AC NO. 20-7P

GENERAL AVIATION inspection AIDS

SUMMARY

AUGUST 1977

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

Flight Standards Service

PREFACE

The General Aviation Inspection Aids publication provides the aviation community with a uniform means for interchanging service experience which is intended to improve the durability and safety of aeronautical products. It is hoped that this exchange of brief, advisory data will be of value to mechanics, operators of repair stations, and others engaged in the inspection, maintenance, and operation of aircraft in general.

The information contained in the Aids publication is in no way intended to be critical of any manufacturer or his product. Rather, it is expected to alert the aviation community to maintainability data gained through service experience. When possible, manufacturers' suggestions for improvements to their products have been included. The recommendations which are contained in the Aids, however, are not mandatory.

When the information is made available, this publication includes data on the service experience of U. S. manufactured aircraft that have been exported and are operating in foreign countries. In addition, information is also provided on those aircraft of foreign manufacture that have been issued an FAA Certificate of Airworthiness.

To advance the exchange of in-service information such as that available in this publication, the FAA encourages all persons in the aviation community (including aircraft owners, mechanics, pilots, and manufacturers) to promptly report their experiences by submitting a Malfunction or Defect Report (FAA Form 8330-2). Copies of this form, commonly referred to as an M & D Report, may be obtained, free of charge, from most airport managers or at any FAA District Office. This form requires no postage and is preaddressed to receive prompt handling.

For the purpose of accurately determining the scope, complexity, and growth of conditions encountered in service, it is essential that all experiences be reported as they occur, even though such information may have already appeared in the General Aviation Inspection Aids. The results of such cooperative action, on the part of everyone concerned, will provide the means for measuring the validity and effectiveness of corrective actions taken by manufacturers and the Federal Aviation Administration's Flight Standards Service.

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Washington, D.C. 20402

U.S. DEPARTMENT OF TRANSPORTATION

FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20590

GENERAL AVIATION INSPECTION AIDS

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INTRODUCTION

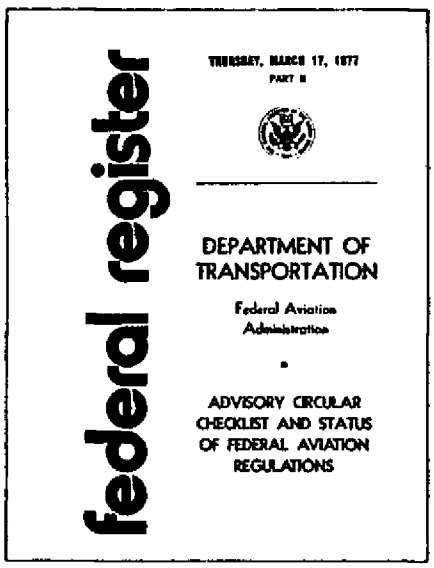
The items in this year's annual summary have been reviewed and updated since they were originally published in a monthly supplement. This has been done to provide the latest information available on the conditions identified. In some instances, problems that proved to be relatively isolated were deleted; and in other cases, new information on specific subjects has been added. A few items which were published in last year's summary have been repeated as the conditions identified continue to be reported.

The Addendum, located in the back portion of this summary, provides the very latest information available on the safety and reliability of aeronautical products not previously published in an Aids supplement. This information was received after the main body of the summary was ready to be printed. The items in the Addendum are, however, indexed into the Table of Contents.

The Voluntary General Aviation Safety Program is indebted to the many persons who reviewed the hundreds of items printed during the past year to evaluate and update the data prior to republication. We also wish to express our gratitude to those persons in the aviation community who support this program as the Inspection Aids rely on their interest and continued participation. The voluntary submission of the many thousands of Malfunction or Defect Reports (FAA Form 8330-2) throughout the preceding 12 months provided the data without which this program (in its present form) would not be possible.

GENERAL AVIATION INSPECTION AIDS SUMMARY

OF INTEREST


federal register

TUESDAY, MARCH 17, 1977
PART II

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

ADVISORY CIRCULAR CHECKLIST AND STATUS OF FEDERAL AVIATION REGULATIONS

PURPOSE: This notice contains the revised checklist of current FAA advisory circulars and the status of Federal Aviation Regulations.

EXPLANATION: The FAA issues advisory circulars to inform the aviation public in a systematic way of nonregulatory material of interest. Unless incorporated into a regulation by reference, the contents of an advisory circular are not binding on the public. Advisory circulars are issued in a numbered-subject system corresponding to the subject areas in the recodified Federal Aviation Regulations (14 CFR Ch. I).

This checklist is issued triannually and lists all current advisory circulars. In addition, it now includes information concerning the status of the Federal Aviation Regulations. The checklist may be obtained by requesting "AC 00-2, Advisory Circular Checklist" from:

Department of Transportation
Publications Section, TAD 443.1
Washington, D. C. 20590

The General Aviation Inspection Aids publication is always interested in new facts and/or photos that can be instrumental in furthering the safety features and reliability of aeronautical products currently in the aviation community. If you would like to share such material, please send it to: Federal Aviation Administration, Flight Standards National Field Office, Attention: AFS-583, P. O. Box 25082, Oklahoma City, Oklahoma 73125.

P. S. The publishing facilities here at the FAA Aeronautical Center are capable of reproducing any snapshot of average quality, but we ask that identification data such as make, model, and assembly name be included as an attachment rather than printing on the photograph.

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

GENERAL AVIATION INSPECTION AIDS

AUGUST 1977 SUMMARY

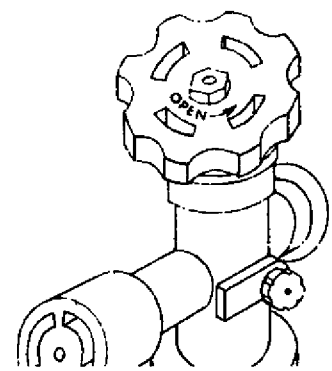
AIRCRAFT

AVIONS MARCEL DASSAULT

Avions Marcel Dassault Model Falcon 10	Wing Leading Edge Slat Anti-Icing Hose	The left wing outboard slat anti-icing hose uncoupled from the slat at wing zone 540 as a result of a loose hose clamp. High temperature engine bleed air discharged into the forward wing area melting the flux gate transmitter wiring insulation, and short circuited the a.c. power. The short circuit burned the directional gyro transformer and tripped the No. 1 a.c. circuit breaker. Uncoupling of the hose clamp may be prevented by positioning the clamp so that it is not on the coupling bead and by verifying its tightness. The manufacturer's maintenance manual, chapter 30-10-01, pages 602 and 603 graphically describes the correct way for installing these clamps.

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.



NOTICE TO READERS: The General Aviation Inspection Aids are, for the most part, prepared from information supplied by those who operate and maintain aircraft. For the Aids to be of the most value, a continual interchange of service information is most important. 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.

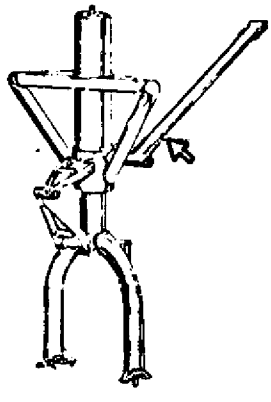
GENERAL AVIATION INSPECTION AIDS SUMMARY

BEAGLE AIRCRAFT LTD.

Beagle Model B. 206 Series 2	Exhaust System	During takeoff, the right engine manifold pressure was lost. Investigation revealed that the exhaust bellows on the outboard exhaust stack were broken aft of the No. 1 cylinder. The engine compartment was severely damaged. Total time in service - 2072 hours.

BEECH

Beech Model 18 Series	Cabin Door Safety Chain	The safety chains used as a secondary method to secure the cabin door are not adequate for any particular load. They can obstruct egress as well as hinder ground crew entry in an actual emergency. The door latching mechanism is completely adequate without the safety chain engaged if the door is closed and latched according to established instructions. It is recommended the safety chain be removed from all airplanes on which they have been installed.
Beech Model 18 Series	Main Landing Gear Drag Leg, P/N 404-188405-6	Cracks and complete failures of the main landing gear drag leg have been reported. The failures usually occur at the lower end of the tube and are generally attributable to corrosion. It is suggested the drag legs be carefully examined on a periodic basis. Defects in the paint should be given special attention to determine whether they are corrosion pits or merely stone chips, etc. Probing questionable areas with an ice pick or cotter key extractor is also suggested as a method to determine if corrosion has progressed through the tube.



Beech Models 18 and C-45 Series	Tail Wheel Installation	An airplane was substantially damaged during a ground loop following collapse of the tail wheel assembly upon landing. The tail wheel support structure incorporates a vertical cross brace member in the aft fuselage above the tail wheel truss attach fittings. The upper right member of the cross brace support was found separated and evidence of a pre-existing crack was observed. Failure of the cross brace support resulted in loss of structural support to the tail wheel assembly, allowing it to collapse when side loads were encountered.

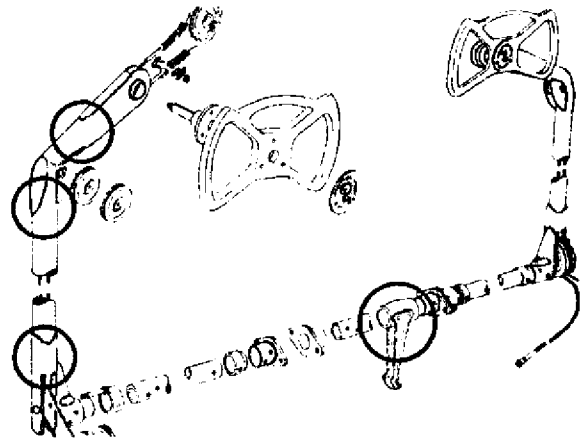
GENERAL AVIATION INSPECTION AIDS SUMMARY

Beech
Model 18
Series

Control Column
Assembly

There have been several reports of the control columns being found either cracked or broken. The manufacturer believes these cracks may have been caused by stress exerted by the elevator during gusty wind conditions when the control locks were in place.

Beech has issued Class I Service Instructions No. 0889-155 which provides procedures to be used to detect and repair cracks found in the control column or elevator control arms.



Beech Model E18S	Elevator Control Arm Assembly, P/N 804-187504	Elevator control was lost during takeoff. Investigation revealed that the elevator control arm had failed at the taper pin where the arm is attached to the torque tube. The break was clean with no indication of a pre-existing crack.

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.

BEECH MODELS B19, C23, A24, A24R, AND B24R AIRCRAFT -- INDUCTION AIR FILTER

The following information is contained in Beechcraft Executive Airplane Service Communique No. 24, dated September 13, 1976:

"Failure to properly tighten the screws attaching the induction air filter to the cowling or fuel injector air box can result in the filter gasket becoming loose and separating from the induction air filter. If this should occur, it is possible for the air filter gasket to be sucked into the induction air system resulting in a reduction of engine power.

For this reason, the induction air filter must be inspected for condition, and for a snug and secure fit to the cowling or fuel injector air box any time the induction air filter is replaced or reinstalled, and as a part of pre-flight inspections."

Aircraft affected: Model B19, S/N's MB-481 and after; C23, S/N's M-1285 and after; A24, S/N's MA-364 through MA-368; A24R and B24R, S/N's MC-2 and after.

SAFETY is a Responsibility, Not a Task!

GENERAL AVIATION INSPECTION AIDS SUMMARY

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.

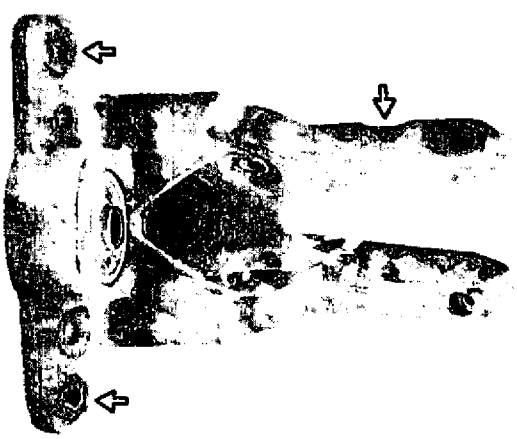
Teledyne Continental Motors Service Bulletin No. M75-27 dated November 1975 pertains to this subject. It is suggested this service bulletin be consulted for additional information.

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.

Beech
Model 35
Series

Elevator Support,
P/N 35-600002

An annual inspection of a Beech M35 Bonanza revealed severe corrosion (pitting) of the elevator support located on the fuselage aft bulkhead. The area affected the most was around the attach boltholes. The corrosion is believed to have been caused by inadequate removal or neutralizing of a paint stripper used during preparation for repainting the aircraft.



BEECH AIRCRAFT -- INSPECTION AND REPLACEMENT OF ROD END BEARINGS

Some rod end bearings, which were manufactured by Nippon Miniature Bearing Corporation, were reported to have seized in service. Beech has issued Class II Service Instructions No. 0760-010 to advise Beech owners/operators of this situation, and to provide information regarding manufacturers of approved replacement rod ends.

It is suggested that rod end bearings used on engine controls; landing gear retract mechanisms; nose gear steering mechanisms; flap, aileron, elevator, rudder, and tab controls be carefully inspected for binding during normal maintenance activities. Serial numbers of the affected aircraft are listed in the service instructions.

BEECH AIRCRAFT -- FUEL CELL INSPECTION

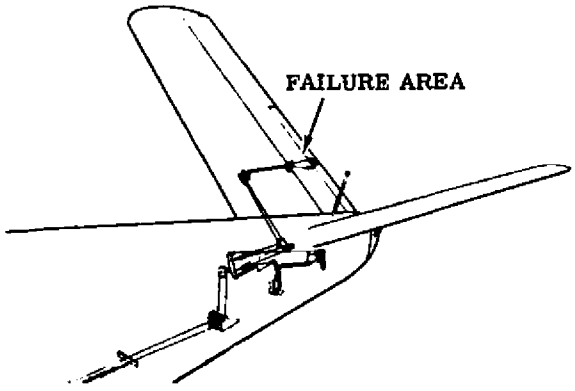
Beech issued Class I Service Instruction No. 0632-280 to provide inspection criteria for bladder type fuel cells because numerous reports have been received of leaks being found at the drain nipples and fuel vents. Wing lower surfaces and under the nacelles should be examined each 100 hours for fuel stains or other evidence of possible fuel seepage. If stains are found, remove the access plates from the wing lower surfaces and inspect the areas between the fuel cells and the wing skin. Aircraft with fuel cells over four years old, or which are continually subjected to high temperature and/or high humidity should be checked more frequently. If fuel seepage is found or if the fuel cells appear to be hard and brittle, they should be replaced. Aircraft affected: All models (except Model 23 series) which are equipped with rubber bladder type fuel cells.

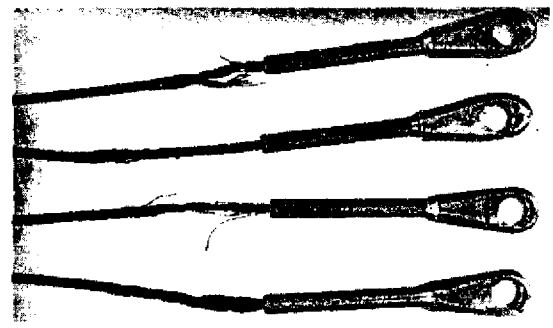
GENERAL AVIATION INSPECTION AIDS SUMMARY

BEECH MODEL 35 SERIES -- ELEVATOR TAB CABLES, P/N'S NAS302-37-( ) AND NAS303-27-( )

There have been a number of reports which indicate that the trim tab cables were found rusted, corroded, frayed, and broken at the end which is attached to the tab.

Rust and corrosion are believed to be the result of paint strippers or other caustic materials coming in contact with the trim tab cables. Cable fraying and breakage at the swaged clevis fitting are caused by overtorque of the bolt used to secure the clevis end to the trim tab horn. When the bolt is overtorqued, the clevis will not move on the horn so all movement occurs at the cable end of the clevis which causes the strands of the cable to fray and break. It is suggested these cables be inspected frequently for conditions of impending failure.





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.

GENERAL AVIATION INSPECTION AIDS SUMMARY

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 Model 58	Propeller Accumulator Diaphragm, P/N 95-380026A	During inspection, the propeller unfeathering accumulator diaphragm was found ruptured permitting oil to leak between the mating surfaces. Total time in service - 1260 hours.
Beech Model 65-A90 S/N's LJ-76 and LJ-114 thru LJ-301	Current Limiters	Reports indicate the propeller detent springs have broken and dropped onto the isolation limiter buss located in the control pedestal. This resulted in sparking and smoke. Beech Class I Service Instructions No. 0825-352 pertaining to this subject is currently being revised. The original service instruction called for the installation of a protective cover over the current limiters; however, this cover will not fit the affected airplanes. Revision I will detail a different method of protecting the isolation limiter buss. It is suggested this service instruction be complied with when received.
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.

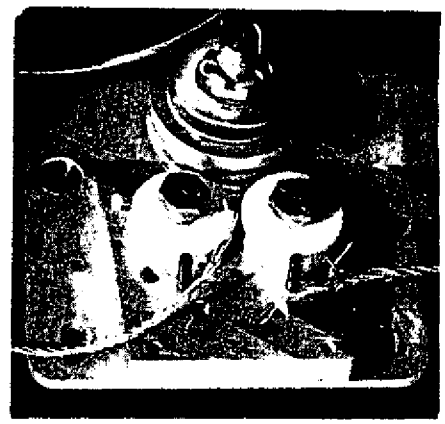
BEECH MODEL 90, 99, 100 and 200 SERIES AIRCRAFT -- ENGINE FUEL DRAIN COLLECTOR SYSTEM

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. 0763-282 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.

GENERAL AVIATION INSPECTION AIDS SUMMARY

Beech
Models B90,
C90 and E90

Edo-Aire Mitchell
Model AK422
Autopilot
STC SA1640SW



Several reports have been received which indicate that the elevator trim cable has loosened and failed at the electric trim/autopilot actuator located in the vicinity of the cockpit pedestal. This results in the loss of trim capability. In at least one instance, the failed cable unreeled from the actuator capstan and contacted electrical connections on the subpanel feeder diodes causing sparks and smoke in the cockpit; however, no electrical failure occurred.

Edo-Aire Mitchell has issued Service Letters Nos. ML-39 and ML-42 which describe inspection and modification procedures to prevent this type failure.

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	Engine Mount, P/N 95910005	During inspection, both engine mounts were found cracked in the cluster welds at the forward end. A minimum of six cracks were found in each mount.

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.

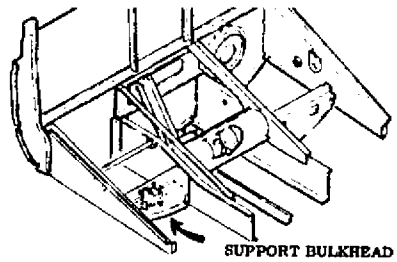
Beech Models 95, B95, B95A, D95A, and E95	Engine Mount	Numerous reports of cracks found in the tubular engine mounts of these aircraft have been received. Beech recommends the engine mounts be inspected with at least a four-power magnifying glass every 100 hours time in service. This inspection is specified 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.

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.

GENERAL AVIATION INSPECTION AIDS SUMMARY

Beech
Models 95-B55
and 95-C55

Rudder Bellcrank Support
Bulkhead, P/N's 35-400366-2
or 96-420001-9


SUPPORT BULKHEAD

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.

Beech
Model D95A

Heater Installation

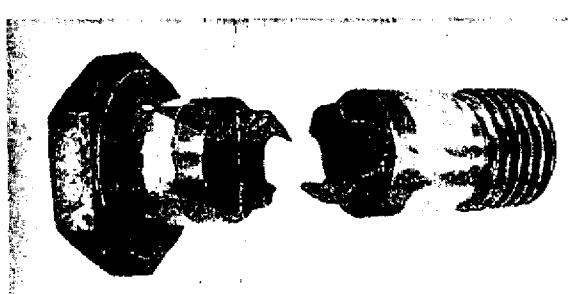
Certain types of combustion heater malfunctions may result in the introduction of flame in the non fireproof combustion air inlet hose and plenum. These hoses and plenums are constructed of material which when burned can produce undesirable and noxious fumes. It is suggested that these areas be given special attention when performing inspections required by FAR 91.

BELL

Bell
Model 47G-2

Boost Cylinder
Bolt, P/N 47-691093-5

The pilot reported fore and aft cyclic control feedback. Inspection disclosed that the boost cylinder bolt was broken.



Bell
Model 47G-5

Fuel Tank Cap Seal,
P/N MS 29513-338

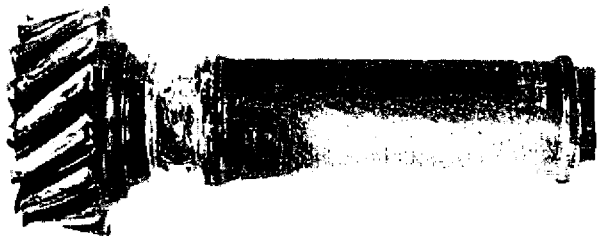
The engine quit during spray operation. Investigation revealed that the fuel remaining in the tank contained water. Also, water was found in the carburetor float chamber. This aircraft had been parked outside during heavy rains and water may have entered the fuel tank through the preformed packing at the filler cap.

GENERAL AVIATION INSPECTION AIDS SUMMARY

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

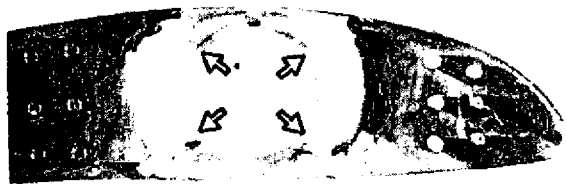
Oil Tank Tube,
P/N 206-061-541-1

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.

Bell
Model 206B

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

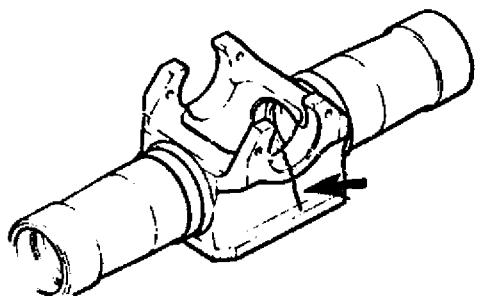
During inspection, the right horizontal stabilizer inboard rib was found to be cracked. Total time in service - 590 hours. A doubler had been installed in compliance with AD 76-05-01, however, the doubler was cracked also.



Bell
Model 206B

Main Rotor Hub
Yoke, P/N 206-010-101-9

The main rotor hub yoke was found to be cracked at the trunnion support bore. The crack was approximately 1 - 1/4 inches deep, extending into the square section at the bottom of the yoke. Bell Service Bulletin No. 206-04-1-74-1 was complied with 9/1/74. Airworthiness Directive 76-04-9 was complied with 10/9/75 and again on 11/23/76 which was 561 hours prior to discovery of the crack.



Bell
Model 206B

Main Rotor System

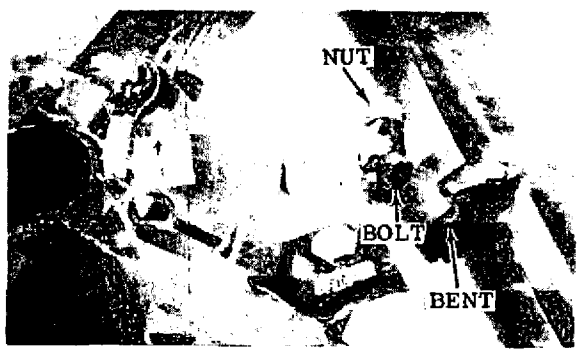
During inspection, a main rotor blade retention bolt, P/N 206-010-154-3, lower washer was found to be cracked through at one side. Total time in service - 705 hours.

GENERAL AVIATION INSPECTION AIDS SUMMARY

Bell Model 206B	Main Rotor Hub Tension Strap Assembly, P/N 206-010-105-3	During inspection, the main rotor hub tension strap assembly plastic outer coating was found to be split at the rotor head attachment end. Total time in service - 1241 hours. Bell Service Bulletin No. 206-76-7 relates to this subject.
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.

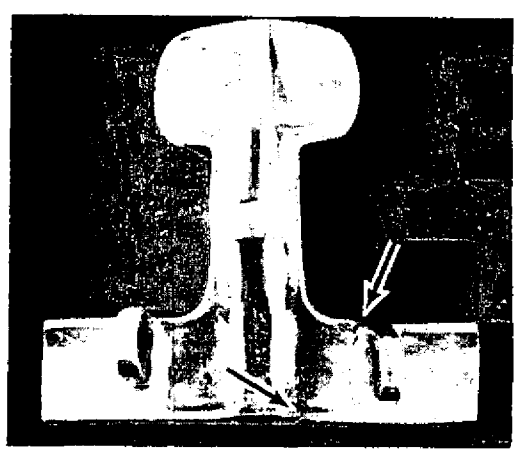
BELLANCA

Bellanca Model 7 and 8 Series	Elevator Bellcrank Stop	The elevator down stop has been found deformed, bent downward and concave, as shown in photo No. 1. The correct condition of the stop, perpendicular to the vertical stabilizer tube and flat, is shown in photo No. 2. The optional bolt, installed in the bellcrank is to adjust for proper elevator travel, and should not be filed flat.



Bellanca Model 7ECA	Brake and Rudder Pedal

The left brake and rudder pedal was found to be cracked and bent during inspection. Total time in service - 979 hours.



GENERAL AVIATION INSPECTION AIDS SUMMARY

Bellanca Model 7ECA	Elevator Cable	The elevator (up) cable broke during aerobatic maneuvers. Investigation revealed that the cable failed at the pulley immediately aft of the aft cabin upholstery panel due to rust and fraying. The elevator (down) cable was found to be severely rusted and frayed. Total time in service - 3100 hours.
Bellanca Model 7GCAA	Main Landing Gear Leg, P/N 7-1404	The left main landing gear leg broke in the radius of the upper bend. A cross section of the break area showed signs of rust discoloration. Total time in service - 1233 hours.
Bellanca Model 7GCAA	Landing Gear "U" Bolt, P/N 1-9805	During takeoff, the right main landing gear "U" bolt failed at the bend radius. Total time in service - 65 hours.
Bellanca Model 8KCAB	Engine Mount Washer, P/N STD-619	The engine starter ring gear cut through the top cowling during inverted flight. Investigation revealed that the engine was sagging in its mounts and could be moved approximately 4 inches at the propeller hub. Further checks disclosed that one washer was missing from the aft side of each mount. Aircraft total time in service - 47 hours.
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 8KCAB	Wing Spar, P/N 5-355	During inspection, the forward spar in both wings was found cracked approximately 4 feet in length. The cracks start at the seventh rib outboard of the wing attach and extend to the twelfth rib. The cracks are approximately one-third of the way up from the bottom of the spars. Total time in service - 727 hours.
Bellanca Model 8KCAB	Wing Structure	The aircraft was difficult to control laterally after doing a series of aerobatic maneuvers. An emergency landing was accomplished. Investigation revealed that the left wing fabric upper attach rivets were pulled loose from 12 ribs outboard of the fuel tank. The doublers that were installed in accordance with AD-74-23-4 and Bellanca Kit No. 243, were found cracked and broken in both wings.
Bellanca Model 14-13-2	Wing Attachment Strap, P/N 7751	Following wing removal, inspection revealed both the left and right upper rear spar attachment straps were severely deteriorated from intergranular corrosion.

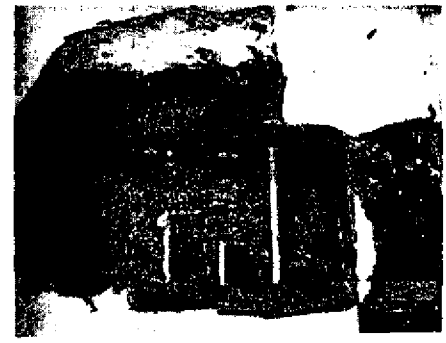
SAFETY IS AVIATION'S GREATEST ASSET

GENERAL AVIATION INSPECTION AIDS SUMMARY

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.

Bellanca
Model 17-30A

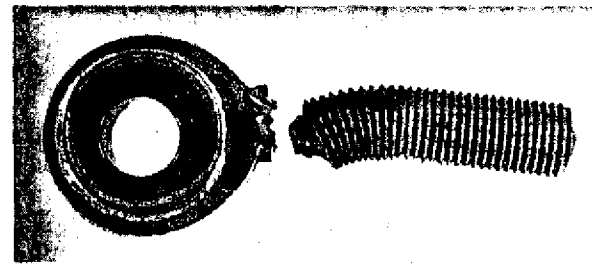
Fuel Selector Valve Pin,
P/N 191177

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.

Bellanca
Model 17-30A

Nose Gear Actuator
Rod End

The nose gear actuator rod end failed during gear extension. Inspection disclosed that the ball joint was seized due to the lack of lubrication.



Bellanca
Model 17-30A

Wing Spar

The pilot noticed a bubble in the skin surface over the left main spar. After the fuel tank cover and fabric were removed, an inspection disclosed severe deterioration of the spar. The right main spar was also deteriorated. Total time in service-1505 hours. AD 76-08-04 relates to this subject.

Bellanca
Model 17-30A

Engine Mount

The engine mount was found to be cracked on both sides where the 45-degree tubing attaches below the forward Lord mount.

GENERAL AVIATION INSPECTION AIDS SUMMARY

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.
	BOEING	
Boeing Model 107-II	Shaft and Carrier Assembly, P/N A-2D1259-3	Due to pilot's reports of a noisy forward transmission, a teardown inspection was performed. When conducting this inspection, the carrier portion of the shaft and carrier assembly was found to be cracked.
Boeing 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.
	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 Single Engine Aircraft	Overvoltage Indicator Light Assembly, P/N S2135-1	There have been a few reports of wires pulling out of the overvoltage light assemblies, allowing the wires to short against the instrument panel. These lights are installed on most single engine aircraft produced by Cessna in the past several years. Effective early in the 1974 model year, the design and construction of the lamp assembly was revised. One change was improved wire retention. However, if proper precautions are taken not to allow the instrument panel to hang by these wires when the panel cover is removed to accomplish maintenance, the earlier lamps will also provide good service life.

Safety Is No Accident

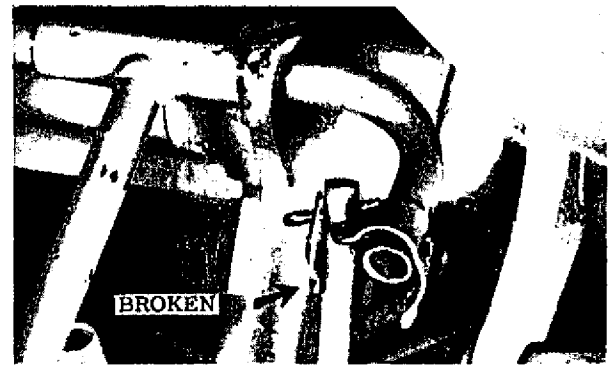
GENERAL AVIATION INSPECTION AIDS SUMMARY

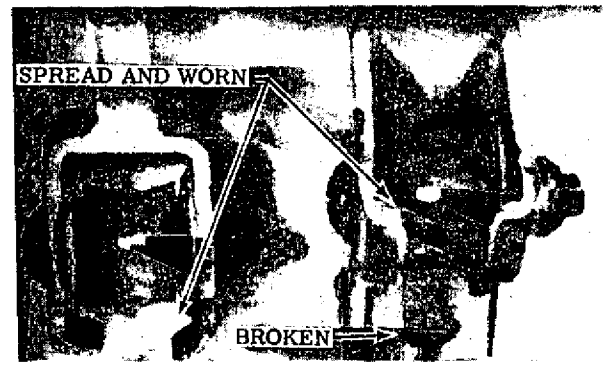
Cessna Single Engine Models — Adjustable Seat Assemblies

Numerous reports have been received which indicate that difficulties continue to be encountered with seat attachments, structure, locking mechanisms, tracks, and stops.. When required inspections are made, it is suggested the following items be examined:

1. Check the seat assembly for structural integrity.
2. Inspect the roller brackets for separation and wear.
3. Examine the locking mechanism (actuating arm, linkage, locking pin) for wear and evidence of impending failure.
4. Inspect the floor mounted seat rails for condition and security, locking pin holes for wear, and rail stops for security.
5. Determine that the floor structure in the vicinity of the seat rails is not cracked or distorted.

Defective or worn parts are a potential hazard which should be given prompt attention. Accomplish repair and/or replacement of damaged components in accordance with the manufacturer's service publications or FAA Advisory Circular No. 43.13-1A, Aircraft Inspection and Repair.

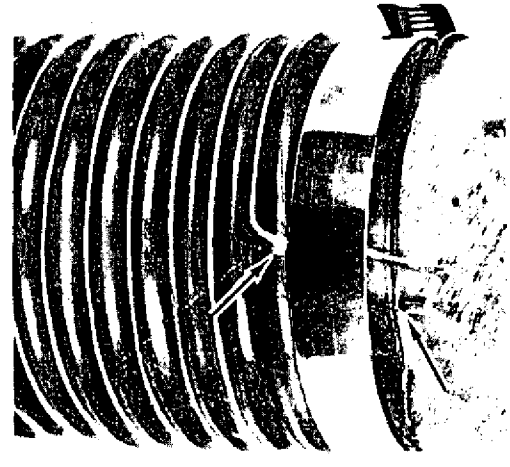




CESSNA SINGLE-ENGINE AIRCRAFT -- INDUCTION SYSTEM FLEXIBLE AIR DUCTS

Several incident and accident reports have been received which were attributed to the failure of the flexible air ducts installed on Cessna single-engine aircraft. Some of the reports indicated the hose assembly collapsed resulting in loss of engine power.

To prevent the possibility of restricting air flow through the engine air induction system, it is recommended the duct assembly be examined each 100 hours. Inspect for such duct deterioration as separation of inner lining, broken or frayed cord wrapping, evidence of hose 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.



The Cessna Aircraft Company provided this photograph to illustrate how they recommend the flexible ducts be clamped. Please note that the ends of the inner reinforcing wire and the outer cord are turned 45 degrees to normal and are secured by the clamp.

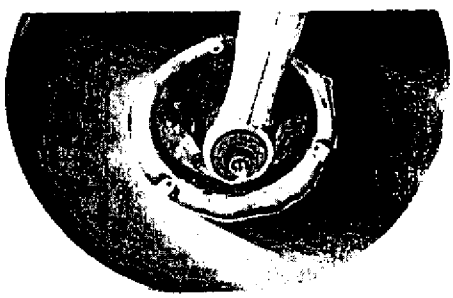
GENERAL AVIATION INSPECTION AIDS SUMMARY

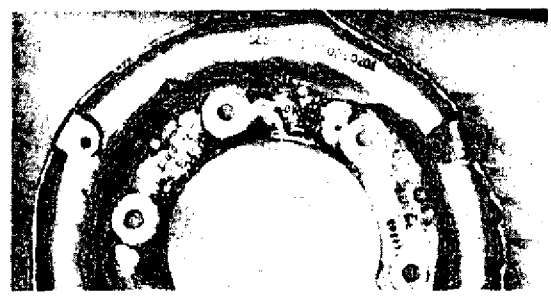
CESSNA SINGLE ENGINE AIRCRAFT -- McCAULEY NOSE WHEELS

Beginning with airplanes manufactured after mid-1973, steel wheel flanges replaced the previously used aluminum flanges on McCauley nose wheels. The aluminum wheel flanges are no longer available for spares. The wheels with steel flanges were identified by P/N C163003-0201. Cessna issued Single Engine Service Letter No. SE74-26 which explained this change and listed serial numbers of the following affected aircraft models: 150, A150, 172, 177, 177RG, 182, U206, 207, and 210.

In December 1974, Cessna incorporated a new improved nose wheel into their production line for Models 177, 177RG, 182, U206, 207, and 210 series aircraft. This new wheel is identified by P/N C163003-401 and is interchangeable with and supersedes the earlier nose wheels, P/N C163003-0201. Improvements include the use of 5/16-inch cap screws in place of the 1/4-inch thru-bolts and slightly thicker steel flanges than those previously used. This information is contained in Cessna Service Letter No. SE75-8.

It is suggested these service letters be reviewed if nose wheels on these aircraft are found damaged in any manner.





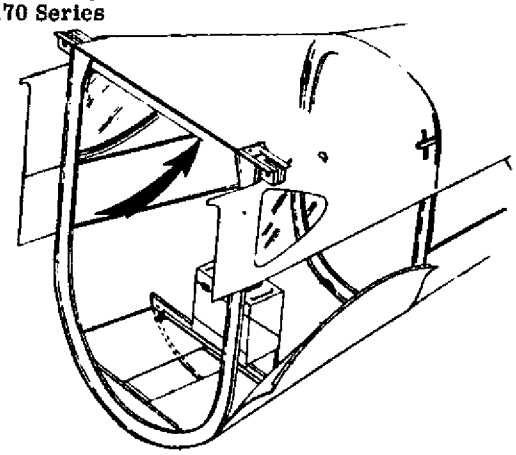
Cessna Single Engine Models

Auxiliary Power Unit Receptacle

Several reports have been received which describe cracks found in the firewall around and under the auxiliary power unit receptacle. It is believed these cracks are caused by side and/or down loads applied to the receptacle when removing the auxiliary power cable. It is recommended this cable be pulled straight out during removal.

Cessna Models 120, 140, 150 (over 10 yrs old) and 170 Series

Fuselage Rear Spar Assembly



There have been several reports of corrosion in the fuselage rear spar wing carry-thru structure. It is recommended that the hat section be checked at every annual inspection. The following procedure is suggested to facilitate this inspection. The Cessna Aircraft Company concurs with this procedure.

1. Remove either wing, remove the spar bearing block. Inspect interior of hat section for corrosion or other discrepancies.

Or

2. Drill 1/2-inch holes in the cabin top skin on 7-inch centers along the center line of the hat section. The first hole should be on the fuselage centerline. Do not drill holes in the area of the spar bearing blocks. After completion of the inspection, smooth edges of holes and apply protective coating. Close the holes with grommets, fabric patches, or other suitable methods.

NOTE: If holes are drilled into the spar channel, reinforce the channel to provide equivalent strength.

GENERAL AVIATION INSPECTION AIDS SUMMARY

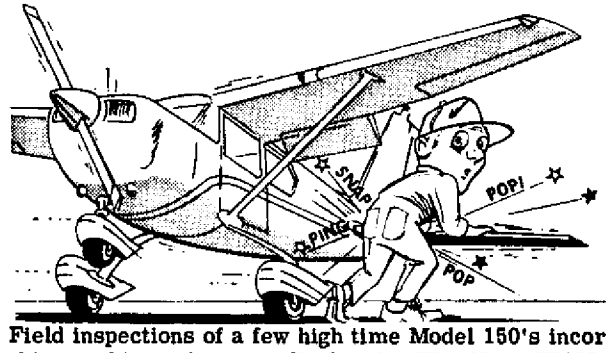
CESSNA MODEL 150 AIRCRAFT - FUEL SYSTEM DRAINS

In addition to the usual provisions for draining fuel and contaminants from the fuel cells, main fuel strainer, and carburetor, the Cessna 150 has one other important fuel drain which has occasionally been overlooked. This drain from a tee fitting at the low point in the fuel system is a tube that extends to the bottom (exterior) of the fuselage where it is capped.

Investigation of complete loss of engine power has disclosed that water accumulating in this drain line can freeze and restrict the flow of fuel to the carburetor. To prevent this, it is essential that owners and operators drain this line periodically and also at any time it is suspected that there is water in the fuel system.

Cessna
Model 150

Horizontal Stabilizer
Attach Stiffeners



Service experience and engineering tests indicate that cracks in the forward attachment stiffener can be caused by excessive loads being imposed on the horizontal stabilizer if improper procedures are used during ground handling. It is important that pushing forces be applied close to the fuselage when moving an aircraft by the horizontal stabilizer (reference Model 150 Service Manual, Section 2, Ground Handling).

Cessna has issued Service Letter No. SE71-23 which supersedes Service Letter No. SE68-32. The current service information provides additional modification instructions and information relative to a modification kit designed to reinforce the present stiffener or replace the stiffener and bulkhead assemblies with improved parts.

Field inspections of a few high time Model 150's incorporating the earlier design stiffeners have disclosed some minor skin cracking. As a result, Service Kits Nos. SK150-43 and SK150-44 have been developed to provide a field repair. These kits and the areas involved are described in Cessna Service Letter No. SE73-23.

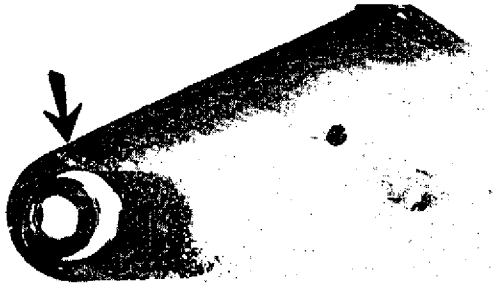
Cessna
Model 150
(S/N's
15072004 and on;
and A15000227
and on)

Main Wheel Brake
Assemblies

Beginning with aircraft produced during the 1971 model year, McCauley brake assemblies were used in place of Cleveland components. The two assemblies are very similar; however, the rivet holes in the McCauley linings are 1/32-inch further apart and 1/32-inch shorter than the Cleveland parts. Caution should be used during maintenance as inadvertent use of the wrong lining will result in cracked linings and loose rivets.

Cessna
Model 150
Series

Elevator and Trim Tab
Assemblies



A number of reports have indicated that various types of service problems have developed in the elevator and trim tab assemblies.

It is suggested the following items be checked for evidence of irregularities during each preflight inspection and at every subsequent scheduled inspection.

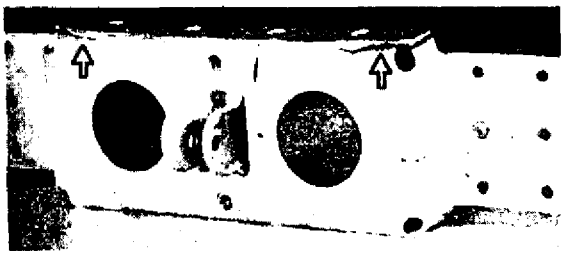
1. Condition of the elevator hinge brackets and bolts.
2. Elevator bellcrank wear at the control attach point.
3. Condition of the elevator trim tab assembly at the hinge and control horn attach points.
4. Bushing wear at control horn/attach points.

Repairs and/or replacements should be accomplished in accordance with the manufacturer's service information.

GENERAL AVIATION INSPECTION AIDS SUMMARY

Cessna
Model 150

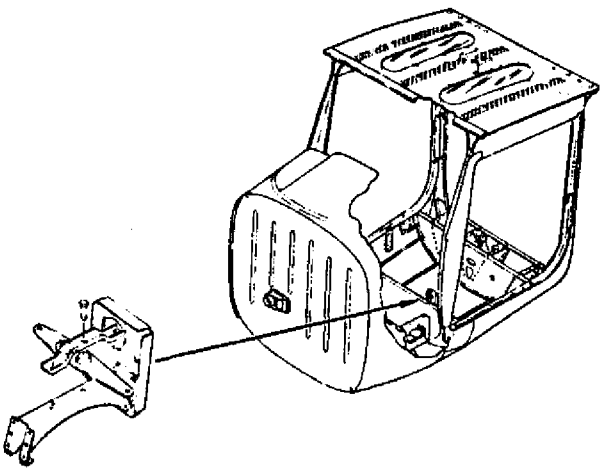
Elevator Bellcrank
Bracket Assembly,
P/N 0432004-1



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
Models 150
and A150

Forward Elevator
Bellcrank Assembly,
P/N 0411288



There have been several reports of cracks found in components of the forward elevator bellcrank assembly, located under the cabin floorboard near the lower end of the control column. Cracks have occurred on both high- and low-time airplanes.

In one case, the cracks were found when investigating the cause of stiff elevator control movement. In another instance, popping sounds were heard when the elevators were moved, and in at least one other case, the elevator system was reported as being extremely loose.

It is recommended that this area be thoroughly inspected at each annual inspection and whenever any peculiar elevator control condition exists.

Cessna
Model 150
Series
(1964 thru
1975 Models)

Fuselage Bulkhead
Assembly, Station 95.00

Cracks have been found in the flanges on the upper portion of the P/N 0412025-8 bulkhead. Cracking also occurs in the upper corners adjacent to the vertical components of the bulkhead. It is recommended this bulkhead be checked for cracks at each required inspection.

Item two of Cessna Service Letter No. SE75-20 announces the availability of a stiffener for the upper outboard corners of the bulkhead. It is suggested this service letter be consulted whenever cracks are found at this location.

Aircraft affected: Models 150 S/N's 15060088 thru 15077005; A150 S/N's A1500001 thru A1500609; F150 S/N's F1500001 thru F1501248; and FA150 S/N's FA1500001 thru FA1500281.

Cessna
Model 150 Series

Horizontal Stabilizer
Attachment

There is a possibility that the boltholes, located in the fuselage and used for the horizontal stabilizer aft attach bolts, can become elongated on high-time aircraft (over 3,000 hours). It is necessary to remove the stabilizer front attach bolts in order to check the aft bolts for looseness or vertical movement.

It is recommended that a check for loose bolts and elongated boltholes be accomplished at 3,000 hours time in service and at each 1,000-hour interval thereafter.

GENERAL AVIATION INSPECTION AIDS SUMMARY

Cessna Model 150 Series	Main Fuel Tank Hold Down Straps	Several reports have been received which indicate the fuel tank hold down straps were found broken. It is recommended the fuel tank covers be removed and the straps checked at least every 1,000 hours of operation.

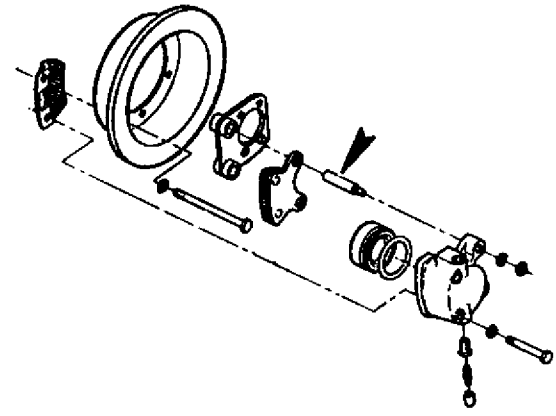
Cessna Model 150M	Static Line, P/N S1071-1	The plastic static line was found melted where it passes near a light dimming assembly, P/N 1570166-1. Heat from this unit melted the tubing. Total time in service - 212 hours.

Cessna
Models 150, A150
and 172

Brake Guide Pin,
P/N A30023
(McCauley Brakes)

The guide pins in the brake cylinder are reported to be corroding and seizing in the torque plate. This condition is more likely to exist if the aircraft has been inactive for an extended period. The brake manufacturer advises that the plating on later guide pins has been improved which reduces this problem.

It is suggested that these brake assembly guide pins be inspected each 50 hours of operation. Aircraft affected are: Model 150, S/N's 15072004 and on; Model A150, S/N's 1500227 and on; and Model 172, S/N's 17260835 and on.



CESSNA MODEL 150 AND 172 SERIES AIRCRAFT -- ROCKER TYPE ELECTRICAL SWITCHES

Reports continue to be received regarding failures of the switch, P/N S1824-1, used in a variety of electrical light circuits of these aircraft. Cessna has provided a new heavy-duty switch to improve the service life. These new switches, which were incorporated in the 1974 Model 150 and 172 airplanes, are identified by P/N S2160-1 for single switch applications and P/N S2160-4 for double switch applications. These can be used for replacement of the earlier switches, P/N's S1824-1 and S2061-1, used in 1969 through 1973 Model 150 and 1971 through 1973 Model 172 aircraft. Cessna Service Letter No. SE74-25 provides installation and cost details involving the new switches.

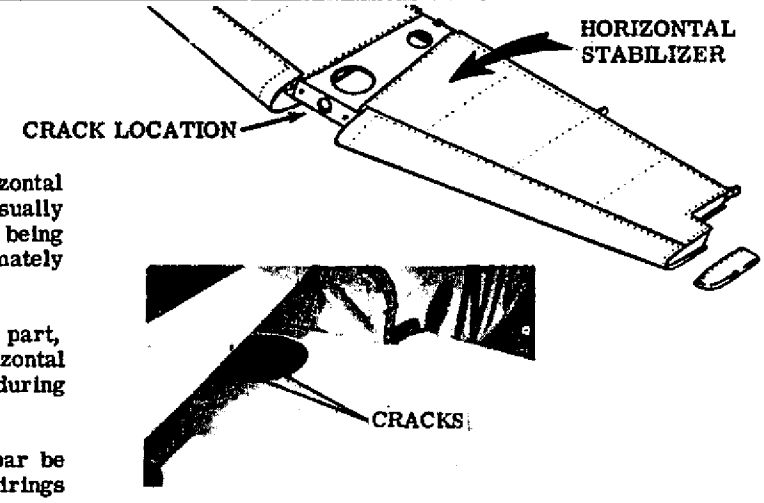
Cessna
Model 150
and 172
Series

Horizontal Stabilizer
Front Spar

Inspections have disclosed cracking of the horizontal stabilizer front spar center section. The cracks usually develop at the lightening holes. The cracks are being found on aircraft which have accumulated approximately 2000 hours time in service.

This condition is believed attributable, at least in part, to the malpractice of pushing down on the horizontal stabilizer to lift the nose wheel off the ground during ground movement of the aircraft.

It is suggested the horizontal stabilizer front spar be examined for this condition whenever the tail fairings are removed.



GENERAL AVIATION INSPECTION AIDS SUMMARY

CESSNA MODEL 150 AND 172 SERIES AIRCRAFT -- FUEL TANK VENTS

Insects and their nests are a constant hazard to safe aircraft operation. Their presence in fuel tank vents creates an obstruction which can cause the engine to operate erratically. Complete engine stoppage due to fuel starvation can also occur. In addition, a malfunctioning fuel vent check valve can block the fuel tank vent.

Owners, operators and maintenance personnel are advised to check the fuel tank vent system for proper functioning during preflight and at each 50-hour inspection. Fuel tank vents should be checked for obstructions and proper operation; and the fuel tank caps for proper fit and sealing.

The following procedures describe a method of checking the vent system which simultaneously checks for vent blockage and proper check valve operation:

1. Attach a rubber tube to the end of the vent line beneath the wing.
2. Blow into the tube (by mouth) to slightly pressurize the tanks. If air can be blown into the tank, the vent line is open.
3. After the tank is slightly pressurized, insert the end of the tube into a container of water and watch for a continuous stream of bubbles. These bubbles indicate that the bleed hole in the valve assembly is open and relieving pressure.
4. Any fuel vent found plugged or restricted must be corrected prior to returning the aircraft to service.

CESSNA MODEL 150 AND 172 SERIES AIRCRAFT -- FUEL TANK VENT SYSTEM

Several recent accident/incident reports have been received which indicate that engine loss of power has occurred on these series of aircraft. Review of these reports disclosed that some of the aircraft involved were operated with partially plugged or malfunctioning fuel vent systems or other problems which affected fuel flow to the engine.

Owners, operators, and maintenance personnel are advised to check the fuel tank vent system for proper functioning during preflight and at each 50-hour inspection. Fuel tank vents should be checked for obstructions and proper operation and the fuel tank caps for proper fit and sealing. The procedure for this check is contained in the current Cessna Service Manuals.

Cessna Service Letter No. SE 77-6 provides information on vented fuel tank caps.

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 Single Engine Aircraft	Main Landing Gear Legs (Flat Spring Type)	To preclude fatigue failures of the landing gear legs at the fuselage outboard supports, it is recommended that the portion of the gear leg which comes in contact with the support structure be examined for signs of chafing, rust pits, and corrosion. Any gear leg which is found with signs of rust pits or severe chafing should be replaced. Minor surface corrosion should be removed and the leg primed and refinished in accordance with procedures in the Cessna Service Manual for the aircraft affected.

239-444 O - 77 - 2

GENERAL AVIATION INSPECTION AIDS SUMMARY

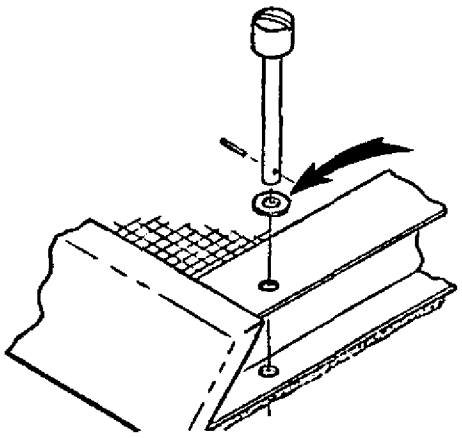
Cessna Model 172	External Power Diode Board, P/N 1570043	When the external power unit was connected, the aircraft's starting circuit was energized. Investigation revealed that the wires, pa 11 and pc 3 were connected in reverse to the diode board. Cessna Service Letter SE77-1 relates to this subject.

Cessna
Model 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.



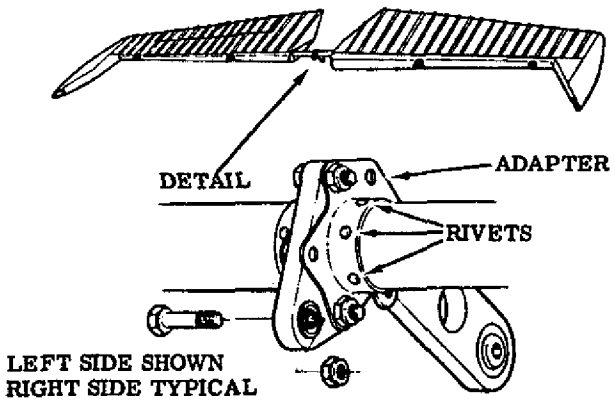
Cessna Model 172M (1974 thru 1976)	Shoulder Harness Attach Bolts	There is a possibility that the bolts used to attach the pilot and co-pilot shoulder harnesses to the cabin top are not the proper length. The correct bolt is an NAS464P4A12 with a grip length of 3/4 inch. It is suggested these bolts be checked at the next routine inspection. Replace any bolt which is not the proper length. Cessna Service Letter No. SE76-23, Item 2, lists the airplane serial numbers which should be checked.

Cessna
Models 172, 180,
182, 185, and 188
Series

Elevator Torque
Tube Adapters

There have been several recent reports which indicate the rivets, used to secure the adapters to the elevator torque tube, have been found loose or sheared off. This condition can usually be detected by holding one elevator immobile while attempting to move the other. Any movement indicates that looseness is present.

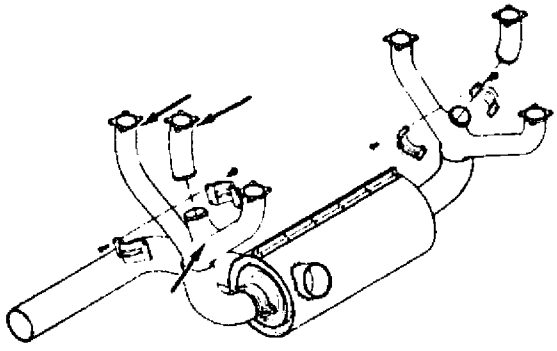
It is suggested that these model aircraft be checked periodically for this problem.



Cessna Models 172, 182, U206, 207, and 210	Cabin Door Push Rod, P/N 1217047-7	A number of reports regarding bent or broken cabin door push rods have been received. Cessna Service Letter No. SE75-10 (Item No. 1) announces the availability of an improved push rod assembly should replacement of the existing push rod become necessary. The new part is identified by P/N 0517021-1.

GENERAL AVIATION INSPECTION AIDS SUMMARY

Cessna Model 177RG	Landing Gear Actuator, P/N 201007-1	A main landing gear actuator shaft rod end locknut was found to be loose. Total time in service - 700 hours.
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.
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 Model 180, 182, 185, and 188	Engine Mount	Engine mounts were found cracked at the tubes adjacent to the reinforcement gusset plates. These cases are more prevalent on older, high time aircraft. It is suggested these areas be closely examined when performing scheduled inspections.
Cessna Models 180, 185 and A188	Exhaust Stack Assembly, P/N 0750161-67	Reports have been received of cracks being found in the exhaust stacks of low-time aircraft. The cracks generally occur in the "Y" section of the stack assembly; however, some cracking in the flanges which bolt to the cylinders have also been reported. It is suggested that the exhaust stacks of aircraft having less than 100 hours time in service be examined immediately for cracks in these areas. It is also recommended that replacement stacks be mounted on the engine before the stack clamps are tightened. This will prevent the stacks from being installed in a "preloaded" condition and, in addition, will allow the stacks to adjust to any differences in cylinder exhaust ports caused by machining tolerances.
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.



GENERAL AVIATION INSPECTION AIDS SUMMARY

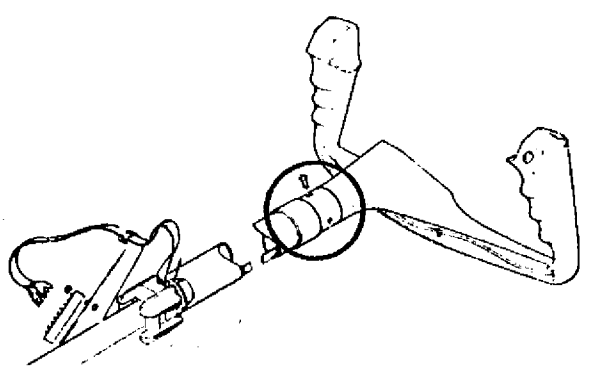
Cessna Model 180, 182, 185 and 188 Series	Engine Mount	There has been a continuing problem with corrosion on those portions of the engine mounts which are exposed to heat from adjacent exhaust stacks. Cessna has issued Single Engine Service Letter No. SE76-22 (dated November 15, 1976) which suggests 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 Models 180, 185 and 188 Series	Tailwheel Steering Mechanism	There have been numerous reports of the tailwheel steering bellcrank, P/N 0712309-1, found with elongated holes at the cable attach points. In addition, the brackets, P/N 0712309-1, have been found cracked. These brackets are used to secure the steering bellcranks to the tailcone bulkhead. It is recommended that the bellcranks and brackets be examined closely at each 100-hour or annual inspection.
Cessna Model 182	Relay, P/N S1917-1	Loss of electrical power to the autopilot, rotating beacon, and all radio equipment was traced to a mechanical failure of the power relay used to disconnect the radio bus during engine starts. The contact rating of this relay should be considered before additional electrical loads are added to the avionics bus.
Cessna Model 182 Series (S/N 18253599 and on)	Carburetor Air Intake Duct	There have been several reports of forced landings caused by engine power loss as a result of the primary air inlet seals (gaskets) being ingested into the carburetor. It is suggested that the condition and installation of the expander boot/air duct seals be checked periodically. These seals are identified by P/N's 0752016-10 and 0752016-11.

Cessna
Model 182, 206, 207
and 210 Series

Control Wheel
Attach Screws

Several reports have been received which describe loose or missing screws which attach the control wheel adapter to the tube assembly.

It is recommended that the control wheel adapter cover be pulled back and the attaching screws periodically checked for tightness. The screws should be tightened to 20-25 inch pounds torque or as an alternate method, a thread locking material such as "Loc-tite" can be used.



The use of screws for this application was discontinued on the Model 210, beginning with the 1972 model year and on; Models 182, 206 and 207 at the beginning of the 1976 model year. These newer model airplanes use AN3 bolts instead of screws. The proper torque value for these bolts is 30 inch pounds.

GENERAL AVIATION INSPECTION AIDS SUMMARY

CESSNA MODELS 182, 205, 206, 207, AND 210 SERIES AIRCRAFT -- AFT TAILCONE ASSEMBLY

There have been numerous reports of cracks being found in the bulkhead at Fuselage Station 209 and in the horizontal stabilator forward attach hardware. It is suggested this area be checked for these conditions during the repetitive inspections of the vertical fin required by FAA Airworthiness Directive No. 72-7-9. Cessna Service Letter No. SE72-29 also pertains to this subject.

Aircraft models affected: 182, S/N 18253599 and on; 205 series; 206 series; 207 series; 210, S/N 21057841 and on; and T210 series.

Cessna Model 182P	Carburetor Air Duct Seal, P/N 0752016-10	The engine quit during cruise. Investigation revealed that the carburetor air duct sponge rubber seal had been sucked into the carburetor venturi, cutting off the air flow which caused the carburetor to flood and choke the engine.

Cessna Model 185 Series	Vertical Fin	The vertical fin has been found loose during routine inspections. Subsequent examination revealed the fore and aft spar attach bolts to be loose. It is suggested that security of the vertical fin be checked immediately on receipt of this information. The Cessna Service Manual provides the recommended torque values to be used for each specific bolt size.

Cessna Model A185F	Rudder Control System	The cotter keys were missing from the bolts that attach the front and rear rudder cables to the bellcrank, P/N 0712309-16. Total time in service - 7 hours.

Cessna
Model A188B

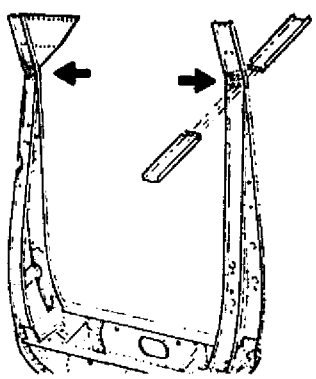
Induction Air Duct,
P/N S1053K24T32

Engine lost power during takeoff. Investigation revealed the induction air duct had collapsed. Two other A188B aircraft were inspected and the air ducts on both showed signs of collapse. Cessna Service Letter No. SE75-5 and AD75-09-06 pertain to this problem.

Cessna
Models 190 and
195 Series

Fuselage
Door Frames

Inspections have revealed cracks emanating from the door post bulkhead (fuselage frame) upper attach rivets. The cracks have been found in the front and rear door posts on both the left and right sides of the aircraft. The area involved is adjacent to the location described in AD No. 63-20-2. Any previous involvement in a ground loop or other operational damage to the wing tip could have transmitted excessive loads to this area. Cessna Service Letter SE 73-15 dated June 22, 1973 outlines an inspection procedure.

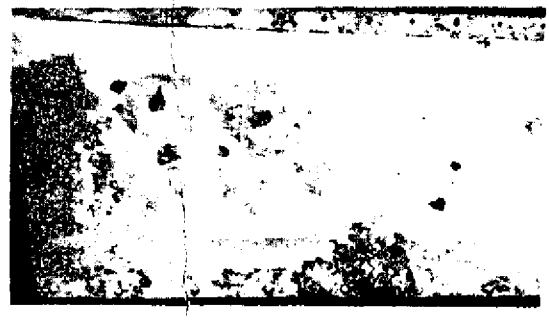


GENERAL AVIATION INSPECTION AIDS SUMMARY

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 207 -- THROTTLE CONTROL ASSEMBLY, P/N S1222-25A

An accident occurred when the engine would not respond when the throttle was being advanced. Investigation disclosed that the throttle control housing had failed where the control assembly passes through the upper (horizontal) gusset plate (P/N 1213921-1) of the nose gear tunnel.

Analysis of this accident and other M or D reports indicates the control is not being inspected and replaced at time periods specified in the Cessna Service Manual. The plastic grommet, P/N NAS557-6A, used around the hole in the sheet metal gusset plate to protect the throttle control housing either wears away after extended periods of time, or is not replaced when the throttle control is replaced. This allows the control housing to chafe on the bare metal and eventually results in control malfunction or failure.

It is recommended that all engine controls be inspected at periodic intervals and retired at the manufacturer's recommended replacement time intervals.

CESSNA MODELS 300 AND 400 SERIES -- ALTERNATOR NOISE FILTER, P/N 5118346-7

Reports have been received of problems associated with the noise filter (capacitor) leads and mounting straps used with alternators installed on various models of Cessna aircraft. These reports were generally associated with low-time aircraft. Cessna was contacted about these reports and the following is a list of changes which will be incorporated into future production aircraft and provided as spares for in-service airplanes:

1. A heavy duty steel clamp which completely encircles the capacitor will be added to improve mounting rigidity.

2. The capacitor will be mounted directly to the alternator negative post.

3. A heavy-duty "hook type" solder connection will be added to the capacitor and 65-strand flexible wiring will be used to improve wiring reliability.

Cessna Multi-Engine Service Letter No. ME 75-15 provides additional information on this subject.

GENERAL AVIATION INSPECTION AIDS SUMMARY

CESSNA TWIN ENGINE AIRCRAFT - - REPLACEMENT OF WING FRONT SPAR CAP/LOWER SKIN RIVETS

When loose or working rivets are found in the wing lower skin (front spar cap juncture) an improved repair can be achieved by using the procedures contained in Cessna Multi-Engine Service Letter No. ME77-6. This service letter describes a combination riveting and bonding technique.

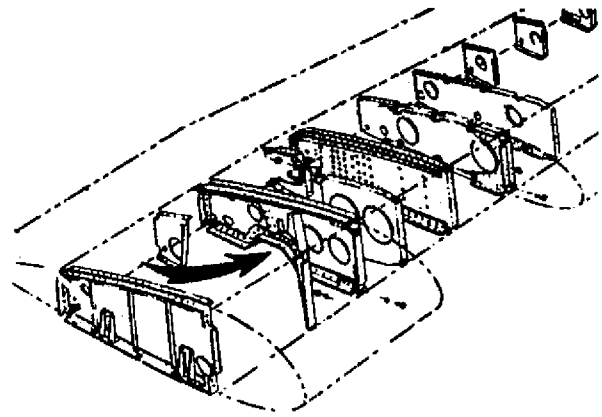
Aircraft serial number affected: 310Q0714 thru 310R0836; 340-0208 thru 340-0555; 340A0001 thru 340A0217; 402B0361 thru 402B1212; 414-0391 thru 414-0912; and 421B0397 thru 421B0970.

Cessna
Models 300
and 400 Series
(Except 336/337)

Wing Rib
Modification

The wing rib onto which the main landing gear side brace attaches has been found cracked on high time, heavy usage aircraft. Reinforcement plates and angles have recently been added to production Model 340 and 400 series airplanes.

Cessna Multi-Engine Service Letter No. ME76-2 has been issued and recommends the wing ribs located within the main wheel wells be inspected for cracks and the main gear upper side brace support be checked for looseness. If cracks are found, the rib can be repaired using Service Kit No. SK414-8E.



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 AND 320 SERIES AIRCRAFT -- NOSE GEAR DOORS

Numerous reports of interference, between the nose gear strut assembly and other components within the nose wheel well, have been received during the last 2 years. In the majority of these incidents, the cause was traced to a procedure used by maintenance personnel to provide better accessibility and ease of maintenance. On these aircraft, the nose gear doors are usually disconnected prior to beginning any repair or servicing function inside the nose wheel well. In far too many cases, the repairman neglects to reconnect the actuating rods to the doors before returning the airplane to service. It is then almost inevitable that the loose doors and/or rods will contact and bind the nose gear during the next retraction/extension cycle causing overloads and failures of other retract system components. This, in most cases, results in a landing with the nose gear in a partially retracted position with subsequent extensive damage.

GENERAL AVIATION INSPECTION AIDS SUMMARY

CESSNA MODEL 310, 320, 340, 401, 402, 411, 414, and 421 SERIES AIRCRAFT -- LANDING GEAR RETRACTION AND EXTENSION SYSTEM

Numerous incidents involving collapse of the landing gear were determined to have resulted from faulty maintenance and/or operational abuse. Some specific causes of landing gear operational difficulties are (1) premature retraction following liftoff resulting in the aircraft settling on a partially retracted landing gear, thus inflicting damage to the operating mechanism and linkage, (2) extension of landing gear above the airspeeds specified by placards or flight manual, (3) out-of-rig conditions found in either or both the uplocks and downlocks, (4) damaged electrical warning and position indicating systems and (5) lack of proper lubrication during maintenance.

In order to decrease the in-service occurrences involving the landing gear systems of these aircraft and to assure a higher level of safety, it is recommended the following be used as guidance by aircraft owners/operators and/or maintenance personnel.

> NOTE! ANYONE PERFORMING MAINTENANCE OR RIGGING ON THESE MODELS OF AIRCRAFT MUST HAVE THE APPROPRIATE SERVICE MANUAL AT HAND. It is also necessary to have the following Cessna Service Manual Changes for Models 310 through 310K and 320, Service Manual Change Notice dated July 13, 1973; for Models 310 through 310N, 320, 411, and 411A, Service Manual Change Notice dated April 12, 1974; for later Models 310, 340, and 400 series aircraft, all necessary information is contained in the current service manual.

The following items should be inspected with the airplane on jacks at 200 hour intervals:

a. Retract mechanisms -- inspect all link rods, rod ends, pivot shafts, gimbals, trunnions, drive tubes, seals and mounting structure for evidence of wear, looseness or other damage.

b. Gear doors and links -- check doors, hinges, hinge pins and linkage for evidence of wear, damage, and security of attachment. Check rigging per Cessna Service Manual instructions.

c. Wiring and switches -- check security of connections, switch operation, and gear position indicator lights for proper indication. Examine wires for worn or chafed insulation, kinks, or sharp bends.

d. Rigging and operational check -- perform operational check to insure proper rigging of all components, including main gear free-fall downlock tensions, uplock hooks, doors, switches, drive tubes, and actuator. Check travel time in each direction.

e. Emergency manual extension -- check operation.

The following items should be inspected for condition at each 50 hour interval. It is not necessary to place aircraft on jacks.

a. Nose gear -- torque links, steering rods, boots, landing/taxi lights, strut for leakage and proper extension, strut barrel condition, shimmy damper, steering bungee.

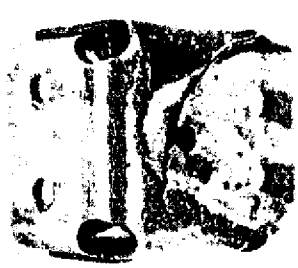
b. Main gear -- torque links, linkages, boots, strut for leakage and proper extension, strut barrel condition.

Cessna
Model 310, 320, 340, and 400 Series

Elevator Outboard Hinge Brackets

There have been several reports of elevator outboard hinge brackets being found cracked or broken where they are attached to the rear spar of the horizontal stabilizer. Failed rivets have also been found at this location.

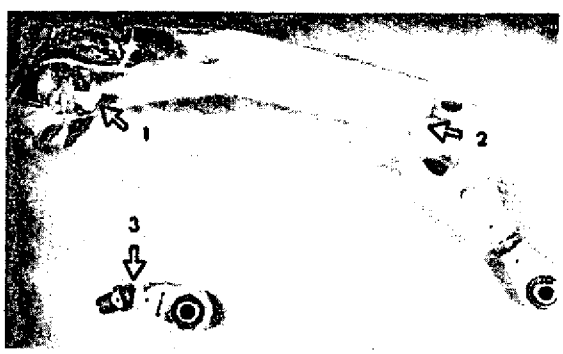
It is suggested these hinge brackets be inspected periodically for these conditions.



GENERAL AVIATION INSPECTION AIDS SUMMARY

Cessna Models 310, T310, 320, 401, and 402 Series	Air Inlet Duct, P/N S1053E36W22 or S1053E40W	Investigation following an engine power loss incident which occurred on a Model 310 revealed that the engine primary air inlet flexible duct had collapsed and shut off airflow to the engine. The flexible duct had a fiberglass inner liner which separated from the outer portion of the duct and collapsed. Ram airflow can contribute to collapse of the inner liner once it is loose. Owners, operators, and maintenance personnel are advised to inspect the engine flexible air intake ducts, located in the wing leading edges, for deterioration and inner liner separation. Ducts must be replaced if flaking or separation of the inner liner is detected. Portions of the air inlet duct inner liner may be found in the engine air filter if the duct is deteriorating.

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.



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 THRU 310E AIRCRAFT -- MAIN LANDING GEAR DOOR CLOSING MECHANISM

The AN4-14A bolt at the end of the actuator arm, P/N 0843500, can become loose and worn if not maintained properly. When this condition exists, the bolthead will not clear adjacent parts and jamming of the entire retract system can result. This difficulty can be avoided by replacing the AN4-14A hex head bolt with an AN24-14A clevis bolt, which has a thinner, smooth head. All component parts of the door closing mechanism should be inspected and maintained so that wear and looseness do not develop to a critical level. Refer to Cessna Service Letter No. 310-37 dated January 26, 1959, concerning looseness of the idler bellcrank.

GENERAL AVIATION INSPECTION AIDS SUMMARY

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 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 rerig 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.
Cessna Model 310C	Wing Spar	During an annual inspection, both wing main spar caps and flanges were found to be severely corroded under the exhaust augmentors. Corrosion was also evident on the right spar extending to the wing tip. Total time in service - 6568 hours.

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.

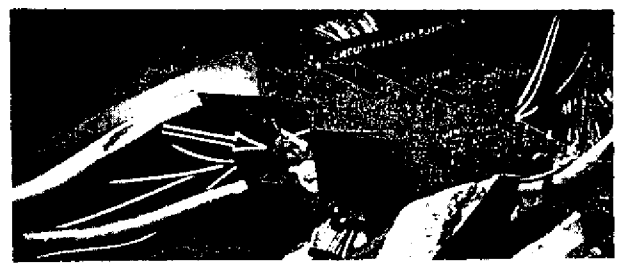
SAFETY is the responsibility of everyone in Aviation.

GENERAL AVIATION INSPECTION AIDS SUMMARY

Cessna Models 310I, 310R, and 421B — Fuel System

An investigation to determine the cause for engine power loss during flight in extremely cold temperature revealed that the fuel filter contained ice. One hundred octane low lead fuel was being used. The fuel tank sumps and filters had been drained before flight. One percent by volume, isopropl alcohol may be used as anti-icing additive as outlined in Cessna Service Letter ME 73-25.

Cessna Model 310K — Circuit Breaker Mounting Panel, P/N 0812565-4



During flight, smoke came from the generator circuit breaker panel and all electrical power was lost. Investigation revealed that the generator circuit breaker panel, P/N 0812668-3, bus bar had shorted against the mounting panel. It is suggested that maintenance personnel check for adequate clearance before substituting longer circuit breakers for the original components.

Cessna Models 310L thru 310R, 320E thru 320F, and 400 Series — Main Landing Gear Trunnion Pivot Shafts, P/N's 504-1107-1 and -2

Several occurrences of collapsed main gears have been attributed to failure of the trunnion pivot shafts. These shafts (two per trunnion) are retained by a roll pin through one end of each shaft. If this roll pin is not in place, the pivot shaft can move endways and eventually will release one side of the trunnion. This causes extreme loads to be applied to the other pivot shaft which will then be subjected to progressive fatigue cracking and finally total failure due to overload. The trunnion will then separate from the wing support structure resulting in a collapsed main gear. The photograph depicts a typical failure of a pivot shaft.

During each scheduled inspection of the landing gear, visually inspect the roll pins to assure proper engagement through both the trunnion and pivot shaft. In addition, assure the roll pins are safetywired as outlined in the service manual.

CESSNA MODEL 310P AND 310Q SERIES AIRCRAFT -- PARTS CATALOG

Figure 93 of the Cessna Model 310P and 310Q parts catalog is misleading as to the proper assembly sequence of the main landing gear torque link center pivot. The AN960-716 washers called out by Index 38 in the parts catalog should be installed between the links. The washers, P/N 5045018-1, (Index 37) are to be used on each side of the links. Cessna plans to revise the parts catalog (Manual No. P497-12) to reflect this change.

Airplanes affected: S/N's 310P0001 thru 310P0683 and 310Q0718 thru 310Q0732.

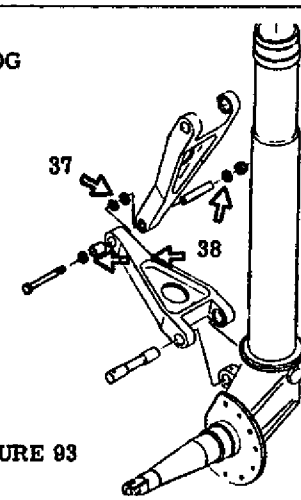


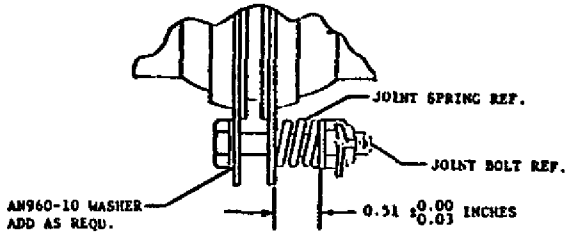
FIGURE 93

GENERAL AVIATION INSPECTION AIDS SUMMARY

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.

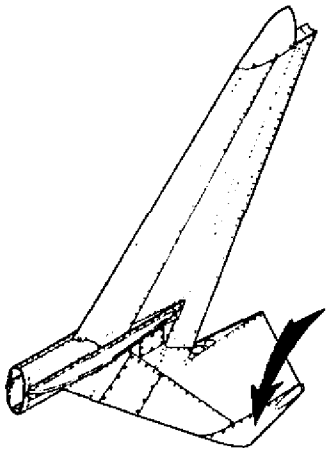


Typical Exhaust Joint Spring Installation

Cessna Model 336 and 337 Series

Vertical Fin, Lower Tip, P/N's 1431001-4, 1431001-6, and 1431001-11

There is a report that water collected in the lower tip fiberglass fairing of the vertical fin. As much as two gallons of water have been found in one fuselage boom fairing. Drain holes should be present in the lower part of the fin. It is recommended that periodic checks be made to assure the drain holes are open.



Cessna Model 337

Aileron Pulley Bracket, P/N 1513507-1

Cessna Service Letter No. ME74-5 dated April 12, 1974, recommended a one-time inspection of the aileron pulley bracket, P/N 1513507-1, for possible misalignment in aircraft S/N's 33701399 through 33701550. Cessna has since determined that S/N's 33701348 through 33701398 should also be included in this inspection, and issued Service Letter No. ME-76-21 on September 27, 1976. It is recommended that owners of these airplanes comply with Service Letter ME76-21. In addition, there have been a few reports of cracks being found in some of the other control system brackets located in the same general area. It is suggested that all pulley brackets be checked for condition during the inspection specified in the Cessna Service Letters.

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 SUMMARY

Cessna
Model 400
Series

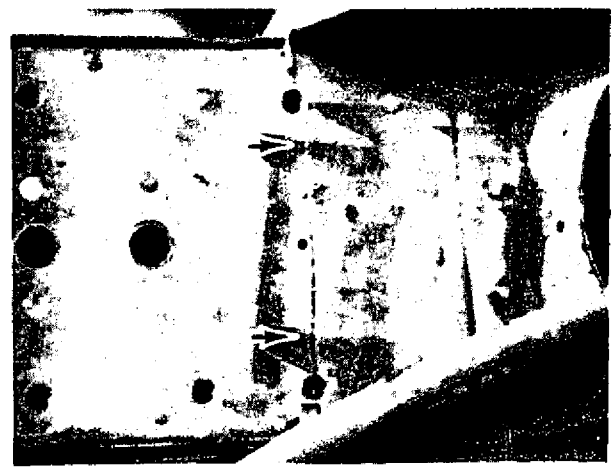
Horizontal Stabilizer

Two reports have been received of loose and working rivets being found in the horizontal stabilizer front spar center section web/cap attachment. Time in service of the airplanes involved was 1,470 and 1,695 hours.

Cessna has issued Multi-Engine Service Letter No. ME75-22 which describes procedures for incorporating additional rivets in the horizontal stabilizer front spar. Cessna recommends this modification, which is intended to increase strength and improve service life, be accomplished within the first 1,000 hours time in service, or at the next 100 hour inspection for those airplanes which have exceeded 1,000 hours total time.

Cessna
Model 400
Series

Horizontal Stabilizer
Front Spar

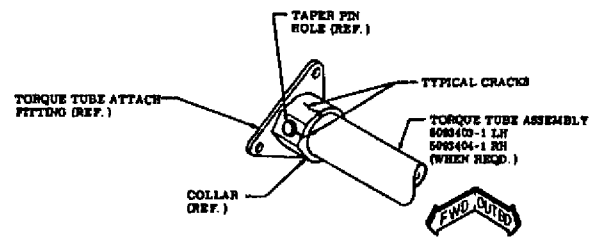


Grooves have been found cut into the web of the front spar center section. These grooves are the result of improperly trimmed fuselage side skin panels chafing on the spar web.

Partial disassembly of the tail section is required to check for this condition; therefore, it is recommended this inspection be combined with the inspection and spar improvement outlined in Cessna Service Letter No. ME75-22. If grooves are found cut into the spar web, damage limits and approved repair methods are contained in Supplement No. 1 of Service Letter No. ME75-22.

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.

Cessna
Model 411

Hose Assembly,
P/N 624100-6DO102

An in-flight fire occurred on the right engine which was shutdown and the fire extinguished. Investigation revealed that the hose to the propeller feathering accumulator had ruptured. It is in a confined area below the cylinders and exposed to heat from the exhaust manifold. Hoses which are confined and subjected to excessive heat should be inspected more frequently than those in an open or cooler area. Advisory Circular 72-14-8 requires inspection of these hoses every 50 hours time in service.

GENERAL AVIATION INSPECTION AIDS SUMMARY

CESSNA MODEL 421 -- FUEL CELL

The right inboard fuel cell vent nipple broke causing a severe fuel leak. Examination of the deteriorated and broken nipple disclosed that when the vent line was installed, the clamp serrations and thumb screw threads had cut the nipple causing it to deteriorate and break, thus causing the fuel leak to develop.

Excessive tightening of clamps and reinstallation of used clamps are considered the main factors in the reported fuel cell damage and subsequent leakage conditions. Clamps must be installed at a sufficient distance from the nipple/bladder interface to relieve shear stresses from the bladder. Proper engagement of the transfer or connector tube must be verified prior to tightening of clamps to insure that no preloads or shear stresses are carried by the bladder side walls. Upon installation (or removal) of connector tubes, both clamps must be loosened until the tanks are properly located and connector tubes correctly engaged.

NOTE: Aero Seal, P/N QS100 style clamps are currently used during fuel cell installation on new production aircraft. These have superseded the AN737RM58 clamps made by Whittek, however, either clamp is acceptable.

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.

DeHAVILLAND

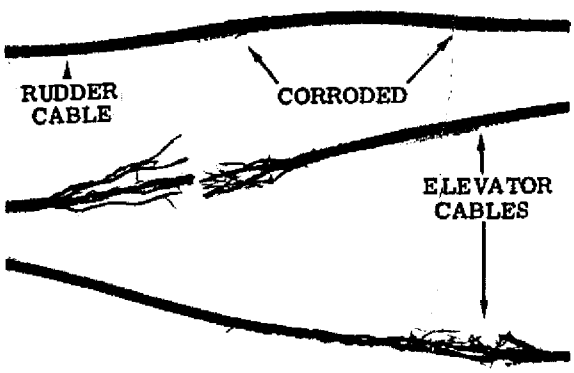
DeHavilland Model DHC-3	Elevator Control Lever Assembly, P/N C3-CF-41	The elevator control lever assembly, which connects the elevator cables to the control column below the cockpit floor, was found to have a fractured end lug. DeHavilland Service Bulletin No. 3/28, dated November 26, 1976, calls for 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.
DeHavilland Model DHC-6	Generator Leece-Neville M-3	The generator became inoperative during flight. Inspection revealed the brush block to be loose. Close examination disclosed two brush block retaining screws had backed out and were rubbing on the cooling fan which repositioned the block assembly, broke a lead, and short circuited the generator field windings.
DeHavilland Model DHC-6	Wing Flap Actuator	The wing flaps jammed during extension. Investigation revealed that the flap actuator had seized. After disassembly, the actuator cylinder walls were found to be severely scored.
DeHavilland Model DHC-6	Landing Gear Fairing Bracket, P/N's C6U1165-43 and -44	The cause of loose landing gear fairing assemblies was traced to failure of the forward inboard attachment brackets for both left and right main landing gear.

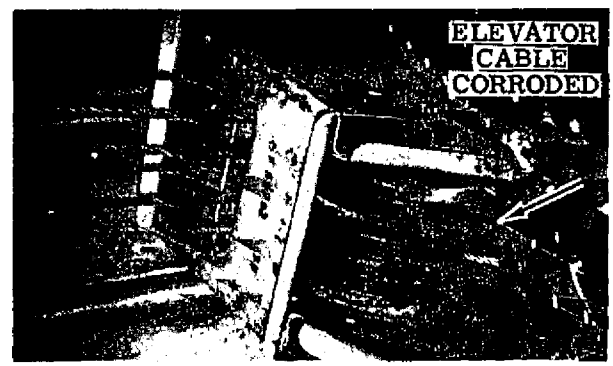
GENERAL AVIATION INSPECTION AIDS SUMMARY

DeHavilland Model DHC-6

Elevator and Rudder Control Cables

A pilot reported loss of elevator control during takeoff roll. Investigation revealed separation of the elevator control cable and severe corrosion of both the elevator and rudder cables between fuselage stations 353 and 377. The aircraft time in service was 9300 hours. Inspection of another aircraft with 8400 hours time in service disclosed control cable corrosion in the same area, but not as severe.





DeHavilland Model DHC-6

Nose Gear Steering Collar, P/N 71-161-9AC

During routine inspection at 1500 hours time in service, the nose wheel steering collar was found to be cracked. The crack originated at the steering actuator stud rollpin hole and progressed completely through the collar.

DeHavilland Model DHC-6

Elevator Control System

During taxi following landing, the pilot was unable to move the elevator control to the forward position. Inspection revealed a screw used to secure a bonding wire to the outboard elevator hinge assembly had backed out, preventing full down travel of the elevators.

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.

DeHavilland Model DHC-6-300

Float Spreader Strut Fitting, P/N C6UFM1031-27

At approximately 200 hours time in service, a strange "pounding" noise was heard during landing, and a slight side-to-side motion of the floats was noted during taxi. Investigation revealed the right spreader strut fitting failed adjacent to its attachment bolthole. A similar failure occurred with the lower fitting of the right upright strut, P/N C6UF1014-1, approximately 40 hours time in service following the failure of the spreader strut fitting.

DeHavilland Model DHC-6-300

Bleed Air Valve, P/N 26440051

The flight crew reported a strong burning odor in the cabin. Investigation revealed a short circuit in the bleed air valve electric solenoid located in the left engine nacelle.

GENERAL AVIATION INSPECTION AIDS SUMMARY

DeHavilland Model DHC-6-300	Fuel Shutoff Lever	Binding of the fuel shutoff levers when moved from the "on" to the "off" position has been corrected by cleaning and lubrication of the linkage in the cockpit overhead panel. Periodic checks to assure free movement and proper action of control return springs is recommended.

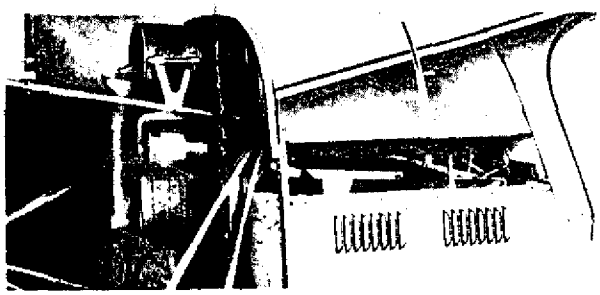
ENSTROM

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.

Enstrom
Model F-28A

Main Drive Belt

The main drive belt tension was found to be unequal across the pulley. The belt was also found to be deteriorated. Total time in service - 100 hours.



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.

GENERAL AVIATION INSPECTION AIDS SUMMARY

Enstrom Model 280C	Tail Rotor Blade Grip Fitting, P/N 28-150013	A tail rotor blade grip fitting failed. The blade separated from the aircraft, followed by the entire tail rotor assembly. Total time in service - 6 hours.

FAIRCHILD INDUSTRIES

Fairchild Industries Model F-27	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 F-27	Nose Gear Cable Pulley, P/N 9009Y16	A loud bang was heard when the landing gear was extended. During a subsequent retraction attempt, the nose gear remained extended. Inspection revealed the nose gear cable attachment lug on the pulley, P/N 9009Y16, had failed.
Fairchild Industries Model F-27	Aileron Tab Mechanism Assembly, P/N 27-727239-32	Malfunctioning of the aileron and spring tab mechanism was found to be caused by breakage of the torsion bar, P/N 27-727251-3 and housing, P/N 27-727240-12. The aircraft had previously been parked outside in strong winds with the gust lock engaged.
Fairchild Industries Model F-27A	Accessory Gearbox Drive Shaft Bearing	A momentary fire warning indication was noted during landing approach. Investigation revealed that the left engine accessory gearbox drive shaft universal joint bearing had failed. The fire warning system activation resulted from combustion gas leakage through a small puncture in the outer shell of the No. 2 burner can due to drive shaft contact following failure of the bearing.
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	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 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.

GENERAL AVIATION INSPECTION AIDS SUMMARY

Fairchild Industries Model F-27A	Horizontal Stabilizer Spar Web and Cap	During a stabilizer leading edge change, the right front spar web was found to be cracked diagonally from the upper cap, at station 108, to the lower cap, at station 99. Also, the upper cap, at station 108, had a crack approximately 3/4-inch in length and the lower cap, at station 99, was broken completely across. Inspection of the failed components indicated excessive bending of the spar web with rivet hole elongation. The aircraft had accumulated approximately 24,000 hours time in service, and Service Bulletin No. 55-7 was complied with.
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.
Fairchild Industries Model FH-227	Seatbelt, P/N BN1-1800	The seatbelt buckle latches were found to be binding on four passenger seatbelts. Inspection revealed that the latch return spring tang becomes deformed with use. This tang separates and lodges between the latch and its pivot pin interfering with release of the seatbelt buckle. Total time in service - 1302 hours.
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	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	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.
Fairchild Industries Model 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 671660	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.

GENERAL AVIATION INSPECTION AIDS SUMMARY

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	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.
Fairchild Industries Model FH-227-B	Horizontal Stabilizer Rib	During routine inspection of the left horizontal stabilizer at station 126, the rib was found to be cracked. The crack was 7/8-inch in length and extended from a rivet to the fixture assembly hole.
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-227-B	Landing Gear Pneumatic System	The pneumatic system pressure dropped to 1000 PSI during flight. Inspection revealed leakage at the nose gear swivel pipe seal rings and from a pinhole in the main gear "up" pressure line in the right wing leading edge.
Fairchild Industries Model FH-227-B	Mounting Shaft, P/N 244219	The nose wheel turned off center and had to be steered to the right for takeoff centering. Investigation disclosed that the nose gear steering centralizer forward mounting shaft had sheared.
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.
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.
Fairchild Industries Model FH-1100	Tail Rotor Tension-Torsion Plate, P/N 22-55-107	Immediately following landing, one tail rotor blade separated from the hub. The cause of the blade separation is believed to be failure of the tension-torsion plate.

GENERAL AVIATION INSPECTION AIDS SUMMARY

Fairchild Industries Model FH-1100	Tail Fin Assembly	Reports have been received of cracks and loose huck bolts where the tail rotor gearbox attachment fitting, P/N 24-62006-3 is retained to the tail fin assembly, P/N 24-62030-43 or P/N 24-62002. Fairchild Service Letter FH1100-62-1, revised September 10, 1976, prescribes removal, inspection, and reinstallation procedures for the tail rotor gearbox and attachment fitting. The service letter also recommends inspection for cracks within the next 10 hours time in service for helicopters having previously experienced a tail rotor strike, out-of-balance or track, or prolonged vibration to the tail section.
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	Seatbelt and Shoulder Harness Buckle	During operation on uneven terrain, an FH-1100 helicopter rolled over, leaving the pilot hanging by his seatbelt and shoulder harness. He could not release the buckle until he pressed his feet against something to relieve the load on the harness. Investigation revealed a Pacific Scientific Company F-A1101051-15 restraint system incorporating an old style rotary two-wing five-point buckle was installed. Test of the harness revealed the buckle no longer met TSO release force requirements when a belt load of 170 lbs. and a shoulder harness load of 20 lbs. were applied simultaneously. A new buckle, P/N 1101550, that incorporates a guard to prevent the belt fitting from contacting the rotary handle was made available by Pacific Scientific Company in 1970. Tests show these buckles release easily under combined seatbelt and shoulder harness loads, and it is recommended old style buckles be replaced with the new type as soon as possible.
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.

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.

GENERAL AVIATION INSPECTION AIDS SUMMARY

GENERAL DYNAMICS

General Dynamics (Convair) - Model CV-580-31	Aileron	During cruise at 230 knots airspeed, the aircraft suddenly pitched sharply to the left. The aircraft was slowed to 170 knots airspeed and all was satisfactory. After landing, an inspection revealed that a fiberglass wrap-around overlay, bonded to the left aileron fiberglass "V" trailing edge, had a bonding separation on the bottom side leading edge. The separation started thirteen inches from the aileron tip and extended inboard approximately forty two inches. Convair Service Bulletin No. 340-186A relates to this subject.

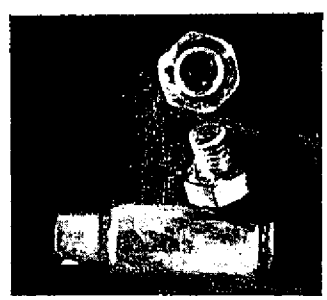
GRUMMAN

Grumman Model G-21A	Landing Gear Upper Compression Link, P/N 12604	The upper compression link for the left main landing gear collapsed when the aircraft was taxied from the water onto the ramp. Investigation revealed internal corrosion was the cause of failure.

GRUMMAN - AMERICAN

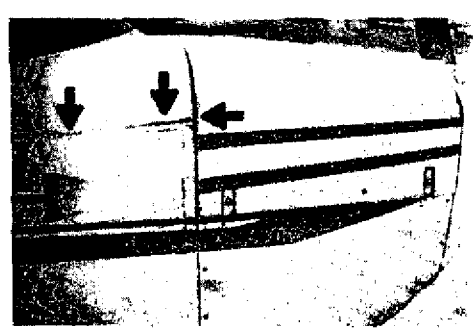
Grumman-American Model AA-1B — Throttle Control

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



Grumman-American Model AA-1B — Exhaust Gasket, Lycoming, P/N 65321

It has been reported that exhaust fumes enter the cabin through the outside air vents. Investigation revealed that the exhaust flange gasket leaks, permitting fumes to build up in the engine compartment. These fumes escape between the cowling and fuselage and enter the cabin through the outside air vents.



GENERAL AVIATION INSPECTION AIDS SUMMARY

Grumman - American Model AA-1B — 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 AA-5 — Muffler

The engine would not develop full power during climb. Investigation disclosed that the baffle inside the muffler had broken and was blocking the exhaust outlet. Total time in service - 1480 hours.

Grumman-American Model AA-5 — Brake Disc, P/N 164-02000

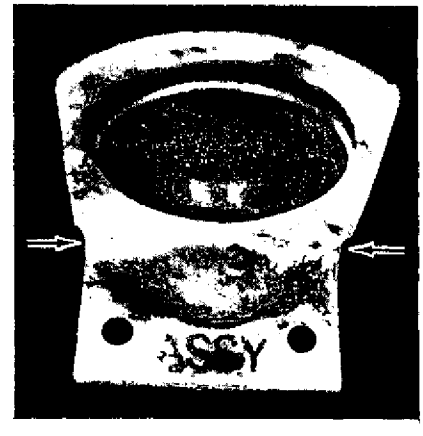
The brake disc separated from the flange at the weld. Total time in service - 1110 hours.

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.

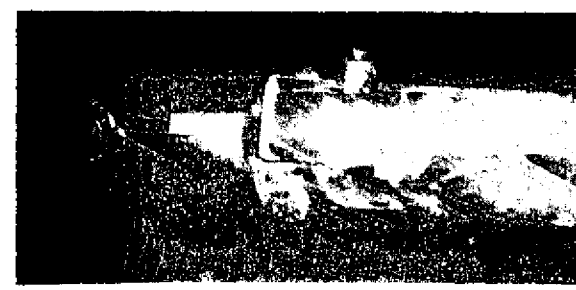


Grumman-American Model G-73 — Main Landing Gear Lock Assembly, P/N 69883

The landing gear lock assembly was found cracked just outboard of the center shaft.

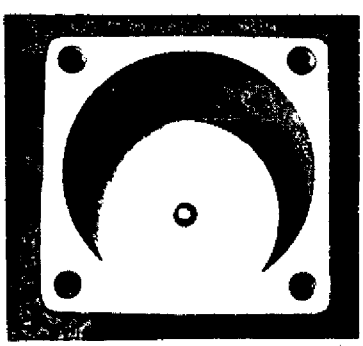
GENERAL AVIATION INSPECTION AIDS SUMMARY

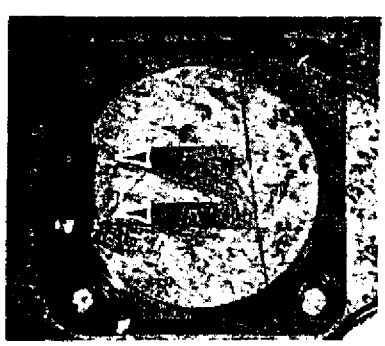
Grumman-American Model G-164	Fuselage-To-Wing Attachments	Inspection of an aircraft at 5,000 hours time in service revealed severe rusting of the lower fuselage tubular members and the aft wing attachment fittings on the left and right sides. Also, corrosion was found adjacent to the wing spar fittings. Examination of another aircraft which had accumulated 7,000 hours time in service revealed the lower rear fuselage wing attachment fittings and tubular members were rusted through. These conditions clearly illustrate the need for frequent cleaning and periodic detailed inspection of aircraft used in agricultural operations.
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.
Grumman-American Model G-164A	Fuel Line Fittings	During inspection, the aluminum fittings installed on the left and right stainless steel fuel line "Y" fittings mounted on the cabane struts, were found to be corroded. Close examination indicated some "B" nuts and ferrules were also cracked.
Grumman-American Model G-164A	Elevator Push Rod Assembly, P/N's A1847-401 and A1847-403	When performing routine inspection at approximately 3500 hours time in service, both the forward and aft elevator push rod assemblies were found to be severely corroded. Swelling and splitting of the tubes adjacent to the end fittings were noted and attributed to entry of fertilizer and other agricultural chemicals into the tube assemblies.
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.
Grumman-American Model G-164A	Throttle Cable, P/N 1651-5	A contributing causal 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.



GENERAL AVIATION INSPECTION AIDS SUMMARY

Grumman-American Model G-164A	Fuselage Tubular Members	Cracks have been reported in left and right lower fuselage tubular members forward of the tail wheel spring aft support channel, P/N A-1380-3A. The cracks were approximately 1 inch in length running parallel with the forward weld. This condition has been reported with aircraft having from 2000 hours to 3000 hours time in service.
Grumman-American Model G-164A	Landing Gear Spring Strut Assembly, P/N A1530-12	The right main landing gear strut was found to be cracked at the trailing edge and adjacent to the first bend immediately above the wheel attachment end. AD 76-13-10 does not call for inspection in this area of the strut. Total time in service-347 hours.
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.
Grumman-American Model G-1159	Fuel Injector Pump	The fuel injector pump inlet flapper valve separated at the hinge and lodged in the throat of the pump, rendering the pump inoperative. Total time in service - 1521 hours.



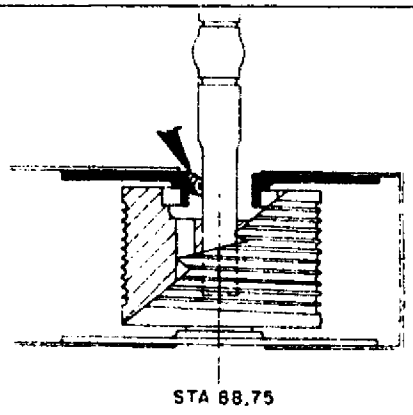


Grumman-American Model G-1159	Rudder Former, P/N 1159CS20306-21-02	During inspection, the rudder former was found to be cracked near the lower hinge point. The crack extended 5 inches in length. Total time in service - 848 hours.

GENERAL AVIATION INSPECTION AIDS SUMMARY

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.



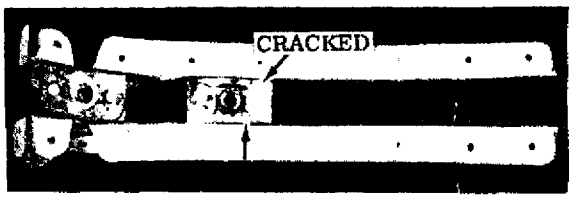
Grumman-American Model G-1159 — Fuel Boost Pump

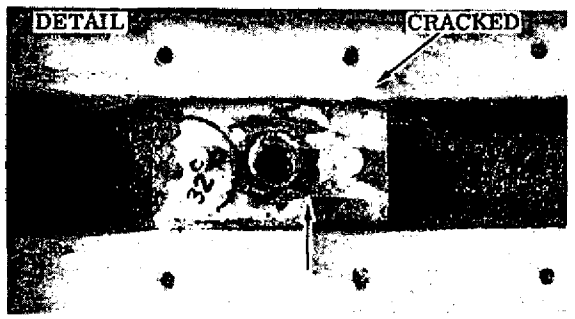
The right main fuel boost pump failed. Investigation revealed that the wiring was severely burned at the pump.

HELIO

Helio Model H-391B — Wing Leading Edge Rib

The wing leading edge rib assemblies were found to be cracked and corroded.





HILLER

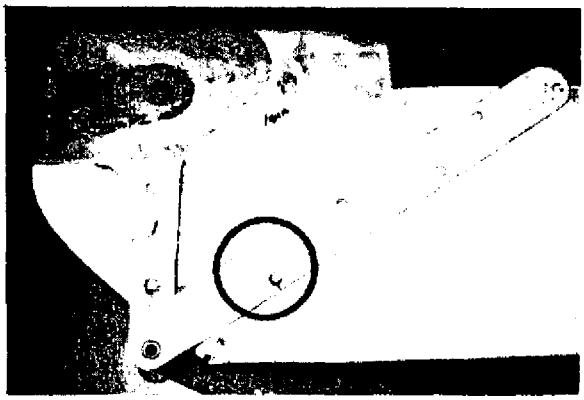
Hiller Model UH-12E	Main Rotor Hub, P/N 51437-11	Dye penetrant inspection of the main rotor hub revealed a crack where the lower studs go through the hub. The crack extends out from the stud hole.

GENERAL AVIATION INSPECTION AIDS SUMMARY

Hiller
Model UH-12B

Retention Strap,
P/N 40-017-2

During preflight inspection,a main rotor blade upper retention strap was found to be cracked. Total time in service - 644 hours.



INTERCEPTOR

Interceptor 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 auxiliary 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.
Interceptor Model 200D	Ammeter Wiring	All electrical power was lost during flight. After landing, the voltage regulator was found burned. Further checks disclosed a high resistance at the ammeter where the wiring was found to be loose on the terminal.

ISRAEL AIRCRAFT

Israel Model 1124	Elevator, P/N's 5463012-401 and 5463012-402	The left and right elevator bonded skin was found to be separating - total time in service - left 136 hours, right 151 hours.
Israel Model 1124	Electrical Wiring	An inspection to determine the cause for an intermittent thrust reverser "on" light, followed by an "armed" indication disclosed that the right nosewheel tire had chafed the wire bundle in the wheel well which contained wires from the nose gear squat switch. Aircraft total time in service - 160 hours.
Israel 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.

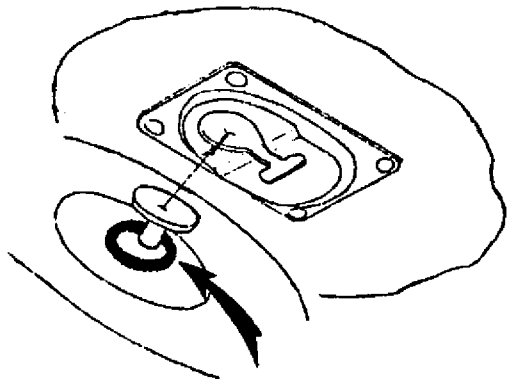
GENERAL AVIATION INSPECTION AIDS SUMMARY

LAKE

Lake
Model LA-4-200

Fuel Cell,
P/N 6701

The fuel cell upper hanger buttons have been found to be disconnected due to the buttons being too long. The addition of an "o" ring around the button neck will provide the necessary tight fit. Lake Service Bulletin No. B58 relates to this subject.



LEAR

Lear
Model 23

Tube Assemblies,
P/N's 2388154-029 and -030

The tube assemblies routed through the wing tip fuel tanks were severely scraped and collapsed. These tubes contain electrical wiring for the strobe and navigation lights. It is believed that the tubes are being damaged by fuel nozzels during fueling operations.

Lear
Model 23

Motive Flow Shutoff
Valve Seal

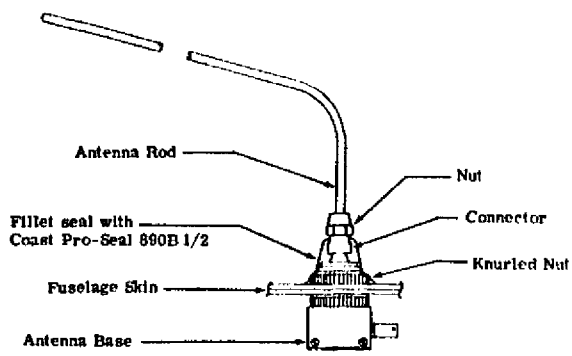
There is a report that the rubber deteriorated in the shaft seals of the motive flow shutoff valve, P/N AV16E1182. This allowed fuel to leak around the valve shaft.

It is suggested these seals be checked for condition.

LEAR MODELS 23, 24, 25, 35, AND 36 AIRCRAFT -- ARC-15 COMMUNICATIONS ANTENNA

Gates Learjet has issued service information intended to provide instructions for an inspection to assure that the communications antennas are properly sealed to prevent entry of moisture. Instructions for sealing the antennas are also provided should such action be necessary. This information is contained in Service Bulletins SB 23/24/25-263A and SB 35/36-23-1A. Serial numbers of the affected airplanes are contained in these bulletins.

Note: Antennas presently installed on any of these model aircraft which have a vendor I.D. placard installed should be reidentified by Lear P/N 2380050-6.



GENERAL AVIATION INSPECTION AIDS SUMMARY

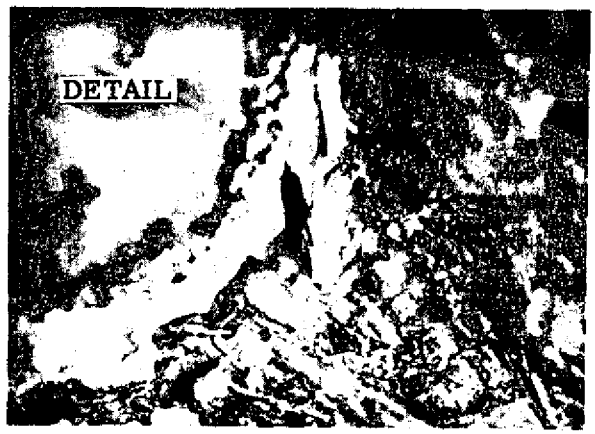
MARTIN		
Martin Model 404	Landing Gear Trunnion Fitting, P/N 404-2000046-20	The right main landing gear would not remain retracted. Inspection revealed the landing gear trunnion fitting attachment flange was cracked on both sides along its bolt centers.
Martin Model 404	Nacelle Stringer, P/N 404-2000173-6	During inspection, the lower inboard stringer of the left engine nacelle was found to be severely corroded.
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.
Martin Model 404	Landing Gear Door Balance Tube, P/N 404-1420030	The left landing gear would not retract. Inspection revealed the left outboard landing gear door balance tube had failed which allowed the gear to strike the door during retraction.
Martin Model 404	Intergranular Corrosion	When complying with AD 75-26-08, intergranular corrosion was found in the left wing upper attach angle, P/N 404-2000110-7 and its mating angle, P/N 404-2000110-3, in the wing center section. The cause of corrosion is attributed to engine exhaust deposit accumulation, a condition which could be alleviated by more frequent inspection and cleaning of the subject components. Inspection of another aircraft revealed extensive intergranular corrosion of the left wing lower front spar, the rear spar, and the left upper riser trunnion fitting. The corrosion had progressed to an extent which may require replacement of the wing.
MAULE		
Maule Model M-4-210	Exhaust System	Exhaust fumes enter the cabin when fresh air or heat is used. Investigation disclosed that the exhaust system was leaking at the slip joints and at cracks in the welds.

GENERAL AVIATION INSPECTION AIDS SUMMARY

McDONNELL DOUGLAS

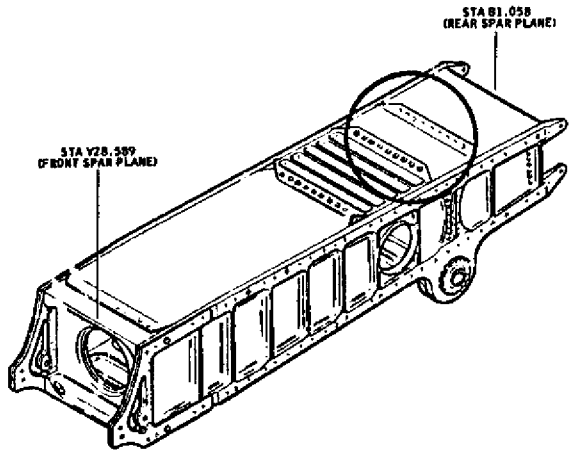
McDonnell Douglas Wing
Model DC-3

During maintenance, corrosion was found on the underside of the left wing outboard of the attach angle. After the wing was removed, extensive corrosion was found along the spars. Further checks disclosed that the corrosion was evident at every point where an unknown type of sealant had been used in the wing.



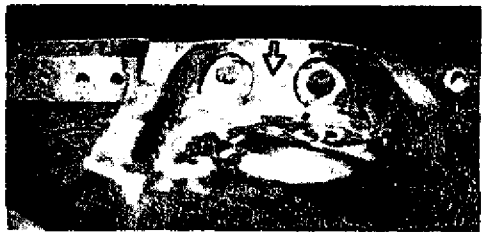
McDonnell Douglas Fitting, P/N 5918098
Model DC-9

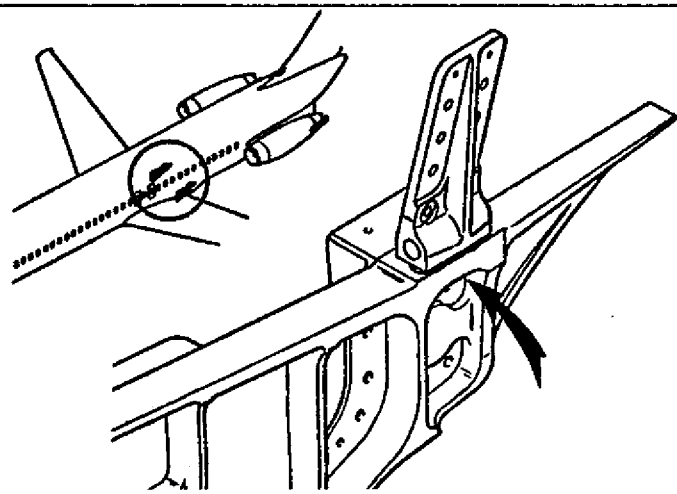
During inspection, the horizontal stabilizer center section fitting was found to be cracked. The crack extended 6-3/4 inches.



McDonnell Douglas Trapezoidal Panel,
Model DC-9-31 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.





GENERAL AVIATION INSPECTION AIDS SUMMARY

MITSUBISHI

Mitsubishi Model MU-2B-30	Fuel System	Fuel was found to be leaking from a wing-to-fuselage fairing. Investigation disclosed that the center wing fuel tank lower skin was corroded through under the sealant. AD 71-14-1 relates to this subject.
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.
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 M20	Landing Gear Handle, P/N 5059	During takeoff, the landing gear retraction handle broke above the weld. Inspection of the break showed indications of a previous crack. Total time in service - 1843 hours.
Mooney Model M20C	Fuselage Longeron, P/N 340117-108	The fuselage left lower longeron was found to be split and corroded between the front and the rear spar attachments. Other areas of the longeron would collapse when pressure was applied. Total time in service - 1500 hours.

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 SUMMARY

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.

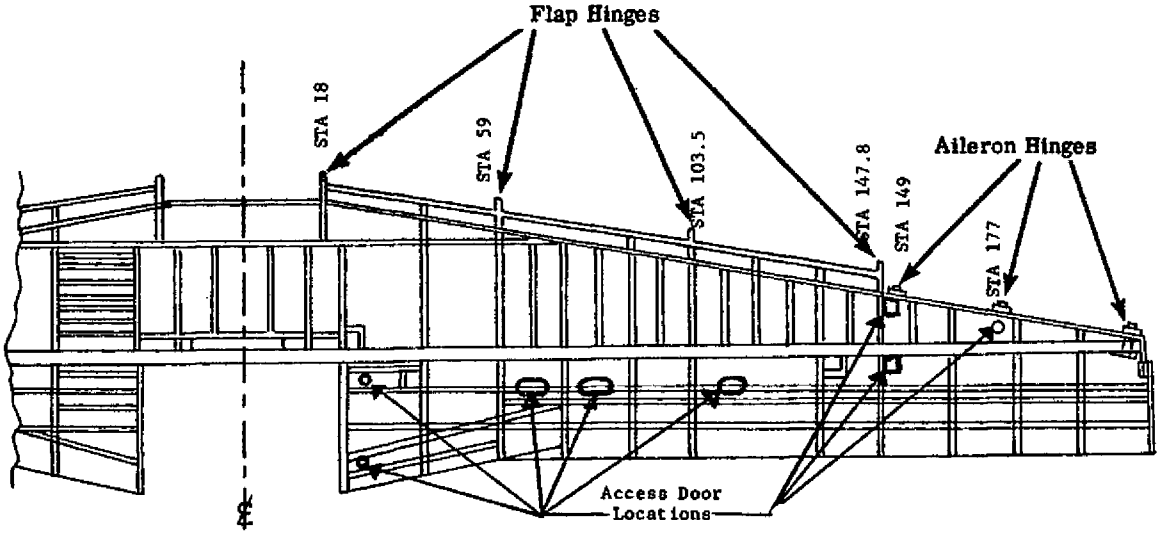


FIG. 1 WING STRUCTURE BOTTOM VIEW

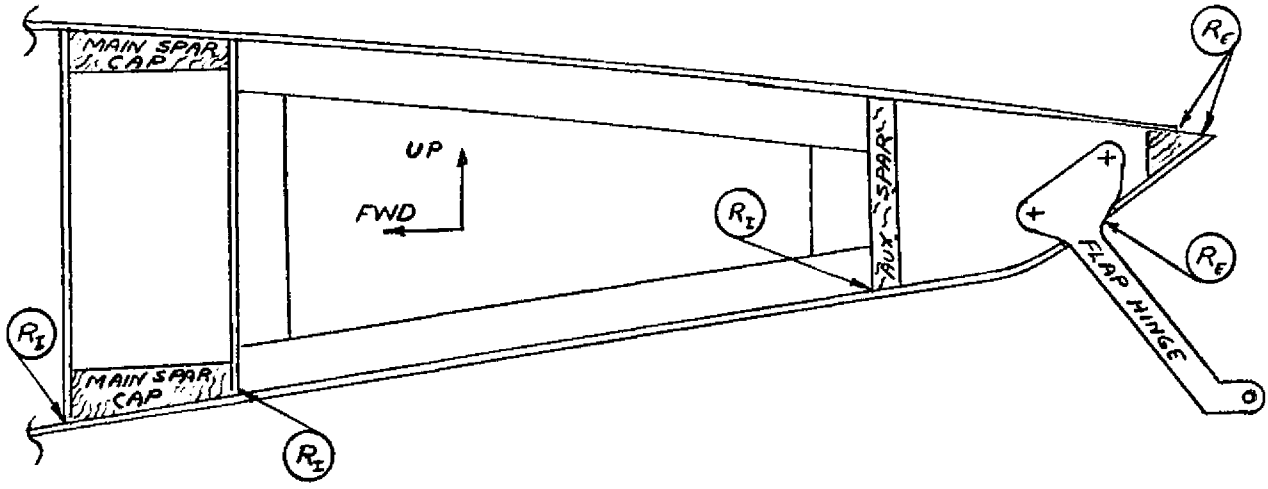


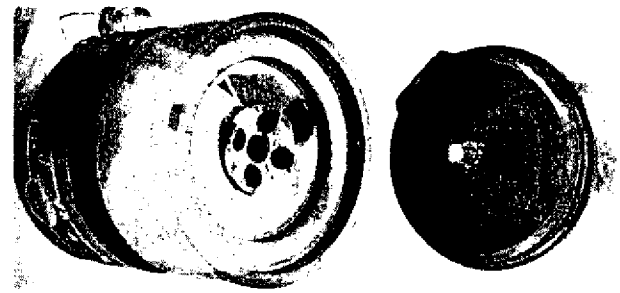
FIG. 2 WING RIB, STATION 147.8 (LOOKING INBOARD)

GENERAL AVIATION INSPECTION AIDS SUMMARY

Mooney
Model M20C

Fuel Strainer
Assembly, P/N HE-769

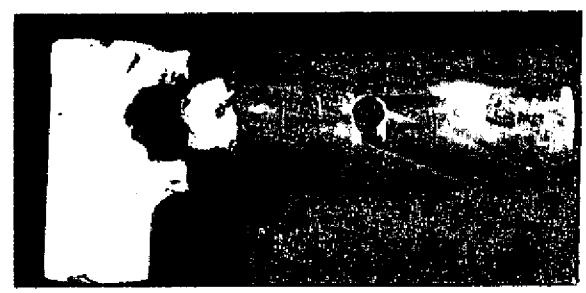
The fuel strainer assembly was found to be leaking. Investigation revealed that the strainer upper casting was broken in the threaded area at the lower portion attachment.



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.

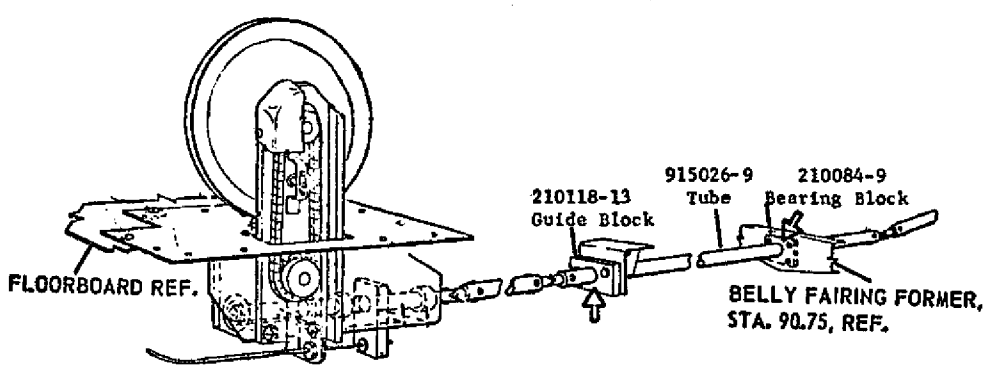


Mooney
Model M20F

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.



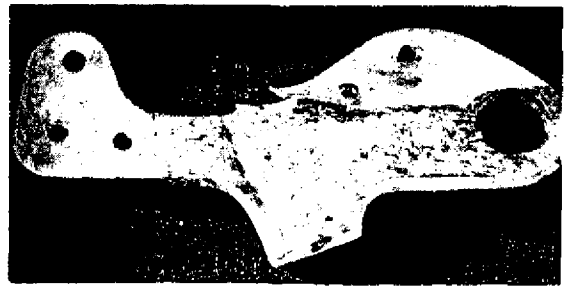
DON'T PUT IT OFF ANY LONGER - If you have recently experienced mechanical difficulties or problems with an aeronautical product and have not reported it yet, please do so now and help your fellow airmen. FAA Form 8330-2, available from your local General Aviation District Office, may be used for this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

GENERAL AVIATION INSPECTION AIDS SUMMARY

Mooney
Model M20F

Flap Hinge Bracket,
P/N's 240015-000, -501,
and -502

Five of the eight flap hinge brackets were found severely corroded. Mooney Aircraft Corporation Service Bulletin No. M20-186A, dated 1/14/75, relates to the subject.

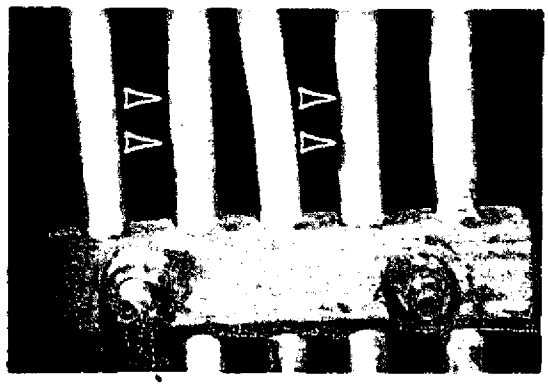


NAVION

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.



NORTH AMERICAN

North American
Model T-6G

Propeller Spinner

The propeller spinner separated from the aircraft during cruise. Inspection of the spinner, after recovery, revealed that the attachment holes were elongated and cracked.

PIPER

Piper
Model PA-11, PA-12, PA-14, PA-16, PA-18, PA-20, and PA-22 Series

Fuel Tank Vent

Collapse of wing mounted fuel tanks have occurred because of inadequate venting. Piper Service Bulletin No. 522, dated September 28, 1976, calls for modification of P/N 15296-02 fuel tank caps and inspection for proper installation of filler neck seals prior to next flight. The bulletin also requires the addition of ventholes in the cap flange perpendicular to the ventslots presently provided.

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GENERAL AVIATION INSPECTION AIDS SUMMARY

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 which 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 With Wing (Steel) Lift Struts	Wing Lift Struts	Piper Service Bulletin No. 528 and Airworthiness Directive 77-03-08 require inspection of (steel) wing lift struts for evidence of internal corrosion. The bulletin calls for inspection of the lower 11 inches on the bottom surface of the subject struts. Information recently received indicates that right and left struts are often interchanged. As a result, the bottom strut surface during previous operation now becomes the top surface. Because of this possibility, both the bottom and top surfaces of the lower 11 inches of the struts should be inspected.
Piper Model PA-12	Oil Drain Valve	Inflight loss of oil pressure and smoke in the cockpit occurred when the plug in which the oil quick drain valve is installed loosened and fell from the engine crankcase. No provisions to safety wire the plug were provided. The incident occurred two hours after the engine oil was changed.
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-18-150	Fuel Guage, P/N 10804-00	During inspection, at 43 hours total aircraft time in service, both left and right fuel sight guages indicated 1/4 full when the tanks were empty. Further examination revealed both guages had been installed upside down.

GENERAL AVIATION INSPECTION AIDS SUMMARY

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-18-150	Main Landing Gear	During inspection, the rear tubing for the right main landing gear was found to be broken. Internal rusting of the tubular member was the cause of failure.
Piper Model PA-18A	Landing Gear Vee Assembly, P/N 30602-06	During inspection, the landing gear vee assembly tubes were found to be rusted through at their upper ends. The aircraft had previously been operated on floats. Total time in service - 2400 hours.
Piper Model PA-18A	Clevis Bolt	During inspection the aileron and elevator control stick clevis bolts were found to be severely worn. These bolts attach the control stick connector tube assembly, P/N 40261-00, to the forward and rear control sticks, P/N's 13733-02 and -03. Total time in service - 1500 hours.
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 Model PA-22	Fuselage Tubular Member	At 1500 hours aircraft time in service, the fuselage tubular member at the baggage compartment doorsill was found to be severely rusted. This tube is normally covered with fabric, making it difficult to detect deterioration until it has progressed to an advanced stage.

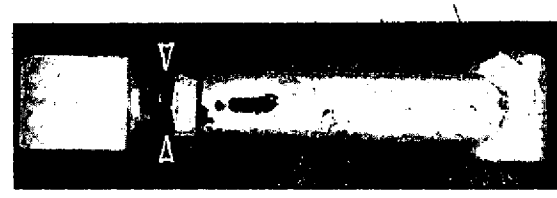
GENERAL AVIATION INSPECTION AIDS SUMMARY

Piper Model PA-22	Brake Master Cylinder Diaphragm, P/N 1751	When the pilot applied brakes, he felt a sudden loss of pressure followed by loss of braking action. The brake failure was attributed to a ruptured diaphragm in the master cylinder. Further investigation revealed the master cylinder had previously been serviced with automotive brake fluid which had recently been flushed out and replaced with the proper fluid. Use of improper fluid caused deterioration of the diaphragm.
Piper Model PA-22-160	Magneto Lead	Intermittent engine roughness and power loss were traced to both magneto primary leads shorting to ground. Crumbling away of the internal insulation material allowed the primary circuit wire to short against the metal shielding of the "P" leads. The leads are believed to have been in service for about ten years.
Piper Model PA-23	Rudder Tab Control Rod Rollpin, P/N 480728	During annual inspection, the rollpin which secures the rudder trim tab control rod to the screw assembly was found to be worn almost through. This rollpin had been installed in compliance with Airworthiness Directive 63-24-3 and Piper Service Letter No. 407. The directive requires 100 hour recurrent inspections of the tab control rod end directly above the rollpin which should have resulted in earlier detection of the wear problem. Total time in service - 1040 hours.
Piper Model PA-23	Gusset, P/N 17336-02	During inspection, the subject gussets were found to be badly corroded. These gussets are located at the top wing skin splice immediately aft of the nacelle turtlebacks, P/N's 17913-57 and -58. The aft attachment for the engine mount support assembly, P/N 17107-00 and -01 are attached to the wing structure at these gusset locations.
Piper Models PA-23 and PA-23-250	Fuel Tank Cap, P/N 16097-00	Fuel cell collapse and fuel starvation has been experienced when PA-30 aircraft fuel tank caps which are not vented have been installed on PA-23 aircraft. Reports recently received advised new fuel tank caps, P/N 16097-00, marked for "PA-23 series only", did not have vent holes. It is recommended that new caps for PA-23 series aircraft be checked prior to installation to insure they are vented.
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.

GENERAL AVIATION INSPECTION AIDS SUMMARY

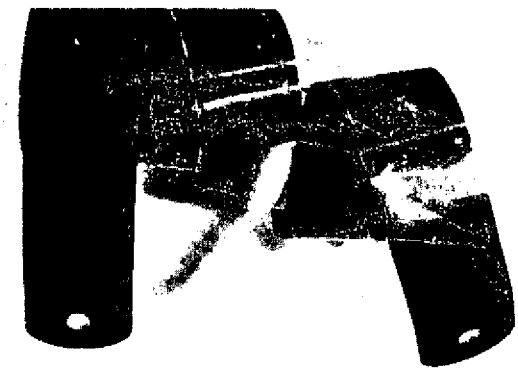
Piper Model PA-23-160	Oil Cooler Hose	All oil was lost from the right engine during cruise resulting in an unscheduled landing. Investigation revealed a hole had chafed through the right engine oil cooler flexible hose due to contact with the engine mount. The hose wear was located approximately 4-inches aft of its engine attachment end.
Piper Model PA-23-160	Fuselage Channels, P/N's 19938-00 and -01	During inspection, the left and right channels, to which the lower rudder hinge bracket is attached, were found to be cracked adjacent to the bracket mounting holes. Previous outside parking of the aircraft without use of control locks is believed to be a cause factor. A flashlight and mirror are needed to properly inspect these channels.
Piper Model PA-23-160	Nose Landing Gear Lock Link Assembly P/N 16667-00	The cause for a reported inoperative nose landing gear warning light was traced to failure of both the left and right links installed between the retract cylinder rod end and the drag link assembly. The failure area showed indications of a previous crack and significant wear.
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 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.

GENERAL AVIATION INSPECTION AIDS SUMMARY

Piper Model PA-23-240	Wing Flap Structure	Cracks were found in the left wing flap spar web, ribs and doublers installed between the ribs and spar at the hinge bracket attachment locations. Reports indicate cracks can be expected at 1500 hours operating time and above.
Piper Model PA-23-250	Nose Gear Steering Link Assembly, P/N 32268-00	 The pilot reported a loud snap followed by complete loss of nose wheel steering during taxi. Inspection revealed the steering link bolt was rusted which restricted free radial movement of the link and subsequent fatigue failure of the link assembly.
Piper Model PA-23-250	Hydraulic Powerpak Assembly	The landing gear collapsed during landing. Investigation revealed a severe leak in the landing gear downlock poppet valve in the hydraulic powerpak assembly.
Piper Model PA-23-250	Wing Leading Edge Spar, P/N 16010-01	During inspection, the right wing leading edge spar was found to be cracked. The crack was located adjacent to the inboard side of the engine nacelle. Total time in service - 5000 hours.
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-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-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.

GENERAL AVIATION INSPECTION AIDS SUMMARY

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 Model PA-23-250	Control Column Balance Spring, P/N 16891-00	A pilot reported having trouble moving the elevator controls and advised he felt something holding them. Inspection revealed the control column balance spring had failed and caused interference with movement of the control column. This was the second spring failure reported with this aircraft during approximately 1800 hours of operation.
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 Model PA-23-250 Aztec "F"	Stabilator Rib, P/N 15658-04	During inspection of the stabilator tip tube and counterweight assembly per Piper Service Bulletin No. 540, stabilator ribs, P/N 15658-04, have been found to be cracked. Cracks have been reported in the ribs adjacent to the balance weight attachments. The reports did not indicate if any required hardware was found to be missing. However, Piper Service Bulletin No. 547, dated March 1, 1977, advises some stabilator tip rib rivets or the stabilator tip tube and weight assembly attachment screws may not have been installed in certain serial number aircraft. The bulletin advises that missing hardware could lead to cracking of the tip ribs. In addition the bulletin requires inspection within the next 50 hours of aircraft operation and calls for installation of required rivets or screws as appropriate.



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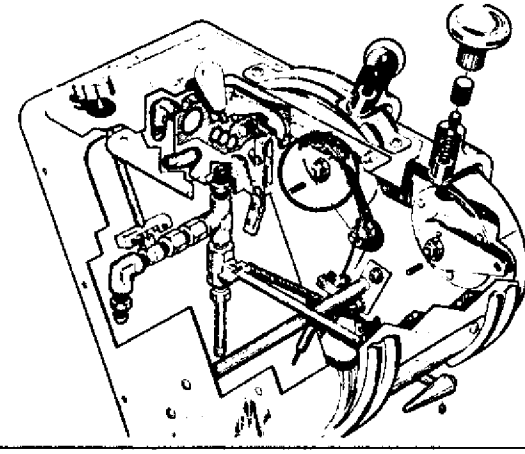
Piper Model PA-23-250	Main Landing Gear Drag Link Bolt, P/N 402427 (AN177-27)	When greasing the main landing gear drag link, the center bolt appeared to expand or both ends of the bolt moved outward. Inspection after removal revealed the bolt had failed due to fatigue at approximately the center point of the bolt grip area.

Piper
Model PA-23-250

Fuel Valve Control
Arm, P/N 31378-00

Investigation to determine the cause of reported play in the fuel valve control system revealed that the screw which retains the control lever arm was loose. Further inspection inside the fuel system control box disclosed one of the roll-pins, P/N 480700, which secures the lever arm in position had fallen out, and the other was loose.



Piper Model PA-23-250	Wing Flap System	When the wing flaps were lowered during landing approach, they would move back to retracted position after the selector switch returned to neutral. When on the ground, the wing flaps would droop from the full-up to the full-down position within a relatively short period of elapsed time. Investigation revealed that the in-flight discrepancy was caused by internal leakage of the bypass flow valve, P/N 33037-00, and the on-ground problem resulted from internal leakage of the wing flap actuating cylinder, P/N 17637-03. These units had been in service for approximately 2100 hours.
Piper Model PA-23-250	Hydraulic Powerpak	During preflight inspection, hydraulic fluid was noted to be leaking from the hydraulic powerpak in the vicinity of the hydraulic hand pump. Inspection disclosed the snap ring, P/N 484721, that retains the pump piston, "O" ring seals, and other parts was broken. The pump piston and seals were forced out of the cylinder bore resulting in external fluid leakage.
Piper Model PA-23-250	Fuel Gauge Transmitter Unit, P/N 486411	The source of fuel fumes inside the right wing was traced to fuel leakage from the inboard fuel tank fuel quantity gauge transmitter unit. Fuel was leaking past the center electrical contact post saturating the area with fuel, presenting a serious fire hazard.
Piper Model PA-23-250	Landing Gear Control Lever, P/N 752303	When attempting to retract the landing gear, following takeoff, the control lever broke completely off. The failure occurred at the first 90 degree radius from the aft end of the lever. Close examination revealed the lower 1/8 inch of the fracture area was dark (grease or dirt inclusion) indicating the presence of a previous crack.

GENERAL AVIATION INSPECTION AIDS SUMMARY

Piper Model PA-23-250	Air Scoop Assembly, P/N 31275-00	During flight, the pilot noted a jolt followed by a drop of 1.5-inches of manifold pressure on the right engine. Investigation revealed the right engine air scoop assembly had separated from the lower engine cowling.
Piper Model PA-23-250	Hydraulic Line, P/N 17766-27	The emergency CO_2 system had to be used to lower the landing gear when the normal and hand pump hydraulic systems were ineffective. Inspection revealed the cause of difficulty to be loss of hydraulic fluid resulting from rupture of the left landing gear anti-retraction valve flexible return line. Severe fluid leakage occurred adjacent to the swaged end fitting at the anti-retraction valve end of the line. This line had been in service approximately 12 years. Frequent inspection and periodic replacement of these lines which are subjected to flexing during landing gear extension and retraction is recommended.
Piper Model PA-23-250	Nose Landing Gear Fork, P/N 31793-03	During inspection, the nose landing gear fork was found to be cracked. The crack was located at the collar adjacent to the fork-to-piston attachment bolthole. 
Piper Model PA-23-250	Horizontal Stabilizer Skin	Inspection at 1200 hours aircraft time in service revealed cracks in the lower skin of the left stabilator. The cracks extended fore and aft over the second and third rib outboard of the fuselage and were two inches and five inches in length respectively.
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 (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 100 hours of operation.

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Piper Model PA-23-250	Tire and Brake Assembly	The sidewalls of 7.00-6 eight ply tires were found to be worn by contact with the stationary brake pad support assembly. This condition was experienced with two tires built by McCreary Tire Company when installed in conjunction with Cleveland wheel assembly 3080D and brake assembly 37-200A (30-72), as called for in applicable specifications. The report advised the problem was not experienced until new brake pads and discs were installed.
Piper Model PA-23-250	Wing Flap Torque Tube Bracket, P/N 17159-01	The wing flaps jammed in a partially extended position and could not be lowered further or retracted. Investigation revealed that the wing flap torque tube bearing support bracket which is welded to the fuselage lower right longeron immediately aft of the wing rear spar attachment fitting, had separated from the longeron.
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-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	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 Model PA-23-250	Fuel Pump, Romec, P/N RG 17980J	The left engine caught fire during taxi. Investigation revealed that the fuel pump drive end seal was leaking. In addition, the drive splines were badly worn.

GENERAL AVIATION INSPECTION AIDS SUMMARY

Piper Model PA-23-250	Induction Air Filter Seal, P/N 32198-00	Failure of the adhesive bond allows the seal, installed in conjunction with Fram CA-162-PL induction air filters, to be drawn into the engine fuel injector air intake. This condition can result in complete loss of power output for the affected engine.
Piper Model PA-23-250 (Aztec "F")	Wing Tip Navigation Light Wiring	Persistent navigation light circuit breaker tripping was found to have been caused by short circuiting of the wing tip strobe navigation light wire against the wing tip rib. This condition could lead to electrical arcing which would present an explosion hazard in the event fuel fumes were present inside the wing. Piper Service Bulletin No. 486, dated October 11, 1976, calls for the application of additional insulating material, on the subject wiring within the next 50 hours of operation, to preclude chafing of the wire on the adjacent wing tip rib. The bulletin provides aircraft serial number applicability.
Piper Model PA-23-250	Nose Landing Gear Strut Housing, P/N 751930	The nose landing gear strut housing was found to be cracked approximately halfway around its circumference at the lower end under the steering collar. Exceeding turning limits during ground towing operation was the cause for the housing failure.
Piper Model PA-23-250	Engine Mount Chafe Strip	The alternate air control cable housing was found chafing against the right engine mount diagonal tubing. The chafe strip had split permitting the cable housing to wear into the engine mount. The original thickness of the mount tubing wall was .032 inches. Wear loss was .024 inches. Piper recommended a splice weld repair in accordance with Advisory Circular No. AC 43.13-1.
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.

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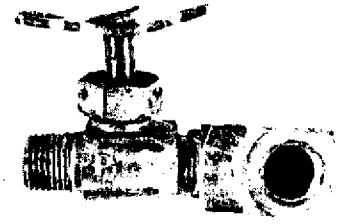
Piper
Model PA-23-250

Heater Fuel Valve,
P/N 194-6000

The pilot reported a fuel odor in the cockpit. An investigation disclosed that fuel was leaking around the cabin heater fuel shutoff valve control shaft when the boost pump was running. The packing nut was found to be tight and safetied in accordance with AD 74-22-05.



Piper
Models PA-23-250, PA-31, PA-31-325, PA-31-350, PA-31P, and PA-31T

Cigar Lighter Element

Reports received describe a tendency of the cigar lighter element coils to become detached and uncoil when the lighter is withdrawn from its mating receptacle. Detachment of the red-hot coil presents a potentially hazardous condition in the cabin area. Piper Service Bulletin No. 523, dated October 8, 1976, calls for replacement of existing 24 volt cigar lighter elements in certain aircraft within the next 25 hours of aircraft operation. The subject lighter elements, located in the instrument panel, control pedestal, or folding table, should be replaced with new elements, P/N 55674-02, which include positive heating coil retention security.

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
Models PA-24, PA-24-250, PA-24-260, PA-24-400, PA-30 and PA-39

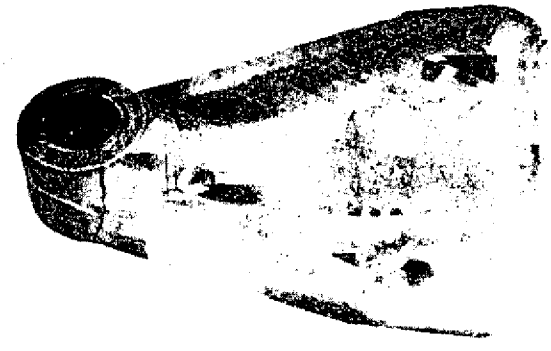
Aileron Spar

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
Models PA-24, PA-30 and PA-39

Rudder Hinge Bracket,
P/N 20707

Three instances of cracked upper and center rudder hinge brackets have been reported with PA-24-250 and PA-24-260 aircraft. Aircraft time in service varied from 1018 to 1550 hours. The cracks originated at the outer race of the pressed-in bearing and progressed to the edge of the brackets. Similar problems may possibly be experienced with PA-30 and PA-39 series aircraft.



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PA-24, PA-30 39	Vertical Fin Forward Spar	Piper Service Letter No. 777, dated June 16, 1976, provides instructions to modify the vertical fin front spar. The purpose of the modification is to enable visual inspection per AD 75-12-06 and AD 76-18-05 without requiring removal of the fin.
A-24-180	Nose Landing Gear Drag Link Bolts	A pilot reported that when the landing gear control was placed in the down position, the gear actuator circuit breaker tripped and the engine throttle control moved to idle position. Investigation following a forced landing revealed that AN6-13 bolts were installed at the center hinge point of the nose gear drag link assembly in place of the special bolts, P/N 22066-00, called for in the aircraft parts catalog. Additionally, these bolts were improperly installed with the heads facing inboard allowing an excessive length of the threaded shank to protrude outboard from the drag link. The threaded shank of the right bolt caught on the throttle control cable housing pulling the throttle to the closed position and stopped movement of the nose gear, which caused the gear actuator circuit breaker to trip.
A-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.
A-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.
A-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.
A-24-250	Exhaust Stack Assembly, P/N 24543-00	The cause for smoke in the cockpit was traced to a hole burned through the exhaust stack assembly on the left side of the engine. Escaping exhaust gases resulted in distortion and rupture of the heater shroud assembly and burning of rubber hoses and wire insulation inside the engine compartment.
A-24-250	Fuel Cell, P/N's 20355-00 and -01	The cause for fuel stains and fumes in both wings was traced to leaking fuel cells. Both tanks were found to have porous areas. Total time in service - 1800 hours.

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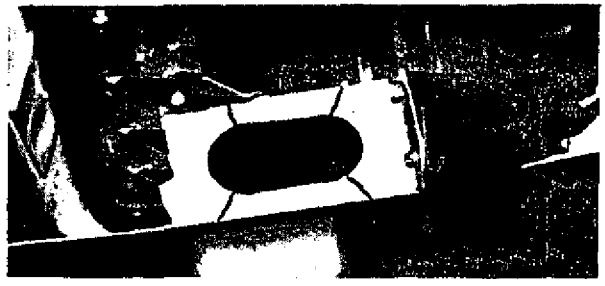
Piper Model PA-24-250	Landing Gear	The landing gear collapsed during landing rollout. In tion revealed the landing gear motor and transmissio bly had pulled loose from its fuselage bulkhead attach The failed area of the bulkhead showed evidence of a crack.
Piper Model PA-24-250	Main Landing Gear Retraction/ Extension Conduit Assembly, P/N 455180	The landing gear appeared to extend properly but th main gear collapsed during landing. Investigation re the telescoping portion of the gear retraction/extensi duit in the right wheel well was frozen in the retract due to the accumulation of dirt, and the housing had s at its flex joint adjacent to the bracket assembly, P/ 00.
Piper Model PA-24-250	Nose Landing Gear Aligner Assembly, P/N 21725-00	The nose landing gear failed to extend when the selec switch was placed in the down position. Investigatio that the nose landing gear aligner assembly was bent, aligning roller was found lodged outside the guide bra Piper Service Letter No. 596A advises of product im ment items that will help maintain the nose landing g system in proper operating condition during the retra and extension cycles, and to help deter improper gro handling practices.
Piper Model PA-24-250	Landing Gear Retract Coil Spring, P/N 83302-39	Several attempts had to be made to obtain a landing g down and locked indication. Inspection revealed the of difficulty to be inadequate tension on the coil sprin 83302-39, which attaches to the transmission motor arm assembly, P/N 23042-00. Inadequate spring ten was the result of loosening of the cotter pin which se the upper end of the spring to the cockpit floor.
Piper Model PA-24-250	Aileron Nose Rib, P/N 20234-31	Cracks have been found in the aileron nose ribs or bu assemblies adjacent to the balance weight arm attach boltholes. The condition is similar to that covered b 74-10-03 for the PA-30 aircraft.
Piper Model PA-24-250	Landing Gear Safety Switch, P/N 487864	The landing gear collapsed during landing rollout. In tion revealed the landing gear safety switch was inope which permitted the gear to become unlocked when th gear selector was momentarily activated during landi
Piper Model PA-24-250	Landing Gear Transmission	During inspection at 2600 hours time in service, the gear transmission was found to be severely worn. T housing was worn nearly through allowing excessive of the worn gear shaft, the emergency release handle rivets were badly worn, and the internal gears were a knife edge. During an emergency extension check, lever would strike the edge of the access hole. Thes tions, if not corrected, could have caused inability to the landing gear using either normal or emergency p

GENERAL AVIATION INSPECTION AIDS SUMMARY

s PA-24-250 A-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.

PA-24-260	Fuselage Stringers, P/N's 23743-04 and 23743-05	

performing a detailed inspection of the fuselage rame assembly, the subject stringers were found cracked. The cracks were located in each corner of both left and right stringer lightening holes lo- between bulkhead, P/N 20612, and bulkhead, P/N at fuselage stations 66 and 70. This area is direct- w the left and right cabin air valve assemblies, 24720-00 and 24720-01. The cracks had progressed through the stringers.

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.

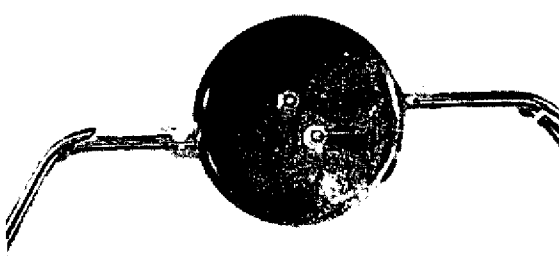
PA-24-260	Fuel Line, P/N 23070-00	Fuel was dripping from the aircraft's lower fuselage area immediately following refueling. Investigation revealed the source of the fuel leak to be a hole worn through the subject fuel line. This condition was caused by contact with a PK screw used to secure the carpet adjacent to the front floor shield plate, P/N 22340-03, forward of the wing spar carry-through.

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.

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.

GENERAL AVIATION INSPECTION AIDS SUMMARY

Piper Model PA-24-260	Alternate Air Door, P/N RJ-0758-21	The alternate air door fell off during operation and wa jested into the turbocharger inlet air duct. The spring holds the door closed was missing and is believed to h entered the turbo impeller.
Piper Model PA-24-400	Engine Mount	The lower tubular members on both the left and right s the engine mount were found to be severely corroded. proximity of exhaust stacks was reported as a factor c buting to the problem. Total time in service - 1800 ho
Piper Model PA-25-235	Control Cables	During annual inspection, the elevator control cable, P 42702-07, and both aileron control cables, P/N's 4270 and 42702-05, were found to have worn and broken str Total time in service - 455 hours.
Piper Model PA-25-235	Carburetor Heat Control Cable, P/N 61360-07	A loss of engine power occurred because of carburetor even though the carburetor heat control was placed in f position. Accident investigation revealed the carburet control cable had failed at its heat valve attachment.
Piper Model PA-25-235	Wing Spar, P/N 6115602	During inspection, the front spar of the right wing was to be cracked. The crack extended from the wing atta bolthole to the edge of the spar.
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 Models PA-28, PA-32, and PA-34	Stabilator Hinge Attach Bolts	The stabilator hinge attach bolts were found loose on s Piper Model PA-34 aircraft. It is recommended that Models PA-28, PA-32, and PA-34 aircraft be inspecte this condition and the bolts be retorqued to the manufa specification.
Piper Model PA-28-140	Oil Cooler Hose Assembly P/N's 61413-2 and 63794-16	Airworthiness Directive 72-4-3 and Piper Service Lett 604, require a 100-hour repetitive inspection of the oil hose assemblies. In addition, Piper PA-28 Cherokee Manual requires an inspection. It also requires replac of these hoses at 1000-hours time in service. Hoses c deteriorated by heat; therefore, compliance with these quirements could prevent hose failure.



GENERAL AVIATION INSPECTION AIDS SUMMARY

Piper Model PA-28-140	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-28-140	Flap Spring, P/N 62820-00	During inspection, the flap return spring was found to be broken. Total time in service - 5588 hours.
Piper Model PA-28-140	Aileron, P/N 62373-01	During inspection, the left aileron spar outboard doubler was found to be cracked. The crack was 3/4 inch in length. Total time in service - 8141 hours.
Piper Model PA-28-140	Main Landing Gear Cylinder, P/N 65319-03	Reports continue to be received where the main landing gear cylinders have been found cracked at the base of the torque link attach lug.
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-28-180	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	Wing Spar, P/N 62074-00	During inspection, corrosion was found on the left wing spar upper cap immediately inboard and above the landing gear support casting.

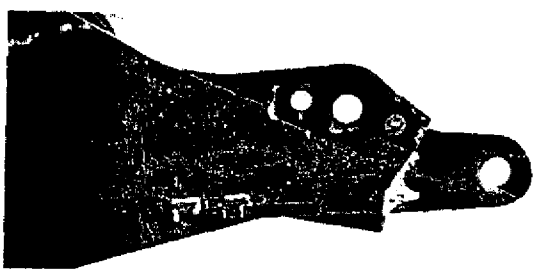
Piper
Model PA-28R-180

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.

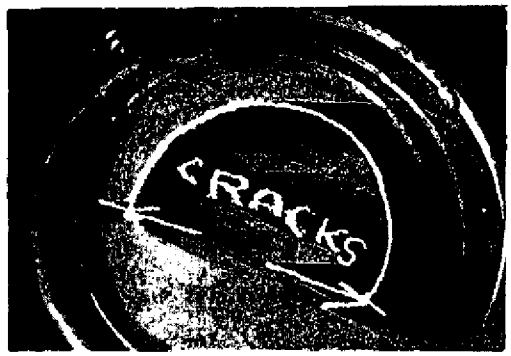
GENERAL AVIATION INSPECTION AIDS SUMMARY

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.
Piper Model PA-28R-180	Wing Rib Assemblies, P/N's 78475-05 and 78500-9	The right wing rib assemblies for the main landing gear cutout were found to be loose and pushing through the upper wing skin. The rib assemblies in the same area of the left wing were found to be loose and working. Total time in service - 3300 hours.
Piper Model PA-28R-180	Engine Mount Assembly, P/N 6117949	The engine mount was found to be broken in the ring section at both upper dynafocal mounts. Total time in service - 1446 hours. Inspection of a second aircraft disclosed that the engine mount was also broken in the ring section at the right upper dynafocal mount. Total time in service - 1442 hours.
Piper Model PA-28-181	Main Landing Gear Cylinder, P/N 65319-04	During inspection, the left main landing gear cylinder was found to be cracked at the torque link flange. Total time in service - 291 hours.
Piper Model PA-28R-200	Landing Gear Squat Switch, P/N 451-823	The landing gear would not retract. Inspection disclosed that the squat switch actuator was broken. Total time in service - 920 hours.
Piper Model PA-28R-200	Alternator Mounting Bracket, P/N 99089-00	The alternator mounting bracket forward ear failed approximately 1-3/4-inches from center of the bolthole. The required shims had been installed between alternator and bracket ears. Total time in service - 97 hours.
Piper Model PA-28R-200	Power Lever Ball Joint, P/N 3174700	An engine power reduction was experienced. Investigation revealed that the power lever ball joint had separated from the control arm at the fuel injector.



GENERAL AVIATION INSPECTION AIDS SUMMARY

Piper Model PA-28R-200	Engine Mount	During inspection at engine change, the left mount tube was found to be cracked adjacent to the weld cluster. Total time in service - 3641 hours.
Piper Model PA-30	Aileron Spar	The spars have been found cracked in both ailerons. The cracks extend spanwise below the outboard hinge brackets. Time in service - 1800 hours.
Piper Model PA-30	Cabin Heater Combustion Chamber	The cause of reported exhaust fumes in the cabin was determined to be a cracked heater combustion chamber. The aft end of the combustion chamber was cracked in excess of 180 degrees around its circumference permitting combustion gases to mix with heated air entering the cabin.
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-30	Landing Gear Motor, P/N 21286-00	The landing gear motor circuit breaker popped when the gear switch was placed in the down position. The landing gear was lowered using the emergency extension procedures. Investigation revealed that the landing gear transmission motor had failed.
Piper Model PA-30	Control Wheel, P/N 20965-00	The control wheels were found to be cracked. The cracks originated at the retention pin and progressed approximately 180 degrees around the wheel hub. Total time in service - 2346 hours.
Piper Model PA-30	Landing Gear	A Piper PA-30 aircraft experienced an unintentional landing gear retraction during landing rollout. Following the incident, the landing gear was extended using the emergency system and the aircraft was ferried where repairs could be made. Upon arrival at its destination, a smoother than normal landing was made without using the brakes. However, when turning from the runway onto the taxiway, the landing gear collapsed. Investigation revealed binding in the nose gear drag linkage prevented full overcenter locking of the nose gear. Also, the left landing gear cable system was found to be loose. No external bracing had been installed for the ferry flight.



GENERAL AVIATION INSPECTION AIDS SUMMARY

Piper Model PA-30	Wing Skin	Inspection at 3045 hours time in service revealed spanwise wrinkles and numerous small cracks in the upper skin of both wings outboard of the engine nacelles. Investigation failed to reveal that the aircraft had been operated in excess of limitations, or in turbulent air. Records indicated that Brittian wing-tip fuel tanks had been installed per STC SA727WE at 2963 hours aircraft time in service. Also, at 2344 hours time in service, STC's SA1151SW IO-360-C1C Engines and HC-C2YK Propellers, SA1112SW Dorsal Fin, and SA1114SW Nacelle Baggage Compartment installations were incorporated.
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-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-30	Fuel Cell, P/N 454335	The cause for fuel fumes in the cabin was traced to fuel leakage from the right fuel cell. Inspection disclosed porosity in the area of the fuel cell adapter pad that accommodates the filler cap plate, P/N 20899-03. Total time in service - 2400 hours.
Piper Model PA-30	Fuel Selector, P/N 24100-00	During flight, the left auxiliary fuel tank quantity was noted to decrease even though the selector was in "left main" tank position. After the auxiliary tank was empty, the left engine fuel pump continued to draw air from the tank resulting in loss of power. Inspection of the fuel selector valve revealed foreign material lodged under the auxiliary tank ball check valve.

GENERAL AVIATION INSPECTION AIDS SUMMARY

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-30	DC Electrical Power	A complete electrical power loss was experienced during flight, requiring manual extension of the landing gear. The left main landing gear collapsed during landing rollout. Investigation revealed the left engine alternator was inoperative due to worn and sticking brushes, and a high-resistance DC electrical connection resulted from a frayed (+) positive battery cable. No discrepancies were found in the landing gear system.
Piper Model PA-30	Aileron Counterweight, P/N 2072100	The counterweights on both ailerons were found loose during inspection. The attaching bolts were tight but the counterweight material was worn away under the bolts.

Piper Model PA-31	Fuselage Skin	During inspection, the right wing lower skin was found to be severely corroded aft of the engine exhaust between the main spar and the wheelwell. Total time in service - 2084 hours.
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 Model PA-31	Main Landing Gear Strut Housing, P/N 40327-00	Severe corrosion was detected under the large clamps, P/N 554874, that secure the brake hydraulic lines to the main landing gear strut housing assembly. The corrosion had progressed to a degree which required replacement of the strut assembly.

GENERAL AVIATION INSPECTION AIDS SUMMARY

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	Alternator Switch	An investigation to determine the cause of electrical power failure during flight revealed that both alternator field switches were contaminated with moisture, corrosion, and dirt. Total time in service - 4148 hours.
Piper Model PA-31	Flap Drive Shaft, P/N 486590	The wing flaps would not extend during landing approach. Investigation revealed that the left flap drive shaft had failed. Total time in service - 1200 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 Model PA-31	Main Wheel Inboard Half, P/N 753219	When taxiing for takeoff, the left main tire completely deflated. Inspection revealed a crack 8 inches long in the flange radius of the inboard wheel half which caused rupture of the tire inner tube.
Piper Model PA-31	Elevator Tab Hinge Bolts	A mechanic has reported loose elevator tab hinge bolts (inboard, center and outboard) detected during inspection of several PA-31 series aircraft. Some bolts were found to be loose, and some were found to have backed almost completely out of their self-locking plate nuts.
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	Fuel Selector Control Cable, P/N 31384	Fatigue failures of fuel selector valve push-pull control cables (piano wire) have prevented its use. Inspection has disclosed failure is sometimes the result of too rigid attachment of the cable housing adjacent to the selector lever. This prevents swiveling of the housing and causes excessive flexing and failure of the cable.

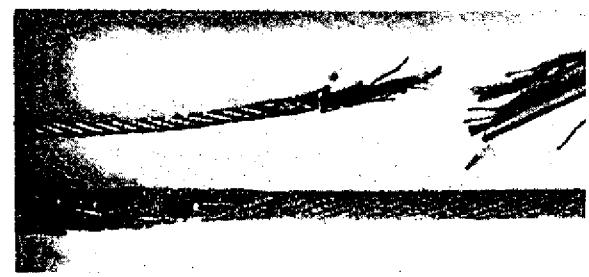
GENERAL AVIATION INSPECTION AIDS SUMMARY

Piper Model PA-31	Engine Cooling Baffles, P/N 41608-007	During 100-hour inspection, the cooling baffles were found to be chafing against the engine oil sumps on the left side of both engines. Grooves approximately 1/16 inch deep had been worn into the sumps.
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	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	Main Landing Gear Bolt, P/N 400309	The left main landing gear aft side link bolt corroded and seized which prevented proper extension of the gear. The operator recommends removal, inspection, and lubrication of these bolts at each 200 hours of operation.
Piper Model PA-31	Wing Ribs, P/N's 40490-04 and -05	During inspection, the wing ribs located at station 147.5 of the left and right wings, were found to be cracked. The cracks were located in the flange radius where the ribs are attached to the rear wing spar immediately forward of the outboard wing flap track assembly.

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 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 Series	Wing Flap Transmission Ball Screw Shaft Bearing	During compliance with AD 76-10-06 and Piper Service Bulletin No. 494, the bearing that supports the forward end of the wing flap transmission ball screw shaft (jack shaft) was found to be badly worn. This condition can cause jack screw binding, worm gear failure, or flexible drive shaft failure.

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Piper Model PA-31 Series	Landing Gear Uplock Rod	Although an unlocked landing gear was indicated in the cockpit, a PA-31T aircraft landed without mishap. After landing roll-out, the main landing gear downlocks were bumped into full locked position by hand. Investigation revealed the telescoping section of the landing gear uplock rods, P/N 4149-03, were binding due to accumulation of residue. Cleaning and lubrication of the rods corrected the condition. Due to similar instances and reported collapse of landing gears, Piper issued Service Letter No. 755, calling for frequent inspection, cleaning, and lubrication of the rod assemblies.
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 Models PA-31, PA-31-300, PA-31-325 PA-31-350, PA-31P and PA-31T	Microphone and Phone Jack Relay Mounting	The cause for intermittent operation of the copilot's microphone in a PA-31 aircraft was traced to loosening of the phone jack relay. The nut, P/N AN340-C3, that secures the relay in its mounting bracket became loose allowing the relay to rotate, short circuiting its 28 volt pin against the bracket. This is a potentially hazardous condition due to close proximity of the relay to oxygen and fuel pressure gauges plumbing. Piper Service Bulletin No. 526, dated November 30, 1976, calls for the application of a rubber strip to the relay assembly to dampen vibration and increase rigidity of the mounting bracket. Compliance with the bulletin is called for at the next regularly scheduled inspection interval, but not later than the next 50 hours of operation.
Piper Models PA-31, PA-31-325 and PA-31-350	Horizontal Stabilizer	It has been determined that an inadequate number of rivets may have been used to attach the stringers to the top and bottom horizontal stabilizer skin panels. An inadequate number of rivets may permit local buckling of the skin between rivets. Piper Service Bulletin No. 521, applicable to certain serial number aircraft, was issued September 20, 1976. The bulletin calls for inspection and rework as necessary within the next 50 hours of operation.
Piper Models PA-31 and PA-31-300	Landing Gear Restrictor Valve	A gear-up landing occurred when the main landing gear doors failed to open during gear extension. Investigation revealed the probable cause to be internal failure of the "door close" hydraulic line restrictor valve. It was also determined a second restrictor valve, installed in the "gear-up" hydraulic line, could also be subject to similar internal failure, depending upon the type of valve installed. Piper Service Letter No. 784, dated September 27, 1976, applicable to aircraft serial number 31-2 to 31-694 inclusive, calls for replacement of the "door close" restrictor valve with a AN815-4D union and replacement of TACTAIR "gear-up" restrictor valve with TAVCO, P/N 484459, restrictor valve.

GENERAL AVIATION INSPECTION AIDS SUMMARY

Piper Models PA-31, PA-31-300, PA-31-325, PA-31-350, PA-31P and PA-31T	Radio Power Relay Cover Spacer Bushings	The manufacturer has found that inadvertent bending of wires attached to the radio power relay can force the relay into a tilted position. If this should occur, the electrical terminals can contact the relay cover spacer metal bushings, short circuiting the radios and present a possible fire/smoke hazard. In order to eliminate the possibility of this condition occurring, Piper is to issue Service Bulletin No. 535 calling for replacement of the metal spacer bushings with phenolic spacer bushings prior to further flight.
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-31-300	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-31-300	Flap Cable, P/N 486-590	The right flap remained up and the left flap lowered. Investigation revealed that the right flap drive cable had failed. It is suggested that the flap system be checked thoroughly in accordance with the manufacturer's maintenance manual.
Piper Model PA-31-310	Propeller Spinner, P/N 43940-00 Backplate, P/N 43933-4	At 100 hours time in service, the left spinner was found to have a piece 3 inches by 4 inches cracked out adjacent to a propeller blade cutout. At 295 hours, the backplate was found to be cracked adjacent to the spinner attachment screwholes.
Piper Model PA-31-310	Cabin Door Latch Assembly	The cabin door opened in flight. Inspection disclosed that the latch assembly eccentric bushing, P/N 43065-00, retainer bolt was loose, permitting the eccentric to rotate in the safety stop bracket assembly, P/N 43066-00, which resulted in intermittent loss of safety latching. Total time in service - 3740 hours.
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-31-325	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.

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GENERAL AVIATION INSPECTION AIDS SUMMARY

Piper Model PA-31-325	Wing Stringer, P/N 40586-44	During inspection, the left wing top stringer was found to be cracked through the flange 1 inch inboard of wing station 160.50.
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-31-350	Fuel Selector Valve Handle, P/N 53890-05	The left fuel selector valve handle came off in the pilot's hand during preflight check. Inspection revealed that the fuel selector valve handle had not been drilled to accommodate a rollpin, P/N 480682, to secure it to the control shaft assembly, P/N 52263-02. When the handle came off, the detent ball, spring and plunger shaft fell through the console preventing movement of the selector valve.
Piper Model PA-31-350	Mixture Control Cable Assembly, P/N 24894-02	The right engine mixture control cable failed at the fork fitting inside the control pedestal.
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-31-350	Fuel Quantity Transmitter	During inspection, the tops of the fuel quantity indicator transmitters were found to be badly corroded. The cause was attributed to water which entered around the unsealed wing access covers and collected on top of the indicator units.
Piper Model PA-31-350	Nose Landing Gear Door Studs, P/N 40263-00	When the landing gear was retracted, the nose gear left door failed to close. Inspection revealed that the left gear door pick-up stud, P/N 40263-00, was broken and the right stud was bent. Damage is believed to have occurred when line crew personnel used the door pick-up studs when towing the aircraft.
Piper Model PA-31-350	Nose Landing Gear Fork Assembly, P/N 45320-00	When installing the nose wheel axle in a new landing gear fork assembly, the axle holes in the fork were found to be misaligned. With the axle installed, misalignment imposed significant stress on the fork assembly. Examination of other new assemblies revealed the same discrepancy.

GENERAL AVIATION INSPECTION AIDS SUMMARY

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-31-350	Nose Cowling, P/N 41838-08	The right engine cowling separated from the aircraft during cruise. Inspection of the recovered components revealed that failure of the Fiberglass nose cowling evidently permitted ram air pressure to lift the complete cowling from the aircraft.
Piper Model PA-31-350	Elevator Trim Tab Drum Mounting Bolt, Nut, and Washer	During 100-hour inspection, the nut and washer were found to be missing from the inboard mounting bolt for the elevator trim tab drum assembly. These parts had not been disturbed during the aircraft's 300 hours total time in service, and it is believed the self-locking nut loosened and fell from the aircraft during operation.
Piper Model PA-31-350	Cabin Door Latch	The main cabin door opened during flight. Investigation revealed the forward latch was out of adjustment, permitting the forward edge of the door to protrude into the air stream.
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	Propeller Control Cable	The cause of reported loss of propeller r.p.m. control was traced to decoupling of the propeller pitch control cable at the governor. Inspection revealed insufficient spring tension in the "snap-on" type ball joint socket assembly, P/N 54175-00, at the control cable-to-governor attachment point allowed the ball to disengage from the socket. The incident occurred at 350 hours time in service and was the second occurrence experienced with this aircraft.

GENERAL AVIATION INSPECTION AIDS SUMMARY

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-31P	Throttle Control Rod End, P/N 469142	The throttle control for the left engine disconnected during ground runup. Inspection revealed the rod end ball became disengaged from its mating socket allowing the rod end to slip over its attachment bolthead decoupling the control linkage. Piper Service Bulletin No. 407, dated November 14, 1973, provided inspection procedures to insure that the control rod ball joints cannot become disengaged from their mating sockets. Piper Service Bulletin No. 497, dated March 29, 1976, calls for replacement of the throttle and propeller control rod ends with a new type provided in kit, P/N 761031, within the next 100 hours of operation.
Piper Model PA-31P	Fuel Boost Pump Piston Assembly, P/N 757329	The pilot reported the right engine would lose power when the electric fuel pump was shutoff. Investigation revealed the nylon piston assembly, in the fuel pump, was stuck in the closed position. The piston appeared to be swollen and was binding in its guide requiring fuel to be drawn through the electric fuel pump when turned off reducing fuel flow to the engine.
Piper Model PA-31P	Elevator Bellcrank Bushing, P/N 41413-03	Excessive play in the elevator control system was caused by wear of the bushings where the elevator control tube assembly, P/N 40847-04, attaches to the elevator bellcrank assembly, P/N 40307-00. This condition was detected during inspection at 430 hours aircraft time in service.
Piper Model PA-31P	Elevator Rib, P/N 45933-00	Both elevator butt ribs were found to be cracked adjacent to the torque tube attachment. Total time in service - 700 hours. Piper Service Letter No. 778, dated June 14, 1976, recommends installation of new butt ribs, P/N 54755-02 at the next scheduled inspection.
Piper Model PA-31T	Engine Oil Temperature Gauge Placard	The oil temperature gauges installed in PA-31T aircraft, serial number 31T-7620012 to 31T-7620050 inclusive, are not identified as to function. Piper Service Bulletin No. 517, dated October 5, 1976, advises that placards, P/N 757 487, are available for these aircraft, free of charge, through Piper Field Service facilities.
Piper Model PA-31T	Strobe Light Power Supply	Screws which secure the wing lower access covers contact the wing tip strobe light power supply units. A recent report advised that a screw punctured the strobe light power supply case resulting in high voltage discharge inside the wing. This condition would have been extremely critical if fuel fumes had been present in the area. FAA Advisory Circular 90-75, dated February 10, 1977, advises of the fire/explosion hazards involved when arcing occurs in wing tip strobe light systems and provides inspection recommendations.

GENERAL AVIATION INSPECTION AIDS SUMMARY

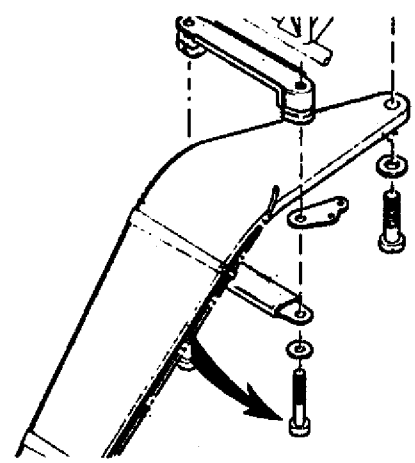
Piper Model PA-31T	Elevator Bellcrank Bearing, P/N 452360 (SBG-4)	An inspection to determine the cause for excessive play in the elevator system revealed that the bellcrank bearing had failed. When removed from the bellcrank the bearing fell apart. Total time in service - 700 hours.
Piper Model PA-31T	Wing Tip Fuel Tank Fairing Caps	Inspection disclosed that water seeps into the forward and aft fairing caps installed on the wing tip fuel tanks. As much as four pints of water have been drained from these areas. In addition, some corrosion was evident on the inside surfaces of the fairing caps.
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-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-32-260	Fuselage Structure	During inspection, the lower fuselage hat sections and skin were found to be severely corroded. Total time in service - 1363.0 hours. Inspection of a second aircraft disclosed that the lower fuselage area was covered with exhaust stains and slight corrosion. Total time in service - 382 hours.
Piper Model PA-32-300	Exhaust Stack, P/N 6503900	During cruise, the pilot noticed smoke coming from the engine compartment. After an emergency landing, an inspection disclosed that a 3 inch square section of exhaust stack was missing near the wye on the right side of the engine.

GENERAL AVIATION INSPECTION AIDS SUMMARY

Piper Model PA-32-300	Rudder Rib, P/N 63544-00	During inspection, the rudder rib was found to be severely corroded between the steel horn assembly and the alloy rib.
Piper Model PA-32R-300	Rollpin	The right main landing gear collapsed during takeoff. Investigation revealed that the landing gear side brace stud had separated from the gear truss bracket assembly, P/N 95643-03. Further checks disclosed that the rollpin, which secures the nut to the stud, was missing permitting the nut to loosen and back off the stud.
Piper Model PA-32R-300	Flap Tension Spring, P/N 62821-00	During inspection, the flap tensioning spring was found in the lower fuselage with both hook ends straightened out.
Piper Model PA-34-200	Wing Rib	Two ribs in the right wing were found to be cracked as decribed in Airworthiness Directive 73-11-2. These ribs are the first inboard and the first outboard from the landing gear. Piper Service Kit No. 760-977 is available for a repair. Total time in service - 1003 hours. This aircraft serial number is above those called out in the AD.
Piper Model PA-34-200	Throttle Control	The right engine throttle control became disconnected from the fuel injector due to incorrect adjustment of the spring loaded ball joint.
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.
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-34-200T	Main Landing Gear Fitting Assembly, P/N's 67040-13 and 67042-12	Several cycling attempts were required before the main landing gear would extend and lock. After landing, an inspection revealed that the right main landing gear forward and aft attach fittings were cracked. Total time in service - 502 hours.
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.

GENERAL AVIATION INSPECTION AIDS SUMMARY

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-36-285	Fuel Quantity Gauge, Pneumercator Co. P/N6-316J-1B	The cause for incorrect fuel quantity indications was traced to the gauge needle contacting the instrument glass face. The needle curls at its tip and rubs against the glass in aircraft that have been parked outside in the sun for extended periods of time. This condition has been found with aircraft having 45 to 140 hours total time in service.
Piper Model PA-36-285	Tailwheel	Tailwheel shimmy may occur with certain serial number PA-36-285 aircraft as a result of inability of the tailwheel steering pivot to maintain a required breakout torque level. If not corrected, excessive tailwheel shimmy can cause cracking of the tailwheel to fuselage longeron attachment fittings. Piper Service Bulletin No. 506, dated August 23, 1976, applicable to aircraft S/N 36-7360001 to 36-7660080 inclusive, calls for installation of compression springs (Kit No. 761 034) as shimmy dampers to maintain the proper tailwheel steering pivot breakout torque level. Compliance is called for at the next regularly scheduled inspection, but not to exceed the next 100 hours of operation.
Piper Model PA-36-285	Landing Gear Mount Bolt, P/N 553232 (NAS-148-84)	The head of a landing gear mount bolt was found to be missing during annual inspection. Two of these bolts secure each of the two main gear springs to the aircraft fuselage. Removal and inspection of the remaining three bolts revealed grooves worn in the shank radius beneath the bolt heads from contact with the inside diameter of the installed plain washers. The aircraft parts catalog calls for installation of washers with a beveled inside diameter.
Piper Model PA-36-285	Muffler, P/N 9840500	The exhaust crossover stack decoupled from the muffler, causing heat damage to surrounding areas. Inspection revealed the cause for the decoupling was insufficient overlapping where the stack joins the muffler. This occurred because the muffler flame tube was welded too close to the end of the coupling.



GENERAL AVIATION INSPECTION AIDS SUMMARY

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.
Piper Model PA-36-285	Wing Attachment Fittings	Piper Service Bulletin No. 471A, dated July 16, 1976, calls for inspection of the forward and aft wing attachment fittings beginning with aircraft S/N 36-7360003 through S/N 36-7560044 within the next 50 hours time in service and each 500 hours thereafter, until Modification Kit No. 760933 is incorporated. Piper advises that elongation of the boltholes at the forward and aft wing attachment fittings can occur. This condition is caused by excessive bolt grip length due to an insufficient quantity of washers.
Piper Model PA-36-285	Voltage Regulator, Prestolite P/N VSF7404	The pilot noted the cockpit lights flickering and dimming followed by loss of all lights, radio, and the electric turn and bank indicator. Investigation disclosed an overvoltage condition had resulted from malfunction of the voltage regulator.
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.
Piper Model PA-36-285	Mixture Control Cable	After approximately 370 hours time in service, the mixture control would not go to full rich position. Internal binding of the cable inside the housing could not be corrected and required replacement of the assembly. Similar problems were experienced with three other aircraft at between 370 and 600 hours in service.
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.
Piper Model PA-36-285	Flap Control Bellcrank Grease Fitting	Piper Service Letter No. 776, dated October 11, 1976, announces the availability of a kit, P/N 761068, for the installation of a grease fitting on the flap torque tube. This modification is provided to reduce binding and wear of the flap torque tube due to accumulation of chemicals and other foreign material.

GENERAL AVIATION INSPECTION AIDS SUMMARY

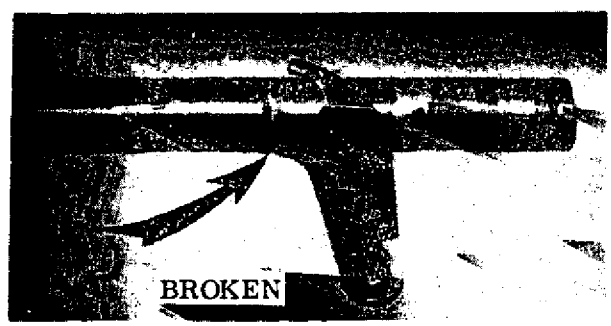
Piper Model PA-36-285	Flap Bellcrank, P/N 9782100	During inspection, the wing flap bellcrank bearings have been found to be binding. Frequent cleaning and lubrication are recommended.
Piper Model PA-36-300	Electric Fuel Pump Circuit Breaker	A Piper Aircraft Corporation Service Release dated April 4, 1977, advises that certain serial number PA-36-300 aircraft were incorrectly equipped with electric fuel pump 20 Amp. circuit breakers. The service release calls for replacement with 10 Amp. circuit breakers, P/N 454707, 1600-041-01008, within the next 100 hours of operation. The release applies to aircraft serial number 36-7760001 to 36-7760009 inclusive, 36-7760011, 36-776013 to 36-7760019 inclusive, and 36-7760021.
Piper Model PA-39	Alternate Air Door, P/N 23809-07	Inspection at approximately 900 hours time in service revealed some tabs had broken away from the alternate air door hinge and were injested into the engine induction system. Close examination of the alternate air box and its component parts is recommended at each aircraft inspection period.
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

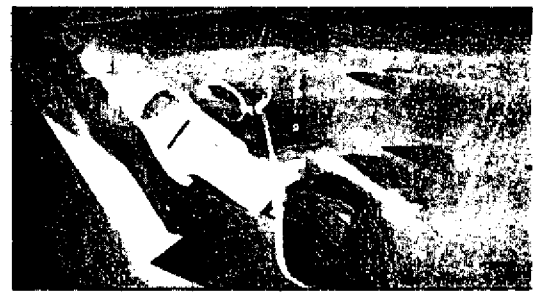
The right rudder bar cable bracket separated in flight. Examination of the rudder bar disclosed that the failure occurred in the weld attaching the cable bracket to the bar.



GENERAL AVIATION INSPECTION AIDS SUMMARY

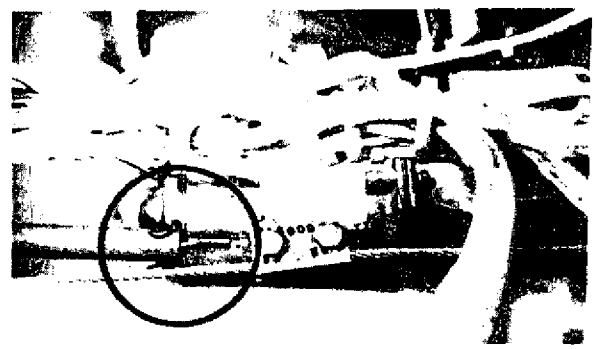
Rockwell International Electrical Wiring Support
Model 112A

The landing gear would not extend. Investigation revealed that the right main gear had caught on the wire bundle which extends along the inboard and forward side of the wheelwell. Further checks disclosed that the plastic clips, which attach the wire bundle to the airframe, had come loose.



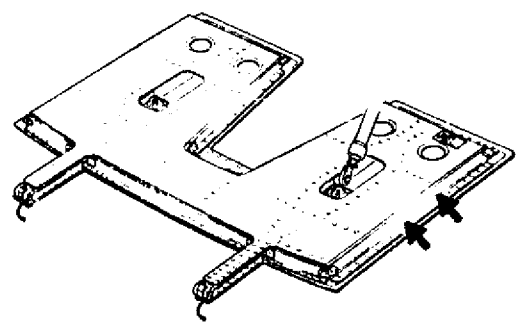
Rockwell International Control System
Model 112TC

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 Speed Brake Door,
Model NA-265-40 P/N 265-390004-3

During inspection, the speed brake door was found to be cracked. The crack extended fourteen inches along the bend radius of the inner skin on the left side.



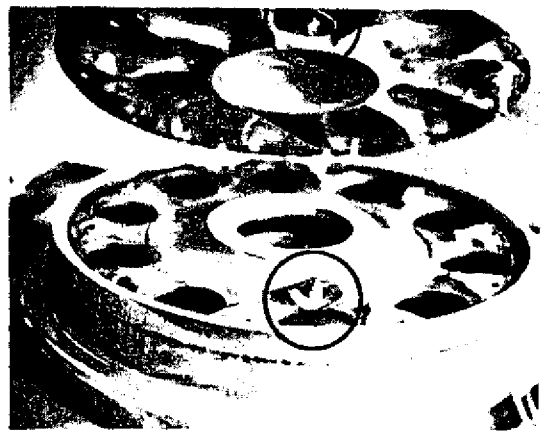
Rockwell International Nosewheel Steering
Model NA-265-60 Bellcrank, P/N 3010812-5

The nosewheel steering bellcrank was found to be sheared at the serrated end. Also, a radial crack was found which extended two-thirds of the way around the shaft and into the machined radius. Total time in service - 1337 hours.

GENERAL AVIATION INSPECTION AIDS SUMMARY

Rockwell International Main Wheel Assembly
Model NA-265-80

The Goodyear manual states that each wheel half is individually balanced at the factory and may be assembled in any position relative to each other. However, if two wheel halves are assembled so that the balance weights are together, the weight attach screws and nuts contact each other, preventing the wheel halves from seating properly. The wheel shown in the photo was assembled so that the screws contacted. Both screws were bent and loose, and both balance weights were bent.



Rockwell International Engine Mount
Model 500 Attachment Structure

During annual inspection, severe intergranular corrosion was found at the engine attach points on both wings. The corrosion was located at and behind the firewall at wing station 109 through 118. Total time in service - 3550 hours. This area is very difficult to inspect. It is suggested that all model 500 aircraft be inspected for this condition.

Rockwell International Engine Mounts,
Model 500 P/N 3620025-1

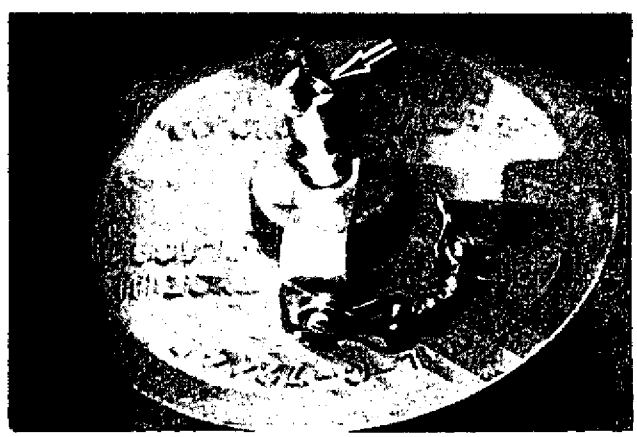
Both engines upper mounts were found to be heavily corroded. Two additional aircraft were inspected and the same condition was found.

Rockwell International Landing Gear Retract
Model 500-B Cylinder Clevis,
P/N ED-12526

The landing gear could not be extended. Investigation revealed that the retract cylinder clevis was broken at the end of the machined area. Further checks disclosed that a crack had existed prior to total failure as evidenced by rust on approximately 1/4 of the crack. Total time in service - 5262 hours.

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

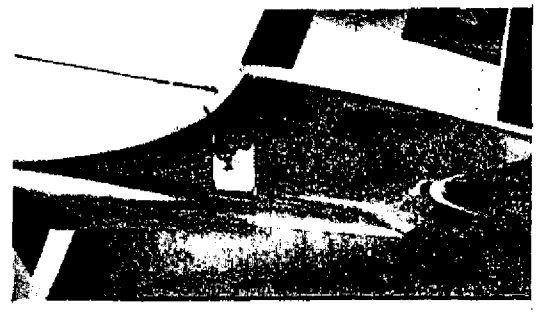
The Dzus button locking ears are reported to fail after 2 or 3 locking operations.



GENERAL AVIATION INSPECTION AIDS SUMMARY

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.



Rockwell International Passenger Seat
Model 690

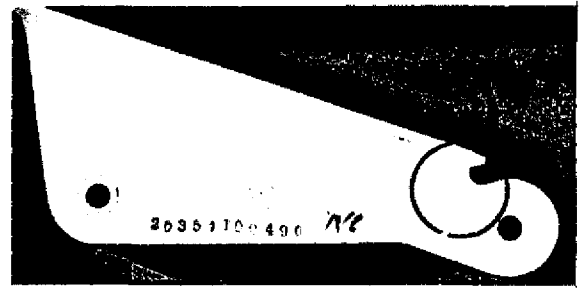
The left front aft facing passenger seat was moved forward on the tracks to facilitate cleaning of the cabin. The cleaning crew departed the aircraft without moving the seat to its normal position. The cabin door was closed and locked. Later, the flight crew was unable to open the door because the inside handle was restricted by the arm rest of the seat and prevented opening. Observation window was removed and a small child was used to enter the aircraft and move the seat clear of the door opening.

Rockwell International Picture Window,
Model 690A P/N 330367-9

The left picture window was found to be cracked in the upper corner and also through eleven of the attaching boltholes.

Rockwell International Aileron Hinge Bracket,
Model S-2R P/N's 20354T-1, -2, -3, and -4

Several aileron hinge brackets were found to be cracked. Total time in service range from 342 hours to 1004 hours.



SCHWEIZER

Schweizer Aileron Control Rod and Rod
Model SGS 1-23D 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.

SAFETY IS NO ACCIDENT

GENERAL AVIATION INSPECTION AIDS SUMMARY

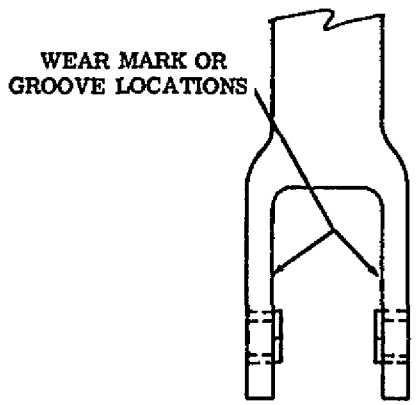
Schweizer Model SGS2-33	Fuselage Tubular Members	The fuselage tubular members fore and aft of the main wheel on both the left and right sides of the aircraft had rusted completely through. Unlike the internal rusting condition for which AD 76-13-1 was issued, these tubular members had rusted through from their outside surface. This condition is believed to be the result of water entering between the tube outside surface and the fuselage fabric. Deterioration of the tubular members is difficult to detect because the area is covered by fabric.
Schweizer Model SGS2-33A	Rudder Control	The right rear rudder pedal became partly jammed due to contact with the cockpit side panel. The "Royalite" composition side panel had broken during normal use, allowing it to protrude into the path of the pedal, preventing full movement of the rudder controls.
Schweizer Model SGS2-33A	Vertical Stabilizer Spar End Assembly	When at approximately 2,000 feet altitude under tow, the pilot reported hearing a loud noise followed by loss of rudder control. The glider was immediately released from tow and descended in a spiral, under partial control. Subsequent investigation revealed the vertical stabilizer spar end assembly had failed approximately 9/16-inch above the two upper spar-to-fuselage attachment bolts. Laboratory analysis revealed the spar had failed due to fatigue. Record review revealed the glider had major repair work performed, on five occasions, between July 1969 and August 1976, due to accident damage.
Schweizer Model SGU2-22E	Fuselage Longeron	During compliance with AD 76-13-11, a black moist substance was found in the aft fuselage longerons. X-ray inspection disclosed indications of rust flakes approximately 1/4-inch deep in the aft end of the longerons.

SIKORSKY

Sikorsky
Model S-62

Flight Controls

Wear marks and grooves are being found in the primary servo input bellcrank and arm assemblies caused by contact with the primary servo input control rod. Sikorsky Service Bulletin No. 62B40-11 outlines inspection and repair of these units.



SAFETY is the Responsibility of Everyone in Aviation.

GENERAL AVIATION INSPECTION AIDS SUMMARY

SMITH

Smith
Model 601

Aileron Push-Pull Tube Assembly, P/N 600050-507

The aileron push-pull tube assembly was found corroded. Total time in service - 948 hours.

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.

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

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-AT

Nose Landing Gear

During maintenance, the nose landing gear leg retainer bar, P/N 50-820022, was found to be incorrectly seated with the snap ring dislodged from the retaining groove. Total time in service - 405 hours.

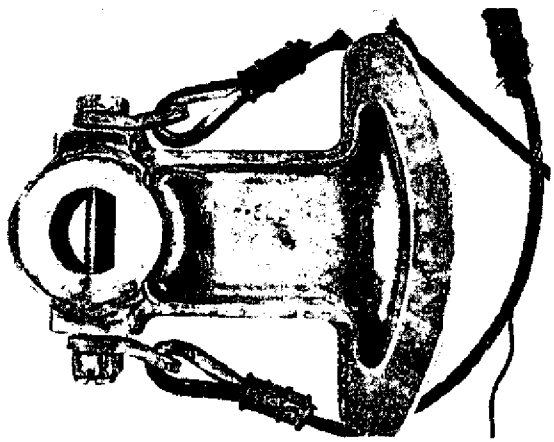
Swearingen Model SA26-T	Aileron Structure, P/N 50-130002-1	During inspection, a crack was found under the hinge fitting where the control attaches to the left aileron. The crack was approximately 2-1/2-inches in length. The hinge fitting must be removed for a positive inspection. Total time in service - 4157 hours.
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.

UNIVAIR

Univair (Ercoupe)
Model 415C

Aileron Cable,
P/N 41552172

An investigation to determine the cause for loss of aileron control revealed that the aileron cable was broken in the control column assembly where it wraps around the control quadrant, P/N 415-52130. AD 54-26-2 relates to this subject.

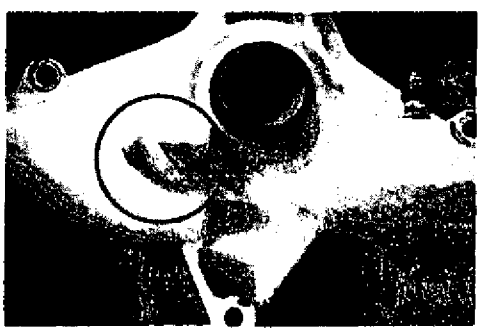


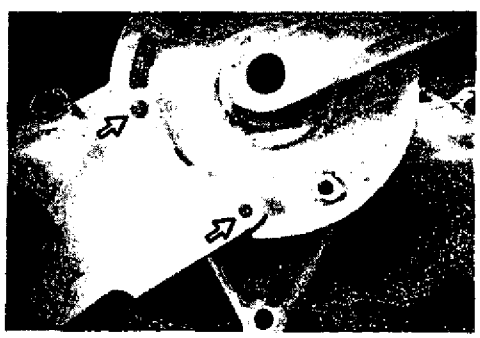
UNIVERSAL AIRCRAFT INDUSTRIES

Universal Aircraft Industries (Globe)
Model GC-1A

Landing Gear

The landing gear actuator assembly was found to be worn. Inspection disclosed that the round head rivets, which attach the landing gear brace arm to the pulley assembly, P/N 16031, were chafing against the actuator assembly.





GENERAL AVIATION INSPECTION AIDS SUMMARY

WEATHERLY

Weatherly Model 201C	Rudder Hinge Attach Bracket	During inspection, the rudder lower hinge attach bracket was found to be broken at the weld. Total time in service - 72 hours. Two other aircraft were checked and the same condition was found. Total time in service - 20 hours and 57 hours.

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.

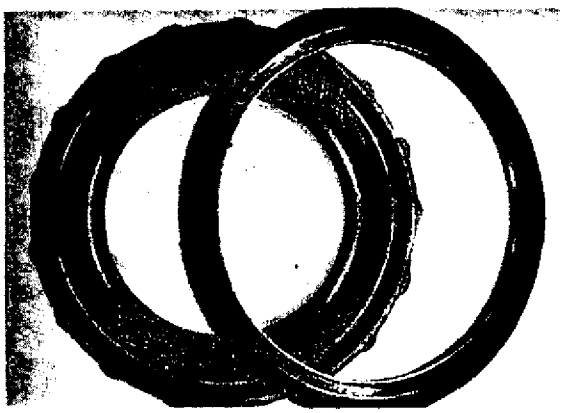
CLEVELAND--BRAKE DISC, P/N 164-22A

The brake disc separated at the weld. The disc and weld areas were rusty and pitted. AD 71-6-8 is not applicable to this brake assembly.

GOODYEAR

GOODYEAR -- MAIN LANDING GEAR WHEEL BEARING, TYSON P/N 13685XL

The grease seal, P/N 5B, which is pressed onto the main wheel, P/N 9543991, bearing, would not remain on the bearing. When this condition occurred, the grease was lost from the bearing. Total time in service - 1153 hours.



GENERAL AVIATION INSPECTION AIDS SUMMARY

GOODYEAR--BRAKE DISC, P/N 953099-3

Both brake discs, used with Goodyear wheels, type III 953, were found to be warped at 25-hours time in service. The previous set of brake discs warped at 50-hours time in service.

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.

ACCESSORIES

AIRESEARCH

AIRESEARCH -- TURBOCHARGER, P/N 406610-5

During compliance with Cessna Service Letter SE 77-3, the turbine shaft, P/N 406304-4, was found to be galled, grooved, and discolored, with evidence of the lack of lubrication.

BENDIX

Bendix Fuel Injector Model 135A-5AD1	Fuel Leakage	The cause for high fuel consumption of a Mooney M-20F aircraft was traced to external fuel leakage from the engine fuel injector. Inspection revealed the mixture control unit seal, P/N 951401, had broken permitting fuel to spray into the engine compartment. The condition occurred at 980 hours time in service, between normal inspection periods and could have resulted in a fire or explosion.
Bendix Fuel Injector Model RSA-5AD1	Rich Mixture	Following engine stoppage and a forced landing, the investigation revealed a malfunction of the fuel injector. A flow-bench check revealed 85 lbs. per hour fuel flow instead of the 22 to 28 lbs. per hour recommended by the manufacturer's test specifications. The injector had been in service in excess of 1700 hours.

Aviation SAFETY is everyone's responsibility.

GENERAL AVIATION INSPECTION AIDS SUMMARY

Bendix Fuel Injector Model RSA-5AD1	Mixture Control Shaft	Investigation of two Piper Model PA-30 aircraft engine nacelle fires revealed that fuel was leaking past the fuel injector mixture control shaft and dripping onto hot exhaust system components. One incident occurred at approximately 900 hours time in service, and the other occurred at 1900 hours time in service.
Bendix Fuel Injector Model RSA-10DB2	Mixture Control Stop Retaining Screw	A Lycoming TGIO-541 engine installed in a Piper PA-31P aircraft would not shutdown when the mixture control was placed in idle cutoff position. Inspection revealed that the fuel injector mixture control stop had backed out due to loosening of its retaining screw which was not safetied. Inspection of other engines revealed the same condition.

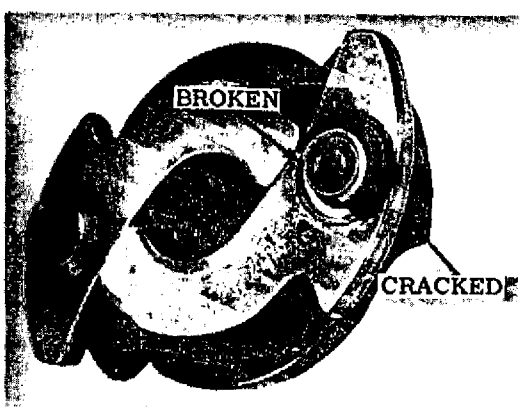
BENDIX MAGNETO IMPULSE COUPLING MAINTENANCE

One of the most important engine accessories is the magneto impulse coupling. The unit is unusually reliable and is able to withstand considerable abuse; however, for the most part there is a lack of a sense of awareness as to the maintenance needs of this part.

The inattention and mishandling many magneto impulse couplings receive is substantiated by service difficulty reports. In some instances, when magnetos are removed for maintenance/overhaul the couplings are not disassembled for inspection and receive no more attention than a "wash down." They are then reinstalled in an "as is" condition. This situation is further magnified by the abuse the unit receives through various unorthodox removal methods. Quite often this results in hidden damage which if not detected can lead to in-flight engine failure.

Sometimes impulse couplings are found broken and cracked as shown in the accompanying picture. In this instance, the damage is believed to have resulted from the use of gear pullers. Careful attachment of pullers used to remove the impulse coupling must be exercised to avoid damage.

To help all persons to better understand the purpose, operation, and care of aircraft magneto impulse couplings, the Bendix Corporation has prepared a booklet related to this subject. The title of the publication is "I Am Your Impulse Coupling." The caption on the booklet face is "Nobody Pays Any Attention to Me." Copies of the publication may be procured free from: The Bendix Corporation, Electrical Components Division, Product Support Department, Sidney, New York 13838.



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.

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

GENERAL AVIATION INSPECTION AIDS SUMMARY

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 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-2230	Condenser, P/N 10-382681	Several magneto malfunctions have been traced to failure of the condenser. The condenser separates at the threaded end where it is crimped to the body.
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.

Bendix Magneto Models D-2000 and D-2200

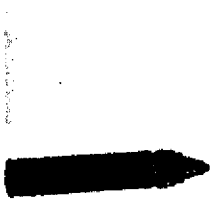
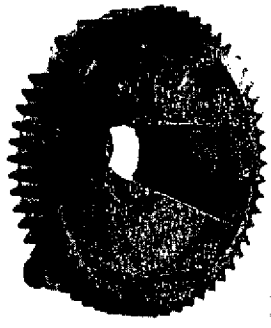
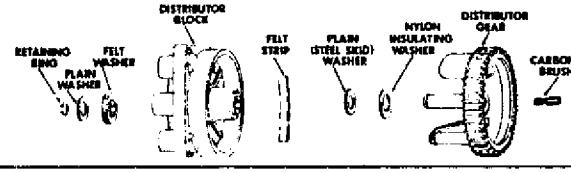
Breaker Point Cam Follower

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--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.

GENERAL AVIATION INSPECTION AIDS SUMMARY

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 Model S-20, S-200 and S-1200 Series	Distributor Gear	Numerous distributor gear failures have been reported with the subject magnetos. The reports advise of teeth stripped from the large distributor gears with both new and overhauled magnetos at operating times ranging from 200 to 1900 hours. Evidence of over-heating and distributor finger-to-electrode contact indicates that gear failures in a significant number of instances are related to wear of the distributor block bronze bushing or binding between the bushing and the distributor gear shaft. Bendix Service Bulletin No. 551A, applicable to S-20, S-200 and S-1200 series and bulletin No. 566, applicable to S-1200 series magnetos, pertain to modifications designed to alleviate bushing wear, shaft binding, and gear failure difficulties.
Bendix Magneto Model S-1200 Series	Distributor Gear  	A recent report, which is typical of other reports received, advised of a distributor gear failure at approximately 215 hours time since magneto overhaul. The gear shaft was heat discolored, and the nylon gear had melted allowing separation of the gear from its shaft. In order to prevent this type failure, Bendix Service Bulletin No. 566, was issued in January 1974. This bulletin called for rework of the distributor block and installation of a steel skid washer and a nylon insulating washer between the gear shaft and the distributor block bushing, to reduce the possibility of lubricant deterioration and seizure of the shaft within the bushing. 
Bendix Magneto Model S4LN-201	Rotating Magnet Shaft	Inspection to determine the cause of a dead magneto revealed that the rotating magnet shaft had failed. Close examination disclosed that the shaft had sheared aft of the front bearing, and rust inclusions indicated the presence of a partial fracture for some time prior to complete separation. The magneto had operated 188 hours since factory overhaul.
Bendix Magneto Model S4LN-204	Rotating Magnet Shaft, P/N 10-52945	Prior to takeoff, the right magneto went dead. Inspection revealed that the magneto drive shaft (rotating magnet) was sheared just aft of the seal and bearing on the drive end.
Bendix Magneto Model S4LN-204	Distributor Drive Gear, P/N 101571234	Drive gear looseness which was caused by wear of the woodruff keyway, resulted in failure of the teeth on the distributor driven larger gear. This condition has been found during several investigations to determine the cause for malfunctioning magnetos.

GENERAL AVIATION INSPECTION AIDS SUMMARY

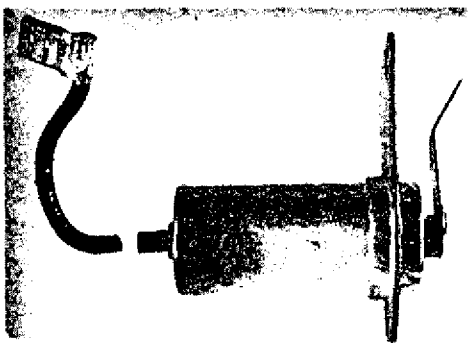
Bendix Magneto Model S4LN-204	Rotating Magnet Shaft	Shaft failures of Bendix Model S4LN-204 magnetos, installed on Lycoming Model O-360-A4J engines, reportedly cause damage to the engine gear train and metal contamination of the engine oil system. The failures are believed to be due to vibratory stresses 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 S6LN-1227	Impulse Coupling	A loud snap followed by complete engine stoppage was experienced during climb. Investigation revealed that one of the magneto impulse coupling flyweights had jammed against the side of the magneto housing, preventing the rotor shaft from turning, causing three teeth to shear from the crankshaft drive gear. The magneto had been in service for 1150 hours. The cause for in-flight stoppage of another engine was attributed to shearing of an impulse coupling stop pin, seizure of the magneto rotor and subsequent stripping of six teeth from the crankshaft drive gear at 1950 hours time in service. The manufacturer recommends periodic inspection of magneto impulse couplings for axial wear and "scrubbing" of flyweights, stop pin clearance, and bent or worn stop pins. Bendix booklet, "I Am Your Impulse Coupling", applicable overhaul instructions, and Service Bulletin No. 585 which revises flyweight clearance check procedures, provide the necessary inspection information.

Bendix
Magneto
Model S6LN-200

Condenser
P/N 10-163131JG

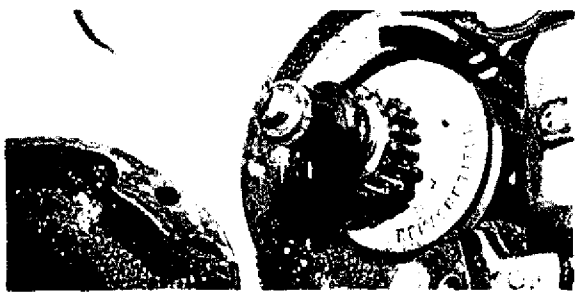
An inspection to determine the cause for intermittent magneto operation disclosed that the condenser wire was broken. Total time in service - 300 hours.



Bendix
Magneto
Model S6LN-204

Rotor Shaft
Bearing, P/N 2-202

When performing a 100 hour inspection of the engine installed in a Bell Model 47G-2 helicopter, the left magneto breaker point compartment was found to contain bronze metal particles. Further investigation revealed that the ball bearing at the cam end of the magneto rotor shaft had disintegrated. The operator advised that this was the third occurrence of this type experienced with low-time new or factory overhauled magnetos.



GENERAL AVIATION INSPECTION AIDS SUMMARY

Bendix Magneto Model S6LN-25	Primary Lead Connector	The engine was reported to run rough on the left magneto. Inspection revealed that a portion of the female threads for the "P" lead connector was broken, shorting the breaker points to the magneto case.

Bendix
Magneto
Models S6RN-1201 and
S6RN-1205

Case, P/N 10-349394-3

Several reports have been received regarding magneto case cracks.

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.

LEAR SIEGLER

LEAR SIEGLER--FUEL PUMP, P/N RG17980

An in-flight fire in a Piper PA-23-250 aircraft was reported to have been caused by a fuel pump leak. The gasket located between the pump body and the valve body blew out allowing fuel to be sprayed into the engine compartment.

MARVEL - SCHEBLER

Marvel-Schebler Carburetor Model MA-4-5	Idle Tube	The engine would not run properly below 1500 RPM. Inspection revealed that the carburetor idle tube was obstructed with metal shavings. Total time in service - 35 hours.

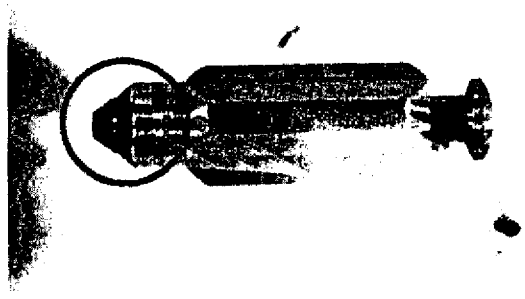
Marvel-Schebler Carburetor Model MA-4SPA

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.

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.

Marvel-Schebler Carburetor Models MA4-SPA and MA4-5

Body Screws

Inspections to determine the cause for rough engine operations revealed the MA4-SPA carburetor installed on a Lycoming O-320 engine and the MA4-5 carburetor installed on a Lycoming O-360 engine, had separated at the body mating surface due to loose screws. A gap of about 1/16 inch was evident between the mating surfaces and the carburetor body half was visibly loose. In both instances, the body screws were properly safetied.

PRESTOLITE

PRESTOLITE--ALTERNATOR COOLING FAN, P/N 90-2241

During 100-hour inspection of a Piper PA-23-250 aircraft, the right engine alternator cooling fan was found to have failed. Several pieces of the fan were found in the bottom of the engine cowling. This was a later type two-piece cooling fan not included in AD 72-15-2.

GENERAL AVIATION INSPECTION AIDS SUMMARY

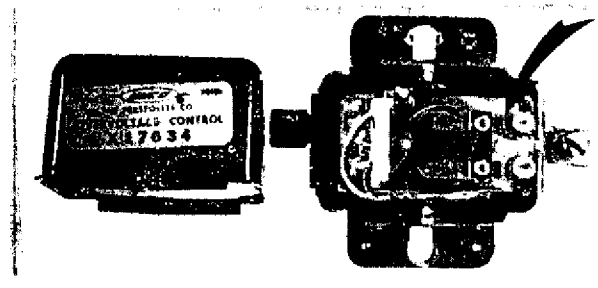
Prestolite Alternator Model ALV-9400 Series	Slip Ring End Bearing	Teledyne Continental Motors Service Bulletin No. M75-30 and Prestolite Aircraft Service Bulletin No. ASM-10 outlines important inspection and lubrication procedures for the slip ring end bearing in the ALV-9400 series gear driven alternators installed in Cessna Model 300/400 series aircraft (except Skymaster). These procedures are designed to improve reliability and service life of the alternator. Also, Avco Lycoming Service Bulletin No. 386 and AD 76-02-07 pertain to this subject.

Prestolite Alternator Model ALX 9425	Through Bolts, P/N ALA20GS	The alternator through bolts have been found broken and loose. In one instance the bolts sheared permitting the aft half of the alternator to separate leaving only the base plate. It is suggested that these bolts be inspected for proper torque at each inspection.

Prestolite
Overvoltage Control
Model X17634

Contact Plate

The overvoltage control failed. Investigation disclosed that the contact plate was broken.



PRESTOLITE--STARTER CLUTCH ASSEMBLY, P/N 639153

The engine could not be started due to loss of starter engagement. Investigation revealed that the starter clutch springs were broken, permitting free wheeling in both directions. In addition, the clutch gear and shaft were severely scored.

RAJAY

Rajay
Turbocharger
Model RJ0237

Heat Shield

The turbocharger heat shield was found to be broken. Total time in service - 416 hours.

GENERAL AVIATION INSPECTION AIDS SUMMARY

SLICK

Slick Magneto Model 622R	Distributor Block, P/N M1686	During cruise, RPM loss and propeller surge occurred. After landing, an investigation disclosed that three screws were loose, which secured the distributor block. Total time in service - 1100 hours.

SORENSEN

SORENSEN--AGRICULTURAL 90-GALLON SPRAY SYSTEM PUMP FAN, P/N 7-16

Inspection of the pump assembly fan revealed cracks in the radius of all blades. This was a new unit, and the cracks are believed to have occurred during the fan stamping and blade pitch bending process. Inspection of all fans, including those in service and those in stock is,recommended.

TITAN

Titan Fuel Pump Model G-6	Mating Surface Screws	The cause for in-flight 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 in-flight fire or explosion.

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 (MHz). For example, when 131.0 MHz is selected, the unit actually transmits on either 130.0 or 132.0 MHz.

SAFETY is the Responsibility of Everyone in Aviation.

GENERAL AVIATION INSPECTION AIDS SUMMARY

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.

EDO-AIRE

Edo-Aire Mitchell Autopilot Model Century I	Bridle Cable	Installation of an autopilot in a Beech Model 35 aircraft using STC SA3098SW-D, kit No. AK306, Drawing No. 69D996, dated 2/27/73, revealed that an error existed in the bridle cable length or in the installation instructions. Installation per instructions with 180° cable turn on the roll servo drum, the bridle cable-to-aileron control cable clamp catches on the wing rib lightening hole restricting aileron travel.

NARCO

Narco Altitude Encode Adapter Model ARA-812	Relay, P/N 65143-1	The cause for incorrect altitude reporting by the transponder was traced to the relay, which was not making good contact when energized.

EQUIPMENT

AIR CRUISER

Air Cruiser Life Vest Model AD-8C	Leakage	When performing pressure tests of several life vests which had been in service for approximately four years, about 25 percent were found to have numerous leaks. Leakage was attributed to faulty mouth inflation valves and porosity of the rubber-coated material, particularly in the area of folds. Advisory Circular 43.13-1A, chapter 8, section 2, recommends visual inspection and air inflation test at 3-month intervals and CO_2 inflation test at 12-month intervals.

GENERAL AVIATION INSPECTION AIDS SUMMARY

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.

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.

JANITROL

Janitrol Cabin Heater Model B3040	Valve Assembly, P/N A13D81	The odor of fuel was obvious during operation of the cabin heater. Inspection disclosed a fuel leak where the fuel nozzle cap is swaged onto the magnetic valve. This condition permitted fuel to flow into the fresh air chamber of the heater and into the cabin.

LEIGH SYSTEMS

Leigh Systems Emergency Locator Transmitter Model Sharc 7	Battery	The ELT failed to activate during an accident. Investigation revealed that the battery and circuit board was severely corroded. Total time in service - 65 hours. The serial number of this unit is not included in AD 74-20-10, amended 9/29/76.
Leigh Systems Emergency Locator Transmitter Model Sharc 7	Battery, Mallory P/N L026	During inspection, the ELT antenna lead connection was found to be corroded. Investigation disclosed extreme battery corrosion and leakage. All ELT components were severely corroded and deteriorated. This unit's serial number is later than those listed in the existing AD.

GENERAL AVIATION INSPECTION AIDS SUMMARY

MARATHON

Marathon Battery Model MA 11	Cover, P/N 25421-2	A cell-to-cover short was caused by an improper battery cover installed in a Sikorsky Model S-61L aircraft. The battery cover for this model aircraft has an extra fiberglass liner to prevent cell-to-cover shorts. It is suggested that special attention be given to the battery covers for this model aircraft.

NARCO

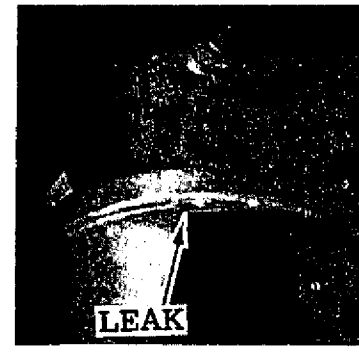
Narco Emergency Locator Transmitter Model ELT-10	Battery Lead	Inspection of the subject ELT prior to battery expiration date revealed battery case swelling and separation of the negative lead due to corrosion.

WALTER KIDDE

Walter Kidde
Fire Extinguisher
Water Type

Canister

The water type extinguisher, P/N 892480, canister was found to be leaking at the seam.



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.

INSTRUMENTS

AEROSONIC

AEROSONIC - - ENCODING ALTIMETER, P/N 101435-01211

After each flight, the pilot noticed an altimeter error of approximately 100 feet (positive). Investigation revealed that the altimeter checked normal for baro tests during bench check. However, after power was applied to the encoding portion, the error became apparent after 15 to 20 minutes. The problem was identified to be the 24V-to-12V dropping resistor heating up. Heat from the resistor affected the baro temperature compensator. Adding a heat shield decreased the error. Aerosonic Corporation Service Bulletin No. 1, dated March 3, 1977, provides information relating to this problem.

DATCON

DATCON - OIL PRESSURE SWITCH INSTALLATION, P/N 40558-1

Reports indicate failures of pressure switches have been caused by installing them directly into the engine block. This is an improper installation and can subject the switch to high oil pressure pulsations and spikes which can cause fatigue failure of the switch contacts. Contact failure leads to diaphragm failure resulting in loss of engine lubricating oil. According to the manufacturer, any switch not installed in the following recommended manner shall be removed immediately and returned to the dealer or distributor for exchange. The new switch shall be installed as follows:

The oil pressure switch for hour meter actuation shall be installed off the line to the mechanical oil pressure gauge with an AN type "T" fitting or equivalent. This shall be supported on the firewall. Thus, the switch and gauge are isolated from the engine and protected from pressure surges by the flexible hose in this line and the flow-restricting orifice in the engine side of the line. If a flow-restricting orifice is not provided at the engine end of the line to the gauge, contact the aircraft manufacturer for proper installation method before installing the switch. Datcon Instrument Company Service Bulletin No. 1 dated January 2, 1975 relates to this subject.

DATCON -- OIL PRESSURE SWITCH, P/N 40558

Several reports have been received that oil pressure switches are being installed in Piper PA-28 aircraft. These switches are not approved for installation in Piper PA-28 aircraft and are identified as Datcon, P/N 40558. The switches are rupturing internally, causing loss of engine oil through the top of the switch, resulting in complete engine failure.

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

GENERAL AVIATION INSPECTION AIDS SUMMARY

ELECTRICGYRO

Electricgyro Turn & Bank Indicator Model 1394T100	Brush Assembly, P/N 1234209	Several reports have been received of turn & bank indicator failures. Investigation revealed that the armatures were clogged with brush material. In addition, the roller bearings, P/N SFR166STA5, were noisy and sluggish.

ENGINES

AIRESEARCH

Airesearch Model TFE731-3-1G	Combustion Liner, P/N 3072448-4	During boroscope inspection of three engines, cracks were found in the combustion liners directly above the ignitors at the 7 o'clock position. Average time in service - 239 hours.

CONTINENTAL

Continental Model O-200	Oil Screen, P/N A3568	During the first oil change since new, the oil screen was found to be collapsed. Investigation disclosed heavy sealing compound surrounding the screen. Total time in service - 67 hours. Three additional aircraft were inspected and the same condition was found.
Continental Model O-200	Oil Drain Valve, P/N HAJ00AH3D	The pilot noticed oil under the aircraft. Investigation revealed the oil quick drain upper valve body flange had failed, causing the valve core to drop out while the outer shell remained secured in the oil tank.
Continental Model O-200-A	Cylinder, P/N 641916-A1	The No. 3 cylinder head separated from the barrel. The failure occurred between the No. 2 and No. 3 cooling fins. Total time in service - 539 hours.
Continental Model E-225-4	Screw, P/N 25167	The engine failed during flight. Investigation revealed that the crankshaft rear gear attaching screws and dowel had sheared permitting the gear to separate from the shaft. The engine had not been modified in accordance with Service Bulletin No. M62-3.

GENERAL AVIATION INSPECTION AIDS SUMMARY

Continental Model IO-360-C	Starter Adapter, P/N 630526	The starter adapter was found loose on its studs. The studs and holes were badly worn. All fasteners were in place. Total time in service - 1251 hours.
Continental Model LTSIO-360-E	Oil Pump P/N 640926	An investigation to determine the cause of oil pressure loss revealed that the oil pump drive shaft had sheared at the key-way. Also, the pressure relief valve spring was broken in two places.
Continental Model O-300-D	Exhaust Valve Rocker Arm, P/N 3550	The No. 4 exhaust valve rocker arm broke. The break was through the oil hole. Total time in service was 2 hours since the arm had been rebushed.
Continental Model IO-470-U	Crankshaft, P/N 632195	The crankshaft failed across the web between No. 2 and No. 3 connecting rod bearing journals. The crack appeared to have started at the counterweight pinhole.
Continental Model GTSIO-520-H	Turbosupercharger, P/N 637364-1	During engine change, the turbosupercharger was found to be cracked. Total time in service - 1202 hours.

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.

Continental Model IO-520-BA	Bolt Locking Tabs, P/N 634021	While changing engine oil, a bolt was observed sticking out of the sump drain hole. Inspection disclosed that one of the bolts which secures the alternator drive face gear to the crankshaft was missing and the others were in place, but loose. Further checks revealed that the bolt locking tabs were missing. Total time in service - 79 hours.

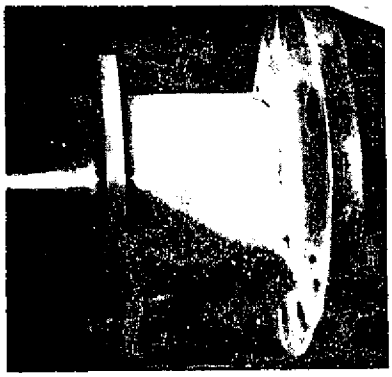
GENERAL AVIATION INSPECTION AIDS SUMMARY

Continental Model IO-520-BA	Crankcase	During inspection for an oil leak, the crankcase was found to be cracked at the bottom centerline of the alternator mount. The crack extended downward approximately 4 inches. Total time in service - 1265 hours.

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.



Continental Model IO-520-F9	Oil Pan, P/N 633412	Several reports have been received regarding cracks in the oil pan. The cracks emanate from the drain hole and extend horizontally 1/2 to 2 inches in length. Average time in service - 491 hours.
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 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.

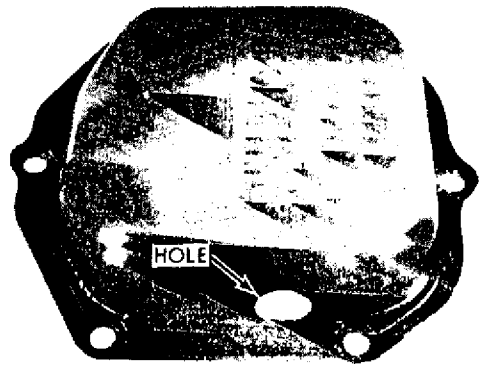
LYCOMING ENGINES -- MAINTENANCE PROCEDURES AND SERVICE LIMITATIONS FOR VALVES

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.

GENERAL AVIATION INSPECTION AIDS SUMMARY

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
All Models

Engine Inspection After Overspeed or Overboost

Detailed inspection and analysis following engine failure in many instances, revealed the cause to be previous engine overspeed or overboost. Avco Lycoming Service Bulletin No. 369B, dated December 12, 1975, provides charts that depict overspeed and overboost limits for all Lycoming reciprocating engines. The bulletin also prescribes various inspections that must be performed dependent upon the percentage of overspeed/overboost experienced.

Lycoming
Model AEIO Series
Aerobatic Engines

Engine Oil

Unless an adequate quantity of lubricating oil is maintained in the sump of these engines, oil starvation and loss of oil pressure can occur during extreme attitudes of flight such as steep dives. The risk of the oil not covering the inlet to the oil pump increases as the quantity of oil decreases and the angle of decent increases. It is vitally important to assure a sufficient quantity of oil is in the engine prior to takeoff. Avco Lycoming Service Bulletin No. 399, dated May 14, 1976, pertains to this subject and makes reference to paragraph 3-9 of the Operators Manual, No. 60297-21, for procedures to determine the normal engine oil level. The quantity of oil considered to be not useable is significantly greater for AEIO series aerobatic engines than for nonaerobatic IO series engines.

Lycoming
Models VO, IVO, TVO, and TIVO-540

High-tensile Strength Connecting Rod

Avco Lycoming recommends the use of high-tensile strength bolts with connecting rod assembly, P/N LW-13422, and high-crush bearing, P/N LW-13212. Avco Lycoming Service Bulletin No. 371A covers this subject. Also, reference AD73-05-01. In addition, reinforced heavy connecting rods, P/N 77450, should be further modified to incorporate high-crush bearings, be reidentified as connecting rod assembly, P/N LW-13422, and be installed with high-tensile strength bolts.

Reports indicate replacement rod assemblies received from suppliers were equipped with the lower-tensile strength bolts and were subsequently installed in overhauled engines. The purpose of this aid is to advise that the high-tensile strength bolts, P/N LW-12596, have a heavier head section, .243 to .248-inch thick as opposed to the lower-tensile strength bolts which have a head section .173 to .178-inch thick. Avco Lycoming Service Bulletin No. 303F relates to this subject.

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GENERAL AVIATION INSPECTION AIDS SUMMARY

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 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	Hose Assembly, P/N 63901-72	The oil supply hose which extends from the oil cooler to the rear case, failed during flight. Inspection disclosed that the hose failed due to heat embrittlement.
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 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-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.

GENERAL AVIATION INSPECTION AIDS SUMMARY

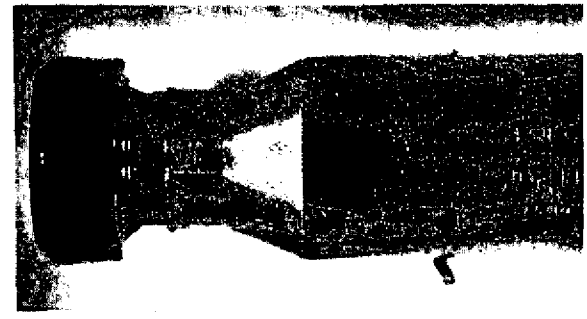
Lycoming Model O-320-E2D	Crankshaft Oil Seal, P/N LW-13792	Investigation to determine the cause of an oil leak at the engine nose section revealed the crankshaft oil seal had been rotating with the crankshaft. A comparison made following seal removal disclosed its outside diameter was approximately .125 inch less than that of a new seal. Total time in service - 189 hours.
Lycoming Model O-320-E2D	Oil Pump Impeller, P/N LW14038	A complete loss of oil pressure was experienced during cruise. Investigation revealed that the new type oil pump driving impeller had cracked open damaging the pump drive shaft and body assembly. Close examination disclosed evidence of binding between the aluminum driven impeller and the oil pump housing. Airworthiness Directive 75-8-9 had been complied with 51 hours time in service prior to the oil pump failure.
Lycoming Model O-320-E2D	Crankcase, P/N 78206	The cause of an engine oil leak was traced to failure of the front crankcase assembly. A 2-inch piece of the casting was broken out where the alternator adjustment strap attaches to the front portion of the crankcase.
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 O-320-H2AD	Cam and Cam Follower	At approximately 200 hours time in service, ferrous metal particles were found in the engine oil screen. A cylinder was removed and inspection revealed the No. 1 cam lobe was severely worn, and the cam followers were badly chipped and pitted. This condition has also been found with other low-time O-320-H2AD engines. If ferrous metal particles are found during sump and screen inspections, removal of a cylinder is recommended to facilitate a close examination of the cam and cam followers.
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.

GENERAL AVIATION INSPECTION AIDS SUMMARY

Lycoming
Model HIO-360

Exhaust Valve

An engine was removed for overhaul due to metal particles found in the oil system. Tear-down inspection revealed excessive wear in the keeper grooves of all exhaust valve stems. The manufacturer has advised such wear is indicative of engine over-speeding.



Lycoming
Model HIO-360-D1A

Fuel Injection Tube Assembly, P/N LW-10420

The cause of an engine power loss was traced to failure of the No. 1 cylinder fuel injection tube assembly. The failure occurred inside the isolation sleeve assembly clamped to the No. 3 cylinder rocker box cover. In addition to the reported engine power loss, the condition presented a serious potential for an in-flight fire or explosion. It is recommended that the isolation sleeves be loosened and moved to facilitate a detailed examination of the fuel injection lines during inspections.

Lycoming
Model HIO-360-D1A

Valve Tappet Clearance

Avco Lycoming Service Bulletin No. 402, dated August 27, 1976, calls for increased dry tappet clearance for HIO-360-D1A engines with P/N LW-13356 camshafts installed. In order to improve valve action and initial starting characteristics, the bulletin calls for increasing the dry tappet clearance from .028/.080 inch to .070/.105 inch within the next 10 hours time in service. Additionally, the bulletin provides instructions for grinding rocker arms if interference with the cylinder occurs when the dry tappet clearance is increased.

Lycoming
Model HIO-360-D1A

Camshaft

The proper camshaft for installation in the subject engine is P/N LW-13356. Avco Lycoming Service Bulletin No. 396, dated May 14, 1976, directs attention to incorrect part numbers listed in the parts catalog, for this engine, and provides a corrected parts listing. The bulletin further recommends immediate replacement of P/N 78717 or P/N 76097 camshafts, inadvertently installed in these engines during overhaul, with the correct camshaft, P/N LW-13356.

Lycoming
Model IO-360-A1A

Crankshaft

Investigation revealed engine stoppage which occurred at 30 hours after overhaul resulted from a fatigue failure of the crankshaft originating in the radius of the No. 4 crank pin journal. Inspection revealed the crankshaft had been ground .003 inch undersize. The engine overhaul records did not contain specifics concerning the crankshaft regrinding operation and did not indicate if nitrifying after grinding had been accomplished as called for in the manufacturer's overhaul procedures.

SAFETY is the Responsibility of Everyone in Aviation.

GENERAL AVIATION INSPECTION AIDS SUMMARY

Lycoming Models IO-360, IO-540, and TIO-540	Cylinder Holddown Stud and Nut	Reports concerning relatively high-time new engines and low-time overhauled engines involved loose nuts and failed cylinder holddown studs. The condition has been detected during investigations to determine the cause for external oil leakage, manifold pressure fluctuation or rough running engines. Recent reports attributed external oil leakage and manifold pressure fluctuation of a TIO-540 engine to a broken No. 5 cylinder holddown stud and three loose nuts. Rough running of an IO-540 engine was caused by five broken No. 6 cylinder holddown studs and three loose nuts, and severe vibration of an IO-360 engine was found to have been caused by five broken No. 3 cylinder holddown studs and loose holddown nuts on all other cylinders. In most instances, nut loosening and stud failure have been attributed to nonconformity with the procedures specified in Lycoming Service Instruction Nos. 1228A and 1029B for holddown plate installation and nut tightening. Painting of holddown plates will also result in nut loosening and stud failure.
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 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 bolthole. 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 internally 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 O-360-A1F6	Oil Sump Casting	After approximately 100-hours time in service, the engine would not operate at the proper idle RPM after restart, and advancing the throttle caused the engine to stall. The cause of the problem was traced to a porous oil sump casting which permitted air to be drawn into the engine induction system. Replacement of the sump corrected the problem.
Lycoming Model TIO-360-C1A6D	Turbocharger Induction Air Hose	The pilot reported loss of engine power during climb, immediately following takeoff. Investigation revealed that the induction air rubber hose, P/N 784277A, that connects the turbocharger to the fuel injector air inlet had split open allowing loss of supercharged air.

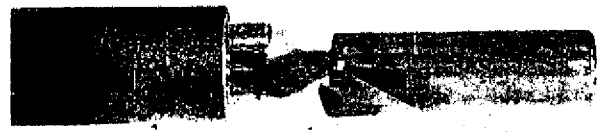
GENERAL AVIATION INSPECTION AIDS SUMMARY

Lycoming Model TC-360-C1A6D	Engine Oil	Seven quarts of oil were lost during flight in a Rockwell Model 112TC aircraft. Investigation revealed the vacuum pump mounting nuts became loose during operation allowing the vacuum pump to separate from its engine mounting pad, resulting in depletion of the engine oil supply. Inspection revealed a turbocharger bracket also utilized the vacuum mounting studs, limiting the stud length available, which prevented adequate stud penetration through the self-locking nuts, allowing them to loosen during operation.
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 GO-435-C2	Reduction Drive Gear Bolt, P/N 68083	When power was applied during cruise, the engine oversped and the propeller slowed to windmill RPM. Investigation revealed that four bolts had failed in the reduction drive gear section of the engine.
Lycoming Model IGSO-540-A1A	Fuel Injection Line, P/N 73942	When the fuel boost pump was turned on during inspection, fuel was found to be spraying inside the engine compartment. Further checks revealed that the problem was caused by a porous fuel injection line.
Lycoming Model IGSO-540-A1A	Accessory Housing Cover Gasket, P/N 72724	Teardown inspection revealed an engine failure occurred due to insufficient lubrication of internal engine parts. The engine accessory housing cover gasket was either split or improperly installed during overhaul, restricting oil return passages and pressure. The engine had accumulated approximately 440 hours since overhaul.
Lycoming Model IGO-540-B1A	Oil Slinger, P/N 68572	At approximately 5 hours time in service, a portion of the oil slinger, which is attached to the tachometer drive idler gear, was found in the lower accessory case. Faulty spotwelds are believed to be the cause of failure.
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 IO-540-E1A5	Fuel Injection Line, P/N 61581-21A	A left engine nacelle fire in an Aero Commander, Model 500S, was caused by fuel leakage from the No. 3 cylinder fuel injection line. Inspection revealed the line had been chafing against an alternator post.

GENERAL AVIATION INSPECTION AIDS SUMMARY

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.

Lycoming Models IO-540-K1A5 and K1G5	Propeller Governor Drive Rollpin, P/N MS-9048-111	The propeller governor idler gear shaft, P/N 70384, is retained in the engine case by a rollpin. Recent reports indicate pieces of the rollpin have been found in engine oil screens during routine inspections. Avco Lycoming has advised Service Bulletin No. 405 and Service Instruction No. 1343 are to be issued pertaining to this subject. The service bulletin will call for periodic oil screen inspections, and the service instruction will specify use of a set-screw retainer in place of the rollpin.
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-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.
Lycoming Model TIO-540-C1A	Turbocharger Bearing	When investigating the cause for a turbocharger bearing failure, the turbo oil scavenge pump was found to be inoperative. Further inspection revealed the lock ring (circlip), P/N STD-1667, which secures the pump drive gear to the shaft, P/N 77719, which operates the scavenge pump, had fallen into the oil sump. Avco Lycoming Service Instruction No. 1335, dated July 7, 1976, pertains to this subject and calls for installation of a new type shaft using a rollpin to secure the pump drive gear.
Lycoming Model TIO-540-J2BD	Oil Cooler Bypass Valve, P/N 75944	The retaining nut on the oil cooler thermostatic bypass valve fell off. The nut entered the oil pump shearing three teeth from the pump driven impeller and two teeth from the pump drive gear.
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.

GENERAL AVIATION INSPECTION AIDS SUMMARY

Lycoming Model TIO-540-J2BD	Oil Cooler Bypass Valve Spring	The cause of high temperature engine oil was attributed to failure of the oil cooler bypass valve spring.
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 oil 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 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.
Lycoming Model TIGO-541-E1A	Exhaust Adapter Flange, P/N LW10798	The loss of cowl flap and carburetor air temperature indications necessitated inflight shutdown of the left engine. Investigation revealed that the No. 5 cylinder exhaust adapter flange had failed, resulting in fire damage to the right magneto and the wiring for the cowl flap motor, indicator, EGT indicator, and the carburetor temperature indicator. In addition, the lower cowling was severely burned and warped. Lycoming Service Bulletin No. 393A provides information relating to this subject.
Lycoming Model TIO-541-E1C4	Rocker Box Cover, P/N 73038	The "U" shaped bracket that is welded to the rocker box cover was worn through by the No. 3 cylinder intake valve rocker shaft, P/N 72626. The remaining cylinders were checked and the "U" brackets were also found to be excessively worn.
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-E	Exhaust Slip Joint Retainer Cable, P/N LW-14572	Cable failure, slip joint separation and engine fires have resulted from improper installation of these cables. Lycoming Service Bulletin No. 393A, issued February 6, 1976, calls for 1/4 inch deflection of the cables after assembly to prevent overtightening and failure. This service bulletin also prescribes other maintenance and inspection procedures designed to improve exhaust system slip joint security.

GENERAL AVIATION INSPECTION AIDS SUMMARY

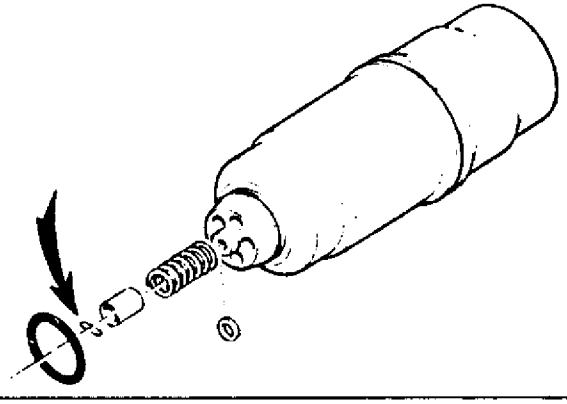
Lycoming Model TIGO-541-E1A	Propeller Thrust Bearing, P/N LW-12978	At 565 hours time in service, metal particles were found in the engine oil screen. Inspection revealed the propeller shaft thrust bearing, P/N LW-12978, retainer had broken allowing the balls to move from their controlled position within 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 96 hours since overhaul and 12 hours since a 100-hour inspection.
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.

UNITED AIRCRAFT OF CANADA

United Aircraft of Canada Model JT15D-1	Oil Filler Cap, P/N 3020907	The engine oil pressure fluctuated, then dropped to 35 psi during climb. The engine was shutdown. Inspection revealed that the oil filler cap locking tab had not been secured, which allowed oil to be siphoned from the tank during flight.
United Aircraft of Canada Model JT15D-1	Bearing Housing Bolt, P/N MS9705-10, and Nut, P/N 3015264	An investigation to determine the cause of smoke coming from the exhaust of a Cessna Model 500 aircraft revealed that the No. 4 bearing housing was caked with carbon deposits and the housing scavenge oil drain line was clogged. Also, the No. 4 bearing housing bolt had failed and the nut damaged the aft face of the turbine wheel.
United Aircraft of Canada Model JT15D-1	Bearing	A slight rumbling noise was reported during operation at 40 to 50 percent RPM. A subsequent inspection revealed metal particles in the engine oil screen. Further examination revealed partial failure of the No. 3 1/2 bearing (chipped). Total time in service - 563 hours.

UNITED AIRCRAFT OF CANADA

United Aircraft of Canada Model JT15D-1	Accessory Gearbox Bearing, P/N 3013696	Inspection to determine the cause of low oil pressure revealed metal particles in the engine oil filter and relief valve. Engine tear-down inspection disclosed the upper cage of the tower shaft bearing in the accessory gearbox had failed, and the bearing was cocked in its retaining bracket. The engine had accumulated 1241 hours time in service and 1713 operation cycles.
United Aircraft of Canada Model JT15D-1	Turbine Blade, P/N 3028001	The pilot of a Cessna Model 500 aircraft reported the right engine began to whine when reaching 16,000 feet altitude, and the turbine inlet temperature increased approximately 40 to 50 degrees. Subsequent ground inspection revealed metal particles in the engine exhaust nozzle. Further investigation revealed high turbine blade failure. Total time in service - 198 hours.
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.
United Aircraft of Canada Model PT6A-6	Turbine Blades	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 bolt-heads in the exhaust pipe.
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.

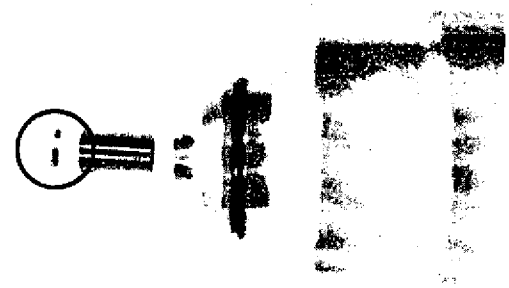


United Aircraft of Canada Model PT6A-20	Tube Assembly, P/N 3008578	The cause for the right engine N1 RPM to suddenly drop to 49 percent was traced to failure of the subject P_3 tube assembly.

GENERAL AVIATION INSPECTION AIDS SUMMARY

United Aircraft of Canada
Model PT6A-20

Oil Filter Housing and Valve Assembly, P/N 3018128



During inspection to determine the cause for left engine oil pressure fluctuation, the dowel pin, which secures the oil filter check valve spring retainer collar to the valve, was found to be broken. A precautionary check of the right engine revealed the same condition.

United Aircraft Service Bulletin No. 1224, dated February 17, 1975, calls for replacement of the old check valve, P/N 3010097, and straight pin, P/N AN122676, with a new cyanide-nitride surface hardened valve, P/N 3021558, and pin, P/N 3024866, at the next engine overhaul or sooner.

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.
United Aircraft of Canada Model PT6A-27	Reversing Lever Bracket Assembly, P/N 3011543	The right propeller would not come out of feathered position following engine start. Inspection revealed the guide pin had broken and was missing from the reversing lever bracket, which allowed the beta control system carbon block assembly to separate from the low stop collar. The carbon block assembly, P/N A-3044, was found in the lower engine cowling.
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.
United Aircraft of Canada Model PT6T-3	Air Filter Housing Gasket, P/N 3011854	During flight, a sudden loss of power required a precautionary shutdown of the No. 2 engine in a Bell Model 212 helicopter. Investigation revealed that the P3 air filter housing gasket 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-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.

United Aircraft of Canada Model PT6T-6	Key Washer, P/N 3016598	The oil system chip detector light for the No. 1 engine of a Sikorsky model S58T helicopter came on during flight. Investigation revealed that tangs from a key washer were found in the oil screen. The combining gearbox cover assembly, P/N 3017307, was removed and inspection disclosed a bearing oil nozzle attachment nut and key washer had loosened and fell into the sump. The key washer tang failure occurred at 1067 hours engine time since overhaul and was the second occurrence experienced by the operator.

PROPELLERS

BEECH

BEECH PROPELLERS -- INSPECTION OF PLASTIC COVERED WOOD PROPELLER BLADES

There is a report that three inches of one propeller blade separated in flight just after the aircraft had reached cruise altitude. Examination of the propeller after landing disclosed the tips of the wood blades had deteriorated from exposure to weather. Also, the rivet holes for the metal tipping were found enlarged and filled with wood putty. In another instance, the blade tipping separated from one propeller blade during takeoff. The resultant imbalance condition caused severe vibration and subsequent engine mount failure.

As these type propellers are now quite old and maintenance is very important, they should be examined periodically for condition of the plastic covering and security of the metal tips and rivets. They should also be checked for improper repairs. Please submit an FAA Malfunction or Defect Report if any of these conditions are found.

Models affected: B200, R200 Series and 214. Maintenance data for these models of Beech propellers are available in the early Bonanza Maintenance Manuals and in the Beech Propeller Manuals.

HAMILTON STANDARD

Hamilton Standard Model 2D30	Blade, P/N 6101-12	The propeller blade failed 12-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 inspected prior to each flight and if any damage is found, it should be repaired immediately.

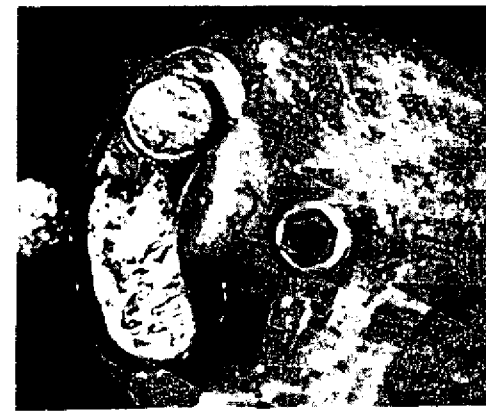
HARTZELL

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.

GENERAL AVIATION INSPECTION AIDS SUMMARY

Hartzell Blade Actuating Pin
Model BHC-J2YF-2CF

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 Blade, P/N F7666A-2
Model HC-CY2K-1BF

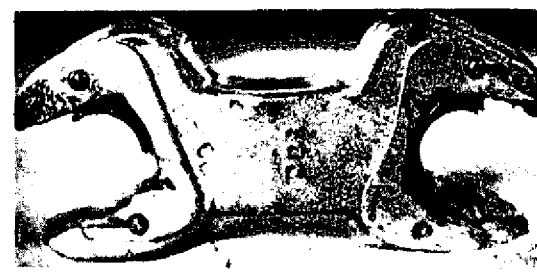
The pilot reported severe vibration during landing approach. Investigation revealed a loose propeller blade. During propeller disassembly, a crack was found in the radius at the shank end of the blade. Total time in service - 332 hours. AD 75-07-05 pertains to this problem but this blade serial number is not included.

Hartzell Blade,
Model HC-C2YK-1BF P/N F7666A-2

The propeller blade broke 5-inches from the tip. Investigation revealed a scratch mark on the face of the blade parallel to the blade chord. Total time in service - 176 hours.

Hartzell Pitch Change
Model HC-C2YK-1BF Block, P/N A-2217-3

Both pitch change blocks were found to be broken and working in the fork and on the pitch change knob.



Hartzell Blade, P/N C8477
Model HC-C2YK-2CF

A propeller blade separated from the aircraft during takeoff. Investigation revealed that the blade failed in the shank radius.

Hartzell Attachment Studs,
Model HC-92Z-K8D 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.

McCAULEY

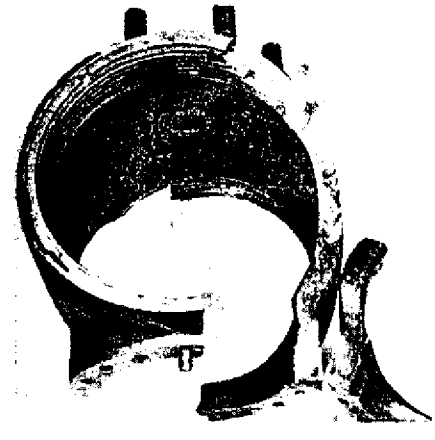
McCAULEY--PROPELLER BLADE FERRULE AND ACTUATING PIN ASSEMBLIES

There have been instances where propeller repair stations have indiscriminately applied McCauley Service Bulletin No. 99 to propeller models not designated in the bulletin. This can create a hazardous situation because these models use different types of ferrules and contain actuating pin washers of varying thickness. On these propellers, the use of a blind actuating pinhole can cause the actuating pin to "bottom out" in the hole preventing proper contact of the actuating pin and washer.

Also, the drilling and tapping procedures specified in McCauley Service Bulletin No. 99 have, in some cases, not been properly implemented and failures have resulted. A hole not tapped to the proper depth can cause stripped threads on the end of the actuating pin resulting in severe localized stress and may prevent an actuating pin from seating properly on the washer.

McCauley Service Bulletin Nos. 99, 99-1, 99-2, 99-3, and McCauley Service Manual No. 710930, Rev. 1, relate to this subject.

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.
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.
McCauley Model 2AF34C55N	Hub	The propeller hub failed at the blade retention sockets permitting the blades to separate from the hub.
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 D3A32C90M	Hub	Approximately 5 quarts of engine oil were lost during takeoff. Investigation disclosed that the propeller hub was cracked from the mounting pad to the blade retention threads. Total time in service - 551 hours.

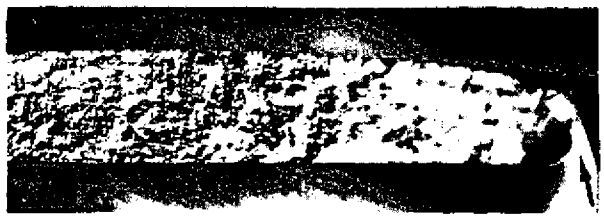


McCauley Hub
Model DA34C58A

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.

McCauley Blade
Model 1C172

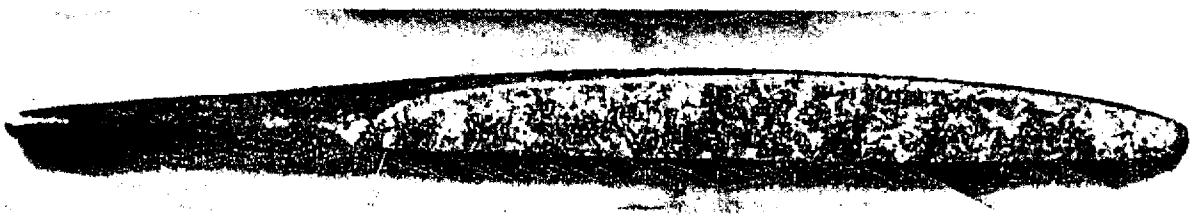
The propeller blade failed 8-inches from the tip. Failures of this type are usually due to previous damage to the blade leading edge, such as a stone nick. It is suggested that the propeller blades be examined prior to each flight and if any damage is found, it should be repaired immediately.



SENSENICH

SENSENICH -- PROPELLER MODEL 76M855-0-60

The tip of one propeller blade separated during flight. Examination of the fracture area revealed a fatigue type failure originating at the blade face approximately 3-1/2 inches from the blade tip. The propeller had 735 hours time in service. Review of records revealed the failed blade had been straightened following an accident when it had approximately 38 hours time in service.



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.

GENERAL AVIATION INSPECTION AIDS SUMMARY

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)

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.

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

GENERAL AVIATION INSPECTION AIDS SUMMARY

CARBURETOR AIR BOX ASSEMBLIES

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

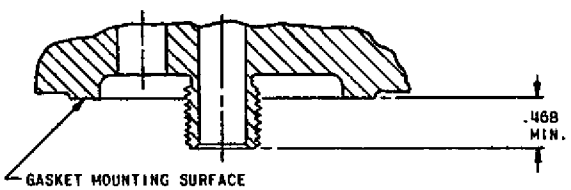
It is suggested that the following be included as part of the usual maintenance procedures when performing periodic inspections in the powerplant area:

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.

CHECK THESE DIMENSIONS

When installing spin-on type oil filters, regardless of make or manufacturer, always check the engine oil filter adapter stud for security and minimum dimensional protrusion as illustrated.

If this dimension is below referenced minimum, remove the filter adapter from the engine and inspect for cause of trouble and correct as needed.



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.

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

GENERAL AVIATION INSPECTION AIDS SUMMARY

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.

CORROSION CONTROL

Service reports indicate many of the chemicals and fertilizers (both liquid and dry) being dispensed at the present time, have highly corrosive effects on the component parts and systems of the aircraft engaged in this activity. As a result, extensive and costly damage can be expected if good preventive maintenance practices are not followed at all times.

To avoid serious corrosion problems, it is essential that aircraft used in dispensing operations be kept as clean as possible. Inspections should be conducted at regular intervals, and any evidence of corrosion should be completely removed before refinishing operations are performed.

ELT BATTERIES

Several ELT batteries were removed during inspections. They were found to be corroded. The corrosion was primarily around the negative lead.

Corrosion of this type occurs when battery voltage drops to a point where the ELT will no longer transmit (the battery is dead). There is a strong indication that these batteries, which have a 24-month life, are failing prematurely.

The ELT is a life-saving device; therefore, it should be checked closely. When any corrosion is found, the battery should be replaced.

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

FLEXIBLE THROTTLE CONTROL CABLE ASSEMBLIES

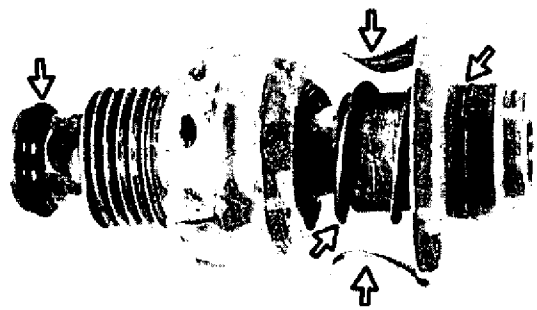
As a rule, the throttle control assemblies on general aviation aircraft cannot be disassembled for a periodic conditional check. It is therefore suggested that flexible cable housings located forward of the instrument panel (including that portion through the firewall) be inspected for minimum bend radius and proper support to preclude unnecessary vibration or flexing. In addition, operate throttle (fore and aft) to check for any abnormal stiffness or binding which could result in cable fraying and/or breakage at the swage point. If undue binding is noticed, the throttle assembly should be replaced.

GENERAL AVIATION INSPECTION AIDS SUMMARY

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.



GROUND SERVICE EQUIPMENT BATTERY CARE

Some batteries get old and fail because of age. But many batteries fail because of electrical system problems or lack of care. Whenever a battery fails, determine the cause of the failure. If the cause is something other than natural wear, the problem must be corrected or the new battery will also fail prematurely.

If the battery carrier or hold-downs are damaged or corroded, they should be repaired or replaced. Clean and paint them. Take a look at the case of the failed battery:

Are there any dents or holes in the bottom? Dirt, rocks or other objects in the carrier can puncture the bottom of the battery case.

Is the top or bottom scuffed? Scuffing indicates the hold-downs were installed incorrectly or were not tightened.

A scuffed case may not seem to be a problem, but it indicates the battery was loose. Vibration or bouncing can cause internal damage to the battery.

Are corners cracked or warped? Hold-downs that are too tight can crack or warp the battery corners.

A faulty charging system can either undercharge or overcharge a battery. In an undercharged battery, the chemical action of the battery deteriorates. The battery becomes less active chemically and will eventually be unable to accept a charge. In cold weather an undercharged battery can freeze. The lower the state of charge, the higher will be the battery's freezing point.

Overcharging causes excessive gassing and internal heat. The gas bubbles tend to wash active material from the plates.

Moisture and acid escape from the cells as a fine mist and corrode surrounding metal parts. Overcharging is detected by the need for frequent water addition to the battery.

If not used correctly, a battery charger can overcharge and damage a battery. Slow charging is best, but there may be times when a fast charge or boost charge must be made. The battery is fully charged when the electrolyte temperature is 80°F (27°C) or higher and the specific gravity is 1.240 or above.

Always test the generator or alternator, regulator and other parts of the charging system when a battery is replaced. If one of these components caused the charging problem, the component must be repaired or the replacement battery will fail too.

Tech Review

SAFETY is a Responsibility, Not a Task!

GENERAL AVIATION INSPECTION AIDS SUMMARY

HOT AIR BALLOON DEFLATION PANELS

Reports have been received of accidents that may have resulted from the failure of balloon pilots to properly inspect and test the Velcro closure which holds the deflation (or "rip") panels in place on some hot air balloons. Velcro closure is a proper and effective product for this purpose, but it must be recognized that:

1) The Velcro closure is designed solely as a closing device and is not intended to bear significant loads;
2) Repeated use of Velcro closure results in wear which reduces its holding strength.

Wearing of the Velcro closure and the forces applied to it in normal use may be increased by any or all of the following circumstances:

1) Overloading or overheating the balloon in excess of manufacturer's specifications;
2) Elongation of the loose load tapes over the deflation panel;
3) Shrinkage of the deflation panel at a different rate than shrinkage of the entire balloon envelope, resulting from exposure of the balloon envelope material to heat and ultraviolet light; or
4) The transmission of a "shear" force to the Velcro closure at and near the commencement of the opening of the deflation panel which wears the Velcro closure at that spot more rapidly than does the "peel" force which the Velcro closure in hot air balloons is intended to bear.

The wearing of the Velcro closure and the operation of the forces described above create the risk that the deflation panel may become activated during flight. The likelihood of inadvertent activation is further increased by the failure of hot air balloon operators to inspect and manually test Velcro closure before and after each use, immediately replace worn Velcro closure, properly join the hook and pile of the closure fully and completely over its full width and length and in the manner recommended by the balloon manufacturer, and strictly adhere to all other specific instructions in this respect by balloon manufacturers.

Because the useful life of Velcro closure may vary according to balloon design and the manner of use, it is recommended that before each flight, the balloon manufacturers' instructions for checking the length of the loose load tapes and the dimensions of the deflation panel be carefully followed. In addition, after each ten activations of the deflation panel, the holding power of the Velcro closure should be tested by use of a spring loaded scale (e.g. a 75 pound capacity fish scale) to insure that a force of not less than 25 pounds, nor more than 75 pounds, is required to open the panel (as specified by the FAA in Part 31.57, Ripcords, Airworthiness Standards: Manned Free Balloons, Federal Aviation Regulations (1974)).

"The statement contained in the Maintenance Note which appeared on page 163 of the General Aviation Inspection Aids Summary dated August 1976, to the effect that nylon Velcro closure should not be used in hot air balloons, has been found to be incorrect. Nylon Velcro closure has been and is currently being used in approved hot air balloon deflation panels. Recently received test data indicates that nylon Velcro closure is adequate for the currently approved hot air balloon deflation panel installations when established limitations are observed."

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

GENERAL AVIATION INSPECTION AIDS SUMMARY

HOW TO MINIMIZE LEAD FOULING PROBLEMS

Using proper operating and maintenance procedures will minimize spark plug lead fouling problems according to engineers at Champion Spark Plug Company.

Chances of ignition problems resulting from shrinking availability of 80 grade fuel are reduced considerably when efficient fuel management is practiced. This is so despite the increased usage of 100 LL Blue or 100 Green in today's engines that infuse four to six times more tetraethyl lead (TEL) into the combustion chamber and oil supply.

The problem stems from the fact the TEL in the fuel may not fully vaporize. It can form as deposits in the combustion chamber. These deposits may adhere to the firing end of the lower spark plugs, causing a fouling condition that can produce misfire.

Theoretically, the TEL upon combustion should be vaporized and converted into a powder form which is blown out the exhaust.

To achieve the proper vaporization, proper operating temperatures should be maintained.

Engine manufacturers recommend an oil temperature of 180 degrees to 200 degrees Fahrenheit for most efficient fuel vaporization.

For low ambient outside temperature operations, one method to keep oil hot is by closing off the air flow to the oil radiator. Manufacturers make available a winterization kit that can be used to raise oil temperatures to the desired range.

Proper Leaning To Prevent Fouling

Use of proper fuel leaning procedures in flight also is important in reducing chances of plug fouling. The use of economy cruise leaning wherever possible will keep deposits to a minimum. Manual leaning will not only result in fewer deposits but in fuel saving.

Excessive low-power ground operation may produce plug fouling. Using the manufacturer's recommended clean-out procedure prior to takeoff can eliminate misfiring at high engine-power settings.

In cruising flight, proper leaning techniques in conjunction with previously described heat control can reduce lead accumulation. Consult the engine operation manual for your particular aircraft for proper leaning procedures.

Severe lead fouling can occur during rapid descent or let-down due to low-power high airplane speed and consequent low engine temperatures. The regular let-down procedure requires enriching the mixture which increases the cylinder cooling rate and adds extra lead to the engine. Therefore, let-down should combine slow descent and a gradual richening of the mixture to maintain most efficient engine temperatures possible.

Maintenance Recommendations

Special attention to the engine lubricant and the spark plugs is increasingly important due to the lead fouling possibilities. The engine oil may contain excessive quantities of lead since particles may be too fine for the full flow filter to remove them. When sufficient particles of lead reach the high temperature areas of the engine with the oil, they can affect the exhaust valve guides causing sticking valves.

With use of higher-leaded fuel, the 50-hour oil drain period should be strictly observed. Also, if sticking valves are noted, guides should be reamed and an even more frequent drainage of oil and filter replacement practiced.

Rotate spark plugs from top to bottom on a 50-hour basis and service on a 100-hour basis. An approved plug of a different heat range may be best if a lead fouling problem is noted.

According to the oil companies, fuels with higher lead content will be the rule, not the exception. This needn't cause a major problem to pilots who operate and maintain their aircraft with proper care. Being a good A & P, you could be the best person to "educate" pilots in the maintenance of their aircraft.

Aviation Mechanics Bulletin

GENERAL AVIATION INSPECTION AIDS SUMMARY

NICK-KNOCKED PROPS

The metal propeller appears to be one of the most durable parts of the modern light aircraft, and indeed it is, when properly maintained. But as an instrument of thrust it has more pressure exerted against it than any other part of the aircraft. The blades are designed and constructed in such a manner as to withstand maximum power loading, but when the shape of the blade is marred or disturbed, its inherent strength can be reduced to a point where blade failure in flight is possible. Such failure can take place entirely without warning.

Most pilots find it hard to believe that a small cut or nick in a sturdy metal propeller can lead to a broken prop. To understand how this is possible, it helps to know something about the stress and force to which a propeller in action is subjected.

The most obvious force is centrifugal - the rotating action which exerts an outward pull on the blades. If you imagine an enormous giant trying to draw your arm out of your socket, exerting a force some 7,500 times the weight of your arm, you can appreciate the strain on the blade.

The revolving blade is also subject to a centrifugal twisting force, which may be visualized as the effect of a gigantic hand attempting to flatten the blade, exerting a force as high as 20,000 lbs. per sq. in. Again, the thrust exerted by the propeller results in a forward pull of the blades. Straining the engine to pull the plane out of a mudhole can result in an out-of-track prop. These two kinds of stress produce lines of force running across the face of the blade.

But the kind of stress which is believed responsible for most blade failures in conjunction with surface damage in piston-driven aircraft is the vibratory stress set up by the engine forces conveyed to the propeller by the crankshaft to which it is bolted. This produces oscillating forces within the blade which change patterns as the engine RPM changes. The locations on the surface of the blade where maximum bending occurs are called nodes; at these locations the greatest amount of stress occurs. Even slight damage at these points can seriously weaken the propeller.

Any mechanical damage to the prop creates an opportunity for blade failure. Nicks, cuts, or corrosion pits can set up stress points by interrupting line of force. Certificated mechanics are trained to round out depressions in the blade in such a manner as to minimize the concentration force at a given point.

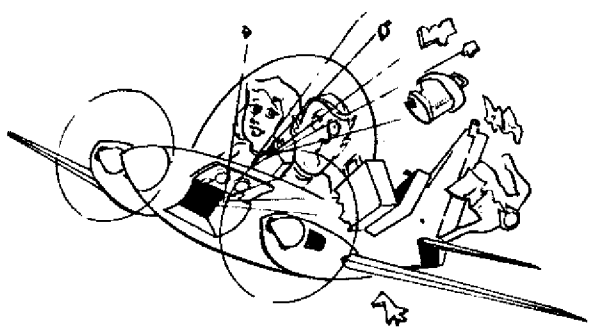
The ordinary preflight inspection tends to scant the propeller. The pilot may do nothing more than run his eye down the leading edge of the blade and, if nothing catches his attention, move on. What he should do realizing the consequences of an inflight propeller failure, is to scrutinize and feel - with clean, dry hands - the entire surface of the blade. Nicks or cuts that escape the eye are often easily perceptible to the fingers. Inspection is easier and more accurate if the blade is kept clean. This is facilitated by occasional waxing with a paste wax, which helps prevent corrosion. Decals on a prop, incidentally, have been known to permit the accumulation of hidden corrosion.

Note that the removal of small nicks or defects is not "preventive maintenance," which may be performed by the pilot or owner, but is defined in FAR Part 43 as "minor repairs," and requires the service of a qualified mechanic.

One little nick could knock you out of the sky.

NOSE CARGO DOORS

Instances of in-flight opening of nose cargo doors continue to be reported. These occurrences are attributed to improper latch adjustments and/or failure to secure the door properly. The in-flight opening of nose cargo doors is not confined to any one model but may be a general problem on all light twin-engine aircraft. The necessity for proper locking of nose cargo doors cannot be overemphasized. It is recommended that owners/operators of aircraft having nose cargo doors reevaluate their maintenance procedures to include the inspection, cleaning, and lubrication of locking mechanisms.



GENERAL AVIATION INSPECTION AIDS SUMMARY

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

NOSE GEAR--HARD LANDINGS AND CONTROL SYSTEM DAMAGE

Inspection of Aircraft Following Hard Landings. It is recommended that a comprehensive hidden damage inspection be performed following a hard landing. Hard landings have resulted in damage to other areas of the aircraft (other than the landing gear, cowl, or firewall), which has gone undetected and resulted in an incident/accident.

Primary Control Systems May be Affected. Various pulleys and their supports through which the elevator and rudder control cables pass, are located on or near the firewall adjacent to the nose gear support. When the firewall is displaced rearward as a result of a hard landing on the nose gear, slackness occurs in the elevator/rudder control cables, which may limit the movement of these controls or render them ineffective. This area is concealed and a casual inspection will not reveal the extent of damage. A thorough inspection of this area requires the removal of the lower cowling and interior inspection plates.

PAINTING AND BALANCING CONTROL SURFACES

The control surfaces on some aircraft have been 100 percent statically balanced. After each repair or repainting of the control surfaces, they must be rebalanced. In addition, entries must be made in the aircraft log book to reflect the fact that the control surfaces were repaired, repainted, and balanced. This control surface would not balance in accordance with the manufacturer's prescribed procedures and had to be stripped and repainted. It had five coats of paint plus heavy surface corrosion.

GENERAL AVIATION INSPECTION AIDS SUMMARY

OVERHEATED NICKEL-CADMIUM BATTERIES

You can generally tell an overheated aircraft battery condition by one of the following indications: smoke or fumes coming from the battery compartment or vent tubes; a sound described as a "bang" or "thud" coming from the battery compartment; or, battery electrolyte leaking into the battery compartment or from the vent tubes.

The following instructions apply to an overheated nickel-cadmium aircraft battery:

1. If any of the above indications occur, remove the battery from the charging source by turning the battery switch OFF. This action prevents the occurrence of a thermal runway condition.

2. If the aircraft is in flight, land as soon as practicable, secure all power, and alert the fire department.

3. If the aircraft is on the ground, secure all power and alert the fire department.

4. After the aircraft is secured, the fire department personnel (in suitable protective clothing) should open the battery compartment. Visually check for the following conditions then take indicated action.

Flame - Use CO_2 extinguisher.

No flame - however, smoke, fumes or electrolyte present - Spray with low-velocity water spray or waterfog to lower battery temperature.

No flame, smoke, fumes or electrolyte emitting from the battery or vent tubes - No remedial action required.

After sufficient cooling, remove the battery from the aircraft for examination and service.

SELF-LOCKING FASTENERS

A recent NTSB safety release included the following information concerning four Fairchild FH-1100 helicopter accidents which occurred between August 1969, and June 1975:

In August 1969, a model FH-1100 helicopter was involved in an accident. As the pilot applied cyclic pitch on takeoff, fore and aft cyclic control was lost. The pilot and his two passengers were injured. Investigation disclosed that the fore and aft cyclic control bolt and nut were missing.

In October 1973, a model FH-1100 helicopter was involved in an accident when the pilot lost cyclic control. The pilot and two crewmembers were injured. Investigation disclosed that the bolt which connects the left cyclic control to the aft cyclic bellcrank was missing.

In August 1974, a model FH-1100 helicopter crashed on takeoff because of an uncontrollable fore and aft cyclic control system. The pilot and two passengers were injured. Investigation disclosed that the upper attachment bolt had separated from the fore and aft cyclic actuator.

In June 1975, a model FH-1100 helicopter was involved in an accident. The pilot and the traffic observer were killed. Examination of the wreckage disclosed that the MS 21042L nut, the AN960-416L washers, and the NAS1104-18 bolt, which attached the longitudinal cyclic power cylinder pilot valve rod end, P/N 24-30256-3, to the aft cyclic bellcrank assembly, P/N 24-33286-1, were missing.

The NTSB advised in each of the above instances, that maintenance had been performed prior to control linkage separation. It is not known if the self-locking fasteners were not installed following maintenance, if self-locking fasteners were reused when their locking characteristics had deteriorated, or if loose fasteners were not detected due to improper inspection.

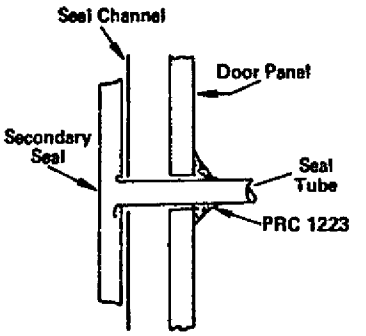
Although all instances cited in the NTSB release involved Fairchild FH-1100 helicopters, similar occurrences have been experienced with other helicopters and fixed-wing aircraft. Therefore, it is recommended that careful attention be directed toward assuring that all self-locking fasteners used on control system linkages be carefully inspected for security and tightness following maintenance and during routine inspection. Fasteners should not be reused if their self-locking characteristics have deteriorated.

GENERAL AVIATION INSPECTION AIDS SUMMARY

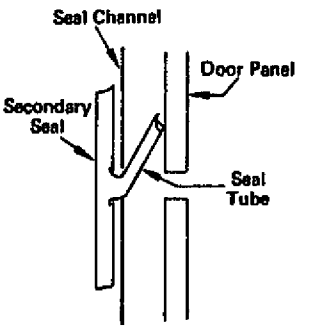
SABRELINER DOOR SEAL INSTALLATION

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.



Correct Installation



Incorrect Installation

SAFETY BELT CONFUSION

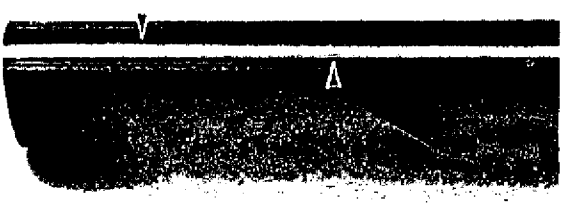
There have been reports of problems in distinguishing between Technical Standard Order (TSO) approved safety belts designed for single occupancy and those designed for double occupancy. Also, double occupancy belts have been ordered and single occupancy belts received. The required markings on TSO approved 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.

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.



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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.

Cont'd

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.

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.

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.

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.

WRONG SEAL

Do you know what happens when a fuel system O-ring is used in an oil filter? When this happened in the external transmission oil filter, a copter made an emergency landing. Both seals are received as part of a kit. In some cases the seals are identified by name on the package and sometimes only by part number. Once the seals are removed from the packages, there is no way to tell them apart. It has been recommended that these seals be more clearly marked.

GENERAL AVIATION INSPECTION AIDS SUMMARY

TIRE AND WHEEL INSPECTION

Inspect the entire wheel for damage. Wheels which are cracked or injured should be taken out of service and laid aside for further checking, repair or replacement.

When inspecting a mounted tire on the wheel of a plane, always be sure that nothing is caught between the landing gear and the tire and that no parts of the landing gear are rubbing against the tire.

At this time also check the nacelle into which the tire fits, when the landing gear is retracted. Clearances are sometimes close and any foreign material or loose or broken parts in the nacelle can cause severe damage to the tire and even cause it to fail upon landing.

B. F. Goodrich

TIRE PRESSURE GAUGE PRACTICE

Quite often it is found that the differences in reported air pressures are entirely due to the difference in accuracy in different gauges, rather than in any change in air pressure.

It is not unusual to find an inaccurate tire gauge in constant use with a tag that states that the gauge reads a certain number of pounds too high, or too low. Unfortunately, this error will change as different pressures are checked. A tire gauge reading 10 lbs. high at 80 lbs. pressure may very well read 25 lbs. too high at 150 lbs. pressure. Therefore, incorrect tire gauges should either be repaired or replaced. They should not be continued in service.

Cold temperatures may also affect tire gauges and cause pressure readings to be lower than they actually are. Occasionally, too, a gauge has been mistakenly treated with oil or some other lubricant in expectation of making it work better. This, of course, will actually cause incorrect readings and probably render the gauge unfit for further service.

It is good practice to have gauges recalibrated periodically and to use the same gauge for performing an inflation cycle--for the original 12- or 24-hour stretch period. Dial type gauges, of good quality, are highly recommended for all tire maintenance installations--regardless of size!

B. F. Goodrich

OF INTEREST

BEECH MODEL 18 AND C45 SERIES AIRCRAFT -- WING STRUCTURE

X-ray inspections of Beech 18 or C45 airplane wing structure as required by Airworthiness Directive (AD) 75-27-09 can only be performed by approved facilites. The following is a list of those facilities which have been authorized to conduct these inspections in accordance with Paragraph H of the AD. The FAA District Office having surveillance responsibility for each facility is also listed, as personnel of that office are most familiar with the current status of each facility. Last revision of this list accomplished on May 5, 1977.

	Facility	FAA Office
Alabama	Vester J. Thompson, Jr., Inc. 3707 Cottage Hill Road P. O. Box 9253 Mobile, Alabama 36609	General Aviation District Office No. 2 6500 43 Avenue North Birmingham, Alabama 35206
Arizona	ICC X-Ray Company 6262 East 34th Street Tucson, Arizona 85711	Flight Standards District Office No. 62 15041 North Airport Drive Scottsdale, Arizona 85260

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GENERAL AVIATION INSPECTION AIDS SUMMARY

California	Commercial Field Service, Inc. 7118 Gerald Avenue Van Nuys, California 91406	General Aviation District Office No. 1 7120 Hayvenhurst Avenue, Suite 316 Van Nuys, California 91406
	X-Ray Products Corporation 7839 Industry Avenue Pico Rivera, California 90660	General Aviation District Office No. 6 Santa Monica Municipal Airport 3200 Airport Avenue, Suite 3 Santa Monica, California 90405
Florida	Q. C. Laboratories, Inc. 2870 Stirling Road Hollywood, Florida 33021	General Aviation District Office No. 5 Building 121, Opa Locka Airport Opa Locka, Florida 33054
Georgia	McPherson Nondestructive Testing 2851 Atlanta Road Smyrna, Georgia 30080	General Aviation District Office No. 1 FAA Building Charlie Brown County Airport Atlanta, Georgia 30336
Indiana	Industrial Heat Treating & Metallurgical Co., Inc. 2131 Northwestern Avenue Indianapolis, Indiana 46202	General Aviation District Office No. 10 Building #1, Municipal Airport P. O. Box 41525 Indianapolis, Indiana 46241
Kansas	H. R. Inspection Service 6837 Woodland Drive P. O. Box 3280 Shawnee Mission, Kansas 66203	General Aviation District Office No. 11 Administration Building Fairfax Airport Kansas City, Kansas 66115
Maryland	Reliance Testing Laboratories, Inc. 2100 Greenspring Drive P. O. Box 85 Timonium, Maryland 21093	General Aviation District Office No. 21 Elm Road Baltimore/Washington International Airport Baltimore, Maryland 21240
Massachusetts	J. G. Sylvester Associates, Inc. 900 Hingham Street Rockland, Massachusetts 02370	General Aviation District Office No. 13 Norwood Municipal Airport Norwood, Massachusetts 02062
Michigan	Industrial Testing Services 17810 John R Street Detroit, Michigan 48203	Flight Standards District Office No. 63 Flight Standards Building Willow Run Airport Ypsilanti, Michigan 48197
	Magna Chek 2125 Riggs Warren, Michigan 48091	Flight Standards District Office No. 63 Flight Standards Building Willow Run Airport Ypsilanti, Michigan 48197
Missouri	St. Louis Testing Laboratories, Inc. 2810 Clark Avenue St. Louis, Missouri 63103	Flight Standards District Office No. 62 9275 Genaire Drive Berkeley, Missouri 63134
New Hampshire	Venegas Industrial Testing Labs, Inc. 9 Pelham Street Nashua, New Hampshire 03060	General Aviation District Office No. 15 Portland International Jetport Portland, Maine 04102
New York	Buffalo X-Ray Company 81-83 E. Market Street Buffalo, New York 14204	Flight Standards District Office No. 63 Rochester-Monroe County Airport Rochester, New York 14624

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GENERAL AVIATION INSPECTION AIDS SUMMARY

	Certified Testing Laboratories, Inc. 2626 Halperin Avenue Bronx, New York 10461	General Aviation District Office No. 11 Building #53, Republic Airport Farmingdale, New York 11735
North Carolina	Piedmont Aviation, Inc. Smith Reynolds Airport Winston Salem, N. C. 27102	General Aviation District Office No. 3 FAA Building, Municipal Airport P. O. Box 27005 Charlotte, North Carolina 28208
Ohio	Dayton X-Ray Company 1150 West 2nd Street Station B, P. O. Box 7275 Dayton, Ohio 45407	General Aviation District Office No. 5 4242 Airport Road Lunken Executive Building Cincinnati, Ohio 45226
Puerto Rico	J. G. Sylvester Associates, Inc. 104 Jefferson Street Santurce, Puerto Rico 00911	Flight Standards District Office No. 61 RFD #1, Box 29A, Loiza Station San Juan, Puerto Rico 00914
Texas	Jack Brink 9023 Wetmore Road San Antonio, Texas 78216	General Aviation District Office No. 10 1115 Paul Wilkins Road, Room 201 San Antonio, Texas 78216
	Hatfield Aviation, Inc. 8109 Braniff Street P. O. Box 12756	General Aviation District Office No. 5 8800 Paul B. Koonce Drive, Room 152 Houston, Texas 77061
	Sumar Inspection Corporation 15245 Addison Road P. O. Box 943 Addison, Texas 75001	General Aviation District Office No. 2 8032 Air Freight Lane Love Field Airport Dallas, Texas 75235
Washington	X-Ray, Incorporated 7500 Perimeter Road South Seattle, Washington 98108	Flight Standards District Office No. 61 FAA Building Boeing Field/King County Airport Seattle, Washington 98108
Wisconsin	McManus Inspection Service 3410 Sunny View Lane Brookfield, Wisconsin 53005	General Aviation District Office No. 13 FAA/WB Building Milwaukee, Wisconsin 53207
	Wisconsin Industrial Testing, Inc. 5600 West Hemlock Street Milwaukee, Wisconsin 53223	General Aviation District Office No. 13 FAA/WB Building Milwaukee, Wisconsin 53207

Approval is pending for the following facilities:

Hawaii	Industrial Inspection Service, Inc. 2629 Ahekolo Street Honolulu, Hawaii 96813	Flight Standards District Office No. 61 218 Lagoon Drive P. O. Box 29728 Honolulu, Hawaii 96820
Ohio	Ohio Aviation Company P. O. Box 398 Vandalia, Ohio 45377	General Aviation District Office No. 5 Lunken Executive Building 4242 Airport Road Cincinnati, Ohio 45226
Texas	Consolidated X-Ray Services Corporation 10931 Indian Trail Drive Dallas, Texas 75229	General Aviation District Office No. 2 8032 Air Freight Lane Love Field Airport Dallas, Texas 75235

GENERAL AVIATION INSPECTION AIDS SUMMARY

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.

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.

CAUTION! OWNERS AND MECHANICS

Some parts and instruments offered for sale as aircraft replacement parts are represented as being of aircraft quality when they are not, or when their origin or quality is unknown. To be sure any parts or accessories you purchase are FAA-approved, check that they have an FAA Airworthiness Approval Tag, TSO number, or some other unquestionable identification. Do not be misled by deceptive advertising terms like "aircraft quality," "remanufactured," etc. Remember, under FAA rules the responsibility for seeing that materials and parts used in aircraft maintenance and alteration meet requirements, lies with the person who approved the unit for return to service. For free copy of AC 20-62B, "Eligibility, Quality, and Identification of Approved Aeronautical Replacement Parts," write DOT/FAA Publications Section, TAD 443.1, Washington, D.C. 20590.

GENERAL AVIATION INSPECTION AIDS SUMMARY

COLD WEATHER MAINTENANCE

As we approach the winter months, we can expect the seasonal hazards associated with this time of year. Personnel working on aircraft during extremely cold days are often tempted to hurry because of the cold. Don't. Take time to do the job right, and stay aware of hazards associated with cold weather. Remember that aircraft skin becomes slippery when it has set in the cold, so be careful about your footing. Accumulation of water on or around control surfaces can freeze and bind control linkages.

Advisory Circular 91-13A provides background and guidelines relating to operation of aircraft in the colder climates where wide temperature changes may occur.

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.

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.

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

GENERAL AVIATION INSPECTION AIDS SUMMARY

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.

DO-IT-YOURSELF QUALITY CONTROL

It is real nice to have the back-up of a skilled team of Quality Control people . The very fact that knowledgeable and conscientious men are there to catch and correct any slip-up of the maintenance crew brings a warm sense of comfort and well being to the mechanic. This is not complacency (perish the thought of complacency) but the peace of mind and the appreciation that come with the awareness of good planning by topside.

However, the pleasure derived from your contemplation of the Quality Control people and their work does not commence to stack up with the genuine satisfaction afforded by being your own Quality Control expert. Many aviation mechanics enjoy Do-It-Yourself Quality Control. They know their job so well, are so observant of the requirements of the Maintenance Manual, and do their work so meticulously that the full-time guardians of the established standards find no discrepancies to report.

Do-It-Yourself Quality Control is a grand thing. It will decrease your reliance on the back-up people and increase your recognition of your own responsibilities. If you haven't experienced it as yet, try it. You will find its rewards beyond computation: pride in achievement; self-appreciation; job security; the inner glow, the joy and satisfaction inherent in each manifestation of integrity.

When you move up to D.I.Y.Q.C. you will join the vast number of mechanics who are doing their best all of the time. You can't beat that for good company.

Aviation Mechanics Bulletin

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.

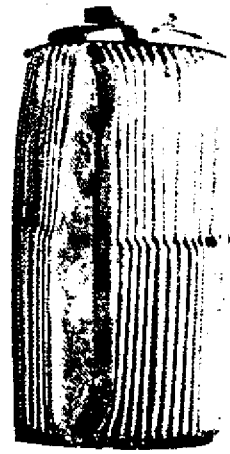
SAFETY in Aviation is Everyone's Responsibility.

GENERAL AVIATION INSPECTION AIDS SUMMARY

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.



INSPECTION DO'S AND DON'TS

DO's

DO have an assortment of proper tools for inspection

DO use an inspection check form and a regular inspection procedure.

STICK TO IT.

DO remove all inspection plates and cowlings.

DO clean all items to be inspected. This is essential in order to clearly see the parts you are inspecting.

DO check all moving parts for proper lubrication and check the "jam" or locking nuts on push-pull controls or adjustment devices for security.

DO familiarize yourself with proper safetying techniques and inspect for proper safetying. Resafety a part you have unsafetied before inspecting the next item.

DO seek advice if the need arises. A certificated mechanic, an approved repair station, or your local FAA inspector are your prime contacts. Use them!

DO the job right the first time - save a life - it may be your OWN!

DON'Ts

DON'T be hurried - take plenty of time to properly inspect each item. If you don't know what to do next, ASK.

DON'T move the propeller unless the magneto switch reads "OFF", or the ignition system is otherwise rendered inoperative.

DON'T neglect hard-to-reach items.

DON'T presume an item is airworthy until it has been checked.

DON'T check landing gear by kicking it - raise it off the ground.

DON'T perform any complex inspection or maintenance operation unless you are properly supervised by a certificated mechanic.

DON'T take the attitude - it can't happen to ME!

GENERAL AVIATION INSPECTION AIDS SUMMARY

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.

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.

GENERAL AVIATION INSPECTION AIDS SUMMARY

FROST COSTS

A number of the incidents that occur each winter are directly attributable to persons in the aviation community disregarding the effects of frost on the flight characteristics of airfoil surfaces and the performance of aircraft. There are also instances in which the dangers of frost are fully respected, but no consideration is given to the hazards associated with removing it improperly. As a result, this also causes a number of incidents each year.

The presence of frost on wings, tail surfaces, etc., cannot be dealt with lightly. Safe operation depends upon its removal, not an evaluation of what effect it will have on the performance of the aircraft. Too often, these effects are not completely understood until the aircraft has either gone down the runway too far to abort safely, or the landing gear is already being retracted. At this point, the facts become of little value without the necessary airspeed, altitude, and adequate control to return to the starting line undamaged.

Unlike the presence of frost, the hazards that can develop via the removal of frost are more numerous and not so readily detectable. Fortunately, however, there is a common root to these hazards: the materials and procedures used to do the job. Even water can become a problem, especially in near freezing temperatures, if it does not completely drain off the aircraft and out of its systems and balanced control surfaces.

Like any other maintenance and service practice, frost must be removed properly the first time; i.e., in accordance with the aircraft manufacturer's recommendations. For this reason, it is suggested that maintenance and operations personnel obtain and use the manufacturer's recommendations to keep "Frost Costs" down.

OVERHEATING OF NICKEL CADMIUM BATTERIES

Over the past months, there have been many questions about procedures for handling overheated nickel cadmium batteries. Following questions were researched with appropriate commands, and here are the answers.

How long should it take an overheated battery to cool, and how do you know when the battery has cooled to a safe temperature? Under normal conditions it takes approximately one-half hour for a battery to cool after landing. However, if the battery is making a hissing sound or fluid is escaping from the vent, wait until this venting process has completely stopped. To determine if the battery has reached a safe temperature, recommend the hand-touch method be used; i.e., lightly place hand against the battery case similar to the way you determine the temperature of an iron.

When a battery overheats, will its charge be lost? In most cases the battery will have some charge remaining. However, it is suggested that an engine start not be attempted until the battery has been inspected by maintenance personnel.

USAAAVS' Flightfax

SUPERVISION + SAFETY = A WINNING TEAM

We all know that teamwork is a necessity for success in sports, and that it is equally necessary for safety in aviation. What happens when we don't get it? This accident provides one answer.

When a pilot lifted his aircraft to hover for a maintenance test flight, the aircraft began to roll to the right. The pilot applied left cyclic and rolled off throttle, but the aircraft continued an uncontrolled roll to the right, settling on its right side. A ground observer was injured by flying debris. The cause? A bolt from the lateral cyclic linkage was missing. Sabotage? Not at all. Let's look at the facts.

An inexperienced mechanic was told to disconnect the lateral magnetic brake as corrective action for a sticking forced trim. The mechanic's regular supervisor was called away from the flight line and was not present when the work was performed. Unfortunately, the mechanic disconnected the wrong linkage and failed to reinstall the bolt. Since the magnetic brake was not considered a part of the primary flight controls, no red-X symbol entry was deemed necessary and no tech inspector checked the completed work. But despite the mechanic's error, the discrepancy could still have been detected by the pilot had he properly performed a tip path plane check.

There you have it. Lack of training, inspection, supervision, and proper crew procedure all teamed up to produce a major accident. Let's prevent other mishaps from these causes. All it takes is teamwork - the right kind of teamwork!

Flight Fax

GENERAL AVIATION INSPECTION AIDS SUMMARY

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

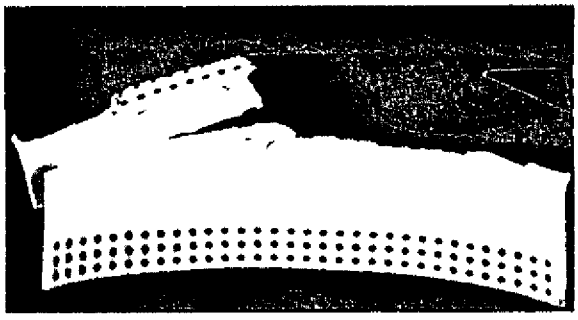
How many standard swivel nuts (known as B-nuts) are on your aircraft? Each nut connects two component parts of a system that is considered essential to the safe operation of the aircraft. Further, the reliability of each system incorporating B-nuts depends not only on how well such nuts were manufactured 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.

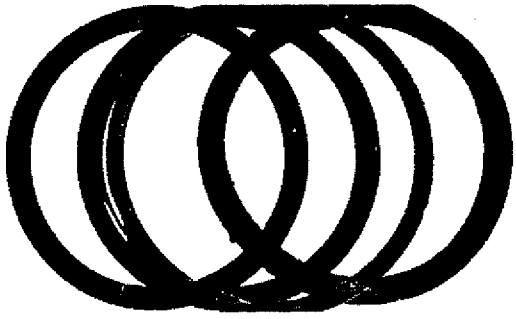
GENERAL AVIATION INSPECTION AIDS SUMMARY

TOO MUCH OF SOME GOOD THINGS CAN BE BAD

The weather in central Illinois was cold in January, and the airplane owner preheated his engine before attempting a start. In this case, a hot air blower was used, but too much heat was directed around the top portion of the nose gear oleo strut resulting in the "o" ring seals and plastic stop being overheated and melted.

Extreme caution should always be exercised to ensure that heat sensitive components are protected when using a hot air blower to preheat engines.





WHEEL FAIRINGS COLLECT DIRT

The wheel fairings were removed from a Piper Model PA-28-151 aircraft. Each fairing contained approximately 23 pounds of dirt. This aircraft had been operating from an unpaved airport.

PARA-AIDS

PIONEER

PIONEER--PARACHUTE, P/N 1.019 GR-4

Heavyweight drop tests have indicated that the GR-4 version of the Pioneer 23-foot tri-con auxiliary parachute may not consistently meet the overload requirements for escape from aircraft at speeds over 150 MPH. Pioneer recommends that markings be placed adjacent to the skirt, to read, "low-speed parachute limited to use in airplanes at speeds under 150 MPH."

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.

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

GENERAL AVIATION INSPECTION AIDS

ADDENDUM

AIRCRAFT

BEECH

Beech Model D55 (Australian Registry)	Landing Gear Motor Brushes	The landing gear failed to extend when selected. Investigation revealed that the landing gear motor brushes were sticking, which was attributed to inadequate maintenance at periodic inspection.

BELL

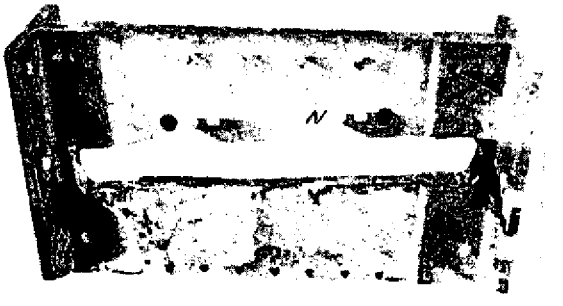
Bell Model 205A-1	Tail Rotor Pitch Chain Assembly, P/N 204-001-739-003	The tail rotor pitch chain assembly broke during landing approach. This is the fourth chain failure on this aircraft in the last 359 hours of operation.
Bell Model 206L (Australian Registry)	Oil Cooler Blower Impeller, P/N 206-061-432-11	An investigation to determine the cause of high oil temperature during taxi revealed that the oil cooler blower impeller had failed. Total time in service - 71 hours. Bell Service Bulletin No. 206L77-1 relates to this subject.

CESSNA

Cessna
Model 170B

Landing Gear
Bracket, P/N 0713495-3

During inspection, the left landing gear bracket was found to have intergranular corrosion. Total time in service - 1165 hours.



GENERAL AVIATION INSPECTION AIDS SUMMARY

FAIRCHILD INDUSTRIES

Fairchild Industries Model FH-1100	Rudder Controls (Anti-Torque)	The manufacturer has advised of an instance where the control chain assembly, P/N 24-32101, was found to be 1/2 inch longer than required. If installed in this condition, problems will be encountered in obtaining the proper tail rotor cable tension, and an undesirable looseness in the chain will be noted when the rigging pin is installed through the chain end fittings. Service Letter FH-1100-32-1 dated April 29, 1977, pertains to this subject and prescribes a one-time inspection to be performed within the next 25 hours of operation.
Fairchild Industries Model FH-1100	Swashplate Bearing, P/N 24-34252-1	The swashplate bearing was found to be excessively worn. This condition resulted in rapid wear and looseness of adjacent cyclic and collective control linkages, especially the upper incidence rod end bearing. Total time in service - 270 hours. Two additional aircraft were inspected and the same condition was found.
Fairchild Industries Model FH-1100	Transmission Support Strut, P/N 2428032	The main transmission support strut broke approximately 2 inches below the upper end. The failure appeared to have originated at a rivet hole and progressed completely around the strut. Internal corrosion was evident adjacent to the strut end fitting. Total time in service - 7973 hours.
Fairchild Industries Model FH-1100	Compressor Inlet Duct, P/N 24-76102-1	The compressor inlet duct was found to be deteriorated. The missing portion of the duct may have been ingested into the engine compressor, however, no foreign object damage was found. Total time in service - 730 hours.

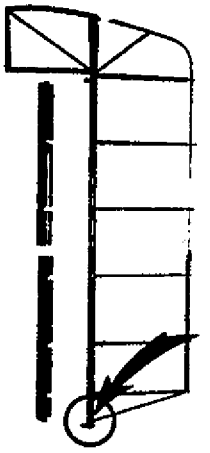
GRUMMAN - AMERICAN

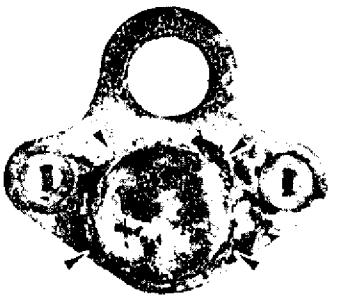
Grumman-American Model AA-5A	Primer Line Bushing, P/N 5401131-2	An inspection to determine the cause of a fuel leak under the pilot seat revealed that the primer line bushing had straight threads, and the "tee" which screws into the bushing had pipe threads. Total time in service - 335 hours.

GENERAL AVIATION INSPECTION AIDS SUMMARY

Grumman-American Models G-164, G-164A, and G-164B	Rudder Tube Assembly, P/N A1203-11A

Loss of rudder control was attributed to failure of the lower end of the rudder tube where it is welded to the fitting, P/N A1203-33. Complete separation resulted from internal corrosion. Internal corrosion of rudder tube assemblies was reported to have been found in two other aircraft. AG-Cat Service Bulletin No. 61 pertains to this subject and prescribes procedures for inspection and anti-corrosion treatment of the tube assembly.





LET

Let Model L-13 "Blanik"	Horizontal Stabilizer Rib, P/N 13.301-04.01	During inspection of the elevator outboard hinge attachment to horizontal stabilizer ribs, the left and right ribs were found to be cracked at both top and bottom positions. Total time in service - 25 hours.

MOONEY

Mooney Model M20A	Fuselage Tube, P/N 3283-11	During modification of the aircraft, the fuselage tube which is located just aft of the main spar was found to be heavily corroded inside. Total time in service - 2259 hours.

PIPER

Piper Model J-5	Lift Strut Fork, P/N 14481-00

The left wing rear lift strut fork fitting failed in flight. Examination of the part revealed a fatigue-type failure originating in the first thread radius from the fork end. Slight bending of the fitting shank indicates possible use as a step when entering and exiting the aircraft. This part had been in service 830 hours since compliance with AD 58-10-2.

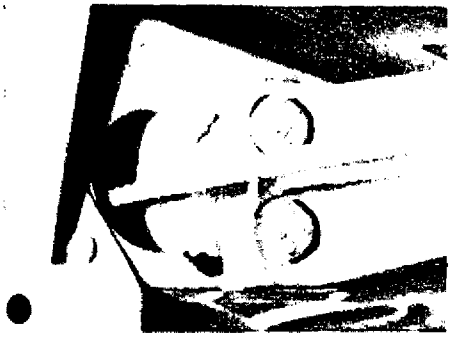
Aviation SAFETY is everyone's responsibility.

GENERAL AVIATION INSPECTION AIDS SUMMARY

Piper
Model PA-23-160

Rudder Lower
Hinge Support

The bulkhead crossmember assembly, P/N 17069-02, at fuselage station 290 was found to be cracked. The cracks were located adjacent to all four attachment boltholes of the rudder lower hinge bracket, P/N 17289-00. The cracks adjacent to the lower boltholes had progressed completely through the crossmember flange.



Piper
Model PA-23-250

Exhaust Stack,
P/N 33420-03

A postflight inspection at approximately 600 hours aircraft time in service revealed that the right engine exhaust stack was missing. Further investigation revealed that the stack assembly had separated at the "Y" junction where the left and right tubes join. Escaping exhaust gases damaged nacelle wiring harness and de-icer boot lines. A similar failure of the left engine stack assembly, P/N 33419-02, occurred at 300 hours time in service.

Piper
Model PA-23-250

Rudder Hinge
Bearing, P/N 452347

An inspection to determine the cause for excessive rudder play revealed that the bearing installed in the rudder upper hinge bracket, P/N 16103-03, was severely worn. Close examination revealed that some bearing needles were missing, and the remainder were badly worn.

Piper
Models PA-23-250 (Aztec "F"), PA-31, PA-31-325, and PA-31-350

Engine Control Cable

Piper Aircraft Corporation advises that during installation of the engine throttle and mixture control cables, the "Bundy Sleeve", in some instances, would crack or break where it enters the cable housing. Investigation revealed on certain groups of cables the Bundy Sleeve had been improperly heat treated. This condition could result in the Bundy Sleeve becoming detached from the cable housing and thereby limiting the throttle and/or mixture control cable travel. Piper Service Bulletin No. 550, dated March 29, 1977, lists aircraft serial number effectivity and prescribes inspection procedures to be employed prior to the next 50 hours of aircraft operation.

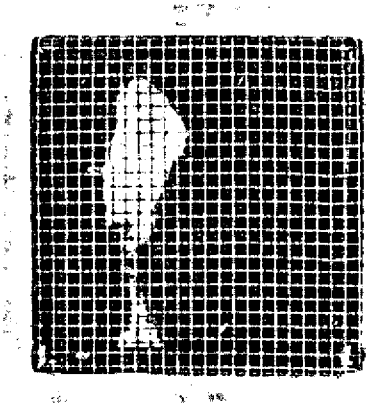
Piper
Models PA-23-250, PA-31, PA-31-325, PA-31-350, PA-31P, PA-31T, PA-36-285 PA-36-300, PA-24-160, and PA-39

Whelen A427 Wing Tip Strobe Light Flash Tube, Piper P/N's 761156 and 761187

Airworthiness Directive 75-05-04 calls for inspection and sealing of the subject tubes manufactured prior to November 1, 1974. The directive was issued to preclude possible ignition of flammable fluids or vapors by electrical arcing. Piper Service Bulletin No. 546, dated May 18, 1977, advises the affected strobe light units may have been installed as original equipment on a significant number of the subject model aircraft. The service bulletin lists the aircraft serial numbers applicable and prescribes the same corrective action as required by Whelen Engineering AD 75-05-04 for lights installed and those in stock.

GENERAL AVIATION INSPECTION AIDS SUMMARY

Piper Model PA-24-250	Landing Gear Side Brace Links, P/N's 20768-00 and 20768-01	During annual inspection, both the left and right main landing gear side brace links were found to have excessive side play. Disassembly inspection revealed almost all threads were worn from the shank area of both link assemblies, and the mating threads in the rod end bearings were severely worn. This difficulty is attributed to poor maintenance and failure to follow the rigging, inspection and wear-check procedures in the aircraft service manual.
Piper Models PA-25, PA-25-235, and PA-25-260	Wing Rear Spar Attachment Area and Fuselage Tubing Cluster	Corrosion of the fuselage tubular members adjacent to the wing rear spar attachment fittings has been reported. Piper Service Bulletin No. 551, dated April 22, 1977, pertains to this subject and calls for a detailed inspection within the next 100 hours of operation and annually thereafter.
Piper Model PA-28-151	Carburetor Air Filter	An investigation to determine the cause of power loss and a rough running engine revealed that part of the carburetor air filter element material had been ingested into the carburetor venturi.
Piper Model PA-30	Fuselage Aft Bulkhead	During inspection, the vertical stabilizer attachment bracket doubler at fuselage station 285.75 was found to be cracked on both sides in the bend radius. Piper Service Letter No. 679, dated January 21, 1974, pertains to this subject and calls for a detailed inspection each 100 hours of aircraft operation until kit, No. 760783, is installed.
Piper Model PA-30	Wing Flap System	When the wing flap control was placed in the down position during landing approach, only one flap extended. The asymmetrical flap condition almost resulted in an accident. Investigation revealed the cause of difficulty to be accumulation of dirt in the wing flap tracks. Piper Service Letter No. 595 calls for inspection, cleaning and lubrication of flap tracks and rollers at each 100 hour and annual inspection.
Piper Model PA-31-300	Elevator Channel Assembly, P/N 43744-00	During inspection, the left elevator inboard channel was found to be broken and the counterweights were loose. Total time in service - 1702 hours.



GENERAL AVIATION INSPECTION AIDS SUMMARY

Piper Model PA-31-350	Master Switch, P/N 27274-00	Malfunction of the electrical system master switch was found to be the result of a short circuit due to water or moisture contamination. Further investigation revealed poor sealing of the pilot door assembly, P/N 54612-02, allowed water to enter and run down behind the switch and circuit breaker panel.
Piper Model PA-31-350	Manifold Pressure Line	Pilot reports advised of a manifold pressure spread between engines at various power settings. Investigation revealed that the inboard flange of the left engine cowl flap had chafed through the manifold pressure line.
Piper Model PA-34-200	Horizontal Stabilator Attach Bracket, P/N 95980-00	An inspection to determine the cause of vibration during climbout revealed that the horizontal stabilator attach bracket mounting holes were elongated. Total time in service - 1500 hours.
Piper Model PA-36-285	Spray Boom Support Structure	The right outboard spray boom and support dropped and moved inboard binding the aileron. Investigation revealed the square aluminum tube inside the wing tip to which the boom support strut is attached had failed. Total time in service - 820 hours.

ROCKWELL INTERNATIONAL

Rockwell International Model 560	Rudder Torque Tube Assembly, P/N 5420014-157	The rudder torque tube assembly separated between the adapter plate and the rudder horn. The interior of the tube was found to be heavily corroded. Total time in service - 3978 hours. The rudder must be removed to inspect this area.

ACCESSORIES

BENDIX

Bendix Magneto Model S-1200 Series	Housing Ventilator Plug	The cause of reported engine roughness was traced to water inside both magnetos. Investigation revealed that the vented plugs, P/N 10-157134, were installed in the top, and the solid timing plugs, P/N 10-157135, were installed in the bottom of both magneto housings. This is reverse to the procedures specified by the manufacturer, and it permitted water in the (blast tube) cooling air to enter the magnetos.

GENERAL AVIATION INSPECTION AIDS SUMMARY

EQUIPMENT

DORNE AND MARGOLIN

Dorne and Margolin Emergency Locator Transmitter Model ELT 131	Portable Antenna	The emergency locator transmitter was mounted above the No. 1 voltage regulator in an executive jet aircraft. The ELT is equipped with a portable antenna secured to its side with rubber snaps. After about 800 hours time in service, the rubber snaps deteriorated allowing the antenna to fall and short circuit across the voltage regulator terminals.

LEIGH SYSTEMS

Leigh Systems Emergency Locator Transmitter Model Sharc 7	G-Switch Position	It has been reported that the manufacturer has altered the ELT impact switch in certain production runs so that aircraft manufacturers may accomodate both vertical and horizontal mounting installations. For example, a unit altered for horizontal installation may have the inertial switch installed on the internal circuit board with its functional axis aligned 90 degrees from the original position. A unit so altered will have a placard applied directly over the original arrow which is embossed in the plastic case material. Persons inspecting ELT's in accordance with the current Airworthiness Directive or installing a replacement unit should assure that the arrows point to the proper direction after being fastened into the original mounting bracket. If the arrows align perpendicular to the direction of flight, it will be necessary to remove and reinstall the ELT mounting bracket for the purpose of properly aligning the ELT with the actual direction of flight.
Leigh Systems Emergency Locator Transmitter Model Sharc 7	Battery	The emergency locator transmitter was found to be severely corroded. The battery expiration date was July 1981. After approximately 2 months of "on-shelf" storage, the unit exploded.

ENGINES

LYCOMING

Lycoming Model IO-360-A1B	Intake Pipe	During a 100 hour inspection, the No. 3 intake pipe was found to be cracked in 2 places. The cracks extended one inch in length along the weld seam on the tube outside bend radius.

GENERAL AVIATION INSPECTION AIDS SUMMARY

Lycoming Model IO-320-B1A	Propeller Governor Oil Line Fitting, P/N AN822-5-4D	The cause of oil leakage was traced to a hairline crack in the inside bend radius of the propeller governor oil line aluminum fitting. This fitting accommodates the P/N 68532 stainless steel propeller governor oil line at the right side of the engine crankcase front section. This was the second fitting failure experienced with the same Piper PA-30 aircraft.
Lycoming Model IO-540-C4B5	Alternator Cooling P/N 90-2241	The alternator cooling fan disintegrated during cruise operation. This was a two-piece type fan installed per Prestolite Service Bulletin ASM-8. Total time in service - 600 hours.
Lycoming Model IO-540-G1B5	Fuel Pump Fitting, P/N AN822-4	When the fuel boost pump was turned on, the pilot heard a thump or muffled explosion and observed smoke and flames emitting from the left engine compartment. Investigation following an emergency landing revealed the 90 degree fitting in the outlet side of the engine driven fuel pump had failed in the threaded area allowing fuel to be sprayed into the engine compartment. This fitting accomodates the P/N LW 10445 stainless steel fuel line that runs from the fuel pump to the injector. The engine had accumulated approximately 825 hours time in service.
Lycoming Model TIGO-541-E1A	Alternator Drive Coupling, P/N LW14464	The rubber inserts in the alternator drive coupling have been reported to wear to the extent that decoupling from the engine drive train occurs. This condition was recently reported on a Piper PA-31P aircraft with 630 hours time in service.
Lycoming Model TIGO-541-E1A	Turbocharger Bearing	During cruise, the pilot noted a rise in manifold pressure, oil temperature, and cylinder head temperature combined with a loss of oil pressure. Investigation revealed oil in the turbocharger turbine area and exhaust pipes. It was also noted that the engine oil supply had decreased from 18 quarts to 5 quarts during a relatively short period of flight operation. Further checks disclosed that the oil was lost through the turbocharger bearing.
Lycoming Model TIO-541-E1B4	Cylinder Holddown Studs	The right propeller was feathered during cruise because of roughness and smoke emitting from the engine cowling. Investigation revealed six holddown studs had failed on the No. 6 cylinder. There was approximatly 1/16 inch clearance between the nuts of the two remaining studs and the cylinder flange. Oil lost due to dislodging of the intake push rod housing ignited upon contact with the engine exhaust system components. The engine had operated approximately 775 hours since overhaul.

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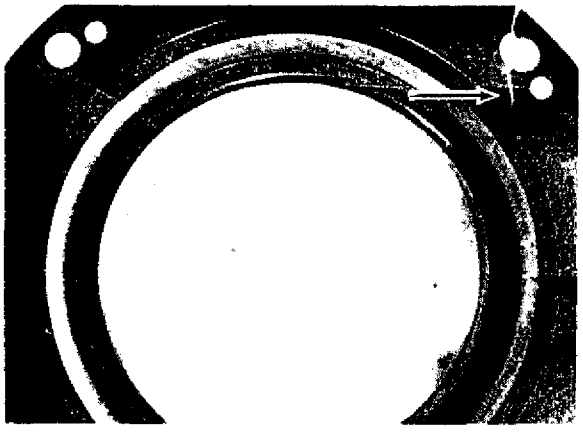
GENERAL AVIATION INSPECTION AIDS SUMMARY

UNITED AIRCRAFT OF CANADA

United Aircraft of Canada Model JT15D-1	No. 4 Bearing, P/N CPW3017323	Excessive bearing noise was reported during engine rundown. Inspection revealed that the engine No. 4 bearing outer race was cracked.



United Aircraft of Canada Model PT6A-28	Reduction Gearbox Bearing, P/N 3004229	One engine was removed from service due to metal contamination. Total time in service - 756 hours. A second engine was removed from service due to no propeller rotation below 20 percent N1 speed. Total time in service - 2622 hours. Tear-down inspection revealed fretting of the plain bearings in the reduction gearbox rear case of both engines. The cause of difficulty was reported to be insufficient clearance between the first stage reduction carrier assembly journal OD and the plain bearing ID. Service Bulletin No. 1228 which calls for increased bearing clearance had not been complied with.
United Aircraft of Canada Model PT6T-6	Fuel Control Bypass Valve Cap Screws, P/N 3240746	One engine flamed out during cruise operation. Investigation revealed all three cap screws which secure the bypass valve to the automatic fuel control had failed. The heads of all screws had broken off and were found still attached to the fuel control by their safety wire. Stronger bypass valve retention screws had been factory installed in accordance with Pratt & Whitney Service Bulletin No. 5110. The engine had accumulated 335 hours time in service.

PROPELLERS

HAMILTON STANDARD

Hamilton Standard Propeller Model 2D30 (Australian Registry)	Counterweight Shaft Pin	An investigation to determine the cause of vibration during flight revealed that the propeller counterweight shaft pin was broken. Time since overhaul - 583 hours.

GENERAL AVIATION INSPECTION AIDS SUMMARY

HARTZELL

Hartzell Blade,
Model HC-C2YK-1BF P/N F8475D4

One propeller blade separated from the aircraft immediately after takeoff. Inspection disclosed that the blade failed in the retention area. The remaining blade was found to be cracked 270 degrees around the shank in the same area.

McCAULEY

McCauley Blade
Model 1C172

Severe vibration was encountered during cruise. Investigation revealed 5 inches of the No. 1 blade tip was missing. The break area had indications of a nick just aft of the leading edge on the back side of the blade. Total time in service - 3367 hours.

MAINTENANCE NOTES

CARGO DOORS

Instances of in-flight opening of cargo doors continue to be reported. These occurrences are attributed to improper latch adjustments and failure to secure the door properly. The in-flight opening of cargo doors is not confined to any one model aircraft but may be a general problem. The necessity for proper locking of cargo doors cannot be overemphasized. It is recommended that owners and operators of aircraft having cargo doors reevaluate their maintenance procedures to include the inspection, cleaning, and lubrication of locking mechanisms.

SAFETY Is Aviation's Greatest Asset

GENERAL AVIATION INSPECTION AIDS SUMMARY

AIRCRAFT FLEXIBLE FUEL HOSES

Numerous reports of fluid carrying flexible hose failures have been received. The reports indicated these hoses are generally located in the engine compartments of various model aircraft and include the wire-braided types supplied by Aeroquip and Stratoflex, etc. As these hoses are fabricated from synthetic rubber, their finite service life depends on factors such as age, shelf life, temperature (ambient and fluid), and other environmental conditions.

To assure continued hose integrity, it is suggested the following inspection procedures be accomplished after each 100 hours of operation:

1. For those aircraft having an auxiliary fuel pump, pressurize the flexible fuel lines with the fuel boost pump operating in high position. The fuel system of certain models of aircraft equipped with fuel-injected engines can be pressurized by activating the electric primer.

   NOTE: Place the mixture control in the idle cutoff position prior to using either the boost pump or the electric primer for fuel system pressurization.

2. Examine the hose exterior for evidence of leakage or wetness.

3. Inspect for discoloration of the hoses and/or color bleaching of the end fittings.

4. Check the hoses for evidence of stiffness.

5. After pressure testing, allow sufficient time for excess fuel to drain overboard before attempting to start the engine.

6. On those aircraft having a gravity flow fuel system, the inspection procedures in steps 2, 3, and 4 apply.

It is suggested that any flexible hoses which are found leaking or which show a notable amount of stiffness be replaced. It is further suggested that all flexible flammable fluid carrying hoses in the engine compartment be replaced at engine overhaul or every five years, whichever occurs first. The aircraft manufacturer's service information, however, should always be followed if different from the above procedures.

During reinstallation of flexible hose assemblies, consider the following precautions:

1. Assure the hose is not twisted. High pressures applied to a twisted hose can cause failure of the hose or loosening of the B-nut.

2. Provide as large a bend radius as possible; however, never use a bend radius less than the minimum specified by the hose manufacturer.

3. Do not attempt to straighten a hose having a bend in it as this could result in damage to the hose. Rubber hoses will take a permanent set during extended service periods. Care should also be taken during removal and reinstallation of such hoses to assure they are not bent excessively and that they are returned to their original position.

FUEL CONTAMINATION INSPECTION

Numerous practices, procedures, and methods of inspecting the fuel system for contaminants have been followed. In more recent years, several different types of quick drain devices have been installed to assure sampling and ease of accomplishment. Many times the drained fuel is not carefully examined, neither is the amount drained sufficient to remove all contaminants.

Draining fuel into transparent containers, rather than on the ground, is considered to be a good practice; but even then, a considerable amount must be drained and examined to insure that all contaminated fuel has been removed. The amount of fuel to be drained cannot be specified as storage and climatic conditions will cause a variance.

SOMETHING TO THINK ABOUT

CARE AND HANDLING OF METALLURGICAL FAILURES

The single most important aspect of metallurgical failure analysis centers around locating the origin of fracture. Generally the fracture face contains the origin and holds the key to the cause of failure. Determining cause and prevention of additional failures is often hindered or rendered impossible through inept handling. Strict adherence to the following rules will assist in the preservation of evidence necessary for accurate failure analysis.

1. Do not attempt to clean the fracture. Foreign products on the fracture face may aid analysis. Acid cleaning is definitely unacceptable.

2. Avoid the natural tendency to "fit" the mating pieces back together. This can seriously damage the fracture origin.

3. Handling the fracture faces with fingers or picking with a sharp instrument should be avoided.

4. Mating fractures should be protected from the environment. One method of protection is spraying with a water soluble coating, i.e. Crown Formula 101 Corrosion Suppressant, Crown Industrial Products, Hebron ILL., 60034.

5. Store fractured components in a plastic bag containing pre-packaged desiccant to prevent undue moisture accumulation. Suitable pre-packaged desiccant may be found in Polaroid's film pack.

KEEP THE BUGS OUT

This expression is often heard in discussions of mechanical problems. In this article we are referring to real live bugs, insects, the kind that cause people problems. They bite, sting and -- crawl into openings to build nests. These nests create problems, such as sluggish or inoperative airspeed indicators. Since insects and pilots are more active in warm weather, an increase in pitot-static system reports is anticipated.

A typical pitot-static system includes these components:
1. Pitot tube (for the input of ram air pressure).
2. Pitot piping and drains (for routing of ram air pressure).
3. Static air vents (for input of static air pressure).
4. Static piping and drains (for routing static air pressure).

The air speed indicator operates on pressure differential between pitot (ram) and static air pressures. The altimeter and rate-of-climb indicators need only static pressure to function. Blockage of the pitot tube will render the airspeed inoperative whereas blockage of the static port will render all instruments, connected to the static system, inoperative or inaccurate.

Insect blockage of the pitot-static system occurs most frequently in southern and tropical areas of operation, other type blockages may occur any place. Investigation of a malfunctioning airspeed indicator in Alaska revealed it was obstructed with a carbon-like ash or dust. This substance was very similar to the volcanic ash that settles out of the Aleutian atmosphere.

Pitot-static system intake and drains, battery box vents and drains, and fuel tank vents can be blocked by insects or debris. Maintenance and operations personnel should be aware that potential problems exist in these systems. Procedures for clearing the systems are found in the aircraft maintenance manual. (Excerpts from Approach, August 1969, Navy Safety Center).

GENERAL AVIATION INSPECTION AIDS SUMMARY

AIRCRAFT SERVICE PERSONNEL

Persons directly involved with aircraft service are most vulnerable to injuries by propellers or rotors. Working around aircraft places them in the most likely position for possible propeller or rotor accidents. Aircraft service personnel should develop the following safety habits:

a. Treat all propellers as though the ignition switches are "on".

b. Chock airplane wheels before working around aircraft.

c. Use wheel chocks and parking brakes before starting engines or handcranking engines. Handcranking a starter-equipped engine with a low battery or defective starter, although convenient, can expose personnel to a possible accident. For safety reasons, the replacement of the faulty starter and the use of a ground power source should be considered rather than handcranking. Only experienced persons should do the handcranking with a reliable person in the cockpit. Handcranking with the cockpit unoccupied has resulted in accidents.

d. Attach pull ropes to pull chocks from wheels close to rotating propeller or rotor blades.

e. After an engine run and before the engine is shut down, perform an ignition switch test to detect a faulty ignition switch. Follow the manufacturer's recommendations for the switch test and the procedures to be followed when a faulty switch is found. Applicable airworthiness directive requirements related to ignition switches have been issued to help locate and eliminate faulty switches.

f. Before moving a propeller or connecting an external power source to an aircraft, be sure the aircraft is chocked, ignition switches are in the "off" position, throttle is closed, mixture is in "idle cut-off" position, and all equipment and personnel are clear of the propeller or rotor. Faulty diodes in aircraft electrical systems have caused starters to engage when external power was applied regardless of the switch position.

g. Always stand clear of rotor and propeller blade paths, especially when moving the propeller. Particular caution should be practiced around warm engines.

h. Ground personnel should be given recurrent propeller and rotor safety lectures to keep them alerted to dangers when working around helicopters and fixed-wing aircraft.

FAA Aviation News

SPECIAL NOTE

The aviation fuel shortage has resulted in some operators considering some of these following unsafe acts with their aircraft engines:

(1) Do not advance timing -- set timing in accordance with the Engine Operator's Manual for the specific engine model.

(2) Do not use a hotter spark plug for low power cruise -- unless it is approved for the specific engine as listed in Lycoming Service Instruction No. 1042.

(3) Do not abbreviate the warmup of a turbo-charged engine -- follow the instructions of the manual pertaining to oil temperatures, otherwise an overboost or erratic power condition will result.

(4) Do not use automotive oils in aircraft engines -- they will cause engine damage or possible failure.

(5) Do not use automotive fuel in aviation engines -- the FAA joins the engine manufacturers in warning operators that automotive fuel will not only damage the engine, but could cause an accident as well.

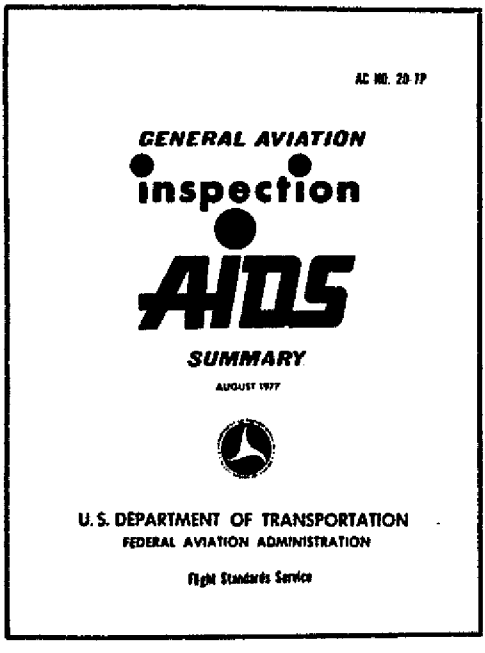
AVCO Lycoming Flyer

Aviation SAFETY Is Everyone's Responsibility.

U. S. GOVERNMENT PRINTING OFFICE : 1977 O - 239-444

A MESSAGE TO THE SUBSCRIBERS AND READERS OF THIS PUBLICATION

With a degree of justification, the aviation community may point with pride to its participation in the FAA/Industry safety program for voluntarily interchanging information gained through service experience. Through trial, the program has pretty well proven to be both workable and inexpensive as a communicative system capable of staying abreast of aviation's rapid growth. The number of reports, photographs, and other data continually being received has exceeded our expectations. In addition, the number of new names on the subscription list for the General Aviation Inspection Aids publication has increased measurably. It is hoped that similar progress is being made in the safety, durability, and reliability of the aeronautical products which have been identified. The only way this can be determined is through your continued support in reporting conditions as they occur or are found, even though the information may have already appeared in the General Aviation Inspection Aids publication. The success of this Voluntary General Aviation Safety program depends on the efforts of everyone to reveal the existence of unsatisfactory conditions.



The General Aviation Inspection Aids, FAA AC No. 20-7P, may be purchased from the Superintendent of Documents, U. S. Government Printing Office, Washington, D.C. 20402. The annual subscription includes the summary and 11 monthly supplements as they are published.

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SUPPLEMENT NO. 1

SEPTEMBER 1977

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

Flight Standards Service

GENERAL AVIATION INSPECTION AIDS

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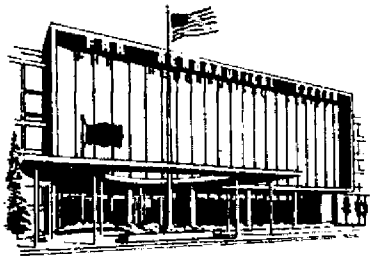
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
WASHINGTON, D.C. 20590

GENERAL AVIATION INSPECTION AIDS

SUPPLEMENT No. 1
SEPTEMBER 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.

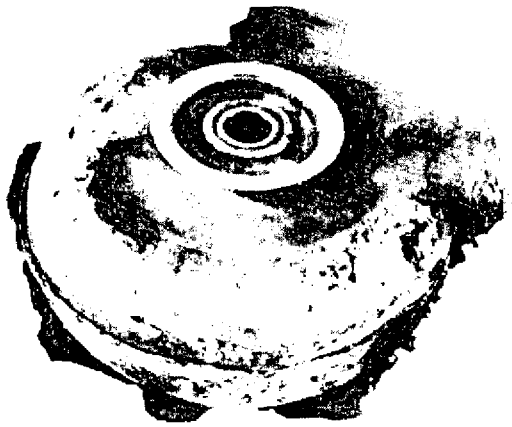
AIRCRAFT

AMATEUR BUILT

Bryan (Sailplane) Model HP Series	"V" Tail Stabilizer Taper Pin Spring Retainer	There has been a report of a loose "V" tail stabilizer taper pin spring retainer on the subject type aircraft. Loss of this pin results in the free movement of a second pin which locks the "V" tail in its correct flying position. The failure of this locking mechanism results in the tail folding upward with the subsequent loss of aircraft control. To prevent the inadvertent mistreatment of the subject pin or its loosening, the manufacturer recommends its replacement with an AN3-6A aircraft bolt and an AN365 self-locking nut. It is recommended that an inspection be made before further flight. A bulletin covering this subject is available from Bryan Aircraft Inc., Box 488, Bryan, Ohio 43506.

SAFETY Is Aviation's Greatest Asset

Pitts Model S-2S	Tailwheel, P/N 1-H	During landing, the tailwheel started to lose rubber which caused the tailwheel spring bracket to break. The aircraft then ground looped causing minor damage to the wing tip. Total time in service - 20 hours.



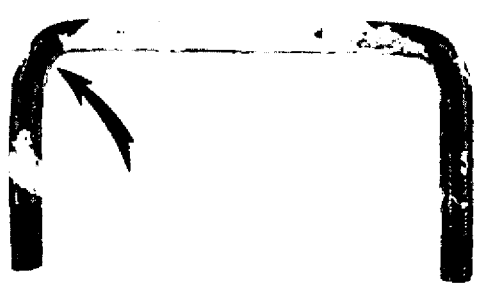
BELL

Bell Model 206L	Engine Air Inlet Screen, P/N 206-063-206-039	The engine air inlet screen was found to be deteriorated. One wire from the screen was found adjacent to the engine inlet, and another wire had been ingested by the engine, causing minor damage to the compressor (repaired by dressing blades and stators). Eleven additional wires were loose but still partially attached to the screen. Total time in service - 615 hours. Replacement screen was a better quality screen with interwoven and welded joints.

BELLANCA

Bellanca Model 7KCAB	Wing Structure	An investigation to determine the cause of a popping noise in the wing revealed that the first rib inboard and four ribs outboard, of the lift strut attachment, were not attached to the wing front spar. Further checks disclosed that nails had never been installed in these ribs. Total time in service - 703 hours.

Bellanca Model 8KCAB	Main Landing Gear "U" Bolt, P/N 1-9805	The left main landing gear "U" bolt failed at the aft bend radius. The break appeared to be a progressive type failure. Total time in service - 250 hours.

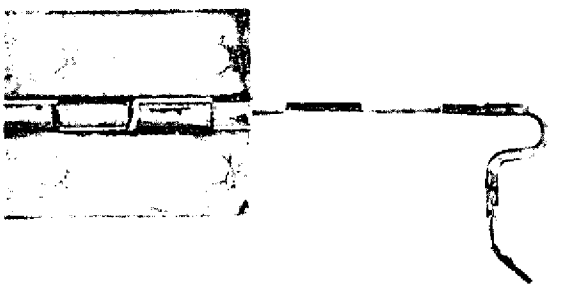


CESSNA

Cessna Model 180, 182, 185, 206, 207, and 210 Series

Engine Cowl Flaps

Reports of cowl flap component failures include loose or cracked hinges, loose hinge pins, and broken hinge pin locking wires. One report indicated the cowl flap fell off the airplane during flight.



Cessna Model U206F (Australian Registry)

Muffler, P/N 1250250-5

An investigation to determine the cause of engine power loss immediately after takeoff disclosed that the left muffler internal baffle had broken loose and was obstructing the muffler outlet. Cessna Service Letter SE 72-13 relates to this subject.

Cessna Model 210L (Australian Registry)

Brake Line, P/N 1280509-44

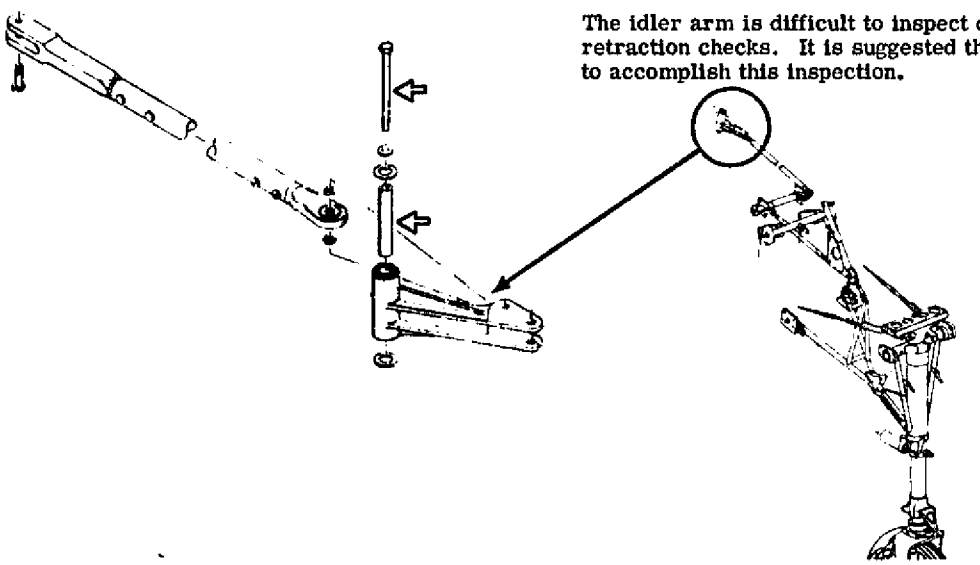
During inspection, the right brake line was found to be chafed. Investigation revealed that distortion of the line during earlier maintenance had permitted contact with the brake disc flange.

Cessna Model 310, 320, 340, and 400 Series (except 404 and 421C)

Nose Landing Gear Retract Mechanism

An investigation to determine why the nose landing gear collapsed revealed that the idler bellcrank pivot bolt and bushing were worn. The wear permitted the mechanism to sag and contact the nearby structure, preventing the nose gear from extending completely.

The idler arm is difficult to inspect during landing gear retraction checks. It is suggested that special effort be made to accomplish this inspection.



Cessna Model 310R	Nose Landing Gear Mounting Structure	In the past 18 months we have received several reports of cracks found in the nose wheel well. The cracks are located in the areas where the brackets for the nose gear trunnion and the nose gear drag brace are mounted. This was not considered to be a significant problem on the Model 310Q and earlier models; however, it appears the Model 310R aircraft is more susceptible to cracking in these areas due to the extended nose structure. Cessna recently issued Service Letter No. ME77-12 which pertains to this subject. Aircraft affected: S/N 310R0001 through 310R0816.
Cessna Model T310Q	Wing Tip Tank, P/N 5092300-17	The left wing tip tank exploded in the strobe light area during taxi. Investigation disclosed that the strobe light mount plate bracket spot welds were cracked permitting fuel to enter the wing tip nose cap. Total time in service - 440 hours.

DeHAVILLAND

DeHavilland Model DHC-6-200	Rudder Tab Actuator Lever Assembly, P/N C6CFM1252-1	During inspection, the rivets which attach the rudder tab actuator lever assembly to the geared rudder tab mechanism were found to be loose. Total time in service - 13560 hours. A second aircraft was inspected and the same condition was found. Total time in service - 17192 hours.

ENSTROM

Enstrom Model F-28A	Tail Rotor Drive Shaft, P/N 28-13603	Directional control was lost during hover. Investigation revealed that the tail rotor drive shaft had failed at the aft taper pin hole at the forward drive coupling.

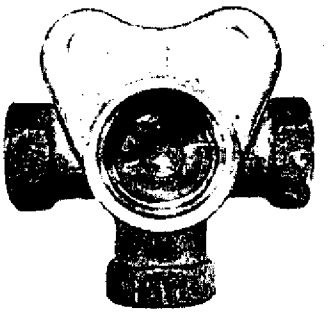
FAIRCHILD INDUSTRIES

Fairchild Industries Model F-27J	Wing Panel, P/N 27130107-11	A crack was found to be in the left wing lower panel at station 196. The crack was located at a soft rivet hole in the outer radius of the No. 1 fuel access opening and extended three inches to the flange of the No. 4 stringer. The crack was stop drilled, and a doubler was installed. Total time in service - 24498 hours. Subsequent inspection at 39173 hours time in service revealed that the crack had progressed 3/16 inch beyond the stop drill hole, requiring replacement of the wing panel.

SAFETY is a Responsibility, Not a Task!

GRUMMAN - AMERICAN

Grumman-American Model AA-1	Fuel Selector Valve, P/N X670401	The fuel selector valve plastic core failed permitting misalignment of the ports. Total time in service - 650 hours.



HUGHES

Hughes Model 369HS	Relay, P/N HH500R	The reverse current relay failed causing starter-generator failure. Inspection disclosed that water entered the relay due to proximity to the outside air duct.

ISRAEL AIRCRAFT

Israel Model 1124	Thrust Reverser Bushing, P/N F10A-5-B-20501-13	The thrust reverser bushings were found to be loose and rotating in the support castings (pivot points) causing loss of the interference fit and lack of bushing retention. Total time in service - 402 hours. A second aircraft was inspected and the same condition was found. Total time in service - 376 hours.

PIPER

Piper Model PA-22-150	Landing Gear Pivot Bolts	During inspection, the right landing gear rear fitting, P/N 13047-01, was found to be broken. Failure was attributed to seizure of the landing gear rear attachment bolt, P/N AN6-27, which imposed excessive torsional loads on the fitting. Further examination revealed the right forward bolt was also seized due to rust and corrosion. With movement of the landing gear, this condition caused the cluster tubing to flex adjacent to the lift strut attachment. If this condition had not been corrected, in-flight structural failure may have resulted.

Piper Models PA-23-250 and PA-E23-250	Landing Gear Emergency Extension Control System	The landing gear emergency extension control system was found to be improperly rigged. Improper control cable length caused the CO_2 bottle to discharge before opening of the priority valve which rendered the emergency system ineffective. Total time in service - 14 hours. Piper Service Bulletin No. 564 dated April 25, 1977, applicable to aircraft serial numbers 27-2659 through 27-7754039 inclusive, calls for a rigging check of the CO_2 control system within the next 100 hours of aircraft operation.
Piper Model PA-24-250	Exhaust Stack, P/N 24543-00	The pilot reported smoke coming from the engine compartment after takeoff. Inspection revealed that the exhaust stack had failed aft of the No. 5 cylinder, inside the carburetor heat shroud. The escaping exhaust gases burned through the heat shroud assembly, P/N 75677, and burned the outer layers of the fuel pressure lines, P/N's 17766-20 and 17766-43.
Piper Model PA-25	Jury Strut, P/N 61066-00	During inspection, the jury strut drain holes were found to be plugged. Further checks disclosed severe internal corrosion of both the left and right wing struts. Total time in service - 2500 hours.
Piper Model PA-28-140	Rear Spar Attach Fitting, P/N 62448-00	During annual inspection, rust was noticed in the area of the rear spar attach fittings. Removal of the fittings revealed extensive rusting between the mating surfaces. It is recommended that this area be inspected in all older Model PA-28 aircraft and that rust and corrosion be removed and treated per Advisory Circular 43.13-1A or that heavily damaged parts be replaced.
Piper Model PA-28-160 (Australian Registry)	Rudder Rib, P/N 63544-00	During inspection, the rudder rib was found to be corroded between the rib and the steel attach horn, P/N 63546-00. Total time in service - 6242 hours.
Piper Model PA-28R-200	Nose Landing Gear Actuator Bearing Lock Nut, P/N 67192-00	The nose landing gear actuator piston lock nut was found to be loosening and permitting the piston to rotate within the cylinder. This condition caused the bearing, P/N 452451, to back out. Total time in service - 500 hours.
Piper Models PA-28R-200, PA-28R-201, PA-32R, and PA-34-200	Landing Gear Actuator Shaft Seal	Several reports have been received regarding failures of the landing gear actuator shaft seal. The actuator is a Syncro Devices, P/N SFA232-3. Time in service ranges from 27 hours to 118 hours.
Piper Models PA-31, PA-31-300, PA-31-350, PA-31P, and PA-31T	Crew Seat Latch	Excessive upward movement of the pilot or copilot seat latch plunger has resulted in its jamming in the "up" position. This is potentially hazardous because it permits inadvertent fore and aft travel of the seat. Piper Service Bulletin No. 525 calls for modification of crew seats installed in certain serial number aircraft by installation of a bracket to prevent over-travel of the latch plunger.

PIPER MODEL PA-31 SERIES -- PNEUMATIC MANIFOLD ASSEMBLY, P/N 43139-03

Following failure of the right pneumatic pump, the gyro pressure dropped to two inches of mercury and when the deicer system was turned on, the pressure dropped to zero. Normally, either engine-driven pump should provide adequate pressure to drive the gyro instruments and operate the deicer system. Investigation revealed the pneumatic manifold rubber check valves had swollen and did not seat with reverse airflow when the right pump failed. This prevented isolation of the inoperative right system and permitted pressure from the operating left system to be lost.

Tests performed by Piper Aircraft Company attribute the cause of manifold valve swelling to ingestion of degreaser fluid into the pneumatic system. Pump intakes are located in the lower engine cowling where engine breather oil normally accumulates. If all traces of degreaser or cleaning solvents are not removed following engine cleaning, they could be ingested into the pneumatic system which will cause swelling and subsequent malfunction of the pneumatic manifold valves.

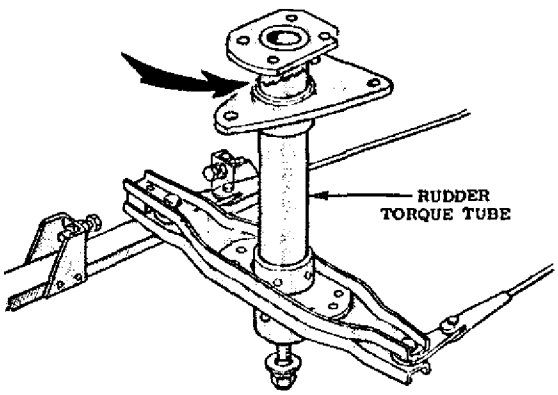
Piper Model PA-31P	Wing Rib, P/N's 45447-04 and 45447-05	During inspection, the wing ribs in both wings were found to be cracked at station 147.5. The cracks were located in the rib flange bend radius and reinforcement angles at the rear spar, adjacent to the outboard flap track attachment. Total time in service - 2250 hours.
Piper Model PA-31T	Freon Condenser Fan, P/N 55299-02	One blade on the Freon condenser cooling fan was found to be broken. Total time in service - 400 hours. Two additional reports have been received advising of the same problem.
Piper Model PA-31-350 (Australian Registry)	Elevator Bungee Spring, P/N 43277-02	During preflight inspection, the elevator bungee spring was found to be broken at the hook end. Total time in service - 327 hours. Piper Service Bulletin No. 549 relates to this subject, and modification had been accomplished 56 hours prior to failure.
Piper Model PA-31-350	Fuel Sensor Probe, P/N 54751-02	Fuel was found to be leaking from the right inboard wing area. Inspection disclosed that the low level sensor probe was loose in its cover plate, P/N 40558-02. Fuel would leak when the tank was full. Further investigation revealed fuel seepage from the low level sensor of the left main fuel tank also.
Piper Model PA-31-350	Starter Solenoid and Battery Ground Wires	During inspection, several strands were found to be broken at the terminal ends of the starter solenoid wire assembly, P/N 14226-27, and the battery ground wire assembly, P/N 80009-04. This condition was attributed to flexing of the wires when sliding batteries in and out during routine servicing. Total time in service - 2550 hours.
Piper Model PA-31-350	Landing Gear Door Actuator	Several cycles of the landing gear were required before the left gear doors would stay in the "up" position. Investigation revealed a broken spring, P/N 756265, in the landing gear door actuating cylinder.

Piper Model PA-32-300	Exhaust Stack, P/N 68793-00	Immediately after takeoff, the cockpit filled with smoke and engine vibration was apparent. Investigation revealed that the left forward exhaust stack had broken off at the wye to the muffler. A hole six inches in diameter was burned in the lower cowling.
Piper Model PA-39 (Australian Registry)	Main Landing Gear Housing, P/N 20752-08	During inspection, the left main landing gear housing assembly was found to be cracked through the web at the brake hose attachment clamp bolthole. Total time in service - 2482 hours. A later model housing assembly, P/N 27053-00, was installed.

ROCKWELL INTERNATIONAL

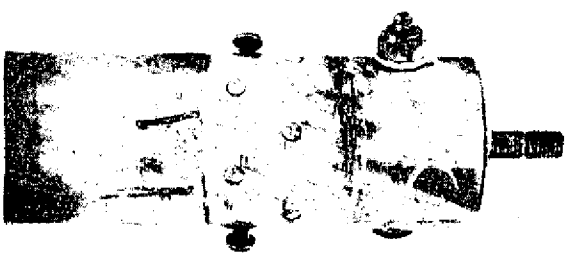
Rockwell International Model 560 — Rudder Torque Tube Assembly, P/N 5420014-157

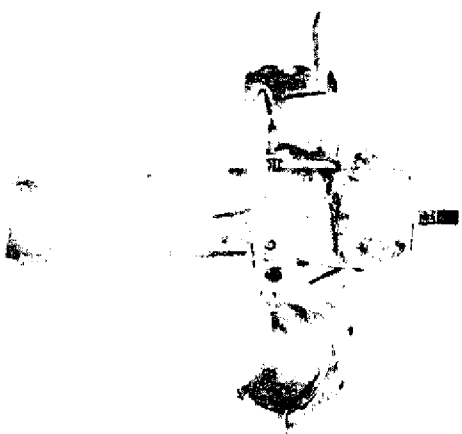
During preflight engine run, the rudder torque tube assembly separated between the adapter plate and the rudder horn. Investigation disclosed that the interior of the tube was severely corroded. Total time in service - 3978 hours. The rudder must be removed for inspection of the interior of the tube. Further checks disclosed that this tube has no provision for drainage.



Rockwell International Model 690 — Rudder Torque Tube Fitting, P/N 420082-1

The rudder torque tube fitting failed through the two steel rivet holes. The 10 aluminum rivets were sheared, and the steel rivet holes in the torque tube were elongated.





Rockwell International Model 690A	Windshield P/N 360043-2	The copilot's windshield shattered during flight. The exact cause of failure could not be determined. However, it is believed to have started with a scratch or crack. Therefore, it is suggested that the windshields in pressurized aircraft be inspected periodically for this type defect.

SWEARINGEN

Swearingen Model SA26-AJT	Elevator Spar	During preflight inspection, the right elevator spar was found to be broken at both sides of the outboard hinge fitting.

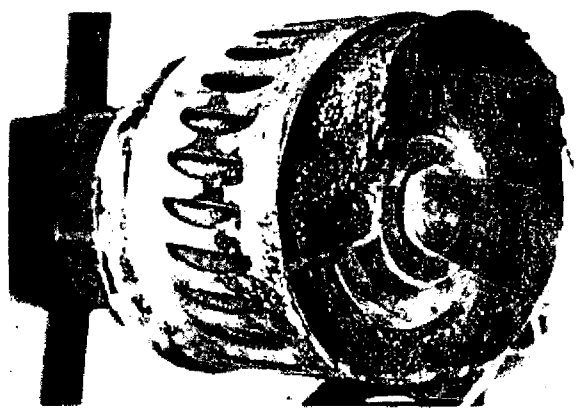
AIRFRAME COMPONENTS

GOODYEAR

Goodyear
Fuel Cell

Drain Valve Nipple

The fuel cell drain valve was found to be leaking. Inspection disclosed that the fuel cell nipple had deteriorated to the point that it separated from the cell when an attempt was made to stop the leak. Total time in service - 3134 hours. The fuel cell was manufactured in April 1963. This cell was installed in a Beech Model 95A55 aircraft.



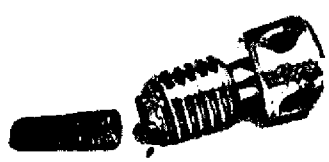
ACCESSORIES

MARVEL - SCHEBLER

Marvel-Schebler
Carburetor
Model HA-6

Mixture Retainer Pin,
P/N 15-A1

The engine was reported to be running lean. Inspection disclosed that the mixture retainer pin had broken permitting the fuel cut-off valve, P/N 242-541, to move out of position. Total time in service - 1269 hours.



SAFETY is a Responsibility, Not a Task!

STEWART WARNER

STEWART WARNER -- OIL COOLER, P/N 8432H

An investigation, to determine the source of oil which covered the aircraft after flight, revealed that the oil cooler was leaking. This oil cooler was installed in a Mooney Model M20J aircraft. Total time in service - 8 hours. Airworthiness Directive 77-08-06 does not apply to this aircraft serial number or the oil cooler serial number.

INSTRUMENTS

MACLEOD

MacLeod Altimeter Model 12003	Bearing Spacer, P/N 200192	An investigation to determine why the altimeter was sticking and providing inaccurate readings revealed that the bearing spacer, installed per MacLeod Service Bulletin No. 2, was flaking and small particles were getting into the top plate gears and pivots.

ENGINES

ALLISON

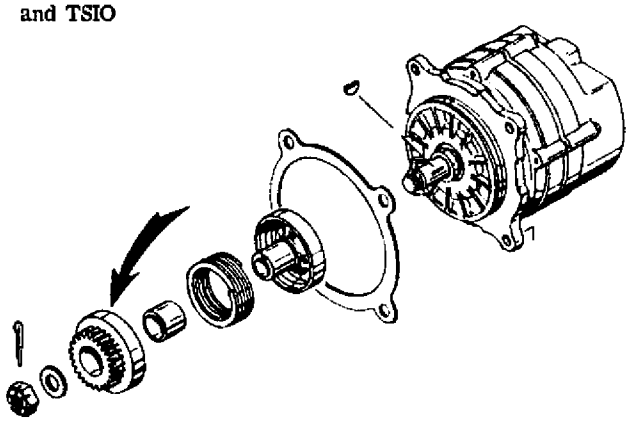
Allison Model 250-C18	Gear Shaft Spur Adapter, P/N 6852090	The engine stopped without prior warning. Investigation revealed that the gear shaft spur adapter which couples the compressor and the turbine had failed.

CONTINENTAL

Continental Model O-470-S	Oil Dip Stick, P/N 6320622	The oil dip stick plastic coating was found to be peeling off, leaving large particles of material in the oil. Total time in service - 10 hours.
Continental Model IO-470-L21	Valve Lifters and Rotator Springs	Maintenance personnel reported an unusual exhaust sound in both engines installed on a Beech Model B55 aircraft. Inspection disclosed that some of the exhaust valve lifters were collapsed and that the valve rotator springs were broken in both engines. Total time in service - 184 hours.

Continental Models GTSIO and TSIO

Gear Driven Alternator Clutch and Hub Assembly



The investigation of two (2) aircraft engine failures has revealed a potentially hazardous problem concerning the clutch and hub assembly that is attached to the alternator used on the subject engines.

There are at least two different types of clutch assemblies identical in outward appearance, but not interchangeable. One has a clutch spring wound in a clockwise direction designed for use on the TSIO engines, and one has a clutch spring wound in a counterclockwise direction, designed for use on the GTSIO engines. These assemblies are not a part of the alternator and are supplied by the engine manufacturer.

Regardless of the assembly being used, a torque value of 450 to 500 inch pounds is required for attachment to the alternator shaft. The torque values can be found in Continental Teledyne engine publications and the aircraft maintenance manuals. An improper torque value or assembly type could lead to damaged alternator bearings, failed alternators, and most importantly, engine damage.

Persons installing this type of alternator should ensure that all installation instructions are followed. Check part numbers and torque values before installing the alternator.

Persons repairing or overhauling alternators with a clutch and hub assembly affixed should not replace these assemblies if removed during overhaul unless technical information relative to the clutch assembly is available and followed.

The above problem could exist on other model aircraft engines using similar type alternator drive methods.

CONTINENTAL -- ENGINE INSPECTION AFTER SUDDEN STOPPAGE

When an engine has been involved in an accident which resulted in sudden stoppage (propeller strike), it is impossible to predict if any internal damage was incurred and the extent of damage by relating to such things as forward speed, engine r.p.m., type of surface upon which the propeller impacted, etc.

The most vulnerable areas where damage might occur as a result of such accidents are the crankshaft propeller flange, the crankshaft counterweight blades and the crankcase bearing webs.

The crankshaft can be inspected with the engine assembled for propeller flange runout and for cracks on the backside of the flange at the radius to the shaft.

The crankshaft counterweight blades can be superficially inspected by removing one or more cylinders. However, the limited access afforded by this method does not permit a positive determination.

Cracks in the crankcase bearing webs can only be discovered by complete engine disassembly. Therefore, the manufacturer takes the position that the only sure method of inspecting for possible internal damage is complete engine disassembly and magnetic particle inspection of the crankshaft, gears and connecting rods, and Zyglo inspection of the crankcase. Continental Service Bulletin No. M71-5 relates to this subject.

LYCOMING

Lycoming Model LTIO-540-J2BD

Crankcase, P/N LW 12307

The left half of the crankcase was found to be cracked between the No. 2 and the No. 4 cylinders. The crack extended approximately 1 1/2 inches in length. Engine teardown inspection revealed another crack extending from the sump mounting flange to the No. 4 cylinder pad. Lycoming Service Bulletin No. 392 pertains to this subject and calls for replacement of cracked crankcase assemblies with assemblies, P/N LW 13851, which have been reinforced in the flange areas.

Lycoming Model TIO-540-8A2C	Crankcase, P/N LW 12030	A significant amount of oil was noted coming from the right engine compartment of a Piper Model PA-31 aircraft. Inspection revealed a crack in the engine crankcase adjacent to the No. 1 cylinder mounting pad and extending aft for approximately eight inches.
Lycoming Model TIGO-541-E1A	Alternator Drive Coupling, P/N 77858	Failure of the engine alternator drive coupling resulted in loss of alternator output. In addition to the coupling failure, the alternator to the engine mounting adapter was found to be cracked. Records indicate the alternator had been in service 2600 hours without overhaul.

UNITED AIRCRAFT OF CANADA

United Aircraft of Canada Model JT15D-1	Turbine Blade, P/N 3019001	A sudden loss of r.p.m. and e.g.t. was experienced during climb. Investigation revealed metal in the tailpipe and binding of the rotor. Engine teardown inspection disclosed that a high turbine blade had failed. The engine was equipped with old Preservice Bulletin No. 7102 turbine blades, P/N 3019001, and Preservice Bulletin No. 7074 turbine disc, P/N 3018811.
United Aircraft of Canada Model PT6A-20	Gas Generator Case, P/N 3018051	The gas generator case was found to be cracked along the welded seam. Total time in service - 15260 hours.
United Aircraft of Canada Model PT6T-6	Key Washer, P/N 3017216	The source of metal chips found in the reduction gearbox was traced to the key washer used to secure the nut, P/N 3014490, to the main input drive shaft. This condition has been reported with several engines and is caused by pieces of the key washer breaking off in the areas where it is crimped or peened to lock the input drive shaft nut.

PROPELLERS

SENSENICH

Sensenich Model 76EM855-0	Blade	Approximately six inches of the blade tip separated during flight. Total time in service - 3400 hours. Records indicate that the blade had been straightened on two different occasions. The most recent straightening of the blade had been accomplished 170 hours prior to the blade failure.

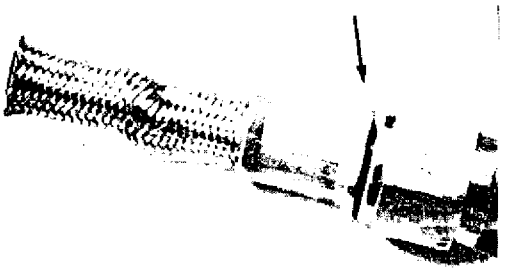
MAINTENANCE NOTES

A TWISTED HYDRAULIC LINE

The picture at right shows what happens when a hydraulic line is improperly installed. Note twist in braiding caused by failure to hold metal sleeve (arrow) while tightening connection nut.

This particular condition caused an in-flight incident requiring emergency extension of the landing gear.

FAA Maintenance Tips



COLD WEATHER OPERATIONS AND YOUR NICKEL-CADMIUM BATTERY

Difficulties with nickel-cadmium batteries during extreme cold weather operations can be corrected by using a ground power unit. Extreme caution must be exercised to ensure the amperage rating of the ground power unit equals or exceeds that required for engine starting.

When a ground power unit is not available, batteries should be removed after shutdown and stored in a heated area. They should be reinstalled just before engine starting to prevent them from becoming "cold soaked." A cold weather start should not be attempted without a ground power unit unless the battery is fully charged. At the first indication of insufficient electrical power, the start should be aborted to ensure electrical energy remains for engine cooling in the event of hot start.

If the battery requires charging, ensure that all appropriate requirements are met.

Flight Fax

DON'T DESTROY THE EVIDENCE

Engine manufacturers locate magnetic drain plugs at strategic points in the oil system to catch and retain ferrous metal particles being generated by the engine. Nonferrous particles are removed from the oil by a filter. A skilled engine diagnostician can frequently identify the location of an inprocess failure by the position of the magnetic plug that caught the ferrous metal, or by noting the type of metal in the oil filter. The location of an inprocess failure is vitally important when repairing an engine for time-continued operation because the repair facility is charged with the responsibility of disassembling the engine only sufficiently to expose all damages but still must be certain that everything that needs attention is corrected. We occasionally receive an engine tagged, "metal in screen" or "metal in sump," but with clean magnetic plugs and filters. The engine must either be test-run to make it generate more metal, thereby running the risk of further damage, or be subject to random disassembly in an attempt to locate the failure. Either approach can be expensive.

Operators are reminded to leave the metal where it is found and replace the magnetic plugs and the oil screen in the exact location from which they are removed.

FAA Maintenance Tips

HOW MUCH TO CHARGE?

Most pilots know about the woes of an undercharged battery. Not so well known is the fact that overcharging can cause problems through excessive gassing and internal heat. Gas bubbles tend to wash active material from the plates, and moisture and acid escaping from the cells in a fine mist may corrode surrounding metal parts. Overcharging results when the charging system is faulty or is improperly used. Whenever possible, slow charging is recommended. In any case, batteries are fully charged when the electrolyte temperature is 80^{0}F (27^{0}C) and the specific gravity is 1.240.

FAA General Aviation News

SOMETHING TO THINK ABOUT

CIVIL AERONAUTICS MANUALS (CAMs)

Civil Aeronautics Manual policies provide detailed technical information on acceptable methods of complying with the regulations. Such policies are for the guidance of the public and are not mandatory.

CAMs covering the certification of products should not be discarded by interested persons upon recodification, because the rules contained therein, and accompanying policies, will continue to apply to products which have been certificated thereunder.

FIBERGLAS CONSTRUCTION

The use of fiberglas in the construction of homebuilt aircraft is becoming fairly common. Therefore, the following report from the National Safety Council should be of interest to anyone using or planning to use fiberglas.

At a safety conference in Vancouver, B. C., an eye specialist described a hazard that could affect each of you and your families. That hazard is the catalyst for a "hardner" or an "accelerator" that is added to fiberglas resin before the resin is applied. The eye specialist reported that a drop of this catalyst in the eye will progressively destroy the tissue of the eye and result in blindness. This will occur even though an attempt is made to wash the catalyst from the eye. Furthermore, once the chemical has started to destroy the eye, there is no known way of stopping the destruction or repairing the damage. Extreme caution is urged when using these chemicals.

Designee Newsletter

FLIGHT PERSONNEL AND FLIGHT INSTRUCTORS

Prior to starting an engine, flight personnel should make certain that all personnel are clear of the propeller or rotor.

1. The engine of a fixed-wing aircraft or of a helicopter SHOULD BE SHUT DOWN BEFORE BOARDING OR DEPLANING PASSENGERS. This is the simplest method of avoiding accidents.

2. Boarding or deplaning of passengers with an engine running should only be allowed under the strictest of supervision. The pilot in command should have knowledge that either his company or the airport operator has fully trained ground attendants in their specific duties when boarding or deplaning passengers while an engine is running. The pilot should instruct his passengers how to avoid the propeller or rotor blades before he allows them to exit the aircraft while an engine is running.

3. When flight and ground instructors are instructing their students about propellers or rotors, they should emphasize the dangers of rotating propeller and rotor blades. Students should be taught the techniques and safety procedures for handcranking, and how to determine which engines should not be handcranked. Safety through education is the best and most positive means available for reducing potential accidents from rotating propeller and rotor blades.

4. The prestart portion of the checklist should include an item to make sure the propeller or rotor blades are clear. The proper use of the aircraft checklist should be taught to all student pilots.

5. Flight personnel should perform an ignition switch test prior to engine shutdown to detect faulty switches. The checklist should include an item for that test to be made and an item to assure that the switch is off before leaving the cockpit.

6. In reviewing propeller- and rotor-to-person accidents, the most impressive fact is that every one of them was preventable. The danger of rotating propeller or rotor blades is universally recognized.

7. There is an obligation on the part of pilots to ensure that their passengers arrive and depart the vicinity of the airplane safely, whether this is accomplished by stopping the engine completely at the time of loading and unloading, or by providing a definite means of keeping them clear of the propeller if it is left in motion.

8. Prominent warning signs, placed in the aircraft's interior near or on the inside face of aircraft doors to alert passengers and crewmembers of propeller or rotor hazards, could be helpful in preventing accidents.

U. S. GOVERNMENT PRINTING OFFICE : 1977 O - 243-714

GENERAL AVIATION inspection AIDS

SUPPLEMENT NO. 3

NOVEMBER 1977

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

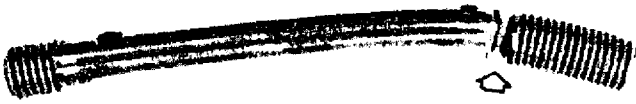
SUPPLEMENT No. 3
NOVEMBER 1977

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 99	Brake Master Cylinder, P/N 50-580027-73	Pilot's brake master cylinder piston and pushrod assembly, P/N A47G374, has been reported to bend and break at the clevis end threads. This difficulty could be attributed to improper adjustment of the master cylinder linkage. Beech Shop Manual provides some information on master cylinder adjustment. Additional guidance is contained in Beech Airliner Communique No. 29 and King Air Communique No. 3.



BELL

Bell Model 206L	Oil Cooler Impeller Mount, P/N 206-061-432-011	During flight, the pilot heard a loud "BANG" followed by rising oil temperature and low oil pressure. After landing, inspection revealed that the oil cooler impeller mount legs had failed. Total time in service - 190 hours.

BOEING

Boeing Model B-17G	Center Section Wing Spar	The center wing section aft lower spar failed at the left end at bulkhead station five. The break was at the end bolthole in the inboard gusset.

BOLKOW

Bolkow Model BO-105C	Main Rotor Transmission Input Drive Flange, P/N 4619302037	During cruise, a loud noise was heard. The aircraft immediately yawed to the right. The No. 1 engine shut down (unassisted). Investigation revealed failure of the main rotor transmission input drive flange. The flailing drive shaft severed the N1 control for No. 1 engine causing the shutdown. Total time in service - 1023 hours.

BRITTEN NORMAN

Britten Norman Model BN-2A	Rudder Bar Lower Mount Plate, P/N NB-10-1827	During taxi, interference was noted in rudder operation. Investigation revealed that the fuselage structure which supports the rudder bar torque tube was cracked. This condition permitted the left rudder bar assembly to cock, causing the retaining bolt for the rudder pedal adjustment to rub the nosewheel steering cables. This interference caused control binding and affected rudder movement. Total time in service - 4850 hours.

CESSNA

CESSNA SINGLE-ENGINE AIRCRAFT -- DEFECTIVE NAS679 SELF-LOCKING NUTS

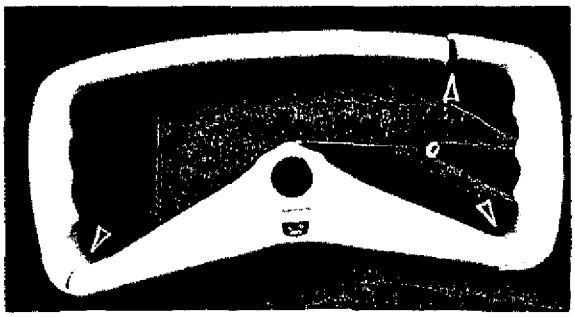
Reports have been received of loose or broken NAS679 self-locking nuts being found in various areas of the single-engine model Cessna aircraft manufactured beginning in late 1973 through 1974 and early 1975. Specifically, a nut was found split on one of the forward attach bolts for the vertical stabilizer of a 172M; several of the wing strut fitting attach nuts on a U206 were found cracked; and the nose gear upper support attach bolt nuts were found cracked and broken on several Model 177's. The latter instances resulted in the issuance of Cessna Single-Engine Service Letter No. SE 76-1.

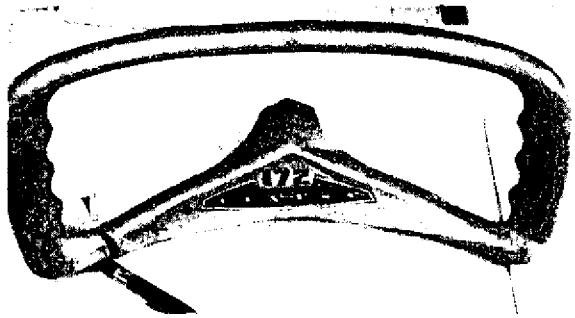
It is suggested that the NAS679 type self-locking nuts used extensively throughout the various models of single-engine Cessna airplanes be checked for condition whenever any area is open for inspection. If any defective nuts are found, the recommended replacement nut is P/N MS21042L.

CESSNA AIRCRAFT - CONTROL WHEEL ASSEMBLIES

Cracking of the plastic control wheels continues to be a problem. Replacement of these control wheels would eliminate the problem; however, periodic examination will provide the assurance of finding cracks and/or other deformities before a failure occurs. It is suggested the one-time inspection procedure for the plastic control wheels contained in Cessna Service Letter No. 64-8 be conducted on an annual basis.

Aircraft Affected: Model 150 - S/N's 15017684 thru 15017999, and 15059001 thru 15060174; Model 172 - S/N's 17246755 thru 17250872, and P17257120 thru P17257188; Model 175 - S/N's 17556239 thru 17557119; Model 180 - S/N's 18050662 thru 18051329; Model 182 - S/N's 18252359 thru 18255113; Model 185 - S/N's 185-0001 thru 185-0663; Model 205 - S/N's 205-0001 thru 205-0520; Model 206 - S/N's 206-0001 thru 206-0062; Model 210 - S/N's 21057001 thru 21058240; and Model 336 - S/N's 336-0001 thru 336-0134.





Cessna Model 182H (Australian Registry)	Engine Oil Indicating Line	An investigation, to determine the cause of engine oil pressure indication loss, revealed that the oil pressure gauge line was leaking six inches from the gauge due to chafing against the radio cooling hose.
Cessna Model 210L (1975 through 1977)	Nose Landing Gear Door Inspection	There have been several reports of improper clearance between the outboard edges of the nose gear doors and the engine lower cowling skins. Proper clearance in this area is critical. Gear up landings have occurred because interference between the doors and cowling skins has prevented the nose gear from extending. Cessna Service Letter No. SE 77-15 has been issued to call out a special inspection of the nose gear door to cowling clearance. *Procedures for performing the clearance check* and any required door rework are detailed in the service letter. Cessna recommends this inspection be accomplished within the next 25 flight hours. Aircraft affected: S/N's 21060540 through 21061745.
Cessna Model 402	Landing Gear Switch Bracket, P/N 50450284	During landing rollout the right main landing gear collapsed. Investigation revealed that the landing gear actuator down limit switch bracket, which is secured to the gearbox, was misaligned with P/N 5045009-10 tube assembly (right hand inboard) which caused the actuator down limit switch roller to ride off and below the flat of the above tube assembly. This allowed the landing gear actuator to go past the down and lock position toward the up position. Time in service - 2000 hours. It is suggested that maintenance personnel make a physical check on a regular basis for misalignment of the switch roller and the tube assembly.

Cessna Model 402	Wing Rib Assembly, P/N 0822175-61	The left main landing gear collapsed on landing. Investigation revealed that the left wing center rib had cracked and broken out where the main landing gear support, P/N 0822180-5, attaches. Further investigation revealed a crack in the right wing center rib, P/N 0822175-60, where the right main landing gear support, P/N 0822180-6, attaches. Total time in service - 7390 hours. Cessna Service Letter ME 76-2 had not been complied with.
Cessna Model 421C	Fuel Selector Valve, P/N 9910201-1	Fuel was found to be dripping from the left wing near the exhaust stack. Investigation disclosed that the left fuel selector valve was leaking at the shaft. Fuel had accumulated approximately one inch deep in the wing cavity. Total time in service - 150 hours.

FAIRCHILD INDUSTRIES

Fairchild Industries Model F-27A	Fuel Pump, P/N GB119-3AV1	The right propeller was feathered when the oil pressure dropped and smoke was noted coming from the right engine. Investigation revealed fuel in the oil system due to leakage past the engine-driven fuel pump shaft seal.
Fairchild Industries Model F-27A	Gearbox Drive Shaft Oil Seal	The left propeller was feathered due to gearbox low oil pressure indication and flickering of the low oil pressure light. Investigation revealed oil leakage from the drive shaft oil seal.
Fairchild Industries Model FH-227-B	Low Torque Switch	Takeoff was aborted when the right propeller began to auto-feather. Malfunction of the low torque switch (Negretti and Zambra Model L944738) was determined to be the cause of difficulty.

HAWKER SIDDELEY

Hawker Siddeley
Model DH114-2X

Nose Wheel Fork,
P/N 144N213A-2

The nosewheel fork arm broke when the brakes were applied during taxi.

HUGHES

Hughes Model 369A	Clutch Inner Race, P/N 369A5353	During an accident investigation, the clutch inner race was found broken due to heat induced by failure of the bearing, P/N 369A5361. Total time in service - 300 hours. Three additional aircraft were inspected and the bearings were found to be dry and rough. The bearing grease seal, P/N 369A5368, was found to be damaged on two of the aircraft which permitted the grease to leak out of the bearing.

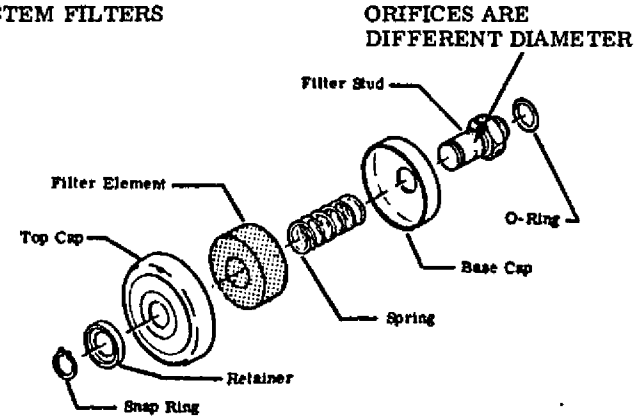
LEAR

LEAR -- MODELS 24D AND 25B/C PRESSURIZATION SYSTEM FILTERS

The following information is contained in Gates Learjet Service News Letter No. 19, dated April 1977:

"Maintenance personnel are reminded not to interchange the three (3) filters installed in the Garrett Pressurization System during the filter cleaning process each 300 flight hours. The orifices in each filter are of a different size and reinstallation of a filter in the wrong place will drastically affect system operation.

"The Garrett Pressurization System is installed in all aircraft beginning with the first Model 25B/C and Model 24D."



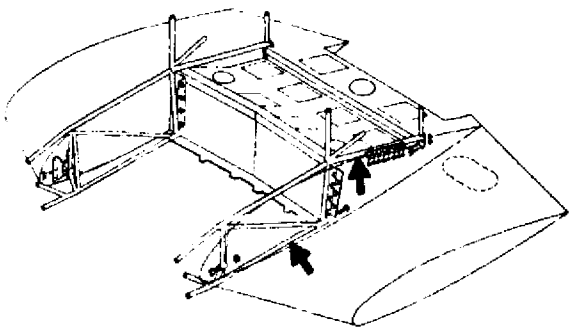
MARTIN

Martin Model 404	Spar Cap	When performing wing inspection per AD 67-14-06, a 3/4-inch crack was found in the left front spar cap outboard of the butt closing rib.

MOONEY

Mooney Model M20	Fuselage Longeron Tubes, P/N's 340117-107 and -119

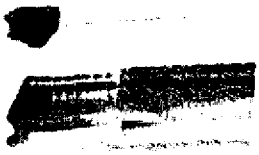
The fuselage longeron tubes have been found to be corroded and split.



Mooney
Model M20C

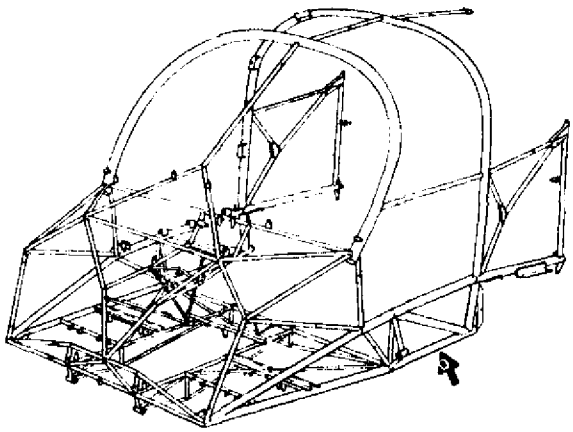
Control Column Shaft Assembly,
P/N 710005-001

The left control column shaft broke in the area of the control wheel-to-shaft junction. Total time in service - 2740 hours. Two additional aircraft were inspected and the shafts were found to be cracked.



Mooney
Model M20E

Fuselage Longeron,
P/N 340117119



During repairs after a belly landing and after removal of the fuselage lower skin, the lower left longeron tube was found to contain water and rust. In addition, the tube had a rupture three inches in length. Total time in service - 1803 hours. A second aircraft (Model M20B) was inspected and the tube was also found to contain water and rust. Total time in service - 1100 hours.

Mooney
Model M20J

Circuit Breaker

The landing gear collapsed during landing. Investigation revealed an intermittent short in the auxiliary bus bar circuit breaker. Further checks disclosed that the screws which attach the wires to the circuit breaker were loose. Looseness of the screws was attributed to improper torque during original installation. Total time in service - 217 hours. This condition was reported on another aircraft with 139 hours' time in service.

PIPER

Piper
Model PA-24-250

Carburetor Air Box,
P/N 21943-03

The pilot reported engine roughness and power loss during cruise operation. Investigation revealed that the vanes in the carburetor air box throat had broken loose restricting air flow through the carburetor. Airworthiness Directive 64-10-4, which called for vane removal, is not applicable to this aircraft by serial number. Evidently, an unmodified air box had been installed on this aircraft sometime during its 2000 hours of operation even though Piper Service Letter No. 420 referenced in the AD recommended modification of air boxes in stock from P/N 21943-03 to P/N 21943-05 by removal of the vanes.

SAFETY is a Responsibility, Not a Task!

Piper
Model PA-25-235

Door Release Pin,
P/N 480746

The release pins for emergency release of the cockpit entrance door were frozen in the locked position due to corrosion. It was also noted the release handle was safetied in the locked position with steel safety wire too strong to break by hand. Due to these conditions, the cockpit emergency escape provisions were rendered inoperable. Total time in service - 630 hours.

Piper
Model PA-25-235

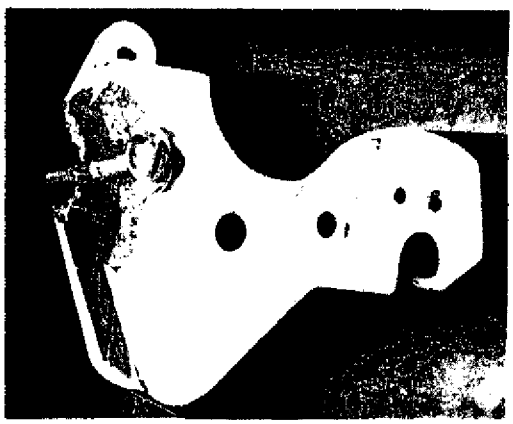
Fuel Cell,
P/N 64954-00

A forced landing was a result of premature depletion of the aircraft's fuel supply. Investigation revealed loss of fuel resulted from a 1 1/2-inch tear in the fuel cell reinforced area adjacent to the fuel outlet connection. The fuel cell manufacture date was July 1969, and it had been in service for 1936 hours.

Piper
Model PA-28R-201

Nose Gear Downlock,
P/N 67150-03

The top portion of the nose landing gear downlock hook was found to be broken. Total time in service - 48 hours.



Piper
Model PA-28R-201T

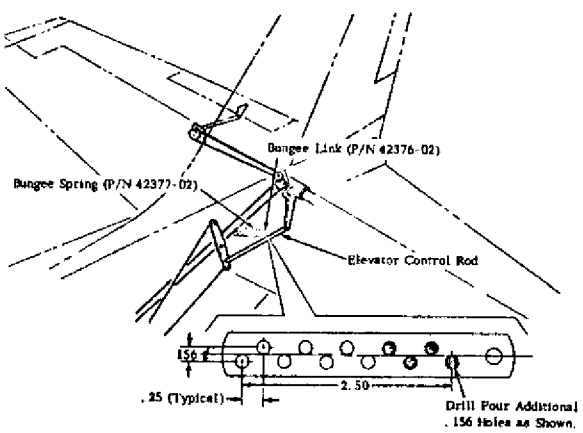
Clevis Bolt,
P/N AN23-14

During routine maintenance, the nose landing gear retract mechanism bolt was found to be worn and bent. Further checks disclosed that a 3/16-inch clevis bolt had been installed in the rod end which had a 1/4-inch hole. Total time in service - 175 hours.

Piper
Models PA-31,
PA-31-325, and
PA-31-350

Elevator Bungee Link,
P/N 42376-02

In some instances, the prescribed elevator bungee ("down") spring tension could not be obtained due to insufficient adjustment provided at the bungee link. Piper Service Bulletin No. 549, dated February 16, 1977, provides instructions for modification of the subject link by incorporation of additional adjustment holes and for checking bungee spring tension. Compliance is recommended within the next 50 hours of operation for certain serial number aircraft.



BUNGEE LINK REWORK DETAIL

Piper Model PA-31-350 (Australian Registry)	Landing Gear Retraction System	During inspection, the landing gear selector, P/N 487-155, antiretract safety system solenoid plunger was found to be bent preventing engagement with the selector handle. This condition was attributed to the practice of selecting landing gear down after first engine start to check the hydraulic system. The selector handle returns rapidly to neutral, striking the solenoid plunger. Total time in service - 2354 hours.

Piper
Model PA-31T

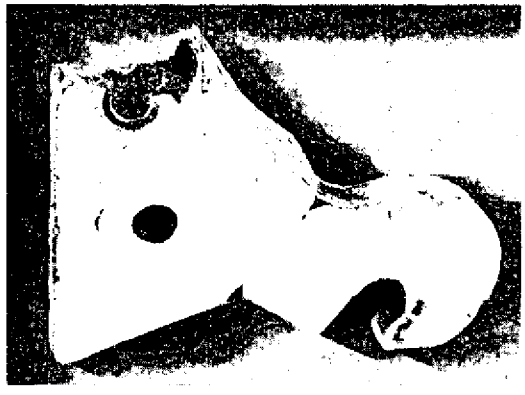
Main Landing Gear Actuator Bearing, P/N 452 383

After takeoff, the right main landing gear would not retract or indicate "down and locked." Investigation revealed that the landing gear actuator rod end bearing had failed. Total time in service - 479 hours. Piper Service Bulletin No. 570, dated June 22, 1977, pertains to replacement of hollow rod end bearings.

Piper
Model PA-32R-300

Nose Gear Downlock, P/N 38078-02

An investigation to determine why a landing gear green light indication could not be obtained during a landing approach revealed that the top portion of the nose gear downlock hook assembly was completely broken out. Total time in service - 89 hours.



ROCKWELL INTERNATIONAL

Rockwell International Model 680W	Tires, 850 x 10 Type III	New Uniroyal tires were installed; and during a landing gear retraction test, the tires caught on the gear doors. Investigation revealed that the tires were two inches larger than a comparable size B. F. Goodrich tire. Owners, operators and mechanics should be aware that clearances in the wheel well may be altered whenever tires are replaced.
Rockwell International Model 690A (Australian Registry)	Pressure Controller Rate Control	During flight, pressurization control was erratic. Inspection disclosed that the pressure controller rate control (Airesearch) was contaminated with tar and moisture. Total time in service - 2000 hours.

ATTENTION TO DETAIL - May save more than money.

SCHWEIZER

Schweizer Model SGS-2-33A	Fuselage Tubular Member	During inspection, a vertical tubular member was found to be broken where it was welded to the fuselage upper longeron near the back seat release mechanism. Total time in service - 1660 hours.

AIRFRAME COMPONENTS

GOODYEAR

GOODYEAR -- FUEL CELL, P/N 5653088-504

Investigation of a fuel leak disclosed the source to be a hole in the top of the tank due to a weak area in the tank fabric. Further investigation revealed the bottom interior of the tank was delaminating. The tank was manufactured in June 1967, from BTC 39 material under TSO C-80. It is suggested that fuel cells be inspected at regular intervals.

McCAULEY

McCauley Main Wheel Model D30260	Hub Assembly	During inspection of a Cessna Model 172M aircraft, both main wheel hubs were found to be cracked at the web where the flange bolts attach. Total time in service - 578 hours. Cessna Service Letter SE 77-28 relates to this subject.

ACCESSORIES

BENDIX

Bendix Magneto Model S-1200 Series	Case	A number of reports have been received advising of cracks and discontinuities in S-1200 series magneto cases. Bendix Service Bulletin No. 533A pertains to the subject and provides information concerning acceptable stress relief fissures, flow lines, and cracks.

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.

PRESTOLITE

PRESTOLITE MODEL ALV-9400 SERIES ALTERNATORS -- NEW OVERHAUL MANUAL

Reports received by the FAA indicate that a significant number of Prestolite alternators have been failing after overhaul. Prestolite Aircraft Electrical Products has issued a new overhaul manual for the ALV-9400 Series, 24 volt, 100 ampere alternators. This is identified as Form L-670. Prestolite believes that if these new manual procedures and limitations are followed, they will reduce the number of failures.

The new manual has been sent to all repair facilities known to Prestolite. Persons interested in obtaining a copy may contact Prestolite at the following address:

Prestolite Electrical Division
Technical Service Department
511 Hamilton Street
Toledo, Ohio 43694
(Telephone (419) 244-2811, Ext. 437)

EQUIPMENT

LEIGH SYSTEMS

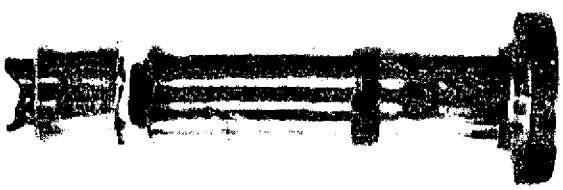
Leigh Systems Emergency Locator Transmitter Model Sharc 7	Coaxial Cable Nut	The emergency locator transmitter coaxial cable nut became disconnected and shorted against the battery solenoid terminal causing a fire in the baggage compartment. It is suggested that ELT installations be checked for loose or improperly attached coaxial cable nuts and missing or defective protective covers on solenoid terminals.

ENGINES

LYCOMING

Lycoming Model O-320-E2D — Cam Follower, P/N 72877

A cam follower was found to be broken approximately 9/16 inch from the outboard end. The valve lifter socket was also found to be chipped and broken. Total time in service - 1032 hours.



SAFETY in Aviation is Everyone's Responsibility.

Lycoming Model O-360-A1D	Oil Line, P/N 75167	Oil leakage resulted in loss of oil pressure and engine failure. Investigation revealed that all engine oil was lost because of a hole worn through the propeller governor oil line due to chafing against the generator mounting bracket. The manufacturer's inspection checksheet for the Piper Model PA-24 aircraft calls for inspection of oil lines and fittings for leaks, security, chafing, dents, and cracks each 100 hours of operation.
Lycoming Model GSO-480-B1C6	Rocker Shaft Support 	No exhaust valve action in one cylinder, due to failure of the rocker arm shaft support boss, was found to be the cause for engine power loss. Further inspection revealed the rocker arm shaft end had worn through its retention bracket attached to the rocker box cover resulting in overload and subsequent failure of the shaft support boss. This condition was possibly caused by a small nick or other distortion at the end of the shaft which would account for the wear problem. Lycoming Service Instruction No. 1176, although not applicable to the GSO-480 engine, does concern a similar problem and recommends smoothing out nicks or distortions found on rocker shaft ends.
Lycoming Model TIGO-541-E1A	Exhaust Pipe, P/N 78286	The pilot of a Piper Model PA-31P aircraft aborted takeoff due to a sudden loss of manifold pressure on the left engine. Investigation revealed that the No. 5 cylinder exhaust pipe had failed just aft of the "Y" junction resulting in loss of pressure to the turbocharger and expelling of hot exhaust gases into the engine compartment.

PROPELLERS

McCAULEY

McCauley Model 2AF34C-55N (Australian Registry)	Counterweight, P/N D-3156-1	During takeoff, the No. 2 engine propeller blade counterweight was lost. The missing counterweight was not recovered. Failure was attributed to either cracking of the counterweight half or failure of the connecting bolt. Total time in service - 4253 hours.
McCauley Model D2A34C98	Hub	During takeoff roll, the propeller separated from the aircraft. All four engine mount legs separated from the engine mount pads. The engine canted downward at a 45 degree angle. Investigation revealed that the propeller hub cracked and opened at the blade attachment screw collar which permitted the blade to separate from the hub. The ensuing vibration caused the engine crankshaft to shear behind the propeller flange at the front main bearing. Discoloration was found in the propeller hub. This propeller was installed on a Continental IO-520 engine, installed in a Cessna Model 188B aircraft. This aircraft is used in an agricultural application service. Total time in service - 1160 hours.

MAINTENANCE NOTES

IN THE CESSNA SKYHAWK MODEL 172N THE OIL DIPSTICK MUST BE INSTALLED VERTICAL

Reports from operators reveal that a number of them have forced the oil dipstick into the oil filler tube at an angle on the recent Model 172N Cessna Skyhawk. When the dipstick is forced in at an angle in the 172N instead of from a vertical position, the dipstick will get chewed up by the crankshaft when the engine is running, distributing pieces of metal in the oil system.

The Cessna Skyhawk Model 172N uses the Avco Lycoming O-320-H, 160 HP powerplant. Since it is a newly designed engine, the design difference has necessitated the relocation of the oil dipstick and filler tube on top of the engine and very near its centerline. The dipstick on the O-320-H must be installed in a vertical position. Any attempt to force it in the filler tube at an angle will result in the above described damage.

Operators apparently have failed to notice the difference in the earlier Model O-320-E series, 150 HP Avco Lycoming, from the later O-320-H series, 160 HP model.

In earlier 150 HP models, the oil dipstick and filler tube was located on an approximate 45° angle on the right rear of the powerplant. This allowed most pilots to view the oil filler tube through the oil access door.

However, on the later 160 HP Model 172N, the oil access door is located on top of the cowl, and unlike the 150 HP model, the operator cannot very well see down the filler tube without standing on a ladder. In addition, if the operator has been familiar with the earlier 150 HP models which required the dipstick enter at a 45° angle, and not familiar with the recent 160 HP version, he or she will tend to force it in the filler tube incorrectly at a 45° angle.

Also remember that your 160 HP model Cessna Skyhawk requires 100 octane aviation fuel minimum.

AVCO Lycoming

REPLACEMENT OF AIRFRAME MATERIALS

Recently, a pilot flying a Luscombe 8A aircraft elected to crashland the aircraft when the cockpit filled with smoke. Investigation of the accident revealed that the soundproofing on the back of the firewall was a flammable material. Although the fire started in the engine compartment, it rapidly spread to this material through the control openings in the firewall causing the entire aircraft to be consumed by fire.

Persons replacing soundproofing and upholstering materials in aircraft are reminded that the replacement airframe materials, by regulations, must at least meet the original type certification fire prevention test requirements. Acceptable test procedures for demonstrating compliance with those requirements are outlined in Flight Standards Service Release (FSSR) No. 453 dated November 9, 1961, and in Federal Aviation Regulations 23.583 and 25.583, Appendix F.

Many earlier manufactured aircraft by original type certification are only required to use airframe materials with flash-resistant qualities. The test procedure in FSSR No. 453 shows that flash-resistant materials may have a burn rate of up to 20 inches per minute. Once ignited in free air, these type materials burn rapidly. Exposed to a fuel or oil-fed fire, the burning would be faster.

When replacing soundproofing and upholstering materials, consideration should be given to the use of material with fireproof or at least fire-resistant qualities. All control openings through engine compartment firewalls and openings into aircraft interiors should also be sealed to help prevent the spread of fire.

The local General Aviation District Office may be contacted for proper and acceptable guidelines in determining if the materials to be used will meet the fire protection requirements in accordance with the Federal Aviation Regulations.

A copy of Flight Standards Service Release No. 453 may be obtained by contacting the Flight Standards National Field Office, Attention: Safety Data Branch, AFS-580, P. O. Box 25082, Oklahoma City, OK 73125.

NICKEL-CADMIUM BATTERY MAINTENANCE

Proper maintenance of ni-cad batteries is necessary to obtain the best performance and maximum cell life.

Two factors have been noted which can be detrimental to a ni-cad battery:

1. Electrolyte level - Not enough can be more harmful than too much. Dry cells are an indication of excessive overcharge or a lack of water. Three hours after charging, the water level should be 1/8" above the plates.

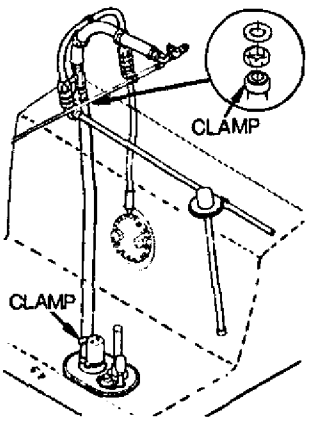
2. DC-4 compound on cell tops - Applying any substance to cells is not authorized. The only area in a ni-cad battery where DC-4 is to be applied is to the cell connector straps where the Ray sensor spring makes contact and to the tips of the sensor springs. Only a light coating is acceptable.

SOMETHING TO THINK ABOUT

FUEL STARVATION

Three engine failures on Bell Model 206 (OH-58) aircraft have been reported recently. In each instance, the cause was traced to fuel starvation. Specifically, the upper and lower clamps that attach the rubber fuel hose between the boost pump and the upper fuel fitting inside the fuel tank are losing torque, allowing air to be drawn into the fuel line. The result is fuel starvation and engine failure. This problem appears to be widespread - 22 percent of the aircraft inspected at one unit were grounded because of this condition.

The problem stems from the tendency of the synthetic rubber to cold flow from under the clamping area over a period of time, causing a loss of effective clamp torque - even though the clamps were properly tightened at installation.



Because of the serious nature of this problem, it is imperative that all maintenance and inspections of these clamps and hoses be performed by the book, and that fuel servicing be accomplished with extreme care.

NOTE

Aircraft hose constructed with synthetic compound has a tendency to cold flow; therefore, when new hose is installed, clamps should, after a time, be retightened to maintain original torque value. This is caused by synthetic rubber flowing from under clamping area and not from loosening of clamps.

1. Clamps on self-sealing hose. Hose clamps on self-sealing hose shall be tightened to a torque of 25 inch-pounds minimum to 30 inch-pounds maximum for original installation, and maintained at this torque value. When sealing is not effective at 30 inch-pounds, component parts of connection shall be examined, and unserviceable parts replaced. Under no circumstances shall hose clamp be tightened in excess of 30 inch-pounds in an attempt to effect sealing. This added torque will reduce safety factor of hose clamps as well as destroy hose and connection.

2. Clamps on nonself-sealing hose. Hose clamps installed on nonself-sealing hose shall be installed and maintained at a torque of 25 inch-pounds minimum to 30 inch-pounds maximum. If satisfactory sealing is not accomplished at a torque of 30 inch-pounds, component parts of connection shall be examined and unserviceable parts replaced.

CAUTION

Internal fuel cell hoses and clamps can be jarred loose with fuel nozzles. Insert nozzle carefully in a generally downward direction; avoid contact with internal fuel hose. Fuel nozzles must be hand-held during servicing.

Flightfax

GENERAL AVIATION INSPECTION AIDS

CUMULATIVE INDEX (Con.)

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SOMETHING TO THINK ABOUT

U. S. GOVERNMENT PRINTING OFFICE : 1977 O - 248-274

AC NO. 20-7P

GENERAL AVIATION inspection AIDS

SUPPLEMENT NO. 4

DECEMBER 1977

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

Flight Standards Service

GENERAL AVIATION INSPECTION AIDS

CUMULATIVE INDEX

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

GENERAL AVIATION INSPECTION AIDS

SUPPLEMENT No. 4
DECEMBER 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 18 and C45 Series	Wing Rear Spar Attach Nut, P/N 18207-2	There have been at least two reports that the aluminum alloy nuts used at the rear spar attachment between the outer wing panels and the wing center section have been found cracked. A metallurgical examination of the fracture surface indicated that stress corrosion of the nuts was the probable cause of failure. It is recommended that these nuts be carefully inspected for cracks, especially at the safety pin hole. If this examination discloses a crack, replacement of the nut, bolt, washers and cotter pin will be necessary. The manufacturer (Beech) suggests that the aluminum alloy bolts and nuts be protected with a light coat of silicone lubricant or other moisture barrier. Care should be taken to avoid excessive torque to the nut.

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

BEECH MODEL 33, 35, 55 AND 95 SERIES AIRCRAFT--LANDING GEAR SYSTEM

Many of the reports received on landing gear retraction system mechanism failures contain evidence that the unsatisfactory condition developed because the weight of the aircraft inadvertently rested on the gear while the landing gear was not fully extended and latched down. This type of situation usually occurs when the gear is not quite fully down at the time the aircraft makes its initial contact with the ground during touchdown. A "down" indication on the gear position light, sight indicator, or warning horn does not always assure the gear is fully down and locked.

In some instances the weight of the aircraft may have rested on the gear momentarily because the landing gear was prematurely retracted during takeoff. Damage can develop instantly if the aircraft momentarily settles back down on the gear during the retract cycle. Unfortunately, the flight crew may not be aware of the damage the system incurred during that period, and the condition goes undetected until too late.

When it is suspected the aircraft was subjected to conditions such as those described above, it is recommended the following examination be made immediately: Check all retract rods for bends or buckles, linkage for cracks or breakage, uplock rollers for ease of operation, and quadrant actuator arms for cracks or damage. A recheck of the rigging and downlock adjustment may reveal one or more of the component parts of the landing gear system out of adjustment.

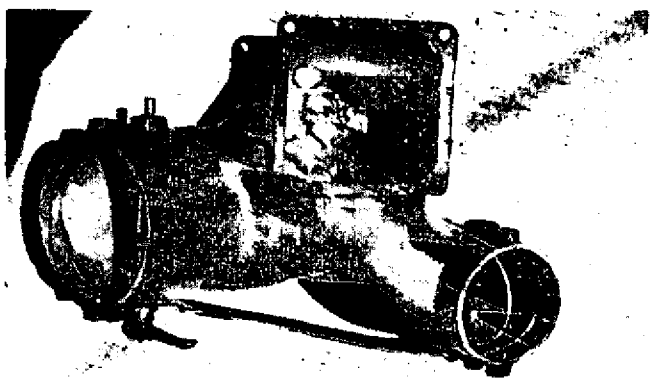
Reference should be made to the applicable Beech Maintenance Manual and Service Bulletins for data on servicing and rigging the landing gear system.

BOEING

Boeing
Model E75

Alternate Air Gasket

An investigation to determine why the engine quit during takeoff revealed that the asbestos gasket which is installed between the exhaust collector and the alternate air manifold had separated and was blocking the carburetor screen. Further checks disclosed that the type of asbestos used was plain sheeting. The type that should be used is wire reinforced asbestos.

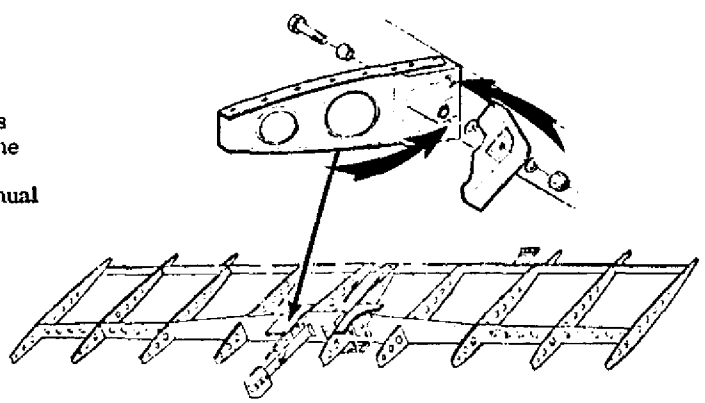


CESSNA

Cessna
Models 177
and 177RG

Stabilator Pivot
Mount Fitting,
P/N 1732001-1

There have been reports which indicate that the bolts used to attach the stabilator pivot mount fittings to the stabilator main spar have been found loose. It is recommended that these bolts be checked at each annual inspection for proper torque.



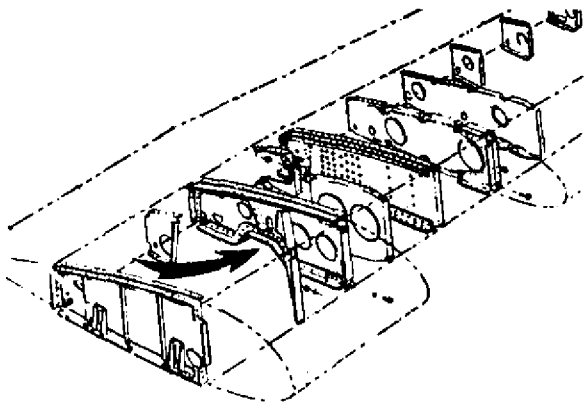
Cessna Model 177RG	Throttle Cable, P/N 9863053-9-2Q76	During landing approach, the pilot attempted to adjust the engine power setting; the engine failed to respond. Investigation revealed that the throttle cable had separated at the swage fitting at the engine end. Total time in service - 420 hours.

Cessna
Models 300
and 400 Series
(Except 336/337)

Wing Rib
Modification

The wing rib onto which the main landing gear side brace attaches has been found cracked on high time, heavy usage aircraft. Reinforcement plates and angles have recently been added to production Model 340 and 400 series airplanes.

Cessna Multi-Engine Service Letter No. ME76-2 has been issued and recommends the wing ribs located within the main wheel wells be inspected for cracks and the main gear upper side brace support be checked for looseness. If cracks are found, the rib can be repaired using Service Kit No. SK414-8E.



CESSNA MODEL 337 SERIES AIRCRAFT--SELF-LOCKING NUT INSPECTION

A special "one-time" inspection of certain self-locking nuts located in the forward engine compartment is required to determine that the correct steel nuts are installed. Some of the airplanes listed below may have been built with brass nuts instead of steel nuts.

Cessna has issued Multi-Engine Service Letter No. ME77-8 to inform owners/operators of this situation. An attachment to the service letter identifies the locations of the questionable nuts. Cessna recommends this service letter be complied with during the next 100 hours of operation.

Aircraft serial numbers affected: 33701672 through 33701748 and P3370226 through P3370257.

FAIRCHILD INDUSTRIES

Fairchild Industries Model FH-1100	Engine Alternate Air Door Cable	Fairchild Industries Service Bulletin Number FH-1100-76-7, dated April 14, 1975, called for rerouting of the alternate air door cable and repositioning of the door spring to prevent possible ingestion of the spring into the engine in event of failure. A recent report advises a piece of an alternate air door cable broke away and was ingested into the engine compressor of a helicopter that incorporated the subject bulletin. Investigation revealed the alternate air door clip, P/N HS 1020-75, had not been repositioned on the door 53 degrees as called out in the bulletin. This caused the cable to be subjected to sharp bending at its ball end fitting, resulting in its failure. Improper positioning of the door clip also caused excessive cable wear at the micarta guide due to misalignment of the cable.
Fairchild Industries Model FH-1100	Swash Plate Drive Ring Assembly, P/N 24-34203-11	During a 100 hour inspection, corrosion was noted between the swash plate drive ring and the main rotor mast. When removed, the ring was found to be corroded and pitted. Surface corrosion was evident on the rotor mast in areas adjacent to the ring.

LEAR

GATES LEARJET MODELS 23, 24, 25, 35 and 36 AIRCRAFT--AILERON CONTROL CABLE IDLER PULLEYS

The following information is contained in Gates Learjet Service News Letter No. 20, dated July 1977:

> "All owners and operators of the subject aircraft are reminded of the availability of Airplane Modification Kit No. AMK77-1. This Kit, when installed, is designed to reduce aileron control cable wear at the fairleads. Gates Learjet recommends the kit be installed no later than the next 600 flight hours."

Aircraft serial numbers affected: 23-003 through 23-099; 24-100 through 24-328; 25-003 through 25-224; 35-001 through 35-115; 36-001 through 36-032.

MOONEY

Mooney Model M20 Series	Oil Cooler Fins	High oil temperatures have been reported which were caused by bent over and obstructed oil cooler fins as a result of rain and insect impact. It is suggested that oil cooler fins be inspected, straightened (if necessary), and cleaned for proper cooling.

MORRISEY

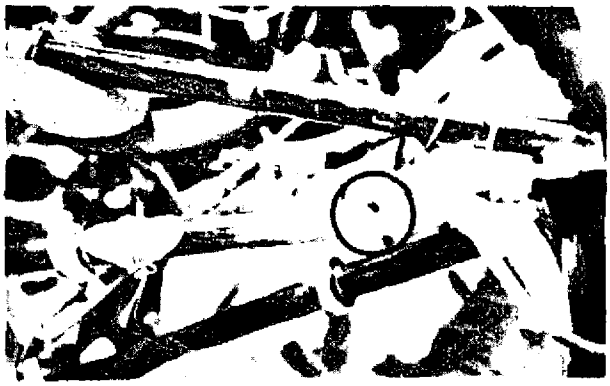
Morrisey Model 2150A	Wing Flap Bellcrank, P/N 26022-9	The left wing flap bellcrank was found to be attached to the bracket through the wrong bolthole which resulted in improper flap travel and permitted the bellcrank to strike the wing rib. Total time in service - 23 hours. A second aircraft was checked and the same condition was found. Total time in service - 96 hours.

PIPER

Piper Model PA-23-160	Fuselage Structure	During an annual inspection of a PA-23-160 aircraft to which Airworthiness Directive 63-26-3 did not apply, cracks were found in the aft fuselage structure that supports the lower rudder hinge bracket. The right channel, P/N 19938-01, left channel, P/N 19938-00, and tail channel, P/N 17121-24, were all found to be cracked adjacent to the lower rudder hinge bracket attachment boltholes.
Piper Model PA-23-250	Main Landing Gear Drag Link Support Tube Assemblies, P/Ns 17420-00, -01, -02, and -03	A repair station has reported seven instances where both left and right inboard and outboard landing gear drag link support tubes were found to be cracked and/or loose. The discrepancies involved seven different aircraft in the 27-2559 through 27-3020 serial number range. Aircraft time in service range from 5931 to 10595 hours.

Piper Model PA-23-250 (Aztec F)	Stabilator, P/Ns 15658-22 and -23	An inspection performed at 273 hours aircraft time in service revealed that all rivets attaching the lower skin to the spars of both the right and left stabilators were loose. Discoloration streaks trailing from the rivet heads directed attention to the unsatisfactory condition.
Piper Model PA-23-250	Wing Flap Torque Tube Attachment Bracket, P/N 17159-01	The right wing flap gave way when stepped on by the pilot when exiting the aircraft. Inspection revealed the wing flap torque tube attachment bracket had broken loose from the fuselage longeron. The aircraft had accumulated 2811 hours time in service. An in-flight failure of a P/N 17159-01 bracket was reported with another aircraft which resulted in jamming of the wing flaps in an intermediate position preventing further extension or retraction.
Piper Model PA-23-250	Fuselage Fitting, P/N 30368-01	During an annual inspection the subject fuselage steel fitting was found to be severely rusted. The fitting is located in the lower right fuselage area just behind the rear baggage compartment aft bulkhead. The condition was evidently caused by entrapped water that apparently leaked past the baggage compartment door seal.
Piper Model PA-23-250	Wing Flap Bellcrank Assembly, P/N 16423-00	During a landing approach, the left wing flap suddenly retracted leaving the right flap extended. The asymmetric flap condition was corrected by placing the control in up position and the landing was executed without flaps. Investigation revealed that the flap bellcrank assembly had separated from the flap control torque tube, P/N 17634-00, resulting in loss of interconnect between the right and left wing flaps. Entrapped water caused internal rusting and subsequent failure of the bellcrank adjacent to its attachment weld.
Piper Models PA-23-250 and PA-24-260	Stabilator Attachment Bolts, P/Ns 502342 and 502329	The corrosion resistant stabilator attachment bolts, P/N 502342 (AN 175-C32A) previously installed in a Model PA-23-250 aircraft in compliance with Airworthiness Directive 74-13-03, were found to be severely corroded. These bolts had been in service only 227 hours and less than 2 1/2 years. Also, the corrosion resistant stabilator attachment bolts previously installed in a Model PA-24-260 aircraft in compliance with the directive were found to be severely corroded. These bolts had been in service for 500 hours and 3 years. Neither aircraft had been operated in a salt air environment and installation of the corrosion resistant bolts deleted the recurrent inspection requirements of the directive.
Piper Model PA-24-260	Stabilator Attachment Fittings, P/Ns 21420-02 and -03	A pilot reported hearing a noise when flexing the stabilator tips during a preflight inspection. Investigation by maintenance personnel disclosed movement of the torque tube fittings inside the stabilator when pressure was applied to the stabilator tips. Further inspection revealed the bolts that secure the fittings to the stabilator were loose.
Piper Model PA-30	Alternate Air Door, P/N 23809	Power on one engine was lost during takeoff. Subsequent investigation revealed the alternate air door assembly hinge broke allowing the door to partially block the induction air flow.

Piper Model PA-30	Engine Mount	Routine inspection at 1511 hours aircraft time in service revealed that the housing of the left engine propeller control cable had been chafing against the engine mount. The cable housing had worn a groove approximately 1/4 inch deep through the center tube of the lower inboard mount cluster approximately 5 inches forward of the firewall.



Piper Model PA-31	Fuel Cell Nipple	Fuel was noted to be leaking from the underside of the right wing. Investigation revealed that the rubber nipple that connects the bottom of the tank to the sump drain had sheared. Improper alignment of the nipple with the drain resulted in tearing and separation of the nipple. The cell cure date was March 1969.
Piper Model PA-31	Hydraulic Hand Pump, P/N 481717	When performing landing gear retraction checks with the aircraft on jacks, the hydraulic hand pump handle broke off. Inspection revealed that the failure occurred across the lever assembly, P/N 752361, adjacent to the hole that accommodates the pivot pin, P/N 757231.
Piper Model PA-31-350	Landing Gear Selector Valve Cable, P/N 44289-00	The landing gear selector valve handle was reported to bind and not return to neutral automatically following gear retraction. Investigation revealed that the selector valve cable was frayed inside its housing, causing it to bind. The aircraft had been in service for 3500 hours, and it is believed that cable failure would have occurred had the binding condition not been detected.
Piper Model PA-31-350	Hydraulic Pump, (Eastern Industries Model 1213HBG-310)	During retraction, the landing gear would not lock in the up position and would not lock down when the selector was placed in the down position. Emergency procedures had to be used to obtain a down and locked indication. This condition was experienced with two aircraft, one at 194 hours and the other at 234 hours time in service. Investigation in both instances revealed that failure of the right engine hydraulic pump shaft seal resulted in depletion of the hydraulic fluid supply for the normal system.
Piper Model PA-31-350	Elevator Hinge, P/Ns 42231-00 and 42749-00	During inspection, excessive play was noted at the outboard hinges of both elevators. Close examination revealed that some of the rivets which secure the hinge brackets to the elevator spar had sheared.
Piper Model PA-31-350	Cowl Flap Actuator Motor Brake Solenoid, P/N 43988-03	During inspection, at 98 hours aircraft time in service, the right engine cowl flap actuator motor brake solenoid was found loose and hanging from its electrical wires. The solenoid plunger, spring and mounting screws were found in the bottom of the aft nacelle area.

Piper Model PA-31-350	Elevator Trim Tab Cable, P/N 41734-38	At 3600 hours aircraft time in service, the elevator trim tab cable was found to be frayed. The fraying was evident on the portion of the cable that was wound around the trim tab servo drum.
Piper Model PA-31P	Fuel Cell, Piper P/N 40519-02 Goodyear P/N 2F1-6-3566-1	At 2188 hours aircraft time in service, fuel stains were noted on the bottom of the left wing. Investigation revealed the left auxiliary fuel cell was leaking due to porosity.
Piper Models PA-31P and PA-31T	Elevator Rib, P/N 54755-02	At 1120 hours time in service, the elevator butt ribs, P/N 45933-00, installed on a PA-31P aircraft, were found to be cracked and were replaced with ribs, P/N 54755-02, per Piper Service Letter No. 778. At 1500 hours aircraft time in service (380 hours later), inspection revealed the new ribs were also cracked. The inboard elevator (butt) ribs, P/N 54755-02, of a PA-31T aircraft were found to be cracked at 226 hours aircraft time in service, and were replaced with new ribs. Reinspection 457 hours later, at 684 hours aircraft time in service, revealed the replacement ribs had also cracked.

Piper
Model PA-31T

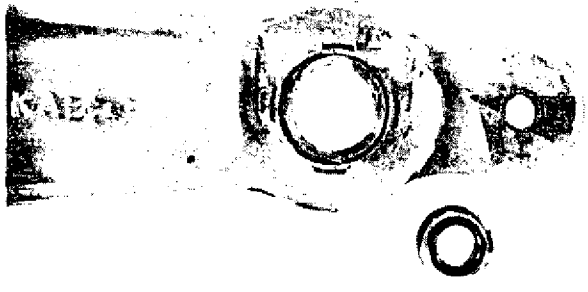
Main Landing Gear
Actuating Cylinder Rod
End Bearing Assemblies

The right main landing gear would not retract after takeoff and would not show a down and locked indication during subsequent gear extension. Investigation revealed that the right gear actuating cylinder rod end bearing assembly had failed through the first thread of the shank at the bearing end. Both the failed assembly and the rod end bearing assembly removed from the left actuating cylinder were found to have hollow shanks rather than solid shanks. Piper Service Bulletin No. 570, dated June 22, 1977, pertains to the subject and calls for inspection of certain serial number PA-31T aircraft within the next 50 hours of operation, and replacement of main gear actuating cylinder rod end bearing assemblies not marked "MXK 46-16A," and those with illegible part numbers found to have hollow shanks.

Piper
Model PA-31T

Elevator Bellcrank
Bearing, P/N 452360

Investigation to determine the cause for excessive play in the elevator control system revealed extensive wear of the elevator bellcrank bearing. This bearing accommodates the forward attachment bolt of the elevator control tube assembly. Total time in service - 300 hours. At 600 hours time in service another PA-31T aircraft was checked and the P/N 452360 bearing outer race was found to be worn to an extent that allowed the ball to fall out when the control tube assembly was disconnected from the elevator bellcrank. An identical condition had previously been reported at 700 hours operating time with a third aircraft.



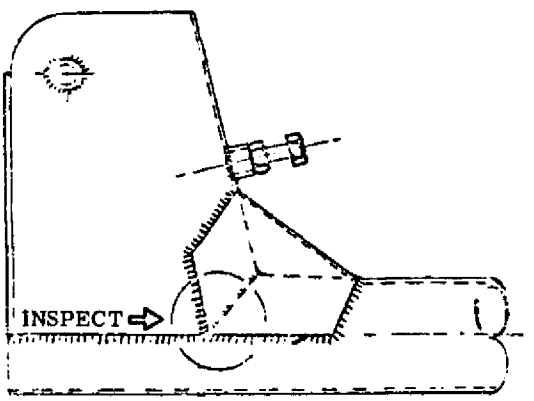
Piper Model PA-34-200	Wing Skin, P/N 95645-01	During inspection, the right wing skin was found to be cracked at the third rib inboard from the tip at the spar and stringer rivets. Total time in service - 1221 hours.
Piper Model PA-34-200T	Wing Structure Nut, P/N 404-531 (MS21042-51)	During inspection, one of the main spar attaching bolts was found to be loose. Investigation revealed that the nut which secures the left inboard attach bolt was found broken in three pieces and lying in the bottom of the aircraft. Total time in service - 131 hours.
Piper Model PA 36-285	Muffler Clamp Retaining Pin	The exhaust muffler clamp retaining pin sheared, allowing the exhaust crossover tube, P/N 98409-00, to separate, discharging hot exhaust gases into the engine compartment. The escaping exhaust gases burned through the lower engine cowling.

PITTS

Pitts
Model S-2A

Control Tube,
P/N 2-5100

The aileron control tube was found to be cracked where the vertical tube interconnects with the horizontal tube. Total time in service - 650 hours. Pitts Service Letter No. 5, dated May 1, 1975, relates to this subject.



ROCKWELL INTERNATIONAL

ROCKWELL INTERNATIONAL MODELS S-2D AND S-2R, EQUIPPED WITH PRATT & WHITNEY MODEL R-1340 SERIES ENGINES--ELEVATOR TRIM TABS

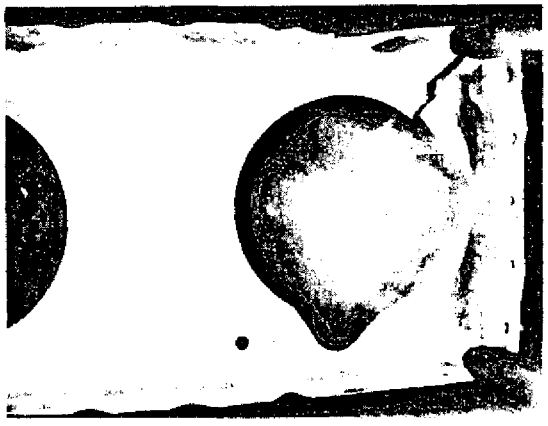
The subject aircraft are designed with anti-servo trim tabs on the elevators to provide the minimum stability/stick force gradients required by regulations. It has been reported that some operators have changed the trim tab action from anti-servo by moving the trim tab horn from the top side of the tab to the bottom side. Aircraft altered in this manner no longer conform to the FAA approved type design.

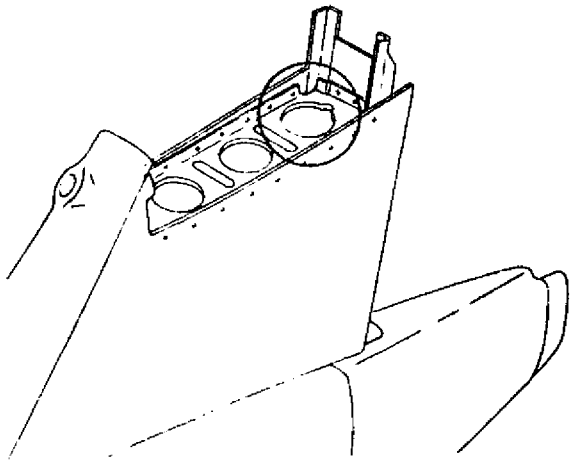
Altered aircraft can be identified by the horn installation on the bottom side at the elevator trim tab, and should be returned to the original FAA approved configuration. For configuration and rigging details, see manufacturer's maintenance manual.

S-2R aircraft fitted with the Wright Model R-1300-1B engine installation (S/N 5000 and up) are designed with servo trim tabs and should not be changed to the anti-servo configuration.

Reports have been received of trim tab linkage wear, resulting in excessive free play in the tabs which could initiate flutter. Free play should not exceed .125 inch when measured parallel to the push rod at the trim tab horn push rod attach point. Worn linkage causing excessive free play should be promptly replaced. Rockwell International Service Letter No. SL-AG-90 provides for a service kit designed for better wear resistance.

Rockwell International Model 112A	Vertical Stabilizer Rib, P/N 44222-3	There have been several reports of vertical stabilizer ribs being found cracked between the aft lightening hole and radii of the corners at the aft end of the rib. Rockwell International Service Letter No. SL-114-10 pertains to this subject.





SIKORSKY

Sikorsky Model S-61	Main Rotor Damper, Assembly No. S6110-26400 Series	A head fracture of an internal wrenching bolt occurred during installation of a new main rotor damper assembly. An investigation revealed that a quantity of these bolts may have been manufactured with too much material removed from the internal wrenching head. Sikorsky Service Bulletin No. 61B10-31B pertains to this subject.

UNIVERSAL AIRCRAFT INDUSTRIES

Universal (Globe) Model GC-1B	Rudder Horn, P/N 11-140-1116	The rivets which attach the rudder horn to the brackets, P/Ns 11-140-1190-1 and -2, were found to be sheared after the aircraft had been subjected to high winds while parked. These sheared rivets appeared to be good as all heads were in place. Normal inspection procedures did not reveal the discrepancy but the condition became apparent in flight, during high rudder loads.

WEATHERLY

Weatherly Model 201B	Wing Bolts, P/N AN4-24	As aircraft taxied in after spray operation, maintenance personnel noticed that the left wing was low. After removal of the wing fillet fairing, the rear spar fitting bolts were found to be backed away from the fitting, P/N 50222-9, approximately 1/4 inch. The right wing was checked and the same condition was found. Total time in service - 1757 hours.

ACCESSORIES

BENDIX

Bendix Fuel Injector Model RSA-10ED1	Adjustment Nut, P/N 178491	In-flight engine power loss at approximately 200 hours time in service was caused by a defective fuel injector assembly. Flow bench test of the unit revealed a maximum fuel flow of 68 pounds per hour instead of the specified 156.5 pounds per hour. Further investigation disclosed the regulator valve diaphragm stem adjustment nut was loose. When the nut was adjusted to provide the required fuel flow, the threads of the diaphragm stem did not penetrate the elastic portion of the nut.
Bendix Fuel Injector Model RSA-5AB1	Automatic Mixture Control, P/N 2538056	Higher than normal cylinder head temperatures and decreased engine power output was determined to have been caused by too lean fuel air ratio. Investigation revealed that the automatic mixture control bellows was cracked.
Bendix Fuel Injector Model RSA-5AD1	Manual Mixture Control Bushing Sleeve, P/N 2520878	Fuel leakage past the fuel injector manual mixture control shafts of the right and left engine fuel injectors was determined to be the source of fuel fumes in both engine compartments. It was found that, at about 1500 hours time in service, the manual mixture control plastic bushing sleeves had worn egg-shaped, permitting external fuel leakage.
Bendix Fuel Injector Model RSA-5AD1	Servo, P/N 11056-38	The cause for complete engine power loss during takeoff was determined to be a ruptured servo diaphragm. Inspection also revealed the servo was contaminated with dirt and foreign matter.

LEAR SIEGLER

Lear Siegler Starter-Generator Model 23048-001	Cooling Fan	The right generator of a Piper PA-31T aircraft would intermittently go off the line during cruise. Subsequent investigation revealed the generator cooling fan had failed and two of the fan blades entered the commutator section, short circuiting the brushes. The starter-generator had been in service 106 hours since overhaul.

The Airframe and Powerplant Mechanic's Handbooks, AC 65-9, -12, and -15, have been updated and are now available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. (25402). Please order by stock number.

AC 65-9A, Airframe and Powerplant Mechanics - General Handbook ($6.75, GPO stock number 050-007-00379-0)

AC 65-12A, Airframe and Powerplant Mechanics - Powerplant Handbook ($6.50, GPO stock number 050-007-00373-1)

AC 65-15A, Airframe and Powerplant Mechanics - Airframe Handbook ($6.00, GPO stock number 050-007-00391-9).

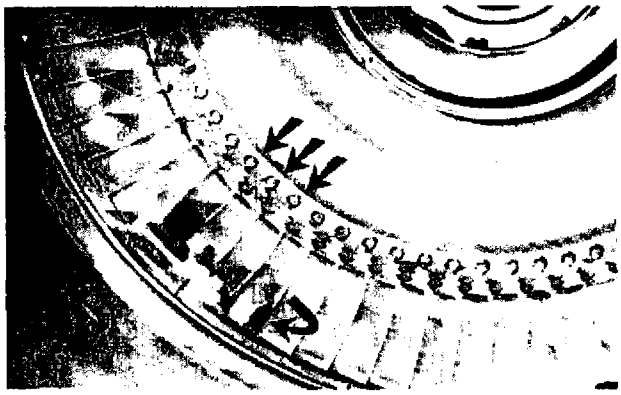
ENGINES

LYCOMING

Lycoming Model IO-360-A1B6	Intake Pipe, P/N 78742	During inspection, at 300 hours engine time in service, a hole was detected in Number 2 cylinder intake pipe. There were no other objects in the vicinity, and the pipe surface showed no evidence of chafing.

Lycoming Model IO-360-C1EB	Governor Drive Idler Shaft, P/N 77876	Inspection of both engines installed in a Piper Model PA-34 aircraft revealed that the governor drive idler shafts were severely worn. The engines had been in service for 750 hours. Lycoming Service Instruction No. 1343, dated August 6, 1976, calls for a set screw to retain the idler shaft instead of a spring pin and advises of a new P/N LW-14021 shaft. Compliance is recommended at the next engine overhaul.
Lycoming Model IGSO-540-A1A	Propeller Reduction Ring Gear, P/N 65970	Ferrous metal chips were found in the oil strainer during routine inspection at 175 hours engine time in service. Further investigation revealed improper wear pattern and galling of the propeller reduction ring gear teeth.
Lycoming Model IO-540-A2A	Starter Ring Gear Support Assembly, P/N 75030	Power output from the left engine alternator of a Piper Model PA-31 aircraft was lost shortly after takeoff. Investigation revealed that the slip rings for the electric propeller deicer had separated from the starter ring gear and severed the alternator drive belt.
Lycoming Model IO-540-K1C5	Crankcase Half, P/N LW-11964	The propeller was feathered due to loss of oil pressure. Investigation revealed that the engine oil supply was lost due to a crack in the left crankcase half. The crack originated below the No. 1 cylinder pad and progressed upward between No. 1 and No. 3 cylinders, and terminated at the No. 1 intake valve lifter location. The engine total time was approximately 12700 hours, and it had operated about 700 hours since major overhaul.
Lycoming Model LTIO-540-J2BD	Exhaust Pipe, P/N LW-12468	Stains from exhaust blow-by were detected on fluid hoses and the right engine mount of a Piper Model PA-31-350 aircraft during inspection at 98 hours aircraft time in service. An exhaust system pressure check revealed the right exhaust pipe was cracked 50 percent around its circumference at the flange area.

Lycoming Model TIGO-541-E1A	Crankshaft Counterweight and Bushing	During routine inspection, at 230 hours since engine remanufacture, a piece of a counterweight bushing, P/N 74876, and a piece of the dynamic counterweight were found in the oil sump.
United Aircraft of Canada Model JT15D-1	Lower Power Shaft Bearing, P/N 3013696	Investigation following reported smoke in the cockpit revealed large amounts of metal in the engine oil. Further inspection disclosed the cause of difficulty to be failure of the lower power shaft bearing in the engine accessory section. The engine had been in service 1060 hours.
United Aircraft of Canada Model JT15D-1	High Turbine Blade, P/N 3019001	The engine was removed because of reported vibration and metal found in the exhaust duct. Disassembly inspection disclosed the cause of difficulty to be (N2) high turbine blade failure. Pieces of the broken blade(s) entered the gas path causing damage to both the N1 and N2 stationary and rotating blades.



United Aircraft of Canada Model PT6A-20	Chip Detector, P/N 30193738	At 400 hours time in service the chip detector unit was not functioning. Inspection revealed no continuity between the magnet and connector pin.
United Aircraft of Canada Model PT6A-28	Oil Filter Check Valve, P/N 3021558	The engine was shut down when the oil pressure suddenly dropped to 45 PSI. Investigation disclosed the oil filter check valve stem had failed at the dowel pin hole. The oil filter housing and valve were replaced. After about 10 hours of operation another in-flight engine shutdown was executed when the oil pressure dropped to 30 PSI. Subsequent investigation revealed a piece of the old check valve dowel pin, which evidently had remained in the oil system following the previous failure, lodged under the oil pressure relief valve.

MAINTENANCE NOTES

SAVE THOSE THREADS

"Never screw aluminum fittings together without a thread lube of some kind." I have run into half a dozen stripped out fittings this past week and have even had a couple of fittings ruined right here at the office because fellows put them together to see if they would fit. A hint might be to keep a plain old bar of soap on a piece of string in the shop. When you are playing with fittings and matching them up for fuel or instrument systems, a wipe across the bar of soap with the end of the fitting will keep them from galling up and locking together. This is especially important on pipe threads.

Designee Newsletter

EXTEND THE LIFE OF THAT TRANSISTORIZED RADIO

With the advent of solid state radios in planes, communicating and navigating has become more reliable and accurate. The sound quality is better, and for the most part, range has improved; but transistorized radios do need extra care in a few areas, such as:

1. Voltage transients (or spikes) are created when an engine is started or shut down and can seriously damage transistorized equipment. Make sure radio gear is off before starting or stopping the engine.

2. High temperatures seriously degrade the life of transistor equipment. An airplane parked in the sun can have cabin temperatures as high as 150 degrees. Cover your windshield or instrument panel, especially during the summer.

3. Humidity directly affects the life of transistorized components. Damp cabins or instrument panels are bad omens for your transistorized equipment. Seal your cabin leaks and keep moisture absorbents, such as silica gel packets, around enclosed spaces next to the radios.

4. Most transmitter duty cycles are 20 to 25 percent. This means if you transmit to 10 seconds, you should let the transistors rest and cool down for 40 to 50 seconds before transmitting again. Long transmissions and short cycles will decrease your transmitter's performance and longevity if continued over a long period of time.

DAAS FLYpaper

SOMETHING TO THINK ABOUT

FUEL REPORT

We are pleased to report that complaints about engine problems caused by the use of 100 LL aviation fuel in our engines certified for 80 octane aviation fuel have disappeared in recent months.

Your Editor checked this situation with AOPA, Teledyne Continental, and members of the FAA, who all confirmed they no longer hear complaints. It may be that our stress on the need for improved operation and good maintenance has helped, along with the increased availability of 80 octane aviation fuel.

AVCO Lycoming

MoGAS ACCIDENT REPORTS

NTSB said failure to follow approved procedures and mismanagement of fuel were the probably causes of the crash of a single engine plane at Lansing, Mich., on April 7, 1976. The engine lost partial power on initial climb and the pilot was forced to ditch the plane on water. Two passengers were seriously injured and the pilot and two other passengers sustained minor injuries. The Cessna was destroyed. The board said there were four seat belts and five people aboard the plane, and the aircraft was burning automobile gasoline. The commercial pilot, 38, had logged 394 total hours, 51 in type.

AVCO Lycoming

NO FUEL ADDITIVE NEEDED

In answer to the question frequently asked of us at the factory by operators in the field concerning TCP or fuel additives, our position is that we have no plans at this time to test such additives because we think fuel additives are not needed. Advocates of TCP say it is necessary for the engine certified for 80 octane aviation fuel, but forced to use the higher leaded aviation fuel in order to cope with the lead.

However, we do not have any recent complaints about spark plug lead fouling in engines certified for 80 octane aviation fuel, but forced to consistently use a higher leaded aviation fuel. In addition to this, four fuel companies are now supplying 80 octane aviation fuel in the U.S., making the availability of this fuel considerably expanded. TCP should not be used with turbocharged engines.

AVCO Lycoming

GENERAL AVIATION INSPECTION AIDS

CUMULATIVE INDEX (Con.)

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ENGINES

PROPELLERS

MAINTENANCE NOTES

SOMETHING TO THINK ABOUT

U.S. GOVERNMENT PRINTING OFFICE : 1977 O - 250-613

AC NO. 20-7P

GENERAL AVIATION inspection AIDS

SUPPLEMENT NO. 6

FEBRUARY 1978

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

Flight Standards Service

GENERAL AVIATION INSPECTION AIDS

CUMULATIVE INDEX

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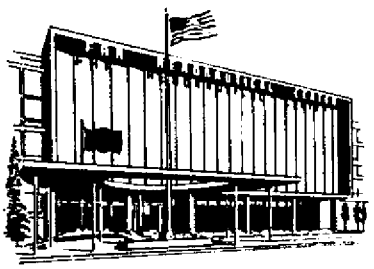
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
WASHINGTON, D.C. 20590

GENERAL AVIATION INSPECTION AIDS

SUPPLEMENT No. 6
FEBRUARY 1978



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

BELL

Bell Model 205A-1	Float Cross Tube, P/N 205-706-050-013	During takeoff, the left landing gear float separated from the aircraft. Investigation revealed that the float forward cross tube had failed through the rivet hole under the mounting saddle. Total time in service - 824 hours.
Bell Model 206L	Main Transmission Restraint Bushings, P/Ns 206-033-521-005 and 206-033-523-003	During inspection the transmission restraint was found to have excessive side movement. Investigation revealed that the teflon bushings were severely worn. Total time in service - 203 hours.

BELLANCA

Bellanca Model 8KCAB	Main Landing Gear Bolt, P/N MS 520007	During taxi, a main landing gear collapsed. Investigation revealed that the landing gear retaining bolt failed. The bolt showed evidence of working prior to complete failure. Total time in service - 275 hours.

BOEING

Boeing Model 107-II	Rotor Hub Lag Damper, P/N 107R2563-4	During preflight inspection, the lag damper piston rod, P/N 5521642, was found broken. This part had been in service for 303 hours and no in-flight difficulties had been reported.

FAIRCHILD INDUSTRIES

Fairchild Industries Model F-27A	Diode, P/N 1N1084	The cause of inability to retract the landing gear was traced to a defective diode in the control panel, even though it checked satisfactorily with a tester.
Fairchild Industries Model F-27A	Cabin Pressurization	Cabin pressurization was reported to be inoperative in both automatic and manual. Investigation disclosed the cause to be a loose clamp at the recirculation blower.
Fairchild Industries Model F-27A	Wing Skin	During routine inspection, at approximately 26250 hours aircraft time in service, a crack was found in the right wing lower skin. The crack was about 1/4 inch in length, and was located at wing station 174 adjacent to the fuel tank sump fitting.
Fairchild Industries Model FH-227-B	Spring, P/N 27-727659-3	The pilot reported the elevator controls felt light during preflight check, and the aircraft required an abnormal amount of nose down trim in flight. Subsequent investigation revealed the left elevator control bungee spring was broken.
Fairchild Industries Model FH-227-C	Generator	The cause for in-flight activation of the undervoltage warning light and AC generator failure were traced to chafed and shorted wires in the right engine nacelle.

Fairchild Industries
Model FH-1100

Oil Pressure Switch,
P/N 910615

An emergency landing was executed because of in-flight vibration. Subsequent investigation revealed the paint on the transmission housing was scorched, and the second stage planetary gears had failed from the lack of lubrication. Even though loss of oil pressure to the transmission is believed to be the cause of difficulty, the pilot advised the low oil pressure light for the transmission did not activate. Inspection disclosed a broken wire under the potting compound of the low oil pressure switch.

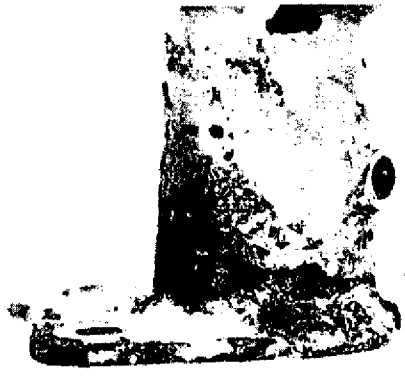
In addition, the one-way check valve, installed in the oil line to prevent oil from draining back into the tank after shutdown, contained grit and dirt. It is believed this caused the valve to remain open, resulting in loss of prime to the oil pump.

GRUMMAN - AMERICAN

Grumman-American Model G-164A	Elevator Horn Bearings, P/N KS-4	Excessive play was detected in the elevator control system during preflight inspection. Further investigation revealed that the upper and lower bearings installed in the elevator horn assembly, P/N A1841-3, were severely worn. The upper bearing fell apart when the control linkage was disconnected. This discrepancy was found at approximately 800 hours aircraft time in service.

Grumman-American Model G-164A — Rudder Tubular Spar, P/N A1203-11

When performing the inspection called for in AG-CAT Service Bulletin No. 61, the rudder spar was found severely corroded. The tubular spar was corroded through approximately one half of its circumference on the lower end. The aircraft had been in service 5799 hours and 8 years.



HUGHES

Hughes Model 269C	Throttle Cable, P/N 269A4683-3	The throttle control operation became stiff during flight. During investigation of the control (after landing), the engine end separated from the cable. Total time in service - 801 hours.
Hughes Model 369D	Pitch Control Rod End, P/N 369A1011	The pitch control upper rod end was found to be loose. Investigation disclosed that the rod end teflon insert was severely worn. Total time in service - 19 hours.
Hughes Model 369D	Main Rotor Blade Retention Strap, P/N 369D21210	The top lamination of the retention strap pack of the white main rotor blade was found to be broken. The break was in the tongue section on the outer end. Total time in service - 50 hours.
Hughes Model 369HS	Main Rotor Transmission Assembly Bolts, P/N 369A5174	During inspection of the main rotor transmission to determine the cause of the magnetic chip detector light illumination, a loose piece of safety wire was found. Further checks disclosed that four of 16 bolts which attach the shaft, P/N 369A5158, to the output ring gear in the transmission was sheared. Nine others were near failure as determined by magnaflux. The remaining three bolts were serviceable.

ISRAEL AIRCRAFT

Israel Model 1121	Horizontal Stabilizer Fitting, P/N 4453005501	During inspection, the horizontal stabilizer aft spar fitting was found to be cracked. One ear on the left side of the fitting was broken off and the crack had penetrated through the fitting. Total time in service - 5376 hours.

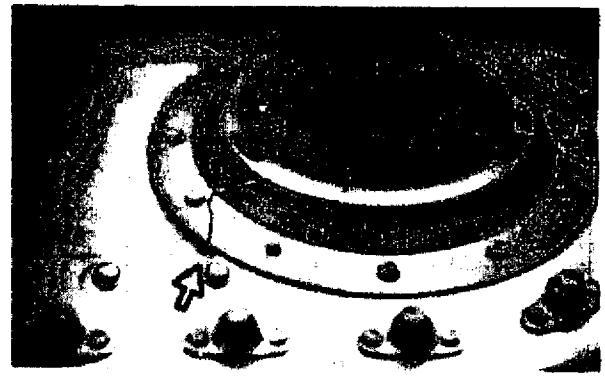
Israel Model 1124	Horizontal Stabilizer Bolt, P/N 2-453007	The horizontal stabilizer aft attach bolt at Station 521.75 was found to be loose. Total time in service - 531 hours. A second aircraft was inspected and the same condition was found. Total time in service - 534 hours.
Israel Model 1124	Rudder Trim Tab Actuator, P/N 5793500-503	During inspection, the rudder trim tab was found to be twisted. Investigation revealed that the trim tab top actuator shaft was broken. Total time in service - 593 hours.

McDONNELL DOUGLAS

McDonnell Douglas Model DC-9-14	Rudder Control Pulley, P/N MS20220A3	An investigation, to determine why the rudder control was binding, revealed that the pulley for the rudder primary control cable (located in the tail section near station Y984) was split. Failure of the pulley was attributed to intergranular corrosion. Total time in service - 28281.

MOONEY

Mooney Model M20F	Fuel Tank Plate, P/N 610036-007	During inspection, the fuel tank plates on the bottom of the left wing were found to be leaking. When the plates were removed for resealing, water and corrosion were found in the tank. Further checks disclosed that the sealant was missing from around the fuel filler cap well. In addition, corrosion had progressed through the tank in two places in the filler cap well, permitting water to enter the tank.



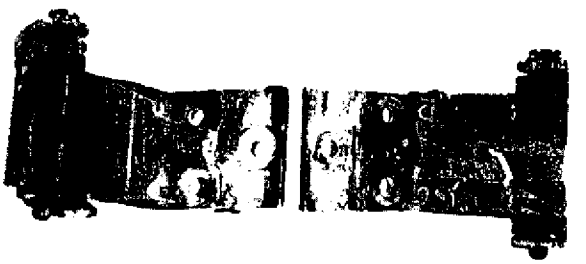
PIPER

Piper Model PA-18-150	Wing Front Spar Attachment	The aircraft was involved in a ground incident which resulted in minor damage to a wing tip. Subsequent investigation revealed that although the wing tip damage was relatively slight, failure of the wing front spar attachment at the fuselage occurred, leaving the wing supported only by the rear spar-to-fuselage attachment and the lift struts. Complete inspection of wing attachments should be performed whenever wing tip damage occurs, because extremely high loads may have been transmitted to that area.

Piper
Model PA-23

Cabin Door Hinges,
P/N 18094-00 and 01

During annual inspection, the cabin door hinges were found badly deteriorated from intergranular corrosion. The discrepancy was detected at 2600 hours and 19 years of aircraft time in service.



Piper Model PA-23-250	Fuel Selector Valve Control Cable, P/N 30856-00	The cause for in-flight engine stoppage was traced to failure of the right fuel selector valve control cable. When the selector valve control was moved from auxiliary tank to main tank position during approach for landing, the valve remained in auxiliary tank position. Investigation revealed binding at the valve swivel fitting resulted in cable bending, overstress, and fatigue failure. Inspection further disclosed all other fuel selector valve swivel fittings were excessively tight, which would have resulted in cable failure if not detected and corrected. The aircraft had been in service for 857 hours and requirements of Piper Service Bulletin No. 507A, dated November 9, 1976, had not been accomplished.
Piper Model PA-23-250	Alternate Air Door, P/N 31207-03	Complete power loss necessitated feathering of the left propeller immediately prior to lift off. The pilot was unable to restart the engine in flight and a single engine landing was required. Investigation revealed the alternate air door hinge pin, which is vertically mounted, had worn through the induction air box and had fallen free. The door then dislodged and was drawn into the fuel injector air inlet, almost completely blocking engine induction air flow.
Piper Models PA-24-180	Strut Housing, P/Ns 20752-12 and -13, and 20753-00 and -01	Cracks were reported in the left and right main landing gear strut housing assemblies of a model PA-24-180 aircraft (at 3000 hours time in service), and a model PA-30 aircraft (at 6200 hours time in service). The cracks were located adjacent to the lower bolthole in the reinforcement webbing that bridges the radius between the strut housing cylinder and its aft horizontal member.

STATISTICS are like a Bikini; what they Reveal is Interesting, but what they Cover is Vital

Piper Model PA-24-250	Fuel Cell, P/N 20355-00	Fuel stains were noted under the left wing. Investigation disclosed fuel seepage between the fuel cell material and the nutplate ring that secures the access plate assembly, P/N 21810-04, to the fuel cell. This fuel cell had been in service approximately one year.
Piper Model PA-24-260	Oil Radiator Inlet Hose, P/N 17766-48	In-flight engine stoppage occurred because of oil starvation. Investigation revealed all engine oil was lost due to rupture of the oil radiator inlet hose. Record review indicated the hose had been in service for approximately 10 years and 1300 hours of operation. Additionally, the hose assembly was lagged or sheathed, and this covering evidently had never been removed to facilitate inspection. FAR 43, Appendix D, and Piper inspection check sheets call for periodic inspection of hoses for looseness, leaks, and condition.
Piper Model PA-24-260 (Australian Registry)	Wing Rib, P/Ns 25409-00 and -01	During routine inspection, left and right wing ribs were found to be cracked at the flap control pulley bracket attach point. Total time in service - 2215 hours.
Piper Model PA-24-260	Engine Driven Fuel Pump, AC P/N 40296	The cause for in-flight engine stoppage was traced to loss of engine fuel pressure. Investigation revealed the secondary arm of the engine-driven fuel pump was broken. In addition, two shear pins in the fuel booster pump were found sheared. The engine had been in service 20 hours since overhaul, and records show the boost pump had been installed approximately 6 months prior to the reported difficulty.
Piper Model PA-25-235	Control Cable	Inspection performed at 695 hours aircraft time in service revealed excessive wear and fraying of the rudder and elevator control cables. The cable wear and/or fraying was detected adjacent to fairleads that had previously been installed in compliance with Piper Service Letter No. 702, using Kit No. 760841.
Piper Model PA-28-180 (Australian Registry)	Alternator Wire	Electrical power was lost during flight. Investigation revealed that the alternator field wire was broken at the series resistor due to an incorrect wire stripping technique. Aircraft total time since overhaul - 92 hours.
Piper Model PA-31	Propeller Governor Control Cables, P/Ns 24894-08 and -09	An unscheduled landing was necessitated when control of both propeller governors was lost during climb. Investigation revealed the inner rods of both propeller governor control cables had seized in their outer housings at the governor pulley end. Vertical mounting of the cable assemblies at the governor end allows precipitation, which enters the engine nose cowling openings to run down the cable rods and enter the housings, particularly if excessive clearance is present due to wear, or if the control cable rods have not been properly lubricated. The moisture that enters the cable housing can freeze at altitude, resulting in loss of governor control.

SAFETY is Everybody's Business

iper lodel PA-31	Fuel Selector Valve Control Cable	The pilot was unable to select the left main fuel tank due to failure of the selector valve control cable. Investigation disclosed binding of the control cable swivel fitting, P/N 70371-00, resulted in excessive bending of the cable and subsequent fatigue failure. Factory installation of too many washers at the swivel fittings caused them to be excessively tight and not swivel freely with cable movement. Piper Service Bulletin No. 507A pertains to the subject; however, the serial numbers listed in the bulletin do not include this aircraft. Aircraft time in service - 376 hours.

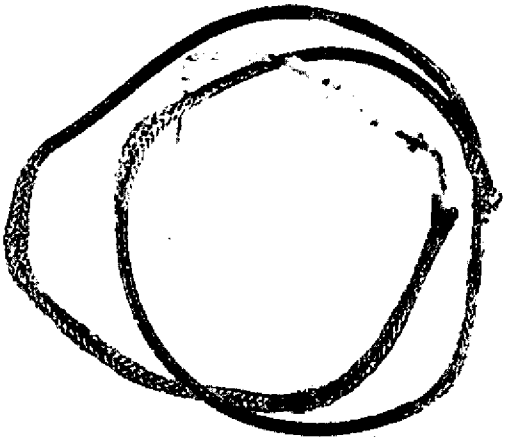
PIPER MODEL PA-31 SERIES -- MAIN LANDING GEAR DOWNLOCK HOOK, P/N 41983-01

At 190 hours time in service, the right main landing gear of a PA-31-350 aircraft failed to show a down and locked indication after several extension attempts. Ground inspection revealed the downlock hook was stuck in the unlocked position. Application of slight downward force moved the hook to the locked position. Cleaning and lubrication of the hook restored proper operation, and the aircraft was returned to service. However, the problem recurred after 30 hours of operation. Inspection disclosed hook binding resulted from inadequate side clearance between the hook pivot bolt bushing and the main gear side links. The aircraft service manual assembly procedure states "insert the pivot bolt and on each side of the bushing, install spacer washers (P/N 407566/AN960) to maintain a minimum amount of side play." In this instance, the use of too thick a washer on one side of the hook eliminated all side play, causing hook binding with slight accumulation of engine exhaust deposits.

Piper Service Letter No. 755, dated October 20, 1975, calls for inspection and lubrication of landing gear downlock actuator rod assemblies at each programmed inspection in order to prevent binding. Although not specifically called for in the service letter, inspection and lubrication of the downlock hooks is also recommended. The number of malfunction reports received since the service letter issuance indicates the manufacturer's recommendations are not always adhered to.

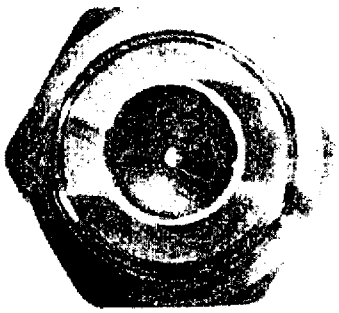
iper lodel PA-31-350	Magneto Primary "P" Leads J16FB, J17FB, and J18FB

The cause for loss of engine magneto output was traced to short-circuiting of the "P" leads forward of the fire wall. The subject leads are routed over and in close proximity to the engine turbocharger, resulting in burning and deterioration of the wire insulation.



Piper Model PA-31P	Wing Spar	Surface corrosion was noted on the rear spar and adjacent structure inside the left wing. The condition was attributed to engine exhaust gases entering the wing through cutouts provided for the flap transmission, flap tracks, and flap indicator transmitter linkage. Aircraft time in service - 1500 hours.
Piper Model PA-32R-300 (Australian Registry)	Elevator Trim Cable, P/N 62701-135	The elevator trim cable failed during takeoff. Inspection disclosed that the cable was misaligned at the trim servo. Total time in service - 268 hours.

Piper Model PA-36-285	Fuel System Fitting, P/N 491-053 (AN815-8D)	During engine conversion work, inspection disclosed that fuel would not flow to the engine from the forward or auxiliary fuel system. Investigation revealed the fitting installed in the outlet side of the fuel shutoff valve, P/N 98494-00, was completely blocked. Further examination disclosed the inside diameter of the fitting had not been bored completely through during manufacture. The aircraft was reported to have operated 25 hours before the fitting blockage was discovered.



SCHWEIZER

Schweizer Model SGS 2-32	Rudder Cable	During routine inspection, the right rudder cable was found worn almost 2/3 through the fuselage skin adjacent to the rear seat. When occupied, the rear seat would deflect, pressing the cable between the seat structure and the fuselage skin. The glider had been in service for 2600 hours, and evidently the control system binding had not been reported.

AIRFRAME COMPONENTS

GOODYEAR

GOODYEAR -- MAIN LANDING GEAR BRAKE DISC, P/N 9543505

The right main landing gear brake locked as brakes were applied during a landing roll of a Rockwell International Model NA-265 aircraft. After the brake was disassembled, inspection revealed that the three rotating brake discs were smaller in circumference than the replacement discs. Further checks disclosed that when the disc wears, it drops below the wheel key and locks the brake. Total time in service - 140 hours.

ACCESSORIES

BENDIX

Bendix Fuel Injector Model RSA-5AD1	Air Adjustment Screw	The pilot declared an emergency when the engine would not run above 1500 RPM. Investigation revealed that the nut, P/N 2537499, had backed off the fuel injector air diaphragm adjustment screw. The injector had accumulated 250 hours since overhaul.

ndix agneto Models D-2000 and D-2200	Coil Retention Screw Torque	Airworthiness Directive 77-17-07, paragraph (d), applies only to the subject model magneto bearing with serial numbers below 4400 and coil retaining screws that are internal to the magneto. These screws should be checked for the proper torque value, which is 70/75 inch pounds. Reports indicate the 70/75 inch pound torque has been applied to self-locking screws, P/N 10-382899, used to retain coils in later serial number magnetos. These screws have heads externally accessible to the magneto case, and the torque value must be 10 to 15 inch pounds, but never higher than 15 inch pounds. Excessive torque will result in severe distortion of the magneto housing. If the coil retention screws have had excessive torque applied, the "detailed instructions" of Bendix Service Bulletin No. 590, dated May 1977, must be accomplished. This is necessary to insure sufficient clearance between the magneto rotor and the housing pole shoes, because interference between these parts could result in complete loss of ignition.

MARVEL - SCHEBLER

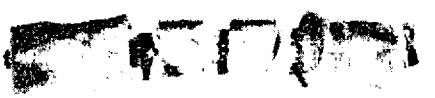
Marvel-Schebler Carburetor Models MA-3A and MA-4SPA	Body Screws	Inspection (at 1420 hours time in service) revealed that the carburetor body to bowl assembly screws were loose, even though their lock tabs were in place. It appeared the gasket had shrunk. A similar condition was recently reported (at 1081 hours time in service) with a model MA-4SPA carburetor. In this instance, lean engine operation and inability to shut down the engine by using the mixture control directed attention to the difficulty. In both cases, external fuel leakage presented a serious fire or explosion hazard.

COMMUNICATION/NAVIGATION EQUIPMENT

EDO-AIRE

Edo-Aire Mitchell Autopilot Model Century III	Trim Switch Wire

The cause for intermittent operation of the autopilot control wheel trim switch was attributed to improper installation of a "knife" type wire terminal. The crimped terminal had been installed over the wire insulation.



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. AA Form 8330-2, available from the local General Aviation District Office, may be used for reporting purposes.

NARCO

Narco Pictorial Indicator Model DGO-10	Spur Gear, P/N 631-0097-902	At 400 hours time in service, the omni bearing selector spur gear was found severely worn. Plastic particles from the worn gear were free to fall into the VOR/LOC and glideslope meter movements which could render them inoperative. An identical condition was previously found on three occasions with units that had been in service from 400 to 500 hours.

EQUIPMENT

COMMUNICATION COMPONENTS CORPORATION

Communication Components Emergency Locator Transmitter Model CIR-10	Battery	Reports continue to be received regarding battery failures which resulted in extensive corrosion in the area surrounding the ELT, including control cables and turnbuckles.

NARCO

Narco Emergency Locator Transmitter Model ELT 10	Contact Separator, P/N 906930101	The ELT signal was not heard following an aircraft accident. It is believed the "G" switch had actuated, but the signal was not transmitted because the antenna was disabled due to the contact separator not being inserted during antenna coax connector installation.

INSTRUMENTS

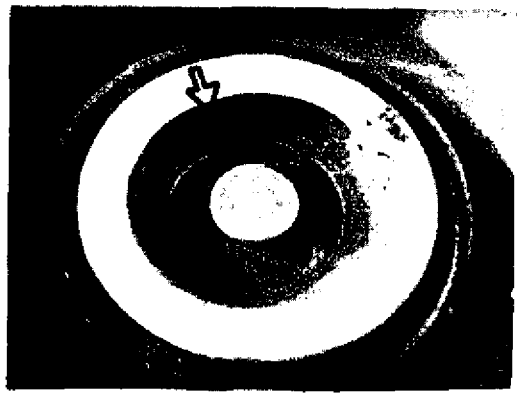
AIRCRAFT RADIO CORPORATION

Aircraft Radio Corporation Encoding/Alerting Altimeter Model EA-801A	Zener Diode	A few instances have been reported of inadequate illumination of the encoding/alerting altimeter. Where this condition is experienced, a check should be made to make certain that the proper zener diode is installed. In this circuit the zener diode limits the lamp voltage to 14 volts and the correct diode to use is part number 1N5351B. Cessna Service Letter ME77-25 relates to this subject. This updates the item on page 65 of the General Aviation Inspection Aids Supplement No. 5, dated January 1978.

CONTINENTAL

Continental Model 6-285-C — Rotocoil Assembly, P/N 637790

Several exhaust valve rotocoil assemblies were found to be cracked during engine disassembly. Total time in service - 704 hours.



Continental Model C-75, C-85, C-90, C-125, O-200 and O-300 Series — Rocker Arm Identification

It has been brought to the attention of the Teledyne Continental Motors Aircraft Service Department that, on occasion, intake and exhaust rocker arms are not being installed in their proper respective positions during servicing of the above mentioned model engines.

We wish to point out that intake rocker arms, Teledyne Continental Motors part number 639614, do not have an oil orifice drilled in the valve stem end of the rocker arm as does the exhaust rocker arm, Teledyne Continental Motors part number 639615. The oil orifice provides needed lubrication to the exhaust valve stem during engine operation. Caution notes regarding this subject should be placed in your Teledyne Continental Motors Overhaul Manuals, Form Number X-30013, dated July 1970, or earlier, and Form Number X-30010, dated April 1973, or earlier.

Continental Model O-200A — Cylinder, P/N TM641916A1

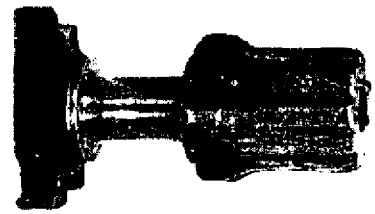
All four cylinders were found to be cracked in the head area of the intake ports. Total time in service - 198 hours.

Continental Model O-200A — Crankcase, P/N 628A22A-1

Inspection of the front crankcase area revealed an oil leak around the plug, P/N 532432. Attempts to stop the leak by replacing gaskets and tightening the plug were unsuccessful. Further checks with a probe disclosed that the wall thickness of the case was very thin and the probe went through the case in the counterbore area for the plug.

LYCOMING

Lycoming Model O-320-H2AD	Oil Return Line, P/N LW-15362	Inspection of a Cessna model 172N aircraft, at 15 hours time in service, revealed chafing between the engine cooling baffle and the No. 2 cylinder oil return line. This condition caused excessive wear at the outside radius of the line which would have resulted in line failure and loss of oil supply.
Lycoming Model O-360-A4K	Fuel Shut Off Valve, P/N 242541	The cause for lean fuel air ratios above 1800 RPM was traced to excessive end play (about 1/8 inch) in the fuel shut off valve shaft. Shifting of this rotory type valve restricted fuel flow to the main fuel nozzle. The excessive end play was attributed to wear of the pin, P/N 15-A1, which secures the valve in the carburetor body assembly. The carburetor had been in service for 816 hours and 95 hours since disassembly and inspection.
Lycoming Model O-540-E4B5	Governor Drive Gear, P/N 70387	Decoupling of the camshaft governor drive gear resulted in propeller overspeed and a forced landing. Subsequent investigation revealed the P/N STD-737 Woodruff Key (which secures the governor drive gear to the cam) had sheared. The engine had been in service 2212 hours since overhaul.
Lycoming Model IO-540-K1A5	Fuel Pump Drive Shaftgear Assembly, P/N 72972	The internal splines of the engine fuel pump drive shaftgear assembly were found almost worn away. The external splines of the Lear-Romec Model RG-17980-0 engine-driven fuel pump drive coupling, P/N RB7779-4, which engage the internal splines of the shaftgear, were also severely worn. The shaftgear assembly total time in service was approximately 3372 hours.
Lycoming Model IO-540-K1A5	Fuel Injector Air Inlet Elbow Clamp	A high concentration of aluminum particles were found during routine oil sump and screen checks at 800 hours time in service. Investigation revealed chafing between the fuel injector air intake elbow and the injector servo housing produced aluminum chips which were drawn into the engine induction system. The intake elbow looseness was the result of a loose elbow clamp, Piper (PA-32-R300) P/N 555846.
Lycoming Model TIGO-541	Transition Assembly, P/N LW-11016	The exhaust transition assembly was found burned through in the radius on the lower side of both left and right exhaust inlets above the wastegate. The part had been in service approximately 800 hours.



SAFETY is a Responsibility, Not a Task!

PRATT & WHITNEY

Pratt and Whitney Model JT15D-1 — Low Turbine Stator, P/N 3021762

Disassembly of an engine following a report that it had "boomed or banged" revealed approximately one-third of the outer shroud of the low turbine stator had collapsed. The discrepancy was found at 1075 hours engine time in service.

MAINTENANCE NOTES

FUEL NOZZLE PRECAUTION

Some service personnel providing fuel service are reported to be causing cracks and total separations to occur in the fuel filler necks of various general aviation aircraft. The reporter, a certificated mechanic with inspection authorization, encountered five cases of fuel filler neck failure in the past year. The same reporter suggested the following analysis as to why the failures occur:

> "This failure is caused by fuel servicing personnel failing to support the fuel nozzles and hoses when servicing airplanes. Few people have any appreciation for the load a fuel nozzle and a long fuel hose can exert when permitted to sag or hang in the fuel filler neck. In this configuration, the slightest pulsation of the hose or someone stumbling over the hose, and the damage is done -- resulting in costly, time-consuming repair. Furthermore, with the advent of the automatic cutoff fuel nozzle, it is common practice to insert the nozzle in the fuel filler neck, turn it on, and go off and leave it. These fuel filler necks were not designed for such abuse."

WOULD YOU BELIEVE IT?

ONE TOO MANY

TOO MANY RADIOS SPOIL THE NAVIGATION. Pocket-sized portable radios that receive aircraft navigation and communication frequencies are handy to have and fun to listen to - but never on board an aircraft. So warns FAA in a new advisory circular, reminding pilots that the operation of these radios in the air could interfere with the airborne navigation system. Furthermore, the FAR's require that aircraft operators not allow electronic devices (except specified exceptions such as hearing aids, pacemakers, etc.) on any IFR flight or commercial or air carrier aircraft. Advisory Circular No. 91-47, "Use of Portable Electronic Devices - Radio Receivers," is free from FAA, DOT Distribution Unit, TAD 443.1, Washington, D. C. 20590.

GENERAL AVIATION INSPECTION AIDS

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MAINTENANCE NOTES

SOMETHING TO THINK ABOUT

WOULD YOU BELIEVE IT?

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GENERAL AVIATION inspection AIDS

SUPPLEMENT NO. 7

MARCH 1978

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

Flight Standards Service

GENERAL AVIATION INSPECTION AIDS

CUMULATIVE INDEX

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AIRCRAFT

AIRFRAME COMPONENTS

ACCESSORIES

COMMUNICATION/NAVIGATION EQUIPMENT

EQUIPMENT

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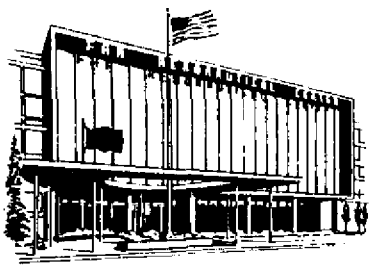
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
WASHINGTON, D.C. 20590

GENERAL AVIATION INSPECTION AIDS

SUPPLEMENT No. 7
MARCH 1978



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 58P	Battery Drain Tube, P/N 95-410006-11	Strong fumes were noted inside the aircraft. An inspection during a flight test (using oxygen masks) revealed the fumes were coming from the cabin door seal. After landing, maintenance personnel determined that the battery drain tube had deteriorated and the cabin door seal pump (in the nose compartment where the battery is located) was picking up acid fumes and pumping them into the cabin door seal.

BOEING

Boeing Model 107-II	Potentiometer Drive Gear, P/N HL6783-1	The engine throttle system would not program properly using normal starting procedures. Investigation revealed the engine condition control assembly potentiometer drive gear, Sargent Industries P/N HL8117-1, had slipped on its shaft, causing the system to go out of sequence.

CESSNA

Cessna Model 310J	Fuel Filter Screen, P/N 33-199-71	The right engine main fuel strainer was found contaminated with a soft red substance. The aircraft had been operating in Mexico recently.

ENSTROM

Enstrom Model F-28A	Torque Tube Rivet, P/N MS20470-AD4	The rivets attaching the lateral cyclic arm-to-torque tube failed, causing loss of lateral cyclic control. Total time in service - 813 hours. Enstrom Service Note No. 0015, dated 2-26-73, does not apply to this serial number aircraft.

FAIRCHILD INDUSTRIES

Fairchild Industries Model FH-227-B	Pulley, P/N MS 20219-4	An unscheduled landing was executed because of elevator trim binding. Investigation revealed the trim tab cable pulley under the pilot's seat was chipped, which allowed the cable to come off the pulley, resulting in control system binding.

GRUMMAN

Grumman-American Model AA-5A	Engine Air Intake Screen, P/N 5503006-9	An engine power loss resulted in a forced landing. Investigation revealed that the aft wire screen that holds the engine air filter in place had broken in the bend radius, permitting the filter to be sucked against the carburetor heat valve and block airflow to the engine. Total time in service - 404 hours.
Grumman-American Models G-164A and G-164B	Wing Skin Assembly, P/N A1003-499ABL	At 1020 hours aircraft time in service, the upper wing skin of the lower left wing of a Model G164A aircraft was found cracked. The crack was approximately 3 inches in length and was located about 34 inches outboard from the wing root, and 9 inches forward of the wing trailing edge. A similar condition was found with a Model G-164B aircraft with 1150 hours time in service.

MOONEY

Mooney Model M20E	Landing Gear Handle	During landing approach, the gear handle broke at the weld joint. Total time in service - 1908 hours. It is suggested that this area be inspected for cracks.
Mooney Model M20J	Circuit Breaker Screws	During inspection, the screws attaching the wires to the circuit breakers were found loose at the auxiliary busbar. Total time in service - 194 hours.

PIPER

Piper Model PA-18-150	Brake Line Assembly P/N 71061-04	A recent report advises of four instances where the subject brake line assemblies have burst during normal operation. The line is routed between the master cylinder and the brake, and rupture results in full loss of braking on the side affected.
Piper (Cherokee) All Models	Battery Vents	It has been reported that battery vents have been found clogged in several Piper Cherokee aircraft. One vent was clogged by an insect nest. This particular installation was in the tail section of the aircraft. Corrosion was found in the immediate area of the battery due to venting inside the tail section. A clogged vent in a cockpit (under seat) battery installation could be hazardous due to hydrogen build-up in a closed area. It is suggested that battery vents be checked periodically for restrictions.
Piper Model PA-22-160	Brake Cable, P/N 14300-05	Repeated reports have been received of brake fading and spongy brake action. These reports were responded to by numerous brake bleeding operations, a master cylinder change, brake adjustments, and brake cylinder overhaul. The cause of difficulty was finally traced to brake cable stretching when the cable failed, and replacement rectified the condition.
Piper Model PA-23-160	Wing Flap Spar Assembly, P/N 17104-02	During inspection, at 2656 hours aircraft time in service, a crack was found at the inboard end of the left wing flap spar. The crack extended through the spar web and reinforcement channel, P/N 16234-00, and had progressed approximately 2 1/2 inches outboard of the inboard flap hinge, P/N 17101-00.
Piper Model PA-23-250 (6 Place)	Fuel Booster Pump, P/N 33959-02	During routine 100 hour inspection, fuel was noted leaking from the right engine booster pump overboard drain. Disassembly of the pump revealed that the shaft bushing was loose, which allowed the entire pump assembly to rotate within the housing. The pump was original equipment installed in the aircraft which had accumulated 127 hours time in service.

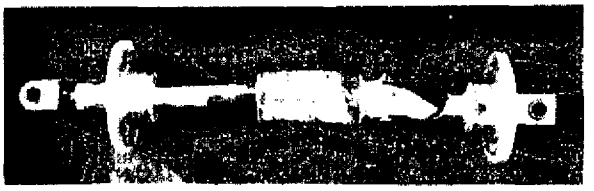
Piper Model PA-23-250 (6 Place)	Outboard Fuel Cell P/N 33779-02	A fuel leak was detected at the outboard end of the left outboard fuel cell, at 127 hours aircraft time in service. Further examination revealed the forward interconnect (outboard to tip tank) nipple was cracked circumferentially 180 degrees around its lower surface where it joins the outboard end of the subject cell.
Piper Model PA-24-250	Bearing Support Fitting, P/N 20420-00	At 2062 hours aircraft time in service, no loose rivets were found in the stabilator torque tube bearing support fitting when complying with Airworthiness Directive 74-13-01. Although not required by the directive, a repeat inspection was performed 276 hours later, at which time the high shear attachment rivets were found loose in the subject fitting.
Piper Model PA-24-250	Landing Gear Transmission, P/N 25720-00 (Dukes P/N 458700)	On the first flight after installing a new landing gear transmission, it malfunctioned and the gear had to be extended manually. Investigation revealed the sleeve separated from the transmission screw nut at its stake points. The staked areas appeared to be too deep, as compared with other new transmissions in stock, and is believed to have weaked the material.
Piper Model PA-25-235	Elevator Cable Turnbuckle Barrel	During routine inspection, at 2500 hours aircraft time in service, the lower elevator cable turnbuckle barrel, P/N 452011 (NAS 649-B32S), at the elevator horn link, P/N 61445-00, was found cracked. The cracks were located in the barrel grooves on both sides which are provided to accommodate the locking clip, P/N 454867 (NAS 651-16S). Barrel expansion due to the cracks resulted in reduced thread engagement area with the turnbuckle end fitting, which could have allowed cable separation and loss of elevator control.
Piper Model PA-28-140	Landing Light Retainer Thumb Screw, P/N 63674-00	During taxi, the landing light fell into the propeller. Inspection disclosed that the thumb screw for the landing light retainer assembly had backed out of the fiber locknut.
Piper Model PA-28R-180	Landing Gear System	An inspection to determine why the left main gear collapsed during landing disclosed that the gear downlock hook was contaminated with paint from a recent repainting of the aircraft. Further checks disclosed that the gear struts, switches, link assemblies, and bearings were also painted. In addition, the control surfaces had not been balanced after painting, and the fuel filler decal was missing. Also, an entry had not been made in the aircraft log book stating that the aircraft had been repainted.
Piper Model PA-28-235	Flight Control Cables	During routine inspection, all flight control cables were found substantially low in tension. Total time in service - 312 hours.

Piper Model PA-30	Aileron Counterweight P/N 20721-00	During routine 100 hour inspection, at approximately 3000 hours aircraft time in service, both the left and right aileron counterweights were found to be very loose. The lead weight material had worn away, or was displaced, causing the weight to become loose on its arm, P/N 20720-00.
Piper Model PA-30	Landing Gear Extension Lever Assembly, P/N 23919-00	The pilot had extreme difficulty extending the landing gear using emergency procedures because he could not extend the subject (telescoping) lever assembly. Although the pilot was a large man, 6 feet 2 inches tall, and weighing 200 pounds, he was just barely able to move the gear to the down and locked position due to the absence of adequate mechanical advantage (leverage) with reduced handle length. Investigation revealed that a dent in the outer tube near its lower end prevented extension of the lever assembly inner tube. The damage was probably present for a considerable length of time, but had not been detected because of no previous need to use the emergency system.
Piper Model PA-30	Stabilator Torque Tube, P/N 22855-07	A 100 hour inspection, at approximately 2000 hours aircraft time in service, revealed excessive stabilator play at the torque tube bearing collar location. Further investigation revealed the torque tube outside diameter was excessively worn in the area where it mates with the inner race of its support bearings, P/N 452363.
Piper Model PA-31-310 (Australian Registry)	Fuselage	During inspection, several cracks were found in the fuselage skin, bulkhead assemblies, and channels at left and right front spar attach points at station 104.5. Total time in service - 6111 hours. This aircraft had been operated from rough airstrips for prolonged periods.
Piper Model PA-31-350	Fuel Booster Pump, P/N 53050-02 (Weldon Tool Company)	The cause for engine power loss during takeoff was traced to fuel starvation. Investigation revealed a piece of the fuel booster pump blade retainer ring, P/N 756051, broke off. The piece of ring traveled through the fuel line from the booster pump to the engine-driven fuel pump, causing it to jam and its shaft to shear. The booster pump had been in service for 600 hours at the time of difficulty, and the report indicated this was at least the second failure of this type experienced.
Piper Model PA-31-350	Oil Separator Assembly, P/N 42409-00	During routine inspection, the mounting lug was found to have broken away from the oil separator due to weld failure. The discrepancy was detected at 315 hours aircraft time in service.
Piper Model PA-31-350	Parking Brake Cable Assembly, P/N 16775-03	Both brakes locked during landing and could not be released, causing the tires to wear down to the cord. Investigation disclosed the parking brake cable had become disconnected from the parking brake valve, P/N 492152, and the valve apparently vibrated to "on" or "park" position in flight. The cable (piano wire) end was not bent, and its retention nut evidently had not been sufficiently tightened. The aircraft had been in service for approximately 51 hours when the difficulty was experienced.

ROCKWELL INTERNATIONAL

Rockwell International Model 500-B — Nose Gear Bungee Assembly, P/N 375055-503

The nose landing gear bungee assembly (rod) failed. It is suggested that the bungee assembly (rod) be inspected periodically. Total time in service - 6505 hours.



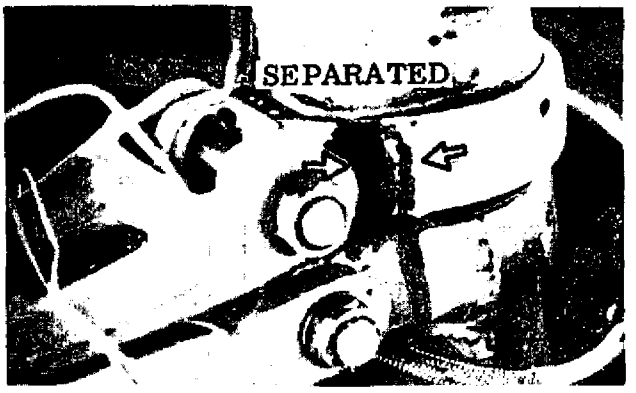
SIKORSKY

Sikorsky Model S-58E	Fuel Line Elbow, AN823-16-12	An accident occurred due to failure of the subject elbow. Investigation revealed that the elbow was aluminum instead of steel.

SMITH

Smith Model 600 — Main Landing Gear Cylinder Assembly, P/N 400054-2

The right main landing gear turned 90 degrees to the right during landing. Investigation disclosed that the landing gear scissors attaching collar was broken and had turned. Total time in service - 5612 hours.



ACCESSORIES

BENDIX

Bendix Fuel Injector Model RSA-5AD1	Mixture Control Valve, P/N 2525195	The engine could not be shut down by using the mixture control. Investigation revealed the fuel injector mixture control valve was scored, which allowed fuel to pass through when in the cut-off position.

Can You Afford the Time to be Careless?

Bendix Magneto Model D-2000 Series	Breaker Assembly Cam Follower	The pilot of a Cessna 177 aircraft reported the right side of the dual magneto inoperative and the left side extremely rough during flight. Investigation following an unscheduled landing revealed the malfunction was the result of both breaker assembly cam followers melting, most likely due to a capacitor or capacitor lead crimp difficulty. The magneto was reported to have a blue nameplate (remanufactured) bearing S/N 714003, not covered by Bendix Service Bulletin No. 587 (AD 77-17-07), which pertains to the subject. The magneto had been in service 105 hours since remanufacture.

CHAMPION

CHAMPION -- OIL FILTER, P/N CH48110

Approximately 10 hours after oil filter replacement, engine oil temperature would gradually climb. A similar condition was experienced on three occasions. When the oil filter was cut open to facilitate inspection, in each instance the internal seal was found displaced and lodged on the filter element.

EQUIPMENT

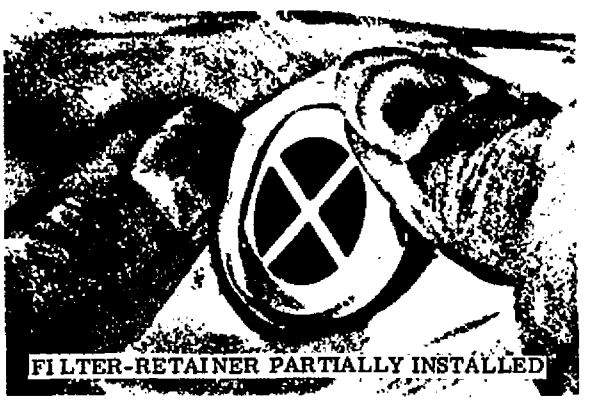
SCOTT

Scott Oxygen Mask Sky Mask Series 28314, 28315, and 28317	Dilution Valve Filter

Immediately after donning his oxygen mask, the copilot of a Piper PA-23 aircraft began to choke because an object had lodged in his throat. With great difficulty, he managed to cough free and swallow the object. Subsequent investigation revealed the circular sponge rubber dilution valve filter was missing from the face of the copilot's mask, and the filter in the pilot's mask was partially dislodged.

Examination of other masks disclosed the filter could easily be dislodged by squeezing the pliable face piece and/or by exerting relatively slight pressure with the index finger against the filter inlet opening of the mask. It was concluded filter displacement could occur during normal donning or adjustment of a mask to fit facial contours.

In order to rectify the condition, Scott Aviation has developed a filter retainer, P/N 10005489, that can easily be installed without use of special tools. The filter retainers may be obtained, free of charge, through Scott Aviation distributors, or by contacting Scott Aviation, 225 Erie Street, Attention: Manager Distributor Sales (Aviation), Lancaster, New York (14086).



FILTER-RETAINER PARTIALLY INSTALLED

FILTER-RETAINER WITHIN MASK CAVITY

SEYBOTH

SEYBOTH -- FABRIC TESTERS

The manufacturer's records indicate only a small percentage of all Seyboth fabric testers in use today are actually calibrated and maintained within the specified standards. Some of these testers, recently calibrated, showed internal damage which was caused by mishandling; i.e., playing with the spring loaded needle. Even though this test instrument is extremely reliable, the requirement to accomplish calibration of the unit once every 12 months still exists in order to get continued reliable readings.

Any information concerning the Seyboth fabric testers, repair, or calibration can be obtained by writing to:

R. P. Tomcek
6801 Elmore Street
San Diego, California 92111

ENGINES

LYCOMING

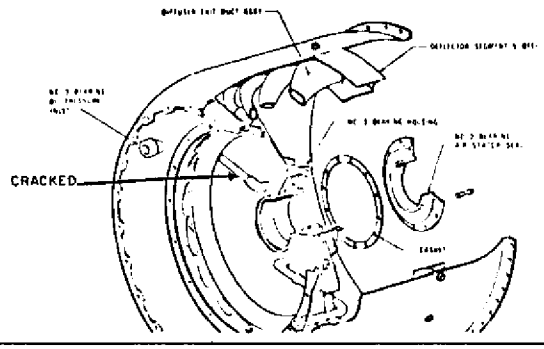
Lycoming Model O-320-H2AD	Push Rod Assembly, P/N LW-15315	At approximately 792 hours engine time in service, the number 1 cylinder exhaust push rod had a radial groove worn on its outside diameter about 1/4 inch from the rocker arm. Lycoming Service Bulletin No. 412A was complied with, and special attention was given to properly align all parts during reassembly in compliance with the bulletin caution note. At 810 hours engine time in service, an identical push rod wear condition was noted.
Lycoming Model TIO-540-A2C	Hose Assembly, P/N 74587	Erratic operation of an engine was reported approximately 7 hours after installation on a Piper PA-31 aircraft. During the troubleshooting process, sediment was found in three fuel injection nozzles. Further investigation revealed the source of contamination to be internal deterioration of the fuel hose assembly that is routed between the injector and distributor.

PRATT & WHITNEY

Pratt & Whitney
Model JT15D-1

Bearing Oil
Transfer Tube

The cause for reported smoke in the cockpit of a Cessna Citation aircraft was traced to a cracked oil inlet transfer tube to the No. 3 bearing. Engine disassembly inspection revealed an oily gas path forward of the impeller rotor, and a pressure check of the oil tube revealed the crack.



Pratt & Whitney Model PT6A-20	Oil Fuel Heater	The right engine installed in a Beech E18S aircraft reportedly lost power in flight, and after shutdown on the ground, it could not be restarted. Investigation revealed the fuel side of the oil fuel heater was partially clogged, restricting fuel flow to the engine driven fuel pump.
Pratt & Whitney Model PT6A-20	Oil Line, P/N 3011255	In-flight shutdown of the left engine of a Beech 99 aircraft was executed due to fluctuation and loss of oil pressure. Subsequent investigation revealed the oil line which is routed from the oil temperature sensor to the oil fuel heater had burst, resulting in depletion of the engine oil supply.
Pratt & Whitney Model PT6A-27	Propeller Reversing Lever Clevis Pin, P/N 3013165	Inadvertent propeller feathering occurred during flight operation. Investigation revealed the cotter pin hole in the propeller reversing lever clevis pin broke out, allowing the pin to work loose and fall from the lever. This condition allowed the beta valve to fully extend, causing the propeller to feather.

PROPELLERS

McCAULEY

McCauley Model D3A34C402	Retaining Screw, P/N A-1635-104	The pilot reported severe vibration during flight. After landing, investigation revealed the retaining screw for the propeller blade actuating pin was broken. The hub and internal parts of the propeller were damaged. Total time in service - 28 hours.
McCauley Model HC-C2YK-2CF (Australian Registry)	Bearing	During propeller overhaul, the split bearings were found to be corroded, pitted and cracked. Heavy build-up of rust with associated pitting had cracked one bearing half. Attention should be directed to the propeller manufacturer's requirement for relubrication every 100 hours of operation.

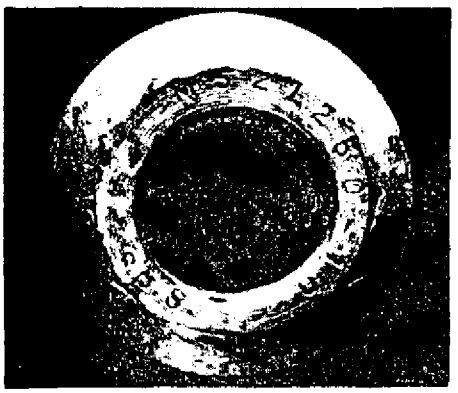
MAINTENANCE NOTES

TEFLON TAPE

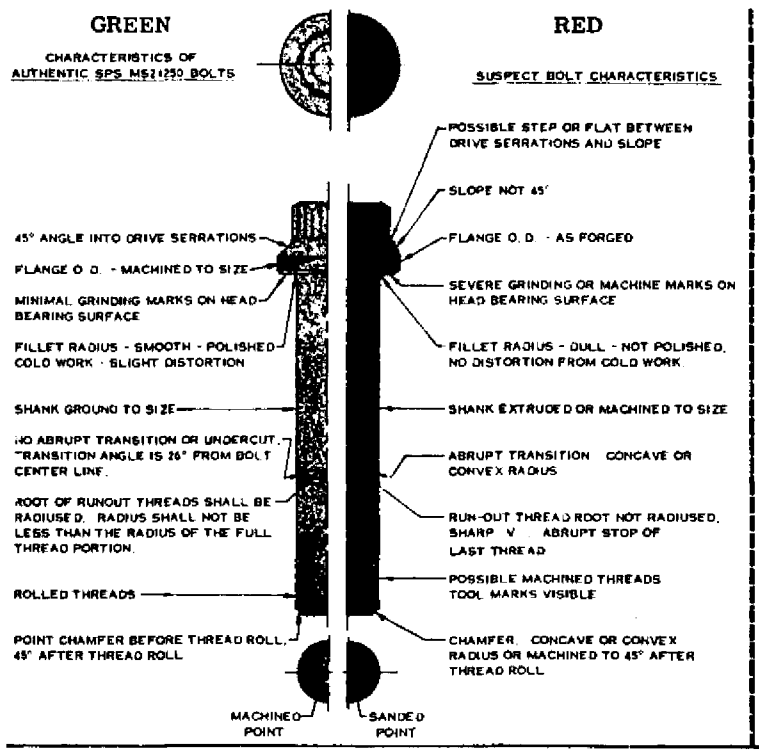
It has been reported that numerous instruments have been received by a repair station, for overhaul, where the fittings were installed using teflon tape to seal the fittings. If this tape is not used properly, fragments of it can get into the instrument case and could cause gears and mechanisms to bind, causing instrument failures. The repair station recommends using a substitute thread sealing method that would lessen the chance of instrument failures.

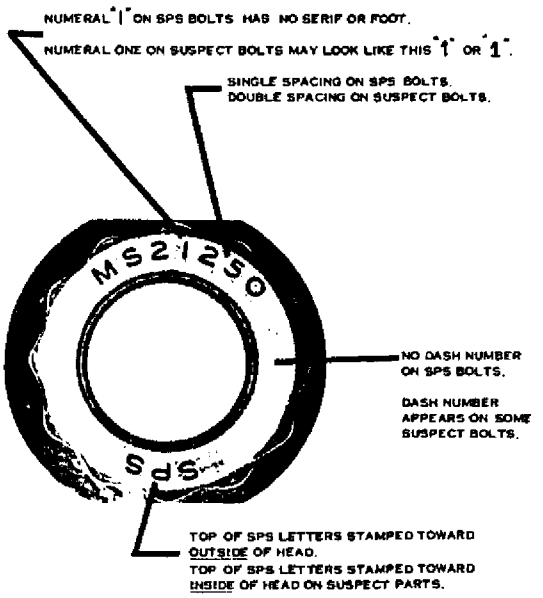
BOGUS BOLTS

Bogus bolts, P/N MS21250, have been found installed in a Bell Model 214B/B1 helicopter, and also in the manufacturer's stock. The bolt is used to attach the tail boom to the fuselage. This bolt may have applicability to other make and model aircraft. Bogus bolts can usually be identified by reference to the following:



COMPARISON - SPS BOLTS VS. SUSPECT BOLTS - MS21250 ONLY





NOTE
A GENUINE SPS BOLT WOULD HAVE ALL OF THE CHARACTERISTICS OF THE GREEN SECTION. A SUSPECT BOLT MAY HAVE ONE OR MORE OF THE CHARACTERISTICS IN THE RED SECTION. CONFORMITY OF THE HEAD STAMPING SHOULD NOT BE THE SOLE BASIS FOR CONCLUDING THAT A BOLT IS AUTHENTIC. NONE OF THE RED SECTION CHARACTERISITCS OR HEAD STAMPING DEVIATIONS SHOULD BE PRESENT IN AN AUTHENTIC SPS BOLT.

SPS

NOTE
IF A BOLT IS SUSPECT, CONTACT THOMAS ROACH, STANDARD PRESSED STEEL CO, JENKINTOWN, PENNSYLVANIA 19046
PHONE (215) 884-7300, EXT. 503

HAZARDS OF AIRBORNE CB RADIO INSTALLATIONS

Installing citizen band (CB) or amateur radios or mobile telephones in aircraft can interfere with the approved avionics system unless certain installation and operational criteria have been met. Owners are reminded to check both FAA and FCC regulations before installation, since both are involved. Additionally, the flight characteristics of the aircraft may be affected by improper installation of CB antennas (often more bulky than those normally used on aircraft). Guidelines for installation and operation of these communication systems are contained in a new FAA Advisory Circular 20-98, "Auxiliary Two-way Airborne Radio System Installations," available free from DOT/FAA Distribution Unit, TAD 433.1, Washington, D.C. (20590).

CONTROL SURFACE BALANCE

The controls on some aircraft have been 100 percent statically balanced. After each repair or repainting of the control surfaces, they must be rebalanced. In addition, entries must be made in the aircraft log book to reflect the fact that the control surfaces were repaired, repainted, and balanced. The accompanying photographs display the evidence that this is not being done in some cases.

The Piper Navajo PA-31 elevator may be balanced on the aircraft as described in the service manual, but the control rod must be disconnected. This photo shows the evidence that the control rod was not removed since the aircraft was painted.

This nut and bolt would have to be removed in order to balance this control surface in accordance with the prescribed procedures. It is apparent that it was not removed after painting.

This is a photograph of a rudder on a Piper Model PA-31 aircraft, which shows it was not removed after painting. It did require rebalancing after it was checked.

ANTENNA CABLE DAMAGE

Each year a considerable amount of money is spent repairing or replacing antenna system cables (coax, twinax, triax, etc.) because someone has damaged them while performing maintenance on aircraft.

These cables are used in systems that are required for dispatch of a flight, or for accomplishment of a particular mission. Many are of critical length or capacitance, and many are nearly inaccessible for a portion of their length, making replacement time-consuming.

Extreme caution should always be used when working in the vicinity of these cable runs. --Avoid damage and reduce costs!

FAA Maintenance Tips

SABRELINER -- FUSELAGE WATER DRAINS

One operator called to comment he had encountered considerable rain during a short period of time, and did not find any water when opening the cockpit drain valves. As a matter of curiosity, a check was performed with the escape hatch and cockpit drain valves open. Airflow was present at the escape hatch, but not at the cockpit drain. Further investigation revealed the cockpit drain was clogged.

These drains should be periodically checked for obstructions. This can be accomplished following engine maintenance when an engine runup is required. Set the parking brake and sufficiently chock the aircraft wheels. Open the subject drain valves and position a person near the drain outlets. Some valves will remain open when pushed up and twisted; others may require being held open. Open the pilot's sliding window, close the main entrance door and start at least one engine. Pull the landing gear position circuit breaker.

CAUTION - Do not taxi the aircraft with the landing gear position circuit breaker pulled. The main steering system will not be operational when this circuit breaker is not engaged.

Momentarily advance the throttle of the operating engine sufficiently to inflate the cabin door seal, then return the throttle to idle. Position the pressurization control switch to the operating engine or engines. Select the cabin pressure controller slightly below field elevation. Slowly close the pilot's sliding window. As the window closes, airflow indicates an unobstructed drain channel.

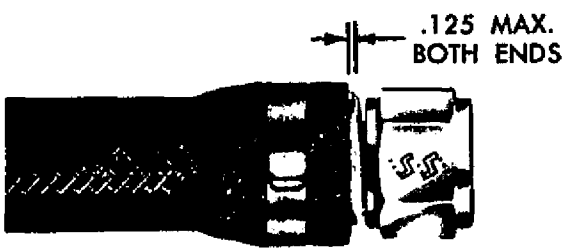
Return the cabin pressure controller to slightly above field elevation. Reposition the pressurization select switch to the off position and shut down the operating engine or engines. Push in the landing gear position circuit breaker. Close all drain valves that have been opened.

Remember! Checking the fuselage water drain is a preflight requirement as well as a requirement of the 100-hour maintenance inspection. These drains will relieve water accumulations that, when frozen, may otherwise interfere with some flight control mechanisms.

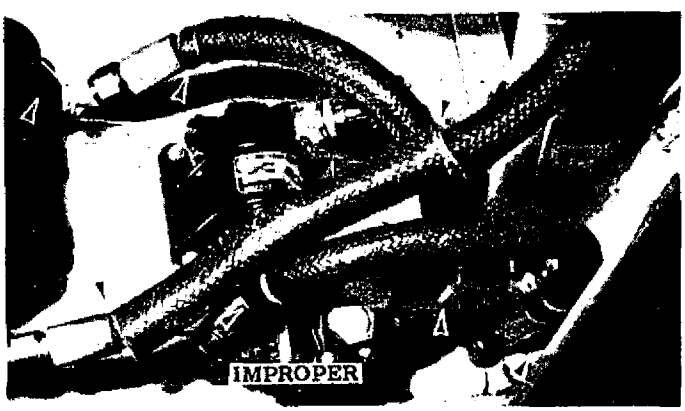
Rockwell International

FIRE SLEEVED TYPE HOSE ASSEMBLIES

Hose assemblies that utilize a fire sleeve will not provide the proper level of fire protection unless the sleeving is properly installed. Examples of proper and improper sleeving installations are shown below.



PROPER



A HOT COMPLAINT

Approximately three hours out, a lady passenger approached the steward complaining that her purse was getting very hot. It was discovered that a 9-volt battery in her purse was generating the heat, and smoke was coming from the battery. An oven mitt was used to remove the hot battery from the purse. The lady then removed some coins, which were quite hot to the touch, from the same section of her purse. Apparently the passenger had removed the battery from her portable radio but unwittingly dropped it into the section of her purse containing the coins. The battery was shorted. The manufacturer of the particular battery stated that a fresh 9-volt battery, shorted by a coin, could produce sufficient heat to cause a fire, or the battery itself could explode. (BRITISH AIRWAYS)

SPRAG CLUTCH MALFUNCTIONS

About the time we think we've covered every possible aircraft malfunction with an appropriate emergency procedure - along comes a new one. In this case, clutches that won't clutch when they should.

Since 1972, there have been several of these failures reported worldwide, six of them at Fort Rucker alone, one of which resulted in a fatal accident. At first glance, a clutch failure would appear similar to a short shaft failure with an autorotation as the inevitable result. This is true, but there is one very important exception. Let's take a look at it.

The aircraft freewheeling unit consists essentially of an outer (driving) and an inner (driven) race. Arranged between these races is a series of metal wedges (sprags). When everything is working as it should and power is applied to the outer race, these wedges gradually shift to provide a positive lock between the engine and transmission. Conversely, when engine power is reduced the wedges unlock, thus allowing the driven portion of the clutch to rotate at a higher speed than the driving portion (freewheeling). The problem arises when these wedges do not correctly position themselves as power is applied at the termination of a power recovery autorotation or when the throttle is reduced to flight idle during engine shutdown. In these cases, the rotor r.p.m. will eventually drop below the corresponding engine r.p.m. When this happens, the clutch is subject to violent reengagement as the sprags attempt to reposition in order to again provide a positive lock between the engine and transmission. Remember the clutch driving race is now rotating at a speed higher than the driven race and the sprags intend to make up that difference - RIGHT NOW. So what's the exception to an ordinary autorotation if the clutch doesn't reengage during power recovery? Just this - the engine r.p.m. (N2) must not at any time be permitted to override the rotor (reverse needle split). To prevent this from happening, you must shut that engine down, but only after confirming that your problem is not merely a rotor tach failure.

Should the rotor tach drop below the engine while operating in flight idle during cool down, the same rule applies - shut the engine down immediately. This action could well save both you and the aircraft a considerable amount of grief because, if that clutch reengages, some awesome things can happen. Main rotor masts become twisted and displaced; tail rotor drive shafts fail and the entire drive train undergoes a severe overtorque.

The specific mechanism which causes a clutch to malfunction is not entirely certain. What is certain, however, is that each clutch inspected following a failure showed evidence of previous hard clutch engagements, most probably as a result of improper power recovery technique.

Since prevention of a failure is much preferable to executing an emergency procedure, let's review the proper technique of performing the power recovery portion of an autorotation. It's simplicity itself.

1. Smoothly increase throttle to full operating r.p.m.

2. Increase collective only after the needles are joined.

3. DO NOT simultaneously increase throttle and collective.

Treat that clutch as though your life depended on it. Give yourself plenty of time to make a power recovery, then be silky smooth about it. If, despite your best efforts, you experience a clutch malfunction, check to be sure it's not just a rotor tach failure, then SHUT THAT ENGINE DOWN.

Flightfax

LIGHT-SENSITIVE CORRECTIVE LENSES

There is a definite relationship between wearing light-sensitive lenses while making fluorescent penetrant and magnetic particle inspections and failure to detect flaws, according to the Space Division of Rockwell International.

The information was passed through GIDEP (Government Industry Data Exchange Program). Lieutenant Colonel James E. Givan, Air Branch, USMC Development Center, Quantico, Virginia, brought it to the attention of the Naval Safety Center.

"Two fluorescent penetrant inspectors who had previously performed tests satisfactorily failed to detect flaws in test panels," the GIDEP report states. "Investigation revealed both men had purchased corrective lenses that darken when exposed to ultraviolet light or sun rays. Further investigation revealed that there was a definite relationship between the use of light-sensitive lenses and the failure to detect flaws under ultraviolet light conditions. Communication with engineering personnel of a glass manufacturing company revealed light transmission losses of 16 to 45 percent, depending on glass type and temperature."

Rockwell says that "Inspectors using light-sensitive lenses should be restricted from performing fluorescent penetrant and magnetic particle inspections while wearing these corrective lenses."

GENERAL AVIATION INSPECTION AIDS

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MAINTENANCE NOTES

SOMETHING TO THINK ABOUT

WOULD YOU BELIEVE IT?

U. S. GOVERNMENT PRINTING OFFICE : 1978 O - 255-413

GENERAL AVIATION inspection AIDS

SUPPLEMENT NO. 9

MAY 1978

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
Flight Standards Service

GENERAL AVIATION INSPECTION AIDS

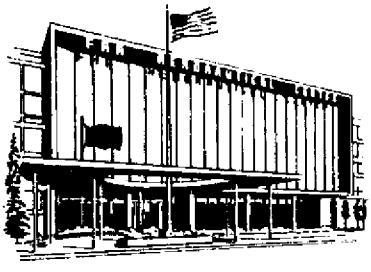
CUMULATIVE INDEX

. . . . . Cumulative Index continued on page 11 (see last page) . . . . . .

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

GENERAL AVIATION INSPECTION AIDS

SUPPLEMENT No. 9
MAY 1978



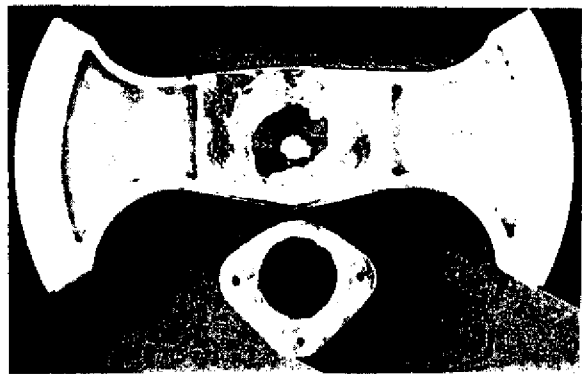
This is the home of the General Aviation Inspection Aids. The publication is prepared from information submitted by those of you who operate and maintain civil aeronautical products. The content of this publication includes select items that have been reported to be significant but were not fully evaluated 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 D50C — Rudder Bellcrank, P/N 50-524327-1

During inspection, the rudder control bellcrank was found severely corroded. The rudder lower fitting, P/N 50-630015, was also corroded in the area of attachment to the bellcrank. Total time in service - 2502 hours.

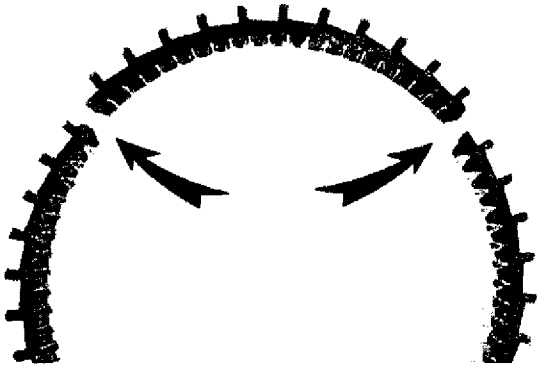


KNOWLEDGE is what you learn from others; WISDOM is what you teach yourself. Both are needed to achieve SAFETY.

Beech Model 95-D55 (Australian Registry)	Main Fuel Cell, P/N 35-9009-15	Fuel was noticed dripping from the left wing. Inspection disclosed the left main fuel cell was cracked at the drain neck. This fuel cell was original equipment and had been in service approximately eight years. Aircraft total time in service - 4100 hours.

BELL

Bell Model 47G-3B-2A	Transmission Inner Race Gear, P/N 47-620-965-1	During disassembly for overhaul, the main rotor transmission inner race gear was found broken in two places. Total time in service - 2400 hours.



Bell Model 212 (Australian Registry)	Bearing, P/N 204-040-424-1	During inspection to determine the source of an oil leak, the rotor brake quill duplex bearing outer half was found collapsed. Total time in service - 54 hours. Extensive secondary damage to the transmission assembly had occurred.

BOEING

Boeing Model 107-II	Horizontal Hinge Pin Bearings, P/N 107RS262-1	During post flight inspection, the oil in the forward rotor hub red pitch arm was found to be contaminated with metal particles. Subsequent teardown inspection revealed that one horizontal hinge pin bearing had a galled roller and another had a broken cage and scored liner. The parts had been in service for approximately 3277 hours.

CESSNA

Cessna Model TU 206 (Australian Registry)	Magneto Distributor Block Screws	The engine was running rough. A teardown inspection disclosed that the right magneto distributor block was loose. Further checks disclosed that the mounting screws had backed out. Time since overhaul - 584 hours. It is suggested that these screws be checked for tightness.
Cessna Model 404	Elevator Trim Tab Bracket, P/N 5815141-3	During inspection, both elevator trim tab actuator brackets were found deformed. Total time in service - 410 hours.

Cessna Model 404	Horizontal Stabilizer Rib, P/Ns 5832140-15, -19, and -21	The left and right horizontal stabilizer ribs were found cracked during inspection. Total time in service - 410 hours. Cessna Service Letter No. 77-26 relates to this subject.

DeHAVILLAND

DeHavilland Model DHC-6-200	Fuselage Side Frames, P/N C6FSM1422/23 and Fuselage-to-Wing Front Fitting Adapters, P/N C6FSM2515-29/30	Inspection performed at 15586 hours aircraft time in service revealed cracks in the lower fuselage side frames and the fuselage-to-wing front fitting adapters. Cracks, ranging from 2 to 8 inches in length, were found in the forward and rear flanges of both left and right front fitting adapters, a condition described in DeHavilland Service Bulletin No. 6/149. Both left and right lower fuselage side frames at stations 218.125 and 219.525 were found to display inter-rivet cracks at various locations between the fuselage floor station WL-100 and WL-152. Detailed periodic inspection of the subject frames and adapters is recommended, as well as immediate inspection following any report of hard landings or operation in severe turbulence.

FAIRCHILD INDUSTRIES

Fairchild Industries Model F-27	Fuel System Bleeding Procedures	The cause for in-flight flameout of the right engine was attributed to air in the crossfeed fuel system. The incident occurred during the first flight following compliance with AD 65-24-3 (radiographic inspection) which requires complete defueling of the aircraft. The F-27F maintenance manual, chapter 28, page 211 through 214, contains procedures for bleeding the fuel system of air (including the crossfeed system) and testing the system to ascertain proper operation. Evidently, these procedures had not been followed.

GRUMMAN - AMERICAN

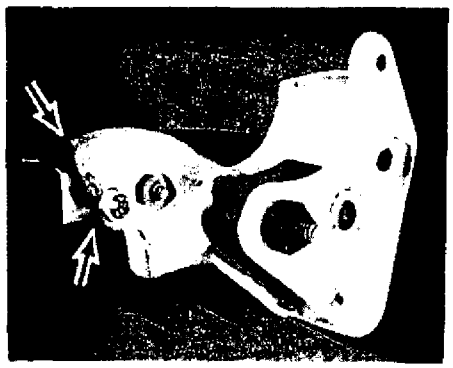
Grumman-American Models G-164A and G-164B	Carburetor Air Box Latch and Bolts, P/N 20635	Separation of the carburetor air box intake elbow has been reported with late model AG-CATS equipped with dry air filter boxes. The cause of difficulty is attributed to loosening of the overcenter latch adjustment bolts.
Grumman-American Model G-164B	Brake Master Cylinder Model 30-67	The right brake system fluid was found to be contaminated with minute metallic particles. Inspection of the master cylinder revealed the inside wall surface had some bare areas due to loss of cadmium plating. Total time in service - 122 hours.

The General Aviation Inspection Aids may be purchased from the Superintendent of Documents, U. S. Government Printing Office, Washington, D.C. (20402). A check or money order, payable to the Superintendent of Documents, in the amount of $9.00 ($11.25 foreign) should accompany your order for FAA AC No. 20-7P. You will receive the Summary and 11 monthly Supplements as they are published.

PIPER

Piper Model PA-23-250 Aztec F	Hydraulic Tube Assembly, P/N 17706-01	A hydraulic leak was noted under the right wing between the engine nacelle and the wing root. Inspection through the opening forward of the main spar revealed a hairline crack in the subject tube assembly. The discrepancy was detected at 487 hours aircraft time in service.
Piper Model PA-24-180	Carburetor Air Box, P/N 21224-00	The cause for an in-flight engine power loss and forced landing was attributed to the carburetor air box vanes breaking loose and lodging in the carburetor throat. Airworthiness Directive 64-10-4, which pertains to the subject, did not apply to this aircraft. The part had been in service for 4000 hours at the time of the incident.
Piper Model PA-24-250	Nose Gear Aligner Guide Bracket, P/N 21719-05	The cause for failure of the nose landing gear to lock in the down position was traced to a bent aligner guide bracket. The aircraft had accumulated approximately 2680 hours time in service, and did not have Piper Service Letter No. 596A (dated September 5, 1975) incorporated. This service letter calls for installation of a heavier type bracket. Piper Service Letter No. 575, dated April 8, 1971, calls for 100 hour recurrent inspections of the nose landing gear system to detect conditions similar to that reported.
Piper Model PA-24-260	Exhaust Stack Assembly Center, P/N 24770-04	The cause for reported exhaust fumes in the cockpit was traced to failure of the right exhaust stack assembly. The failure occurred 360 degrees around a weld just forward of the muffler attachment flange, which allowed the muffler to drop down into the engine cowling. The incident occurred at 1760 hours aircraft time in service, and inspection revealed the part had been previously repaired in the area of failure.
Piper Model PA-24-400	Engine Mount, P/N 22918-00	Inspections, performed at 1500 to 3000 hours aircraft time in service, have revealed mounts cracked at the nose landing gear attachment location.
Piper Model PA-25-235	Oil Hose Assembly, P/N 64228-03	The oil hose assembly which runs from the oil cooler to the engine sump is routed in close proximity to exhaust system components. The hose ruptured when bent 45 degrees , by hand, because it had become hard and brittle. Aircraft records indicate the hose had been in service approximately 2060 hours. The manufacturer recommends inspection of engine flexible hoses each 100 hours time in service.
Piper Model PA-28-151 (Australian Registry)	Rudder Pedal Support Brackets, P/N 63451-00	During inspection, the rudder pedal support brackets were found cracked from the front and rear attach holes.

Piper Model PA-28R-180	Nose Landing Gear Downlock, P/N 67150-03	During landing, the nose gear collapsed. Inspection disclosed that the nose landing gear downlock was broken adjacent to the hook. Total time in service - 2272 hours.



Piper Model PA-31	Fuel Cell Assembly, P/N 40519-01	Fuel leakage from the right auxiliary fuel cell resulted from separation of the vent tube approximately 1/2 inch from the cell wall. The tube is an integral part of the fuel cell, and its failure resulted in fuel spilling into the wing when serviced above the vent tube level. This is an extremely hazardous condition, and was detected at approximately 2450 hours aircraft time in service.

Piper Model PA-31	Exhaust Tail Pipe Assembly, P/N 40310-09	The pilot reported loss of output from the left engine alternator, accompanied by a rise in oil and cylinder head temperature. The engine cowling was later noted burning black adjacent to the exhaust pipe outlet. Subsequent inspection revealed the turbocharger waste gate pipe had separated along the weld to the tail pipe assembly for approximately 300 degrees, resulting in exhaust gas leakage and heat damage in the engine accessory section. The part had been in service 2400 hours, and was inspected 18 hours prior to its failure.

Piper Model PA-31-350	Pneumatic Pump, Airborne Model 442	Inspection, at 875 hours time in service, revealed the right pneumatic pump was cracked across two of its four housing-to-flange webs.

Piper Model PA-31-350	Aileron Spar, P/N 40190-15	The right aileron spar and doubler were found cracked adjacent to the inboard hinge attachment point. Further inspection revealed the rib, P/N 40118-00, at station 175.12, was also cracked along its flange radius where it attaches to the spar. The discrepancy was detected, during routine inspection, at 7120 hours aircraft time in service.

Piper Model PA-31-350	Oil Pressure Tube Assembly, P/N 41913-00	The source of an oil leak in the right engine nacelle was traced to a hole in the oil pressure tube assembly. The hole had evidently been worn through the tube due to contact with the air conditioner ground intake door hinge. The difficulty was detected at 20 hours aircraft time in service.

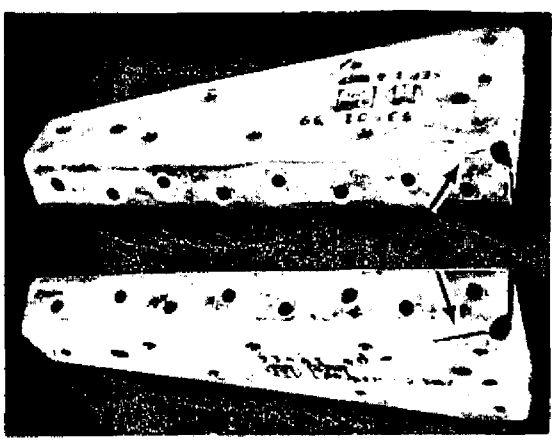
Piper Model PA-31-350	Propeller Control	A pilot reported that the right engine propeller control was inoperative. Inspection disclosed the governor arm screws had been rubbing against the left front baffle assembly, P/N 41605-11, of the right engine. Holes worn through the baffle caused the governor arm screws to hang up, resulting in loss of propeller control. The difficulty was experienced at 802 hours aircraft time in service.
Piper Model PA-31P	Propeller Spinner, P/N 46350-00	The large nut which attaches the spinner front bulkhead to the propeller dome low pitch stop became loose, breaking its safety wire. This condition resulted in wear of the propeller low pitch stop threads, and cracking of the spinner rear bulkhead. The condition was reported with the left propeller of three Piper PA-31P aircraft with operating times ranging fro 300 to 1360 hours.
Piper Model PA-31T	Landing Gear Door Hinge, P/N 46653-00	During approach for landing, the right inboard landing gear door forward hinge assembly failed. The cause of failure has not yet been determined, but it was reported at the time of failure the aircraft was executing a crosswind landing during gusty conditions. Total time in service - 420 hours.
Piper Model PA-31T	Wing Tip Fuel Tank Attachment Bolts	During inspection, at 324 hours aircraft time in service, three center attachment bolts for the left wing tip fuel tank were fou loose. The bolt nuts were tightened, but a recheck, at 360 hours time in service, revealed they had loosened again.
Piper Model PA-34-200T	Horizontal Stabilator Balance Weight	During a routine inspection, the stabilator balance weight tube was found loose at the center fitting, which is riveted to the stabilator spar. Further inspection revealed a surface crack 3/4-inch long on the left side of the fitting, just above the bolthole. The casting bore is off-center, which apparently resulted in variable wall thickness in the bore. Time since new - 154 hours.

SCHWEIZER

Schweizer
Model SGS 2-33A

Aileron Horn Flange, P/Ns 33501-39 and -40

The left and right aileron horn flanges were found cracked. The cracks extended along the horizontal radius. Total time in service - 1229 hours.

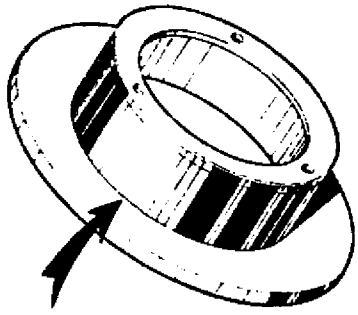


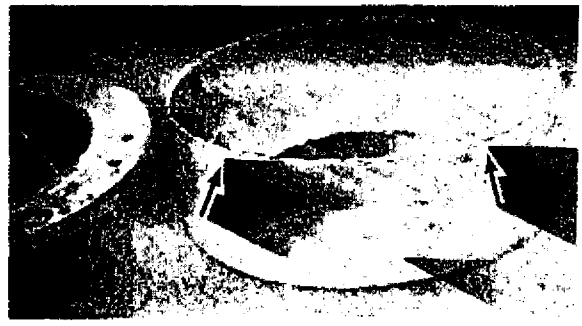
AIRFRAME COMPONENTS

CLEVELAND

CLEVELAND--BRAKE DISC, P/N 164-22A, Piper P/N 754-554

Several reports have been received regarding separation of the brake disc from the attaching flange. It is suggested that the brake disc assembly be inspected for cracks in the weld attaching the disc to the flange.





COMMUNICATION/NAVIGATION EQUIPMENT

EDO-AIRE

Edo-Aire Mitchell Autopilot Model Century IIB	Controller	During flight, the autopilot disengaged and the aircraft made a hard right bank. The pilot regained control of the aircraft and landed. During ferry flight back to the repair station, the autopilot disengaged twice. Investigation disclosed that the autopilot control head was not fastened to the pedestal and would move slightly, disconnecting momentarily from the mating plug in the pedestal.

ENGINES

CONTINENTAL

Continental Model GTSIO-520-M	Rocker Shaft Retainer, P/N 639574	During inspection, several rocker shaft retainers were found cracked. Total time in service - 410 hours.

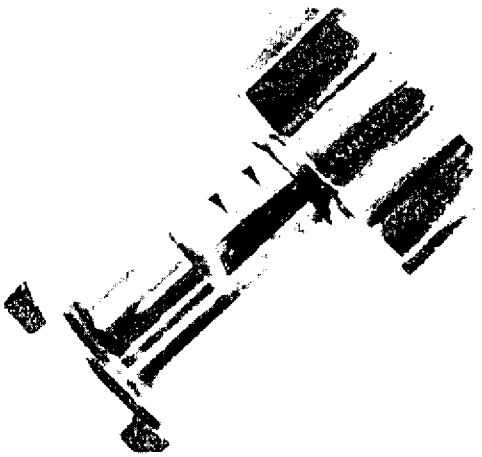
LYCOMING

Lycoming Model O-320-E2D	Primer Nozzle Nipple, P/N 74225	The orifice from the primer nozzle nipple fitting separated and was found lodged in the lower spark plug of No. 4 cylinder. Two instances of this condition were recently reported. One occurred at 1409 hours engine total time, and the other at 274 hours time since overhaul. Although no cylinder or piston damage was noted, the condition resulted in spark plug short circuiting.

Lycoming
Model O-320-E2D

Oil Pump Drive Shaft
and Drive Impeller

After approximately 1000 hours of operation since compliance with Airworthiness Directive 75-08-09, metal particles were found in the engine oil screen. Inspection of the oil pump revealed galling of the thrust edges of the drive shaft flats and the corresponding surfaces on the inside diameter of the drive impeller bore.



Lycoming Models O-360 and O-540 Series	Capscrews, P/N STD 1838	Reports indicate the capscrews that secure the crankshaft idler gear shafts to the rear of the crankcase become loose. This condition caused the idler gears to misalign with the crankshaft and camshaft gears, resulting in excessive wear of the gears. Lycoming Service Instruction No. 1310A, dated February 25, 1977, calls for modification at engine overhaul, by installation of new idler gear shafts, studs and capscrews. The new configuration calls for the use of safety wire instead of lockplates for securing the idler gear shaft nuts and capscrews, and should prevent recurrence of the reported condition.
Lycoming Model VO, TVO, and TIVO-435 and 540 Series	Crankshaft Flange Bolts, P/N 68965	Loosening of crankshaft flange bolts, due to insufficient torque during assembly, sometimes results in bolt failure and/or elongation of the crankshaft flange boltholes. Lycoming Service Instruction No. 1209 pertains to the subject, and provides for reaming crankshaft flange holes oversize and the installation of oversize bolts. Recent reports advise that rework procedures do not call for chamfering the reworked boltholes to accommodate the bolt shank-to-head radius. This condition results in approximately .002 clearance between the underside of the boltheads and the crankshaft flange surface, following the bolt torque operation, when using bolts identified with a scroll type "A" on the head. These bolts have a .040 inch shank radius (as opposed to bolts identified with the letters "CP" on the head, which have a .020 inch shank radius). The reported condition could result in bolt loosening and failure during operation. The manufacturer is presently preparing a Service Bulletin pertaining to the subject.

Lycoming Model TIGO-541-E1A	Exhaust Pipe, P/N 78011	The pilot of a Piper Model PA-31P aircraft noted the left engine manifold pressure fluctuated, then suddenly dropped to 18 inches Hg. Subsequent ground inspection revealed the exhaust pipe for No. 6 cylinder had broken completely in half where it joins the manifold. The failure occurred at approximately 1244 hours aircraft time in service.

Lycoming — Crankcase Assembly,
Model TIGO-541-E1A — P/N LW-13082

Disassembly inspection, at 885 hours engine time in service, disclosed both the right and left crankcase halves were cracked in the propeller shaft thrust bearing cavity. The cracks ran circumferentially 5 to 6 inches in the radius of the bearing cavity aft flange.

Lycoming Model TIGO-541-E1A	Crankshaft Spline Bushing Dowels, P/N 75359	The propeller was feathered because of in-flight engine RPM fluctuation and backfiring. Subsequent investigation disclosed that little resistance was experienced when pulling the propeller through by hand, indicating the propeller shaft had evidently discoupled from the engine drive train. Further investigation revealed two sheared dowel pins in the engine oil screen. These dowels were identified as P/N 75359, which assist in securing the front crankshaft spline bushing, P/N 75462, in the crankshaft.

PRATT & WHITNEY

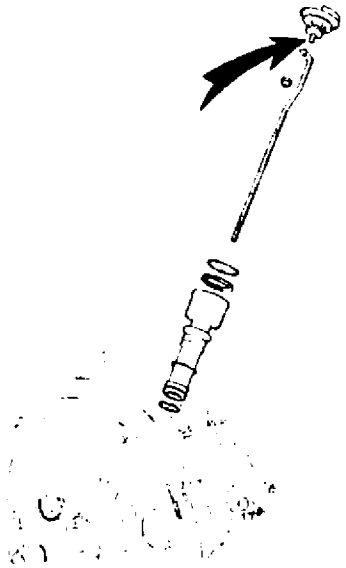
Pratt & Whitney Model PT6A-20	Fuel Pump Drive Coupling, P/N 0214910-01	The left engine of a Beechcraft Model 90 aircraft flamed out during cruise operation. Investigation revealed the cause of difficulty to be decoupling of the Pesco engine driven fuel pump from the engine due to wear of the drive coupling inner splines and the mating splines of the fuel pump. The engine had accumulated 3250 hours time in service. United Aircraft of Canada Service Bulletin No. 1165, dated March 1, 1974, calls for modification of the fuel control drive gearshaft assembly to provide improved lubrication of the fuel pump drive coupling. The bulletin called for partial compliance for engines equipped with Pesco fuel pumps within 1100 hours time in service, or compliance with the periodic inspection requirements prescribed in Special Instruction No. UAC 4-70 until the modification is accomplished. Evidently, neither of these manufacturers' requirements were complied with.

The Gravest Enemy of SAFETY is Complacency

Pratt and Whitney Model PT6A-28

Oil Filler Cap and Dipstick Assembly, P/N 3020908

A recent report advised that the stud which secures the dipstick to the oil filler cap portion of the subject assembly had failed. The break occurred through the first thread of the stud at the filler cap end. This was a later type assembly installed per United Aircraft of Canada Service Bulletin No. 1183, and was identified in the Malfunction or Defect Report as "Shaw Aero Model 99321, Code ID, S/N 417-390-1."



MAINTENANCE NOTES

AILERON CABLE INSPECTION

A thorough check of all control surface cables is an important part of any periodic inspection. Occasional reports concerning frayed aileron cables prompts this reminder.

On aircraft which have 500 hours or more, the aileron cables should be inspected thoroughly for worn or frayed spots at each aircraft inspection. Particular attention should be given to the following areas:

1. Make certain that proper alignment of cables exists at pulleys, bellcranks and quadrants. Alignment at the arc end of the quadrant forward of the aileron is particularly important.
2. Check clearance of cables where they pass through bulkheads and ribs. Nacelle ribs should be checked closely. Clearance should be equal to the diameter of the cable when near a pulley bracket.
3. Check to make certain all fairleads are providing adequate protection. Worn fairleads should be replaced.
4. Make certain all cable guards are in place.
5. Check for proper cable tension.

CONTROL CABLE CORROSION

A number of incidents that occur each year are attributable to cables breaking in areas where rust developed on the cables and was left unattended. With few exceptions, the rusted sections on the cables were exposed and readily accessible. Thus, it is difficult to understand why something had not been done about the rust before the failure occurred.

Sections of control cables exposed to cleaning solvents, metal polishes, and the elements of the weather should be carefully examined at frequent intervals. It would also be desirable to check the cable anytime a cleaning and/or metal-brightening operation has been completed near an exposed section of cable. It is suggested that special attention be given to assuring the cable is free of rust and properly treated with a corrosion-prevention compound.

Being with those who care -- is your reward for safe flying.

DEFUELING OPERATIONS

Defueling operations are similar to fueling operations and present approximately the same fire hazards. Draining operations present greater fire hazards because the procedures are more difficult to accomplish, and because drainage provisions are seldom convenient. Normally, initial drainage will be accomplished by suction with a hose inserted at the fuel tank filler neck utilizing pumping equipment. Following this, remaining liquid must normally be drained from the fuel piping system, most often from the sumps or central valves in the system. Final draining is normally done with temporary pipe or hose connected into vented drums or covered containers. The necessity for providing static bonds at points of possible spark gap, where flammable vapors may be present, is obligatory, despite the relatively small amounts of fuel and slow rates of delivery experienced in this draining operation. Variations between different types of aircraft preclude the establishment of standard procedures, but the same principles apply in all cases.

GUIDE FOR CONTINENTAL ENGINE BREAK-IN WHEN TEST CELL OR STAND IS NOT AVAILABLE

This guide is basically for hot weather conditions and may be altered according to outside temperature. Overheating the engine on the ground will prevent the piston rings from seating. In some cases of extreme engine overheating, the pistons will expand to a larger diameter than the cylinder bore. The latter condition will cause severe scoring.

PROCEDURES WITHOUT TEST CELL

a. Limit initial run to 3 or 4 minutes. Do not exceed 1200 RPM.

b. Allow engine to cool to approximately 120 degrees Fahrenheit and repeat short runs of 3 minutes each. Do this as many times as necessary to correct discrepancies. Do not exceed 1600 RPM.

c. After all discrepancies are corrected, a very brief power run, 15 to 20 seconds, will determine if the engine is ready for in-flight break-in.

d. Under no circumstances, attempt to clear a fouled spark plug by a power run during this critical period. Stop engine and change fouled spark plug.

e. In hot weather, select the coolest time of day for in-flight break-in.

f. Keep aircraft weight to minimum.

g. Do not cycle propeller on ground.

h. For take-off, use minimum power to attain at least 40 MPH IAS before applying required take-off power.

i. Do not use take-off power any longer than necessary.

j. Use minimum rate of climb with maximum air speed.

k. Do not lug engine. Use low pitch range for propeller setting with the minimum manifold pressure required for clean in-flight attitude. For aircraft not equipped with variable pitch propeller or manifold pressure gauge, use minimum power for clean in-flight attitude.

l. After desired altitude is reached, maintain level flight attitude. At some period between 20 and 30 minutes, the cylinder head temperature will show a rapid decrease. This indicates that the piston rings have seated, and the short ground runs and the in-flight engine break-in procedures were all satisfactorily accomplished.

m. Return to airport and weigh or measure amount of lubricating oil. At the same time, note oil temperature and ground attitude of aircraft. This applies to oil stick measurement only.

n. Again, fly aircraft a minimum cruise power setting for one hour, land and again weigh or measure oil. If oil is measured on stick gauge, make sure temperature and aircraft ground attitude are the same as described in paragraph m.

o. Record test flight and oil consumption in engine log book before aircraft is released.

p. After release of aircraft to operator, please discourage prolonged ground runs. This can be highly detrimental to any engine.

Good MAINTENANCE - Prime SAFETY Factor

SOME LUBRICATING OIL RECOMMENDATIONS

As a result of a recent revision of Avco Lycoming Service Instruction No. 1014F, the key parts of that service publication with our lubricating oil recommendations are included in this issue of the Avco Lycoming Flyer in order to update our customers and operators.

Avco Lycoming Specification No. 301E approved lubricating oils for use which conform to both MIL-L-6082B straight mineral type, and MIL-L-22851 ashless dispersant type lubricants for aircraft engines. Any brand name FAA-approved aviation lubricating oil which is in accordance with these specifications is acceptable for use. Proof of such conformity is the responsibility of the lubricating oil manufacturer.

AVERAGE TEMPERATURES - A great deal of personal judgment must be used when selecting the seasonal grade of oil to put into the engines. For example, if a plane is to be flown into an area which is much warmer or much colder, only personal judgment on the part of the operator can determine what grade of oil to use. When oil inlet temperatures approach the maximum allowable during operation, it is a good indication that a higher viscosity oil should be considered.

SINGLE VISCOSITY GRADES - This classification of lubricating oils includes any aviation grade (straight mineral dispersant) that is designated by a single viscosity number. The SAE Grades 20, 30, 40 and 50 shown in the chart are equivalent to Grades 55, 65, 80 and 100 respectively.

ASHLESS DISPERSANT GRADES - This classification includes additive oils with viscosities the same as straight mineral oil at high temperatures, but which provide a lower viscosity at low temperatures. The additives in these oils extend operating temperature range, improving cold engine starting and lubrication of the engine during the critical warm-up period, thus permitting flight through wider ranges of climate change without the necessity of changing oil. The ashless dispersant grades are recommended for aircraft engines subjected to wide variations in ambient air temperatures, particularly the supercharged and undercharged series, when cold starting of the engine must be accomplished at temperatures of 30 degrees Fahrenheit and below. The SAE Grades 30, 40 and 50 shown on the Chart in Service Instruction No. 1014F are equivalent to grades of 65, 80 and 100 respectively. It must not be presumed, however, that these oils will alleviate all of the problems encountered in extremely cold environments (below +10 degrees Fahrenheit). At these temperatures, preheating of the engine and oil supply tank will be required regardless of the type of oil used.

OIL RECOMMENDATIONS FOR NEW ENGINE BREAK-IN

ALL MODELS EXCEPT TO-360, TIO and TIGO-541 SERIES - New, or newly overhauled engines should be operated on straight mineral oil during the first 50 hours of operation, or until oil consumption has stabilized. If ashless dispersant oil is used in a new engine, or a newly overhauled engine, high oil consumption might possibly be experienced. The anti-friction additive of some of these AD oils will retard the break-in of the piston rings and cylinder walls. This condition can be avoided by the use of straight mineral oil until normal oil consumption is obtained, then changed to the AD type.

Generally, aircraft manufacturers add approved preservative lubricating oil to protect new engines from rust and corrosion at the time the aircraft leaves their factory. We strongly recommend this preservative oil be removed at the end of the first 25 hours of operation, but it must never be used beyond 50 hours. When adding oil during the period preservative oil is in the engine, use only aviation grade straight mineral oil of the viscosity desired.

CAUTION

All engines except TO-360, TIO and TIGO-541 series must be operated on straight mineral oil, following the replacement of the cylinders, until the oil consumption has stabilized.

RECOMMENDATIONS FOR CHANGING OIL

In engines that have been operating on straight mineral oil for several hundred hours, a change to AD oil should be made with a degree of caution. The cleaning action of some additive oils will tend to loosen sludge deposits and cause plugged oil passages. When an engine has been operating on straight mineral oil and is known to be in an excessively dirty condition, the switch to AD oil should be deferred until after the engine is overhauled.

When changing oil from straight mineral oil to AD oil, other than after initial break-in period, the following precautionary steps should be taken:

a. Do not add additive oil to straight mineral oil. Drain the straight mineral oil from the engine and fill with additive oil.

b. Do not operate the engine longer than five hours before the first oil change.

c. Check all oil screens for evidence of sludge or plugging. Change oil every ten hours if sludge conditions are evident. Resume normal oil drain periods after sludge conditions improve.

CAUTION

Under no circumstances should automotive oil be used. The use of automotive lubricants in Avco Lycoming engines is not recommended because its use could cause engine failure. Do not use any additives in the oil. Any FAA-approved aviation oil has all the necessary ingredients to properly lubricate our engines. It is our recommendation that additives should not be used in the oil.

AVCO Lycoming

WIRE CHAFING

It has been determined that most wire chafing incidents are the result of omitted clamps, mispositioned clamps, improper dress of wire cable, improper wire routing, or omission of chafe-protection material. Prevention of chafing is thus entirely dependent upon the diligent, conscientious, detailed attention to the detection or elimination of chafe-potential conditions.

SOMETHING TO THINK ABOUT

THE COTTER PIN

Perhaps no single item of equal size used on today's aircraft has a more important role than the cotter pin.

It is used extensively throughout the construction and assembly of the aircraft, but its more significant role is to join and securely hold aircraft control systems.

Consequently, the improper installation or failure to install a cotter pin usually results in the loss of control of the aircraft, sometime culminating in a serious accident. The selection of the combination of castellated nut and cotter pin as a fastener from the large family of fasteners in aircraft usage is determined by a number of factors; the relative motion of assembled parts, heat, vibration, chemical action and stresses to which it may be subjected.

Experts say that for certain assemblies the cotter pin is unexcelled in ensuring a positive lock. A quick examination of the cotter pin-castellated nut-bolt assembly suggests why. When the cotter pin is inserted through the keyways of a nut and bolt, it passes through the common axis of both. The forces required to separate the nut and bolt are immeasurably greater than those that are ever exerted during normal operation. This feature of security is the cotter pin's greatest asset and accounts for its long time use on aircraft.

But not all is ideal with the cotter pin.

Because of its small size, it is sometimes omitted during assembly, maintenance or repair of aircraft. Further, this feature helps it escape the scrutiny of mechanics.

Make a point to complete each job separately before starting another. If this rule is followed, you may avoid forgetting to drop the cotter pin through bolt and nut and say - bend the ends over, it will keep it there forever.

TOWING AIRCRAFT

Numerous reports have been received regarding damage to nose landing gear assemblies when aircraft were moved by power tugs. Evidently, the turning radius was exceeded. This caused damage to the towing pins which, in some cases, are the lower scissor hinge pins. Also, shimmy damper piston rods and attaching brackets have been bent or broken, as well as turn stops and steering bungees. All personnel operating power tugs should be cautioned against making sharp turns.

An Unhappy LANDING; No Power and No Airport

GENERAL AVIATION INSPECTION AIDS

CUMULATIVE INDEX (Con.)

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SUPPLEMENT NO. 10

JUNE 1978

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. 10
JUNE 1978

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

BELL

Bell
Model 47D1

Tail Rotor Yoke,
P/N 47-641-057-9

During hover operation, the tail rotor separated from the aircraft. Investigation revealed the rotor yoke had failed near the thrust bearing. Total time in service - 1696 hours.

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.

BELLANCA

Bellanca Model 1419-3	Wing Spars	During replacement of wing fabric, cracks were found in the butt (root) end of the wing spars. The front spars were cracked the most. Total time in service - 1252 hours.

BOEING

Boeing Model 107-II	Aft Transmission Lower Case Assembly, P/N 10702231-504	During routine post flight inspection, the aft transmission lower case was found cracked in the mount lug web area. The assembly had been in service 1654 hours.

CESSNA

CESSNA MODELS 120, 140 and 140A--LOWER DOORPOST MODIFICATION

There have been reports of cracks found in the lower doorpost near the wing strut attach point. These cracks are believed to be caused by operating from rough, unpaved surfaces. In some cases, the cracks can also be the result of a previous ground loop accident.

Cessna has developed a service kit to reinforce the doorpost area. The modification consists of a doubler which is recommended for installation during the repair following discovery of a crack. Details of the modification are described in Service Kit SK150-53, which was announced by Single-Engine Service Letter No. SE78-7.

It is recommended that the lower doorpost area be periodically checked for cracks, and, if necessary, repaired in accordance with this Cessna Service Kit.

Cessna Model 150 and 172 Series	Main Fuel Tank Hold Down Straps	Several reports have been received which indicate the fuel tank hold down straps were found loose or broken. It is recommended that fuel tank covers be removed and the straps checked at least every 1000 hours of operation.

CESSNA MODEL A150 AIRCRAFT--SEAT FRAME MODIFICATION

Cessna has issued Service Letter No. SE77-40, which pertains to the seats used in the 1972 through 1976 model airplanes. This service letter announces the availability of Service Kit SK150-54B. This kit provides reinforcing braces and a heavier shaft assembly to the seats used in the Aerobat airplanes. In view of some of the service problems which have occurred on the present seats, it is recommended that this service letter be reviewed for possible incorporation.

Aircraft serial numbers affected: A1500277 through A1500647 and FRA 1500167 through FRA1500291.

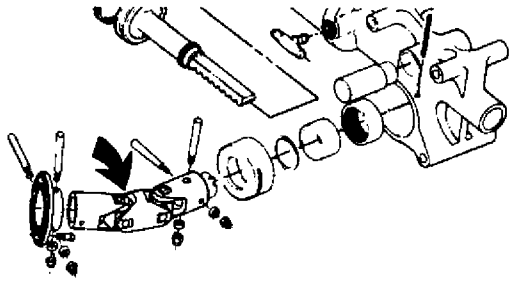
CESSNA MODEL R182--NOSE GEAR DOOR INSPECTION

There is a possibility that some of the early Model R182 airplanes were delivered with inadequate clearance between the nose gear doors and the lower cowl skins. A jammed nose gear door and resultant gear-up landing could result unless a clearance of .10 to .16 inch is maintained in this area.

Cessna Single-Engine Service Letter No. SE78-8 has been issued to provide instructions for the inspection, and any required rework of the nose gear doors. Serial numbers of the affected airplanes are also contained in the service letter.

Cessna Model 337 — Main Gear Adapter and U-Joint Assembly

Seizing, corrosion, and sheared pins in the U-joint assemblies (P/N's 1541037-1 and 1541037-2) continue to be a problem. The Cessna Service Manual contains the recommendation that these assemblies be inspected and lubricated at each 100-hour interval.



DeHAVILLAND

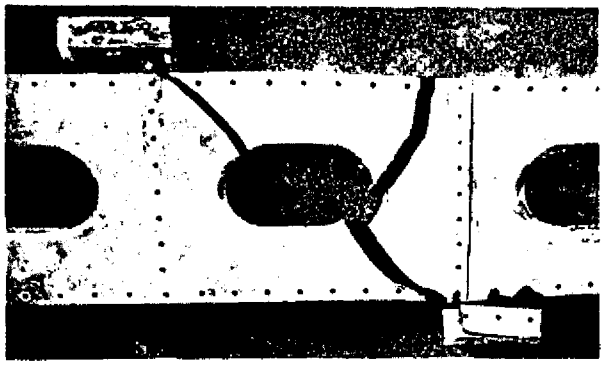
DeHavilland Model DHC-6-100 — Rudder Hinge Assembly, P/N C6TFM1042-1

Inspection of two aircraft, at 13000 and 15469 hours respectively, revealed moderate to severe corrosion of the rudder upper hinge assembly installed in the vertical stabilizer. The corrosion was evident on the lower surface of the hinge assembly fingers near the stabilizer attachment points, and adjacent to the hinge bearing. These were old pre-modification 6/1339 assemblies, now replaced with P/N C6TFM1042 post-modification 6/1339 assemblies.

FAIRCHILD INDUSTRIES

Fairchild Industries Model FH-227-B — Horizontal Stabilizer Spar Assembly, P/N 27-211000-72

When performing X-ray inspection of the horizontal stabilizers in accordance with Fairchild Service Bulletin No. FH227-55-9 and AD 66-27-05, a cracked stringer was found in the right stabilizer. The stabilizer leading edge was removed to gain access for repair, at which time the front spar web was found cracked completely through between stations 104 and 111; the front spar upper cap was cracked at station 112, and the lower cap was cracked almost completely through at station 103. The service bulletin does not call for inspection of the area where the spar defects were found, and the condition most likely would not have been detected if the stabilizer leading edge had not been removed.



Report an Incident - Prevent an Accident

GRUMMAN - AMERICAN

Grumman-American Model G-164	Fuselage Tube, P/N A1300-297	Inspection, at 7477 hours aircraft time in service, revealed the forward diagonal tubular member which runs between the fuselage upper and lower left longerons separated. The break occurred a few inches below the upper longeron, was open approximately 3/16 inch, and appeared to have failed in tension. There was no evidence of damage or rust in the area of fracture.
Grumman-American Model G-164A	Wing Attachment Fittings, P/N A1050-101	During inspection, both right and left forward wing spar-to-fuselage lower attachment fittings were found to be severely corroded. Exposure to agricultural dust and spray chemicals without proper and frequent cleaning is the cause of difficulty. Similar conditions have been reported with the wing-to-fuselage lower aft fittings. Frequent thorough cleaning and careful inspection is recommended.
Grumman-American Model G-164A	Tail Wheel, Cleveland Model 40-50	The tail wheel body assembly, P/N 201-1, cracked and separated 360 degrees around the wheel flange lock ring (P/N 198-1) groove. Investigation revealed the pilot had inflated the tire to 90 PSI because the tire flattened out too much using the prescribed pressure of 35 PSI. The aircraft had been operating with 150 gallons (1250 lbs) in the hopper.
Grumman-American Model G-164A	Spray Boom Beam Assembly, P/N A2903-103	The rivets that secure the vertical leg of the left trailing edge spray boom mount beam to the horizontal leg sheared. This condition allowed the vertical leg to separate during flight and drop in a 90 degree arc (around the boom tube), jamming the left aileron in the down position.

ISRAEL AIRCRAFT

Israel Model 1124	Hydraulic Hose, Tite Flex P/N 660000206-0212F

The hydraulic pressure hose which extends from the right engine driven pump to the pylon failed during flight. All hydraulic pressure was lost. Investigation disclosed a broken sleeve. Total time in service - 481 hours.

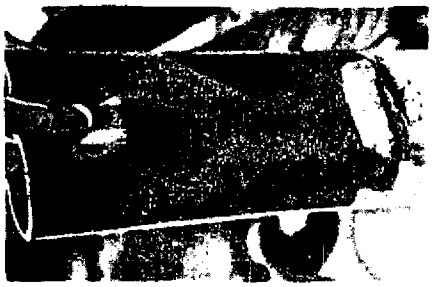
SAFETY is a Responsibility, Not a Task!

LAKE

Lake
Model LA-4-200

Engine Strut

While taxiing (on water) the engine fell onto the right wing. Investigation disclosed that the upper bolt pulled out of the engine left side strut. The bolthole appeared to have been elongated prior to the bolt pulling through the strut metal. Total time in service - 232 hours.



PIPER

Piper
Model PA-23

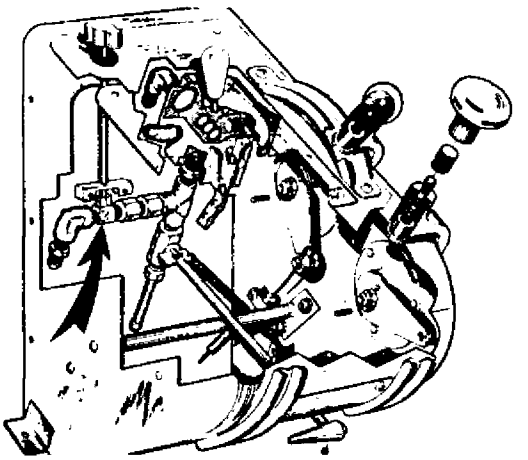
Rudder Lower Hinge Bracket Assembly, P/N 17289-00

During routine annual inspection, at 2600 hours aircraft time in service, the subject bracket was found cracked. The crack had progressed through the bracket to the right of the torque tube horn pivot bolt bearing bore. This condition generally results from failure to use control locks when the aircraft is parked outside unattended.

Piper
Model PA-23-250

Heater Shutoff Valve Assembly, P/N 19460-00

The source of fuel and fuel fumes in the cockpit and aircraft belly was traced to a leaking heater fuel shutoff valve. The subject valve is located inside the cockpit mounted fuel system control box.

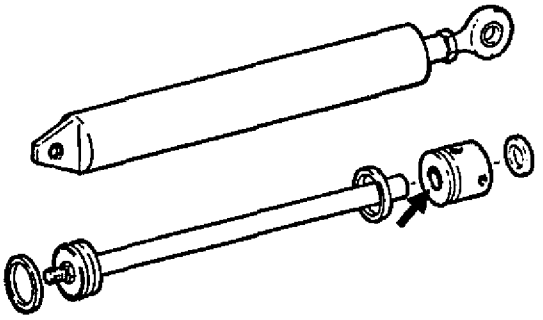


Piper
Model PA-23-250

Cabin Heater (Janitrol) Combustion Tube Assembly, P/N 756315

During the second attempt to start the cabin heater on the ground, a fire resulted. Subsequent investigation revealed the heater combustion tube assembly was cracked in two places. The part had been in service for 2126 hours.

Piper Model PA-23-250	Flap Control Rod Assembly, P/N 18316-00	Failure of the right wing flap to actuate was attributed to a broken control rod end fitting. The end fitting bearing seized, resulting in overloading of the fitting threaded shank and subsequent failure. The control rod connects the flap to the torque tube bellcrank assembly.
Piper Model PA-23-250	Induction Air Box Drain Hose, P/N 16633-51	A fire occurred during engine start because of residual fuel trapped in the left engine induction air box. Investigation revealed the air box drain line was plugged with dead bugs and other foreign matter.
Piper Model PA-23-250	Landing Gear Actuating Cylinder Assembly, P/N 35030-02	Flight personnel had reported slight fluid leakage from the right main landing gear actuating cylinder. Gear swing during annual inspection revealed a massive leak from the left cylinder. The cause of difficulty was attributed to excessive wear of the piston rod bore in the cylinder end plug, P/N 751691.
Piper Model PA-23-250 Aztec "F"	Window Moulding Retainer Strips, P/Ns 31185-00 and -01	When performing inspection, at 350 hours aircraft time in service, much difficulty was experienced deploying the emergency exit window assembly, P/N 30478-00. Investigation revealed that the metal strips which retain the fuselage moulding would catch on the plastic trim on the emergency exit, preventing quick removal. Trimming 1/4 inch from the bottom of the strips corrected the condition.
Piper Model PA-23-250	Flap Torque Tube Attachment Bracket, P/N 17159-00	An in-flight asymmetrical flap condition resulted from failure of the right flap torque tube attachment bracket. This bracket supports the wing flap torque tube bearing, and is welded to the lower right fuselage longeron at station 141.5. The right flap is used as a step by personnel enplaning and deplaning, which imposes excessive load on the subject bracket.
Piper Model PA-23-250	Aileron Spar Assembly, P/N 1710018	At 1250 hours aircraft time in service the left aileron spar was found cracked adjacent to the inboard hinge attachment point. The inboard aileron rib, P/N 17100-13, which was also cracked, was all that was holding the inboard hinge in place.
Piper Model PA-23-250	"Amp" Wire Harness Connector Plug Assembly	At 75 hours aircraft time in service, the right engine magneto switch would not ground out, the right engine alternator warning light system would not function, and the right wing navigation light was inoperative. Inspection revealed that the threaded ring which secures the male and female portions of the (black plastic) "amp" wire harness connector, accessible through the lower fuselage access opening (right side), had loosened. The resulting high resistance connection caused arcing and burning of the connector plug pins.



Piper
Model PA-23-250

Battery Cable,
P/N 30958-00

During routine 100 hour inspection, the insulation on the battery cable was found severely burned and blistered. High resistance, due to corrosion between the aluminum cable and its terminal fittings, was the cause of the difficulty.

Piper
Model PA-23-250

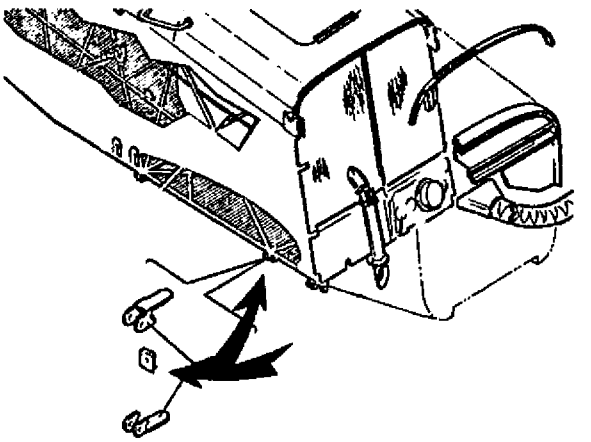
Alternate Air Box
Door, P/N 31207-03

During routine 100 hour inspection, at 2000 hours time in service, the alternate air box door hinge was found severely worn and the door spring, P/N 23097-00, was broken. Failure of the door hinge could result in parts being drawn into the engine induction system.

Piper
Model PA-25-235

Fuselage Lower Longeron

When the filler spacer between both the right and left wing forward spar-to-fuselage fitting assemblies, P/N 64412-00, were removed, the lower longerons were found rusted completely through. The condition could not be detected without removal of the welded filler spacers.



Piper
Model PA-28-180

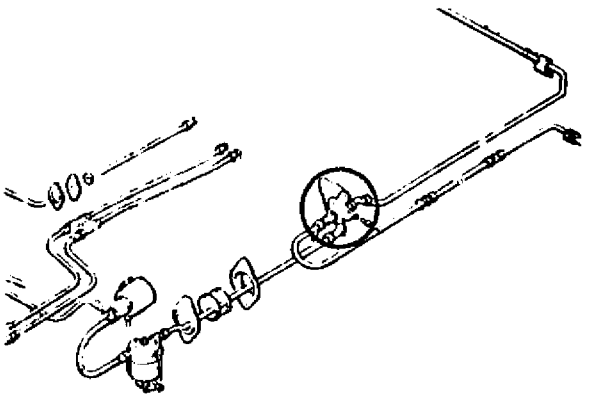
Oil Hose,
P/N 61413-02

The engine-to-oil cooler hose failed during climbout. The rupture occurred where the hose passes under the exhaust stack at rear of engine. Both areas where the hose passes near the exhaust had less than 1/2 inch clearance.

Piper
Model PA-28R-201T

Fuel Line Fittings

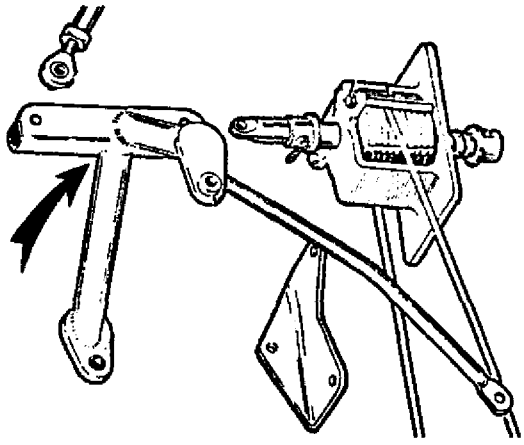
The fuel line fittings which connect the right tank to the fuel selector were found leaking. Two additional aircraft were inspected and the same condition was discovered. These discrepancies were found on new aircraft during radio equipment installation.



Piper
Model PA-30

Stabilator Tab Control Bellcrank Assembly, P/N 22887-00

During routine inspection, at approximately 3150 hours aircraft time in service, the subject bellcrank assembly was found cracked. The crack was through the left tubular member of the assembly, adjacent to its weld to the vertical rectangular member.



Piper
Model PA-31-350

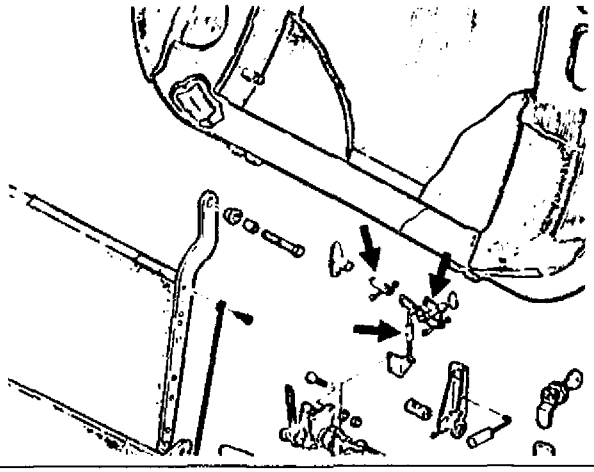
Cabin Heater Vent Air Blower Fan, P/N 754828

A few minutes after the heater was turned on during taxi, vibration was noted, followed by much smoke entering the cockpit. Subsequent inspection revealed the vent air blower fan had failed. Residual fuel burning in the heater combustion chamber caused heat damage to the defroster ducting and electrical wiring insulation. Another report advised of severe vibration during flight, accompanied by a loud "clanking" noise when the heater was turned on. Investigation revealed the cause to be a bent vent air blower fan resulting from ice ingestion through the heater air duct.

Piper
Model PA-31-350

Entrance Door Assembly, P/N 41668-06

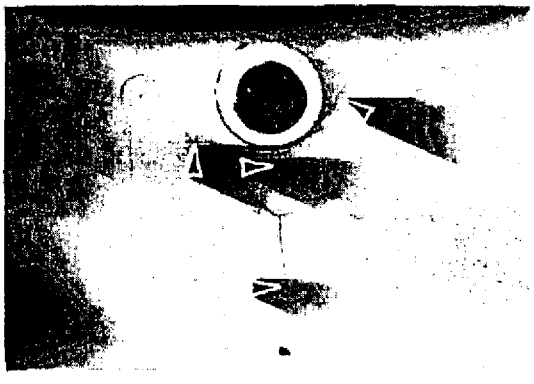
The upper half of the cabin entrance door separated from the aircraft and struck the left horizontal stabilizer. Subsequent inspection of the lower door latching mechanism revealed the door latch safety pin, P/N 54242-02, (installed in aircraft above S/N 7552052) was not engaged with its latch plate. The bellcrank assembly, P/N 54243-02, was dislodged from its bearing plate, P/N 54237-02, and the latch rod, P/N 54244-02, was bent. These are components of the safety pin actuating mechanism. Although the upper door assembly has not been recovered, it is believed the safety bolt, P/N 54263-02, provided to prevent inadvertent inflight opening of the upper door, had not been engaged.



Piper
Model PA-31P

Propeller Spinner Bulkhead Assembly, P/N 46223-00

Inspection performed at 162 hours time in service revealed cracks in the propeller spinner bulkhead assemblies. The cracks were located adjacent to the bulkhead-to-propeller hub boltholes.



Piper Model PA-31T	Wing Tip Fuel Tank Cap, P/N 554119 (Shaw Aero P/N 457-2)	Inability to lock the cap lever over center was attributed to shifting of the lower portion of the cap in relation to the locking lever shaft. This shifting results in misalignment of the three lugs on the lower portion of the cap with corresponding grooves in the upper portion of the cap. The right cap which exhibited the condition evidently had the lever forced into locked position, and subsequently could not be removed without first removing the filler neck or adapter assembly, P/N 50226-00, from the tank. Shifting of the lower portion of the left cap in relation to the lever shaft was also noted, but had not progressed to the point where lug-to-groove misalignment occurred. No difficulty was reported until 444 hours aircraft time in service.

Piper
Model PA-31T

Nose Wheel Assembly, P/N 551778 (Cleveland Model 40-120A)

The ground crew noticed the aircraft nose wheel wobbled slightly when towing the aircraft. Inspection revealed an open crack completely through the wheel flange, which had progressed circumferentially approximately 8 inches. The discrepancy was detected at 253 hours aircraft time in service.

Piper Model PA-34-200T	Mixture Control Cable, P/N 95695-05	Fuel was observed dripping from the lower right nacelle. Inspection disclosed the right mixture control cable housing had chafed a hole in the main fuel line, P/N 95153-145, aft of the firewall, approximately 4 inches from the boost pump. Total time in service - 130 hours. It is suggested that the mixture control cable housing be inspected in this area for proper clamping.
Piper Model PA-36-285	Rudder Spar, P/N 98126-00	Cracks in the rudder spar of aircraft with from 1100 to 1500 hours time in service have been reported. The cracks were located in the vicinity of the upper rudder hinge, P/N 76847-02.

ROCKWELL INTERNATIONAL

Rockwell International
Model 112A

Nose Landing Gear Arm, P/N P-242-1

The nose landing gear arm failed during takeoff. Total time in service - 1200 hours.

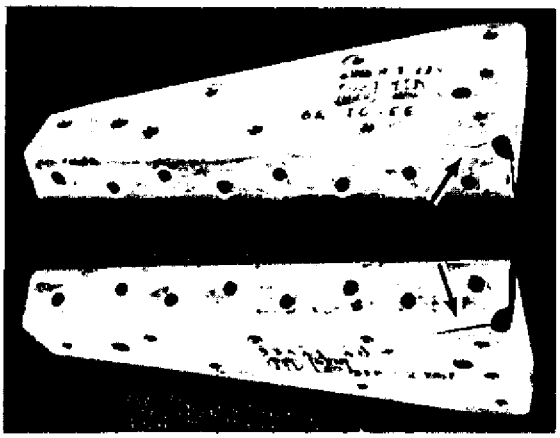
SCHWEIZER

Schweizer
Model SGS 2-33A

Aileron Horn Doubler,
P/Ns 33501H-39 and -40

During routine annual inspection, both left and right aileron horn reinforcement doublers were found cracked along the upper flange bend radius. This condition was found with gliders having 1000 hours to 5000 hours time in service.

This updates the item on page 118 of Supplement No. 9, dated May 1978.



ACCESSORIES

BENDIX

Bendix
Magneto
Models S-20, S-200,
S-1200 and D-2000
Series

Timing Practices

The manufacturer has advised that magneto timing is sometimes being set using a holding tool in contact with the distributor gear teeth. The tool is evidently inserted through the timing window, applying pressure on the gear teeth, and could inflict hidden damage. If pressure is exerted on the propeller with the distributor gear immobilized, damage to the gear would be a certainty. Only the tools and procedures recommended by the manufacturer should be used for internal timing of the magneto, and timing the magneto to an engine.

ENGINES

LYCOMING

Lycoming
Model O-320-H2AD

Valve Rocker Arm,
P/N LW-15014

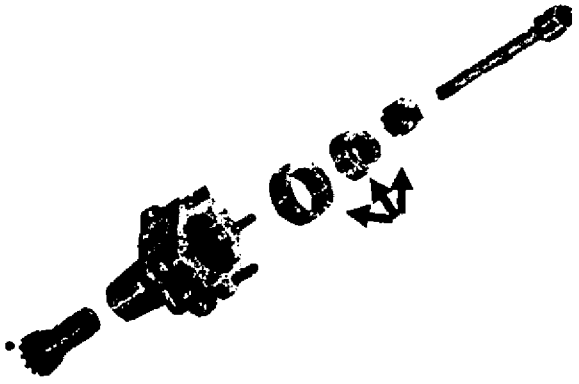
When complying with Airworthiness Directive 77-20-07, visual inspection revealed one of the rocker arms was cracked. Dye penetrant inspection revealed a hairline crack which had progressed about 90 degrees around the fulcrum radius, and terminated at the approximate center of the rocker arm fulcrum slot. The part had been in service for 46 hours.

Lycoming Model O-540-A1D5	Engine-driven Fuel Pump, AC Model 40295	The source of a dangerous fuel leak in the engine compartment of a Piper Model PA-24-250 aircraft, was traced to the engine-driven fuel pump. The fuel pump, which had been in service for only 10 hours, was leaking badly between its parting surfaces because of loose case screws. Inspection of another new pump in stock revealed all case screws turned when 2 to 5 inch pounds torque was applied.

Lycoming
Model TIO-540-C1A

Turbocharger Scavenge
Pump Assembly,
P/N 77635

The right propeller of a Piper Model PA-23-250 aircraft was feathered during flight due to loss of engine oil pressure. Investigation disclosed the engine-driven turbocharger scavenge pump gerotor assembly, P/N 76302, had failed, causing loss of engine oil through the turbocharger oil seal. The engine had been in service for 175 hours.



MAINTENANCE NOTES

CLEANING SOLVENTS MAY DAMAGE ALUMINUM ELECTROLYTIC CAPACITORS

The following information is from a Bendix Service Letter: Aluminum electrolytic capacitors are susceptible to attack by halogenated hydro-carbon solvents. Printed circuit boards containing capacitors of this type should NOT be cleaned with the following solvents:

UNSAFE

Freon TF, TMC
Carbon Tetrachloride
Cloroform
Trichloroethylene
Trichloroethane
ALL (the detergent)
Methylene Chloride

Isopropyl alchohol is recommended as a safe cleaning solvent for use on aluminum electrolytic capacitors. Other solvents which may be used are as follows:

SAFE

Xylene
Ethyl Alchohol
Butyl Alchohol
Methyl Alchohol
Propyl Alchohol
Calgonite (the detergent)

NOTICE TO READERS: The General Aviation Inspection Aids are, for the most part, prepared from information supplied by those who operate and maintain aircraft. For the Aids to be of the most value, a continual interchange of service information is most important. 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.

OIL FOR YOUR AIR-COOLED ENGINE

Oil in the aircraft engine is like blood in your veins. You wouldn't want the hospital to put water in you, so don't compromise on the quality of the oil in your engine. Contrary to most things, aircraft/aviation oils are the same price as automotive oils, so there is no reason to even consider compromising safety by using automotive oils in air-cooled engines.

OIL CHANGES: Oil is inexpensive relative to the cost of engine parts. Change oil at least as frequently as the engine manufacturer recommends. Better to do it too frequently than not frequently enough. During overhaul or anytime the engine has been opened up (cylinder change, etc.), it is impossible to keep all foreign matter out (like shop rag lint). So, change the oil and filter and/or screens within a few hours. Always drain the oil immediately after flight while the oil is still hot.

Don't just throw away the old oil - read it first. That oil has been running around inside the engine for many hours and has much to say if you just take the time to inspect it. When draining the oil, drain it over a magnet. Any magnetic particles will adhere to the magnet as the oil runs out of the sump. Before cleaning the screens, inspect them for foreign particles, such as carbon fragments, brass, main and rod bearing material, etc. After removing the oil filter, cut it open and remove the accordian folded paper. Unfold the filter material and look for foreign particles. Best of all, while draining the oil, drain a pint into a CLEAN container and send the sample out for spectrographic inspection.

The spectrographic analysis will tell you what kind of contamination was found and its concentration. The amount of the various contaminants can then be compared with similar engines to see if the contamination levels are normal or if they indicate a future failure.

In any event, the previously mentioned inspection should be performed at every oil change. In this manner, the various levels of the various contaminations can be compared within the same engine to see if any changes are occurring. Generally speaking, contaminants will be fairly high immediately following overhaul until all the parts work themselves together. This is why we change the oil at short intervals after overhaul, as we don't want this "junk" flowing around inside the engine causing damage. After the initial hours, the oil contamination should settle down to some kind of a predictable pattern. As the engine accumulates hours, the various contamination levels can gradually increase. Watch for the rate of change - this is what is important!

Before reinstalling the screens and filter, clean them thoroughly. Don't add dirt to that engine we are trying to keep clean. The same goes for those quart oil cans and pour spout. Make sure the can is clean on the top before inserting the oil pour spout, and make sure the pour spout is clean before pouring oil through it into your engine.

OXYGEN CYLINDERS

Title 49, Parts 173 and 178 of the hazardous materials regulations were amended January 17, 1978, to requalify the DOT 3HT cylinder specification by extending the life limit from 15 to 24 years. The amendment was published in the Federal Register dated December 19, 1977. In the past, some cylinders manufactured to DOT special permit 5967 specifications were incorrectly marked with DOT 3HT in addition to SP 5967. Cylinders manufactured to DOT SP 5967 are NOT DOT 3HT cylinders. The service life extension provided in the amendment for the 3HT does not apply to SP 5967 cylinders.

To aid in distinguishing one cylinder from another, the 3HT has an opening only on one end, while the SP 5967 has an opening on each end. Additionally, the 3HT is seamless and the SP 5967 has a welded seam.

PROPER PURGING PAYS OFF

Following a 30-hour, forced-air ventilation of No. 2 fuel cell on a P-3 aircraft, a maintenance man entered the fuel cell to repair a seam that had been leaking. While attempting to hang the explosion-proof extension light, a strong spark jumped between the light fixture and a fuel line bracket on which the light was being hung. Power to the extension light was immediately secured. If the fuel cell hadn't been properly purged, an explosion could have occurred in the cell.

An immediate inspection revealed the grounding wire and one hot lead were cross-connected at the male plug. Proper repairs were made, and the light returned to service without further incident. Three other lights were subsequently inspected and found properly wired.

This explosion-proof light extension was received from the manufacturer without the male plug installed. Although a warning tag and wiring instructions were attached to the leads, the three-prong male plug was still installed incorrectly. Time/cause of this erroneous wiring were unknown due to extended shelf storage of this unit.

Recommend all custodians or users make a one-time inspection for this potential hazard.

The following article is an excerpt from Continental Aircraft Service Bulletin No. M73-24, Revision 1, dated March 25, 1977, entitled "Chrome Cylinders - Rebuilt Engines," which affects all Continental engine models except the GTSIO-520 series.

GUIDE FOR CONTINENTAL ENGINE BREAK-IN WHEN TEST CELL OR STAND IS NOT AVAILABLE

This guide is basically for hot weather conditions and may be altered according to outside temperature. Overheating the engine on the ground will prevent the piston rings from seating. In some cases of extreme engine overheating, the pistons will expand to a larger diameter than the cylinder bore. The latter condition will cause severe scoring.

PROCEDURES WITHOUT TEST CELL

a. Limit initial run to 3 or 4 minutes. Do not exceed 1200 RPM.

b. Allow engine to cool to approximately 120 degrees Fahrenheit and repeat short runs of 3 minutes each. Do this as many times as necessary to correct discrepancies. Do not exceed 1600 RPM.

c. After all discrepancies are corrected, a very brief power run, 15 to 20 seconds, will determine if the engine is ready for in-flight break-in.

d. Under no circumstances, attempt to clear a fouled spark plug by a power run during this critical period. Stop engine and change fouled spark plug.

e. In hot weather, select the coolest time of day for in-flight break-in.

f. Keep aircraft weight to minimum.

g. Do not cycle propeller on ground.

h. For take-off, use minimum power to attain at least 40 MPH IAS before applying required take-off power.

i. Do not use take-off power any longer than necessary.

j. Use minimum rate of climb with maximum air speed.

k. Do not lug engine. Use low pitch range for propeller setting with the minimum manifold pressure required for clean in-flight attitude. For aircraft not equipped with variable pitch propeller or manifold pressure gauge, use minimum power for clean in-flight attitude.

l. After desired altitude is reached, maintain level flight attitude. At some period between 20 and 30 minutes, the cylinder head temperature will show a rapid decrease. This indicates that the piston rings have seated, and the short ground runs and the in-flight engine break-in procedures were all satisfactorily accomplished.

m. Return to airport and weigh or measure amount of lubricating oil. At the same time, note oil temperature and ground attitude of aircraft. This applies to oil stick measurement only.

n. Again, fly aircraft a minimum cruise power setting for one hour, land and again weigh or measure oil. If oil is measured on stick gauge, make sure temperature and aircraft ground attitude are the same as described in paragraph m.

o. Record test flight and oil consumption in engine log book before aircraft is released.

p. After release of aircraft to operator, please discourage prolonged ground runs. This can be highly detrimental to any engine.

This updates the item on page 123 of Supplement No. 9, dated May 1978.

The General Aviation Inspection Aids may be purchased from the Superintendent of Documents, U. S. Government Printing Office, Washington, D.C. (20402). The current advisory circular number and price information is listed in the advisory circular checklist of the Federal Register, which can be obtained from any Federal Aviation Administration (FAA) Aviation District Office.

GENERAL AVIATION INSPECTION AIDS

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INSTRUMENTS

ENGINES

PROPELLERS

MAINTENANCE NOTES

SOMETHING TO THINK ABOUT

WOULD YOU BELIEVE IT?

U. S. GOVERNMENT PRINTING OFFICE : 1978 O - 264-776

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

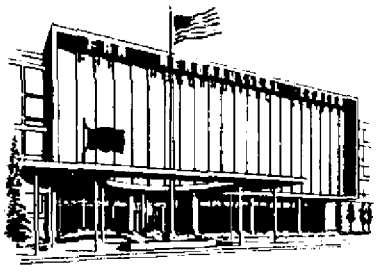
CUMULATIVE INDEX

. . . . . 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. 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.

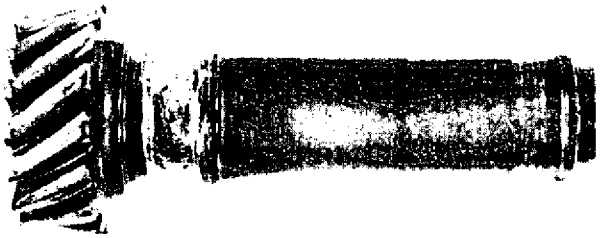
DON'T PUT IT OFF ANY LONGER - If you have recently experienced mechanical difficulties or problems with an aeronautical product and have not reported it yet, please do so now and help your fellow airmen. FAA Form 8330-2, available from your local General Aviation District Office, may be used for this 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.

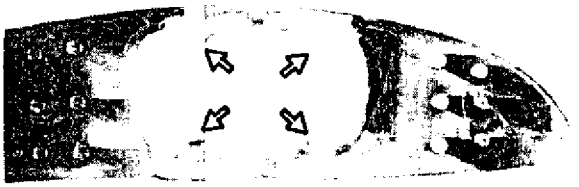


Bell
Model 206B

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.

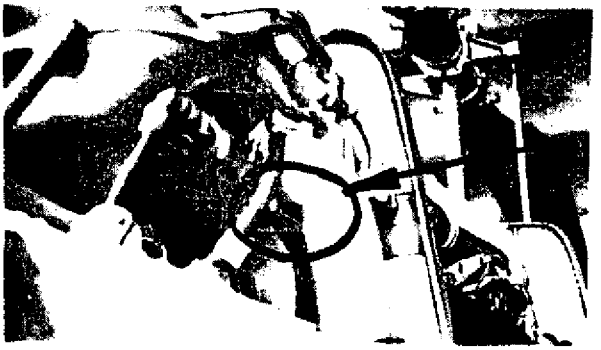
This updates the item on page 58 of the General Aviation Aids Supplement No. 5 dated January 1977.



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.

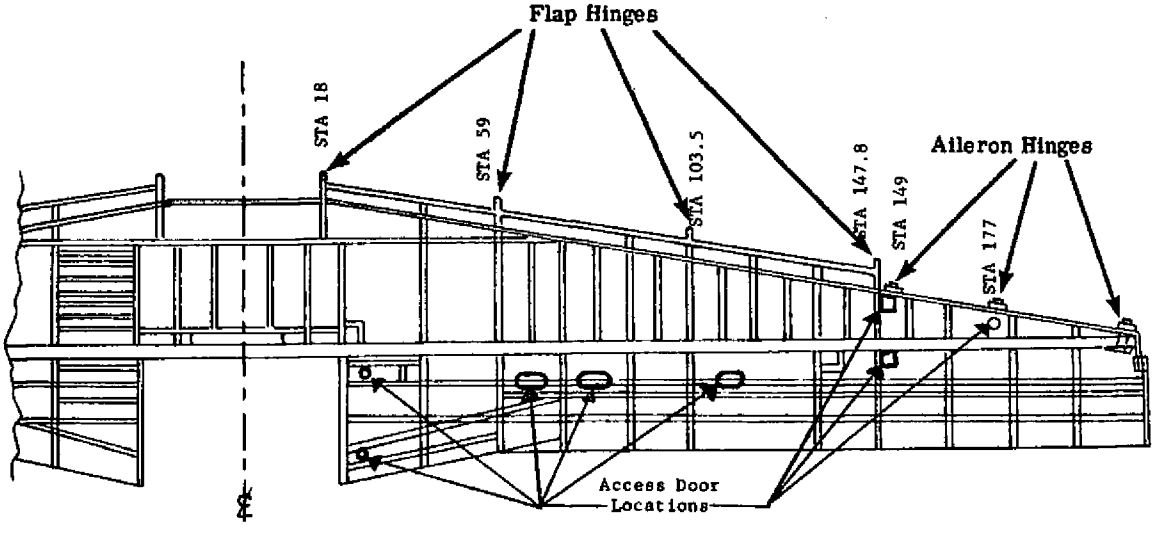


FIG. 1 WING STRUCTURE BOTTOM VIEW

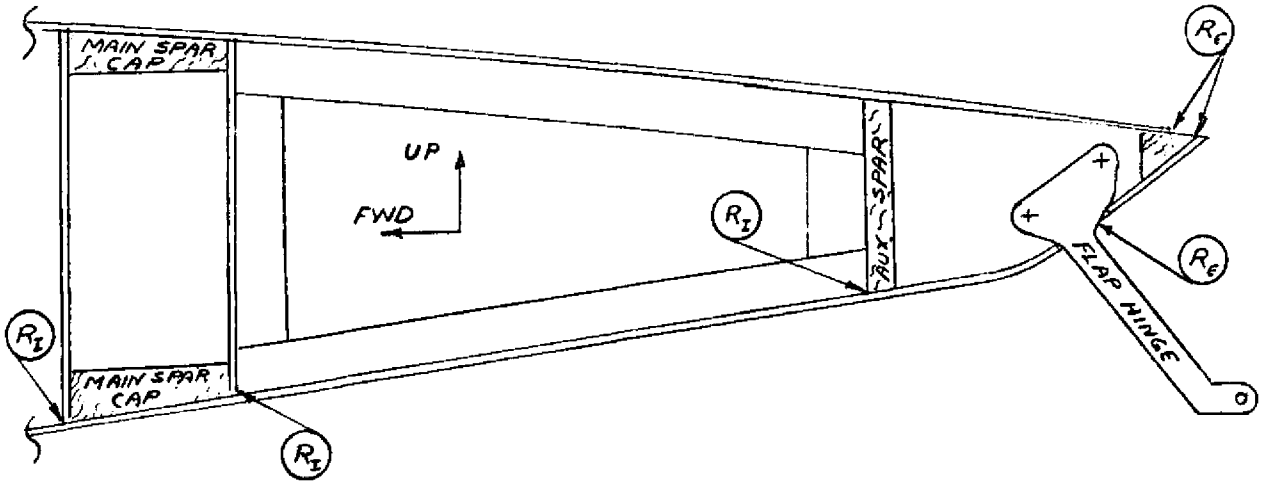


FIG. 2 WING RIB, STATION 147.8 (LOOKING INBOARD)

PIPER

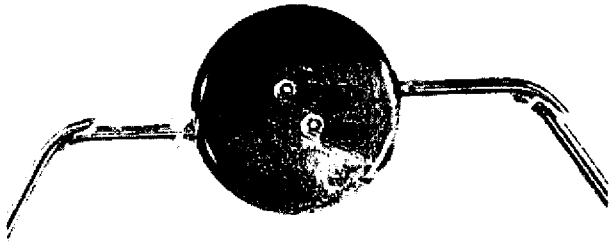
Piper Model PA-18-150	Muffler	Only 2300 RPM could be obtained during takeoff. Although visual inspection indicated no restriction in the engine exhaust system, the muffler was replaced. Subsequent engine operation was satisfactory. The muffler was cut open, and inspection revealed that the core tube 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.

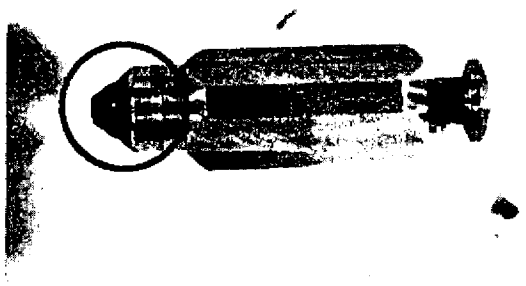
MARVEL - SCHEBLER

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 SAFETY 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

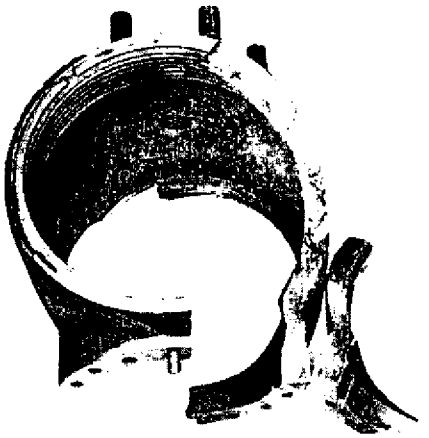
McCAULEY

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.

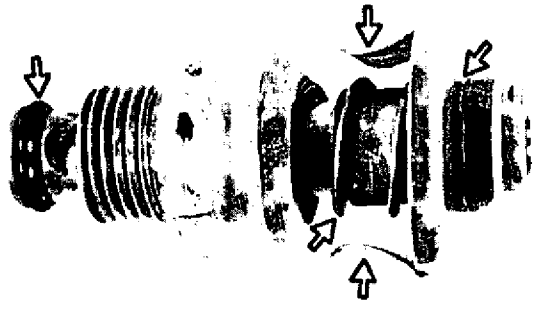
It is suggested that the following be included as part of the usual maintenance procedures when performing periodic inspections in the powerplant area:

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.

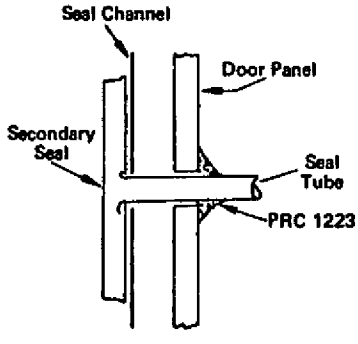


SABRELINER DOOR SEAL INSTALLATION

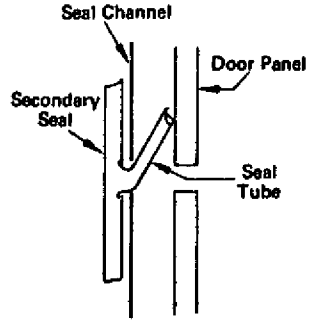
We have had reports that on some Sabreliners the secondary door seal is being incorrectly installed. Perhaps this tip will help you . . . . .

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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