GRUMMAN AMERICAN AVIATION CORPORATION

SAVANNAH, GEORGIA

STANDARD REPAIR MANUAL

MODEL ALL LIGHT A/C : REPORT NO. LIA S.R. 002

LIGHT AIRCRAFT

STANDARD REPAIR MANUAL

#19

REPORT DATE: FEB. 1, 1978

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REV. NO.	DATE	DESCRIPTION OF REVISION	APPROVAL
A	06/17-78	Added SR 033 to General Repair Index Added SR 228 to Wing Repair Index	
B	7/20/78	Added to Manual and General Repair Index SR034 and SR035 In SR032, Added Alternate Bolts, Notes 1 and 2, and deleted lengths of NAS bolts. In SR102, Added rivet callout to repair sketches and removed the grip lengths from repairs 1 and 2. In SR227, Added .060 min. to bushing wall. Added to Manual and Empennage Index SR319 and SR320. In SR307, Deleted "or Rudder" from title In SR310, Added "VERTICAL OR" to title. In SR314, Added Limitation #4	

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INTRODUCTION

The purpose of this manual is to provide a listing and description of commonly occuring minor discrepancies and the approved repair applicable to each for all Grumman American Light Aircraft Programs. This manual permits a standardized recording and reporting method which assures proper implementation of the commensurate repair procedures in accordance with the requirements of the Quality Control Manual. The repairs contained in this manual are considered approved deviations from type design and are substantiated by approved methods, techniques, and practices which produce equal or better than type design strengths, and/or by test and analysis by Grumman American Aviation in accordance with FAA Regulations.

SCOPE AND APPLICABILITY

The Standard Repairs contained herein are basically general in nature and may be used singularly or in combination on any parts for which they are applicable. These repairs are not intended to supersede the engineering drawing requirements, unless a discrepancy does exist, and are not necessarily authorized in Grumman American Specifications, Reference to applicable specifications is made as necessary.

Each specific Standard Repair (SR) will be individually approved by Grumman American Quality Control And Engineering. Federal Aviation Administration approval for application of repairs will be via DER approval system.

Listed in each SR are restrictions and/or limitations where applicable.

RESTRICTIONS are prohibitions against the use of that SR under certain conditions or for certain programs.

LIMITATIONS are stipulations concerning the extent of damage to which the repairs may be applied and the need for M.R.B. signatures.

REVISIONS AND SUPPLEMENTS

The contents of this manual will be periodically updated as necessary, and all request for changes or additions are to be forwarded to Liaison Engineering. The SR manual will be maintained by engineering and all revisions must be approved by Engineering, Quality Control, and FAA approved via DER approval system.

REVISIONS AND SUPPLEMENTS (CONTINUED)

Approved supplements can be added to the Manual by Grumman American, via DER approval system, which shall be filed directly preceding the basic SR. When a supplemented SR is revised or cancelled, the supplement shall be reviewed and incorporated or cancelled as necessary.

IMPLEMENTATION

Discrepant material or parts, identified in accordance with the requirements of the Quality Control Manual, and matching one or more of the discrepant conditions within this Manual, shall be repaired as described under the applicable condition by following the procedures of this manual.

In cases where the repair instruction for a given condition must be modified or an alternate used, they are to be processed on DMT tags.

CORRECTIVE ACTION AND CONTROL

Quality Control shall have the responsibility for administering the SR system. Quality Control and Engineering shall have the authority to limit the usage and the number of SR's applied to any part or condition by monitoring the frequency/recurrence of SR's and requiring DMT action.

The control of the SR Manual does not require a complete manual be maintained in all areas. Only the SR's needed in a particular area need to be controlled in that area's manual. Quality Control shall be responsible for maintaining the Manual contents and distribution in each area.

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GENERAL NOTES

1. Except in fuel bay areas, rivets added per the SR's, may be MS 20426AD3 or Avex 1604-0412 where one or the other is specifies. The MS20426AD3 is the perfered rivet.

2. When Avex 1604-0412 rivets are used on any air passage surface, the heads are to be filled with aerodynamic filler per GAPS 1010.

3. In material thickness .020 & below, the NAS 1097AD3 rivet should be used in place of both the MS20426 & 1604 Avex.

4. Definition of a suspect void is: When bond is checked by ultrasonic methods, the light will flicker but not come all the way on. This suspect void will not resound with a hollow sound when checked by tap testing, nor will a gap exist at the mating part edge.

5. When selecting a repair, it is important to consult the engineering drawing to prevent:
   (A) Rework operations in areas where the design is restricted.
   (B) The incorporation of a repair which would result in interference on subsequent installation or assembly.

6. In case of conflict between the engineering drawing and this manual, The drawing will take precedence. Engineering should be notified in this event, for future revisions.

7. All repair rivets passing thru bondlines are to be installed wet with adhesive or sealer as used in that repair. These rivets are to be installed along bonded flange centerlines unless otherwise specified.

8. When adding a repair part, it is to be of the same material, temper, and finish as that of the part being repaired, unless otherwise specified, and is to be verified by Quality Control.

9. When adhesive is to be applied in the repair, and cleanliness of parts are in question, faying surfaces are to be cleaned & prepaired per GAPS 1041 or, if sufficiently practical, scuff surfaces with # 320 cloth and wipe clean with MEK solvent.

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GENERAL NOTES (CONTINUED)

10. The bonding agents called out in this manual will be as follows:
    A) Thermosetting adhesive is to be used on all repairs where the assembly can be oven cured during it's production flow.
    B) Room temperature curing adhesive is to be used on all repairs where the assembly can not be oven cured during it's normal production flow.
    C) Room temperature and/or thermosetting adhesive repairs are per GAPS 1041.
    D) Repaires to the fuel bay areas are to use either thermosetting adhesive or the following room temperature curing adhesives: Hysol 9316 (preferred) or Hysol 9309, Unless otherwise specified.
    E) In the event of a conflict with a specific SR, this procedure will take precedence.

11. When bondline voids or gaps are to be filled per these notes, and the fill agent is not specified by the SR, adhesive is to be used as specified in Note 10 above.

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Hardware Substitution

RIVET SUBSTITUTION

The Table of Rivet Substitution shown below has been condensed from GAPS 1089 Section 10.1 for general information purposes.

The Table shows the rivets in an order of ascending strength; therefore, all rivets listed below a given rivet are an acceptable substitute for that rivet except as noted.

RIVET	RESTRICTIONS
(*)* AVEX 1601 (*)* AVEX 1604 Flush	Substitution applies only if rivets listed in column at left are called out on Engineering DWG or SR.
(*)* MS20470AD4 (*)* MS20426AD4 Flush	
* CR2249-4 * CR2248-4 Flush	
(*)* NAS1919BO4 (*)* NAS1921BO4 Flush	
CR3243-4 CR3242-4 Flush	

* NAS rivets can be substituted for CR rivets only if hole has not been drilled.

(*) MS & NAS rivets can be substituted for AVEX rivets only if hole has not been drilled.

The following Table of Material Substitutions has been condensed from GAPS 1089 for production reference.

ALLOWABLE FASTENER SUBSTITUTIONS:

ANCHOR NUTS-

Specified anchor nut (fixed)	Approved Substitution (floating)	Restrictions
NAS680	NAS686	1. Dash numbers must be identical 2. Hole sizes to remain unchanged
NAS697	NAS1068	3. This substitution shall be limited to areas: a) Where the greater width of the floating anchor nut will not cause interference. b) Where an assembly problem exists, due to cost and weight increase of float-anchor nuts.

NUTS-

Any MIL-SPEC approved alternate or superseding part is acceptable

Specified Nut	Approved Substitute	Restrictions
MS20364	NAS679	Allows substitution of steel nuts only in like thread size except 7/16-20 nuts. MS20364 nuts and/or MS20365 nuts may not be substituted for NAS679 nuts.
MS20365	MS21045	Allows substitution of steel nuts only. MS21045 and/or 21044 nuts Universally replace MS20365 and/or AN365 nuts of like thread size except 7/16-20 nuts: MS20365 and/or AN365 may not be substituted for MS21045 and/or MS21044 nuts.
AN365	MS21044	
MS20365	MS21042	
MS20364	MS21042	
AN365	MS21042	

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BOLTS-

Any MIL-SPEC approved alternate or superseding part is acceptable

Specified Bolt	Approved Substitute	Restrictions
AN3 thru 20	NAS464	Allows substitution of steel bolts in like thread size only. An3 thru 20 bolt shall not be substituted for NAS464 bolt.
NAS148	MS20008	Drilled or undrilled head optional. NAS148 internal wrenching. .50/flats MS20008 .37 /flats.

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Condition: OVERSIZE, ELONGATED OR DAMAGED HOLES FOR HI-SHEAR, HI-LOK, HI-LOK HI-TIGUE, LOCKBOLT, LOCKBOLT STUMP, OR BLIND HIGH STRENGTH FASTENERS

Limitations:

1. GB511AM, GB5100R, GB511AN, GB510S, GB511AU, and GB510AU fasteners used on surfaces sloped between 3° and 7° require GN512W self-aligning collars in place of the GN512DF collars. GB511BE, GB510AB, GB511BF, and GB510AC fasteners used on surfaces sloped between 3° and 7° require GN512FD self-aligning collars in place of the GN512FC collars. Where the preceeding fasteners are used against surfaces sloped more than 7° and where the other fasteners are used with the collars against surfaces sloped more than 3°, install the collars against G23 tapered washers of the appropriate angle, increasing the length of the fastener as necessary.

2. Where the drawing calls for Stat-O-Seals and/or "O" rings only 1/64" oversize fasteners may be used. Seal back-up washers shall be reamed 1/64" oversize to match fasteners.

3. Applications involving the use of interference fit fasteners require the review and signature of the MRB Engineer.

4. 1/64" oversize fastener may be used up to a maximum of (15) adjacent fasteners.

5. 1/32" oversize fasteners may be used provided there are no (2) adjacent fasteners replaced.

6. Replacement fasteners listed in the accompanying table are not necessarily carried in stock, size for size.

7. Where salvage fastener replacement is authorized by other documentation such as a specification, drawing, or E. O., the provisions of the individual authorization take precedence over the provisions of this SR.

Repair:

1. Determine the minimum hole size necessary to clean out any existing elongation, mislocation, or hole damage and select from the table the appropriate replacement fastener, utilizing the 1/64" oversize choice wherever possible in lieu of the 1/32" oversize fastener.

2. Ream for and install the required replacement fastener with the hole size selected to provide the same degree of fit as for the original fastener/hole combination. Since the replacement fastener may not necessarily be in stock, the reaming operation should not be undertaken until the salvage fastener availablility is assured.

3. The replacement fastener and collar shall be installed with wet primer wherever dissimilar metals are in contact and all sealing and installation requirements stipulated for the original fastener shall be met. See Limitations 2 and 3.

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Condition: OVERSIZE, ELONGATED OR DAMAGED HOLES FOR HI-SHEAR, HI-LOK, HI-LOK HI-TIGUE, LOCKBOLT, LOCKBOLT STUMP, OR BLIND HIGH STRENGTH FASTENERS

FASTENER REPLACEMENT TABLE

ORIGINAL FASTENER	1/64" OVERSIZE REPLACEMENT FASTENER	1/32" OVERSIZE REPLACEMENT FASTENER
NAS1054	GP510AG/GC580G GB511AM/GN512DF	GP510AK/GC580G GB511CS/GN512DE
NAS1055 5555	GP510AH/GC580G GB51 OR /GN512DF	GP510AJ/GC580G GB510BD/GN512DE
GB511D, NAS1426-1432, NAS1446-1452	GB511AM/GN512DF	GB511CS/GN512DE
GB510B, NAS1416-1422, NAS1436-1422	GB510R/GN512DF	GB510BD/GN512DE
GB511G	GB511AN/GN512DF	GB511AP/GN512DE
GB510E	GB510S/GN512DF	GB510T/GN512DE
GB511K, NAS2606-2612, C020	GB511AM/GN512DF GB511AN*/GN512GV (alum. structure) /GN512CV (other structure)	GB511CS/GN512DE GB511AP*/GN512DE (alum. structure) /GN512DD (other structure)
GB510A, NAS2506-2512, NAS2706-2712, C021	GB510R/GN512DF GB510S*/GN512GV (alum. structure) /GN512CV (other structure)	GB510BD/GN512DE GB510T*/Note 1
GB511E, NAS1466-1472, NAS1496-1502	GB511AN/GN512GV (alum. structure) /GN512CV (other structure)	GB511AP/Note 1
GB510C, NAS1 456-1462, NAS1486-1492	GB510S/GN512GV (alum. structure) /GN512CV (other structure)	GB510T/Note 1
GB511P, NAS2006-2010 NAS2206-2210	GB511AN*/GN512GV (alum. structure) GN512CV (other structure)	GB511AP*/Note 1
NAS2106-2112	GB510S*/GN512GV (alum. structure) /GN512CV (other structure)	GB510T*/Note 1

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Condition: OVERSIZE ELONGATED OR DAMAGED HOLES FOR HI-SHEAR, HI-LOK, HI-LOK HI-TIGUE, LOCKBOLT, LOCKBOLT STUMP, OR BLIND HIGH STRENGTH FASTENERS

FASTENER REPLACEMENT TABLE
(Continued)

ORIGINAL FASTENER	1/64" OVERSIZE REPLACEMENT FASTENER	1/32" OVERSIZE REPLACEMENT FASTENER
GB511BC	GB511BE/GN512FC FH	GB511BF/GN512FC FH
GB510AA	GB510AB/GN512FC FH	GB510AC/GN512FC FH
GB511BL	GB511BK/GN512FH GB511BE/GN512FC FH	GB511BM/GN512FH GB511BF/GN512FC FH
GB510AG	GB510AH/GN512FH GB510AB/GN512FC FH	GB510AJ/GN512FH GB510AC/GN512FC FH
GB511BN	GB511BP/GN512FH	GB511BR/GN512FH
GB510AL	GB510AN/GN512FH	GB510AM/GN512FH
GF510C, NAS1669	PPO-	
GF511C, NAS1670	FFO-	

*Prior to use, strip cad plate per GSS 8050 and measure reduced diameter in order to determine the required hole size.

NOTES:

1. Use MS 21042 nut with AN960 washer against aluminum structure, AN 960 washer against steel structure or AN 960C washer against titanium or stainless steel structure. Torque nuts per G. A. P. S. as applicable.

2. Where required, MS 21042, MS 21043 or GN 510AE nuts with appropriate washers as above may be used in lieu of the Hi-Loc or Hi-Tigue collars specified. Follow the installation and Torque Requirements of GS31A-98 or GS31B-28. Caution - MS21043 silver plated nuts shall not be used directly against aluminum structure.

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Condition: MINIMUM FASTENER EDGE AND CENTER-TO-CENTER DISTANCES

1. GENERAL:
Limitations:

a) Proper or nominal fastener edge distance shall be defined as two (2) fastener shank diameters from fastener center line to edge of part.

b) The following tables list the MINIMUM acceptable-without-repair fastener edge and center-to-center distances for the types of fasteners and attached part materials listed. Where measured fastener center line to edge of part or fastener center line to adjacent fastener center line distances are less than the drawing requirement but equal to or greater than the values included herein, a Standard Repair is required and may be accomplished by referring to one (1) or a combination of the applicable SR's shown elsewhere in the manual.

c) The specific limitations applicable to any given repair will be stated in the "Limitations" section of that particular SR. However, there are several "General Limitations" which are applicable to ALL SR's involving shy edge or shy center-to-center fastener distances.

d) Drawing dimensions occasionally permit fastener edge and/or center-to-center distances which are less than the minimums listed in the tables. Such cases are not discrepant conditions and do not require SR's except where the actual measured distances are below the drawing values.

e) The values described herein are applicable to all additional fasteners added by other SR's.

2. GENERAL LIMITATIONS:

a) When determining the minimum center-to-center distance requirements for any two (2) adjacent fasteners of different diameters, the nominal shank diameter of the larger fastener shall be used.

b) When determining the minimum edge distance requirements for replacement with the next larger size fastener, the diameter of the larger fastener shall be used.

c) Next larger size fasteners shall not be used in splice areas without the approval of the MRB Engineer.

d) Fasteners shall not be added between any two (2) fasteners of a splice without approval of the MRB Engineer.

e) All applicable sealing requirements must be adhered to.

f) Standard dimpling requirements must be adhered to.

g) When adding a repair part it is to be of the same material, temper, and finish as that of the part to be repaired, and shall have the same or better surface smoothness.

h) For fasteners not listed, maintain applicable Engineering Drawing or Specification edge and center-to-center distances.

i) All conditions or repairs involving the use of interference fit fasteners shall require the review and signature of the MRB Engineer.

Condition: MINIMUM ACCEPTABLE FASTENER EDGE & CENTER-TO-CENTER DISTANCES-- PROTRUDING HEAD FASTENERS (1) (For Values Shown in ( )Refer to Notes)

TABLE I

DISTANCE CENTER LINE OF FASTENER TO EDGE OF MATERIAL

THESE VALUES APPLICABLE TO 2014, 2024, 2219, 7075, AND 6061 ALLOYS IN ANY FULLY HARDENED TEMPER

MATERIAL THICKNESS	FASTENER TYPES (SEE BELOW) & DIA. (2)								
	A	B	C	D	E	F	G	H	I
.025	.16	.25	.31	.31	.32	.37	.37	.37	.37
.032	.14	.22	.31	.31	.32	.37	.37	.37	.37
.040	.14	.19	.27	.31	.32	.36	.37	.37	.37
.050	.14	.19	.23	.27	.32	.34	.37	.37	.37
.063	.14	.19	.23	.23	.32	.28	.33	.36	.37
.071	.14	.19	.23	.23	.32	.28	.31	.33	.37
.080	.14	.19	.23	.23	.32	.28	.28	.30	.37
.090	.14	.19	.23	.23	.32	.28	.28	.28	.37
.100	.14	.19	.23	.23	.32	.28	.28	.28	.37
.125	.14	.19	.23	.23	.29	.28	.28	.28	.35
.160	.14	.19	.23	.23	.25	.28	.28	.28	.30
.190	.14	.19	.23	.23	.25	.28	.28	.28	.28

A = AD3, CO 89-3

B = AD4, C089-4, GR500L-4

C = AD5, C089-5, GR500L-5

D = DD5

E = GB511D-08, GB511K-08, GB511P-08, GB511J-08

F = AD6, C089-6, GR500L-6

G = DD6

H = NAS1526(5), GB511F-3, GB511R-3, GL500C-6

I = NAS1054-6(5), NAS1303, NAS1446(5), NAS1466(5), NAS1496(5), NAS1103, GB511D-3, GB511K-3, GB511S-3, MS90354-06, GB511E-3, GB511P-3, GB511J-3, NAS653, NAS673, NAS1426, NAS2006, NAS2206, NAS2606

TABLE IA

DISTANCE CENTER LINE TO CENTER LINE OF ADJACENT FASTENERS

Fastener Type (2)	
AD, C089, GR500L	Three times nominal diameter of fastener shank less .030
All Others	Four times nominal diameter of fastener shank less .030

Condition: MINIMUM ACCEPTABLE FASTENER EDGE & CENTER-TO-CENTER DISTANCES - COUNTERSUNK HOLE FASTENERS (1) (For Values Shown in ( ) Refer to Notes)

TABLE II

DISTANCE CENTER LINE OF FASTENER TO EDGE OF MATERIAL

THESE VALUES APPLICABLE TO 2014, 2024, 2219, 7075, AND 6061 ALLOYS IN ANY FULLY HARDENED TEMPER

MATERIAL THICKNESS	FASTENER TYPES & DIA. (3) (SEE BELOW)								
	A	B	C	D	E	F	G	H	I
.025	.19	.25	.31	.31	.32	.37	.37	.37	.37
.032	.17	.25	.31	.31	.32	.37	.37	.37	.37
.040	.16	.22	.27	.31	.32	.37	.37	.37	.37
.050	.16	.21	.26	.30	.32	.37	.37	.37	.37
.063	.16	.21	.26	.26	.32	.33	.37	.37	.37
.071	.15	.21	.25	.25	.32	.32	.36	.37	.37
.080	.15	.20	.25	.25	.32	.32	.32	.34	.37
.090	.15	.20	.25	.25	.32	.31	.31	.31	.37
.100	.14	.19	.25	.25	.32	.31	.31	.31	.37
.125	.14	.19	.24	.24	.28	.30	.30	.30	.37
.160	.14	.19	.23	.23	.25	.30	.30	.30	.32
.190	.14	.19	.23	.23	.25	.28	.28	.28	.28

A = AD3, C088-3, C2896-3

B - AD4, C088-4, C2896-4, GR501L-4

C = AD5, C088-5, C2896-5, GR501L-5

D = DD5

E = GB510B-08, GB510A-08

F = AD6, C088-6, C2896-6, GR501L-6

G = DD6

H = NAS1536(6), GB510D-3

I = NAS1055-6(6), GB510A-3, GB510B-3, NAS2506V, NAS2706V, NAS1416, NAS1436, GB510L3

TABLE IIA

DISTANCE CENTER LINE TO CENTER LINE OF ADJACENT FASTENERS

Fastener Type (3)	
AD, C088, GR501L, C2896	Three times nominal diameter of fastener shank
All Others	Four times nominal diameter of fastener shank

Condition: MINIMUM ACCEPTABLE FASTENER EDGE AND CENTER-TO-CENTER DISTANCES - DIMPLE HOLE FASTENERS (1) (For Values Shown in ( ) Refer to Notes)

TABLE III DISTANCE CENTER LINE OF FASTENER TO EDGE OF MATERIAL (AD, C088, C2896 & GR501LTYPES (4)

Two times nominal diameter of fastener shank

TABLE IV DISTANCE CENTER TO CENTER LINE OF ADJACENT FASTENERS (AD, C088, C2896 & GR501L TYPES) (4)

Three times nominal diameter of fastener shank

NOTES: The values shown in ( ) on Pages 3,4, and 5 pertain to the following notes:

1. Values listed for specific fasteners are also applicable to the authorized replacements for these fasteners.
2. Callouts for AD or DD fastener types refer to MS20470 rivets.
3. Callouts for AD or DD fastener types refer to MS20426 and NAS1097 rivets.
4. Callouts for AD or DD fastener types refer to MS20426 rivets.

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Condition: STOP HOLE SIZES TO BE USED ONLY WHEN SPECIFIED BY ANOTHER S/R or by liaison engineering on D.M.T. tags.

Limitations:

1. Cracks must be cleaned out wherever possible.
2. Use in any area where sealing requirements would be affected, require signature of MRB Engineer.
3. Use of stop hole in material thicker than .080 and in all steel parts above 180,000 PSI requires signature of MRB Engineer.

Repair: Where stop holes are referred to in this manual use the following table to select hole size.

MATERIAL THICKNESS	HOLE SIZE
up thru .032	#40
.033 thru .080	#30
.081 and up	see limitation 3

NOTE: Dye penetrant inspect, magnetic particle inspect, or use inspection approved alternate technique as applicable to ensure that cracks have been completely removed or that the required stop holes are properly located at the extreme end of each individual crack and that the crack does not extend beyond the stop hole.

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DISCREPANCY: Minor scratches, wrinkles, dents or depressions in aluminum alloy sheet metal

Limitations:

1. Wrinkles shall not exceed a height equal to 10% of the material thickness.
2. Dents or depressions shall be no less than 1/10 inch in width or diameter and shall not exceed a diameter of 1 1/2 inches, nor a depth of .010 inch.
3. Wrinkles, dents, or depressions which appear to have been caused by impact with a sharp object, or, which are not smoothly contoured, must be penetrant inspected and submitted for signature of MRB Engineer.
4. A scratch shall not be closer to a fastener than (2) fastener shank diameters.
5. Blended scratches shall not exceed the depth values listed in the following table nor extend from any sealant groove location to an adjacent edge of the faying surface.

Material Thickness	Limiting Depth of Scratch (after Blending)
.008 - .011	.001
.012 - .018	.002
.019 - .045	.003
.046 - .075	.005
.076 - .125	.006

NOTE: Dye penetrant inspect or use inspection approved alternate techniques as applicable to ensure that the scratches have been completely removed.

Repair:

Condition 1. Wrinkles, Dents, or Depressions

Smoothly surfaced wrinkles, dents or depressions within the limits specified in Limitations (1) and/Or (2) are acceptable without repair.

Condition 2. Minor Scratches

a) If damage does not penetrate alclad - SR is <u>not required</u>. If <u>estimated</u> depth of blended damage does not exceed the depth limitations noted, then blend out smoothly (para. 2c)

b) The depth of scratch or damage shall be determined by the use of inspection methods approved for this purpose by Grumman Quality Control, & GAPS 1023.

c) All skins containing visible scratches or damage which does not exceed the values of limitations (4) and/or (5) shall be reworked by blending out smoothly using aluminum oxide abrasive materials. The extent of the blend area shall not exceed a maximum width of $\frac{1}{2}$" to either side or end of the scratch or damage. The depth of the blend shall be just sufficient to remove evidence of the scratch or damage. No fingernail pickup shall occur when the nail is moved across the blended area, and the surface smoothness of the reworked area shall be equal to or better than that of the parent material.

d) Following rework, the skins may be subjected to ultrasonic inspection, or shall be checked by other suitable inspection methods to insure that the blend area does not exceed the maximum allowable scratch or damage depth.

e) Surfaces already alodined or anodized shall receive Brush Alodine 1200 chemical treatment per GAPS 1067 immediately following blending. Replace any paint type finishes removed during the blending operation.

f) Unpainted surfaces where the depth of the damage and/or blend out does not penetrate the alclad do not require any further treatment.

g) Defects regarding unpainted surfaces where the depth or damage and/or blend out penetrates the alclad and which will not be subsequently painted shall be signed by MRB Engineering member.

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REMOVAL & REPLACEMENT

Detail parts which require removal & replacement as they are obviously unusable but cannot be replaced to the drawing because of the requirements of having to go back into the fixture; or riveted to locate and apply bonding pressure; may be replaced as follows:

Applicable to Class II bondlines only as specified per the Engineering drawing and GAPS 1053 requirements.

1. Remove the original part and prepair assy per replacement paragraph in in GAPS 1041.

2. Relocate a new part per the drawing requirements

3. Apply bonding agents as described in the General Notes of this manual.

4. Add rivets as described in SR 118 using (1) end rivet at each end and interspacing the remainder per table.

NOTE: This procedure may also be used to apply first installation of parts after the normal bonding sequence. Example (Parts Shortage)

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DISCREPANCY

Mismatch between mating parts resulting in a gap requiring a shim

LIMITATIONS

1. Not applicable to bonded joints
2. Maximum gap to be .090
3. Not applicable to major assy connections

REPAIR

Fabricate a shim from 2024-T3 alum. with a shape as required to match the edge trim of the parts it will be installed between. .The shim may be tapered if required to fill the gap.
Install the shim picking up a minimum of two existing fasteners and adjust the grip length as required to accomodate the added thickness.
In locations where one fastener is used, apply adhesive per general notes of this manual to the faying surfaces.
In locations where the joint is attached with screws or bolts and is to be removable, apply adhesive only to the faying surface which is permanently attached.

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RIVET SET CUTS

DISCREPANCY : Rivet set cuts around protruding head solid rivets

RESTRICTION: Does not apply to AA-1 or AA-5 series A/C

LIMITATIONS:
1. Does not apply to GA-7 inboard wing spars or web.
2. Does not apply to GA-7 wing ribs in fuel bays.
3. Does not apply to machined parts or forgings.
4. Maximum of (2) adjacent fasteners with set cuts.
5. Maximum length of cut is to be 135°.
6. Maximum depth of cut is to be .005.
7. To be used on skin thickness greater than .030 only.

REPAIR: Blend out cut smoothly following blending techniques of S/R 014 . Where blending out occurs on an air passage surface, fill the depression flush with aerodynamic filler per GAPS 1010 before the application of final finishes.

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Condition: FASTENER HEAD, TAIL, COLLAR, OR NUT RIDING RADIUS OF FLANGE

Restrictions: Not for use on castings or forgings

Limitations:

1. Maintain minimum E. D. and spacing requirements of SR 012 .
2. Fastener shanks must not show between faying surfaces.
3. MRB Engineering review, disposition and signature required for all instances where fastener sealing is affected and for all use on forged or machined flanges.
4. Repairs may only be used on forged or machined flanges when so specified by the MRB Engineer.

Repair:

1. If flange width is more than 7/8" wide - add extra staggered fasteners of same size and type, located midway between the discrepant fasteners and at a distance from the flange edge to satisfy the spacing and E. D. requirements of SR 012 . See Limitation 4.
2. If flange width is less than 7/8" wide or if E. D. and spacing requirements of added fasteners cannot be maintained - make and install a radius block against the inner face of the flange, picking up the existing fasteners. The block is to be of sufficient thickness to eliminate interference between fastener and flange radius but in no case less than the basic flange thickness, is to nest into the inside radius of the flange and is to have a minimum of two (2) fastener diameters edge distance at each end and along the edge not against the flange radius. See Limitation 4.

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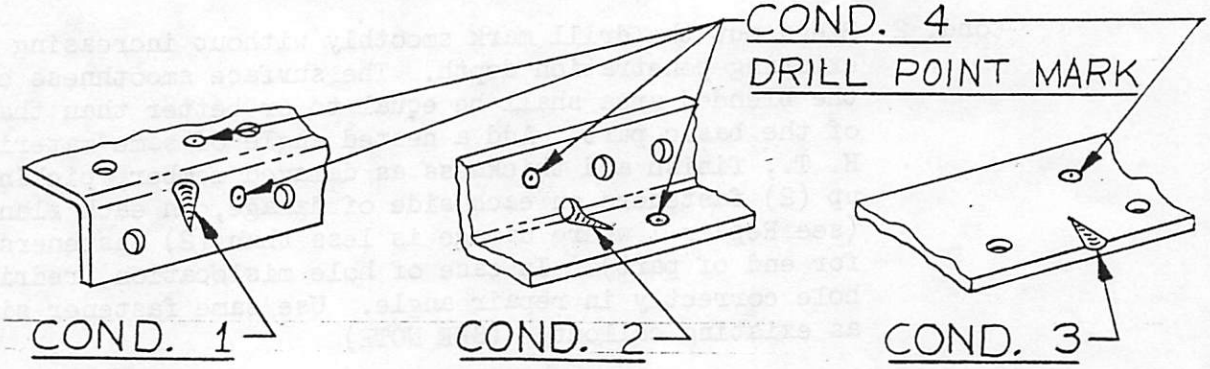
Condition: DRILL MARKS

Restrictions:

Limitations:
1. Maintain minimum E. D. and spacing requirements of SR 012 .
2. Not applicable to machined parts, or to within 6 fasteners of a splice.
3. MRB Engineering review and signature required when the adjacent fasteners are designed for an interference fit.



Repair: Condition 1. Where drill mark is 30% or less of the part thickness, extends not more than 1/3 the width of the flange, and does not touch on a fastener hole, blend out the drill mark smoothly without increasing the existing penetration depth. The surface smoothness of the blended area shall be equal to or better than that of the basic part. Where drill mark is greater than 30% of the part thickness, or extends more than 1/3 the width of the flange, blend as above and make and install a nested or wrapped angle of same material, H. T., finish and thickness as damaged member. Attach angle with (2) fasteners on each side of damage, in each flange. Use same fastener size as exist- callout.

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Condition: DRILL MARKS (Cont'd)

Repair: If damage is between 1st and 2nd fastener from end of part, pick up end fastener only on that side. If mark is between end of part and 1st fastener, treat as E. D. problem using SR 020 (assume drill mark is at edge). (SEE NOTE)

Cond. 2 Blend out the drill mark smoothly without increasing the existing penetration depth. The surface smoothness of the blended area shall be equal to or better than that of the basic part. Add a nested angle of same material, H. T., finish and thickness as damaged member, picking up (2) fasteners on each side of damage, in each flange (see Repair 1 where damage is less than (2) fasteners for end of part). In case of hole mislocation, redrill hole correctly in repair angle. Use same fastener size as existing callout. (SEE NOTE)

Cond. 3 Same as Repair 1, except use flat plate instead of angle.

Cond. 4 Where the maximum depth of the drill point penetration is no more than 30% of the minimum drawing required part thickness, locally blend out the depression to a smooth match with the surrounding surface without increasing the existing penetration depth. The surface smoothness of the blended area shall be equal to or better than that of the basic part. Where the maximum depth of the drill point penetration exceeds 30% of the minimum drawing required part thickness, repair per SR 014 .

NOTE: Where the blended drill mark occurs on an air passage surface, fill the depression flush to the adjacent air passage surface with aerodynamic sealer per GAPS 1010 before the application of final finishes.

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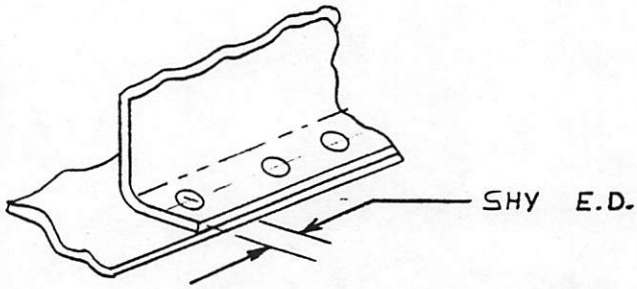
Condition: SHY E. D. ON FLANGE END

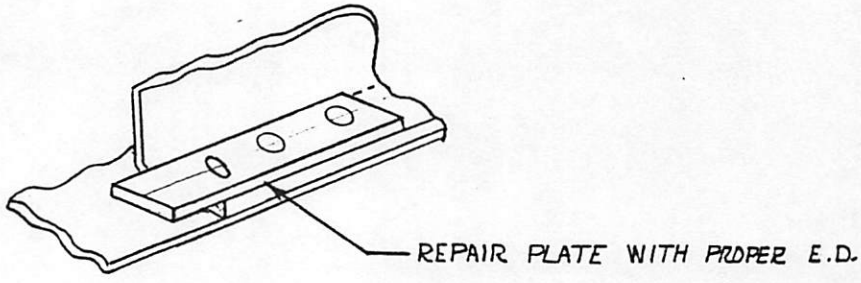
Restrictions: Not for use on castings or forgings

Limitations:

1) Maintain minimum E. D. and spacing requirements of SR 012 .

2) MRB Engineering review and signature required when one or more of the affected parts is a machined part and/or when the affected fastener is designed for an interference fit.





Repair:

1) Add repair plate with proper E. D. picking up (3) fasteners as shown.

OR

2) Where existing fastener spacing and locations permit, add same type and size fastener between fastener having shy E. D. and next fastener.

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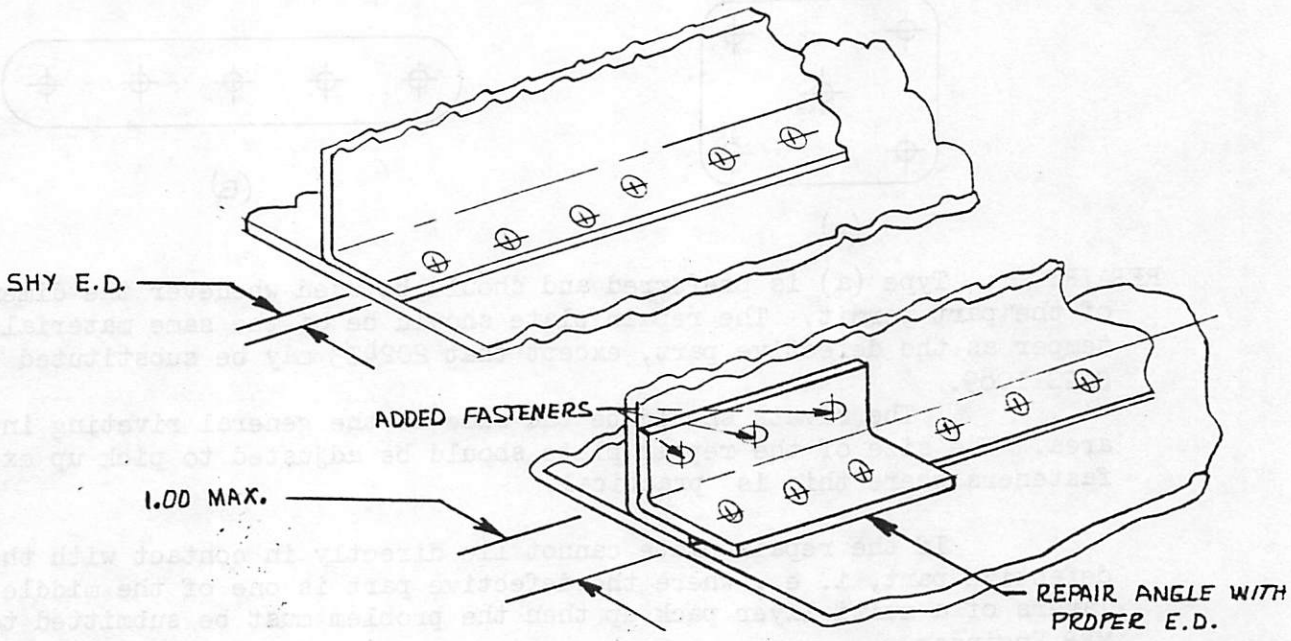
Condition: SHY EDGE DISTANCE - ALONG FLANGE EDGE

Restrictions: Not for use on castings or forgings

Limitations:
1) Maintain minimum E. D. & spacing requirements of SR 012 .
2) Repair limited to flange widths of 1.0 inch or less.
3) MRB Engineering Review and signature required when one or more of the affected parts is a machined part and/or when the affected fasteners are designed for an interference fit.



Repair:
1) Add angle with proper E. D., pick up existing fasteners, and add (1) same type fastener for each fastener with shy E. D., as shown. Angle to be of same material and thickness as member lacking E. D.

OR

2) Stagger space (1) additional fastener, next diameter smaller, for each fastener with shy E. D., provided there is no actual bulging or breaking out of the shy E. D. fasteners.

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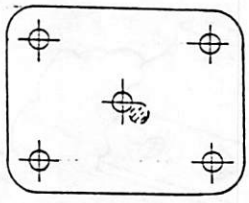
Discrepancy: EXTRANEOUS HOLES AND/OR COUNTERSINKS IN METAL PARTS

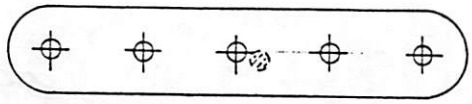
LIMITATION: Does not apply to a Splice Joint
Standard Repair for situation where Tooling Holes are in close proximity to Rivet Holes.

The minimum acceptable distance between the centerline of a fastener hole and the edge of a tooling hole shall be no less than the distance called out in SR 012 for the centerline of the fastener to the edge of the part, no repair required.

For closer distances between fastener and tooling hole the following repairs may be made, provided that the repair plate can lie in contact with the defective part.



(A)



(B)

REPAIR: Type (a) is preferred and should be used whenever the dimensions of the part permit. The repair plate should be of the same material and temper as the defective part, except that 2024T3 may be substituted per GAPS 1089.

The rivets should be the same as the general riveting in the area. The size of the repair plate should be adjusted to pick up existing fasteners where this is practical.

If the repair plate cannot lie directly in contact with the defective part, i. e., where the defective part is one of the middle layers of a multi-layer pack up then the problem must be submitted to an MRB Engineer.

A rivet should be installed in the original rivet hole, as called out on the assembly drawing. If the part with the tooling hole can be separated from the assembly, plug the tooling hole with "AD" Rivet Material. Otherwise leave the hole open.

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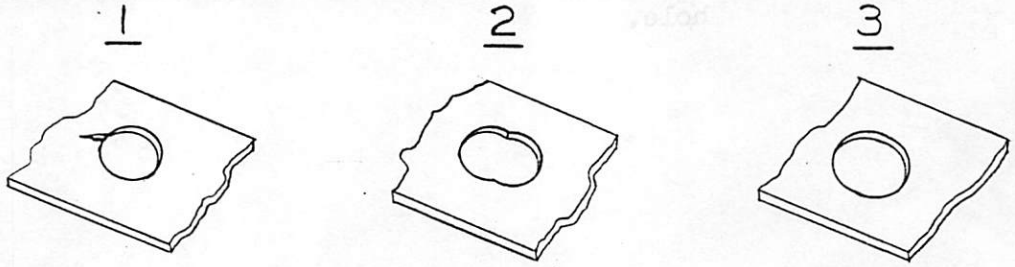
Condition: CRACKED, ELONGATED, OR OVERSIZE HOLES FOR PROTRUDING HEAD, SOLID ALUMINUM RIVETS

Restrictions:

Limitations:

1. Maintain minimum E. D. and spacing requirements of SR 012.
2. Use in a stringer splice, or within (2) rivets, thereof, requires signature of MRB Engineer.
3. Condition 1 not applicable to machined parts when the crack will not be completely cleaned out by drilling for the next larger diameter rivet.



Condition:

1. Cracked holes
2. Double or elongated holes up to 1/64" oversize
3. Double, oversize, or elongated holes between 1/64" and 1/32" oversize.

Repair:

Condition 1.

Where crack will clean out, drill for and install next larger diameter rivet. For cracks up to 1/8" in length, or where crack will not clean out completely, drill stop hole per SR 013, and install blue print diameter rivet. Add a next smaller diameter rivet adjacent to each cracked hole. (SEE NOTE)

Condition 2.

Install blueprint rivet.

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Condition: CRACKED, ELONGATED, OR OVERSIZE HOLES FOR PROTRUDING HEAD, SOLID ALUMINUM RIVETS

Condition 3.

Drill for and install next larger diameter rivet.

NOTE: Dye penetrant inspect, magnetic particle inspect, or use inspection approved alternate technique as applicable to ensure that cracks have been completely removed or that the required stop holes are properly located at the extreme end of each individual crack and that the crack does not extend beyond the stop hole.

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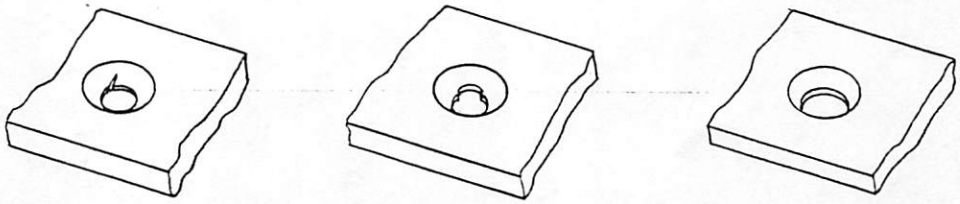
Condition: CRACK, ELONGATED OR OVERSIZE HOLES - COUNTERSUNK FOR FLUSH HEAD, SOLID ALUMINUM RIVETS

Restrictions:

Limitations:

1. Maintain minimum E. D. requirements of SR012 .
2. Does not apply to blind rivets or to NAS1097 shallow head type rivets.
3. Use in a stringer splice or within (2) rivets thereof, requires signature of MRB Engineer.
4. Final hole and existing countersink must be concentric within .010.
5. Damage must be completely cleaned out by drill for next larger diameter rivet.



Repair: Drill hole for next larger diameter rivet, install and mill head flush with surface. Do not deepen existing countersink. Ref. SR 030

NOTE: Dye penetrant inspect, magnetic particle inspect or use inspection approved alternate technique as applicable to ensure that cracks have been completely removed.

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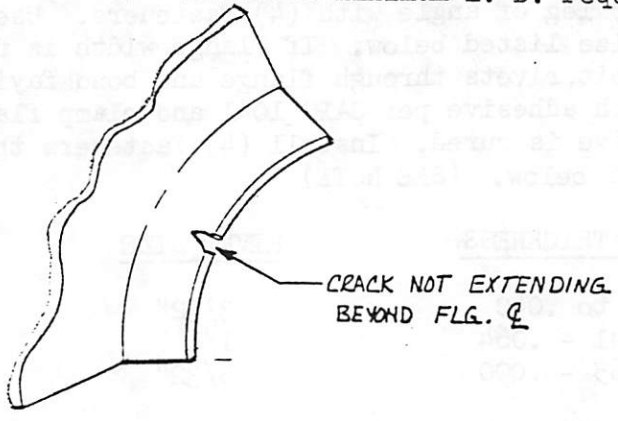
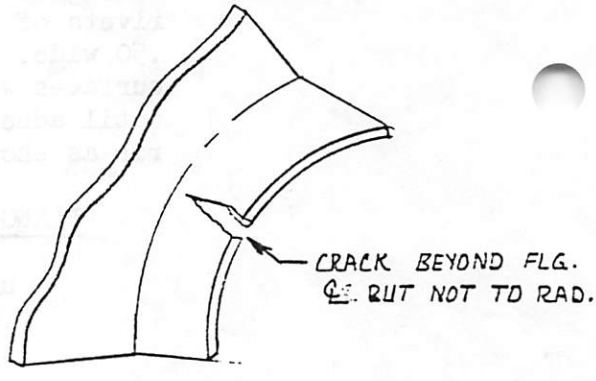
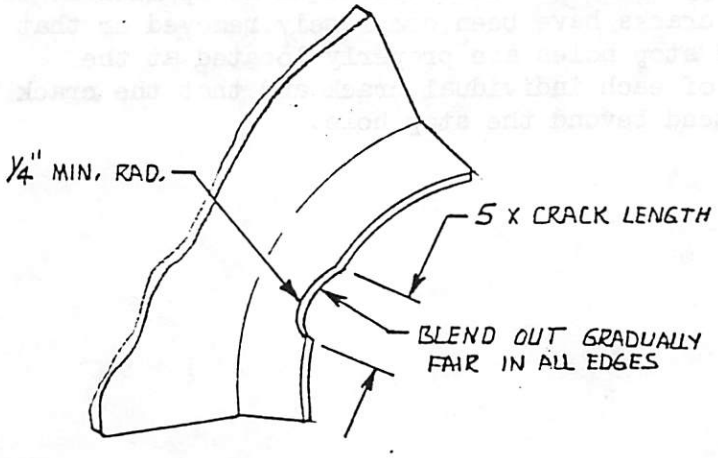
Discrepancy: CRACKED LIGHTENING HOLE FLANGE

Limitations:

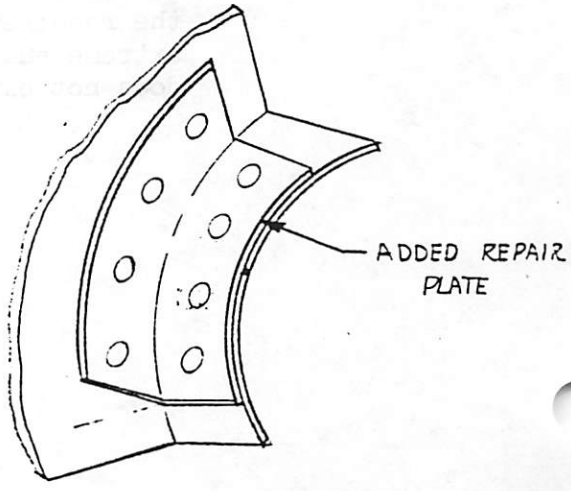
1. Maximum flange width for Repair 2 is 3/4".
2. Repair 2 is not applicable where it is necessary to use existing fasteners or where any existing fasteners fall within (2) diameters of any added fastener.
3. For Repair 2, blind rivets shall be used only when absolutely necessary. Flush blind rivets are not permitted.
4. Maintain minimum E. D. requirements of SR 012 .







REPAIR COND 1



REPAIR COND. 2

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Discrepancy: CRACKED LIGHTENING HOLE FLANGE

Repair:

CONDITION 1

File out crack smoothly as shown in repair sketch, Page 1. (SEE NOTE)

CONDITION 2

Drill stop hole per SR 013 . Add repair angle as shown picking up (2) added fasteners each side of crack. Attach other leg of angle with (4) fasteners. Use AD rivets of size listed below. If flange width is under .50 wide, omit rivets through flange and bond faying surfaces with adhesive per GAPS 1041 and clamp flange until adhesive is cured. Install (4) fasteners through rib as shown below. (SEE NOTE)

FLANGE THICKNESS	RIVET SIZE
up to .040	3/32"
.041 - .064	1/8 "
.065 - .090	5/32"

NOTE: Dye penetrant inspect, magnetic particle inspect, or use inspection approved alternate technique as applicable to ensure that cracks have been completely removed or that the required stop holes are properly located at the extreme end of each individual crack and that the crack does not extend beyond the stop hole.

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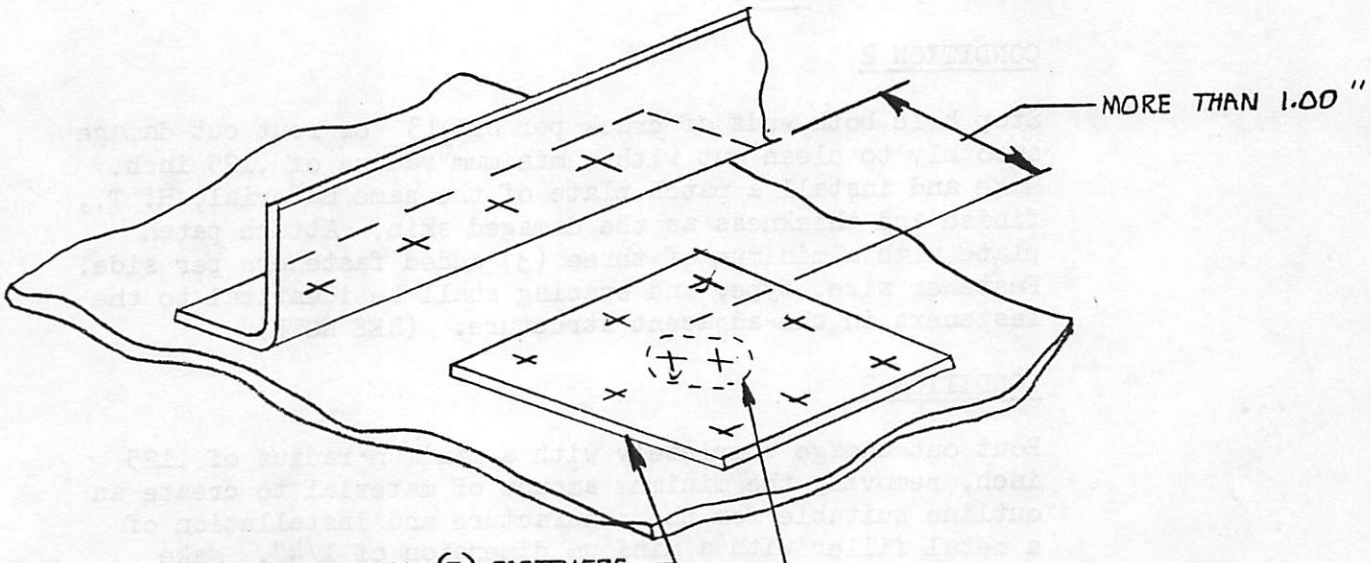
Discrepancy: CRACK OR PUNCTURE IN INTERIOR OR EXTERIOR SKINS AND GREATER THAN 1" FROM ANY FLANGE

Limitations:
1. Maintain minimum E. D. requirements of SR 012 .
2. This repair not applicable when clean out of crack or hole is closer than 1" to any flange.
3. Repair plate to be installed on inside ONLY.
4. Not for use on Honeycomb.



COND. 3 SHOWN

Discrepancy: CRACK OR PUNCTURE IN INTERIOR OR EXTERIOR SKINS AND GREATER THAN 1" FROM ANY FLANGE

Condition:

1. Interior or exterior skin crack or puncture more than 1" from any adjacent flange and such that a circular hole of no more than 1/4" diameter will completely clean cut all evidence of damage.

2. Interior skin crack or puncture more than 1" from any adjacent flange and not exceeding a maximum dimension of 1/2".

3. Exterior or air passage skin crack or puncture more than 1" from any adjacent flange and not exceeding a maximum dimension of 1/2".

4. Skin crack or puncture more than 1" from any adjacent flange, longer than 1/2" in length but no longer than 25% of the skin panel or bay width.

Repair:

CONDITION 1

Repair per SR 022.

CONDITION 2

Stop hole both ends of crack per SR 013 or rout out damage smoothly to clean out with a minimum radius of .125 inch. Make and install a patch plate of the same material, H. T., finish and thickness as the damaged skin. Attach patch plate with a minimum of three (3) added fasteners per side. Fastener size, type, and spacing shall be identical to the fasteners in the adjacent structure. (SEE NOTE)

CONDITION 3

Rout out damage completely with a minimum radius of .125 inch, removing the minimum amount of material to create an outline suitable for the manufacture and installation of a metal filler with a minimum dimension of 1/4". Make and install a patch plate of the same material, H. T., finish and thickness as the damaged skin, picking up a minimum of three (3) added fasteners per side. Fastener size and spacing shall be per SR 012. Make and attach a filler, of the

same material, H. T., finish and thickness as the damaged skin, to the patch plate with a minimum of one (1) NAS 1097-AD3 rivet. (SEE NOTE)

CONDITION 4

Repair in the same manner as for Condition 2 or Condition 3 as applicable except that the number, size and location of all fasteners between the patch plate and the original skin and between the filler and the patch plate shall be as designated by the MRB Engineer. (SEE NOTE)

NOTE: Dye penetrant inspect, magnetic particle inspect, or use inspection approved alternate technique as applicable to ensure that cracks have been completely removed or that the required stop holes are properly located at the extreme end of each individual crack and that the crack does not extend beyond the stop hole.

Fill exterior surface with Aerodynamic filler per GAPS 1010. (To fill GAPS & cover rivet heads).

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Discrepancy: CRACK IN RADIUS OF FLANGE (Assembly Problem Only)

Restrictions: Maximum number of detail parts in a prod. run is (5).

Limitations:

1. Maintain minimum E. D. requirements of SR 012 .
2. MRB Engineering review and signature required when sealing provisions would be affected, when the affected part is a machined part and/or when the Flange Fasteners are designed for an interference fit.
3. For Condition 1 - cumulative length of multiple cracks must not exceed 10% of the flange lengths and individual cracks must be separated by at least 3" of sound material.
4. Review, designation of fasteners and signature of MRB Engineer required when any of the conditions listed in the note to alternate Repair B exist.

Conditions:

1. Crack up to 1/4" long and extending for no more than 10% of the flange radius length.

2. Crack more than 1/4" long but no greater than 6" long or extending for more than 10% but no more than 30% of the flange radius length.

NOTE: Dye penetrant inspect, magnetic particle inspect, or use inspection approved alternate technique as applicable to ensure that cracks have been completely removed or that the required stop holes are properly located at the extreme end of each individual crack and that the crack does not extend beyond the stop hole.

Repair:

CONDITION 1

Rout out crack smoothly with 1/8" minimum radius, blend into any adjacent edges and use. Surface finish of reworked edges must be equal to or better than the original part requirement.

APPROVAL		GRUMMAN AMERICAN AVIATION CORPORATION	SR
LIAISON ENGRG.			NO. 027
PROJ. ENGRG.			PAGE 2 OF 4
STRESS GROUP		STANDARD REPAIR MANUAL	ISSUE DATE 2-1-78
Q.C.			REVISION NO. DATE
Prod.			

Discrepancy: CRACK IN RADIUS OF FLANGE

CONDITION 2

A. 1. Stop hole crack #40 diameter, rout out smoothly and leave flange in place.

2. Manufacture a reinforcing angle of the same configuration, material, temper, finish and thickness as the cracked flange and adjacent portion of web.

3. Install the reinforcing angle in a position nested against the inside radius of the damaged part and extending a sufficient distance beyond any inside end(s) of the crack to pick up 2 additional flange fasteners at each such end. The web leg of the reinforcing angle is to pick up added fasteners through the web, the same number as through the flange leg and of the same material and diameter except that where the cracked flange contains only 1 fastener, 2 added web fasteners shall be installed. Maintain the same spacing as for the flange and provide for 2 fastener diameters edge distance except that a reduced edge distance per limitation 1 may be allowed where necessary.

ALTERNATE REPAIR B:

1. Cut off the entire length of flange.

2. Manufacture a replacement angle section of the same configuration, material, temper, finish and thickness as the original flange.

3. Install the special angle on either side of the web as circumstances dictate, picking up added fasteners through the web, the same number as through the flange leg and of the same material and diameter, except that where the cracked flange had contained only 1 fastener, 2 added web fasteners shall be installed. Maintain the same spacing as for the flange leg and provide for 2 fastener diameters edge distance except that a reduced edge distance per limitation 1 may be allowed where necessary.

NOTE: Where no flange fasteners exist, where the existing flange type fasteners cannot be installed or where existing web fasteners would interfere with the angle installation, consult the MRB Engineer for type, number and location of angle to web attachment fasteners to use.

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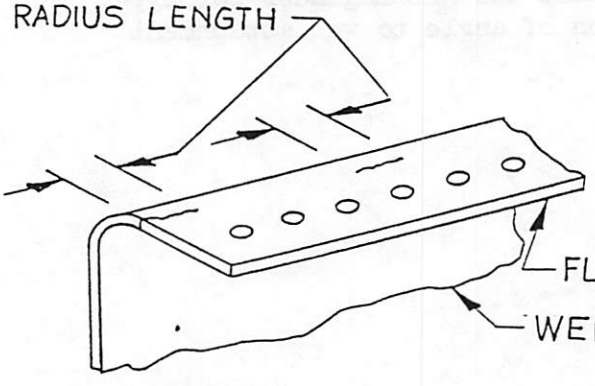
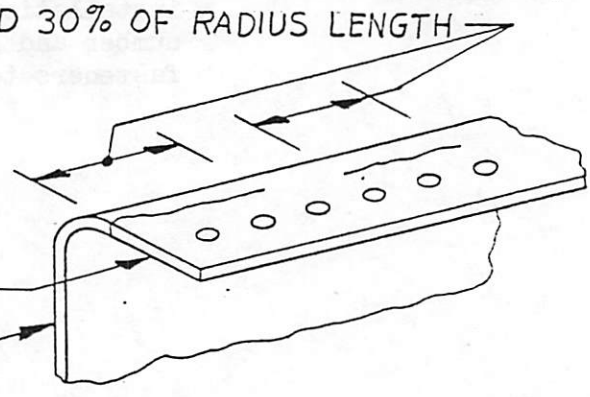
Discrepancy: CRACK IN RADIUS OF FLANGE

1/4" MAX. AND LESS THAN 10% OF RADIUS LENGTH



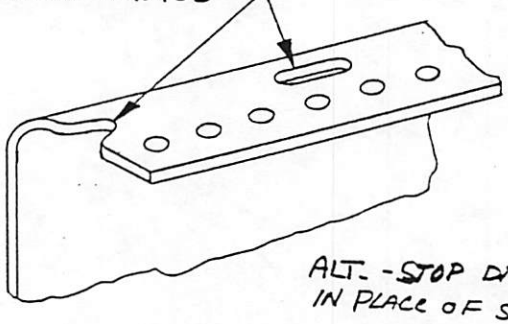
CONDITION 1

BETWEEN 1/4" AND 6" OR BETWEEN 10% AND 30% OF RADIUS LENGTH



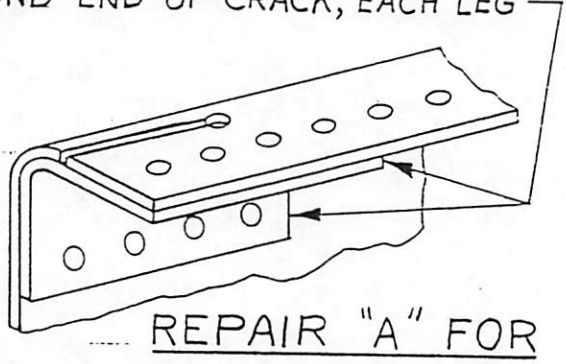
CONDITION 2

BLENDED OUT WITH 1/8" MINIMUM RADIUS

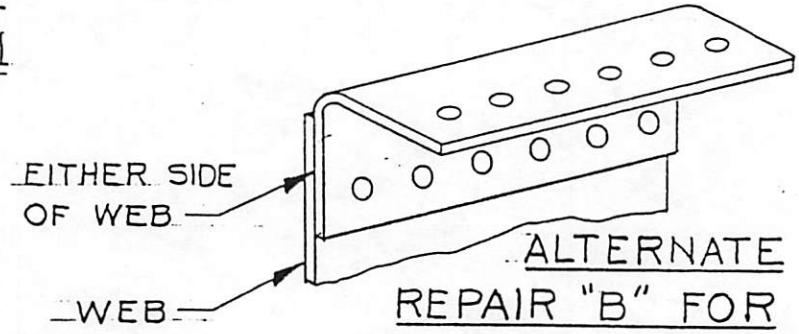


REPAIR FOR CONDITION 1

MUST PICK UP 2 FASTENERS BEYOND END OF CRACK, EACH LEG



REPAIR "A" FOR CONDITION 2



ALTERNATE REPAIR "B" FOR CONDITION 2

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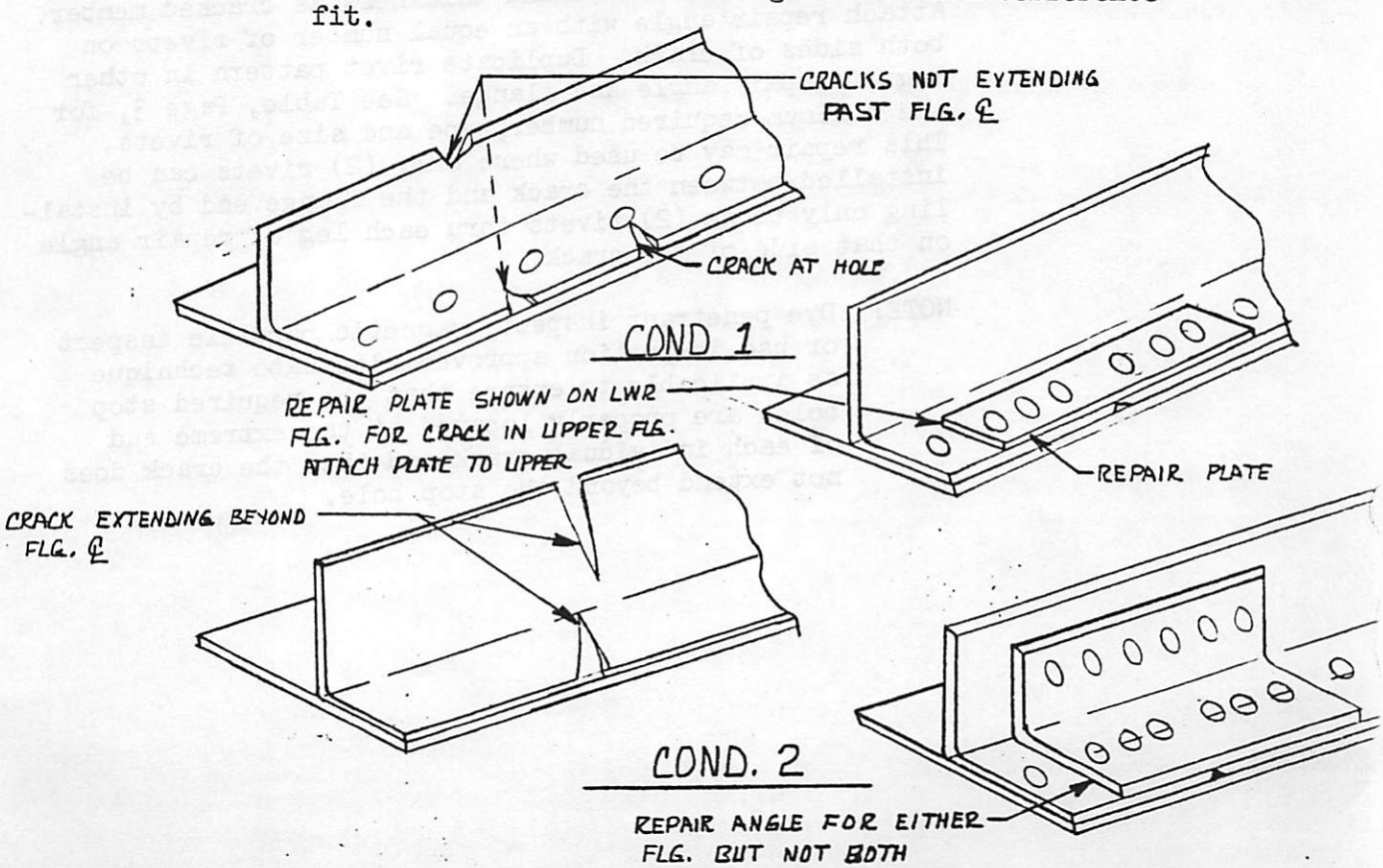
Discrepancy: LATERAL CRACK IN FLANGE OR ANGLE LEG (Assembly Problem Only)

Restrictions: Maximum number of detail parts in a prod. run is (5).

Limitations:

1. Maintain minimum E. D. requirements of SR 012 .
2. This repair is not applicable when crack is within (4) fasteners of a splice.
3. Blind or flush solid rivets shall be used only when absolutely necessary. Flush blind rivets are not permitted.
4. Use of this repair where flange thickness is greater than .080 requires signature of MRB Engineer.
5. C'sink or dimple per GAPS 1012 when required.
6. No more than 2 cracks per 6 inches of flange length.
7. Where cracks not extending past the flange center-line occur in both legs of angle within 2 fastener spaces, repair as for Condition 2.
8. Not applicable to machines parts.
9. MRB Engineering review and signature required when adjoining fasteners are designed for an interference fit.



APPROVAL	
LIAISON ENGRG.	J. Garrett
PROJ. ENGRG.	
STRESS GROUP	R. Miller
Q.C.	F. L.
Prod.	JC BB

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Discrepancy: LATERAL CRACK IN FLANGE OR ANGLE LEG

Repair:

CONDITION 1

Drill stop hole per SR 013, unless crack ends in a fastener hole. Add repair plate of same material, H. T., finish and thickness as cracked member. Chamfer or radius edge of repair plate to nest into bend radius of angle. Attach repair plate with an equal number of rivets on both sides of crack. See Table, Page 3, for the minimum required number, type and size of rivets. This repair may be used where only (2) rivets can be installed between the crack and the flange end by installing only those (2) rivets thru the repair plate on that side of the crack.

CONDITION 2

Drill stop hole per SR 013. Add repair angle of same material, H. T., finish and thickness as cracked member. Attach repair angle with an equal number of rivets on both sides of crack. Duplicate rivet pattern in other leg of repair angle and flange. See Table, Page 3, for the minimum required number, type and size of rivets. This repair may be used where only (2) rivets can be installed between the crack and the flange end by installing only those (2) rivets thru each leg of repair angle on that side of the crack.

NOTE: Dye penetrant inspect, magnetic particle inspect or use inspection approved alternate technique as applicable to ensure that the required stop holes are properly located at the extreme end of each individual crack and that the crack does not extend beyond the stop hole.

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Discrepancy: LATERAL CRACK IN FLANGE OR ANGLE LEG

TYPE, NUMBER & SIZE OF RIVETS REQ'D ON EACH SIDE OF CRACK

FLANGE THICKNESS		FLANGE WIDTH					
		UP TO 1/2"		OVER 1/2" to 3/4"		OVER 3/4" to 1"	
Up to .040	RIVET TYPE	A No. Dia (3) 3/32	B No. Dia (3) 1/8	A No. Dia (3) 1/8	B No. Dia (4) 1/8	A No. Dia (5) 5/32	B No. Dia (4) 5/32
	RIVET TYPE	C No. Dia (3) 3/32	D No. Dia (4) 3/32	C No. Dia (3) 1/8	D No. Dia (3) 1/8	C No. Dia (4) 1/8	D No. Dia (4) 1/8
.041 to .064	RIVET TYPE	A No. Dia (3) 1/8	B No. Dia (4) 1/8	A No. Dia (5) 1/8 Or (3) 5/32	B No. Dia (5) 5/32	A No. Dia (4) 5/32	B No. Dia (5) 3/16
	RIVET TYPE	C No. Dia (3) 1/8	D No. Dia (3) 1/8	C No. Dia (4) 1/8 or (3) 5/32	D No. Dia (4) 1/8 or (3) 5/32	C No. Dia (3) 5/32	D No. Dia (4) 5/32
.065 to .080	RIVET TYPE	A No. Dia (4) 1/8	B No. Dia (5) 1/8	A No. Dia (6) 1/8 or (4) 5/32	B No. Dia (5) 5/32	A No. Dia (5) 5/32	B No. Dia (6) 3/16
	RIVET TYPE	C No. Dia (3) 1/8	D No. Dia (3) 1/8	C No. Dia (3) 1/8	D No. Dia (3) 1/8	C No. Dia (4) 5/32	D No. Dia (4) 5/32

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Discrepancy: LATERAL CRACK IN FLANGE OR ANGLE LEG

RIVET TYPE*

A (For Aluminum Alloys)	B (For Aluminum Alloys)
MS20470-AD Solid Protruding	NAS1097-AD Solid C'sink
MS20426-AD Solid Dimpled	

*Where existing rivets are to be picked up, they shall be at least as large and there shall be at least as many as the table specifies.

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Discrepancy: SHALLOW COUNTERSINK OR DIMPLE RESULTING IN HIGH RIVET HEAD FOR MS20426, RIVET

Restrictions:

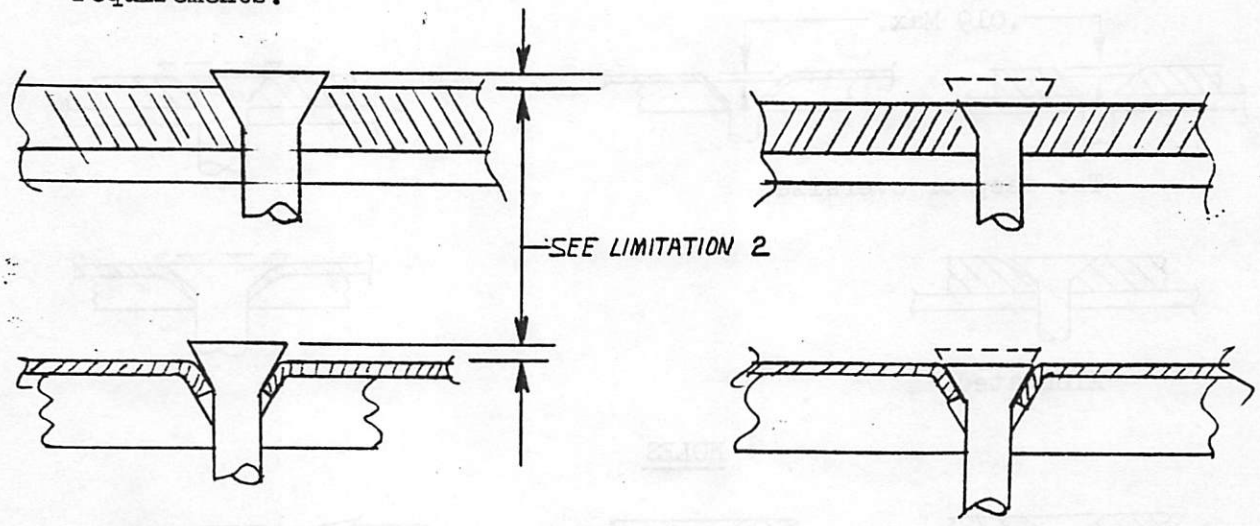
Limitations:
1) Not for use with blind rivets, or NAS1097 rivets.
2) Excess head height not to exceed .006 for 3/32" diameter rivets; .013 for 1/8" diameter rivets; .017 for 5/32" diameter rivets; .024 for 3/16" diameter rivets; or .035 for 1/4" diameter rivets.

CONDITION

Shallow countersink or dimple causing high rivet head on structure that cannot be reworked to drawing requirements.

REPAIR

Drawing specified rivet with head shaved flush.



Repair: Install drawing specified rivet and mill head flush.

APPROVAL	
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Discrepancy: COUNTERSINK OR DIMPLE TOO DEEP, OVERSIZE OR ELOGNATED, HOLE OVERSIZE, ELONGATED, OR OBLIQUE FOR MS20426, RIVET

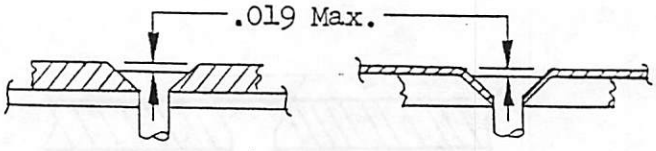
Restrictions:

Limitations:

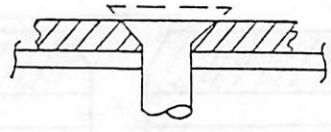
1. Maintain minimum E. D. requirements of SR 012 .
2. Repair applicable to excess depth of up to .019.
3. Drill for next size must clean up hole completely.
4. Not to be used for blind rivets, or for NAS1097, C2896, NAS1200, GR501V, or GR501W shallow head type rivets.
5. Maximum of (1) out of (8) holes in a row with no (2) adjacent.
6. Rivet head must fill countersink.

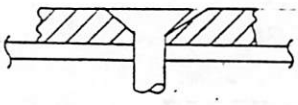
COUNTERSINK or DIMPLE

REPAIR

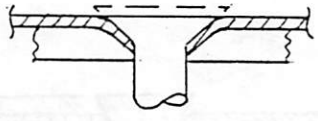


Too deep or oversize

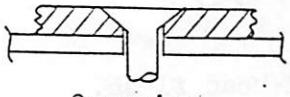




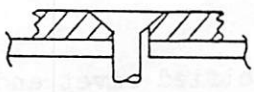
Elongated



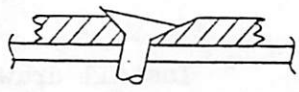
HOLES



Oversize



Elongated



Oblique

Repair: Drill out hole for next larger diameter rivet. Leave dimple or countersink as for drawing specified rivet except that countersink for oblique condition shall be straightened. Install next larger diameter rivet to fill dimple or countersink and mill head flush.

APPROVAL	
LIAISON ENGRG.	J. Hanett
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Q.C.	F.L.
Prod.	JC LB

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DISCREPANCY: Incorrect holes or countersinks for NAS1097, shallow head rivets

Limitations:
1) Maintain minimum E. D. requirements of SR 012
2) Maximum of (2) rivets out of (8)
3) See SR 030 for MS20426 rivets
4) Replacement rivet head and shank must fill hole and countersink. The countersink depth for the replacement rivet shall not exceed 85% of the part thickness at the hole

Condition :
1. Hole is elongated, oversize, or oblique to correct countersink. Countersink is oblique or off center to correct diameter hole.
2. Countersink is elongated but concentric to correct diameter hole.
3. Countersink is too deep but concentric to correct diameter hole.

Repair:
1. Drill and countersink for and install next larger diameter NAS 1097.

2. Countersink only as required to remove elongation. Install same diameter MS20426 rivet, as applicable and mill head flush.

3. Install same diameter MS20426 rivet as applicable, and mill head flush as required.

APPROVAL	
LIAISON ENGRG.	J. Garnett
J. [illegible] RG	[illegible]
STRESS GROUP	R. Miller
Q.C.	F.L.
Prod.	GC [illegible]

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STANDARD REPAIR MANUAL

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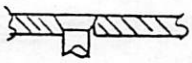
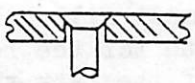
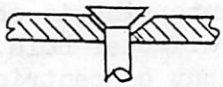
CONDITION 1

HOLE:
Elongated 

Oversize 

Oblique 

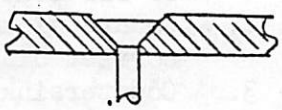
COUNTERSINK:
Oblique 

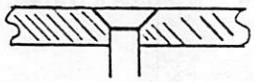
Off Center 

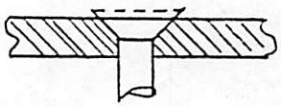
CONDITION 2

Concentric
Countersink
Elongated 

CONDITION 3

Concentric
Countersink
Too Deep 

REPAIR FOR CONDITION 1 

REPAIR FOR CONDITIONS 2 & 3 

APPROVAL	
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IOJ.	
ENGRG	
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REVISION NO. B DATE 7/20/78

BELLCRANK ATTACH HOLES

DISCREPANCY: Bellcrank attach holes in torque tubes, noted below, are oversize or elongated.

LIMITATIONS:
1. Applies only to specific torque tubes listed below.
2. If holes will not clean up to the tolerance specified below, Alternate repair noted must be accomplished.
3. To be used only on a completed assembly or installation.

REPAIR: Open the existing hole in the torque tube and bellcrank to .312 - .315 Dia. Install bolt specified below.

AA-1 Series A/C	BOLT	ALT. REPAIR
ELEVATOR	NAS-464-P5	S.R. 307
RUDDER	NAS-464-P5	S.R. 307
AILERON (Inbd end only)	NAS-464-P5	S.R. 219

AA-5 Series A/C	BOLT	ALT. REPAIR
ELEVATOR	NAS 464-P5	S.R. 306
RUDDER	NAS 464-P5	S.R. 307
AILERON	NAS 464-P5	S.R. 219

GA-7 Series A/C	BOLT	ALT. REPAIR
ELEVATORS	NAS 464-P5	S.R. 316
RUDDER	NAS 464-P5	S.R. 317

Alt. bolts AN5 or NAS 1305 of equivalent grip length are acceptable.

NOTES:
1. When installing AN-5 bolts, ream holes to .3110 to .3120
2. Grip length as required

APPROVAL	
LIAISON ENGRG.	6-16-78
JJ. ENGRG.	6-16-78
STRESS GROUP	
Q.C.	6/16/78
Prod.	6/15/78
Elec.	6/16/78

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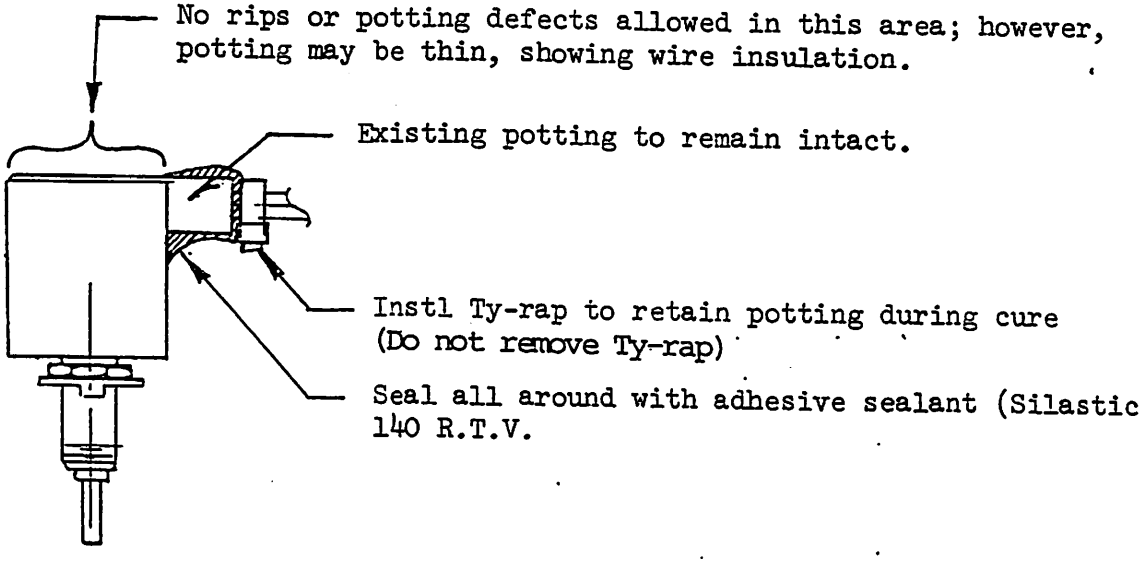
DISCREPANCY: Loose cracked or torn potting of Licon P/N 65-430130 and Licon P/N 65-430139 switches.

RESTRICTION: Does not apply to AA1 or AA5 series aircraft.

LIMITATIONS: Noted below; switches with potting damage in area noted below shall be scrapped.

REPAIR:



APPROVAL		GRUMMAN AMERICAN AVIATION CORPORATION	SR
LIAISON ENGRG.	O. Grant		NO. 034
PROJ. ENGRG.	[illegible]		PAGE 1 OF 1
STRESS GROUP	[illegible]	STANDARD REPAIR MANUAL	ISSUE DATE 7/20/78
Q.C.	F.W.		REVISION NO. B DATE 7-18-78
PROD.	[illegible]		

DISCREPANCY: Minor nicks and cracks along edges of H'comb panels or H'comb ribs.

LIMITATIONS: 1. Maximum length of crack or tear to be 1/4"

REPAIR: Stop drill end of crack or tear with #40 drill and fill with adhesive per general Note 10.

APPROVAL	
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PROJ. ENGRG.	
STRESS GROUP	
Q.C.	
PROD.	
P-PLANT	7.27.78

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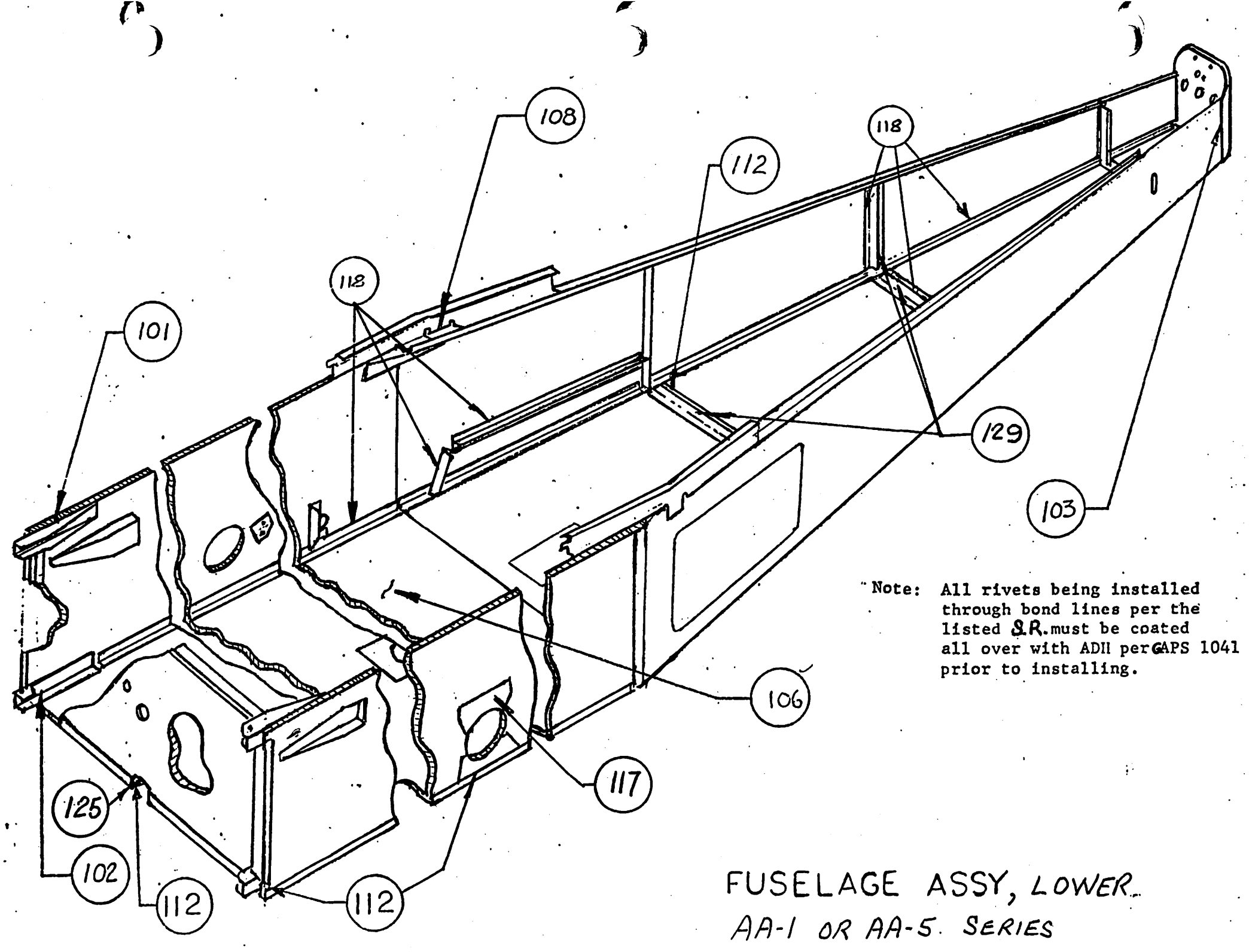
FUEL SUMP TANKS

DISCREPANCY: 1/8" pipe threads gall when removing quick drain valve or vent fitting from fuel sump tank.

Restriction: Does not apply to GA-7, AA-1C.

Repair:

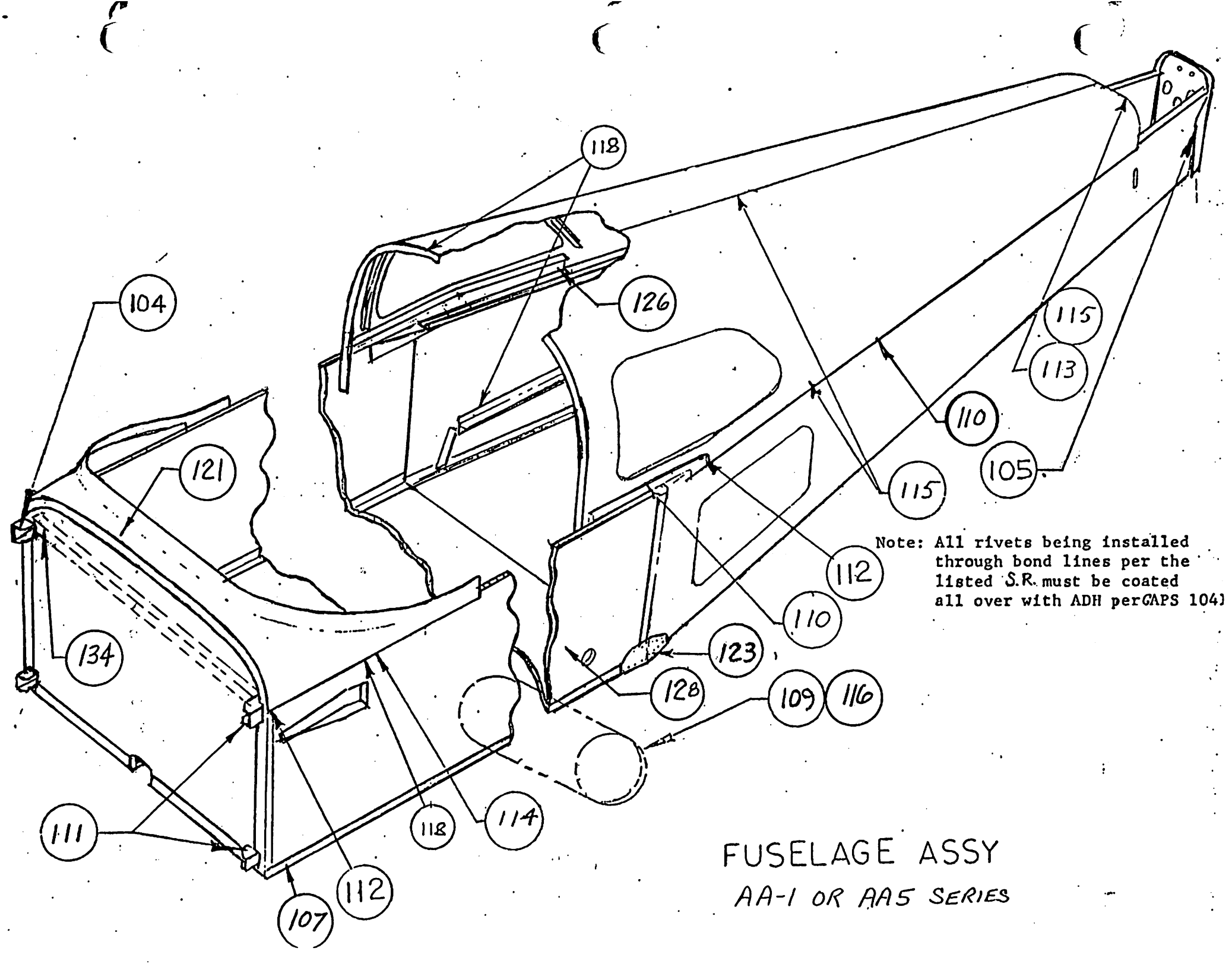
1. 7/16 dia. drill to remove damaged thread. Avoid getting chips into the tank.
2. Using a 1/4"-18 national pipe thread tap, thread only deep enough to give leak tight threads between the sump tank flange and the reducing bushing when the bushing is screwed into the flange to a depth of .21 inch. Avoid getting chips into the tank while tapping the thread.
3. Apply loctite No. 262 to only the external threads of an AN 912-1 reducer-bushing.
4. Install the AN 912-1 reducer-bushing and torque to 35 to 45 inch pounds.
5. Inspect original AN 816-4D tank fitting or CAV110H-4 drain valve for damage. If there is damage, replace the fitting or valve.
6. Apply thread sealant to the 1/8" pipe threads on the fitting or valve and torque to 30 to 40 inch pounds.
7. If the tank is pressure tested, do not exceed 3.5 psi. If leaks are observed, remove the fitting, apply more thread sealant and torque to 30 to 40 inch pounds.



Note: All rivets being installed through bond lines per the listed S.R. must be coated all over with AD11 per GAPS 1041 prior to installing.

FUSELAGE ASSY, LOWER

AA-1 OR AA-5 SERIES



Note: All rivets being installed through bond lines per the listed S.R. must be coated all over with ADH per CAPS 104

FUSELAGE ASSY

AA-1 OR AA5 SERIES

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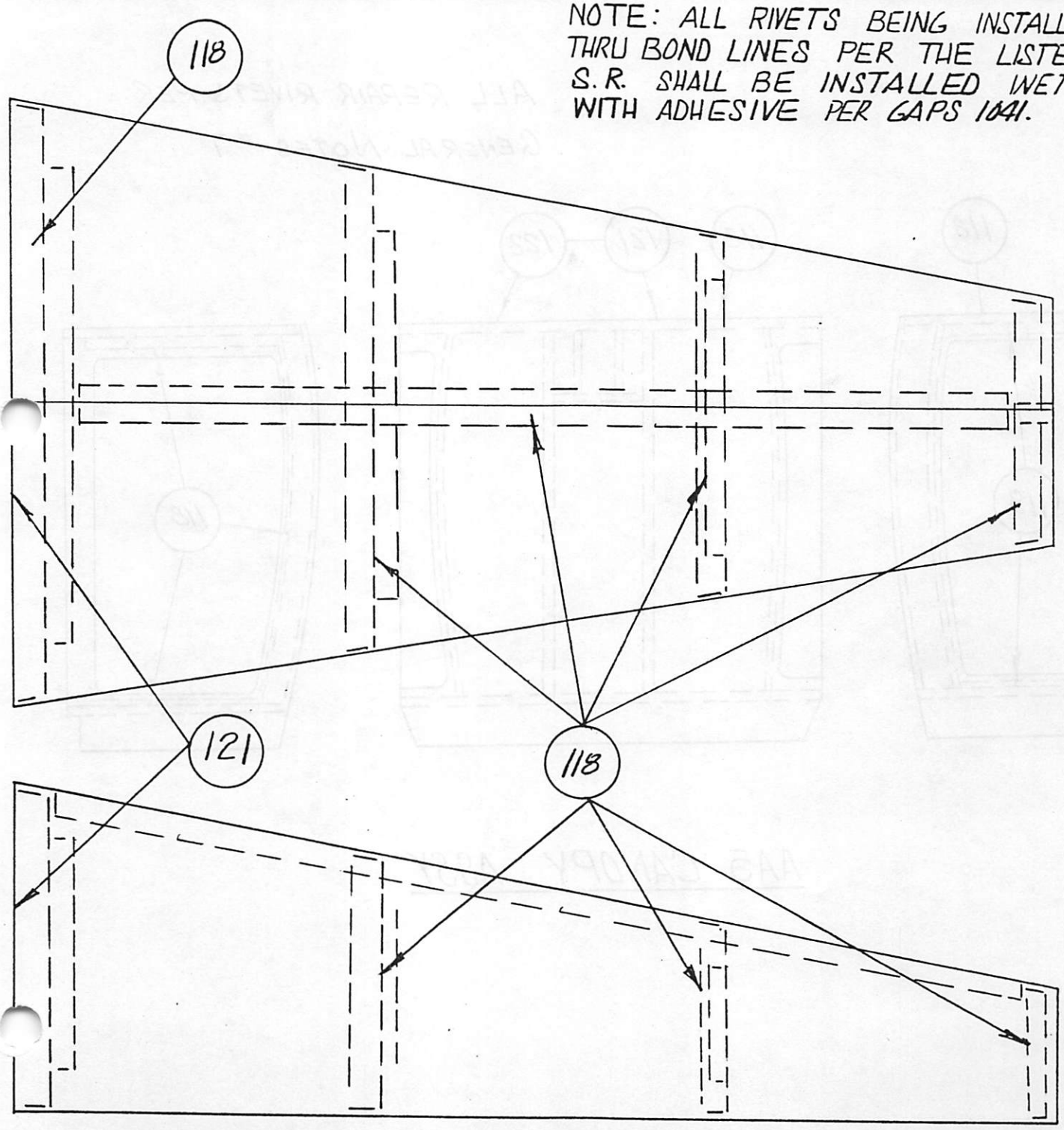
NOTE: ALL RIVETS BEING INSTALLED THRU BOND LINES PER THE LISTED S.R. SHALL BE INSTALLED WET WITH ADHESIVE PER GAPS 1041.



AAI FUSELAGE ASSY, UPPER AFT.

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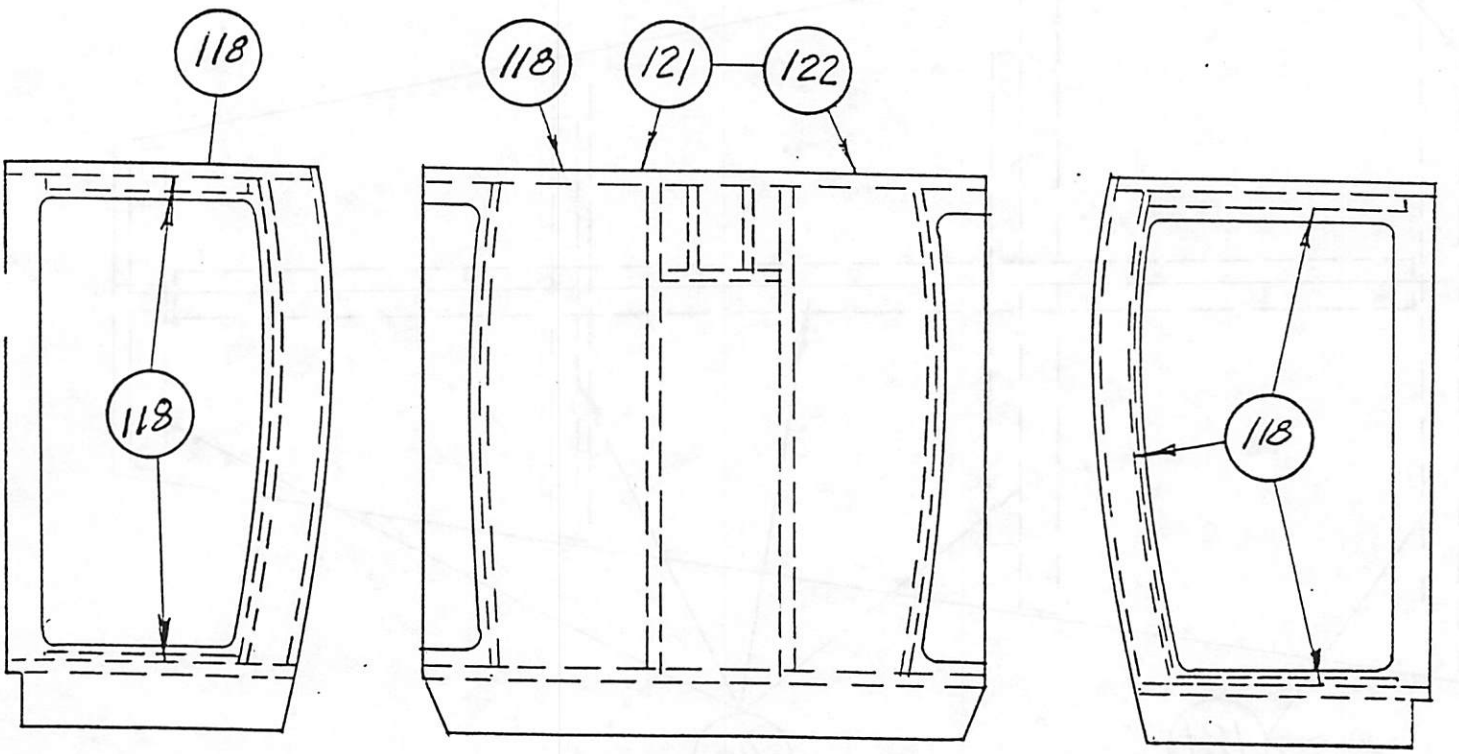
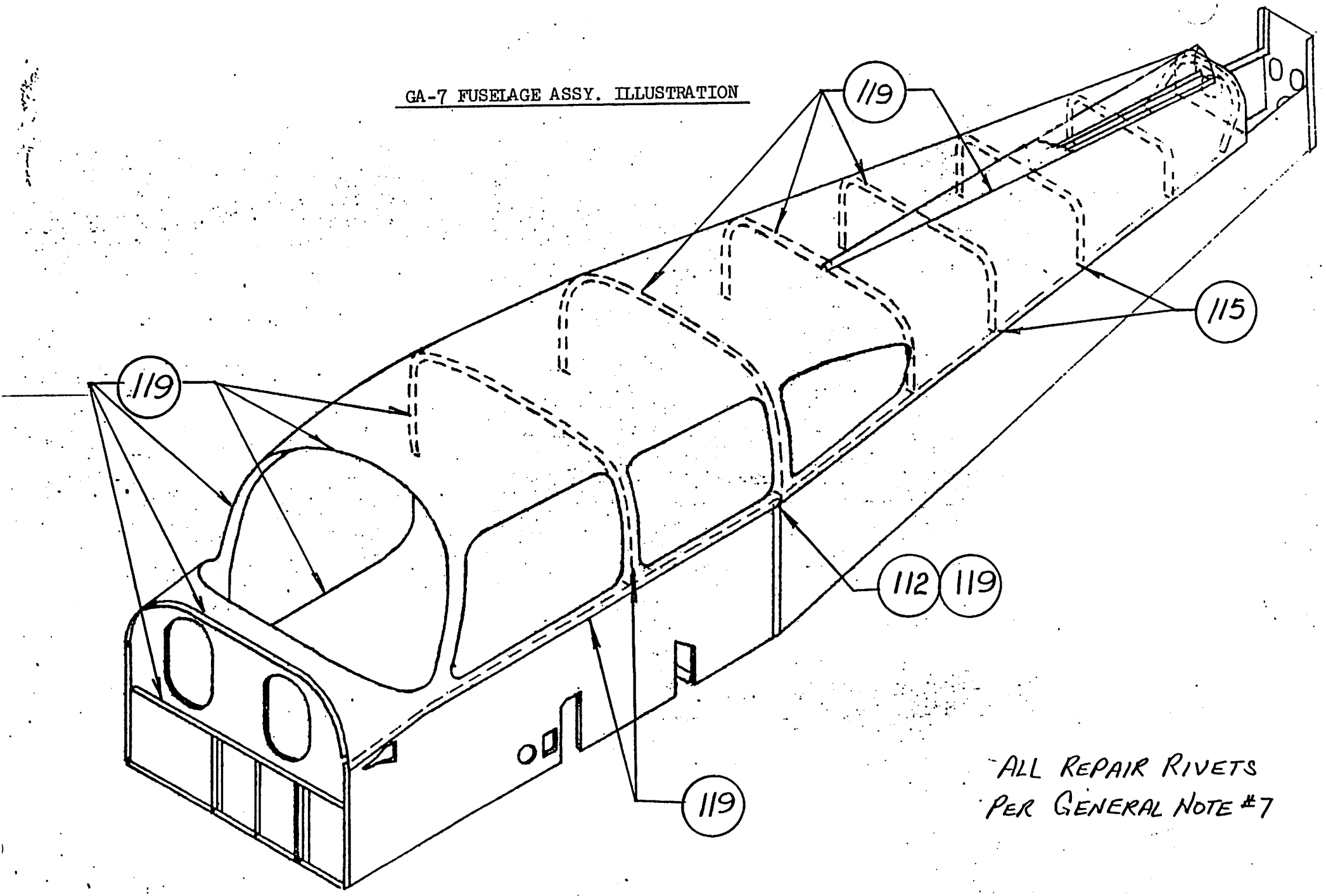
ALL REPAIR RIVETS PER GENERAL NOTES #7



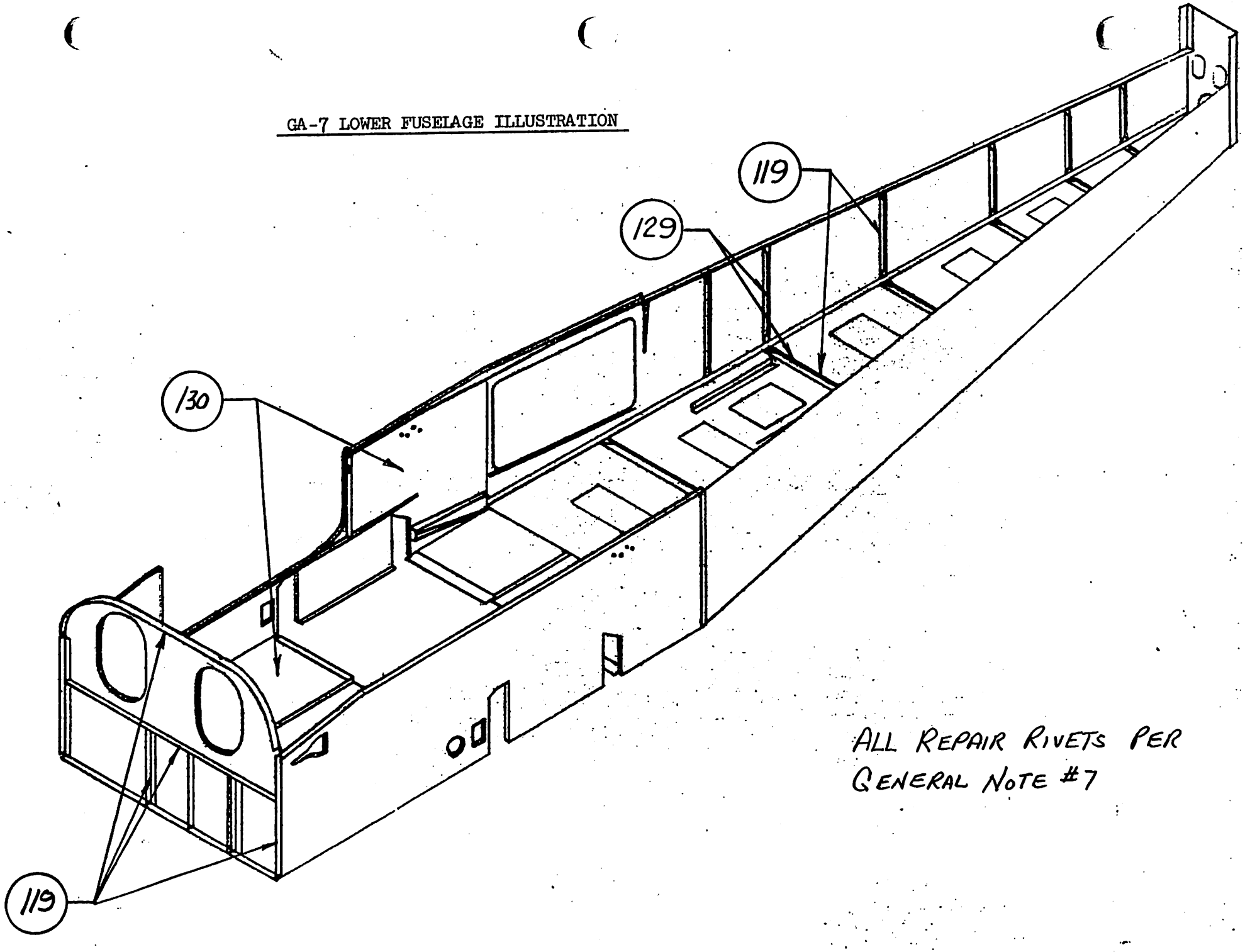
AA5 CANOPY ASSY.

GA-7 FUSELAGE ASSY. ILLUSTRATION



ALL REPAIR RIVETS
PER GENERAL NOTE #7

GA-7 LOWER FUSELAGE ILLUSTRATION



ALL REPAIR RIVETS PER GENERAL NOTE #7

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UPPER ENGINE MOUNT BRACKET

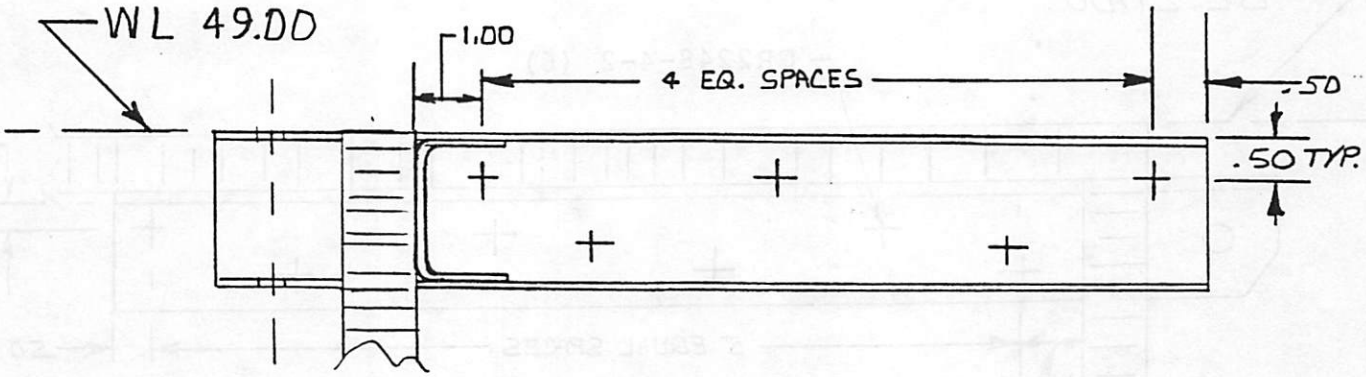
DISCREPANCY: Voids or suspect areas in the upper engine mount bracket

RESTRICTION: Does not apply to GA-7

REPAIR:

1. The gap between mating surfaces shall be less than .020 and the void or suspect area less than 1/3 of the total bonded surface. Fill the void area with 2214 adhesive per GAPS 1041. Install CR2249-4-2 rivets utilizing the hole pattern shown.

2. Suspect areas shall be fastened with CR-2249-4-2 rivets utilizing the hole pattern shown.



+ CR-2249-4-2 Rivet or equiv. per SR 010

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LOWER ENGINE MOUNT BRACKET

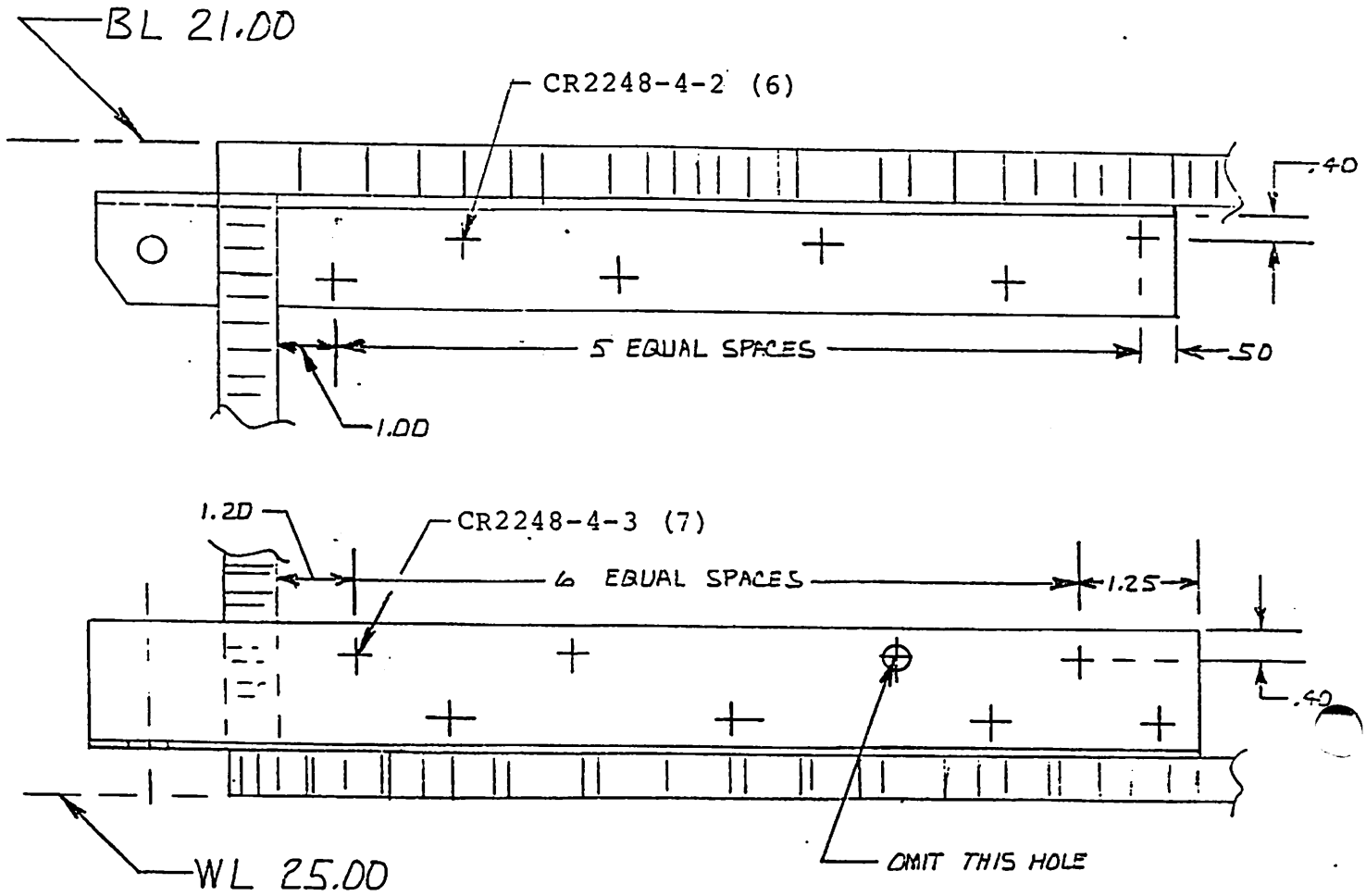
DISCREPANCY: Voids or suspect areas in the lower engine mount bracket

RESTRICTION Does not apply to GA-7

Repair:

1. The gap between mating surfaces shall be less than .020 and the void or suspect area less than 1/3 of the total bonded surface. Fill the void area with 2214 adhesive per GAPS 1041. Install CR-2248-4 rivets utilizing the hole pattern shown.

2. Suspect areas shall be fastened with CR-2248-4 rivets utilizing the hole pattern shown.



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AFT FUSELAGE BULKHEAD

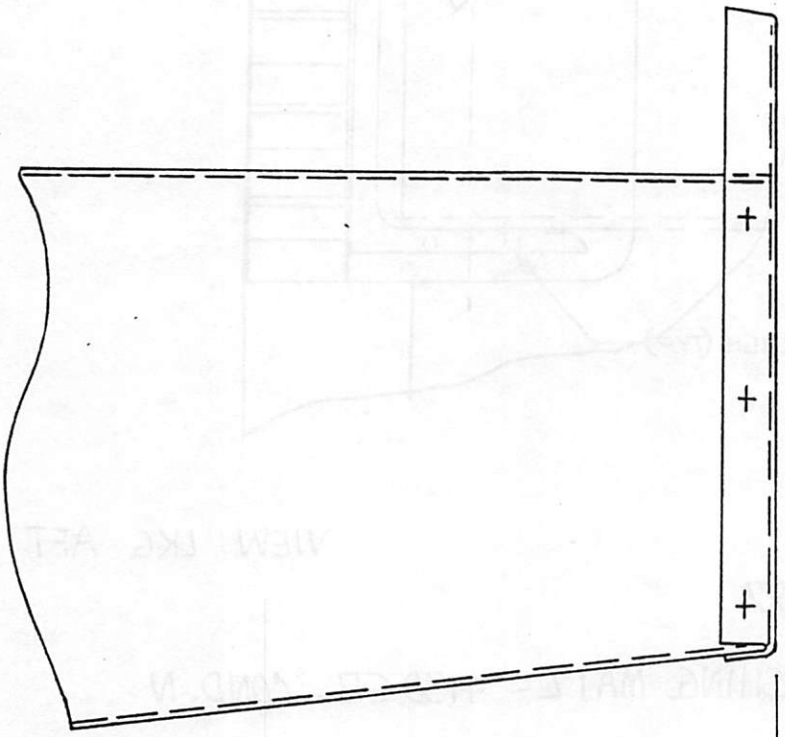
DISCREPANCY: Voids or suspect areas - bulkhead, fuselage station 216.726 and 240.726

Restriction: Does not apply to GA-7

Repair:

1. Fill voids whose width does not exceed 1/2 of the bond width, length does not exceed 2.00 inches and gap between faying surfaces not more than .030 with 2214 adhesive per GAPS 1041.

2. Suspect areas are acceptable as is because rivets are installed as shown on fuselage assembly drawing.



FUS. STA.
216.726 REF.
240.726 "

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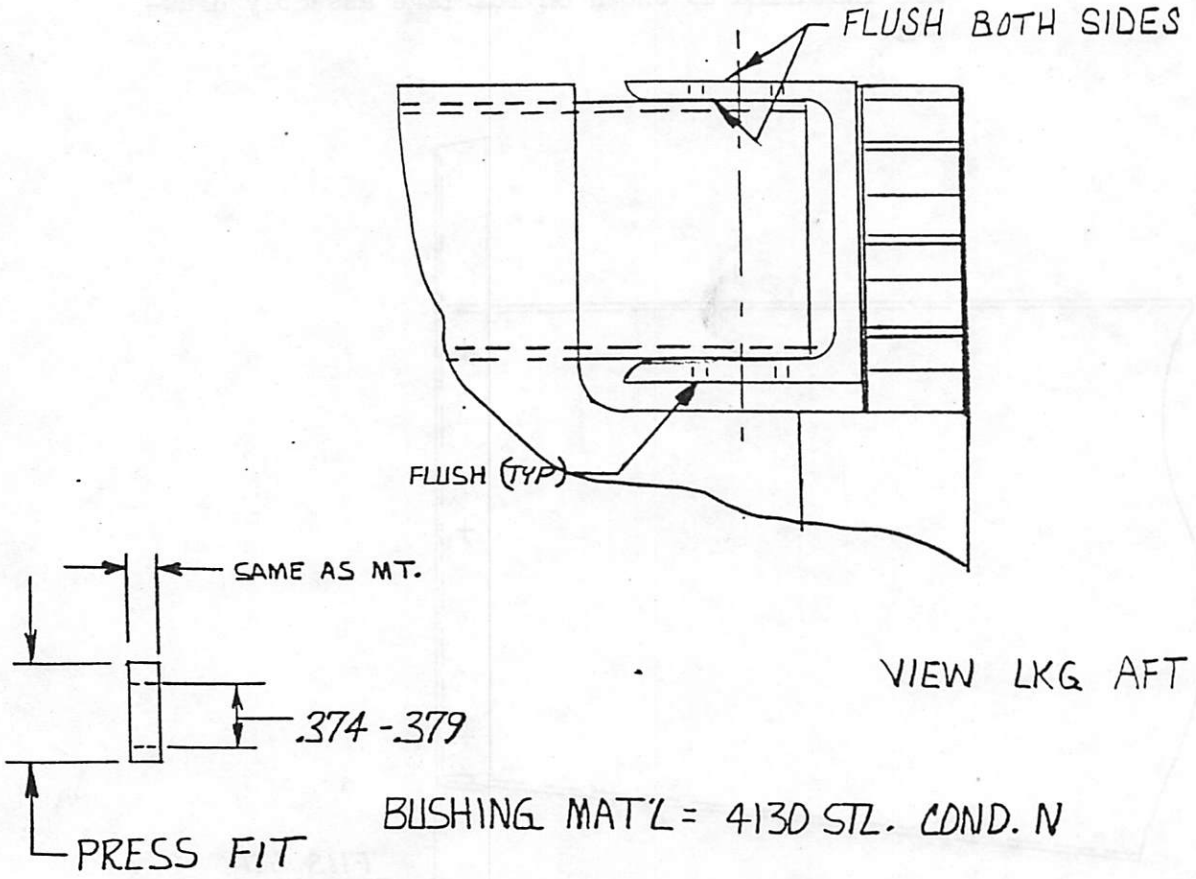
ENGINE MOUNT ATTACH HOLES

DISCREPANCY: Oversize engine mount attach holes - upper and lower (Drawing tolerance .374 to .379 diameter)

RESTRICTION: Does not apply to GA-7.

REPAIR:

1. Open the oversize hole to .437 diameter. Manufacture a bushing as shown. Apply wet zinc chromate per GAPS 1057-1C and install the bushing into the engine mount with .001 - .002 interference.



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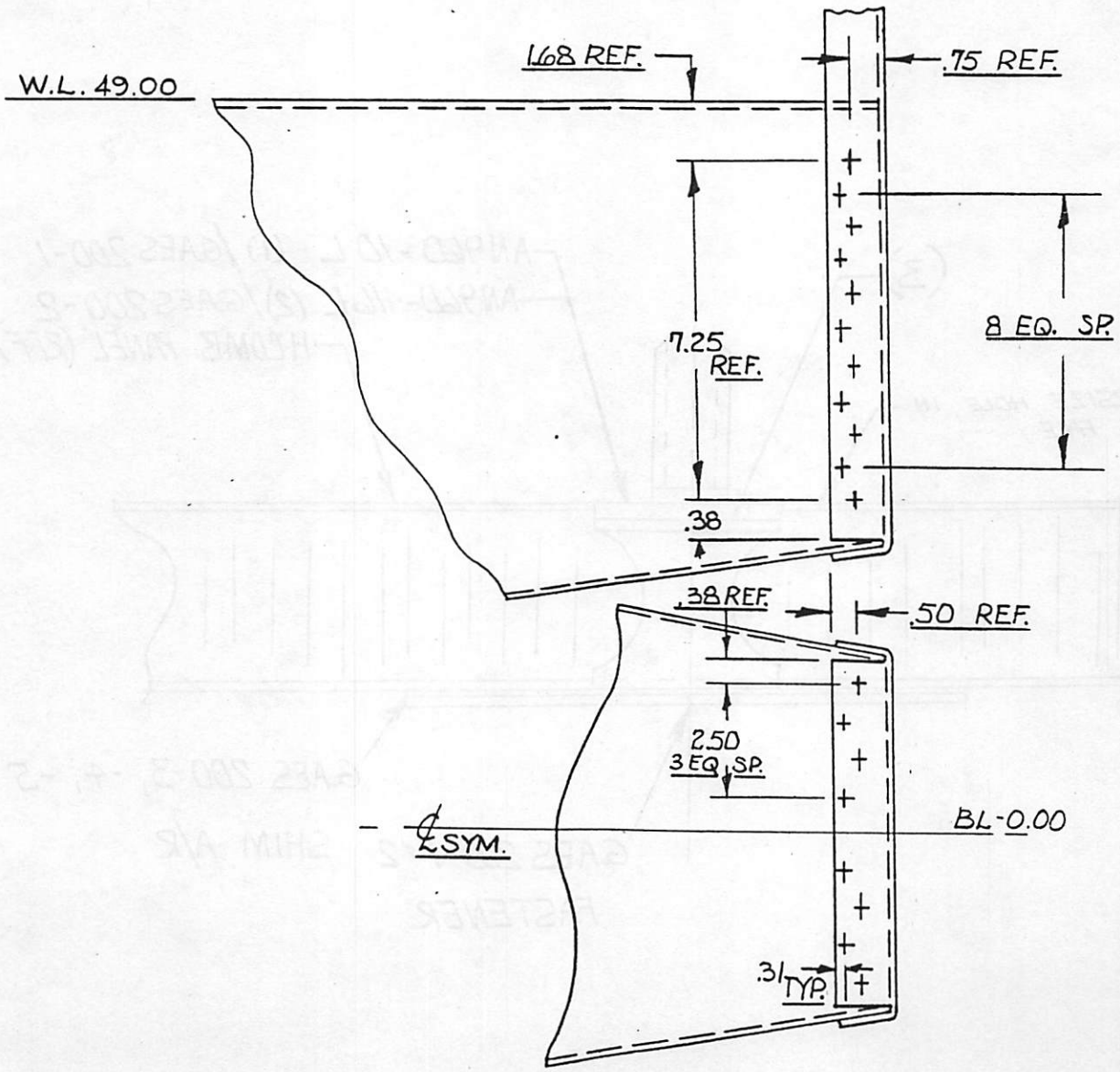
ART FUSELAGE BULKHEAD REPLACEMENT

DISCREPANCY: Fuselage bulkhead replacement
Fus. Sta. 216.7 and 240.7

(MRB Engineering signature required)

Restriction: Does not apply to GA7

Repair: Remove the aft bulkhead and bond a new bulkhead with 2214 adhesive per GAPS 1041 if the assembly is to be subjected to another cure cycle. Install CR-2248-4 rivets (30) as shown. Room temperature adhesive may be used as an alternate adhesive.



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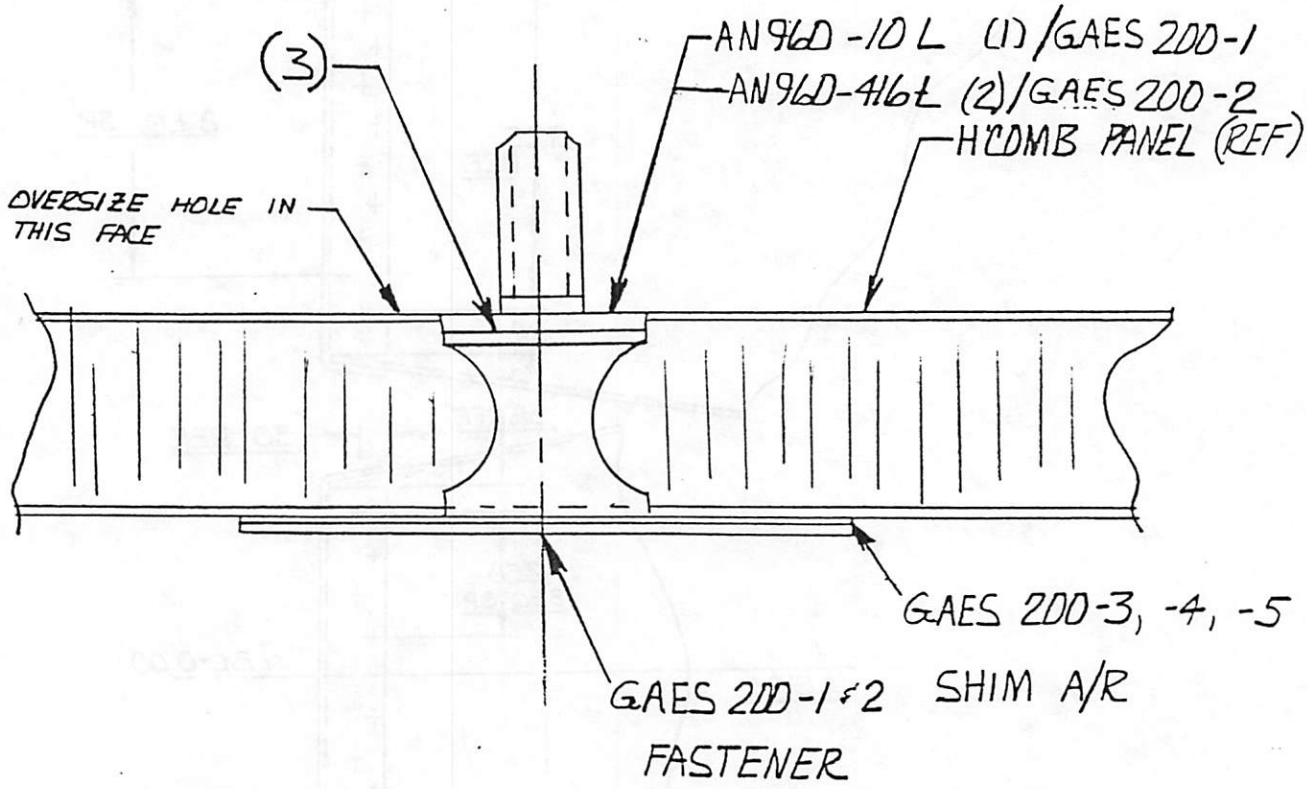
DISCREPANCY: Honeycomb - Oversize hole for GAES 200-1 and 200-2 fastener

REPAIR:

1) Open oversize hole to .437 $^{+.010}_{-.000}$ diameter GAES 200-1 fastener)
2) Open oversize hole to .500 $^{+.010}_{-.000}$ diameter GAES 200-2 fastener)
3) Apply Loctite to faying surfaces of washer and fastener.



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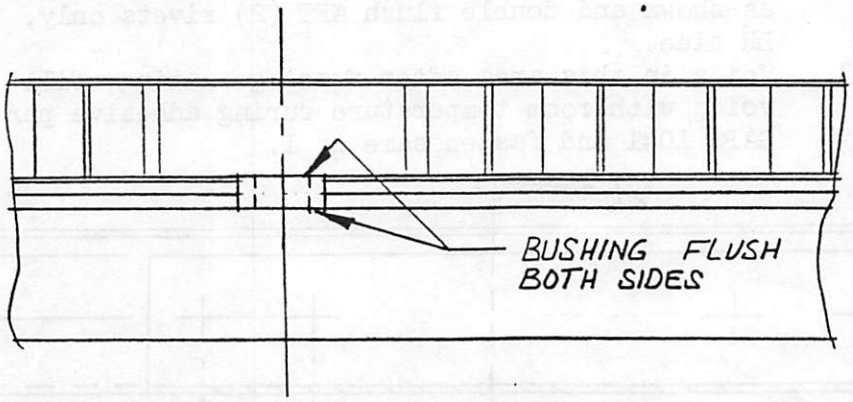
NOSE LANDING GEAR

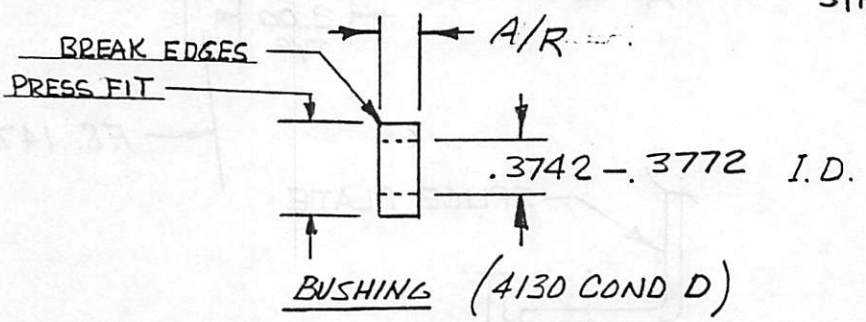
DISCREPANCY: Nose landing gear- Oversize side panel attach holes & Nose gear attach holes thru floor panel & sta. 50 F/W B'Head

Restriction: Does not apply to GA-7

Repair: Open the oversized hole to .437 inch diameter. Apply wet zinc chromate per GAPS 1057-1C and install the bushing into the engine mount, doubler and honeycomb skin with .001 - .002 interference.



SIDE PANEL ATTACH SHOWN (FLOOR & STA. 50 PANEL SIMILAR)



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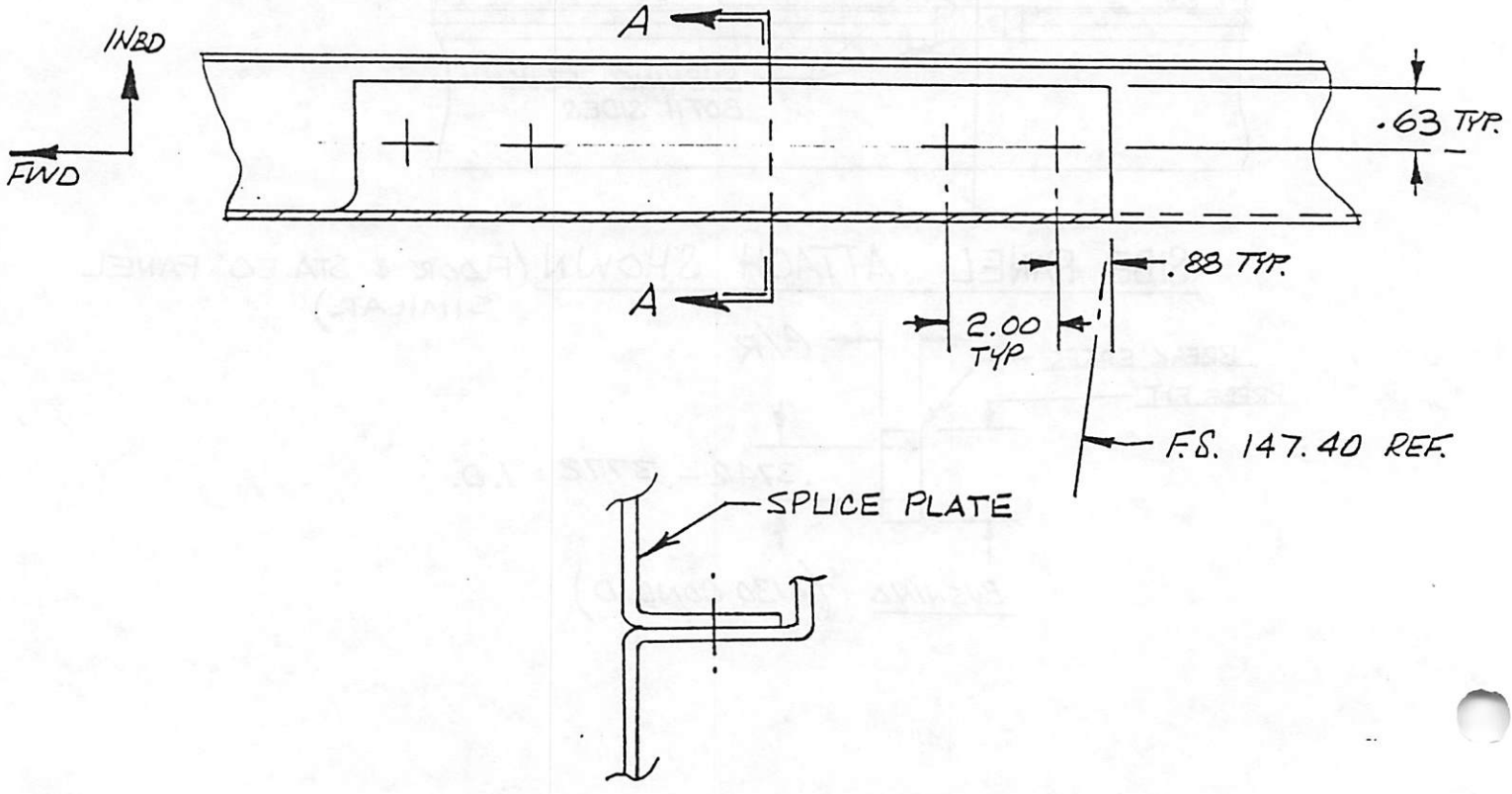
SPLICE PLATE AFT FLANGE FUSELAGE STA 147

DISCREPANCY: Splice plate aft flange fuselage STA 147.40 to WL 49 - thru maximum voids, suspect or fit up problems. Half of bonded area maximum

Restriction: Does not apply to GA-7 or AA-1 Series

Repair:

1. Fill void area with 2214 adhesive paste per GAPS 1041 and fasten with MS 20426 AD4 rivets (4) as shown and double flush AFT (2) rivets only, LH side.
2. Suspect - Fasten with MS 20426 AD4 Rivets (4) as shown and double flush AFT (2) rivets only, LH side.
3. Voids in this area after fuselage mating; fill voids with room temperature curing adhesive per GAPS 1041 and fasten same as 1.



SECT A-A

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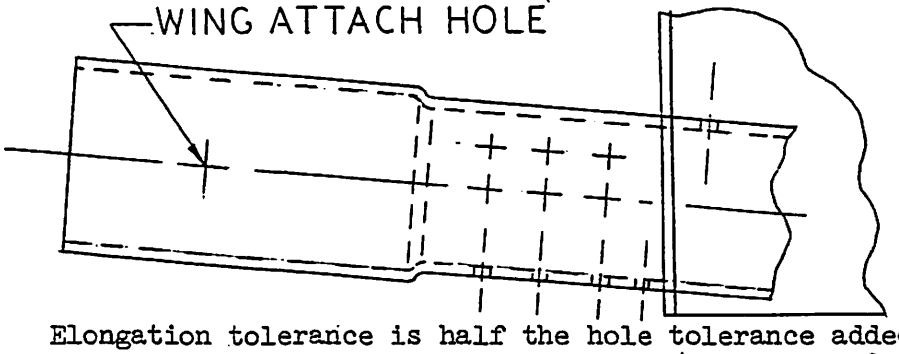
SPAR CARRY - THRU WING ATTACH

DISCREPANCY:
1. Spar assembly - Inboard wing elongated and oversized holes, also mismatched holes
2. Wing angle of incedence out of drawing tolerance

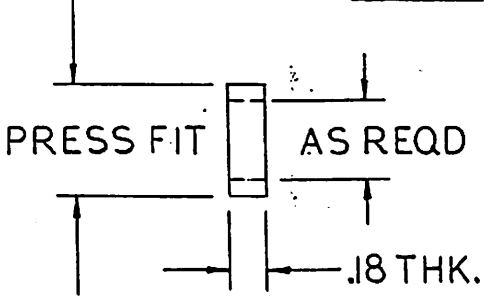
Restriction: Does not apply to GA-7

Limitations:
1. All holes except lower .4930 - .4940 dia holes (13) plcs. Ref SR 116 .
2. Repair of wing attach hole requires bushing as shown below for holes over .3765. No MRB allowance remains. (MRB Engineering acceptance signature required on bushed wing attach holes)

Repair:
a. Open .3745 - .3765 diameter holes that exceed drawing and Note (1) tolerances to .500 dia.
b. Open .377 - .382 diameter holes that exceed drawing and Note (1) tolerances to .500 dia.
c. Open .503 - .507 diameter holes that exceed drawing and Note (1) tolerances to .62 dia.
d. Apply wet zinc chromate per GAPS 1057-1C and install bushing into wing spar with .001 - .002 interference.



NOTE: (1) Elongation tolerance is half the hole tolerance added to the maximum diameter of bolt hole I/e .375 - .382 diameter hole, the total elongation permissable would be .3855 without repair.
This tolerance does not apply to wing attach hole.



BUSHING MATERIAL IS 4130 cond. "N" stl.

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DISCREPANCY: 1. Skin splice overlap under minimum Requirements

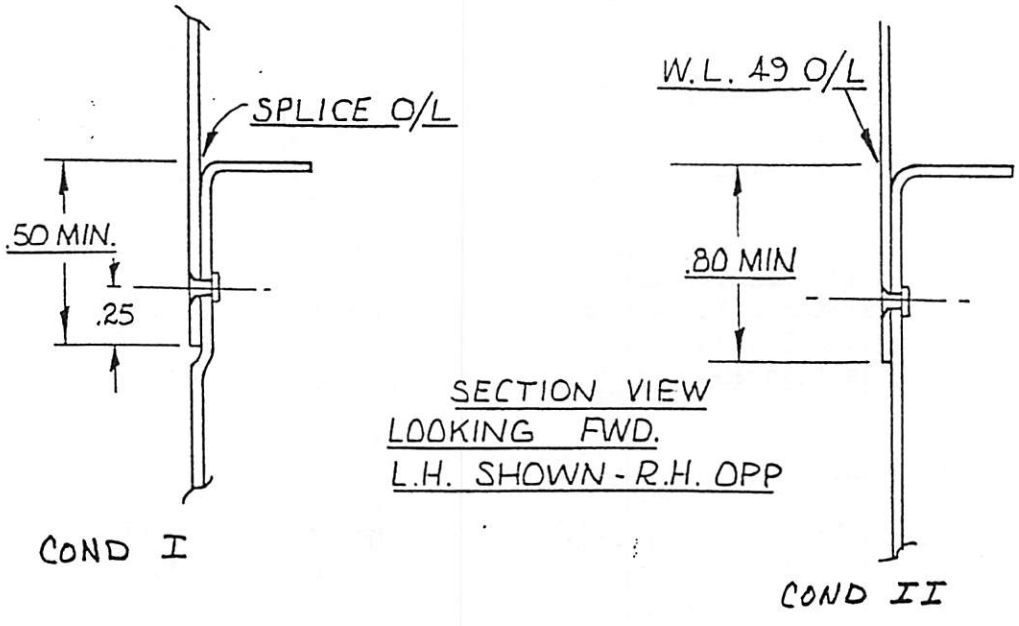
2. Turtle back assy to bottom fuselage assy voids

RESTRICTION: Does not apply to GA-7

REPAIR: Accept as is minimum bonded overlap of .75 Cond. I
Accept as is min. bondline of .80 Cond. II

Condition I: For bonded overlap of less than .75 to a minimum overlap of .50 repair by adding a single row of MS20426 AD 3 rivets (3). Use .50 E. M. on the forward end rivet AFT of joggle and (2) equally spaced rivets at 6.50 spacing. Maintain .25 E. M. on the skin edge.
For overlap under .50, remove and replace, no MRB allowance remains.

Condition II: If void is along WL 49, install MSC-32 rivets on 1.00 centers to extend .50 minimum beyond void. If at part end, start .38 E. D.



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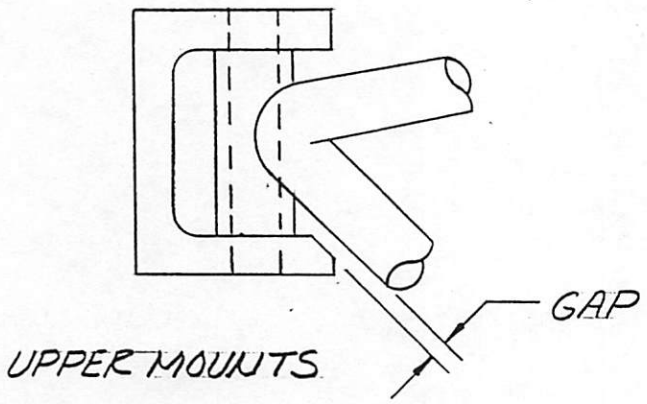
ENGINE MOUNT INTERFERENCE

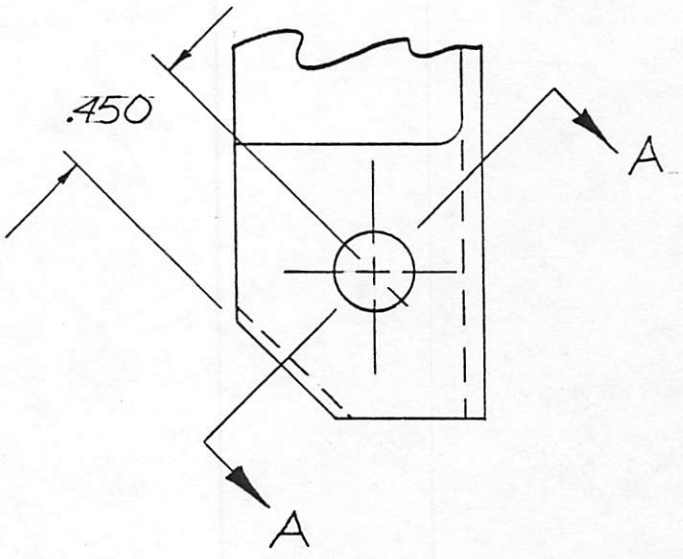
DISCREPANCY: Engine mount assy interferes with lower or upper fuselage mount

RESTRICTION : DOES NOT APPLY TO GA-7

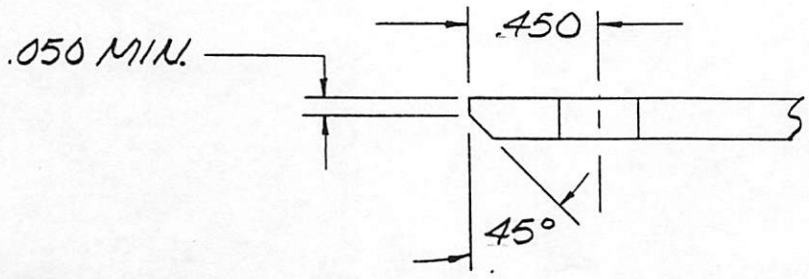
REPAIR: Chamfer fuselage engine mount fitting as shown. Chamfer top inbd edge to obtain .03 to .06 clearance. Maximum amount of material removed is to maintain a minimum of .450 edge margin from centerline of bolt hole to the nearest edge. The reworked surface is to be smooth with no nicks or sharp edges. Refinish reworked area with primer per GAPS 1057.



UPPER MOUNTS



LOWER MOUNTS



SECTION A-A

TYP UPPER & LOWER MOUNTS

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OVERLAPPING FLANGES

DISCREPANCY: Frames, angles or stiffeners overlapping flanges or riding in bend radius. (See Illustration)

REPAIR: Trim portion of overlapping member to obtain a resulting edge gap of .03 to .06 or to clear bend tangent by .03 to .06. Use smooth edge trim and runout of .50 min.

NOTE: If voids exist, coordinate with applicable repairs in this manual.

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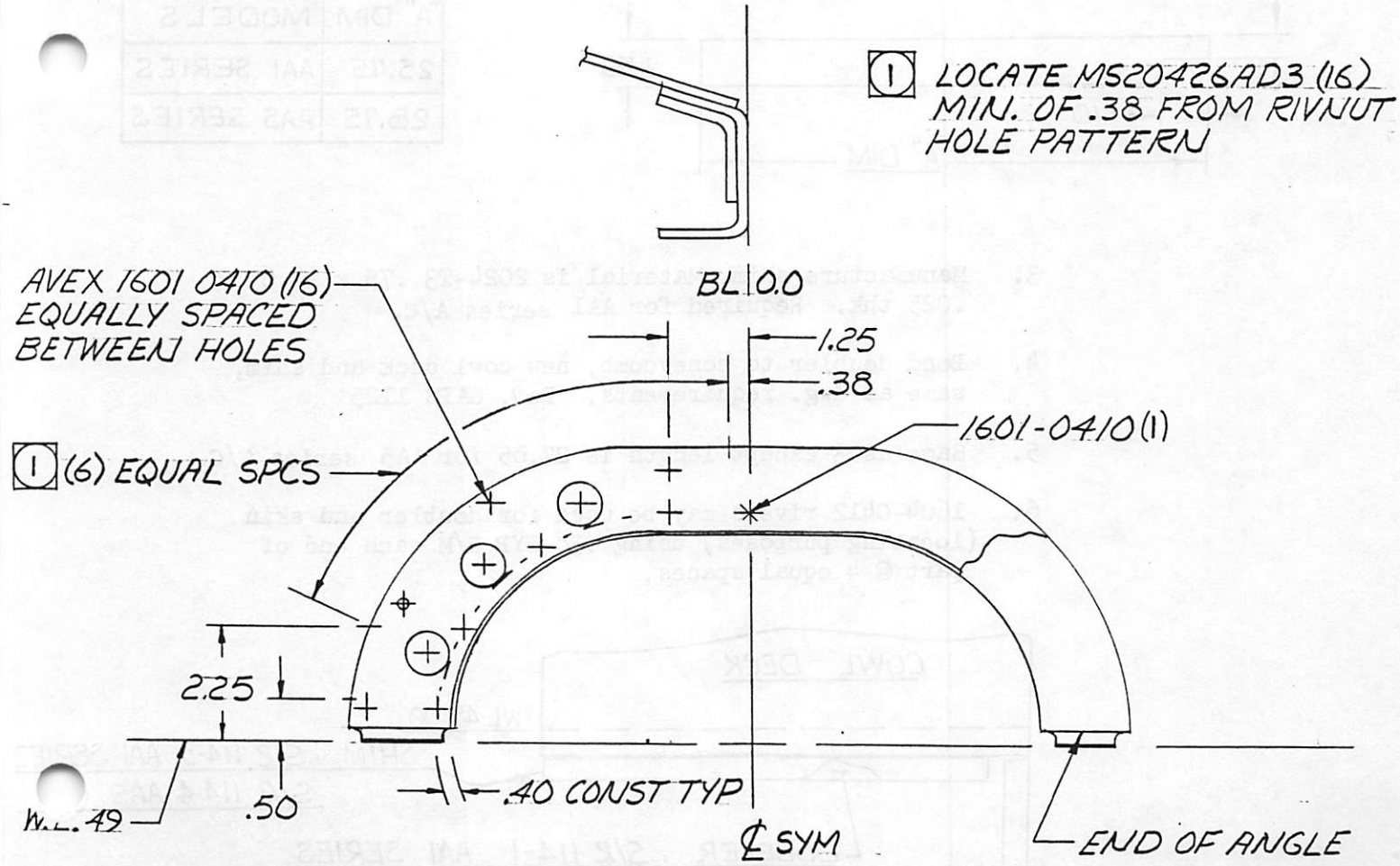
AFT TURTLE DECK FRAME

DISCREPANCY: Radius of AFT turtle Deck frame damaged
Restriction : Does not apply to GA-7
Condition: Frame radius at Skin Edge sanded removing unknown amount of material

REPAIR: Modify new frame same as B/P by cutting off bottom flange and side stringer attaching tabs at bend line. Add new modified angle on forward side of damaged frame nesting flange at skin edge and lightening hole flanges. Bond (2) mating surfaces with adhesive, per general note section. Rivet as shown below:



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COWL DECK REPLACEMENT

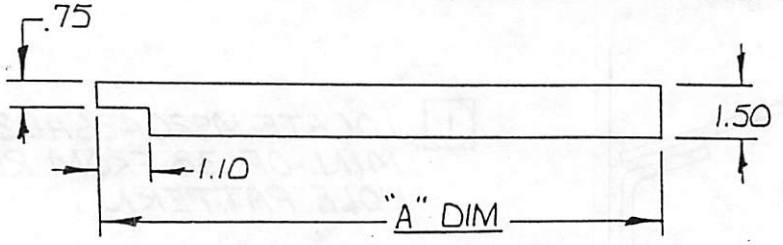
DISCREPANCY: Cowl deck replacement due to cutting thru honeycomb outer face sheet at bondline overlap during bond flash removal.

Restriction: Does not apply to GA-7

Repair:

1. Remove cowl deck and stop drill thru area max. length 3.00 using #40 drill, inject 2214 adhesive into honeycomb core per GAPS 1041.

2. Manufacture doubler from 2024-T3 to dimensions shown, thickness of doubler is .016.



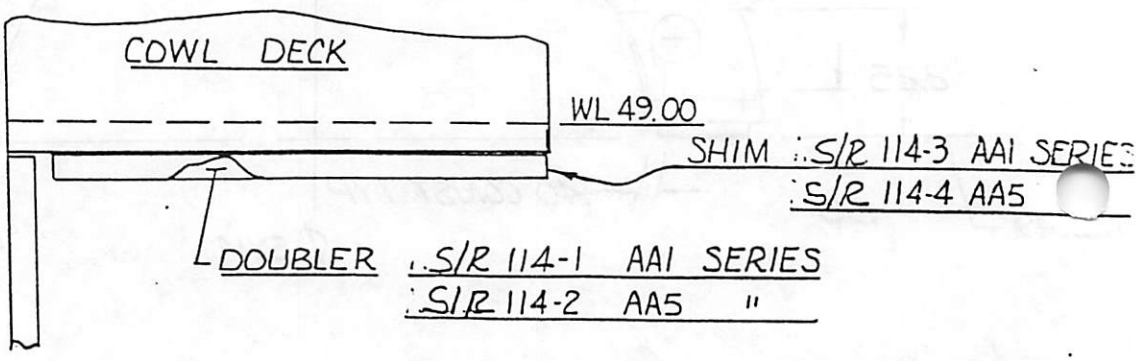
"A" DIM	MODELS
25.75	AA1 SERIES
28.75	AA5 SERIES

3. Manufacture shim, Material is 2024-T3 .75 x 24.65 x .025 thk. Required for AA1 series A/C.

4. Bond doubler to honeycomb, new cowl deck and shim, same as dwg. requirements. Ref. GAPS 1125

5. Same as 3 except length is 27.65 for AA5 series A/C.

6. 1604-0412 rivets may be used for doubler and skin (locating purposes) using .38 TYP E/M each end of part @ 4 equal spaces.



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AFT FUS. TOP SKIN

DISCREPANCY: Crack or deformation in radius of formed aluminum frame flanges or gap greater than .093 W. L. 49

Restriction: CONDITION (1) Does not apply to GA-7

Condition 1. Damage at B. L. 0.0 turtle deck upper stringer attachment

Condition 2. Damage at W. L. 49 turtle deck side stringer attachment

REPAIR:

Conditions 1 and 2:

Cut off length of flange at bend line. Manufacture a replacement angle section of alclad 2024-T3 .025 thickness with dim's shown in details A and B. Use drawing bend radius and angle

Install the replacement angle on either side of the frame web adding (4) 1601-0410 rivets .25 edge margin and .50 pitch distance on centers

At B. L. 0.0 location: Add (2) MS20426AD3 rivets thru skin and angle using .25 edge margin each side of skin splice

At W. L. 49 location: Pick up (2) 1601-0410 rivets existing thru stringer flange (typical)

Conditions #1 and #2 bond with 2214 adhesive per GAPS 1041 (substitute room temperature curing adhesive if 3rd stage bonding operation is complete.

NOTE: Where voids exist at this flange to skin, fill with adhesive per general note 10 at the beginning of this manual, and coordinate with drawings for added rivets.

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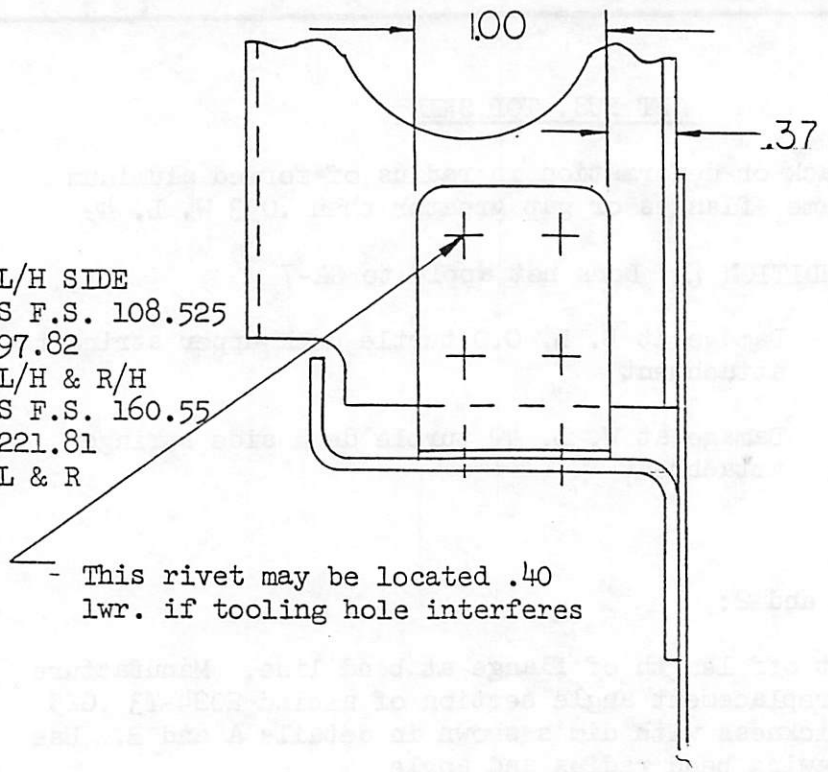
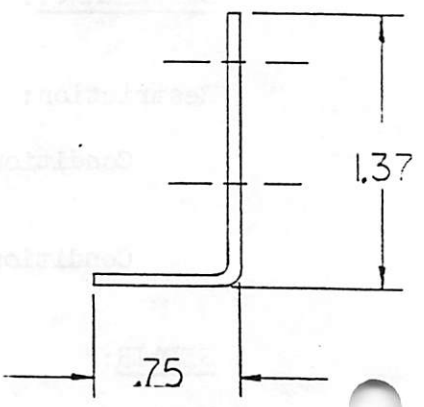
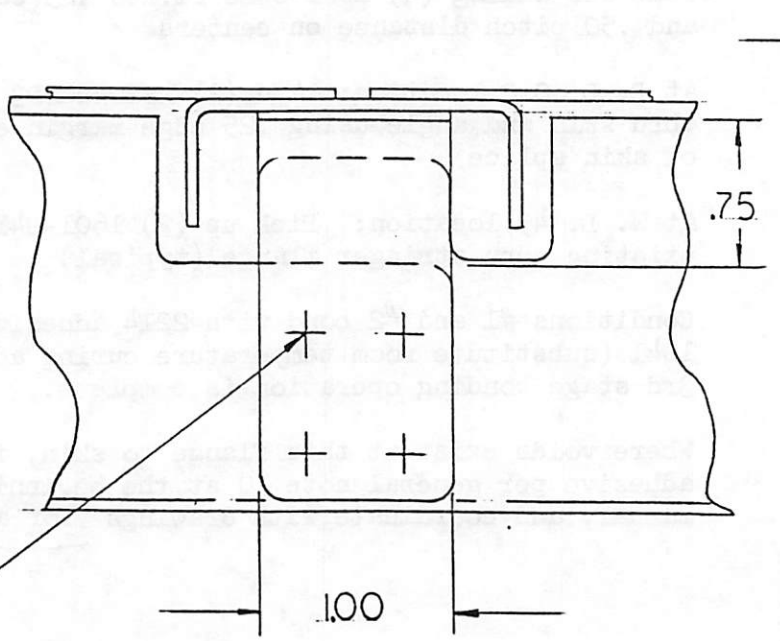
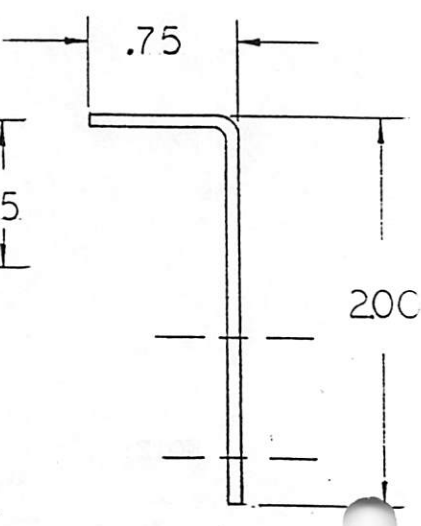




REPAIR COND. #2
DETAIL A





REPAIR COND. #1
DETAIL B

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SPAR ASSY - INBD WINGS

DISCREPANCY: Spar assembly - Inboard wing .4930 - .4940 dia holes 13 places elongated and oversize or misaligned

Restriction: Does not apply to GA-7 or AA1 Series A/C

Repair: Prior to fuselage assy

a) Open .4930 - .4940 diameter holes, that exceed drawing and Note (1) requirements on SR 109, to .5312 to .5322 diameter

b) Manufacture bushing to meet the same requirements as drawing 5201183-1 except for outside diameter. Outside diameter to be .5332 - .5337

c) Install bushing to meet same requirements as Note 6 on Drawing 5102310

ALTERNATE REPAIR:

d) Same as a) except open holes to the minimum diameter required to correct elongation, and record oversized hole

e) Same as b) except outside diameter to be oversized as required to provide same interference as drawing requirements

f) Same as c)

NOTE: Bushing O. D. and Bushing I. D. to be concentric within .010

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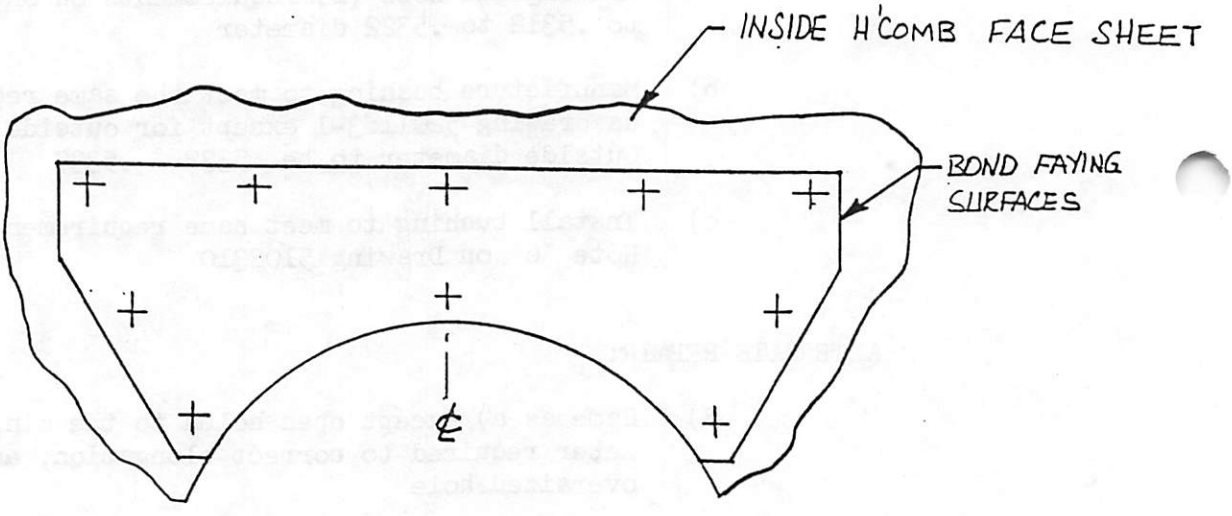
HONEYCOMB SOLID PLUGS

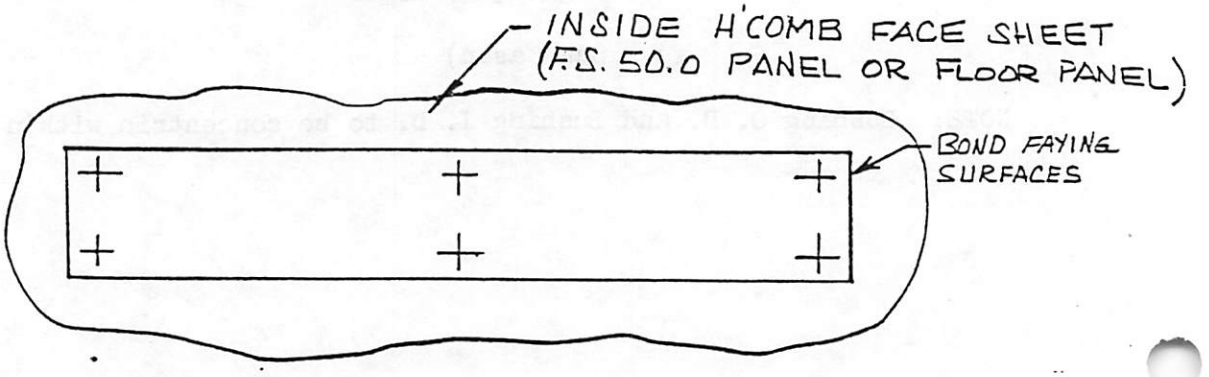
DISCREPANCY: GAES solid H'comb plugs omitted (wing attach brkts.; Nose gear attach brkts)

Restriction: Does not apply to GA-7

Repair: Remove Doubler plate, Install plugs & new doubler (per - Blueprint) With adhesive per General Notes & GAPS 1041. Install 1604-04 rivets as shown in sketch below. Maintain E.D. Requirements of SR 012.



WING ATTACH BRKTS



NOSE GEAR ATTACH BRKTS

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FUSELAGE VOIDS

DISCREPANCY: SEE ILLUSTRATION

1. Thru void between turtle back bulkhead and skin

2. Thru voids between window retainers

3. Thru void between fwd. or aft canopy bows, skin

4. Thru voids at window frame stiffeners or at top stiffeners above window frames

5. Void between vertical stiffener to lower skin flange @ F.S. 230

6. Voids between stringer and side or bottom skin

7. Voids between stiffeners & strap & strap and honeycomb side panels or lower panel

8. Voids between cowl deck and honeycomb side panels

RESTRICTION: Does not apply to GA7

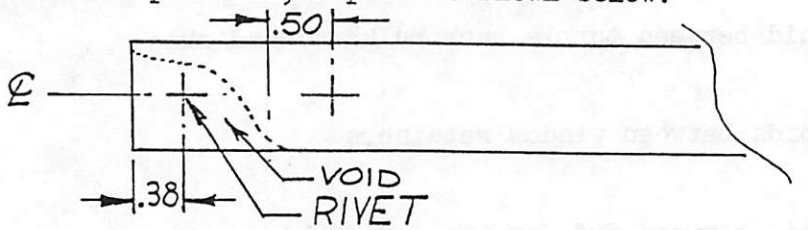
Limitations: Max. gap .060

Repair: ITEMS (1) thru (5) -------- Fabricate a shim from 2024-T3 alum., thickness, length and taper as required to reduce gap to .040 or less. Bond faying surfaces with 2214 adhesive or room temperature curing adhesive per GAPS 1041 and fasten with MS20426AD3 rivets; one (1) each at .50 E. D. (TYP) E. O. P., shims, (1) at .50 beyond void and (1) or more equally spaced between per table below.

NOTE: Do not install rivets in Item 5; clamp until bond is cured.

Void Length	Rivet Quantity Equally Spaced
3.00 to 4.00	1
4.00 to 6.00	2
6.00 to 8.00	3
8.00 or more	Every 2.00

When void is at a part end, repair as shown below:



Repair item 6, 7, & 8 as follows:

LIMITATIONS:
1. Maximum length to be 50% of total bondline for non-thru voids
2. Maximum length for thru voids is 30%
3. Maximum gap to be .030
4. Not within 6.00 of spar to fuselage attach area

Fill voids with adhesive per General Notes & GAPS requirements. Install rivets per table below: No rivets required if void is less than 30% of the bondline width.

Table quantity is including end rivets

VOID LENGTH	2.00	2.00 to 3.00	3.00 to 5.00	5.00 to 7.00	Over 7.00
RIVET QTY.	3	4	5	6	2" spcg.

Rivet spacing is to be 2.00 or less & end rivets at .50 beyond voids.

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GA7 TURTLEBACK, CABIN TOP, AND LOWER FUSELAGE

DISCREPANCY:

1. Voids between turtleback skins and frame, skins and window retainers and dorsal fin to channel or ribs.
2. Voids in lower fuselage bonded assy.
3. Voids in cabin top bonded assy.

Restriction: Does not apply to AA1 Series or to AA5 series

Limitations:

1. Does not apply to STA 284 bulkhead.
2. No more than 30% of total bond line for thru void.
3. No more than 50% of total bond line for non thru void.
4. No gap greater than .020 , except as noted below.

REPAIR:

Condition 1: Thru voids: Fill voids per general notes and GAPS requirements. Install (1) rivet .50 beyond void each direction and equally spaced between on 2.0" centers max. (See general requirements below)

Condition 2: Non thru voids: For non thru voids up to 30% of bond line width fill per general notes and GAPS requirements. Non thru voids greater than 30% of bond line width are to be repaired per Condition 1.

General Requirements: Any void at part end requires (1) rivet @ .38 E. D. from part end.

Preferred rivets are MS20426AD3 or NAS1097AD4.

Rivets are 1604-04 or MSC-32 when solid rivet instl. is not practical.

For Gap greater than .020 to a max of .040 fill gap with 2214 adh. per GAPS reqmts. and cure before installing rivets per above.

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GA7 NOSE SECTION

DISCREPANCY: Voids between skin and frame

Restrictions:

1. Does not apply to AA1 Series or AA5 Series A/C

Limitations:

1. No more than 30% of total bondline for thru void.
2. No more than 50% of total bondline for non thru void.
3. Gap no greater than .040

Repair:

Condition 1:

1. Thru voids: Fill voids per gen notes and GAPS reqmts. Install (1) rivet .50 beyond void each direction and equally spaced between on 2.0" centers max. (See general reqmts below)

Condition 2:

2. Non thru voids: For non thru voids up to 30% of bond line width fill per general notes and GAPS reqmts. Non thru voids greater than 30% of bond line width are to be repaired per Condition 1.

General Remts.: Any void at part end requires (1) rivet @ .38 E. D. from end of part

Preferred rivets are MS20426AD3 or NAS1097AD4

Rivets are 1604-04 or MSC-32 when solid rivet instl. is not practical

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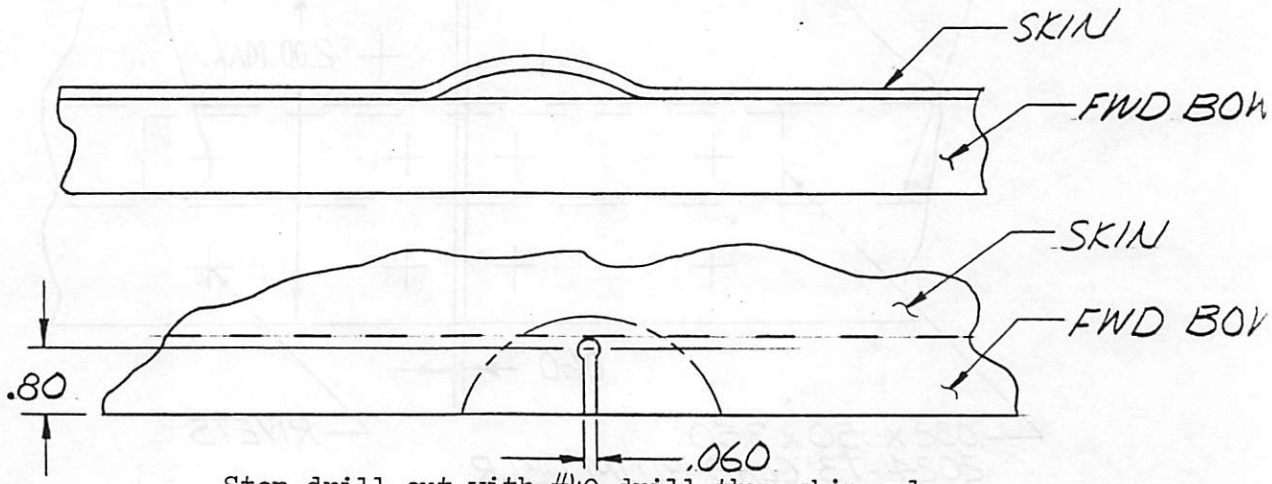
SKIN PUCKERED AT TURTLEBACK OR COWL DECK

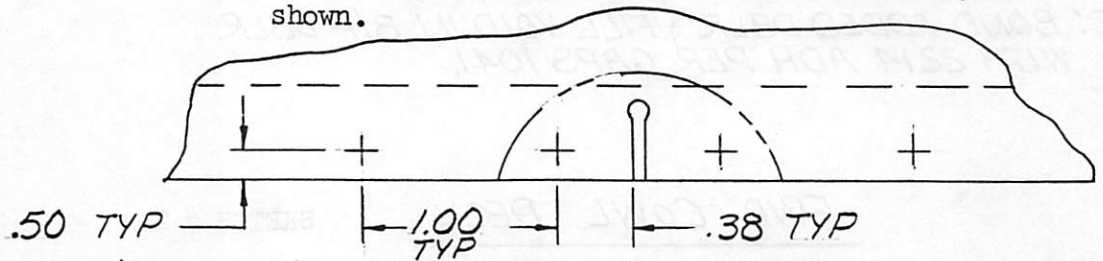
DISCREPANCY:
1. Skin puckered at forward canopy bows.
2. Skin puckered at forward bulkhead bow at forward turtle back skin. Also for cowl deck puckers.

Repair:
1. Remove excessive adhesive from bond line area and void to allow part contact.
Cut skin at center line of pucker to a length of .80 and width of .060. (Sketch 1)

If length required is over .80, repair (Sketch 2)



Stop drill cut with #40 drill thru skin only.
Straighten pucker as practical.
Fill with room temperature curing adhesive per GAPS 1041 and fasten with rivets MS20426AD3 as shown.



Fill affected area with Aerodynamic filler or Alum-A-Lead and blend to contour. This repair may be used on multiple puckers. 6.00 of sound bond line must exist between any (2) repairs. Limit of (2) repairs per skin.

SKETCH # 1

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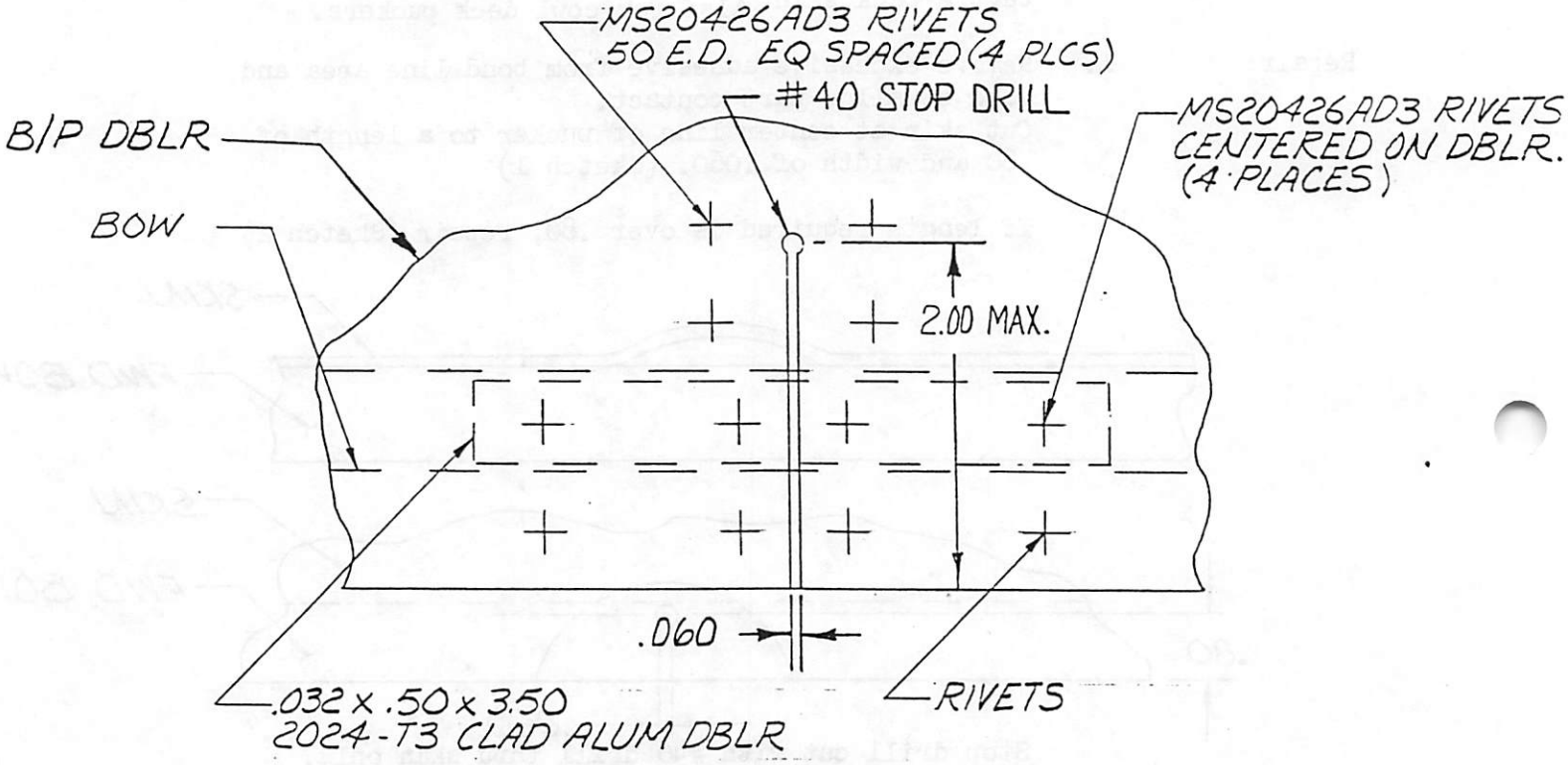

NOTE: BOND ADDED DBLR ; FILL VOID IN B/P DBLR WITH 2214 ADH PER GAPS 1041.

FWD COWL DECK

SKETCH # 2

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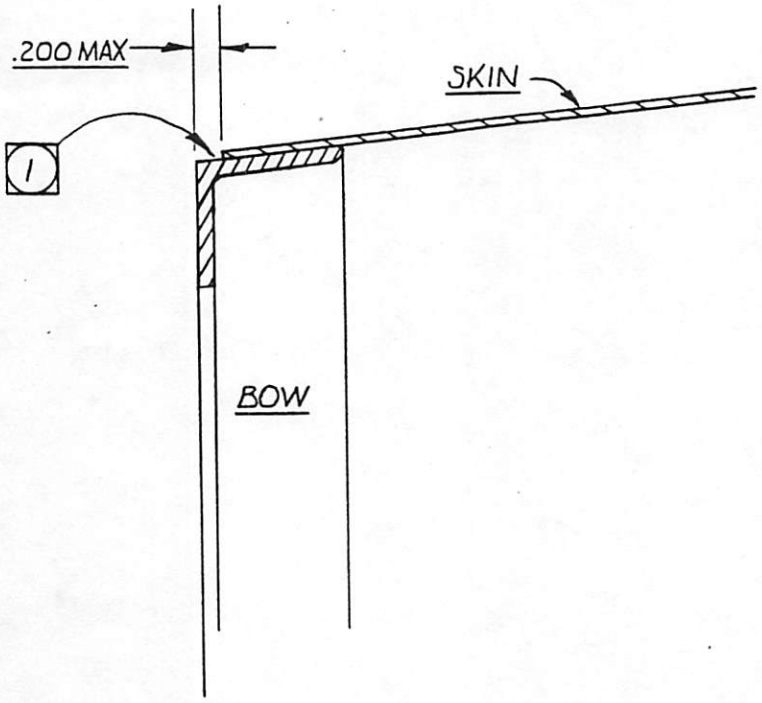
SKIN MISALIGNED

DISCREPANCY: 1. Skin misaligned at forward canopy bow .200 maximum.

2. Turtle back skin misaligned at forward bow, .200 maximum. See illustration

Restriction: Does not apply to GA-7

Repair: Remove adhesive residue from bow and polish area with #320 cloth. Fill area with Alum A Lead or epoxy paste 1250 REN and blend to contour, per GAPS 1010.



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GUSSET FUSELAGE STA 128.000

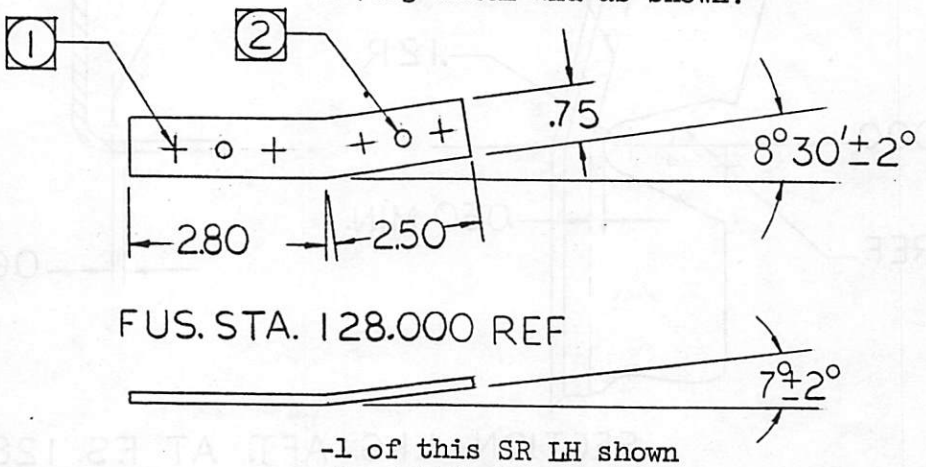
DISCREPANCY: .44 minimum dimension is .060 under minimum and lower flange is raised .050 in notched area ref. fuselage STA 128.000 P/N 5102372-1 and -2.

Restriction: Does not apply to GA-7 or AA-1 Series A/C

Repair:

1. Parts acceptable for use on AA5A only (tag parts)
2. For AA5B (tag parts) and rework as noted:

a) Manufacture splice plate, material 2024-T3 x .063 thick and as shown:

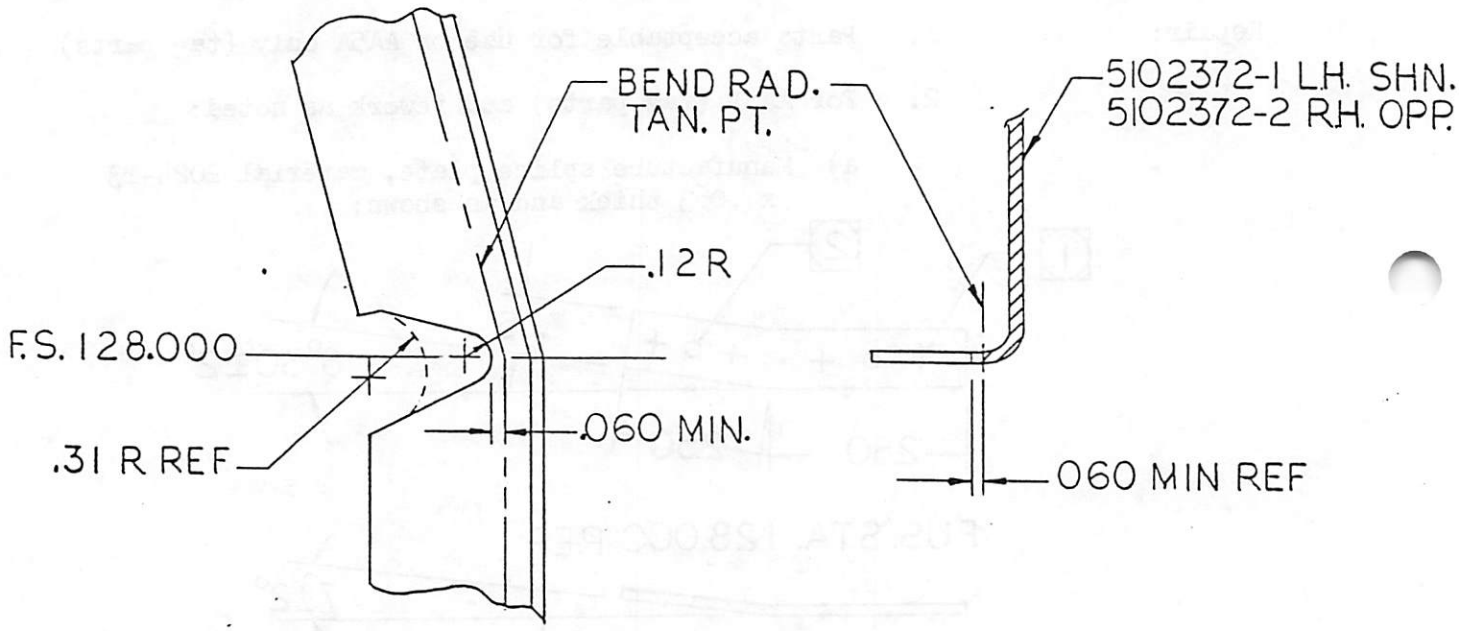


-1 of this SR LH shown
-2 of this SR RH opposite

NOTES:

1. Holes marked thus + ; to match hole pattern on part 5102372-1 and -2.
2. Holes marked thus O ; additional holes .143 to .146 dia at two (2) equal spaces between exist- rivet pattern and match drill through part 5102372-1 and -2.

b) Polish out raised notch in lower flange at fuselage STA 128.000 to within .060 of bend radius tangent point



SECTION LKG. AFT. AT F.S. 128.000

c) Bond gusset and splice plate faying surfaces per drawing requirement and fasten using same rivet pattern, except in holes marked thus 0 ref note 2 fasten with two (2) CR2249-4 rivets

d) Fuselage gusset P/N 5102372-1 and -2 may be bonded with room temperature adhesive in lieu of thermosetting adhesive. Suspect voids under the gusset are acceptable. Edge voids are to be injected with adhesive.

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ENGINE COWL

DISCREPANCY:

1. Oversize or elongated holes in lower engine cowl for attaching screws.

2. Holes burnt thru during spot weld operation.

Limitations:

1. Max. number of holes to be welded in any one cowl is (2).

2. Max. diameter of any hole to be welded is 5/16".

Repair:

Weld holes closed by tig. welding in accordance with GAPS 1003. Grind and sand smooth to contour, refinish per B/P.

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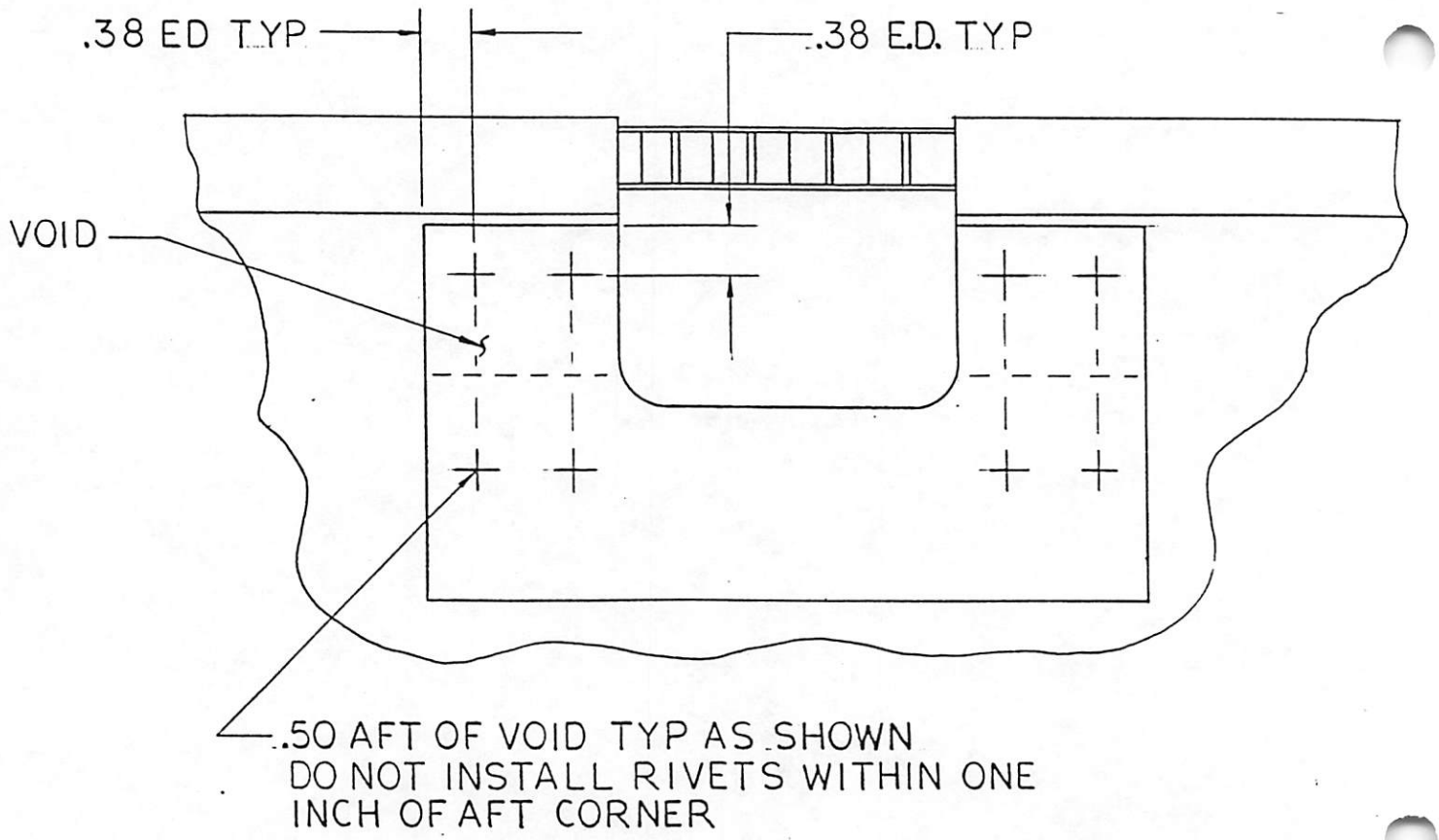
NOSE GEAR CUTOUT DOUBLER

DISCREPANCY: Voids at Nose gear cutout doubler.

Restriction: Does not apply to GA-7

Repair: Fill void with 2214 adhesive per GAPS 1041. Add 1604-04 rivets, as required, located as shown.

RIVETS ONLY REQUIRED IN VOIDED AREA



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AFT SPLICE PLATE EXTENSION

DISCREPANCY: Void between aft splice plate extension and fuselage W. L. 49. Flg.

Restriction: 1.Does not apply to GA-7 or AA-1 Series A/C
Limitation: 1.Maximum void of 30% of total bondline

REPAIR: Fill voids with Hysol 9316 or 9309 per GAPS 1041, install MS20470 AD4 rivets, (1) at .38 E. D.,(1) at .50 beyond void and equally spaced on 1.00 centers between. If void is between splice plate extension and side skin use MS20426AD3 or NAS1097-AD4 rivets.

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DORSAL FIN MISMATCH

DISCREPANCY: Dorsal fin bracket mislocated causing mismatch with vertical stabilizer

Restriction: Does not apply to GA7

Repair: Drill out all rivets thru brackets and relocate inboard as required for dorsal fin to match side skin of vertical stabilizer. Install B/P rivets as follows:

(1) at .50 below and in line with existing top hole and equally spaced each (2) remaining holes. Total number of rivets is same as B/P.

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WING ROOT ATTACHMENT

DISCREPANCY:
1. Wing root attach hole counterbored thru outer face sheet
2. AFT. wing root rivnut holes oversize, or mislocated

Restriction: Does not apply to GA-7

Repair:
1. Bond a 2024-T3 alum. doubler .025 thick 2" x 2" with Hysol 9316 or 9309 per GAPS 1041, fasten with (4) 1604-04 rivets, (1) each corner @ .38 E. D. (TYP). Locate top of doubler .03 below top of fairing flange.

2. Repair same as (1) except use MS20426AD3 rivets & install doubler on inside.

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LOWER FUSELAGE STIFFENERS

DISCREPANCY: Bent or crushed horizontal or vertical stiffeners (hat sections) in lower fuselage

Limitations: MRB Engineer signature required.

Repair: Fabricate a new section of stiffener from B. P. part 5.0'' long. Install dblr. ctrd. over damaged area. Bond per general notes and GAPS requirements. Rivet with 1601-04 rivets thru floor skin and 1604-04 rivets thru side skin. Rivets are to be ctrd on flanges: (1) .38 E. D. from ends and (3) equally spaced between.

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HONEYCOMB EXTRANEOUS HOLES

DISCREPANCY: Extraneous hole in honeycomb face sheet or air passage face sheet drilled thru.

LIMITATIONS:

1. Maximum diameter to be .25
2. Not within 2.00 from any edge, hole, fastener, splice, doubler or bond angle
3. Not within 6.00 of spar to fuselage attachment area
4. Not more than (4) repairs on any one honeycomb panel

REPAIR:

Crush back the honeycomb core only, thru the face sheet hole for approximately .12 all around past the edge of the hole.

Fill the cavity with room temperature or thermo-setting adhesive per general note 10 in this manual. The adhesive is to be finished smooth with the face sheet.

Prime reworked area with Type IE primer per GAPS 1057.

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DISCREPANCY: Tear or crack in honeycomb skin

Limitations:

1. Maximum crack to be .75 in length
2. Crack to be no closer than 2" from any edge, hole, fastener, splice, doubler or bond angle
3. Crack to be no closer than 6" from spar to fuselage attachment area
4. Not more than (2) major cracks per any (1) panel and separated by 6" of sound bond
5. Non-air passage surfaces only

REPAIR: Stop drill crack ends with #40 Drill and clean crack edges smooth. Vacuum debris from core. Fill cavity with - - - Adhesive per GAPS 1041 flush with top sheet

Add doubler centered on crack of 2024-T3 .020 x 2" x 2". Bond doubler per GAPS 1041. Insure .62 sound bond line all around crack. Rivet doubler with 1601-0410 rivets (4) equally spaced at .37 E. M. and not in line with crack

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NOSE LANDING GEAR TORQUE TUBE ASSY

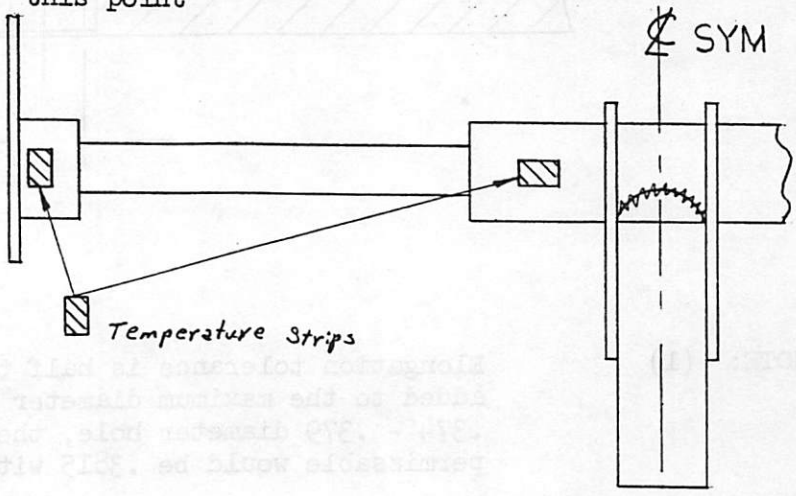
DISCREPANCY:

1. RH or LH attach brackets bonded at an angle, holes oversize
2. Oversize strut attach holes in yoke assy, nose strut located at an angle
3. Replacement of damaged bearing support brackets, holes oversize

Restrictions: Does not apply to GA-7

Repair:

1. Add temperature strips 450°F max to brackets and yoke in areas shown
2. Wrap with wet cold rags along full length of torque tubes
3. Apply torch to bracket or yoke bonded areas until heat temperature strips indicate temperature is approaching 450°F, at this point apply pressure until the bondline breaks and keep rotating, remove heat torch from assy @ this point



4. Salvage parts that meet DWG requirements
5. Clean parts and rebond per DWG REQTS

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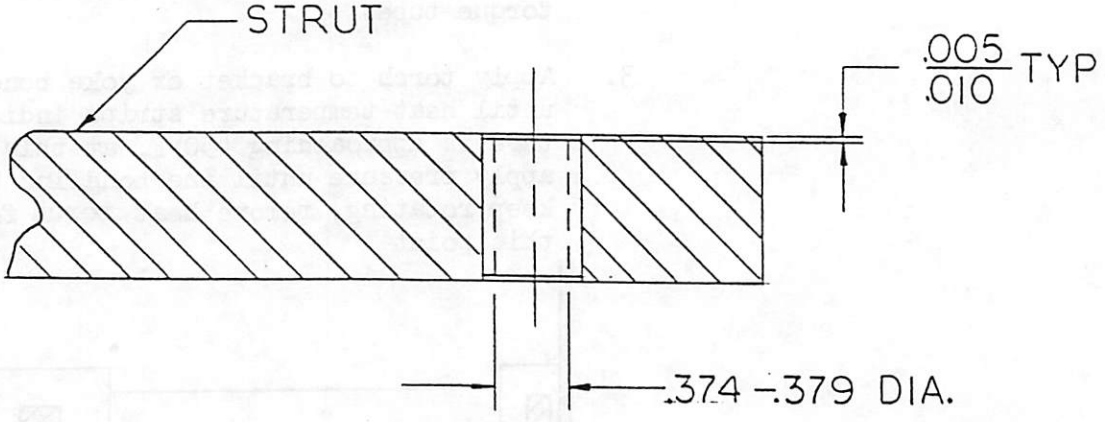
DISCREPANCY: Strut - Main landing gear - Holes are off location from checking fixture, elongated or oversized

Restriction: Does not apply to GA-7

Repair:

1. Improper location - Open the .374 - .379 diameter holes to .3815 inch diameter maximum

2. Elongated or oversized - Open .374 - .379 diameter holes that exceed drawing and Note (1) tolerances to .500 diameter install a bushing into the strut with .003 - .005 inch interference



NOTE: (1) Elongation tolerance is half the hole tolerance added to the maximum diameter of bolt hole i/e .374 - .379 diameter hole, the total elongation permissable would be .3815 without repair.

Bushing Material 6061 - T6

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DISCREPANCY: Main landing gear bracket holes are off location from checking fixture, elongated or oversized

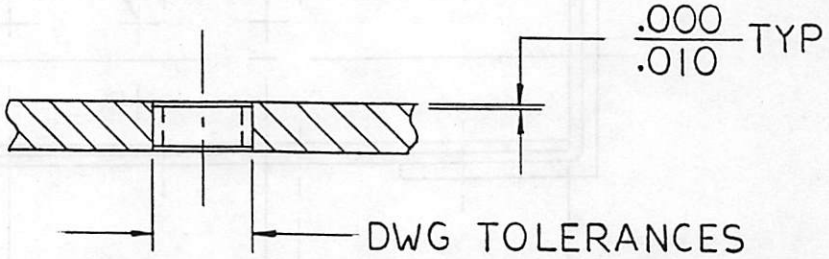
Restriction: Does not apply to GA-7

Repair:

1. Improper location - open holes to top drawing tolerances

2. Elongated or oversized

   a. Open .377 - .382 diameter holes that exceed drawing and Note (1) tolerances to .500 dia.
   b. Open .384 - .387 diameter holes that exceed drawing and Note (1) tolerances to .500 dia.
   c. Open .503 - .507 diameter holes that exceed drawing and Note (1) tolerances to .62 dia.
   d. Apply wet zinc chromate per GAPS 1057 (1C) and install bushing into bracket with .001 - .002 interference.



TYP SECTION

NOTE: 1. Elongation tolerance is half the hole tolerance added to the maximum diameter of bolt hole i/e .375 - .382 diameter hole, the total elongation permissible would be .3855 without repair.

Bushing Material 4130 Cond. D

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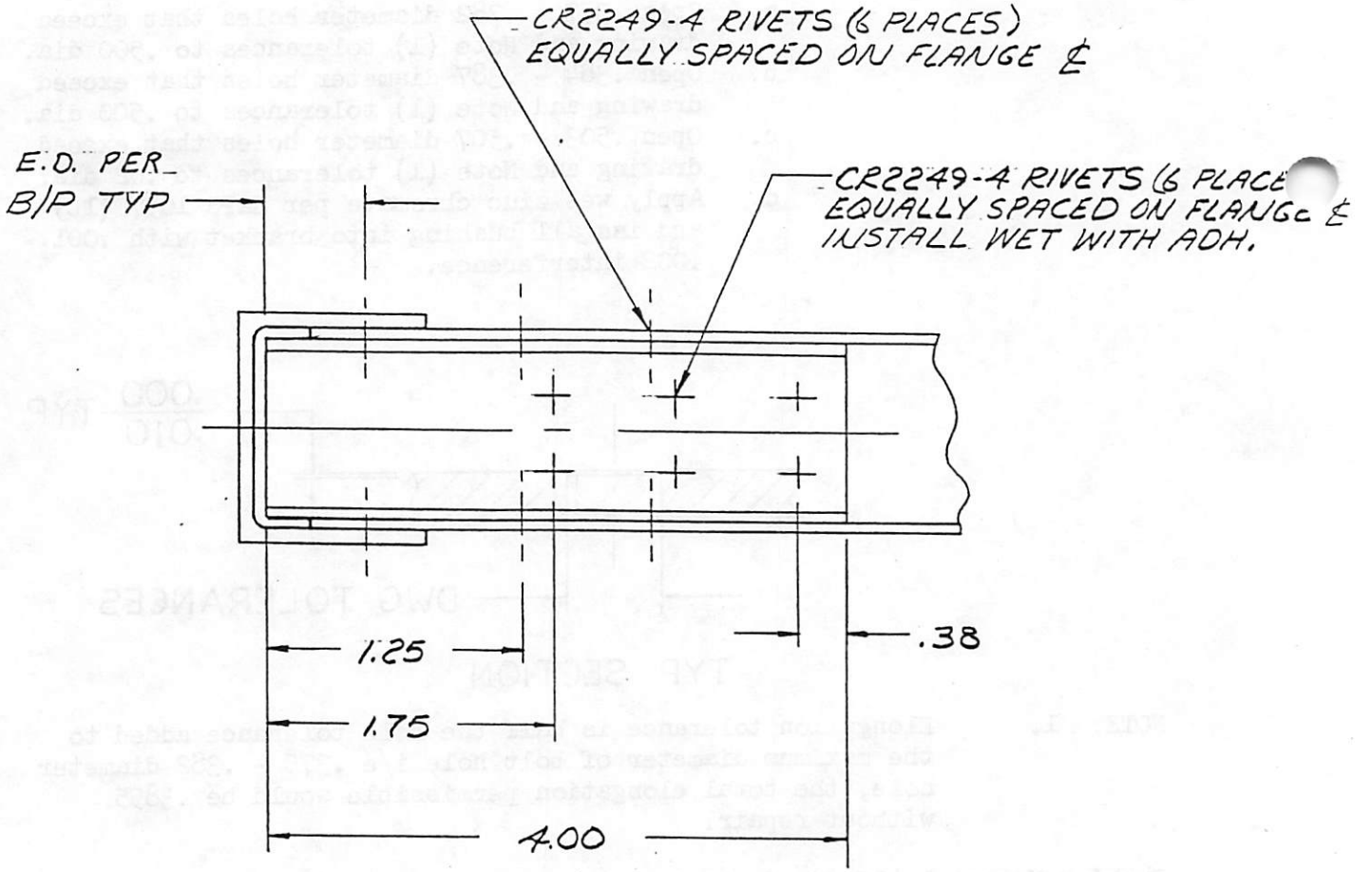
DISCREPANCY: S.E.D. on horizontal channel, FS 50.50 W. L. 49.0

Restrictions: Does not apply to GA7

Repair: Cut (2) angle dblrs from stock channel, install per sketch. Bond faying surfaces per general notes and GAPS REQMTS.



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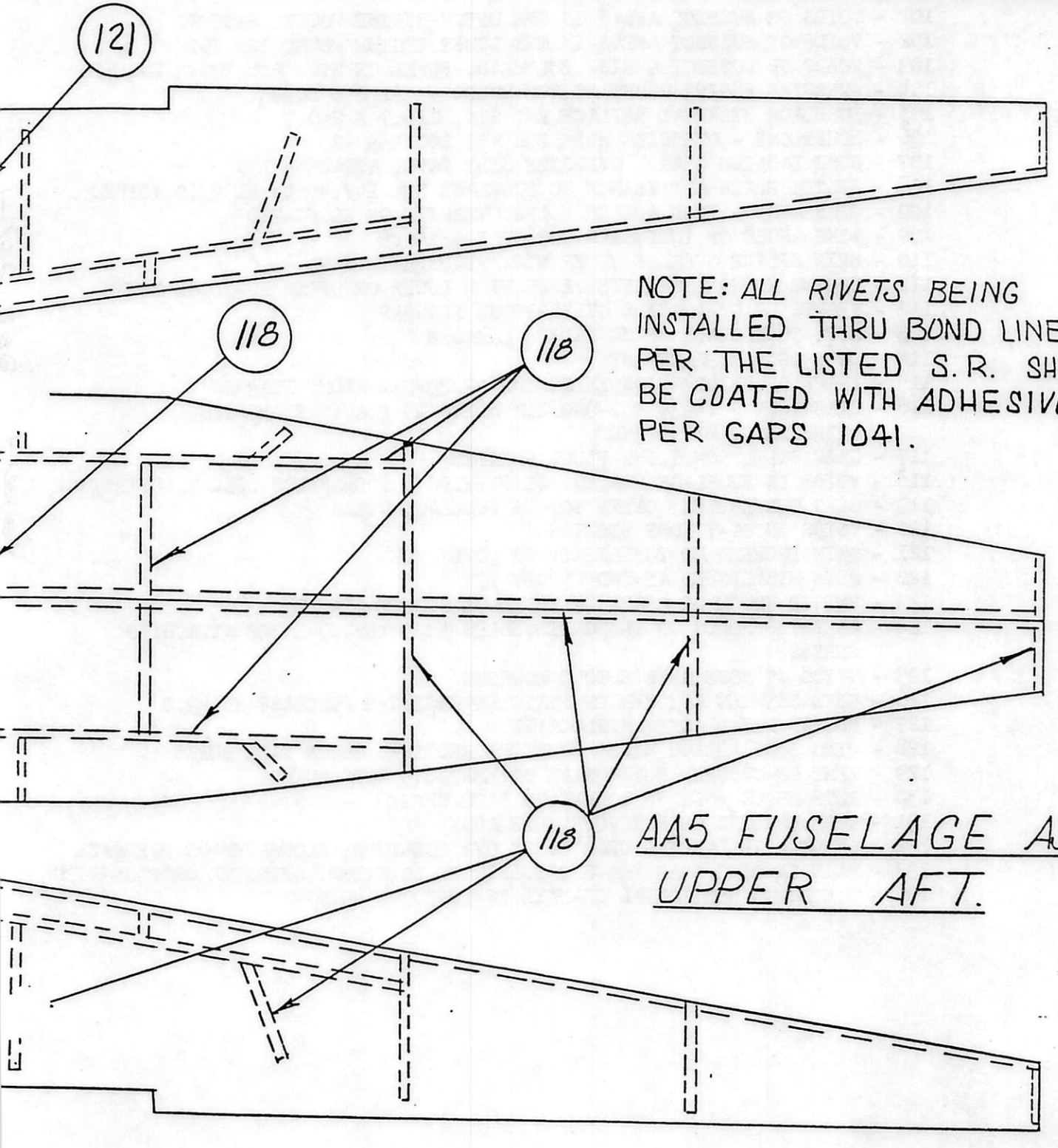

NOTE: ALL RIVETS BEING INSTALLED THRU BOND LINES PER THE LISTED S.R. SHALL BE COATED WITH ADHESIVE PER GAPS 1041.

AA5 FUSELAGE ASSY.
UPPER AFT.

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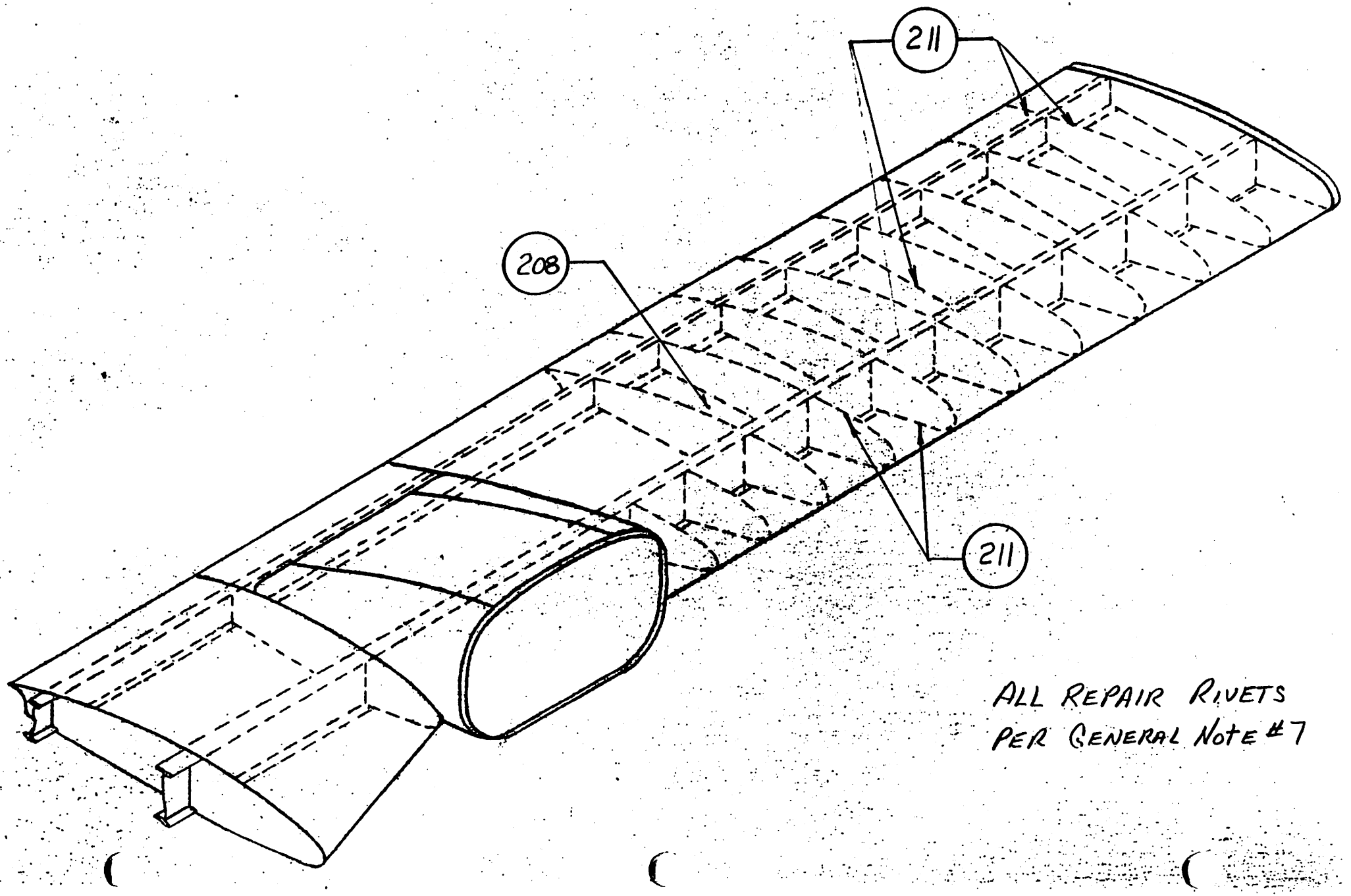
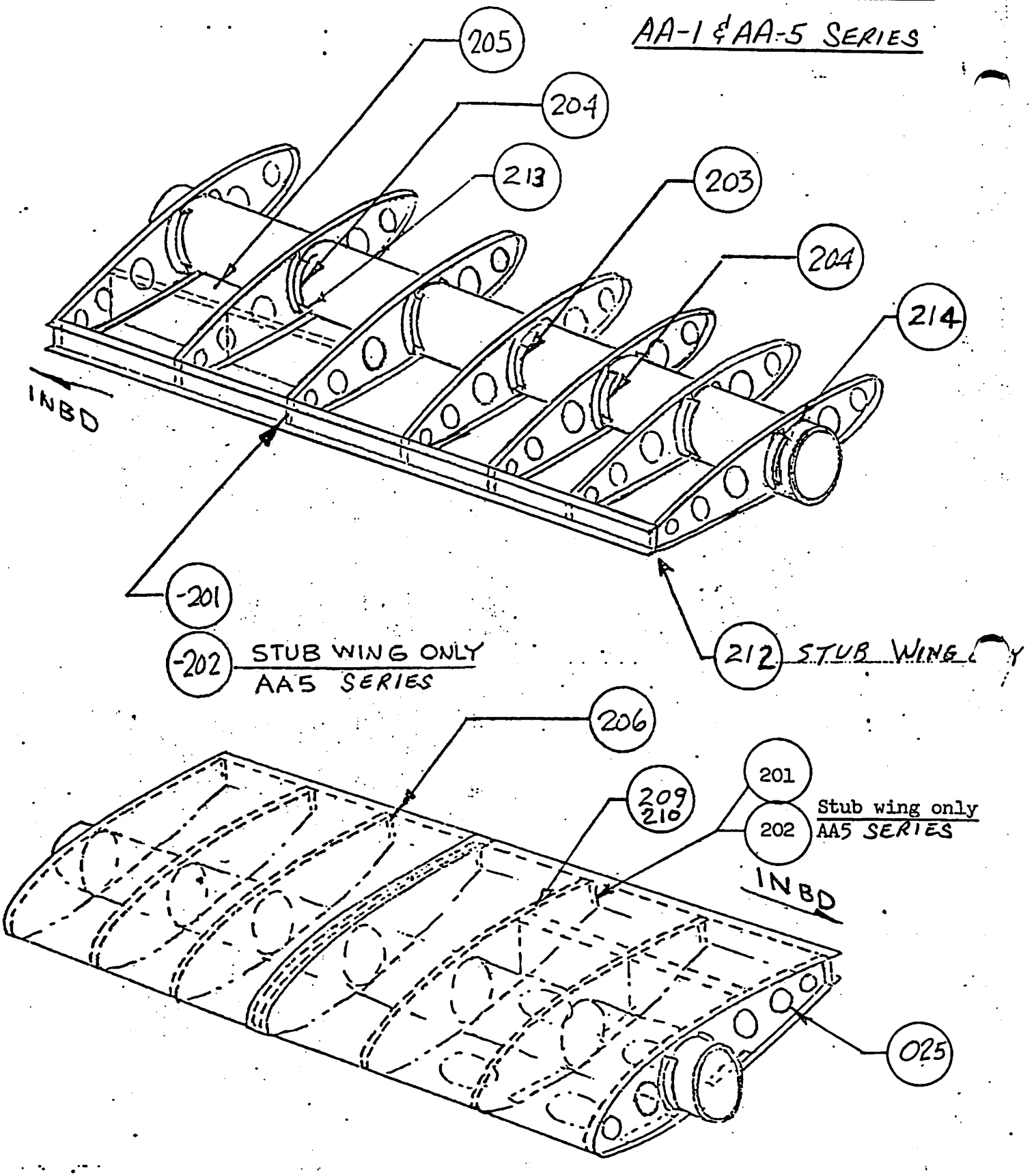
Wing Repair Index

GA-7 WING ILLUSTRATION



ALL REPAIR RIVETS
PER GENERAL NOTE #7

WING ILLUSTRATION
AA-1 & AA-5 SERIES



Note: All rivets being installed through bond lines per the listed S.R. must be coated all over with ADH per CAPS 1041 prior to installing (Ref. General Note #7).

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WING RIB TAB TO REAR SPAR (AA-1 SERIES)

DISCREPANCY:

A. Thru voids

B. Out of tolerance or unknown temperatures

C. Burned appearance of adhesive

D. Soft adhesive

E. Cracked bond line

F. Voids after wing skinning bond cycle

Restrictions: Does not apply to GA 7 or AA-5 series A/C

Repairs:

-Repair discrepancy A per repair 1 or 2

-Repair discrepancies B, C or D per repair 1 or 2, rivet pattern only

-Repair discrepancy E per repair 1 or 2

-Repair discrepancy F per repair 1 or 2 except use room temperature curing adhesive per GAPS 1041 & General Notes.

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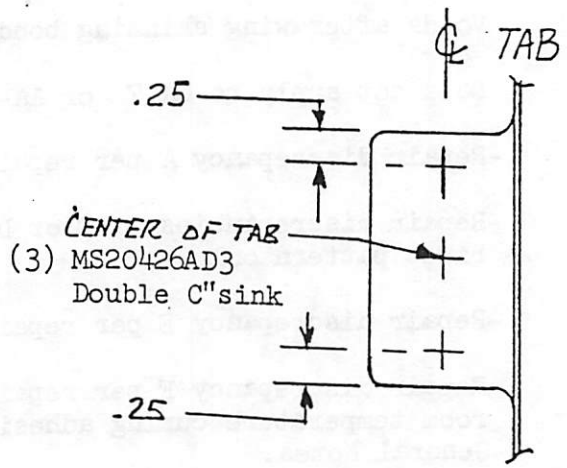
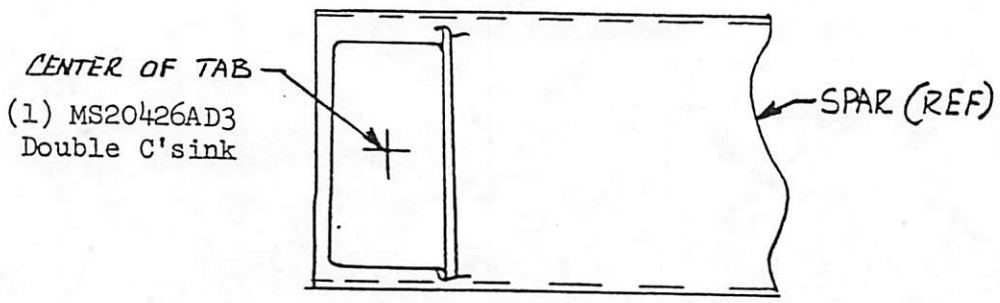
REPAIR: 1) Ribs #2 thru #6
Fill the void with 2214 adhesive per GAPS 1041 & General Notes, Rivet per sketch below:



2) Ribs #1 and #7
fill the voids with 2214 adhesive per GAPS 1041 & General Notes. Rivet per sketch below:



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WING RIB TAB TO REAR SPAR (AA-5 Series)

DISCREPANCY:

A. Thru voids

B. Out of tolerance or unknown temperature

C. Burned appearance of adhesive

D. Soft adhesive

E. Cracked bond line

F. Voids after wing skinning bond cycle

Restriction: Does not apply to GA-7 or to AA-1 Series A/C.

Repairs:

-Repair discrepancy A per repair 1 or 2

-Repair discrepancy B, C or D per repair 1 or 2, rivet pattern only

-Repair discrepancy E per repair 1 or 2

-Repair discrepancy F per repair 1 or 2 except use room temperature curing adhesive per GAPS 1041 & General Notes.

NOTE: In fuel bay area - Install rivets in wet adhesive and overcoat with adhesive to cure.

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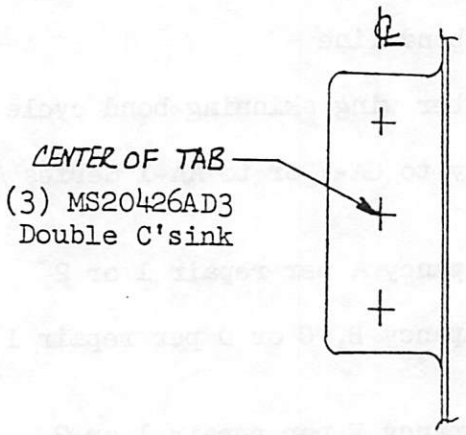
Repair:

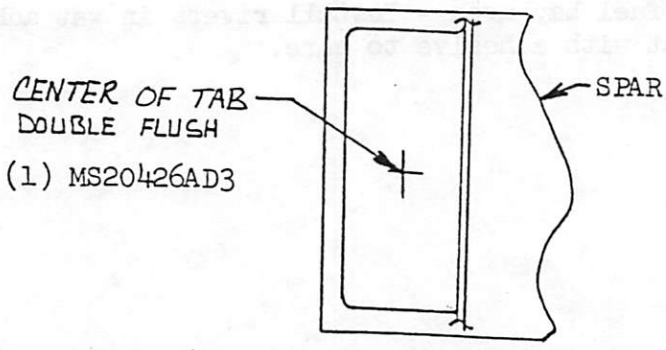
1. Inboard wing, ribs #2 thru #7 and outboard wing, ribs #2, #3.

   Fill the void with 2214 adhesive per GAPS 1041 & General Notes. Rivet per sketch below.



2. Inboard wing, ribs #1, #8 and outboard wing, ribs #1, #4.

   Fill the voids with 2214 adhesive per GAPS 1041 & General Notes. Rivet per sketch.



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WING RIB TO COLLAR

DICREPANCY:

A. Voids and excessive bond line thickness

B. Out of tolerance or unknown temperature

C. Burned appearance of adhesive

D. Soft adhesive

Restrictions: Does not apply to GA-7

Repairs: Repair discrepancy A per repair (1) or (2)

Repair discrepancies B, C or D; add additional collar per S/R 204 repair 1.

Repair: (1.) For voids in an area up to and including 1.25 inches from the end of the collar.

a. Fill the void with 2214 adhesive per GAPS 1041.
b. Install one (1) CR-2249-4-2 rivet.

(2.) For voids in the center area of the collar.

a. Fill the voids with 2214 adhesive per GAPS 1041.
b. Install CR-2249-4-2 rivets as follows:

Void Size	No. of Rivets	Spacing
Up to 1.00 in.	1	Void center
1.00 to 4.00 in.	3	Void center and .30 inches either side of void
4.00 to 6.00	4	Fasten using same rivet pattern as

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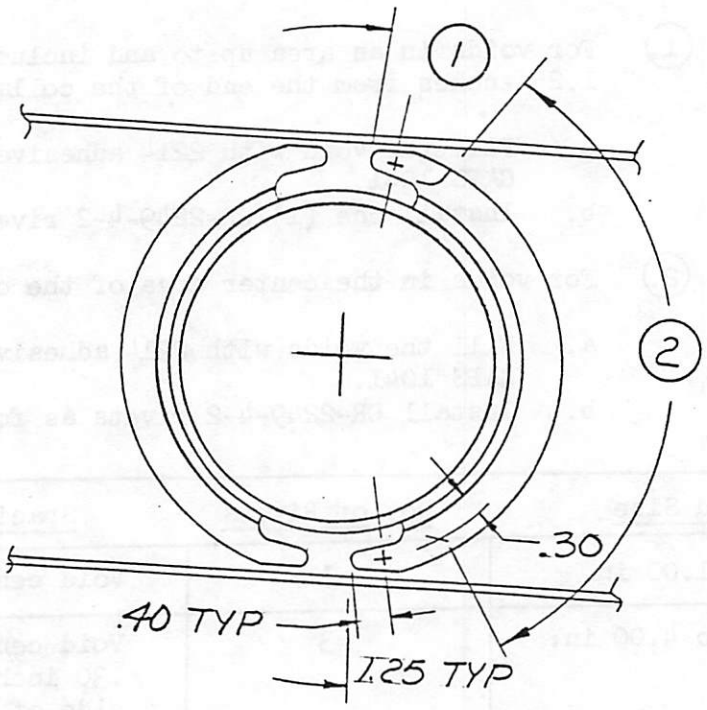
CR-2249-4-2
Rivet

① & ② Repair Areas - Refer to page 1.



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WING SPAR TO COLLAR

DISCREPANCY:

A. Void exceeds .12 width or 1/3 of the total collar to spar bond joint.

B. Void exceeds .50 TYP as shown, collar to spar.

C. Excessive bond line thickness exists at end of collar (over .040).

D. It does not appear feasible to fill complete void area with paste.

E. Out of tolerance or unknown temperatures.

F. Burned appearance of adhesive.

G. Soft adhesive.

Restrictions: Does not apply to GA-7.

Repairs: For discrepancy A thru G, use repair 1 or 2.

1. Voids or excessive thickness not in fuel bay. Bond an additional collar to the wing spar and rib with 2214 paste adhesive per GAPS 1041 and fasten with 4 rivets as shown.

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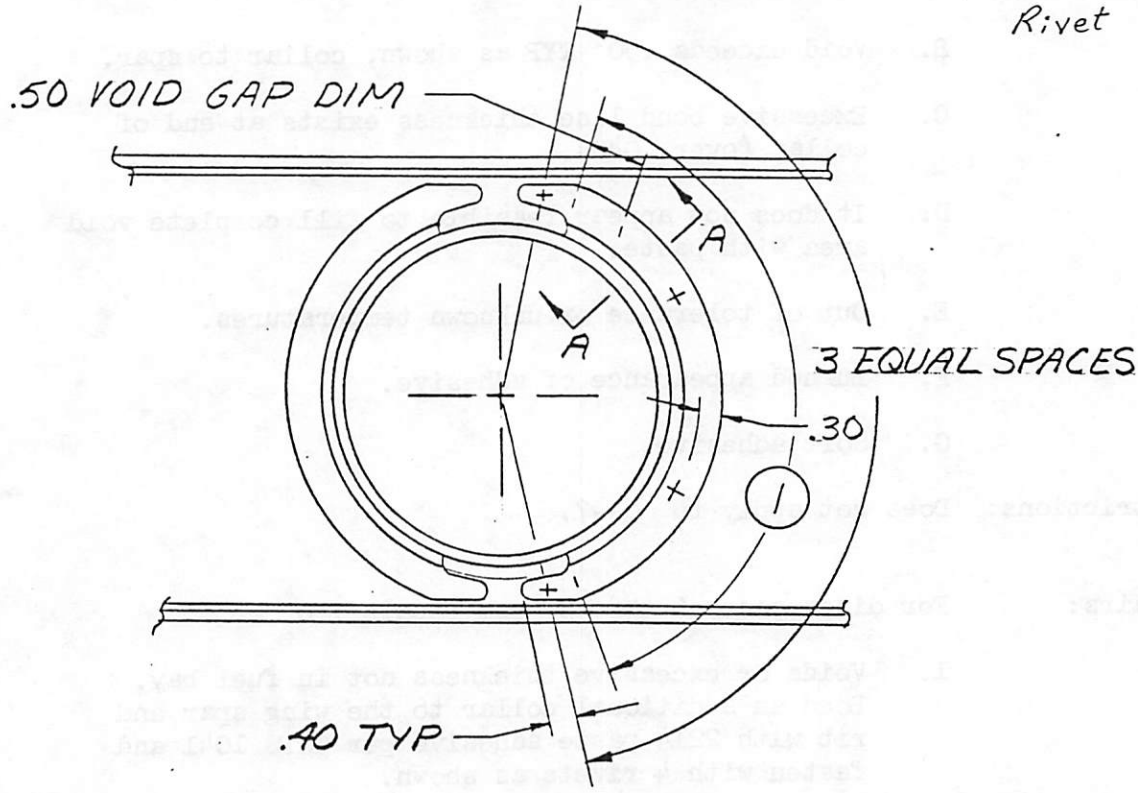
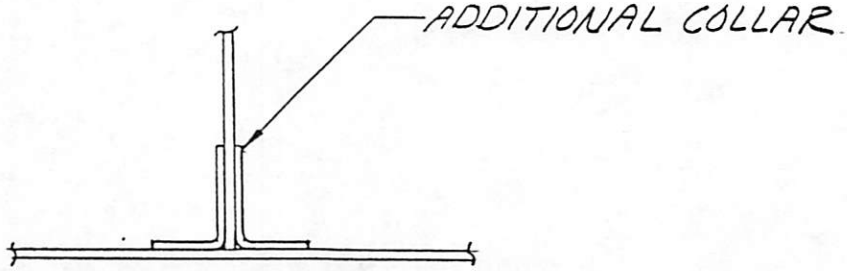
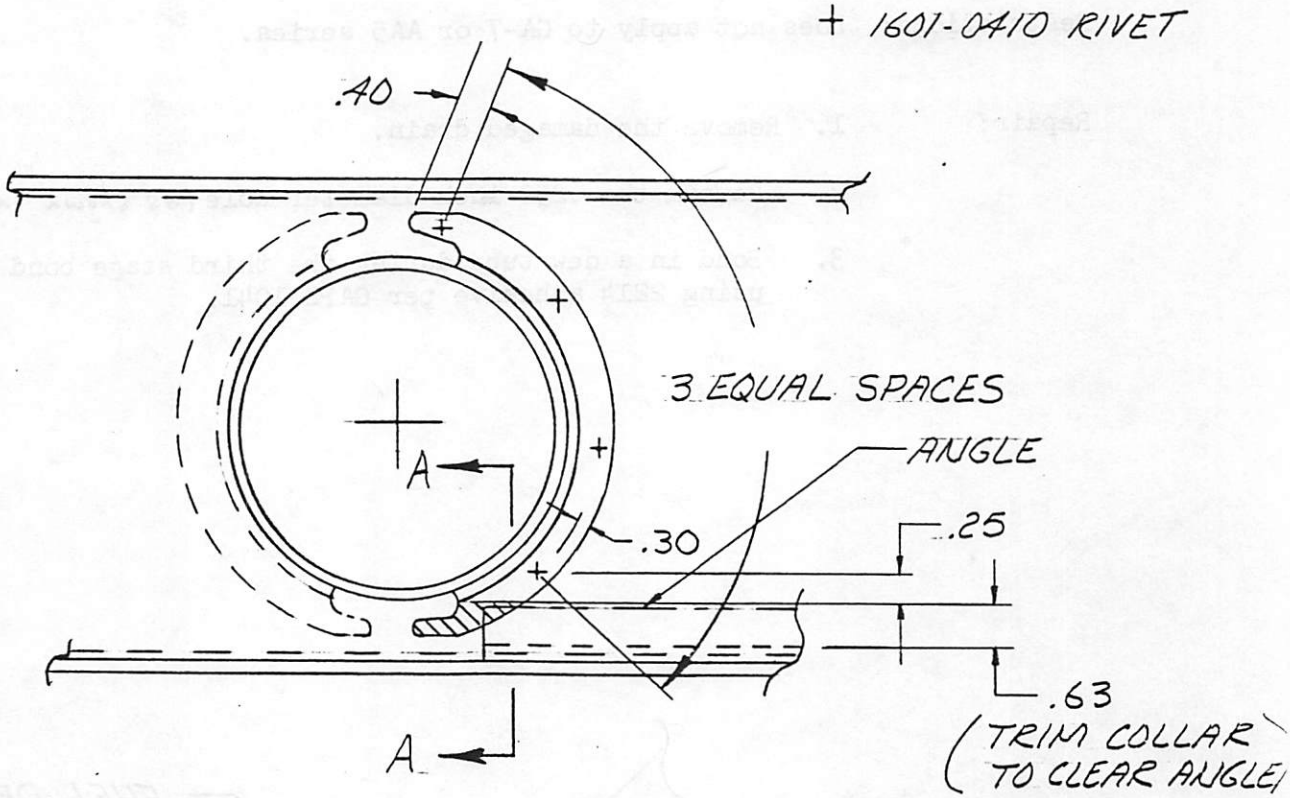
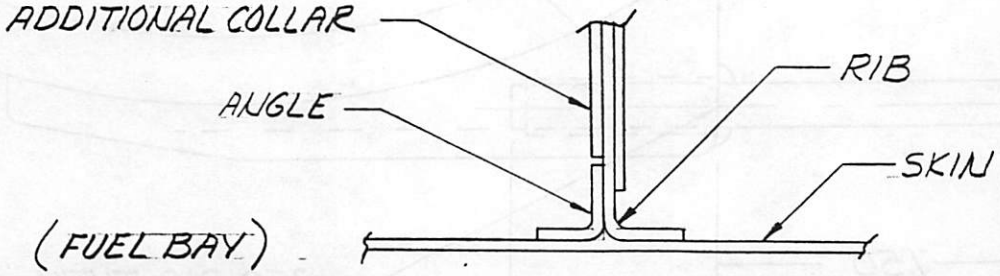




SECTION A-A
ROTATED 45°

2. Voids between the wing spar and collar in the fuel bay shall be repaired same as (1) except as shown.





SECTION A-A

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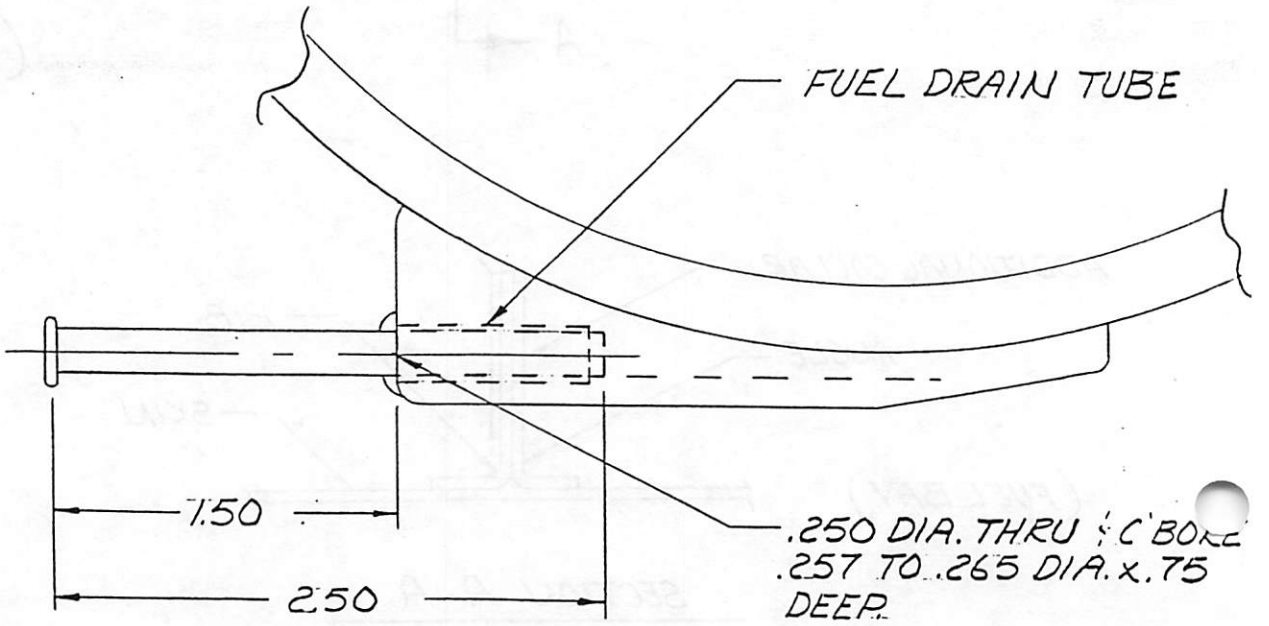
FUEL DRAIN

DISCREPANCY: Damaged fuel drain tube

Restrictions: Does not apply to GA-7 or AA5 series.

Repair:

1. Remove the damaged drain.
2. Rework the .250 inch diameter hole (as shown in sketch).
3. Bond in a new tube during the third stage bond cycle using 2214 adhesive per GAPS 1041.



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WING RIBS TO REAR SPAR MISALIGMENT

DISCREPANCY: Voids at intersection of wing ribs and rear spar due to misalignment of flanges

Restriction: Does not apply to GA-7

Repair: 1. 2. 3.

Fill void with paste adhesive perGAPS 1041, working in adhesive to full void depth. Void size must be within maximum limits illustrated on Page 2.

2. Void at rib flange

   a. Inboard locations - install 1604-0412 rivet (alternate - MS20426AD3 rivet) in rib flange center, 1.38 from T. E. of spar. For AA-1 Series center rib skin splice, install two (2) rivets at .25 edge margin (not shown).

   b. End rib location - install MS20426AD3 rivet as in "a". Rivet to be double c'sunk at wing tip.

3. Void at spar - install MS20426AD3 rivet at .38 edge margin

   a. Inboard rib locations - rivet to be on center line rib flange. Install two (2) rivets at .25 skin edge margin, AA-1 series center (not shown).

   b. End rib locations - rivet to be 1.00 from spar end.

2. 3. Fill over external flush rivet heads with aerodynamic smoother per GAPS 1010 as required for appearance.

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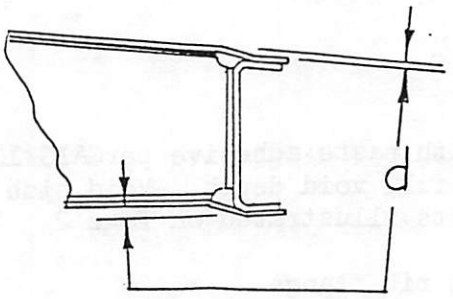
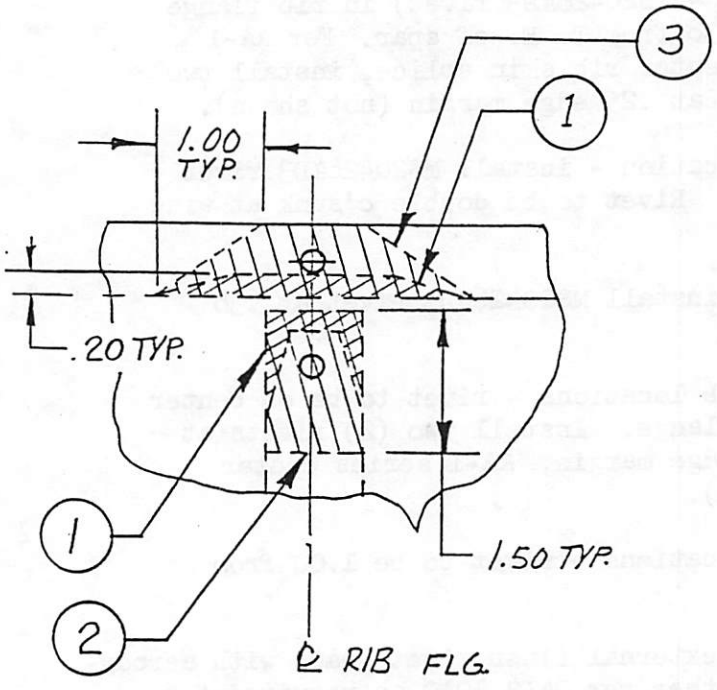
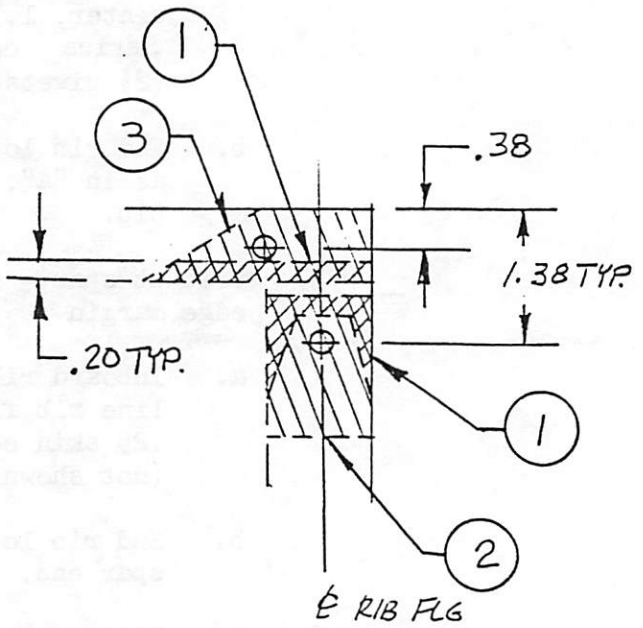
(1) d LESS THAN .030

(2) (3) d LESS THAN .120





INBD RIBS



END RIBS

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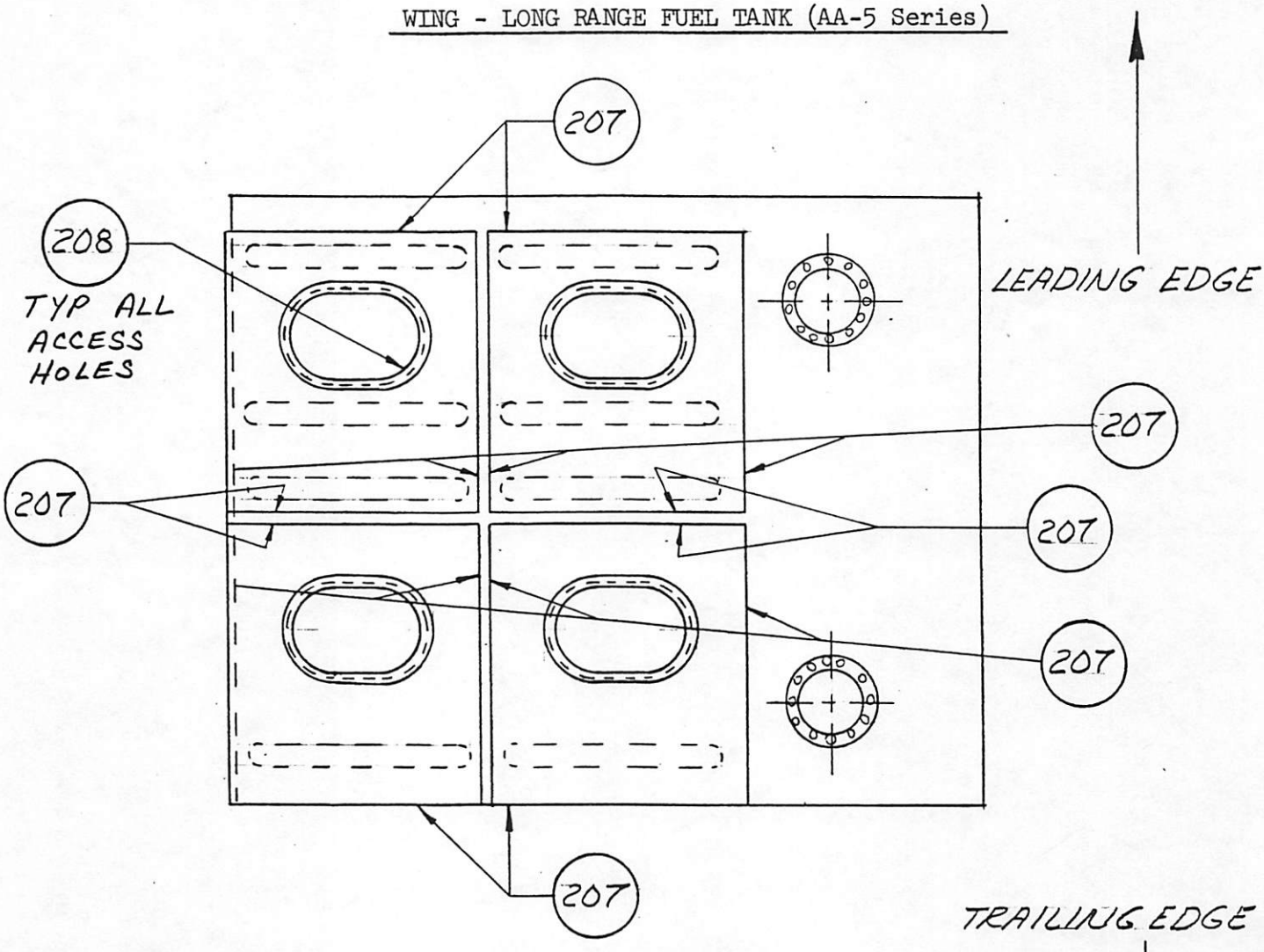
WING - LONG RANGE FUEL TANK (AA-5 Series)



Skin assy. - Inboard wing
inside bottom view
#5201007 AA5B
#5201007 AA5A OPT WING
(Reference)

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DOUBLERS TO SKIN - EDGES

DISCREPANCY: Void along INBD and / or OUTBD edges of fuel bay doublers.

Restriction: Does not apply to GA7 or AA-1 series.
LIMITATION: Maximum gap .060

Repair:

1. For voids any length to a maximum depth of .25 or 1.00 depth x 1.00 maximum length fill with thermosetting paste adhesive per GAPS 1041.

2. For void any length with depth greater than .25 over 1.00 long, fill with thermosetting paste adhesive per GAPS 1041 and fasten with MS20426AD3 rivets using .38 TYP E/M EOP or .50 beyond void. Double flush rivets in bond line area. Quantity in void required per table.

Void length	Rivet Quantity Equally Spaced
2.00 or less	1
2.00 to 4.00	2
4.00 to 6.00	3
6.00 to 8.00	4
8.00 or more	Every 2.00

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DOUBLERS TO SKIN - ACCESS HOLES

DISCREPANCY: Voids between doublers and outer skin at access holes,

LIMITATIONS : Maximum gap .060

Restriction: Does not apply to AA-1

Repair:

1. For voids of any length to a maximum depth of .25, fill with thermosetting adhesive paste per GAPS 1041.

2. For voids of any length with a depth greater than .25, fill with thermosetting adhesive paste per GAPS 1041 and fasten with MS20426AD3 rivets, using one each at .50 E/M beyond void and all at .38 E/M constant from edge of skin. Quantity in void required for equal spaces between rivets see table.

Void Length	Rivet Quantity Equally Spaced
2.00 or less	1
2.00 to 4.00	2
4.00 to 6.00	3
6.00 to 8.00	4
8.00 or more	Every 2.00

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WING SKIN TO RIBS OR REAR SPAR

DISCREPANCY: Bond voids between wing skin and ribs, rear spar, or backup angles.

RESTRICTION: Does not apply to GA-7

LIMITATIONS:
1. Maximum thru void length is not to exceed 25% of the total continuous bond line.
2. Maximum non thru void length is not to exceed 35% of the total continuous bond line.
3. Maximum gap is not to exceed .100 inch at ribs and angles, and .060 at the rear spar.

REPAIR:
1. For non thru edge voids, not exceeding 15% of the total bond line width, fill with Type I fuel tank sealant per GAPS 1163. NO RIVETS REQUIRED.
2. Fill all other voids with adhesive per GAPS 1041 and the General Notes of this manual, and install rivets as follows:
3. For voids 3.00 inches long, or less, No rivets are required if;
   A) There is a minimum of 10.00 inches of non voided bond line to the next nearest void or part end and
   B) The gap is .030 or less.
4. For voids not covered by (1) or (3) above;
   A) Install rivets per General Notes on 2.00 centers (Maximum) with end rivets at .50 inch beyond void. When void is at the part end - Start rivet spacing at .38 E.D. thru the flange. Do not install any rivets within 2.00 inches either side of main spar centerline.
   B) Use MS20426AD3 or NAS 1097AD4 rivets. 1604-04 (Avex) rivets may be used in all areas not in fuel bay.
   C) All rivets are to be installed wet with adhesive and on bonded flange centerline.
   D) Smooth over all rivet heads with aerodynamic filler per GAPS 1010..

NOTE: After wing has been repaired with adhesive, it may be sealed in accordance with GAPS 1163 requirements and pressure tested without the adhesive being fully cured. The only requirement for pressure checking is that the fuel tank sealant must be cured per GAPS 1163.

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WING SKINS TO RIBS

DISCREPANCY: Voids between wing skins and ribs

Restriction: Does not apply to AA-1 or AA-5 Series
Does not apply to Spar Caps

Limitations:
1. Maximum length of thru voids is 20% of the total continuous bondline in the fuel bay areas.
2. Maximum length of all other bondlines is 30% of total bondline.
3. Maximum GAP is .040.

REPAIR;
1. Voids between skin and ribs in the fuel bay area, thru voids. Fill voids with adhesive per General Note 10 & GAPS requirements, Install MS20426AD3 or NAS1097AD4 rivets on 1.00 centers to extend .50 min. beyond voids each end.

2. Voids in areas other than fuel bay, thru voids. Fill voids per General Note 10 & GAPS 1041 requirements, Install MS20426AD3 or 1604-04 rivets on 1.50 centers to extend .50 min. beyond void each end.

Note; When void is at a part end, Start at .38 E.D. thru the flange. Smooth over all rivet heads with aerodydamic filler per GAPS 1010.

3. Repair for non-thru voids, Fuel bay & non fuel bay. Voids that do not exceed 15% of the bondline width may be filled with fuel bay sealant per GAPS 1163 Type I , No rivets required. Voids whose width does exceed 15% will be repaired per (1) or (2) above.

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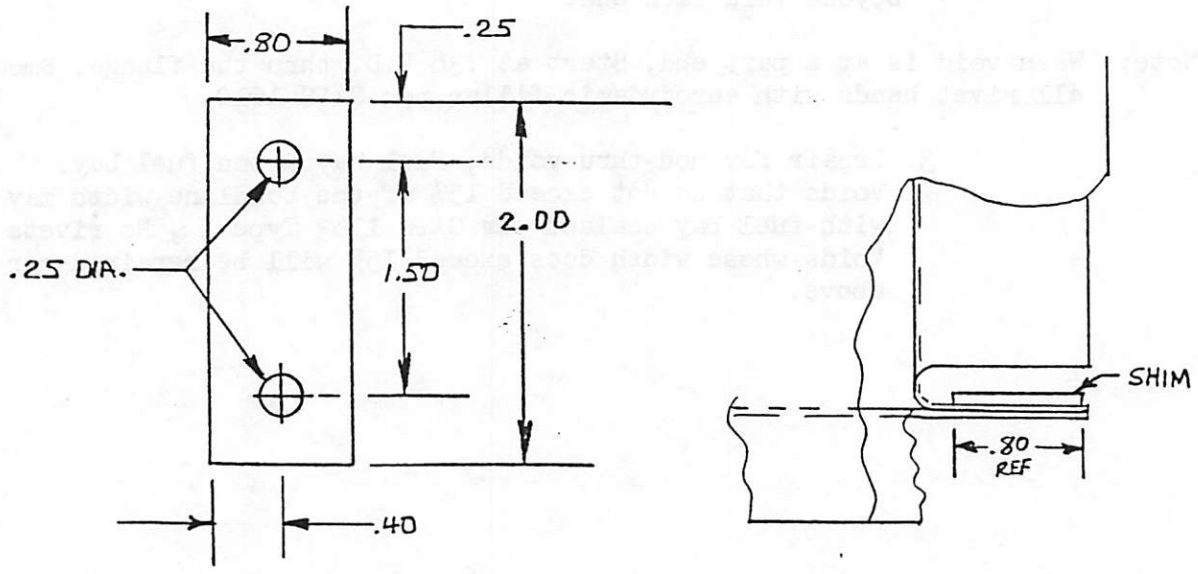
WING REAR SPAR MISMATCH

DISCREPANCY: Wing rear spar on stub wing panel mismatches FWD or AFT to main wing rear spar

Restriction: Does not apply to GA-7 or AA-1 series A/C.

LIMITATION: Maximum mismatch .060

Repair: Fabricate and install a shim to provide a smooth surface at the FWD face of the rear spar. Make the shim from 2024-T3 material x .80 wide x 2.00 long. Drill .25 dia. clearance holes to pick up the two spar splice bolts. Use a shim thickness as required.



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WING RIB TO COLLAR

DISCREPANCY: Wing spar to rib collar overlapping the spar doublers, or cracked collar

Restrictions: Does not apply to GA-7

Repair: Fill the void resulting from the overlap with thermo-setting adhesive per GAPS 1041. Add an additional collar on the opposite side of the rib per S.R. 204. Do not attempt to cut off the overlapping portion of the collar as damage to the spar may result.

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WING RIB TOUCHING TUBE SPAR

DISCREPANCY: Wing rib-spar cutout touching outside diameter of spar

Restriction: Does not apply to GA-7

Repair: Polish wing ribs using #320 cloth to obtain .03 to .06 clearance between spar and rib. Maintain smooth surface and avoid sharp edges. Use caution to avoid scratching the spar. This repair is applicable to all wing ribs including fuel tank bays. Any bond between the rib and spar is to be removed and clearance as above provided, except in fuel bay end ribs.

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FUEL SCUPPER

DISCREPANCY: Voids or lack of pressure between scupper and skin,

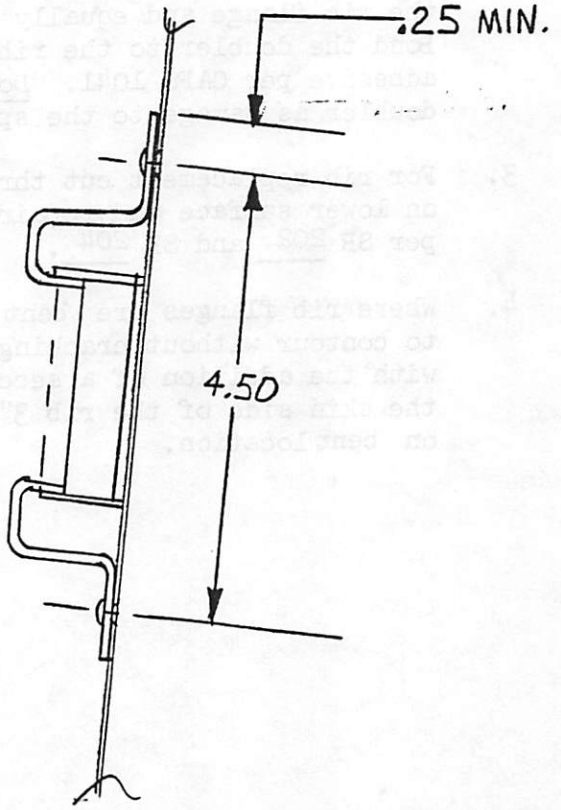
Restrictions: Does not apply to GA-7 or AA-1 series A/C.

LIMITATION: Maximum gap .060

Repair:

1. Fill the void, maximum length of 1.00 thru, with thermosetting paste adhesive per GAPS 1041.

2. For lack of pressure or suspect area and voids longer than 1.00, fill with thermosetting adhesive paste per GAPS 1041 and fasten with (6) MS20426AD3 rivets at 4.50 bolt circle diameter at 6 equal spaces.



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WING RIB FLANGE OR REPLACEMENT

DISCREPANCY: Wing rib cracked or bent at flange, adjacent to spar cutout, also for rib replacement

Restrictions: Does not apply to GA-7

Repair:

1. Where crack is halfway or less thru rib flange, stop drill end of crack #30 drill and add repair doubler per Item 2.

2. Where crack is over halfway thru rib flange, cut thru and smooth edges providing .00 to .03 end gap.

   Fabricate a doubler of 2024-T3 alum. .025 x .87 wide x 3" long. Add the doubler to the inside of the rib flange and equally spaced over the rib cut. Bond the doubler to the rib with thermosetting adhesive per GAPS 1041. Do Not drill or rivet the doubler as damage to the spar may result.

3. For rib replacement cut thru rib at spar cutout on lower surface and repair per Item 2 and fasten per SR 202 and SR 204.

4. Where rib flanges are bent and can be straightened to contour without cracking they are acceptable with the addition of a second layer of tape on the skin side of the rib 3" long centrally spaced on bent location.

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AILERON BALANCE WEIGHT ATTACH HOLES

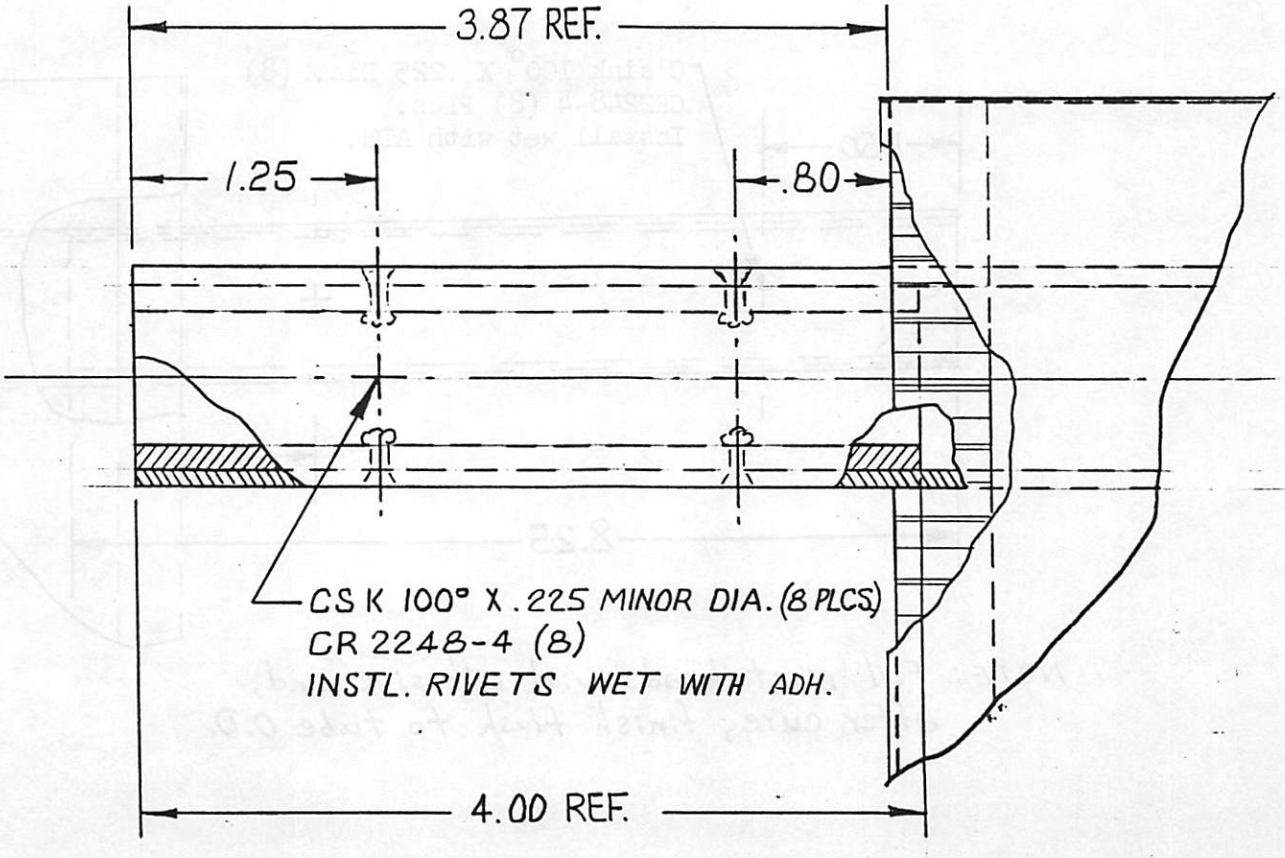
DISCREPANCY: Balance weight attach holes oversize, mislocated, or elongated.

RESTRICTION: Does not apply to GA-7 or AA-1 series.

REPAIR: Manufacture a tube insert from 6061-T6 alum. to the following dimensions: 1.00 dia. X .125 wall X 4.00 long. Machine O.D. to .945 to .948.

Insert tube into outboard end of aileron torque tube & Bond per General Notes & GAPS requirements.

Rivet per sketch & redrill per Drawing requirements. Omit B/P spacers



NOTE: Fill rivet heads with adhesive and, after cure, finish flush to tube O.D.

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AILERON BALANCE WEIGHT ATTACH HOLES

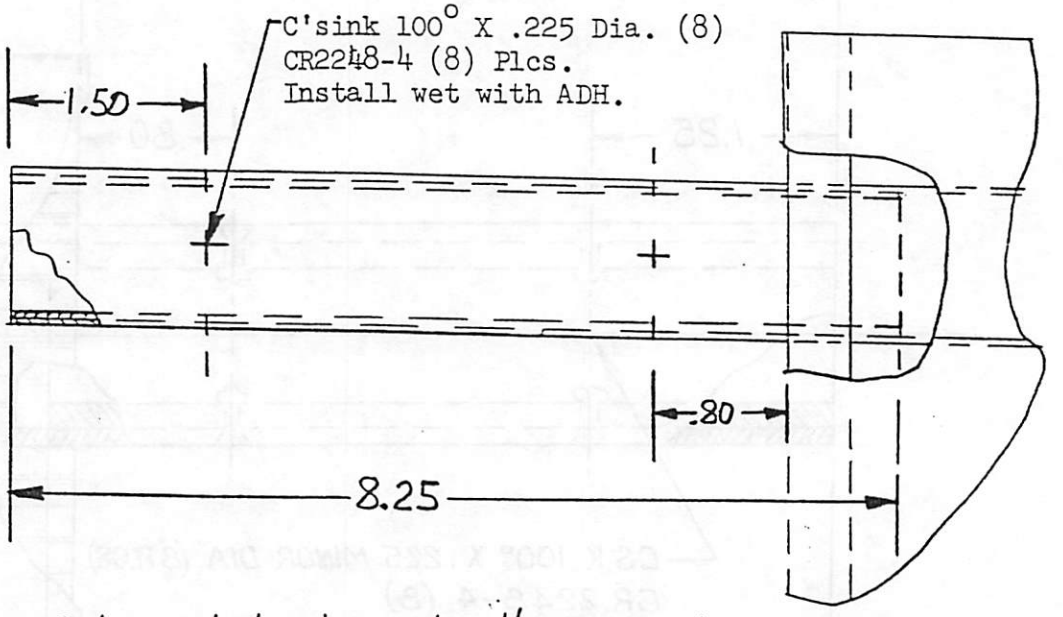
DISCREPANCY: Balance weight attach holes oversize, mislocated, or elongated.

RESTRICTION: Does not apply to GA-7 or AA-5 series.

REPAIR: Manufacture a tube insert from 6061-T6 alum. to the following dimensions: 1.00 dia. X .125 wall X 8.25 long. Machine O.D. to .945 to .948.

Insert tube into outboard end of torque tube , Bond per General Notes & GAPS requirements.

Rivet per sketch & redrill attach holes per drawing requirements for bolt size, Omit B/P spacers.



NOTE: Fill rivet heads with adhesive and, after cure, finish flush to tube O.D.

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AILERON ATTACH HOLES IN TORQUE TUBE

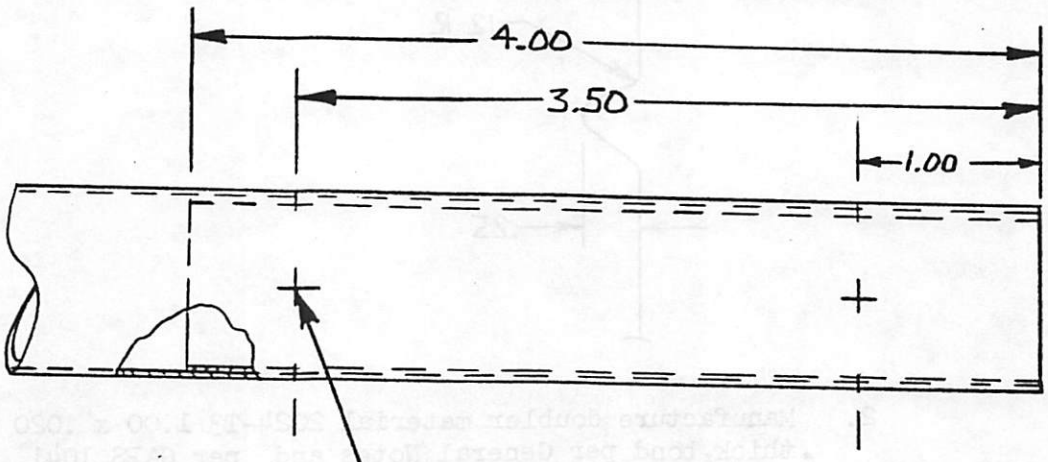
DISCREPANCY: Horn assy attach holes oversize, mislocated, or elongated

RESTRICTION: Does not apply to GA-7

REPAIR: Manufacture a tube insert from 6061-T6 alum. to the following diminsions: .75 Dia. X .125 wall X 4.00 Long.

Insert tube into torque tube (inbd end) & bond per General Notes & GAPS requirements.

Rivet per sketch & redrill per drawing.



C'sink 100° X .225 Minor Dia. (8) plcs.
CR2248-4 (8) Install wet with Adh.

(For Alternate repair see SR 032)

NOTE: Fill rivet heads with adhesive and, after cure, finish flush to tube O.D.

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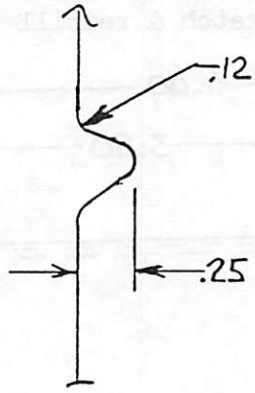
AILERON ASSY RH OR LH

DISCREPANCY: Inboard trailing edge or outboard trailing edge (skin cut or damaged)

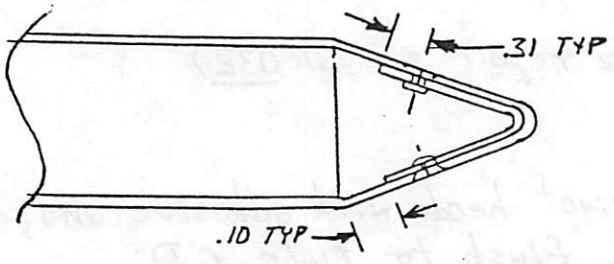
Restriction: Does not apply to GA-7 or AA-1 Series

Repair:

1. Polish and trim to remove cut skin and transition .25 beyond same maximum depth .25



2. Manufacture doubler material 2024-T3 1.00 x .020 thick, bond per General Notes and per GAPS 1041, fasten with (2) 1604-0412 rivets using .5 E/M



3. Damaged inboard and outboard trailing edges; straighten to drawing requirements if skin cracks rework per repair (1) and (2)

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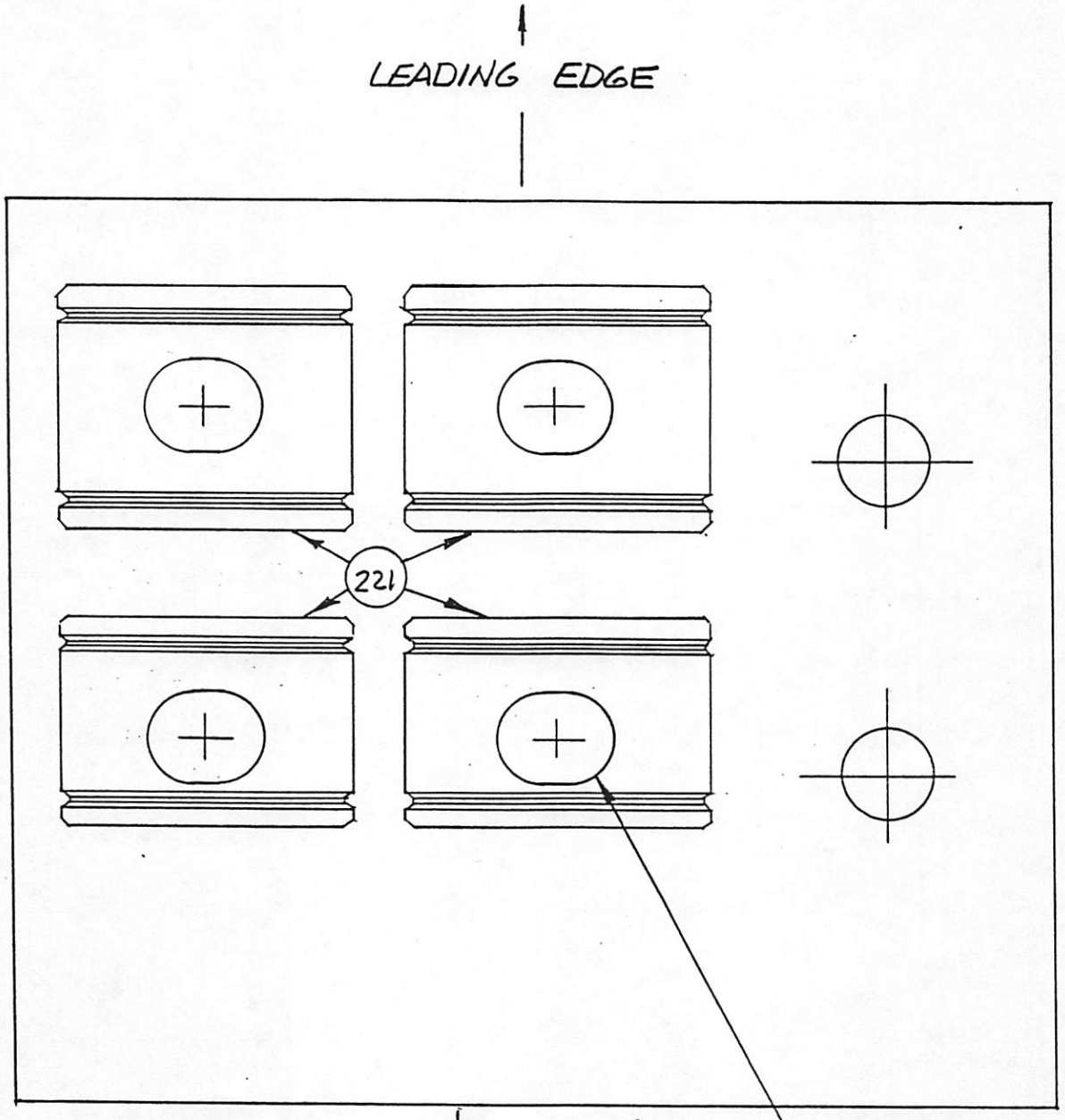
AA-5 SHORT RANGE WING



PANEL ASSY WING

INSIDE BOTTOM VIEW

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DOUBLER TO SKIN EDGE VOIDS

DISCREPANCY: Voids at leading edges and trailing edges of doublers.

Restriction: Does not apply to GA-7 or AA-1 Series

Limitation: 1. Maximum gap to be .040

Repair:

1. For voids of any length to a maximum depth of .25, fill with thermosetting adhesive paste per GAPS 1041

2. For voids of any length with a depth greater than .25, fill with thermosetting adhesive paste per GAPS 1041 and fasten with MS20426AD3 rivets using .38 E/M TYP EOP & .50 E/M beyond void. Quantity required in void per table.

Void Length	Rivet Quantity Equally Spaced
2.00 or less	1
2.00 to 4.00	2
4.00 to 6.00	3
6.00 to 8.00	4
8.00 or more	Every 2.00

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FUEL BAY DOUBLER BEADS

DISCREPANCY: Dents in skin doubler beads, fuel bay - wing

Restriction: Does not apply to GA 7 or AA 1 Series A/C

Repairs:

1. Minor dents which are smooth and without a crease or sharp edge and with a maximum length of .50 and a maximum deformation depth of .060 may be used without repair

2. Large dents over .50 in length and to a maximum length of 1.50 which are sharp edge creased or cracked are to be repaired as follows:

   Stop drilleach end of the crease or crack #30 drill and fabricate a nesting beaded doubler, made from blueprint prod. doubler and install over the damaged bead. Apply 2214 adhesive per GAPS 1041 to the faying surfaces. Rivet with MS20426AD3 rivets as shown. After oven cure, overcoat repair with sealant per GAPS 1163.

   The doublers directly adjacent to the spar may be repaired per the SR except the rivets may be replaced with a special tool to provide pressure during the bonding.

   This repair is shown at a bead end, but the repair may be made to a damaged portion of a bead which is not at an end. In this case the repair doubler is to be made from a center piece of A blueprint prod. skin doubler.

SEE SHEET 2 FOR SKETCH

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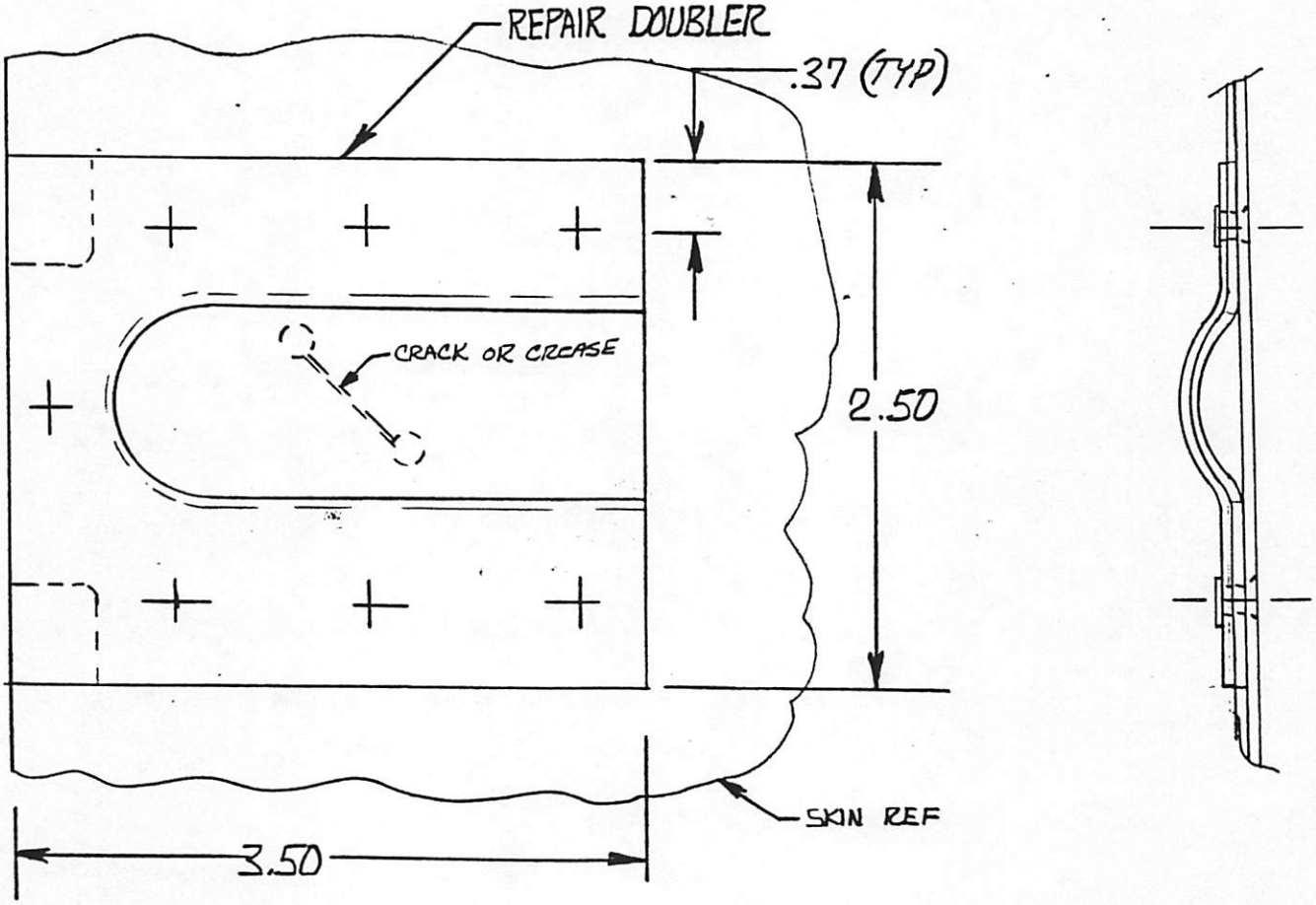

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WING STRAP GAP

DISCREPANCY:
1. Repair rivet interferes with B/P rivet installation on strap.
2. Gap exist between strap and skin between any (2) B/P rivets, except when gap is within 3.00 each side of spar centerline.

RESTRICTION: Does not apply to GA-7 or AA-1 series

NOTE: Fill open pilot holes in strap with Aerodynamic filler per GAPS 1010 after installation of strap.

REPAIR: Relocate B/P rivet .50 to 1.00 fwd. or .50 to 1.00 aft. to avoid drilling within .50 of a repair rivet. Add (1) B/P rivet in center of gap and in line with existing rivets.

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WING RIB TAB TO REAR SPAR

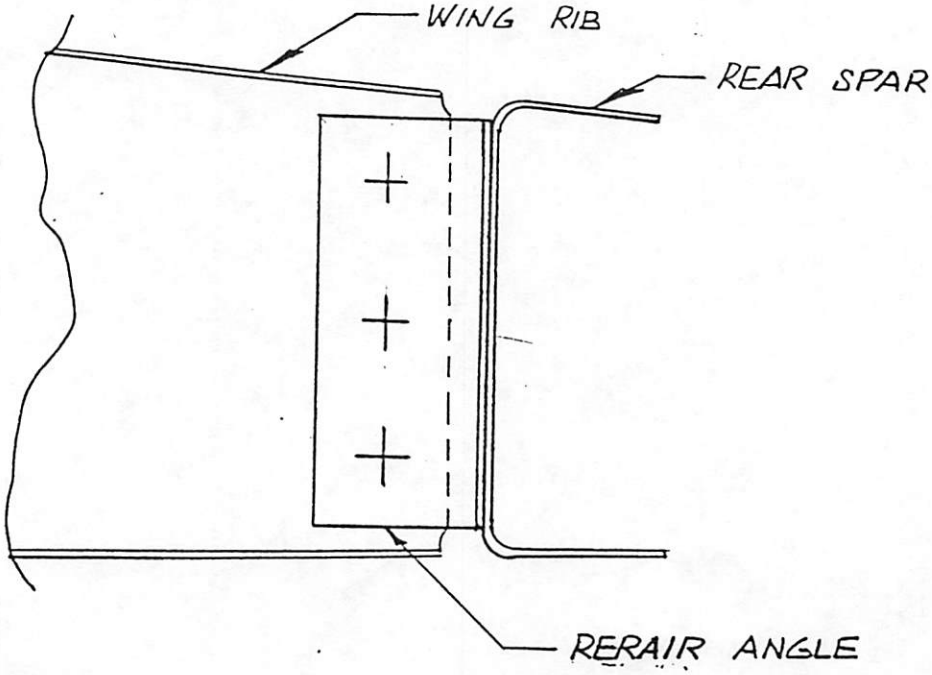
DISCREPANCY: Wing rib tab buckled along radius

Restriction: Does not apply to GA-7

Repair:

1. Cut off tab along radius, smooth edges with #320 cloth

2. Fab an angle from B/P material 2.12" long with 1.25" legs. Bond angle per general notes and GAPS requirements. Install MS20470AD4 rivets thru angle leg to rib web (1) @ .38 E. D. from each end and (1) ctrd between. Rivet thru rear spar per SR 201 or SR 202 with NAS 1097 AD4 rivets.



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WING ACCESS HOLES

DISCREPANCY: Torn wing skin around access hole

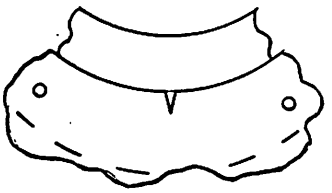
Restrictions: Does not apply to GA7

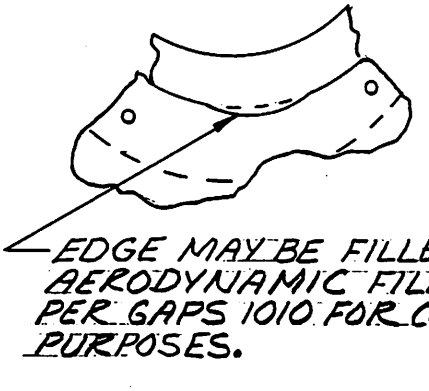
Limitations: 1. Does not apply to fuel bay access holes
2. Max length of tear .50

Repair:

Condition 1. Gouge or tear up to .12 in length:

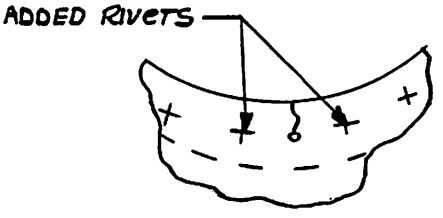
File out damaged area and blend to skin edge over approximately 1.0" length.





Condition 2. Tear up to .25 in length:

Stop drill tear with a #40 drill. Bond skin to access hole dblr. per general notes and GAPS REQMTS. Install (1) 1601-04 rivet on each side of tear at .25 E. D. from tear line and skin edge.



Condition 3. Tear over .25 but not exceeding .50 in length:

Stop drill tear with a #40 drill. Fab a new dblr. from B/P material with nutplates and pilot holes per

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B/P. New doubler flange to be 1.5 wide (7.0" O. D.) Install doubler with adhesive per general notes and GAPS REQMTS. Install rivets per Condition 2.

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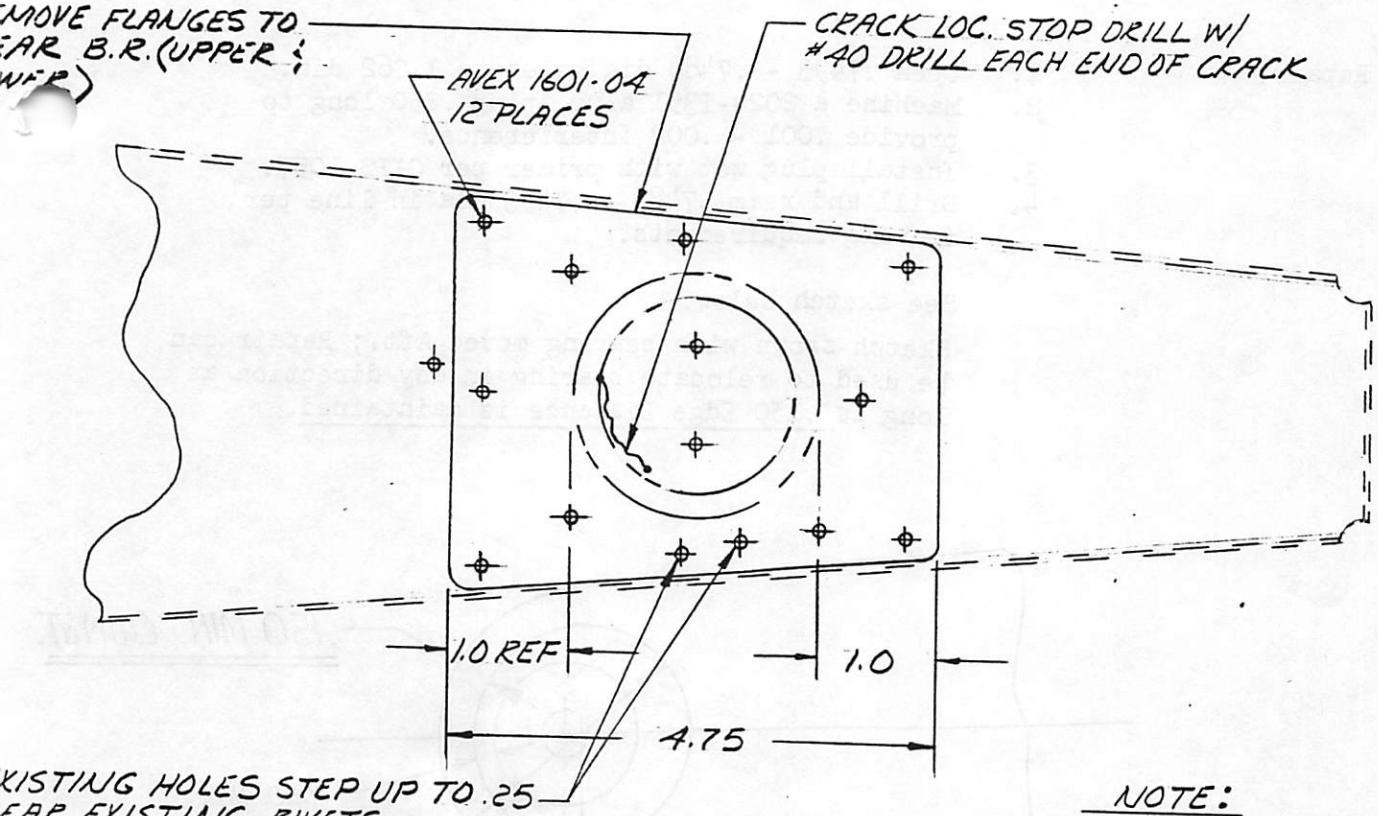
FUEL TANK CLOSE OUT RIBS

DISCREPANCY: Crack in lightening hole bead (fuel tank close out rib) along radius caused by form operation

Restrictions: Does not apply to GA7 or AA-1

Limitations: Applies to aft most lightening hole bead only

Repair: Stop drill crack per SR 013. Fab a doubler from B.P. rib per sketch. Bond faying surfaces per general notes and GAPS REQMTS. Install rivets per sketch.



NOTE:

A.) LOCATE RIVETS APPROX AS SH
W/ .38 E.D. DRILL THRU -4 & -5
B.) CUT DOUBLER FROM PRODUCTIO
C.) INSTALL INBD. SIDE.
D.) BOND WITH HYSOL 9316 PER GA
E.) SEAL OVER REPAIR PER GAPS

TION:

RE INSTALLING AVEX RIVETS, STEP
HOLES IN FLOATING RIB #5 TO #10
TO CLEAR TAILS OF AVEX RIVETS.

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WING AILERON OR FLAP HINGE BRACKET

DISCREPANCY:

1. Wing aileron or flap hinge out of alignment. (pork chop brackets)
2. Wing aileron or flap hinge mislocated.
3. Wing aileron or flap hinge bearing holes oversize.

Restrictions: Does not apply to AA-1 or AA5 Series A/C

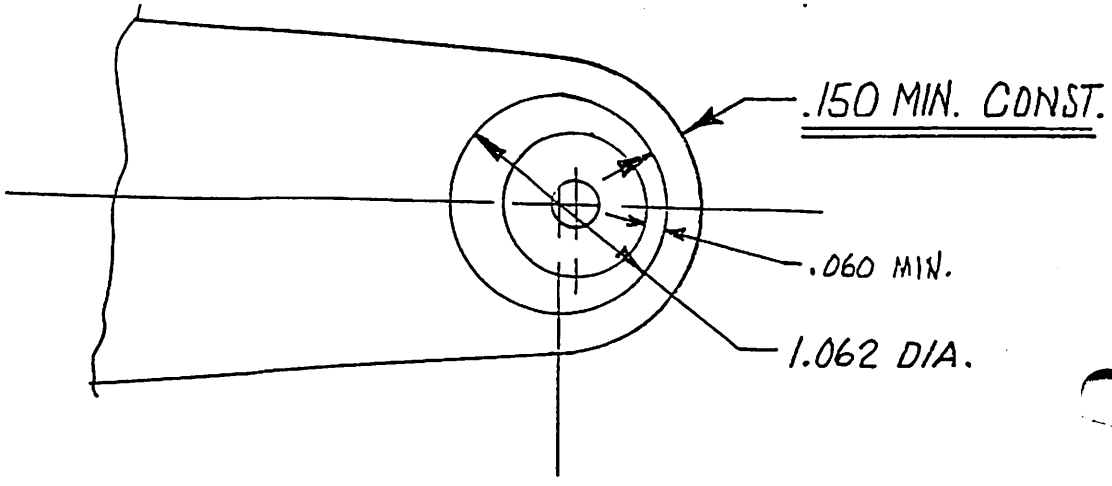
Limitations: Requires MRB approval

Repair:

1. Open .7493 - .7488 dia holes to 1.062 dia.
2. Machine a 2024-T351 alum. plug .250 long to provide .001 - .002 interference.
3. Install plug wet with primer per GAPS 1057.
4. Drill and ream .7488 - .7493 dia in line per drawing requirements.

See sketch below:

Sketch shown with bearing moved Aft.; Repair can be used to relocate bearing in any direction as long as .150 Edge Distance is maintained.



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DISCREPANCY: Insufficient clearance between main landing gear and lower wing skin cutout and/or outboard nacelle rib

LIMITATION : Applies only to GA-7 Aircraft

REPAIR :

1. Trimming around wheel cutout to 1.5 D from existing fasteners is permissible (See page 2)

2. If more localized trimming is necessary around main gear cutout, supplement the existing fasteners in this area with new fasteners staggered between them. New fasteners are to be placed as closely to the web as possible without the bucked tail riding the radius. Cutout may then be trimmed to within (1) D of the first row of fasteners.

3. The stiffening lip around the wheel well can be moved for clearance by drilling out fasteners and spreading the stiffening lip.

4. The only area where trimming will affect wing structure is where the outboard nacelle rib angle, 7W10601-29, (left nacelle), or 7W10601-30 (right nacelle), is installed. Here the angle flange is aft of, and adjacent to, the wheel well cutout. In this area, trim flange as required and splice in a new angle of equal strength with angle turned 90° (See page 3).

5. Flash extensions on the landing gear forgings may be polished off in order to provide additional clearance.

NOTES:

Items 1, 2, and 3 refer to nonstructural areas. Trim only as required to provide specified clearance per Dwg. Requirement.

Engineering approval is not required for rework, if done according to the above instructions.

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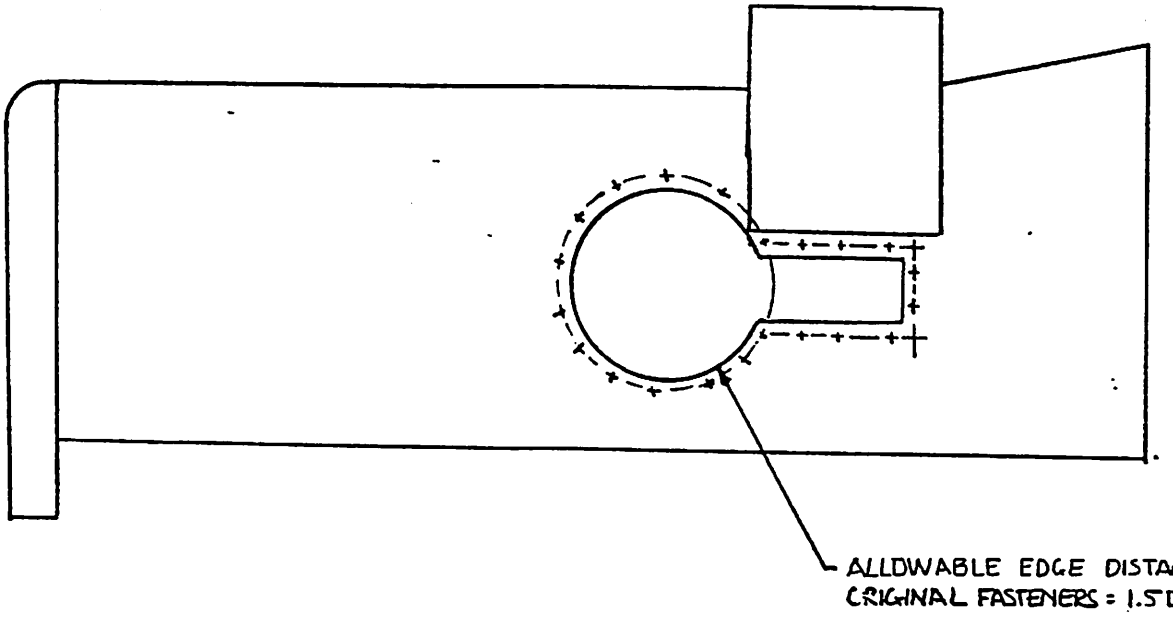
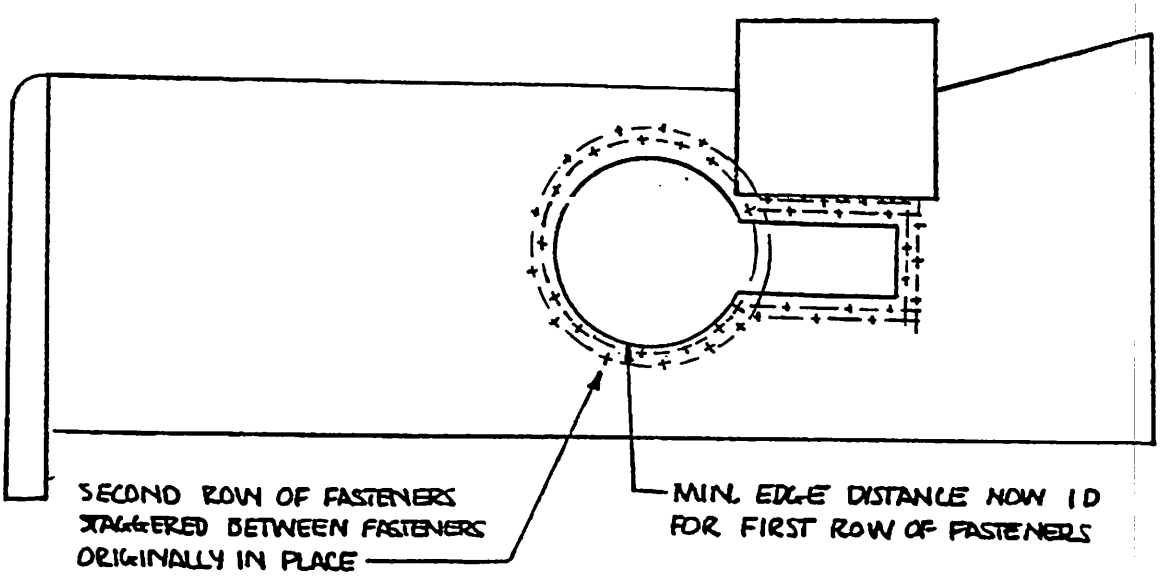
MINIMUM EDGE DISTANCE FOR FASTENERS WHEN TRIMMING WHEEL CUTOUT





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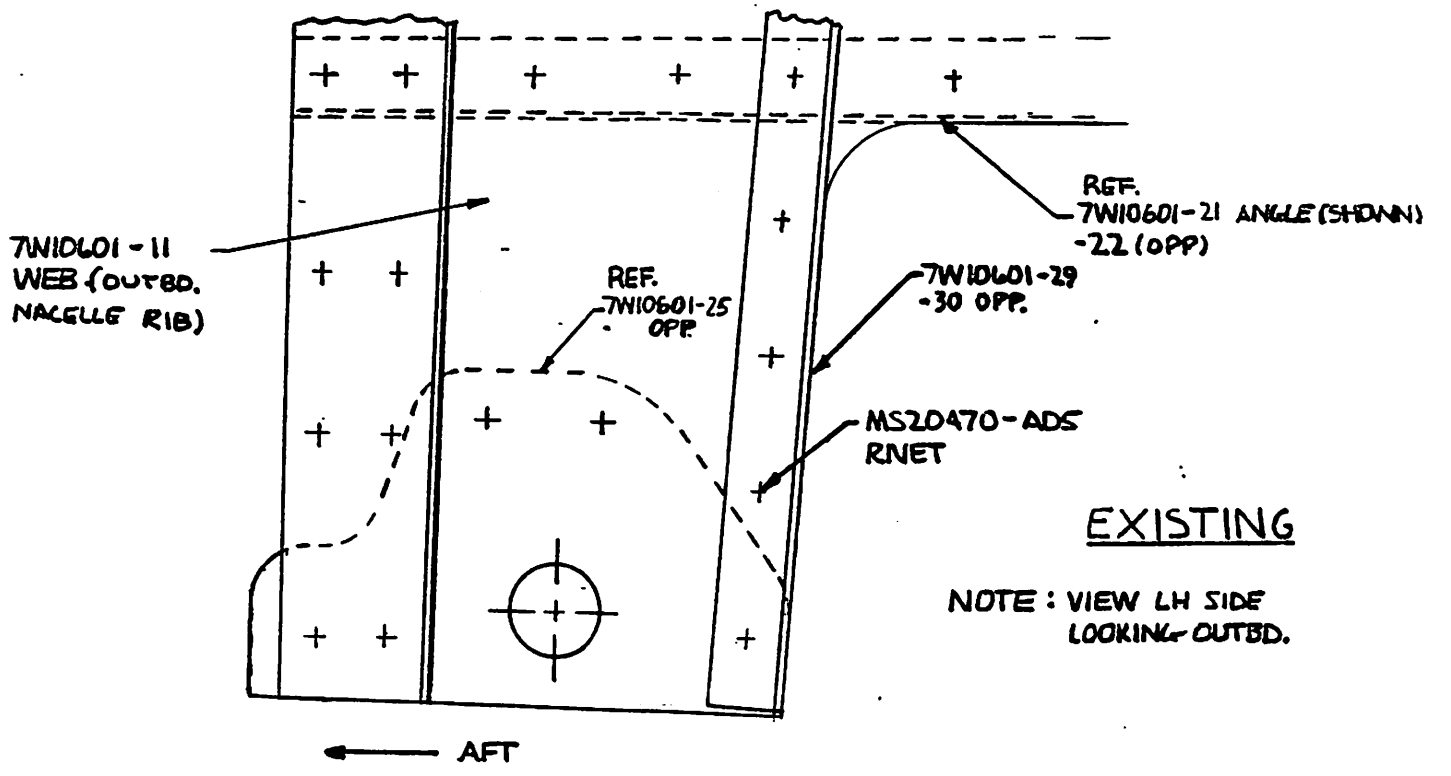

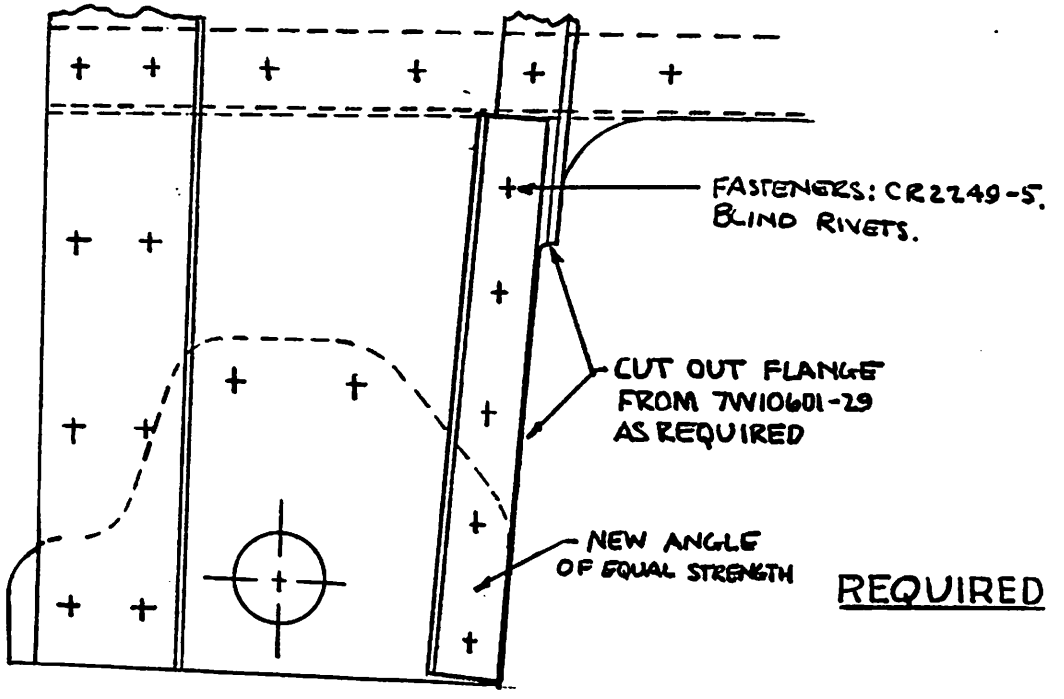

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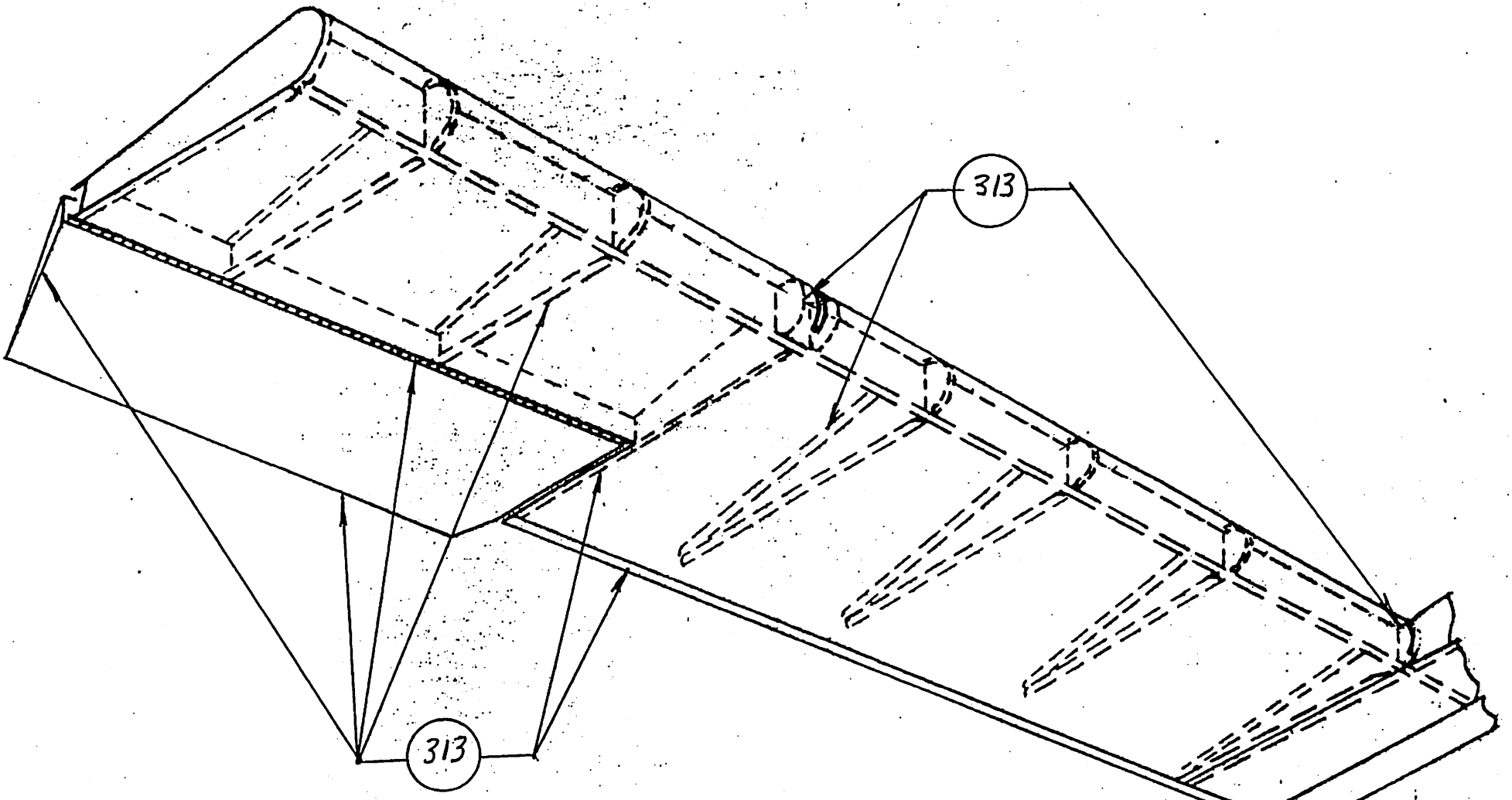
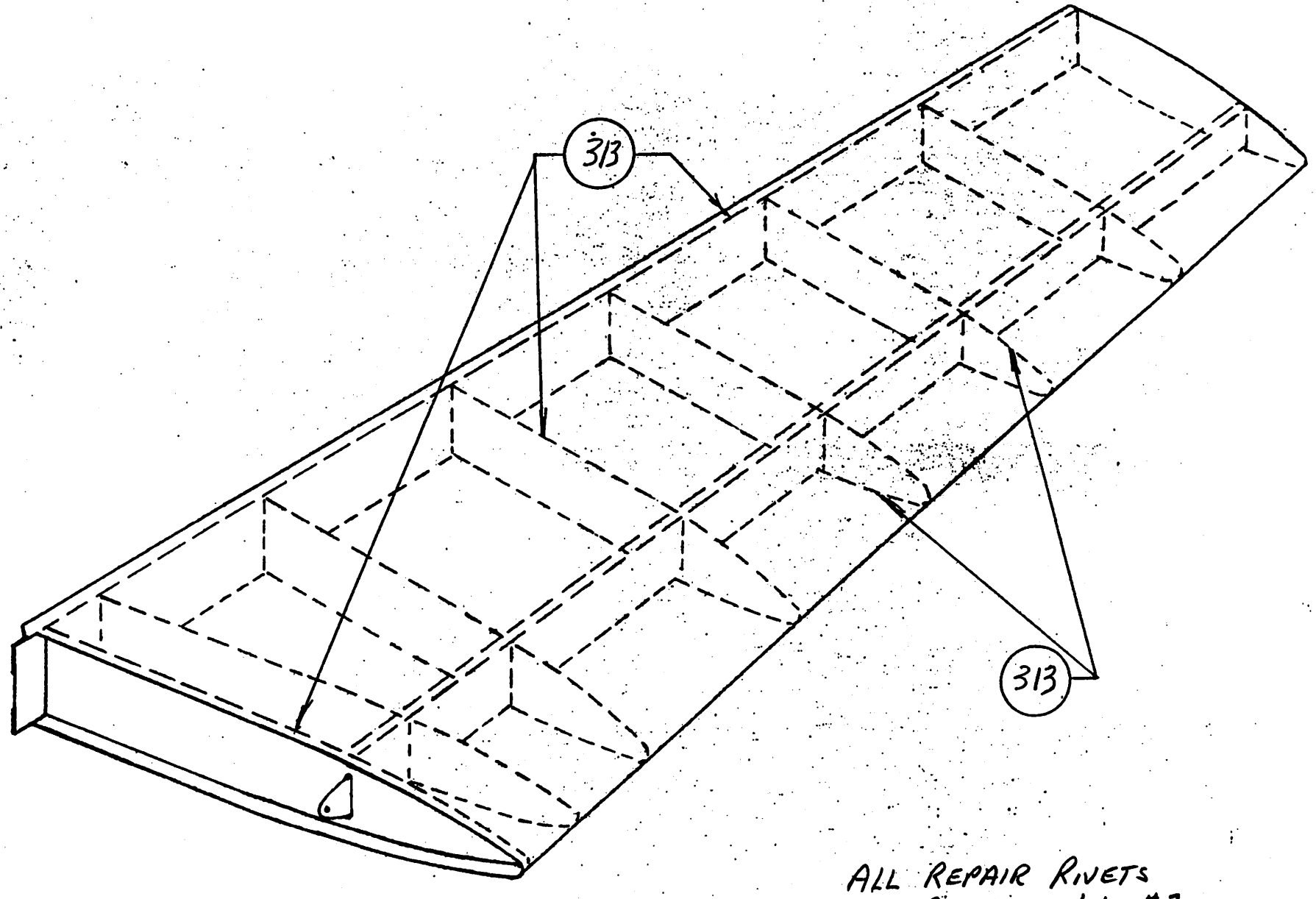
GA-7 ELEVATOR ILLUSTRATION



ALL REPAIR RIVETS
PER GENERAL NOTE #7

GA-7 HORIZONTAL STABILIZER ILLUSTRATION



ALL REPAIR RIVETS
PER GENERAL NOTE #7

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HORIZONTAL STABILIZER GAP TO FUSELAGE

DISCREPANCY: Horizontal stabilizer inbd skin edge- gap to fuselage exceeding .12

RESTRICTION: Does not apply to GA-7 or AA-5 series A/C

LIMITATION: MIN BONDLINE ON INBD RIB IS .60

REPAIR
1. For gaps up to .18, Repair not required.
2. For gaps exceeding .18 but not over .30, Add a G AES 404 rubber edge seal

NOTE - The addition of seal must be accomplished on the R/H & L/H sides of A/C for appearence

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HORIZONTAL STAB. RIB TABS & REAR SPAR

DISCREPANCY: Gaps between horizontal stabilizer rear spar and rib tabs.

Restriction: Does not apply to GA7 or AA1 Series

Repair:

1. Gaps not exceeding .030 add two rivets, of the same type and diameter as the blue print rivets, equally spaced between the blue print rivets and at the same E. M.

2. For gaps exceeding .030 but to a maximum of .060 add a shim of 2024-T3 of the same dimensions as the rib tab and a thickness as REQD to close the gap to within the limitations of Item 1. Add the rivets thru the spar, shim and rib tab as in Item 1.

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CONTROL SURFACES - HONEYCOMB RIBS TO SKIN

DISCREPANCY: Voids thru both face sheets between control surface skins and honeycomb ribs. Ailerons, flaps, elevators and rudders

Restriction: Does not apply to GA-7

Limitations: (Not applicable to inboard flap rib)

1. Void length not to exceed six (6) inches
2. Maximum number of voids per any one rib is (4); defined as (2) on top surface and (2) on bottom surface.
3. Any two (2) voids must be separated by six (6) inches of sound bond line.

Repair: Drill #40 holes, thru skin only, in void areas centered on honeycomb rib edge. Use .50 drill spacing and drill one #40 hole .50 past each end of void. Inject room temperature adhesive per GAPS 1041 in each drill hole until void is full of adhesive and allow to cure min. 24 hrs.

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HONEYCOMB RIBS- CONTROL SURFACES

DISCREPANCY: Crack or void at the edge of a honeycomb rib. Applicable to ailerons, elevators, flaps and rudders

Restriction: Does not apply to GA 7

Limitation: Engineering signature REQD on Elev. tip rib & Inbd Flap Rib.

REPAIR: Stop drill the crack #40 drill to encompass the end of the crack. Maximum length of the crack is to be .125. Add a 1.00 square piece of bonding adhesive tape to the outside skin surface of the rib over the hole. Match tape edge to the rib edge. Fill the core in the area of the crack for .25 past the crack on either side with thermosetting adhesive. Fill the core area flush to the rib edge.

NOTE: Bent side skins may be straightened and repaired the same as a crack above, except if no crack is present, do not stop drill or add tape.

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HORIZONTAL & VERTICAL STAB

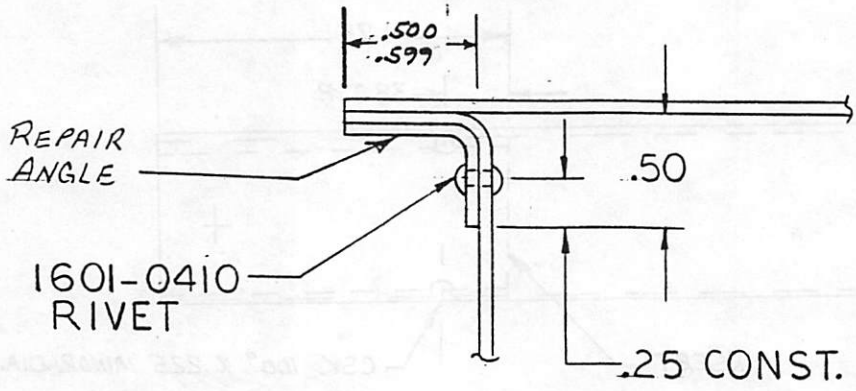
DISCREPANCY: Inboard skin and rib flange rough cut and trimmed short

Restriction: Does not apply to GA 7

Repair:

1. Polish out all rough cuts using #320 cloth min. flange width .600 measured from inside mold line.

2. Rework flanges that are between .500 to .599 by reinforcing with an angle produced from a production rib length as required to extend 2.00 beyond area under min. width, bond using room temperature curing adhesive per GAPS 1041 install rivets as shown on 1.00 CTRS.



3. For rib flanges under .50 remove skin and inboard rib, replace same to DWG REQTS

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ELEVATOR TORQUE TUBE

DISCREPANCY: Elevator torque tube - bolt holes oversize, elongated or mismatched with bellcrank

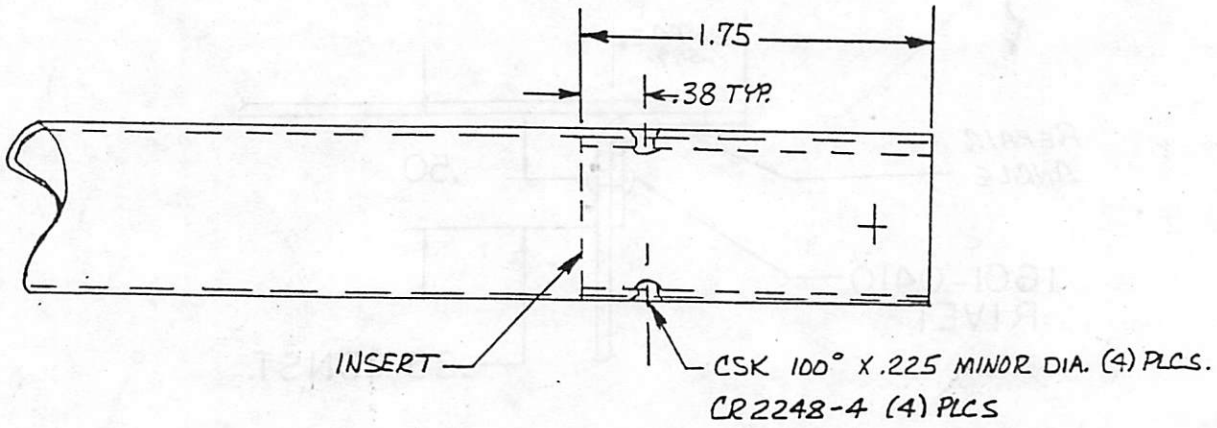
Restriction: Does not apply to GA-7 or AA-1 Series

Repair: Fabricate a tube insert from 6061-T6 alum. to the following dimensions: 1.00 dia. x .125 wall x 1.75 long. Machine O.D. to .945 to .948.

Bond insert tube into torque tube with adhesive per General Notes and GAPS requirements.

Rivet per sketch and redrill attach holes per drawing requirements.

(For alternate repair see SR 032)



NOTE: Install rivets wet with adhesive. Fill rivet heads with adhesive and, after cure, finish flush to tube O.D.

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Elevator Torque Tube

DISCREPANCY: Bellcrank attach holes oversize, mislocated, or elongated

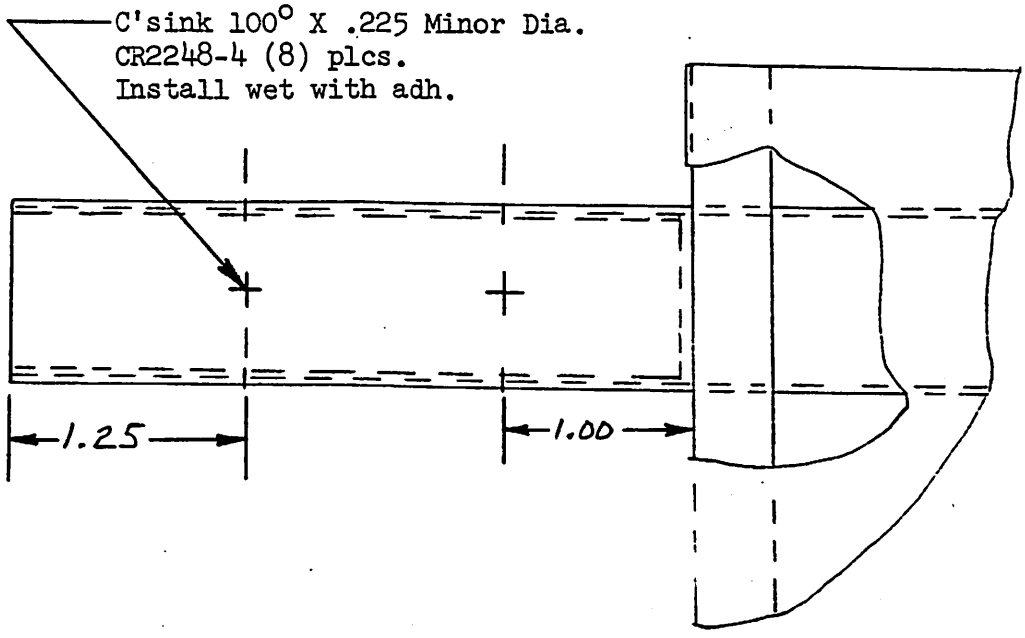
RESTRICTION: Does not apply to GA-7 OR AA5 Series Elevators.

REPAIR: Manufacture a tube insert from 6061-T6 alum. to the following dimensions: 1.00 dia. X .125 wall X 4.00 long. Machine O.D. to .945-.948

Insert tube into end of torque tube & bond per General notes & GAPS requirements.

Rivet per sketch & redrill attach holes per drawing.

(For Alternate repair see SR 032).



Note: Fill rivet heads with adhesive and, after cure, finish flush to tube O.D.

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HORIZONTAL STABILIZER REAR SPAR

DISCREPANCY: Voids between horizontal stabilizer rear spar and spar cap angles.

Restriction: Does not apply to GA7

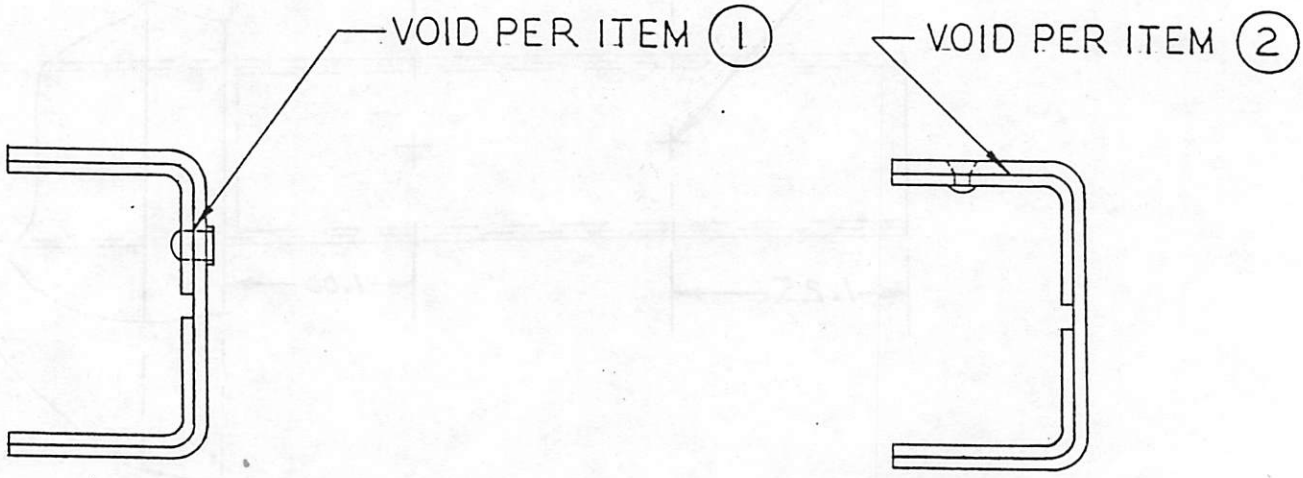
LIMITATION: Maximum gap of .060 and 6.00 in length

Repair:

1. Voids between spar web and cap angle. (Max. depth .25). Fill voids with thermosetting adhesive per GAPS 1041. Add (2) rivets MS20470 AD4 at .38 E. M. and equally spaced between existing blueprint rivets.

2. Voids between spar skin attach flange and spar cap angle. Fill voids with thermosetting adhesive per GAPS 1041. Add MS20426AD4 rivets countersunk in skin attach flange or spar on 2.00 equal spacing with one .50 each side of void. Quantity of rivets in void per SR 118 .

NOTE: Prior to installing rivets coat all over with 2214 adhesive.



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HONEYCOMB RIB TO TORQUE TUBE

DISCREPANCY: Void between honeycomb rib and torque tube.

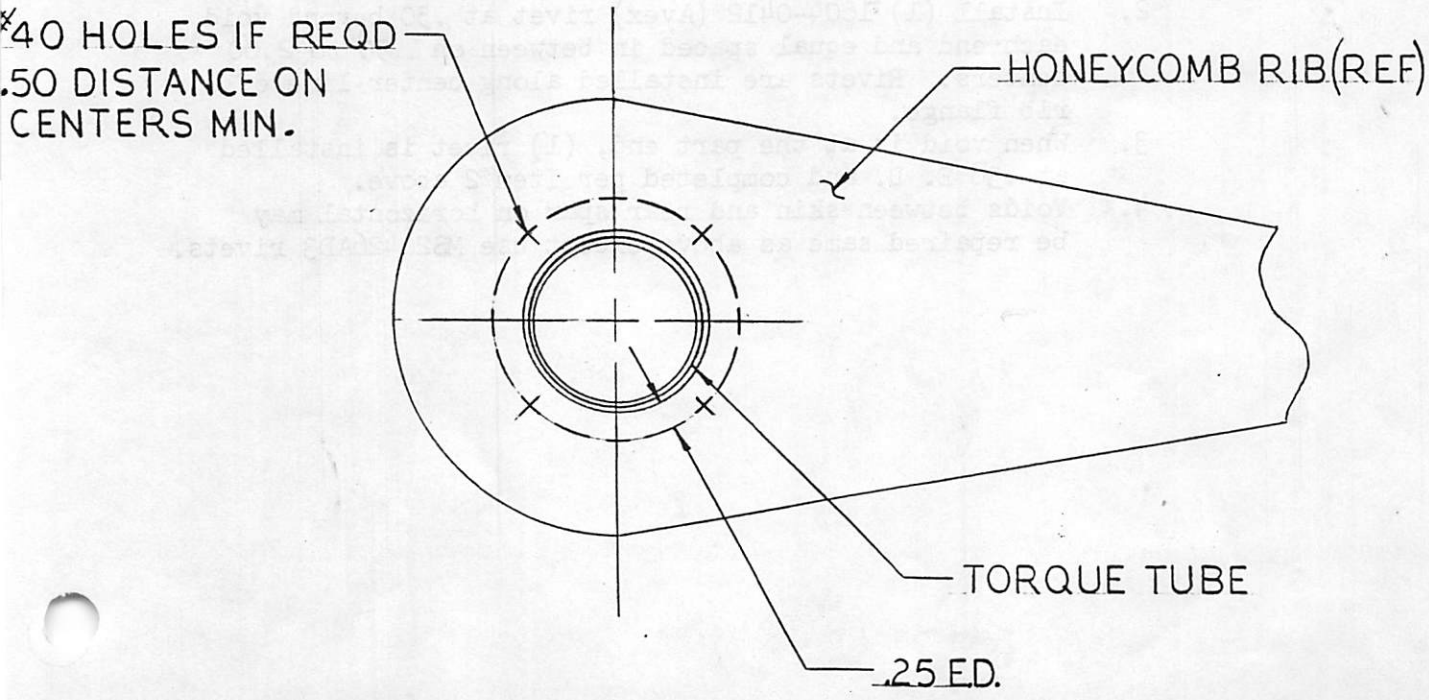
Restriction: Does not apply to GA7
LIMITATION: Max. gap .060

Repair: Inject room temperature adhesive per GAPS 1041 into the gap until it is filled completely around the tube.

Finish the adhesive flush with the torque tube outside diameter and the rib outside face sheet.

NOTE: For rib edge damage at the torque tube, coordinate with SR 315 except use adhesive noted above and inject only those cells of the honeycomb affected by the crack.

If required for injection of adhesive into the void, #40 holes may be drilled thru the honeycomb face sheet as shown below.



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VERTICAL OR HORIZONTAL STAB. & TRIM TABS - RIBS TO SKIN

DISCREPANCY: Voids between ribs and skin on horizontal stabilizers and trim tabs

Restriction: Does not apply to GA-7

Limitations:

1. Max thru void length for horizontal is 30% of bond line
2. Max void not thru is 50% of bond line
3. Max gap is .030

Repair:

1. Fill all voids with room temperature curing adhesive per GAPS 1041.
2. Install (1) 1604-0412 (Avex) rivet at .50 beyond void each end and equal spaced in between on 1.50 to 2.00 centers. Rivets are installed along center line of rib flange.
3. When void is at the part end, (1) rivet is installed at .38 E. D. and completed per Item 2 above.
4. Voids between skin and rear spar on horizontal may be repaired same as above except use MS20426AD3 rivets.

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ELEVATOR SKIN SEALS

DISCREPANCY: Void between seals and skin on elevator assy

Restriction: Does not apply to GA7

Limitations: Max Gap .040

Repair: Fill void with adhesive per general note section of this manual. Install (1) MS20426AD3 rivet at .38 E. D. typ in ea. corner. Two (2) rivets at each seal tab. If void is under .50, install (1) rivet at .50 E. D.

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TRIM TABS & TRAILING EDGES

DISCREPANCY: Voids between skin and ribs on trim tabs & T. E.

Restriction: Does not apply to GA7

Limitations:
1. Max thru void is 1.00
2. Max non thru void is 2.00 x .50 deep
3. Max GAP is .030

Repair:
1. Fill all voids per general note section of this manual.
2. Install (1) 1604-0412 rivet at .38 from part end, (1) at .38 beyond void and (1) equally spaced between.
3. Rivet pattern to be adjusted to maintain minimum of .50 on centers.
4. When void is along T. E. repair same as above, except use NAS1097AD3 rivets, double flushed.

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GA7 RUDDER, ELEVATOR, FLAP, AILERON, TRIM TABS & STABILIZERS

DISCREPANCY: Void between skin and ribs, skin to spar or skin to skin at trailing edge. See illustration.

Restriction: Does not apply to AA1 Series or AA5 Series A/C

Limitations:
1. No more than 30% of total bondline for thru void
2. No more than 50% of total bondline for non thru void
3. Gap no greater than .040

Repair:

Condition 1: (Thru voids):
Fill voids ~~per~~ General Notes GAPS requirements. Install (1) rivet .50 beyond void in each direction & equally spaced between on 2.0" Ctrs. maximum.
(See general requirements below)

Condition 2: (Non-thru voids):
Non-thru voids up to 30% of bondline width, fill voids per general notes and GAPS requirements. Non thru voids greater than 30% of bondline width are to be repaired per Condition 1.

GENERAL REQMTS: Any void at part end requires (1) rivet @ .38 E. D. from end of part

Rivets are 1604-04 or MSC-32 when void is not accessible for solid rivet instl.

Preferred rivets are MS20426 AD3 or NAS1097AD4.

Dbl flush rivets when void is @ trailing edge (where skins meet) Use NAS 1097 AD3

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EXPOSED H'COMB RIB

DISCREPANCY: Honeycomb rib extending past overlapping skin exposing core

Restriction: Does not apply to GA-7

Limitations:

1. Maximum gap is .090
2. Length is not to exceed 6.00
3. Not applicable to inboard flap rib
4. Not applicable to outboard elev. rib

REPAIR: 1. and 2.

If voids exist coordinate with SR 303 . Where no void exists, seal the exposed core with room temperature adhesive per GAPS 1041 or sealant per GAPS 1163 Type 1. Smooth the adhesive flush with the skin and rib face sheet surfaces.

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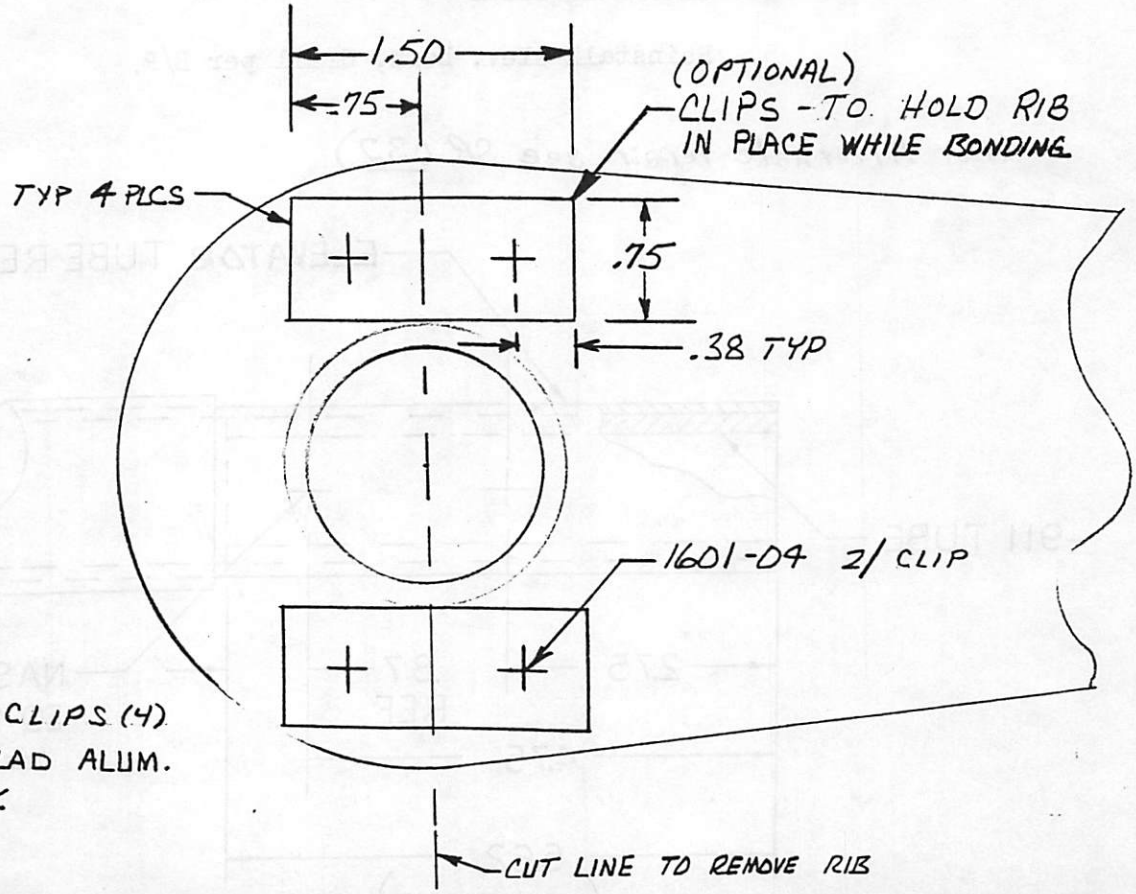
DAMAGED OR MISLOCATED H'COMB RIBS

DISCREPANCY: Damaged or mislocated honeycomb ribs of ailerons, elevators and rudders. (After oven cure of ribs to torque tube assy)

Restriction: Does not apply to GA7

Limitation: Does not apply to inbd and outbd ribs

Repair: Cut through damaged rib at torque tube and remove. Replace rib by cutting out a section of rib at torque tube hole to allow positioning on torque tube. Replace rib section that was removed. Bond along cut edges with 2214 adhesive per GAPS 1041. Bond around torque tube per B/P. Bond splices on each side of rib with 2214 adhesive and rivet as shown.



MAT'L FOR CLIPS (4)
2024-T3 CLAD ALUM.
.025 THICK

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GA-7 ELEVATOR TORQUE TUBE

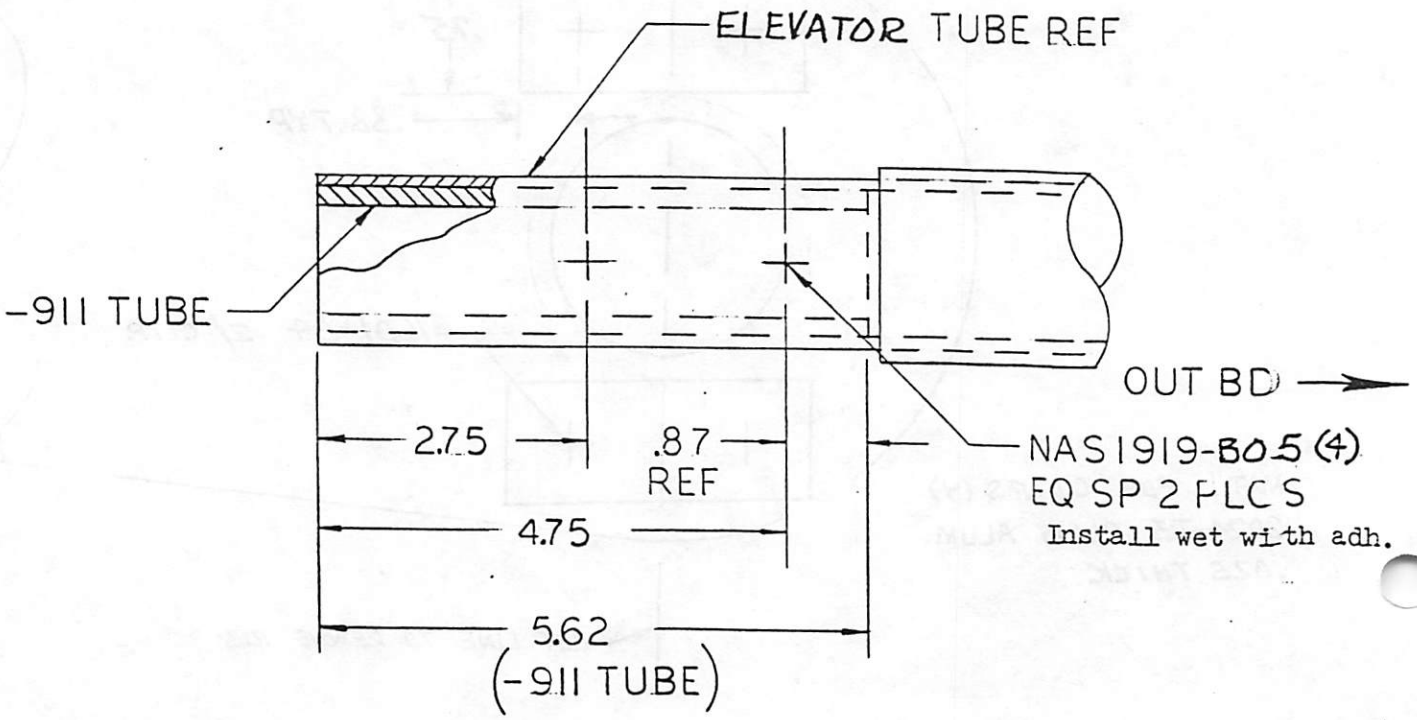
DISCREPANCY: Elev. bellcrank attach holes in torque tube elongated or oversize

Restriction: Does not apply to AA1 or AA5 Series

Repair:

1. Remove elev. horn
2. MFG - 911 tube from 6061-T6 (1.37 O. D., .12 wall) machine O. D. to give .002 - .004 clearance.
3. Bond - 911 tube inside torque tube per General Notes and GAPS requirements.
4. Rivet as shown
5. Reinstall elev. horn, drill per B/P.

(For Alternate repair see SR 032)



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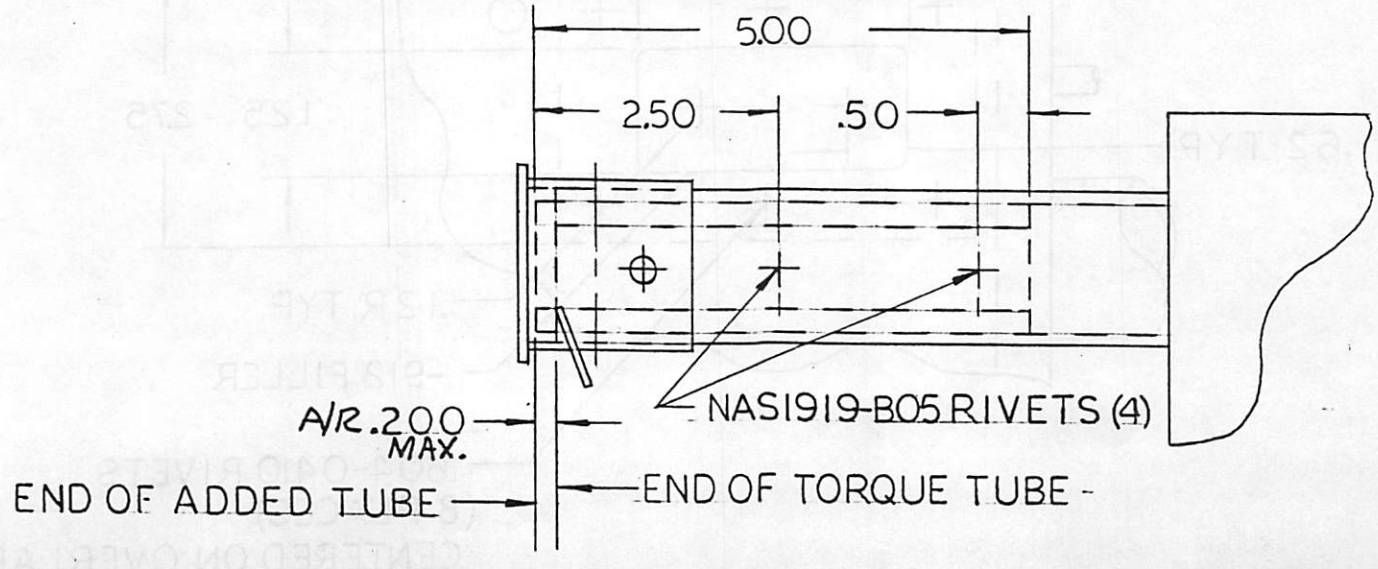
GA-7 RUDDER TORQUE TUBE

DISCREPANCY: Rudder bellcrank attach hole in torque tube mislocated, elongated, or oversize

Restriction: Does not apply to AA1 or AA5 Series

Repair:

1. Remove Rudder
2. Remove Bellcrank
3. Manufacture a tube from 6061-T6 alum 1.75 dia x .250 wall thk x 6.00 long. Machine O. D. to give .002 - .004 clearance.
4. Bond added tube to rudder torque tube with .200 protrusion(see sketch) per General Notes & GAPS requirements. Fill bellcrank attach holes with adh. and smooth after cure.
5. Add (4) NAS1919B05 rivets, equally spaced around tube as shown (2) places. Install wet with adh.
6. Install bellcrank and redrill torque tube to match bellcrank attach holes locating bellcrank to eliminate gap.
7. Acceptable to add an AN960-416 washer between bottom of bellcrank and rudder mt.



(For Alternate repair see SR 032)

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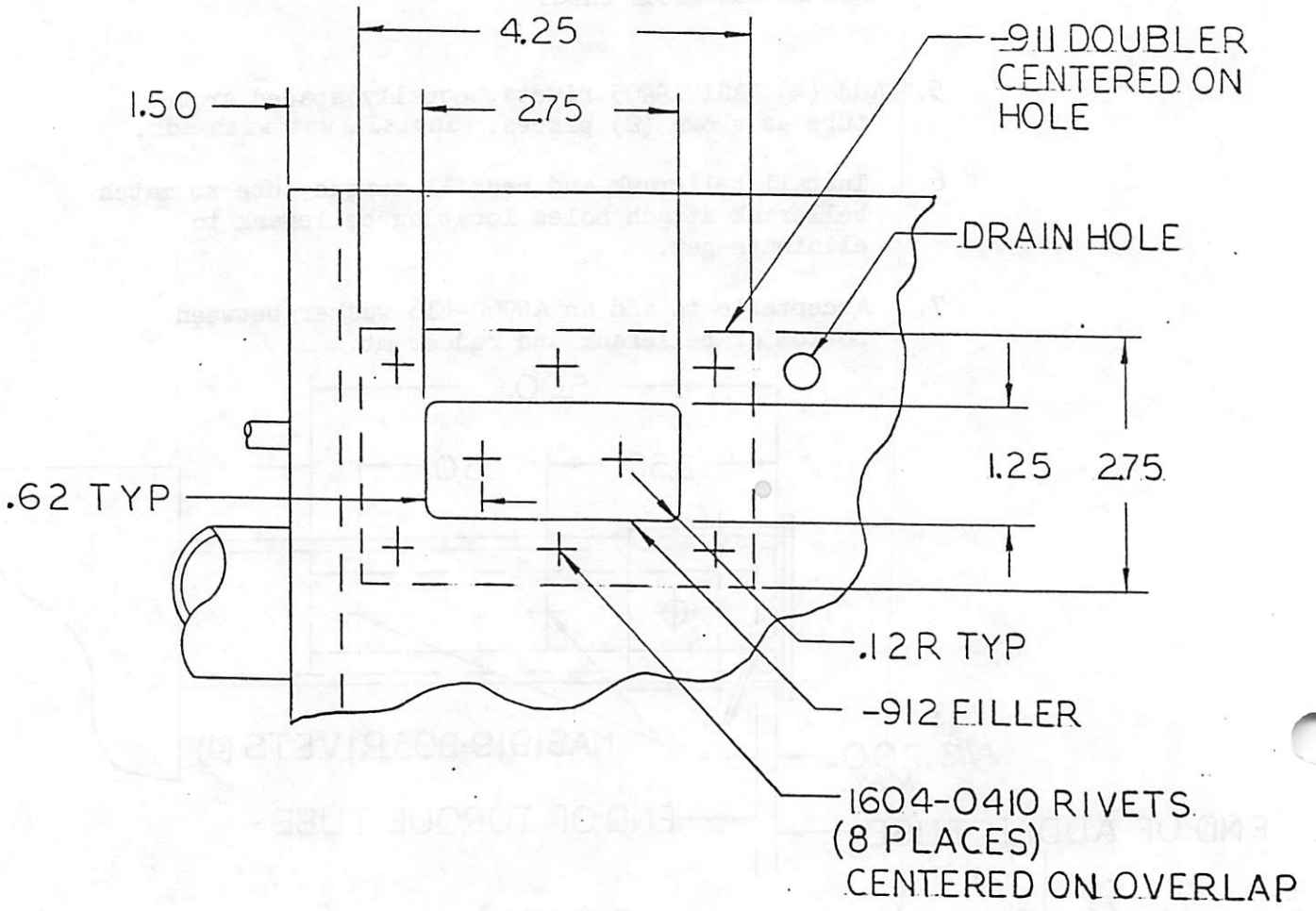
ELEVATOR HINGE BOLT NUTPLATE

DISCREPANCY: Nutplate for elevator hinge bolt stripped out or damaged

Restriction: Does not apply to GA7 or AA1 Series

Repair: Cut a hole in the elevator, as shown in sketch, to give access to nut plate. Remove nutplate and install a new nutplate per blueprint. Make a -911 Dblr and -912 filler, as shown, from .016 thk 2024-T3 alum. Locate dblr and filler as shown. Bond per general notes and add (8) 1604-0410 rivets located as shown. Smooth over rivet heads and edge of hole with aerodynamic smoother per GAPS 1010.



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PROD.	[illegible]

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RUDDER, ELEVATOR OR TRIM TAB HINGE VOIDS

DISCREPANCY: Voids between skin and hinge on elevator, rudder or trim tab

LIMITATION:

1. Max. gap is .06
2. Max. thru void is 30% of total bondline
3. Max. non-thru void is 50% of total bondline

REPAIR:

1. Fill voids with adhesive per general Note 10.
2. Install (1) 1604-04 rivet at .50 beyond void each end and equally spaced on 1.50 to 2.00 ctrs. Rivets are installed along centerline of flange.
3. When void is at a part end, start rivets at .38 E.D.
4. Rivet pattern may be adjusted to avoid drilling thru existing rivets.
5. Smooth over rivet heads with aerodynamic filler per GAPS 1010.

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RUDDER OR ELEVATOR PIVOT POINTS MISALIGN

DISCREPANCY: Rudder or elevator pivot boltS do not align with mating holes on fin or stabilizer. Normally, the center and upper (outboard) bolts are installed and the misalignment measured at the lower (inboard) bolt hole.

RESTRICTION: Does not apply to AA1 or AA5 series aircraft.

LIMITATION:

1. Maximum of .250 fore and aft misalignment in plane of control surface.
2. Maximum of .060 misalignment 90^{o} to plane of control surface.
3. Misalignment more than (1) or (2) requires MRB Engineering signature.

REPAIR:

1. If hole in bracket on fixed surface is forward of control surface, shim will be installed at lower (inboard) between bearing support and spar. Thickness of shim will be equal to amount of in-plane misalignment.
2. If hole in bracket on fixed surface is aft of hole in control surface, shim will be required at center location between support and spar, thickness will be equal to 1/2 amount of in-plane misalignment.

3. Shims are to be located between the support bracket and spar of the fixed surface unless repair condition 2 exist and while moving control surface from stop to stop, the apparent mismatch point on the inboard bearing appears to move in an arc. If this is the case, the shim is to be installed between the support and spar of the control surface. Caution: If condition 1 exists and the mismatch point moves in an arc, the shim may be installed between support and spar of the fixed surface and control surface moved from stop to stop to check for binding or oil canning on either surface, if either exist, R&R, the control surface or notify Liaison Engineering.

4. Recheck misalignment after installation of shim. In plane maximum misalignment = .020. 90° to plane of surface maximum misalignment = .060.

5. Before installation of control surfaces, check the alignment of the pivot holes on the stabilizers with (2) axially drilled AN4 bolts inserted in inboard and outboard fittings and a string threaded through the hinge line, this will indicate any misalignment, and should be repaired in component build-up.

6. Shims to be made from 2024-T3 alum. and zinc chromate primed. Dimensions are same as base of bearing support and drilled to match.

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11-20-74	
12.9.74	RE3

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GROUP - 700 - ALIGHTING GEAR

MDR	NO.	DISCREPANCY
701	-	Strut M.L.G. Holes Discrepancy
702	-	M.L.G. Bracket Holes Discrepancy
703	-	RH or LH attach brackets bonded at an angle, holes oversize on Nose Landing Torque Tube Assy

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12-9-79			

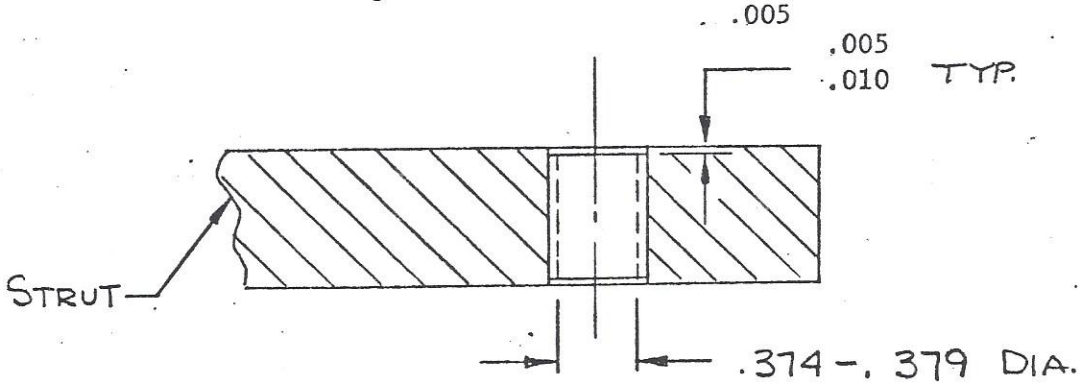
DISCREPANCY: Strut - Main landing gear - Holes are off location from checking fixture, elongated or oversized.

MODELS: AA-1, -1A, -1B, AA-5, -5B, -5A

REPAIR:

1) Improper location - Open the .374 - .379 inch diameter holes to .3815 inch diameter maximum

2) Elongated or oversized - open .374 - .379 diameter holes that exceed drawing and Note (1) tolerances to .500 diameter install a bushing into the strut with .003 inch interference.



NOTE: (1) Elongation tolerance is half the hole tolerance added to the maximum diameter of bolt hole i/e .374 - .379 diameter hole, the total elongation permissible would be .3815 without repair.

Bushing Material 6061 - T6

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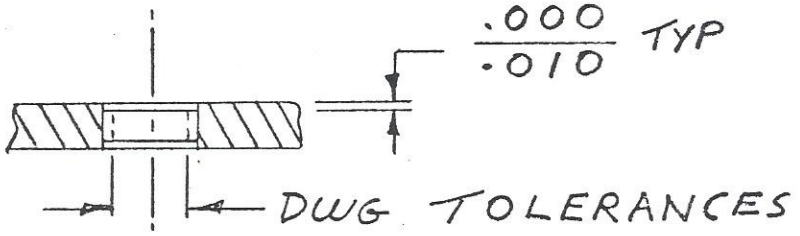
DISCREPANCY: Main landing gear bracket holes are off location from checking fixture, eleongated or oversized.

MODELS: AA-1, -1A, -1B, AA-5, -5B, -5A

REPAIR: 1) Improper location - open holes to top drawing tolerances.

2) Elongated or oversized

a. Open .377 - .382 diameter holes that exceed drawing and Note (1) tolerances to .500 diameter.
b. Open .384 - .387 diameter holes that exceed drawing and Note (1) tolerances to .500 diameter.
c. Open .503 - .507 diameter holes that exceed drawing and Note (1) tolerances to .62 dimaeter.
d. Apply wet zinc chromate per APS 1057 (1C) and install bushing into bracket with .001 interference.
.002



TYPICAL SECTION

NOTE: (1) Elongation tolerance is half the hole tolerance added to the maximum diameter of bolt hole i/e .375 - .382 diameter hole, the total elongation permissible would be .3855 without repair.

Bushing Material 4130 Cond. D

NOSE LANDING GEAR TORQUE TUBE ASSY

DISCREPANCY: a. RH or LH attach brackets bonded at an angle, holes oversize

b. Oversize strut attach holes in yoke assy, nose strut located at an angle

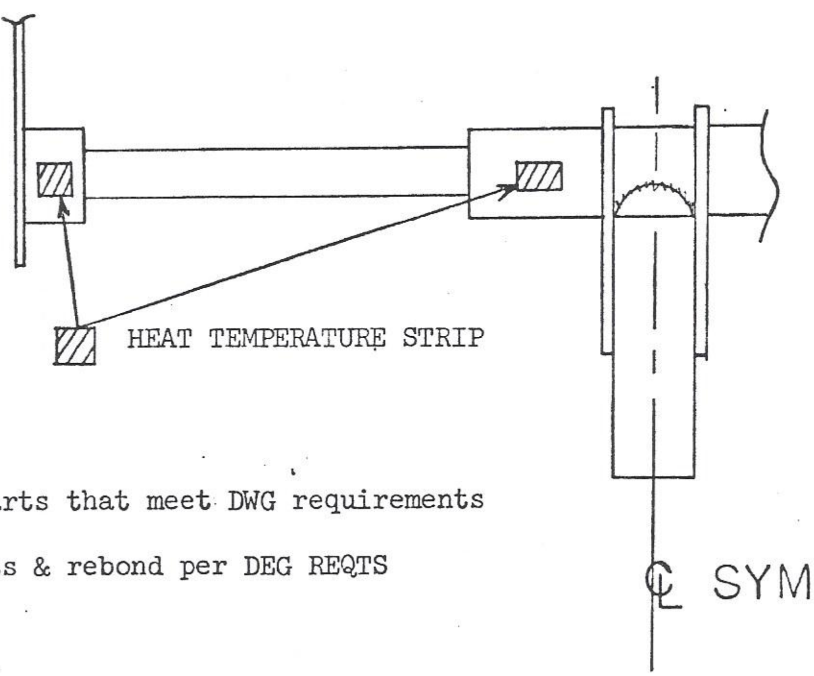
c. Replacement of damaged bearing support brackets, holes oversize

MODELS: AA1, AA1A, AA1B, AA5, AA5A, AA5B

REPAIR: 1. Add temperature strips 450°F max. to brackets & yoke in areas shown

2. Wrap with wet cold rags along full length of torque tubes

3. Apply torch to bracket or yoke bonded areas until heat temperature strips indicate temperature is approaching 450°F, at this point apply pressure until the bondline breaks & keep rotating, remove heat torch from assy @ this point.



4. Salvage parts that meet DWG requirements

5. Clean parts & rebond per DEG REQTS

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GROUP - 800 - HONEYCOMB-GENERAL

MDR NO.		DISCREPANCY
801	-	Major Crack in Honeycomb Skin
802	-	Extraneous hole in honeycomb face sheet or air passage face sheet drilled thru for installation of rivnuts.
803	-	Honeycomb extending past overlaping skin exposing honeycomb core.

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DISCREPANCY: Major Crack in Honeycomb Skin

MODELS: AA-1, -1A, -1B, AA5, AA5A, AA5B

LIMITATIONS:

1. Maximum Crack to be .75 in Length
2. Crack to be no closer than 2" from any edge, hole, fastener, splice, doubler or bond angle.
3. Crack to be no Closer than 6" from Spar to Fuselage Attachment area.
4. Not more than (2) Major Cracks per any (1) Panel and seperated by 6" of sound Bond.
5. Non Air Passage Surfaces Only.

REPAIR: Stop Drill Crack Ends with # 40 Drill and clean crack edges smooth. Vacuum Debris from core. Fill Cavity with 2214 Adhesive per APS 1041 Flush with top sheet.
Add Doubler centered on crack of 2024-T3 .020 X 2" X 2". Bond Doubler per APS 1041. Insure .62 Sound Bond Line all around crack. Rivet doubler with 1601-0410 Rivets (4) Equally Spaced at .37 E. M. and not in line with crack.

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DISCREPANCY

Extraneous hole in honeycomb face sheet or air passage face sheet drilled thru for installation of rivnuts.

MODELS ALL

LIMITATIONS

1. Maximum diameter to be .25
2. Not within 2.00 from any edge, hole, fastener, splice, doubler or bond angle
3. Not within 6.00 of spar to fuselage attachment area
4. Not more than (4) repairs on any one honeycomb panel

REPAIR

Crush back the honeycomb core only, thru the face sheet hole for approx. .12 all around past the edge of the hole.
Fill the cavity with room temperature or thermosetting adhesive per general note # 2 in this manual. The adhesive is to be finished smooth with the face sheet.
Prime reworked area with type IE primer per A.P.S. 1057

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DISCREPANCY

Honeycomb rib extending past overlaping skin exposing core.

MODELS All

LIMITATIONS

1. Maximum gap is .090
2. Length is not to exceed 6.00
3. Not applicable to inboard flap rib.

REPAIR

1. & 2. If voids exist coordinate with MDR # 303. Where no void exist, seal the exposed core with room temperature adhesive per APS 1041 or PR 1436 G class B . Smooth the adhesive flush with the skin & rib face sheet surfaces.

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GROUP - 900 - ALUMINUM SKINS-GENERAL

DMR NO.		DISCREPANCY
901	-	Minor Skin Damage Other Than Honeycomb
902	-	Removal and replacement of detail parts
903	-	Mismatch between mating parts resulting in a gap requiring a shim.

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	W2-QC
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MINOR DISCREPANCY REPAIR MANUAL

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DISCREPANCY: Minor Skin Damage Other Than Honeycomb

MODELS: AA-1, -1A, -1B, AA5, AA5A, AA5B

LIMITATIONS:

1. Not To Apply To Balanced Control Surfaces
2. Not To Apply To Fuel Tank Skins
3. Damaged Area To Be No Closer Than 2" From Any Edge, Hole, Fastener, Splice, Doubler or Bond Angle.
4. Damage Not To Be Closer Than 6" From Any Assembly Attachment Area Or Hinge Location.

CONDITIONS:

1. Crack not exceeding 3/32 in length.
2. Crack exceeding .125 to maximum of .50.
3. Dent or depression in from air passage surface to a maximum size per APS 1010 and with a smooth surface not creased or scratched deeper than .005.

REPAIR: CONDITION # 1
Drill #40 centered on damage and install MS20426AD3 where accessable to buck without interfering with internal structure. Install in minimum skin thickness of .025. Alt. rivet 1604-0412.

CONDITION # 2
Clean out damage to form a .25 minimum to a .50 maximum dia. hole removing a minimum amount of material to clean up damage. Fabricate an Alclad 2024-T3 .032 X 2" X 2" Internal Doubler and a 2024T3 filler the same Dia. as the hole, and of the same thickness as the damaged skin. Install both parts centered on the skin cutout and rivet with MS20426AD3 rivets (4) equally spaced at .38 E. M. and (1) MS20426AD3 centered in filler. Apply bond per APS 1041 prior to riveting using 2214 adhesive, or alternate A-1333, per APS 1041. Apply Aerodynamic filler per APS 1010 over filler and rivets. Alt. rivets 1604-0412.

CONDITION # 3
Acceptable as is. Fill with Aerodynamic Filler Per APS 1010.

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REMOVAL & REPLACEMENT

Detail parts which require removal & replacement as they are obviously unusable but can not be replaced to the drawing because of the requirements of having to go back into the fixture; or riveted to locate & apply bonding pressure; May be replaced as follows;

Applicable to class II bondlines only

1. Remove the original part
2. Relocate a new part per the drawing requirements
3. Apply bonding agents as described in the general notes of this manual
4. Add rivets as described in MDR # 118 using (1) end rivet at each end & interspacing the remainder per table.

NOTE - This procedure may also be used to apply first installation of parts after the normal bonding sequence. Example (Parts Shortage)

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DISCREPANCY

Mismatch between mating parts resulting in a gap requiring a shim

MODELS All

LIMITATIONS

1. Not applicable to bonded joints
2. Maximum gap to be .090
3. Not applicable to major assy connections

REPAIR

Fabricate a shim from 2024-T3 alum. with a shape as required to match the edge trim of the parts it will be installed between. The shim may be tapered if required to fill the gap.
Install the shim picking up a minimum of two existing fasteners & adjust the grip length as required to accomodate the added thickness.

- In locations where one fastener is used, apply adhesive per general notes of this manual to the faying surfaces.
- In locations where the joint is attached with screws or bolts and is to be removable, apply adhesive only to the faying surface which is permanently attached.