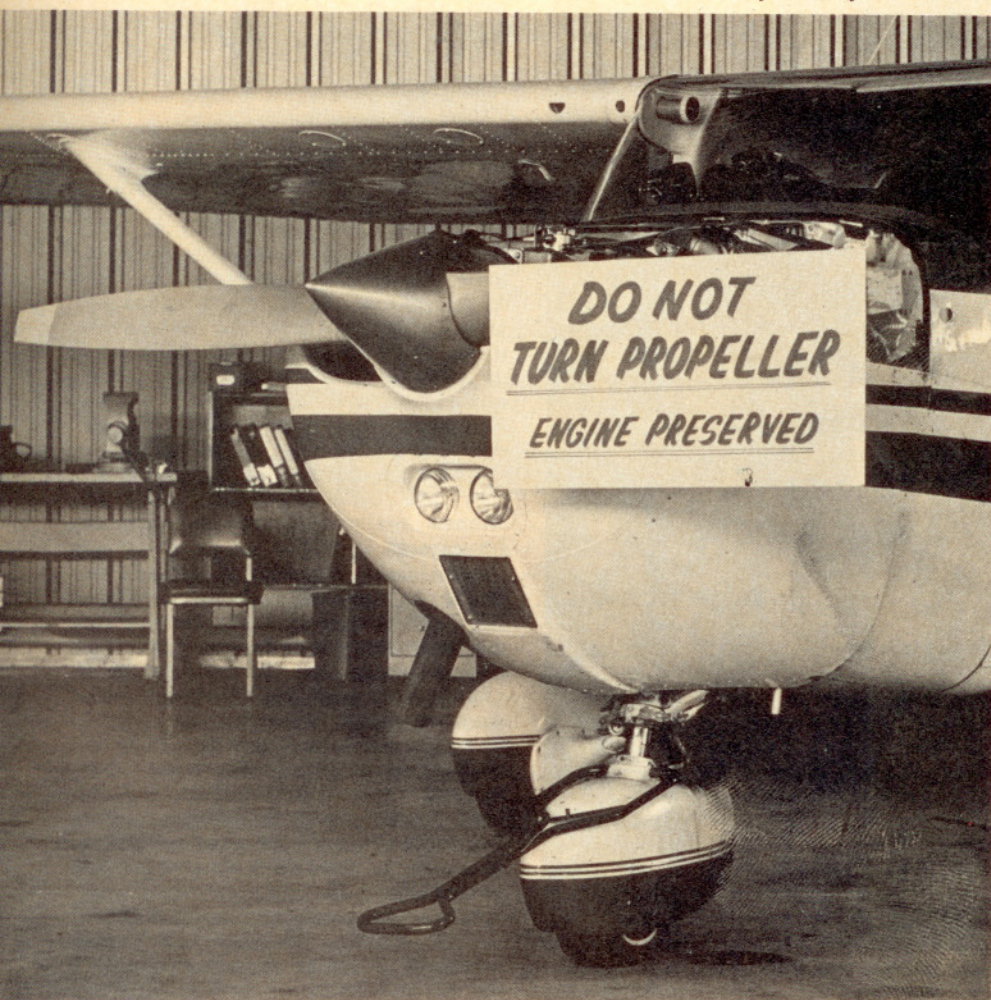


If your bird is infrequently flown, or must be placed in storage for a time, here are recommended tactics in . . .

THE **WAR** AGAINST Engine Corrosion

Aircraft with engine preserved for storage should be placarded with a caution not to turn the prop.
Photos courtesy of Teledyne Continental.



■ ■ Corrosion can be a devastating enemy of aircraft engines—particularly those in planes that are flown infrequently or placed in storage for an extended period of time.

New engines, or those with new or freshly honed cylinders after a top or major overhaul, are of special concern. In areas of high humidity, there have been instances where corrosion has been found in such cylinders after an inactive period of only a few days. Once these cylinders have been operated for approximately 50 hours, the varnish that collects on the cylinder walls offers some protection against this happening.

Obviously, however, proper steps must be taken to preclude the possibility of corrosion at any time. This is especially important if the aircraft is based near the seacoast, or in areas of high humidity, and is not flown more than once a week.

The best method for preventing corrosion of the cylinders and other internal parts of the engine is to fly the aircraft at least once a week, long enough for the engine to reach normal operating temperatures that will cook out moisture and other by-products of combustion.

The possibility of corrosion can be lessened by rotating the engine by hand (five revolutions) every seven days, if the aircraft cannot be flown during that period. This is more effective than running the engine up on the ground, which would only compound the problem by introducing condensation.

Aircraft engine storage recommendations are broken down into the following categories: flyable storage (7 to 30 days); temporary storage (up to 90 days); and indefinite storage.

Flyable Storage. If an aircraft is to be stored much longer than a week under normal climatic conditions, and if periodic flying to circulate the oil will not be carried out, it is advisable to prepare the engine for storage in the following

manner:

Operate the engine (preferably in flight) until the oil temperature reaches the normal range. Drain the oil supply from the sump as completely as possible, while the engine is still warm, and replace the drain plug.

Fill the sump to the full mark on the dipstick gauge with lubricating oil meeting the requirements of MIL-C-6529, Type II, which will mix with normal oil and provide protection against corrosion.

Run the engine at least five minutes, at a speed between 1,200 and 1,500 rpm, with the oil and cylinder-head temperatures in the normal operating range.

Each seven days during flyable storage, the propeller should be rotated by hand without running the engine. After rotating the engine six revolutions, stop the propeller 45 degrees to 90 degrees from the position it was in.

Caution: For maximum safety, accomplish engine rotation as follows: (a) Assure magneto switches are "off." (b) Throttle position "closed." (c) Mixture control "idle cutoff." (d) Do not stand within the arc of the propeller blades while turning the propeller.

If at the end of 30 days the aircraft is not to be removed from storage, the engine should be started and run. The preferred method is to fly the aircraft for 30 minutes and up to, but not exceeding, normal oil and cylinder temperatures.

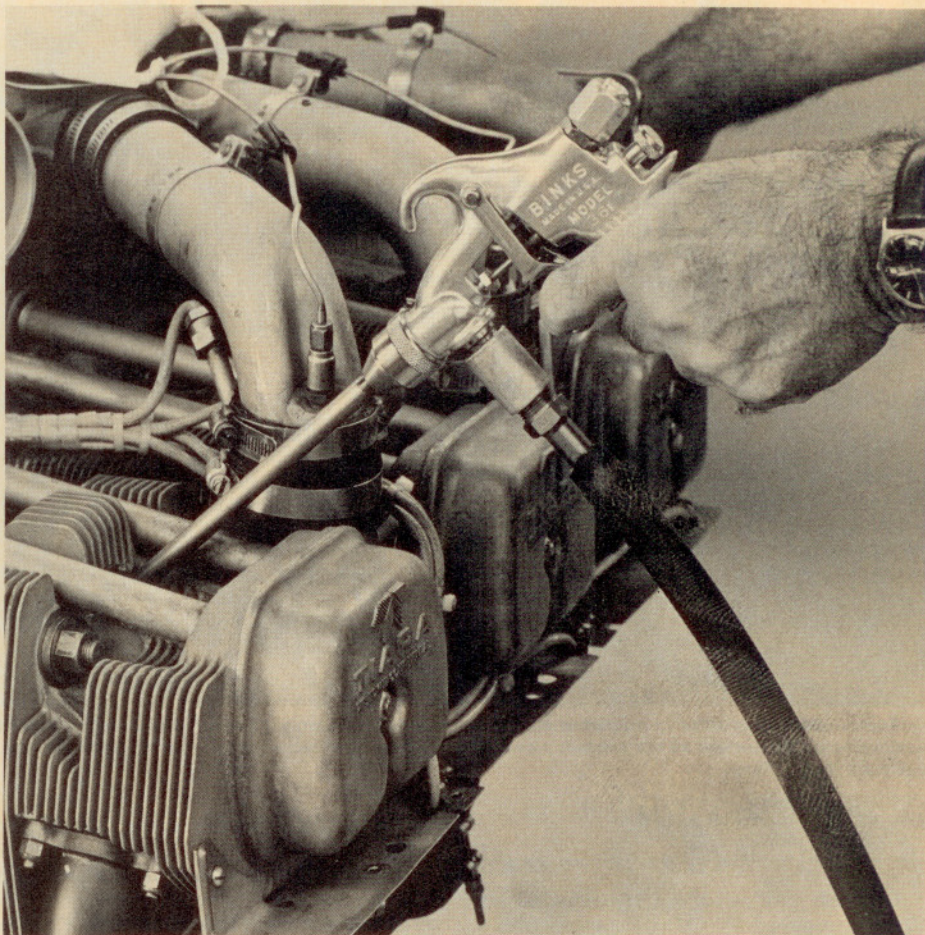
To prepare the aircraft for service, if the engine has a total time of more than 25 hours, the MIL-C-6529 oil should be drained after a ground warmup. Install the engine manufacturer's recommended oil before flight. (MIL-C-6529 is the Teledyne Continental Motors recommended oil for the first 25 hours of flight.)

Temporary Storage. To prepare the engine for temporary storage, remove the top spark plug and atomize spray preservative oil (lubrication oil, contact and volatile, corrosion-inhibited, MIL-L-46002, Grade 1) at room temperature, through the upper spark plug hole of each cylinder, with the piston in the down position. Rotate the crankshaft as each pair of cylinders is sprayed. Stop the crankshaft with no piston at the top position.

(Approved preservative oils recommended for use in Teledyne Continental engines for temporary storage are MIL-L-46002, Grade 1, oils: Nucle Oil 105: Daubert Chemical Co., 4700 S. Central Ave., Chicago, Ill.; Petrotect VA: Pennsylvania Refining Co., Butler, Pa.; Ferro-Gard 1009-G: Ranco Laboratories, Inc., 3617 Brownsville Rd., Pittsburgh, Pa.)

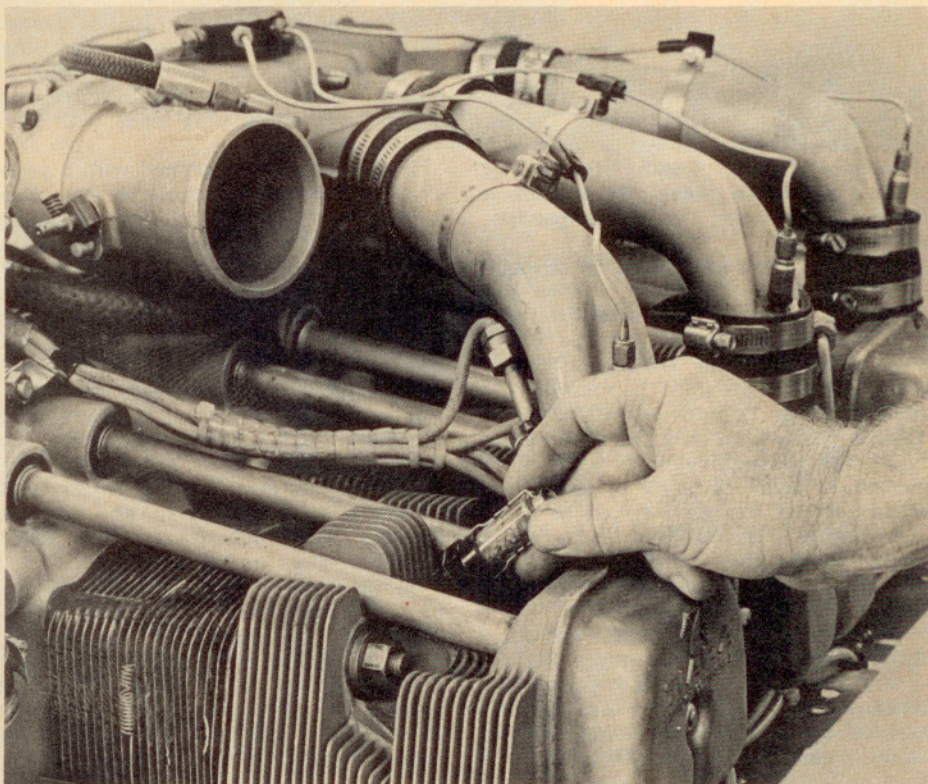
After completing the above, respray each cylinder without rotating the crank. To thoroughly cover all surfaces of the cylinder interior, move the nozzle of the spray gun from the top to the bottom of the cylinder. Then reinstall the spark plugs. Apply preservative to the engine interior by spraying the specified oil (approximately two ounces) through the oil filler tube.

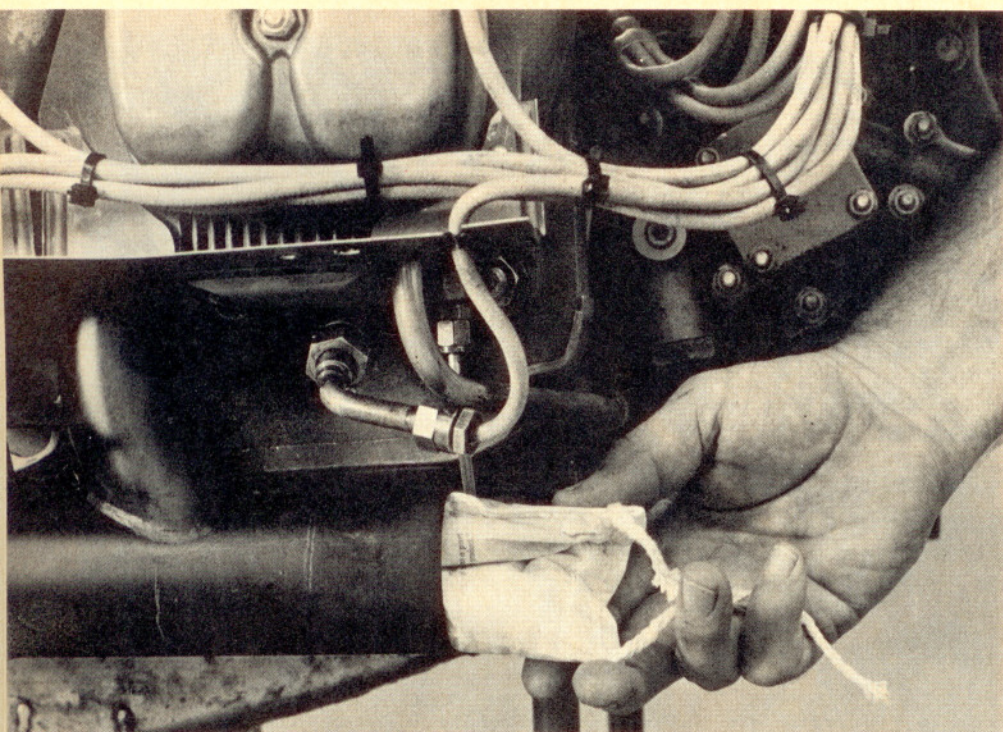
continued



A first step in preparing an engine for temporary storage is to spray preservative oil through the upper spark plug hole of each cylinder.

When an engine is prepared for indefinite storage, after corrosion-preventive mixture has been sprayed into each cylinder, a protex plug is installed in each of the top spark plug holes.





As one of the final steps in preparing an engine for indefinite storage, bags of desiccant are placed in such areas as the exhaust pipes. Openings are then sealed with moisture-resistant tape.

ENGINE CORROSION *continued*

Seal all engine openings exposed to the atmosphere by using suitable plugs or moisture-resistant tape, and attach red streamers at each point. Engines with propellers installed should have a tag affixed to the propeller in a conspicuous place, with the following notation on the tag: "Do not turn propeller; engine preserved."

To prepare the engine for service after temporary storage, remove seals, tape, paper, and streamers from all openings. With bottom plugs removed, hand-turn the propeller several revolutions to clear excess preservative oil, then reinstall plugs. Conduct the normal startup procedure. Give the aircraft a thorough cleaning, visual inspection, and test flight.

Indefinite Storage. Prior to storage, drain the engine oil and service the engine with a corrosion-preventive mixture. Use lubricating oil, MIL-C-6529, Type II, as mentioned earlier, or formulate the same product by thoroughly mixing one part compound MIL-C-6529, Type I (Esso Rust-Ban 628, Cosmoline No. 1223, or equivalent), with three parts new lubricating oil of the grade recommended for service (all at room temperature). Immediately after servicing with the corrosion-preventive mixture, fly the aircraft for a period of time not to exceed 30 minutes.

At the conclusion of the preservation flight, with the engine operating at 1,200 to 1,500 rpm, inject corrosion-preventive mixture (221°F to 250°F) into the carburetor air intake until heavy smoke comes from the exhaust. Increase the flow sufficiently to stop the engine. Do

not turn the propeller after the engine stops.

Remove the top spark plug from each cylinder and spray with corrosion-preventive mixture (221°F to 250°F). To thoroughly cover all surfaces of the cylinder interior, move the nozzle of the spray gun from the top to the bottom of the cylinder. If by accident the propeller is rotated following this spraying, respray the cylinders to ensure an unbroken coverage of corrosion-preventive mixture on all surfaces. Install protex plugs in each of the top spark plug holes, making sure that each plug is blue in color when installed. Protect and support the spark plug leads with AN-4060-1 protectors.

If the engine is equipped with a pressure-type carburetor, preserve this component by the following method. Drain the carburetor by removing the drain and vapor vent plugs from the regulator and fuel control unit. With the mixture control in the "rich" position, inject lubricating oil, Grade 1010, into the fuel inlet, at a pressure not to exceed 10 psi, until oil flows from the vapor vent opening. Allow the excess oil to drain, plug the inlet, and tighten and safety the drain and vapor vent plugs. Wire the throttle in the open position, place bags of desiccant in the intake, and seal the opening with moisture-resistant paper and tape, or a cover plate.

If the carburetor is removed from the engine, place a bag of desiccant in the throat of the carburetor air adapter. Seal the adapter with moisture-resistant paper and tape, or a cover plate. Also place a bag of desiccant in the exhaust pipes, and seal the openings with moisture-resistant tape. Then seal the cold-air inlet to the heater muff with

moisture-resistant tape, to exclude moisture and foreign objects. The engine breather should then be sealed by inserting a protex plug in the breather hose and clamping it in place.

Attach a red streamer to each place on the engine where bags of desiccant are placed. Attach red streamers either outside the sealed area with tape, or inside the sealed area with safety wire, to prevent wicking of moisture into the sealed area. Finally, all engines preserved for storage should have the propeller placarded with a sign: "Do not turn propeller; engine preserved."

This procedure may be used for indefinite storage, providing the airplane is run up at maximum intervals of 90 days and then reserviced in accordance with the temporary-storage requirements.

Aircraft prepared for indefinite storage should have the cylinder protex plugs inspected weekly. The plugs should be changed as soon as their color indicates unsafe conditions of storage. If the dehydrator plugs have changed color in one half or more of the cylinders, all desiccant material on the engine should be replaced.

The cylinder bores of all engines prepared for indefinite storage should be resprayed with corrosion-preventive mixture every six months, or more frequently if bore inspection indicates corrosion has started earlier. Replace all desiccant and protex plugs.

Before spraying, the engines should be inspected for corrosion as follows. Inspect the interior of at least one cylinder on each engine through the spark plug hole. If the cylinder shows the start of rust, spray it thoroughly with corrosion-preventive oil and turn the prop over five or six times, then respray. Remove at least one rocker box cover from each engine and inspect the valve mechanism.

To return the aircraft to service, remove the cylinder protex plugs and all paper, tape, and dehydrating agent used to preserve the engine. Drain the corrosion-preventive mixture and reserve with recommended lubricating oil.

If the carburetor has been preserved with oil, drain it by removing the drain and vapor vent plugs from the regulator and fuel control unit. With the mixture control in the "rich" position, inject service-type gasoline into the fuel inlet, at a pressure not to exceed 10 psi, until all the oil is flushed from the carburetor. Reinstall the carburetor plugs and attach the fuel line.

Rotate the propeller to clear excess preservative oil from the cylinders. Reinstall the spark plugs and battery, and rotate the propeller by hand through all compressions of the engine to check for liquid lock. Reinstall the cowlings and start the engine in the normal manner. Give the aircraft a thorough cleaning, visual inspection, and a test flight.

The foregoing are general recommendations for proper engine care. Since local conditions may differ and Teledyne Continental Motors has no control over the application of these recommendations, no warranty against corrosion is intended. □