SECTION V
STORAGE OF ENGINES

5-1. GENERAL

Engines in aircraft that are flown only occasionally tend to exhibit cylinder wall corrosion more than engines in aircraft that are flown frequently.

Of particular concern are new engines or engines with new or freshly honed cylinders after a top or major overhaul. 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. When cylinders have been operated for approximately 50 hours, the varnish deposited on the cylinder walls offers some protection against corrosion.

Obviously even then proper steps must be taken on engines used infrequently to lessen the possibility of corrosion. This is especially true if the aircraft is based near the sea coast or in areas of high humidity and flown less than once a week.

In all geographical areas the best method of preventing corrosion of the cylinders and other internal parts of the engine is to fly the aircraft at least once a week long enough to reach normal operating temperatures which will vaporize moisture and other by-products of combustion.

Aircraft engine storage recommendations are broken down into the following categories:

Flyable Storage (7 to 30 days) Temporary Storage (up to 90 days) Indefinite Storage

5-2. FLYABLE STORAGE (7 to 30 days)

a. Service aircraft per normal airframe manufacturer's instructions.

b. Each seven days during flyable storage, the propeller should be rotated by hand without running the engine. Rotate the engine six revolutions, stop the propeller 450 to 900 from the original position.

For maximum safety, accomplish engine rotation as follows:

(1) Verify magneto switches are "OFF"

(2) Throttle position "CLOSED"

(3) Mixture control "IDLE CUT-OFF"

(4) Set brakes and block aircraft wheels (5) Leave aircraft tie-downs installed and verify that the cabin door latch is open (6) Do not stand within the arc of the propeller blades while turning the propeller

c. If at the end of thirty (30) days the aircraft is not removed from storage, the aircraft should be flown for thirty (30) minutes, reaching, but not exceeding, normal oil and cylinder temperatures. If the aircraft cannot be flown it should be represerved in accordance with "B" (Temporary Storage) or "c" (Indefinite Storage).

5-3. TEMPORARY STORAGE (Up to 90 Days)

a. Preparation for Storage

1. Remove the top spark plug and spray atomized preservative oil, (Lubrication Oil-Contact and Volatile Corrosion-Inhibited, MIL-L-46002, Grade 1) at room temperature, through upper spark plug hole of each cylinder with the piston in approximately the bottom dead center position. Rotate crankshaft as each pair of opposite cylinders is sprayed. Stop crankshaft with no piston at top dead center.

NOTE

Shown below are some approved preservative oils recommended for use in Teledyne Continental engines for temporary and indefinite storage:

MIL-L-46002, Grade 1 Oils:

NOX RUST VCI-I05
Daubert Chemical Company
4700 S. Central Avenue
Chicago, Illinois

TECTYL 859A
Ashland Oil, Inc.
1401 Winchester Avenue
Ashland, Kentucky

2. Re-spray each cylinder without rotating crank. to thoroughly cover all surfaces of the cylinder interior, move the nozzle or spray gun from the top to the bottom of the cylinder.
3. Re-install spark plugs.
4. Apply preservative to engine interior by spraying the above specified oil (approximately two ounces) through the oil filler tube.
5. Seal all engine openings exposed to the atmosphere using suitable plugs, or moisture resistant tape, and attach red streamers at each point.
6. Engines, with propellers installed, that are preserved for storage in accordance with this section 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."

b. Preparation for Storage

1. Remove seals, tape, paper and streamers from all openings.
2. With bottom spark plugs removed from the cylinders, hand turn propeller several revolutions to clear excess preservative oil, then re-install spark plugs.
3. Conduct normal start-up procedure.
4. Give the aircraft a thorough cleaning and visual inspection. A test flight is recommended.

5-4. INDEFINITE STORAGE

a. Preparation for Storage

1. Drain the engine oil and refill with MIL-C-6529 Type II. Start engine and run until normal oil and cylinder head temperatures are reached. The preferred method would be to fly the aircraft for thirty (30) minutes. Allow engine to cool to ambient temperature. Accomplish steps "5-2.a." and "5-3.a." of temporary storage.

NOTE

MIL-C-6529 Type II may be formulated 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).

2. Apply preservative to engine interior by spraying MIL-L-46002, Grade 1 oil (approximately two ounces) through the oil filler tube.

b. Install dehydrator plugs MS27215-2, 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 protectors.

c. 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.

d. Place a bag of desiccant in the exhaust pipes and seal the openings with moisture resistant tape.

e. Seal the cold air inlet to the heater muff with moisture resistant tape to exclude moisture and foreign objects.

f. Seal the engine breather by inserting a dehydrator MS27215-2 plug in the breather hose and clamping in place.

g. Attach a red streamer to each place on the engine where bags of desiccant are placed. Either attach red streamers outside of the sealed area with tape or to the inside of the sealed area with safety wire to prevent wicking of moisture into the sealed area.

h. Engines, with propellers installed, that are preserved for storage in accordance with this section should have each propeller tagged in a conspicuous place with the following notation on the tag: "DO NOT TURN PROPELLER-ENGINE PRESERVED."

As an alternate method of indefinite storage, the aircraft may be serviced in accordance with the procedures under Temporary Storage providing the airplane is run-up at maximum intervals of 90 days and then re-serviced per the temporary storage requirements.

5-5. PROCEDURES NECESSARY FOR RETURNING AN AIRCRAFT TO SERVICE ARE AS FOLLOWS:

a. Remove the cylinder dehydrator plugs and all paper, tape, desiccant bags, and streamers used to preserve the engine.

b. Drain the corrosion preventive mixture and re-service with recommended lubricating oil.

WARNING

When returning the aircraft to service do not use the corrosion preventive oil referenced in paragraph 5-4.a.l. for more than 25 hours.

c. With bottom plugs removed rotate propeller to clear excess preservative oil from cylinders.

d. Re-install the spark plugs and rotate the propeller by hand through the compression strokes of all the cylinders to check for possible liquid lock. Start the engine in the normal manner.

e. Give the aircraft a thorough cleaning, visual inspection and test flight per airframe manufacturer's instructions.

5-6. AIRCRAFT STORED IN ACCORDANCE WITH THE INDEFINITE STORAGE PROCEDURES SHOULD BE INSPECTED PER THE FOLLOWING INSTRUCTIONS:

a. Aircraft prepared for indefinite storage should have the cylinder dehydrator plugs visually inspected every 30 days. 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.

b. 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 than six months. Replace all desiccant and dehydrator plugs. Before spraying, the engine should be inspected for corrosion as follows: Inspect the interior of at least one cylinder on each engine through the spark plug hole. If cylinder shows start of rust, spray cylinder corrosion preventive oil and turn prop six times, then respray all cylinders. Remove at least one rocker box cover from each engine and inspect the valve mechanism.