

PREPARED BY R. T. Johnson		PAGE NO 1.0.1
		REPORT NO GTA-0462-01
DATE 1 October 2004		MODEL NO 421C

FUSELAGE REPAIR

Cessna 421C, S/N 421C-1213, was repaired in 1998 for a gear-up landing on snow. Damage to the lower fuselage resulted in the repair and replacement of fuselage skin section, stringers and frames. The airplane was originally repaired under direction of the FAA approved data defined in report TSA-98-01, provided by the writer of this report. During routine inspection of the airplane, GTA Air found several parts not properly installed or repaired per the instructions in report TSA-98-01. This report is provided to give further repair instructions and substantiation for the original repairs not properly addressed previously. Specifically, this report will address the frame repair to F.S. 211.75 frame and the new skin panel installation, both of which require further attention.

Details of the repairs and corresponding substantiation are presented beginning on page 2.0.1. Repair instructions are presented beginning on page 4.0.1.

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FUSELAGE SKIN REPAIR

Report TSA-98-01 required the removal and replacement of the skin with two rows of rivets along each edge of the new skin section. The existing repair complied with this required except for the aft outboard edge on both sides. These edges were completed with only a single row of rivets. Therefore, to properly attach the new skin (installed in 1998) to the existing aircraft structure, a doubler will be added to extend the edge of the skin such that two rows of rivet along the edge will be effective in transferring the shear across the splice.

The new doublers are made of the same material and thickness as the existing skin and attached to the aircraft structure with stronger "E" rivets. Therefore, installation of the new doublers is considered structurally adequate and no further analysis is presented.

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FUSELAGE FRAME REPAIR

Report TSA-98-01 required the removal and replacement of the frame at F.S. 211, left hand side from lower centerline of the airplane up to W.L. 83.92. This frame consists of two formed channels spaced apart and attached to the skin. The replacement part for the forward channel appears to be a used channel taken from another airplane. The used part included existing fastener holes for the skin, which did not line up with the existing holes in the skin for this airplane. Therefore, GTA Air found several open holes in the newly installed used part and (3) were found to be must too close to the rivet locations for this airplane. Therefore, a strap is added to repair the holes too close to existing holes in the skin.

Repair instructions for the frame is presented beginning on page 5.0.1

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FUSELAGE FRAME REPAIR (Continued)

The repair strap is made from 0.063 inch thick 2024-T3C. The strap is provided to replace the transfer of shear capability of the three rivets too close to existing holes in the previously installed repair frame section. The strap is designed to allow the equal shear load carried by the existing rivets to transfer through the vertical leg of the strap into the existing frame section. Also, attachment of the strap to the existing frame is designed to equivalent strength of the existing frame flange.

Attachment of Repair Strap to Frame

Equivalent applied load

$F_{tu} = 61,000$ psi for 2024-T3C (Ref. MIL-HDBK-5J, p. 3-75)

flange is 0.75 x 0.063 inches.

$P = 61000 \times 0.75 \times 0.063 = 2882$ lbs.

Rivets are 0.125 inch dia. MS20470E rivets:

$P_{su} = 558$ lbs. (Ref. MIL-HDBK-5J, p. 8-13)

(6) rivets are effective at each end of the strap to react the equivalent loading

Therefore,

$$M.S.(Rivet\ Shear) = \frac{558 \times 6}{2882} - 1 = \underline{\underline{+0.16}}$$

Transfer of Shear Load to Frame

Equivalent shear load lost

existing rivets are 0.125 inch dia. MS20470AD rivets bearing into 0.032 inch thick skin:

$P_{su} = 389 \times 0.964 = 375$ lbs. (Ref. MIL-HDBK-5J, p. 8-13, 8-15)

$P_{bru} = 1.21 \times 411 = 497$ lbs. (Ref. MIL-HDBK-5J, p. 3-75, 8-14)

Therefore

$P = 3 \times 375 = 1125$ lbs.

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FUSELAGE FRAME REPAIR (Continued)

This load has to transfer up to the new rivet line by 0.375 inches. Therefore,

$$P_y = \frac{1125 \times 0.375}{2.50} = 169 \text{ lbs. (on the end rivets)}$$

$$P_z = \frac{1125}{6} = 189 \text{ lbs. (for all six rivets)}$$

$$P_{res} = \sqrt{169^2 + 189^2} = 254 \text{ lbs. (resultant applied to the end rivets)}$$

Allowable rivet load

$P_{su} = 492 \text{ lbs.}$

$$M.S.(\text{Joint Strength}) = \frac{492}{254 \times 1.15} - 1 = \underline{\underline{+0.68}}$$

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SKIN REPAIR INSTRUCTIONS

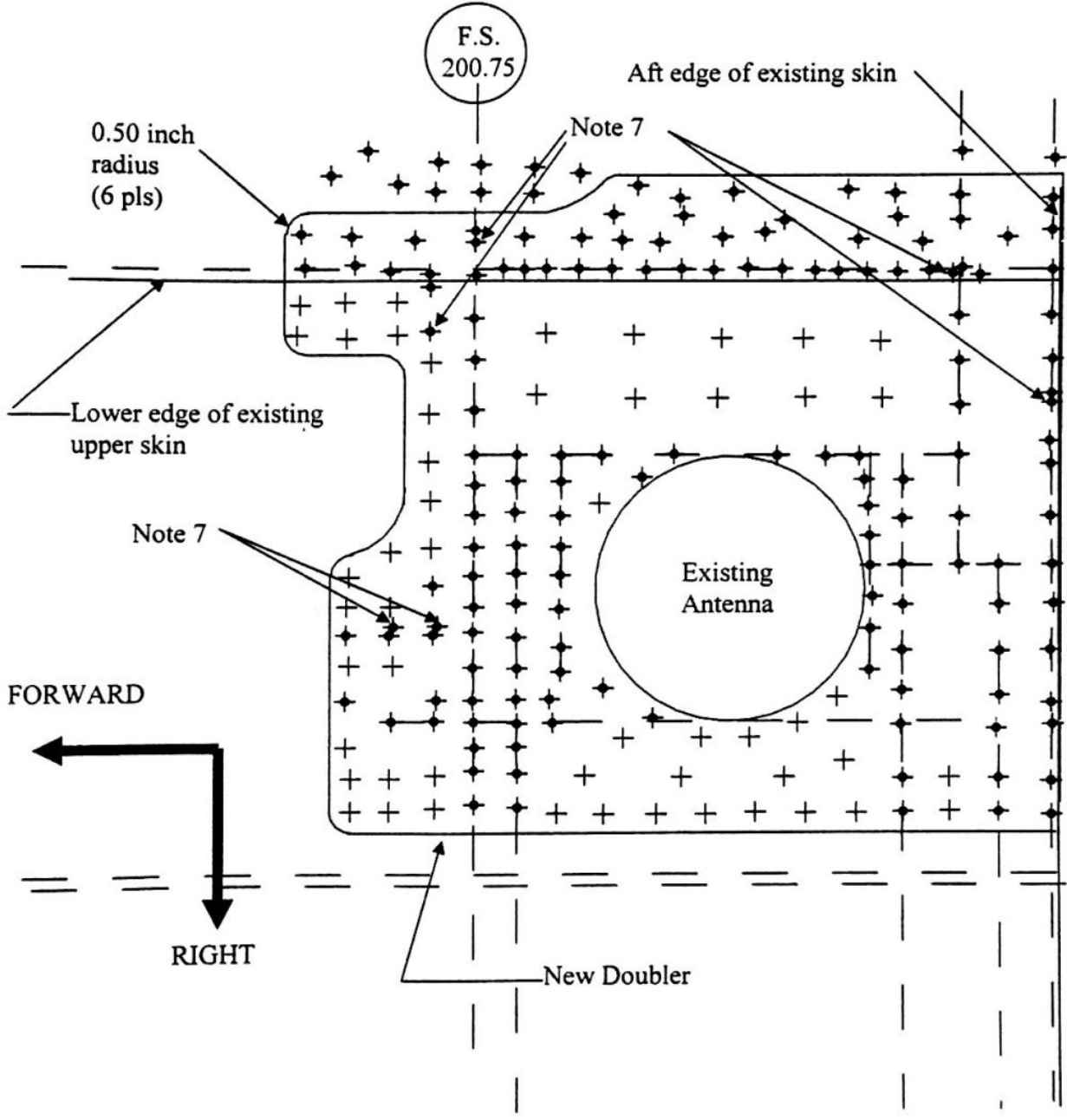
Following are the instructions to repair the skin section forward of F.S. 211:

Left Hand Side Skin Repair

- 1) Remove rivets as indicated.
- 2) Remove and discard existing antenna. Do not remove internal support structure.
- 3) Fabricate a doubler from 0.032 inch thick 2024-T3 clad. Locate aft edge of doubler at aft edge of existing skin. The overall dimensions and location are determined by including the number of existing rivets and new rivets indicated on page 4.0.2. Ensure that all rivets have an edge distance of 2 times the diameter of the fastener (2d). Ensure that the minimum spacing between any new or new and old fastener is 0.50 inches or 4d, which ever is greater.
- 4) Alodine the doubler using Dorado Kote4 per MIL-C5541A, Type I or equivalent. Prime with zinc chromate.
- 5) Apply sealant Flamemaster Chem Seal CS3204 Class B (MIL-S-8802 Type II Class B-1/2) between the strap and frame.
- 6) Bond countersunk washers in existing countersinks to fill the voids when covered by the new doubler using a structural adhesive per the adhesive manufacturer's instructions.
- 7) Leave these holes open in skin. Do not pick up in doubler. Smooth edges.
- 8) Attach doubler to skin with MS2470E4 rivets in new and existing locations except for those that were countersunk originally, as shown on page 4.0.2. Use NAS1097E4 rivets existing countersunk locations. Install rivets per AC 43.13-1, Chapter 4. Ensure the number of rivets indicate on page 4.0.2 are included. Field rivets should be located approximately as shown, but no closer than 6d to any adjacent rivet. Shim as necessary between existing skin and doubler to prevent excessive pull-up.

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GENERAL ARRANGEMENT - FUSELAGE SKIN REPAIR L.H. SIDE



- +— New Fastener Location
- Existing Fastener Location

VIEW LOOKING UP

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SKIN REPAIR INSTRUCTIONS (Continued)

Right Hand Side Skin Repair

- 1) Remove rivets as indicated.
- 2) Fabricate a doubler from 0.032 inch thick 2024-T3 clad. Locate aft edge of doubler at aft edge of existing skin. The overall dimensions and location are determined by including the number of existing rivets and new rivets indicated on page 4.0.4. Ensure that all rivets have an edge distance of 2 times the diameter of the fastener (2d). Ensure that the minimum spacing between any new or new and old fastener is 0.50 inches or 4d, which ever is greater.
- 3) Alodine the doubler using Dorado Kote4 per MIL-C5541A, Type I or equivalent. Prime with zinc chromate.
- 4) Apply sealant Flamemaster Chem Seal CS3204 Class B (MIL-S-8802 Type II Class B-1/2) between the strap and frame.
- 5) Bond countersunk washers in existing countersinks to fill the voids when covered by the new doubler using a structural adhesive per the adhesive manufacturer's instructions.
- 6) Attach doubler to skin with MS2470E4 rivets in new and existing locations except for those that were countersunk originally, as shown on page 4.0.4. Use NAS1097E4 rivets existing countersunk locations. Install rivets per AC 43.13-1, Chapter 4. Ensure that all existing rivet holes are pickup inside the surface of the new doubler, and the number of new rivets indicated on page 4.0.4 is included. Field rivets should be located approximately as shown, but no closer than 6d to any adjacent rivet. Shim as necessary between existing skin and doubler to prevent excessive pull-up.

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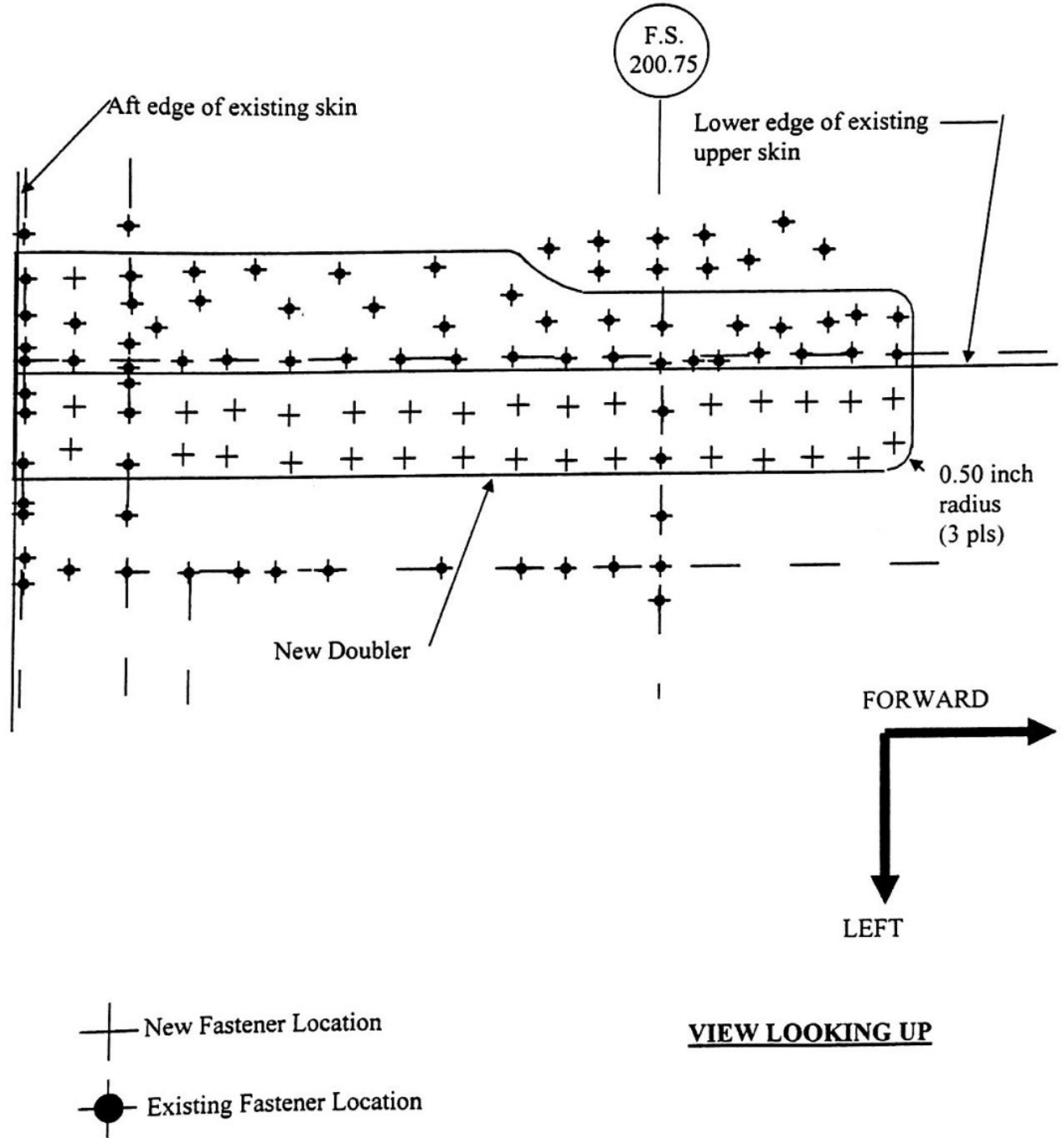
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GENERAL ARRANGEMENT - FUSELAGE SKIN REPAIR R.H. SIDE



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FRAME REPAIR INSTRUCTIONS

Following are the instructions to repair the miss-drilled holes in the forward channel at F.S. 211, left hand side of the airplane:

- 1) Remove rivets as indicated.
- 2) Insert a thin piece of steel between the fuselage skin and frame at the two miss-drilled holes. Elongate only enough to remove segment between the holes and remove sharp corners.
- 3) Fabricate the repair strap from 0.063 inch thick 2024-T3 clad. Overall length of part is dependent on the spacing of the existing rivets indicated. Ensure that the end rivets have a minimum edge distance of 0.25 inches. Form the vertical leg of the strap to nest inside existing bend radius of frame. Ensure bend radius of strap does not fall below the minimum for 0.063 inch thick 2024-T3C per AC 43.13-1, paragraph 4-55. **POSITION THE VERTICAL LEG SUCH THAT THE NEW RIVETS DO NOT LINE UP WITH EXISTING HOLES IN THE FRAME. LENGTH OF VERTICAL FLANGE MAY VARY DEPENDING ON THIS REQUIREMENT.**
- 4) Alodine the repair strap using Dorado Kote4 per MIL-C5541A, Type I or equivalent. Prime with zinc chromate.
- 5) Apply sealant Flamemaster Chem Seal CS3204 Class B (MIL-S-8802 Type II Class B-1/2) between the strap and frame. Fill holes to remain open in existing frame with sealant.
- 6) Attach strap to frame and skin with noted MS20470E4 rivets per AC 43.13-1, Chapter 4. **RIVETS THROUGH THE FRAME AND SKIN ARE EXISTING AND DO NOT INCLUDE THE OPEN HOLES!** Acceptable to use MS20470E5 rivets where 0.125 inch diameter rivets will not install properly. Do not install rivets larger than 5/32 inch diameter.
- 7) Attach vertical leg of strap to frame with 1/8 inch diameter Cherrymax Rivets CR3213-4, per manufacturers instructions.

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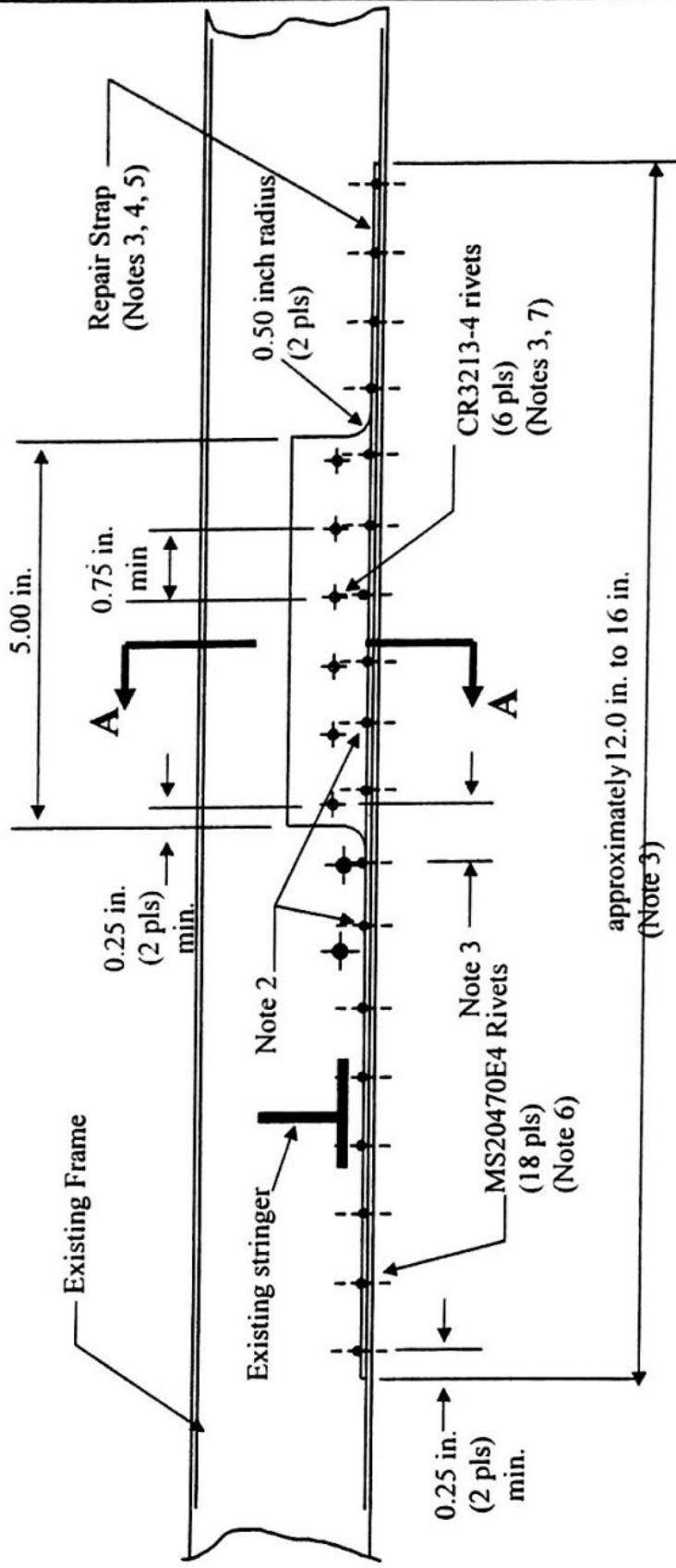
DATE

1 October 2004

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GENERAL ARRANGEMENT - FRAME REPAIR



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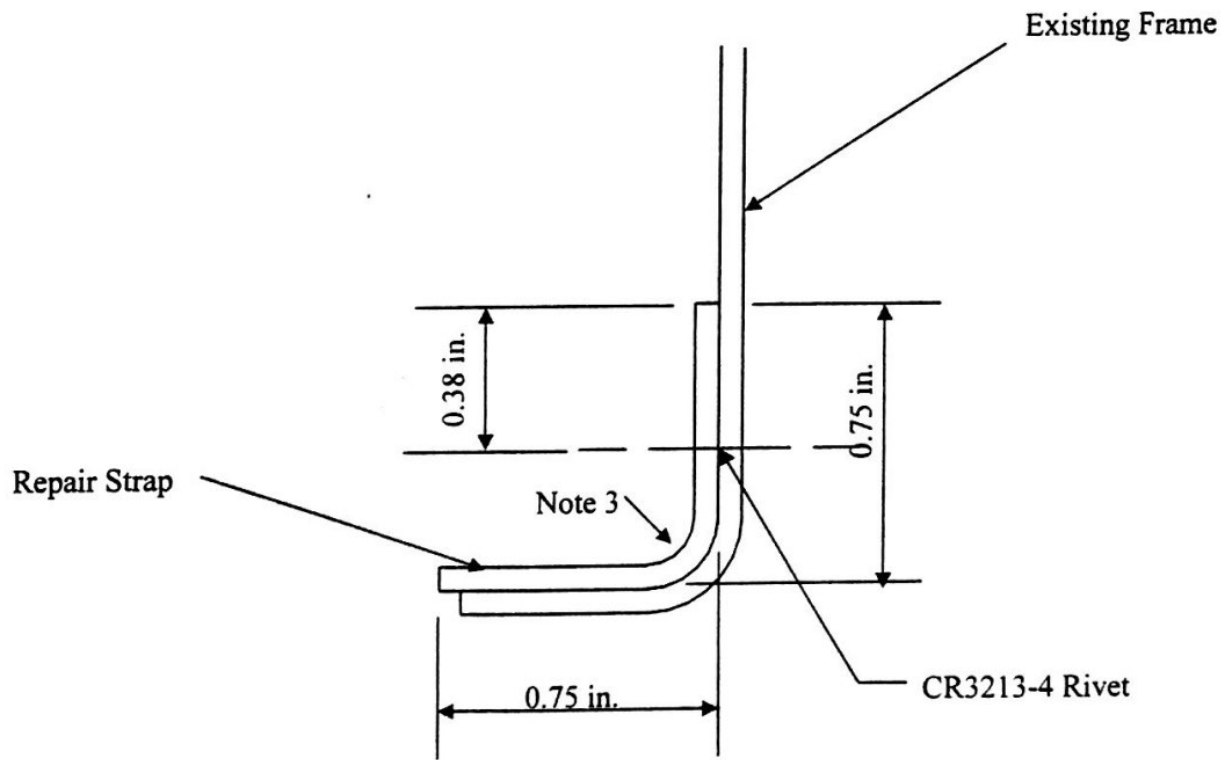
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GTA-0462-01

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GENERAL ARRANGEMENT - FRAME REPAIR (Continued)



Section A-A

INTRODUCTION

This report consists of the structural review of the major repairs defined by drawings numbered;

1. 04-107-01 REPAIR - RH WING AFT SPAR UPPER CAP
2. 04-107-02 REPAIR - LH WING SKIN AND SPAR CAPS

The structural aspects of the repair design are reviewed and justified within this report.

REFERENCES

1. 14 CFR Part 23 current amendment level.
2. MIL-HDBK-5, "Military Handbook, Metallic Materials and Elements for Aerospace Vehicle Structures. Revision level noted in text.
3. E-Systems Structures Manual.

LOADS

Equivalent strength analysis is used for this repair. The loss in strength due to the removal of the extra material is compensated by use of a reinforcing doubler or other means that maintains the structural stress levels at or below the original design levels.

CERTIFICATION BASIS

This certification basis for this model airplane (Jetstream Series 3101) is presented in the Type Certification Data Sheet number A21EU. The basic certification basis is FAR 23 through amendment 23-3. However, this analysis will use the current rules and amendment level of 14 CFR Part 23.

ANALYSIS

REPAIR - RH WING AFT SPAR UPPER CAP 04-107-01

The upper rear spar cap is partially cut. The cut length is .30 inches. The spar cap is .090 inches thick. The material of the cap is 2024-T3511 which has the following material properties;

**2024-T3, T3510, T3511 (QQ-A-200/3) Extruded bar, rod and shapes, <0.249 in thick, "A",
Ref. MIL-HDBK-5E, Table 3.2.3.0(j₁).**

$F_{tu} = 57 \text{ ksi}$ $F_{ty} = 42 \text{ ksi}$ $F_{cy} = 34 \text{ ksi}$ $F_{su} = 29 \text{ ksi}$ $F_{bru} = 84 / 108 \text{ ksi}$ $E = 10.8 \times 10^6 \text{ psi}$

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The ultimate loss in strength is $.30(.09)(57,000) = 1539$ lbf. The doubler strap is made from 2024-T3 clad sheet, .050 thick. Material properties are:

2024-T3 (QQ-A-250/5) Sheet, 0.010 - 0.062, "A", Ref. MIL-HDBK-5E, Table 3.2.3.0(e1).

F_{tu} = 60 ksi F_{ty} = 44 ksi F_{cy} = 36 ksi F_{su} = 37 ksi F_{bru} = 97 / 121 ksi E = 10.5x10⁶ psi

The strength of the doubler is $(.7 - .156)(.05)(60000) = 1632$ lbf.

$$MS(\text{Strap Strength}) = (1632 / 1539) - 1 = \underline{+0.06}$$

There are four MS20470AD5 rivets on each side of the damage. The rivet shear strength is $596(.995) = 593$ lbf. The bearing strength of the strap is $.05(.156)(121000) = 943$ lbf. The strength of the rivets is $4(593) = 2372$ lbf.

$$MS(\text{Rivet Strength}) = (2372 / 1539) - 1 = \underline{+0.54}$$

REPAIR - LH WING SKIN AND SPAR CAPS

04-107-02

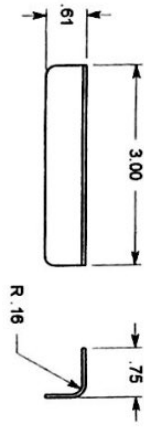
The lower right hand wing skin is found to be damaged. The wing skin is made from 2024-T3 clad sheet .063 thick. The skin must support ultimate loads of minimum section which occurs just inboard of the damaged area. The minimum sectional length is $7.6 - 1.1 - .156 = 6.344$ inches. The ultimate loss in strength of the skin section is $.063(6.344)(60000) = 23980$ lbf. The doubler installed is made from .063 thick 2024-T3 clad sheet. The minimum section of the doubler is $9.69 - 9(.156) = 8.284$ inches. The minimum strength of the doubler is $8.284(.063)(60000) = 31313$ lbf.

$$MS(\text{Doubler Strength}) = (31313 / 23980) - 1 = \underline{+0.31}$$

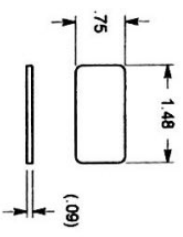
There is a minimum of 35 MS20470AD6 rivets on each side of the damage. The strength of the rivet is 862 lbf per Ref. 3, Table 6-12a. There is no correction factor required for AD6 in .063 thick material. Bearing strength is $.063(.191)(121000) = 1456$ lbf. The minimum strength of the fasteners is $35(862) = 30170$ lbf. Margin is:

$$MS(\text{Rivet Strength}) = (30170 / 23980) - 1 = \underline{+0.26}$$

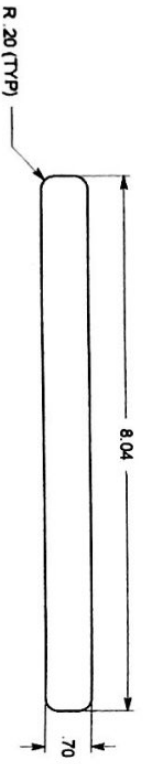
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Date: 15-Oct-04	Rev: IR	Model: 421C S/N: 421C-1213
Wing Repair		



-015 L-ANGLE
 (MAKE FROM 2024-T3 CLAD, QQ-A-250/5
 .050 THK)



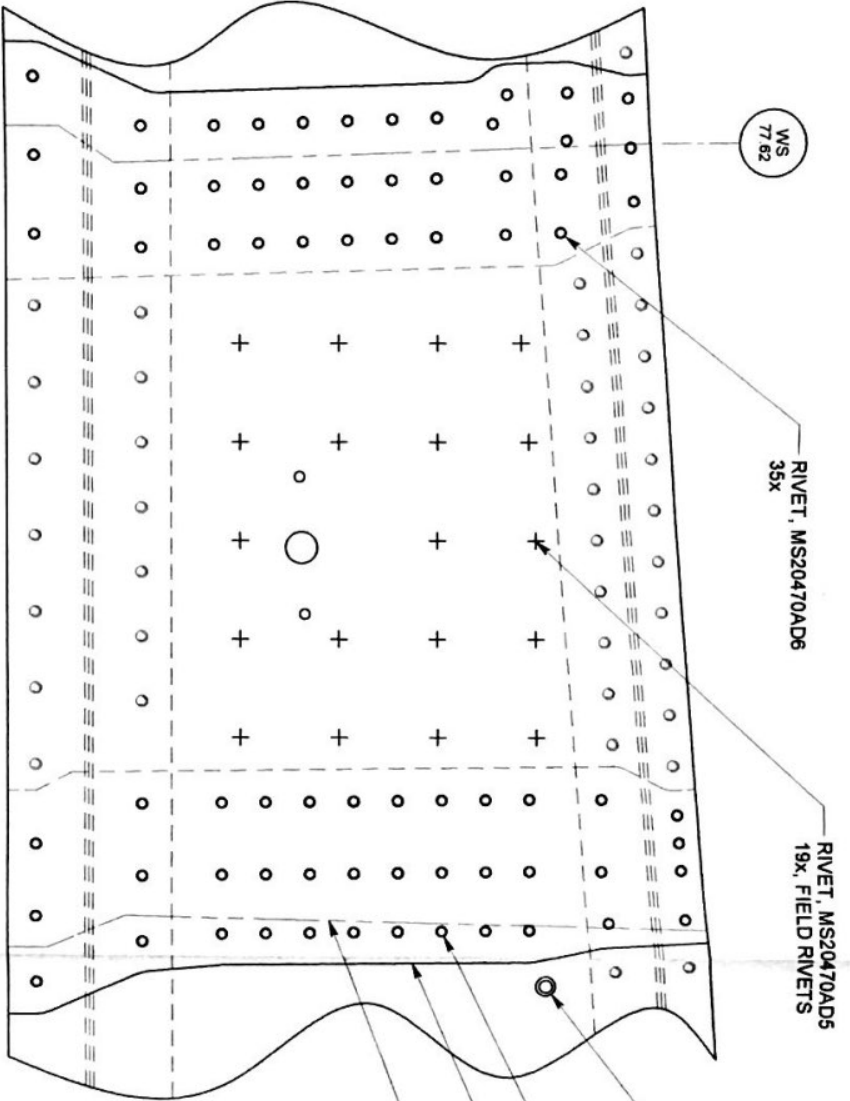
-013 FILLER
 (MAKE FROM 2024-T3 CLAD, QQ-A-250/5
 .090 THK)



-011 STRAP
 (MAKE FROM 2024-T3 CLAD, QQ-A-250/5
 .050 THK)

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MAKE	CESSNA	DRAFTER	Michael Lieblich	DWG NO	04-107-01
MODEL	421C	APPROVAL		REPAIR - RH WING AFT SPA	UPPER CAP
S/N	421C-1213	Scale = 1 : 2		Date:	2 SEP 04
N	878DS	CAGE CODE		Sheet	2 of 2
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REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

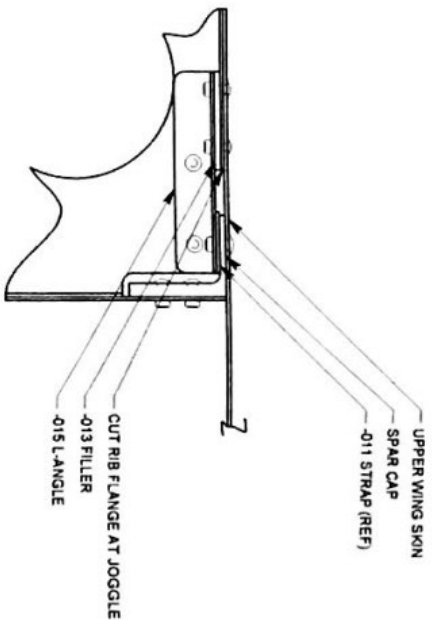
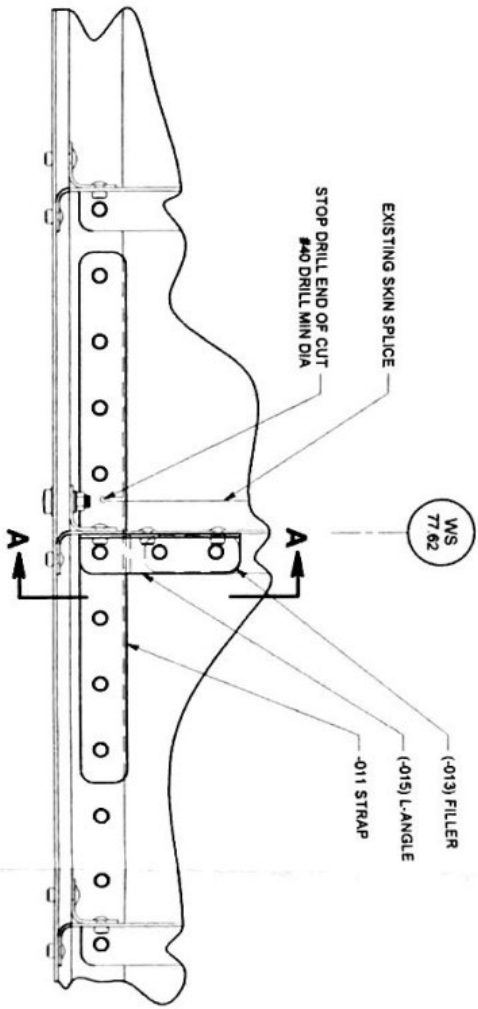


-101 REPAIR INSTL
(VIEW LKG UP AT LWR WING SKIN)

- NOTES / REQUIREMENTS:**
1. FAB REPAIR PARTS AS SHOWN.
 2. AFTER FINAL DRILL, REMOVE ALL PARTS AND DE-BURR. (0.005 MAX CHAMFER)
 3. FINISH PARTS PER PS210, TYPE 1.
 4. INSTALL RIVETS AND FASTENERS PER PS310.

PROPRIETARY NOTICE ALL INFORMATION DISCLOSED HEREIN IS CONSIDERED PROPRIETARY AND MAY NOT BE REPRODUCED OR USED FOR ANY PURPOSE EXCEPT AS EXPRESSLY GRANTED IN WRITING BY GTA AIR		Tolerance Unless Otherwise Specified X ± .000 XX ± .030 XXX ± .005 angles ± 0.5 deg		GTA AIR, INC. Lancaster, TX 75146 REPAIR - LH LWR WING SKIN AND SPAR CAPS	
MAKE	CESSNA	DRAFTER	Michael Lieblich	DWG NO	04-107-02
MODEL	421C	APPROVAL		Scale = 1 : 2	Date: 2 SEP 04
S/N	421C-1213			Sheet 1 of 2	REV IR
	876DS				

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED



-101 REPAIR INSTL
(VIEW LKG UP AT RH SIDE AFT WING SPAR)

- NOTES / REQUIREMENTS:**
1. FAB REPAIR PARTS AS SHOWN.
 2. LOCATE RIVETS APPROX AS SHOWN. MAINTAIN 2xDIA MIN EDGE DISTANCE. MINIMUM NUMBER OF FASTENERS ARE SHOWN.
 3. AFTER FINAL DRILL, REMOVE ALL PARTS AND DE-BURR. (0.005 MAX CHAMFER)
 4. INSTALL RIVETS AND FASTENERS PER PS310 TYPE 1.

PROPRIETARY NOTICE ALL INFORMATION DISCLOSED HEREIN IS CONSIDERED PROPRIETARY AND MAY NOT BE REPRODUCED OR USED FOR ANY PURPOSE EXCEPT AS EXPRESSLY AUTHORIZED IN WRITING BY GTA AIR		Tolerance Unless Otherwise Specified X ± .100 XX ± .030 XXX ± .005 angles ± 0.5 deg		GTA AIR INC. Lancaster, TX 75146	
MAKE	CESSNA	DRAFTER	Michael Lieblich	DWG NO	04-107-01
MODEL	421C	APPROVAL		REPAIR - RH WING AFT SPAR UPPER CAP	
S/N	421C-1213	CAGE CODE	B	Scale = 1 : 2	Date: 2 SEP 04
N	876DS			Sheet 1 of 2	REV IR

SEQ. NO: 200462-01

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION	DATE 15 OCTOBER 2004
STATEMENT OF COMPLIANCE WITH THE FEDERAL AVIATION REGULATIONS	

AIRCRAFT OR AIRCRAFT COMPONENT IDENTIFICATION			
MAKE Cessna	MODEL NO. 421C	TYPE (Airplane, Radio, Helicopter, etc.) AIRPLANE	NAME OF APPLICANT GTA Air, Inc. Lancaster, Tx

IDENTIFICATION	LIST OF DATA
AR-0462-01, Rev. NC Dated 1 October 2004	<p style="text-align: center;">TITLE</p> <p style="text-align: center;">STRUCTURAL SUBSTANTIATION CESSNA 421 FUSELAGE REPAIR</p> <p>NOTES: 1. THIS APPROVAL APPLIES TO ENGINEERING DESIGN DATA ONLY. 2. THIS APPROVAL APPLIES TO CESSNA 421C, SERIAL NUMBER 421C-1213 ONLY.</p> <p style="text-align: center;">-----END-----</p>


PURPOSE OF DATA
IN SUPPORT OF A MAJOR REPAIR

APPLICABLE REQUIREMENTS (List specific sections)
FAR 23.301, .303, .307(a), .601, .603, .609, .613, .615

CERTIFICATION - Under authority vested by direction of the Administrator and in accordance with conditions and limitations of appointment under Part 183 of the Federal Aviation Regulations, data listed above and on attached sheets numbered none have been examined in accordance with established procedures and found to comply with applicable requirements of the Federal Aviation Regulations.

Recommend approval of these data
 Approve these data

I (We) Therefore

SIGNATURE(S) OF DESIGNATED ENGINEERING REPRESENTATIVE(S)	DESIGNATION NUMBER(S)	CLASSIFICATION(S)
RONALD T. JOHNSON 	DERT-710143-SW	STRUCTURES

**STRUCTURAL SUBSTANTIATION
CESSNA 421 FUSELAGE REPAIR**

**REPORT NO. : GTA-0462-01
MODEL NO. : 421C
SERIAL NO. : 421C-1213**

Prepared for:

**GTA Air, Inc.
770 Ferris Rd, LB 13
Lancaster, TX 75146**

DATE 1 October 2004

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PREPARED BY _____



**Ronald T. Johnson
FAA DER Structures
Greenville, Tx**

LOG BOOK ENTRY

December 21, 2004

CESSNA 421C S/N 1213 HOBBS: 2508.9 AFTT: 2508.9 N 876DS

- R/H wing flap well, replace existing fasteners in ribs from STA 54.94 to 58.94 with correct factory fasteners.
- R/H wing flap well, replace incorrect blind fasteners @ STA 67.94, and @ 70.94 with correct factory fasteners.
- R/H wing flap well, added a single row of rivets @ STA 77.44 for the previous skin splice that had not been drilled.
- R/H wing flap well, replaced blind fasteners with proper solid rivets in upper aft spar cap from STA 63.94 to 76.94.
- R/H wing flap well, Fabricate and install doubler for upper aft spar cap @ STA 76.94 IAW 8110-3. 04-107-01 dated 02 SEP. 04
- R/H wheel well butt rib/ false spar mating point, @ STA 58.94, replace I/B end of the false spar web. And replace blind fasteners as needed. Reassure all pre-existing fasteners are of the correct type.
- R/H wing, replaced blind fasteners in upper aft spar cap from STA 58.94 to 76.94 with factory correct fasteners.
- R/H wing, verified validity of previously installed rivets in fwd spar web @ wing root STA 58.94, and STA 62.44.
- R/H wing, replace blind fasteners, and shim skin to proper contour between I/B aft engine beam, aft of the firewall @ STA 90.94.
- R/H wing, replace rivet that has been installed with a shim under the bucktail, in the lower fwd spar cap @ STA 92.94

PG. 1

PG 2

- R/H wing, repair inspection panel flanges @ STA 92.94, and 105.94.
- R/H wing, replace six improperly installed, shimmed huck bolts in lower, O/B engine beam, aft of firewall @ STA 105.94.
- R/H wing, O/B flap, Repaired tear on the IB edge.
- R/H wing, repair crack in lower wheel well skin @ STA 64.44.
- R/H wing, replace various blind fasteners along bottom of wing @ STA 58.94.

FUSELAGE STRUCTURE REPAIRS

- Replace an enormous amount of blind fasteners in the fuselage skin and surrounding ribs and longerons from STA 154.5 to 212.87.
- Installed doublers LEFT & RIGHT side of fuselage from F.S. 195 to aft edge of existing skin. IAW 8110-3 Report NO. : GTA-0462-01, dated 1 Oct. 2004 pages 4.0.1. thru 4.0.4 This was done to comply with non compliance of 8110-3 dated September 27,1989 Report NO.: TSA-98-01.
- Repaired forward channel at F.S.212.57, left hand side of the airplane IAW 8110-3, Report NO. GTA-0462-01, Dated 1 Oct. 2004, page 5.0.1 thru 5.0.3 to repair miss drilled hole from the original repairs on 8110-3, REPORT NO. TSA-98-01, date September 27,1998.
- Repaired fuselage belly stringers that had not been repaired Per 8110-3 REPORT NO TSA-98-1, left hand and right hand sides, at FS200.75-FS 225.50, IAW Cessna 421C Structural Repairs, Section 15-

40 Page 19 and Repair information in 8110-3 Report NO. TSA-98-01 page 6.0.1,6.1.1. for the stringers forward of FS 200.75.

- L/H wing, replace improperly installed rivet in L/E rib @ STA 43.44.
- L/H wing, replace improperly installed blind fasteners along the lower wing structure @ STA 58.94.
- L/H wing, replace blind fasteners in the aft, upper false spar fwd and aft cap @ STA 58.94. Also, verify validity of previously installed screws.
- L/H wing, replace shimmed huck bolts, with proper length fasteners and inspect holes in fwd lower spar cap, fwd and aft sides @ STA 82.94.
- L/H wing, lower fwd carry through spar web has three bolts that were damaged by a cutting wheel from STA 65.94 to 68.44. replaced bolts with new bolts.
- L/H wing, replace six blind fasteners attaching a pulley bracket the aft false spar @ STA 89.44 to 91.44.
- L/H wing, and inboard end of fuel tank, replace blind fasteners.
- Research validity of lower skin splice @ STA 81.44 to 92.94. Replaced splice and doubler IAW 8110-3, 04-107-02 dated 02 SEPT 04
- L/H wing, remove auto body filler, shim aft O/B engine beam to proper skin contour, and replace blind fasteners in lower nacell skin @ STA 93.44 and 111.94.
- L/H wing, replace doubler, huck bolts, hi-locs, solid rivets in the lower aft engine nacell/ fwd false spar flange @ STA 88.94, and 110.94.

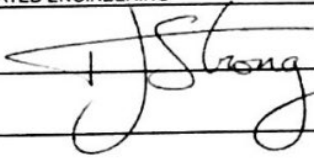
PG 3

- L/H wing, replace rivets in I/B flap hinge, through aft lower spar cap, with the proper rivets.
- L/H wing, repair damaged flap well rib @ STA 58.94. IAW Cessna 421 Structural Repair Service Manual Section 15-40, page 28
- L/H wing, replace improperly installed rivets in bottom of aft spar cap from STA 58.94 to 130.94.
- L/H wing, remove damaged makeshift stringer that is wedged, but not fastened in any way, in I/B flap well STA 58.94.
- L/H wing, Replace improperly installed rivets in aft lower butt wing strip.
- L/H wing, replace blind fasteners securing flap actuator bellcranks to the lower skin @ STA 72.94, 95.94, and 120.94.
- L/H wing, replace blind fasteners through cap of lower aft false spar from STA 58.94 to 121.94.
- L/H wing, replaced blind fasteners with solid rivets, in previous lower skin repair, O/B of wheel well from STA 110.94 to 125.94.
- L/H wing, replace rivets and doubler in the aft upper cap of the upper spar @ STA 32.94. Replace missing rivets in cap nearby.
- L/H wing, finish smoothing and contouring previous cutout modification in the aft wing spar web where the I/B flap, O/B actuator rod passes through the spar.

Rivet replacement in the above rework and repairs was done IAW CESSNA 421 STRUCTURAL REPAIR SERVICE MANUAL Pages 3-13 Paragraph 6 and Paragraph 7 . Also FAR 43.13-1B, Section 4, Paragraph 4-57,b,e,f 2 & 4

PAGE 4 LOG BOOK ENTRY
N 876 DS S/N 421C-1213

John H. H.
10 2045752

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION			1. DATE 10/24/17
STATEMENT OF COMPLIANCE WITH AIRWORTHINESS STANDARDS			
AIRCRAFT OR AIRCRAFT COMPONENT IDENTIFICATION			
2. MAKE TEXTRON	3. MODEL NO. 421C	4. TYPE (Aircraft, Engine, Propeller, etc.) AIRPLANE	5. NAME OF APPLICANT HANGAR ONE AVIONICS
LIST OF DATA			
6. IDENTIFICATION		7. TITLE	
N421SM-101417-1 REV N/C 10/14/17		"HORIZONTAL STABILIZER TRAILING EDGE REPAIR DESIGN AND INSTALLATION"	
<p style="text-align: center;"><u>Notes</u></p> <p>This approval is for engineering design data only. It indicates the data listed above demonstrates compliance only with the regulations specified by paragraph and subparagraph listed below as 'APPLICABLE REQUIREMENTS'. This form does constitute FAA approval of all the engineering data necessary for substantiation of compliance to necessary requirements for the entire alteration/repair. Structural aspects are approved.</p>			
8. PURPOSE OF DATA IN SUPPORT OF A REPAIR TO SHOW COMPLIANCE WITH THE FOLLOWING REGULATIONS FOR ONE AIRCRAFT ONLY; S/N <u>421C1213</u> , T/N <u>N421SM</u>			
9. APPLICABLE REQUIREMENTS (List specific sections) 14 CFR Part 23.301(a)(b), Amdt 23-48; 23.303, Amdt 23-0; 23.305(a), Amdt 23-45; 23.307(a), Amdt 23-0; 23.601, Amdt 23-0; 23.603(a)(b), Amdt 23-23; 23.605(a), Amdt 23-23; 23.607(a)(b)(c), Amdt 23-0; 23.609(a), Amdt 23-0; 23.613(a)(b), Amdt 23-45; 23.625(a), Amdt 23-7			
10. CERTIFICATION - Under authority vested by direction of the Administrator and in accordance with conditions and limitations of appointment under 14 CFR Part 183, data listed above and on attached sheets numbered <u>N/A</u> have been examined in accordance with established procedures and found to comply with applicable requirements of the Airworthiness Standards listed.			
<input type="checkbox"/> Recommend approval of these data <input checked="" type="checkbox"/> Approve these data			
I (We) Therefore			
11. SIGNATURE(S) OF DESIGNATED ENGINEERING	12. DESIGNATION NUMBER(S)	13. CLASSIFICATION(S)	
TREVOR J. STRONG	DERT-605818-NM	STRUCTURES	
			

HORIZONTAL STABILIZER TRAILING EDGE REPAIR DESIGN AND INSTALLATION
 (FOR ONE AIRCRAFT ONLY - A CESSNA 421C, S/N 421C1213, T/N N421SM)

ZONE	REV	DESCRIPTION	DATE	APPROVED

NOTES:

1. THIS DRAWING DEFINES THE REPAIR TO DAMAGE TO THE EXISTING HORIZONTAL STABILIZER (H-STAB) LOWER SKIN PANEL AT THE TRAILING EDGE. THE REPAIR INVOLVES TRIMMING/REMOVING THE EXISTING TRAILING EDGE, INCLUDING DAMAGED SKIN, AND THE INSTALLATION OF A STIFFENER, SIMILAR TO THE AIRCRAFT FLAP DESIGN. THE REPAIR IS LOCATED AT FS 400.0 (+/-2.0") AND ALONG THE AIRCRAFT CENTERLINE, AS SHOWN.
2. CHECK FOR CLEARANCE WITH EXISTING SYSTEMS, HOLES, AND AIRCRAFT STRUCTURE PRIOR TO STARTING INSTALLATION
3. CHEM FILM ANY BARE ALUMINUM PER MIL-DTL-5541F (OR EQUIVALENT)
4. EPOXY PRIME NEW FABRICATED PARTS AND ANY BARE METAL PER MIL-PRF-233773 (OR EQUIVALENT)
5. PAINT EXTERNAL SURFACE OF REPAIR TO MATCH THE AIRCRAFT PAINT SCHEME AS PREFERRED
6. TRIM OFF EXISTING H-STAB TRAILING EDGE, AS SHOWN. ENSURE ALL DAMAGE HAS BEEN REMOVED, BY PERFORMING A DIE PENETRANT INSPECTION OF THE SKIN PANEL PER THE AIRCRAFT MAINTENANCE MANUAL/STRUCTURAL REPAIR MANUAL (AMM/SRM). IF DAMAGE REMAINS, CONTACT STRONG AERO ENGINEERING FOR DISPOSITION
7. ADJUST -01 HEAVY DUTY STIFFENER LENGTH TO MATCH THE EXISTING H-STAB SKIN PANEL, AS SHOWN
8. WET INSTALL -01 HEAVY DUTY STIFFENER TO MIL-S-8802 (OR EQUIVALENT)
9. MAINTAIN 2D EDGE AND 4D PITCH DISTANCE MINIMUMS ON ALL RIVETS HOLES
10. FUNCTION CHECK THE AIRCRAFT ELEVATOR SYSTEM, PER THE AIRCRAFT AMM, POST REPAIR INSTALLATION

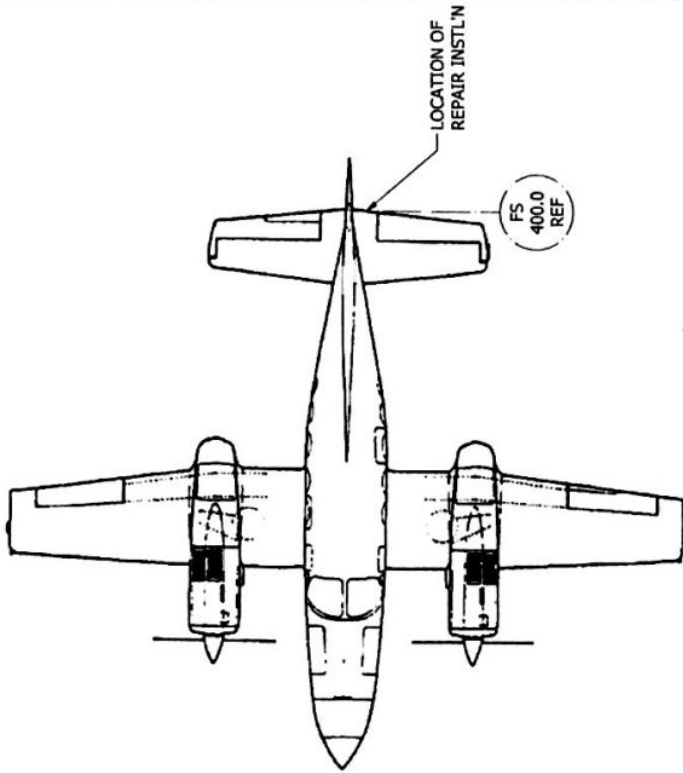
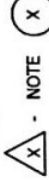


FIG 1 - LOCATION OF REPAIR INSTALLATION
 (NOT TO SCALE)

AR	MS20470AD3-XX	3/32 SOLID RIVET (OR EQUI.)	3
1	-01	HEAVY DUTY FLAP STIFFENER (P/N 0523902-7, TEXTRON)	2
X	-101	H-STAB TRAILING EDGE REPAIR	1
-101	PART NUMBER	DESCRIPTION	MATERIAL
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES DECIMALS ANGLES .001 & .01 30° & 45° .0005 90° & 120° .0001 15° & 30°			
APPROVALS:		DATE:	
DESIGNED BY: R. HODGINS		10/14/2017	
CHECKED BY: T.J. STRONG		10/14/2017	
DRAWN BY: T.J. STRONG		10/14/2017	
SCALE: 1:1		10/14/2017	
NEXT ASSY USED ON:			
APPLICATION:			

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KEY:



GENERAL NOTE

N421SM-101417-1 2 N/C 1

HORIZONTAL STABILIZER TRAILING EDGE REPAIR DESIGN AND INSTALLATION
(FOR ONE AIRCRAFT ONLY - A CESSNA 421C, S/N 421C1213, T/N N421SM)

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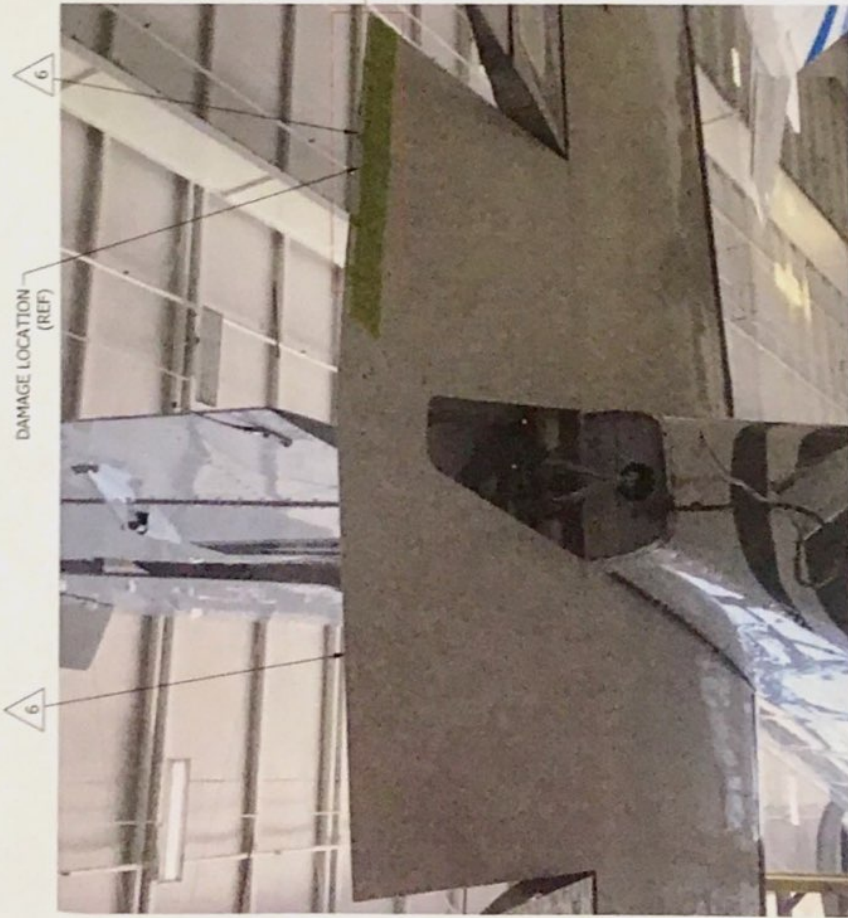
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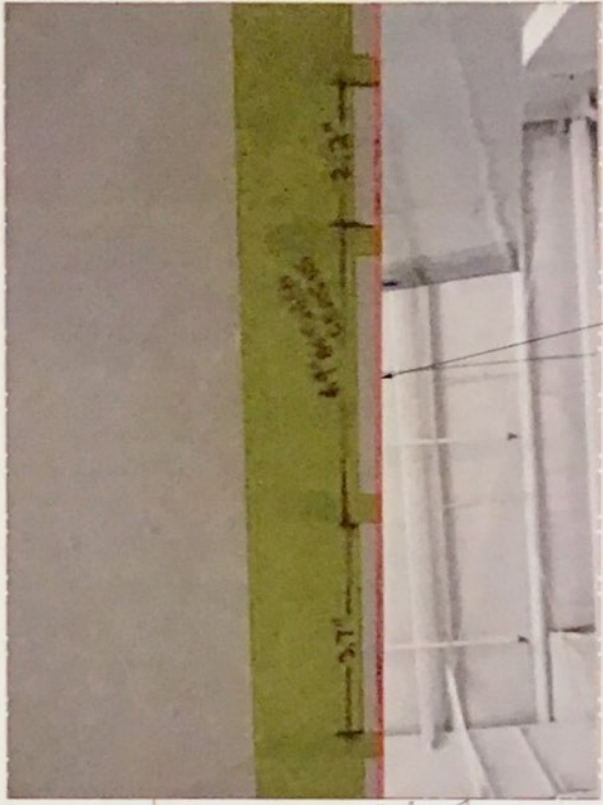
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UP
PORT

FIG 2 - PHOTO LOOKING UP AND FORWARD AT DAMAGE LOCATION



FORWARD
S/BOARD

FIG 3 - PHOTO LOOKING UP AT DAMAGE

N421SM-101417-1 N/C

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D C B A

HORIZONTAL STABILIZER TRAILING EDGE REPAIR DESIGN AND INSTALLATION
 (FOR ONE AIRCRAFT ONLY - A CESSNA 421C, S/N 421C1213, T/N N421SM)

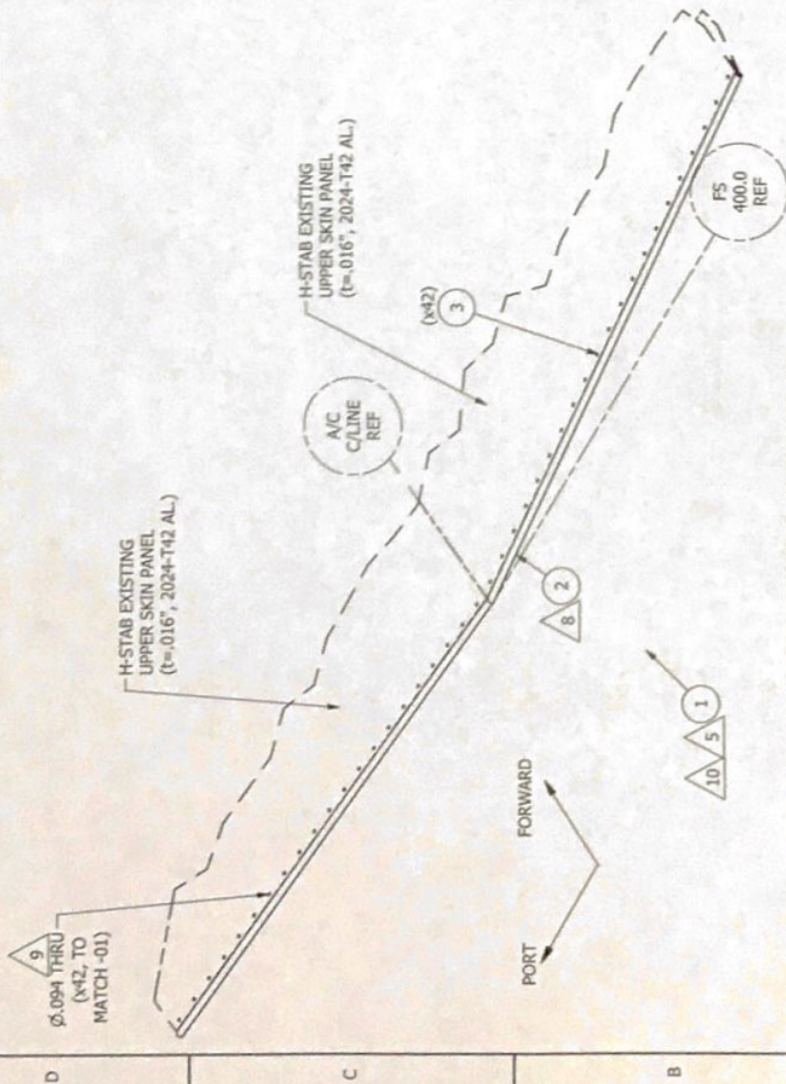


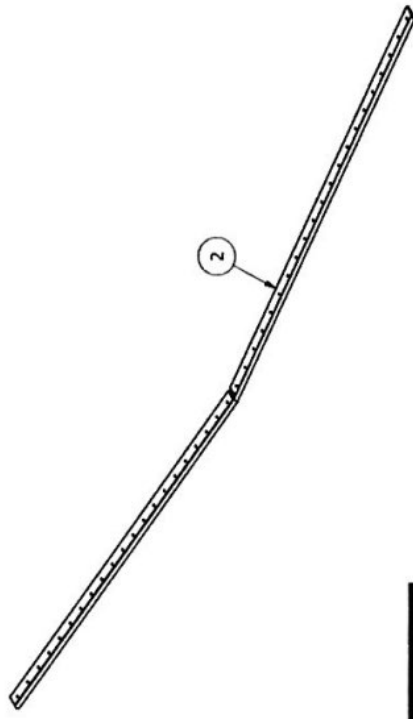
FIG 4 - VIEW LOOKING DOWN & FORWARD AT REPAIR INSTALLATION



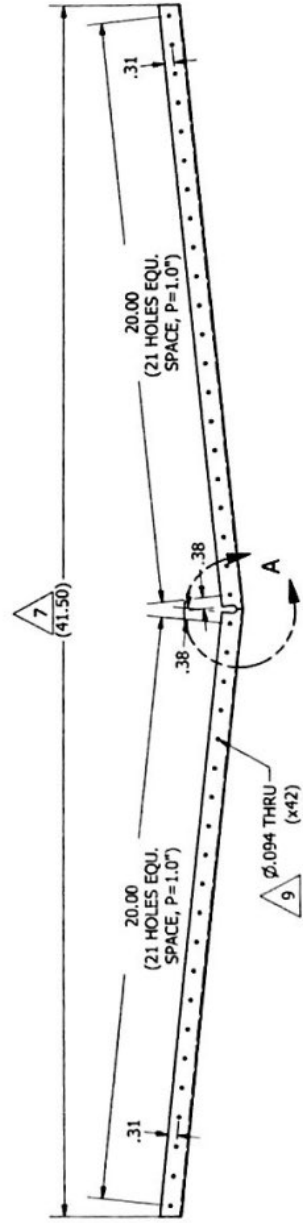
FIG 5 - PHOTO OF REPAIR POST INSTALLATION

N421SM-101417-1 4 N/C

HORIZONTAL STABILIZER TRAILING EDGE REPAIR DESIGN AND INSTALLATION
(FOR ONE AIRCRAFT ONLY - A CESSNA 421C, S/N 421C1213, T/N N421SM)



-01 HEAVY DUTY FLAP STIFFENER



DETAIL A

N421SM-101417-1 N/C

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