AEROPRODUCTS

60-17-1 Aeroproducts Amdt. 193 Part 507 Federal Register August 19, 1960. Applies to A6441FN-606 Propellers Installed On Lockheed 188 Series Aircraft.

Compliance required as indicated.

As a result of investigations, it has been determined that the following must be accomplished to minimize the possible occurrence of propeller roughness and/or failures:

Not later than November 1, 1960, the thrust member thickness must be determined per Allison Propeller Bulletin 63-127. All blades that do not meet thrust member thickness as prescribed in Allison Propeller Bulletin 63-127 must be removed from service prior to further flight. Concurrently with this inspection all blades shall be classified aerodynamically per Allison Propeller Bulletin 63-125. (Allison telegram to all operators dated May 19, 1960, and Allison Propeller Bulletins Nos. 63-125 and 63-127 cover this same subject.)

BEECH

62–17–1 Beech Amdt. 467 Part 507 Federal Register July 26, 1962. Applies to All Model 278 Propellers With More Than 200 Hours' Time in Service Installed in Single Engine Tractor Type Aircraft Such as Beech Model A45 (T–34A), B45, D45 (T–34B), H35, and Subsequent Bonanza Aircraft.

Compliance required as indicated.

Cracks have occurred in the welded joint where the aft side of the hub barrel is joined to the hydraulic cylinder. Such cracks could lead to serious oil loss.

(a) Within the next 25 hours of time in service after the effective date of this AD, and thereafter within each 100 hours' time in service, remove the propeller spinner and visually inspect for cracks and oil leaks in the weld area where the aft side of the hub barrel is joined to the hydraulic cylinder.

(b) At each propeller overhaul inspect the hub by magnetic particle inspection or FAA approved equivalent method. Give particular attention to the weld area where the aft side of the barrel is joined to the hydraulic cylinder.

(c) Replace cracked parts with new parts prior to further flight.

NOTE: Repairs are not permissible.

(Beech Propeller Service Bulletin No. 6 dated January 1962, applies to this subject.)

This directive effective August 27, 1962.

CURTISS-WRIGHT

49–30–1 Douglas and Convair Applies to All DC–6 and 240 Aircraft Equipped With Curtiss Model C632S–A Propellers.

Compliance required as soon as possible but not later than August 15, 1949.

Because of a number of cracks having been discovered in the threaded portion of the hub barrels of the C632S–A propellers, preflight visual inspections must be made in accordance with Curtiss Instructions to all owners dated May 12, 1949.

It is strongly recommended that wherever the necessary equipment is available, magnetic inspections be made in accordance with Curtiss Instructions entitled, "Field Magnetic Inspection of C632S–A Hubs".

Any hubs revealing cracks must be retired from service immediately.

The above inspections are to remain in effect as long as these propellers are in service regardless of any rework accomplished.

Operational procedures for the Douglas DC–6 during ground run, takeoff and climb, as recommended by the Douglas Co. telegram of May 25, 1949, must also be complied with.

53–5–1 Boeing, Convair, Douglas and Lockheed Applies to All Boeing 377, Convair 240 Series, Douglas DC–6 Series, and Lockheed 749 Series Airplanes With Curtiss Reversing Propellers.

Items I through IV are to be accomplished by means of progressive modification program to be submitted to and approved by the FAA. This program shall begin no later than September 1, 1953, and shall be completed no later than March 1, 1954. (For Boeing 377 completion must be no later than July 1, 1954.) The replacement program in item III and the maintenance and inspection program in item V shall be instituted no later than April 1, 1953.

I. Revise propeller slip rings, brush cap connector plug and harness to provide isolation of the reverse slip ring and brushes by relocating them between the "Common" and "Bonding" slip rings and brushes, which are both maintained at ground potential. Curtiss Information Reports have been issued to cover this subject, as follows: Convair 240 Series, Report No. 245S dated November 5, 1951; Douglas DC–6 Series, Report No. 249S dated December 4, 1951; Boeing 377, Report No. 258S dated March 21, 1953; Lockheed 749 (C634S Propeller), Report No. 250S dated April 15, 1952; Lockheed 749 (C632S Propeller), Report No. 267S dated May 14, 1952.

II. A. Install Curtiss brush cap P/N 148764, which has provisions for a separate brush cap connector for the reversing lead. This change may be accomplished after or simultaneously with I, and in accordance with Curtiss Information Report No. 273–S, dated January 15, 1953.

B. Isolate the reversing circuit from the propeller brush cap to (and including) the "I" terminal on the reverse pitch relay, in the manner described below. Where applicable, the same isolation shall be provided for the extension of the reversing circuit to the secondary reverse lock relay.

(1) Terminal strips. Any one of the following methods of isolation may be used:

(*a*) Elimination of connections at terminal strips by using continuous wiring.

(*b*) Providing separate covered terminal strip for reversing lead connections.

(*c*) Isolating the reversing lead stud, terminals, and asociated hardware from all nearby components in an insulating cover which is so designed or secured to the wiring that the wire will stay in place in case of breakage of the terminal; or so that the broken wire and terminal will remain insulated by the cover from contact with other circuits if the wire comes off its terminal. The nature of the cover design or provisions for its attachment must be such that its installation will not be overlooked during maintenance.

(*d*) Removing or grounding studs adjacent to the reversing lead stud and securing all adjacent wiring and the reversing lead to prevent contact of broken leads with re-

versing terminal or contact of broken reversing lead with other terminals. If the adjacent studs are grounded, rather than removed, the studs must be identified distinctively so that they will not inadvertently be used for the attachment of wires serving other circuits.

(2) Multiple pin connector assemblies. Any one of the following methods of isolation may be used:

(*a*) Elimination of connectors by using continuous wiring.

(*b*) Providing separate connectors for each reversing circuit.

(*c*) Deactivating all pins adjacent to the one carrying the reversing circuit. These pins are to be retained in the connector but identified distinctively so that they will not be used inadvertently. When distinctively identified, these pins may also be used for circuits which cannot supply sufficient energy to drive the pitch-change motor or to release the pitch change motor brake, or for circuits which are energized only when reversing is desired. At the points where wires are attached to the connector pins, all exposed metal parts are to be protected with insulating covers so secured that contact between circuits cannot occur in case of failure of the connection or in case foreign material is left in the connector assembly.

(3) Exposed terminals on relays or switches.

(*a*) As specified in item B(1)(*c*) for terminal strips, or

(*b*) If the terminal is a type which cannot be protected as specified above, cover all exposed metal components with insulating material and secure all wires so that no wire can touch another terminal if the wire breaks or falls off its own terminal. Install insulating barriers as necessary to prevent inadvertent contact between broken or loose wires and other terminals.

(4) Reverse circuit wiring. Modify in one of the following ways:

(*a*) Physically isolate the reverse wire from all other circuits.

(*b*) If the wiring is run in bundles with other wires, a shielded wire is to be used. The shielding shall be grounded at both ends, and a protective cover shall be provided over the shielding. The shielding shall be carried as close as possible to all terminal points.

(5) Nacelle filter. If the reverse wire and, where applicable, the lead to the secondary reverse lock relay, is enclosed in conduit or shielding for its entire length from the brush cap to the "I" terminal of the reverse pitch relay, the lead may be routed so as to bypass the nacelle filter thus eliminating the need for isolating the condenser terminals. If the reverse wire is isolated in such manner that filtering is still necessary, provide an additional filter which is physically separated from the existing nacelle filter.

III. Comply with AD 56-8-1.

IV. An unmodified C632S Series propellers which have both the reverse pitch circuit and the feathering circuit opened by the same limit switch when the propeller blades are at the reverse pitch position modify the propeller limit switch arrangement so that it will be possible to energize the increase pitch circuit by operating the feathering control even when the propeller is in reverse pitch. Curtiss Information Reports have been issued to cover this subject, as follows: CV-240 Series, Report No. 245S, dated November 5, 1951; DC-6 Series, Report No. 249S, dated December 4, 1951; L-749 Series, Report No. 267S, dated May 14, 1952.

V. Maintenance practices.

A. At each nearest scheduled service to 350 hours:

(1) Inspect all points specified in items II. B. (1) and II. B. (3). The inspections of item II. B (1) may be discontinued if the modifications made to the system are of the type described in items II. B. (1)(*a*) or II. B. (1)(*b*).

B. At any time that an electrical fault occurs in a circuit which is carried in the same bundles or the same conduits as the reverse wing, representative terminal points in the faulty circuit are to be inspected to determine whether any damage may have occurred within the bundles or conduit. If there is evidence of possible damage, all the wiring involved is to be removed for inspection. Damaged wiring will be replaced as necessary.

C. At each scheduled service nearest to 350 hours, perform an electrical check of the reverse safety switches in the pedestal assembly to assure that the switches open when throttles are moved forward out of the reverse position.

D. At any time that operations are performed which may affect the relative position of the solenoid lock and throttle switches, but in any event at intervals not to exceed 1,500 hours: Check the relationship between the position of the pedestal strikers when they are: (*a*) in contact with the solenoid latch; (*b*) at the point where the detent roller contacts the first detent cam; and (*c*) when the reversing microswitches are actuated. It shall not be possible for the switches to be actuated before the latch and the detent engage the striker and the cam. This determination shall be made by positive measurements rather than observation of engine r.p.m. at which these actions take place.

56–8–1 Curtiss Applies to All Models C632S, C634D and C634S Propellers.

Compliance required as indicated.

I. Replace low pitch limit switches P/N 110425 at not more than the following intervals:

	Hours
Douglas DC–6 Series Aircraft	3,500
Lockheed 749 Series Aircraft	3,500
Lockheed 1049 Series Aircraft	3,500
Convair 240 Series Aircraft	1,000

(Curtiss Service Bulletin No. 52 dated December 29, 1949, and appropriate service manuals also cover these recommendations.)

II. Disassemble and visually inspect low pitch limit switches P/N 154592 at not more than the same intervals. Inspect for proper switch operation and for mechanical and electrical condition. Failure or malfunction other than normal service wear shall be cause for replacement of switch parts or of the assembly. Switches not revealing adverse conditions may be returned to service.

This supersedes Section III of AD 53–5–1.

59–7–1 Curtiss Applies to Models C634S–C400 and C634S–C500 Series Propellers.

Compliance required as indicated.

Excessive wear of power unit motor and mating speed reducer splines in Curtiss C634S–C400 and C634S–C500 Series propellers has been observed at a time short of a full overhaul period. Accordingly:

(1) Inspect rotor assembly P/N 113330 and drive sleeve P/N 102664 splines, and rear motor shaft bearing fit at each 500–600 hours' flying time.

(2) Discontinue mixture of Molybdenum Disulfide in spline lubricant. Use only Lubriplate 315.

Inspect as directed in Curtiss-Wright Corporation Propeller Division letters to all operators of Lockheed 749 and 1049 Series aircraft dated December 5, 1958, and March 20, 1959. Worn parts must be replaced.

This supersedes AD 58–25–2.

59–18–3 Curtiss Applies to All Models C634S–C400 and C634S–C500 Series Propellers.

Compliance required at first propeller overhaul after January 1, 1960, but not later than May 1, 1960.

Peculiar wear of power unit motor and mating speed reducer splines in Curtiss C634S–C400 and C634S–C500 Series propellers has been observed at a time short of a full overhaul period. In order to minimize the possibility of such occurrences, provide a new motor rotor assembly which incorporates a longer shaft with splines of a larger pitch diameter and a new mating splined sleeve and high speed drive gear. Modification of the 145295–2 power unit assembly in Curtiss C634S–C400 and C634S–C500 Series propellers to the 163308 power unit assembly accomplishes the desired objective.

(Curtiss Service Bulletin No. C–24 covers this same subject.)

Compliance with AD 59–7–1 is no longer required after compliance with this AD.

FREEDMAN

48–48–1 Freedman Applies to Cessna 120 and 140, Superior (Culver) V and V2, Universal (Globe) GC–1A and GC–1B and Silvaire (Luscombe) 8E Airplanes Equipped With Freedman Propellers.

Compliance required prior to August 1, 1947.

Freedman Aircraft Engineering (formerly Freedman Burnham) hubs, Models PC–203, PX–203 and PY–203 must be removed from engines rated above 80 h.p., with the exception of the PX–203 hub on the Franklin Model 4AC–199 engine. The propellers may be replaced by any propeller listed as approved on the latest revision of the pertinent aircraft specification.

This supersedes AD 47–22–2.

HAMILTON STANDARD

50–12–1 Hamilton Standard Applies to All Aircraft Equipped With Continental Engines, Models W–670–6A (R–670–3, –5), W–670–6N (R–670–4), W–670–16 (R–670–8, –11, –11A) and Hamilton Standard Ground Adjustable Propellers Having Blades, Model 11C1 (Navy 4350, 4350F, 4350F1).

Compliance required not later than April 15, 1950.

To minimize the possibility of propeller blade shank fatigue failures as a result of noncompliance with a mandatory engine operation restriction, the following precautionary measures should be taken:

(1) Check the marking on the engine tachometer and correctly mark it, if necessary, with a red arc which covers the entire r.p.m. range above the higher side of the 1,900 r.p.m. graduation.

(2) Install placard in aircraft to read: "Avoid all engine operation above 1,900 r.p.m. except during takeoff".

(3) Check position of the propeller and correctly index, if necessary, in the zero degree position (blades in line with crankthrow).

50–52–1 Hamilton Standard Applies to All Convair Model 240 Series, Douglas DC–6 and Martin Models 202 and 202A Aircraft Equipped With Hamilton Standard 2H17 Series Blades.

Compliance required daily until further notice.

There have been several cases in which a crack has been detected in Hamilton Standard 2H17 blades during routine ground inspections and recently there was a case in which a section of the blade tip shell was lost in flight requiring an unscheduled landing. In order to eliminate the possibility of other blade failures, the following precautionary measures must be taken:

(1) Thoroughly clean the entire surface of each blade to remove oil, grease, dirt, etc., so that an adequate inspection of the entire blade surface can be made.

(2) Carefully examine visually at close range (12 inches–14 inches) and in detail, the entire surface of each blade for cracks and surface defects in accordance with Hamilton Standard Service Bulletins Nos. 177 and 193. Any suspected areas should then be more closely examined by using a suitable magnifying glass, permanent magnet or any other suitable means as required.

(3) If any cracks are found in the blade surface, it must be retired immediately from service. All doubtful cases should be referred to the propeller manufacturer.

This directive supplements previous Hamilton Standard information on the same subject to all affected operators.

52–13–2 *See* Lockheed Aircraft.

52–14–1 *See* Douglas Aircraft.

52–14–2 *See* General Dynamics.

52–15–1 *See* Boeing Aircraft.

52–15–2 *See* Martin Aircraft.

54–1–1 Hamilton Standard Applies to All Hamilton Standard Reversing Propellers Models 43D, 43E, 34D, 34E, 232 and 242.

Compliance required as indicated.

Subsequent to December 31, 1954, Hamilton Standard Model 67000 reverse solenoid valves shall not be used on civil aircraft.

Analysis has shown that unwanted reversal of Hamilton Standard propellers could possibly occur with use of the Hamilton Standard Model 67000 reverse solenoid valve if any of the following malfunctions of the valve were experienced:

1. A broken plunger spring. This could cause the valve to open fully.

2. A film of oil between the armature and the valve body. This could cause the valve to remain fully open.

3. A foreign particle lodged between the valve and its seat. This could cause a pressure buildup in the reverse oil passage.

Although there is no record of such malfunctions of this valve on civil aircraft, the potential hazards that exist indicate the desirability of precluding future use of this obsolete component.

54–1–2 Hamilton Standard Applies to Hamilton Standard Reversing Propellers Models 43D, 43E, 34D, 34E, 232 and 242 Incorporating Low Pitch Stop Assemblies With Wedge Return Springs; and Models 43E, 34D, 232 and 242 Incorporating Low Pitch Stop Assemblies With Wedge Inserts, on Boeing 377, Convair 240 and 340 Series, Douglas DC–6 Series, Lockheed 49 Series, Martin 202 and 404 Series Aircraft.

Compliance required as indicated.

Investigations of three recent incidents in commercial service in which the propeller inadvertently reversed during approach, have indicated the possibility that the low pitch stop wedge, under vibratory conditions, can move forward from its position under the stop levers, allowing the propeller to travel into the reverse range upon governor demand for lower pitch. Therefore, to minimize the forward forces applied against the stop wedge by piston-to-stop-lever contact at the low pitch position, it is necessary to remove the 2° pitch angle from the stop lever and wedge contact surfaces.

Prior to June 1, 1954, rework all low pitch stop levers and wedges as specified in Hamilton Standard Service Bulletin No. 273 and its Supplement No. 273A.

This supersedes AD 53–15–1.

54–10–1 Hamilton Standard Applies to All Models 23260, 24260, and 34D Series Propellers Using Wedge Insert Type Low Pitch Assemblies.

Compliance required as indicated.

In order to preclude any possibility of reverse system malfunction caused by breakage of the servo piston shaft as a result of fatigue in highly stressed areas:

1. At the earliest opportunity, but not later than the first overhaul subsequent to June 1, 1954, dimensionally inspect the internal diameter of all 75361 and previous wedge insert type servo piston shafts for a maximum of 0.688 inch.

2. Magnetically inspect the stop return spring seat thread area of the shafts at the period specified in item 1 and at every overhaul subsequent to that period.

(Hamilton Standard Service Bulletin No. 287, revised March 5, 1954, covers these same inspections.)

55–5–2 Hamilton Standard Applies to All 43E60 Propellers With 6903 Blades Installed on Lockheed 1049 Series Aircraft Powered by Wright 972TC–18DA Series Engines.

Compliance required as indicated.

Analysis of loadings and stresses in the Hamilton Standard 43E60/6903 propeller when installed as noted has shown that it is desirable to improve the strength characteristics of the propeller barrel assembly by shotpeening the barrel and spider in specified areas, and by substituting stronger barrel bolts. Therefore, in order to preclude any failures from this cause:

At the earliest opportunity, but not later than the first overhaul subsequent to May 1, 1955, accomplish the rework of the hub barrels and spiders, and replace the barrel bolts as specified in Hamilton Standard Service Bulletin No. 316 dated September 10, 1954.

55–9–4 Hamilton Standard Applies to All 24260 Propeller Hub Barrels Used on Boeing 377 Aircraft.

Compliance required as indicated.

As a result of cracks occurring in several 24260 hubs when installed as noted, it is considered desirable to improve the strength characteristics of the hub by reworking and shotpeening the areas subject to such failures. Therefore, in order to minimize the possibility of failures of the nature indicated, accomplish the following:

Inspection. Inspect at every overhaul.

Rework. Rework hubs at the earliest opportunity, but not later than at the next overhaul following June 15, 1955, for hubs with 6,000 or more hours of total operating time.

(Hamilton Standard Service Bulletin No. 327 dated November 18, 1954, outlines the required rework.)

56–19–2 Hamilton Standard Applies to All 2J17 Steel Propeller Blades Installed on Boeing 377 Aircraft.

Compliance required as specified herein.

This note consolidates all items of AD notes and revisions issued on the subject propeller blades prior to August 1, 1956. Only those items that are still in effect are included.

I. The inspection and maintenance procedures given in Hamilton Standard Service

Bulletin No. 302, except as modified by this AD must be accomplished on a continuing basis.

II. No external deicers shall be used on the exposed metal portions of the blade.

III. Blades of the "stiffner type" shall not be used.

IV. The following r.p.m. restrictions shall be included in the aircraft placard:

(A) For aircraft having zinc-plated blades:

(1)"Avoid ground running under static conditions above 2,600 r.p.m."

(2) "Avoid continuous ground operation between 1,400 and 2,000 r.p.m."

(3) "Avoid continuous operation in flight below 1,750 r.p.m. except 1,400 r.p.m. may be used for level cruise but not for descent."

(B) For aircraft having nickel-plated blades:

(1) "Avoid ground running under static conditions above 2,500 r.p.m." This shall be accomplished by increasing the settings of the low pitch stops in the propeller hub.

(2) "Avoid continuous ground operation between 1,400 and 1,900 r.p.m."

(3) "Avoid continuous operation in flight below 1,750 r.p.m. except 1,400 r.p.m. may be used for level cruise but not for descent."

V. Propeller blades in service that have not been renovated or rebuilt by Hamilton Standard. Blade Serial Numbers below 649,400.

(A) Conduct hand magnetic inspection of entire blade at 400–500 hour intervals of operation.

(B) Blades on which corrosion was found and repaired within acceptable tolerances must not have these reworked areas covered with any material which would preclude discovery of a crack or other defect. Direct inspection, the use of hand magnetic inspection procedures or equivalent, must remain effective.

(C) Conduct hand magnetic inspection of garter area daily on blades on which corrosion was found and repaired. On blades on which no corrosion was found, conduct similar inspection at 65-hour intervals of operation.

(D) Conduct electrical leakage check in accordance with Section G–3 of Hamilton Standard Service Bulletin No. 302 at 120-hour intervals of operation for blades with Serial Numbers below 619,000 and 500–600 hour intervals for blades with Serial Numbers from 619,000 to 649,400.

(E) Conduct electrical resistance check in accordance with Section G–4 of Hamilton Standard Service Bulletin No. 302 as follows:

(1) Within 65 hours after each deicer circuit energization. (NOTE: When propeller deicing is used regularly over an extended period of time resistance checks may be conducted at 65-hour intervals of operation rather than after each use.) A means should be provided at the deicer circuit switches that will clearly indicate when a switch has been operated to energize the circuits. Maintenance procedures and instructions should be established to provide for the resistance check within the specified time whenever the indicator shows that the deicer circuits have been energized.

(2) At each composite service, not to exceed 200 hours.

VI. New propeller blades incorporating special treatment of unplated area and an 8-inch rubber sleeve in place of narrow garter previously used. These new blades can be identified by (1) presence of 8-inch sleeve in place of narrow garter, (2) Serial Numbers above 649,400, (3) model designation 2J17H3–8W change AE or later (zinc plate), 2J17Z3–8W change R or later (nickel plate), 2J17AG3–8W (zinc plate) or 2J17AH3–8W (nickel plate).

(A) At a maximum of 1,500 hours operation, remove the sleeve, and inspect the exposed area for corrosion, and the entire blade visually and hand or machine magnetically for other defects. If the blade satisfactorily passes inspection, a new sleeve shall be installed prior to further service. These inspections shall be repeated at intervals of 1,500 hours of operation maximum.

(B) Conduct electrical leakage check in accordance with Section G–3 of Hamilton Standard Service Bulletin No. 302 at the time of hand magnetic inspection specified in VI. (A).

(C) Conduct electrical resistance check in accordance with Section G–4 of Hamilton Standard Service Bulletin No. 302 as follows:

(1) Within 65 hours after each deicer circuit energization. (NOTE: When propeller

deicing is used regularly over an extended period of time, resistance checks may be conducted at 65-hour intervals of operation rather than after each use.) A means should be provided at the deicer circuit switches that will clearly indicate when a switch has been operated to energize the circuits. Mainteance procedures and instructions should be established to provide for resistance check within the specified time whenever the indicator shows that that the deicer circuits have been energized.

(2) At each composite service, not to exceed 200 hours.

VII. Factory renovated propeller blades incorporating special treatment of unplated area and an 8-inch rubber sleeve in place of narrow garter previously used. These blades can be identified by (1) presence of 8-inch sleeve in place of narrow garter, (2) Serial Numbers between 645,300 and 649,400, (3) model designation 2J17H3–8W prior to change AE (zinc plate), or 2J27Z3–8W prior to change R (nickel plate).

(A) At a maximum of 1,500 hours of operation remove the sleeve, and inspect the exposed area for corrosion, and the entire blade visually and hand or machine magnetically for other defects. If the blade satisfactorily passes inspection a new sleeve shall be installed prior to further service. These inspections shall be repeated at intervals of 1,500 hours of operation maximum.

(B) Conduct electrical leakage check in accordance with Section G–3 of Hamilton Standard Service Bulletin No. 302 at the time of hand magnetic inspection specified in VII. (A).

(C) Conduct electrical resistance check in accordance with Section G–4 of Hamilton Standard Service Bulletin No. 302 as follows:

(1) Within 65 hours after each deicer circuit energization. (NOTE: When propeller deicing is used regularly over an extended period of time, resistance checks may be conducted at 65-hour intervals of operation rather than after each use.) A means should be provided at the deicer circuit switches that will clearly indicate when a switch has been operated to energize the circuits. Maintenance procedures and instructions should be established to provide for the resistance check within the specified time whenever the indicator shows that the deicer circuits have been energized.

(2) At each composite service, not to exceed 200 hours.

VIII. Check strength of hand magnets for conformance with Hamilton Standard Service Bulletin No. 302 or equivalent before each use, or daily when in continued use.

IX. To supplement the above precautions, while in flight continue to monitor the vibration indicator at least hourly for any indication of progressive unbalance.

X. While in flight continue to monitor the propeller deicer current load meter for any indication of deicer heater resistance change.

This supersedes AD 55–21–1.

56–20–6 Hamilton Standard Applies to All Hamilton Standard Governors Installed on Wright TC18DA and TC18EA Series Turbocompound Engines.

Compliance required prior to October 15, 1956.

Subsequent to October 15, 1956, no Hamilton Standard governor drive gear shafts P/N 67035 shall be used in their governors installed on Wright TC18 Series turbocompound engines.

This supersedes AD 56–2–2.

56–22–1 Hamilton Standard Applies to All Hamilton Standard Aluminum Alloy Propeller Blades.

Compliance required for 6507 blades before July 1, 1957; all other blades before January 1, 1958.

Omission of EC776 cement as a prime coat under BB1007 in the cement sequence for adhering rubber accessories to Hamilton Standard aluminum blades as required by their Service Bulletins 210 and 217 has resulted in corrosion of the blade area under these parts. Although this corrosion does not necessarily appear sever to the naked eye, two instances of fatigue cracking of 6,507 blades on DC–4 type aircraft have been encountered and are believed to have originated from such corrosion. Remove the adhered rubber parts from all aluminum blades having fluid deicing boots, electric blade heaters, deicer troughs, or slip ring mounts excepting only those blades which have known histories of positive application of EC776 adjacent to the blade surface under

BB1007 throughout the blade's entire life, or for at least the last 5,000 hours of operation. Inspect and rework uncovered areas in accordance with Hamilton Standard Service Bulletin No. 385. Where anodize inspection facilities are available, non-surface-treated blades and non-surface-treated areas of surface treated blades may be inspected and reworked in accordance with Hamilton Standard Service Bulletin No. 385B. Blades with excessive corrosion and/or cracks should be returned to Hamilton Standard for further evaluation.

This directive is also applicable to aluminum blades which do not currently include the aforementioned adhered rubber parts, but formerly incorporated them without the EC776 application.

(Hamilton Standard Service Bulletins Nos. 210, 217, 385, 385A, and 385B cover this same subject.)

57-13-5 Hamilton Standard Applies to All Hamilton Standard Aluminum Alloy Blades Used in Hydromatic (Noncounterweight Type) Propellers, With the Exception of Blades With Integrally Molded Chafing Rings (Refer Hamilton Standard Service Bulletin No. 508) and With the Exception of Those Blades Already Incorporating Corrosion Barriers Installed in Accordance With Service Bulletins Numbers 390, 414, and 414A, Provided This Corrosion Barrier is in Good Condition.

Compliance required as noted.

1. At each removal of propeller blade from hub after December 1, 1957, inspect for corrosion the shank area of blades not incorporating a corrosion barrier. Operators who have experienced corosion in the shank area of any blade in the past 5 years and those who find corrosion during the above inspection must install the corrosion barrier except as outlined in 2.

2. Prior to September 1, 1957, or 450 hours of operating time after July 1, 1957, whichever comes first, for blades installed on P&W R-2800 "B" type engines (Refer FAA Engine Listing) in C-46 aircraft.

Investigation of a recently failed blade revealed the existence of severe corrosion in the seal area at the shank. This blade did not incorporate a corrosion barrier as recommended by the manufacturer's Service Bulletins Numbers 390 and 414A. In order to minimize the possibility of additional blade failures due to corrosion in the shank area, disassemble the propeller and inspect this area in accordance with Hamilton Standard Service Bulletin No. 508. If no corrosion is present and none is suspected, install the corrosion barrier on each blade in accordance with the instructions contained in the bulletin. If corrosion, pitting, staining, or other conditions indicating chemical attack on the basic blade material are found, rework the shank area in accordance with the instructions contained in the bulletin. Remove from service any blade reworked below the minimum shank diameters tabulated in the bulletin. Install the corrosion barrier on each acceptable blade prior to assembly of the propeller.

(Hamilton Standard Service Bulletin No. 508 covers this same subject.)

57-16-4 Hamilton Standard Applies to All Hamilton Standard Two-Flyweight Models 4U18 and 5U18 Governors.

Compliance required as indicated.

To prevent the possible occurence of propeller reversal resulting from oil leakage caused by the mounting holes in the governor body being drilled beyond tolerances, the following must be accomplished:

A. Prior to the installation of new or overhauled governors of the above models, perform the following, except that it need be accomplished only once for each governor affected, and need not be accomplished if paragraph C is complied with:

1. Remove reverse solenoid valve assembly.

2. Thoroughly clean the solenoid valve mounting hole in the governor body as described in Hamilton Standard Service Bulletin No. 518.

3. Measure the depths of the hole to the deepest point.

4. Governor bodies having a hole exceeding 0.490 inch deep shall not be used until inspected as specified by paragraph C.

B. If the reverse solenoid is loosened or removed while in service, comply with paragraph A unless already accomplished.

C. As soon as practicable, but not later than next overhaul of all governors of the above models, comply with the inspection outlined in Hamilton Standard Service Bulletin

No. 518. Governor bodies having a wall thickness between the solenoid attaching stud hole and the low pressure relief valve passage of less than 0.035 inch should not be returned to service. If the provisions of Service Bulletin No. 518 have been complied with, it will not be necessary to repeat.

(Hamilton Standard Service Bulletin No. 518 covers this same subject.)

This supersedes telegraphic instructions dated July 12, 1957.

58–3–2 Hamilton Standard Applies to All Hamilton Standard 4U18 and 5U18 Governors Shipped From the Factory Prior to September 26, 1957.

Compliance required:

A. Prior to April 15, 1958, for governors with the solenoid valve installed with the solenoid-electrical connection combination parallel to the governor drive shaft axis (Position 1 as shown in Hamilton Standard Service Bulletins Nos. 528, 536, and 536A).

B. At next governor overhaul for governors with the solenoid valve installed with the solenoid-electrical connection combination at right angles to the governor drive shaft axis (Positions 2 and 4 as shown in Hamilton Standard Service Bulletins Nos. 528, 536 and 536A).

Three unwanted propeller reversals have been reported. Investigation revealed that, in two cases, the oil hole sealing plugs in the governor body solenoid valve boss were missing. In the third case, oil leaked past one of the oil hole sealing plugs.

To preclude additional unwanted reversals from this cause, remove the solenoid valve assembly from the governor. Inspect for the presence of two oil hole plugs, PN 68753, in two-flyweight-type governor bodies and one oil hole plug, P/N 321736, in four-flyweight-type governor bodies. Install plugs as required. Install solenoid valve mounting gasket, P/N 60912, reworked to solenoid mounting gasket P/N 322778, such that the triangular cutout is position over the two plugged holes (two-flyweight-type) or over the single-plugged hole (four-flyweight-type). As an alternative, particularly on earlier models not incorporating the second drain passage as described in Service Bulletins Nos. 345, and 345A, install solenoid valve mounting gasket, P/N 60912, reworked to solenoid mounting gasket, P/N 322779, by making two cuts at each corner and removing each cutout portion. Identify inspected and/or reworked governors by any convenient means. In lieu of replacing the P/N 60912 gaskets, the control body solenoid may be permanently vented by milling grooved channels in the boss face in accordance with Hamilton Standard Service Bulletin No. 536B.

Governors which were shipped from the factory September 26, 1957, and later, are identified by Serial Number WH87433 and above. Likewise, those governors with Serial Numbers below WH87433, but having an inspector's stamp in white ink located to the left of Hamilton Standard nameplate, were also shipped from the factory September 26, 1957, or later. The stamping consists of an oval enclosing a two-letter initial. Controls so identified need not be inspected for inclusion of the sealing plugs, but must have the gasket reworked.

(Hamilton Standard Service Bulletins Nos. 528, 536, 536A, and 536B cover this same subject.)

58–8–4 Hamilton Standard Applies to All Models 23260, 24260, 34D50, 34D51, 34E60, 43E60, and 43H60 Propellers Incorporating Pitch Locks.

Compliance required at first propeller overhaul after May 15, 1958, if not already accomplished.

Two cases have been reported wherein the dome cap of propellers incorporating a pitch lock become partially disengaged in flight, resulting in complete loss of propeller control.

To preclude additional failures of this nature, reduce to 0.013 or less the clearance between the dome cap and stop lever sleeve bushing by conducting the necessary inspection, rework, and/or replacement.

(Hamilton Standard Service Bulletin No. 496D covers this same subject.)

This supersedes AD 58–2–2.

58–8–5 Hamilton Standard Applies to All 34E, 43E, and 43H Propellers Installed on TC18DA and TC18EA Series Engines.

Compliance required at first propeller overhaul after October 1, 1958, but not later than May 1, 1959.

Cases of propeller-engine overspeeds have resulted in instances of failure to feather, reversing when feathering was initiated, and in aircraft fires. In order to provide a means for limiting propeller overspeeding so that the possibility of castastrophic conditions developing will be greately minimized, install the "RPM-Sensitive Hydraulic Pitch Lock".

(Hamilton Standard Service Bulletins Nos. 387, 472, and 472A cover this same subject.)

58-18-1 Hamilton Standard Applies to All Hamilton Standard Propellers Controlled by 5U18 Governors and Installed on TC18DA and TC18EA Series Engines.

Compliance required at first governor overhaul after December 1, 1958, but not later than June 1, 1959.

Adverse environmental conditions in the propeller governor resulting from certain types of engine failure have caused improper operation of the governor in such a manner as to result in propeller overspeeding, failure to feather and reversing when feathering was initiated. In order to minimize the possibility of such occurences, provide a means for feathering that will be independent of the low pressure relief and pilot valves incorporated in the 5U18 governors. Installation of the Deterjet Model DJ-1025 governor bypass valve or replacement of the 5U18 governor by the Hamilton Standard 5AA22 governor are considered acceptable means to accomplish the desired objective. (Installation of Deterjet Model DJ-1025 on Douglas DC-7C approved under Supplemental Type Certificate SA4-507.)

(Deterjet Service Bulletin No. 1 and Hamilton Standard Bulletin No. 561 cover this same subject.)

58-19-2 Hamilton Standard Applies to All Hamilton Standard 2J17 Hollow Steel Propeller Blades Installed on Boeing 377 Aircraft.

Compliance required as indicated.

Operators that are using or have used these blades learned through adverse experiences that exceptional maintenance procedures and repair techniques are required to assure the continued airworthiness of these blades. In order to preclude the possibility of additional adverse experiences occuring either under the supervision of the present operators or other operators who will acquire some of the involved aircraft, the following shall apply:

1. Not later than August 1, 1959, remove from service all 2J17 Series propeller blades.

2. Prior to August 1, 1959, no operator who has not had previous experience in the overhaul and maintenance of 2J17 Series propeller blades shall be issued a certificate of airworthiness for aircraft on which these blades are installed.

58-22-1 Hamilton Standard Applies to All 6800, 6900, and 7000 Series Externally Surface-Treated Aluminum Alloy Blades (Airfoil Shotpeened and/or Shank Rolled, Including Nickel-Plated Blades).

Compliance required at first blade overhaul after January 1, 1959, and at every overhaul thereafter.

Two surface-treated aluminum alloy blades have fractured during operation. Blade bending may have, depending on the circumstances surrounding the incident, a serious detrimental effect on the fatigue strength of a blade. Therefore, it is considered necessary to establish a means to detect and evaluate instances of unrecognized blade bending by systematically comparing at overhaul measured face alinement values with previously established values. To establish such a means, follow the detailed instructions contained in Hamilton Standard Service Bulletin No. 546. This procedure requires that face alinement measurements be made prior to any overhaul, and then again following all operations that would affect face alinement.

(Hamilton Standard Service Bulletins Nos. 546 and 546A cover this same subject.)

58-24-1 Hamilton Standard Applies to All 2H17K3, 2H17U3, 2H17AA3 and 2H17AC3 Hollow Steel Propeller Blades.

Compliance required as indicated.

It has been determined that 2H17K3, 2H17U3, and 2H17AA3 blades have a substantial reduction in fatigue resistance after 5,000 hours' operational time. The 2H17AC3 blades have shown no reduction in fatigue resistance at 5,400 hours' operational time, but the limited number of blades in service does not

warrant continued sampling inspection. Therefore, these blades must be removed from service, as follows:

1. 2H17K3, 2H17U3, and 2H17AA3 blades when they have accumulated 5,000 operational hours.

2. 2H17AC3 blades when they have accumulated 5,400 operational hours.

(Hamilton Standard Service Bulletins Nos. 305 and 559 cover this same subject.)

This supersedes AD 54–23–3.

59–10–5 Hamilton Standard Applies to All Hamilton Standard Propellers Controlled by 5U21 Governors and Installed on TC18EA Series Engines.

Compliance required at first governor overhaul after September 1, 1959, but not later than February 1, 1960.

Adverse environmental conditions in the propeller governor resulting from certain types of engine failure have caused improper operation of the governor in such a manner as to result in propeller overspeeding and failure to feather. In order to minimize the possibility of such occurrences, provide a means for feathering that will be independent of the pilot valve incorporated in the 5U21 governor. Replacement of the 5U21 governor by the Hamilton Standard 5AB23 governor is considered an acceptable means to accomplish the desired objective. Any other approved means of accomplishing the desired objective will also be acceptable.

(Hamilton Standard Service Bulletin No. 591 covers this same subject.)

59–17–3 Hamilton Standard Applies to All Hamilton Standard Surface-Treated Aluminum Alloy Propeller Blades Which Experience Impact. These Blades May Be Installed on Such Aircraft Models as Boeing 377, Convair 240, 340, 440, Douglas DC–6, DC–6A, DC–6B, DC–7, DC–7A, DC–7B, DC–7C, Lockheed 049, 749A, 1049/C/D/G/H, 1649A, and Martin 202A, 404.

Compliance required as indicated.

All surface-treated aluminum alloy propeller blades exposed to known or suspected impact with solid objects (blades static or rotating) must be disposed of as outlined herein and in Hamilton Standard Service Bulletin No. 596 (formerly 473 and 473A).

(a) If the track is affected or if bending, twisting, or other damage is evident, the propeller shall be removed immediately and returned to Hamilton Standard for repair.

(b) If the track is unaffected and there is no visual evidence of bending, twisting, or other damage, aircraft may continue service operation to the first station where facilities exist for performing blade face alinement checks in accordance with Hamilton Standard instructions. Blades inspected and repaired in accordance with Hamilton Standard instructions may be returned to service.

(Hamilton Standard Service Bulletins Nos. 339C, 339D, and 596 (formerly 473 and 473A) cover this same subject.)

60–3–4 Hamilton Standard Amdt. 91 Part 507 Federal Register January 26, 1960, revised by Amdt. 130 Federal Register April 9, 1960. Applies to 6895–8 Aluminum Alloy Propeller Blades Installed On Douglas DC–6, DC–6A, and DC–6B Aircraft.

Compliance required as indicated.

In order to minimize the possibility of additional 6895–8 blade failures occurring between overhaul on DC–6, DC–6A, or DC–6B aircraft due to undetected blade damage, the face alinement check required by AD 58–22–1 must be supplemented as specified:

(a) Blades which have not been checked for face alinement must be checked at overhaul as required by AD 58–22–1 or by April 15, 1960, whichever comes first, and thereafter at intervals not to exceed 1,000 flight hours.

(b) Blades which have been checked for face alinement at overhaul as required by AD 58–22–1 and which by April 15, 1960, will have been in operation in excess of 1,000 flight hours since the last face alinement check was made must have a new face alinement check made not later than April 15, 1960, and thereafter at intervals not to exceed 1,000 flight hours.

(c) Blades which have been checked for face alinement at overhaul as required by AD 58–22–1 and which by April 15, 1960, will have been in operation less than 1,000 flight hours since the last face alinement check was made must have new face alinement checks made at intervals not to exceed 1,000 flight hours.

Blades which are checked and found not to meet the limits specified in Hamilton Standard Service Bulletins Nos. 546, 546A, and 602 shall be removed from service and treated according to Service Bulletin 596. Face alinement checks between overhauls may be made with blade alinement gages as specified in Service Bulletin 602. (Hamilton Standard Service Bulletins Nos. 546, 546A, 596, and 602 cover this same subject.)

This supplements AD 58–22–1 for Model 6895–8 blades installed on Douglas DC–6, DC–6A, and DC–6B aircraft only.

60–20–2 Hamilton Standard Amdt. 201 Part 507 Federal Register September 23, 1960, revised by Amdt. 210 Federal Register October 15, 1960. Applies to All 34E60 Propellers.

Compliance required as indicated.

As a result of two recent dome cap fractures one resulting in propeller overspeed and inability to feather the following must be accomplished:

(a) All dome caps must be examined in the threaded area for crack indications in the inside diameter and outside diameter by means of visual or dye penetrant or magnetic particle inspection within the next 50 hours' time in service unless already accomplished within the last 50 hours.

(b) Dome caps inspected visually only must be reexamined by means of dye penetrant or magnetic particle inspection within the next 200 hours' time in service.

(c) Caps with indications of cracks must be replaced with caps which have also been inspected in accordance with the foregoing inspection provisions and found to have no crack indications.

(d) Upon reinstallation caps must be tightened to 350–450 foot-pounds.

(e) Dome caps must be reexamined by means of dye penetrant or magnetic particle inspection within the next 350 hours' time in service after the last dye penetrant or magnetic particle inspection made in accordance with paragraphs (a) or (b). This inspection must be repeated at intervals not to exceed 350 hours' time in service until new design-strengthened dome caps, P/N 565334, have been installed. (Hamilton Standard telegram to all operators dated September 16, 1960, covers this same subject.)

Note: The replaced caps should be returned to Hamilton Standard.

(Hamilton Standard telegram dated August 29, 1960, covers this subject.)

This airworthiness directive sent by telegram to all known operators of Douglas DC–7 Series and Boeing B–377 aircraft equipped with Hamilton Standard 34E60 propellers on September 2, 1960. Effective on date of publication in the Federal Register to all persons not receiving telegram of September 2, 1960.

62–26–1 *See* Douglas Aircraft.

HARTZELL

53-15-3 Hartzell Applies to All Model HC-82XF-1 Controllable Pitch Propellers Installed on Cessna 180 Aircraft.

Compliance required as indicated.

A number of recent in service failures of the pitch change link screws (P/N A-98) on Hartzell HC-82XF-1 propellers have resulted in exposing the occupants to hazardous situations. All such propeller failures have resulted in forced landings, some of which caused major damage to the aircraft. Due to the serious nature of these failures, the following inspections and replacements are necessary:

I. Inspection.

A. Prior to August 1, 1953, visually inspect all link screws to determine:

(1) If any are broken.

(2) If any are cracked or bent.

(3) If any are not fully seated on the conical seat.

B. If any are found broken, cracked, bent or not fully seated on the conical seat, prior to further flight replace with screws as noted in item II.

C. If visual inspection proves satisfactory, the propeller may be flown subject to compliance with item II.

II. Replacement. Compliance required prior to September 1, 1953.

A. Replace all original A-98 link screws with improved A-98-B link screws in accordance with Hartzell Service Bulletin No. 24, dated May 28, 1953.

B. Propeller with serial numbers not listed in Service Bulletin No. 24 may not have the improved screws. Owners of these propellers shall check with the propeller manufacturer for verification.

55-3-2 Hartzell Applies to All Hartzell Propellers With Metal Blades Installed on Continental E-185, E-225, and O-470 and Lycoming O-320 and O-340 Series Engines.

Compliance required by March 1, 1955, and at intervals not to exceed each 25 hours operation thereafter.

To eliminate the possibility of blade tip failures on Hartzell propellers with metal blades installed on the above engines, all nicks, gouges and scratches within 15 inches of the blade tip should be removed. Care should be taken to be sure all trace of the damage is removed. Minor damaged areas may be removed by using coarse emery cloth. The repaired area shall then be polished with fine emery cloth. Rebalancing is not necessary when repairing minor damage areas as defined in Civil Aeronautics Manual 18, Section 18.30-15(b)(3)(ii).

Propellers having severe nicks, gouges or scratches should be forwarded to the propeller manufacturer, or approved propeller repair station for inspection and repair.

(Hartzell Service Bulletin No. 31 dated December 31, 1954, covers this same subject.)

56-17-3 Hartzell Applies to All Model HC-12X20 Reversing Propellers Installed on Downer (Republic) RC-3 Aircraft Having B-55 Valve Assembly.

Compliance required as soon as possible but not later than next 25 hours of operation and each 100 hours flight time thereafter.

There have been two reported instances of broken valve tube A-57. These failures were due to vibration of the valve assembly and the weakening effect of the valve porthole. Failure of this part will allow the propeller to go into reverse under certain conditions, forcing the airplane to land. In view of the possible serious consequences resulting from inadvertent reversal of the propeller, disassemble the valve and inspect the A-57 valve tube around the valve port with a magnifying glass or with magnetic inspection equipment. If no cracks are found, the sharp edges at the sides of the porthole should be rounded slightly, using a fine round file.

This inspection is not required for valve assembly B-299.

(Hartzell Service Bulletin No. 38 dated June 16, 1956, covers the same subject.)

57-8-4 Hartzell Applies to All HC-83X and HC-93Z Three-bladed Feathering Propellers Installed on Aero Commander Models 520, 560, 560A, 560E and 680, Beech Model 50, and Piaggio P.136 Aircraft.

Compliance required as soon as possible but not later than May 15, 1957.

There have been several cases reported that screw P/N AN 501-A10-6 securing the RG-50 safety link bar unscrewed, without breaking the safety wire, from the link arm mounting pin P/N A-872-1 located at piston end of pitch change link arm P/N A-861 on Hartzell HC-83X and HC-93Z three-bladed feathering propellers installed on twin engine aircraft. This occurs because link arm P/N A-861 rotates during propeller operation and thus applies a torsional force to the link arm mounting pin P/N A-872-1, thereby causing it to rotate. To preclude possible loss of propeller blade pitch control from this cause, accomplish the following modification on these propellers:

1. Feather propeller and remove safety link RG-50 and link pin A-872-1 from propeller pitch change piston.

2. Replace screw AN 501-A10-6 with screw AN 501-A10-18 that will extend through safety link pin P/N A-872-1 a maximum of two threads.

3. Peen projecting end of screw to prevent screw from backing out of link pin.

4. Replace safety link and link pin assembly in the piston. Be sure safety link RG-50 is not held away from piston lug surface due to peened screw threads bottoming in pin hole. (This AD covers the same subject as CAA telegraphic instructions dated April 12, 1957.)

(Hartzell Service Bulletin No. 46 covers this same subject.)

58-4-2 Hartzell Applies to All HC-93Z20-2C and -2B Propellers. The -2C Propellers Are Installed on All Beech E50 and F50 Aircraft, and -2B Propellers Are Installed on Some Cessna T-50 With Lycoming R-680 Engines and on Mansdorf Conversion of Grumman G-44 With Lycoming R-680 Engines (STC SA4-2).

Compliance required prior to next flight for propellers with hub Serial Numbers 100A through 361A and above.

The recent failure of an A-1307 split ring, which the records show had less than 180 hours' operating time, permitted the propeller blade to leave the hub. In order to minimize the possibility of the occurrence of this type of serious failure, the present split ring must be replaced with a strengthened split ring. Accordingly, replace A-1307 split ring with A-1331 split ring. This also requires replacing A-1303 bearing with A-1303A bearing. Modified propellers should be stamped HC-93Z20-2B1 or -2C1. New propellers so stamped will incorporate modified split rings and bearings.

(Hartzell Service Bulletin No. 55 covers this same subject.)

58-6-2 Hartzell Applies to All HC-82XF/8833-0 (86 to 88 inch-diameter) Propellers, Hub Serial Numbers Between T-913 and T-2891 Except T-2564, T-2569, T-2594, T-2595, T-2609, T-2648, T-2703 and T-2716.

Compliance required prior to next flight.

Two recent failures of A-159 split rings have occurred in HC-82XF/8833 propellers. In order to minimize the possibility of the occurrence of this type of serious failure, replace the present split rings with new split rings. The present rings are unmarked, but the new A-159 rings will be marked with the letter "N".

(Hartzell Service Bulletin No. 57 covers this same subject.)

58-7-1 Hartzell Applies to All HC-12X20, HC-13X20, HC-82X and HC-83X Series Propellers.

Compliance required at the next propeller overhaul.

To minimize the possibility of fatigue failure of the split rings used to retain the blades in the hub, replace all unmarked split rings with new split rings marked with the letter "N". The new production rings have a higher safety factor. Recent failures involving the old type split rings have been covered in airworthiness directives concerned with the particular propeller model or hub-blade combination involved.

(Hartzell Service Bulletin No. 58 covers this same subject.)

58-9-2 Hartzell Applies to HC-82XF-1 and -1A Propellers Installed on Cessna 180 Aircraft.

Compliance required as outlined.

There have been several reported instances of the piston guide rod P/N A-811 used in jack assembly B-804 breaking at the point where it is pinned to the A-96A fork. Failure of a guide rod will allow the particular blade to become uncontrollable. In view of the possible serious consequences resulting from vibration and the loss of control of the propeller, the following steps must be taken:

1. Inspection within 25 hours.

If item 2 will not be complied with within 25 hours of operation, remove fork pin P/N A-522 and slide the pitch change fork P/N A-96 sufficiently to completely expose the hole in push rod P/N A-811 used in jack assembly B-804. Visually inspect the exposed rod for cracks. If a crack is found, the rod should be removed from the propeller and replaced.

2. Replacement.

Prior to September 1, 1958, replace jack assembly B-804 with jack assembly B-828.

(Hartzell Service Bulletin No. 39 dated January 16, 1957, covers this same subject, and Hartzell Service Bulletin No. 47 also applies.)

59-1-3 Hartzell Applies to HC-12X20, HC-13X20, HC-82X and HC-83X Series Propellers With Hub Serial Numbers As Indicated Herein.

Compliance required as indicated.

To minimize the possibility of failure of the split rings used to retain the blades in the hub, replace (if not previously accomplished) all unmarked split rings with new split rings marked with the letter "N", as follows:

(1) Prior to February 15, 1959.

Hub Model	*Hub Serial No. Inclusive*
HC-82XF-1DB, -1BB	T-913 to T-2891
HC-82XF-2B	F-400 to F-1675

(2) Prior to April 15, 1959.

Hub Model	*Hub Serial No. Inclusive*
HC-82X20-1B	C-104 to C-267
HC-12X20-7D, 7C, 7E	R-118 to R-260
HC-12X20-8D, 3C, 3E	P-157 to P-494
HC-83X20-2C	D-448 to D-1530
HC-83XF-2A	U-105 to U-437
HC-83X20-2CL	V-104 to V-179
HC-13X20-6L	X-101 to X-111

(3) Prior to June 1, 1959.

Hub Model	*Hub Serial No. Inclusive*
HC-82XG-1D	G-102 to G-305
HC-82XG-2B	K-592 to K-2919
HC-82XL-1D	100-Y to 121-Y
HC-82XG-6B	100D to 169D

After compliance, stamp the letter "N" after the hub serial number. This letter "N" should be stamped on propellers already modified. Serial numbers of propellers modified at the factory are listed in Hartzell Bulletin No. 64. The aircraft log book should contain this information for propellers modified in the field.

(Hartzell Bulletin No. 64 covers this same subject.)

59-9-3 Hartzell Applies to All Propeller-Engine Combinations Consisting of HC-82-XG Series Propellers Installed On Lycoming 0-320 Series Engines and On Some 0-340 Series Engines (as noted below).

Compliance required as indicated.

There are six 3/8-inch diameter bolts used to hold the HC-82XG Series propellers on the 0-320 and some 0-340 engines (if a Hartzell HC-82XL Series propeller is installed on a Lycoming 0-340 Series engine, the bolts are already 7/16-inch in diameter). A number of these bolts have broken and, in several cases, the failures progressed, allowing the propeller to separate from the engine. In order to minimize the possibility of this type of failure, inspect and take action as follows:

(1) If the mounting bolts have not been checked for the proper torque within the last 100 hours, check these bolts for the proper 30 foot-pounds torque before completing the next 25 hours' operating time and at or before completing each 100-hour operating period thereafter until item (2) is complied with.

(2) At next engine or propeller overhaul but not later than January 1, 1961, change mounting bolts from 3/8-inch to 7/16-inch. Use bolts specified in Hartzell Bulletin No. 68. Change marking on propeller from HC-82XG-( ) to HC-82XL-( ). Change markings on 0-320 Series engines as instructed in Lycoming Service Bulletin No. 253A.

The model designation of Lycoming 0-340 Series engines will not change since, when this AD is complied with, all 0-340 engines will incorporate 7/16-inch bolts.

(Hartzell Bulletins Nos. 41 and 68 and Lycoming Service Bulletin No. 253A cover this same subject.)

59-26-1 Hartzell Applies to All HC-12X20 Propellers With Serial Numbers As Indicated Below. These Propellers May Be Installed On Such Aircraft Models As Downer (Republic) RC-3, Grumman G-44, and Navion Series.

Compliance required not later than March 1, 1960.

To preclude possible failures, remove from service Hartzell hub spiders with Serial Numbers 1 through 4303, 4307 through 4316, 4318, 4319, 4321, 4323, 4324, 4325, 4328, 4329, 4332 through 4336, 4341. After removal, these hub spiders will not be eligible for use in certificated aircraft.

Hub spiders with serial numbers other than those listed may be used as replacements.

This supersedes AD 53-6-2.

60-16-4 Hartzell Amdt. 182 Part 507 Federal Register July 29, 1960. Applies to All Propellers HC-82XF-1D, HC-82XF-1DB, HC-82XG-1D, HC-82XG-6DL, HC-82XL-1D, and HC-92ZK-8L; and to HC-82XK-1D Serial Numbers 100G Through 846G; and to HC-92ZK-8D Serial Numbers 100L Through 491L. These Propellers May Be Used On Such Aircraft As Piper PA-24, Cessna 180 and 182, Meyers 200, Mooney Mark 20, and Lake (Colonial) C-2.

Compliance required as indicated.

Because of failure or cracking of several cast guide collars, P/N 834-4, -8, -9, the following shall be accomplished:

(a) Within the next 25 hours of propeller operation and each 25 hours of operation thereafter, visually inspect for cracks, all guide collars not marked with a letter "P" or "F". This inspection can be accomplished by looking through the spinner blade cutouts without removing the spinner. Cracked collars must be replaced prior to further flight.

(b) At the next propeller overhaul or by January 1, 1961, whichever occurs first, replace all unmarked guide collars with marked guide collars. Cast collars which are marked with the letter "P" and forged collars which bear part number as cast collars but are marked with letter "F" have been tested and need not be inspected or replaced.

(Hartzell Service Bulletin No. 71 covers this same subject.)

This directive shall become effective 30 days after publication in the Federal Register.

61-3-3 Hartzell Amdt. 247 Part 507 Federal Register February 2, 1961. Applies to All HC-93Z30-2D and HC-B3Z30-2D Propellers Installed on Pratt and Whitney R-985 Engines. (These May Be Found in Such Aircraft As Beech 18 Series, Grumman G-21A, and Lockheed 12A.)

Compliance required as indicated.

Due to failure or cracking of several B-1803 cylinders in the threaded area, resulting in the loss of engine oil and control of the propeller, the following shall be accomplished, unless the replacement required in paragraph (b) has already been made:

(a) Check for oil leaks in the propeller hub within the next 25 hours' time in service and every 25 hours' time in service thereafter until the replacement required in paragraph (b) is accomplished. It is not necessary to remove the spinner for this inspection. If an oil leak is discovered replace the cylinder as provided in paragraph (b) before further flight.

(b) Unless already accomplished, replace cylinder B-1803 and collar 834-7 with cylinder B-1803-1 and collar 834-7A at the next propeller overhaul or within the next 400 hours of time in service, whichever occurs first. The hub model dash number is to be restamped -2E in place of the present -2D.

(Hartzell Bulletin No. 73 dated April 18, 1960, and Bulletin No. 73 amendment dated September 8, 1960, cover this subject.)

This directive effective February 13, 1961.

McCAULEY

54-12-2 McCauley Applies to All McCauley Propellers Having 41D5926 Hub With SS-135-6 Blades and D-1093 Hub With SS-135-6M or SS-138-6 Blades.

Compliance required as indicated.

On the basis of satisfactory vibration stress surveys conducted on the 102-inch diameter configuration, these propellers were approved vibration wise for installation on the Continental W-670-6A and W-670-6N and Lycoming R680 engines. When installed on the Continental engine, the propeller must be indexed in the 0° position (blades in line with the crankthrow) and operation is to be restricted between 1,500 and 1,650 r.p.m.

Additional approvals were given for the installation of propellers in reduced diameters at a time when the effects on the vibratory stresses resulting from such a reduction were not generally appreciated. Accordingly, some installations were made where the propeller diameter was reduced, as in the Fairchild M-62C. Service experience with this installation and a more thorough knowledge of the vibration problems indicate that diameters below the normal 2 percent reduction that is usually permissible on the basis of a stress survey have resulted in serious failures. Accordingly, to preclude additional propeller failures, the following should be performed. Compliance required prior to July 1, 1954.

(a) To preclude failures due to vibratory conditions, remove from service all of these propellers in diameters outside the 102- to 100-inch limits.

(b) To preclude fatigue failures due to corrosion or galling in the blade shank region and/or hub, disassemble propellers maintained in service (diameters 102 to 100 inches) and magnetically inspect hub and blades at intervals not exceeding 100 hours. The propeller blade and hub surface must be kept free from corrosion at all times.

If 100 hours operating time has not been accumulated since an inspection was conducted on the propeller as provided in AD 47-43-9, it will be satisfactory to operate until 100 hours have been accumulated.

This supersedes AD 47-43-9.

61-19-4 McCauley Amdt. 335 Part 507 Federal Register September 20, 1961. Applies to 2A36 and 2D36 Series Propeller Models Installed On Various Single Engine Tractor Type Aircraft As Listed Below.

Compliance required as follows:

(a) (1) For those propellers having accumulated the time in service specified in (c) on or before the effective date of this AD, compliance with (b) required within the next 25 hours' time in service after effective date.

(2) For those propellers which have not accumulated the time in service specified in (c) on or before the effective date of this AD, compliance with (b) required within 25 hours' time in service after accumulation of time in service specified in (c).

(3) Propellers with blade assembly numbers given in (c) which may have had this special inspection accomplished at the factory prior to the issuance of this directive, are listed in McCauley Service Bulletin No. 48. Such blades are not required to comply with this directive.

(b) Because of cracking of the blade threaded shank of several propellers the following shall be accomplished:

Disassemble propeller and remove ferrule from blade assembly and inspect entire threaded length for cracks by dye penetrant method or equivalent and inspect for obvious surface defects such as cuts, dents, gouges and nicks in accordance with McCauley Service Bulletin No. 48.

Blades with cracked threads or nonrepairable surface defects shall be retired from service. Blades with no cracks or defects are acceptable and shall be identified as noted in McCauley Service Bulletin No. 48 prior to return to service.

(c) (1) 2A36C1/90M, 2A36C18/90M, and 2A36C29/90M Series propellers installed on Bellanca 14-19-2, Cessna 180 and 182 Series, 305B, 321, Fletcher FU-24, Meyers 200, Na-

vion D, and Taylorcraft 20 aircraft, 500 hours' time in service for blade assembly Serial Numbers K20501 to K23532, 600 hours' time in service for blade assembly Serial Numbers K17001 to K20500, 600 hours' time in service for blade assembly Serial Numbers 25990 to 27064, 700 hours' time in service for blade assembly Serial Numbers K13501 to K17000, 800 hours' time in service for blade assembly Serial Numbers K10000 to K13500 and 800 hours' time in service for blade assembly Serial Numbers 21298 to 21828.

(2) 2D36C14/78KM Series propellers installed on CallAir A–6, Mooney Mark 20A, 20B and 21, Piper PA–24 aircraft, 200 hours' time in service for blade assembly Serial Numbers K17200 to K23532 and 25990 to 27064, 375 hours' time in service for blade assembly Serial Numbers K15000 to K17199, and 500 hours' time in service for blade assembly Serial Numbers K11000 to K14999 and 21298 to 21828.

(3) All 2D36C28/80MM Series propellers installed on Piper PA–24 "250" aircraft, 750 hours' time in service for blade assembly Serial Numbers beginning with the prefix K up to K23532.

(4) B2A36C31/90M, D2A36C31/90M, C2A36C32/90M and D2A36C33/90M Series propellers installed on Bellanca 14–19–3, Cessna 210, Lockheed 402–2, Meyers 200A, Navion D, E, F, and G, and Fletcher FU–24 aircraft, 500 hours' time in service for blade assembly Serial Numbers 21298 to 27064 and for all blade assembly Serial Numbers beginning with the prefix K up to K23532.

(McCauley Service Bulletin No. 48 covers this same subject.)

This directive effective September 30, 1961.

SENSENICH

50-47-1 Sensenich Applies to Controllable and Constant Speed Propeller Models C3FR4, CS3FR5, C2FM and CS2FM. Some of the Airplanes on Which These Are Installed Are Bellanca 14-13 (165 hp); Goodyear GA-2B; Universal (Stinson) 108-2 and -3; Monocoupe 90AL-115; Piper PA-12, -14, -16; and Piper PA-20 With Lycoming O-235-C1 Engine.

Compliance required after each 300 hours of propeller operation, except for any aircraft not listed above compliance required after each 500 hours. If the accumulated time is over 300 or 500 hours, compliance is required prior to next 50 hours of operation and after each 300 or 500 hours of operation thereafter, whichever is applicable.

The propeller blades should be removed from the hub, and the wood blade shank and the split retaining ring groove in the blade ferrule should be carefully inspected for cracks. The lag screws should be check-tightened to 160 inch-pounds torque. Blades with broken lag screws, cracked wood shank or ferrule must be removed from service. The ferrule and all ferrous metallic parts of the hub should be magnetically inspected.

(Sensenich Service Bulletins Nos. 133 and 135 cover this same subject.)

50-47-2 *See* Superior Aircraft.

54-5-2 Sensenich Applies to All Model M76AM-2 Propellers Installed on Lycoming Models O-290-D and O-290-D2 Engines.

Compliance required by March 15, 1954, and at intervals not to exceed each 25 hours operation thereafter.

To eliminate the possibility of blade tip failures on Model M76AM-2 propellers installed on the above Lycoming engines, all nicks, gouges and scratches within 8 inches of the blade tip should be removed. Care should be taken to be sure all trace of the damage is removed. Minor damaged areas may be removed by using coarse emery cloth. The repaired area should then be polished with fine emery cloth. Rebalancing is not necessary when repairing minor damage areas as defined in Civil Aeronautics Manual 18 (18.30-15)

(Sensenich Service Bulletin No. R-2 covers this same subject)

60-11-8 Sensenich Amdt. 166 Part 507 Federal Register May 28, 1960. Applies to M74DM Propellers Installed On Lycoming O-320-B Series Engines Except Propellers With An "A" or "K" prefix to the Serial Number. (Effective November 14, 1961.)

Compliance required within the next 100 hours of flight time or by August 1, 1960, whichever comes first, and at each periodic inspection thereafter.

As a result of three incidents of cracked hubs, the following shall be accomplished:

(a) Remove the propeller and visually inspect for cracks originating in the pilot bore. In case of doubt, any of the approved methods for aluminum alloy inspections should be used. If cracks are found, the propeller shall be retired immediately from service.

(b) If no cracks are found, polish out any scratches in the bore and break and polish any sharp edges at the front and rear chamfer of the pilot bore.

(c) When the propeller is reinstalled, torque retaining bolts to 300 inch-pounds.

(Sensenich Service Bulletin No. R-8-1 covers the same subject.) (Effective November 14, 1961.)

UNIVERSAL

(Koppers)

47-50-13 Downer (Bellanca) and Universal (Stinson) Applies Only to Aircraft Equipped With Koppers Model Aeromatic F200 Propellers.

Compliance required no later than the next 25-hour propeller lubrication and at 25 hours of operation thereafter.

Inspect propeller hub as follows:

Remove balancing band from both ends of hub barrel after index marking each to facilitate proper reassembly. Examine the other surfaces of the hub completely for indications of line cracks or fractures. The areas of primary concern are (1) those beneath the balancing bands, (2) the weld joint where hub barrel and mounting tube met, and (3) the weld joint where mounting tube and mounting flange meet.

Defective hubs should be removed from service.

(Koppers Service Bulletin No. 12, dated October 9, 1947, covers this same subject.)

50-34-1 Koppers Applies to All Aircraft Equipped With Model F200 "Aeromatic" Propellers (Does Not Apply to "Aeromatic Model 220 Propellers").

Compliance required in all cases no later than April 1, 1952.

1. Universal (Stinson) Models 108-2 and 108-3 aircraft: Compliance required no later than first 200 hours of propeller operation.

2. Universal (Stinson) Models 108 and 108-1 aircraft: Compliance required no later than first 400 hours of propeller operation.

3. If the total propeller operation time is unknown, or if a reasonably accurate estimate of total time cannot be made, compliance is required not later than the next 50 hours of operation. (Except for Universal (Stinson) Series aircraft, compliance is required by not later than the next 50 hours of operation if the total operation time as of August 29, 1949, exceeds 500 hours.)

Blade retaining flanges, P/N 3277 must be replaced with P/N 3277-1. When this change is accomplished a "-1" (dash one) is to be suffixed to the propeller assembly number on the nameplate to indicate compliance. Koppers Service Bulletin No. 24 covers this same subject.

Universal (Stinson) Models 108-2 and 108-3 only: (Compliance required by May 16, 1949). To avoid the possibility of crankshaft or propeller failures resulting from excessive torsional vibration in the 2,700 to 2,800 r.p.m. range, all engine operation must be restricted to 2,650 r.p.m. maximum and propeller readjusted in accordance with Koppers Service Bulletin No. 22. As a further safety measure it is required that propellers which have accumulated any operating time in the 2,650 to 2,800 r.p.m. range be equipped with new blade retainer flanges P/N 3277-1.

(Koppers Service Bulletin No. 23-E covers this same subject.)

This supersedes AD 49-42-1, for the purpose of clarifying the date of compliance.