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GENERAL AVIATION inspection AIDS

SUPPLEMENT NO. 1

SEPTEMBER 1976

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

Flight Standards Service

GENERAL AVIATION INSPECTION AIDS

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U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
WASHINGTON, D.C. 20590

GENERAL AVIATION INSPECTION AIDS

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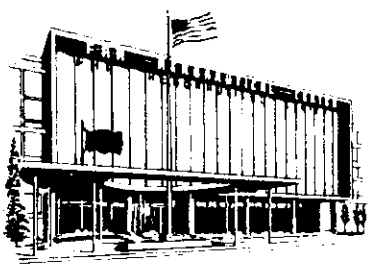


This is the home of the General Aviation Inspection Aids. The publication is prepared from information submitted by those of you who operate and maintain civil aeronautical products. The content of this publication includes select items that have been reported to be significant but were not fully evaluated by the time the material went to press. As additional facts, such as cause and corrective action, are identified, the data will be brought to your attention in subsequent issues of the Aids. This action has been implemented to give Aids' readers the earliest notice of reported conditions received via Malfunction or Defect Report, FAA 8330-2. Computers will constantly monitor these conditions during the period of evaluation for cause and corrective action. Your comments and suggestions for improvement are always welcome. If you wish to share in such material, please send to: FAA, Flight Standards Technical Division, Attn: AAC-236, P.O. Box 25082, Oklahoma City, Oklahoma 73125.

AIRCRAFT

BEECH

BEECH MODEL 33, 35, 36, 55 AND 58 SERIES AIRCRAFT--OIL FILTER ADAPTERS AND NEW TYPE OIL FILTERS

Teledyne Continental Motors recently made a change to the oil filter adapter used with the O-520 series engines. The by-pass valve in the adapter was removed and is now incorporated in the new type "gold" oil filters (P/N's 641583 and 641584). With this change a situation can occur which we feel should be brought to the attention of owners/operators and maintenance personnel.

If the old type "black" oil filters (P/N's 632399 and 637584) are used with the new oil filter adapter, P/N 641639, there will not be a by-pass in either unit and proper oil pressure cannot be obtained with cold oil. However, oil pressure will be normal after the oil warms up.

Teledyne Continental Motors Service Bulletin No. M75-27 dated November 1975 pertains to this subject. It is suggested this service bulletin be consulted for additional information.

Beech aircraft affected: Models F33A, S/N's CE-572 and on; F33C, S/N's CJ-86 and on; V35B, S/N's D-9757 and on; A36, S/N's E-670 and on; E55, S/N's TE-1044 and on; 58, S/N's TH-615 and on; and 58P, S/N's TJ-4 and on.

SAFETY Is Aviation's Greatest Asset

Beech Model 35 Series	Oil Pressure Gauge Line	Cracks are reported to have occurred in the oil pressure gauge line of these aircraft, resulting in loss of engine oil and subsequent emergency landings. In these instances the lines were made of copper. Copper tubing should be inspected for cracks, hardness, brittleness, and general condition at regular intervals. Copper becomes hard and brittle from vibration; however, it may be restored to the soft annealed state by heating to a red-hot condition and quenching in cold water. This annealing process should be accomplished if the copper tubing is removed for any reason. The copper tubing may also be replaced with aluminum alloy or corrosion-resistant steel tubing.

BEECH MODELS C35 THROUGH H35 AIRCRAFT--FUEL SELECTOR VALVE HANDLE

Reports have been received which indicate that the fuel selector valve will sometimes stick due to lack of usage. Other reports cite a misunderstanding as to which end of the fuel selector valve handle serves as the tank selection pointer. In this regard, the shorter, narrow thin end of the old type handle (P/N 35-924251) is to be pointed toward the desired fuel tank.

Beech Class II Service Instructions No. 0670-289 and Beechcraft Executive Airplane Safety Communique No. 35-28 were both released in late 1974. Each publication refers to the availability of a newly designed handle for the fuel selector valve. The new handle, which is identified by P/N 35-924287-1, features a better hand grip area and improved visual pointer capability. This handle replaces the handles on the P/N 35-924230 fuel pump or the handle which was included in Kit No. 35-576S.

In addition, the Safety Communique contains a preflight procedure the pilot can use to assure the fuel selector valve is not binding and that the selector indicator is positioned to the desired fuel tank prior to takeoff.

Airplanes affected: S/N's D-2901 thru D-5330, except D-5062.

Beech Models V35B, 95-B55, and 58P	Emergency Hand Crank -- Main Landing Gear	There have been a few reports of spar covers installed so the landing gear emergency handle is covered and cannot be used. Investigation of these reports disclosed that the spar covers were installed after alterations in the field without any consideration given to the functioning of the emergency hand crank. It is recommended that the emergency landing gear hand crank be checked for clearance from obstructions prior to being returned to service after maintenance or servicing has been accomplished in the cabin area.

Beech Models 95, B95, B95A, D95A, and E95	Engine Mount	Numerous reports of cracks found in the tubular engine mounts of these aircraft have been received. Beech recommends the engine mounts be inspected with at least a four-power magnifying glass every 100 hours time in service. This inspection is specified in Beech Class II Service Instructions No. 0816-241. These engine mounts are not heat treated; therefore, if cracks are found during this inspection, repairs can be made using the guidelines contained in the welding section of FAA Advisory Circular No. 43.13-1A.

DON'T PUT IT OFF ANY LONGER - If you have recently experienced mechanical difficulties or problems with an aeronautical product and have not reported it yet, please do so now and help your fellow airmen. FAA Form 8330-2, available from your local General Aviation District Office, may be used for this purpose. The form requires no postage and is preaddressed to receive prompt handling.

BEECH MODEL 90, 99, 100 and 200 SERIES AIRCRAFT -- ENGINE FUEL DRAIN COLLECTOR SYSTEM

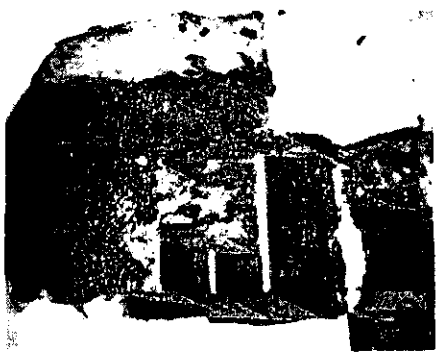
Inoperative or defective float switches in the engine fuel drain collector tanks will allow fuel from the tanks to overflow onto the ramp. Beech has issued Class I Service Instructions No. 0783-282 which announces the availability of an improved float switch. It is suggested that this service instruction be complied with if problems are encountered with the existing float switches.

BELLANCA

Bellanca
Model 14-13-2

Wing Spar

At 1555 hours aircraft time in service, external examination of the wing surfaces failed to reveal any evidence of wood decay. Removal of the plywood skin from suspected areas revealed extensive wood deterioration of the left wing rear spar adjacent to the upper attachment fitting and the right wing front spar 70 inches outboard of the upper attachment fitting.



Bellanca Model 14-19-3	Carry Through Spar, P/N 190202	The rear spar carry through truss was found to be cracked during inspection. The vertical members were cracked adjacent to the welds at the upper rear spar attachment fittings. The left side was cracked approximately 90 degrees around the circumference and the right side was cracked approximately 40 degrees around the circumference.

BOEING

Boeing (Vertol) Model 107-II	Rotor Hub Horizontal Hinge Pin Bearing. P/N AO2R8262-1	During inspection to determine the cause of an oil leak in the forward rotor hub, the horizontal hinge pin bearing liner was found to be cracked. Total time in service - 2864 hours. The life limit specified by the manufacturer for this part is 4000 hours.

CESSNA

Cessna
Model 310G

Landing Gear Actuator
Gearbox, P/N 0894000

The landing gear collapsed during landing roll. Investigation revealed that the gearbox sector gear had failed at the pivot shaft. Further checks disclosed that the landing gear was misrigged, and the sector gear was contacting the internal stop. The sector gear was dented at point of contact.

CESSNA MODEL 310, 320 AND 400 SERIES AIRCRAFT -- RUDDER PEDAL TORQUE TUBE ASSEMBLY

Bending and breakage of the rudder pedal posts and control cable attach arms welded to the rudder pedal torque tubes continue to be reported. Airplanes manufactured prior to March 1970, are particularly susceptible to this type problem. Affected part numbers are:

Models 310 and 320 -- P/N's 0813018-1 and -2; 0861700-1 and -2.
Model 400 Series -- P/N's 5015006-7, -8 and -9; 5115260-1 and -4.

It is recommended these torque tubes be carefully examined for deformation or cracks in the welded areas during regularly scheduled inspections. Removal of the cabin floorboards is necessary to properly accomplish this inspection.

Cessna Service Letter No. ME71-1 announced that a strengthened torque tube had been developed for inclusion in production 400 series aircraft and for use as spares. This service letter also provided instructions for the modification of existing torque tubes. In March 1970, a reinforcing sleeve was added to the torque tubes used on Model 310 production aircraft and spares. A modification similar to that described in Service Letter ME71-1 can also be added to the torque tubes originally installed in early Model 310 and 320 airplanes.

CESSNA MODEL 310, 401, 402 and 411 SERIES AIRCRAFT -- EMERGENCY EXIT WINDOW RELEASE HANDLE

A number of instances have been reported where the handle on the emergency exit was pulled, probably out of curiousity, and then stowed so the condition was undetectable by visual inspection. On a subsequent flight, the emergency exit window blew off unexpectedly.

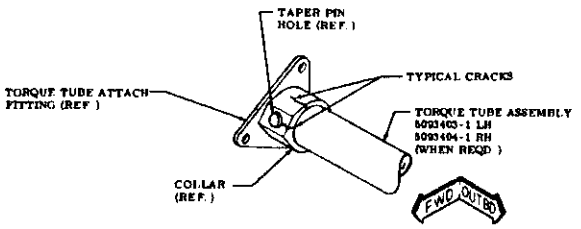
When the emergency exit handle is pulled on these airplanes, the retaining pins are withdrawn from the window frame. Merely returning the handle to its normal position will not reinstall the pins to their locked position.

An acceptable method to prevent occurrences such as these is to tag the exit release handle for easy preflight inspection. Use a fine wire such as a 5-amp fuse wire or .011 copper safety wire and secure it loosely between the handle and the window trim. If the handle is displaced enough to disengage the retaining pins, the wire will be broken, thereby indicating an unsafe condition during the next preflight.

Cessna Model 401, 402, 411, 414 and 421 Series — Elevator Torque Tube Fittings

There have been several reports of cracks found in the torque tube fittings, especially at the taper pinholes. Cracking at these holes is believed to be caused by overtorquing the taper pins. The recommended torque value for these pins is 50 ± 10 inch-pounds.

It is suggested that these fittings be checked for cracks and corrosion at each annual or 100-hour inspection, or whenever the tail cone is removed for any reason. Cessna Service Letter No. ME71-8 provides additional information on this subject.



CURTISS-WRIGHT

Curtiss-Wright Model C-46F — Elevator Bellcrank, P/N 2053030441

Elevator control was lost during takeoff. Investigation revealed the lower end of the elevator bellcrank had failed adjacent to the torque tube attachment bearing.

SAFETY is the responsibility of everyone in Aviation.

FAIRCHILD INDUSTRIES

Fairchild Industries Model FH-1100	Cyclic Input Ring Assembly, P/N 24-34205	A cyclic input ring assembly failure is believed to have been caused by use of incorrect torque when installing the vertical assembly bolts. A torque value, significantly lower than specified by the manufacturer, was used which caused improper distribution of longitudinal cyclic control loads and subsequent failure of the ring assembly. The importance of using the correct torque values when assembling rotorcraft components cannot be over-emphasized.

MARTIN

Martin Model 404	Nose Landing Gear Downlock, P/N 202SD82043	An unsafe nose landing gear indication resulted because the downlock plunger had only extended half of its full travel. Flaking of the metal plating on the lock plunger pin caused it to bind, preventing full extension
Martin Model 404	Horizontal Stabilizer Spar	During inspection, corrosion was found on the front spars of both the right and left horizontal stabilizers. The corrosion was located on the upper spar caps approximately 20 inches outboard of the aircraft centerline.

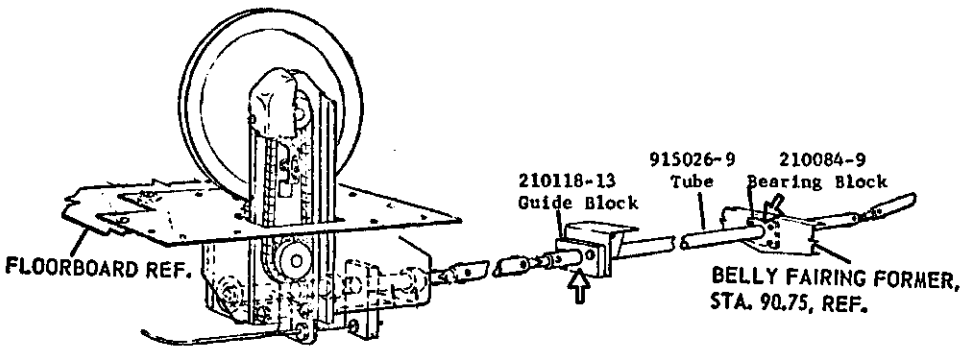
MOONEY

Mooney
Model M20F

Elevator Trim Tab Control
Tube, P/N 915026-9

The elevator trim tab control tube was found to be severely worn at both ends where it rubs on the guide blocks.

Mooney Service Bulletin No. M20-185 provides information for inspection in this area and describes a kit which protects the trim tube from wear.



PIPER

Piper Model PA-18	Fuselage Longeron	Cracks have been detected in the upper fuselage longerons adjacent to the aft horizontal stabilizer support assembly, P/N 21161-00, welds. Bending loads imposed upon the longerons due to binding of the pivot tube, P/N 86062-79, in the support assembly during trim actuation, is a possible cause factor. Frequent lubrication of the pivot tube and support assembly is recommended.
Piper Model PA-18S	Elevator Cable Turnbuckle Terminal	Elevator control was lost immediately following takeoff, requiring the pilot to execute a straight-in emergency landing maintaining altitude control by use of the throttle. Investigation revealed the upper elevator cable turnbuckle terminal had failed adjacent to its bellcrank attachment. The terminal fork to bellcrank attachment was rusted causing the terminal to bend rather than swivel during elevator control actuation, resulting in eventual failure. The aircraft had been operated 97 hours and 12 months since last inspection.
Piper Models PA-23-235 and PA-23-250	Wing Spar	Piper Service Letter No. 591 issued August 31, 1971, called for a one-time inspection of certain serial number aircraft wing front spars for cracks. The service letter identified the areas where cracks might be found and specified reinforcement kits to be used in the event cracks were detected. A repeated examination during a recent 100-hour inspection of a PA-23-250 aircraft at 2500 hours time in service, revealed the front spars of both wings were cracked. Careful examination of the spar areas identified in service letter No. 591 is recommended each 100-hour or annual inspection.
Piper Model PA-23-250	Landing Gear Anti-Retraction Valve Hose, P/N 17766-27	Loss of hydraulic and CO_2 pressure due to failure of the subject hose assembly prevented the nose landing gear to lock in the down position. Deterioration of the hose due to exposure to the elements was the cause of failure. The hose had been in service for 2,315 hours and several years.
Piper Model PA-24-250	Landing Gear Retract Coil Spring, P/N 83302-39	Several attempts had to be made to obtain a landing gear down and locked indication. Inspection revealed the cause of difficulty to be inadequate tension on the coil spring, P/N 83302-39, which attaches to the transmission motor brake arm assembly, P/N 23042-00. Inadequate spring tension was the result of loosening of the cotter pin which secures the upper end of the spring to the cockpit floor.
Piper Models PA-24-250 and PA-24-260	Stabilator Balance Weight Tube	Testing by the manufacturer indicates cracks may develop in stabilator balance weight tubes, P/N 28035-00, installed per Piper Service Letter No. 687 dated June 19, 1974. Sufficient radius was not provided at the balance weight cut-out of the subject tubes. Piper Service Bulletin No. 493 dated June 4, 1976, calls for the installation of new P/N 28035-00, tubes within the next 100 hours of operation for certain serial number aircraft that have been modified per SL 687. The new tubes have a reshaped balance weight cut-out with radius cut corners to preclude corner cracks.

Piper Model PA-24-260	Rudder Hinge Bracket, P/N's 20707-02 and 20707-03	During a routine annual inspection at 1092 hours time in service, the rudder top hinge bracket, P/N 20707-02, and the center bracket, P/N 20707-03, were found to be cracked. The cracks originated at the outer race of the pressed-in bearing and had progressed to the edge of the brackets.
Piper Model PA-28-140	Hose Assembly, P/N 61413-02	The oil cooler hose assembly failed, resulting in loss of oil and engine failure. Total time in service - 3327 hours.
Piper Model PA-28-151	Hose Clamp, P/N 62858-02	The pilot reported that the elevator control jammed in flight. Investigation revealed that when the elevator control is pulled back approximately 5-inches, the aileron chain will catch on the vacuum regulator hose clamp. If the clamp is installed with the adjustment worm down, the chain-to-clamp clearance is less than 1/8-inch. If the clamp adjustment worm is installed on top of the hose, the clearance increases to approximately 3/8-inch.
Piper Model PA-31	Main Landing Gear Uplock Rod, P/N 41949-03	After takeoff, the landing gear would not lock in the up position. During landing roll-out, the right main gear collapsed. The cause was traced to binding of the main gear uplock rod. Due to a number of similar reports, Piper issued Service Letter No. 755, which calls for inspection and lubrication of landing gear actuator rods each 100-hour, annual or programmed inspection.
Piper Model PA-31	Aileron Interconnect Cable	During a routine 100-hour inspection, the aileron interconnect cable was found to be chafing against the edge of a lightening hole under the cabin floor, just forward of the rear spar.
Piper Model PA-31	Battery Box Drain Tube	During a routine inspection, the battery box overboard drain line was found to be clogged and separated from the box. If this condition had not been detected, corrosion of the aircraft structure could have occurred.
Piper Model PA-31 Series	Flap Drive Transmission, Dukes P/N 4268-00	Several reports of worn flap drive transmission ball shafts have been received. The wear has been detected on the machined surface on the end of the shaft which enters the bearing immediately forward of gear, P/N 2154-53, and the threaded portion of the shaft. This condition has been found when complying with AD 76-10-06 and installing transmission gear overhaul kit, Piper P/N 761 059.
Piper Model PA-31-350	Nose Landing Gear and Torque Link	When replacing the nose landing gear strut upper housing assembly, P/N 40273-00, which was damaged due to improper ground handling, additional discrepancies were noted. Both upper and lower torque link bolts were nearly sheared and their attachment points at the cylinder assembly and fork assembly were badly distorted. Complete disassembly was required to detect this hidden damage. The damage required replacement of both torque links, P/N 45318-00, both torque link bolts, P/N 402 344, cylinder assembly, P/N 45314-00, and fork assembly, P/N 45333-03, in addition to the upper strut housing, P/N 40273-00.

Piper Model PA-31-350	Elevator Balance Weight, P/N 53104-00	Several reports of loose and broken elevator balance weights have been received. In one instance at an aircraft total time of 389 hours, the left balance weight had broken and pieces had worked their way to the elevator trailing edge. This condition was detected when complying with Piper Service Bulletin No. 500. A similar condition was found during a routine preflight inspection, and the aircraft total time in service was 510 hours. Another report advised of a loose balance weight bolt found at 181 hours on an aircraft which had Service Bulletin No. 500 and modification kit No. 761 041 incorporated. Service Bulletin No. 500, dated April 23, 1976, calls for installation of balance weight modification kits within the next 50 hours of operation.
Piper Model PA-31P	Landing Gear Control Handle Lockout Solenoid, P/N 487-155	A pilot inadvertently moved the landing gear control lever to retract position causing the nose landing gear to collapse during engine start. Investigation revealed the lockout pin in the subject solenoid was stuck in the retracted position defeating its purpose, permitting movement of the selector lever to retract position when the aircraft was on the ground.
Piper Model PA-31T	Elevator Hinge System Modification	Recent testing of the aircraft structure by the manufacturer revealed a need to strengthen the elevator hinge system. Piper Service Bulletin No. 504, dated June 1, 1976, applicable to aircraft starting with S/N 31T-7400001 through 31T-7620039, calls for installation of modification kit No. 761 056 at the next "Continuous Maintenance Event", not to exceed the next 50 hours of operation. The modification consists primarily of new elevator mating hinges, support and attachment components, and hardware.
Piper Model PA-31T	Engine Mounts	The Piper Continuous Inspection Program for the PA-31T aircraft, calls for replacement of engine top mounts, P/N's 761 603 and 761 604, each 400 hours of operation. Piper Service Letter No. 780, dated June 8, 1976, advises of new top mounts, P/N's 761 612 and 761 613, refined to offer increased service life. The service letter states, replacement of the new part number mounts will not be required until scheduled engine removal as long as routine and detailed engine inspections ascertain continued serviceability.
Piper Model PA-34-200	Nose Landing Gear System	During approach for landing, the nose gear failed to extend. A gear-up landing was made. Inspection revealed the nose strut aligning ball end had missed the retract track assembly and jammed the nose gear. Further inspection disclosed that the steering arm assembly, P/N 95395-00, secured to the mount assembly, P/N 95551-23, had deflected upward permitting the ball to miss the track assembly, P/N 95759-07. Also, the boltholes in the mount assembly were elongated.
Piper Model PA-36-285	Wing Spar Bolt	Piper Aircraft Corporation advised exhaustive fatigue testing of the PA-36 wing structure has resulted in the establishment of a 2000-hour life limit for the subject bolts. Piper Service Bulletin No. 501 applicable to aircraft serial number 36-736001 and above, provides information for procuring bolt replacement Kit No. 761 058 and installation instructions.

RAVEN

Raven (Balloon) Model AX 7	Inflater, P/N DPB2000	During balloon inflation with a hand-held inflater, the nozzle jet of the inflater came off. This permitted raw propane to escape and ignite. The pilot received burns and one panel in the skirt and one panel in the envelope were damaged. Investigation revealed that the nozzle is silver soldered in place. This inflater is also used as installed equipment on Piccard balloons.

ROCKWELL INTERNATIONAL

Rockwell International Model 500	Engine Mount, P/N's 3620025-1 and -2	The upper mounts of both engines were found to be heavily corroded. Total time in service - 4138 hours.

Rockwell International Vertical Stabilizer Fairing
Model 685

The vertical stabilizer fairing failed at the ADF sense antenna attach point. Total time in service - 1300 hours.

SMITH

Smith Model 601A	Fuel Selector Knob	The right fuel selector valve knob came off while changing tanks. Investigation revealed that the setscrews retaining the knob on the shaft had worked loose. Further checks disclosed that the shaft had a flat side for one setscrew, but not the other.

SWEARINGEN

Swearingen Model SA226-AT	Elevator Quadrant, P/N 27-44046-5	The elevator quadrant was found cracked in the web adjacent to the main pivot point. The crack involves approximately 10 percent of the web area.

SAFETY is the Responsibility of Everyone in Aviation.

ACCESSORIES

BENDIX

Bendix Magneto Model D2200	Capacitor, P/N 10-382681	The left magneto capacitor was found broken during an investigation to determine why the engine would not start. Total time in service - 251 hours.
Bendix Magneto Models D6LN-2021 and D6LN-2230	Coil retainer screw, P/N 10-382649	Disassembly of magnetos to determine the cause for malfunctioning revealed that the coil retaining screws had loosened and backed out. The screws were found inside the magneto case and had caused damage to rotating components including the distributor gears.

BENDIX MAGNETO--DRIVE COUPLING

Pieces of metal and rubber from a failed magneto drive coupling were found in the engine oil system. The magneto was replaced and the engine crankcase was cleaned and flushed. Approximately 200 hours later, the oil cooler ruptured causing complete loss of engine oil. Inspection revealed that the oil cooler was plugged with rubber and metal known to be from the previous magneto drive coupling failure.

TITAN

Titan Fuel Pump Model G-6	Mating Surface Screws	The cause for inflight stoppage of the left engine installed in a Piper PA-31-325 aircraft was traced to severe external fuel leakage through the parting surface of the engine driven fuel pump. Inspection revealed although the mating surface screws were properly safetied, they all became loose during 240 hours of operation. This condition allowed much raw fuel to be pumped into the engine compartment adjacent to the turbocharger presenting a potential for an inflight fire or explosion.

COMMUNICATION/NAVIGATION EQUIPMENT

DORNE AND MARGOLIN

Dorne and Margolin VOR Antenna Model DM-N4-15	CDI Indications	An operator of a fleet of Learjet aircraft has reported unstable and erroneous VOR course deviation indicator readings during flight operation. Many times, the cause of difficulty has been traced to the subject antennas. Examination of the defective units revealed paint separation that follows the boot portion at the edge of the antenna.

EQUIPMENT

COMMUNICATION COMPONENTS CORPORATION

Communication Components Emergency Locator Transmitter Model CIR-10	Battery	During a 100-hour inspection, the ELT mounting plate was found to be severely corroded. Also, the ELT was inoperative. Further checks disclosed that the ELT battery was leaking.

NARCO

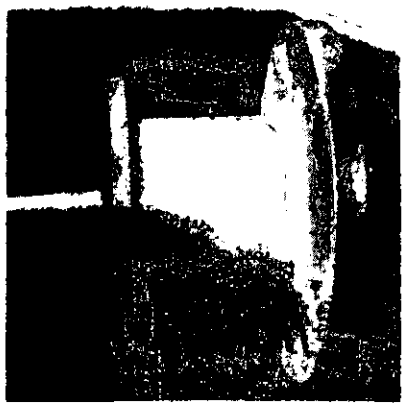
NARCO Emergency Locator Transmitter Model ELT-10	Internal Corrosion	Many reports of internal corrosion, lead separation, and inoperative units have been received. These conditions have been found during inspection performed several months prior to the placarded battery expiration date.

ENGINES

CONTINENTAL

Continental Model IO-520-E — Crankshaft, P/N 631716

An inspection to determine the source of an oil leak revealed that the crankshaft was cracked behind the propeller flange. The crack extended approximately 3/4 of the way around the shaft.



NOTICE TO READERS: The General Aviation Inspection Aids are, for the most part, prepared from information supplied by those who operate and maintain aircraft. The FAA encourages the reporting of all malfunctions or defects that come to the attention of service or operating personnel, even though the problem has been previously reported. FAA Form 8330-2, available from the local General Aviation District Office, may be used for reporting purposes.

LYCOMING

Lycoming Model O-320-A2B	Magneto Impulse Coupling	A "thud" followed by engine stoppage was experienced during flight. Investigation revealed that the left magneto impulse coupling had failed. A piece of the failed coupling was found to be lodged between the magneto driven gear and the drive gear which also drives the engine camshaft.
Lycoming Model O-360-A1A	Connecting Rod P/N LW 11750	The engine was disassembled and inspected at 374 hours time in service because metal particles were found in the oil screen. Magnetic particle inspection revealed that the No. 3 cylinder connecting rod was cracked adjacent to a top bolt-hole. Records show a cylinder, piston, and spark plugs were replaced because of foreign object damage at 2 hours time in service, and the propeller was replaced at 274 hours time in service because of damage experienced during a gear-up landing.
Lycoming Model O-360-A3A	Crankshaft	Failure of the engine crankshaft resulted in complete loss of the propeller and part of the engine nose section during flight. Records disclosed that 41 hours prior to the incident, the propeller was replaced due to blade damage incurred when the aircraft struck a snowbank during taxi. The engine had not been inspected internaliy although Lycoming Service Letter No. L163A advises, "In the case of sudden engine stoppage the safest procedure is to remove and disassemble the engine and inspect the reciprocating parts."
Lycoming Model VO-435-AIF	Push Rod Tube	When checking for exhaust valve guide wear per Service Bulletin No. 388 at 456 hours TSO, all intake and exhaust push rod tubes were found to be excessively worn. Investigation revealed washers, P/N 71549, had been installed on the outboard side of the rocker shafts rather than the inboard side during engine overhaul. This caused misalignment of the push rods in their housings resulting in wear of the push rod tubes during engine operation.
Lycoming Model TIO-540-J2BD	Temperature Control Oil Cooler Bypass Valve	The engine was disassembled because of reported high oil temperature. Inspection revealed the temperature control cooler bypass valve seat was elongated. Also, the nut which retains the valve and spring to the bypass valve shaft was missing and found inside the oil cooler. The nut is safetied by crimping to conform to the flats on two sides of the threaded shaft. It appears this crimping action causes thread disengagement between the nut and shaft perpendicular to the crimped areas.
Lycoming Model TIO-540-J2BD	Crankcase	The engine crankcase was found to be cracked. The crack which was located at the base of the No. 6 cylinder below the top forward stud extending to the raised No. 6 on the crankcase, was found when checking for the source of an oil leak. This area is obscured by the cylinder baffle and is not clearly visible without removing the cylinder. Total time in service - 1332 hours.

Lycoming Model TIO and TIGO-541-E Series	Oil Filter Seal	Avco Lycoming Division advises loss of engine oil and possible engine damage could result if oil seals supplied with other than Lycoming oil filter element kit LW-11198 are used. Other manufacturers' oil filter element kits listed in Service Letter No. L178 and Service Bulletin No. 397 are acceptable if used with O-ring seal, P/N's MS-9021-154 or MS-29513-154, obtainable through any Avco Lycoming distributor. Service Bulletin No. 397 pertains to the subject and provides necessary installation instructions.
Lycoming Model TIGO-541-6	Manifold Pressure Relief Valve	Avco Lycoming has introduced as optional equipment a manifold pressure relief valve to prevent inadvertent engine overboost. This valve supplied with Kit, P/N 14383, limits manifold pressure to 47.75 inches HG which will help prevent exceeding engine horsepower limitations and overstress of engine parts. Lycoming Service Instruction No. 1337 pertains to the subject.

UNITED AIRCRAFT OF CANADA

United Aircraft of Canada Model PT6A-6	Turbine Disc, P/N 3013511	An explosion type noise followed by fire from the right engine exhaust was experienced in flight. The propeller was feathered and ground inspection revealed turbine blades and boltheads in the exhaust pipe. Engine teardown inspection disclosed the gas generator turbine disc had failed.
United Aircraft of Canada Model PT6T-3	Drive Shaft Bearing, P/N 3021467	The engine was shutdown in flight due to loss of oil pressure. Investigation revealed that the main input drive shaft bearing had failed.
United Aircraft of Canada Model PT6T-3	Fuel Pump, Pesco, P/N V25277-300-02	An in-flight engine flameout was found to have been caused by worn splines on the drive coupling, P/N 02-14910-01, and fuel pump shaft.

MAINTENANCE NOTES

AIRCRAFT WIRING HARNESS SPIRAL WRAPPING

It was found during the investigation of a recent aircraft electrical fire that the polyethelene spiral wrapping used with the aircraft wiring harness continued to burn after the ignition source was removed causing substantial additional damage. Certain types of polyethelene spiral wrapping will not meet the FAR 23 flame resistance requirement or the FAR 25 flame self-extinguishing requirement. It is suggested that persons responsible for replacement or modifications to aircraft wiring consult their local General Aviation District Office if any doubt exists as to the acceptability of spiral wrap materials selected for use.

Aviation **SAFETY** is everyone's responsibility.

CARBURETOR CLEANING

Follow the cleaner manufacturer's instructions. DO NOT expose non metal parts to carburetor cleaning solutions.

Carburetor cleaning solutions are formulated to be used on metal only and can have a very adverse effect on non metal materials.

Parts which are made with both metal and non metal--such as floats, gaskets, accelerator pump plungers, etc., --must not be cleaned or rinsed with cleaners.

If non metal parts have been accidentally exposed to cleaners, they must be scrapped.

Non metal parts must not be steam cleaned.

The photograph shows non metal parts which have been exposed to carburetor cleaner.

Marvel-Schebler/Tillotson Service Bulletin No. A1-76 and Aircraft Carburetor Overhaul Procedures Manual relate to this subject.

EXAMPLES OF DAMAGED NON METAL CARBURETOR PARTS WHICH HAVE BEEN EXPOSED TO CARBURETOR CLEANER

CONTINENTAL AND LYCOMING ENGINES USING CRANKSHAFT DAMPERS

Engine damper systems are precisely tuned centrifugal pendulum dynamic absorbers. Without these types of finely tuned devices, many highly efficient reciprocating aircraft engine-propeller combinations in service today would not be possible. Being so designed, it is necessary that this precise tuning be maintained in service or its effectiveness is lost.

Unlike other wearing parts of the engine such as bearings, rings, cylinders, etc.; detectable by loss of oil pressure, high oil consumption, or cylinder compression checks, dampers have no such wear symptoms. Contrary to much popular belief, wear of these assemblies is not normally detectable by vibration, noise, or any other measurable engine performance parameter.

Criteria for wear measurement and replacement of specific parts of the assemblies have been made available in overhaul manuals by engine manufacturers for some time. Service Bulletins have been issued by Continental (M73-5) and Lycoming (240H) both calling for 100% replacement of those parts, due to the difficulty of making accurate wear measurements and evaluations.

Wear of certain components of the damper assemblies varies greatly between engines and is directly related to sound operational and maintenance procedures. It is strongly recommended therefore that:

1. Particular attention be given this subject at the time of engine overhaul.
2. Manufacturers published instructions be strictly adhered to.
3. These recommendations be carefully evaluated in any consideration of extending engine operation beyond recommended overhaul time.

CORROSION

Corrosion control continues to be one of the most important tasks in prolonging the service life of airplanes and airplane components. To simplify this task, airplane design, materials, and manufacturing processes are continually being upgraded to extend the service life by increasing their resistance to corrosion. The basic protection given metal surfaces of airplanes is cladding, plating, sealing, priming, and painting. New airplanes are receiving added protection in the form of a water-displacing corrosion-preventive compound. The compound is being applied to some difficult access areas as a standard production treatment and to other specified areas as a customer option. Use of the compound in specified areas of in-service airplanes has also been recommended.

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GENERAL AVIATION inspection AIDS

SUPPLEMENT NO. 2

OCTOBER 1976

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

Flight Standards Service

GENERAL AVIATION INSPECTION AIDS

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U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
WASHINGTON, D.C. 20590

GENERAL AVIATION INSPECTION AIDS

SUPPLEMENT No. 2
OCTOBER 1976

This is the home of the General Aviation Inspection Aids. The publication is prepared from information submitted by those of you who operate and maintain civil aeronautical products. The content of this publication includes select items that have been reported to be significant but were not fully evaluated by the time the material went to press. As additional facts, such as cause and corrective action, are identified, the data will be brought to your attention in subsequent issues of the Aids. This action has been implemented to give Aids' readers the earliest notice of reported conditions received via Malfunction or Defect Report, FAA 8330-2. Computers will constantly monitor these conditions during the period of evaluation for cause and corrective action. Your comments and suggestions for improvement are always welcome. If you wish to share in such material, please send to: FAA, Flight Standards Technical Division, Attn: AAC-236, P.O. Box 25082, Oklahoma City, Oklahoma 73125.

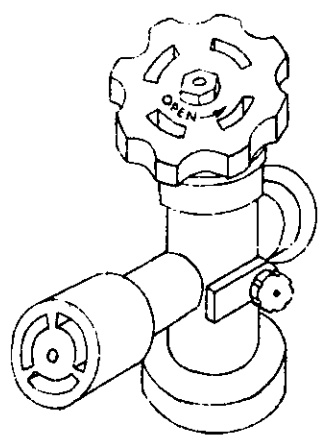
AIRCRAFT

BALLOON WORKS

Balloon Works
Model 6

Tank Valve

The operator attempted to shut off the gas supply to the pilot light. Instead of turning the valve in the normal clockwise direction, he turned it counterclockwise. The valve stem and packing came out, releasing propane. The propane caught fire destroying the balloon and tanks.



Aviation SAFETY is everyone's responsibility.

BEECH

Beech Model 90, 99, 100, and 200 Series	Fuel Filters	An operator experienced an in-flight loss of power on the No. 2 engine of a Model B99 airplane. Contaminants were found in excessive quantities in the fuel filters and a small amount had bypassed the filters through bypass valves and affected operation of the fuel discharge nozzles. It is recommended that all fuel filters (in-line and engine driven) be inspected at regular intervals of 100 hours aircraft time as specified in the applicable Beech Service Manual. ● If at any time it is suspected that contaminated fuel has been used, earlier inspection is recommended. ● At any time the submerged fuel boost pumps are replaced, all filters and tank sump area should be properly cleaned. Model 99 operators following this procedure have verified adequacy of these procedures. If abnormal quantities of contaminats are found, please report details of such occurrences via Malfunction or Defect Report, FAA Form 8330-2.

BELL

Bell Model 47G-5	Fuel Tank Cap Seal, P/N MS 29513-338	The engine quit during spray operation. Investigation revealed that the fuel remaining in the tank contained water. Also, water was found in the carburetor float chamber. This aircraft had been parked outside during heavy rains and water may have entered the fuel tank through the preformed packing at the filler cap.

BELLANCA

Bellanca Model 8KCAB	Seat Frame, P/N 7-1454-16	The front seat frame broke during aerobatic maneuvers. The break occurred in the lower portion of the frame just forward of the bend at the aft attachment to the floor.
Bellanca Model 17-30A	Fuel Selector Valve Pin, P/N 191177	The pin which connects the main fuel selector handle to the valve was found to be missing. Inspection of the auxiliary selector valve disclosed that a cotter pin was being utilized instead of the proper pin, P/N 191177. This pin is drilled for a cotter pin and washer combination. Inspection of two additional aircraft revealed that the correct pins were installed in one aircraft, but the washers were missing. The second aircraft had the correct installation on the main fuel selector valve but the auxiliary valve had a 3/32-inch cotter pin installed in lieu of the pin.

BOLKOW

Bolkow Model BO-105C	Main Rotor Stud, P/N 105-14101-38	During inspection of the main rotor head for seal leakage, two studs were found to be cracked in the threaded area. In addition, two bearings, P/N F32827, were badly worn.

CESSNA

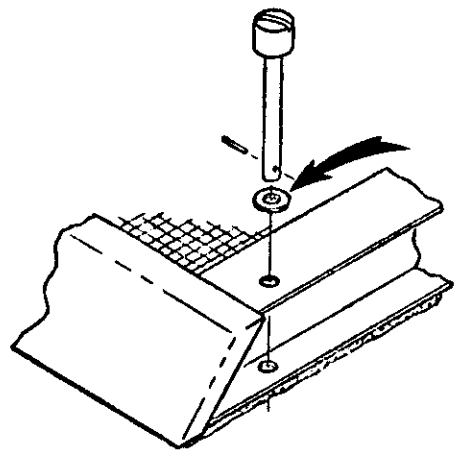
Cessna Models 150, 172, 175, 180, 182, 185, and 210 thru 210E	Ailerons	There are reports of corrosion being found in the ailerons between the skin and balance weights. Some rivet heads have separated due to corrosion. It is suggested this area be checked closely for corrosion during inspections. The manufacturer recommends that MS20470A rivets be used if replacement is necessary. This type rivet replaces the 5056 alloy rivets used in these models of aircraft produced prior to late 1965.

Cessna
Model 172,
S/N 17256513 thru
17266399 (1968 thru
1976)

Induction Air
Filter Sealing
Improvement

Washers may be added under the head of induction air filter attach studs, as required, to insure proper fit of the filter and improve the air filter seal.

Addition of washers (AN960-10) is recommended whenever excessive filter looseness is experienced. Cessna has issued Service Letter No. SE76-12 providing instructions.

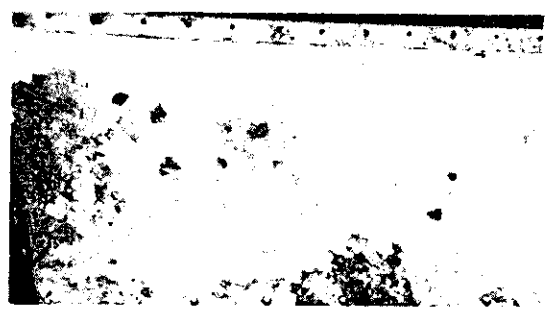


Cessna Model 180, 185, and 188 Series	Fuselage Tailcone	Reports have been received describing cracks in the bulkheads and looseness in fittings for the tailwheel spring attachment. Recommend close attention be given this area, especially for airplanes operating from unpaved fields.

Cessna
Model 206, 207 and
210 Series

Elevators

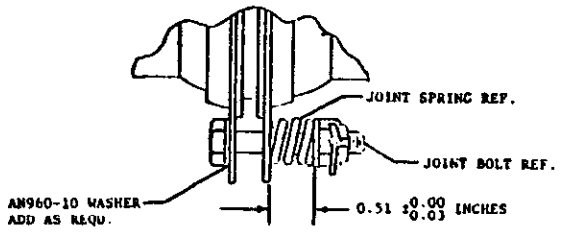
There have been several reports of corrosion being found in the elevator trailing edge. This corrosion is apparently caused by water retention in the styrofoam type stiffening material. It is recommended this area be checked at scheduled inspections.



Cessna
Model 320E

Exhaust Joint Spring,
P/N 186218

The exhaust joint spring tension relaxed permitting the ball socket to separate approximately 1/8-inch. The escaping exhaust damaged the right engine compartment, hoses, and wiring. AD 75-23-08 relates to this subject.



Typical Exhaust Joint Spring Installation

FAIRCHILD INDUSTRIES

Fairchild Industries
Model F-27A

Fuel Shutoff Valve Motor

Following in-flight feathering of the left propeller, the No. 1 fuel tank shutoff valve failed in the closed position. Investigation revealed the fuel tank shutoff valve motor was burned out.

GRUMMAN - AMERICAN

Grumman-American
Model AA-5

Nose Landing Gear Strut
Assembly, P/N 702057506

The nose gear failed during landing. Investigation revealed that the strut broke at the lower bolthole, where it attaches to the torque tube.

Grumman-American
Model AA-5

Aileron Bearing Support
Bracket, P/N 902010-501

During inspection, the right aileron outboard hinge bearing support bracket was found to be cracked in the bend radius. These cracks were not visible until the bracket was removed from the aircraft.

Grumman-American
Model G-164A

Throttle Cable,
P/N 1651-5

A contributing casual factor for an aircraft accident was traced to failure of the engine throttle control cable. The cable failed at the carburetor end adjacent to its swaged end fitting. Total time in service - 230 hours.

HILLER

Hiller Model UH-12E	Main Rotor Hub, P/N 51437-11	Dye penetrant inspection of the main rotor hub revealed a crack where the lower studs go through the hub. The crack extends out from the stud hole.

LEAR

Lear Model 23	Motive Flow Shutoff Valve Seal	There is a report that the rubber deteriorated in the shaft seals of the motive flow shutoff valve, P/N AV16E1182. This allowed fuel to leak around the valve shaft. It is suggested these seals be checked for condition.

MITSUBISHI

Mitsubishi Model MU-2B-30	Landing Gear Door Cable, P/N 030A-38558-21	It has been reported that when the landing gear door emergency release handle is pulled, the cable will not release the door lock. Investigation disclosed that the cable is covered with a plastic material which will not slide into the cable housing, therefore restricting the cable movement.

PIPER

Piper Model PA-23-160	Oil Cooler Hose	All oil was lost from the right engine during cruise resulting in an unscheduled landing. Investigation revealed a hole had chafed through the right engine oil cooler flexible hose due to contact with the engine mount. The hose wear was located approximately 4-inches aft of its engine attachment end.
Piper Model PA-23-250	Fuel Vent Tube, P/N 31008-00	During inspection, the vent tube for the left inboard fuel tank was found to have a split approximately 1-1/8-inch long. This rupture most likely resulted from the freezing of moisture trapped in the tube. Stains indicate fuel had leaked through the tube opening into the wing leading edge and behind the left engine firewall adjacent to the engine exhaust outlet. This condition presents a serious fire/explosion hazard.
Piper Model PA-23-250	Fuel Selector Valve, Scott P/N's 23640-1 and 23640-3	The cause for fuel leakage in both right and left nacelle areas was traced to cracked fuel selector valve bodies. Both selector valves were cracked adjacent to their inlet fittings; a condition possibly caused by excessive torque of the fittings during installation.

Piper Model PA-24-250	Landing Gear Transmission	During inspection at 2600 hours time in service, the landing gear transmission was found to be severely worn. The housing was worn nearly through allowing excessive end play of the worn gear shaft, the emergency release handle collar rivets were badly worn, and the internal gears were worn to a knife edge. During an emergency extension check, the lever would strike the edge of the access hole. These conditions, if not corrected, could have caused inability to extend the landing gear using either normal or emergency procedures.
Piper Model PA-24-250	Oil Cooler Temperature Bulb	An oil cooler rupture was attributed to the installation of an incorrect (too long) oil temperature bulb. It was reported that installation of this bulb caused excessive pressure build-up and subsequent oil cooler failure. The Piper parts catalog calls for installation of bulb assembly, P/N 462042, in PA-24-180 and PA-24-250 aircraft, and bulb assembly, P/N 462012, in PA-24-260 and PA-24-400 aircraft.
Piper Model PA-24-260	Fuel Line, P/N 23070-00	Fuel was dripping from the aircraft's lower fuselage area immediately following refueling. Investigation revealed the source of the fuel leak to be a hole worn through the subject fuel line. This condition was caused by contact with a PK screw used to secure the carpet adjacent to the front floor shield plate, P/N 22340-03, forward of the wing spar carry-through.
Piper Model PA-24-260	Roll Servo Bridle Cable, Altimatic III Autopilot	The pilot reported no autopilot roll action. Inspection revealed the roll servo bridle cable had failed and the short end fell free. If enough cable slack had developed, the cable could have slipped over the capstan and interfered with aileron control.
Piper Model PA-30	Fuel Flow Indicator Gauge, P/N 30-1893	Internal failure of the fuel flow indicator gauge resulted in fuel leakage behind the instrument panel. Raw fuel dripped on the circuit breaker panel and the cockpit floor presenting a serious fire hazard.
Piper Model PA-30	Exhaust Heat Shield Assembly, P/N 23512	Engine exhaust deposits in the wing and exhaust fumes in the cabin were traced to cracks and burned-through areas of nacelle heat shield assemblies. Careful examination of the nacelle heat shield assemblies is recommended at each aircraft inspection period.
Piper Model PA-31	Landing Gear Downlock Fork, P/N 41789-00	During landing gear inspection, the shank of the left downlock fork was found to be broken, and the right fork shank was severely worn.
Piper Models PA-31-310, PA-31-325, and PA-31-350	Engine Mount Nut	Certain serial number Piper Navajo and Chieftain aircraft may have had engine mount attachment nuts installed which were not cadmium plated. These nuts are used at the engine mount-to-firewall attachment locations. Piper Service Bulletin No. 509 pertains to the subject and calls for inspection within the next 100 hours of aircraft operation.

Piper Model PA-31-350	Wing Flap Transmission	When the wing flaps were lowered for landing, only the left flap extended. Inspection of the right flap transmission disclosed that the screw holding the bearing assembly became loose and contacted the housing and cap, P/N 2196.62-1. The end cap, which is threaded, backed out of the transmission housing allowing the worn gear to disengage from the ball screw shaft. AD 76-10-6 had been complied with approximately 50 hours prior to the failure, at which time, the transmission had been disassembled to install Dukes gear installation kit, P/N 4268-1000. Kit instructions call for the application of "GASIOLA" or equivalent to the end cap threads during transmission reassembly to prevent loosening.
Piper Model PA-31T	Elevator Hinge Bearing, P/N 51766-02	At 503 hours time in service, the left outboard elevator hinge bearing was found to be broken around its complete circumference. New bearings were installed in conjunction with Service Bulletin No. 481A compliance. At 652 hours time in service, the left outboard elevator hinge bearing was again found to be broken. At this time, Service Bulletin No. 504 was incorporated by installation of kit, P/N 761-056, which included new one-piece outboard hinge bearing brackets. It was found that the holes in the new brackets misaligned with the holes in the elevator outboard rib by approximately 5/32 inch.
Piper Model PA-36-285	Fuel Tank Vent	Fuel starvation has been traced to blockage or restriction of the fuel vent tube hole inside the fuel tanks. Evidently, some vent tubes have been installed with the vent hole not positioned inside the tank or partially covered by the fuel cell wall. Piper Service Bulletin No. 508 pertains to the subject and calls for inspection within the next 25 hours of aircraft operation.

SCHWEIZER

Schweizer Model SGS 1-23D	Aileron Control Rod and Rod End	It was noted that jam nuts were only installed on the aft end fitting of the control rod located between the aileron and aileron bellcrank. Inspection revealed excessive looseness of the forward end fitting due to thread wear. Radial movement between the external threads of the end fitting and the internal threads of the control rod caused the wear.

STINSON

Stinson Model L5	Throttle Linkage Rod	The throttle linkage rod failed causing the pilot to make a forced landing. Investigation disclosed that the linkage rod had rusted through in an area under a rubber boot at the aft-side of the firewall, where moisture had accumulated over a long period of time. In view of the location of this difficulty, it is recommended that a special effort be made to inspect under the rubber boot at each aircraft inspection.

SWEARINGEN

Swearingen Model SA26-AT (Australian Registry)	Actuator Support Bracket, P/N 50-820107-2	During inspection, the nose landing gear actuator support bracket was found to be cracked. The crack extended from the outer edge of the bracket, at a point midway between the mounting holes, to the edge of the bearing recess. Total time in service - 2741 hours.
Swearingen Model SA26-T	Aileron Structure, P/N 50-130002-1	During inspection, a crack was found under the hinge fitting where the control attaches to the left aileron. The crack was approximately 2-1/2-inches in length. The hinge fitting must be removed for a positive inspection. Total time in service - 4157 hours.

ACCESSORIES

BENDIX

Bendix Magneto Model S6RN-1225	Low Speed Gear	The engine was running rough. A magneto check and teardown inspection revealed that the low speed gear and drive were separated due to heat buildup from insufficient lubricant. Total time in service 1290 hours.

GERDES

GERDES -- FUEL SELECTOR VALVE, P/N A400-1

The fuel selector valve was found to be leaking past the upper "o" ring seal. The fuel filled the recess around the selector plate then overflowed onto the cabin floor. The leak was more pronounced when the fuel tanks were full. Total time in service - 27 hours.

COMMUNICATION/NAVIGATION EQUIPMENT

AIRCRAFT RADIO CORPORATION

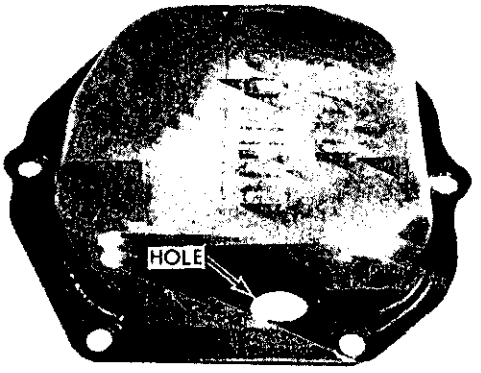
Aircraft Radio Corporation NAV-COM Model RT-328D	Synthesizer, P/N 41405	Malfunctioning of synthesizers has been reported to cause VHF transmission frequency errors of (+) or (-) one megahertz (MH_z). For example, when 131.0 MH_z is selected, the unit actually transmits on either 130.0 or 132.0 MH_z.

ENGINES

LYCOMING

Lycoming Model All Engines Employing Parallel Valve Cylinders — Cylinder Rocker Box Cover

Reports have been received of oil leakage caused by rocker shafts wearing holes through cylinder rocker box covers. Avco Lycoming Service Instruction No. 1176, dated October 27, 1967, advised that any nicks, roughness or other damage on the ends of valve rocker shafts would cause rapid wear-through of the rocker box cover. Service Bulletin No. 400, issued June 4, 1976, calls for the installation of teflon thrust buttons in the ends of valve rocker arm shafts which should eliminate the wear problem.



Lycoming Model O-320	Carburetor Float Chamber	An engine power loss resulted in a forced landing. Investigation revealed the engine stoppage was caused by fuel starvation resulting from corrosion and contamination in the carburetor float chamber. The aircraft had been in storage about 1-year, and the incident occurred on the first flight following annual inspection completion.
Lycoming Model IO-540 Series	Fuel Pump, P/N 75247	The pilot reported excessive oil exiting the engine crankcase breather. Investigation revealed the engine-driven fuel pump diaphragm had ruptured, which allowed fuel to be pumped into the crankcase.
Lycoming Model TIO-540	Cylinder Holddown Nut and Stud	The right propeller was feathered due to engine manifold pressure fluctuation and external oil leakage. Inspection disclosed that the No. 5 cylinder had three loose holddown nuts and the top right through-case stud was broken.
Lycoming Model TIO-541-E1C4	Exhaust Transition Assembly, P/N LW11005	A Beechcraft Model B60 aircraft flight was terminated due to loss of avionics equipment. Investigation revealed that the exhaust transition assembly for the left engine turbocharger was burned through. Escaping exhaust gases overheated the engine firewall and voltage regulator wiring behind the firewall. This condition evidently caused voltage surges which rendered the avionics equipment inoperative. Examination of the right engine exhaust transition assembly disclosed it was also heat distorted, but had not burned through. A flashlight and mirror are needed for proper inspection of exhaust transition assemblies.

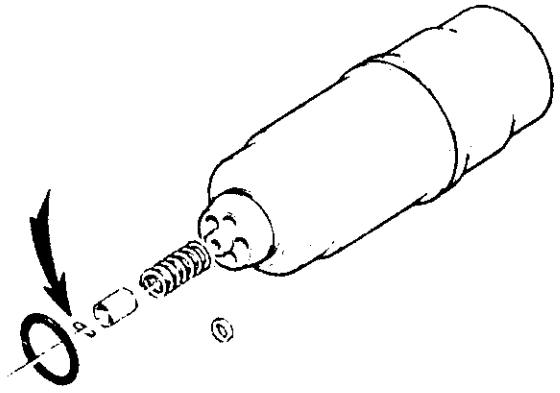
Lycoming All Models	Overhaul Periods and Parts Replacement	In a number of instances, the cause of engine failure has been traced to operation well beyond the recommended overhaul period, and failure to replace parts during the engine overhaul contrary to the manufacturers' recommendations. Avco Lycoming Service Instructions No. 1009W, dated April 9, 1976, lists the recommended overhaul periods for all current production Lycoming engines, and Service Bulletin No. 240J, dated May 7, 1976, specifies engine parts which must be replaced during overhaul regardless of apparent condition.

UNITED AIRCRAFT OF CANADA

United Aircraft of Canada
Model PT6A-20

Oil Filter Check Valve, P/N 3010097

In-flight oil pressure fluctuation was reported. Investigation revealed that the dowel pin which secures the oil filter check valve spring retainer collar to the valve stem had broken. A piece of the broken dowel pin lodged under the valve. The valve face was galled and the retainer collar had worn a groove into the oil filter housing.



PROPELLERS

HARTZELL

Hartzell Model HC-C2YK-1	Blade	The propeller was removed to determine the cause for vibration. The No. 1 blade was found to be cracked in the shank area approximately 270 degrees in an arc from the trailing edge around the leading edge and back to the trailing edge. The trailing edge of the blade was still intact. Total time in service - 85 hours.

McCAULEY

McCauley Model 2AF34C55	Propeller Hub Flange	The propeller separated from the aircraft during takeoff. Investigation revealed that the hub flange failed approximately 1/2-inch from the attaching boltholes.

SAFETY is the Responsibility of Everyone in Aviation.

McCauley Blade
Model 1C172

The propeller blade failed 8-inches from the tip. Failures of this type are usually due to previous damage to the blade leading edge, such as a stone nick. It is suggested that the propeller blades be examined prior to each flight and if any damage is found, it should be repaired immediately.

MAINTENANCE NOTES

ENGINE HOSES

As airplanes and engines attain age, there appears to be a need to re-emphasize the inspection or replacement of engine hoses or lines carrying fuel, oil, or hydraulic fluid. The hose manufacturers definitely recommend the replacement of all such hoses at every engine change (except Teflon) even though they look good.

Age limit of hose has generally been established at four years. This limit of four years is generally considered to be "shelf" life. All hose manufactured for aircraft use is marked indicating the quarter year in which they were manufactured. The listing "4Q71" means the hose was manufactured in the fourth quarter of 1971. Maintenance personnel should not use hoses with a high "shelf" life age.

AVCO Lycoming Flyer

WHAT'S THE DIFFERENCE BETWEEN AVIATION AND AUTOMOTIVE GASOLINE?

It amounts to a lot more than octane or performance number. The simple fact is: automotive gasoline just won't work right in an airplane engine. What's more, it's dangerous. You may already know why, but let's review a few of the differences and dangers once more.

VAPOR PRESSURE. Aviation gasoline has the same closely controlled vapor pressure all year around, all over the world. Automotive gasoline is manufactured to operate at sea level (adjusted locally for climate and sometimes altitude). It works fine in your plane's engine as long as you stay on the ground. Gain a little altitude though, and air pressure decreases. With less outside pressure working on it, automotive gasoline evaporates rapidly, forms bubbles in the fuel lines. Result? Vaporlock and engine failure!

BOILING RANGE. All gasolines can cause vaporlock. Aviation gasoline evaporates, of course, but the rate of evaporation is carefully controlled by the specifications. There's a wider margin of operational safety. In addition, aviation gasoline contains no high temperature boiling materials. It evaporates more completely at lower temperatures for greater economy and smoother engine operation.

CLEANER BURNING. Due to freedom from high temperature components, aviation gasoline burns cleaner in your engine. These components, important in automotive gasoline, form harmful residues that build up on vital airplane engine parts.

STORAGE STABILITY. Unfortunately, most of us don't use our airplanes enough to keep fresh gasoline in the tanks. Gasoline unstable in storage produces two objectionable effects: (a) loss of octane rating and (b) development of gum after evaporation. Aviation gasoline is much more stable than automobile gasoline. However, it's still a good idea to drain a few ounces from your fuel sumps. This gets rid of any water or solids that might have formed if your plane has been out of action for a while.

If you have experienced mechanical difficulties or problems with an aeronautical product and have not reported it yet, please do so now and help your fellow airmen. FAA Form 8330-2, available from your local General Aviation District Office, may be used for this purpose. The form requires no postage and is preaddressed to receive prompt handling.

SOMETHING TO THINK ABOUT

ENVIRONMENT VS. CORROSION

Airplanes enter world-wide service with no corrosion. Inspection after a few years of service will reveal that most airplanes continue to have a good appearance and are relatively corrosion-free. Some airplanes, however, will evidence extensive corrosion necessitating skin or structural repair.

Why the difference?

The extent of corrosive attack on an airplane is directly related to the environment in which the airplane operates and the corrosion prevention and cleanup measures taken by the owner/operator. In a dry climate, corrosion usually progresses extremely slow. If the same airplane is moved from a dry climate to a warm, wet climate with salt water nearby, light corrosion, if untreated, may become severe within a matter of months. Industrial gases in the air also cause corrosion. Corrosion caused by salt air and industrial gases is similar in appearance.

Temperature and atmospheric changes which occur during the course of each flight contribute to corrosion. For example, an airplane may take off from an airport where temperature and humidity are high, climb through rain and industrially polluted air, cruise at subfreezing temperatures, and land at another airport where the climate is again hot and humid. During descent, moisture condenses and airborne salts accumulate on airplane skin, in structural cavities such as flap wells, and on other structural surfaces which may already be contaminated by residue from engine exhaust gases, leakage from fluid and waste systems, and runway soils. These contaminants either directly chemically attach the metal or absorb and retain moisture and thereby provide an excellent environment for corrosion.

CORROSION INSPECTION

Visual inspection is the primary method for corrosion detection. Surfaces should be inspected for evidence of corrosion and protective finish deterioration, especially around fasteners. The first indication of corrosive attack is usually surface roughness and localized discoloration of the metal surface. Painted surfaces become discolored and show blistering and scaling when moisture has penetrated the finish and the base metal is corroding. Corrosion of aluminum, magnesium, or plated steel surfaces can be detected by dulling, pitting, lifting, and cracking, and also by white, gray, or red powder deposits. Airplane surfaces should be inspected for the presence of spilled fuel, Skydrol, lubricating greases, and other contaminants which can cause softening, peeling, or flaking of paint or other protective finishes. These contaminants should be cleaned away as soon as they are detected.

COMMON TYPES OF CORROSION

Surface Corrosion consists of etching or pitting of metal surfaces caused by a reaction between the metal and moisture containing contaminants. It is first evidenced by a white powder that dulls the surface. If the powder deposit is removed, tiny pits or holes remain in the surface. Corrosion is accelerated by conditions of high humidity and temperature.

Dissimilar Metals Corrosion is caused by the flow of a small amount of electrical current between two adjacent dissimilar metals which are electrically coupled in the presence of a suitable electrolyte. The corrosive process is similar to action which occurs in a simple acid battery.

Intergranular Corrosion seriously affects the strength of metals and is caused by breakdown of the grain structure of the metal at its grain boundaries due to corrosive attack. This type of corrosion is difficult to detect in its early stages because only the grain boundaries of the metal are affected. Before corrosion is apparent on the surface of the metal, the internal structure has been seriously weakened. As corrosion progresses, lifting of the metal surface occurs. Exfoliation is one severe form of intergranular corrosion.

Stress Corrosion occurs in some alloys which are susceptible to cracking when they are under tensile stress and are exposed to a corrosive environment. Small intergranular cracks occur at the bottom of corrosion pits. Stress causes these cracks to open, exposing fresh metal to corrosive attack. Metal failure occurs due to the combined effects of stress and corrosion.

CAUSES OF CORROSION

When paint has deteriorated or plating has worn thin, the underlying metal surfaces are vulnerable to corrosive attack. Most common types of corrosion are electrolytic in nature. Metal parts corrode when an electrolyte such as water creates a battery-like cell. For this type of corrosion to exist, there must be an electrolyte or continuous liquid path (usually moisture with dissolved contaminants, through which materials of different potential can form the battery-like cell). In airplanes, the two materials are commonly different metals, such as steel fasteners in aluminum structure, but there can be different alloying elements within a part itself. Once corrosion starts and affects the internal structure of the metal, it can continue even though the area is subsequently covered with paint or sealant.

CORROSION CONTROL

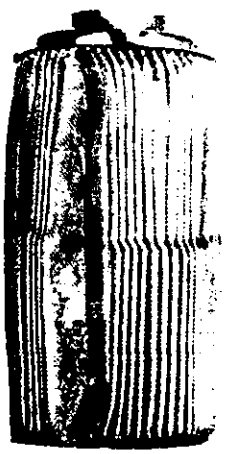
All owners/operators should have a corrosion prevention and control program. If airplanes are operated in a highly corrosive environment, implementation of a comprehensive corrosion prevention program that spans the life of the airplanes is the best way to prevent disruption of operating schedules and to reduce manpower and material costs resulting from advanced corrosion. Catch-up corrective action can be an expensive alternative to a sound corrosion prevention program.

The key to airplane corrosion prevention is to keep airplane metal surfaces clean and covered by protective coatings. Frequent airplane washing is recommended.

FLOW DIRECTION

Lube, hydraulic, and fuel filters are made for a one-way passage of the fluid through them although, unfortunately, some can be connected backwards. The fluid will flow through, but filtering is ineffective, and the filter element is likely to be damaged as the one shown was.

When installing filters (and other devices through which fluids flow, for that matter), be sure that they are connected so that the fluids will flow in and out of the correct ports.



PART MISSING? FIND IT!

A power lever wouldn't stop where it was supposed to. While troubleshooting the discrepancy, a spacer was found to be missing. It was not found.

New parts were installed, and during the post-maintenance check-flight, the power lever stuck. Care to guess what caused it to stick? You're right. 'Twas the missing spacer.

Foreign objects continue to cause problem after problem. Remove them and get rid of the problems.

GE Service News

SUPPORT OF FITTINGS USED IN THE REPAIR OF FUEL AND HYDRAULIC RIGID LINES

To prevent possible failure, additional fittings used in the repair of rigid lines should be supported by means other than the tubing. Support clamps or brackets should be located as close to fittings as possible to reduce overhang.

PREVENTIVE MAINTENANCE AND TIPS ON WINTER OPERATION

Each winter a number of aircraft service experience reports indicate the operation of aircraft in wet and cold weather is both hazardous and costly, if good winter preventive maintenance practices are disregarded. In many instances, attention to a few common maintenance items such as the following would have eliminated the cause of many operational problems that occurred in flight.

Of utmost importance is the cabin air heating systems and the dangers associated with any form of system leakage that would allow carbon monoxide to enter the area occupied by the crew and passengers. It is a good practice to supplement cabin heating system inspection with periodic carbon monoxide detection tests, especially in those cases where visual inspections are infrequent. Carbon monoxide tests are reliable and may be accomplished quickly without any disassembly operations. Such tests, however, are not conclusive, as the state of the preservation and actual condition of the component parts of any heating system can only be determined by visual inspection. "Don't forget," carbon monoxide (CO) is a colorless, odorless, and tasteless gas that has long been suspected as a cause for some aircraft accidents. Further, the susceptibility to carbon monoxide poisoning increases with altitude.

Another item often overlooked is water accumulating in the various component parts and systems of an aircraft. The expansion that takes place when water freezes may cause considerable damage to the internal structure of wings, control surfaces, fuselage bulkhead areas, etc. A small amount of water, frozen, can prevent proper operation of fuel pumps, selector valves, and carburetors. Further, only small quantities of water accumulating in such places as control surfaces may create a condition of static unbalance that would seriously impair the operational control of the aircraft in flight. For these reasons, it is always a good practice to check drain holes in wings, stabilizers, flight control surfaces, fuselages, and air scoops to make sure they are unobstructed and capable of serving their intended purpose. Systems should be checked for the presence of water, in accordance with the appropriate aircraft manufacturer's recommendations. "Don't forget," that one source of water which created problems is the wash rack, where the conscientious owner and/or operator ironically had cleaned the aircraft for safety reasons. Unfortunately, the aircraft was operated immediately thereafter in freezing temperature and water that did not have time to drain away, froze.

The third item responsible for many problems, if neglected, is the landing gear of aircraft operating from surfaces covered with mud, snow, and slush. Although it results in a never ending job of trying to keep the aircraft clean, experience has proven it wise to remove most types of wheel streamline covers from fixed-gear aircraft during the winter months. This practice eliminates the possibility of mud, slush, etc., building up between the tires and streamline covers, then freezing into a solid mass. On retractable-gear aircraft, the integrity of shields, boots, and curtains used to protect actuating devices, switches, etc., must be maintained. In addition, retraction mechanism lubrication. in accordance with the manufacturer's recommendations. cannot be overstressed. "Don't forget," improperly rigged skis are also a relatively common source for accidents each winter.

The fourth and probably the key item in many ways is the powerplant and the importance of operating it in strict accordance with the engine manufacturer's recommendations. Some aircraft use winterizing kits to maintain desired engine operating temperatures and to prevent vapor vent lines from freezing. Any questions regarding the utilization of such kits should be directed to the appropriate aircraft manufacturer's service department. In winter the importance of engine temperatures, i.e., cylinder head, oil, and carburetor air heat, cannot be overemphasized. Attention to such details as warming up the engine before takeoff and allowing the engine to cool down prior to shutting it off pays dividends in many ways, especially at overhaul time. Good practices in this item would also include a check of the carburetor air heat system and the degree of heat rise available. At the same time, the engine idle r.p.m. and mixture, with and without carburetor air heat, should be checked. Many forced landings could have been avoided if this one check had been made beforehand. "Don't forget," obtain the aircraft and engine manufacturer's recommendations regarding the use of additives to the fuel for the purpose of preventing ice forming in the fuel system.

In closing, "Don't forget" the flight characteristics of any aircraft will probably be seriously affected by the existence of any forms of frost, ice, and snow on the wings and control surfaces. Before it is too late, get the aircraft manufacturers' recommended methods for removing such accumulations and when the need arises, "Don't forget" to heed the advice.

B-NUTS

How many standard swivel nuts (known as B-nuts) are on your aircraft? Each nut connects two component parts of a system that is considered essential to the safe operation of the aircraft. Further, the reliability of each system incorporating B-nuts depends not only on how well such nuts were manufactured but also on their proper installation and maintenance. Think about it, and also think of the hazards of improperly torqued B-nuts, especially on fuel lines. It is suggested that owners and operators have qualified maintenance personnel inspect their aircraft at the earliest opportunity for the manufacturer's recommended torque value of all fluid-carrying lines B-nuts.

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GENERAL AVIATION inspection AIDS

SUPPLEMENT NO. 6

FEBRUARY 1977

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

Flight Standards Service

GENERAL AVIATION INSPECTION AIDS

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EQUIPMENT

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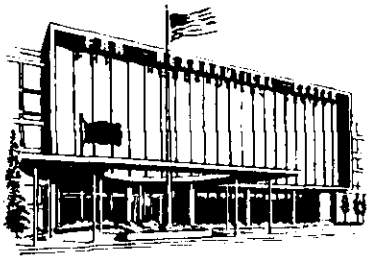
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
WASHINGTON, D.C. 20590

GENERAL AVIATION INSPECTION AIDS

SUPPLEMENT No. 6
FEBRUARY 1977



This is the home of the General Aviation Inspection Aids. The publication is prepared from information submitted by those of you who operate and maintain civil aeronautical products. The contents of this publication includes select items that have been reported to be significant but were not fully evaluated by the time the material went to press. As additional facts, such as cause and corrective action, are identified, the data will be brought to your attention in subsequent issues of the Aids. This action has been implemented to give Aids' readers the earliest notice of reported conditions received via Malfunction or Defect Report, FAA 8330-2. Computers will constantly monitor these conditions during the period of evaluation for cause and corrective action. Your comments and suggestions for improvement are always welcome. If you wish to share in such material, please send to: Flight Standards National Field Office, Attn: Safety Data Branch, AFS-580, P. O. Box 25082, Oklahoma City, Oklahoma 73125.

AIRCRAFT

BEECH

Beech Model 95 and 95-55 Series	Elevator Trim Tab Universal Joint, P/N 45-526015	There are reports of the universal joint in the trim tab actuator drive being found dry, worn, and seized. It is recommended these "U" joints be inspected each 100 hours.

CESSNA

Cessna Model 177RG	Landing Gear	There have been reports where, during landing, a gear unsafe indication was noticed. In one instance, the setscrew which anchors the sector gear shaft, P/N 2041012-1, was found broken. This allowed the shaft to slide until it interfered with the spur gear. The bushing, P/N S1004-58A, was also broken. In a similar instance, the setscrew was found loose. It is suggested these setscrews be checked periodically for tightness.

FAIRCHILD INDUSTRIES

Fairchild Industries Model F-27A	Nose Gear Pneumatic Line, P/N 70A570000600-160	A loud "bang" was heard and the normal pneumatic pressure dropped to zero when the landing gear was retracted following takeoff. The emergency system was used to extend the landing gear. Investigation revealed the nose landing gear-up pneumatic line had failed midway between the actuator and bulkhead.
Fairchild Industries Model FH-227-B	Pneumatic Pressure Line	The normal pneumatic system pressure dropped to 1800 PSI during cruise and would not build up with isolation valve open and the unloading valve switch in the normal position. The pressure would build up slowly with the unloading valve switch in the emergency position. Investigation revealed pneumatic system pressure was being lost because of a hole chafed through the right landing gear-up line due to contact with the gearbox drain line.
Fairchild Industries Model FH-1100	Cyclic Pitch Control Isolation Link Swivel	Binding between the isolation link swivel, P/N 24-30231-11, and the isolation link, P/N 24-30233-3, may occur because of an improperly tightened swivel retaining nut, worn or improperly installed swivel bushings, or incorrect or inadequate lubrication. Fairchild Service Letter FH-1100-33-1, dated October 25, 1976, advised that checks for binding between the subject parts is required during 100-hour inspection. The service letter also prescribes inspection procedures to be used to detect binding, dye penetrant inspection of parts if binding is detected, and replacement of self-locking nuts removed during inspection.
Fairchild Industries Model FH-1100	Tail Rotor Tension Torsion Bar	Due to a reported failure of a tail rotor tension torsion (T. T.) bar, Fairchild Industries Service Letter, FH-1100-55-2A, Revision 1 was issued calling for inspection within the next 25 hours time in service. The bulletin requires disassembly and inspection of T. T. bar assemblies, P/N 24-55106, using visual and dye penetrant methods. All spare, new, and used T. T. bars prior to S/N 1878 and S/N 1893 through 1901 are to be inspected prior to installation on aircraft.

GRUMMAN

Grumman
Model G-1159

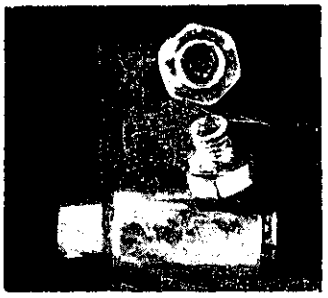
Fuel Boost Pump

The right main fuel boost pump failed. Investigation revealed that the wiring was severely burned at the pump.

GRUMMAN - AMERICAN

Grumman-American Model AA-1B — Throttle Control

The carburetor arm ball bolt failed. Total time in service - 1484 hours.



Grumman - American Model AA-1B (Australian Registry)	Carburetor Heat Valve, P/N 503001-7	The carburetor heat control failed during flight. Inspection disclosed that the valve had separated from the shaft following the loss of the nuts, P/N MS20364-632, and screws, P/N AN515-6R8. Total time in service - 762 hours.
Grumman-American Model G-164	Fuselage Longeron, P/N A1300-4176	The fuselage left lower longeron was found to be cracked. The crack was located approximately 5-1/2 inches forward of the rear upright tubular member on the underside of the longeron and extended one-half of the way around its circumference. Dye penetrant inspection revealed pinhole indications on top of the longeron opposite the crack.

ISRAEL AIRCRAFT

Israel Aircraft Model 1124	Rollpin, P/N MS16562-222	The nose steering control wheel came off in the pilot's hand during taxi operation. Investigation disclosed that the rollpin securing the control wheel to the shaft had come out. Total time in service - 118 hours.

MOONEY

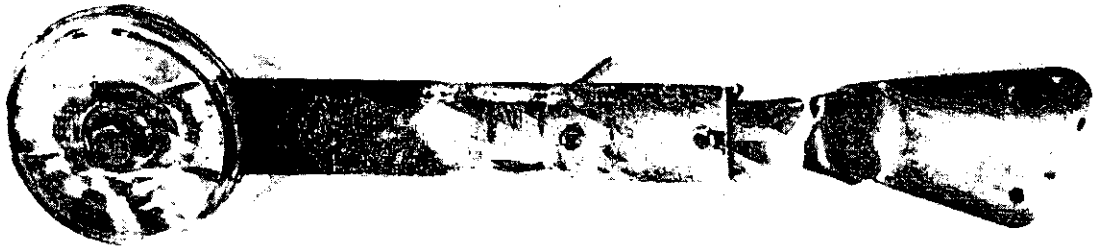
Mooney Model M20C — Nose Steering Link

The aircraft went off the runway during landing. Investigation revealed the nose steering link had sheared at the weld. Total time in service - 1909 hours.

PIPER

Piper Models J3, J4, PA-11, PA-12, PA-14, PA-15, PA-16, PA-17, PA-18, PA-19, PA-20, PA-22, PA-24, and PA-28	Muffler	Airworthiness Directives 68-5-1 and 70-16-5 for Piper aircraft and 69-15-3 for certain Cessna aircraft equipped with Piper mufflers call for recurrent inspections of mufflers at specified operating time intervals. Basically, these directives require inspection each 100 hours of operation for mufflers having less than 1000 hours total time in service and inspection each 50 hours of operation for mufflers with 1000 hours or more total time in service. Mufflers found to be defective during inspection are often sent to facilities who specialize in repairing exhaust system components. In some instances the muffler is repaired and returned to the original owner and in other instances, an off the shelf repaired muffler is provided in exchange. These repaired mufflers are often identified as "remanufactured" and are incorrectly considered to be "zero time." Applicability of the 100-hour or the 50-hour recurrent inspection requirements of the subject airworthiness directives is dependent upon the muffler total time in service. Repaired or "remanufactured" mufflers are not to be considered "zero time" and if their total time in service is not known, the more stringent 50-hour recurrent inspection requirements of the directives must be applied.
Piper All Models Incorporating Steel Lift Struts	Wing Lift Strut	Piper Service Bulletin No. 528, issued October 28, 1976, prescribes procedures to be used to inspect steel lift struts for internal corrosion. The bulletin calls for the use of a Maule "Fabric Tester" to detect evidence of internal corrosion or rusting of the lower 11 inches of the lift strut surface. Numerous reports have been received whereby this area of the lift strut tubing has rusted completely through.
Piper Models PA-23, PA-23-160, PA-23-235, PA-23-250, PA-31, PA-31-300, PA-31-325, and PA-31P	Fuel System Control Cables	Reported fuel selector malfunctions have a direct relationship with control cable failures at the swivel fittings. Selector valve binding or misrigging causes overstress of the control cables at the swivel fittings and subsequent fatigue failure of the cables. Piper Service Bulletin No. 507A, dated November 9, 1976, calls for an inspection for proper rigging and possible binding of fuel selector valves and binding, kinking, or bending of the control cables at the swivel fittings. The bulletin lists the aircraft serial numbers applicable and recommends inspection of aircraft with 300 hours or more time in service at the next regularly scheduled inspection interval, but not later than the next 100 hours time in service and thereafter in accordance with service manual inspection recommendations.
Piper Model PA-23-250	Emergency Exit Window, P/N 30684-03	During routine inspection, the emergency exit window required prying to open due to interference with cabin interior metal trim. Additionally, when released, the window could not be displaced clear of the escape path because of a curtain that was attached to the window and the cabin interior. These conditions could prove hazardous in the event emergency evacuation of the aircraft became necessary.

Piper Models PA-23-235 and PA-23-250	Landing Gear Control Lever, P/N 752303	Several instances have been reported where the landing gear control lever has failed when attempting to retract the landing gear. If these failures had occurred after the landing gear had retracted, a serious accident may have resulted. Reports indicate the failures occur at the first bend radius forward of the control lever knob. Close examination of this area of the control lever for evidence of cracks is recommended at each aircraft inspection period.



Piper Model PA-23-250	Oil Cooler Support Baffle, P/N 31329-00	Although reinforced by a doubler, the baffle assembly of the right engine has been reported to crack. The engine oil cooler is supported by this baffle and its failure allows the oil cooler to drop from its mounting.
Piper Model PA-23-250	Main Landing Gear Drag Link Bolt, P/N 402427 (AN177-27)	When greasing the main landing gear drag link, the center bolt appeared to expand or both ends of the bolt moved outward. Inspection after removal revealed the bolt had failed due to fatigue at approximately the center point of the bolt grip area.
Piper Model PA-23-250 (6 place Aztec "F")	Stabilator Tab	Reports advise of looseness of the stabilator tab assemblies. Inspection revealed the tab play was caused by wear-induced elongation of stabilator tab horn attachment boltholes. If not corrected, this condition could lead to flutter, tab loss of function, or detachment of the tab. Piper Service Bulletin No. 514, dated September 20, 1976, calls for modification of tabs installed on aircraft serial numbers 27-7654001 to 27-7654193 inclusive within the next 100 hours time in service by incorporation of Piper Kit No. 761 083.
Piper Models PA-23-250, PA-24-260, PA-30, PA-31, PA-31-300, PA-31-350, PA-31P, and PA-39	Electric Trim Switch	Reports advise that pilots' control wheel mounted electric trim switches tend to "hang up" in the "noseup" or "nosedown" position following removal of thumb pressure. Investigation revealed that the switch "return" coil springs installed in the defective switches had an excessive number of coils which caused the end of the spring to become caught between the switch "rocker" actuator and the micro switch body, preventing return of the switch to the neutral position. This condition has occurred with trim switches previously modified per Piper Service Bulletin No. 331 (AD 71-12-5) and subsequent production modified switches. Piper Service Bulletin No. 527, dated November 5, 1976, provides aircraft serial number effectivity and calls for disassembly inspection and modification of switch return springs if necessary. Compliance is recommended within the next 100 hours time in service.

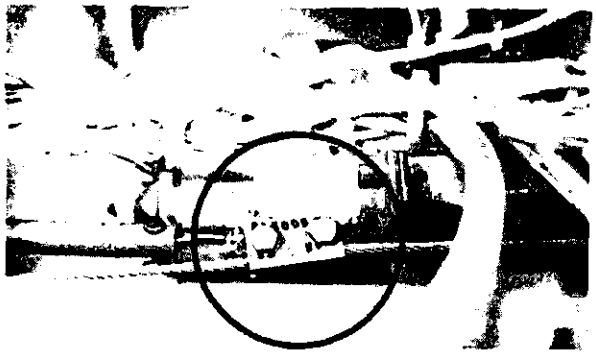
Piper Model PA-24-250	Oil Cooler Temperature Bulb	An oil cooler rupture was attributed to the installation of an incorrect (too long) oil temperature bulb. It was reported that installation of this bulb caused excessive pressure build-up and subsequent oil cooler failure. The Piper parts catalog calls for installation of bulb assembly, P/N 462042, in PA-24-180 and PA-24-250 aircraft, and bulb assembly, P/N 462046, in PA-24-260 and PA-24-400 aircraft. This updates the item on page 20 of supplement No. 2 dated October 1976.
Piper Model PA-24-250	Landing Gear	The landing gear collapsed during landing rollout. Investigation revealed the landing gear motor and transmission assembly had pulled loose from its fuselage bulkhead attachment. The failed area of the bulkhead showed evidence of a preexisting crack.
Piper Model PA-25-235	Carburetor Heat Control Cable, P/N 61360-07	A loss of engine power occurred because of carburetor ice even though the carburetor heat control was placed in full hot position. Accident investigation revealed the carburetor heat control cable had failed at its heat valve attachment.
Piper Model PA-30	Landing Gear Actuator Cable, P/N 455180	The landing gear collapsed during landing roll. Investigation revealed the right actuator cable had seized in its housing preventing the landing gear from fully locking in the down position. Total time in service - 2500 hours.
Piper Model PA-31	Hydraulic Pump Drive Impeller	In-flight loss of hydraulic pressure necessitated manual extension of the landing gear. Investigation revealed the aircraft hydraulic fluid was lost through the hydraulic pump case drain due to internal failure of the pump. The Eastern Industries Model 1213HBG-310 hydraulic pump had accumulated 1046 hours time in service.
Piper Models PA-31 and PA-31-325	Seat Track	It has been found that when in the full aft position, the pilot and copilot seats interfere with access to the fuel firewall shutoff valve. Piper Service Bulletin No. 512, dated October 21, 1976, calls for installation of Crew Seat Track Stop Replacement Kit, No. 761 086, at the next programmed inspection, but not later than the next 100 hours aircraft time in service. The bulletin is applicable to PA-31 and PA-31-325 aircraft S/N 31-7401252 to 31-7512013 inclusive.
Piper Model PA-31-300	Propeller Spinner and Bulkhead	The right propeller spinner and bulkhead separated from the aircraft during flight severely damaging one propeller blade. The parts believed to be bulkhead, P/N 43557-00, and spinner, P/N 43556-00, were not recovered. Piper inspection procedures call for 50-hour routine and 100-hour detailed inspection of the propeller spinners and bulkheads.
Piper Model PA-31-350	Spinner, P/N 43940-00	During routine inspection at 150 hours time in service, the left propeller spinner was found to be cracked. The crack was located adjacent to one of the spinner-to-bulkhead attachment screwholes. This was a later type spinner equipped with a welded doubler.

Piper Model PA-36-285	Rudder Control Horn Bolts	Inspection of a PA-36-285 aircraft, above the serial number effectivity for AF 76-05-07 and Piper Service Bulletin 495A, revealed the rudder control horn attachment bolts were loose. The bolts were found to be the proper length, but were not the prescribed torque. In addition, the two bolts that attach the lower rudder hinge to the fuselage were found to be only finger tight.

ROCKWELL INTERNATIONAL

Rockwell International Control System
Model 112TC

The left aileron control wheel movement was restricted during a crosswind landing. Investigation revealed that the rudder and aileron interconnect cable shield had caught on the flap motor.



Rockwell International Fuel Cap,
Model 680FL P/N 3630216

The Dzus button locking ears are reported to fail after 2 or 3 locking operations.

We would like to take this opportunity to inform our readers that there have been a number of occasions in recent months when FAA/manufacturer action could not be finalized on a reported service difficulty. In each instance, the manufacturer's serial number on the product involved had not been entered on the Malfunction or Defect report which had been received. As a result, the problem could not be accurately correlated with any specific engineering and production data or for that matter, information of a comparable nature obtained via other methods. Without question, the serial numbers on today's aeronautical products are very important in identifying what units of a given make and model may be involved in a difficulty or affected by a corrective action.

It is a loss to the entire aviation community each time information on a FAA Form 8330-2 cannot be used to further improve the safety and reliability of aeronautical products. For this reason, your support is needed in completely identifying the specific unit involved whenever an in-service difficulty is reported.

AIRFRAME COMPONENTS

CLEVELAND

CLEVELAND -- BRAKE DISC, P/N 164-22A

The left brake disc failed after landing. The disc was found to be cracked around the mounting holes. Also, the disc showed evidence of having been extremely hot. Ten operating hours later, the pilot reported a dragging brake. Inspection revealed that the right brake disc was broken at the mounting holes and was jamming on the landing gear leg. Total time in service - 650 hours.

ACCESSORIES

BENDIX

Bendix Magneto Models D-2000 and D-2200

Breaker Point Cam Follower

Inspection to determine the cause for magneto malfunction revealed the breaker points remained closed as the cam was rotated. This condition has been reported with magnetos having as little as 70 hours time in service. Close examination of the breaker point assemblies revealed the portion of the nylon cam follower that contacts the breaker spring had melted. In other instances, the portion of the nylon cam follower that contacts the cam had melted. This problem is presently being studied by Bendix and service bulletin issuance is expected in the near future.

Bendix Magneto Model S4LN-204

Rotating Magnet Shaft

Shaft failures of Bendix Model S4LN-204 magnetos, installed on Lycoming Model O-360-A4J engines, reportedly cause damage to the engine gear train and metal contamination of the engine oil system. The failures are believed to be due to vibratory stresses encountered with this engine and magneto combination. The condition is presently being studied by Bendix and service bulletin issuance is expected in the near future.

Bendix Magneto Model D6LN-2230

Distributor Gear Bushing

The left propeller on a Piper Model PA-31-350 aircraft was feathered. Investigation revealed the left magneto distributor bushing had disintegrated. The metal particles from the failed bushing shorted out both sets of breaker points.

Bendix Magneto Model D6LN	Rotor Bearing, P/N 10-35310	The left engine of a Piper Model PA-31-350 aircraft lost power during climb following takeoff. Investigation revealed the bearing at the cam end of the magneto rotor had failed. Excessive heat generated during the failure caused both breaker point cam followers to melt, preventing the points from opening. The magneto had 615 hours time in service. A similar failure was experienced with the right engine magneto at approximately 300 hours time in service.

ENGINES

LYCOMING

Lycoming Model O-320-E2D	Crankshaft Oil Seal, P/N LW-13792	Investigation to determine the cause of an oil leak at the engine nose section revealed the crankshaft oil seal had been rotating with the crankshaft. A comparison made following seal removal disclosed its outside diameter was approximately .125 inch less than that of a new seal. Total time in service - 189 hours.
Lycoming Model O-320-H2AD "76" Series	Oil Level Gauge (Dipstick)	Damaged oil level gauges, metal contamination of engine oil systems, and complete loss of oil supply has resulted from improper installation of the oil level gauge. Avco Lycoming Service Bulletin No. 407, dated October 18, 1976, announces the availability of a new oil level gauge assembly, P/N LW-15481, which incorporates a pinned bushing to guide the gauge into the crankcase. The new gauge can also be improperly installed if forced, so care must be exercised to be sure it is in correct position. A positive means to prevent improper installation of the oil level gauge in this model engine is presently being developed by Lycoming.
Lycoming Model TIGO-541-E1A	Propeller Thrust Bearing, P/N LW-12978	At 565 hours time in service, metal particles were found in the engine oil screen. Inspection revealed the propeller shaft thrust bearing, P/N LW-12978, retainer had broken allowing the balls to move from their controlled position within the races of the bearing. Avco Lycoming Service Bulletin No. 390, dated September 26, 1975, calls for inspection for this condition on certain serial number engines having 400 hours or more time in service. The bulletin recommends oil system contamination checks each 50 hours time in service and bearing inspection if metal contamination is found. The bulletin advises "use bearing P/N LW-13335, for replacement."
Lycoming Model TIO-541-E1A4	Oil Line Fitting	Engine roughness accompanied by loss of oil pressure was experienced during climb in a twin-engine aircraft. Investigation following a successful emergency landing revealed the engine oil supply was lost due to a loose connection at the No. 5 cylinder exhaust rocker box oil line elbow. Examination of the engine also revealed the No. 5 cylinder connecting rod had failed and had penetrated the engine crankcase. The engine had operated 98 hours since overhaul and 12 hours since a 100-hour inspection.

UNITED AIRCRAFT OF CANADA

United Aircraft of Canada Model PT6A-20	Tube Assembly, P/N 3008578	The cause for the right engine N1 RPM to suddenly drop to 49 percent was traced to failure of the subject P_3 tube assembly.
United Aircraft of Canada Model JT15D-1	No. 4 Bearing Oil Scavenge Tube	The right engine of a Cessna 500 aircraft was shutdown in flight due to loss of oil pressure. A postflight inspection revealed the right engine tailpipe was wet, a considerable amount of oil ran from the aft section drain tube, and the dipstick showed zero oil supply. Investigation disclosed the No. 4 bearing housing oil scavenge tube was blocked with carbon chips. It is believed this condition resulted in pressurization of the bearing housing and subsequent loss of oil through the No. 4 bearing air seal.

PROPELLERS

HARTZELL

Hartzell
Model BHC-J2YF-2CF

Blade Actuating Pin

During engine shutdown, the propeller would not feather. The propeller was disassembled and the blade actuating pin was found to be broken. Total time in service - 1004 hours.

Hartzell Model HC-92Z-K8D	Attachment Studs, P/N 756295	During flight, the propeller separated from the engine. Investigation revealed that the propeller attachment studs had sheared. Total time in service - 1890 hours.
Hartzell Model HC-CY2K-1BF	Blade, P/N F7666A2	The pilot reported severe vibration during landing approach. Investigation revealed a loose propeller blade. During propeller disassembly, a crack was found in the radius at the shank end of the blade. Total time in service - 332 hours. AD 75-07-05 pertains to this problem but this blade serial No. is not included.

McCAULEY

McCauley Model 2AF34C55	Propeller Hub	During takeoff, a blade separated from the right propeller. Investigation revealed that the hub had failed at the threaded area.

MAINTENANCE NOTES

IMPORTANCE OF THE CORRECT CYLINDER BASE NUT TIGHTENING PROCEDURE

The need to constantly stress the correct cylinder base nut tightening procedure seems apparent. Operators in the field are occasionally having engine problems and malfunctioning after reinstalling cylinders and not tightening the cylinder base nuts correctly. The latter tends to cause crankshaft bearing shifting, crankcase fretting, or broken cylinder studs, and possible engine failure.

Again we remind all operators in the field that we called this problem to your attention in Flyer No. 15, published in 1972, and repeated the information again in 1973 in the Key Reprints. In order to properly reinstall cylinders, consult AVCO Lycoming Service Instruction No. 1029.

Maintenance people should ensure that torque wrenches have been correctly calibrated before accomplishing cylinder base nut tightening. After reinstalling cylinders, a ground run of the engine should be accomplished as outlined in the Lycoming "Engine Operator's Manual". Then the engine should be test flown normally, and following the flight, a good inspection of the engine should be made before returning the aircraft to routine use.

AVCO Lycoming Flyer

NA-265 FUEL TANK DRAINING

Problems are being experienced with fuel quantity indicating systems on the Sabre-80 aircraft. The most recent of these problems caused an aircraft to be out of service for an extended period while maintenance was being performed. Ironically enough, the problem was caused by a minute amount of moisture in the fuel probes.

The construction of probes used in these aircraft is such that even the smallest amount of moisture will cause erroneous fuel quantity readings. While this is a problem inherent to the design, we, as maintenance personnel, can help to prevent it.

Always, drain the fuel system of entrapped water at every daily inspection, and again just before refueling operations are begun. The draining before refueling is especially important because fueling pressure causes water which has already settled to be mixed with the fuel.

Keep in mind that it takes four times as long for water to separate from turbine fuel as it does from gasoline; therefore, draining of sumps immediately after flight or after refueling will not be as effective as if the fuel were allowed to set for a period of time.

The Sabre-80 is equipped with 11 sump drains and the Sabre-40 with 12 to facilitate contaminant removal. The draining of each sump is equally important and none should be omitted.

While we have emphasized only the problem with fuel quantity indicating components, please keep in mind that it only takes a drop of moisture, or other contaminants to induce an engine flame-out when all other engine conditions are prevalent.

FAA Maintenance Tips

Safety Is No Accident

VIBRATION CHECKLIST

Vibration can be transmitted from the engine to the aircraft structure from points of contact between engine components and the cowl, firewall, or engine mount. The following is a list of areas to be checked to ensure the engine is isolated from the aircraft structure or to minimize the effect from components which must bridge between engine and structure. The list also includes engine conditions for smooth operation which affect airframe vibration.

BAFFLE-TO-COWL CLEARANCE
Check inside of cowl for chafing; trim metal baffle as required. Repaint affected area and reinspect next flight.

EXHAUST-TO-COWL
Check exhaust stack for clearance where it extends through cowl. Check stack and cowl for signs of interference. Enlarge cutout in cowl as required.

COWL-TO-FIREWALL INTERFERENCE
On models utilizing shock mounted cowls, positive clearance should be ensured between the cowl and the firewall. Typical clearances where the cowl overlaps the fuselage run on the order of .06 to .13.

INDUCTION HOSE CLAMPS
Check induction hose clamps for clearance with the engine mount structure. Look for marks on engine mount. Rotate clamps as required.

BREATHER AND OVERBOARD DUMP LINES
Check all overboard dump lines from the engine for clearance with the firewall, cowl, and/or cowl flap openings. Check cowl flap in both the open and closed positions. Reposition and reclamp to clear.

ENGINE ISOLATORS
a. Check engine isolator bolt lengths. Bolts which are too long will shank out and will not apply the correct pressure to the isolator. Bolts must be removed to be properly checked. Replace with next size shorter bolt if barrel nut has shanked out.

b. Check isolators for aging and deterioration. Replace if rubber is separated from metal pad, there is cracking of the rubber, and/or pronounced set of the rubber pad.

PROPELLER TRACK
a. Check propeller track; set up reference point at tip of propeller, rotate blades past this point. Blades should not be more than 1/16" out of track.

b. Check propeller for loose or binding blades, loose or missing attach bolts.

c. Check propeller spinner for loose, damaged, or deformed parts and visual wobble.

d. Balance suspected prop if roughness continues.

ENGINE CONTROLS
a. Engine controls should be routed to provide a gentle curve between engine and firewall. They should not be stretched tight. Pull control through firewall and reclamp.

b. Check engine controls behind engine for contact with engine. Reroute and reclamp controls, as required, to clear.

STARTER CABLE
Check starter cable for clearance with cowl and that a loop is provided for flexing.

ENGINE CONDITION
a. Check spark plugs for fouling, improper gap, and for proper type.

b. Check condition of ignition wiring.

c. Check condition of points.

d. Check magneto timing.

e. Check engine compression.

f. Check fuel injection engines; check fuel injector nozzles for restriction and correct size. Check fuel pump and mixture unit settings; check distributor valve for calibration and proper flow.

Cont'd

g. On turbocharged engines, check nozzle shrouds for leakage; check air induction ducting for leaks, and/or rubber couplings for proper seal.

h. On turbocharged engines, check turbocharger for foreign object damage, binding, and worn bearings.

ANTENNA VIBRATION
Check antenna if vibration tends to be related to airspeed rather than power setting.

WHEEL BALANCE AND BRAKE DISC TRUENESS
Wheel balance and brake disc trueness can be sources of vibration during the ground run on some aircraft. These should be checked as a part of the vibration diagnostic process if conditions indicate that they may be a problem.

SAFETY BELT CONFUSION

There have been reports of problems in distinguishing between Technical Standard Order (TSO) approved safety belts designed for single occupancy and those designed for double occupancy. Also, double occupancy belts have been ordered and single occupancy belts received. The required markings on TSO approved safety belts do not include the number of occupants for which the belt was designed. The TSO does require the rated strength of the safety belt assembly to be marked on the nameplate or identification label. The rated strength of safety belt assemblies for use with a seat designed for single occupancy is 1,500 pounds. The rated strength of safety belt assemblies for use with a seat designed for double occupancy is 3,000 pounds.

SOMETHING TO THINK ABOUT

A SAFE TOOL OR A LIVE BOMB

That fire extinguisher hanging on the wall in the welding shop or paint shop or wherever it is - is it a safe tool or A LIVE BOMB?

The National Association of Fire Equipment Distributors, Inc., investigated case histories of failure of portable fire extinguishers. The types of extinguishers under investigation were carbon dioxide extinguishers, dry chemical extinguishers, and the liquid type extinguishers, soda-acid, cartridge operated, water, foam, and vaporizing liquids. In 1970, they published a pamphlet type report on their findings. This pamphlet, "Fire Extinguishers - Can They Be Dangerous" - is available to the public. The answer to the question, "can they be dangerous," is YES! The investigation revealed that all the above type extinguishers are potentially dangerous.

Carbon dioxide extinguishers failed due to internal and external corrosions, improper safety discs, and other causes. Some of these failures occurred during hydrostatic tests - others occurred with the effect of a bomb.

Dry chemical extinguishers failed due to corrosion and overpressurization caused by mixing foreign materials with the regular "ABC" chemical. This resulted in generation of carbon dioxide gas, overpressurizing the container.

Case histories on liquid type extinguishers, soda-acid, foam, and cartridge operated water, revealed failures during hydrostatic tests, failures during use, and failures under static conditions. Failures under hydrostatic tests were controlled, but failures in use and under static conditions resulted in property damage, injury, and loss of life.

Hydrostatic tests and visual inspection of the above types, except the vaporizing liquid type, should be performed according to the National Fire Codes, which require hydrostatic test and internal examination each 5 years or at time of each recharge.

Approval for vaporizing liquid type fire extinguishers which used carbon tetrachloride or chlorobromomethane was discontinued in 1968 by the National Fire Protection Association. These extinguishers during their approved life, did extinguish some fire, but at times were not effective. Health hazards were the prime reason for discontinuing these types of extinguishers. The application of carbon tetrachloride to a heated surface generates phosgene gas, a poison. Use of this chemical to extinguish fire has caused serious injury and death.

For further information relating to fire extinguishers, contact your local fire department.

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U. S. GOVERNMENT PRINTING OFFICE : 1977 O - 227-359

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AC NO. 20-7N

GENERAL AVIATION inspection AIDS

SUPPLEMENT NO. 8

APRIL 1977

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

Flight Standards Service

GENERAL AVIATION INSPECTION AIDS

CUMULATIVE INDEX

AIRCRAFT

AIRFRAME COMPONENTS

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COMMUNICATION/NAVIGATION EQUIPMENT

EQUIPMENT

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U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
WASHINGTON, D.C. 20590

GENERAL AVIATION INSPECTION AIDS

SUPPLEMENT No. 8
APRIL 1977

This is the home of the General Aviation Inspection Aids. The publication is prepared from information submitted by those of you who operate and maintain civil aeronautical products. The content of this publication includes select items that have been reported to be significant but were not fully evaluated by the time the material went to press. As additional facts, such as cause and corrective action, are identified, the data will be brought to your attention in subsequent issues of the Aids. This action has been implemented to give Aids' readers the earliest notice of reported conditions received via Malfunction or Defect Report, FAA 8330-2. Computers will constantly monitor these conditions during the period of evaluation for cause and corrective action. Your comments and suggestions for improvement are always welcome. If you wish to share in such material, please send to: Flight Standards National Field Office, Attn: Safety Data Branch, AFS-580, P. O. Box 25082, Oklahoma City, Oklahoma 73125.

AIRCRAFT

BEECH

BEECH MODEL 19, 23 AND 24 SERIES AIRCRAFT -- THROTTLE CONTROL FAILURES

Failures of vernier throttle controls continue to be reported. These reports have been received on airplanes equipped with either the fuel injected engine or the carbureted version, including those airplanes which have complied with AD 73-23-06. It is believed these failures are caused by improper use of the vernier control; however, it may also be possible to induce a failure through misrigging of the throttle control.

The vernier action should only be used to adjust power in the mid-range of throttle control travel. Do not rotate the throttle knob when the throttle is against the full power or idle stops. This can damage the internal throttle cable and eventually cause cable separation and result in loss of power control. Beech issued Executive Airplane Safety Communique No. 19/23/24-12 on August 14, 1972, intitled "Proper Use of the Vernier Throttle Control." It is suggested this information be reviewed by owners/operators. In addition, it is recommended that maintenance personnel adhere to the rigging information contained in the Beech Shop Manual or Service Instruction No. 0130-159 any time rerigging of the throttle control is necessary.

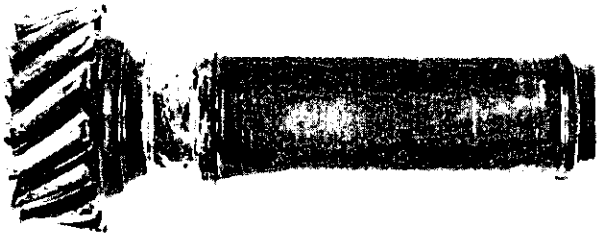
DON'T PUT IT OFF ANY LONGER - If you have recently experienced mechanical difficulties or problems with an aeronautical product and have not reported it yet, please do so now and help your fellow airmen. FAA Form 8330-2, available from your local General Aviation District Office, may be used for this purpose. The form requires no postage and is preaddressed to receive prompt handling.

BELL

Bell
Model 47G-5

Tail Rotor Drive Pinion
Gear, P/N 47-620-568-1

The tail rotor drive pinion gear failed resulting in loss of tail rotor drive. Investigation disclosed that the shaft was worn severely permitting the gear to disengage. Bell Service Instruction No. 428 relates to this subject.

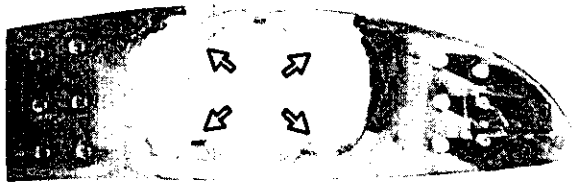


Bell
Model 206B

Horizontal Stabilizer
Rib, P/N 206-020-119-52

During inspection, the right horizontal stabilizer inboard rib was found to be cracked. Total time in service - 590 hours. A doubler had been installed in compliance with AD 76-05-01, however, the doubler was cracked also.

This updates the item on page 58 of the General Aviation Aids Supplement No. 5 dated January 1977.



Bell
Model 206B

Oil Tank Tube,
P/N 206-061-541-1

An oil tank tube failed due to chafing against air duct, P/N 5112-2. The air duct which connects to the oil cooler must be disconnected in order to see the chafed area. Inspection of five additional aircraft disclosed chafing in the same area.

BELLANCA

Bellanca
Model 17-30A

Fuel Selector
Valve Shaft

There has been a report of the main fuel selector valve shaft becoming disengaged from the selector valve due to a missing fastener.

It is suggested that the selector valve assemblies be checked periodically for wear of the indexing roll pin and fastener.

SAFETY is the responsibility of everyone in aviation. ACCIDENTS never take a vacation.

CESSNA

Cessna Model 172	External Power Diode Board, P/N 1570043	When the external power unit was connected, the aircraft's starting circuit was energized. Investigation revealed that the wires, pa 11 and pc 3 were connected in reverse to the diode board. Cessna Service Letter SE77-1 relates to this subject.
Cessna Model 180, 182, 185 and 188 Series	Engine Mount	There has been a continuing problem with corrosion on those portions of the engine mounts which are exposed to heat from adjacent exhaust stacks. Cessna has issued Single Engine Service Letter No. SE76-22 (dated November 15, 1976) which suggests that a very high temperature enamel be applied to the areas of the engine mounts which are in close proximity to the exhaust stacks. This enamel is identified by Cessna P/N CES1054-8125. Although the service letter specifically mentions the Model A185 and A188 Series airplanes with the 300 hp engine, it is recommended the enamel be used on any airplane where corrosion of the engine mounts is accelerated by elevated temperatures.

CESSNA, MODEL 310, 320, 340 AND 400 SERIES AIRCRAFT -- LANDING GEAR RIGGING

There have been a number of recurring accidents wherein the landing gear collapsed. It has been determined that in many of these cases, after the defective or broken component was replaced, the only adjustment made was to the downlock tension of the affected gear. This procedure may only compensate for an out-of-limit condition somewhere else in the system. Whenever components are replaced in a landing gear system, it is necessary to completely re-rig the entire system starting at the actuator gearbox.

It is recommended that maintenance personnel assure they have the latest revisions to the Service Manual for the specific airplane involved and that they adhere to the step-by-step rigging procedure for the entire gear system.

Cessna Models 310, 320 and 400 Series	Wing Rear Spar Caps	The wing rear spar caps, located directly downstream of the engine exhaust discharge and in the vicinity of the gap between the wing flap panels, can become corroded from the exhaust gases entering the area. The manufacturer indicates that particular attention should be directed to the inspection of the wing rear spar caps during scheduled annual inspections. The metal in this area should be closely checked for corrosion and deterioration.

DeHAVILLAND

DeHavilland Model DHC-6-300	Float Main Frame	During inspection, the main frame of the right float was found to be cracked at approximately the one o'clock position at station 195. Failures of the right float spreader and upright strut fittings were previously experienced on this aircraft.

ENSTROM

Enstrom All Models	Tail Rotor Gearbox Oil Sight Glass	There have been reports of inability to accurately determine the level of oil in the tail rotor gearbox due to oil residue buildup on the gearbox oil sight glass. It is suggested that the oil sight glass be inspected for evidence of discoloration at recommended oil change intervals after the oil has been removed. If discoloration is found, the glass should be cleaned or replaced, as necessary.

FAIRCHILD INDUSTRIES

Fairchild Industries Model F27	Landing Gear Strut Cylinders, P/N 20004228	During overhaul of the main landing gear, corrosion pits approximately .025 inch in depth were found on the outside surface of both strut cylinders. The corrosion was beneath the landing gear data plates which were removed during the overhaul process.
Fairchild Industries Model FH-227	Low Torque Switch Diaphragm, P/N 3907935	The left propeller auto feathered during descent. The discrepancy was corrected by replacement of the low torque switch, Negretti and Zambra Model L944738. Disassembly of the switch revealed a defective diaphragm which leaked oil at all test pressures.
Fairchild Industries Model FH-227-B	Oil Pressure Line	The right propeller was feathered due to flickering of the engine oil low pressure warning light. Inspection revealed that the engine gear box vent line and the oil pressure line on the compressor were loose.
Fairchild Industries Model FH-227-B	Air Duct Clamp Rivets	A rapid decompression and inability to control cabin pressure manually were caused by an open air duct at the recirculation fan outlet. Inspection revealed that the air duct clamp rivets failed permitting the clamp to loosen and the boot to slip off the duct.

GRUMMAN - AMERICAN

Grumman-American Model G-164A	Fuel Quantity Indicator	Grumman Ag-Cat Service Bulletin No. 54, dated July 18, 1974, advised of possible errors in fuel quantity indications and prescribed transmitter checks to be performed on certain serial number aircraft. Several incidents of fuel exhaustion, resulting from fuel quantity indicating system errors, have been experienced with aircraft having serial numbers above those covered by Service Bulletin No. 54. Fuel gauge quantity indications of from 1/4 to 3/8 full have been reported when actually the fuel tank was empty. Fuel quantity indicating system calibration checks should be performed as part of routine 100 hour/annual inspections.

MOONEY MODELS M20 AND M20A - - WING STRUCTURE

During an accident investigation, extensive wood rot, weathering, and glue joint separation were found in the wing structure. Airworthiness Directive 76-15-01 and Service Bulletin No. M20-170A require inspections of the wing wood structure as well as the empennage wood structure. When required inspections are made, particular attention should be directed to the wing areas shown in Figures 1 and 2. The areas marked R_E can be visually inspected externally without removing access plates. The areas marked R_I require removal of access plates for inspections. The flap support ribs of Stations 18, 59, 103.5, and 147.8 can all be inspected externally. The flap support ribs should be gently flexed during visual inspections for evidence of rot near the flap hinge and for glue joint separation. If evidence of wood deterioration is observed (such as wood discoloration or weather cracks) the fabric (and skin as necessary) should be removed until the extent of wood deterioration is determined. All wood and wood-joint deterioration should be repaired in accordance with the provisions of AD 76-15-01. Malfunction or defect report (FAA Form 8330-2) should be submitted for each instance of wood deterioration requiring repair.

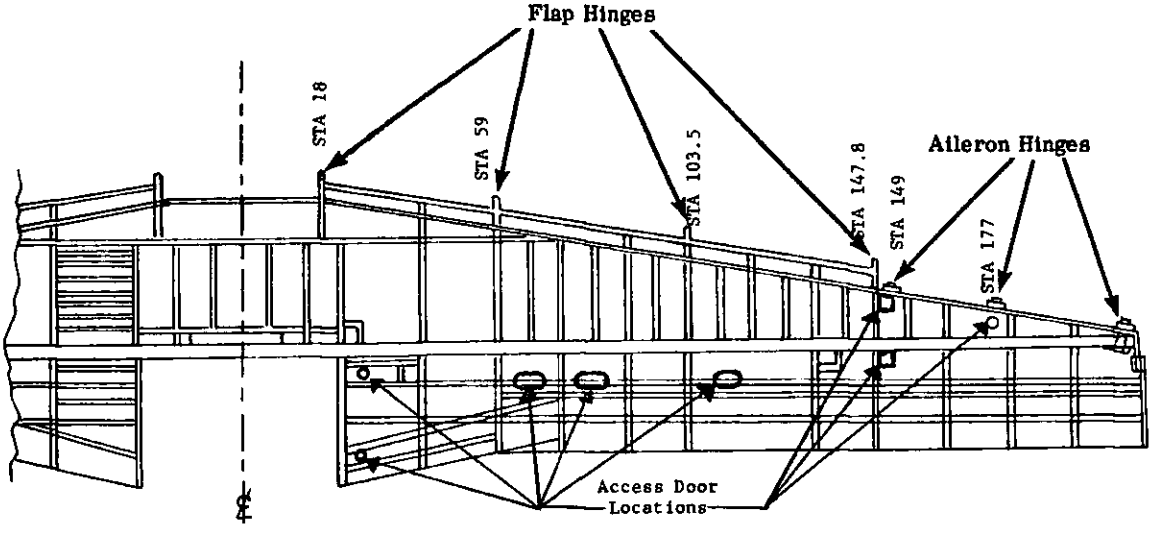


FIG. 1 WING STRUCTURE BOTTOM VIEW

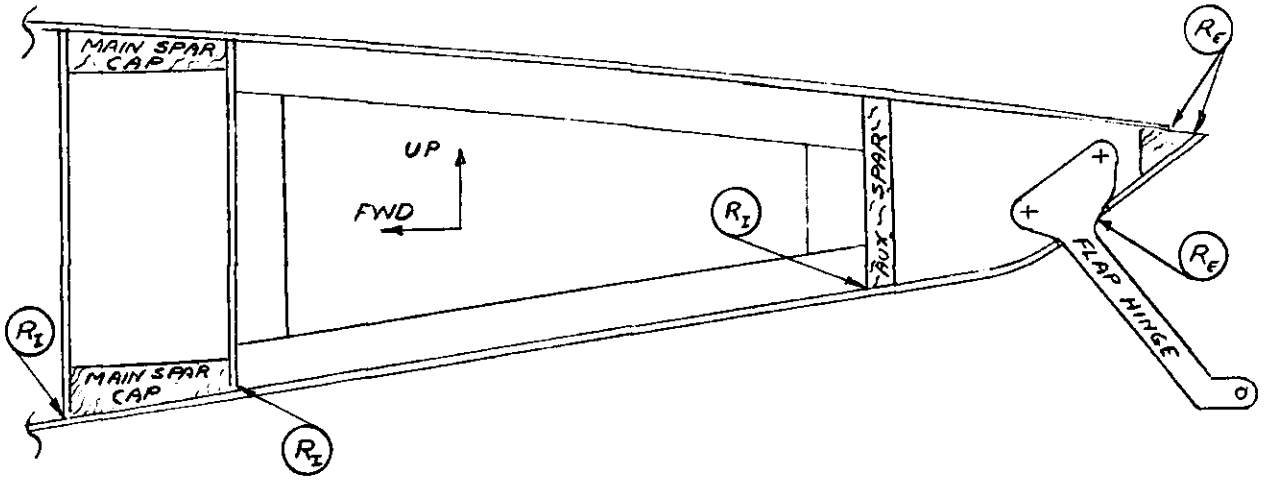
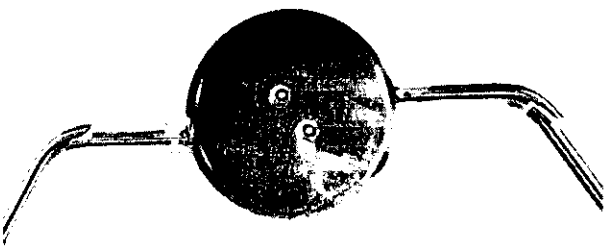


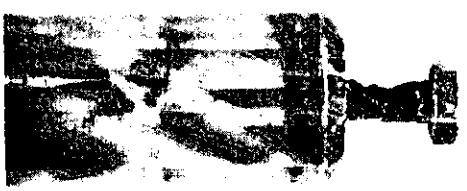
FIG. 2 WING RIB, STATION 147.8 (LOOKING INBOARD)

PIPER

Piper Model PA-18-150	Muffler	Only 2300 RPM could be obtained during takeoff. Although visual inspection indicated no restriction in the engine exhaust system, the muffler was replaced. Subsequent engine operation was satisfactory. The muffler was cut open, and inspection revealed that the core tube was badly distorted. The muffler was original equipment and had been in service approximately 6,000 hours.
Piper Model PA-23-250	Landing Gear	The right main landing gear collapsed during landing roll-out. When attempting to move the aircraft, the left main landing gear also collapsed. Investigation revealed that a bent rod end fitting had prevented the right main gear from locking over center in the down position. All gear pivot points were stiff, preventing free movement of the down lock linkage of both main landing gear. Also, the hydraulic system was low on fluid.
Piper Model PA-23-250 (6 place) Aztec "F"	Stabilator Tip Tube and Counterweight Assembly, P/N 15658-20	At 350 hours time in service, failure of the stabilator tip tube assembly was detected when a cracked fairing cover was found during preflight inspection. In this instance, the counterweight was found lying inside the cover. Piper Service Bulletin No. 540, dated January 4, 1977, advises that cracks have been found at either or both ends of the squared tube portion of the assembly where the tube joins the weight and also where the tube joins the outboard rib attachment plate. Failure to correct this condition has resulted in separation of the weight from the tube. This service bulletin provides instructions for inspection within the next 10 hours of operation and each 100 hours thereafter and modification within the next 10 hours of operation and each 100 hours thereafter and modification within the next 100 hours of operation.
Piper Model PA-23-250	Hydraulic Line, P/N 16585-00	Investigation to determine the cause for the nose landing gear collapsing revealed a hole corroded through the aluminum hydraulic line in the right wheel well. Loss of fluid pressure prevented full over center locking of the nose landing gear. Due to exposure of fluid lines to water, dirt and other corrosive matter in the wheel well areas, frequent cleaning and close inspection is recommended.
Piper Model PA-23-250 (Turbocharged)	Engine Shock Mount, P/N's 475-116 and -117	The lower cowling was found to be burned due to contact with the engine exhaust stack. Investigation disclosed that the engine shock mount assemblies were sagging. Total time in service - 1200 hours.
Piper Model PA-23-250	Exhaust Stack, P/N 31226-10	The nose gear failed to indicate down when the landing gear control lever was placed in down position. Use of the emergency CO_2 system failed to correct the condition. The nose landing gear collapsed during landing roll-out. Investigation revealed that the right engine outboard exhaust stack had broken off approximately 5 inches forward of the tail pipe support clamp. The stack failure allowed hot exhaust gases to enter the nacelle area damaging the right main gear actuating cylinder and causing loss of all hydraulic fluid.

Piper Models PA-24, PA-24-250, PA-24-260, PA-24-400, PA-30 and PA-39	Aileron Spar	Reports describe the existence of cracks in the aileron spar assembly radiating from the outboard hinge attachment point. Piper Service Letter No. 787, dated December 1, 1976, calls for inspection of the aileron spars of certain serial number aircraft at the next scheduled inspection interval and each 100 hours thereafter until hinge bracket replacement kit, P/N 760914 is installed.
Piper Model PA-24-180	Stabilizer Bearing Support Rivets	During replacement of the aft fuselage skins, the rivets which attach the vertical stabilizer torque tube bearing support fittings, P/N's 20419-01 and 20420-01, to the stringers were found to be loose. This condition is difficult to detect and was not noted during previous compliance with AD 75-27-08. Periodic inspection of the support fitting to stringer rivets for working or looseness is recommended.
Piper Model PA-28 Series	Nav Antenna, P/N 451-273	During inspection, cracks were noted in the bend radius of both elements of the nav antenna installed on the aircraft vertical stabilizer. Identical conditions were found during inspection of six other aircraft.
Piper Model PA-28-140 (Australian Registry)	Vertical Stabilizer Attach Bracket	During inspection, the vertical stabilizer forward attachment bracket was found to be severely corroded. Total time in service - 4525 hours.
Piper Model PA-28-180 (Australian Registry)	Aileron Bellcrank Support Bracket, P/N's 62102-00 and 62102-01	During inspection the aileron bellcrank support brackets in both wings were found to be cracked in the flange where the flange attaches to the wing rib. Total time in service - 3342 hours.
Piper Model PA-28R-180	Landing Gear Actuator Bolt, P/N 401-348 (AN-4-40A)	The landing gear actuator bolt, which attaches the retainer assembly, P/N 67197-00 to the main gear trunnion, was found to be severely corroded. Investigation revealed that water enters the end of the retainer and will not drain out due to the angle of installation.
Piper Model PA-30	Landing Gear	Although the pilot advised he had a gear down and locked indication, all three gears collapsed during landing roll-out. Investigation revealed that the landing gear transmission had separated from its bulkhead mounting. Examination of the bulkhead disclosed that a repair had been previously made using .025 inch material in place of the original .032 inch thick material.





Piper Model PA-30 .	Nacelle Heat Shield Assembly, P/N 23512-00	The cause for exhaust fumes in the cabin was traced to cracks in the left nacelle heat shield assembly. Engine exhaust gases entered the lower rear portion of the left nacelle through the cracks and traveled through the wing to the cabin. Total time in service - 2250 hours.
Piper Model PA-34-200	Nose Gear Centering Spring Bolt, P/N AN4-13A	The nose landing gear would not extend. Investigation revealed that the centering spring attach bolt was installed in the reverse position. This permitted the nut end of the bolt to hang on the nose gear door actuator tube.

ACCESSORIES

BENDIX

Bendix Magneto Model D-2000	Coil Retainer Screws	Malfunctioning of the dual magnetos has been traced to loose coil retainer tapered plug screws. In some instances, these older type screws have backed all the way out resulting in damage to magneto rotating parts. Bendix Service Bulletin No. 584, dated August 1976, recommends that these retainer screws be checked for the proper torque, which is 70/75 inch pounds, not later than the next 100 hours time in service. The bulletin also calls for installation of new type coil retainer devices at the next magneto overhaul.

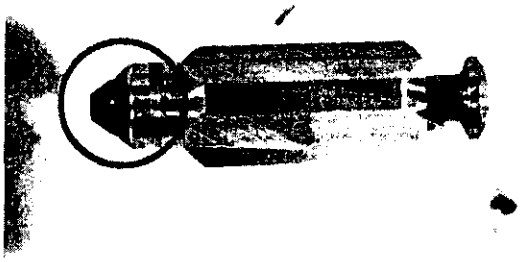
MARVEL - SCHEBLER

Marvel-Schebler Carburetor Model MA-4SPA — Venturi, P/N A46-A33

Inspection to determine the cause for reported intermittent engine roughness during level flight revealed the carburetor venturi was severely distorted. Examination revealed that heat from a previous induction system fire evidently caused the venturi to burn and melt. Further checks revealed a worn and leaking carburetor needle valve and evidence of carburetor flooding.

Aviation S A F E T Y is everyone's responsibility.

Marvel-Schebler Carburetor Model MA-4SPA	Needle Valve and Seat Assembly, P/N A233-615	The cause for carburetor flooding, rough running and inflight engine stoppage, has been traced to fuel leakage past the carburetor needle valve. In several instances, disassembly inspection revealed the leakage to be caused by wear of the needle valve rubber tip or insert. Contact of the needle valve with the seat sometimes wears a groove 360 degrees around the rubber tip permitting fuel to pass into the float chamber when the valve is in the closed position. This condition has been reported with needle valve and seat assemblies with as little as 300 hours time in service.



EQUIPMENT

GARRETT

Garrett Emergency Locator Transmitter Model Rescue 88	Battery	A report advised that a Rescue 88 ELT began smoking and became extremely hot approximately 16 hours after new batteries were installed. When the unit was opened, a clear fluid drained out. Other Rescue 88 emergency locator transmitters were reported to have had severe internal corrosion due to battery leakage. In addition, antenna separation due to poor adhesive bond has been reported.

ENGINES

CONTINENTAL

Continental Model TSIO-520-J	Crankcase	During inspection, the crankcase was found to be cracked at the front upper through bolthole. The crack extended approximately 1 inch in length. Total time in service - 696 hours. Continental Service Bulletin No. M72-20, Supplement No. 1 relates to this subject.

LYCOMING

Lycoming Model O-320-H2AD	Rocker Arm Fulcrum Assembly, P/N LW-15010	Investigation to determine the cause for engine roughness revealed the No. 2 cylinder exhaust valve rocker arm fulcrum assembly was broken into three pieces. One piece of the failed assembly lodged under the intake valve rocker shaft causing the push rod and its housing to bend. Total time in service - 84 hours.

Lycoming Model AEIO-320, AEIO-360, and AEIO-540 Series	Aerobatic Engine Lubrication Requirements	The risk of the engine oil not covering the inlet to the oil pump increases as the quantity of oil decreases, and the aircraft pitch attitude decreases or increases beyond limits established for prolonged operation. Lycoming Service Bulletin No. 399, dated May 14, 1976, cautioned operators to assure that a safe quantity of lubricating oil is provided. Service Bulletin No. 403, dated September 10, 1976, specifies the minimum safe quantity of oil for the subject model engines. Also, the bulletin advises of an improved oil strainer fitting for AEIO-360-A series engines which when installed, raises the present 8 degrees maximum nose down pitch limitation to 20 degrees.
Lycoming Model O-320-A, -E, IO-320-E, AEIO-320-E, and O-540-B Series	Exhaust Valve, P/N 75068	Field experience has shown that, when subjected to the effects of high leaded fuels, this exhaust valve shows mild to severe head erosion and cracks which could progress to valve failure. In order to detect this condition, AVCO Lycoming Service Bulletin No. 404, dated September 17, 1976, calls for a borescope inspection. This inspection applies to engines that are equipped with exhaust valves, P/N 75068, that have more than 1000 hours time in service, if more than 25 percent of operation was with fuel higher than 80/87 octane. Inspections are recommended within the next 50 to 100 hours time in service and each 100 hours thereafter until high compression type sodium cooled exhaust valves, P/N 74541, are installed.
Lycoming Model O-360	Oil Pressure Switch, (Datcon) P/N 40558	An engine failure occurred as a result of oil starvation. Inspection revealed that all engine oil was lost due to leakage through the top of the oil pressure switch which is used to activate the engine hour meter.
Lycoming Model TIO-540-A1A	Turbocharger Coupling Bolt	Failure of the V-Band coupling, P/N 75606, bolt allowed the exhaust bypass valve to separate from the turbocharger transition assembly. The failure occurred at approximately 2200 hours time in service.

UNITED AIRCRAFT OF CANADA

United Aircraft of Canada Model PT6A-20	Oil Filter Dowel Pin, P/N AN122676	The left propeller of a Beechcraft 99 aircraft was feathered during approach for landing due to loss of engine oil pressure. Investigation revealed that the oil pump drive gear shaft, P/N 3008127, had sheared due to ingestion of a dowel pin from the oil filter housing and valve assembly, P/N 3018128. United Aircraft Service Bulletin No. 1224, which calls for installation of a new type filter check valve and dowel pin, had not been complied with.

NOTICE TO READERS: The General Aviation Inspection Aids are, for the most part, prepared from information supplied by those who operate and maintain aircraft. The FAA encourages the reporting of all malfunctions or defects that come to the attention of service or operating personnel, even though the problem has been previously reported. FAA Form 8330-2, available from the local General Aviation District Office, may be used for reporting purposes.

PROPELLERS

McCAULEY

McCauley Model 3AF34C92 — Mounting Stud, P/N B3099

The propeller was found to be loose on its mounting flange. Inspection revealed that 2 mounting studs were broken and the 6 remaining stud nuts were loose. Total time in service - 654 hours.

McCauley Model 2AF34C55N — Hub

The propeller hub failed at the blade retention sockets permitting the blades to separate from the hub.

MAINTENANCE NOTES

A NOTE OF CAUTION!

When attaching electrical connectors to accessories, always be sure the plug and receptacle keyways are aligned. It has been observed that appropriate caution is not always being taken. Although the connector design allows for keyway engagement prior to pin engagement, as the parts become older, it is possible to engage the pins first.

If pin engagement occurs and the keyways are not aligned, subsequent rotation of the plug will distort and damage the receptacle pins. This may be compounded when the keyway is reached and the plug/receptacle threads are engaged. Due to the mechanical advantage available from the threads, it is possible to secure the plug.

Bearing in mind the above, the following points should be remembered when making electrical receptacle connections:

(1) Ensure the connectors are in good repair.
(2) Align plug keyways and press plug as far as possible into the receptacle.
(3) Hand tighten. This should be reasonably easy to accomplish. If stiffness is encountered, investigate for pin damage or cross threading.
(4) Snug-up by using finger power and safety.

CAUTION: Do not use "water pumps," "vise grips" or any mechanical means to perform this operation.

Remember . . . electrical system defects are some of the hardest to identify. Don't build them in.

(Airwork Turbine Update)

CARBURETOR AIR BOX ASSEMBLIES

Inflight operational difficulties, which have been attributed to deteriorated carburetor air box assemblies continue to be reported.

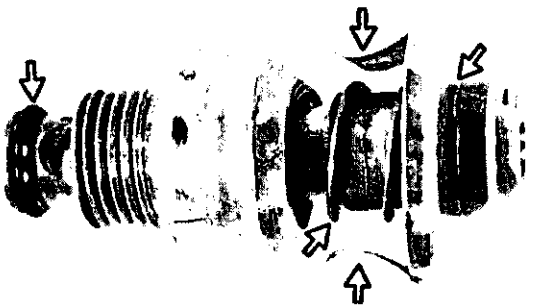
It is suggested that the following be included as part of the usual maintenance procedures when performing periodic inspections in the powerplant area:

1. Examine the entire air box assembly for cracks and security of attachment to the carburetor.
2. Inspect the actuating controls for cable wear, cable housing tightness, and wear at the control arm attach point.
3. Examine the air box valve assembly and all associated parts including bushings and bearings for wear, security of attachment to the shaft, and edge seal for deterioration.

ENGINE OIL DRAIN VALVES

Numerous reports have been received which indicate a variety of difficulties are being encountered with engine oil quick drain valves. When required inspections are made, it is suggested that the following items be examined:

1. Check the "O" ring seal for condition and proper sealing.
2. Check the spring for condition and tension.
3. Examine the spring keeper for wear, cracks, and grip strength.
4. If the quick drain valve is removed or replaced, check for clearance with the engine cowling.
5. Anytime the quick drain valve is replaced on single engine aircraft that have a retractable nose landing gear, a gear retraction should be accomplished, to assure clearance between the valve and the nose gear.

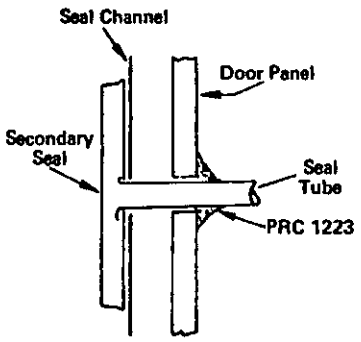


SABRELINER DOOR SEAL INSTALLATION

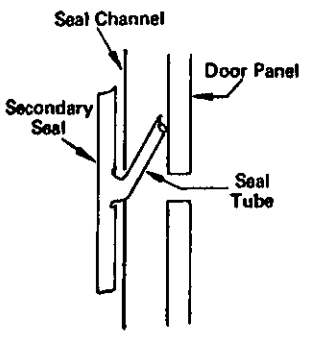
We have had reports that on some Sabreliners the secondary door seal is being incorrectly installed. Perhaps this tip will help you . . . . .

When pressing the door seal into the channel, insert the seal tube into the hole in the channel and guide the tube through the hole in the door panel. The tube should be visible when looking inside the door from the interior door handle opening. PRC 1223 (or equivalent) pressure sealant should be used around the tube on the door panel as shown.

FAA Maintenance Tips



Correct Installation



Incorrect Installation

SOMETHING TO THINK ABOUT

METAL PROPELLER -- USE AND CARE

Your aircraft propeller has been manufactured from a high-strength, heat treated forging under closely controlled conditions to the approved design in accordance with the applicable FAA regulations. Stamped on the propeller hub face are the model, serial number, type, and production certificate numbers. The following are some DO's and DO NOT's that one manufacturer has published for guidance in helping to assure proper use and care of metal propellers.

DO

1. Make a complete preflight and postflight inspection of blades for nicks, scratches, erosion, stone bruises, and cracks. Look at and feel the surface.
2. Have any minor damage repaired at once by qualified personnel in accordance with Advisory Circular 43.13-1A and the manufacturer's metal propeller repair manual.
3. Clean propeller blades frequently with a nonoil base solvent (Stoddard) or equivalent. Never use an alkaline cleaner.
4. Protect propeller blades from moisture and corrosives, by wiping with a cloth dampened with oil or by waxing the blades with an automotive type paste wax.
5. Conform to applicable r.p.m. placard limitations and periodically have tachometer checked for accuracy.
6. Have all major repairs and reconditioning done by an FAA certificated propeller repair station or by the factory. This will assure you that the correct repair procedures are followed.
7. Have your propeller completely reconditioned after extensive flight time (provided it has not received prior damage requiring more frequent attention).
8. Replace your propeller when there is any question as to its airworthiness. To avoid interruption in aircraft use, consider having a spare unit which can be installed while the other one is being inspected and/or repaired. Check with manufacturers for recommended times.
9. Be sure that proper bolt torque is applied evenly when installing a propeller. See decal on blade or refer to manufacturer's maintenance manual.

DO NOT

1. Use your propeller under any circumstances without a thorough inspection by qualified personnel if it has been subjected to impact.
2. Have your propeller straightened except by qualified personnel. Even partial straightening of blades for convenience of shipping to a repair station may cause hidden damage which, if not detected, could result in a nonairworthy propeller being returned to service. Be sure to report anything of this nature before repair is initiated.
3. Repair blade defects by peening or welding. This induces premature failure and is not permissible.
4. Paint over corroded or damaged blades. This hides the defect and may deter needed correction.
5. Run up your engine/prop in areas containing loose stones and gravel.
6. Push or pull on the propeller when moving the aircraft by hand.
7. Install a propeller on your aircraft unless it is the model approved under the Aircraft Type Certificate and has been obtained from a reliable source. A used propeller of unknown service history may be no bargain.

GENERAL AVIATION INSPECTION AIDS

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ENGINES

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PARA-AIDS

MAINTENANCE NOTES

OF INTEREST

SOMETHING TO THINK ABOUT

U. S. GOVERNMENT PRINTING OFFICE : 1977 O - 230-983

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GENERAL AVIATION inspection AIDS

SUPPLEMENT NO. 9

MAY 1977

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

Flight Standards Service

GENERAL AVIATION INSPECTION AIDS

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AIRCRAFT

AIRFRAME COMPONENTS

ACCESSORIES

COMMUNICATION/NAVIGATION EQUIPMENT

EQUIPMENT

. . . . . Cumulative Index continued on page ii (see last page) . . . . . .

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
WASHINGTON, D.C. 20590

GENERAL AVIATION INSPECTION AIDS

SUPPLEMENT No. 9
MAY 1977

This is the home of the General Aviation Inspection Aids. The publication is prepared from information submitted by those of you who operate and maintain civil aeronautical products. The content of this publication includes select items that have been reported to be significant but were not fully evaluated by the time the material went to press. As additional facts, such as cause and corrective action, are identified, the data will be brought to your attention in subsequent issues of the Aids. This action has been implemented to give Aids' readers the earliest notice of reported conditions received via Malfunction or Defect Report, FAA 8330-2. Computers will constantly monitor these conditions during the period of evaluation for cause and corrective action. Your comments and suggestions for improvement are always welcome. If you wish to share in such material, please send to: Flight Standards National Field Office, Attn: Safety Data Branch, AFS-580, P. O. Box 25082, Oklahoma City, Oklahoma 73125.

AIRCRAFT

BEECH

Beech Model E90	Generator Contactor Strap, P/N 90-364071-55	During inspection, the pilot's left rudder cable, P/N 50-524438-17, was found to be burned as a result of touching the generator contactor strap. All cable strands were broken except the core. Total time in service - 90 hours.

Beech Model 95-B55 Aircraft - - Prestolite Alternators

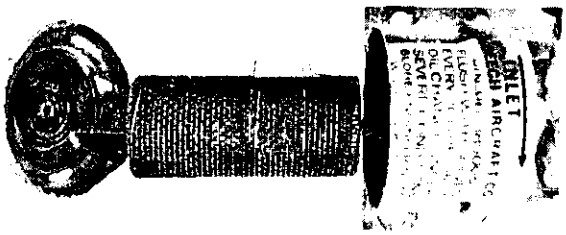
The following information is contained in Beechcraft Executive Airplane Service Communique No. 25, dated September 13, 1976:

> "Due to three reports of the alternator drive pulley and cooling fan separating from the alternator, the proper torque of the pulley retaining nut should be confirmed. The torque should be 410-480 inch lbs."

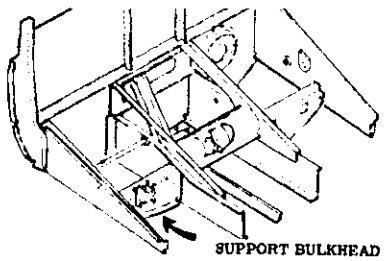
Airplanes affected: Serial numbers prior to TC-1981, except TC-1979.

SAFETY is the Responsibility of Everyone in Aviation.

Beech Model 95-B55	Oil Separator, P/N 96-389006-1	An investigation to determine the cause of metal in the engine oil screen disclosed that the oil separator screen was coming apart. Total time in service - 1300 hours.



Beech Models 95-B55 and 95-C55	Rudder Bellcrank Support Bulkhead, P/N's 35-400366-2 or 96-420001-9	The bulkhead, located on the left side of the fuselage at Station 49.0, has been found cracked or broken. When this bulkhead fails, partial loss of rudder travel may occur as the rudder bellcrank support, P/N 35-424136, is mounted on this bulkhead. These failures are believed to be attributable to ground handling of the aircraft using a tow bar and tow tractor when the aircraft gust locks are installed. Beech Class II Service Instructions No. 0869-154 announced the availability of two kits which were developed to provide more durable cast-type supports. Kit No. 55-4029-1S pertains to Model 95-B55, S/N's TC-502 through TC-1944. Kit No. 55-4029-3S affects Model 95-C55, S/N's TE-1 through TE-300.



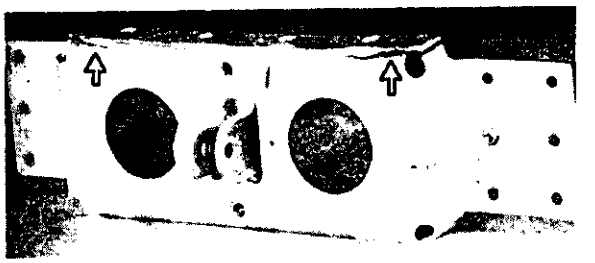
BELL

Bell Model 206B (Australian Registry)	Main Rotor System	During inspection, a main rotor blade retention bolt, P/N 206-010-154-3, lower washer was found to be cracked through at one side. Total time in service - 705 hours.
Bell Model 212	Main Rotor Blade, P/N 204-012-001-023	The main rotor blade lower surface was found to be cracked. The crack was located 76 inches inboard from the blade tip and extended 19 inches across the blade. Also, the spar was cracked approximately halfway through the "D" section. Total time in service - 2979 hours. Bell Service Instruction No. 204-32 relates to this subject.

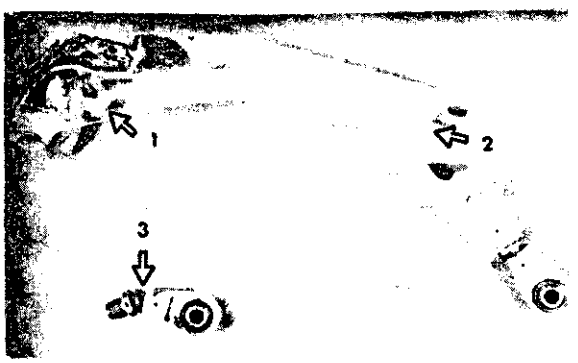
DON'T WASTE THAT EXPERIENCE, PUT IT TO GOOD USE. Send in the facts and photos via an FAA Form 8330-2, Malfunction or Defect Report, available at Flight Standards District Offices and most aircraft maintenance facilities.

CESSNA

Cessna Model 150	Elevator Bellcrank Bracket Assembly, P/N 0432004-1	The elevator bellcrank bracket assembly was found to be cracked. Total time in service - 6275 hours. A second aircraft was inspected and the same condition was found.



Cessna Model 177RG	Stabilator Attach Bolts, P/N NAS1306-17D	Problems of looseness in the stabilator attach bracket were corrected by replacing the existing bolt and nut with P/N's NAS1306-17D, and AN310-6, also, adding cotter pin, P/N MS24665-283, and washers, P/N AN960-616L, (as required). Cessna Service Letter No. SE73-30 describes this change. Reports have since been received which indicate that the castellated nuts on the pivot bolts were found to be loose. It is suggested that these bolts and nuts be checked for proper torque and security.
Cessna Models 310, U-3A, 310B and 310C	Flap Cable System	A split-flap condition occurred during approach to landing on an early Model 310 airplane. A clevis pin used to attach the flap cable to the actuator was found sheared. The aircraft was manufactured in 1957 and had accumulated over 8,600 hours in service. The flap control cables in early 310 series airplanes were attached with clevis pins, such as AN392 or MS20392-1. Although the strength of these pins is adequate for the design loads, some additional margin of safety can be achieved by replacing the pins with AN21 clevis bolts.
Cessna Model 310, 320, 340 and 400 Series (Except 404 and 421C)	Main Landing Gear Downlock Links	Reports continue to be received regarding collapse of the main landing gear of these aircraft. One of the most common causes of landing gear collapse is that the downlocks do not snap fully over center into the locked position. Improper lubrication and/or rigging almost always contributes to this situation. The photograph illustrates the type failures which can occur due to overload when the weight of the airplane is put on a landing gear which is not in the fully locked position. 1. Mounting lug breaks off main gear trunnion and/or bolt fails. 2. Ear breaks off downlock bellcrank. 3. Eyebolt lug breaks in the threaded area.



DeHAVILLAND

DeHavilland Model DHC-3	Elevator Control Lever Assembly, P/N C3-CF-41	The elevator control lever assembly, which connects the elevator cables to the control column below the cockpit floor, was found to have a fractured end lug. DeHavilland Service Bulletin No. 3/28, dated November 26, 1976, calls for inspection of both faces of the elevator control lever assembly immediately inboard of the cable attachments using a 10-power magnifying glass and mirror. The inspection should be performed within the next 50 hours time in service and each 200 hours thereafter.

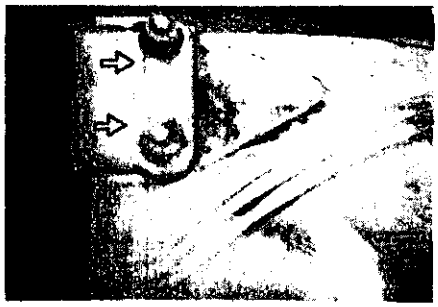
ENSTROM

Enstrom Model F-28C	Tail Rotor Spindle, P/N 28-15202	During flight, the pilot noted a vibration. The aircraft was destroyed during an attempt to land. Investigation revealed that the tail rotor spindle had failed in the reduced-area portion. Total time in service - 483 hours. AD 76-18-08 had been complied with 86 hours previously.

Enstrom
Model 280C

Tail Rotor Blade,
P/N 28-15017

A tail rotor blade grip was found to be cracked. The crack extended from a retaining bolt hole.



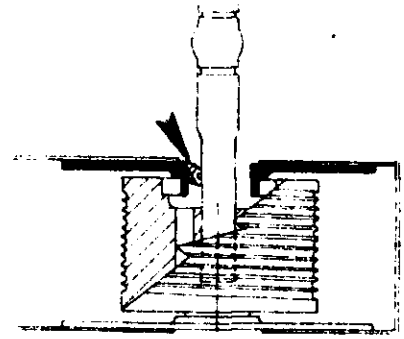
FAIRCHILD INDUSTRIES

Fairchild Industries Model F-27A	Horizontal Stabilizer Skin	During inspection, a 1 1/2 inch crack was found on the top skin of the left horizontal stabilizer just forward of the outboard elevator hinge.
Fairchild Industries Model F-27A	Wing Rib	During inspection, the left wing outer section closing rib at station 167 was found to be cracked at the lower end of the 1st and 2nd vertical stiffener.
Fairchild Industries Model FH-227	Low Torque Switch, P/N L944738	When power was reduced for descent, the right propeller auto feathered. Investigation revealed the cause of difficulty to be low torque switch leakage.

Fairchild Industries Model FH-227-B	Vertical Stabilizer Fitting, P/N 27-233000-12	During inspection, the forward leg of the vertical stabilizer attachment fitting was found to be cracked at the bottom of the lower forward bolt hole.
[redacted]ld Industries FH-227-B	Blockage of Pitot Lines	During cruise, the copilot's airspeed indicator became unreliable, followed by complete loss of airspeed indication on the pilot's instrument. At the time of the occurrence, the outside air temperature was minus 10 degrees centigrade with visible moisture present. Subsequent ground inspection revealed ice in both the right and left pitot lines.
Fairchild Industries Model FH-227-B	Nose Steering Servo Valve, P/N 871660	When retracting the landing gear following takeoff, the pneumatic pressure dropped to 1300 psi. The brake pressure was 1800 psi, and emergency pressure was 3100 psi. With the isolation valve closed, the pressure built up to 3100 psi. Subsequent ground inspection revealed that the nose wheel steering servo valve had separated at its parting surface.
Fairchild Industries Model FH-1100	Rotor Isolation Mount, P/N LM-701-SA6	An inspection to determine the cause of excessive transmission movement disclosed deterioration of the rubber isolation mount assembly. In addition, the upper cowling showed some wear. Total time in service - 1400 hours.
	GRUMMAN - AMERICAN	
Grumman-American Models G-164A and G-164B	Tail Landing Gear Spring Attachment Bolt	To increase the service life of the tail landing gear spring attachment bolt, the manufacturer recommends that the existing AN-5-21A bolt be replaced with a NAS-1305-28 bolt. Grumman-American Service Note No. 24, dated August 1, 1976, applicable to G-164A aircraft, serial number 1 through 1659 and G-164B aircraft, serial number 1B through 53B, pertains to this subject.
Grumman-American Model G-164B	Oil Inlet Hose, P/N A3502-17	The engine oil inlet hose installed on G-164B aircraft is longer than on the G-164A model aircraft because of the increased length of the engine mount. The aircraft manufacturer advises there is a possibility this longer "oil in" (suction) hose could collapse and restrict oil flow to the engine. Grumman-American Service Bulletin No. 58, dated December 27, 1976, applicable to aircraft serial number 01B through 156B, calls for installation of an aluminum reinforcement tube, P/N A3502-21, inside the oil inlet hose, P/N A3502-17, within the next 25 hours aircraft time in service.

If you have experienced mechanical difficulties or problems with an aeronautical product and have not reported it yet, please do so now and help your fellow airmen. FAA Form 8330-2, available from your local General Aviation District Office, may be used for this purpose. The form requires no postage and is preaddressed to receive prompt handling.

Grumman-American Model G-1159	Elevator Trim Tab System	The elevator trim tab system jammed in the neutral position shortly after takeoff. After landing, an inspection disclosed that a nut, washer and rivet were jamming the trim cable shaft under the cockpit floor at the control pedestal. Further checks disclosed that an opening in the cockpit floor at the control pedestal, permited debris to fall through. Grumman Alert Customer Bulletin No. 13, Amendment 1, dated January 1977 relates to this subject.



INTERCEPTOR

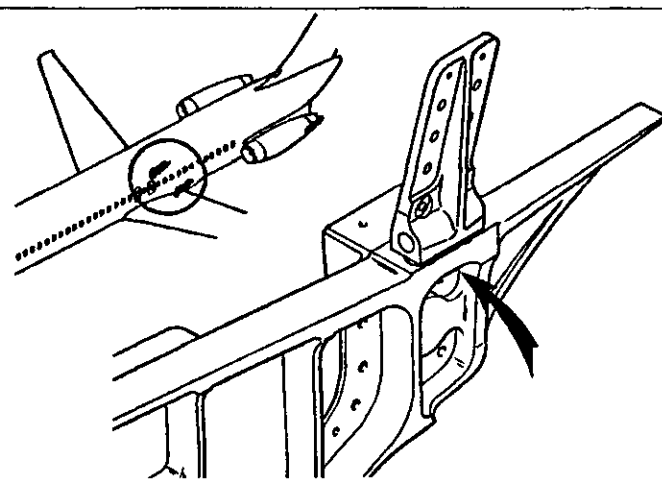
Interceptor (Meyers) Model 200A	Fuel Hose, P/N 65-A034-16	The engine lost power during takeoff. Investigation revealed that the wire-braided fuel hose, which connects the gascolator to the auxillary fuel pump, was leaking, permitting air to be drawn into the fuel system. This hose had been installed since 1970 and had accumulated 509 hours time in service.

MARTIN

Martin Model 404	Nacelle Stringer, P/N 404-2000173-6	During inspection, the lower inboard stringer of the left engine nacelle was found to be severely corroded.

McDONNELL DOUGLAS

McDonnell Douglas Model DC-9-31	Trapezoidal Panel, P/N 9919402-2	The right trapezoidal panel was found to be cracked at its attach point to the fuselage fitting, P/N 5911366-1. The crack extended from bolthole-to-bolthole. Total time in service - 21824 hours.



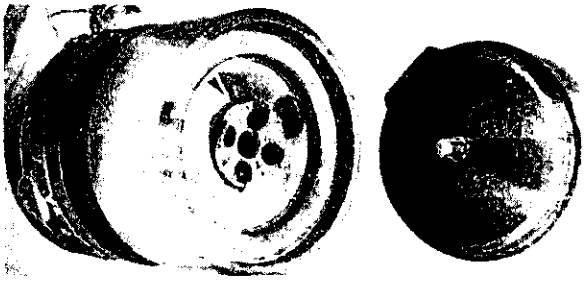
MITSUBISHI

Mitsubishi Model MU-2B-25	Engine Cowl Latch, P/N 016A-13322	The right engine top cowl outboard latch link broke during flight. Total time in service - 1902 hours. Airworthiness Directive 76-16-05 and Mitsubishi Service Bulletin No. 171A relates to this subject.

MOONEY

Mooney Model M20C	Fuel Strainer Assembly, P/N HE-769

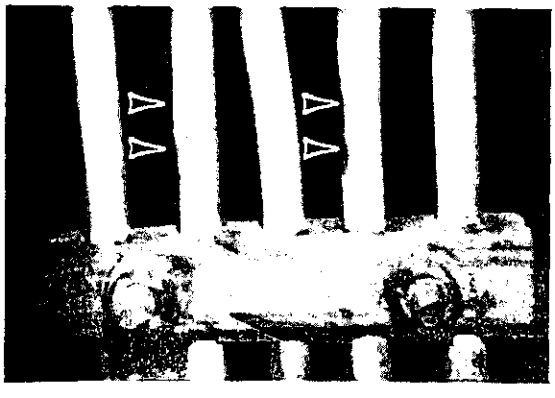
The fuel strainer assembly was found to be leaking. Investigation revealed that the strainer upper casting was broken in the threaded area at the lower portion attachment.



NAVION

Navion Model A	Hydraulic Lines

Five metal hydraulic lines are secured by a wood clamp block aft of the nose wheel well. A leak developed from corrosion damage that formed at the wood clamp block. This clamp should be removed for proper inspection of the hydraulic lines.

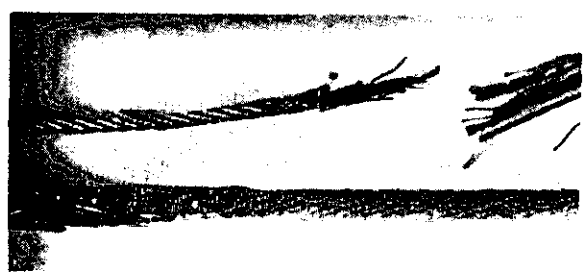


PIPER

Piper Model PA-23-250	Fuselage Longerons	During annual inspection at 2007 hours aircraft time in service, both lower longerons of frame assembly 30393 were found to be rusted completely through adjacent to the wing attachment fittings. The aircraft had been in service four and one half years at the time of inspection. Piper Service Letter No. 629 pertains to this subject, but recommends inspection after accumulation of five years in service.

Piper Model PA-23-250	Electrical Power Loss	Approximately three minutes following a night IFR departure, a complete loss of aircraft electrical power was experienced. An emergency landing was made. Investigation revealed that the left engine starter showed evidence of severe overheating caused by failure to de-energize when the starter switch was released, and the aircraft battery charge was completely depleted. The problem was believed to have been caused by failure of the starter switch to disengage when released.
Piper Model PA-24	Landing Gear System	When performing landing gear retraction checks, the landing gear solenoid circuit breaker tripped during the extension cycle when the throttle was retarded. A short circuit in the warning horn reportedly tripped the circuit breaker preventing full extension of the gear and, at the same time, denied both visual (lights) and audio (horn) warnings to the pilot.
Piper Model PA-24-250	Landing Gear System	The cause of inability to extend the landing gear, using emergency procedures, was traced to failure of the cotter pin that secures the upper end of the transmission support spring, P/N 83302-39. This condition permitted the transmission worm drive to drop down when disengaged which prevented full extension of the landing gear.
Piper Model PA-24-260	Nose Landing Gear	The aircraft nose landing gear failed to fully extend using both normal and emergency procedures. Investigation revealed that the nose landing gear push pull rod, P/N 21109-00, had become disconnected due to loss of the clevis pin which connects the rod to the retraction conduit linkage arm, P/N 21012-02. The clevis pin which evidently was installed without a cotter pin was found in the lower fuselage area.
Piper Model PA-25-235	Control Cables	During annual inspection, the elevator control cable, P/N 42702-07, and both aileron control cables, P/N's 42702-04 and 42702-05, were found to have worn and broken strands. Total time in service - 455 hours.
Piper Model PA-28R-180	Engine Air Intake Duct	The engine air intake duct was found to be collapsed and severely deteriorated. To prevent the possibility of restricting air flow through the engine air induction system, it is recommended the duct assembly be examined as follows: Inspect for duct deterioration, separation of the inner lining, broken or frayed cord wrapping, evidence of collapsing, indication of reinforcement wire slippage, or evidence of wire not being properly bonded to the duct. Replacement of defective duct assemblies should be accomplished promptly when any indication of deterioration is evident. Airworthiness Directive 69-12-01 and Piper Service Bulletin No. 297 relates to this subject.

SAFETY in aviation is everyone's responsibility. An accident can wreck your world.

Piper Model PA-30	Fuel Flow Indicator Line, P/N 23195-10	A pilot reported loss of fuel flow indication for the left engine. Inspection revealed that the fuel flow indicator line, which runs from the flow divider to the rear baffle, had failed. The break occurred adjacent to the tubing flare at the flow divider end permitting fuel to be sprayed on the engine. Inspection of the fuel flow indicator line for the right engine showed signs of impending failure. The copper lines which had been in service for approximately 1300 hours had become work hardened and brittle.
Piper Model PA-30	Heater Combustion Chamber	The cause of reported exhaust fumes in the cabin was traced to a defective Stewart-Warner Model 940 heater. The aft end of the heat exchanger assembly, P/N 754710, was rusted through allowing fumes and dangerous carbon monoxide gas to enter the cabin.
Piper Model PA-31	Fuel Shut Off Valve Controls	The right engine was shut down due to intermittent power loss experienced approximately ten minutes after takeoff. Investigation following a successful single engine landing revealed that the engine fuel shut off valve was partially closed. The sheet metal covers, P/N's 41478-00 and -01, which secure the valve handles in the open position, were missing for both engines. The valve controls are located aft of the crew seats and can easily be disturbed inadvertently during normal movement of personnel within the cockpit.
Piper Model PA-31 Series	Control Cables	Two instances have been reported whereby the left aileron balance cable and the rudder interconnect cable have short circuited against the wing flap motor solenoid, P/N 26898-04, terminal at fuselage station 174 under the cabin floor. The rubber insulator boot did not completely cover the terminal and contact resulted in complete burn-through of the interconnect cable and approximately 50 percent burn-through of the balance cable. This condition was found when the pilot reported sloppy control action. In one instance, the wing flap circuit breaker tripped as a result of the short circuit. 
Piper Model PA-31-300	Nose Wheel, (Piper) P/N 451784	During inspection, at 3000 hours aircraft time in service, the nose wheel was found to be cracked through the flange radius. The crack was noted on the outside surface of the wheel adjacent to the valve stem bore and had progressed approximately 90 degrees around the wheel circumference.
Piper Model PA-31-325	Main Landing Gear Actuator Rod End, P/N 755956	When adjusting the rigging of the left main landing gear during a 100 hour inspection at 300 hours time in service, the actuator rod end was found to be cracked. The crack had progressed completely through the outer shell which retains the rod end bearing and could not have been detected without disconnecting the actuator from the side link retraction arm, P/N 42042-00.

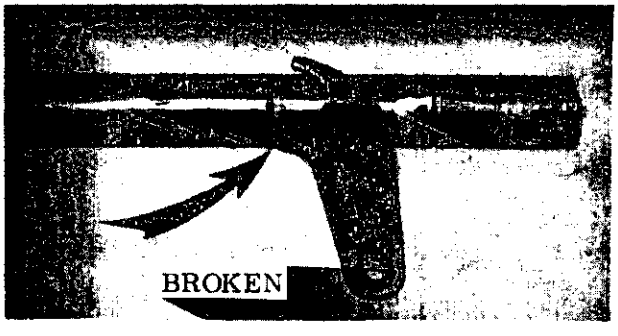
Piper Model PA-34-200T	Flaps	The aircraft was reported to fly extremely right wing heavy. Investigation revealed that the flaps were rigged in accordance with PA-28 series setting instead of PA-34 series setting. Total time in service - 55 hours.
Piper Model PA-36-285	Control Rod End Bearings	Corrosion and seizure of rod end bearings for throttle, propeller, mixture, cabin heat, elevator trim, and aileron controls have been reported. If not corrected, seized rod end bearings could result in control loss of the affected system. Additionally, reports of failure of the engine mixture control to travel to full rich position, following relatively low time in service, have also been received. Piper Kit No. 761095 provides material and instructions to replace existing control rod end bearings with improved corrosion resistant bearings and provides instructions to insure complete "stop to stop" travel of the mixture control arm. Piper Service Bulletin No. 516, dated January 20, 1977, pertains to this subject and calls for compliance within the next 50 hours time in service for aircraft serial number 36-7360001 to 36-7660125 inclusive.
Piper Model PA-39	Alternator Idler Pulley Bracket, Lycoming P/N 77757	The landing gear would not fully retract due to insufficient battery voltage. It was noted that there was no output from either the left or right alternator when the voltage regulator switch was in the main position. With the voltage regulator switch in the auxiliary position, the right alternator showed output, but the left alternator did not. Further investigation revealed the left engine alternator idler pulley bracket had failed, breaking the alternator F2 lead, causing it to short circuit and render the main (solid state) voltage regulator inoperative.

ROCKWELL INTERNATIONAL

Rockwell International Model 112A	Nose Landing Gear Actuator, P/N 48805-1	The jam nut which locks the rod end to the nose landing gear actuator shaft was found to be loose. Total time in service - 199 hours.

Rockwell International Rudder Bar
Model 112A

The right rudder bar cable bracket separated in flight. Examination of the rudder bar disclosed that the failure occurred in the weld attaching the cable bracket to the bar.



Safety Is No Accident

AIRFRAME COMPONENTS

PEE-KAY

Pee-Kay Amphibian Float Model 3500	Landing Gear	The rear landing gear of the floats installed on a Cessna 185F aircraft per STC SA877 EA failed to extend during landing approach. Investigation revealed that the aircraft had been used extensively in water operation which washed all grease from the rear landing gear causing it to bind and "hang up" when extension was attempted.

ENGINES

CONTINENTAL

Continental
Model GTSIO-520-K1B

Turbo Outlet Hose,
P/N 639356-1-8.5

During engine runup, oil was dumped overboard. Investigation disclosed that the left engine turbocharger line, between the scavenge pump and the turbocharger, was twisted, shutting off oil flow. This condition permitted oil to be dumped overboard through the breather line.

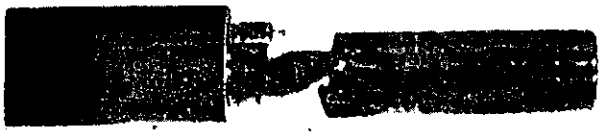
LYCOMING

Lycoming Model All Engines Equipped with TC 1108 Turbochargers	Turbocharger Inspection and Maintenance	Satisfactory operation of turbocharged engines is highly dependent on careful periodic inspection and maintenance of the turbocharger and related components. Avco Lycoming Service Bulletin No. 313B, dated February 18, 1977, prescribes certain inspection procedures, torque values, and clearance measurements to be used when performing 100 hour inspections of the turbocharger system. Inspection for general condition and proper torque values are called for at the exhaust pipe-to-cylinder flanges, exhaust pipe, and by-pass valve-to-transition assembly Marmon clamps, and the turbine housing-to-transition assembly mounting bracket bolts. Additionally, the bulletin specifies limits for turbine blade to housing tip clearance.

LYCOMING ENGINES -- MAINTENANCE PROCEDURES AND SERVICE LIMITATIONS FOR VALVES

Avco Lycoming Service Bulletin No. 301B, dated February 18, 1977, provides maintenance procedures and service limitations for intake and exhaust valves. The bulletin calls for inspection inside cylinder rocker boxes each 400 hours time in service for evidence of wear and general condition. Additionally, the bulletin prescribes certain service limits to be applied and inspection methods to be used when cylinders are removed from an engine.

Lycoming Model IO-540-K1A5	Propeller Governor Idler Gear Shaft, P/N 70384	The cause of loss of propeller r.p.m. control at approximately 1800 hours time in service was traced to failure of the governor idler gear shaft. The idler shaft had broken into three pieces causing decoupling of the governor idler gear from the cam mounted governor drive gear. During overhaul of another IO-540 engine, an idler shaft, P/N 70384, was found to have broken in half adjacent to the outboard end of its Woodruff key slot. No propeller control difficulties had been reported with this engine.



UNITED AIRCRAFT OF CANADA

United Aircraft of Canada Model PT6T-6	Thermocouple, P/N 3023750	The cause of inaccurate engine turbine inlet temperature indications reported with Sikorsky S58T helicopters has been traced to loose thermocouple terminals. Loosening of the thermocouple wires at the terminals alters the resistance value, resulting in erroneous temperature indications.

PROPELLERS

HARTZELL

Hartzell Model HC-C2YK-2CF	Blade, P/N C8477	A propeller blade separated from the aircraft during takeoff. Investigation revealed that the blade failed in the shank radius.

McCAULEY

McCauley Model DA34C58A	Hub	The propeller hub was found to be cracked in the blade socket. The crack was approximately 1 inch in length. Total time in service - 2197 hours.

SAFETY is a Responsibility, Not a Task!

MAINTENANCE NOTES

AIRCRAFT TIRE CARE

With the onset of summer the high temperatures will be more detrimental to aircraft tires. Maintaining the correct inflation pressure in an aircraft tire is one of the most essential factors in obtaining maximum safe service life. Inner tubes and tubeless tire liners used in most automotive tires are made of butyl rubber. Most aircraft inner tubes and tubeless tire liners, on the other hand, are made of natural rubber to satisfy extreme low temperature performance requirements. Natural rubber is a poor air retainer when compared with butyl rubber. This accounts for the comparatively high daily air pressure loss and need for frequent pressure checks with aircraft tires.

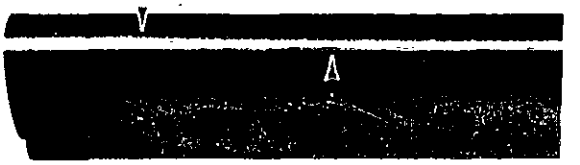
Daily inspection of tires includes checking the pressure. This can only be done properly with calibrated gauges. Don't let an improperly serviced tire cause an aircraft accident/incident or personnel injury. Ensure that tire servicing equipment is in good working condition and properly calibrated.

STREAMLINE TUBING PROBLEMS

A member of the experimental aircraft association discovered cracked streamline tubing on his aircraft. The aircraft is currently under construction and this particular streamline tubing was used on the cabane struts. The tubing was from a kit supplied by an Aircraft Materials Supplier. Examination revealed that all of the streamline tubing used on the landing gear and the cabane struts was cracked. He immediately contacted the supplier and they furnished him with replacement tubing that came directly from the distributor of the tubing. Upon close examination, it was discovered that this tubing was also cracked.

Because these two shipments had different heat treat numbers, it is very likely that many of the suppliers of streamline tubing may have defective stock on hand.

Shown is a piece of the streamline tubing with the crack quite visible at the trailing edge. We urge all builders-no matter who you may have received the tubing from-to immediately inspect all streamline tubing you may have on hand. to be sure you do not have cracked stock. If so, you should immediately contact your supplier.



USE OF FUEL ADDITIVES

Aviation gasolines contain some water in both suspended particle and liquid form. During freezing temperatures, this water may turn to ice, restricting or stopping fuel flow. Cessna Service Letter ME73-25, dated November 2, 1973, entitled "Use Of Fuel Additives", directed to Cessna aircraft using Continental engines, discusses this specific problem and the use of fuel additives. This data is also contained in Cessna Aircraft Specification A7-CE-400 and Continental Aircraft Engine Service Bulletin M75-2. Some additives may not be compatible with the fuel or the materials in the fuel system and may be harmful to other parts of the engine with which they come in contact. Additives that have not been approved by the manufacturer and the FAA should not be used.

DON'T PUT IT OFF ANY LONGER

If you have experienced mechanical difficulties or problems with an aeronautical product and have not reported it yet, please do so now and help your fellow airmen. FAA Form 8330-2, available from your local General Aviation District Office, may be used for this purpose. The form requires no postage and is preaddressed to receive prompt handling.

GENERAL AVIATION INSPECTION AIDS

CUMULATIVE INDEX (Con.)

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