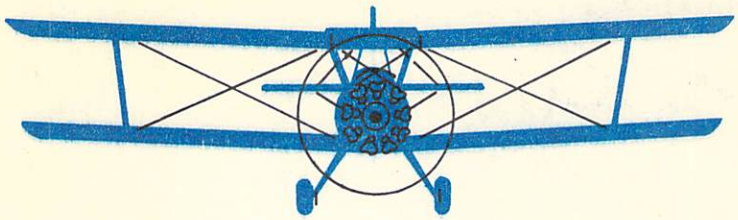
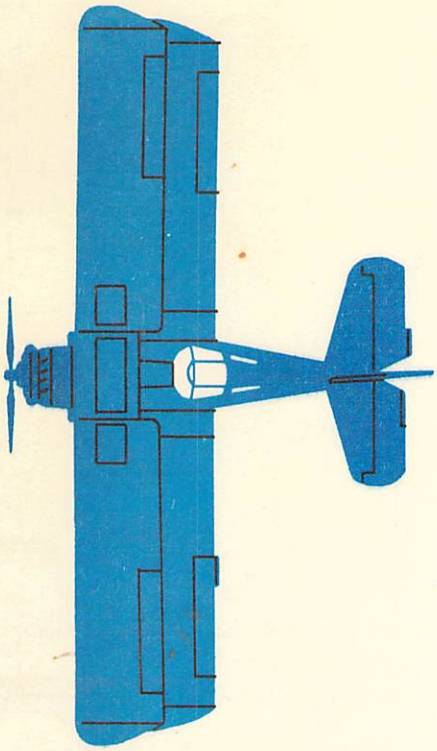
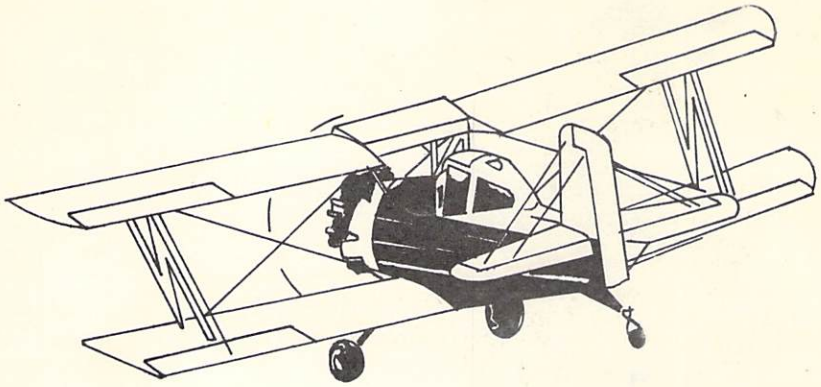
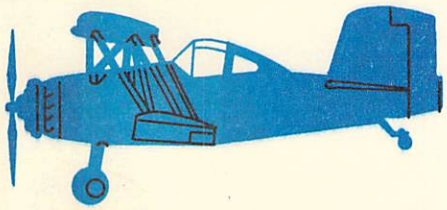
AG-CAT SERVICE NOTES and BULLETINS









GRUMMAN AMERICAN AVIATION CORPORATION

P.O.BOX 2206, SAVANNAH, GEORGIA 31402

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE BULLETINS

The following pages are reproductions of Grumman Ag-Cat Service Bulletins dating back to the first Ag-Cats produced. Many do not apply to later models, but are included here for general information only. Service Bulletin's #4, 5, and 9 apply to the first model Dust Spreader which no operator is using today, and have therefore been omitted. Bulletin #13 never existed, probably for obvious reasons.

Grumman

SERVICE BULLETIN INDEX

NO.	Subject
1	Main Landing Gear
2	Aileron Interconnect Strut & Attach Bolts
3	Engine Gage Unit
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5	Spreader Modification
6	Spray Pump Fans
7	Stiffening of Fairing
8	Installation of Spare Wing Tips
9	Service Reinforcement of Fuselage Tail Post
10	Inspection of Exhaust Brackets
11	Corrosion-proofing
12	Revised Ag-Cat Flight Manual
13	None
14	Repair of Welded Aluminum Alloy Hoppers
15	Improvement on Brake Installation
16	Spraying - Low Volume Output
17	Wing L.E. Skins
18	Magneto Switch Modification
19	Elevator & Rudder Cables
20	Aileron Cable Control Sector Support Brackets
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22	Landing Gear Spring Leg Failures
23	Spray Pump Fan Armor Plates
24	Correct Engine Mount spacer bushings - install, etc.
25	Rework of Throttle Arm on Carburetors
26	Engine Mount bolts (at mount ring) - Inspection
27	Modification of Crank Case breather
28	Modification of Elevator Trim Tab Horn connection
29	Rework of Parking Brake & Control Lock
30	J5404 Propeller Hub Rework
31	Modification of Aileron Control System
32	J5405 Propeller
33	Cracks in Elevator Torque Tube
34	Addition of Surface Control Lock Safety Device
35	Addition of Cushion Clamps to support Flexible Oil Pressure line
36	Sulphur Dusting
37	Carburetor Air Duct
38	Rework of Battery Hold Down Frame
39	Rework of Parking Brake Control Lock Device
40	Repair of Ag-Cat Engine Accessory Cowl
41	Inspection & Repair of Elevator Pushrod Assembly at Control stick
42	Leading Edge Skin Attachment to Wing

NO. Subject

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE BULLETIN #1

SUBJECT: Main Landing Gear

1. It is recommended that the three 3/8" dia. bolts that hold the two (2) main wheel halves together be torque checked after every 25 hours flight time. The correct torque for these bolts is 16 foot lbs. This torque value is plainly cast on the outboard web of the wheel casting.

2. The attached Engineering Change Order #S164-481 ("A" Rev.) should be incorporated on all aircraft bearing Serial Nos. 2, 3, 4, 5, 6, 7, 8, 9, 11, 12, 17, 18 and 19.

   The special HI-HEAT treat bolts, NAS1304-13H (4 per wheel) will be furnished by Grumman to effect this change.

March 3, 1960

Grumman

F-200

SCHWEIZER AIRCRAFT CORP.

ARK 3-3-60
ES 3-7-60

ENGINEERING CHANGE ORDER							CHG. LET.	A
TITLE:	GEAR INSTAL. — MAIN LDG							
CHG. INC.		EFFECTIVITY *	ALL A/C	PARTS AFFECTED	✓	ECO. SERIAL	S164-481	"A"
BY		CARD POSTED		TOOLS AFFECTED		D.C.R. SERIAL	—	
DATE		CHECKED	ARK 12-11-59	STOCK DISPOSITION	SCRAP	DWG. NO.	A1500	

ES 12-11-59

CHANGE:

THE AN4H12A (4) BOLTS PER WHEEL THAT ATTACH BRAKE ASS'Y TO AXLE, S/B HI-HEAT TREAT BOLTS, NAS1304-13H (4) (PER WHEEL)

(160,000 P.S.I. (REF.))

(A)* (BACK-FIT ON ALL A/C; FURNISH KIT of PARTS WITH THIS E.C.O. TO ALL OWNERS of DELIVERED A/C.)

REASON: FAST LANDINGS WITH BRAKES LOCKED & FULL LOAD COULD SHEAR OFF ORDINARY AN4 BOLTS. (ONLY 125,000 P.S.I. HEAT TREAT.)

Incorporated in A1500 "A"
ARK 10-13-61

ARK 12-11-59
(A) 3-3-60

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

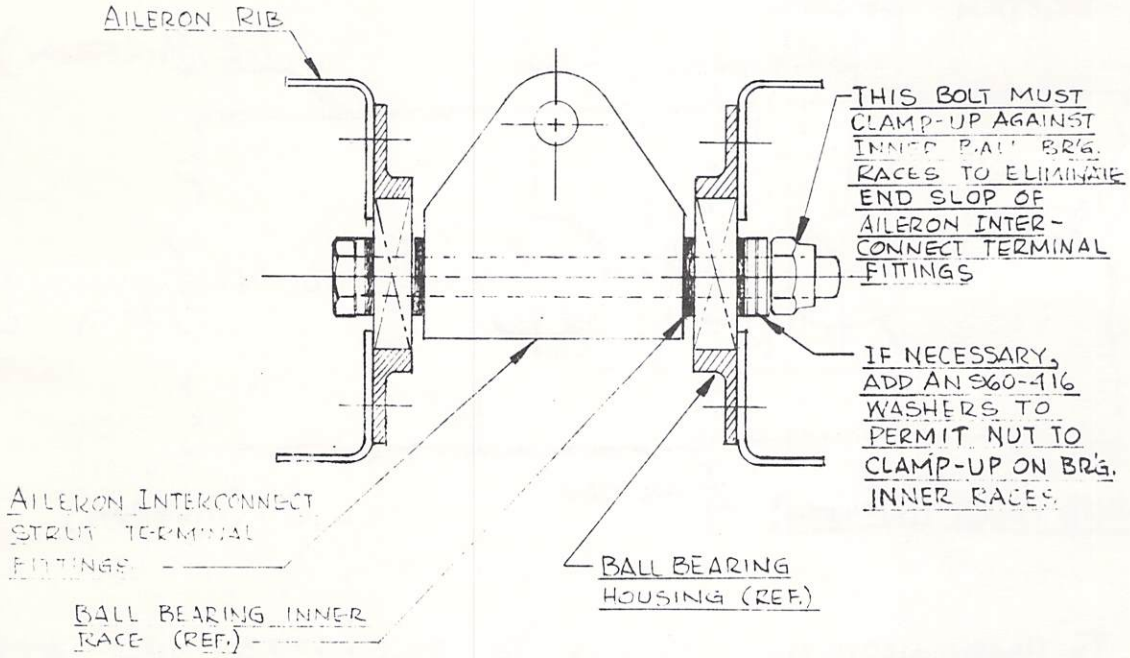
AG-CAT SERVICE BULLETIN #2

SUBJECT: Aileron Interconnect Strut End Attach Bolts

This service check is not mandatory, but should the aileron interconnect strut ends appear to have end play, the following check-up of the clamp-up aileron fitting assembly may be made as outlined below:

1. Add two (2) each of P/N A1004-35 and -33 (inspection hole metal inspection cover plates and commercial celluloid grommets) per attached E.C.O. #S164-528 to obtain visual and mechanical access to the aileron interconnect attach bolt connection. Inspection of this interconnect terminal connection may indicate that the thru bolt is not firmly clamped up on the inner races of the ball bearings as it should be.

   (See sketch of connection below.)



May 19, 1960

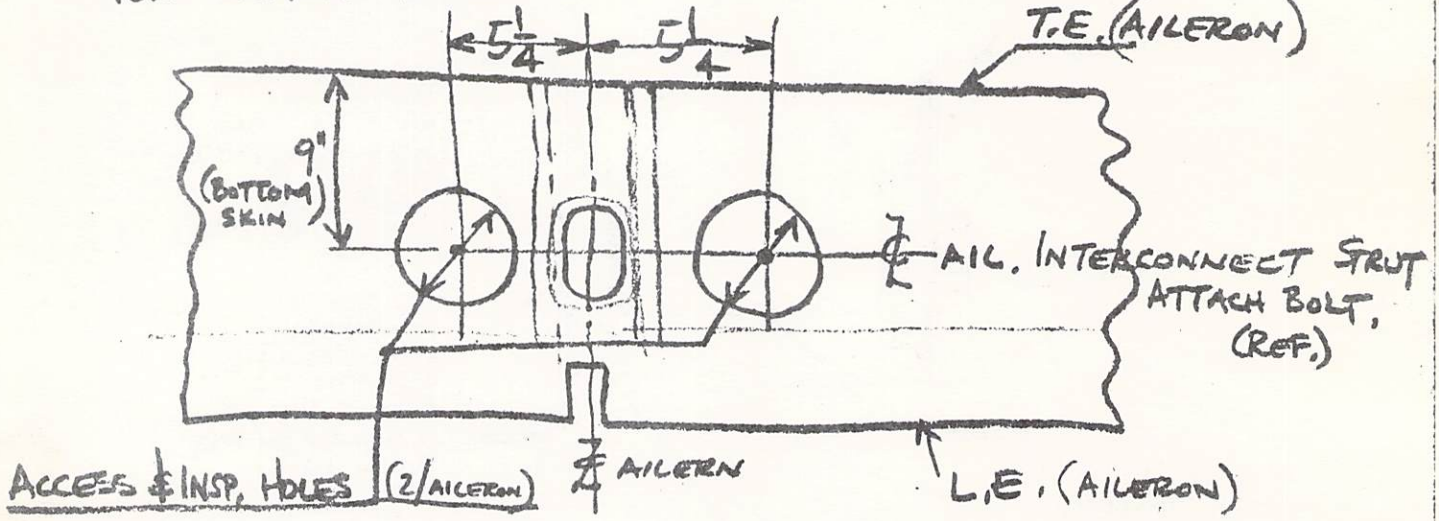
Grumman

F-200

SCHWEIZER AIRCRAFT CORP.

ENGINEERING CHANGE ORDER							CHG. LET.	
TITLE:	AILERON — COVER ASSY							
CHG. INC.		EFFECTIVITY	ASAP	PARTS AFFECTED	L	ECO. SERIAL	S164-528	
BY		CARD POSTED	4-20-60	TOOLS AFFECTED		D.C.R. SERIAL	—	
DATE		CHECKED ARK ES	4/19/60	STOCK DISPOSITION		DWG. NO.	A1131 "B"	

CHANGE: ① ADD TWO EA. of P/N A1004-35 & -33, INSPECTION HOLE METAL INSPECTION COVER PLATES (4 5/8" O.D. SINGLE SPRING TYPE) & COMM'L CELLULOID GROMMETS (3 1/2" I.D. x 4 5/8" O.D.) TO THE UNDER SIDE FABRIC COVER ASSY (A1131) PER DETAIL of INSTALL. SHOWN ON DWG A1004 (SECTION J-I) & LOCATED ON AILERON COVER FABRIC ASSY AS PER SKETCH BELOW:-



REASON:

① TO HAVE INSPECTION ACCESS TO AIL. INTERCONNECT ATTACH BOLT CONNECTION. (NO BACK FITTING! CONVENIENCE ITEM ONLY.)

A R Koch
4-18-60

INC. PER "C" CHANGE 11-28-61 S2R W.E.F.

10

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE BULLETIN #3

SUBJECT: Engine Gage Unit (Fuel Pressure Portion)

This is a Mandatory Change applicable to all Ag-Cat aircraft. (FAA requirement)

1. The fuel pressure portion of the engine gage instrument dial must be "blanked-off" in accordance with the directive noted in the attached ECO #S164-540.

2. If your aircraft has not been changed in accordance with E.C.O. #S164-540, please correct same and make a notation of this change in your aircraft log book.

May 20, 1960

Grumman

F-200

SCHWEIZER AIRCRAFT CORP.

ENGINEERING CHANGE ORDER						CHG. LET.	
TITLE:	INSTRUMENT MARKINGS G-164						
CHG. INC.		EFFECTIVITY	ASAP *	PARTS AFFECTED		ECO. SERIAL	S164-540
BY		CARD POSTED	ARK 5-19-60	TOOLS AFFECTED		D.C.R. SERIAL	—
DATE		CHECKED	PD 5.19.60	STOCK DISPOSITION		DWG. NO.	A1887

CHANGE: * THIS CHANGE IS AN FAA INITIATED MANDATORY CHANGE!

(1.) THE FUEL PRESSURE PORTION of THE ENGINE GAGE UNIT INSTRU. FACE SHALL BE "PAINTED OUT" ON THE DIAL FACE (NOT THE GLASS!) ALSO PAINT-OUT THE FUEL PRESSURE POINTER. BLACK (DULL) PAINT SHALL BE USED; & SURFACE of DIAL SHALL BE CAREFULLY MASKED OFF IN THE APPLICABLE AREA.

NOTE:- SZR SHALL ADD THIS REQUIREMENT ON A/C INSPECTION CHECK-OFF LIST & CHANGE ALL A/C (ON HAND) PRIOR TO DELIVERY.

REASON: THIS PORTION of INSTRU. IS NOT USED ON G-164 AG-CAT A/C.

ARKoch
5-19-60

Incorp. on "A" Rev. of A1887
ARK
1-17-62

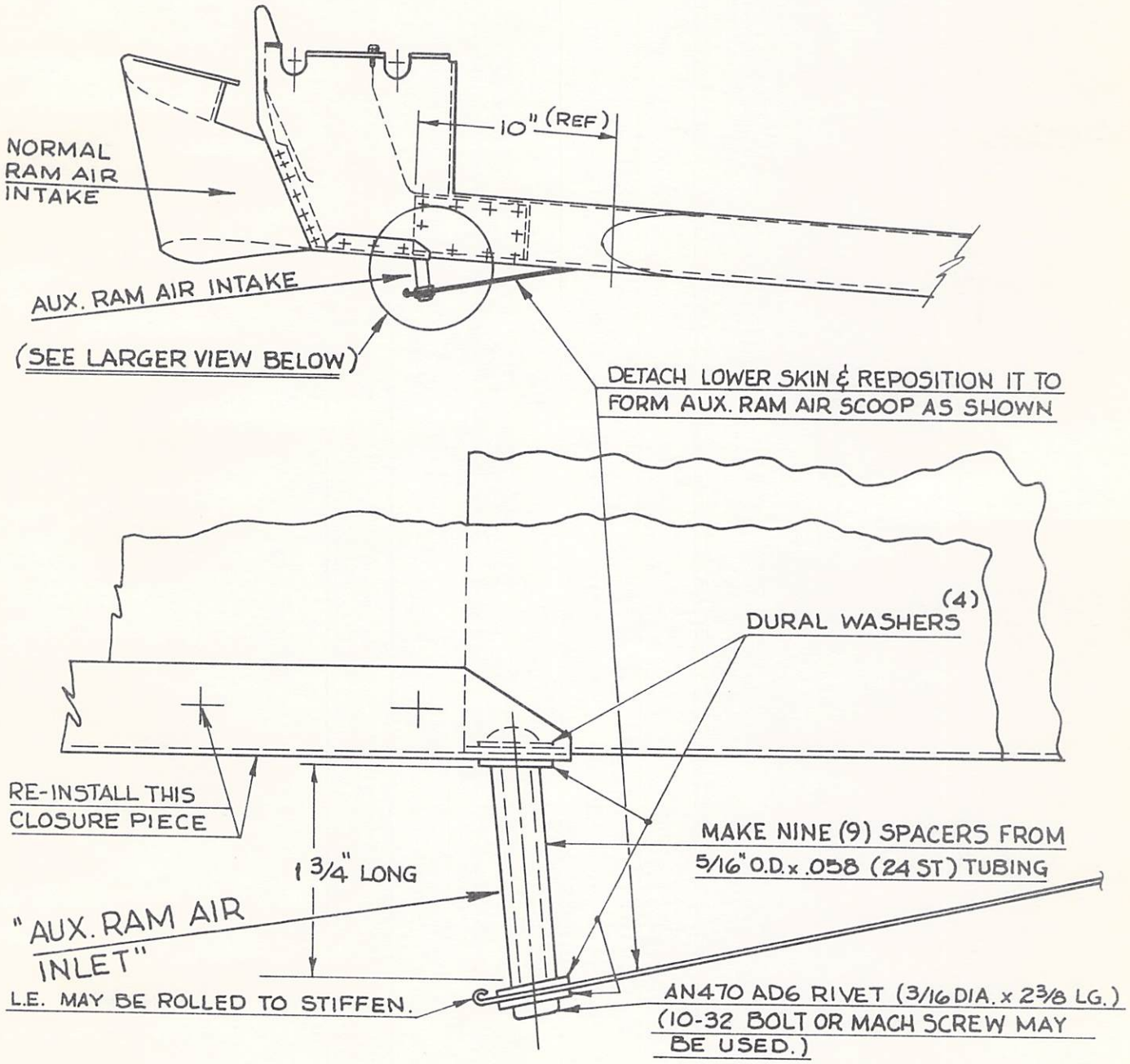
GRUMMAN AG-CAT

SERVICE BULLETIN #4

SUBJECT: Modification of Dust spreader (1st 35 a/c only)

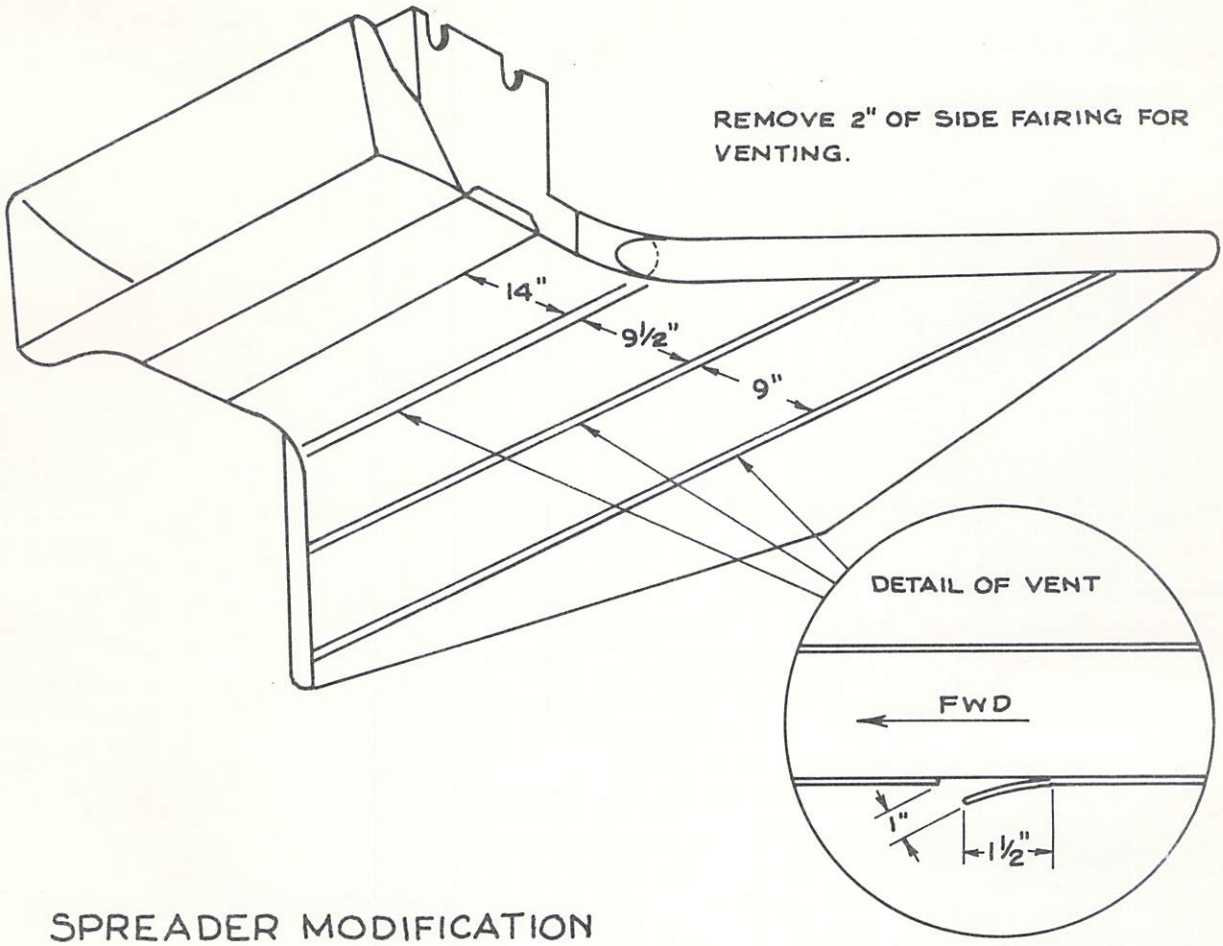
Note: This modification is not mandatory, nor does it consume much effort, but the swath width is improved approx. 50% & the distribution of solids is considerably better.

1. Refer to sketch for spreader modification details: -



GRUMMAN AG-CAT — SERVICE BULLETIN

BULLETIN #5
6/21/60



SPREADER MODIFICATION

THIS MODIFICATION PRODUCES A MUCH BETTER MIXING OF LIGHT DUSTS AND SHOWS EXCELLENT SHUT OFF CHARACTERISTICS. IT IS HIGHLY RECOMMENDED FOR THOSE OPERATORS ENGAGED IN HEAVY DUSTING OPERATIONS.

THE ABOVE MODIFICATIONS MAY BE MADE ALSO TO THOSE SPREADERS WHICH HAVE INCORPORATED THE CHANGE OF SERVICE BULLETIN #4.

THIS NOTICE SHOULD BE CONSIDERED PRELIMINARY SINCE TESTS WITH MATERIALS OTHER THAN DUSTS HAVE NOT BEEN COMPLETED.

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE BULLETIN #6

SUBJECT: Spray Pump Fans (Metal) (P/N A1920)

1. To reduce the probability of throwing blades on Spray Pump Fans, it is recommended that all aircraft in the field be modified in accordance with the attached engineering change order (S164-583).*

2. Careful rounding of the sharp corners of Spray Pump spiders is very important in elimination of minute surface cracks which could result in fatigue failures of the spider hubs in service.

* Note: It is not necessary to remove the blades from the spider to accomplish this change.

August 25, 1960

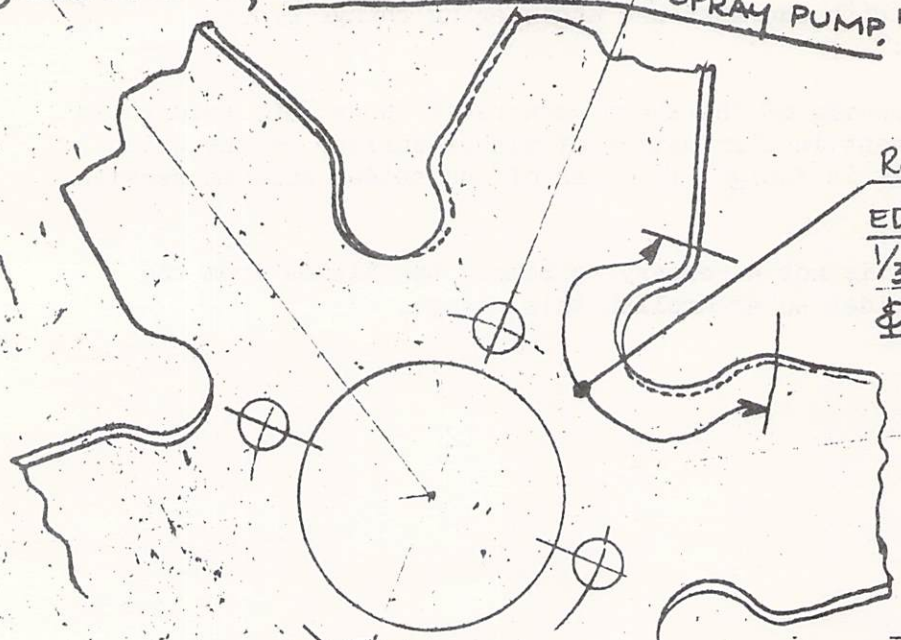
Grumman

F-200

SCHWEIZER AIRCRAFT CORP.

ENGINEERING CHANGE ORDER							CHG. LET.	
TITLE:	FAN Assy & SPACER — PUMP (2" SIMPLEX)							
CHG. INC.		EFFECTIVITY	ALL A/C	PARTS AFFECTED	✓	ECO. SERIAL	S164-583	
BY		CARD POSTED		TOOLS AFFECTED	—	D.C.R. SERIAL	—	
DATE		CHECKED	ARK 8-25-60 ES 8-26-60	STOCK DISPOSITION	REWORK	DWG. NO.	A1920 "A"	

CHANGE: (1) REWORK SPIDER of PUMP FANS IN AREA NOTED BELOW PER INSTRUCTIONS:-
(2) CHG TITLE TO; "FAN Assy & SPACER — SPRAY PUMP"



ROUND OFF BOTH EDGES of SPIDER 1/32 TO 1/16 RADIUS & DRESS RADII WITH FINE EMERY CLOTH SO THAT NO MACHINE OR FILE MARKS SHOW. RE-PRIME & PAINT DISTURBED AREAS

REWORK DESIGNATED AREAS ONLY, & BLEND RADII INTO SHARP CORNER AREAS OUTSIDE AREA INDICATED.)

Incorporated on "B" Rev. of A1920 1-13-61 ARK

REASON:

(1.) SHARP EDGES INVITE PROBABILITY of SPIDER CRACKING & BLADE THROWING DUE TO SHARP CORNERS CONCENTRATING STRESSES AT SECTION of MAXIMUM BENDING LOAD PER FAN BLADE.

(2.) FAN NOW INSTALLED INTERCHANGABLE ON 2" SIMPLEX OR ROOT MODEL 57 PUMPS.

ARKoch 8-25-60

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE BULLETIN #7

SUBJECT: Stiffening of Fairing Over Fuselage Over-Turn Structure

1. Engineering Change Order #S164-582 (enclosed) is calculated to reduce the tendency to cracking of the over-turn structure fairing skins, and to reduce the drumming that occurs in flight, when these thin skins pulsate due to air blasting against them.

2. The enclosed E.C.O. is intended to act as a guide to illustrate what can be done to improve the fairing's durability. Substitutions of other components of similar materials may be freely used at the discretion of the aircraft's owner.

August 25, 1960

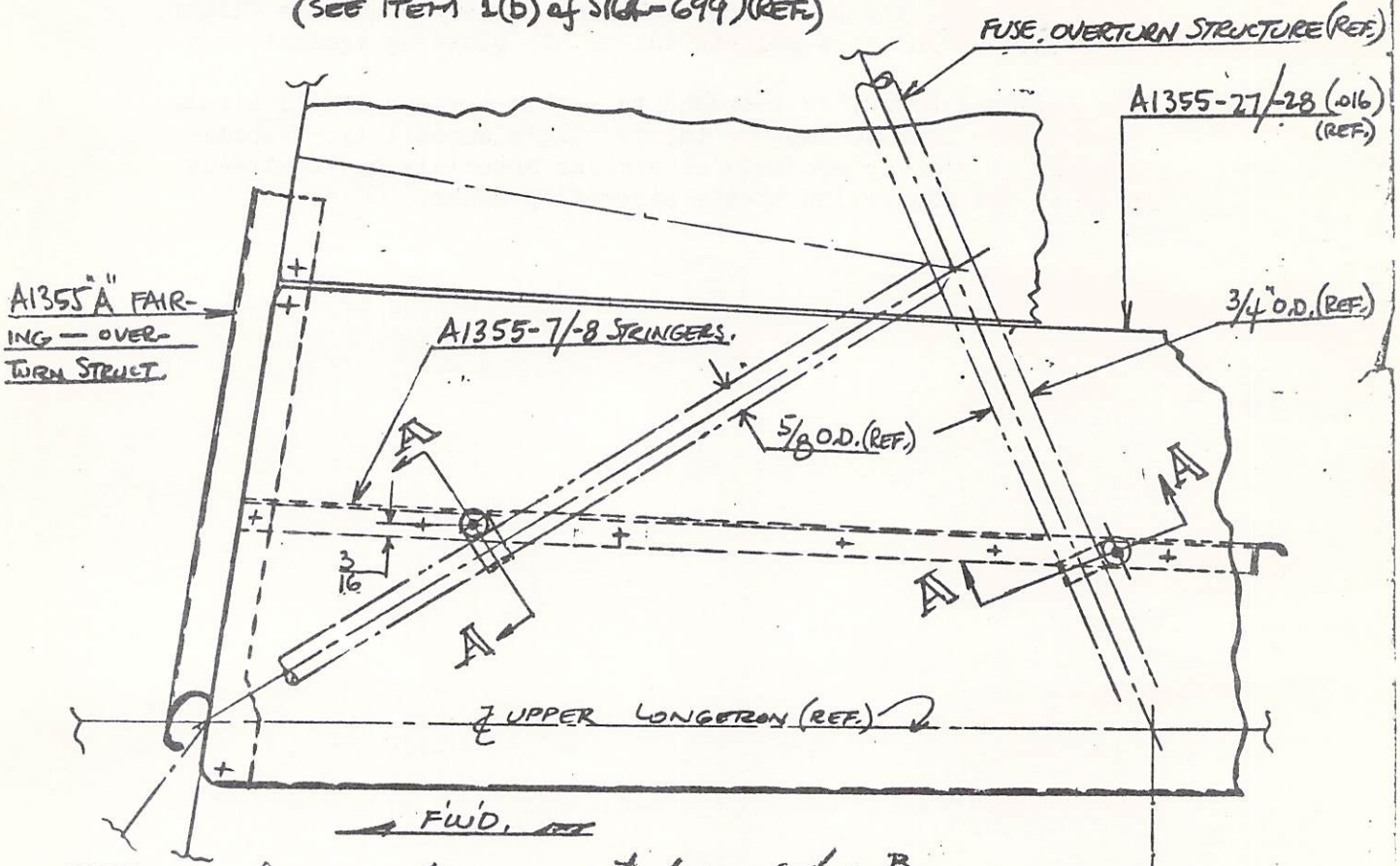
Grumman

F-200

SCHWEIZER AIRCRAFT CORP.

ENGINEERING CHANGE ORDER							CHG. LET.	
TITLE:	FAIRING ASS'Y — FUSELAGE AFT UPPER							
CHG. INC.	? R.I.P 3-1-63	EFFECTIVITY	#36, UP	PARTS AFFECTED	←	ECO. SERIAL	S164-582	
BY		CARD POSTED	ARK 8-25-60	TOOLS AFFECTED	—	D.C.R. SERIAL	—	
DATE		CHECKED	ES-8-25-60	STOCK DISPOSITION	—	DWG. NO.	A1355 "A"	

CHANGE: (1.) ADD CLAMPS & SPACERS AS SHOWN ABOVE TO INSTALL of A1355 "A" OVERTURN STRUCTURE FAIRING. (SEE ITEM 1(b) of S164-699)(REF.)



REASON:

(1) To STIFFEN SIDE SKINS AGAINST DRUMMING & CRACKING.

A.R. Koch
8-25-60

Disposition marked on chg B
9/23/65

AN 525-832-14 (4)
AN 960-8 (8)
AN 365-832 (4)

A1355-101 (4)
5/16 O.D. x .064 x 1/4" LONG SPACERS
MATERIAL = AL. ALLOY TUBE (2ST)

A1355-7/-8 (REF.)

AN 742-D12 (2)
AN 742-D10 (2)

SECT. "A-A" (TYPICAL)

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE BULLETIN #8

SUBJECT: Installation of Spare Wing Tips (Fiberglass)

1. Fiberglass wing tips (P/N A1039) are interchangeable with metal wing tips (P/N A1040) of early model Ag-Cat aircraft with the following special instructions:

   A. Spanwise tabs, located on metal wing tips at both wing beams are not required. Structural tests proved that these may be omitted upon re-installation of metal wing tips; hence they are not required on metal or fiberglass wing tips.

   B. There are no webbed spanwise ribs in the fiberglass wing tips, therefore the fiberglass wing tips require no attachment to either wing beam as provided for in the metal wing tip assemblies. Static tests proved that even the metal wing tips require no internal fastenings at the beams; thus these attachments may be omitted upon re-installation.

   C. The only attachment of fiberglass wing tips to the wing end rib occurs chordwise around the entire contour of the inboard end of the wing tip. Each fiberglass tip assembly is pilot drilled to indicate the correct quantity and location of these attachments. For your convenience, you may attach the tips to the wing with AN 515-6 or AN 526-632 machine screws (#6-32 threads) with appropriate matching nuts, washers (thin) and lock washer; access to be gained thru holes in the fabric covering of the outer wing panel assembly. The correct size holes in the fiberglass tip are #29 drill size; #30 drill size thru the wing skin and flange of the outboard rib.

      If any of the fiberglass tip pilot holes fall on or closer than 3/8" from existing rivets or holes in the wing end rib, move the interferring hole location either fwd. or aft to give the necessary clearance.

      If huck or cherry rivets are available, considerable time may be saved on installation by using them.

      Paint Touch-up After Installation to Prevent Corrosion.

Grumman

CAUTION: Be extremely careful in locating the wing tip onto the wing end rib to be certain that the drilled holes for attachment of the wing tips to the wing are center-lined no closer than 9/32" inboard from the outboard edge of the wing end rib flange. This precaution will assure proper edge distance for the screw or blind rivets.

UNDER NO CIRCUMSTANCES shall these fiberglass wing tips be installed with driven rivets. To use these rivets would almost certainly cause the attachment holes in the fiberglass tip to crack-out.

10-11-60

GRUMMAN AIRCRAFT ENGRG. CORP.

MODEL G-164

GRUMMAN AG-CAT

SERVICE BULLETIN #9 ("A" REVISION)

Subject: Service Reinforcement of Fuselage Tail Post Structure.

1. Service Bulletin #9 (no revision) is hereby cancelled and superceded by this service bulletin. INCORPORATION OF THIS SERVICE BULLETIN IS MANDATORY ON ALL AG-CAT A/C.

2. Certain A/C in service have developed cracks in the tail wheel spring attachment area of the fuselage structure. It was originally felt that cracks appearing in this region were caused by embrittlement of the steel gusset plates adjacent to the welded areas due to excess amounts of carbon absorbsion introduced by the great quantity of weld in this area. However, a study of the stresses that can be imposed due to extremely rough side loading of the tail wheel ass'y show that a beef-up of this tail post structure will appreciably strengthen this area against further cracking tendencies.

3. The enclosed kit of parts with detailed instructions for incorporation on Ag-Cats in service is furnished herewith for incorporation. The Applicable Engineering Change Orders are #S164-602 & -603.

Grumman Aircraft Engrg. Corp.
c/o Schweizer Aircraft Corp.
Elmira, New York

Arthur R. Koch
Project Engr.

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE BULLETIN #10
("A" REVISION)

SUBJECT: Inspection of Brackets (A1627-13) Attaching Exhaust Shroud Blkd. to Engine Mount Ring (A/C Serial Nos. 1 thru 94)

1. It was brought to Grumman's attention that the subject brackets (P/N A1627-13) (6 per airplane) were cracking at the heel of the flange where they clamp onto the engine mount ring. In November of 1960, Grumman corrected the design of these brackets and by Service Bulletin #10 (no revision) dated 11-23-60, called this short-coming to the attention of all Ag-Cat owners. At that time we asked each owner to inspect his aircraft and we offered to furnish replacement brackets to all those who requested same.

2. Again, Grumman's attention has been directed to cracking of the replacement type brackets. A careful study was made to determine why brackets of the improved design should fail. It has been determined that the fault lies not with the bracket design or material used, but rather with the failure of the sub-contractor of these parts, in his failure to closely follow drawing instructions which specify that the bend radius at the heel of the angle be 3/32 R. (inside) and that the spinning operation on the flange should be done with care so that reduction in material thickness at this radius is a minimum.

3. Grumman, therefore, has procured another lot of these parts made exactly to the specifications on the drawing (Ref: Engineering Change Order #S164-576, attached). These new brackets are herewith furnished free of charge to all customers of aircraft not so fitted so that this problem may be corrected. Note here, that even without any such brackets in place, the exhaust shroud bulkhead is firmly fixed in place by the engine accessory cowl panels and their attach channels. (Any two engine accessory cowl panels may be removed on the ground without causing movement of the exhaust shroud bulkhead under the condition stated.)

October 4, 1961

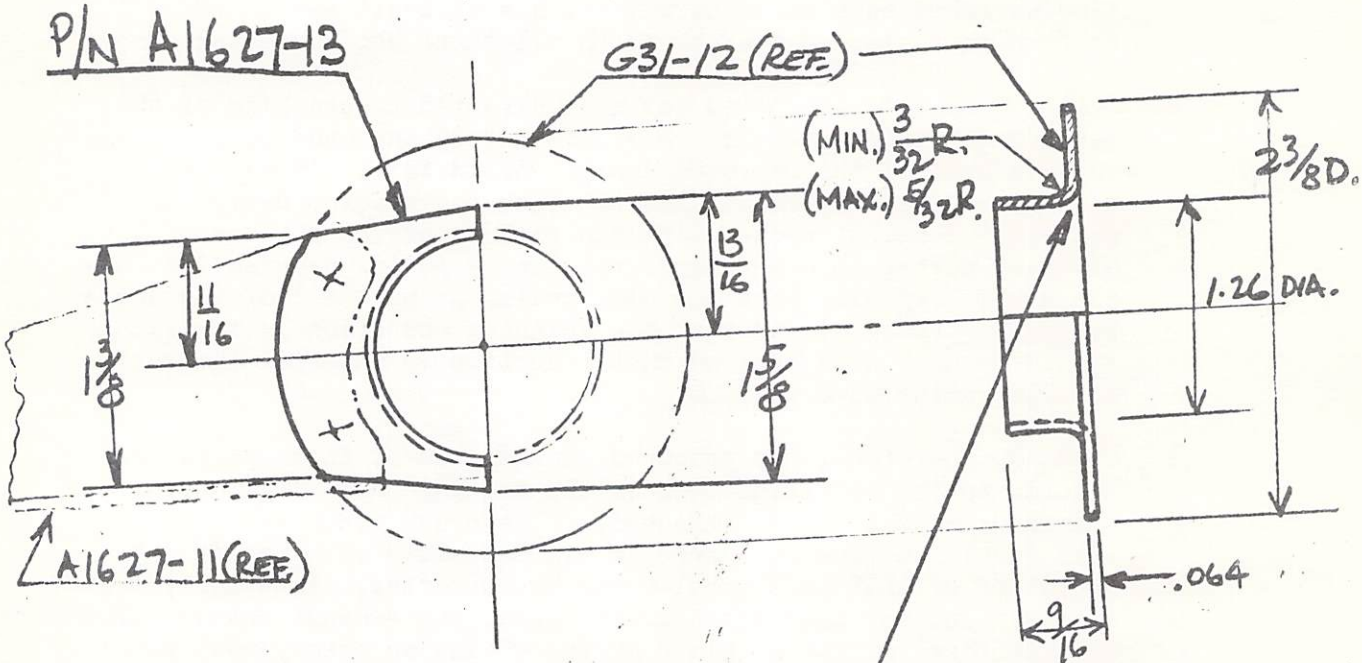
Grumman

F-200

SCHWEIZER AIRCRAFT CORP.

ENGINEERING CHANGE ORDER							CHG. LET.	
TITLE:	BLKHD INSTAL. — ENGINE SHROUD							
CHG. INC.		EFFECTIVITY	ASAP	PARTS AFFECTED	~	ECO. SERIAL	S164-576	
BY		CARD POSTED	ARK 8-18-60	TOOLS AFFECTED	—	D.C.R. SERIAL	—	
DATE		CHECKED	RES. 8/18/60	STOCK DISPOSITION	SCRAP	DWG. NO.	A1627	

CHANGE: Change detail shape of P/N A1627-13 TO DETAIL SHOWN BELOW. USE EITHER .063 2024-0 SHT (H.T. TO T4 AFTER SPINNING) OR .064 5250 SHT. (5250 SHT PREFERED)



NOTE:- SPIN CAREFULLY SO THAT MATERIAL REDUCTION AT THIS RADIUS IS A MIN.

REASON: ORIG. SHAPE of P/N A1627-13 CAUSED FATIGUE FAILURES.

A R Koch
8-18-60

REVISED 9-28-61 (A R Koch) {3/32 R. 5/32 R.}

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE BULLETIN #11

SUBJECT: Corrosion-proofing of Several Fuselage Fittings
(Applicable to First 37 Aircraft Plus #42 Only)

ENCLOSURES: Engineering Change Orders #S164-623, -624 & -625

1. The corrosion-proofing of the subject aircraft shall be undertaken per the attached enclosures.

2. The purpose of this Service Bulletin is to bring to the owner's attention the fact that unless the enclosed E.C.O.'s are complied with, the fin forward attach point, the stabilizer rear spar attach points (2) and the rubber cable pulley brackets (2) (all three are welded to the fuselage frame assembly), there is a good possibility that corrosive action may take place at these fittings which will be detrimental to the aircraft structure.

3. Under no circumstances shall the owner undertake to rework these fittings by welding unless he employs the services of a Certified Aircraft Welder. Rather, first remove any rust that may have developed in this area by wire brushing. Then, after touch-up painting the area, apply caulking compound as directed on the enclosed E.C.O.'s.

December 21, 1960

Grumman

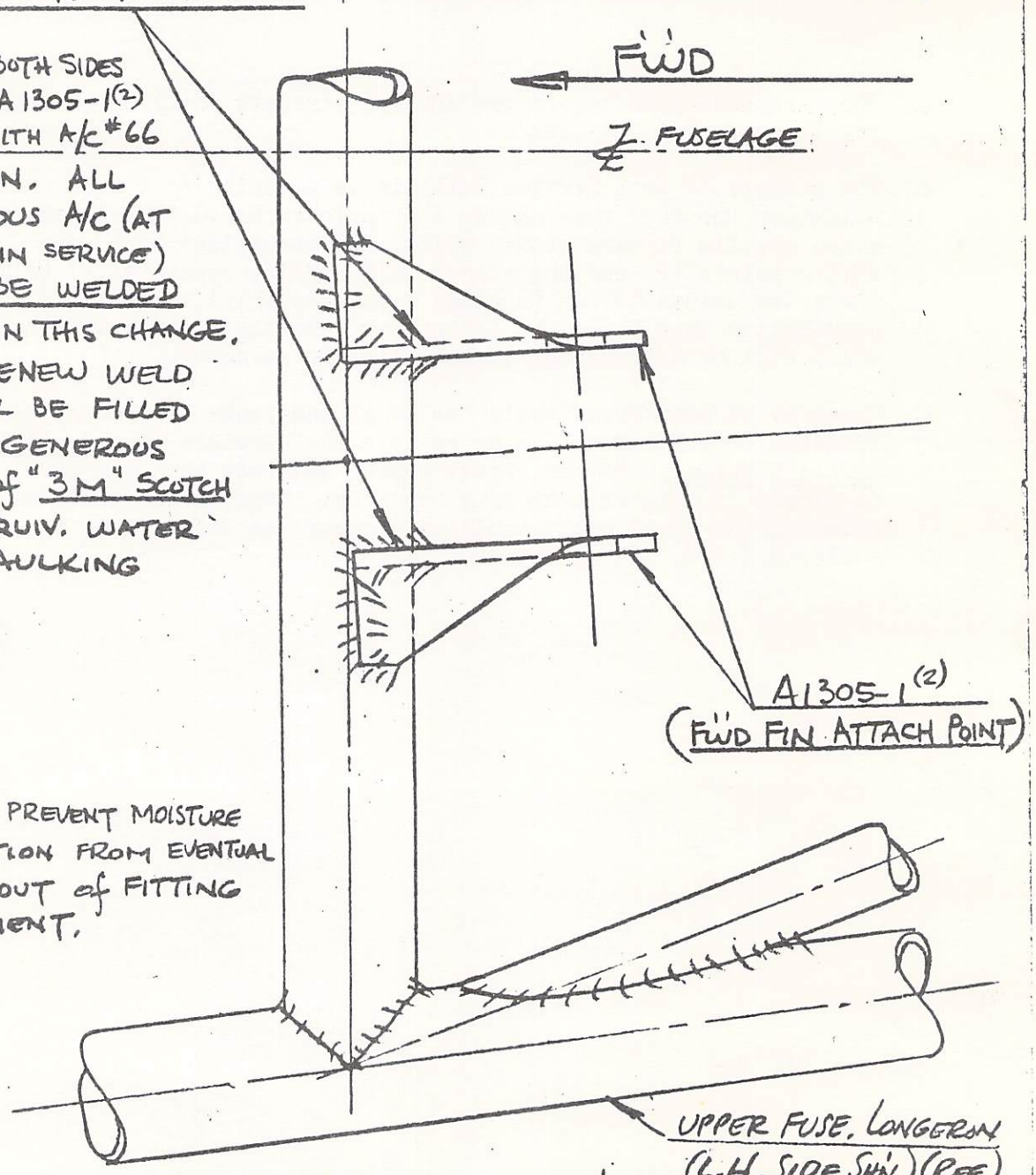
F-200

SCHWEIZER AIRCRAFT CORP.

ENGINEERING CHANGE ORDER							CHG. LET.	B
TITLE:	STRUCTURE (ASSY) — FUSELAGE							
CHG. INC.	P.I.P 2-19-63	EFFECTIVITY	See Note (2)	PARTS AFFECTED	—	ECO. SERIAL	S164-623	
BY		CARD POSTED	ARK 12-21-60	TOOLS AFFECTED	—	D.C.R. SERIAL	—	
DATE		CHECKED	ES 12-21-60	STOCK DISPOSITION	—	DWG. NO.	A1300 "A"	

CHANGE: (1) CHANGE "WELD OUTSIDE ONLY AS SHOWN" NOTE ON SECTION "H-H" TO "WELD BOTH SIDES AS SHOWN". (SEE CHANGE IN SECTION "H-H" BELOW)

(2) WELDING of BOTH SIDES OF FITTINGS A1305-1(2) WILL START WITH A/C #66 IN PRODUCTION. ALL OTHER PREVIOUS A/C (AT FACTORY OR IN SERVICE) SHALL NOT BE WELDED AS SHOWN IN THIS CHANGE. HOWEVER, THESE NEW WELD AREAS SHALL BE FILLED IN WITH A GENEROUS QUANTITY of "3M" SCOTCH CAULK OR EQUIV. WATER RESISTANT CAULKING COMPOUND.



REASON: (1) TO PREVENT MOISTURE ACCUMULATION FROM EVENTUAL RUSTING-OUT of FITTING ATTACHMENT.

A R Kock
12-21-60

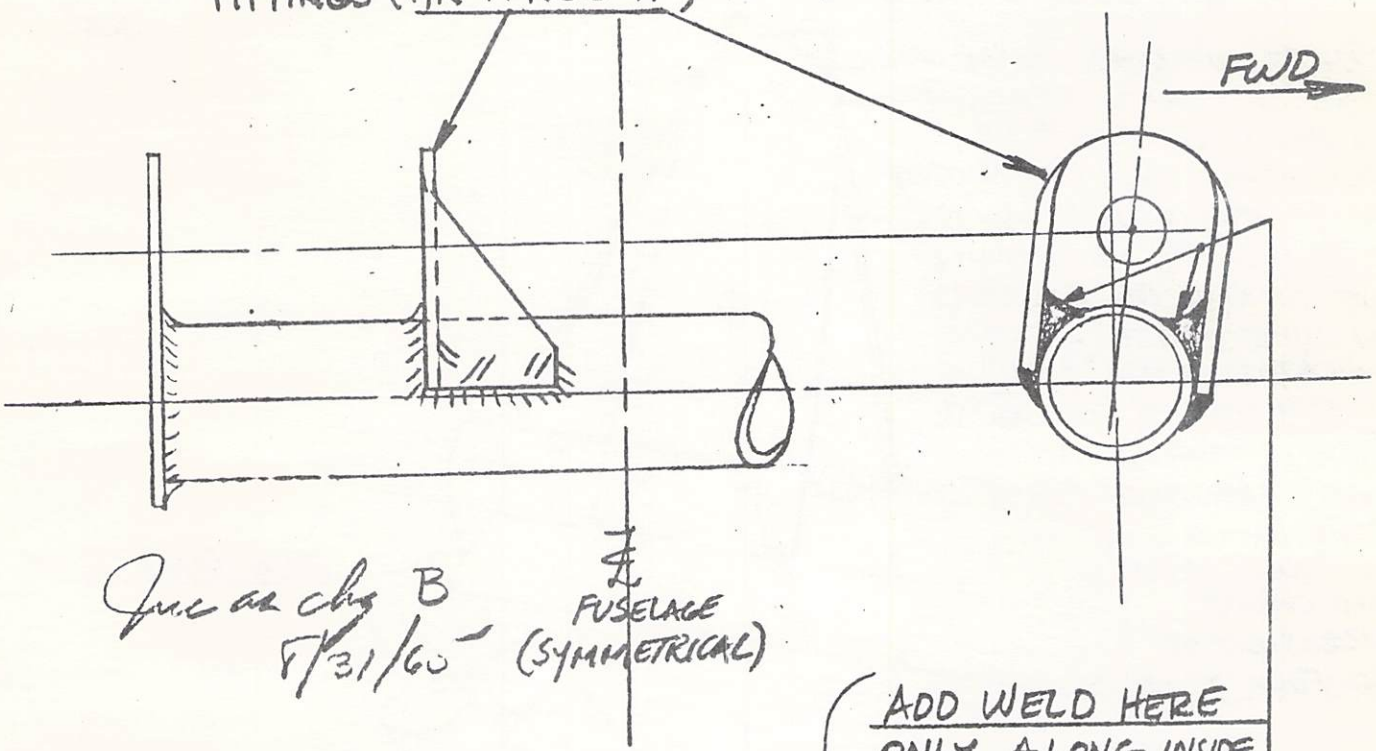
INC. 2-19-63 REV. B BY R. POWELL

F-200

SCHWEIZER AIRCRAFT CORP.

ENGINEERING CHANGE ORDER							CHG. LET.	
TITLE:	BRACKET INSTAL. (ASSY & DETAILS) — FUSE, STABILIZER REAR SPAR							
CHG. INC.	8/31/65	EFFECTIVITY	SEE NOTE (2)	PARTS AFFECTED	—	ECO. SERIAL	S164-624	
BY		CARD POSTED	ARK 12-21-60	TOOLS AFFECTED	—	D.C.R. SERIAL		
DATE		CHECKED	ES 12-21-60	STOCK DISPOSITION	—	DWG. NO.	A1306	

CHANGE: (1) ADD WELD TO INSIDE of STABILIZER REAR SPAR FUSELAGE FITTINGS (2) (P/N A1306-11) AS SHOWN BELOW.



Same as chg B 8/31/65

ADD WELD HERE ONLY ALONG INSIDE of EACH LATERAL LEG of FITTINGS #A1306-11 (2) AS SHN. DO NOT WELD ON FACE of FITTING WHERE IT WILL INTERFERE WITH BOLT.

(2) THIS ADDED WELD SHALL START WITH A/C #66 IN PRODUCTION. ALL OTHER PREVIOUS A/C (AT FACTORY OR IN SERVICE) SHALL NOT BE WELDED IN THESE AREAS FOR FEAR of CRACK DEVELOPMENT. THEY SHALL BE FILLED IN WITH A GENEROUS FILLET of "3M" SCOTCH CAULK (OR EQUIV.) WATER RESISTANT CAULKING COMPOUND.

THIS FILL-IN IS DONE To PREVENT POSSIBLE ACCUMULATION OF MOISTURE AROUND THE FITTINGS.

A R Koch
12-21-60

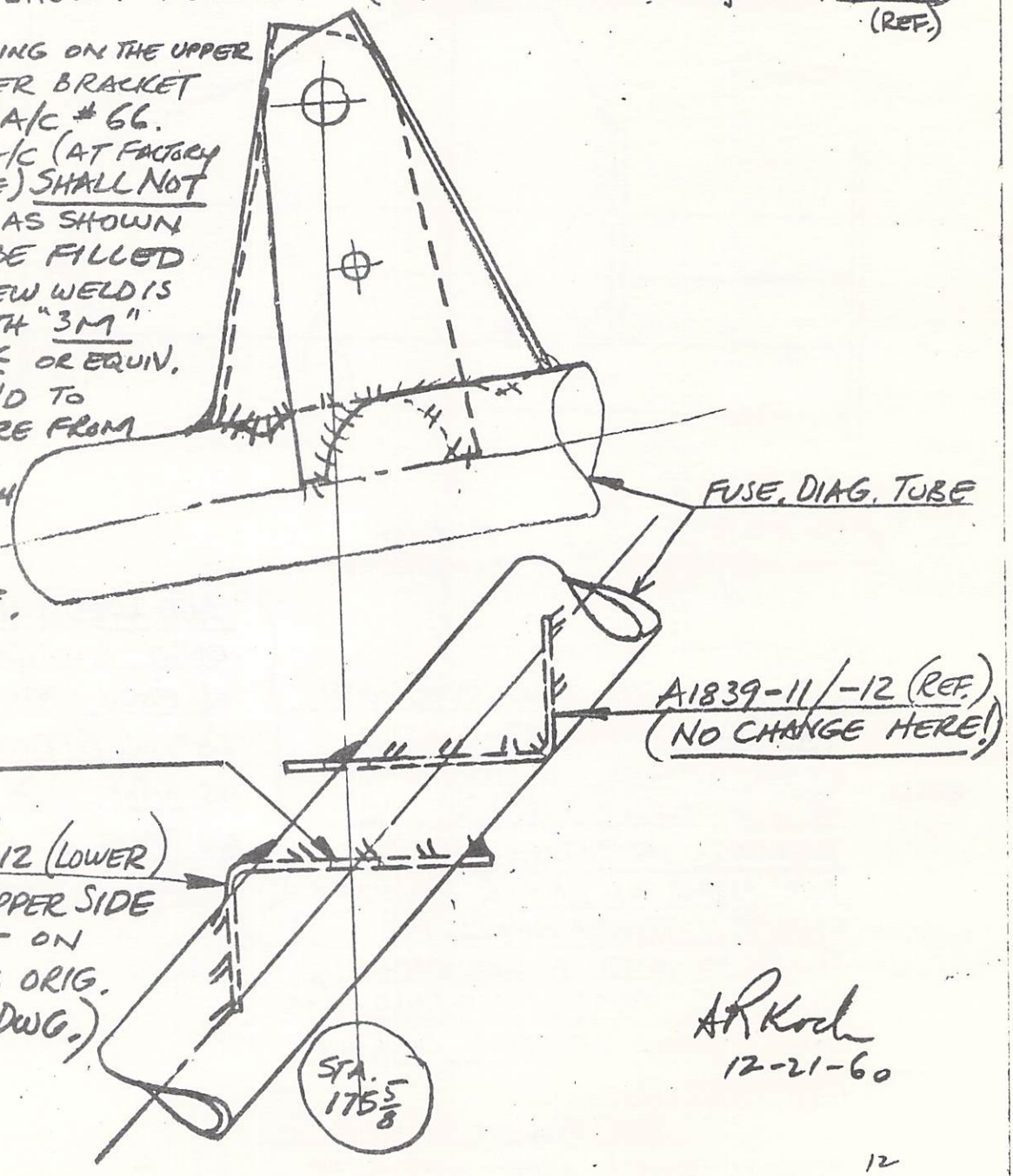
F-200

SCHWEIZER AIRCRAFT CORP.

ENGINEERING CHANGE ORDER							CHG. LET.	
TITLE:	BRACKETS (INSTALL.) — SURFACE CONTROLS							
CHG. INC.		EFFECTIVITY	SEE NOTE (2)	PARTS AFFECTED	—	ECO. SERIAL	S164-625	
BY		CARD POSTED	ARK 12-21-60	TOOLS AFFECTED	—	D.C.R. SERIAL	—	
DATE		CHECKED	ARK 12-21-60	STOCK DISPOSITION	—	DWG. NO.	A1833	

CHANGE: (1) CHANGE LOCATION of WELD (L.H. & R.H. INSTALLATIONS) of RUDDER CABLE PULLEY BRACKET AT FUSE. STA. 175 5/8 AS SHOWN BELOW :- (AFFECTS VIEW "D-D" of DWG. A1833 (REF.)

(2.) START WELDING ON THE UPPER SIDE of LOWER BRACKET IN PROD. ON A/C # 66. ALL OTHER A/C (AT FACTORY OR IN SERVICE) SHALL NOT BE RE-WELDED AS SHOWN BUT SHALL BE FILLED IN WHERE NEW WELD IS INDICATED WITH "3M" SCOTCH CAULK OR EQUIV. CAULKING COMP'D TO PREVENT MOISTURE FROM DEPOSITING IN THIS AREA WHICH COULD CAUSE CORROSION of THE FUSE. TUBE.



A R Koch
12-21-60

12

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE BULLETIN #12

SUBJECT: Revised Ag-Cat Flight Manual

In keeping with our policy of informing Ag-Cat owners of the latest developments in regard to their aircraft, we are sending to you a copy of the latest F.A.A. approved flight manual. Certain changes have been incorporated in this latest manual which may affect relicense of your aircraft. Other changes are the result of additional flight testing, and the incorporation of alternate engines.

These changes are as follows:

ENGINES

The W-670-240 engine supplied by Gulf Coast Dusting has been fully approved for factory installation in the Ag-Cat.

PROPELLER PITCH

Additional pitch angles have been approved to provide additional operational flexibility. The higher angles are useful for extended cruising flights.

OIL PRESSURE GAGE

A yellow arc has been added between 15 and 60 psi.

COLD WEATHER OPERATIONS

An operating procedure for cold weather operations has been approved, and in addition, an easy to install winter front has been approved for cold weather use.

It is suggested that you note the changes, particularly as they may affect your airplane. This manual should be inserted with the aircraft papers.

The approved winter front along with a new placard to replace the original temperature limit placard is available at a cost of $38.00 from Grumman Aircraft Engineering Corporation, Attention: Terrell Kirk, c/o Schweizer Aircraft Corporation, P. O. Box 147, Elmira, New York.

April 4, 1961

Grumman

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

NOTICE

Service Bulletin #12 references the Approved Airplane Flight Manual which was required equipment on all G-164 aircraft through S/N 200. All of these aircraft, S/N 1 - 200, were supplied with all flight manual revisions and may continue to operate with a flight manual, or the owners may elect to install placards as called out in the latest revision of Type Certificate Data Sheet No. 1A16 and discontinue use of the Manual.

Aircraft serial numbers 201 and up do not have an Approved Airplane Flight Manual. The information that was formerly presented in the Flight Manual is now displayed in placards and markings in accordance with FAR 23.1581(a)(2).

August 31, 1966

Grumman

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE BULLETIN #14

SUBJECT: Repair of Welded Aluminum Alloy Hoppers

ENCLOSURES:
(a) Typical Edge Patch (Straight Section)
(b) Typical Edge Patch (On Concave Section)
(c) Typical Edge Patch (On Convex Section)
(d) Typical Flat Surface Patch

1. This Service Bulletin is prepared to assist in making quality repairs to cracked aluminum alloy hoppers. These hoppers are constructed of 52S-H32 (or 52S$\frac{1}{4}$ HARD) aluminum alloy of .090 thickness. All weld joints on original hoppers have been accomplished by Heliarc or Linde Sigmette type welding equipment to reduce distortion and/or build-up of internal weld stresses. To weld with Oxyacetylene equipment would introduce too much heat distortion and high build-up of internal weld stresses. In every case where weld repairs are made (and generally speaking, welding is the easiest way to make a repair), we stress that the repair be by either Heliarc or Sigmette welding equipment and that a 3/32 D. or 1/8" DIA. welding rod be used which is compatible with 52S $\frac{1}{4}$ HARD aluminum alloy sheet. We use Linde Oxweld #23 DRAWN aluminum rod. Suggested equivalent weld rods are:

   (a) AIRCO #26
   (b) VICTOR #9A
   (c) ALCOA #43S (4043)
   (d) N.C.G. (HOLLUP) #3112
   (e) Champion Rivet - 5% Silicon Aluminum Rod

   Needless to say, it is necessary that the repair area be cleaned inside and outside the hopper down to the aluminum alloy sheet before attempting to weld. Also, each weld shall be done both inside and outside to assure complete weld penetration. After the weld repair is completed, torch normalize the area for at least 6" all around the repair to relieve the internal weld stresses that may have been set up during the repair.

2. Another way to make a crack repair is to apply a built-up fiberglass reinforced epoxy resin repair to the affected area inside the hopper. First, remove all paint, dirt, etc. down to the bare metal hopper for an area at least 6 inches in all

June 28, 1961

Grumman

directions from the edges of the crack INSIDE the hopper. Then drill a 3/16" DIA. "stop-hole" at the extreme ends of the crack. Smooth off sharp edges of these "stop-holes" to discourage the starting of cracks originating from these holes.

It is very important that the fiberglass laminate patch be applied to the INSIDE of the hopper. If it were to be applied outside the hopper, seepage of liquids thru the crack from inside the hopper would immediately work on the fiberglass laminate patch with the probability that the patch would start to "lift" off the hopper from the inside, working loose from the aluminum alloy hopper and gradually enlarging the loose area until the repair again started to leak. Putting the patch inside the hopper eliminates this possibility.

Apply epoxy resin to the bare crack area inside the tank. When the resin becomes slightly dry, but tacky, apply first one ply of fiberglass cloth over the crack, extending only 1 inch beyond the crack in all directions. Apply just enough resin to each layer of fiberglass to fill the cloth. SQUEEGEE the excess resin off each ply of fiberglass as it is applied. This will prevent too much resin from building up between plies. Too much resin filler between plies will only serve to weaken the ply buildup. The resin is to be used only as a binder of fiberglass plies. The strength is in the fiberglass, and the resin is only there to hold the lamination of fiberglass cloth plies together. Of course, sufficient resin must be present to soak the fiberglass cloth thoroughly; but, squeegee the excess resin out for greatest lamination strength!

After the first fiberglass ply is almost set (only slightly tacky), apply another ply of fiberglass cloth. This and each successive ply should extend at least 1/2 - 3/4 INCH beyond the ply it is laid over. Build up the patch lamination of fiberglass cloth (each laid up in fresh resin) until the thickness of the ply buildup or lamination equals or exceeds that of the original aluminum alloy skin to which it is attached. Remember that each ply added gets progressively larger in area. The finished patch or repair will thus have great stiffness and strength immediately over the cracked area and the repair will feather-out around the edges.

The curing of the patch can be hastened by working in an area where the temperature is at least 70° F. and by application of heat lamps (not too close to cause air bubbles to form!).

June 28, 1961

Grumman

Never use resin in any area that is not well ventilated and never where an open flame or sparks exist! No finish, such as paint, is required over the completed repair. Generally speaking, the repair will be ready to work 4 to 6 hours after the last ply is in place, provided temperature is above 70° F. and humidity is low.

3. Enclosures (a) thru (d) show how typical metal patch repairs may be made to particular areas of the hopper. Metal (aluminum alloy) patches are quicker to make than fiberglass laminated repairs, provided the proper materials and facilities are available. In every case where a metal patch is applied, the metal must be clean next to the patch; the patch should be external; stop-holes must be drilled at the ends of the cracks; and epoxy resin should be applied between the patch and the hopper skin being repaired. It is further recommended that each rivet be "bedded" in resin at the time it is driven to assure tightness of all seams. The rivets will force out any excess resin. Do not wipe off the excess resin ---- leave it to form a fillet seal at the edges of the patch.

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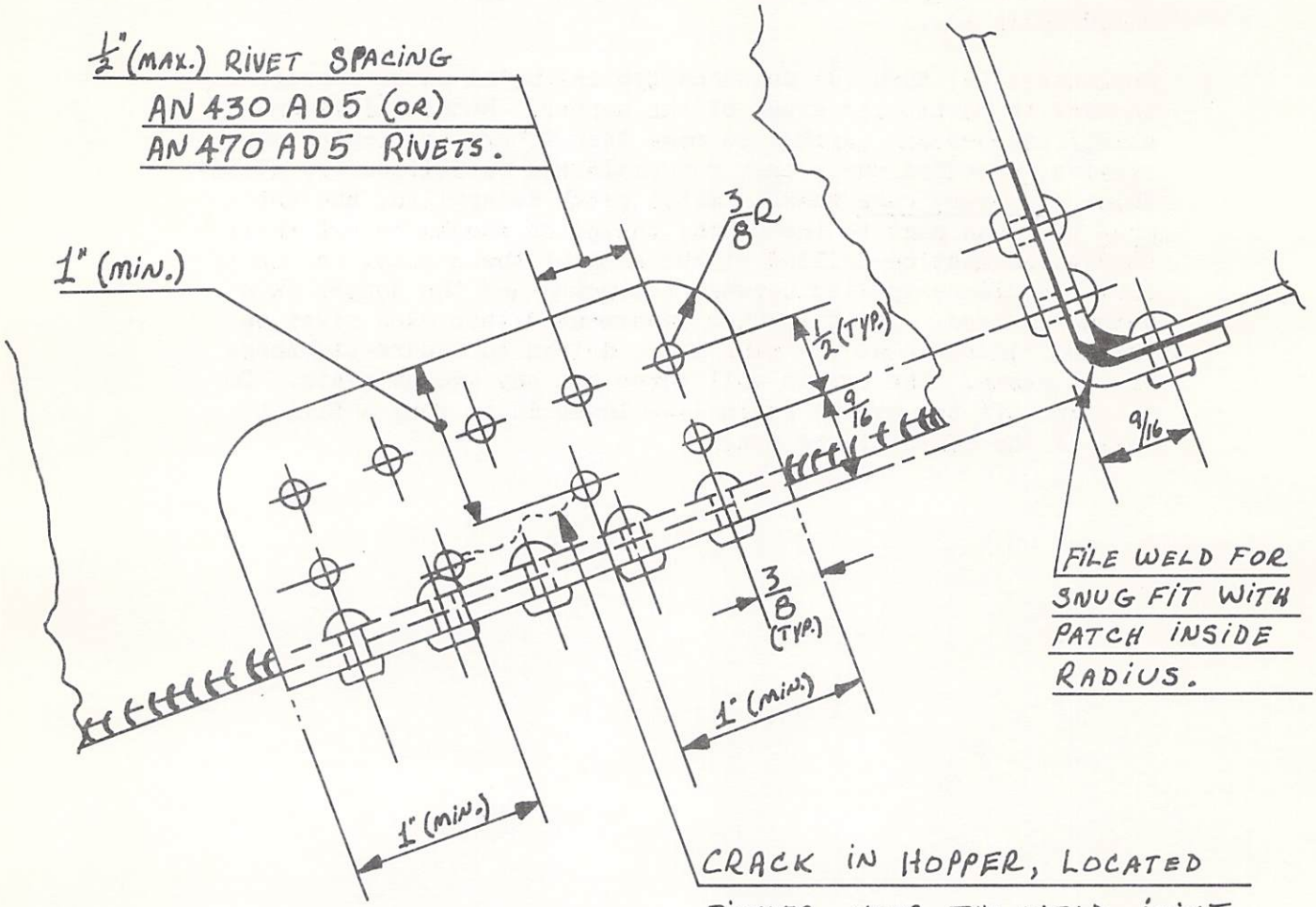
ENCLOSURE (A):

TYPICAL EDGE PATCH (STRAIGHT SECTION).



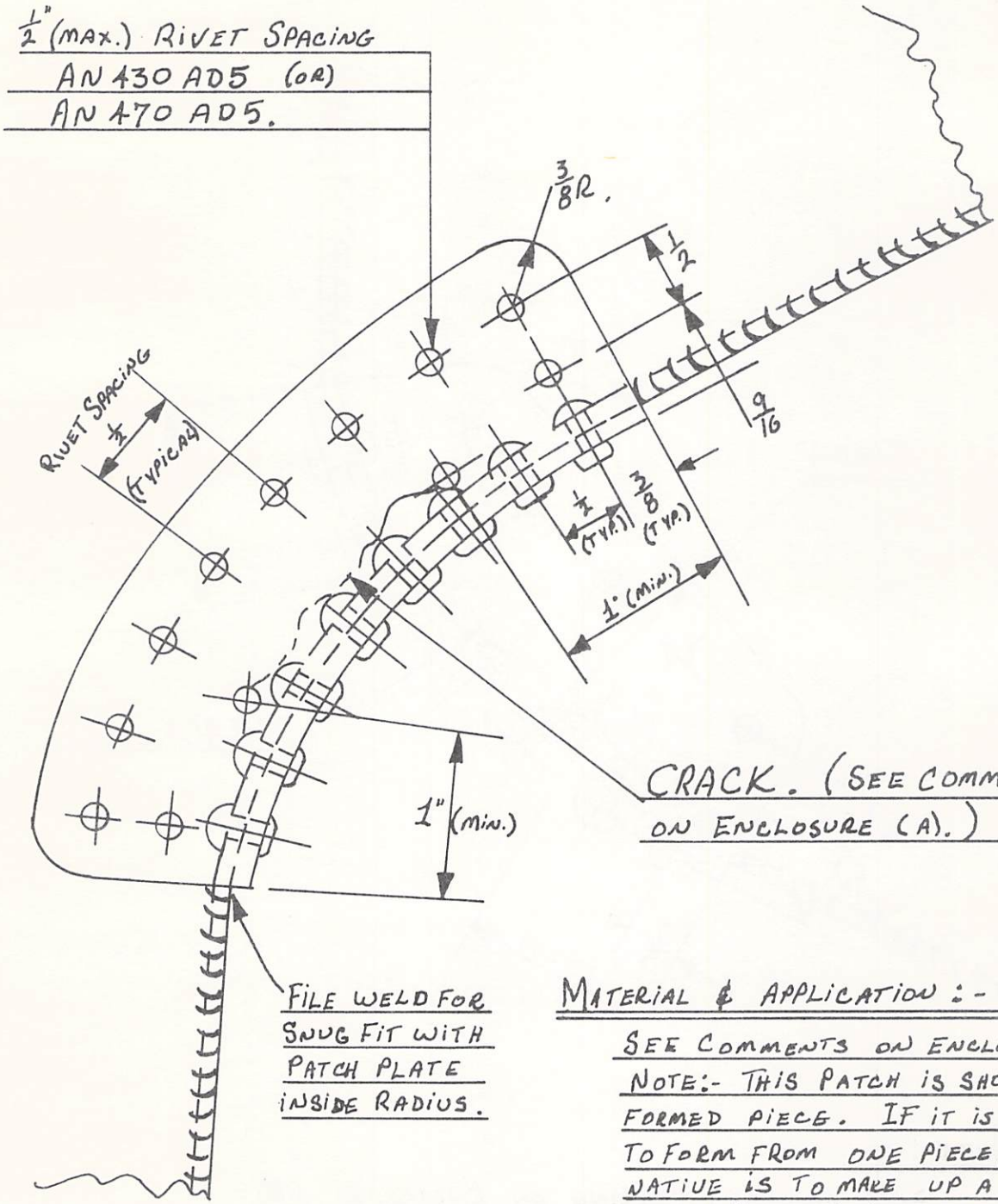
PATCH MATERIAL:

THE PATCH SHOWN ABOVE IS THE MIN. SIZE TO FIT THE CRACK SHOWN. MATERIAL IS 5251/4H, 6150, 1750 OR 2450 ALUM. ALLOY SH'T, 1/8" THICK & BENT TO 1/8" BEND RADIUS.

NOTE: APPLY EPOXY RESIN BETWEEN **EXTERNAL** PATCH PLATE & HOPPER BEFORE RIVETTING TOGETHER.

ENCLOSURE (b):-

TYPICAL EDGE PATCH (ON CONCAVE SECTION)



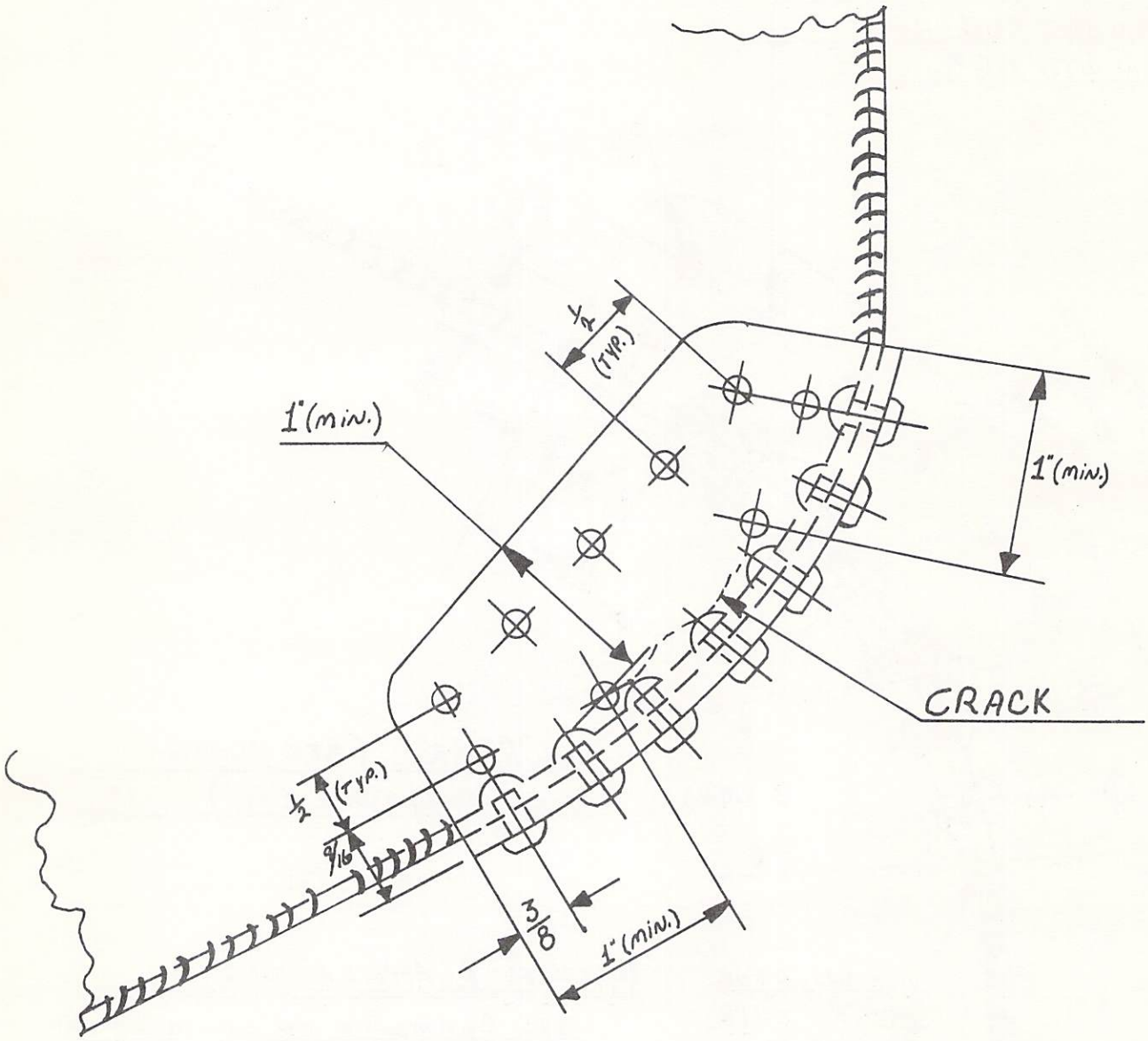
MATERIAL & APPLICATION :-

SEE COMMENTS ON ENCLOSURE (A).

NOTE:- THIS PATCH IS SHOWN AS A FORMED PIECE. IF IT IS IMPOSSIBLE TO FORM FROM ONE PIECE, THE ALTERNATIVE IS TO MAKE UP A WELDED ANGLE PIECE SIMILAR TO THE ABOVE OF EITHER 525 OR 615 MATERIAL. (WELD INSIDE & OUTSIDE OF PATCH PLATE ANGLE @ HEEL OF ANGLE.)

ENCLOSURE (c):-

TYPICAL EDGE PATCH (ON CONVEX SECTION)

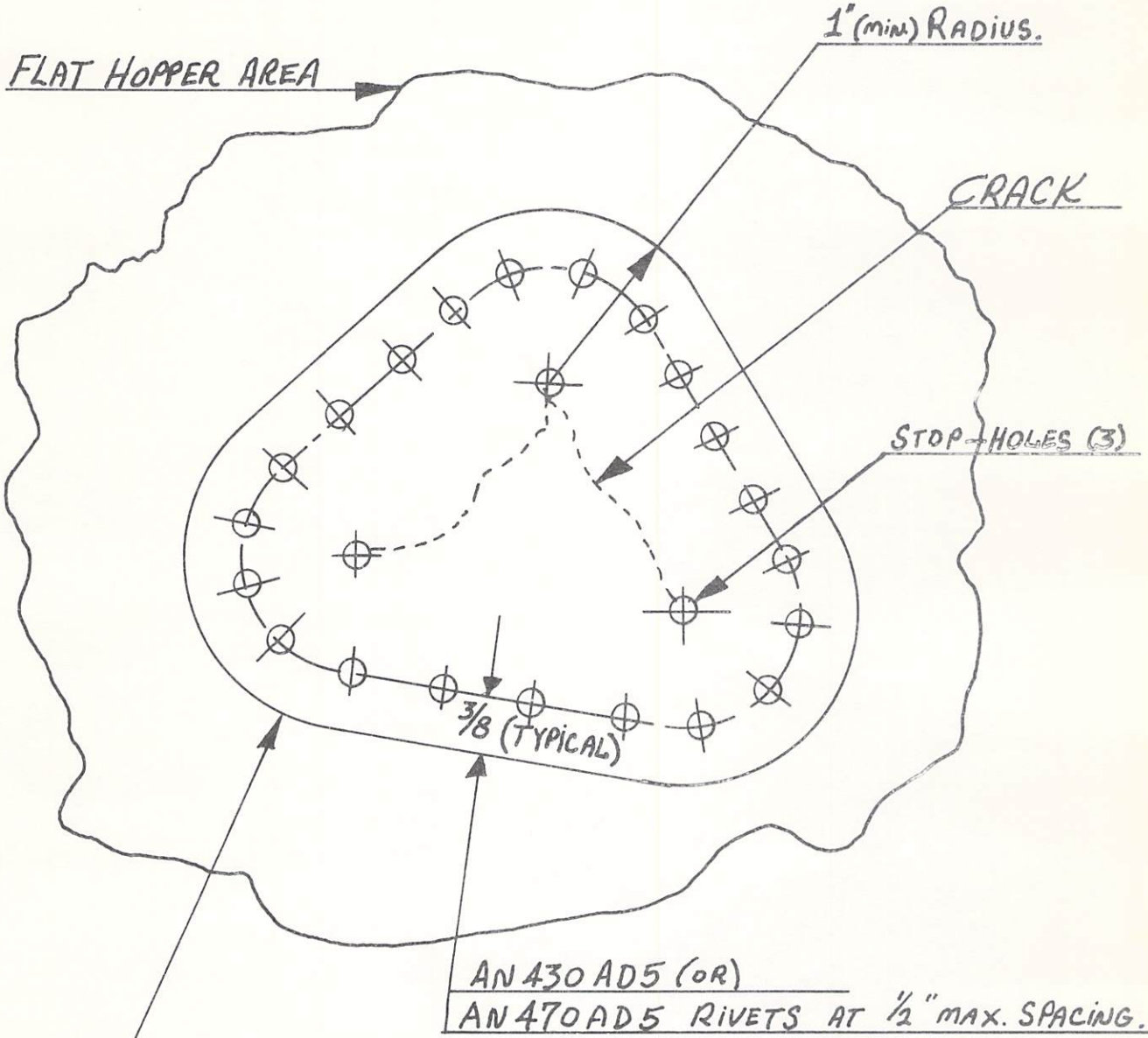


NOTE :-

ALL NOTES APPEARING ON ENCLOSURE (b) APPLY TO THIS SKETCH.

ENCLOSURE (d):-

TYPICAL FLAT SURFACE PATCH PLATE



GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE BULLETIN #15

SUBJECT: Improvement in Main Wheel & Brake Installation Reliability

ENCLOSURES: (a) Axle Rework Detail Sketch
(b) Installation Assembly of Main Wheel & Brake

Notes: It is NOT MANDATORY that this service bulletin be incorporated. It applies only to the 1st 90 G-164 Ag-Cat aircraft. (A/C Serial No. 91 & Up incorporate these changes as delivered from the factory.) GRUMMAN is furnishing (free of cost) a kit of parts required to effect these improvements to owners of all Ag-Cats, Serial Nos. 1 thru 90. While the present wheel and brake installation checks out as structurally sound, installation of this kit will result in a much improved product. It is recommended that owners of the subject aircraft take the time and expense to install this kit. When you decide to incorporate this improvement, plan to do it at a time when you can afford a layup of the aircraft, and be certain to follow - step by step - the instructions contained in the kit. To go about it otherwise could result in having to replace rather expensive Main Wheel Axles! It is necessary that a qualified machine shop do the reworking of the Main Wheel Axles to assure that the job be done accurately. DO NOT attempt to accomplish the axle rework by hand tools! To do so will probably result in spoilage of the axle, or at best, anything but a first class job.

A. STEP BY STEP PROCEDURE FOR INSTALLATION OF WHEEL & BRAKE IMPROVEMENT KIT

(READ THOROUGHLY BEFORE STARTING JOB!)

1. Support aircraft off the main wheels in a secure (safe) manner to permit removal of both main wheels, brakes and axles.

2. Remove wheels from axles.

June 30, 1961

Grumman

3. Remove air from tires.

4. After air is out of tires, remove 3 - 3/8" Dia. bolts that hold each wheel half together.

5. Special Hi-Heat Treat 3/8" Dia. bolts, washers and nuts are furnished in the kit. These are to be installed on wheels in place of the original 3/8 Dia. (AN6) bolts just removed. The Goodyear P/N's of these new bolts, washers and nuts are #95-7871 #95-7869 and #9525268 respectively. Goodyear specifies that these 3/8 Dia. bolts be LUBTORKED to 20 FOOT LBS. TORQUE. This means that each time that these bolts are installed, all friction surfaces of the bolt assembly, including threads and all bearing surfaces of the nut, washers, and the bolt head must be lightly coated with Anti-Sieze Compound (MIL-C-5544) (A 50-50 mixture of graphite and petrolatum, formerly known as AN-C-147). Sufficient Anti-Seize Compound is furnished with this kit to do the job. LUBTORKING assures that consistent torque values are applied to the bolt connection. DRY torque gives "erratic performance" which is evidenced sometimes by an apparent loosening of the nuts due to re-seating of mating surfaces under vibration conditions where the dry, somewhat rough machined faces, tend to wear down and re-seat themselves under load.

6. Remove both axles from the landing gear spring legs.

7. These axles must be carefully reworked (9 holes in each only) per INSTRUCTIONS appearing on Enclosure (a). UNLESS you have a competent machine shop available locally to do this job, we urge you to return the axles to the factory to accomplish this rework. GRUMMAN will bill you for the work on a cost only basis. GRUMMAN is equipped with the necessary special long tap dies required to cut these threads and do the c'boring called for on these 9 holes on the flange of the axles. The axles should be sent to:

Grumman Aircraft Engineering Corporation
c/o Schweizer Aircraft Corporation
Box 147
Elmira, New York 14902

Attention: Mr. Terrell P. Kirk, Jr.

June 30, 1961

Grumman

(If you do send these axles to us for rework, please allow two (2) weeks time for shipping same. We will try to get them back to you in the mail within 24 hours after receiving them)

8. After the axles have been reworked, reinstall same on the aircraft in the reverse order of removal.

9. Carefully re-assemble the wheel and brake onto the axle in accordance with the instructions noted on Enclosure (b). Note particularly here that the original dust seal (P/N A1504-1) and the 1/4" thick spacer washer (P/N A1502-1) have been replaced by a single spacer washer (P/N A1502-1, Revision "B") as furnished in the kit. Be sure to install the old spacer tube (P/N A1503-1) on the axle as shown on Enclosure (b). This spacer tube positions the inboard wheel ball bearing and transmits the side load from the wheel to the axle flange or shoulder.

   INSTALL the Goodyear brake housing (casting) to the axle flange with six (6) of the new, longer NAS 1304-19H bolts furnished with the kit. All the original 1/4 - 28 bolts that formerly attached the brake housing and dust shield - spacer washer to the axle are to be scrapped. Be sure that the (6) new 1/4 - 28 Hi-Heat treat bolts (NAS 1304-19H) are LUBTORKED to 125 INCH LBS. Torque and then lock-wired together at the heads of the bolts.

June 30, 1961

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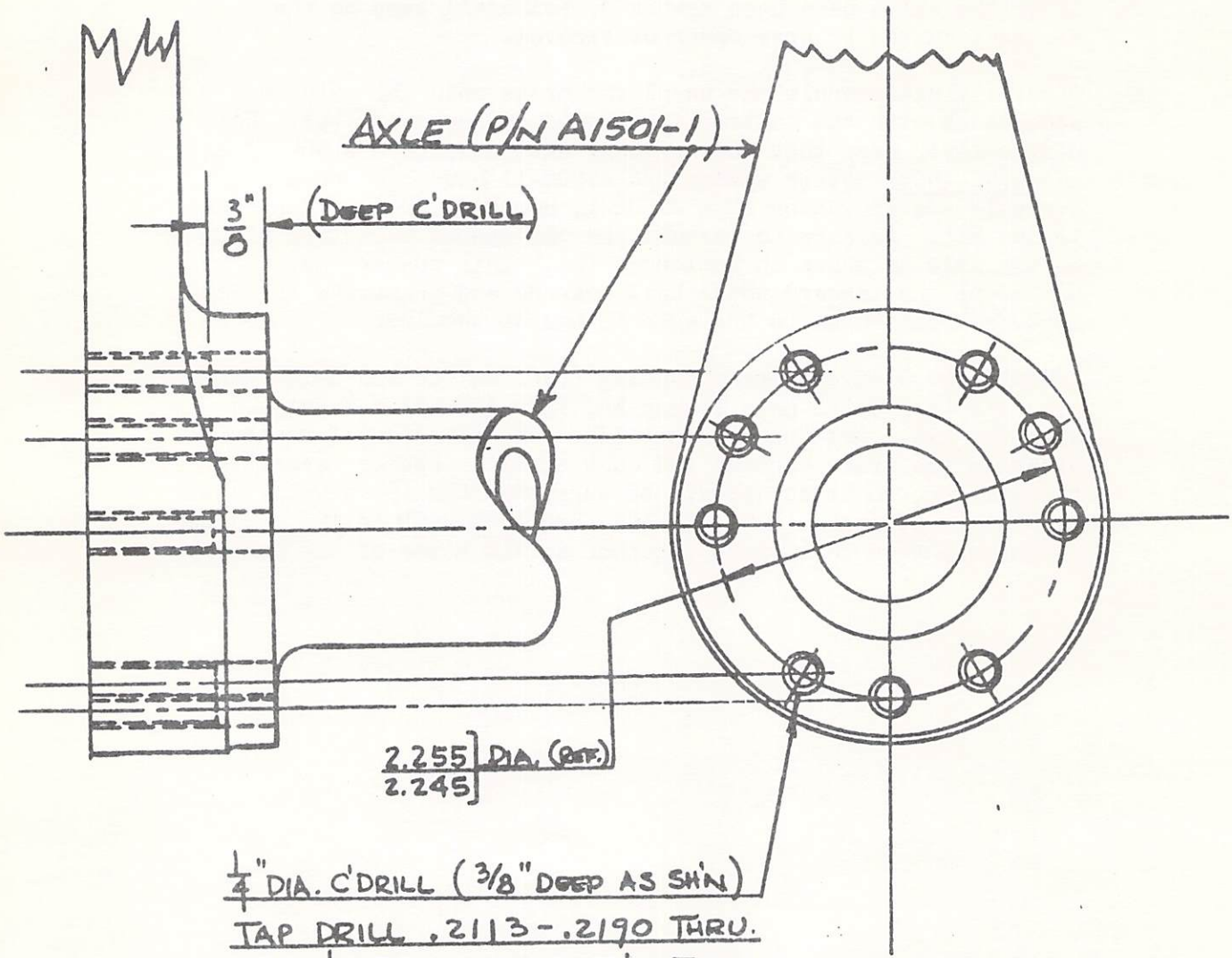
ENCLOSURE (a):-

REWORK OF MAIN WHEEL AXLE.

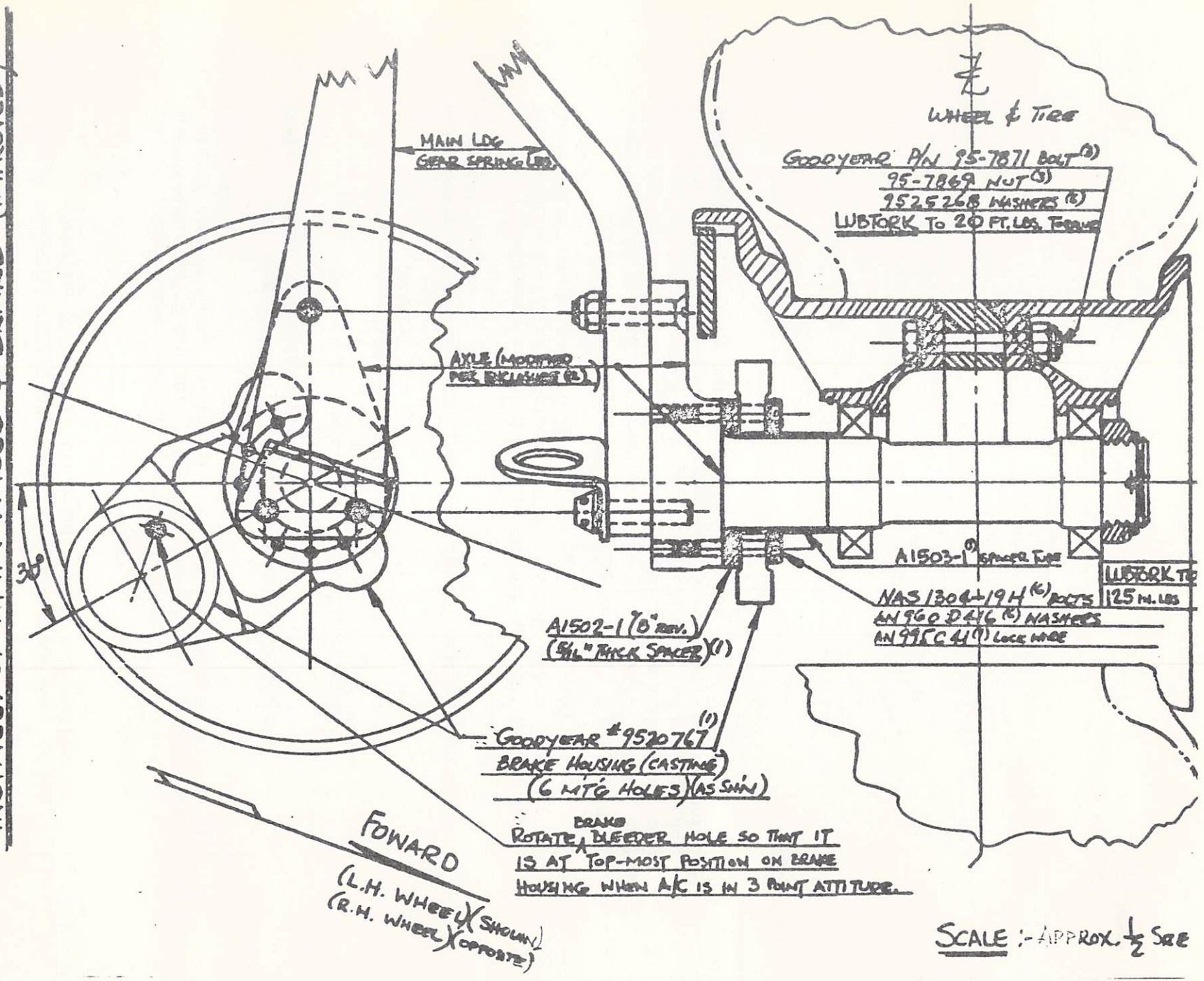


1/4" DIA. C'DRILL (3/8" DEEP AS SH'N)
TAP DRILL .2113-.2190 THRU.
TAP 1/4-28 UNF-3B TH'D THRU
FROM C'DRILLED SIDE OF HOLE.
(PITCH DIA. .2268 — .2300)
9 HOLES ONLY AS SHOWN.

PROTECT NEWLY TAPPED TH'DS & HOLES WITH RUSTBAN OR EQUIV. RUST INHIBITER.

ENCLOSURE (b):-

INSTALL. OF MAIN WHEEL & BRAKE (IMPROVED)



SCALE :- APPROX. 1/2 SIZE

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

MEMO TO AG-CAT OWNERS

(S/N's 1 thru 90)

SUBJECT: SERVICE BULLETIN #15 which covered Improvement in the Goodyear Main Wheel and Brake Installation Reliability

During the summer you received a copy of the above mentioned Service Bulletin. All of the hardware has finally been received from Goodyear and the Kits are now available (free) to make the change.

We suggest you review this Service Bulletin, and if you desire to make the change, please write to:

Grumman Aircraft Engineering Corporation
Att: T. P. Kirk, Jr.
Box 147
Elmira, New York

and request the Kit. Please state your Ag-Cat registration number or serial number.

One change has been made in the Kit and that is NO Anti-Seize Compound will be supplied. If you cannot obtain this compound, "LUBRIPLATE" may be used in lieu of it.

Some of the earlier aircraft utilized only 4 bolts (instead of 6) holding the brake assembly to the axle. If your Ag-Cat is so constructed, it is suggested you send the two axles to Grumman for rework unless you KNOW your local machine shop can properly do the job. Our charge for this rework will be at cost, but all shipping charges are to be paid by you.

Grumman

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE BULLETIN #16

SUBJECT: Spraying - Low Volume Output

1. The Ag-Cat spray system has been designed to dispense liquids at up to 20 gallons per acre. To achieve this high gallonage output it was necessary to go to a high output pump (either a 2" Simplex or the 1 1/2" Root Pump) plus large dia. (2") plumbing in the spray system. Furthermore, a high speed wood propeller was devised to make the pump put out at maximum capacity for airspeeds of 75-80 m.p.h.

   All of the above features in your spray system work against you when you want to put out low gallonage per acre (approximately 1 gal/A).

2. The following set-up of your spray system will result in a very satisfactory method of putting out very low gallonage (of the order of one (1) gal/A).

   a. Make certain that the forward end of the control push-pull tube located in the fuselage is in the uppermost hole in the jackshaft crank arm for low volume output. (The lower crank arm hole is the position to use for high volume control only.)

   b. Install spraying system nozzles on booms using either "D2" or "D4" orificies and fitted with "-45" swirl cores.

   c. Install a 1/8" thick aluminum alloy (or steel) disc of 10" dia. across the face of the 20" wood propeller.* (SEE SKETCH ON ATTACHED PAGE.)

      The addition of this propeller disc effectively reduces the pump speed and spray system pressure to desired operating limits for very low gallonage output. For instance, checks made at the factory using the following configuration resulted in pressures varying from 30 P.S.I. (with control lever opened to index #14) to 45 P.S.I. (when control lever was in fully opened position).

July 24, 1961

Grumman

CONFIGURATION OF SPRAY SYSTEM:

PUMP ---------- ROOT (1 1/2")
PROPELLER ----- 20" WOOD (GRUMMAN P/N A1923)
NOZZLES ------- 24 -- #4664-D2-45
I.A.S. -------- 75 M.P.H. @ 1900 ENGINE R.P.M.
GAL./ACRE ----- .40 GAL./A @ 30 P.S.I. (40° SWATH)
.45 GAL./A @ 40 P.S.I. (40° SWATH)
.50 GAL./A @ 45 P.S.I. (40° SWATH)

If #4664-D4-45 NOZZLES were used, the following results could be expected:

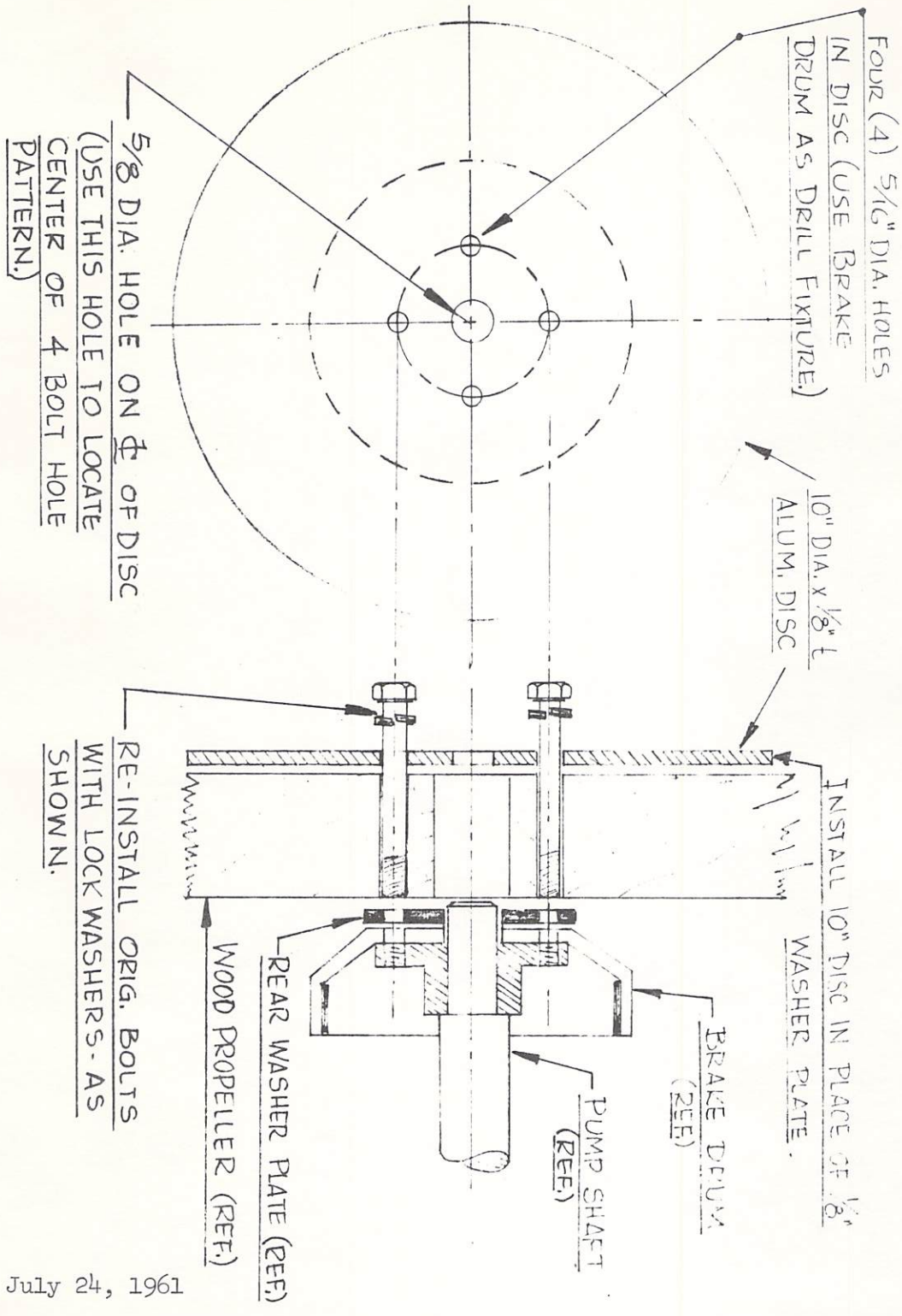
COCKPIT LEVER POSITION	GAL./ACRE	SYSTEM PRESSURE
Index #15	1.0 Gal/A	20 P.S.I.
Full Open	1.4 Gal/A	32 P.S.I.

* If you are using a metal propeller to drive the spray pump, a similar disc (though possibly of slightly different dia.) may be fitted by using longer bolts and a dural or steel spacer block to mount same without interfering with the propeller blades. Sample check flights will establish the correct disc dia. for whatever configuration you desire to set up.

d. When removing or replacing the pump propeller, extreme care must be exercised to prevent cross-threading of the tapped holes in the brake drum assembly to which the propeller is attached. If threads do become damaged, either tap new threads in new holes (rotate drum and use holes in drum as a drill fixture for the new holes) or install heli-coil inserts in the damaged holes.

July 24, 1961

Grumman



July 24, 1961

Grumman

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE BULLETIN #17
("B" REVISION)

SUBJECT: Wing L.E. Skins; Additional Fastenings

ENCLOSURE: (a) Engineering Change Order #S164-684 ("B" Revision)

1. Rivets attaching the wing L.E. skins to the upper capstrips of the forward wing beams were reported as loosening on several G-164 aircraft of early manufacture. This loosening has been attributed to propeller blast action. The attached E.C.O. #S164-684 indicates the corrective action to be taken by all owners of aircraft bearing serial numbers 1 thru 85. All subsequent aircraft have been so corrected at the factory prior to delivery. Any existing L.E. skin attachment rivets that appear to be loose shall be replaced when E.C.O. #S164-684 is incorporated.

2. The incorporation of this Service Bulletin is mandatory. If examination of the subject rivets shows looseness, the Service Bulletin must be incorporated before next flight; otherwise incorporation shall be postponed until the next periodic inspection.

August 15, 1961
September 29, 1961 (Rev. "B")

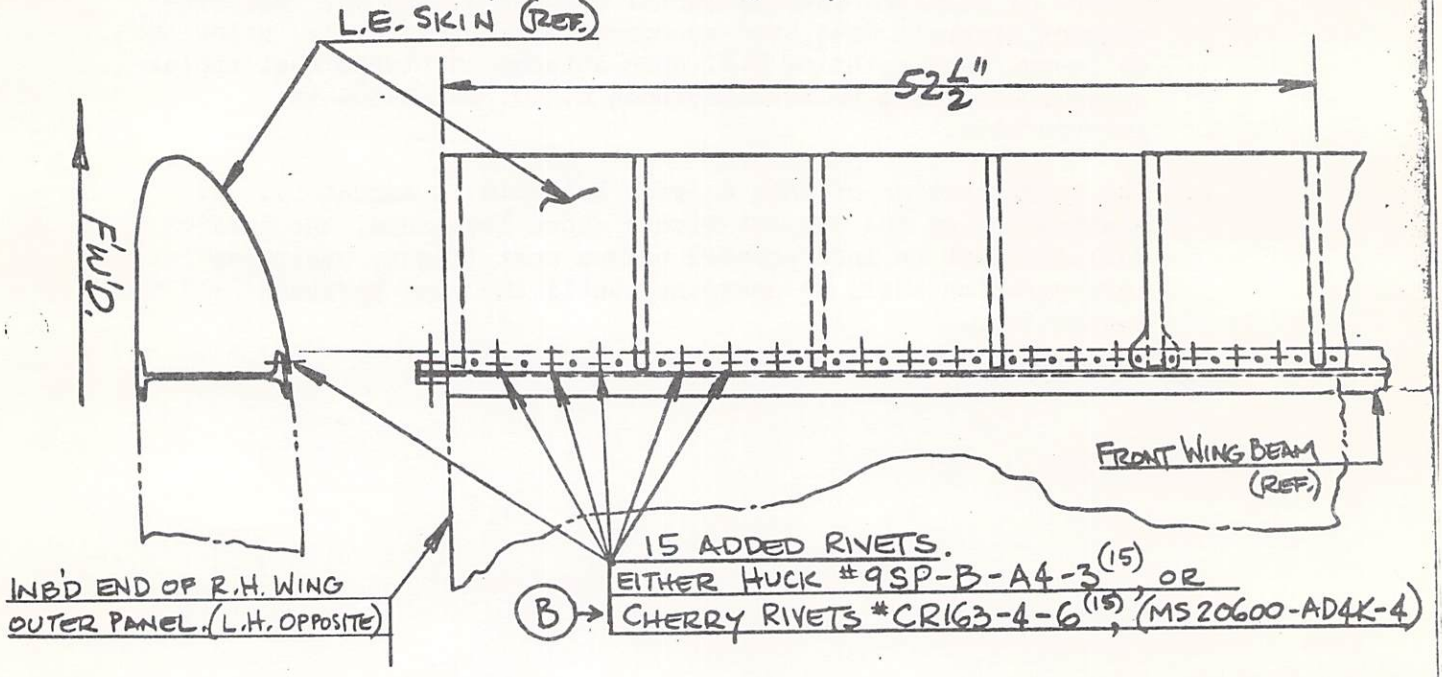
Grumman

F-200

SCHWEIZER AIRCRAFT CORP.

ENGINEERING CHANGE ORDER							CHG. LET.	
TITLE:	WING OUTER PANEL — STRUCTURAL ASSY							
CHG. INC.		EFFECTIVITY	ALL A/C	PARTS AFFECTED	—	ECO. SERIAL	S164-684 "B"	
BY		CARD POSTED	ARK 9-29-61	TOOLS AFFECTED	—	D.C.R. SERIAL	—	
DATE		CHECKED	ES 9.29-61	STOCK DISPOSITION	REWORK	DWG. NO.	A1003	

CHANGE: 1. ADD 15 HUCK RIVETS (#9SP-B-A4-3) OR 15 (B) CHERRY RIVETS, (#CR163-4-6 OR #MS 20600-AD4K-4) AS SHOWN BELOW TO EACH OF FOUR (4) WING OUTER PANELS FOR ATTACHING L.E. SKINS TO THE FORWARD WING BEAM UPPER CAPSTRIPS. THESE ADDED BLIND RIVETS ARE TO BE LOCATED MIDWAY BETWEEN EXISTING RIVETS (AS SHOWN ON SKETCH BELOW BY THE SYMBOL, (+).)



REASON: 1. THESE ADDED RIVETS ARE REQ'D IN THE REGION OF THE PROP. SLIP-STREAM TO STRENGTHEN THE L.E. SKIN ATTACHMENT AGAINST PROP BLAST ACTION. THIS IS A MANDATORY CHANGE!

["B" REVISION :- ALTERNATE BRAZIER H'D CHERRY RIVETS ADDED TO DWG.]

A R Koch
9-29-61

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE BULLETIN #18
MANDATORY

SUBJECT: Magneto Switch Modification and Addition of System Grounding Jumpers (A/C Serial Nos. 1 thru 100 Only)

ENCLOSURES: (a) Grumman Engineering Change Order #S164-703 (10-9-61)
(b) Kit of Parts Required to Modify Magneto Switch and Wiring

1. This Service Bulletin shall be complied with immediately to insure a higher level of safety for ground personnel during propeller moving and cranking operations.

2. There is a possibility that the shielding on the primary electrical harness connecting the magnetos to the magneto switch on the subject aircraft may be the only conductor to the ground due to deterioration of contact between the magneto switch attach bolts and the fuselage frame (caused by corrosive action of certain agricultural chemicals). Should this condition exist, a break in electrical continuity in the shielding would result in both magnetos being "ON" even though the switch were in the "OFF" position. To eliminate this possibility, it is mandatory that the magneto switch case be bonded to ground with an external bonding jumper cable assembly per enclosure (a),4. To further utilize the inherent safety features of the magneto switch, it is mandatory that this switch be removed from its case and a short internal bonding jumper be installed between the center contact marked "B" and the switch hex head bolt (brass) as depicted on enclosure (a),2. Be certain that this bolt locking device is re-crimped against the bolt head after installation of the internal bonding jumper lug.

3. A kit of parts (Enclosure (b)) is enclosed to make the required modifications in accordance with directions contained in Engineering Change Order #S164-703.

October 10, 1961
Retyped June 23, 1965

Grumman

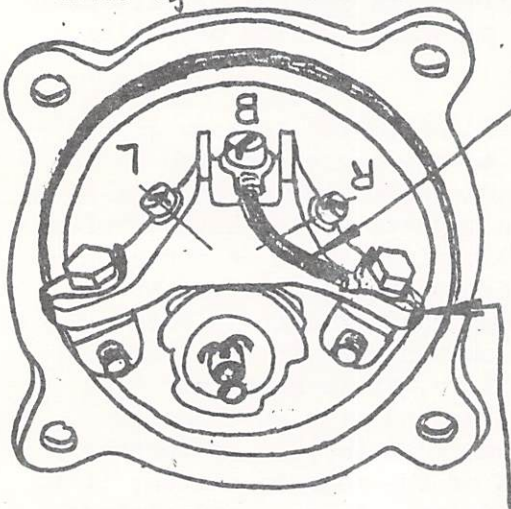
F-200

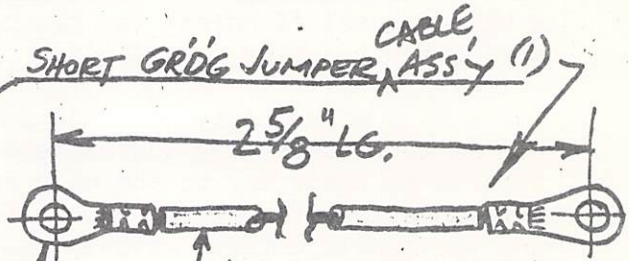
SCHWEIZER AIRCRAFT CORP.

ENGINEERING CHANGE ORDER						CHG. LET.	
TITLE:	SWITCH – REWORK of MAGNETO IGNITION						
CHG. INC.		EFFECTIVITY	1ST 100 H/C ONLY	PARTS AFFECTED	✓	ECO. SERIAL	S164-703
BY		CARD POSTED		TOOLS AFFECTED	✓	D.C.R. SERIAL	—
DATE		CHECKED	ARK 10-9-61 ES 10-19-61	STOCK DISPOSITION	USE	DWG. NO.	A1892"A"

CHANGE:

1. THIS CHANGE IS MANDATORY!
2. INSTALL SHORT BONDING JUMPER (DETAILED BELOW) INSIDE THE CASE of THE MAGNETO SWITCH AS SHOWN BELOW:-

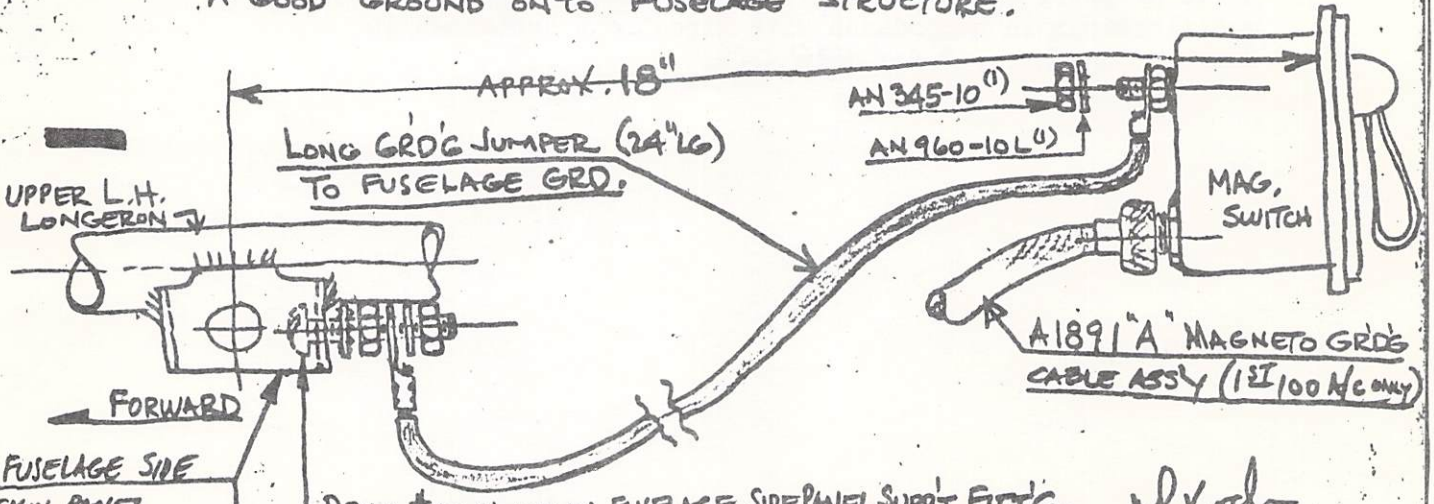




"AMP" #31903 (2) INSULATED SOLDERLESS TERMINALS.

RE-CRIMP BOLT LOCKING DEVICE AFTER INSTALLING BONDING JUMPER.

3. AFTER INSTALLING ABOVE INTERNAL JUMPER CABLE, RE-INSTALL MAGNETO SW. DUST COVER & RE-MOUNT MAG. SWITCH ON COCKPIT PANEL.
4. ADD LONG GROUNDING JUMPER CABLE ASS'Y (MADE UP SAME AS SHORT GR'D JUMPER IN (2) ABOVE, EXCEPT THAT CENTER TO CENTER LENGTH IS 24" LONG) & INSTALL AS SHOWN BELOW TO ASSURE A GOOD GROUND ONTO FUSELAGE STRUCTURE.



DRILL #10 HOLE IN FUSELAGE SIDE PANEL SUPP'T FITT'G.
AN 520-10-8 (1), AN 936-A10 (1) STAR WASHER
AN 345-10 (1), AN 960-10L (1) & AN 345-10 (1)
IN THE ORDER CALLED OUT.

ARK
10-9-61

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE BULLETIN #19

SUBJECT: Wear on Elevator and Rudder Cables, Where They Pass Through the Dust Seal Bulkhead, and Where Rudder Cables Pass Through Fuselage Side Skin Fairing Fairlead Slots Just Forward of the Rudder Horn

ENCLOSURES: Engineering Change Orders #S164-864"A" & -868

1. The Ag-Cat service department has received notice that rudder and elevator cable assemblies have shown wear in the areas noted above. This wear is no doubt accelerated by the introduction of abrasive dust particles clinging to the cables and constantly rubbing against the subject fairleads.

2. To reduce this tendency, starting with Aircraft Serial No. 126, Grumman has redesigned fairleads and dust seals as follows:

   (a) At the dust seal bulkhead, elevator and rudder cables will be sealed with combination fairleads (P/N A1366-1 & -3) and Neoprene Accordian Type Dust Seal Boots (Minor P/N 85225) (4 each required). Installed in accordance with E.C.O. #S164-864"A".

   (b) Where the rudder cables pass through the side skin fairings just forward of the rudder horn; a substitute fairlead (2 required/ship) per E.C.O. #S164-868 will be installed in lieu of the current Nylon or Micarta Slot-type Fairlead.

   Note: For Aircraft Serial No. 1 through 125, Grumman will furnish a conversion kit at cost ($16.85), for back-fitting, for those who may want to make the change-over.

   Please send remittance to:
   Grumman Aircraft Engineering Corporation
   c/o Schweizer Aircraft Corporation
   P. O. Box 147
   Elmira, New York 14902
   Attention: Terrell P. Kirk, Jr.

   Shipment will be made via parcel post.

January 23, 1962
June 20, 1962

Grumman

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C CHG.	AN 520-10-8 (4) WAS AN 515. (DWG ERROR) ARK OCH 5-31-62	APPROVED BY ARK 5-31-62	ES 5/31/62	B CHG.	14" WAS 10" AN 742-3 & -4 WAS -5. ARIC.	APPROVED BY ARK OCH 5-22-62	ES 5-22-62	"A" CHG	EFFECTIVITY CHANGED TO S/N 126	ARK OCH 1-23-62	ES 1-23-62

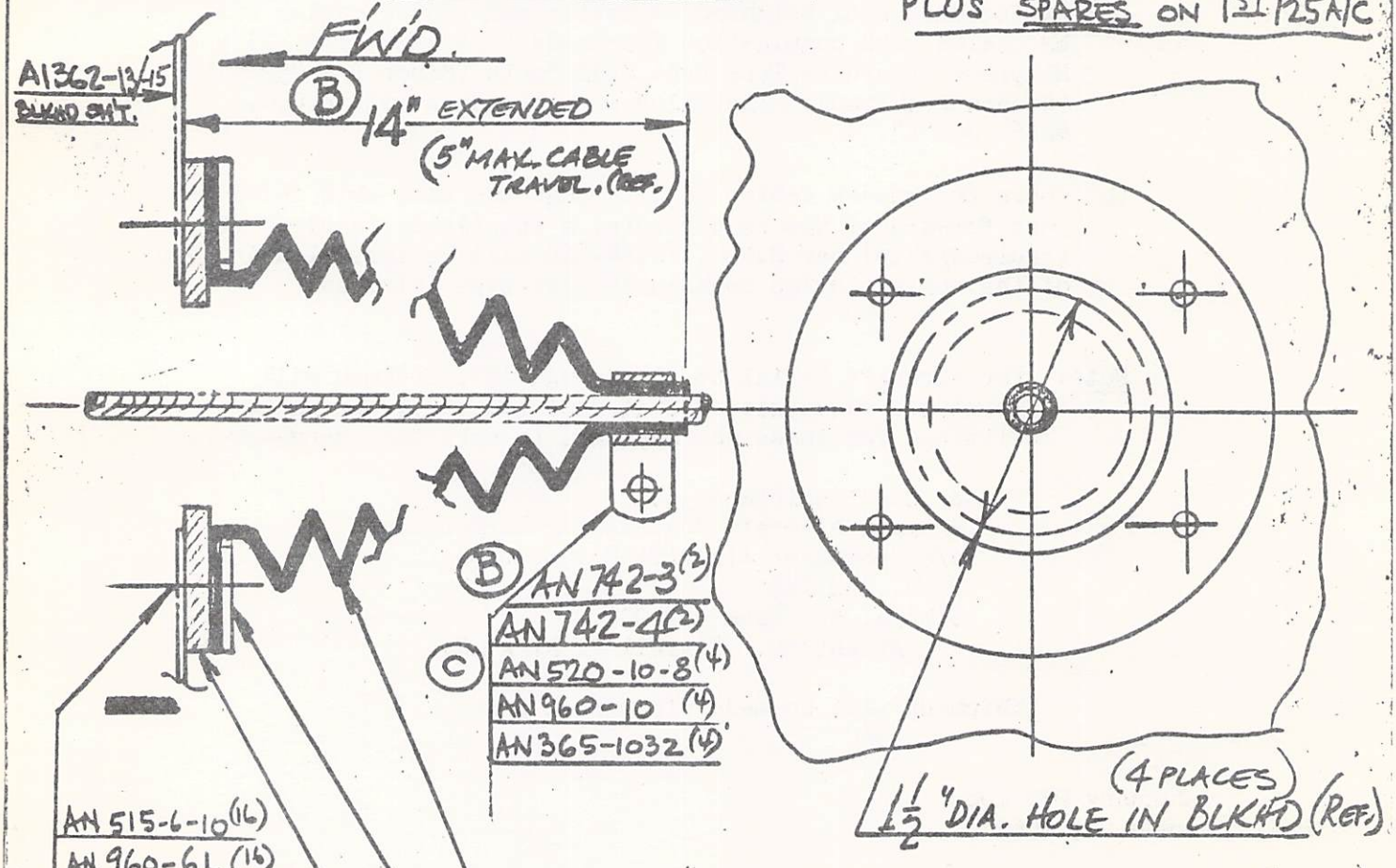
SCHWEIZER AIRCRAFT CORP.

ENGINEERING CHANGE ORDER							CHG. LET.	"C"
TITLE:	BLKHD (DUST SEAL) — FUSE. STA. 219 3/8							
CHG. INC.		EFFECTIVITY (A)	#126 & UP	PARTS AFFECTED	—	ECO. SERIAL	S164-864 "C"	
BY		CARD POSTED	ARK 1-22-62	TOOLS AFFECTED	—	D.C.R. SERIAL	—	
DATE		CHECKED	ES 1-22-62	STOCK DISPOSITION	SCRAP	DWG. NO.	A1362	

CHANGE: (1) SECTION "D-D":- (LIMIT TO A/C #50 THRU #125 INCLDG A/C #43)

(A)

(2) ADD SECTION "D'-D'" (AS BELOW) FOR A/C 126 & UP PLUS SPARES ON 1ST 125 A/C



F-200

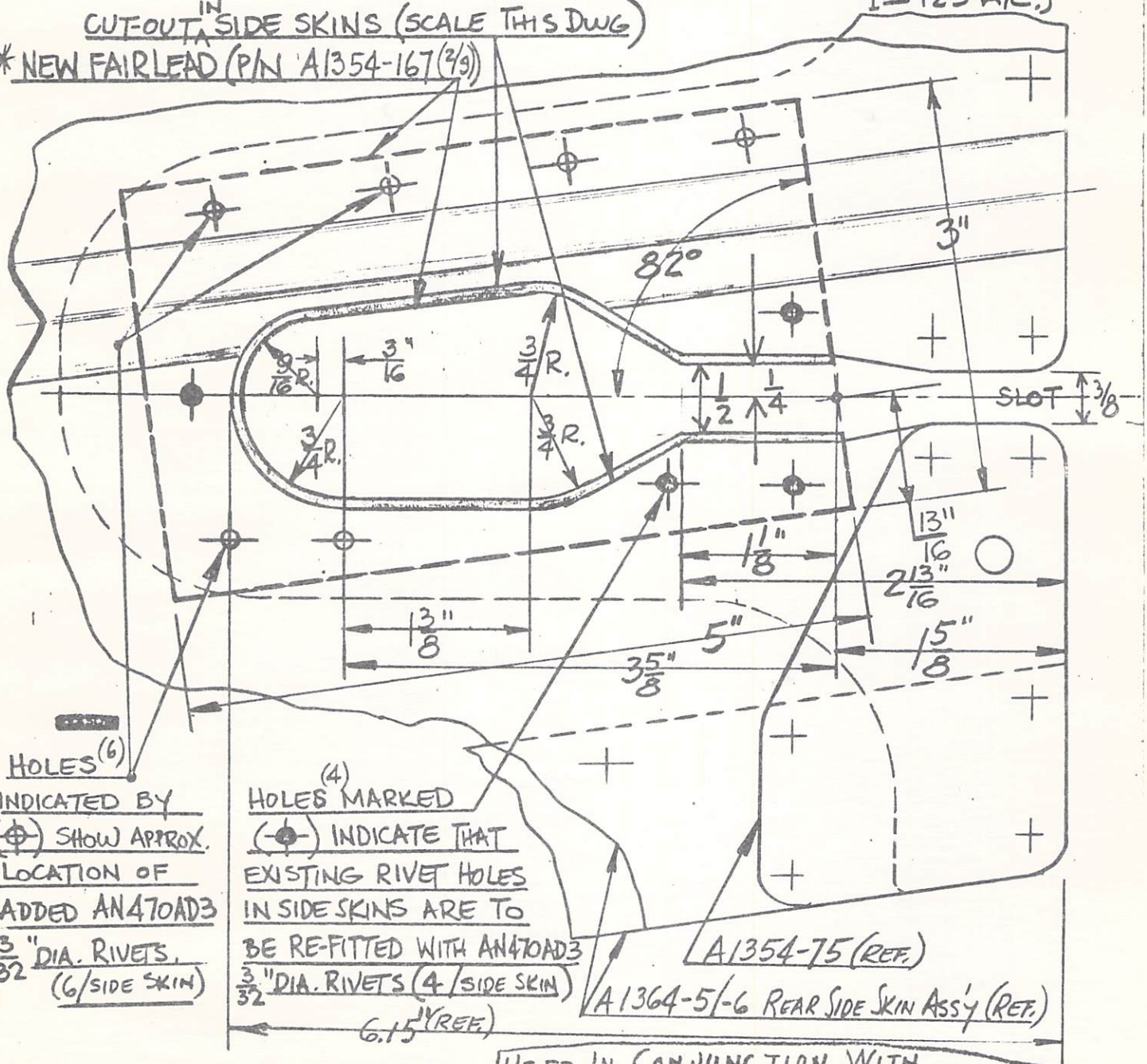
SCHWEIZER AIRCRAFT CORP.

ENGINEERING CHANGE ORDER							CHG. LET.	B
TITLE:	FUSELAGE SIDE PANELS (2 SHTS)							
CHG. INC.	AH 3-22-63	EFFECTIVITY	#126	PARTS AFFECTED	✓	ECO. SERIAL	S164-868	
BY		CARD POSTED	ARK 1-24-62	TOOLS AFFECTED	✓	D.C.R. SERIAL	—	
DATE		CHECKED	EJ 1-24-62	STOCK DISPOSITION	SCRAP	DWG. NO.	A1364 "A"	

CHANGE: (1) LIMIT E.C.O. #S164-574 TO 1ST 125 A/C,
(2.) THIS E.C.O. APPLIES TO A/C #126 & UP. (BACK-FITTING IS OPTIONAL ON THE 1ST 125 A/C.)

CUT-OUT IN SIDE SKINS (SCALE THIS DWG)

*NEW FAIRLEAD (P/N A1354-167 (2/S))



HOLES (6) INDICATED BY (⊕) SHOW APPROX. LOCATION OF ADDED AN470AD3 3/32" DIA. RIVETS, (6/SIDE SKIN)

HOLES (4) MARKED (⊕) INDICATE THAT EXISTING RIVET HOLES IN SIDE SKINS ARE TO BE RE-FITTED WITH AN470AD3 3/32" DIA. RIVETS (4/SIDE SKIN)

6.15" (REF.)

A1354-75 (REF.)

A1364-5/-6 REAR SIDE SKIN ASS'Y (REF.)

USED IN CONJUNCTION WITH E.C.O. S16C-1131 BY A. HAUCK

* MATERIAL FOR A1354-167 (2/S) 16 1/8" L x 3" x 5" POLYPENCO NYLON 101 STRIP

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE BULLETIN #20
MANDATORY

SUBJECT: Beef-up of Aileron Cable Control Sector Support Brackets in Lower Wing Panels (A/C #1 thru #100 Only)

ENCLOSURES: (a) Engineering Change Order #S164-871 (Applicable to 1st 100 A/C ONLY)
(b) Kit of Replacement Parts (#A1854), Furnished By Grumman
(c) Addendum to Service Bulletin #20 Dated 2-3-62

1. This Mandatory Service Bulletin shall be complied with immediately on all aircraft logging over 200 flight hours. Other aircraft having logged less time shall comply within the next 25 hours or at 200 hours T.T., whichever occurs first.

2. Refer to E.C.O. #S164-871, (Enclosure (a)).

(a) Cut a "V" type access in the lower fabric surface of the bottom wing panels to gain working access to remove and replace P/N A1854-13 (2).
(b) Slack-off aileron cable tension 5 turns of the turnbuckle barrel at the aileron cable sector in the fuselage.
NOTE: If you count the turns that you slack-off on the cables and then "fix" the slacked-off length with a piece of masking tape, you can wind-on the same number of turns when you re-rig the cables and be assured that the tension is unchanged.
(c) Remove the aileron cable control sector from the support channels by removing the AN4 bolt ($\frac{1}{4}$" dia.) which acts as a pivot for the sector.
(d) Remove both upper and lower channel brackets (P/N A1854-13), noting how they were attached to the wing ribs.
(e) First, install the new upper channel bracket (P/N A1854-13) exactly as the original part was mounted.
(f) Next, bolt the original cable control sector to the new upper and lower channel brackets before riveting the new lower channel bracket (also P/N A1854-13) to the wing ribs. This procedure will assure you of proper alignment of these channel brackets to permit friction-free pivoting of the cable control sectors.
(g) Re-rig aileron cables and check aileron control operation prior to re-covering access hole.
(h) Repair fabric cutout in the bottom wing surface in accordance with CAM 18 Standards of Performance Specifications, Section 18.30-3(d)(1).

January 24, 1962

Grumman

F-200

ATTACH TO SERVICE BULLETIN #20

SCHWEIZER AIRCRAFT CORP.

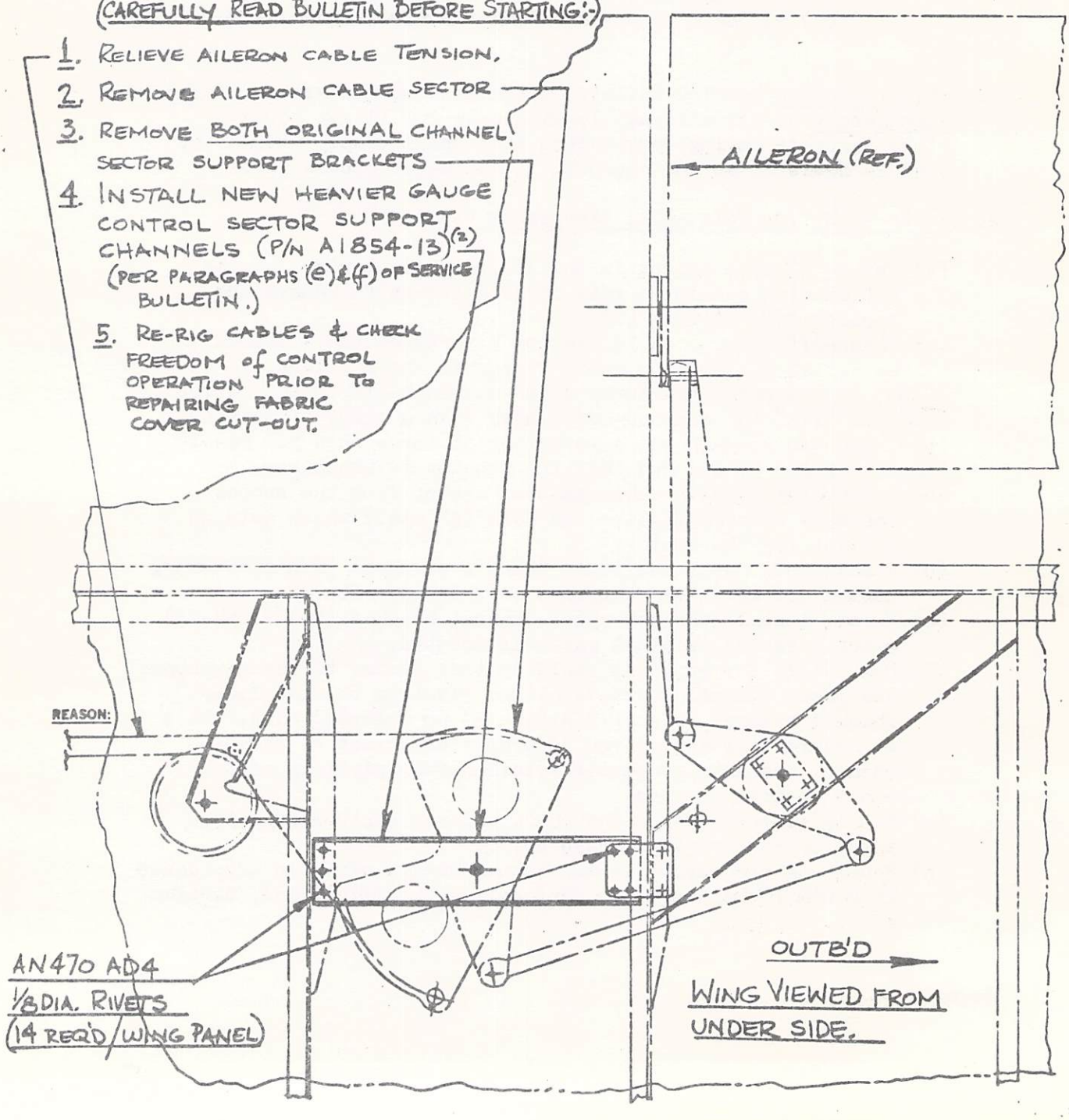
ENGINEERING CHANGE ORDER							CHG. LET.	
TITLE:	BRACKETS (INSTAL.) – AILERON CONTROL SYSTEM							
CHG. INC.		EFFECTIVITY	1ST 100 A/C	PARTS AFFECTED	✓	ECO. SERIAL	S164-871	
BY		CARD POSTED	ARK 1-24-62	TOOLS AFFECTED	—	D.C.R. SERIAL	—	
DATE		CHECKED	FS 1-24-62	STOCK DISPOSITION	—	DWG. NO.	A1832 "A"	

CHANGE: THIS E.C.O. IS WRITTEN TO SHOW THE EXTENT OF REWORK REQ'D BY MANDATORY SERVICE BULLETIN #20. (1-24-62)

(CAREFULLY READ BULLETIN BEFORE STARTING:-)

1. RELIEVE AILERON CABLE TENSION,
2. REMOVE AILERON CABLE SECTOR
3. REMOVE BOTH ORIGINAL CHANNEL SECTOR SUPPORT BRACKETS
4. INSTALL NEW HEAVIER GAUGE CONTROL SECTOR SUPPORT CHANNELS (P/N A1854-13)(2) (PER PARAGRAPHS (e) & (f) OF SERVICE BULLETIN.)
5. RE-RIG CABLES & CHECK FREEDOM of CONTROL OPERATION PRIOR TO REPAIRING FABRIC COVER CUT-OUT.

REASON:



(Enclosure (c) of Service Bulletin #20)

ADDENDUM TO SERVICE BULLETIN #20

SUBJECT: Push-Pull Rod Assemblies - Loose Rod Ends Due to Rivet Hole Elongation - Aileron Control System (Lower Wing Panels)

1. A report of subject rod assemblies having loose rod ends due to rivet hole elongation has been brought to Grumman's attention by the F.A.A. Since the reported deficiency occurred on a 450 h.p. P & W installation of the Ag-Cat (not a Grumman approved installation), it is quite likely that this fault only occurs on aircraft powered with the P & W engine. However, it is requested that owners check all control push-pull rod assemblies on the subject aircraft to determine whether any rod end fittings are loose.

2. Upon inspection of these rod ends, should any be loose, Grumman will give you quick service on repair of these rod assemblies if you will remove and return same to the factory. The service charge will be at cost only. Please forward assemblies to:

Terrell Kirk, Jr.
Grumman Aircraft Engineering Corporation
P. O. Box 147
Elmira, New York 14902

February 3, 1962

Grumman

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE BULLETIN #21

SUBJECT: Replacement of Engine Mount Dural Washers P/N S-136-1-D (G-164 S/N 101 thru 150 Only)

1. As a result of an investigation of the subject engine mount components on Model G-164 Ag-Cats (S/N 101 thru 150), it has been established that engine mount dural washers (P/N S-136-1-D) did not conform to the drawing specifications and could have a serious effect on airworthiness.

2. It is therefore necessary that these components be replaced in service on the subject aircraft at the next 100 hr. or periodic inspection whichever occurs first.

3. The subject parts, S-136-1-D (16), are furnished free of charge by Grumman for replacement.

November 13, 1962

Grumman

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE BULLETIN #22

SUBJECT: Ag-Cat Landing Gear Spring Leg Failures

ENCLOSURE: AN6290-4, (or) MS28775-012 "O" Rings (4 required) Plus Two (2) Large S.S. Washers (1 O.D. x .391 x .062 Thick)

In the past month several main landing gear spring legs have experienced fatigue failures by breaking through the upper 3/8 inch dia. bolt hole where the axle is attached to the spring leg.

Grumman's Material Testing Laboratory has concluded that these breaks were caused by surface cracks originating in the 1/32 x 45° chamfer of the upper axle attach bolt hole. Furthermore, the fact that consistent overloading of the aircraft to gross weights considerably in excess of its design weight of 3750# has consequently increased the stresses in the leg to such a degree that the expected fatigue life of the leg, as originally designed, has been severely reduced. In other words, overloading the aircraft hastens the probability of failure, not only of the landing gear, but of other structural components of the aircraft.

The following fix should be done at the customer's earliest convenience to decrease the possibility of landing gear leg failure: (Effective on aircraft in service as noted on E.C.O. S164-1273, attached).

1. Remove the wheels and axles from the landing gear legs. (If you are careful you do not have to disconnect the brake lines.)

2. Carefully re-chamfer upper 3/8 inch dia. axle attach hole and radius grind same to a smooth machine finish per E.C.O. #S164-1273 shown on the next page.

3. After grinding deeper chamfers and rounding off all sharp edges of chamfers to 1/32 R., carefully inspect the newly machined chamfered surfaces by performing a non-fluorescent dye check on the chamfers to be certain that no surface cracks, no matter how small, exist in this area. If any cracks are evident, the spring leg should be replaced with a new leg.

June 14, 1963

Grumman

4. On reassembly of the axle to the spring legs, be sure to install AN6290-4 or MS28775-012 "O" Ring furnished by Grumman at each chamfer. These "O" Rings will prevent corrosive chemicals from getting into the bolt holes. Torque up the axle attach bolts (3 per axle) to values noted on E.C.O. #S164-1273.

5. Reinstall wheels on axles.

NOTE:

Realizing that many operators of Ag-Cats almost always operate them at gross weights that exceed the design G.W. of 3750# by upwards of 500-700 lbs., Grumman is now designing a landing gear spring leg that has approximately 50% more strength in the critical break area and is completely interchangeable with original equipment. In addition to being a stronger gear, its fatigue life will be greatly increased because of the placement of the upper 3/8" axle attach hole in the center of the enlarged spring X-section and because of the lower stresses obtained with the larger sectioned landing gear leg. These new gears will be available approximately 3 to 4 months after FAA approval of the design (Fall of '63) and will immediately be installed on all new aircraft prior to delivery as standard equipment. They will also be available for installation on aircraft in service for back-fitting. Grumman urgently recommends that all operators consider replacement of gear legs when available to assure safer operations and a longer service life.

June 14, 1963

Grumman

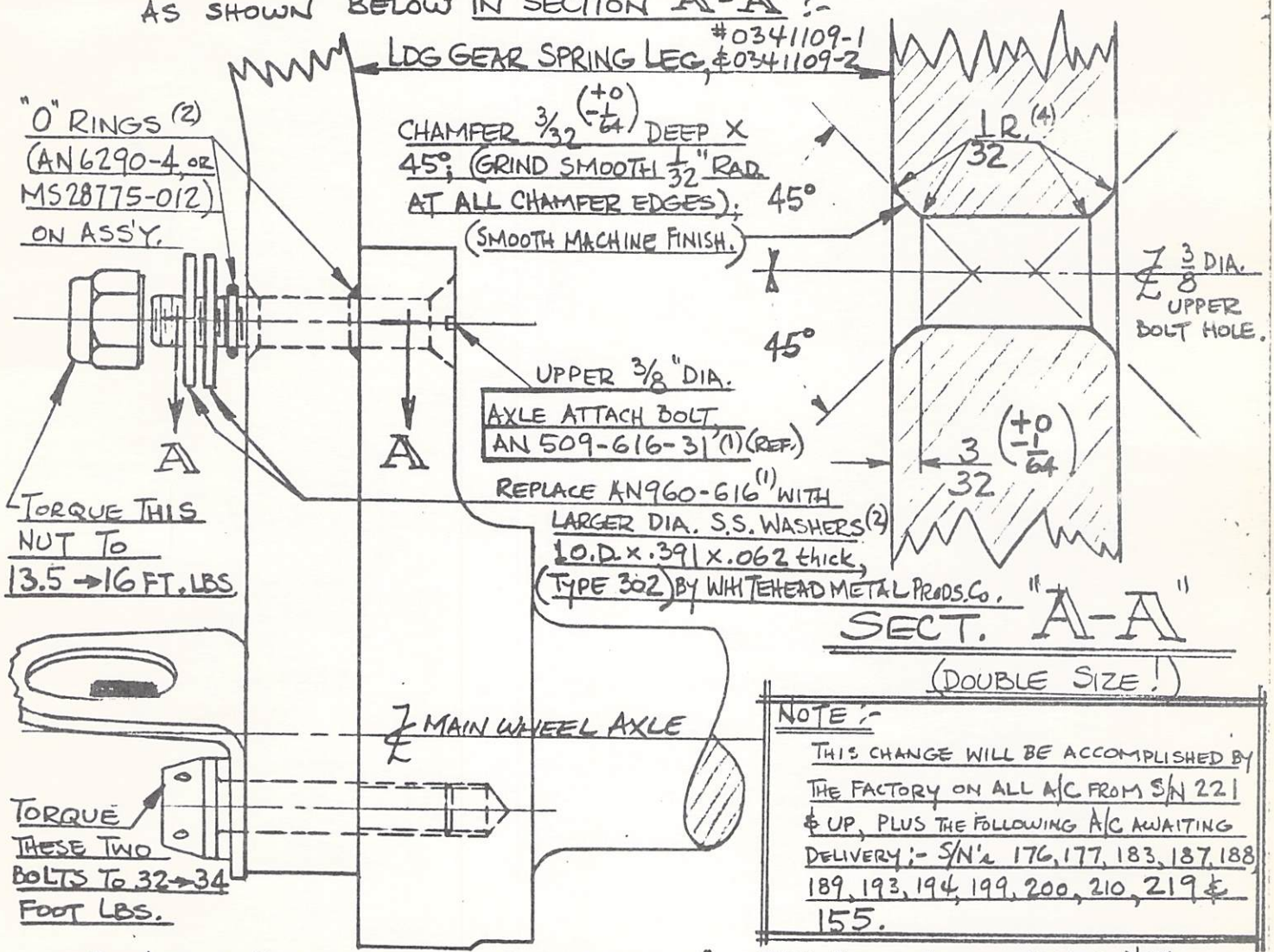
F-200

SCHWEIZER AIRCRAFT CORP.

ENGINEERING CHANGE ORDER						CHG. LET.	
TITLE:	GEAR INSTALLATION — MAIN LDG GEAR						
CHG. INC.		EFFECTIVITY	NOTED	PARTS AFFECTED	✓	ECO. SERIAL	S164-1273
BY		CARD POSTED		TOOLS AFFECTED	✓	D.C.R. SERIAL	—
DATE		CHECKED	ARK 6-11-63 6-13-63	STOCK DISPOSITION	REWORK	DWG. NO.	A1500 "A"

EFFECTIVITY :- (1) ALL A/C IN SERVICE OTHER THAN THOSE NOTED IN NOTE (SHTS 1 & 2) BELOW; (2) A/C AT FACTORY; (SEE S/N's NOTED BELOW AS LISTED UNDER SECTION "A-A")

1. RE-WORK MAIN LDG GEAR SPRING LEG UPPER AXLE BOLT ATTACH HOLE AS SHOWN BELOW IN SECTION "A-A" :-



NOTE :-
THIS CHANGE WILL BE ACCOMPLISHED BY THE FACTORY ON ALL A/C FROM S/N 221 & UP, PLUS THE FOLLOWING A/C AWAITING DELIVERY :- S/N's 176, 177, 183, 187, 188, 189, 193, 194, 199, 200, 210, 219 & 155.

2. AFTER RE-CHAMFERING BOTH ENDS of UPPER BOLT HOLE, APPLY NON-FLOURESCENT DYE CHECK PENETRANT (BY SPRAY OR BRUSH) TO A CLEAN, OIL-FREE CHAMFERED AREA TO DETERMINE IF SURFACE CRACKS EXIST. IF SURFACE CRACKS SHOW UP ON THIS TEST, REJECT LDG GEAR LEG & INSTALL NEW ONE. TURCO PRODUCTS, INC, (CHEMICAL PROCESSING COMP'DS) OF HOUSTON, CHICAGO, N.Y.C., & L.A. CAN PROVIDE A DYE CHECK PENETRANT THAT IS KNOWN AS "TIK-GLO" IT IS AVAILABLE IN A SPRAY CAN CONTAINED FOR EASE OF APPLICATION

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE BULLETIN #23

SUBJECT: Spray Pump Fan Armor Plates

ENCLOSURE: Either A1624"A" (Continental R670 Engines) or A1642 (Jacobs R755 Engines)

1. Whenever a spray pump fan is permitted to rotate freely without liquid in the hopper, there is the danger of the fan overspeeding to such a degree that it may disintegrate. The disintegrated fan blades could penetrate the engine cowling and do damage to fuel and oil line or the engine mount.

2. Grumman has therefore designed armor plating of .063 thick al. alloy sheet (2024-T3) which is riveted to the engine accessory lower cowl panels to prevent this sort of damage. The factory has installed this armor plate as standard equipment on all aircraft commencing with S/N 221. It may be installed on all previously manufactured aircraft by placing an order for same with the factory or your distributor. The parts to order are:

   A1624-111 L.H. Accessory Cowl Doubler Plate (1/ship)
   A1624-113 R.H. Accessory Cowl Doubler Plate (1/ship).

June 17, 1963

Grumman

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE BULLETIN #24

SUBJECT: Engine Mount Spacer Bushings (Correct Length)

1. On the 1st 100 Ag-Cats produced, Grumman installed Stearman spacer bushings (8 places), Stearman P/N S-226-136, when attaching the power plant to the engine mount ring. These Stearman spacer bushings are 2-1/8" long x 5/8 O.D. x 3/8 I.D. Beginning with Ag-Cat Serial No. 101, Grumman has been installing a similar spacer bushing, P/N A1601-1, which is identical to the Stearman part in all respects except that its length is 2-1/4 inches. The longer length bushings were used when it was brought to our attention that the shorter Stearman part squeezed up too much on the rubber anti-vibration parts of these assemblies, causing some shearing out of the rubber components and resulting in too stiff an engine attachment to the engine mount ring.

2. Grumman wants to bring the above to the attention of all Ag-Cat owners so that when new rubber components are installed, the customer makes certain that the longer Grumman spacer bushing is always installed rather than a Stearman bushing on all Ag-Cats. We understand that operators, even on Ag-Cats bearing serial numbers above #100, have inadvertently replaced these bushings with Stearman stock bushings, not knowing of the slight difference in length. Using the Grumman part assures that the rubber components will have the proper "squeeze-up" and that engine vibration transmitted to the aircraft structure will be a minimum. The proper torque for the AN6 bolts at these anti-vibration mounts is 16 ft. lbs.

August 20, 1963

Grumman

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE BULLETIN #25

SUBJECT: Rework of Throttle Arm on Carburetors of Continental R670 220 & 240 h.p. Engines Mounted on G-164 Aircraft

ENCLOSURE: (a) Grumman Engineering Change Order #S164-1292

1. The FAA has brought Grumman's attention to the excessive wear of the throttle control pivot bolt (AN23-13) at the carburetor throttle arm.

2. Grumman has redesigned the carburetor throttle arm to provide for a clamp-up bushing to provide a closer fit in the throttle arm hole and also greater bearing area which will considerably reduce wear at this important control connection. The required rework to the throttle arm is shown on Enclosure (a) and the necessary hardware to accomplish this rework will be made available by Grumman at a nominal fee.

3. This rework should be accomplished at the earliest possible convenience to forestall any possible failure which could create a dangerous flight condition since failure of the original AN23 bolt due to excessive wear would automatically leave you with a full-open throttle or a jammed one.

August 29, 1963

Grumman

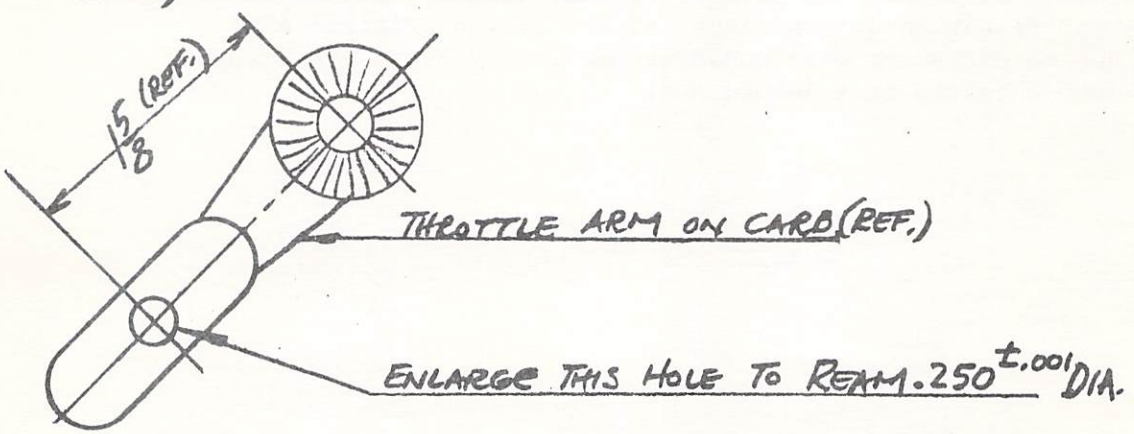
F-200

SCHWEIZER AIRCRAFT CORP.

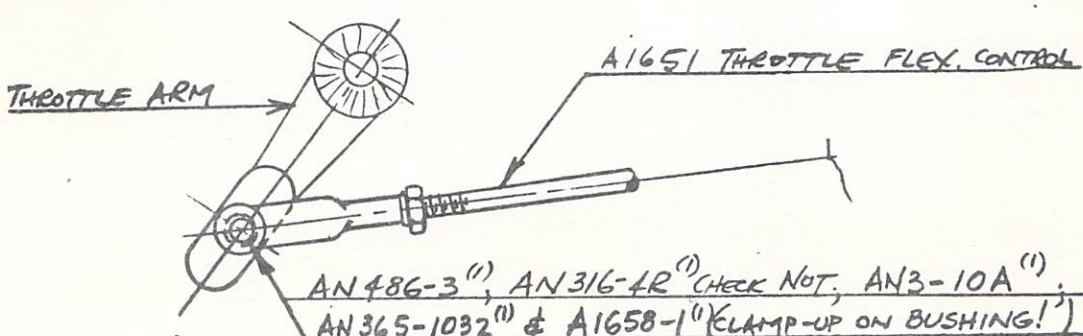
ENGINEERING CHANGE ORDER							CHG. LET.	
TITLE:	CONTROLS (INSTALL.) – P.P. THROTTLE, MIXTURE & FUEL SHUT-OFF VALVE							
CHG. INC.		EFFECTIVITY	NOTED	PARTS AFFECTED	✓	ECO. SERIAL	S164-1292	
BY		CARD POSTED		TOOLS AFFECTED	✓	D.C.R. SERIAL	—	
DATE		CHECKED	ARK 8-29-63	STOCK DISPOSITION	REWORK	DWG. NO.	A1650 "B"	

CHANGE: EFFECTIVITY :- ALL G164 AIRCRAFT FITTED WITH EITHER 220 OR 240 h.p. CONTINENTAL "R670" ENGINES. A/C SERIAL NOS. 230 & UP WILL INCORPORATE THIS CHANGE PRIOR TO DELIVERY. ALL PREVIOUS G-164 A/C (WITH R670 ENGINES ONLY) WILL REQUIRE THAT THIS CHANGE BE MADE BY THE CUSTOMER.

1. RE-DRILL & REAM THE THROTTLE CONTROL ARM (AT THE CARB.) AS SHOWN BELOW :-



2. INSTALL ABOVE THROTTLE ARM ON CARB. & CONNECT THROTTLE CONTROL AS SHOWN BELOW WITH CLAMP-UP BSHG THROTTLE ARM CONTROL CONNECTION :-



(DELETE ORIG. HDWARE CALLOUT : AN 486-3 (1), AN 316-4R (1), AN 23-13 (1), AN 320-3 (1), AN 960-D10L (1) & AN 381-2-12 (2))

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE BULLETIN #26

SUBJECT: Engine Mount Bolts (at mount ring) - Inspection

1. A recent Malfunctioning and Defects Report has brought to our attention a condition existing on G-164 aircraft (Serial Nos. 1 thru 232) which should be brought to the attention of all owners of these aircraft.

2. Attention should be directed to inspection of the AN6 bolts (8) that mount the engine to the engine mount ring. At the next periodic inspection or whenever new anti-vibration rubbers are installed, examination of these 3/8" dia. bolts may indicate a reduction in X-sectional area of the bolt shank approximately $2\frac{1}{2}$" from the bolt head which may be caused by chafing action of the 7/16" dia. holes (8) in the engine baffles (P/N A1621 on Continental engines or P/N A1612 on Jacobs engines). To correct this chafing or wearing action on bolts, it will be necessary to remove the engine baffles and enlarge these eight (8) holes to 3/4 inch dia. If the bolts show chafing or area reduction, it will be necessary to replace them.

3. When replacing or checking these bolts, be certain to torque to a value of 16 ft. lbs.!

October 8, 1963

Grumman

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE BULLETIN #27

SUBJECT: Modification of C-case Breather Line Routing (Jacobs R-755 Engines) (Long Mount)

ENCLOSURES: E.C.O.'s S164-1355 & -1356

1. There have been two (2) reported cases of the c'case breather lines freezing up in flight on the subject aircraft which resulted in pumping of engine oil through the front main bearing due to the pressure built up in the c'case as a result of blockage of the c'case breather line. The manufacturer concludes that the large dia. (3/4") aluminum breather line running from the firewall aft (approx. $5\frac{1}{2}$ ft.) to the outlet at fuselage Sta. 168-5/8 gets very cold in freezing weather; condensation is encouraged by the large radiating area of this line, and subsequently, results in a freeze-up of the line. To preclude this possibility, Grumman is furnishing kits of exchange parts to be installed per Engineering Change Orders #S164-1355 and -1356, copies enclosed.

2. The rework is of a minor nature and easily accomplished. By locating the c'case breather outlet ahead of the firewall, the entire line is inside the warm engine accessory compartment area and its outlet is shielded.

3. The more direct line, with less chance for condensation formation and freeze-up should eliminate these problems.

December 10, 1963

Grumman

F-200

"A" CHG :- REMOVED A1357-121(1) DRAIN SCUPPER. FLITE TESTS INDICATE ICE FORMATION CLOSE TO T.E. OF SCUPPER COULD CLOSE OFF OUTLET IF ACCUMULATION WERE GREAT. ARK-ACH 1-22-64

SCHWEIZER AIRCRAFT CORP.

ENGINEERING CHANGE ORDER							CHG. LET.	A
TITLE:	OIL SYSTEM (ASS'Y & INSTALL.) (JACOBS R-755 ENGINE)							
CHG. INC.		EFFECTIVITY	ALL	PARTS AFFECTED	✓	ECO. SERIAL	S164-1355 "A"	
BY		CARD POSTED		TOOLS AFFECTED	✓	D.C.R. SERIAL	—	
DATE		CHECKED	ARK. 12-10-63	STOCK DISPOSITION	SCRAP	DWG. NO.	A1705 "A"	

CHANGE: DELETE THE FOLLOWING COMPONENTS of C'CASE BREATHER LINE :-

A1705-21(1), INTERMEDIATE C'CASE BREATHER LINE

A1705-39(1) 4" LONG MIL-H-6000 (3/4" I.D. HOSE THRU FIREWALL) (DELETE 1 1/8" DIA. HOLE IN FIREWALL, 19 3/4" TO LEFT OF ℄ & 35/8" ABOVE ℄ of LOWER LONGERON BY SEAL PATCH)

AN737 RM38(2) CLAMPS

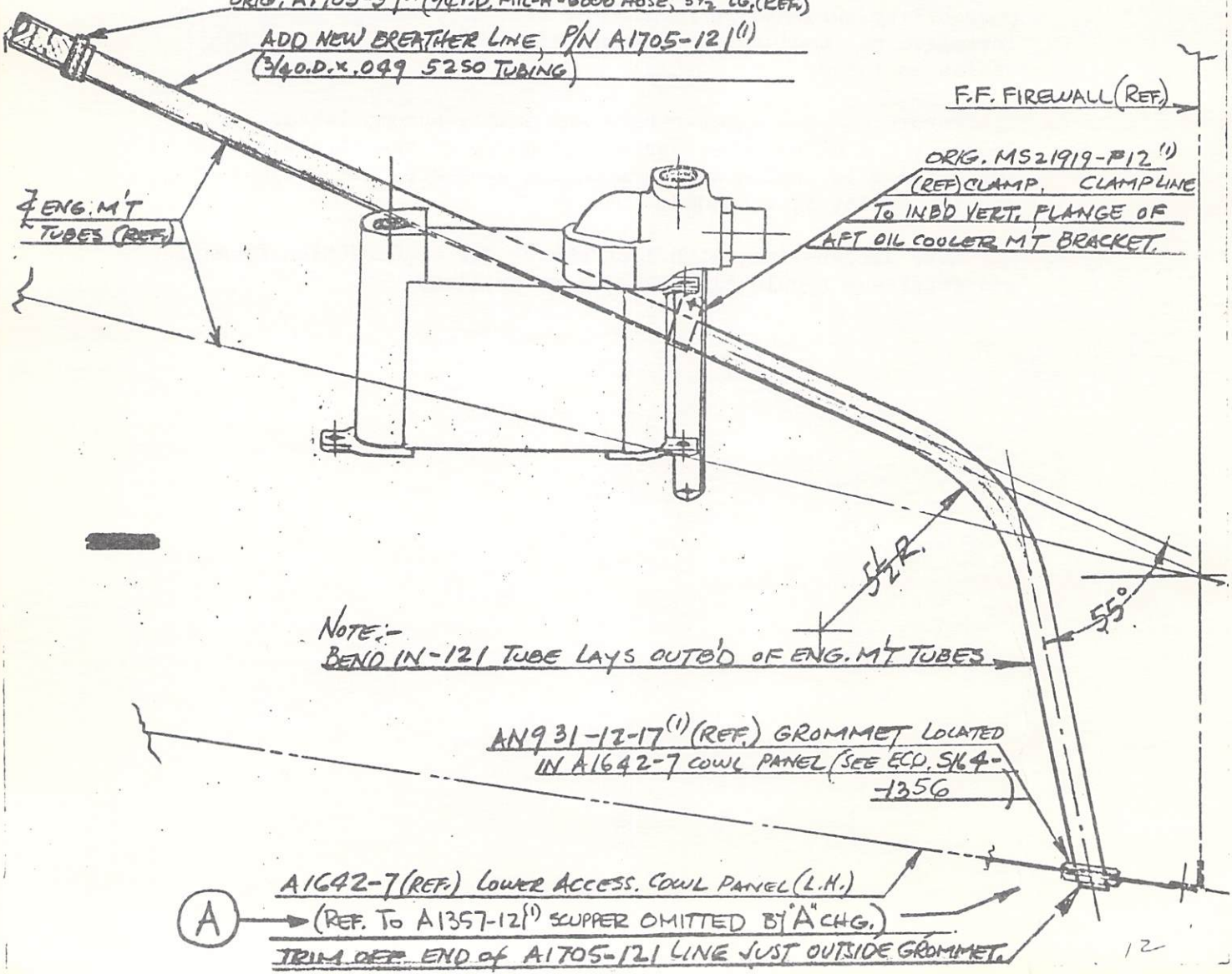
A1705-23(1) C'CASE BREATHER LINE

MS21919-G12(3); MS21919-G10(1); MS21919-G16(1) & MS21919-G18(1) CLAMPS WITH AN520-1032-10(3); AN960-10(6) & AN365-1032(3), ALSO DELETE HOLE (1 1/16" D) IN BOTTOM FUSELAGE SKIN AT STA. 168 5/8 & AN931-12-17(1) AT THIS HOLE (SEAL THIS HOLE WITH REPAIR PATCH)

CHANGE C'CASE BREATHER LINE COMPONENTS & ROUTING AS FOLLOWS :-

ORIG. A1705-37(1) (3/4 I.D. MIL-H-6000 HOSE, 3 1/2" LG. (REF.))

ADD NEW BREATHER LINE, P/N A1705-121(1) (3/4 O.D. x .049 5250 TUBING)



12

F-200

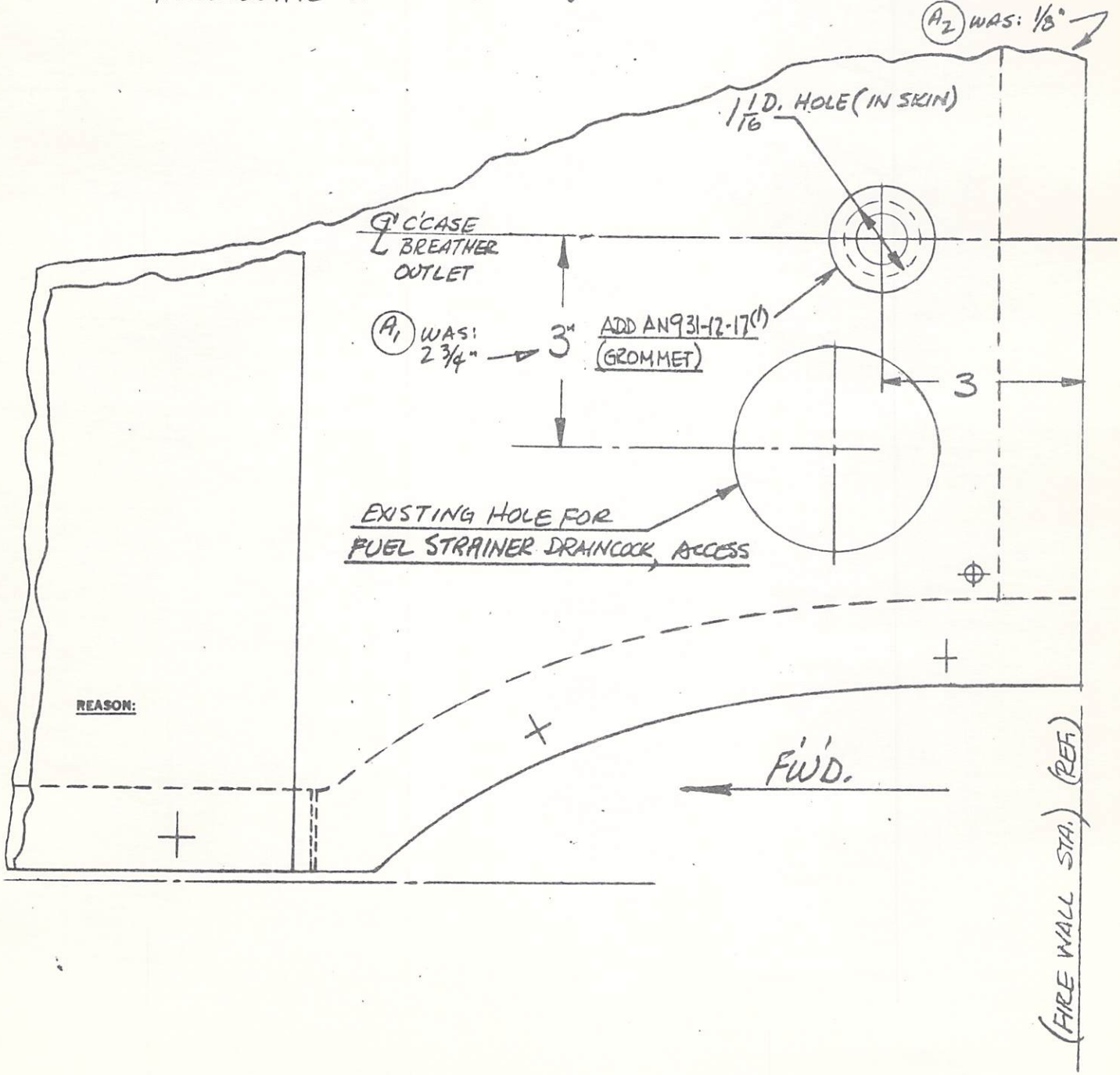
"B" CHG:- REMOVE P/N A1357-121(1) SCUPPER FROM CHG "A". OMISSION OF SCUPPER MAKES INSTALL. LESS LIABLE TO ICING UP.
A.R.Koch 1-22-64

"A" CHANGE: RELOCATED P/N A1357-121 AS SHOWN (RE-DRAWN) R. Powell – 1-13-64 A.R.K. – 1-14-64

SCHWEIZER AIRCRAFT CORP.

ENGINEERING CHANGE ORDER							CHG. LET.	"B"
TITLE:	PANELS INSTALL.- ACCESSORY COWLING (JACOBS R-755 ENG.) (LONG NOSE)							
CHG. INC.		EFFECTIVITY	ALL	PARTS AFFECTED	✓	ECO. SERIAL	S64-1356 "B"	
BY		CARD POSTED		TOOLS AFFECTED	✓	D.C.R. SERIAL		
DATE		CHECKED	ARK 12-10-63	STOCK DISPOSITION	REWORK	DWG. NO.	A1642	

CHANGE: ADD THE FOLLOWING DETAILS TO LOWER L.H. COWL PANEL TO ACCOMODATE NEW ROUTING of C'CASE BREATHER LINE



REASON:

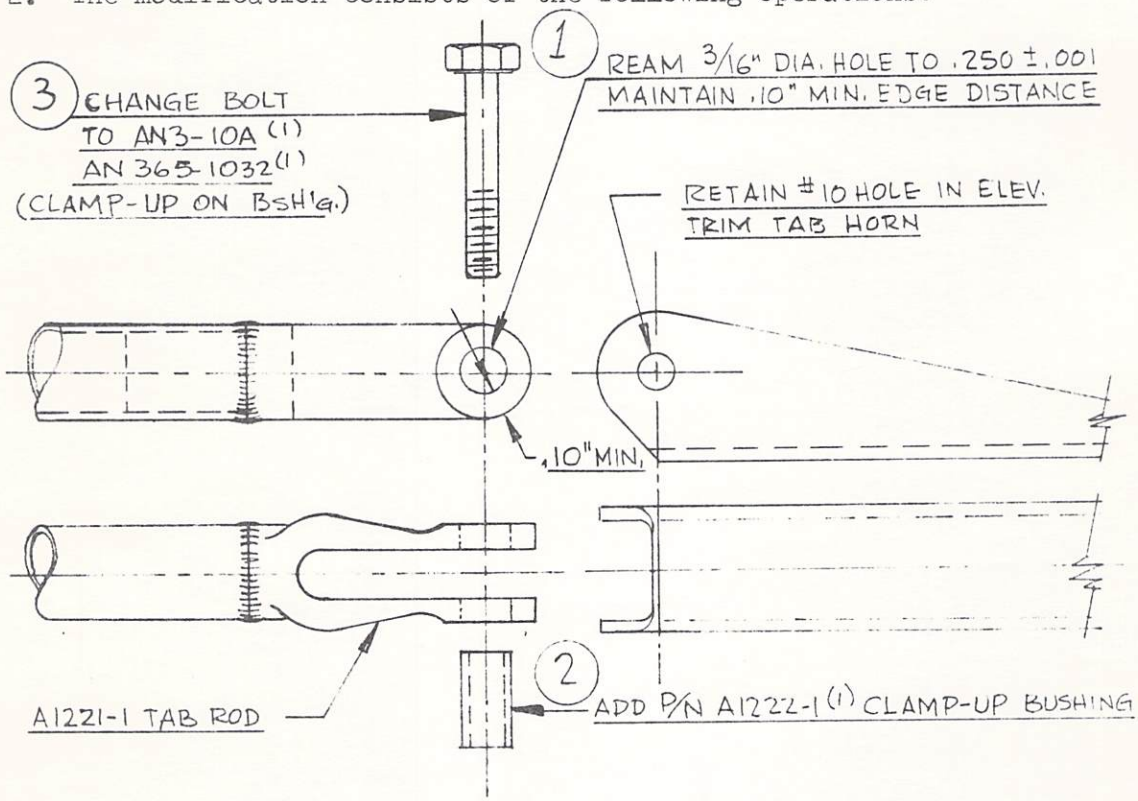
GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE BULLETIN #28

SUBJECT: Optional Modification of Elevator Trim Tab Horn Connection (1st 274 A/C)

1. Starting with production Ag-Cat Serial No. 275, we have modified the design of the subject trim tab horn connection to give longer service life by increasing the bearing surface area of the bolted connection. Ag-Cats manufactured prior to S/N 275 may be (optional) modified to conform with this improved design detail. As noted below, very little work is involved to make the modification, and the results to be gained are considerable.

2. The modification consists of the following operations:



March 19, 1964

Grumman

3. Parts required to make this modification are available from:

Grumman Aircraft Engineering Corporation
P.O. Box 147 Elmira, New York

at the following cost, (postage prepaid):

1 - A1222-1 Clamp-up bushing	$ .95
1 - AN3-10A Bolt	.05
1 - AN365-1032 Nut	.03
Total	$1.03

March 19, 1964

Grumman

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE BULLETIN #29

SUBJECT: Rework of Parking Brake and Control Surface Lock (On A/C 301 thru 310 Only)

ENCLOSURES:
(a) Engineering Change Order #S164-1424"B"
(b) Engineering Change Order #S164-1496
(c) Sketch Showing Rework Required To Be Done On Control Surface Lock
(d) Part No. A1835-21 To Be Installed Per E.C.O. #S164-1424"B"

1. Grumman G-164 A/C (S/N 301 thru 310) were produced with a Parking Brake and Control Surface Lock device employing a spring loaded latch pin for locking to the control stick. To eliminate the hazard of taking-off with the control surfaces locked and then experiencing the problem of trying to unlock same, Grumman has redesigned the lock device at its attachment to the control stick so that detachment can be readily accomplished in flight without danger.

2. To accomplish this change on aircraft in the field, the following steps shall be taken:

   (a) Saw or grind off the portion of the control lock device as shown on enclosure (c) Sketch.

   (b) Insert new part #A1835-21 into hole in A1835-19 lug and weld it to Pilot's Control stick as shown on enclosure (a).

   (c) Paint entire control surface lock assembly bright red as an added attention-getting feature that will help prevent take-offs with the stick control locked.

   (d) The changes will result in a control surface lock device that matches the production units shown on enclosure (b).

August 31, 1964

Grumman

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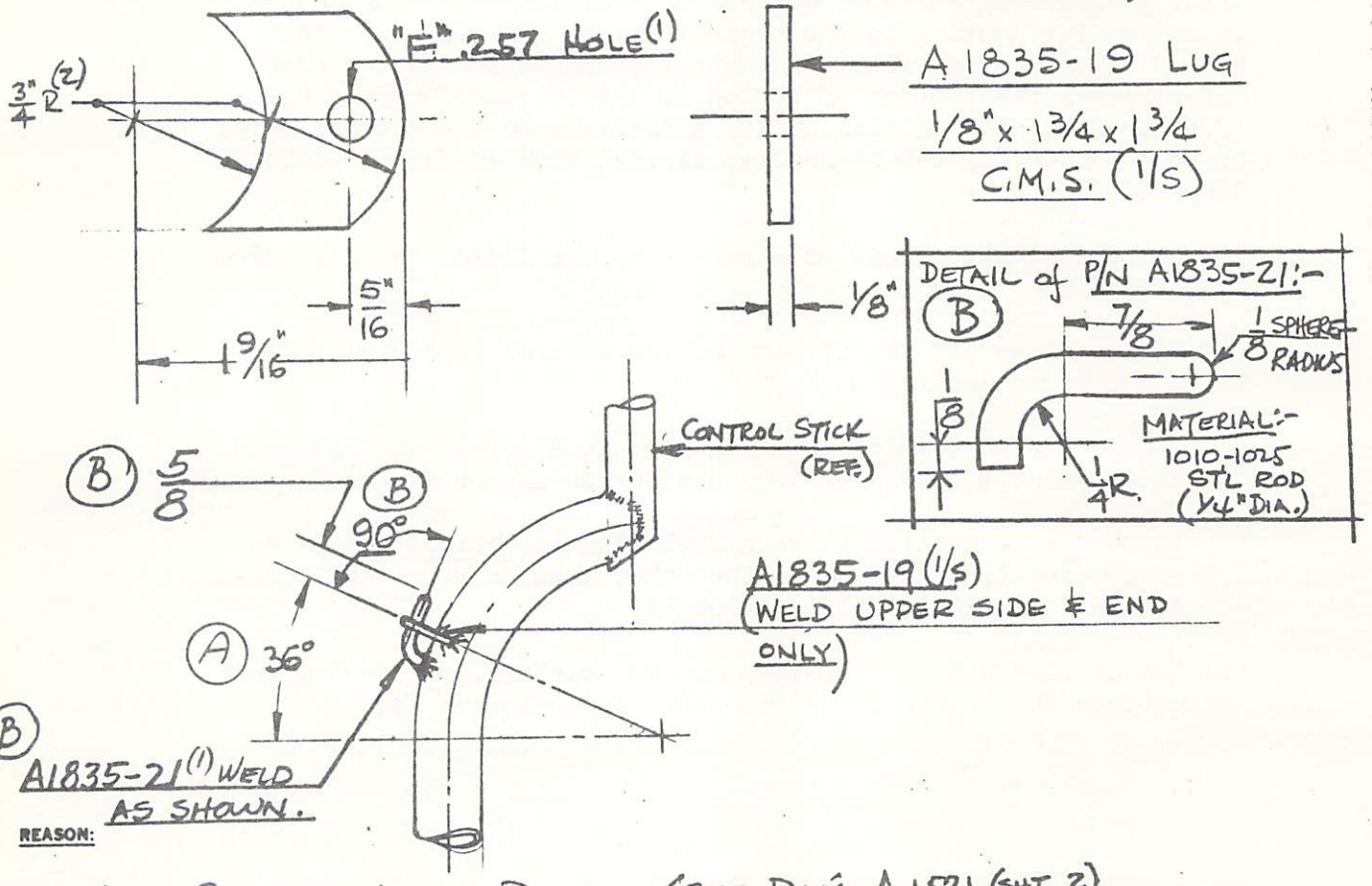
CHG	DESCRIPTION	APPROVED	"A" 36° LUG LOCATION WAS 25°; REWORK ∠. 7/15/64 POWER ARK ok 7-15-64 ES 7/15/64
B	ADDED P/N A1835-21 PIN. WELD IN PLACE AS SHN. ARK ok 8-27-64	A.R.K., (P) 8/29/64	

SCHWEIZER AIRCRAFT CORP.

ENGINEERING CHANGE ORDER							CHG. LET.	
TITLE:	STICK (ASS'Y.) AILERON & ELEVATOR - PILOTS CONTROL							
CHG. INC.		EFFECTIVITY	A/C 301 & UP	PARTS AFFECTED	✓	ECO. SERIAL	S164-1424 "B"	
BY	S/E Powell	CARD POSTED		TOOLS AFFECTED	✓	D.C.R. SERIAL	—	
DATE	2-28-64	CHECKED	ARK 3-2-64 ES 3-11-64	STOCK DISPOSITION	✓	DWG. NO.	A1835	

CHANGE:

1. Add Detail & Instl. of Control Lock Lug as Shown Below:
   (B) P/N -21 added (see detail) in production on A/C 311, up. (Installed on A/C 301 → 310 in the field per Service Bulletin #29)



REASON:

1. New Control Lock Design (See Dwg. A1521 (Sht. 2)

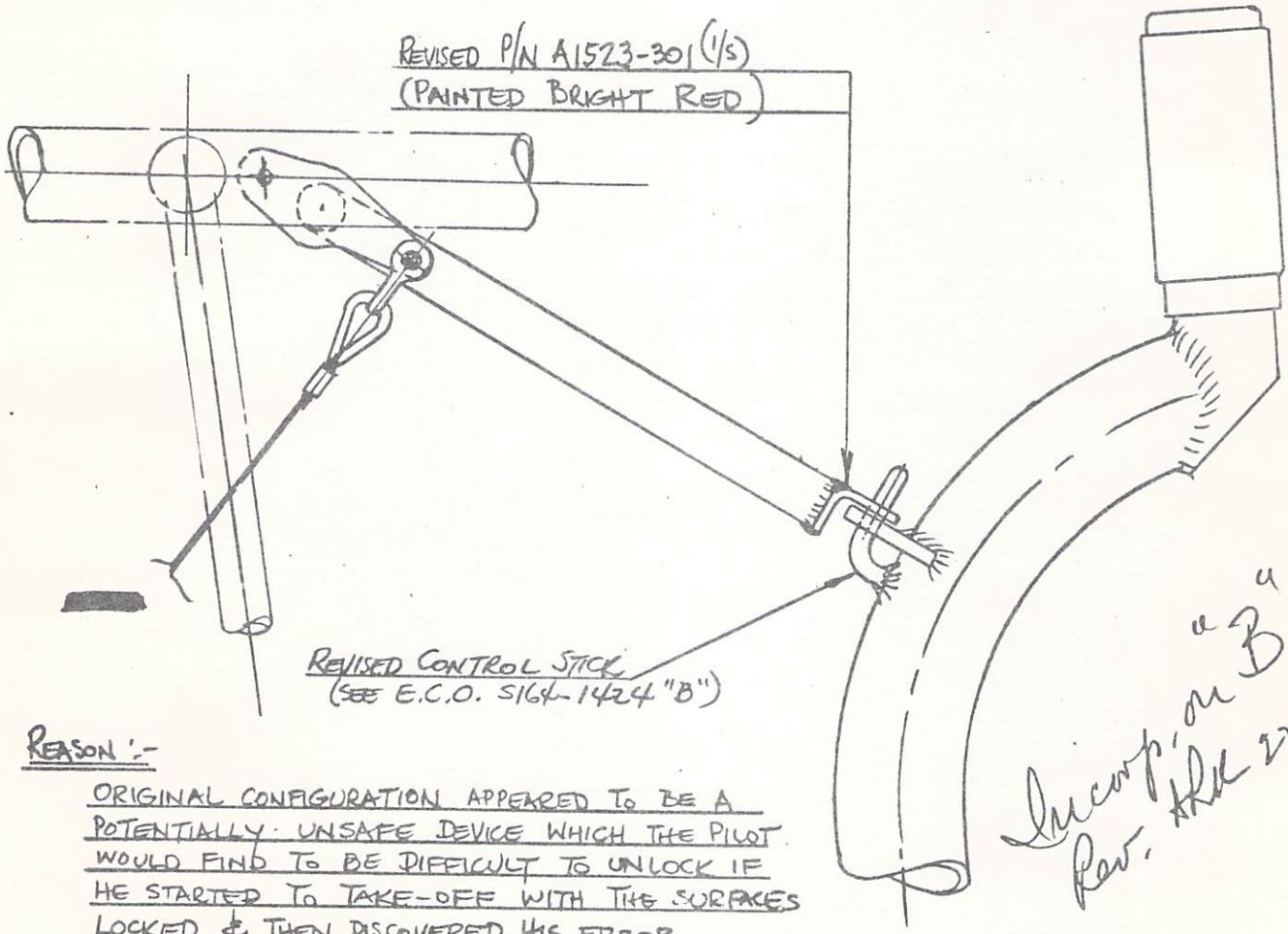
F-200

SCHWEIZER AIRCRAFT CORP.

ENGINEERING CHANGE ORDER							CHG. LET.	
TITLE:	PARKING BRAKE (INSTALL.) - & STICK LOCK CONTROL							
CHG. INC.		EFFECTIVITY	NOTED	PARTS AFFECTED	✓	ECO. SERIAL	S164-1496	
BY		CARD POSTED		TOOLS AFFECTED	—	D.C.R. SERIAL	—	
DATE		CHECKED	ARK ccw 8-28-64 ES 8/31/64	STOCK DISPOSITION	REWORK	DWG. NO.	A1521 "A" (SHT. 2)	

CHANGE: NOTE:- THIS E.C.O. APPLIES TO A/C 311, UP IN PRODUCTION. A/C 301 THRU 310 ARE TO BE REWORKED BY THE CUSTOMER IN ACCORDANCE WITH GRUMMAN SERVICE BULLETIN #29 TO EFFECTIVELY RESULT IN A SIMILAR REVISION.

1. REVISE DWG A1521 "A" (SHT 2) TO SHOW THE INSTALLATION of PART No. A1523-301 AT THE CONTROL STICK ATTACHMENT. THE REVISED PART WILL APPEAR AS SHOWN BELOW WHEN ATTACHED TO THE REVISED CONTROL STICK ASS'Y. (ALSO SHOWN BELOW IN REVISED CONFIGURATION) :-



Incorp. on "B" Rev. ARK 2/26/65

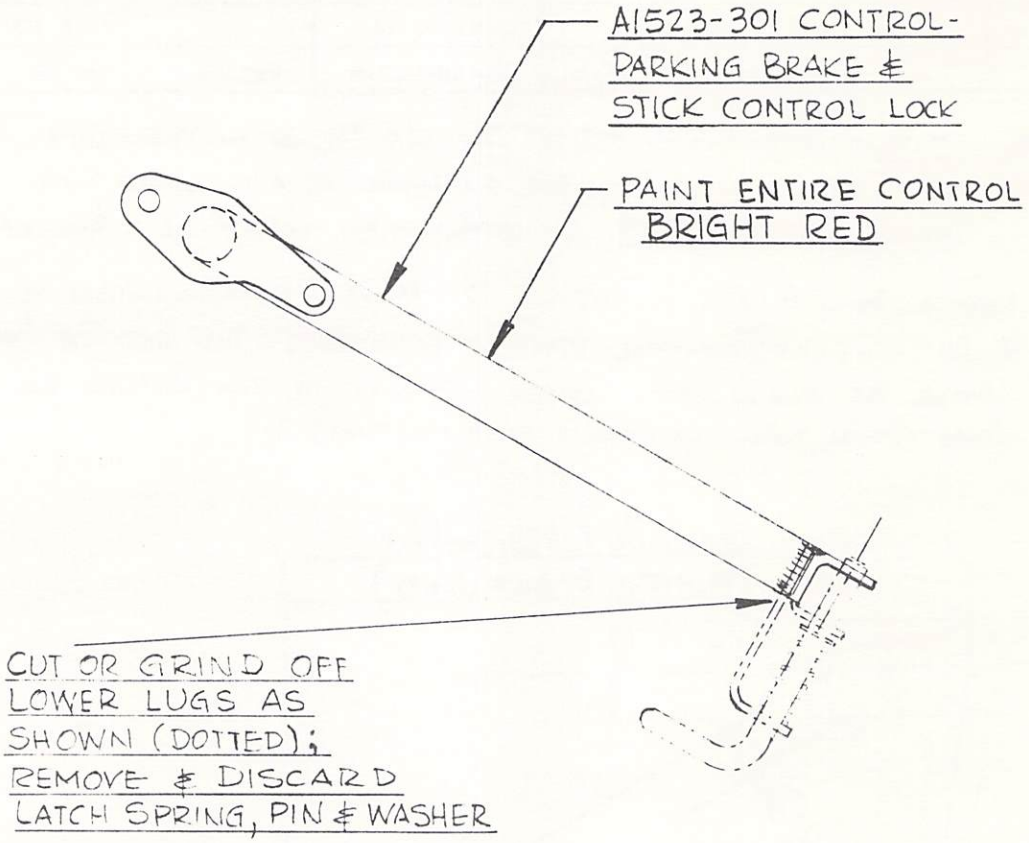
REASON :-

ORIGINAL CONFIGURATION APPEARED TO BE A POTENTIALLY UNSAFE DEVICE WHICH THE PILOT WOULD FIND TO BE DIFFICULT TO UNLOCK IF HE STARTED TO TAKE-OFF WITH THE SURFACES LOCKED & THEN DISCOVERED HIS ERROR.

IF HE SHOULD FIND HIMSELF IN THIS PREDICAMENT WITH THIS REVISED CONTROL SURFACE LOCK, HE CAN READILY "UNLOCK" BY SIMPLY BUMPING UPWARD ON THE CONTROL. (P/N A1523-301)

ENCLOSURE (c)

SKETCH SHOWING REWORK REQUIRED TO BE DONE ON CONTROL SURFACE LOCK



Grumman

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE BULLETIN #30

SUBJECT: J5404 Propeller Hub Rework

ENCLOSURES: (a) Propeller Hub Rework Sketch
(b) Listing of Serial Numbers of J5404 Hubs To Which This Bulletin Will Apply

1. This Service Bulletin is prepared to allow owners of Grumman Ag-Cat Propellers Model J5404/MA96K to rework their J5404 hubs in accordance with changes that are now being incorporated by the manufacturer.

2. To reduce the possibility of cracks resulting from stress concentrations originating in the sharp edges of the rear cone seat and its boss, the following rework should be accomplished as soon as possible.

3. Using a 6 in. or 8 in. half oval or half round fine mill cut file, carefully round the sharp corner of the rear cone seat as noted in the enclosed sketch to a 1/8 in. (.125) radius. Care should be exercised to keep any file cuts from marking the cone seat. After filing to the desired radius all file cuts should be polished out with fine grit emery paper or crocus cloth.

4. Using a 6 in. or 8 in. fine mill cut flat file, carefully round the sharp outer corner of the cone seat boss as shown on the sketch to a 1/16 in. (.062) radius and polish with fine emery paper.

5. In both operations work carefully to avoid removing any more cadmium plating than is necessary. Protective masking tape should be placed on areas adjacent to the filing operations.

6. After rework operations are completed the filed and polished areas should be protected with rust preventive coating such as zinc chromate primer or equivalent.

November 2, 1964

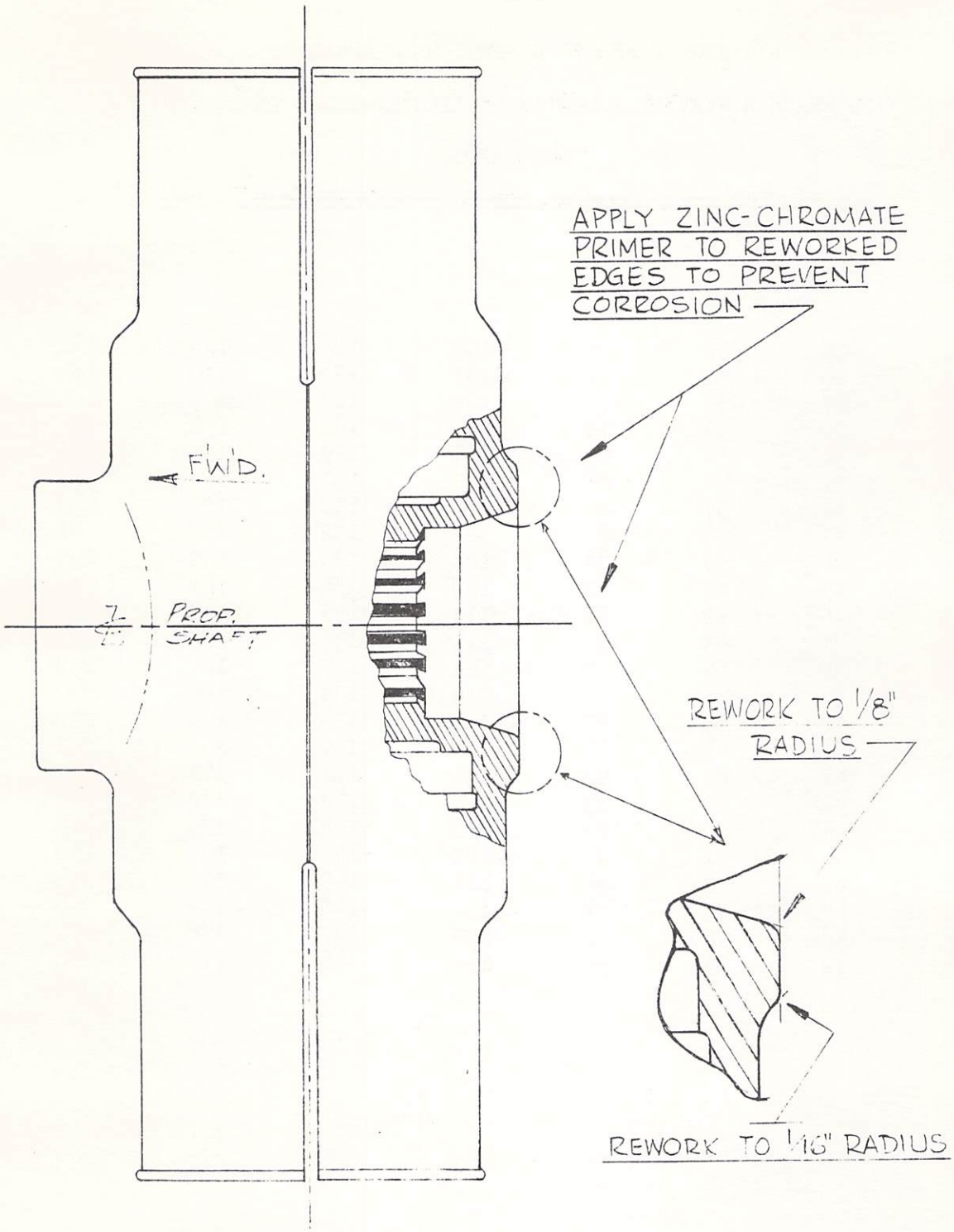
Grumman

7. When installing the propeller on the engine use care to prevent over-torquing the prop nut. The Propeller Installation Instructions call for 750 ft. lb. torque which would be a 187.5 lb. steady pull on a 4 ft. bar. Tighten smoothly to this equivalent. DO NOT jerk or swing on bar once this torque is reached as G loads could easily double this force. Cracks can be caused by the prop hub nut wedging the hub cone too tight against the conical seat, resulting in high stress bursting pressures in the reworked areas noted on enclosure (a).

November 2, 1964

Grumman

ENCLOSURE (2)



Grumman

LISTING OF SERIAL NUMBERS OF J5404 HUBS

TO WHICH A SERVICE BULLETIN OR AIRWORTHINESS DIRECTIVE

WOULD APPLY

1	25	50	76	100	125	149	181
2	26	51	77	101	126	150	183
3	27	52	78	102	127	153	184
4	29	53	79	103	128	154	185
5	30	54	80	104	129	155	186
6	31	56	81	105	130	156	187
7	32	57	82	106	131	157	189
8	33	58	83	107	132	158	191
9	34	59	84	108	133	159	199
10	35	60	85	109	134	161	217
11	36	62	86	110	135	162	230
12	37	63	87	111	136	163	237
13	38	64	88	112	137	164	238
14	39	65	89	113	138	165	240
15	40	66	90	114	139	166	242
16	41	67	91	115	140	167	243
17	42	68	92	116	141	171	244
18	43	69	93	117	142	172	247
19	44	70	94	118	143	173	249
20	45	71	95	120	144	174	250
21	46	72	96	121	145	175	251
22	47	73	97	122	146	176	266
23	48	74	98	123	147	178	275
24	49	75	99	124	148	179	286
							303

Grumman

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE BULLETIN #31

SUBJECT: Modification of Aileron Control System To Prevent Reversed Aileron Control Rigging (A/C S/N 1 thru 400 Only)

ENCLOSURE: 1 Copy of Aileron Controls (Cable Rigging) Schematic Sketch

1. It has been brought to Grumman's attention by the Eastern Regional office of FAA that the Ag-Cat's aileron control system, as originally delivered with the subject aircraft, could be reverse rigged. All aileron control cables are interchangeable, and as such, could be attached to the wrong sector at either end of the cable run.

2. To prevent improper hook-up of aileron cables, the following modification to the system shall be accomplished at the earliest possible date:

   (a) Paint cable sector halves bright red as shown on the enclosed sketch of the aileron system, (shaded areas only).

   (b) When rigging the aileron cables, make certain that cables within the wing panels do not cross one another, and then be certain that the aft cable in each wing panel attaches to the red painted halves of the bellcranks in the system.

   (c) After rigging, the final responsibility for the system correctness rests with the certificated mechanic who records the work accomplished in the aircraft log book.

3. The manufacturer contemplates a mechanical change in the aileron system of Ag-Cats bearing S/N's above 400 which will eliminate the color coding of bellcrank sector halves and eliminate any possibility of reversing aileron controls thereafter.

4. It is recommended that this Service Bulletin be inserted in your Owner's Manual for future reference.

June 23, 1965

Grumman

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE BULLETIN #32

SUBJECT: J5404 Grumman-Sensenich Propeller Alert

1. To be certain that none of the subject propellers are installed on aircraft with improper parts which could result in loosening of the propeller hub on the crankshaft, the following check should be made immediately on all aircraft fitted with this propeller.

   A. Remove the propeller. Determine that the rear bronze cone and spacer are matched sets as called out in the J5404 Propeller Installation Instructions. If an AN5008-20 rear cone is installed, it must be used with an AN5010-20 spacer. If a #525-B cone is installed, it must be mated with a #30091 spacer. This is because the #525-B cone is 1/10 inch shorter than the AN5008-20 cone and therefore requires a spacer 1/10 inch longer for proper installation. Be certain that no intermixing of these parts has occurred during service.

   B. Check to determine that the propeller nut does not bottom on the crankshaft threads when the propeller is installed. This can be determined by first removing the propeller from the engine crankshaft. After the propeller is removed, remove the propeller retaining nut from the hub. Then turn this prop retaining nut onto the crankshaft, carefully counting the total number of turns and fractions of a turn necessary to bottom the nut on the crankshaft. Then place the prop nut back in the hub and install the propeller, again counting turns on the nut until the prop is tight on the crankshaft and the nut correctly torqued. This count of nut turns to correctly seat the propeller hub on the crankshaft should be at least $1\frac{1}{2}$ turns less than the number of turns previously required to bottom the nut. If you cannot obtain the above fit, then you must replace the cone and spacer with new ones in mated sets.

2. Grumman will furnish new mated cone and spacer sets at cost to all customers requesting same as a result of this check, provided the old parts are returned for inspection.

September 9, 1965

Grumman

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE BULLETIN #32
("A" REVISION)

SUBJECT: J5404 Grumman-Sensenich Propeller Alert

APPLICABILITY: All G-164 Model A/C Fitted With Subject Prop On Continental R-670, Gulf Coast R670-240 and Jacobs R-755 Series Engine, 245 h.p. thru 300 h.p.

1. To be certain that none of the subject propellers are installed on aircraft with improper parts which could result in loosening of the propeller hub on the crankshaft; the following check should be made immediately on all aircraft fitted with this propeller.

   A. Remove the propeller. Determine that the rear bronze cone and spacer are matched sets as called out in the J5404 Propeller Installation Instructions. If an AN5008-20 rear cone is installed, it must be used with an AN5010-20 spacer. If a #525-B cone is installed, it must be mated with a #30091 spacer. This is because the #525-B cone is 1/10 inch shorter than the AN5008-20 cone and therefore requires a spacer 1/10 inch longer for proper installation. (The O.A.L. of properly mated rear cone and spacer must be 1.969 inches.) Be certain that no intermixing of these parts has occurred during service.

   An exception to the above will be the short shafted Gulf Coast R670-240 engine manufactured after 3-10-64 (1" shorter shaft than on the Continental 220 engine). In this case, the spacer is omitted from the prop installation. (Ref: G-164 E.C.O. #S164-1432). If procedure "B" should indicate the need for a spacer for the short shafted R670-240 engine, then install Grumman spacer, (P/N A1600-99) (1/8" long spacer per E.C.O. #S164-1497).

   B. Check to determine that the propeller nut does not bottom on the crankshaft threads when the propeller is installed. This can be determined by first removing the propeller from the

Grumman

engine crankshaft. After the propeller is removed, remove the propeller retaining nut from the hub. Then turn this prop retaining nut onto the crankshaft, carefully counting the total number of turns and fractions of a turn necessary to bottom the nut on the crankshaft. Then place the prop nut back in the hub and install the propeller, again counting turns on the nut until the prop is tight on the crankshaft and the nut correctly torqued. This count of nut turns to correctly seat the propeller hub on the crankshaft should be at least 1 turn less than the number of turns previously required to bottom the nut. If you cannot obtain the above fit, then you must replace the cone and spacer with new ones in mated sets.

2. Grumman will furnish new mated cone and spacer sets at cost to all customers requesting same as a result of this check, provided the old parts are returned for inspection.

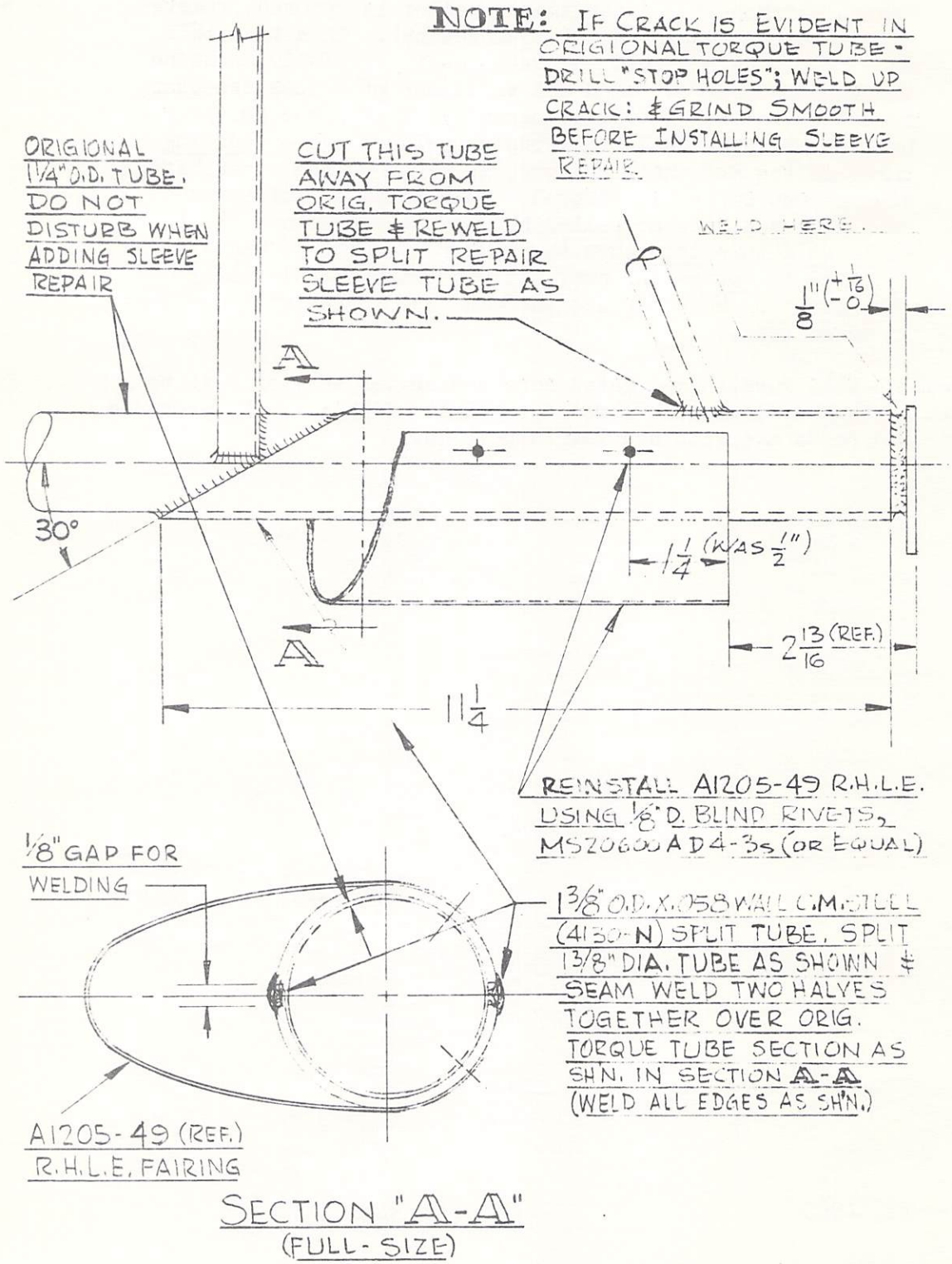
October 21, 1965

Grumman

FIG. 1

FAA APPROVED FIELD REPAIR ON R.H. ELEVATOR TORQUE TUBE FOR GRUMMAN G-164 & G164A

(APPLICABLE TO 1ST. 436 AIRCRAFT)



SECTION "A-A"

(FULL-SIZE)

Grumman

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE BULLETIN #33
ALERT

SUBJECT: Cracks in Elevator Torque Tube (Inboard End) of G-164 A/C

APPLICABILITY: A/C S/N 1 thru 436

ENCLOSURE: (a) Copy of Approved Repair, E.C.O. #S164-1697"A"

1. This is an ALERT BULLETIN. It is intended that all the subject Ag-Cat Owners examine the elevator torque tubes near the inboard end (approx. 3 inches off center line airplane) for radial cracks which could originate from the two inboard 1/8 dia. blind rivet holes which fasten the elevator L.E. skin cover to the elevator torque tubes.

2. There have been three instances where operators have noticed cracks originating from or adjacent to these 1/8 dia. holes in the area where the inboard-most rib welds to the torque tube on R.H. elevators only. Since the cracks were reported as being on R.H. elevators only (and only R.H. elevators have these 1/8 dia. holes drilled into them at this spanwise location), we naturally assume that the cracks originated at the holes. It is also probable that the cracks are the result of fatigue of the torque tube since all reports are on aircraft with considerable time, (1300 to 2000 hours).

3. If cracks are evident, it will be necessary to repair per E.C.O. #S164-1697"A".

March 8, 1966

Grumman

F-200

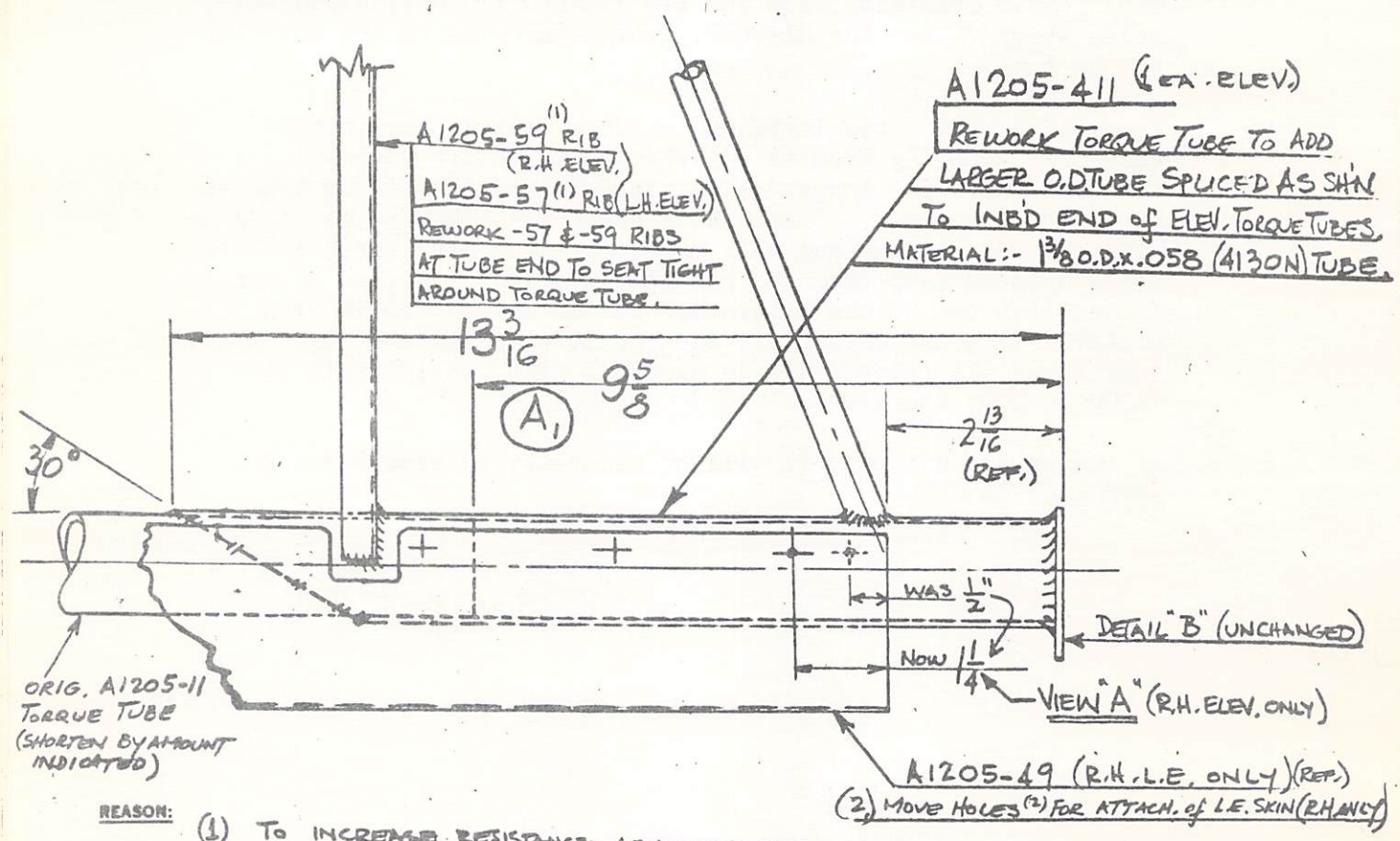
CHG. LET.	DESCRIPTION	APPR'D
A1	13 3/16 & 9 5/8 DIMS. WERE ONE INCH SHORTER. ARK ECH 3-7-66	ARK 3-7-66

SCHWEIZER AIRCRAFT CORP.

ENGINEERING CHANGE ORDER

TITLE:	ELEVATORS – FRAME ASSYS (L.H. & R.H)					CHG. LET.	
CHG. INC.		EFFECTIVITY	ELEV. S/N 462 & ALL REPAIRS TO ELEVATORS	PARTS AFFECTED	✓	ECO. SERIAL	9164-1697A
BY				TOOLS AFFECTED	✓	D.C.R. SERIAL	—
DATE		CHECKED	ARK 2-15-66 ES 3-7-66	STOCK DISPOSITION	—	DWG. NO.	A1205 "A"

CHANGE: (1.) ADD 1 3/8 O.D. x .058 TORQUE TUBES (P/N A1205-411) (1 EA. ELEVATOR) BY SPLICING ON INB'D ENDS AS SHOWN BELOW ON -3/-4 WELD ASSYS. (THIS REDESIGN WILL ALSO APPLY TO ALL REPAIRS MADE TO ELEVATORS IN THIS AREA.)



REASON: (1) TO INCREASE RESISTANCE AGAINST FATIGUE FAILURE of TORQUE TUBES
(2) TO POSITION HOLES AWAY FROM CRITICAL X-SECTION of TORQUE TUBE (R.H. ELEV. ONLY!)

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE BULLETIN #33
ALERT ("A" REVISION)

SUBJECT: Cracks in R.H. Elevator Torque Tube (Inboard End) (G-164 & G-164A Aircraft)

APPLICABILITY: A/C S/N 1 thru 436

ENCLOSURE: (a) Fig. 1, Detail of FAA Approved Field Repair

1. A previous issue of ALERT SERVICE BULLETIN #33 brought to Ag-Cat owners' attentions the possibility that fatigue cracks could develop at the inboard end of the R.H. elevator torque tube, originating at the 1/8" dia. drilled holes for blind rivet attachment of the elevator L.E. skin cover to the elevator torque tube. Originally, Alert Service Bulletin #33 included a drawing (E.C.O. #S164-1697"A") which showed a method of repair which was suitable for production, but not too easy to accomplish in the field. This revision, (Revision "A") includes enclosure (a); (Fig. 1, Detail of FAA Approved Field Repair), which is a relatively simple field repair method, and which has FAA approval.

May 18, 1966

Grumman

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE BULLETIN #34
(MANDATORY)

SUBJECT: Addition of Surface Control Lock Safety Device

APPLICABILITY: Aircraft S/N 301 thru 400 Only

KIT OF FURNISHED PARTS:
1 - #7 Dowsett Tension Spring
2 - "S" Hooks (#9 Gage x 1-3/8" Long)
1 - Dwg. A1521"B" (Sh. 2)

1. It has been brought to our attention by FAA Inspection that it is possible to foul the aircraft's control stick with the surface controls lock IF said lock has not been stowed fully forward and retained by the spring clip provided for that purpose.

2. Grumman has therefore added a tensioning spring, ($\frac{1}{2}$ O.D. x 16-3/8 O.A.L. x .072 gauge), to the R.H. side of the control surface parking lock as shown on Grumman Dwg. A1521"B" (Sh. 2) to positively prevent any possibility of fouling of the control stick in flight with the control locking device. You will note by referring to the enclosed drawing that this tensioning spring is anchored on each end by a heavy gauge "S" hook which makes for a very simple attachment which does not require that the ends of these "S" hooks be pinched closed.

3. The parts to accomplish this change and a portion of G-164 drawing A1521"B" (Sh. 2) are furnished herewith at no cost for you to install. This is a mandatory change and should be accomplished before the next flight. (Installation time is one minute.)

March 8, 1966

Grumman

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE BULLETIN #35
ALERT

SUBJECT: Addition of Cushion Clamps to Support Flexible Oil Pressure Line (Jacobs R-755 Oil System)

APPLICABILITY: All Jacobs R-755 Power Plant Installations Thru A/C S/N 407

ENCLOSURE: (a) Copy of E.C.O. #S164-1747

1. This is an Alert Service Bulletin. It is published as the result of an FAA Material & Defect Report on G-164 A/C S/N's 319 & 320 where it was detected that the 1" O.D. Oil "IN" line to the engine was badly chafed where the Flexible Aeroquip oil pressure line was taped to it for support. Enclosure (a) shows how this flexible oil pressure line should be supported to the Oil "IN" line to prevent chafing. The cushion clamps and hardware may be procured from your distributor or any other source of approved AIRCRAFT HARDWARE.

2. The intent of this Service Bulletin is to call for immediate inspection of the condition of these two lines; replacement if necessary; and installation of cushion clamps per Enclosure (a) in lieu of previous support of the flexible hose assembly.

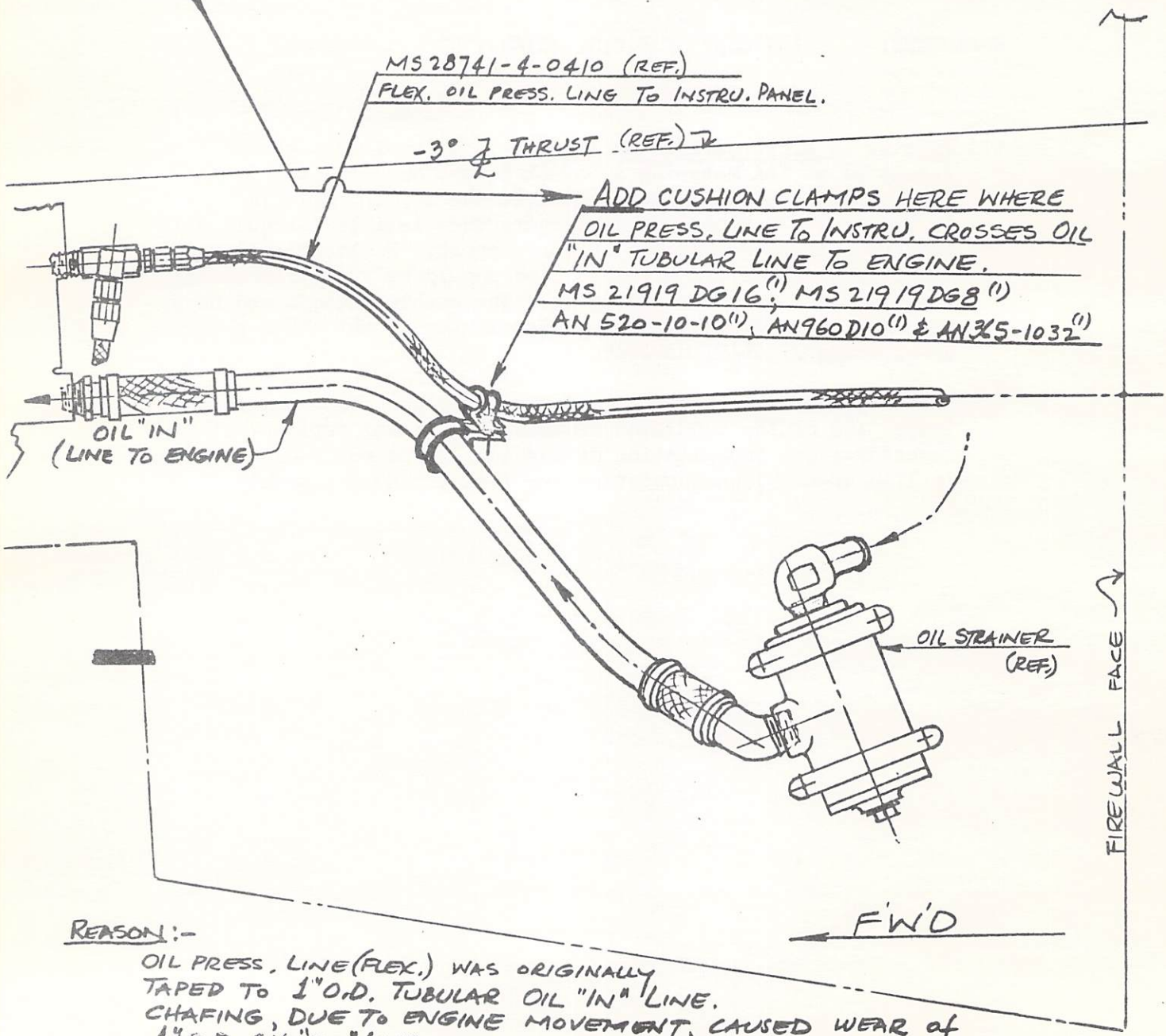
April 8, 1966

Grumman

SCHWEIZER AIRCRAFT CORP.

ENGINEERING CHANGE ORDER							CHG. LET.	
TITLE:	OIL SYSTEM (ASS'Y & INSTALL) (JACOBS R-755 ENGINE)							
CHG. INC.		EFFECTIVITY	ALL	PARTS AFFECTED	✓	ECO. SERIAL	S164-1747	
BY		CARD POSTED		TOOLS AFFECTED	—	D.C.R. SERIAL	—	
DATE		CHECKED	ARK 4-8-66	STOCK DISPOSITION	—	DWG. NO.	A1704	

CHANGE:



REASON:-

OIL PRESS. LINE (FLEX.) WAS ORIGINALLY TAPED TO 1" O.D. TUBULAR OIL "IN" LINE. CHAFING, DUE TO ENGINE MOVEMENT, CAUSED WEAR of 1" O.D. OIL "IN" LINE.

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE BULLETIN #36
ALERT

SUBJECT: Sulphur Dusting Prohibited

APPLICABILITY: Grumman G-164 & G-164A Model A/C, Serial Nos. 201 & Up and Any of the 1st 200 A/C Now Operating Without An Airplane Flight Manual

1. The subject model Grumman Ag-Cats were not originally certificated, nor are they currently approved, for sulphur dusting operations. Aircraft certificated prior to S/N 201 utilized an Airplane Flight Manual which stated under NOTE 7 that "Sulphur dusting is prohibited unless special fire prevention measures have been incorporated in the aircraft." The special fire precautions required of aircraft engaged in sulphur dusting operations are as noted in Airworthiness Directive 48-34-2 and as spelled out in CAM 8, 6.0-6.17.

2. The Airplane Flight Manual was replaced by suitable aircraft placards on A/C 201, up. When this change was made, all reference to prohibition of sulphur dusting without special fire prevention measures being required to the aircraft was inadvertently omitted. The purpose of this Alert Bulletin is to bring this omission to your attention.

3. A new approved placard will soon be released which will state: "Sulphur dusting is prohibited unless special fire prevention measures have been incorporated in the aircraft." This new placard will be available at no cost from your distributor and must be installed on all applicable aircraft. Delivery and installation instructions will be furnished by your distributor as soon as supply is available. (Approximately 90 days).

May 9, 1966

Grumman

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE BULLETIN #37

STATEMENT OF COMPLIANCE CARD ATTACHED

SUBJECT: Rework P/N A1648-1 Carburetor Air Duct As Per Attached E.C.O. #S164-1752

EFFECTIVITY: As soon as possible

AIRCRAFT AFFECTED: Super Ag-Cats With The Following Serial Numbers: 401, 402, 403, 404, 405, 406, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 419, and 420

REASON FOR CHANGE: To preclude the possibility of excess gasoline draining into the accessory cowl and creating a fire or explosion hazard

1. The Federal Aviation Agency has requested that this become a Mandatory Service Bulletin, requiring statement of compliance. Please comply with this Service Bulletin at once and mail the attached statement of compliance card so that FAA may be advised of the status of this condition.

July 27, 1966

Grumman

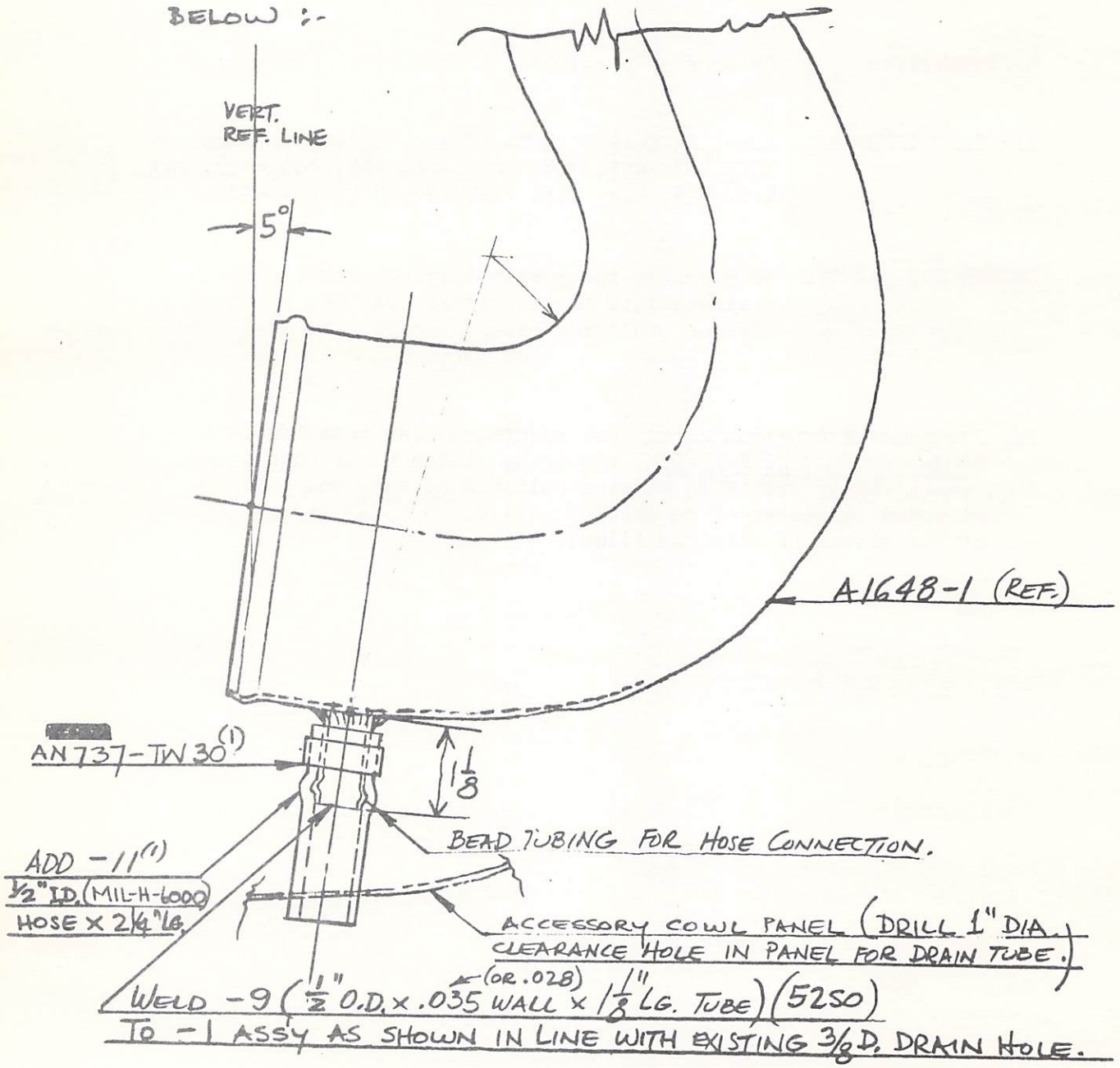
F-200

SCHWEIZER AIRCRAFT CORP.

ENGINEERING CHANGE ORDER							CHG. LET.	
TITLE:	DUCT – CARB. AIR INTERMEDIATE (R-985)							
CHG. INC.		EFFECTIVITY	ASAP	PARTS AFFECTED	✓	ECO. SERIAL	S164-1752	
BY		CARD POSTED		TOOLS AFFECTED	✓	D.C.R. SERIAL	—	
DATE		CHECKED	ARK 5-24-66	STOCK DISPOSITION	REWORK	DWG. NO.	A1648 "C"	

CHANGE:

(1) ADD DRAIN OUTLET TUBE TO A1648-1 ASS'Y AS SHOWN BELOW :-



GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE BULLETIN #38

SUBJECT: Rework of 12 Volt Exide (Type AC-78) Battery Hold Down Frames on 450 H.P. Fitted Ag-Cats Having 12 or 24 Volt Optional Electrical System Installed

APPLICABILITY: G-164A Aircraft, Serial Nos. 401 Thru 425, Plus 447 & 450 Only

ENCLOSURE: (a) Copy of Engineering Change Order No. S164-1797

1. 12 and 24 volt electrical systems fitted to the above G-164A Ag-Cats have battery hold down frames designed to fit early models of Exide Type AC-78 batteries. Recent issues of this same battery have been received with an improved battery terminal design which requires a change in the battery hold down frames (P/N A1372-29) as shown on Enclosure (a) to prevent an electrical short circuit.

2. To eliminate any chance of a short circuit of these batteries with the battery hold down frames, it will be necessary to rework the frames in accordance with Enclosure (a).

   CAUTION: BEFORE STARTING THIS REWORK, BE SURE TO REMOVE BATTERY GROUND CABLE AT THE BATTERY.

November 7, 1966

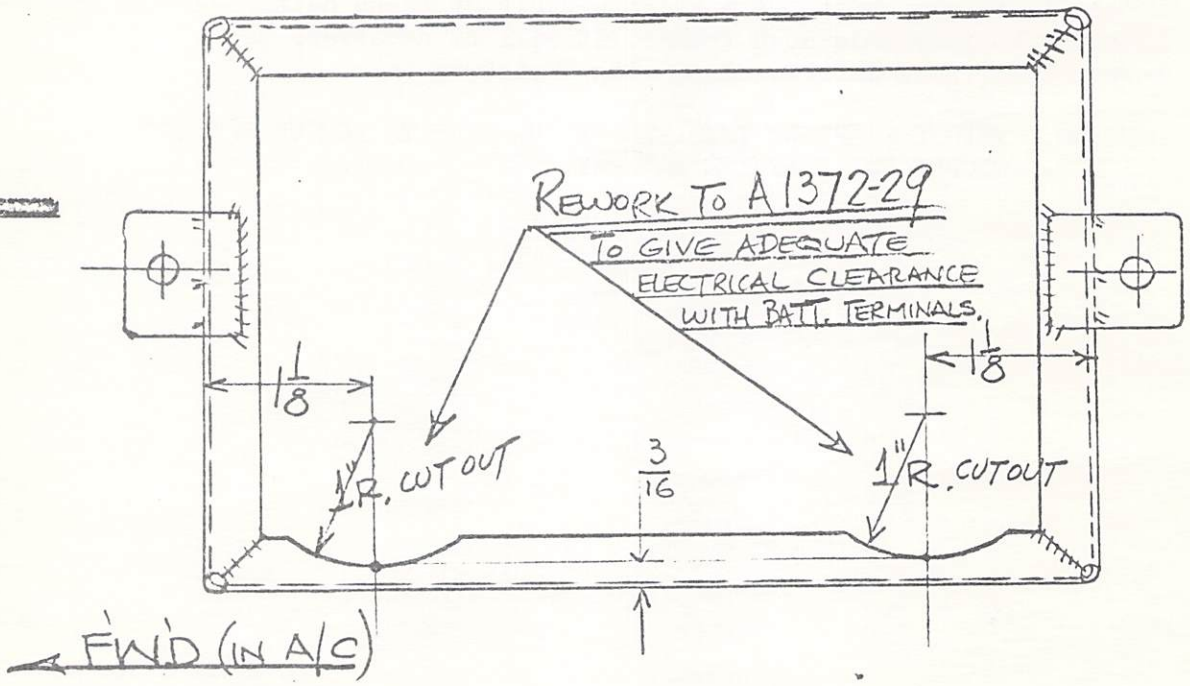
Grumman

SCHWEIZER AIRCRAFT CORP.

ENGINEERING CHANGE ORDER							CHG. LET.	
TITLE:	MOUNT (DETAILS & INSTALL.) — 12 OR 24 VOLT BATT. (R-985 ELECT. SYS)							
CHG. INC.		EFFECTIVITY	NOTED	PARTS AFFECTED	✓	ECO. SERIAL	S164-1797	
BY		CARD POSTED		TOOLS AFFECTED	✓	D.C.R. SERIAL	—	
DATE		CHECKED	ARK 11-4-66	STOCK DISPOSITION	REWORK	DWG. NO.	A1372 "D"	

EFFECTIVITY IS ON ALL G-164A A/C (401, UP) FITTED WITH A1372 ELECTRICAL SYSTEM. A/C 401 THRU 425 PLUS #447 & #450 WILL BE REWORKED IN SERVICE PER GRUMMAN SERVICE BULLETIN #38. ALL OTHER G-164A A/C ARE TO BE REWORKED PRIOR TO DELIVERY AT THE FACTORY AS SHOWN BELOW :-

1. BEFORE STARTING REWORK OF A/C IN SERVICE, BE SURE TO REMOVE BATTERY GROUND CABLE AT THE BATTERY.
2. REWORK A1372-29 BATT. HOLD DOWN FRAME AS SHOWN BELOW :-



GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE BULLETIN #39

SUBJECT: Rework of Parking Brake Control Lock Device

APPLICABILITY: Ag-Cat Serial Nos. 301 & Up

ENCLOSURE: E.C.O. #S164-1845

1. To prevent a remote chance of accidental locking of the R.H. brake master cylinder during flight maneuvering, the parking brake device shall be reworked as shown on the enclosed Engineering Change Order #S164-1845.

2. This change is one that should be done immediately and can be readily accomplished without new parts and in a matter of approximately one minute time.

3. This revision has been accomplished on all Ag-Cats delivered after February 15, 1967 at the factory.

February 15, 1967

Grumman

F-200

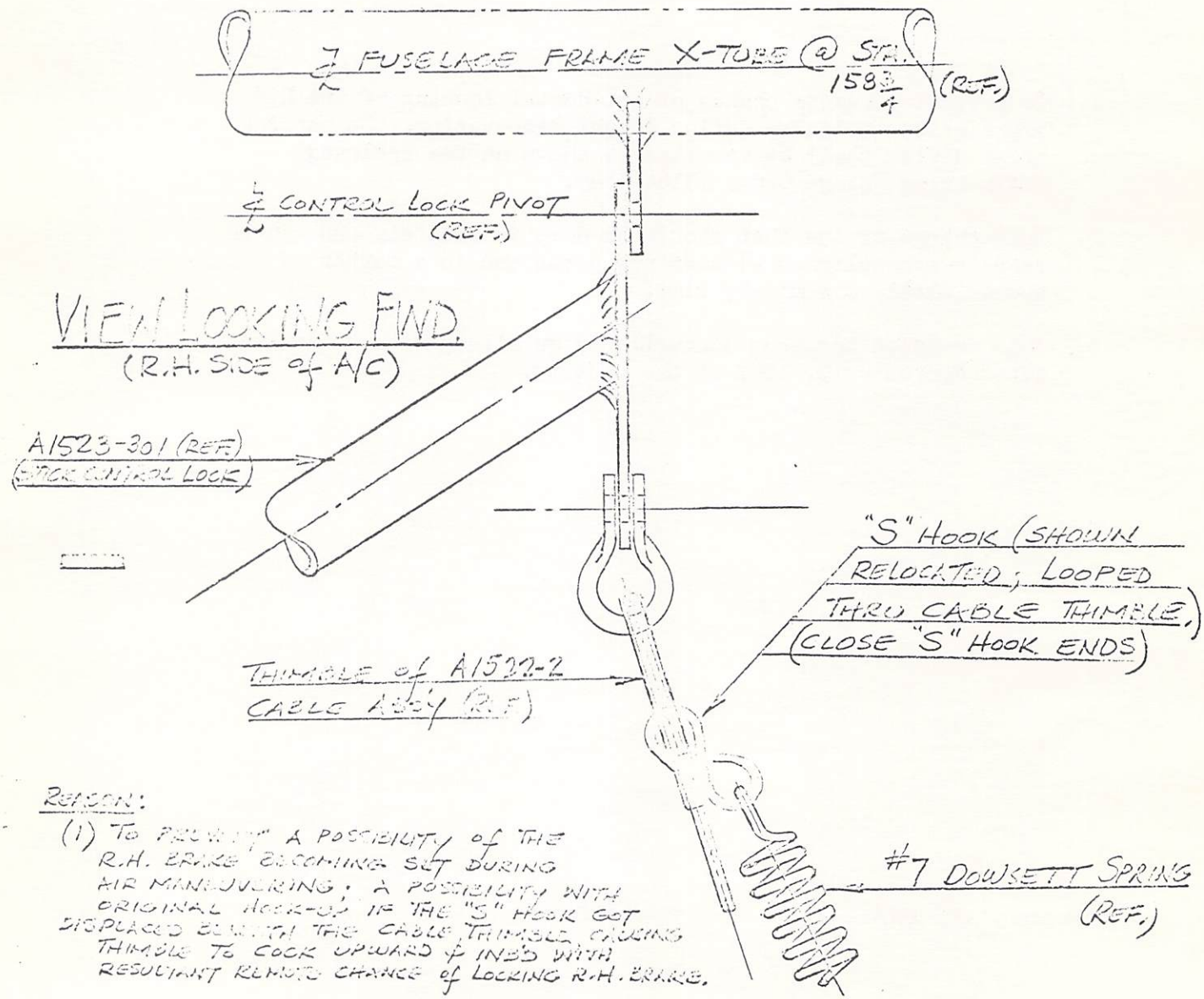
SCHWEIZER AIRCRAFT CORP.

ENGINEERING CHANGE ORDER							CHG. LET.	
TITLE:	PARKING BRAKE (INSTALL) — & STICK CONTROL LOCK							
CHG. INC.		EFFECTIVITY	A/C 301 UP	PARTS AFFECTED	—	ECO. SERIAL	S164-1345	
BY		CARD POSTED		TOOLS AFFECTED	—	D.C.R. SERIAL	—	
DATE		CHECKED	ARK 2-15-67	STOCK DISPOSITION	—	DWG. NO.	A1521"B"	

(SH. 2)

CHANGE:

(1.) DISCONNECT "S" HOOK THAT ATTACHES UPPER END OF #7 DOWSETT TENSION SPRING (ON R.H. SIDE of CONTROL LOCK) FROM AN 393-11 SHACKLE & RE-HOOK SAME INTO THIMBLE END of A1522-2 BRAKE LOCKING CABLE ASS'Y AS SHOWN BELOW :—



REASON:

(1) TO PREVENT A POSSIBILITY of THE R.H. BRAKE BECOMING SET DURING AIR MANEUVERING; A POSSIBILITY WITH ORIGINAL HOOK-UP IF THE "S" HOOK GOT DISPLACED BETWEEN THE CABLE THIMBLE, CAUSING THIMBLE TO COCK UPWARD & INBD WITH RESULTANT REMOTE CHANCE of LOCKING R.H. BRAKE.

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE BULLETIN #40

SUBJECT: Repair of Ag-Cat Engine Accessory Cowl Top Panel

ENCLOSURE: (a) Sketch of Repair for Accessory Cowl Panels Cracked Out Around Airloc Fasteners

1. The top accessory cowl panel is flat across the center portion. Because of this, considerable vibration occurs in service, resulting in occasional panel crack-outs around the airloc studs in this area.

2. This Service Bulletin, and particularly Enclosure (a), shows how a repair may be affected which should cure the problem.

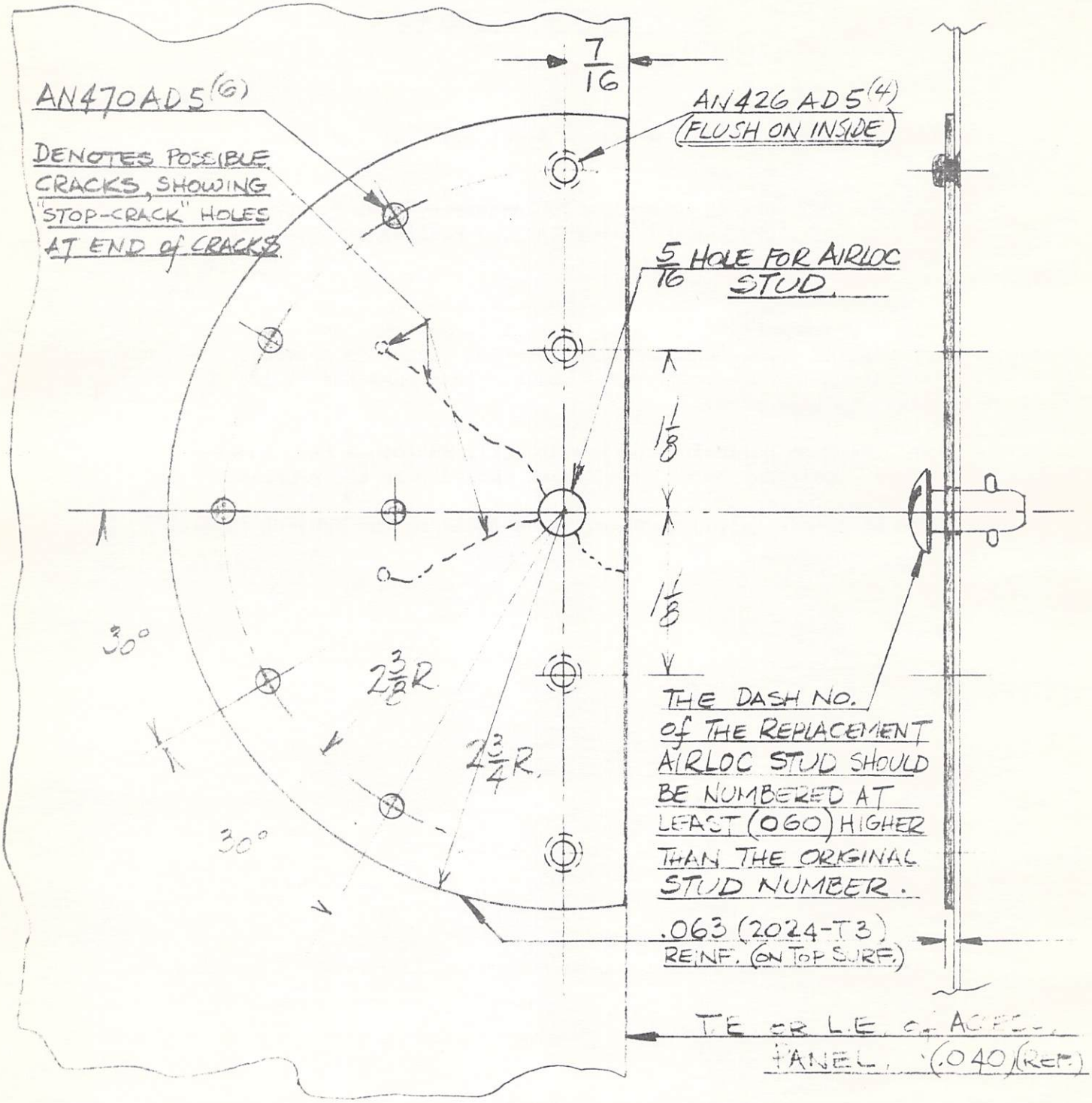
3. See Enclosure (a), next page, for details on the subject repair.

June 1, 1967

Grumman

(GAEC SERVICE BULLETIN #40)

ENCLOSURE (a)



GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE BULLETIN #41
ALERT

SUBJECT: Inspection & Repair of Elevator Pushrod Assembly at Control Stick. P/N's A1847-1 (1st 100 Aircraft) & A1847-3 (Aircraft 101 thru 400)

APPLICABILITY: G-164 Aircraft S/N 1 thru 400 Only

1. It has been brought to Grumman's attention that rivets attaching the subject rod end bearings to the subject pushrod tubing have, on several occasions, loosened, resulting in an unsound attachment of rod ends to the tubing.

2. It is therefore necessary that these assemblies be inspected immediately and at 100 hr. intervals for sound rivet connections. If any loose rivets are found, replace all rivets with AN3 bolts of appropriate length.

3. The above 100 hr. periodic inspections may be omitted once the pushrod assembly has been repaired by replacement of all rivets with AN3 bolts.

July 6, 1967

Grumman

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE BULLETIN #42

SUBJECT: Loose Rivets at L.E. Skin Attachment to Wing Beam

APPLICABILITY: All G-164 and G-164A Ag-Cats

It has been brought to our attention that a tendency toward loosening of rivets attaching wing L.E. skins to the upper capstrip of wing beams in the slipstream area is occurring more frequently since aircraft 401, and especially on Ag-Cats fitted with 450 h.p. engines. The factory has taken steps to improve the attachment by using more rivets, and in the case where blind countersunk rivets are called for we have gone to the use of blind countersunk Cherry Bulb rivets which have considerably better head-holding power. Starting with aircraft Serial No. 526, the factory will improve on the Cherry Bulb type blind rivets by calling for driven AN426-AD4's through the use of access holes for bucking same in the leading edge section.

The question of "how to improve on these fastenings on aircraft working in the field" arises often enough. The following instructions for approved repairs in this area are therefore given below:

1. Drill out loose nose skin attachment rivets; countersunk rivets on inboard portion of wing in the slipstream area, and brazier head rivets for the outer portions of the wing.

2. The lower panel inboard skins are of heavier gauge (.050) aluminum alloy and thus can readily be countersunk to take 5/32" dia. countersunk head blind rivets if the 1/8" dia. countersunk holes are enlarged due to vibration wear caused by friction of loose rivets. Care must be observed to be certain that the skins are held down tightly against the beam while countersinking since the countersink cut may extend slightly into the beam capstrip material. Whenever countersinking, the depth of countersink may be such that a maximum of .010 inch of the head should extend above the skin surface.

3. Whenever the nose skins are attached to the beam with blind rivets at spacings of approximately 3", an additional 1/8" dia. brazier head blind Huck or Cherry rivet shall be added in line with existing rivets and midway between them for extra holding power in addition to refastening any loose rivets.

April 4, 1968

Grumman

4. Whenever the nose skins are attached to the beam with blind rivets with the original spacing of approximately 1½" center to center, an additional 1/8" dia. brazier head blind Huck or Cherry rivet may be added midway between same for extra holding power in addition to refastening any loose rivets.

April 4, 1968

Grumman

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE BULLETIN #43

SUBJECT: Change in Insulation Details for Exide AC-78 Battery Installations

APPLICABILITY: G-164A Aircraft, Serial Nos. 401 and up which are equipped with Exide AC-78 Batteries and G-164 Aircraft which are changed to accommodate Exide AC-78 Batteries in accordance with Grumman Drawing No. A1899"B" and wired in accordance with Drawing A1897"A" with associated Engineering Change Order No. S164-1898

ENCLOSURES: (a) Copy of Engineering Change Order No. S164-1857
(b) Copy of Engineering Change Order No. S164-1892

1. 12 and 24 volt electrical systems fitted to G-164A Ag-Cats and 12 volt only systems fitted to earlier G-164 Ag-Cats that have been changed to use the Exide AC-78 Battery in combination with Grumman Hold-Down Frame, P/N A1372-29 must be fitted with Rubber Guards, P/N A1372-75 as shown in detail of E.C.O. S164-1892 attached and must be fitted with AN781-3 Rubber Insulating Nipples as shown in detail of E.C.O. S164-1857 attached.

2. The Exide AC-78 Battery is furnished with approved plastic terminal shields which were installed on earlier G-164A Ag-Cat battery installations. These shields, however, are designed to be snapped on to the terminal stud after installation of the cable. It has been learned that in some cases these shields have been inadvertently removed or accidentally knocked free during service. To preclude the possibility of this occurrence, the plastic shields have been replaced with AN781-3 Rubber Insulating Nipples. These nipples may only be removed by first removing the cable from the battery terminal, offering greater assurance of continued protection.

   To offer further insulation between the battery terminals and the Hold-Down Frame, the A1372-75 Rubber Guards are installed. These Guards also prevent intrusion of sulphate corrosion between terminal and frame, thereby lessening the possibility of fumes caused by current flow through the sulphate. These corrective actions should be taken on all Ag-Cats using the manifold-vented AC-78 battery as soon as possible.

April 10, 1968

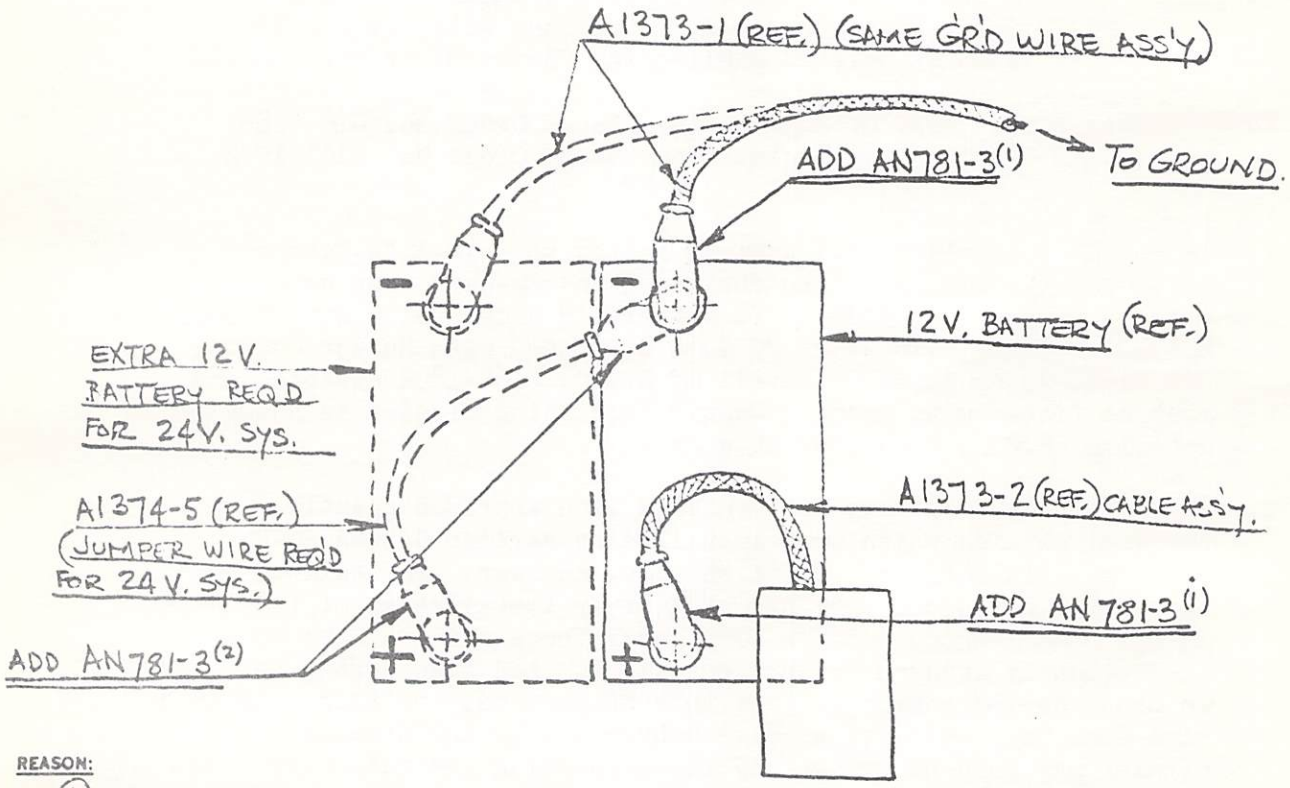
Grumman

SCHWEIZER AIRCRAFT CORP.

ENGINEERING CHANGE ORDER							CHG. LET.	
TITLE:	HARNESS & EQUIP.- (DETAILS, ASS'Y & INSTALL.)- 12V. OR 24V.							
CHG. INC.		EFFECTIVITY	453 UP	PARTS AFFECTED	✓	ECO. SERIAL	S164-1857	
BY		CARD POSTED		TOOLS AFFECTED	—	D.C.R. SERIAL	—	
DATE		CHECKED	ARK. 6-21-67	STOCK DISPOSITION	—	DWG. NO.	A1374	

CHANGE:

(1) ADD EITHER TWO (2) OR FOUR (4) AN 781-3 INSULATING NIPPLES, ELECTRICAL TERMINAL TYPE, TO 12 VOLT OR 24V. BATTERY TERMINAL LEADS AS SHOWN BELOW IN SKETCH FORM:—



REASON:

(1) TO PROVIDE ADDITIONAL TERMINAL INSULATION AGAINST GROUNDING.

F-200

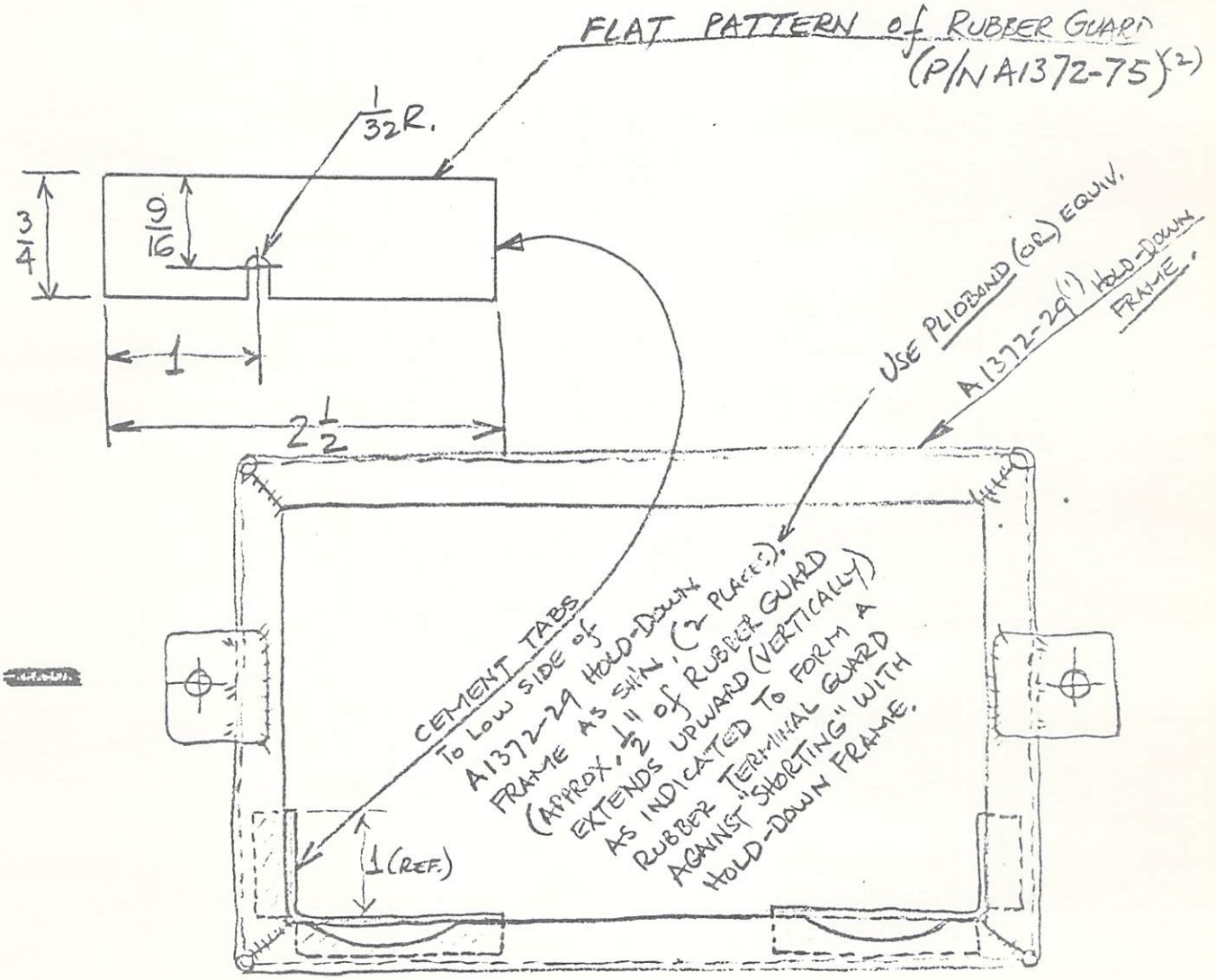
CH'G.	DESCRIPTION	APPROV.
A	ADDED APPLICABILITY TO INSTALL. DWG. A1899"B"	A.R.Koch 4-10-68

SCHWEIZER AIRCRAFT CORP.

ENGINEERING CHANGE ORDER							CHG. LET.	
TITLE:	MOUNT (DETAILS & INSTALL) – 12 OR 24 VOLT BATT. ELECT. SYS.							
CHG. INC.		EFFECTIVITY	ASAP	PARTS AFFECTED	L	ECO. SERIAL	S164-1892	
BY		CARD POSTED		TOOLS AFFECTED	—	D.C.R. SERIAL	—	
DATE		CHECKED	ARK 3-18-68	STOCK DISPOSITION	NONE	DWG. NO.	A1372"D"(SH.1) & A1899"B" (A)	

CHANGE: REF:- ECO. # S164-1797"A"

1. AFTER PERFORMING REWORK of A1372-29 BATTERY HOLD-DOWN FRAME, CEMENT IN PLACE $\frac{1}{16}$"t. RUBBER TERMINAL GUARDS (2/BATTERY) AS DETAILED BELOW :- (BACK FIT, ALL ELECT. SYSTEMS, USING OPEN TERMINAL BATTERIES)



GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE BULLETIN #44

SUBJECT: Modification of Fan Brake Control

APPLICABILITY: All Grumman G-164 and G-164A Model Aircraft, Serial Nos. 1 through 625 When Equipped With A1976-11 Fan Brake Control

ENCLOSURE: Copy of Engineering Change Order No. S164-2059

1. To permit greater lock-up travel of spray pump brake cable and to allow greater compression of the fan brake control spring, the A1976-11 control lever should be modified as shown in detail of E.C.O. S164-2059 attached.

2. The greater slipstream velocity of the higher horsepower Ag-Cat engines may cause the fan brake to slip unless the brake is kept adjusted to close tolerance at all times. Should the fan brake slip with no liquid load on the pump, a runaway condition will exist which may cause the fan to explode, doing considerable damage to the aircraft. The modification shown allows the brake control lever to travel further forward, thereby allowing the brake control cable to be tightened a greater amount. On some aircraft it will be necessary to cut one inch of the plastic control cable housing away on the end in the cockpit to allow the cable to travel the required amount forward. After modification the brake must be readjusted by loosening the cable clamp at the pump brake arm and pulling tight until the brake arm has 1/4 in. free lash at the control cable attach point.

3. This greater control travel will allow the brake to wear a much greater amount before adjustment is necessary. Note that this takeup of the cable is the only brake adjustment possible.

June 6, 1969

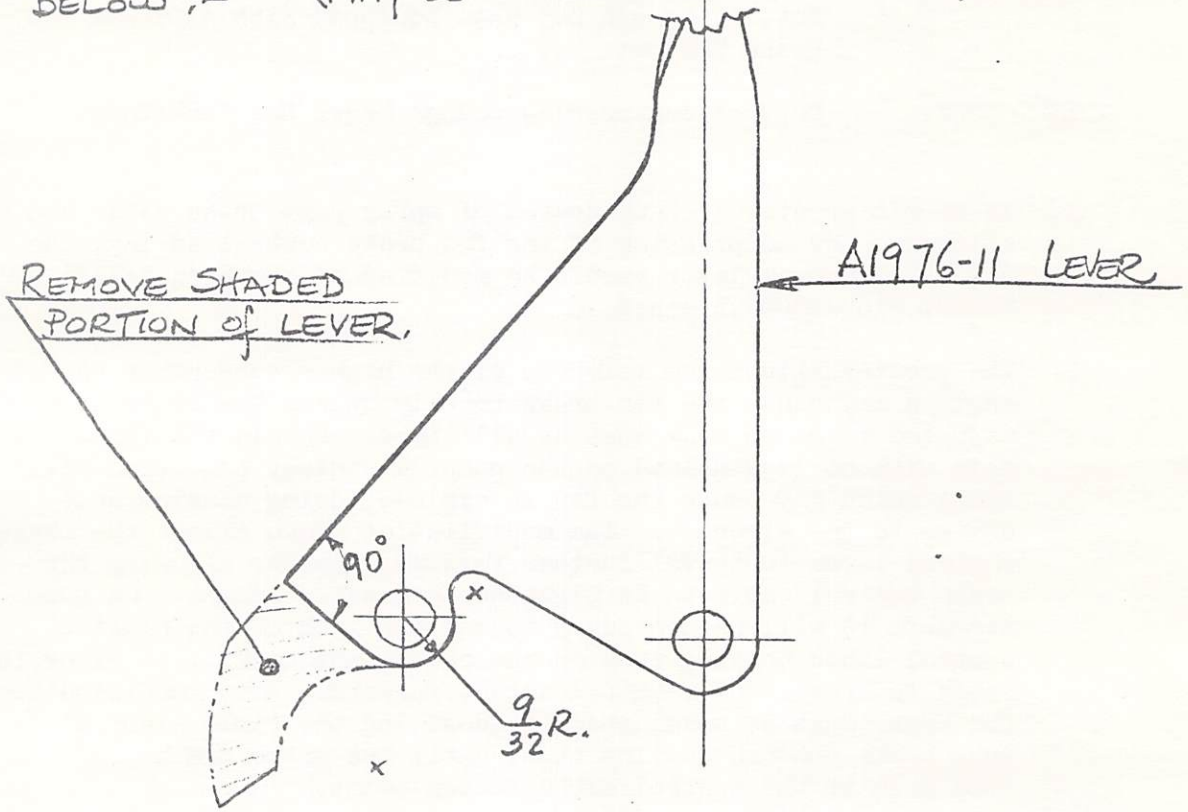
Grumman

SCHWEIZER AIRCRAFT CORP.

ENGINEERING CHANGE ORDER							CHG. LET.	
TITLE:	CONTROL (DETAILS & ASSY) — FAN BRAKE							
CHG. INC.		EFFECTIVITY	626, UP	PARTS AFFECTED	L	ECO. SERIAL	S164-2059	
BY		CARD POSTED		TOOLS AFFECTED	L	D.C.R. SERIAL	—	
DATE		CHECKED	ARK 6-3-69	STOCK DISPOSITION	REWORK	DWG. NO.	A1976"B"	

CHANGE:

1. CUT OFF STOP PORTION of -11 LEVER AS DETAILED BELOW ;— (MAY BE BACK-FITTED ON ALL A/C)



REASON:

1. TO PERMIT GREATER LOCK-UP TRAVEL of BRAKE CABLE.

GRUMMAN AEROSPACE CORPORATION

AG-CAT SERVICE BULLETIN #45

SUBJECT: Reinforcing Fabric Attachment and Trailing Edge Skins for 600 h.p. Ag-Cats

APPLICABILITY: All Grumman G-164A Model Aircraft Powered With R-1340 Engines

The greater slipstream velocity and increased wing loading of the 600 h.p. Super Ag-Cats may cause cracking of the metal skin and loosening of fabric rivet attachments, particularly on upper wings in the slipstream area. Several improvements have been made to production aircraft to correct these problems, but at present time the service history is too short in duration to correctly evaluate the effectiveness of the changes. These and other improvements which may prolong service life are listed below.

1. The metal skin panel most subject to cracking is that section of upper wing panels between the rear beam and the trailing edge extending from the wing butt to the aileron cutout. This panel was originally of .016 thickness 6061-T6 alloy. This entire panel has now been changed to .025 thickness which should add considerable strength and resistance to vibratory movement. The new heavier panel may be ordered as a spare or fabricated from sheet stock on hand. Even greater thickness may be used by a repair agency to effect greater strength.

   Localized areas adjacent to the trailing edge or next to wing ribs that seem to be most subject to cracking may be reinforced by a simple patch placed over the area in accordance with acceptable methods and practices.

   If cracking occurs at rivet holes or along the ribs, the rivet spacing should be decreased by inserting another rivet midway between each existing rivet.

   Wing rib cap flanges are wide enough to use the next larger size rivets if holes become enlarged.

   As an alternative to heavier skin it would be permissible to add an intermediate trailing edge rib midway between existing ribs. This would reduce the overall size of panel sections and add considerable strength. The underside of the wing would also benefit by having better support and more fasteners for the fabric.

September 9, 1969

Grumman

The ultimate beef-up would be to add an intermediate trailing edge rib between each existing trailing edge rib, install .025 thickness skin panel and double up on rivets by using half the present spacing.

2. Fabric suffers damage from the same conditions that affect the metal skin. The following changes will improve service life:

Add a 2" wide finishing tape at the trailing edge over the existing fold-back.

Add a 4" wide finishing tape spanwise from inboard rib to aileron cutout area, centering it over the rear beam.

On upper wing panels only, add 2" wide finishing tape diagonally from inboard corner at trailing edge to rear beam at 2nd rib outboard from butt.

If fabric rivets have torn through the 1/2" wide reinforcing tapes, install new tapes in one continuous piece from front beam to trailing edge. Double the number of fabric rivets by installing an extra rivet between each existing rivet.

Besides the 2" finishing tape over the reinforcing tape add another 4" wide finishing tape over the 2" wide tape.

Extra coats of dope will help when finishing off. The extra weight will make the fabric less responsive to movement.

Grumman

GRUMMAN AEROSPACE CORPORATION

AG-CAT SERVICE BULLETIN #46

SUBJECT: Substitution of AN911-3S Pipe Nipple Fittings for AN911-3D (Aluminum Alloy) Fittings in the Fuel System of G-164A Aircraft Fitted With R-1340 (600 h.p.) Engines

APPLICABILITY: All 600 h.p. G-164A Fuel Systems On A/C Up To Serial No. 850

1. It has been brought to our attention that several AN911-3D (aluminum alloy) straight pipe nipple fittings located at the carburetor inlet port of the fuel system have developed cracks in the threaded area of the fitting. These fittings occur only on 600 h.p. installations.

2. Since there are three (3) of these AN911-3D nipple fittings in the 600 h.p. fuel system forward of the firewall bulkhead, Grumman has elected to substitute corrosion resistant steel AN911-3S nipples at all three locations commencing with aircraft Serial No. 850. The three nipples to be replaced with AN911-3S units are located as follows: two (2) in the carburetor inlet line and one (1) at the outlet boss of the in-line fuel strainer mounted on the forward side of the firewall bulkhead.

3. This change is mandatory because it involves safety of flight. If you are unable to locate these AN911-3S nipples you can order them from us at $4.95 each.

October 27, 1971

Grumman

GRUMMAN AEROSPACE CORPORATION

AG-CAT SERVICE BULLETIN #47

SUBJECT: Additional Engine Primer Line Support - All 450 & 600 h.p. Engines (G-164A)

APPLICABILITY: All G-164A Aircraft Fitted With R-985 or R-1340 P & W Engines

ENCLOSURE: Copy of Engineering Change Order No. S164-2435

1. To reduce the possibility of vibration fatigue failure of the A1750-423 engine primer line, Grumman has provided additional support of the line per enclosure on all production G-164A model aircraft commencing with Serial No. 856.

2. This Service Bulletin is issued to call attention to the need for extra support of this primer line on all 450 and 600 h.p. models delivered prior to Serial No. 856.

December 13, 1971

Grumman

F-205

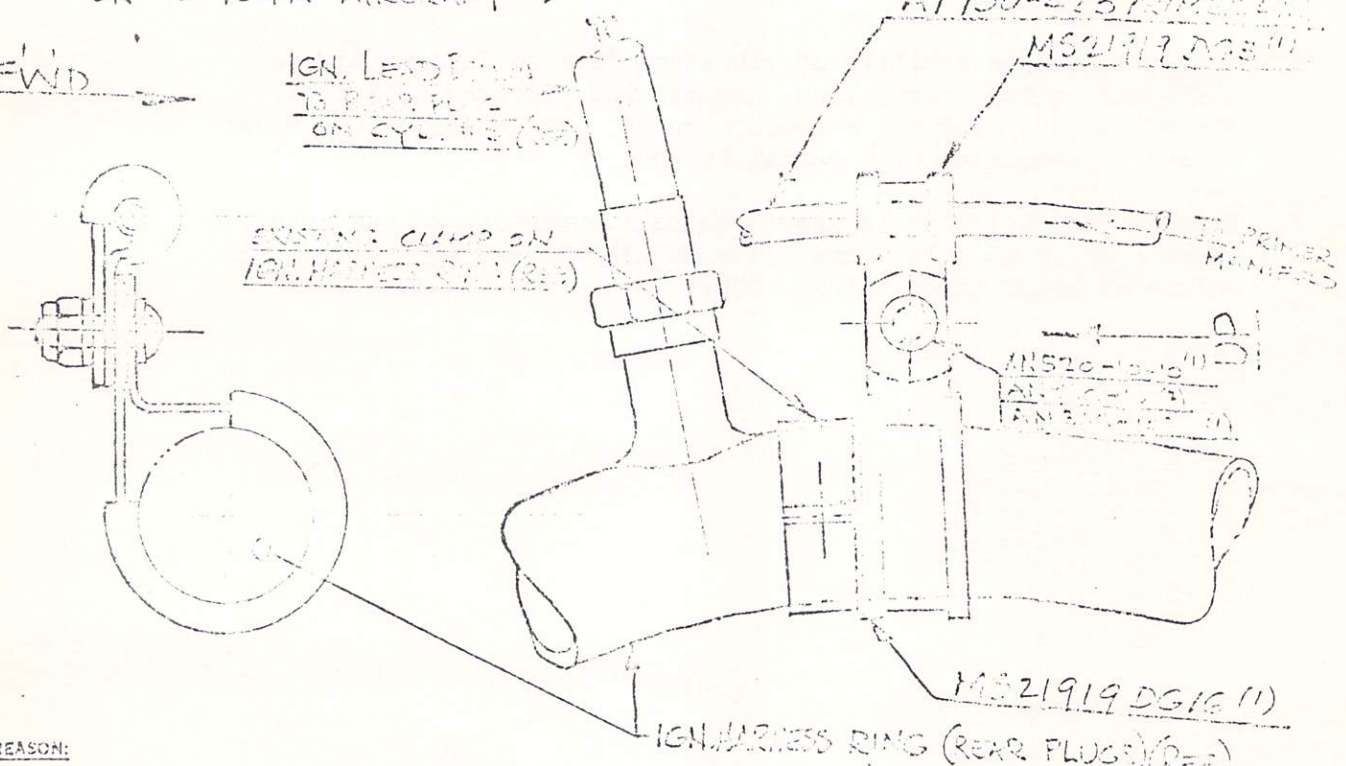
SCHWEIZER AIRCRAFT CORP.

ENGINEERING CHANGE ORDER							CHG. LET.	
TITLE:	FUEL SYS. INSTALLATION (450 & 600 h.p. ENGINES)							
CHG. INC.		EFFECTIVITY	NOTED	PARTS AFFECTED	—	ECO. SERIAL	S64-212	
BY		CARD POSTED		TOOLS AFFECTED	—	D.C.R. SERIAL	—	
DATE		CHECKED	ARK 10-27-71	STOCK DISPOSITION	NONE	DWG. NO.	A1750 F	

(NOTE:- MAY BE RETROFITTED ON A/C PRIOR TO S/N 856) (SH-1)

CHANGE:

1. STARTING IN PRODUCTION ON A/C S/N 856, CLAMP A1750-423 PRIMER LINE TO THE IGNITION HARNESS RING JUST BELOW THE IGNITION LEAD BRANCH FOR THE REAR SPARK PLUG of #9 CYLINDER AS SHOWN BELOW FOR ALL 450 & 600 h.p. ENGINE INSTALLATION ON G-164A AIRCRAFT :-



REASON:

1. TO PROVIDE ADDED SUPPORT AGAINST VIBRATION TO THE PRIMER LINE APPROX MID-WAY BETWEEN THE ENGINE MT'D PRIMER MANIFOLD & THE BULKHD FITTING IN THE PRIMER LINE @ THE ENGINE BAFFLE.

GRUMMAN AEROSPACE CORPORATION

AG-CAT SERVICE BULLETIN #48

SUBJECT: Fuel Gage Pointer

REFERENCE: Engineering Change Order #S164-2316 (attached)

APPLICABILITY: All G-164 & G-164A Model Aircraft Manufactured Prior to S/N 801

1. It has been brought to our attention that it is possible to be confused as to which end of the fuel gage pointer is directed at the correct gallonage on the fuel gage dial because of the manner in which the pointer is painted. E.C.O. S164-2316 was written to correct this possibility.

2. If your aircraft has a pointer painted contrary to what is shown on E.C.O. S164-2316, the correction may be made in the field by removing the snap-ring that locks the glass window in place on the gage, removing the excess glass sealant compound from the gage body and then lifting the glass window out of the gage body with a small suction cup. (The glass may be removed by other means, but extreme care must be exercised to prevent breakage.) After the glass is removed, repaint the pointer in accordance with E.C.O. S164-2316, and reverse procedure for re-assembly.

February 29, 1972

Grumman

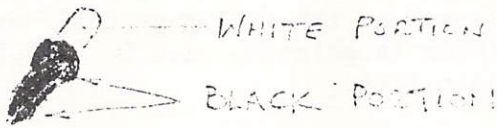
F-200

SCHWEIZER AIRCRAFT CORP.

ENGINEERING CHANGE ORDER							CHG. LET.	
TITLE:	FUEL GAGES (33, 46, 64 & 80 GAL DIALS)							
CHG. INC.		EFFECTIVITY	ALL	PARTS AFFECTED	✓	ECO. SERIAL	S160-23	
BY		CARD POSTED		TOOLS AFFECTED	—	D.C.R. SERIAL	—	
DATE		CHECKED	APK 11-24-70	STOCK DISPOSITION	REWORK	DWG. NO.	A1752-46 A1752-6 A1752-8 A1752-1	

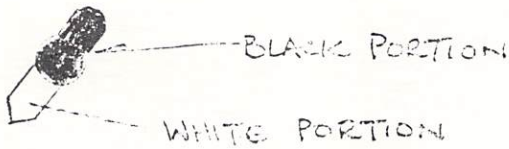
CHANGE:

1. WHEN THE SUBJECT GAGE DIALS FOR 33, 46, 64 & 80 GAL. GAGES ARE OF "WHITE BACKGROUND WITH BLACK NUMERALS", THE POINTER SHALL BE PAINTED AS BELOW :-



NOTE :-

IF THE SUBJECT GAGE DIALS ARE OF "BLACK BACKGROUND WITH WHITE NUMERALS", THE POINTER SHALL BE PAINTED AS BELOW :-



REASON:

GRUMMAN AEROSPACE CORPORATION

AG-CAT SERVICE BULLETIN #49

SUBJECT: Substitution of AN912-4S Reducer Fitting for AN912-4D (aluminum alloy) Fitting in the Fuel System of G-164A Aircraft Fitted With R-1340 (600 H.P.) Engines

APPLICABILITY: All 600 H.P. G-164A Fuel Systems on Aircraft Up To Serial No. 971

1. It has been brought to our attention that an aluminum reducer, part number AN912-4D, has failed either because of over torquing or induced vibration. The part is located in the fuel inlet boss of the carburetor. This aluminum type reducer shall be replaced with a stainless steel 347 reducer, part number AN912-4S.

2. Caution should be used in installing this part to avoid over torquing this fitting and connecting fittings.

3. This is a safety of flight item and, therefore, mandatory. If you are unable to locate this AN912-4S reducer, it may be ordered from Grumman Aerospace Corporation at $6.05 each.

June 12, 1972

Grumman

GRUMMAN AEROSPACE CORPORATION

AG-CAT SERVICE BULLETIN #50

SUBJECT: Mandatory Replacement of Outboard T.E. Boom Support Brackets with new design Outboard Supports per Dwg. A2903 "B" Rev.

APPLICABILITY: All G-164 & G-164A Model Aircraft in service prior to S/N 967 fitted with A2903-1 & -2 Outboard Boom Supports for 1½" dia. booms. (approx. 32 aircraft involved)

ENCLOSURE: Copy of Engineering Change Order No. S164-2524 and Dwg. A2903 "B" (Detail & Installation of New Design Outboard T.E. Boom Support Brackets)

1. The manufacturer's attention has been directed to the fact that the outboard T.E. boom support brackets on the applicable aircraft are located so that deformation of the boom aft of the aileron, caused by snagging a tree branch or other object that the aircraft may collide with in flight, could cause the subject boom support to jam the aileron, creating a potentially dangerous situation. Since this is a possibility, though remote, Grumman has designed and will furnish, free of charge, a replacement kit for these two outboard boom supports to be installed by owners of applicable aircraft. This change is mandatory because failure to comply could involve safety of flight. Kits will be furnished by Grumman upon request directed to:

   Grumman Aerospace Corporation
   P. O. Box 147
   Elmira, New York 14902

2. The change involves removal of the outboard T.E. boom supports (located immediately outboard of the ailerons) from the applicable aircraft, and installation of the new design supports as detailed on enclosed Dwg. A2903 "B" Rev. and Engineering Change Order No. S-164-2524.

July 11, 1972

Grumman

GRUMMAN AMERICAN AVIATION CORPORATION

AG-CAT SERVICE BULLETIN #51

SUBJECT: Inspection of Bolts Connecting Elevator Torque Tubes with Elevator Control Horn.

1. The AN4-12A (2) bolts connecting the two elevator torque tubes with the elevator control horn have been reported as loosening, causing wear and possible failure of the bolts. These bolts and associated parts are exposed to chemical intrusion which may contribute to their becoming loose. Inspection should be made at 100-hour intervals or every 60 days, whichever occurs first, to determine that the nuts on these bolts are made up to standard torque (50 - 70 in. lb.)

2. If any looseness is detected, the bolts must be removed and inspected for wear. Any indication of wear is cause for replacement.

3. The subject AN4-12A bolts must be replaced at intervals not to exceed 1000 hours or 1 year, whichever occurs first.

August 1, 1973

GRUMMAN AMERICAN AVIATION CORPORATION

AG-CAT SERVICE BULLETIN #52

SUBJECT: Modification of Kohler Fuel Primers to Prevent Gasoline Flow-through to Engine.

The subject primer pumps should be pushed in and locked after each use, however should they be inadvertently left unlocked no gasoline should flow through them with the approximately 1 psi head pressure developed from the fuel tank elevation.

The spring pressure against the small ball check valves in the pump is usually sufficient to stop fuel flow, however some pumps are found to have less spring tension than others and may flow a considerable amount of fuel through the primer and into the cylinders when the engine is stopped with the pump unlocked. If the engine is running this action is common because manifold pressure below 30 in. will suck fuel through giving an indication of rich mixture. The dangerous condition is when this happens with a stopped engine because of unsuspected gasoline hydraulic lock in the engine cylinders which can quickly cause enough damage to require immediate engine removal.

An easy rework of the spring in either of the primer pump check valves will ensure that this condition cannot happen. Simply remove the check valve plug with a screw driver and remove the small spiral spring above the ball. This spring will normally measure about 1/4 in. overall. Stretch this spring to 3/8 in. overall length and replace. This will increase the pop pressure of this valve to between 4 and 5 psi which is adequate to prevent flow-through. Production Ag-Cats have the inlet valve on the pump in the clear and pointing straight up. The plug and spring on this valve may be removed without disturbing the ball. Removing the side panel exposes the pump which need not be removed for this operation.

All Ag-Cats from S/N 1163 and up will have this modification incorporated.

October 31, 1973

GRUMMAN AMERICAN AVIATION CORPORATION

AG-CAT SERVICE BULLETIN #53

SUBJECT: Relocation of Fuel Shut-off Valve Control Stops.

ENCLOSURES: (a) Copy of Engineering Change Order #S164-2691C
(b) Instruction Sheet No. 53.

APPLICABILITY: Grumman Model G-164A Aircraft S/N 1176 thru S/N 1209, with the following exceptions:
(a) S/N 1193, 1197, 1200, 1202, 1203, 1206, and 1207 which have been complied with.

Following the design and installation of the larger diameter fuel line system used for gravity flow on S/N 1176 and up, it has been disclosed that the new 3/4 in. Fuel Shut-off Valve operates considerably harder than the original 1/2 in. valve used before S/N 1176. The original fuel valve control stops were located at the actuating handle in the cockpit, one stop for the "ON" position and one for the "OFF" position. The spring-back of the torque tube connecting this actuating handle with the valve on the firewall in some cases will allow the cockpit handle to reach its stop before the 3/4" in. valve reaches either the full "ON" or full "OFF" position. To eliminate this possibility it is imperative that the valve control stops be placed at the valve rather than in the cockpit.

A new stop has been designed to locate under the two outboard cap screws which attach the valve to its mounting bracket. ECO S164-2691C shows this stop and location details. Instruction Sheet No. 53 gives detailed installation information.

The necessary parts to accomplish this change (Stop P/N A1549-5 and two longer attachment cap screws, AN 502-416-10) will be furnished free of charge by Grumman.

It is important that the actuating handle stops located in the cockpit be removed as described in Instruction Sheet No. 53 after the new stop is installed.

THIS IS A MANDATORY BULLETIN AND MUST BE ACCOMPLISHED AS SOON AS POSSIBLE.

February 18, 1974

1. Remove the two outboard(left side) cap screws attaching the fuel valve to its bracket. Do not disturb the two inboard cap screws.

2. Place the stop, P/N A1549-5 on the face of the bracket with the stop angle part down . Install the two longer screws (AN502-416-10) through the holes in the A1549-5 stop and into the threaded valve face as the original screws were attached. Safet wire the screw heads together.

3. Now, when the valve is turned from the cockpit, it will rotate until it stops in either the ON of Off location, even though the control handle may require additional turning motion to compensate for the "twist" in the control tube.

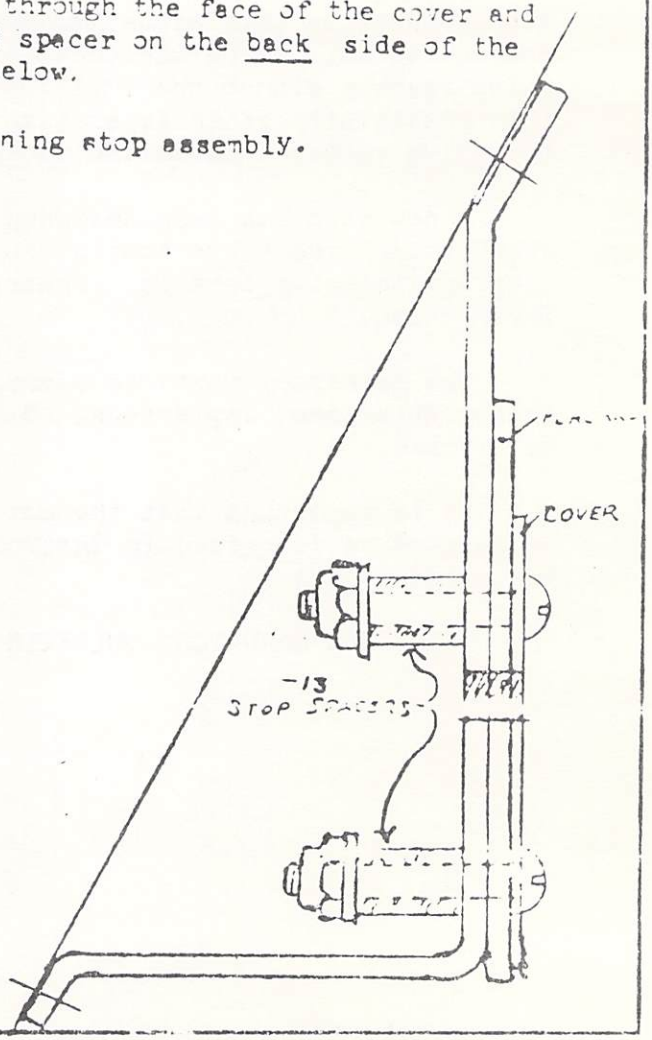
4. To allow the cockpit control handle to rotate the extra amount, both present stops must be removed and relocated as follows:

   a. Remove the nuts from the two 520-10-18 screws holding the -13 spacers used as stops.

   b. Remove the screws one at a time, leaving the -19 cover which hides the letters "AUX" in place.

   c. Replace the 520-10-18 screws through the face of the cover and placard and reinstall the -13 spacer on the back side of the assembly as shown in sketch below.

   d. Repeat "c." above with remaining stop assembly.



REPORT No. 62
DATE 8/8/84

CHG	DESCRIPTION	APP'D	CHG	DESCRIPTION	APP'D	CHG	DESCRIPTION	APP'D
C	ADDED A1552 B TO TITLE BLOCK	ARK 2-20-74 MRS 2-20-74	B	3/8 WAS 13/32 5/8 # DRILL 9/32 ADDED ITEM 2 REWORK ADD.	DRS 15 FEB 74	A	MTG SCREWS AN 502-416-10 (OR ALTERNATE AN 4H-5A[1]) WERE CALLED OUT AS AN 502-10-10[2]	ARK 2-11-74 DRS FEB 11, 74

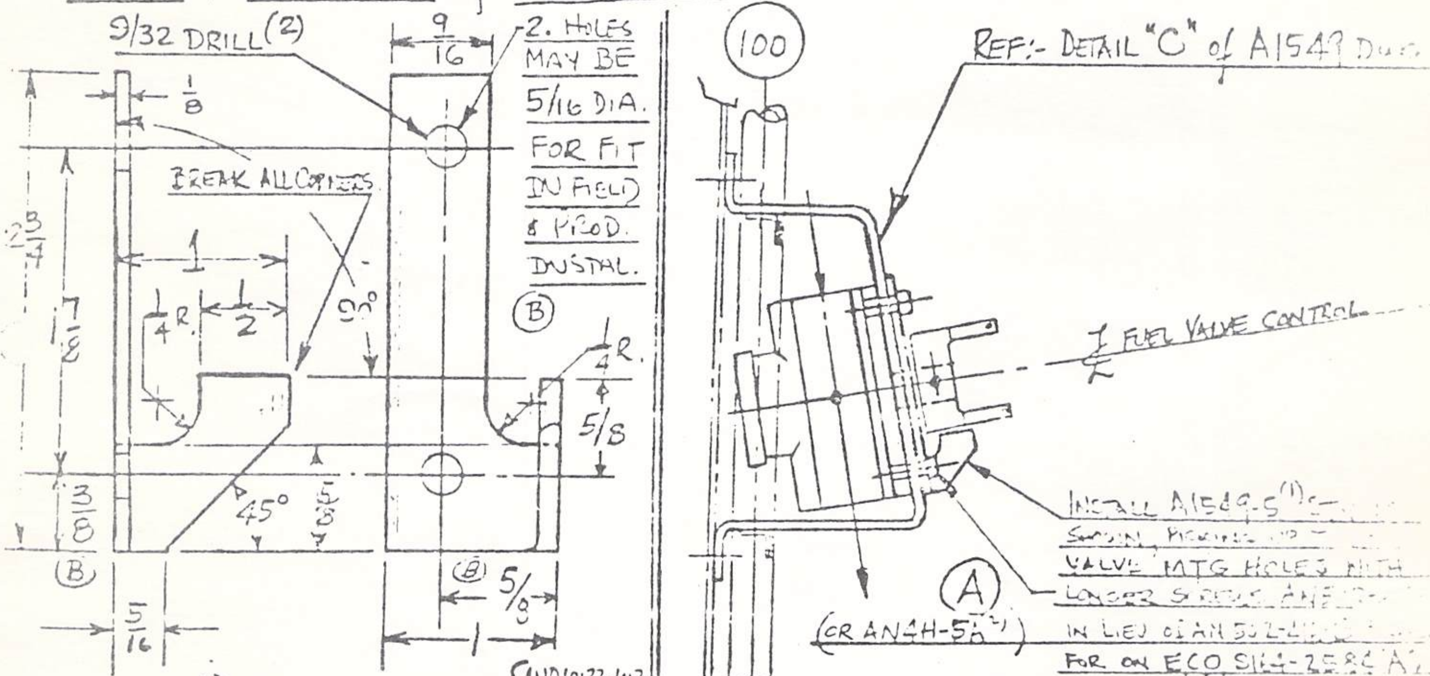
SCHWEIZER AIRCRAFT CORP

ENGINEERING CHANGE ORDER

TITLE:	CONTROLS (INSTALL.) — FUEL SHUT-OFF VALVE (R-985 & R-1340 Long MT)					CHG. LET.	
CHG. INC.		EFFECTIVITY	1176 UP	PARTS AFFECTED	✓	ECO. SERIAL	S164-2691
BY		CARD POSTED		TOOLS AFFECTED	✓	D.C.R. SERIAL	—
DATE		CHECKED	ARK 2-7-74	STOCK DISPOSITION	NONE	DWG. NO.	A1549 "B" A1552

CHANGE: 1. ADD A1549-5[1] (STOP) TO A1747-1 (3/4" P.T. PORT VALVE INSTALL. REQD ON 5/8" D. GRAVITY-FLOW FUEL SYSTEM) AS SHOWN ON DETAIL "C" OF DWG A1549.

DETAIL & INSTALLATION OF A1549-5[1] STOP SHALL BE AS SH'N BELOW:



A1549-5[1] STOP - MAKE FROM {AND10133-1003 2024-T4 EXTRUSION, 1" x 1" x 1/8 t. LEGS (ANGLE)}

FINISH:- 8 & 1012

NOTE: SEE E.C.O. # S164-2692 FOR REMOVAL OF STOPS FROM COCKPIT FUEL SHUT-OFF CONTROL BRACKET.

REASON:

1. TO MOVE STOPS FROM COCKPIT CONTROL HANDLE TO VALVE FOR POSITIVE POSITIONING OF VALVE.

(B) 2. TO ACCOMMODATE FIELD INSTALLATIONS & PRODUCTION VARIATIONS.

GRUMMAN AMERICAN AVIATION CORPORATION

AG-CAT SERVICE BULLETIN #54

SUBJECT: Fuel Quantity Transmitter

APPLICABILITY: G-164A, S/N 1176 thru 1275 including S/N 1279-1283 and 1285-1292, 1295, 1296, 1303.

It has been reported that erroneous fuel quantity indication may occur between the empty and 1/2 position.

Probable cause for this error relates to improper adjustment to the float in the empty position.

Following are the procedures to determine error and corrective action.

1. Drain all fuel from tanks.

2. Remove fuel quantity transmitter fairing from bottom of main tank.

3. Disconnect primary terminal from fuel quantity transmitter.

4. Using an Ohm meter determine that the resistance between "B" and "C" (refer to attached drawing) is a minimum of 240 ohm (+10). If the proper ohm value is established no further action is required.

If in the event the proper ohm value cannot be established proceed as follows:

1. Remove fuel quantity transmitter from tank.

2. Lay the fuel quantity transmitter on the drawing to determine relationship of the transmitter to the drawing.

3. Note adjustment tab "A". If this tab is bent inboard, straighten to approx. 90° with relation to the transmitter. When accomplishing this procedure you will note that the float level will be lower than the fuel tank bottom. To compensate for this, bend float arm up at position "D". It is recommended that two pair of duck bill pliers be used to accomplish this adjustment. (Take care not to break the silver solder joint.)

4. When the adjustments are made, and with the float in the down (empty) position, (use drawing for reference) check the ohm value which should be minimum of 240 ohms (+ 10).

5. Reinstall fuel quantity transmitter, using pro seal #890 sealant. Refuel and check quantity gage for proper operation.

THIS IS A MANDATORY BULLETIN AND MUST BE ACCOMPLISHED AS SOON AS POSSIBLE.

GRUMMAN G-164A SERVICE BULLETIN #54

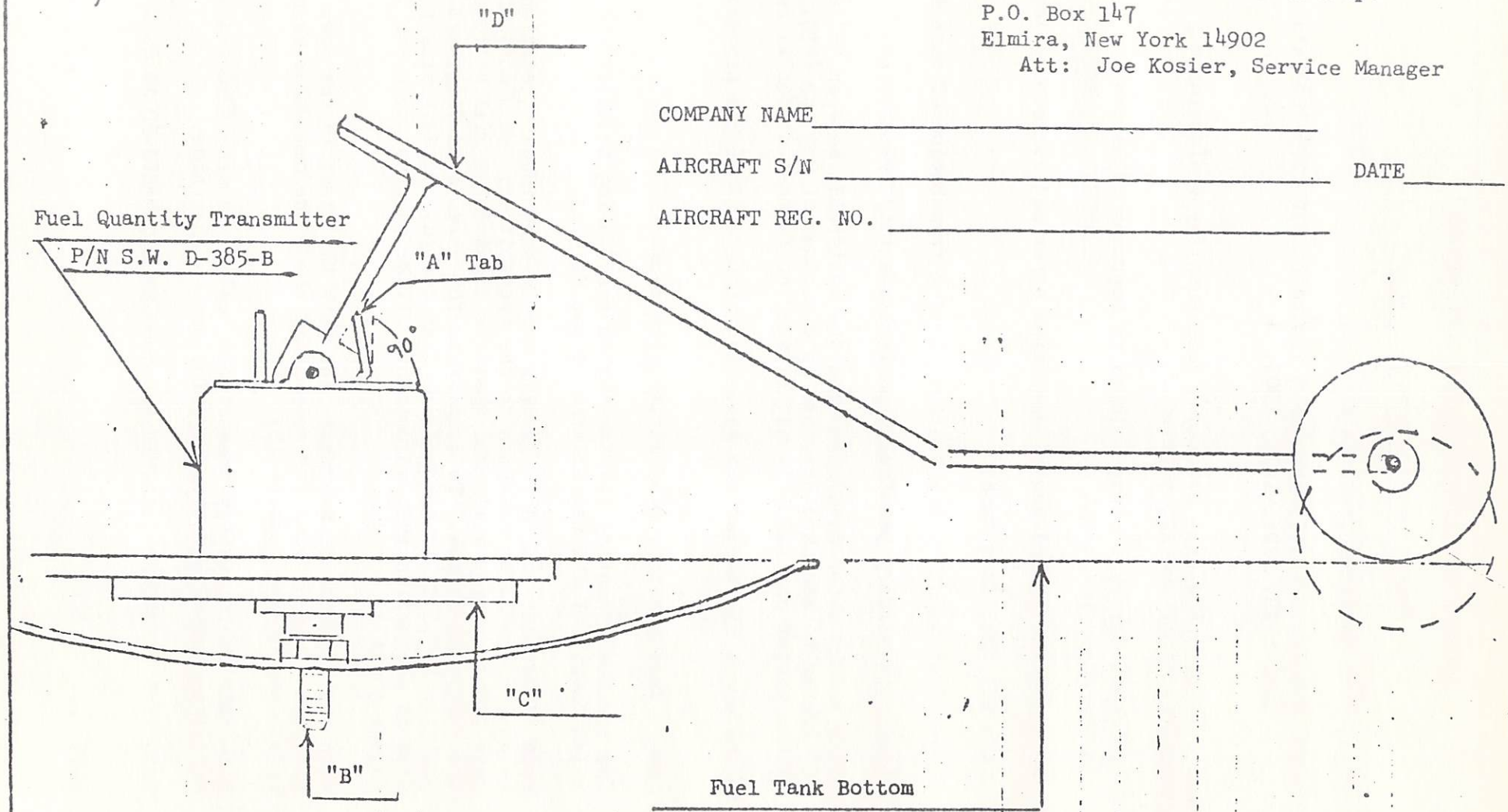
Please fill out Compliance Confirmation and mail to:

Grumman American Aviation Corp.
P.O. Box 147
Elmira, New York 14902
Att: Joe Kosier, Service Manager

COMPANY NAME _____

AIRCRAFT S/N _____ DATE _____

AIRCRAFT REG. NO. _____



GRUMMAN AMERICAN AVIATION CORP.

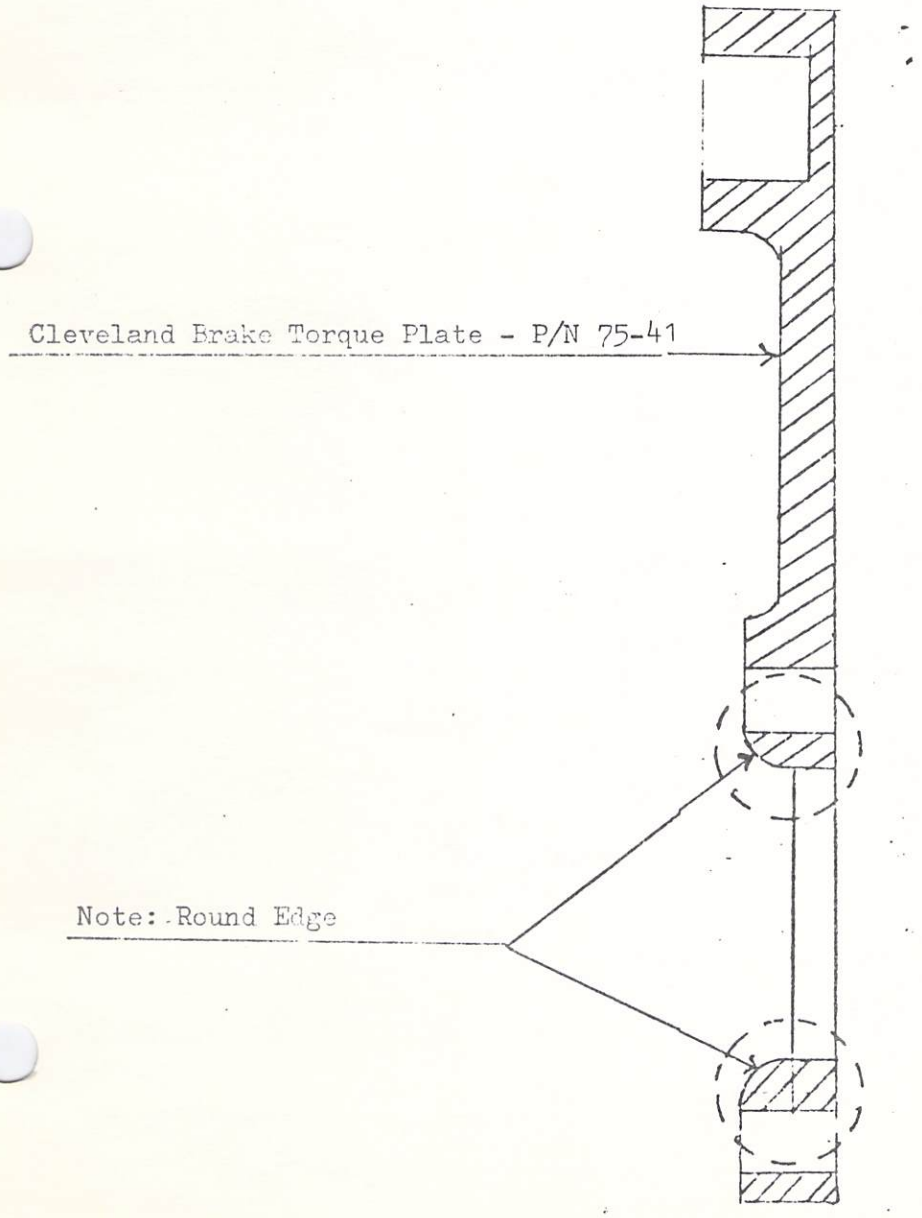
AG-CAT SERVICE BULLETIN #55

SUBJECT: Cleveland Brake Torque Plates P/N 75-41
"Amendment to Alert Bulletin sent via telex 3-6-75"

APPLICABILITY: Grumman Ag-Cats G-164A,
Applicable to Serial Numbers 1274 thru 1406

It has been determined that the Cleveland Brake Torque Plates P/N 75-41 installed on the subject aircraft may be defect. It is important that you contact the owners of these aircraft immediately, and advise that replacement torque plates are available for immediate change. Owners to notify you upon compliance, and advise Grumman American accordingly.

Acceptable torque plates may be identified by drawing below.



(Side View)

GRUMMAN AMERICAN AVIATION CORPORATION

AG-CAT SERVICE BULLETIN #56

SUBJECT: A1860-35 and -36 Rudder Cables

APPLICABILITY: All Grumman Ag-Cats

It has been reported that conditions exist whereby the rudder cables may fray in the area of the pilots foot rail P/N A1810-3 & 4.

We therefore recommend inspecting the rudder cables immediately, and at intervals not to exceed 100 hours.

If a frayed condition exists, replace the cable.

May 1, 1975

GRUMMAN AMERICAN AVIATION CORPORATION

AG-CAT SERVICE BULLETIN #56
(REVISION "A")

SUBJECT: A1860-35 and -36 Rudder Cables

APPLICABILITY: G164A - S/N 101 and up
G164B - S/N 1B and up

It has been reported that conditions exist whereby the rudder cables may fray in the area of the pilots foot rail P/N A1810-3 & 4.

We therefore recommend inspecting the rudder cables immediately, and at intervals not to exceed 100 hours.

If a frayed condition exists, replace the cable.

May 1, 1975

9/1/76 Revision "A"

GRUMMAN AMERICAN AVIATION CORPORATION

AG-CAT SERVICE BULLETIN #56
(REVISION "B")

SUBJECT: A1860-35 and -36 Rudder Cables - "A" Models
A3860-1 and -3 Rudder Cables - "B" Models

APPLICABILITY: G-164A - S/N 101 and up
G-164B - S/N 01B and up

It has been reported that conditions exist whereby the rudder cables may fray in the area of the pilot's foot rail P/N A1810-3 & -4.

We, therefore, recommend inspecting the rudder cables immediately, and at intervals not to exceed 100 hours.

If a frayed condition exists, replace the cable.

Affected aircraft may be modified by installing A1839-11 & -12 brackets and AN220-1 pulleys per Grumman American Aviation Corporation Drawing A1831, Sheet 1 and Drawing A1833. If this modification is accomplished, further inspection per this Service Bulletin will not be required.

May 1, 1975

9/1/76 Revision "A"
10/4/76 Revision "B"

GRUMMAN AMERICAN AVIATION CORPORATION

AG-CAT SERVICE BULLETIN #57
(This bulletin supersedes Ag-Cat Service Bulletin #55)

SUBJECT: Cleveland Brake Torque Plates

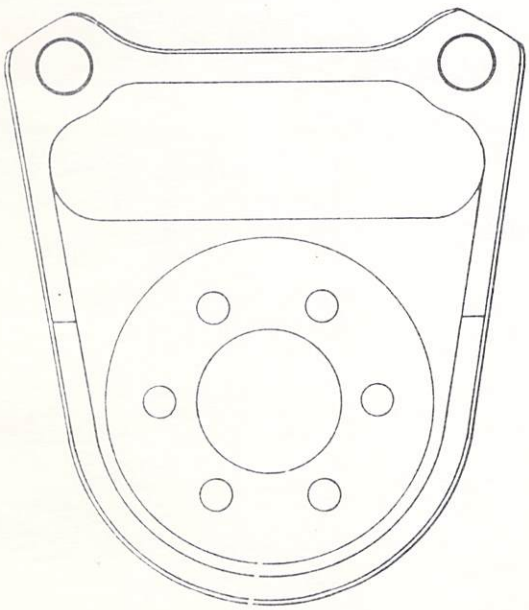
APPLICABILITY: Grumman Ag-Cats G-164A
Applicable to Serial Numbers 1274 thru 1491

It has been determined that the Cleveland Brake Torque Plates installed on the subject aircraft may be defective. It is therefore recommended that these Torque Plates be replaced with the new type identified below.

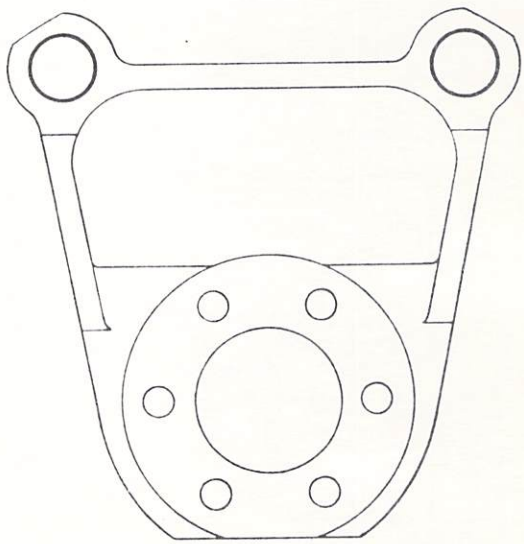
To receive the replacement torque plates, fill out the attached card and mail to Grumman American Aviation Corporation, Elmira, New York.

Install using anti seize compound on the bolt threads, lube torque to 125 inch pounds, and safety wire.

(NEW)



(OLD)



GRUMMAN AMERICAN AVIATION CORPORATION

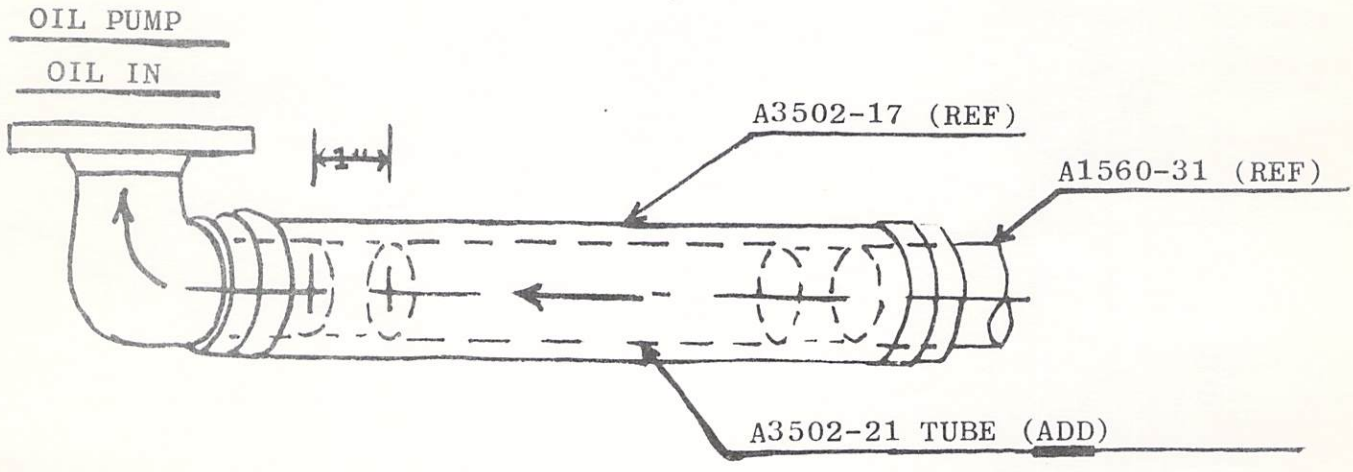
AG-CAT SERVICE BULLETIN #58

SUBJECT: A3502-17 Oil Inlet Hose

APPLICABILITY: G-164B - S/N 01B thru 156B

Due to the oil inlet hose (P/N A3502-17) installed on all "B" Grumman American Ag-Cats being longer in relation to the longer engine mount, a condition could possibly exist whereby this hose could collapse because of oil pump suction pressure.

Although there has not been any reported incidence relating to this condition, we highly recommend that, within the next 25 hours of operation, the aluminum reinforcement tube (P/N A3502-21) be installed in accordance with the drawing below.



December 27, 1976

AG-CAT SERVICE BULLETIN #59

DATE: March 21, 1977

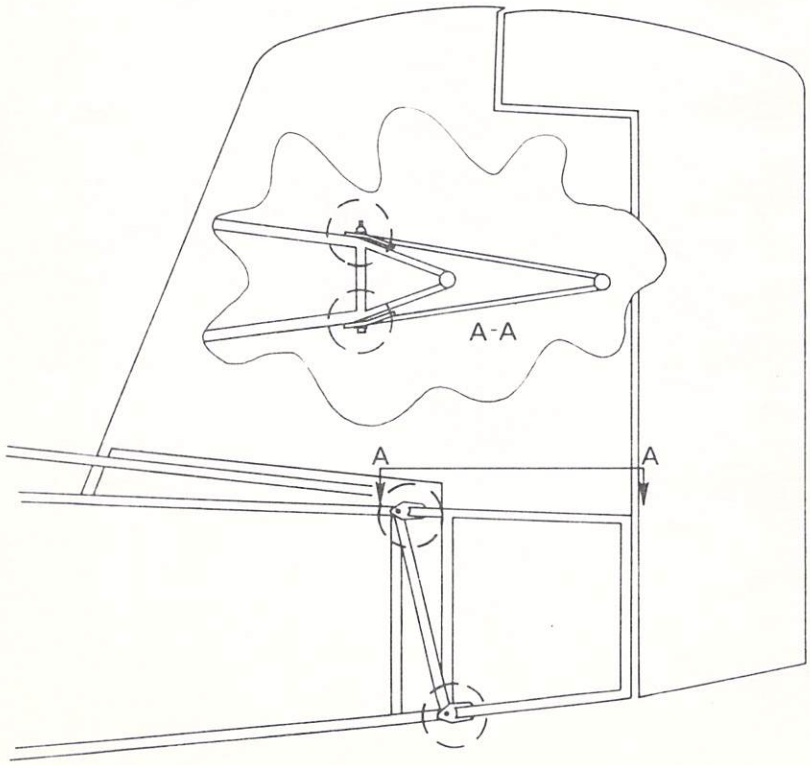
SUBJECT: REAR FUSELAGE EXTENSION

APPLICABILITY: G-164B - S/N 01B through S/N 181B

It has been reported that water may enter the forward tail post tube, due to inadequate sealing of the rear fuselage extension attach bolts.

It is therefore recommended that, within 30 days from date of this Bulletin, the following be accomplished.

Remove the lower attach bolt and determine if water is present. If water is present, allow to drain and dry. Then spray inside the tube through the bolt hole with Rust Ban or equivalent penetrating protection. Apply adequate portion of Permatex between the attach lugs and fuselage, and on the bolt head and nut. Reinstall and torque to 125 inch pounds. Repeat the sealing process for the upper attach bolt. Refer to Drawing below. NOTE: Circled areas to be sealed.



Service Note #1
12/5/67

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE NOTES

Tail Wheel Swivel Assembly

1. Our Australian distributors report that they have experienced a marked reduction of field service problems with the Tail Wheel Swivel Assy. since they have extended the greasing interval to 75 hours. They keep the "red-headed screws" installed in place of the grease fittings while the aircraft is operating in the field, making certain that lubrication is done only at their service facility. They also point out that care is taken not to use a high pressure grease gun or to over-lubricate.

They recommend the same procedure for tail wheel bearings stating that overgreasing can damage the grease seals, which permits foreign matter to enter the bearings.

2. When the Tail Wheel Swivel Assy. is disassembled for overhaul, it will be noted that there is a 1/4 in. Roll Pin, (No. 33 in our Parts Book exploded view) used to keep the upper, inner shaft from falling out during assembly. Lyon Flying Service points out to us that "upper-box" repairs could be simplified if this pin were not preventing removal of the upper shaft. To eliminate this condition after first repair, this pin may be discarded, substituting a loose fitting wood filler plug of proper length between the inner shaft bottom side and the face of the tail-wheel fork. This plug will hold the inner shaft up in place for assembly, but will fall out easily at the next disassembly.

Garland Hiestand
Ag-Cat Service Representative

Service Note #2
12/8/67

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE NOTES

Ag-Cat Fuel Gauge Repairs

1. The attached copy of communication from Simmonds Precision, fabricators of our fuel gauge, A1752 series, is self-explanatory. Fuel gauges that require rebuilding or repair may be returned to Simmonds Precision by any Ag-Cat distributor. Simmonds model number of all gauges is Model 900. Drawing numbers for the 33 gal gauges are A1752-3 and A1760-1 while the drawing numbers for the 46 gal gauges are A1752-401 and A1760-401. Tag your gauges accordingly.

The certification referenced is proper for FAA Return to Service, as this is the standard form blanket certification used by and furnished to manufacturers.

You should experience a considerable saving in this overhaul as compared to new gauge prices.

Garland Hiestand
Ag-Cat Service Representative

Encl.: Simmonds Precision letter dated 12/6/67
" " certification sample

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE NOTES

WING BEAM BUSHINGS

Ag-Cat wings are attached to the fuselage with two bolts through fittings on the front and rear beams. The wing beam fittings are of the single lug type, while the fuselage fittings are forked ends of the steel tubing beam carry-through members.

The wing beam fittings are aluminum, with special steel bushings fitted into reamed holes. The bushing in the rear beam is a tight pressed fit. The bushing in the front beam is a hand push fit. THIS IS AN IMPORTANT DETAIL OF DESIGN. First, this allows easy installation of the wings without having precise dimensions called for at the fuselage fittings simply because the rear beam may be clamped up tight on the fuselage while only the bushing is clamped up tight on the front beam. This front bushing is long enough to allow the beam to slide backwards or forwards over the "snug" fit and align itself, but still be correctly fastened!

NOW - there is a second reason for this arrangement which is MORE IMPORTANT. When the Ag-Cat fuselage structure was designed it was calculated to carry all of the wings' drag loads at the REAR beam attach point. So, if you clamp up the rear beam, but don't clamp up the front beam, the front beam sliding arrangement will prevent any drag loads from being taken at the front fitting! This explains why the Ag-Cat almost never breaks fuselage tubing even after thousands of hours of flight time.

So this is the story. So don't put washers on each side of the front beam so it, too, will be clamped up! This is wrong. If the front bushing gets loose in the beam put in an oversize bushing. Ream the fitting until you can slide the new bushing in as a snug fit. .0005 clearance between bushing and beam won't allow it to "rattle". If it doesn't rattle it won't wear!

In both cases tighten the nuts on the wing bolt to standard torque for this size bolt.

The 1st 100 Ag-Cats did not have exactly this arrangement in bushings, so if you own one of these first 100 ships you should use the data furnished with the attached E.C.O. to make and fit a special clamp-up bushing for the front beam fitting when needed - then your older Ag-Cat will be set up just like the newest ones!

Garland Hiestand
Ag-Cat Service Representative

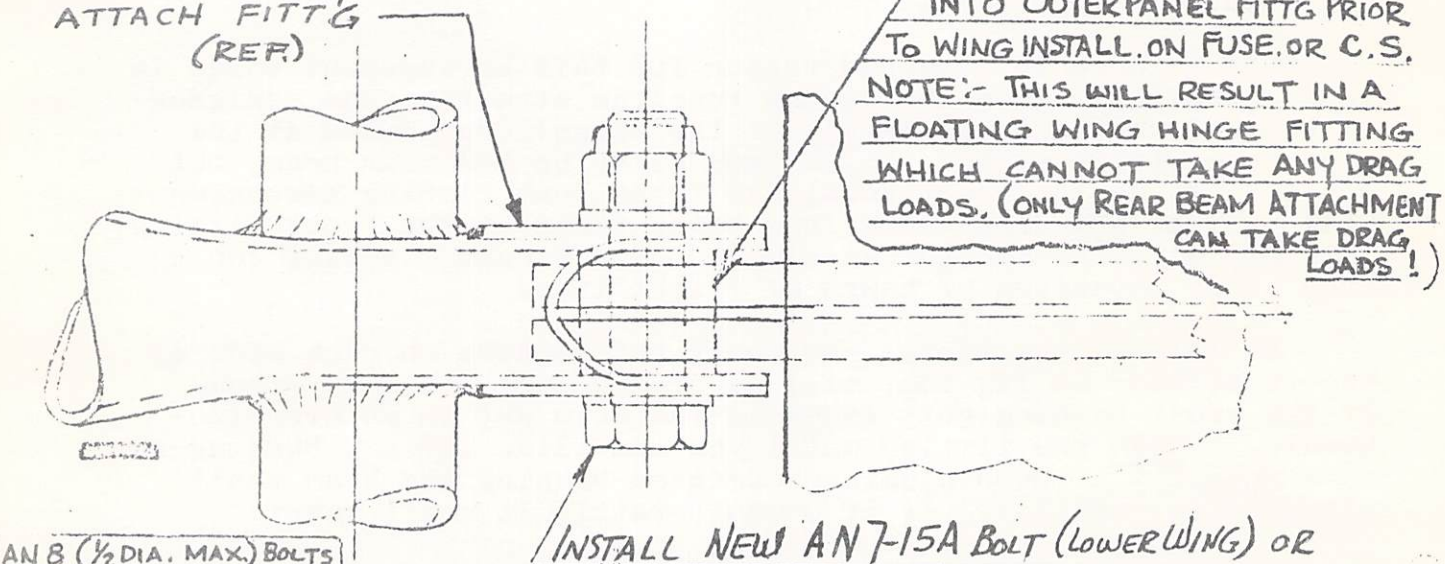
S/N #3

A REV.	4/5 WAS B/5	AIRFRAME ARK

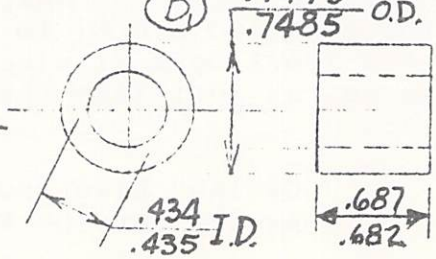
SCHWEIZER AIRCRAFT CORP.

ENGINEERING CHANGE ORDER						CHG. LET.	B
TITLE	WING ERECTION (SH'T 2 of 2 SH'TS)						
CHG. INC		EFFECTIVITY	1ST 100 A/C STARTED	PARTS AFFECTED	✓	ECO. SERIAL	S164-1274 "B"
BY		CARD POSTED		TOOLS AFFECTED	✓	D.C.R. SERIAL	—
DATE		CHECKED	ARK 6-27-67 CA 6-27-67	STOCK DISPOSITION	NONE	DWG. NO	A1002

CHANGE FOR 1ST 100 A/C ONLY, THE FOLLOWING FRONT BEAM ATTACHMENT TO THE FUSELAGE OR C.S. SHALL BE ACCOMPLISHED AS SHOWN BELOW WHENEVER REPLACEMENT BUSHINGS AND BOLTS ARE INSTALLED AT THESE JOINTS. SINCE THE AN 7-20A (UPPER WING) & AN 7-15A (LOWER WING) BOLTS HAVE THE LEAST MARGIN of SAFETY (COMPARED WITH THE BUSHING), IT IS VERY LIKELY THAT THE BOLT WILL SHOW THE FIRST SIGNS of WEAR. IT IS THEREFORE CONSIDERED NECESSARY THAT BOTH THE BOLT & THE BUSHING BE REPLACED AS SHOWN BELOW WHENEVER NECESSARY.



DETAIL of P/N A1002-151 BUSHING → (A) (4 REQ'D / AIRPLANE)



O.D. SURF. ROUGHNESS = 125
I.D. SURF. ROUGHNESS = 200
FINISH:- CAD. PLATE (.0002 MIN. THICK) (BREAK EDGES .015)
MATERIAL:- C.M.ST'L BAR (4130N)

Service Note #4
1/5/68

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE NOTES

GENERATORS & VOLTAGE REGULATORS

Generator and voltage regulator combinations are quite confusing until they are explained as the simple devices that they really are. Before proceeding further, however, it is best to explain that the "little black box", commonly called a "voltage regulator", usually contains three separate units - a current limiter, a reverse current relay (cutout) and a voltage regulator. The "cutout", as it is often called, does just that - it cuts the generator off from the battery when the engine is stopped, otherwise the generator would try to run as a motor and discharge the battery. The current limiter opens its points only when a safe current output is exceeded. It should never, never be adjusted to control the amperes below the rated output of the generator. True, it can be adjusted to allow the ammeter to show any rate that you desire, but it was not meant to operate in this manner. It is simply a max. rate safety valve or limiter. Now, this leaves the voltage regulator as the only unit capable of controlling the charging rate. Actually, it controls the amperes charge rate - from maximum down to practically zero by progressively reducing the field current of the generator as the battery builds up in voltage. Thus, the generator cannot supply amperes when higher voltage causes the voltage "regulated" regulator to open its points so rapidly that the generator field coils can't get sufficient current for charging!! Only this set of points should ever be adjusted to control charge rate. How do you tell which is which inside the box? Easy. The cutout has points that are extra large and are normally open. (They close when the generator starts charging) The current limiter has smaller points that are normally closed. It is wound with only a few turns of very heavy wire. The voltage regulator also has small points, normally closed, but its winding is a large coil of fine wire - generally only the cambric wrapping around the coil shows, not the wire. Now, let's look at the next page which shows the simplified schematic wiring diagrams of the different combinations of generators and voltage regulators and also describes the difference between Circuit "A" and Circuit "B" connections. We will not illustrate the action of the cut-out or current limiter, but show only the voltage regulator. The Super Ag-Cat 24 volt system uses a carbon pile voltage regulator in a case by itself - not a triple unit, so these examples also apply to this system. Note in the schematic wiring diagrams that the field coil is presented as a single coil - actually it is composed of four or more coils connected together which respond to voltage and current as one coil. Brushes are marked positive and negative as are the ends of the field coil.

Notice that a full shunt connection is illustrated to show how a generator of this type operates. When the field is connected directly across the brushes the field will energize fully and maximum output

may be expected. By connecting a lead to each brush we could get full current flow from the generator if we connected these leads together or connected them in correct polarity to a battery. This generator would continue charging even after the battery was fully charged. The circuit is never used "as is", but always has a voltage regulator connected in the field coil circuit. Circuit "A" and Circuit "B" show that a regulator could be placed in either field lead and accomplish the same result. Either connection simply introduces an "automatic resistor" in the form of a "voltage regulated resistor" in the field coil leads to reduce the field current as the battery voltage (charge) increases. Just remember that voltage regulators are not simply clipped into the field leads, but have internal connections in their cases. The cases are usually fastened to the grounded frame at some remote spot. The arrangement of the internal leads determine whether the system will be Circuit "A" or "B".

What would happen if we connected a voltage regulator designed for Circuit "A" up to a generator wired for a Circuit "B"? NO CHARGE! The Circuit "A" regulator picks up the field current and controls its flow to Ground - the Circuit "B" generator already has its field coil connected directly to Ground as you would note on inspection of the internal connections. What Circuit "B" needs is a regulator that will pick up the field current and control its supply from the hot A+ armature lead. A Circuit "B" regulator would do just that. So, the two regulators have different internal connections - one directs field current from the "F" terminal to ground, the other to the hot A+ side. The wrong regulator connected to the circuit does not harm the generator or regulator, but continuous attempts to "flash" the field or polarize with a jumper wire or by exchanging leads in an attempt to get the system to charge may damage the regulator beyond repair. So--check first to see whether your generator is connected as Circuit "A" or Circuit "B"--then be sure that you have the correct regulator to match when changing to a different type regulator.

Early Ag-Cats using the Bendix 309-8A generator and Bendix Eclipse 321-1A regulator were wired to Circuit "B". Later an automotive type regulator - Delco-Remy 1118358,-367,-384 was used with this generator which required that the brush connections be changed to Circuit "A" in accordance with ECO S164-1109A and marked with a special Grumman placard. Do not take the placard as a guarantee that the generator is connected in this manner if the generator has been serviced since leaving the Grumman factory - check internal wiring to determine that field coil wires have not been changed. Bendix 30E01 generators are all connected as Circuit "B". The 24 volt system uses a Bendix carbon pile regulator No. 1588-1 or -2 and must have a separate reverse current relay (AN3025). The 12 volt 30E01 uses Standard Motor Products VR-428 triple unit, black box type regulator. This box as explained earlier contains the reverse current relay and a current limiter as well. NOTE: All 30E01-1A generators are rated at 28 volts on their nameplates, so don't be confused if your 12 volt generator is tagged 28 volts! The 30E01 is rated at 50 amps, whether 12 or 24 volt systems--just realize that with 24 volts you get twice the watts with no increase in amps - so fuses, wire size, etc. remain the same for both systems, these parts being controlled only by the amperes that flow, not the watts.

When trouble shooting or when making adjustments it is essential that an accurate voltmeter be connected across the battery leads. The

12 volt system must regulate between 13.9 and 14.7 volts while the 24 volt system must remain between 27.8 and 29.4 volts with engine rpm above 1800 rpm. The generator voltage must go higher than the regular battery voltage to be able to charge. The higher the voltage goes, the more amps will show on the ammeter!

When generators are repaired or new generators installed it is imperative that the generator be polarized before starting the engine. With Circuit "B" systems it is best to remove the field lead at the regulator and momentarily connect a jumper lead between the "GEN" and "BAT" terminals of the regulator. This allows a momentary surge of current to flow through the generator which correctly polarizes it. Failure to polarize may result in severe regulator damage. The above process is also commonly referred to as "flashing the field" and may also be used to get a generator started to charging after having lost its residual magnetism.

Garland Hiestand
Ag-Cat Service Representative

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE NOTES

GRUMMAN AG-CAT PROPELLERS

The Ag-Cat propeller, like all other propellers installed on radial engines using splined shafts, must depend upon tapered cones both front and rear for centering and tracking. This manner of installing propellers has always presented problems, particularly in service life. It seems that no matter how perfectly the installation may be, the tremendous forces exerted at the small localized area of the cones and cone seats will in time cause breakdown of the contact faces. An exact forecast of the time required for this to happen is impossible, but in most cases there is adequate warning of cone and seat trouble in the form of vibration and other types of roughness before the condition becomes acute.

Because of the excessive wear in this most important area it is important that all operators understand the nature of the problem and realize that at certain intervals all propellers of this type should be returned to the manufacturer or other approved station to have the cone seats renewed in the hub. It is, of course, advisable to return the entire propeller so that a complete check may be made of the assembly, including balance.

Sensenich Corporation, which manufactures the Ag-Cat propeller, advises that at least four out of five propellers of the type that use cones, and which have an accumulation of 1000 hours or more when sent to their shop for service, show evidence that the cone seats should be reground. Some of the wear is caused by pitting in the rear cone, brought on by water and/or chemical solution intrusion between the bronze cone and the steel seat. Even though no pitting occurs, the forces involved will in time cause breakdown of the metals in the contact area and result in galled faces, wallowed out areas, chafing, etc. This erosion shows up on the cone seat in the hub and requires factory rework - the installation of new cones alone will not correct the condition.

In line with the above information, it is therefore advisable to return all Sensenich built Ag-Cat propellers to Sensenich Corporation for rebuilding at least every one thousand hours, or at the end of two seasons of operation. Certainly the added benefits in performance, smoothness and in engine safety will more than repay the small cost and compensate for the inconvenience.

Some additional points to remember during operational periods:

1. Do not change pitch any oftener than is absolutely necessary. When pitch changes are made and it is necessary to loosen

the prop retaining nut, be sure to tighten this prop nut first so that the pressure will align the hub halves on their cone seats, then set the blades and tighten the blade clamps.

2. Tighten blade clamps only with blades in horizontal position to prevent upper blade from dropping into hub. Each blade must be pulled out away from the hub until it hits the shoulder before clamp is tightened.

3. Always coat cones and cone faces with white lead paste when installing. Do not use grease. The white lead will bond to the mating faces and help prevent water intrusion.

4. Use extreme care when setting pitch with a propeller protractor. Always double check readings after blades have been tightened.

5. When prop is installed on an engine, first count the threads on the crankshaft, then count the number of turns made in bringing the prop nut up to torque. This number should be at least one turn less than the number of crankshaft threads to indicate that the nut is not hitting bottom on the crankshaft.

6. Re-torque prop nut to 700 ft. lb. after first 20 hours of operation. THIS IS IMPORTANT.

We hope that these service suggestions will allow you a much longer and more satisfactory life from your Grumman Ag-Cat Propeller.

As you may realize, this checking out of the cone seats is just as important with all other propellers used on radial engines, so don't confine this information to Ag-Cat propellers only. The condition of cone seats should be continuously checked with all propellers of this type, including the controllable and constant speed models.

Garland Hiestand
Ag-Cat Service Manager

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

AG-CAT SERVICE NOTES

FAN BRAKE CONTROL IMPROVEMENT

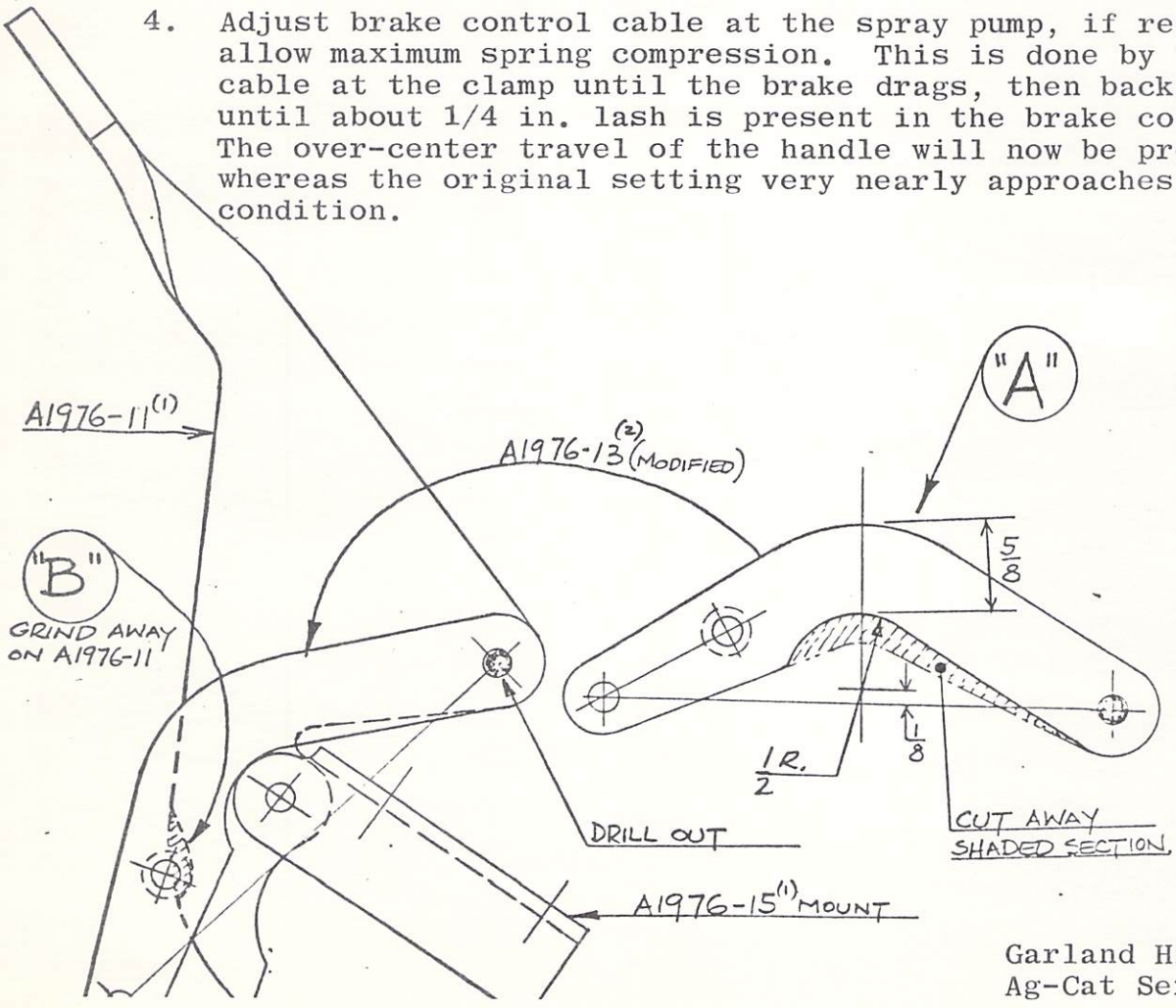
To reduce the possibility of inadvertently tripping the spray pump fan brake control the following rework should be accomplished, resulting in a greater amount of over-center travel of the control handle and a definite over-center lock.

1. Drill out the hinge rivet that attaches the dog-leg to the handle. Either grind or file the dog-leg (P/N A1976-13) to conform to the suggestions of the sketch shown below at "A".

2. Grind control handle as shown at "B" to allow greater travel of the stop spacer.

3. Assemble again, using a new rivet at the hinge or use a suitable AN-3 bolt and elastic stop nut.

4. Adjust brake control cable at the spray pump, if required, to allow maximum spring compression. This is done by tightening cable at the clamp until the brake drags, then backing off until about 1/4 in. lash is present in the brake control arm. The over-center travel of the handle will now be pronounced, whereas the original setting very nearly approaches an on-center condition.



Garland Hiestand
Ag-Cat Service Manager

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

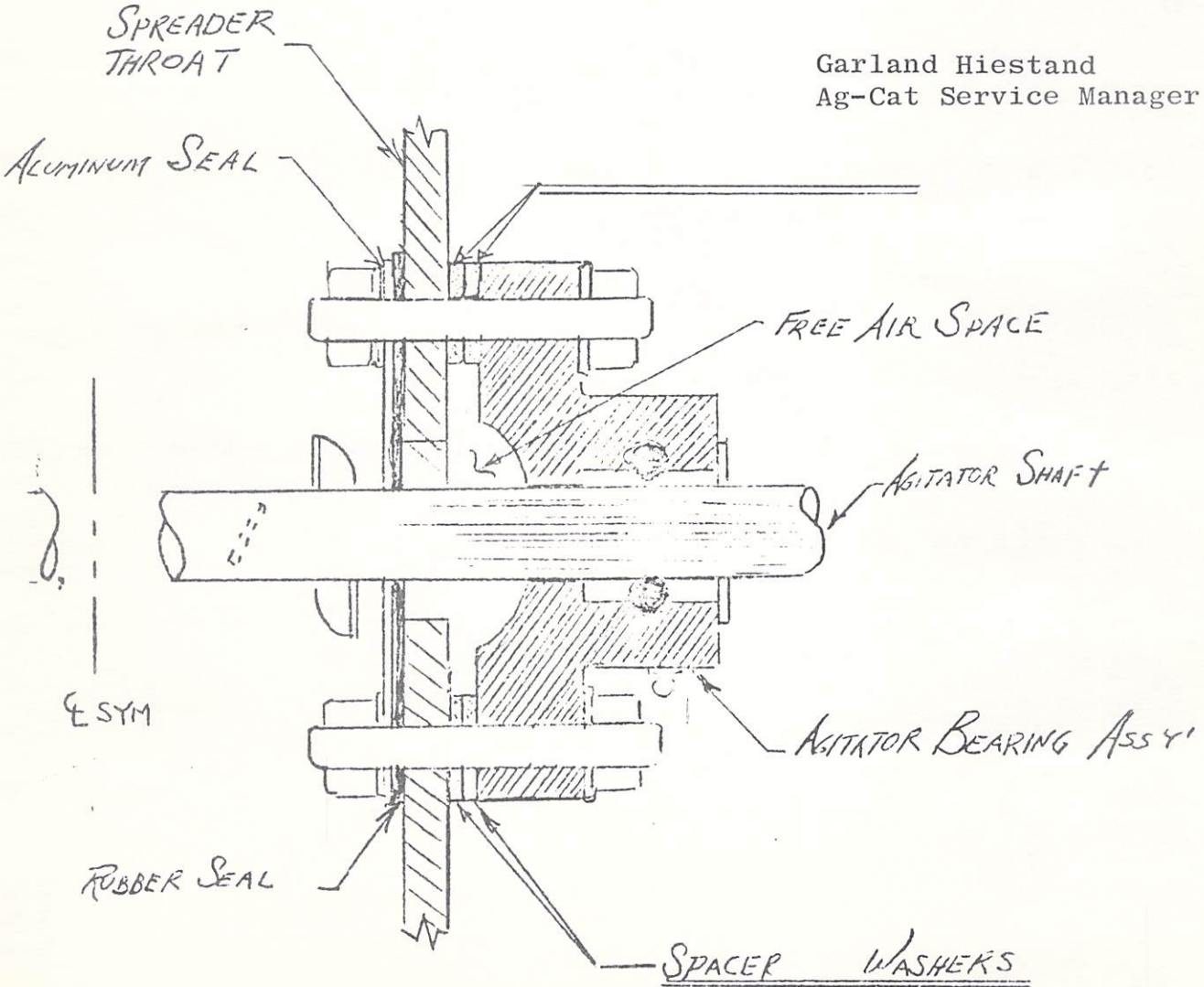
AG-CAT SERVICE NOTES

AGITATOR BEARINGS, SPREADER

Greater service life and more satisfactory operation of the agitator bearings may be had by spacing them out from the spreader throat as shown in the attached sketch so that dust or other material that leaks by the inner rubber seal will fall or blow free.

Simply remove the two attachment bolts and insert a washer or spacer between the bearing and the aluminum throat. As a rule if the rubber seal is in good condition only dust will work past and into the bearing area, so a simple washer will be an adequate spacer. If more clearance is desired, then longer bolts must be used.

This will completely eliminate the problem of material packing between throat and bearing.



Garland Hiestand
Ag-Cat Service Manager

GRUMMAN AEROSPACE CORPORATION

AG-CAT SERVICE NOTES

JASCO ALTERNATORS, VOLTAGE REGULATORS AND VOLTAGE PROTECTORS

Beginning with Ag-Cat S/N 700 (and including Serial No. 694, 697, & 699) a new Alternator, Voltage Regulator, and Voltage Protector is used as standard equipment on all 12 volt systems with R-985 and R-1340 powerplants. (In the near future all 24 volt systems will also be equipped with alternators) Model numbers of these new 12 volt units are as follows:

Alternator - Jasco Model 6555-1
Voltage Regulator - Jasco Model J12M20
Voltage Protector - Jasco Model SVP-3

Several operational details must be kept in mind when alternators are used for battery charging, including the following.

1. Generators used heavy commutator bars and brushes to convert their AC current to DC. This system of "Mechanical Rectification" was simply the best way to do the job with the material available during those early years. Now, however, the rough, sparking, short life brush and bar arrangement can be replaced with new silent, non-sparking, long life solid state rectifiers commonly known as DIODES. This, now, is just what the alternator does - it starts out quite similar to a generator, but the AC current is then picked up by a simple single sliding brush running against a continuous collector ring that never jumps or sparks and which feeds into pairs of diode rectifiers that channel the changing alternating cycles out on positive going and negative going wires for battery charging.

2. The Diodes, however, are not perfectly fool-proof. They carry the current only in one direction - from alternator to the battery because of positive and negative polarity characteristics. So - if you connect a battery backwards in the system they will carry this reversed polarity to the alternator. This big battery load going across them now in the reverse direction will blow the diodes. DON'T EVER CONNECT THE AIRCRAFT OR EXTERNAL START BATTERY BACKWARDS - IN THIS CASE WITH POSITIVE CONNECTED TO GROUND. THE DIODES WILL BLOW IN A FLASH.

3. NEVER try to "flash the field" on an alternator as you did with a generator to try to get it to charge. This will serve no purpose and can damage equipment.

4. DO NOT turn the Master Switch in the aircraft OFF with the engine running unless the ammeter is showing nearly zero charge with all other switches OFF. When this switch is turned off while the

alternator is charging with any appreciable current there is a flash splatter of voltage generated which did not harm the big brushes in a generator, but which may blow some of the solid state units. The VOLTAGE PROTECTOR installed in the system has a solid state device which snuffs out these voltage surges if they are not too high, but even IT may be blown by extreme voltage spikes. The more current the alternator is delivering at the time the field is turned off by the master switch, the higher the voltage on these surges, so use caution.

5. Transistorized units such as the new voltage regulator are marvels of silent, efficient electrical engineering. They, too, are subject to damage by big voltage surges, so the above caution applies here, too.

6. Standard equipment Ag-Cats do not have heavy electrical loads. If you install the landing lights or working lights which carry heavy current, you will also generate voltage surges when you turn their switches off. Check with us for information on voltage snuffers to install across these switches to protect your system.

7. In the near future we will have available a diode to insert in the actuating line of the external start solenoid to prevent it from contacting if the external start battery is inadvertently connected backwards.

Our tests show this alternator and associated system to show unusually good performance characteristics. It should deliver years of trouble free service if all operators are briefed on the above simple precautionary items.

Garland Hiestand
Ag-Cat Service Manager

Service Note #9A
4/1/70
Revised 5/24/76

GRUMMAN AEROSPACE CORPORATION

AG-CAT SERVICE NOTES

WATCH YOUR WEIGHT

Aerial applicators should be very aware of the legal rules which control the operation of agricultural aircraft at weights in excess of the design gross weight. The Federal Aviation Administration has accepted those regulations and recommendations as set forth in CAR8 and CAM8 as being the only provision wherein an applicator may operate a restricted category aircraft with hopper capacities which bring the total weight above the certificated maximum weight as called out in the airplane's Type Certificate Data Sheet.

Old timers who have certified and worked modified aircraft such as Stearman and N3N's are familiar with the CAM8.10-3(e) flight check which was conducted to establish an FAA recognized hopper weight for agricultural operations, but many people who have purchased and are flying newly manufactured agricultural planes DO NOT REALIZE THAT THIS REQUIREMENT IS STILL REQUIRED. All of the new breed of ag planes with few exceptions - Cessna, Piper, Grumman Ag-Cat, etc. are designed and type certificated at a maximum gross weight which does not necessarily allow the aircraft to operate at its placarded hopper weight without first conducting a CAM8 flight check. Most hopper weights that are placarded on new aircraft are static test weights required by FAA and do not necessarily certify the aircraft for flight with that placarded load. All of the original CAM8 regulations are still recognized and required by FAA for over-weight operation. Bear in mind the simple fact that your insurance company may refuse any claim if you happen to be in violation of any of these regulations.

First, the FAA has clearly stated that the provisions originally set forth for modified aircraft to allow operation in Restricted Category with an equivalent level of safety to that of an aircraft operating under an airworthiness certificate such as Normal or Utility Category may also be applied to NEWLY MANUFACTURED AIRCRAFT. This provision was adequately covered by the Preamble to Part 8 which states: "Currently effective airworthiness parts and Part 43 of the Civil Air Regulations provide for the type and airworthiness certification of aircraft built or modified for special purposes, such as crop dusting, seeding, spraying, and other special purposes." The important point to consider is that all new agricultural aircraft are built to a type design and structural analysis very similar to passenger carrying aircraft. They are invariably certified at a design gross weight which will not allow the use of a full hopper load without violation as they leave the factory. It becomes then the responsibility of the owner to comply with CAM8 regulations which govern gross weight changes.

Service Note #9A
4/1/70
Revised 5/24/76

In general these regulations are simple and well understood by all ag operators. Appendix "A" of CAM8 covers possible weight increases under Sec. 7.0 through 7.3. Figure 7-1 gives recommended maximum weight increase in percent based on the manufacturer's limit load factor. Using this curve, for instance with a Grumman G-164A Ag-Cat which is designed around a maximum weight of 4500 lbs. you would first need to know that the design load factor is 4.2 positive g's. Following the 4.2 line upward you would find that it intersects the curve at the 35% line. Thus, the recommended weight increase for the Ag-Cat would be 135% of 4500 pounds or an increase to a maximum weight of 6075 lbs.

Now, it must be repeated - this weight is not accepted as a maximum for a new aircraft until <u>after</u> the owner has conducted the flight check called out in CAM8 - section 8.10-3(e), and the results duly recorded. In certain regions an FAA inspector may wish to witness the flight check. When conducting your first check of a given type airplane you should by all means check with your GADO office and learn if they wish to witness.

Following completion of the flight check, the hoppers should be placarded in accordance with flight check loads. The regulations <u>do not</u> reference a change in maximum weight. To quote CAM8, Sec. 8.10-4(b)(1), "<u>Maximum Weight</u> - It is not <u>required</u> that a maximum (total) weight be established as an <u>operating limitation</u> for agricultural aircraft. In lieu thereof maximum weights for special purpose loads (e.g., hopper or tank capacities) should be selected by the applicant and demonstrated in the flight check in accordance with 8.10-3(e);(i) then these maximum capacities (weights) for the hoppers or tanks should be listed on placards on or adjacent to the appropriate filler covers."

Keeping these simple provisions in mind and making certain that you comply with the requirements for <u>each</u> of your aircraft - brand new or otherwise - will keep you out of the overweight violation columns and fully covered by your insurance.

Part 8 is the greatest compilation of good clean common sense ever to come out of any civil aviation agency anywhere in the world. Keep in step with it and resist any effort to bypass it or change it - your livelihood depends upon it!

Ag-Cat Service Representative

Service Note #9
4/1/70

GRUMMAN AEROSPACE CORPORATION

AG-CAT SERVICE NOTES

WATCH YOUR WEIGHT

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Service Note #9
4/1/70

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Keeping these simple provisions in mind and making certain that you comply with the requirements for each of your aircraft - brand new or otherwise - will keep you out of the overweight violation columns and fully covered by your insurance.

Part 8 is the greatest compilation of good clean common sense ever to come out of any civil aviation agency anywhere in the world. Keep in step with it and resist any effort to bypass it or change it - your livelihood depends upon it!

Garland Hiestand
Ag-Cat Service Representative

Service Note #10
6/11/73

GRUMMAN AMERICAN AVIATION CORPORATION

AG-CAT SERVICE NOTES

SPRAY SYSTEM

Poppet Type Spray Pump Inlet Valves

The Emergency Valve installed in the spray pump suction line inside the hopper sump is fitted with a nylaflow tubing actuating shaft with a push-pull Tee handle near the instrument panel. It has been learned that early installations frequently developed cockpit leaks with a full hopper under the following conditions:

a. The nylaflow tubing is through-drilled at each end and has a split roll-pin driven through it as well as through the metal attachments at each end. Liquid may leak through the hole in the roll pin, through the slit in the roll pin, up the inside of the nylaflow tube and drip out the upper roll pin on the Tee handle in like manner.

b. The lower end should have its metal and seal parts removed, the roll pin driven out and a plug driven into the nylaflow just above the roll pin hole. A piece of 3/16 in. welding rod an inch long makes an ideal plug. Production Ag-Cats now have this plug installed.

c. The packing for the upper and lower ends of this control is a Viton "O" ring installed between the tubing flare and the bulkhead flare fittings. These packings should be made up carefully by gently tightening the flare nut on each end, usually finger tight is sufficient. DO NOT make up these flare nuts to full tight as you would a flare fitting! Lubricate the "O" ring area frequently with heavy water resistant grease.

Spray System Line Strainer

With the strainer installed on the pressure side of the pump use care in tightening the cap after cleaning. A loose cap will allow the pressure to blow the "O" ring out from under its seat and give a sudden deluge rather than a leak!

Garland Hiestand
Ag-Cat Service Manager

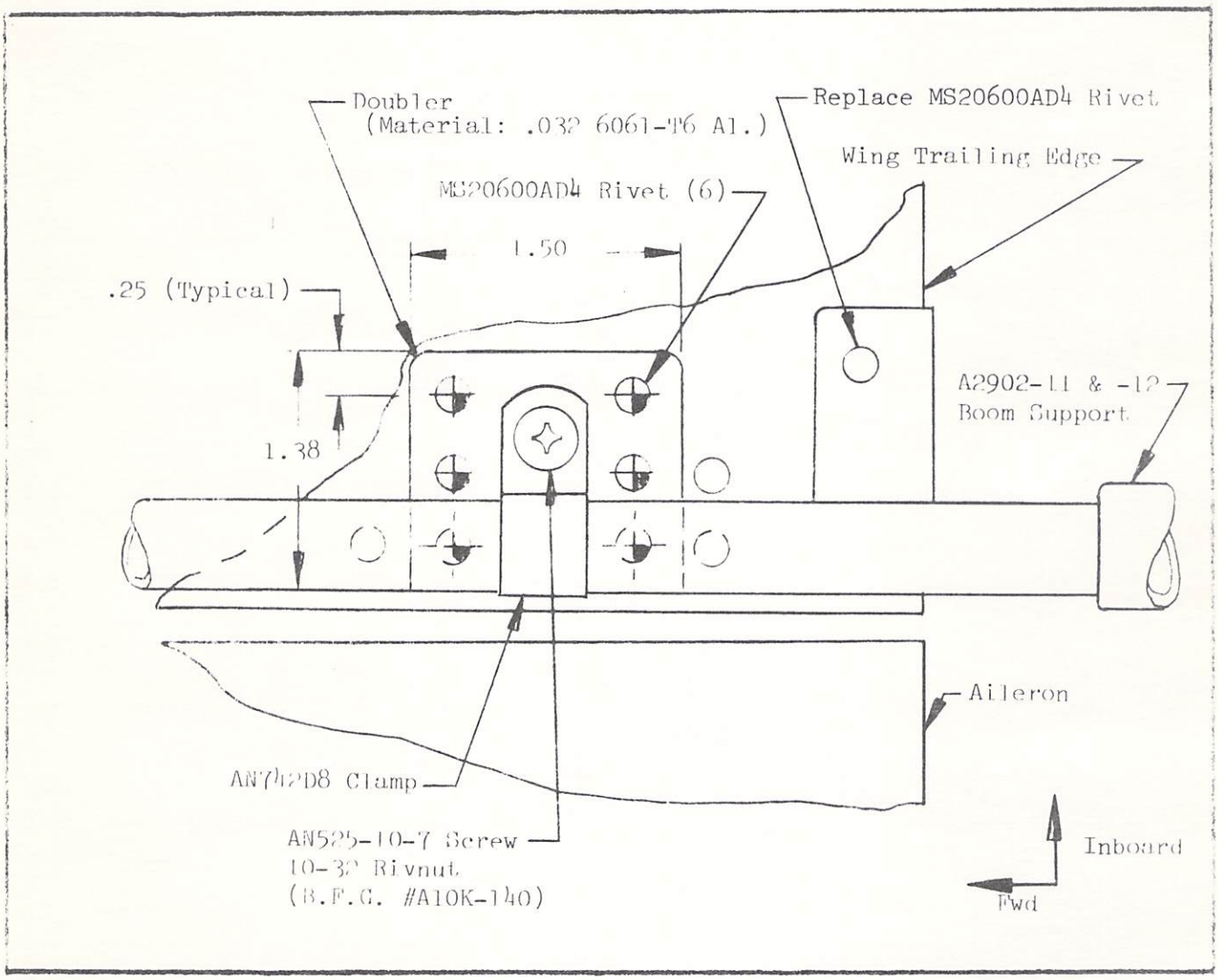
Service Note #11
October 8, 1974

GRUMMAN AMERICAN AVIATION CORPORATION

(Applicable on all Ag-Cats thru S/N 1325 equipped with Trailing Edge Booms)

AG-CAT SERVICE NOTES

It has been suggested that the attachment for the trailing edge boom support is not adequate if in the event an extreme shear load is applied. To increase the shear strength capabilities of the attachment it is suggested that all applicable aircraft be modified in accordance with the drawing noted below.



Joe Kosier
Ag-Cat Service Manager

Service Note #12
November 4, 1974

GRUMMAN AMERICAN AVIATION CORPORATION

Applicable on all Grumman Ag-Cats equipped with P&W R985 & R1340 engines

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A G - C A T S E R V I C E N O T E S

Subject: Lubricating Oil Specifications

Pratt & Whitney Aircraft Corp. has outlined the required lubricating specifications for the R985 and R1340 engines as follows:

All Pratt & Whitney reciprocating engines are required to be operated on grade 1100 (SAE 50) or grade 1120 (SAE 60) lubricating oils, conforming to the approved list in SB-1183M (attached).

Consideration to pre heat the engine should be made at temperatures below 5°C (40°F). Past experience, stiffness of the engine, and fluidity of the oil at the Y drain valve will be the best indications of the necessity to pre heat.

Joe Kosier
Ag-Cat Service Manager

Pratt & Whitney Aircraft

SERVICE BULLETIN

RECIPROCATING ENGINES

FAA APPROVED

G-10C-0

No. 1183
REVISION P

TITLE: OILS APPROVED FOR USE IN PRATT & WHITNEY AIRCRAFT RECIPROCATING ENGINES

PUBLICATIONS AFFECTED: This bulletin supersedes and cancels Service Bulletin No. 765, Revision D, and any other previously published list of approved oils.

REASON FOR BULLETIN: To provide a list of oils which comply with our laboratory requirements for oils used in Pratt & Whitney Aircraft reciprocating engines.

REASON FOR REVISION: To provide current information.

RECOMMENDATION: Recommended.

DETAILED INSTRUCTIONS:

1. The oils described in the following list comply with our laboratory requirements for use in Pratt & Whitney reciprocating engines, and have been found satisfactory in recent service as well.

2. Previous revisions of this bulletin have stated that grade 1100 oils were recommended for practically all conditions of operation. Subsequent experience has shown that grade 1120 is preferred in moderate and warmer climates, particularly in the R-1830 and R-2000 engines. Grade 1120 is preferred in all engines using "dispersant" additive type oils except in very cold climates where grade 1100 may provide easier starting.

TRADE NAME OF SYMBOL

Vendor	Grade 1100	Grade 1120
BP Trading Ltd.	BP Aero Oil 100 *BP Aero Oil D100	BP Aero Oil 120 *BP Aero Oil D120
Caltex Petroleum Corporation	Caltex Aircraft Engine Oil 100 *Caltex Aircraft Engine Oil Premium AD100	Caltex Aircraft Engine Oil 120 *Caltex Aircraft Engine Oil Premium AD120
Chevron Oil Co.	*Chevron Aero Oil 100	*Chevron Aero Oil 120
Cities Service Oil Co.	Koolmotor Aero Oil 100	Koolmotor Aero Oil 120
Continental Oil Co.	Conoco Aero Oil Code 6070 1100	Conoco Aero Oil Code 6070 1120

Distribution Code
2650

Printed in United States of America

TITLE: OILS APPROVED FOR USE IN PRATT & WHITNEY AIRCRAFT RECIPROCATING ENGINES

Vendor	Grade 1100	Grade 1120
Exxon Company, U.S.A.	Exxon Aviation Oil 100	Exxon Aviation Oil 120
	*Exxon Aviation Oil AD-100	*Exxon Aviation Oil AD-120
Exxon Corporation Esso International Co.	Esso Aviation Oil 100	Esso Aviation Oil 120
	*Esso Aviation Oil AD-100	*Esso Aviation Oil AD-120
Fiske Bros. Refining Co.	Lubroleine A Type Aero Oil 1100	
Gulf Oil Corporation	Gulf Aircraft Engine Oil 50	Gulf Aircraft Engine Oil 60
	Gulf Aviation Oil 50	Gulf Aviation Oil 60
DX Sunray Oil Co.	D-X Aviation Oil Code 255	D-X Aviation Oil Code 256
Pennzoil	Pennzoil Aircraft Oil Mineral Type SAE 50	Pennzoil Aircraft Oil Mineral Type SAE 60
	*Pennzoil Aircraft Heavy Duty Dispersant SAE 50	*Pennzoil Aircraft Heavy Duty Dispersant SAE 60
Quaker State Oil Refining Corporation	Quaker State Aero Oil 100	Quaker State Aero Oil 120
Shell Oil Co.	Aero Shell Oil 100	Aero Shell Oil 120
	*Aero Shell Oil W100	*Aero Shell Oil W120

NO. 1183
REVISION P

TITLE: OILS APPROVED FOR USE IN PRATT & WHITNEY AIRCRAFT RECIPROCATING ENGINES

Vendor	Grade 1100	Grade 1120
Atlantic Richfield Co.	Atlantic Richfield Aircraft Grade 1100 or Aircraft 100	Atlantic Richfield Aircraft Grade 1120 or Aircraft 120
Mobil Oil Corp.	Mobil Oil Aero-Red Band	Mobil Oil Aero-Green Band
	*Mobil Aero Oil 100	*Mobil Aero Oil 120
Standard Oil Co. of California	RPM Aviation Oil Code 900 100	RPM Aviation Oil Code 900 120
	*Chevron Aero Oil 100	*Chevron Aero Oil 120
Standard Oil Company (Kentucky)	Chevron Aero Oil 100	*Chevron Aero Oil 120
Texaco, Inc.	Texaco Aircraft Engine Oil 100	Texaco Aircraft Engine Oil 120
	*Texaco Aircraft Engine Oil Premium 100 AD	*Texaco Aircraft Engine Oil Premium 120 AD
Tide Water Associated Oil Co.	Tydol Aviation Oil 100	Tydol Aviation Oil 120
Tide Water Associated Oil Co. (Export)	Veedol Air Flight Oil 100	Veedol Air Flight Oil 120
Union Oil Co.	Union Aircraft Engine Oil 100	Union Aircraft Engine Oil 120

*Dispersant oils - Defined as basic engine mineral base lubricating oil incorporating a dispersant additive designed to keep insoluble material in suspension and prevent agglomeration and/or deposition of sludge. Dispersant oils usually have only minor effect on previously formed or deposited sludge.

3. It is recommended that reciprocating engine lubricating oil be changed after 200 - 300 hours of normal operation. Under conditions of severe operation, involving dust, sand, or coral, lubricating oils should be changed at 100 - 150 hour intervals.

Referance No.
LR/WR/WM

Service Note #13
November 15, 1974

GRUMMAN AMERICAN AVIATION CORPORATION

Applicable on all G-164 and G-164A Ag-Cats

A G - C A T S E R V I C E N O T E S

There have been reports submitted from the field of some main gear spring failures exclusively on the 3/4" and 7/8" thick gear springs.

It is recognized that there may be adverse conditions which the Ag-Cat is exposed to, and accordingly make the landing gear springs more susceptible to fatigue and possible failure. These conditions consist of operating from rough fields, high gross weight, (operation per CAM 8-10-3), pilot technique, and ratio of take-off and landings per operating hour.

Taking in consideration the above facts, we are issuing the following recommended inspection procedure.

All main landing gear springs installed on G-164 and G-164A Ag-Cats S/N 1 thru 1064 (excluding aircraft which have been backfitted to incorporate the one (1) inch thick gear, P/N A1530-33, -34) having an excess of 4,500 landings shall accomplish the following.

Within the next 200 landings (unless previously complied with) remove the main gear springs from the aircraft, remove paint, clean thoroughly, and using dye penetrant or magnetic particle inspection procedures, inspect the gear springs for cracks. Emphasis should be made on the upper bend radius, and fuselage attachment area. If no defects are noted repaint gear springs. An Epoxy Resin base primer and Polyurethane finish is suggested for maximum protection.

It is recommended that this inspection procedure be repeated at intervals of 4,500 landings.

In the event cracks are detected, the gear spring must be replaced.

Joe Kosier
Ag-Cat Service Manager

November 1974

Service Note #14
November 18, 1974

GRUMMAN AMERICAN AVIATION CORPORATION

Applicable to all electrical equipped Ag-Cats thru S/N 1340

A G - C A T S E R V I C E N O T E S

Subject: Stall Warning Switch

There has been one incident whereby the probable cause was the pilot left the stall warning switch in the off position. To eliminate this possibility it is suggested that the stall warning switch be removed so that the stall warning system will be armed direct from the primary electric source.

Recognizing the need for this switch in non electrical equipped Ag-Cats, to eliminate premature battery draining, it is suggested that these aircraft be placarded in full view of the pilot.

STALL WARNING SWITCH MUST BE ON DURING FLIGHT.

Joe Kosier
Ag-Cat Service Manager

Service Note #15
December 10, 1974

GRUMMAN AMERICAN AVIATION CORPORATION

Grumman Ag-Cats thru S/N 1389

A G - C A T S E R V I C E N O T E S

It has been reported that loose rivets and cracks have been noted on the upper forward surfaces of the center section P/N 1081.

It is suggested that 1 ea. MS20600AD-4 rivets be incorporated between each existing rivet. If in the event loose rivets are noted replace with MS20600AD5 rivets. Corrective action relative to the upper surfaces only.

Joe Kosier
Ag-Cat Service Manager

Service Note #16
December 10., 1974

GRUMMAN AMERICAN AVIATION CORPORATION

Applicable on all Grumman Ag-Cats

A G - C A T S E R V I C E N O T E S

Attached is the Maintenance procedure instructions for the Cleveland Brake Assemblies.

Please insert in your Ag-Cat Service Manual for reference.

Joe Kosier
Ag-Cat Service Manager

MAINTENANCE PROCEDURE

FOR THE

40-101/30-67

WHEEL AND BRAKE ASSEMBLIES

USED ON THE GRUMMAN AG-CAT

I. Cleaning and Inspection of Main Wheel Assembly

1. Degrease all parts and dry thoroughly. A soft bristle brush may be used to remove hardened grease, dust or dirt.

WARNING

DRY-CLEANING SOLUTIONS ARE TOXIC AND VOLATILE. USE IN A WELL-VENTILATED AREA. AVOID CONTACT WITH SKIN OR CLOTHING. DO NOT INHALE VAPORS.

2. Visually inspect bearing cones for nicks, scratches, water staining, spalling, heat discoloration, roller wear, cage damage, cracks or distortion. Replace if defective or worn.
3. Inspect wheel bearing grease for contamination and solidification at each periodic maintenance inspection. Do not exceed 500 wheel miles between repacking intervals. Repack wheel bearings with Mobil Bearing Grease (Mobilgrease 77 or Mobilus EP2) or equivalent.
4. Inspect wheel halves for cracks, corrosion, and other damage. Cracked or badly corroded castings should be replaced. Small nicks, scratches, or pits can be blended out using fine (400 grit) sandpaper.
5. Inspect snap rings and grease seals for distortion or wear. Replace if damaged or deformed. Saturate grease seal felts with SAE10 oil (do not soak).
6. Inspect bearing cups for looseness, scratches, pitting, corrosion, or evidence of overheating. If evidence of any defect exists, replace cup as explained in Replacement of Bearing Cup Procedures. Coat cups with clean bearing grease.

(Cont'd)

Cleaning and Inspection of Brake Assembly

1. Clean all metal parts and O-rings with denatured alcohol (gasoline and dry cleaning fluids will damage O-rings). If O-rings are damaged or worn excessively, they should be replaced.
2. Inspect brake cylinder for cracks, nicks, corrosion, damaged threads, etc. Inspect inlet and outlet hydraulic ports for foreign contaminates. Examine cylinder walls for scoring or excessive wear. Blend and polish light scratches in piston cavities with fine emery cloth (600 grit). Castings that are cracked or have damaged threads should be replaced.
3. Inspect anchor bolts for cracks, corrosion, permanent set, and excessive wear. Replace bolts that are bent, cracked or severely corroded.
4. Inspect pistons for cracks, nicks, burrs, or excessive wear. Remove burrs and blend out nicks, using fine emery cloth (600 grit), and clean thoroughly.
5. Inspect pressure plate assembly for cracks, damaged rivets and excessive warpage. Replace if cracked or severely deformed. Replace cracked or deformed rivets.
6. Inspect brake cylinder bolts for cracks, thread damaged, and self-locking feature. Replace bolts that are cracked, bent or have damaged threads.
7. Inspect brake linings for radial cracks around rivets and surface deterioration. Linings should be replaced when worn to a thickness of .100 inch. Worn linings may be easily removed by drilling out rivets, using a 5/32 drill. Install new linings in place, using 105-00200 rivets.

(Cont'd)

8. Inspect torque plate for cracks, nicks, burrs, rust, excessive wear and brinelling in bolt holes. Replace if cracked or severly deformed. Use dry lubricant on torque plate bushings.

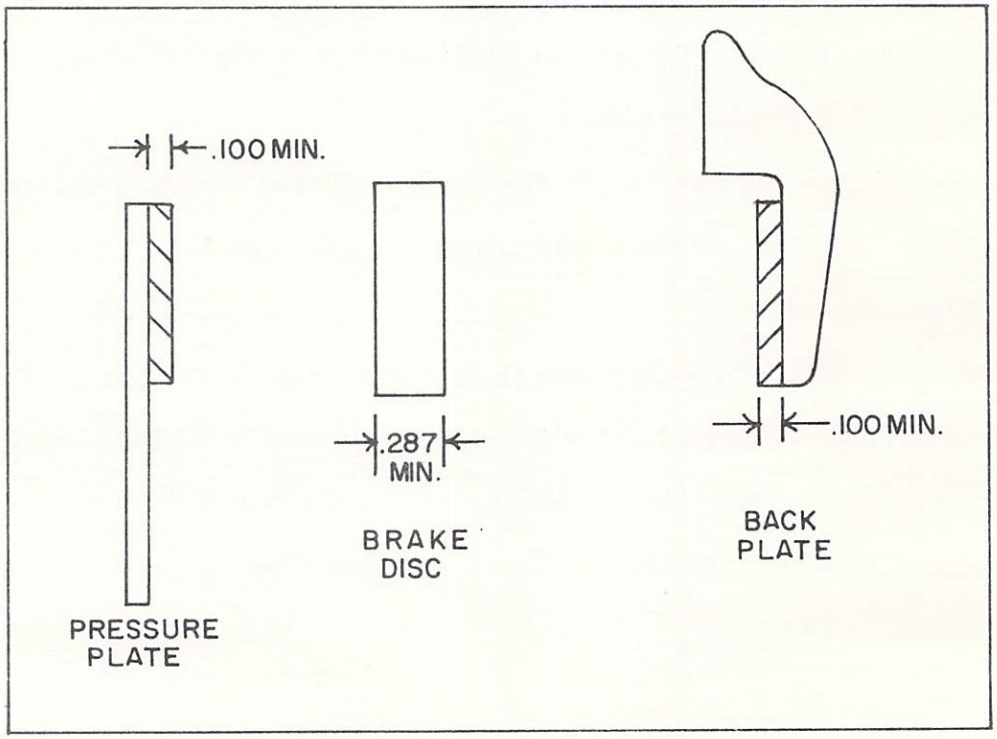
II. Repainting of brake assembly

1. Thoroughly clean repaired surfaces and areas of the brake assembly from which paint has been removed.
2. Paint exposed areas with one coat of primer and one coat of aluminum lacquer.

CAUTION

DO NOT PAINT PISTONS OR THE PISTON BORES IN THE BRAKE CYLINDER.

III. Recommended Wear Limits for Disc and Linings



Service Note #17
June 16, 1975

GRUMMAN AMERICAN AVIATION CORPORATION

Applicable on Grumman Ag-Cats S/N 1521 and Up

A G - C A T S E R V I C E N O T E S

Grumman Ag-Cats S/N 1521 and up will have the starter engine engagement electrically operated to the starter engagement solenoid. Solenoids used on these aircraft starters have been overhauled.

Grumman Ag-Cats using the Bendix #444 (12v) and #915 (24v) starters may be modified in accordance with the attached ECO# S164-2838.

It is very important that the solenoids used are in good operating condition.

Service Note #18
June 18, 1975

GRUMMAN AMERICAN AVIATION CORPORATION

SUBJECT: ELEVATOR AND STABILIZER CONTROL SURFACES

Applicable to Grumman Ag-Cat S/N 1 thru 1489

A G - C A T S E R V I C E N O T E S

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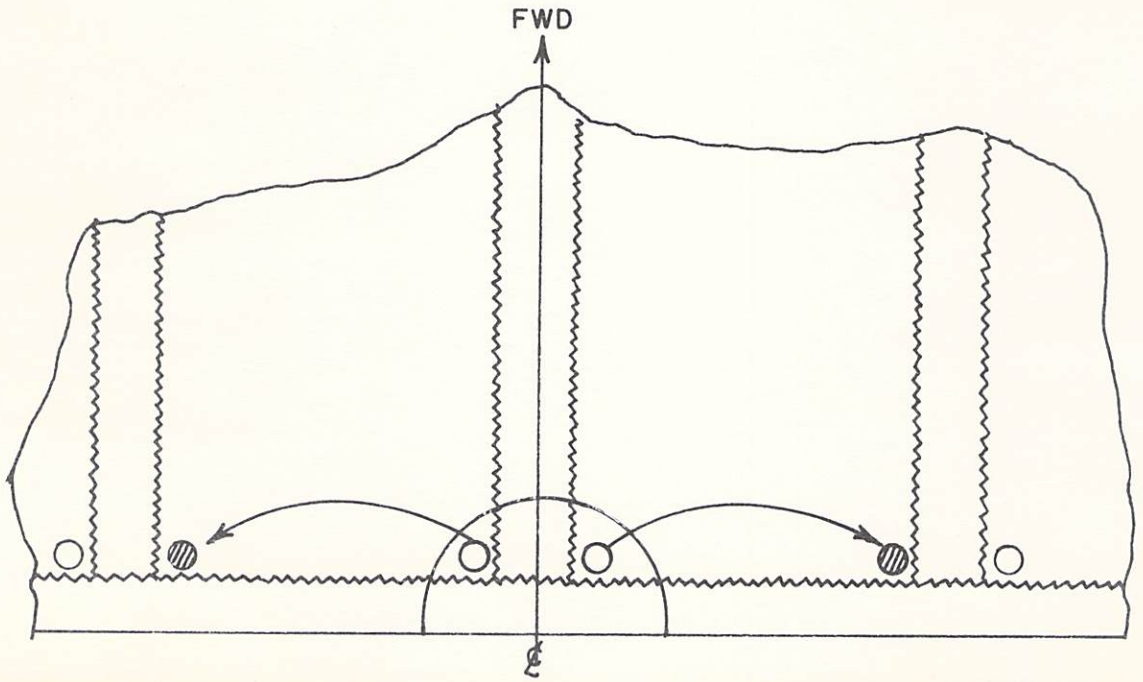
(1) Reports submitted indicate that the dope on the upper portion of these surfaces has a tendency to crack (ring worm). This condition is caused by buffeting of the fabric surface in the slip stream area due to rivet spacing.

It is recommended during recovering of these surfaces that additional fabric rivets be installed between each existing fabric rivet on the three inboard ribs of the left and right sides of these control surfaces.

(2) To eliminate the possibility of fertilizer etc., from entering thru the 2 each center sea plane drain grommets of the stabilizer, it is recommended that they be relocated per drawing below.



Service Note #19
July 1, 1975

GRUMMAN AMERICAN AVIATION CORPORATION

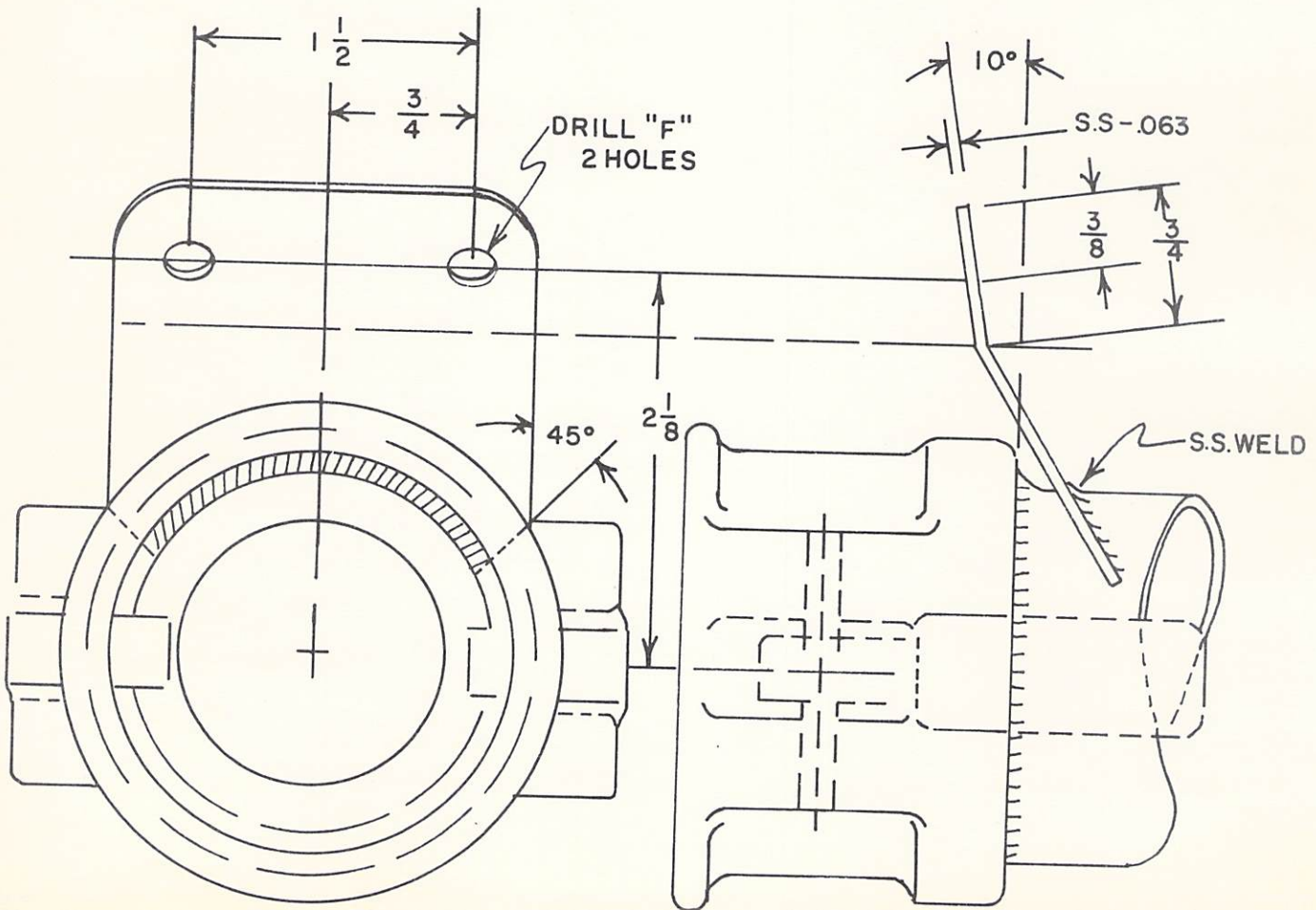
Applicable to Grumman Ag-Cats S/N 1507 and Up

A G - C A T S E R V I C E N O T E S

Field Reports indicate that the brass mounting plate brazed on the A2934-121 tube assembly coupler has been cracking.

Effective on Grumman Ag-Cat S/N 1507, this mounting plate will be fabricated from .063 stainless steel, and welded directly to the A2934-121 tube assembly.

Field modifications maybe accomplished per drawing below.



Service Note #20
July 1, 1975

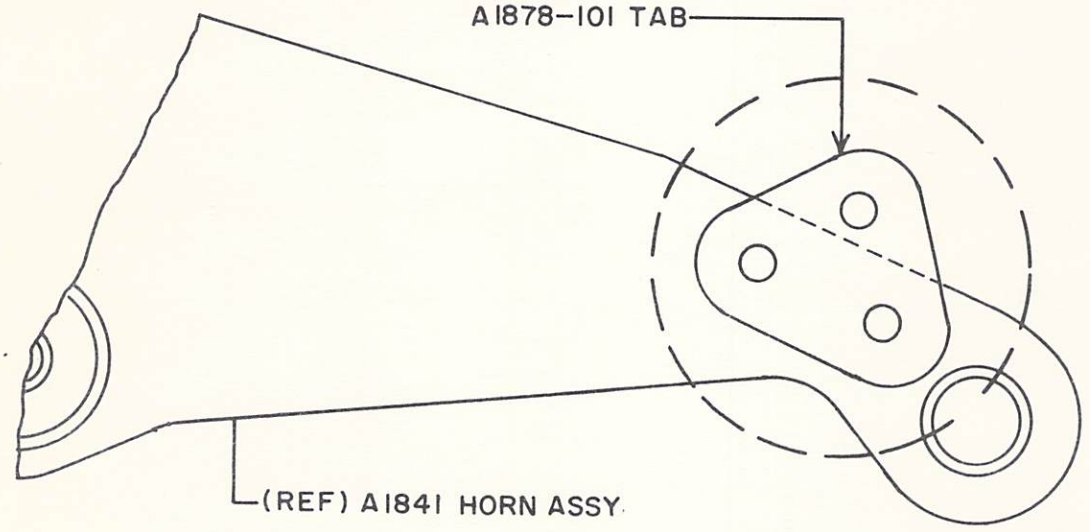
GRUMMAN AMERICAN AVIATION CORPORATION

Applicable to Grumman Ag-Cats S/N 1528 and Up

A G - C A T S E R V I C E N O T E S

Field Reports indicate that the holes located on the A1878-101 tail wheel steering tabs have a tendency to elongate. (Ref. drawing below).

Effective on Grumman Ag-Cat S/N 1528 and up, these tabs will be heat treated to 160,000 p.s.i. All spare tabs ordered after July 1, 1975 will be heat treated accordingly.



Service Note #21
July 18, 1975

GRUMMAN AMERICAN AVIATION CORPORATION

Applicable to all Grumman Ag-Cats

A G - C A T S E R V I C E N O T E S

The Grumman Ag-Cat Parts Manual and the related pictorial figures are to be used for Part Reference only, and is not to be used as a reference for the installation of the given components, or parts, thereof.

Service Note #22
July 22, 1975

GRUMMAN AMERICAN AVIATION CORPORATION

Applicable to all Grumman Ag-Cats incorporating the Coast Winslow Oil Filter Assembly, P/N 30690-B-16.

A G - C A T S E R V I C E N O T E S

Subject: Filter Element Replacement P/N 1A0599

Coast Winslow Filter Corporation has eliminated the manufacturing of filter elements used in conjunction with the subject filter assembly.

They may be purchased from:

World Wide Filter Co.
1685 Abram Court
San Leandro, California 94577

World Wide Part Number #E-5080.

Service Note #23
August 1, 1976

GRUMMAN AMERICAN AVIATION CORPORATION

Applicable to G 164-A and G 164-B, Serial Numbers 1 thru 1659 and 1 B thru 56 B.

A G - C A T S E R V I C E N O T E S

Subject: Grumman American Ag-Cat Service Bulletin #51 (AD 73-19-10)

Grumman American has available a kit to modify the elevator horn assembly which will discontinue the need for compliance with AD 73-19-10.

This modification will also satisfy the requirements of Service Bulletin #33 if not already complied with.

These kits may be ordered through your Ag-Cat distributor. Please request the following:

Kit P/N 1209 for S/N 1 thru 425, or
Kit P/N 1208 for S/N 426 thru 1659 and 1 B thru 56 B.

G 164-A S/N 1660-Up and G 164-B S/N 57 B-Up have this modification incorporated.

Joe Kosier
Ag-Cat Service Manager

JK/ss

Service Note #24
August 1, 1976

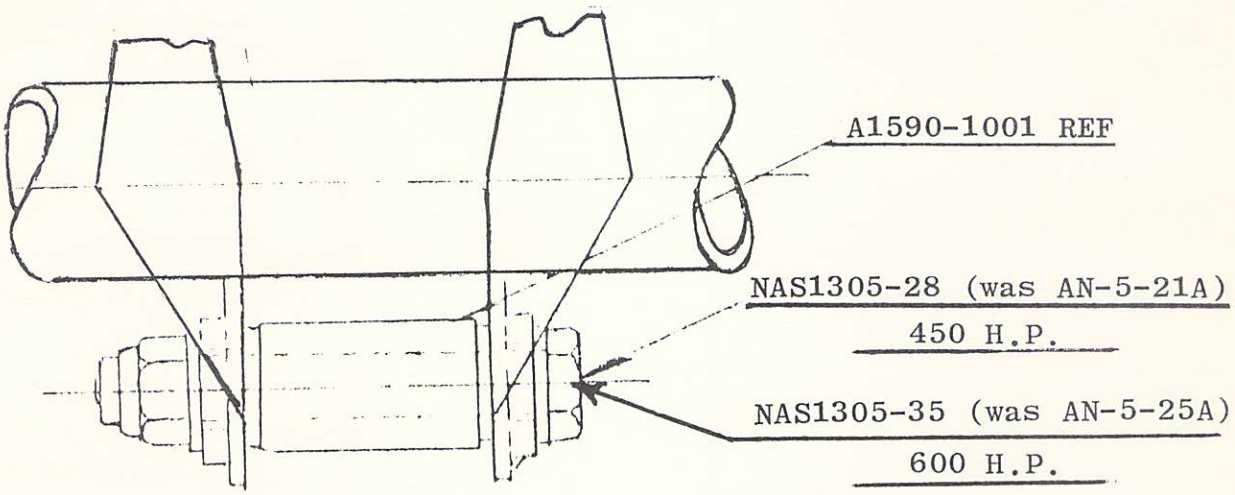
GRUMMAN AMERICAN AVIATION CORPORATION

Applicable to G 164-A and G 164-B, Serial Numbers 1 thru 1659 and 1 B thru 53 B.

A G - C A T S E R V I C E N O T E S
(REVISION "A")

Subject: Tail Gear Spring Bolt

To improve service life of the tail gear spring attach bolt, it is recommended that the existing AN-5-21A bolt be replaced with a NAS1305-28 bolt. Refer to drawing below.



Joe Kosier
Ag-Cat Service Manager

JK/ss

10-11-76 Revision "A"

Service Note #25
October 1, 1976

GRUMMAN AMERICAN AVIATION CORPORATION

Applicable to all Grumman American G 164, G 164-A, and G 164-B aircraft incorporating the Pratt & Whitney R-985 and R-1340 engines.

A G - C A T S E R V I C E N O T E S

Subject: Fuel

Following is Pratt & Whitney's position on using 80/87 oct. and 100/130 L.L. fuel.

"Pratt & Whitney Aircraft's historical policy relative to aircraft engine fuel has been to permit the use of the basic fuel, or any higher grade. In the case of R-985-1340 engines, the basic fuel is Grade 80/87. However, most commercial and military operators have utilized Grade 100/130 or 115/145 fuels when 80/87 was not available.

For your additional information, almost all Aviation Gas suppliers have been gradually converting or standardizing on Avgas 100/130 L.L. (Low Lead - 2c.c. or 2ml.) to supercede or replace Grade 80/87, 91/98, or 100/130. To date, we have not seen any detrimental conditions. Naturally, the lower lead content should provide longer spark plug life and lower lead compound deposition rates in the oil system.

It should be noted that the standard Grade 100/130 MIL-G-5572C fuel only specifies that the lead (T.E.L.) content must not exceed 4.6 ml (AMS-3032C lists 3.0 ml T.E.L. maximum). Therefore, Grade 100/130 L.L. (Low Lead), with 2 ml. T.E.L., meeting other MIL-G-5572C or AMS-3032C Specs., is considered satisfactory for all P&WA piston engines requiring Grade 100/130 fuel or lower grades."

Joe Kosier
Ag-Cat Service Manager

JK/ss