INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

OF

THE GLOBAL HELICOPTER TECHNOLOGY, INC.

TAIL BOOM VERTICAL FIN SPAR
PN VTF-030-846-101

AS INSTALLED ON THE BELL MANUFACTURED UH-1H, UH-1F, UH-1P and TH-1F HELICOPTERS

RECORD OF REVISIONS

Revision	Issue Date	Date Inserted	Initials
1	11/15/00	11/15/00	DJA
2	11/30/00	11/30/00	DJA
3	03/26/01		
4	10/04/02		
5	09/16/09	09/16/09	

List of Effective Pages

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Chapter 1 - Introduction

Applicability: For the purposes of this document only, the term UH-1 represents the Bell manufactured UH-1H, UH-1F, UH-1P and TH-1F helicopters. This ICA is applicable to the UH-1 helicopters certified in Restricted Category having the GHTI vertical fin spar installed (P/N VTF-030-846-101). This document applies to the UH-1 helicopters covered under the following Type Certificates holders:

UH-1H:	H13WE	Garlick Helicopters, Inc
	H3SO	U. S. Helicopters, Inc.
	R00007DE	Utah State University
	H7SO	Williams Helicopters Corporation
	H15NM	Western International Aviation, Inc.
	H6SO	Southwest Florida Aviation
5	R00010SE	Tamarack Helicopters, Inc.
UH-1F:	H7NE	Tamarack Helicopters, Inc.
	H2NM	California Department of Forestry
	H12NM	Garlick Helicopters, Inc
	H11SW	Firefly Aviation Helicopter Services
	R00008AT	Robinson Air Crane, Inc.
UH-1P:	H12NM	Garlick Helicopters, Inc.
	R00008AT	Robinson Air Crane, Inc.
TH-1F:	H12NM	Garlick Helicopters, Inc.
	R00008AT	Robinson Air Crane, Inc

Description of the Appliance: The newly designed GHTI forward vertical fin spar is a replacement for the standard Bell manufactured UH-1 spar P/N 205-030-846. The new design is constructed substantially stronger by using thicker materials and by replacing the old appliance throughout the full length. The kit includes fastener hardware, matching tool and limited hand tools. The Type Design spar assembly, VTF-030-800, includes one each of the following:

VTF-030-832-101	Dzus Rail
VTF-030-833-101	Bracket, Saddle to Spar
VTF-030-841-101	Bracket, Nose Rib, LEFT-HAND
VTF-030-841-102	Bracket, Nose Rib, RIGHT-HAND
VTF-030-846-101	Spar Assembly, Forward, Vertical Fin
VTF-030-860-101	Spacer, Upper Pulley Assembly.
VTF-030-861-101	Spacer, Lower Pulley Assembly.
VTF-030-862-101	Spacer, Saddle Bracket

Types of materials are essentially the same except for the use of Hi-Lock rivets in some areas. The use of a one-time-use matching tool to install the spar alleviates the need for special tailboom jigs and allows field installation at facilities with standard sheet metal capabilities.

Scope: This manual covers the Instructions for Continued Airworthiness for the Global Helicopter Technology, Inc. (GHTI) vertical fin spar replacement for the UH-1 helicopters. Global Helicopter Technology, Inc has designed a field replaceable spar that has infinite fatigue life (P/N VTF-030-846-101). This manual contains the criteria for maintenance and inspections, and determining the serviceability of the Global spar after installation on the UH-1 helicopters.

Distribution: This ICA is to be issued with each purchased GHTI spar kit. Changes to this ICA will be issued to each purchaser as deemed necessary, at a rate of one copy per spar kit. Distribution will be by the most expeditious means.

Superseded Documents: The information, procedures, requirements, and limitations contained in these Instructions for Continued Airworthiness for this type design change supercede the information, procedures, requirements, and limitations contained in the rotorcraft's maintenance manual when the type design change is installed on the Type Certificate Holder's rotorcraft.

Chapter 2 - Inspection Requirements

There are two inspection requirements for the Global Helicopter Technology, Inc. forward vertical fin spar P/N VTF-030-846-101 as installed on the Bell manufactured UH-1 helicopters, a 150-hour (Form A) and 300-hour inspection (Form B).

150-hour Requirement. Use Form A as an aid, page 9.

1. After opening the vertical fin tail rotor drive shaft cover and removing the 42° gear box cover, clean the areas as necessary with cloth dampened with methyl-ethyl-ketone.

Caution: Ventilate area to prevent breathing fumes.

2. Visually inspect the 90° and 42°gearbox fittings (Areas A and C) for cracks, mechanical damage, chafing, and working rivets. Pay particular attention to the area at the spar and upper tailboom skin junction near the two lowest rivets at Area C.

3. Outside tailboom – inspect forward side of spar assembly full length in areas A, B, and C, Figure 1 on page 7. Check for cracks, damage, & corrosion, especially around rivet heads. Check for missing and working rivets. [Inspect for evidence of dark colored material or powder-like substance emanating from under the rivet head on working rivets.]

300-hour Requirement. Use Form B as an aid, page 10.

Inspect the forward side of the forward vertical fin spar caps and web from the 90° gearbox casting on the upper fin to the 42° gearbox fitting. Inspect the forward side of the vertical fin spar to just above lower tailboom skin Areas A, B, and C, as follows:

Access: After removing the aft left and right fin tailboom inspection covers and aft tailboom access door, as well as opening the tail rotor drive shaft cover on the vertical fin and removing the 42° gear box cover, clean area to be inspected as necessary with cloth dampened with methyl-ethyl-ketone.

Caution: Ventilate area to prevent breathing fumes.

1. From inside of tailboom, Area D, face aft, use a bright light and small inspection mirror, inspect area for cracks, corrosion, and mechanical damage. Pay particular attention to areas near rivet holes.

2. DELETED [Moved to 150 hour inspection]

3. If any evidence of cracks, mechanical damage, or corrosion, are found, do not fly the aircraft until evaluated against the following criteria.

REPAIR /REPLACEMENT CRITERIA

Type	Negligible Limit	Repairable Limit	Replacement Required
Surface damage, Scratches	0.015 inches or 10% of material thickness after blending.	N/A	Damage that exceeds repairable limits. Fractures in fitting areas.
Dents, free of cracks & gouges	Not to exceed 0.015 inches depth, 1 inch diameter.	N/A	
Cracks, working rivets or cuts in 90° flanges.	N/A	Does not extend inside of rivet line & no longer than 0.015 inches.	
Web damage, clear of fittings attachment.	N/A	Not to exceed 3.0 square inches after clean up.	

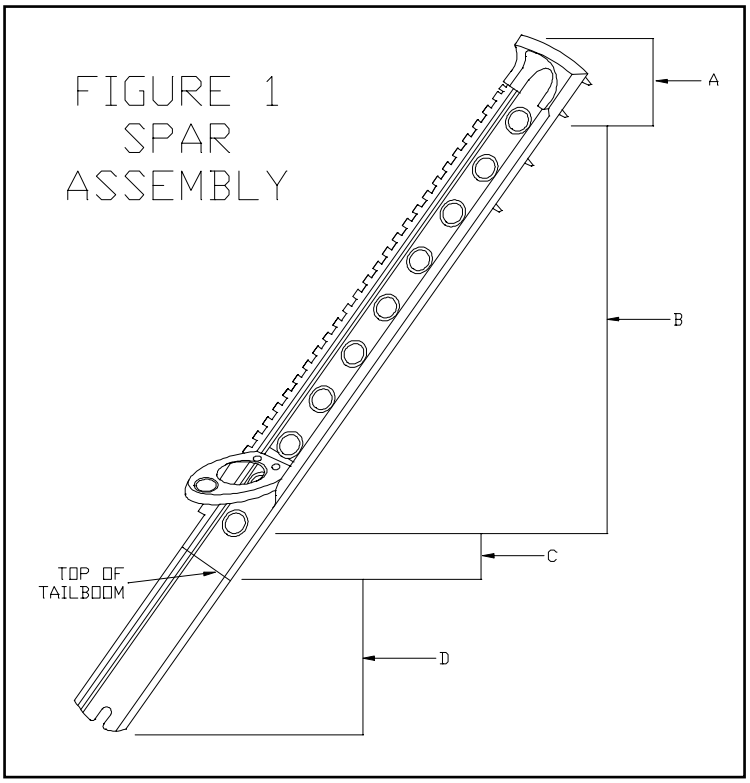


Figure 1 Legend, A – The 90°gear box fitting and interface.
B – The Forward side of spar from 90° gear box fitting to the tail boom upper skin.
C – The forward side of the spar adjacent to the 42° gear box fitting.
D – The back side of the lower spar.

Report all damage findings to Global Helicopter at 817-557-3391, FAX at 817-557-3392, by e-mail at ghti@ghti.net, or by mail to:

Global Helicopter Technology, Inc.
Attn: Quality Control
4846 S. Collins St.
Arlington, Texas 76018

Form A - 150 Hour Forward Vertical Fin Spar Inspection

This inspection shall be accomplished each 150 hours time in service after installation.
Initial each item after accomplishing the inspection.
Record all findings and attach a copy of this inspection form.
After correction of all findings make maintenance record entry.

PRE INSPECTION INITIAL AFTER EACH ACCOMPLISHMENT	INITIALS
1. Review Rotorcraft Maintenance Records.	
2. Review Service Bulletins	
3. Review Airworthiness Directives.	

MAINTENANCE PRACTICES INITIAL AFTER EACH ACCOMPLISHMENT	INITIALS
1. Open fin tail rotor drive shaft cover. Remove 42° gear box cover.	
2. Clean areas to be inspected with MEK. **NOTE: Ventilate areas!**	

INSPECTION INITIAL AFTER EACH ACCOMPLISHMENT	INITIALS
1. Inspect 90°gearbox mount for cracks, mechanical damage, chafing and working rivets.	
2. Inspect 42°gearbox mount for cracks, mechanical damage, chafing and working rivets.	
3. Outside tailboom – inspect forward side of spar assembly full length in areas A, B, and C, Figure 1 on page 7. Check for cracks, damage, and corrosion, especially around rivet heads. Also check for missing and working rivets. [Inspect for evidence of dark colored material or powder-like substance emanating from under the rivet head on working rivets.]	

POST INSPECTION INITIAL AFTER EACH ACCOMPLISHMENT	INITIALS
1. Replace 42° gear box cover.	
2. Close fin tail rotor drive shaft cover.	
3. Complete and sign aircraft maintenance record entry.	
4. Report problem areas to GHTI.	

Sign when completed.

Mechanic's Name_____Signature_____FAA Cert.#_____

Inspector's Name_____ Signature_____FAA Cert.#_____

Form B - 300-Hour Forward Vertical Fin Spar Inspection

This inspection shall be accomplished each 300 hours time in service after installation.
Initial each item after accomplishing the inspection.
Record all findings and attach a copy of this inspection form.
After correction of all findings make maintenance record entry.

PRE INSPECTION INITIAL AFTER EACH ACCOMPLISHMENT	INITIALS
1. Review Rotorcraft Maintenance Records.	
2. Review Service Bulletins	
3. Review Airworthiness Directives.	

MAINTENANCE PRACTICES INITIAL AFTER EACH ACCOMPLISHMENT	INITIALS
1. Remove aft L/H and R/H tailboom inspection covers.	
2. Remove aft tailboom access door.	
3. Open fin tail rotor drive shaft cover. Remove 42° gear box cover.	
4. Clean areas to be inspected with MEK. **NOTE: Ventilate areas!**	

INSPECTION INITIAL AFTER EACH ACCOMPLISHMENT	INITIALS
1. Inside tailboom - face aft, use a bright light & small inspection mirror inspect spar assembly for cracks corrosion, and damage, especially around rivets. Check for missing or working rivets.	
2. DELETED [Moved to form A, Inspection Item no. 3]	

POST INSPECTION INITIAL AFTER EACH ACCOMPLISHMENT	INITIALS
1. Replace aft L/H and R/H tailboom inspection covers.	
2. Replace aft tailboom access door.	
3. Replace 42° gear box cover.	
4. Close fin tail rotor drive shaft cover.	
5. Complete and sign aircraft maintenance record entry.	
4. Report problem areas to GHTI.	

Sign when completed.

Mechanic's Name_____Signature_____FAA Cert.#_____

Inspector's Name_____ Signature_____FAA Cert.#_____

Chapter 3 – Airworthiness Limitations

No airworthiness limitations are associated with this type design change.

Chapter 4 – Weight and Balance

The Weight and Balance of the UH-1 aircrafts are unchanged as a result of replacing a GHTI Forward Vertical Fin Spar P/N VTF-030-846-101.

Chapter 5 –Instructions for Removal

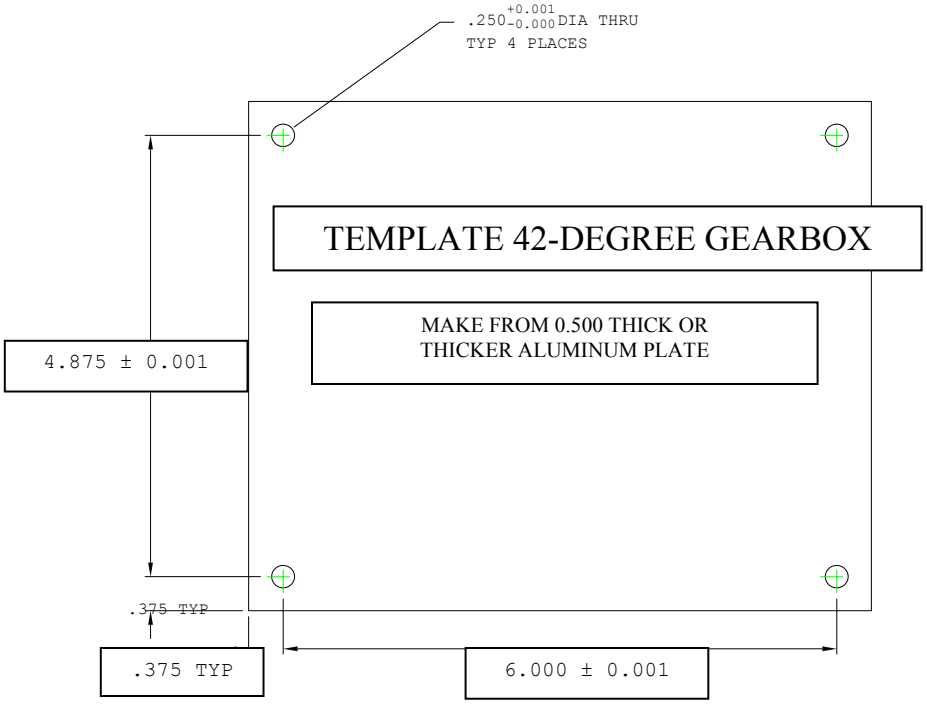
Installation drawings are required for the replacement of the forward vertical fin spar assembly. The current installation drawings are listed in Appendix B.

REQUIRED TOOLS NOT DELIVERED WITH THE INSTALLATION KIT

Other required tools, not supplied with are listed below:

1. Standard air drill
2. 90-degree air drill with short offset
3. Rivet gun for pulling cherry rivets
4. Rivet gun for bucking solid rivets
5. Bucking bars, including finger type for limited access bucking.
6. Clecos (#3, #4, #5, #6)
7. Deburr tools
8. Countersink tools
9. Drill guides
10. Drill Press
11. Tailboom Alignment Tooling

Optional tool for 42°gearbox alignment, if 42°gear box or alignment tool are not available.



CONSUMABLE MATERIALS:

The following material is required to accomplish the bulletin, however this material is considered consumable (bench stock) material and may not require ordering depending on the operators consumable material stock levels.

ScotchBrite TY-A Abrasive Pad C-407
TT-M261 Keytone Methyl Ethyl Ketone (MEK)
MIL-S-8802 Sealant (Proseal 890 B2)
Epoxy Polyamide Yellow Paint per MIL-P-23377 or
Zinc Chromate Yellow Primer per TT-P-1757A

1. PART 1 –GENERAL INSTRUCTIONS:

1. Inspect the tailboom for general condition prior to removal of any components.

2. Assess the condition of the tailboom to determine if a field replacement is possible.

3. Some local minor cracking or damage of the tailboom skin, canted bulkhead, or other tailboom structure may be repairable without effecting the spar replacement alignment, and thus not require the tailboom to be installed in a tailboom fixture. Each damaged area should be assessed independently.

PART 2 – SPAR REMOVAL PROCEDURE:

NOTE:

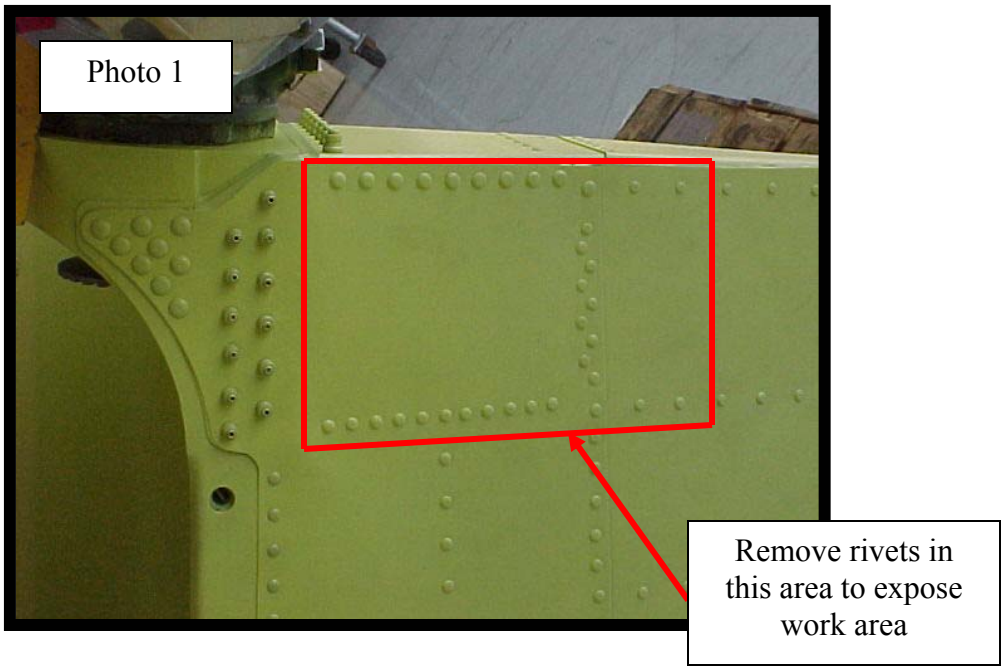
Carefully read all instructions to be sure that both the order and the method of each step is understood prior to starting the removal of old spar and installation of new spar.

Safely store all hardware and parts removed from the aircraft for reuse with the VTF Assembly. Store the hardware with the parts from which they came. The only parts / hardware to be discarded are: the old damaged GHTI spar PN VTF-030-846-101, and the old rivets.

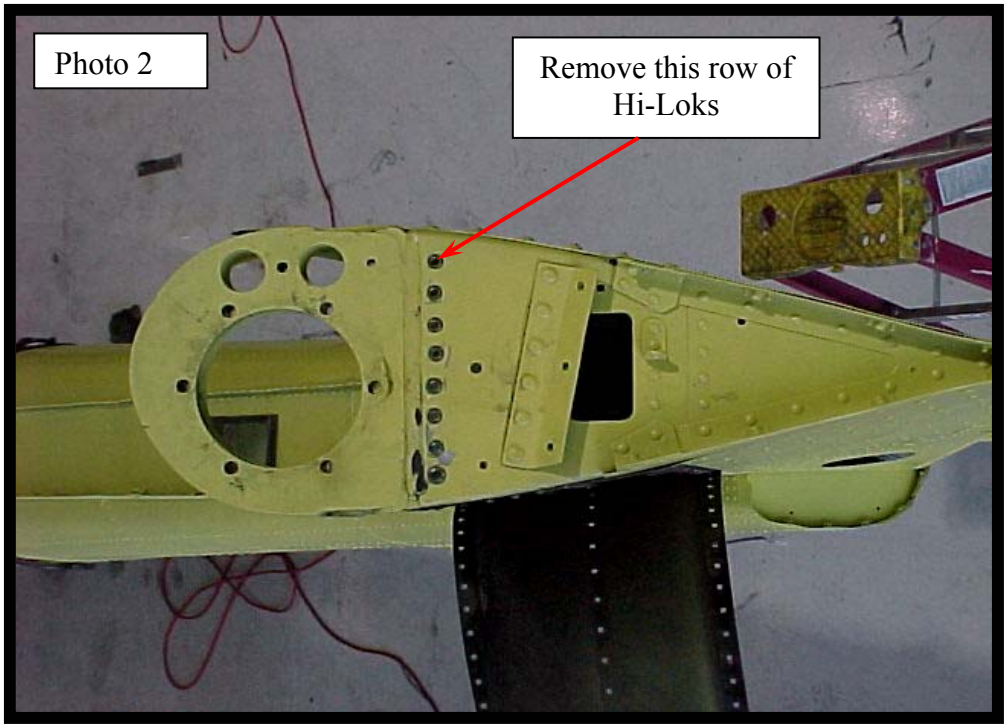
1. The tailboom may be removed from the aircraft and mounted in an acceptable holding fixture, however it is not necessary in order to accomplish this modification.

2. Insure that the following items are removed, then remove the CR3213 rivets from the upper left side vertical fin skin (See Photo 1). Mark locations of nutplates that are in use. Unused nutplates do not have to be installed on the new spar assembly:

    a. Tail rotor hub and blade assembly
    b. #4 and #5 tail rotor drive shafts
    c. Intermediate gearbox
    d. Tail rotor gearbox
    e. Anti-torque flight control cables
    f. Vertical fin drive shaft cover PN 204-030-829-35.
    g. Aft tail rotor drive shaft cover PN 204-030-813-33.
    h. Lower aft tailboom access panel PN 204-030-814-455.
    i. Left side and right side aft tailboom fin covers PN 205-030-899-53S and PN 205-030-899-54S. Store and retain covers.
    j. Upper antenna mount assembly PN 205-031-835-27 (if installed).
    k. Tail skid fairing PN 204-031-096-3.
    l. Tail skid PN 204-030-947-1.
    m. Wiring on vertical fin.
    n. Upper cable pulley assembly PN 204-001-825.

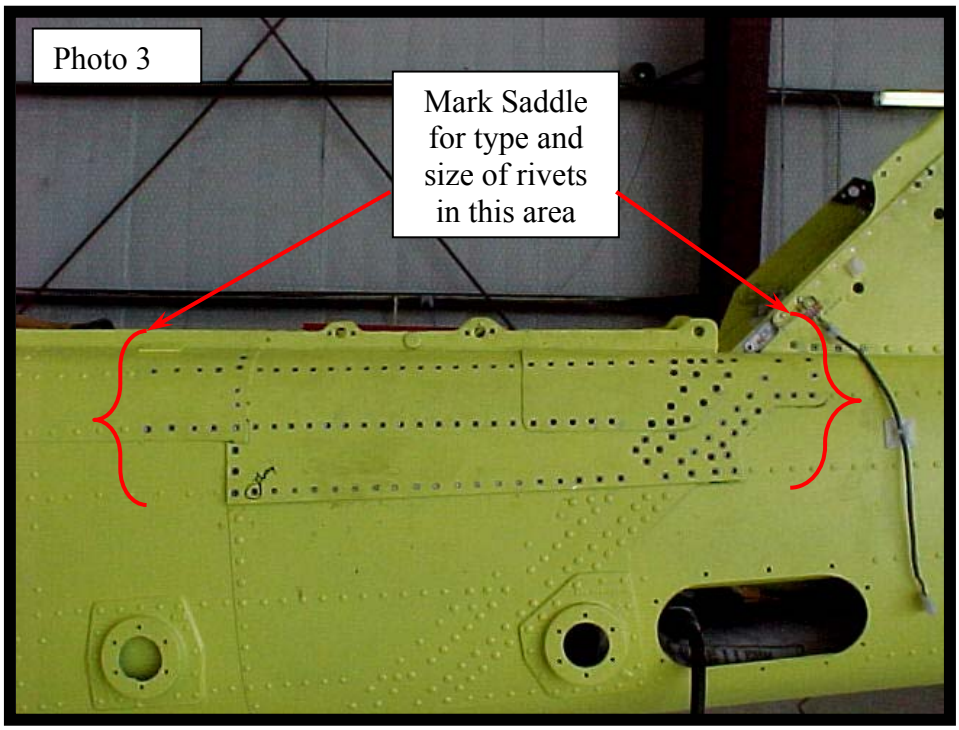


2. Remove Hi-Loks from 90-degree stiffener PN 205-030-846-275. See Photo 2.

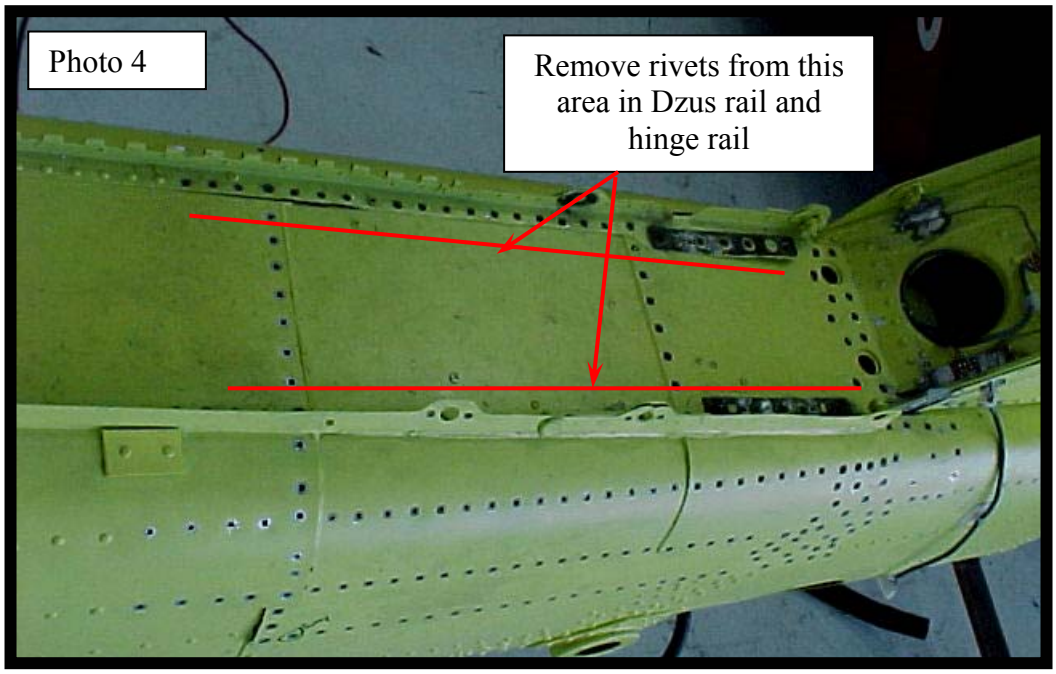


3. After removing vertical fin nose rib PN 204-030-833-235, identify the 42-degree gearbox shims with a permanent marker as to left side or right side, fwd or aft. Remove attaching rivets and carefully remove the shims from the tailboom. Store for reuse. **Locations and orientation of the shims must be duplicated during re-installation.**

4. Locate and identify rivet type in saddle PN 205-032-800-37 for ease of reinstallation. Mark saddle with rivet type and length. See Photo 3.

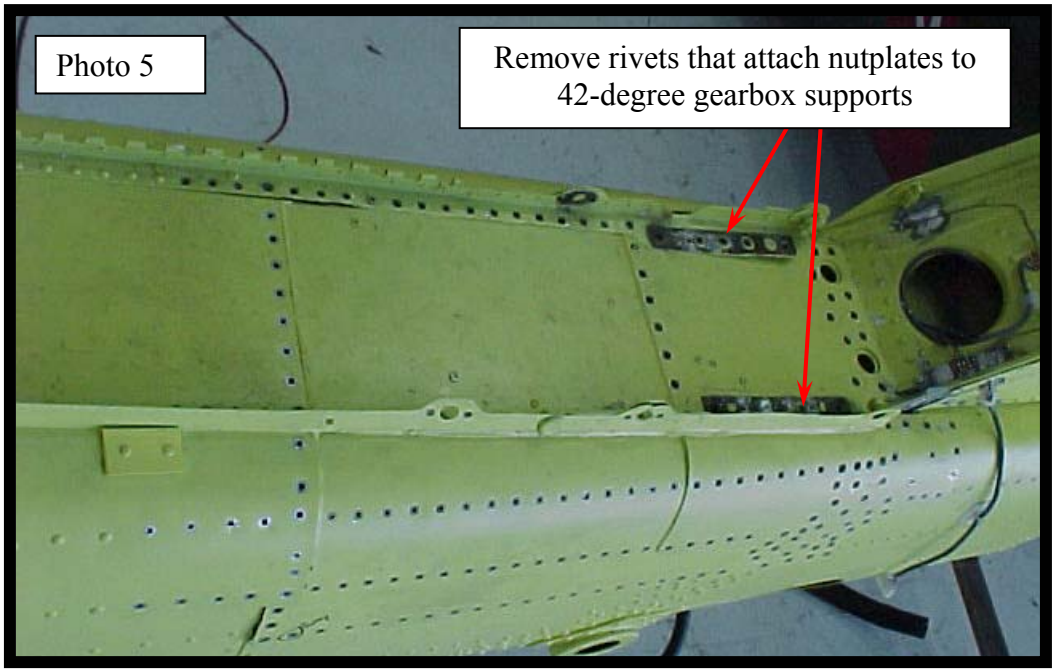


5. Remove enough rivets from the 42-degree tail rotor driveshaft cover Dzus rail and hinge rail to be able to remove saddle. See Photo 4.



6. Remove MS20470AD and CR3213 rivets holding the saddle in place.

7. Remove eight (8) MS20426AD3 rivets that attach the 42-degree nutplates to the saddle. See Photo 5.



8. Remove saddle PN 205-032-800-37S.

9. Remove lower pulley assembly PN 205-001-109.

WARNING NOTE:

Removal of existing rivets must be done carefully in order to preclude enlarging of the rivet holes in the mating parts. On the spar where possible, grind off the rivet head and punch out stem. Damage to the old spar from grinding off rivet heads is not a concern. The old spar will be discarded.

10. Starting at the lower end of the spar, remove MS20470AD rivets.

11. Do not remove 42-degree support castings PN 205-031-831-2, PN 205-031-832-4, or stiffener from spar at this time.

12. Mark locations of PN 205-030-846-45 doubler and PN 90-009-1 tailrotor tie down loop on the left side and right side outer skins for ease of reinstallation.

13. Remove MS20470AD5 rivets from stiffeners PN 205-030-840-25 at fin stations 59.05, 46.95,34.66, 22.37, and 10.08. See drawing sheet 2 view C.

14. Retain filler PN 205-030-847-31 from fin station 35.10.

15. Remove MS20470AD4 rivets from left side spar cap angle. Be sure to remove flush rivet at fin station 70.79.

16. Remove MS20470AD6 rivets from left side of 90-degree casting.

17. Remove MS20426AD4 rivets from Dzus fastener bracket on the vertical fin rib.

18. Remove MS20470AD4 rivets from right side spar cap angle. Be sure to remove flush rivet at fin station 70.79.

19. Remove MS20470AD6 rivets from right side 90-degree casting.

20. Remove damaged GHTI spar assembly from aircraft.

21. Reinstall 42-degree gearbox on the support castings. The 42-degree gearbox must remain installed on the support castings to maintain proper alignment until the reinstallation of the support castings on the new spar.

NOTE:

If a 42° gearbox is unavailable, use the alignment tool P/N 66-SSMAC-D-031A, or fabricate a tool using the dimensions of the tool shown on page 12 of this Manual.

22. Remove sixteen (16) MS20470AD6 rivets holding the 42-degree gearbox support castings to spar (Carefully store in a safe place as an assembly).

23. Remove and store all nutplates from spar.

24. Remove 90-degree gearbox support casting, P/N 204-030-828, from spar. Be careful not to damage rivet holes in spar. Inspect for corrosion on casting.

25. Mark locations and remove five (5) stiffeners PN 205-030-846-19. See drawing sheet 2.

26. Clean Proseal from parts using plastic scraper, Scotch Brite grade A and MEK.

27. Inspect exposed structure for any damage such as double holes or skin cracks. Repairs must be performed or damaged parts replaced before continuing on with this installation. Carefully inspect canted bulkhead for elongated holes or damage to the web. If replacement of the canted bulkhead is needed, it will require the use of an approved tailboom overhaul fixture.

NOTE:

The Straight Fluted Drill Reams are for accurately transferring the hole pattern from the spar tool to the New Spar assembly in a single drill step. These Drill Reams are to be used during the section “Chapter 7, PART 1 – MATCH DRILLING AND BENCH ASSEMBLY OF NEW SPAR “ only.

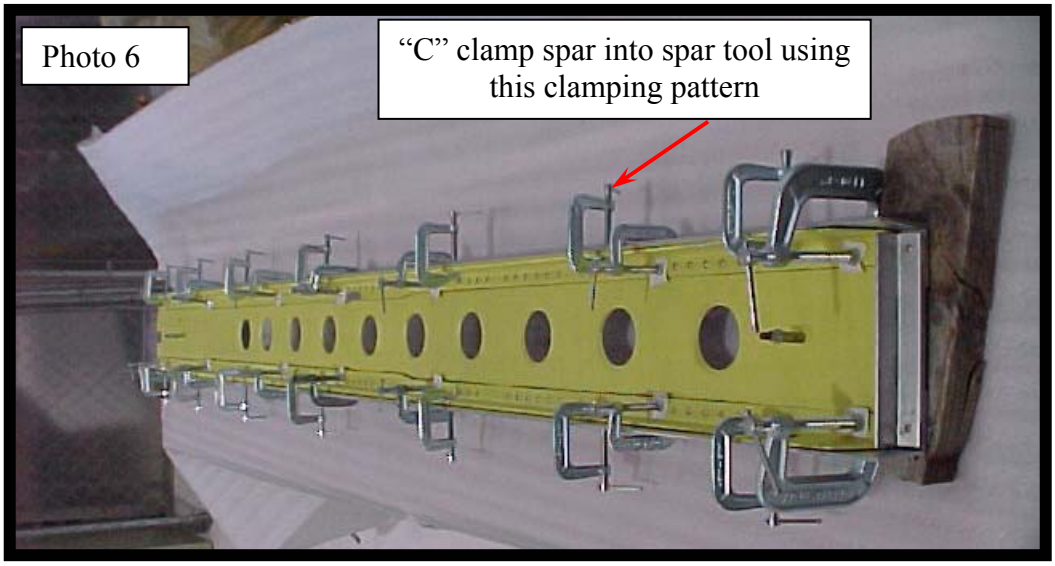
Chapter 6 – Installation Instructions

PART 1 – MATCH DRILLING AND BENCH ASSEMBLY OF NEW SPAR

1. Remove all external parts and clean old spar to facilitate installation in spar tool. Sand bottom and outer surfaces of old spar to remove sealant and paint.

2. Place old spar in spar tool PN VTF-030-870. The top end of the old spar must be butted hard against the angle stop in the spar tool. The old spar should lay flat in the spar tool. Verify that no sealant or paint is present that would prevent the old spar from fitting into spar tool properly.

3. Using the 3-inch C-clamps provided with the VTF Installation Kit, clamp the old spar into the spar tool starting at the top. Position clamps to hold spar web flush with the tool. Also, position 2-inch C-clamps to hold spar caps against the vertical angles of the tool. Adjust clamping to optimize the fit of the old spar into the spar tool. Avoid placing the C-clamps over holes or in a position that would interfere with proper drilling. See Photo 6.



CAUTION:

Caution should be taken to insure that holes are back drilled properly. **This is a critical step.**

HOLE SIZE LIMITS FOR SOLID RIVET, BLIND RIVET, AND HI-LOK FASTENER INSTALLATION

Nominal Size Solid or Blind Rivet

Rivet Diameter (inch)	Hole Size Min/Max (inch)
1/8 (-4)	0.129/0.132
5/32 (-5)	0.160/0.164
3/16 (-6)	0.192/0.196
1/4 (-8)	0.256/0.261

Oversize Blind Rivet

Rivet Diameter (inch)	Hole Size Min/Max (inch)
1/8 (-4)	0.143/0.146
5/32 (-5)	0.176/0.180
3/16 (-6)	0.205/0.209
1/4 (-8)	0.271/0.275

Hi-Lok Fasteners

Shank Diameter(inch)	Reamed Hole Diameter Min/Max (inch)
5/32 Standard **	0.1635/0.1655
3/16 Standard	0.1895/0.1915
3/16 + 1/64 O.S.	0.2026/0.2046
3/16 + 1/32 O.S.	0.2182/0.2202
1/4 Standard	0.2495/0.2515
1/4 + 1/64 O.S.	0.2651/0.2671
1/4 + 1/32 O.S.	0.2807/0.2827

** No oversize fastener exists for -5 (5/32 inch diameter) Hi-Lok; use a -6 (3/16 inch diameter) Hi-Lok if an oversize is required.

4. Back drill all of the holes in the old spar to the spar tool, except where marked with red tape on the spar tool. Be sure to use the proper drill bit size to back drill each hole. Use the above chart to select drill size. Areas marked in red will be match drilled during final installation.

5. Deleted

6. After all holes are back drilled, remove old spar from spar tool and de-burr all holes in the spar tool.

7. Place new spar PN VTF-030-846-101 in the spar tool in exactly the same location as the old spar. Install C-clamps in accordance with Photo 6. Use masking tape or suitable substitute on clamps to prevent marring of new spar.

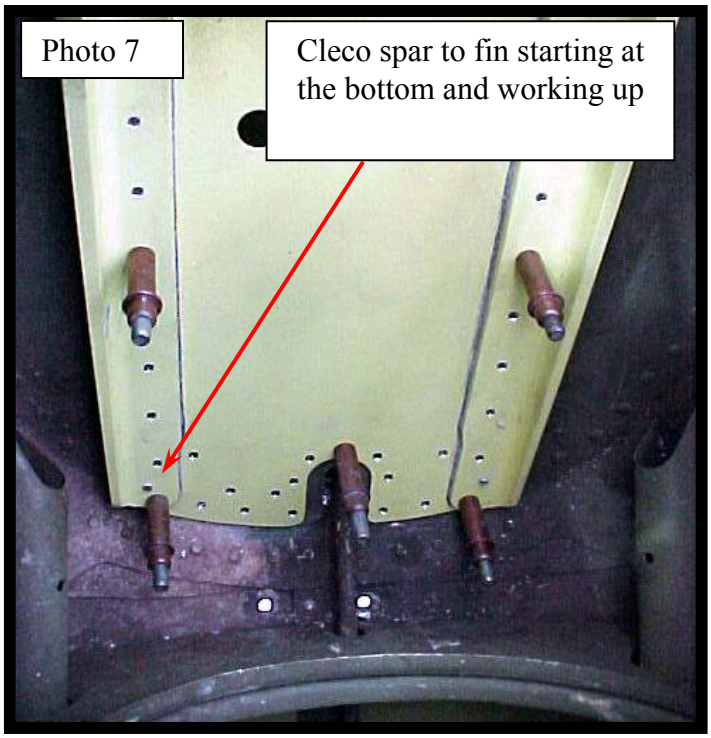
8. Match drill all of the holes from the spar tool to the new spar PN VTF-030-846-101. Use the table above and on page 7 to select the correct Drill Ream bit size. Use the Drill Reams to ream all holes to final hole size.

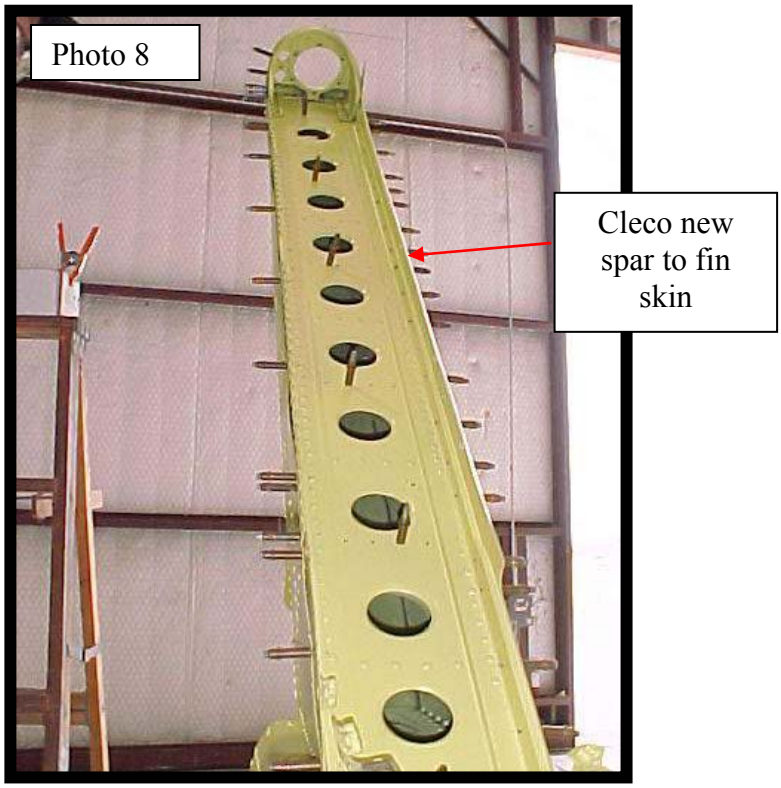
9. Deleted

10. Remove new spar PN VTF-030-846-101 from spar tool.

11. De-burr all holes in new spar PN VTF-030-846-101.

12. Temporarily install new spar PN VTF-030-846-101 with clecos in tailboom to verify hole alignment and to identify any misdrilled or missing holes. The slot at the bottom of the spar assembly may require trimming to clear rib at the bottom of the tailboom. Maintain 1½ hole diameter edge distance after trimming. See Photos 7 and 8.



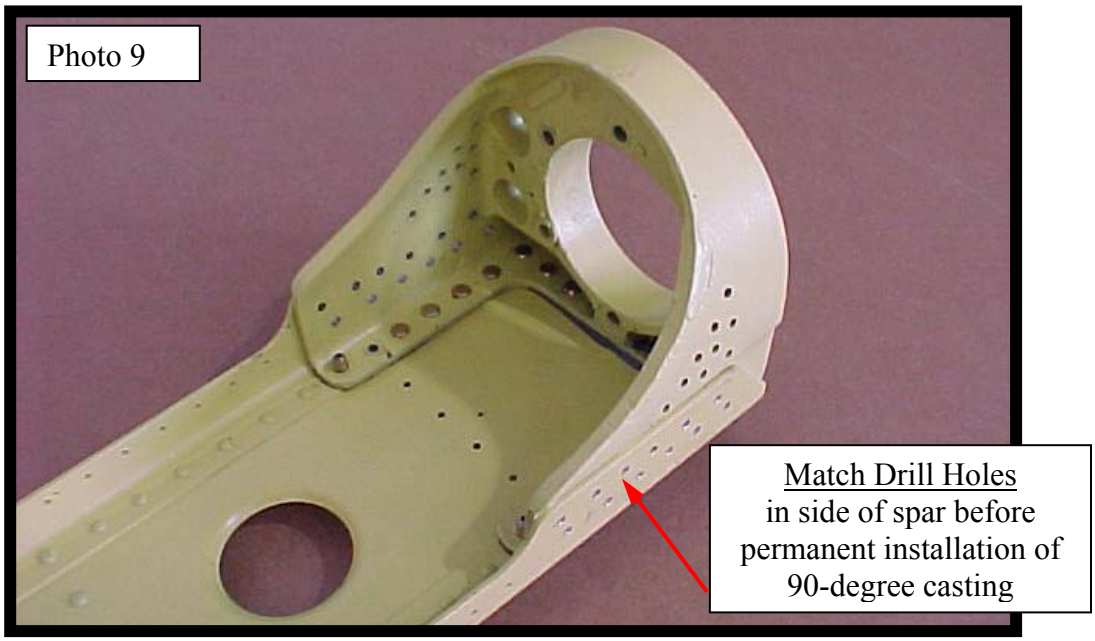


13. Remove spar from tailboom. Correct any misdrilled or missing holes using standard oversize.

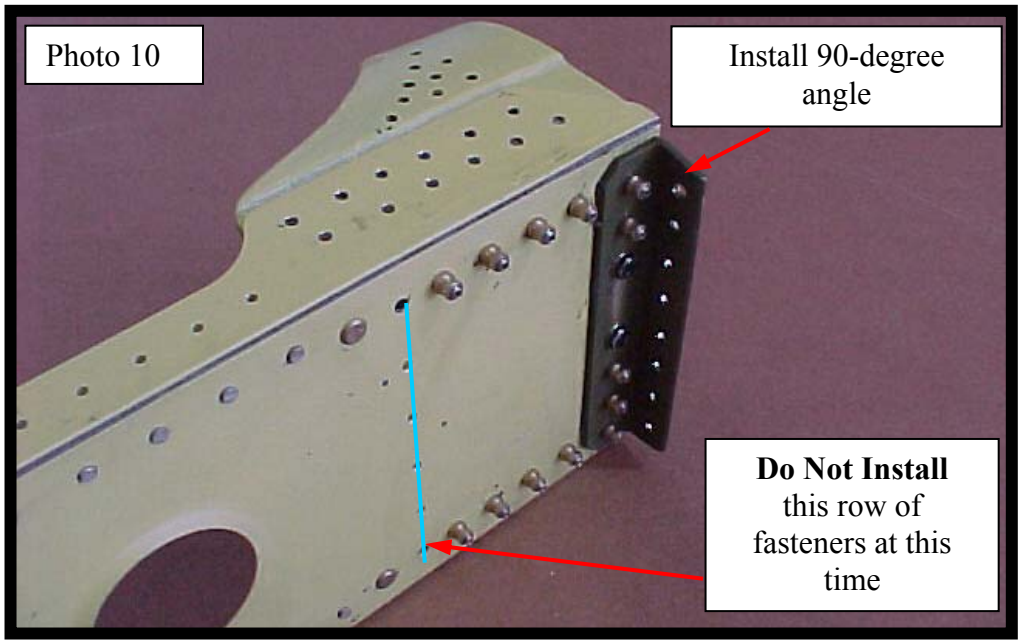
14. Reinstall upper pulley bracket center web nutplate on stiffener PN 205-030-846-25 using flush mount MS20426AD3 rivets. Locate from existing holes.

15. Install MS 21075-L4 nutplates using MS20426AD3 at the location of the upper pulley assembly P/N 204-001-825. See drawing sheet 2.

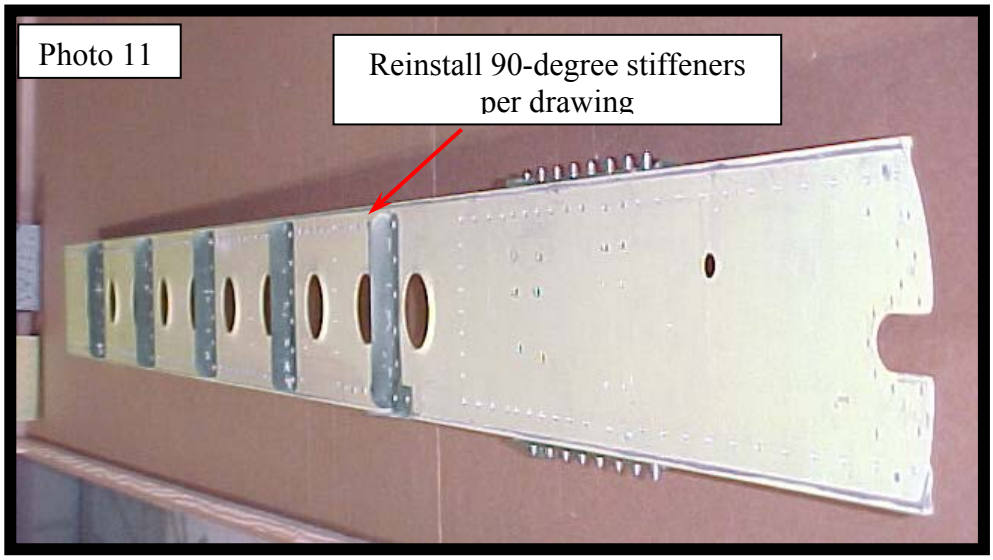
16. Temporarily install 90° gearbox casting PN 204-030-828 and match drill holes in sides of spar. Remove casting and de-burr holes. See Photo 9.



17. Install 90-degree gearbox casting PN 204-030-828 and stiffener PN 205-030-846 to new spar with Hi-Loks and Proseal (See drawing sheet 2). See Photo 10. Do not install Hi-Loks in sides of spar at this time.

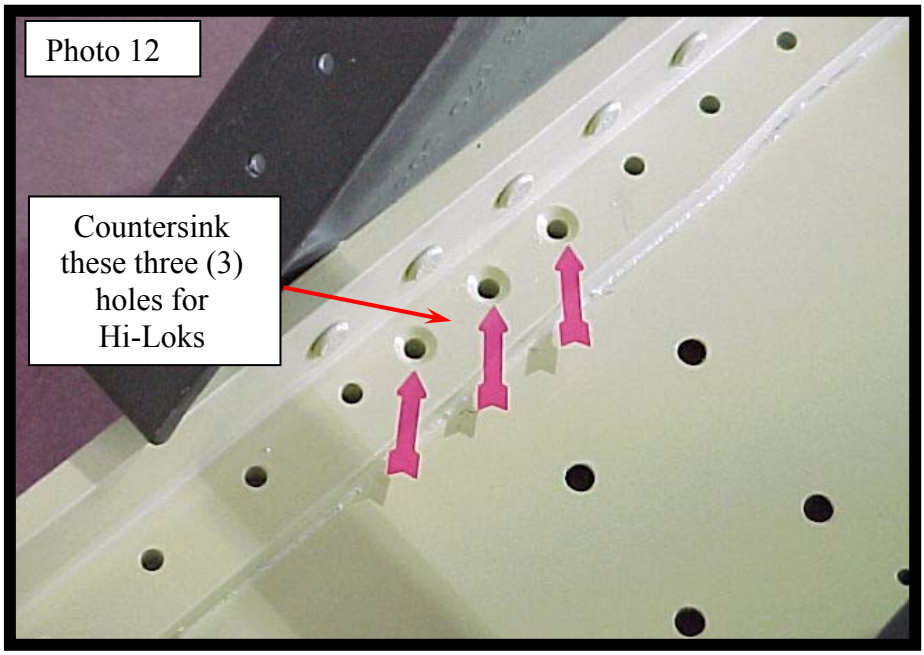


18. Install five (5) stiffeners PN 205-030-846-19 to spar PN VTF-030-846-101 per drawing sheet 2. See Photo 11.

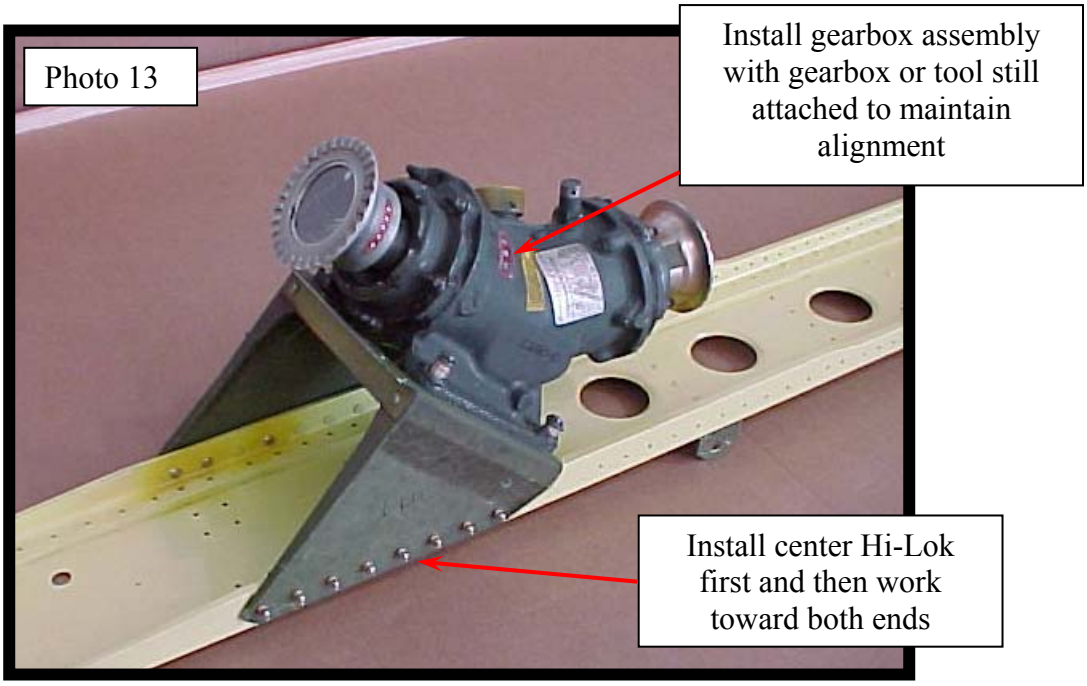


19. Install wiring harness nutplates that were removed from old spar.

20. Counter sink three (3) holes in left side spar for Hi-Lok HL20PB6-8 per drawing sheet 5. See Photo 12.



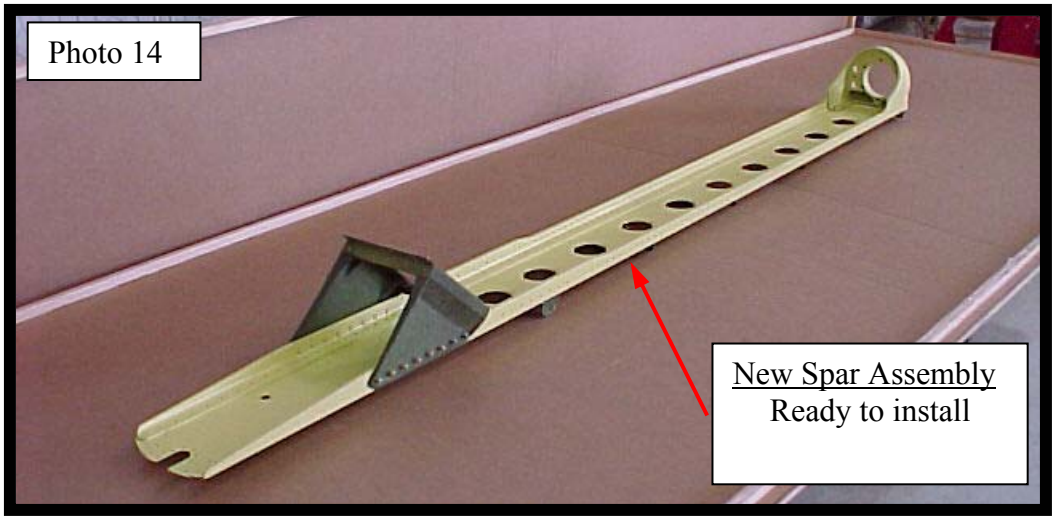
21. Install 42-degree gearbox support assembly, consisting of PN 205-030-801-7 stiffener, support PN 205-031-831, and support PN 205-031-832 with 42-degree gearbox attached. Ream holes for 42-degree gearbox support PN 205-031-831-2, and PN 205-031-831-4 and install Hi-Loks(See drawing sheet 2). Insert all Hi-Loks finger tight. Tighten the center Hi-Lok first in each support casting. Tighten the rest of the Hi-Loks moving from the center, out to the edges of the casting. See Photo 13.



22. Remove 42-degree gearbox from support.

23. Install new rubber bumper PN 4237 in new Dzus rail.

PART 2 – SPAR INSTALLATION PROCEDURE: (See Photo 14)



NOTE:

All holes in spar angle caps must be Drill Reamed to final size.

1. Set spar in tailboom and cleco in place starting from the bottom working your way up alternating left side / right side. (Refer back to Photos 7 and 8.)

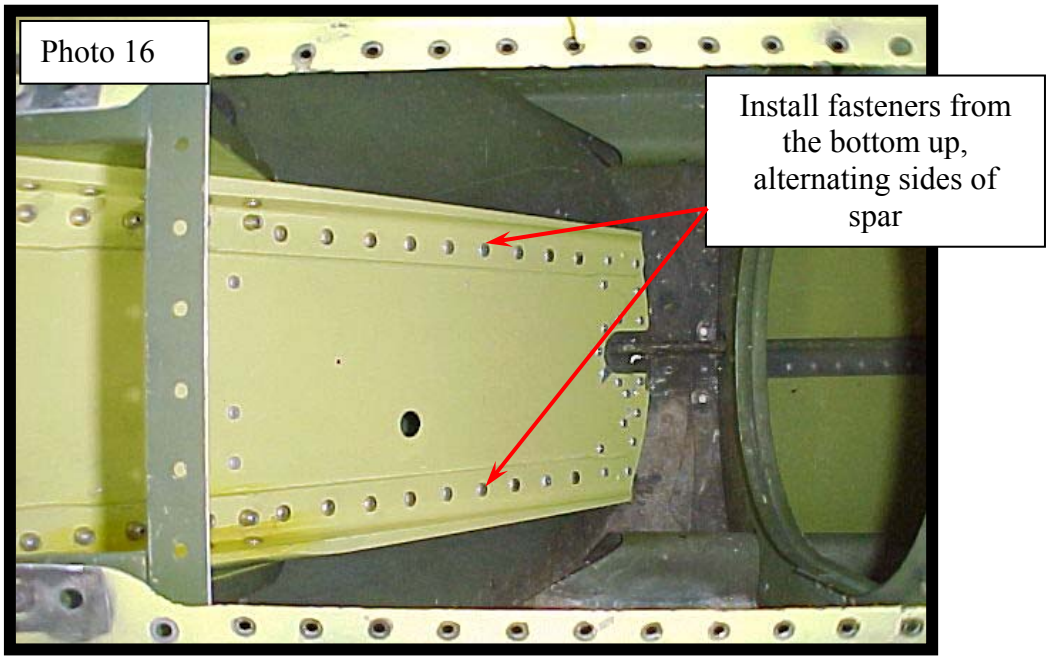
2. Install lower pulley support PN 205-030-817 and cleco in place per detail "E", drawing sheet 5.

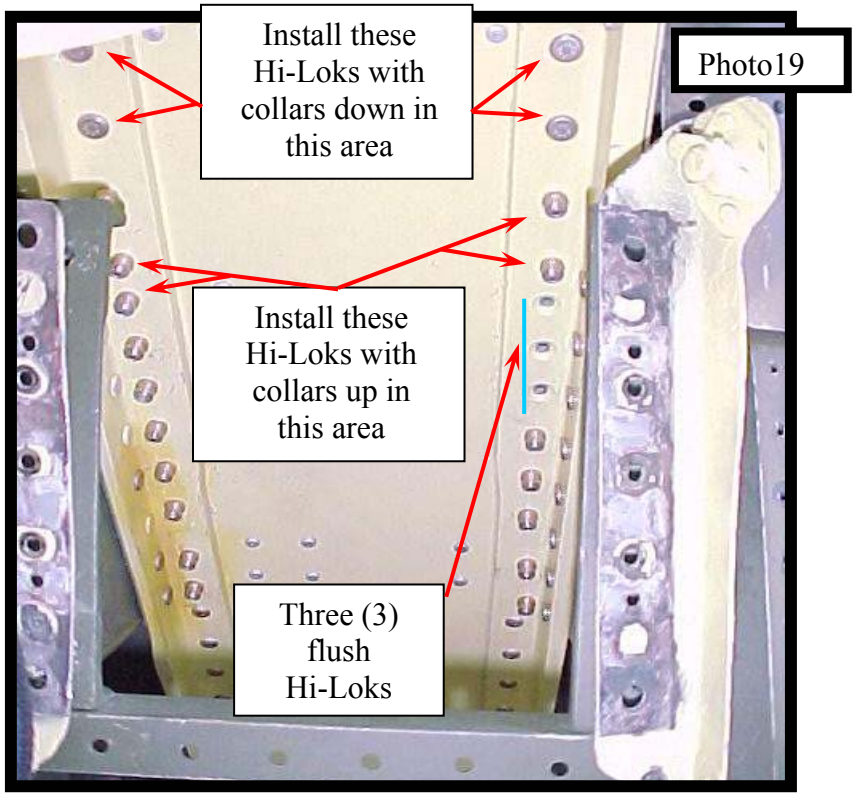
3. Install doubler PN 205-030-846-33 and hinge and cleco in place on right side per drawing sheet 3.

4. Install new dzus rail PN VTF-030-832-101 per drawing sheet 3. Cleco in place.

5. Install bracket PN 205-030-817 to spar with CR3243-4 rivets. See drawing sheet 5.

6. Starting at the bottom of spar, install CR3243-4 rivets. See Photos 16 & 17 and sheet 5.





7. Install rivets. See drawing sheet 5, detail “E”. Hi-Lock working from the bottom up stopping at fin station 70.79. See drawing sheets 3 and 5.

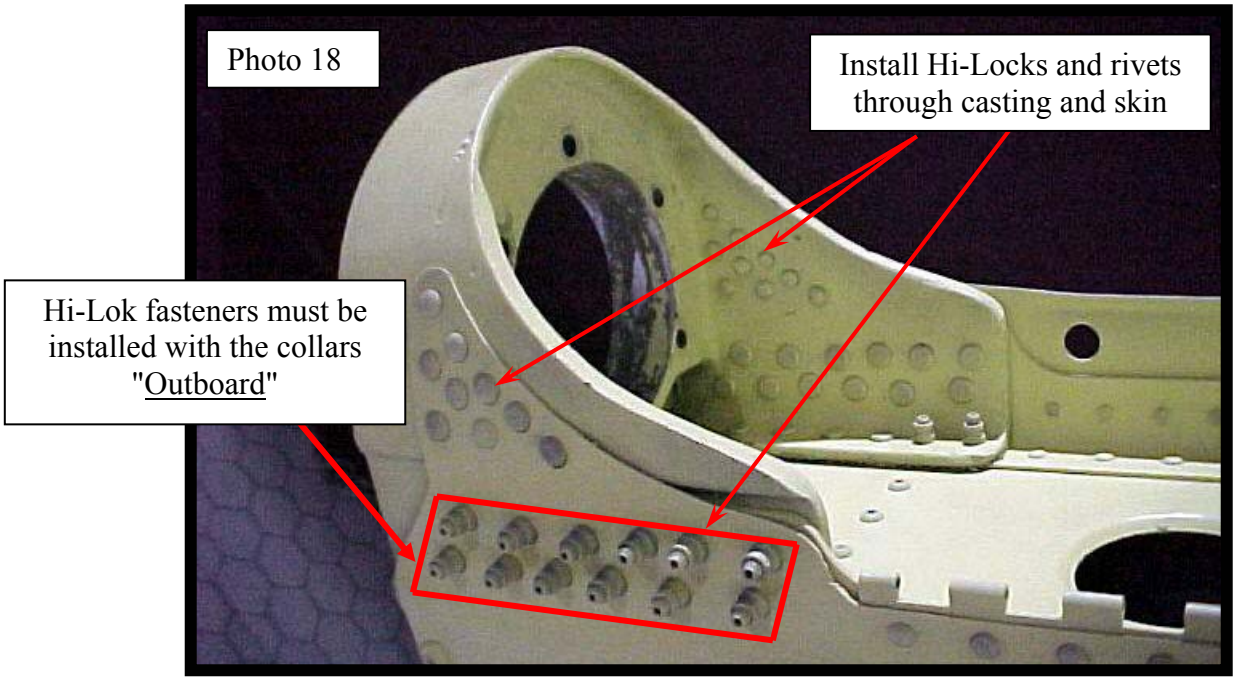
8. Install CR3243-5 rivets at fin stations 59.05, 46.95, 35.10, 22.37 and Hi-Lock HL20PB6 at fin station 10.08. See drawing sheet 3.

9. Install seven (7) HL20PB6 Hi-Locks and one (1) HL20PB8 in back of 90-degree gearbox casting stiffener PN 205-030-846-27. See drawing sheet.

10. Install CR3243-4 rivets in left side upper vertical tailboom skin. See drawing sheet 4, view "C”.

11. Starting at fin station 70.79 install MS20470AD4 and MS20426AD4 rivets on left side spar cap, right side spar cap, and outer skin alternating sides as you go up. See drawing sheet 4, views "C" and "D".

12. Install all remaining Hi-Locks and rivets in 90-degree gearbox casting. See drawing sheet 4. See Photo 18. Hi-Lock fasteners must be installed with the collars "Outboard" to avoid interference with the Tail Rotor Pitch Control Chain.



13. Install lower pulley assembly hardware with shim PN VTF-030-861. See drawing sheet 5.

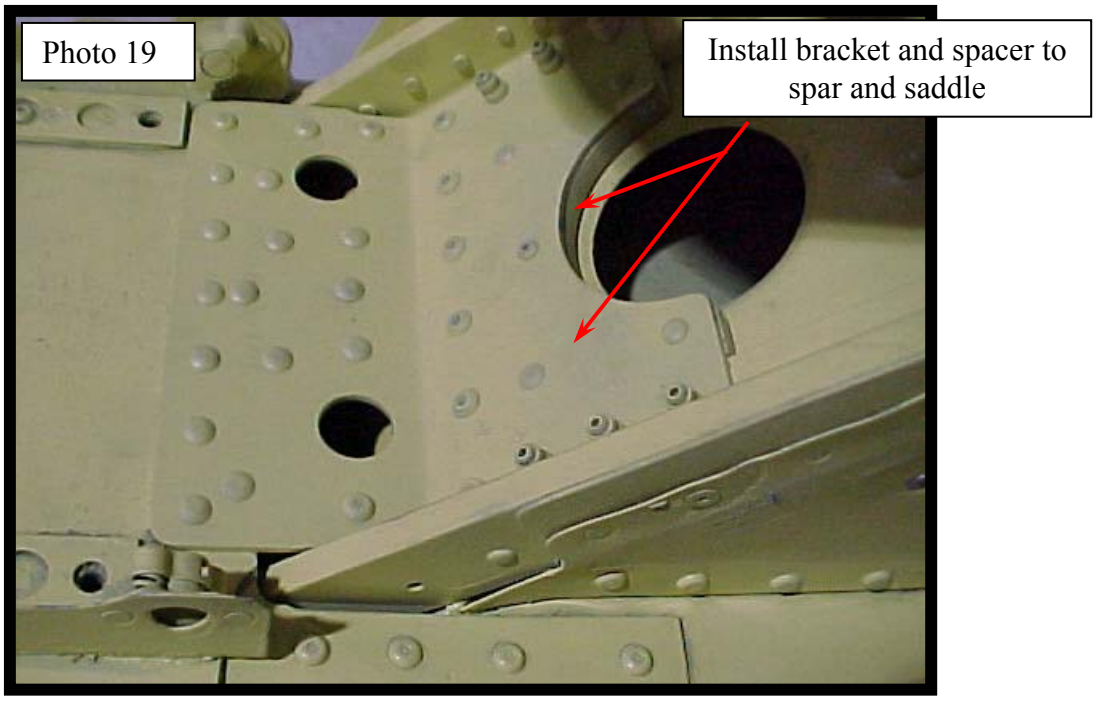
14. Install Proseal on outer edge of saddle. Install with clecos.

15. Rivet saddle (per removal marks for type and length of rivets) by prior measurements. See sheet 8.

16. Install drive shaft cover Dzus rails 42-degree gearbox shims as marked during the spar removal process.

17. Match drill bracket PN VTF-030-833-101 and spacer PN VTF-030-862-101 de-burring all holes. See sheet 7, detail "M" and section "L-L".

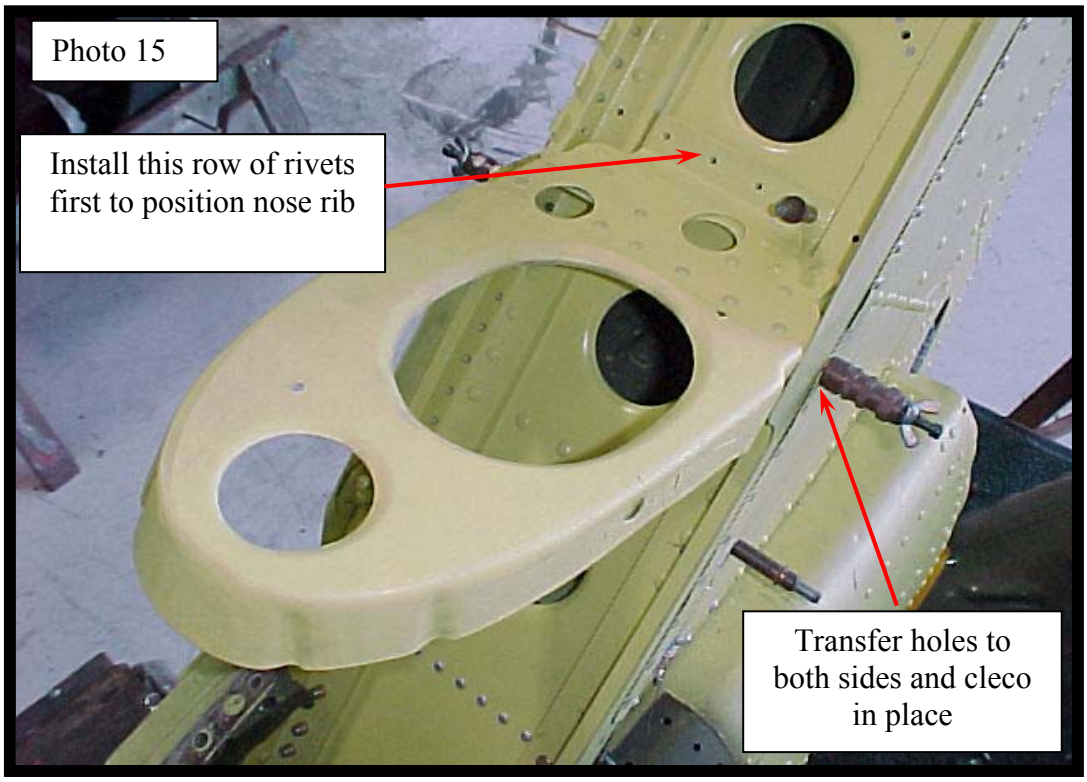
18. Match ream holes with Drill Ream bit in bracket and spacer. Install saddle to spar bracket PN VTF-030-833-101 and spacer PN VTF-030-862-101 using Hi-Loks and rivets. See drawing sheet 7 and Photo 19.



19. Modify vertical fin rib PN 204-030-833(See drawing sheet 6).

20. Install brackets PN VTF-030-841-101 & 102 to vertical fin nose rib PN 204-030-833(See drawing sheet 6).

21. Install vertical fin nose rib per drawing sheet 6.Cleco in place spar to nose rib bracket PN VTF-030-841-101. See Photo 15.



22. Prime Polyamide Epoxy as required per MIL-P-23377E.

Appendix A

Forward Vertical Fin Spar Kit Parts List

VTF INSTALLATION KIT PARTS LIST:

The GHTI Vertical Fin Spar Installation Kit, PN VTF-030-800-001, consists of the following material:

GHTI Vertical Fin Spar Installation Kit: VTF-030-800-001

Part Number	Nomenclature	Quantity
VTF-030-832-101	Dzus Rail	1
VTF-030-833-101	Bracket, Saddle to Spar	1
VTF-030-841-101	Bracket, Nose Rib, LEFT-HAND	1
VTF-030-841-102	Bracket, Nose Rib, RIGHT-HAND	1
VTF-030-846-101	Spar Assembly, Forward, Vertical Fin	1
VTF-030-860-101	Spacer, Upper Pulley Assembly.	1
VTF-030-861-101	Spacer, Lower Pulley Assembly.	1
VTF-030-862-101	Spacer, Saddle Bracket	1

SPAR TOOL:

T030-846 Tool Assembly, spar

1. The GHTI supplied tooling fixture in the installation kit is a "One-Time-Use" spar assembly drill template. This fixture will be used to copy the exact location of the existing fastener holes in the removed UH-1 Spar and transfer them to the new GHTI replacement Spar Assembly. This methodology will allow accurate reproduction of the existing fastener location on the new parts. **This process is Patent Protected**.

PARTS AND TOOLS DELIVERED WITH THE VTF INSTALLATION KIT

The following is a list of all parts and tools that are delivered with the VTF-030-800-001 VTF Installation Kit. The fasteners supplied are usable on a tail boom that has not been modified or previously repaired. Oversized fasteners or fasteners of a different length may be required for a modified tail boom.

Part Number	Nomenclature	Quantity
4237	Bumper	6
AN4-11A	Bolt	2
AN4-7A	Bolt	5
AN3-6A	Bolt	2
AN960PD416	Washer	7
AN960PD10	Washer	4
CR3243-5-08	Rivet	1
CR3243-5-07	Rivet	8
CR3243-5-06	Rivet	4
CR3243-5-05	Rivet	8
CR3243-5-04	Rivet	39
CR3243-5-03	Rivet	80
CR3243-4-09	Rivet	3
CR3243-4-05	Rivet	4
CR3243-4-04	Rivet	70
CR3243-4-03	Rivet	2
CR3242-5-08	Rivet	3
CR3242-4-09	Rivet	4
CR3242-4-03	Rivet	2
CR3213-4-09	Rivet	6
HL86PB8	Collar	1
HL87PB6	Collar	96
HL20PB8-4	Hi-Lock Pin	1
HL64PB6-8	Hi-Lock Pin	29
HL64PB6-7	Hi-Lock Pin	43
HL64PB6-6	Hi-Lock Pin	2
HL64PB6-5	Hi-Lock Pin	10
HL64PB6-4	Hi-Lock Pin	7
HL65PB6-8	Hi-Lock Pin	3
MS21048-3	Nut Plate	5
MS21042L3	Nut	2
MS21042L4	Nut	4
MS21075L4	Nut Plate	3

Part Number	Nomenclature	Quantity
MS20470AD5-11	Rivet	1
MS20470AD5-8	Rivet	6
MS20470AD5-7	Rivet	22
MS20470AD5-6	Rivet	20
MS20470AD5-5	Rivet	26
MS20470AD5-4	Rivet	20
MS20470AD4-10	Rivet	32
MS20470AD4-9	Rivet	50
MS20470AD4-8	Rivet	16
MS20470AD4-7.5	Rivet	14
MS20470AD4-7	Rivet	13
MS20470AD4-6.5	Rivet	19
MS20470AD4-5	Rivet	102
MS20470AD4-4.5	Rivet	28
MS20470AD4-4	Rivet	22
MS20426AD5-10	Rivet	2
MS20426AD4-11	Rivet	11
MS20426AD4-9	Rivet	4
MS20426AD4-8	Rivet	4
MS20426AD4-5	Rivet	2
MS20426AD3-8	Rivet	2
MS20426AD3-6	Rivet	8
MS20426AD3-4	Rivet	14
MS21266-5T	Cat Track	1
RF5-5	Spacer	10

Regular Drill Bits

(Removal of Spar from Aircraft)

Size	Quantity
40	1
30	4
27	2
21	4
16	1
11	1

1/4 -28 Threaded Drill Bits

(Drilling from Old Spar to Tool)

Size	Quantity
30	4
20	2
11	1

Straight Fluted Drill

(Drilling from Tool to New Spar)

Size	Quantity
30	2
27	2
21	2
11	1
F	1

3-inch "C"-clamp, quantity (2)
2-inch "C"-clamp, quantity (28)

Appendix B

INSTALLATION DRAWINGS

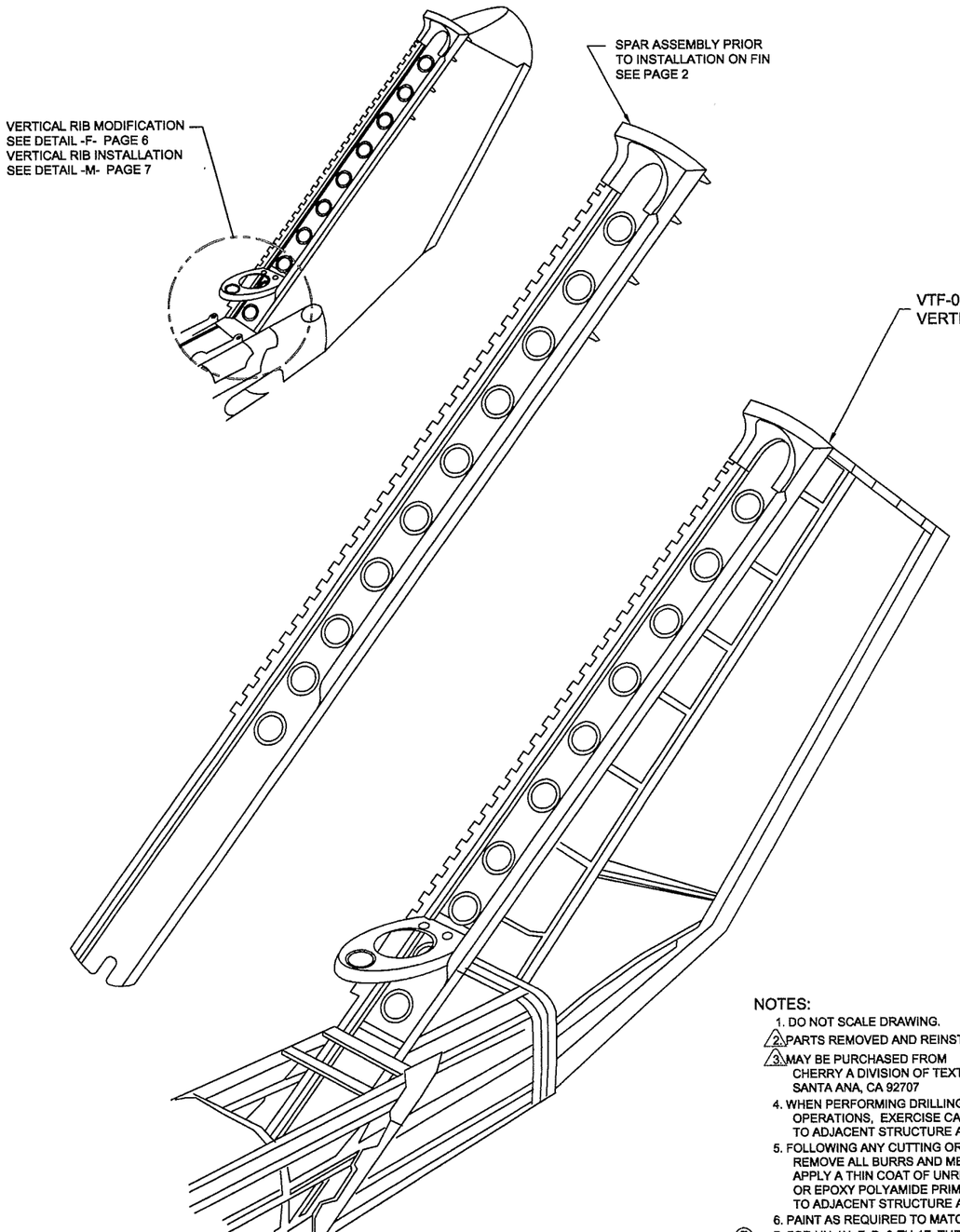
VTF-030-800-001, FORWARD, VERTICAL FIN SPAR ASSEMBLY REV. F, DATED 04-15-08

List of Effective Pages

	Title	Sheet	Revision	Dated
5	SPAR INSTALLATION DRAWING	1 of 9	F	04-15-08
	SPAR INSTALLATION DRAWING	2 of 9	F	04-15-08
	SPAR INSTALLATION DRAWING	3 of 9	F	04-15-08
	SPAR INSTALLATION DRAWING	4 of 9	F	04-15-08
	SPAR INSTALLATION DRAWING	5 of 9	F	04-15-08
	SPAR INSTALLATION DRAWING	6 of 9	F	04-15-08
	SPAR INSTALLATION DRAWING	7 of 9	F	04-15-08
	SPAR INSTALLATION DRAWING	8 of 9	F	04-15-08
	SPAR INSTALLATION DRAWING	9 of 9	F	04-15-08

REV	INCORP. BY	APPR. BY	DATE	DER	DATE	DESCRIPTION
A	JD FINLEY	S. GARDNER	10-31-00			INCORPORATED EO# VTF-001 & VTF-004
B	JD FINLEY	B.A.S.	11-15-00			INCORPORATED EO# VTF-005
C	JD FINLEY	S. GARDNER	11-29-00			CORRECTED HARDWARE CALLOUT, SHT. 2,4
D	LT WHITE	S. GARDNER	03-26-01			INCORPORATED EO# VTF-011 AND REVISED HARDWARE
E	LT WHITE	S. GARDNER	06-06-01			REVISED NOTE 7 & ADDED NOTE 8 TO REFLECT 204B INSTALLATION MANUAL
F	JD FINLEY		4/15/08			SHOW BRACKET ASSY FOR CHAIN DAMPENER INSTALLED ON 204B ONLY, SHT. 3 & 5 INCORPORATED EO# VTF-030-800-EOE1

(D) **HELICOPTER MODELS WITH SHEET METAL FIN INSTALLED:**
ASSEMBLY P/N 205-030-899-109
UH-1H, UH-1F, UH-1P, TH-1F, 204B



NOTES:
1. DO NOT SCALE DRAWING.
2. PARTS REMOVED AND REINSTALLED.
3. MAY BE PURCHASED FROM CHERRY A DIVISION OF TEXTRON, INC. SANTA ANA, CA 92707
4. WHEN PERFORMING DRILLING, RIVETING OR CUTTING, OPERATIONS, EXERCISE CARE TO PREVENT DAMAGE TO ADJACENT STRUCTURE AND EQUIPMENT.
5. FOLLOWING ANY CUTTING OR DRILLING OPERATION, REMOVE ALL BURRS AND METAL PARTICLES, APPLY A THIN COAT OF UNREDUCED ZINC CHROMATE OR EPOXY POLYAMIDE PRIMER TO EXPOSED METAL SURFACES. TO ADJACENT STRUCTURE AND EQUIPMENT.
6. PAINT AS REQUIRED TO MATCH TAILBOOM
(E) 7. FOR UH-1H, F, P, & TH-1F, THESE PARTS ARE TO BE INSTALLED IN ACCORDANCE WITH VERTICAL FIN FORWARD SPAR REPLACEMENT INSTALLATION INSTRUCTIONS MANUAL NO. GHT-VTF-099-UH1.
(E) 8. FOR 204B, THESE PARTS ARE TO BE INSTALLED IN ACCORDANCE WITH VERTICAL FIN FORWARD SPAR REPLACEMENT INSTALLATION INSTRUCTIONS MANUAL NO. GHT-VTF-099-204B.

GHTI RELEASED
Date 4/15/08

	UH-1H NEXT ASSEMBLY	UH-1H USED ON

	REQD.	PART OR INDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
	16	MS20470AD4-8	RIVET
	14	MS20470AD4-7.5	RIVET
	13	MS20470AD4-7	RIVET
	19	MS20470AD4-6.5	RIVET
D A	102	MS20470AD4-5	RIVET
A	28	MS20470AD4-4.5	RIVET
A	22	MS20470AD4-4	RIVET
D	4	MS20426AD4-9	RIVET
	2	MS20426AD5-10	RIVET
D	11	MS20426AD4-11	RIVET
A	4	MS20426AD4-8	RIVET
	2	MS20426AD4-5	RIVET
	2	MS20426AD3-8	RIVET
	12	MS20426AD3-6	RIVET
	14	MS20426AD3-4	RIVET
A	1	HL86PB8	COLLAR (HI-LOC)
F A	96	HL87PB8	COLLAR (HI-LOC)
F	3	HL65PB6-8	PIN (HI-LOC)
	1	HL20PB8-4	PIN (HI-LOC)
F	32	HL64PB6-8	PIN (HI-LOC)
F	43	HL64PB6-7	PIN (HI-LOC)
F	2	HL64PB6-6	PIN (HI-LOC)
F	12	HL64PB6-5	PIN (HI-LOC)
D	7	HL64PB6-4	PIN (HI-LOC)
3	1	CR3243-5-10	RIVET
D	1	CR3243-5-08	RIVET
A 3	8	CR3243-5-07	RIVET
D A 3	4	CR3243-5-06	RIVET
D	8	CR3243-5-05	RIVET
D A 3	39	CR3243-5-04	RIVET
D A 3	80	CR3243-5-03	RIVET
B A 3	3	CR3243-4-09	RIVET
D 3	4	CR3243-4-05	RIVET
D A 3	70	CR3243-4-04	RIVET
D A 3	2	CR3243-4-03	RIVET
A 3	3	CR3242-5-10	RIVET
D	3	CR3242-5-08	RIVET
D	4	CR3242-4-09	RIVET
A 3	2	CR3242-4-03	RIVET
B 3	6	CR3213-4-09	RIVET
D	11	AN960PD416	WASHER
C	4	AN960PD10	WASHER
C	2	AN3-6A	BOLT
D	2	AN4-11A	BOLT
D	5	AN4-7A	BOLT
2	1	205-031-832-4	SUPPORT
2	1	205-031-831-2	SUPPORT
2	1	205-030-846-45	DOUBLER
2	1	205-030-846-33	HINGE
2	1	205-030-846-31	FILLER
2	1	205-030-846-29	BRACKET
2	1	205-030-846-27	STIFFENER
2	1	205-030-846-21	STIFFENER
2	4	205-030-846-19	STIFFENER
2	1	205-030-833	NOSE RIB
2	1	205-030-801-7	STIFFENER, CONNECT
2	1	205-001-109	PULLEY ASSY
2	1	204-030-828	FITTING, SUPPORT TAIL ROTOR DRIVE
2	1	204-001-825	PULLEY ASSY.
2	1	BHTI 90-009-1	LOOP, FOOTMAN
A 2	6	BHTI 4237	BUMPER
F 6	1	VTF-030-875-101	SUPPORT, CABLE DAMPENER
	1	VTF-030-862-101	SPACER, SADDLE BRACKET
	1	VTF-030-861-101	SPACER, LOWER PULLEY ASSY.
	1	VTF-030-860-101	SPACER, UPPER PULLEY ASSY.
	1	VTF-030-846-101	SPAR, FORWARD, VERTICAL FIN
A	1	VTF-030-841-102	BRACKET, NOSE RIB R/H
	1	VTF-030-841-101	BRACKET, NOSE RIB L/H
	1	VTF-030-833-101	BRACKET, SADDLE TO SPAR
	1	VTF-030-832-101	DZUS RAIL
	X	VTF-030-800-001	SPAR, FORWARD, VERTICAL FIN INSTALLATION
	REQD.	PART OR INDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION

	REQD.	PART OR INDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
F 8	3	NAS173885-4	RIVET
F 8	2	NAS173885-3	RIVET
F	A/R	890-B2 (PROSEAL)	PER GHTI-S-8802
D	10	RF5-5	SPACER
B	5	MS21048-3	NUT PLATE
	4	MS21042L4	NUT
	2	MS21042L3	NUT
D	7	MS21075L4	NUT
	1	MS20470AD5-11	RIVET
D	6	MS20470AD5-8	RIVET
D	22	MS20470AD5-7	RIVET
D A	20	MS20470AD5-6	RIVET
D A	26	MS20470AD5-5	RIVET
	20	MS20470AD5-4	RIVET
D C	32	MS20470AD4-10	RIVET
D	50	MS20470AD4-9	RIVET
	X	VTF-030-800-001	SPAR, FORWARD, VERTICAL FIN INSTALLATION
	-001	PART OR INDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
	REQD.		

MACHINED FINISH 125 UNLESS NOTED
TOLERANCES EXCEPT AS NOTED:
ANGLES ± 1°
FRACTIONS ± 1/32
0 ± .100
.00 ± .030
.000 ± .010
.0000 ± .001
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES .013 X 45° OR .016 R.
2. ALL FILLET RADII .030

DRAWN BY	JD FINLEY	DATE 9-13-00
STRESS		DATE
CHECKED BY		DATE
PROJ. ENG.	WA SCHOENBERGER	DATE 9-19-00
DER		DATE

GHTI
GLOBAL HELICOPTER TECHNOLOGY INC.
ARLINGTON, TEXAS

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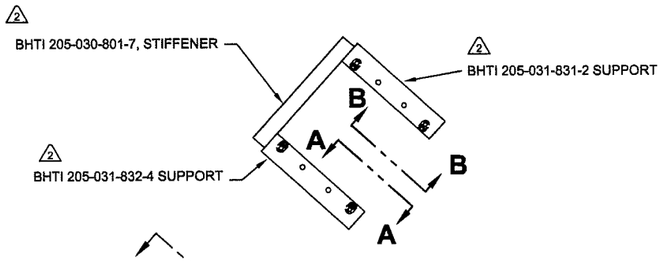
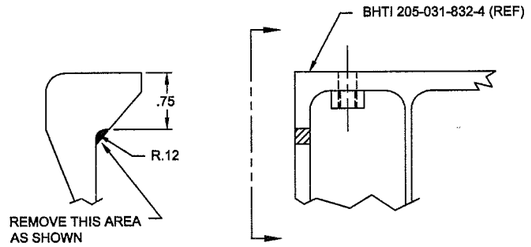
DRAWING NUMBER	VTF-030-800	REV F	SHEET 1 OF 9





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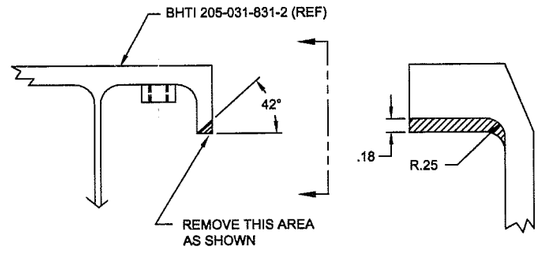

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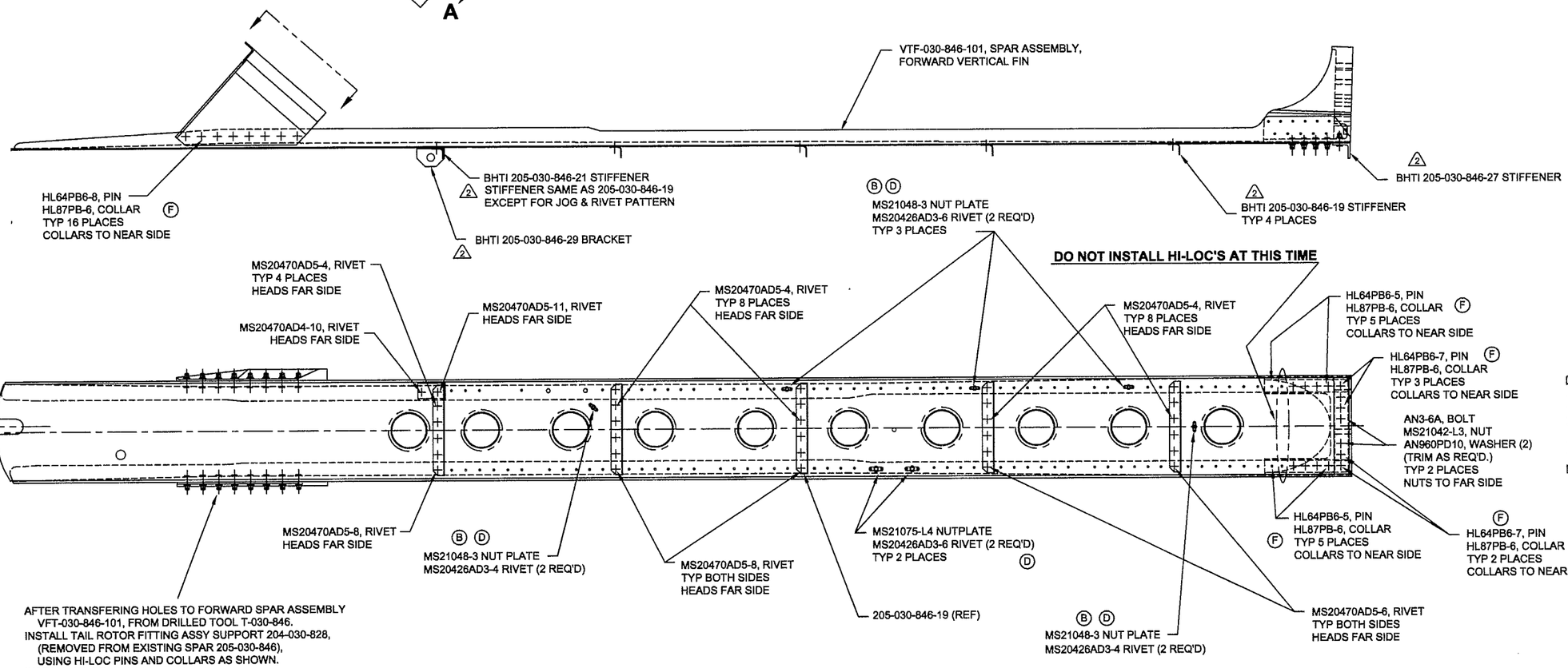
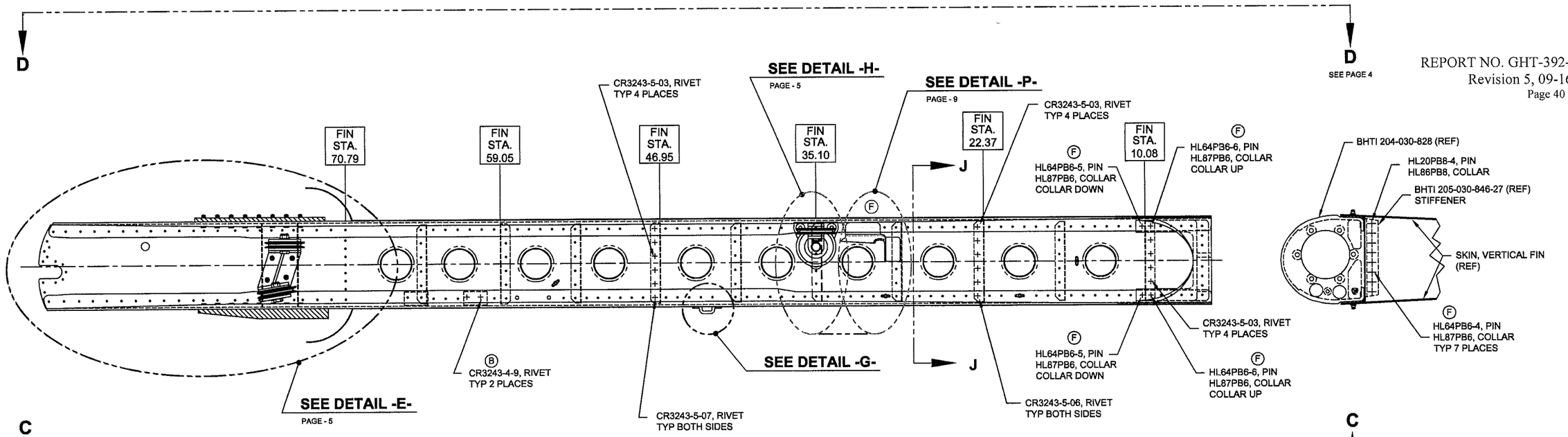


AFTER TRANSFERING HOLES TO FORWARD SPAR ASSEMBLY
VFT-030-846-101, FROM DRILLED TOOL T-030-846.
INSTALL TAIL ROTOR FITTING ASSY SUPPORT 204-030-828,
(REMOVED FROM EXISTING SPAR 205-030-846),
USING HI-LOC PINS AND COLLARS AS SHOWN.
INSTALL 42° GEAR BOX SUPPORTS
CONSISTING OF :
205-030-801-7 STIFFENER,
205-031-831 SUPPORT
(AFTER MODIFICATION SHOWN ABOVE)
AND 205-031-832 SUPPORT,
(AFTER MODIFICATION SHOWN ABOVE)
(REMOVED FROM EXISTING SPAR 205-030-846)
USING HI-LOC PINS AND COLLARS AS SHOWN.
INSTALL 42° GEAR BOX SUPPORT AS AN ASSEMBLY,
WITH GEARBOX SIMULATOR OR GEARBOX INSTALLED
TO MAINTAIN PROPER ORIENTATION.
INSTALL BRACKETS 205-030-846-29 AND
STIFFENERS 205-030-846-19 AND -21 AND -27
(REMOVED FROM EXISTING SPAR 205-030-846)
USING FASTENERS CALLED OUT ABOVE.

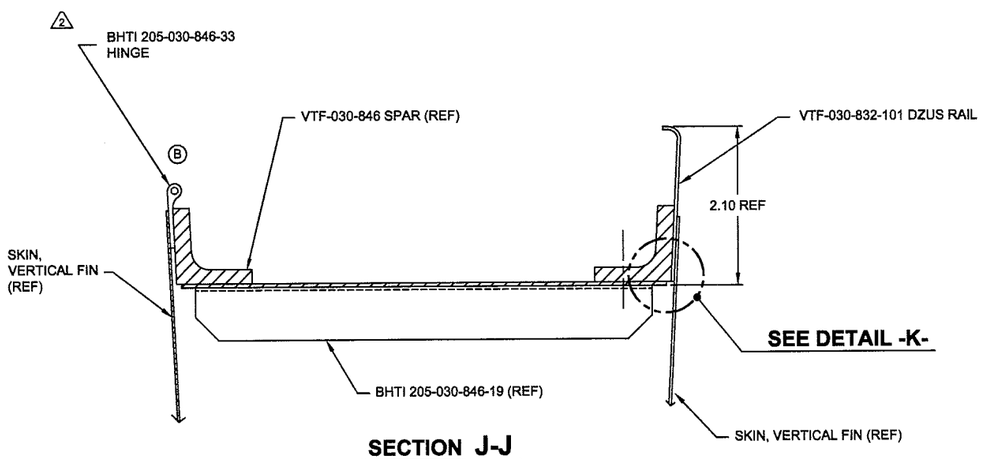
SPAR ASSEMBLY PRIOR TO INSTALLATION INTO FIN

VIEW LOOKING UP

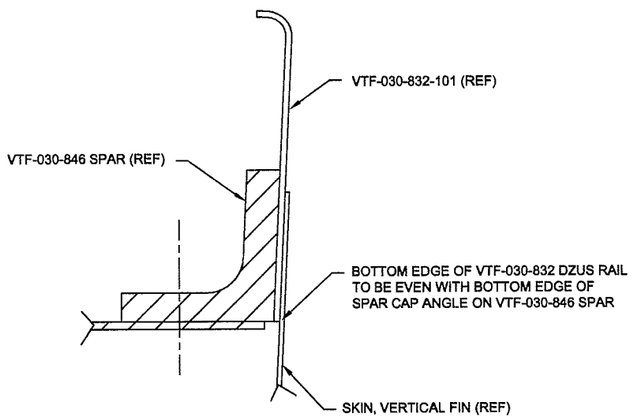
DRAWN BY J.D. FINLEY	DATE 8-26-00	GHTi GLOBAL HELICOPTER TECHNOLOGY INC. ARLINGTON, TEXAS	
STRESS	DATE		
CHECKED BY	DATE	TITLE SPAR, FORWARD, VERTICAL FIN INSTALLATION	SCALE 1 = 4
PROJ. ENG. S. GARDNER	DATE 10-31-00	DRAWING NUMBER VTF-030-800	REV F / SHEET 2 OF 9
DER	DATE		



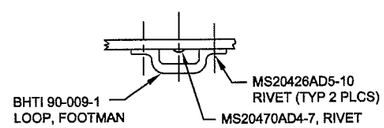
GHTI PROPRIETARY



SECTION J-J

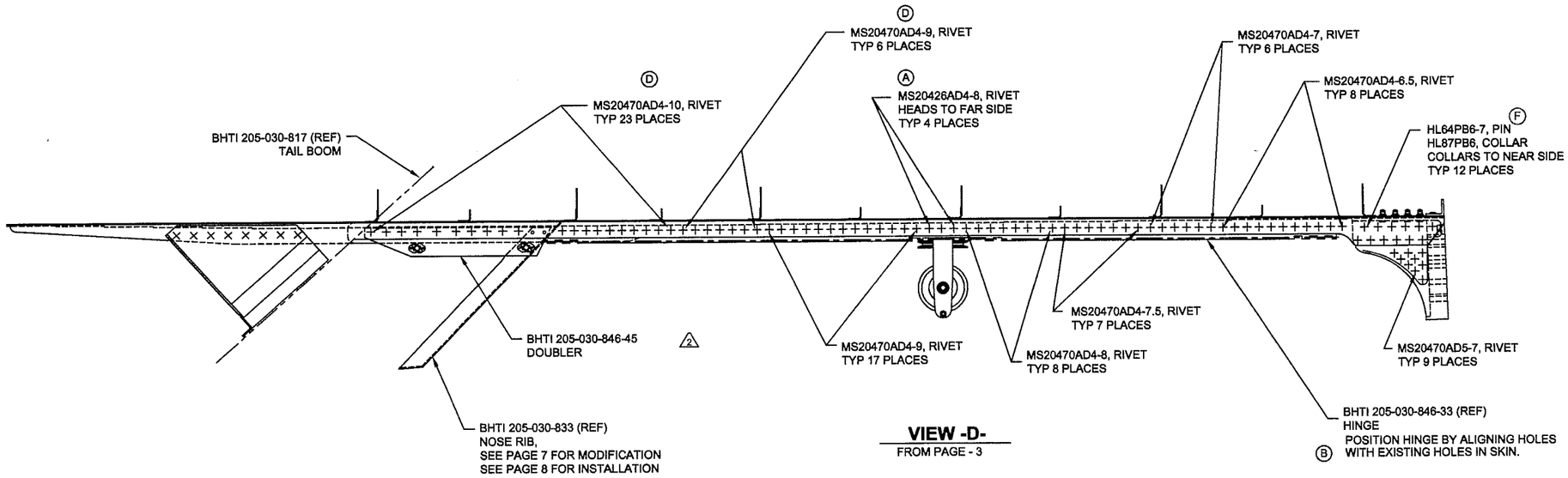


DETAIL -K-
SCALE 1=2



DETAIL -G-
SCALE 1=2

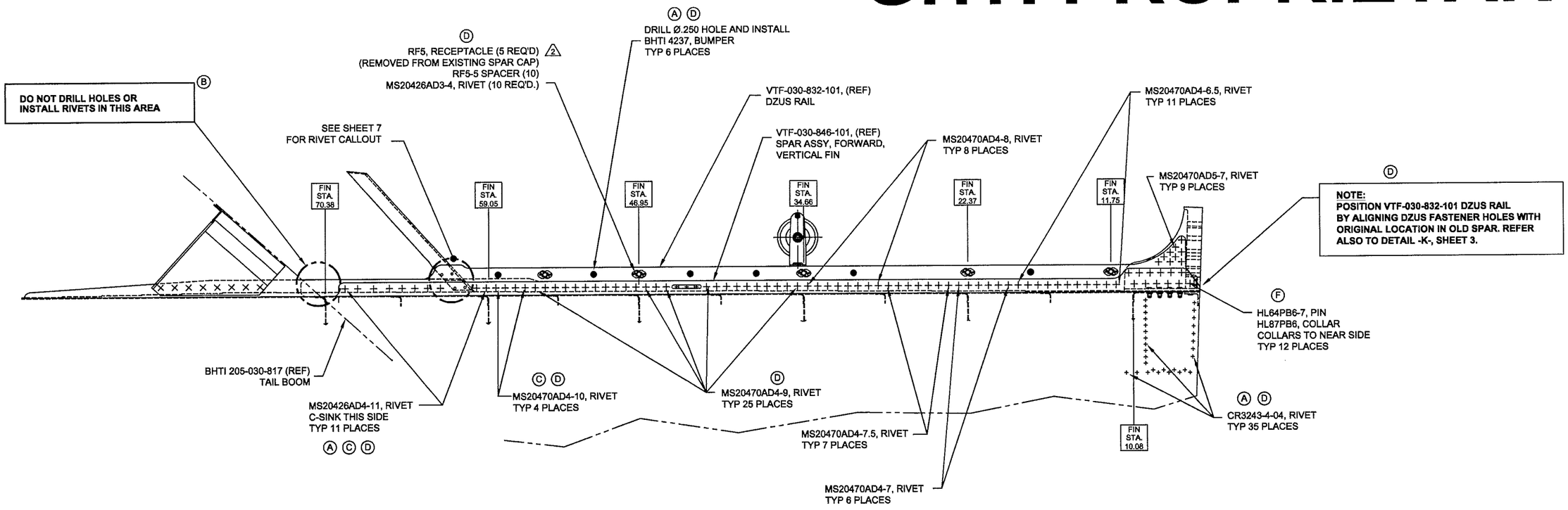
DRAWN BY: J.D. FINLEY	DATE:	GLOBAL HELICOPTER TECHNOLOGY INC. ARLINGTON, TEXAS	
STRESS:	DATE:		
CHECKED BY: S. GARDNER	DATE: 6-6-01	TITLE: SPAR, FORWARD, VERTICAL FIN INSTALLATION	SCALE: 1 = 4
PROJ. ENG.: S. GARDNER	DATE: 10-31-00	DRAWING NUMBER: VTF-030-800	REV: F / SHEET: 3 OF 9
DER:	DATE:		



VIEW -D-

FROM PAGE - 3

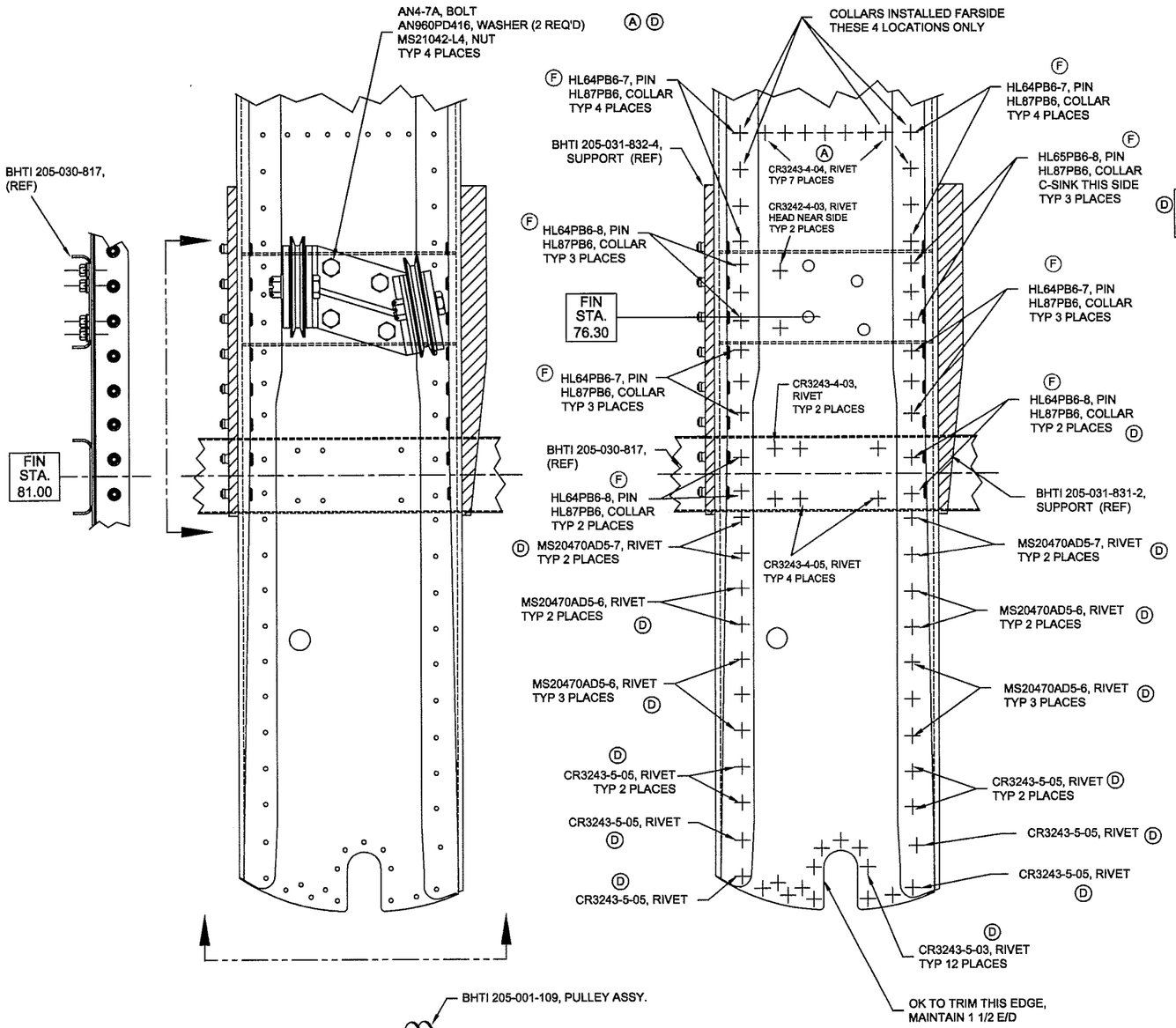
GHTI PROPRIETARY



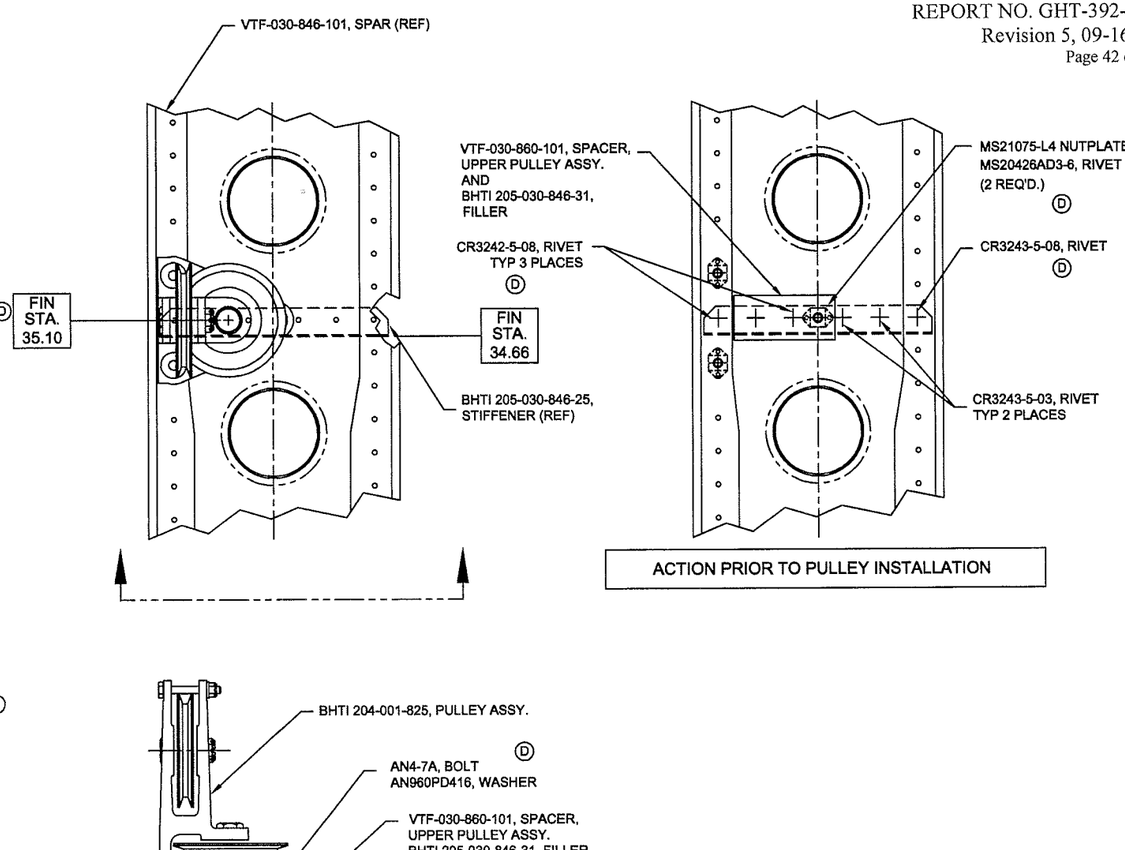
VIEW -C-

FROM PAGE - 3

DRAWN BY: J.D. FINLEY		GLOBAL HELICOPTER TECHNOLOGY INC.	
STRESS	DATE	GHTI ARLINGTON, TEXAS	
CHECKED BY	DATE	TITLE: SPAR, FORWARD, VERTICAL FIN INSTALLATION	SCALE: 1 = 4
PROJ. ENG.: S. GARDNER	DATE: 10-31-00		
DER	DATE	DRAWING NUMBER: VTF-030-800	REV: F / SHEET: 4 OF 9



ACTION PRIOR TO PULLEY INSTALLATION



ACTION PRIOR TO PULLEY INSTALLATION

DETAIL -H-

FROM PAGE 3

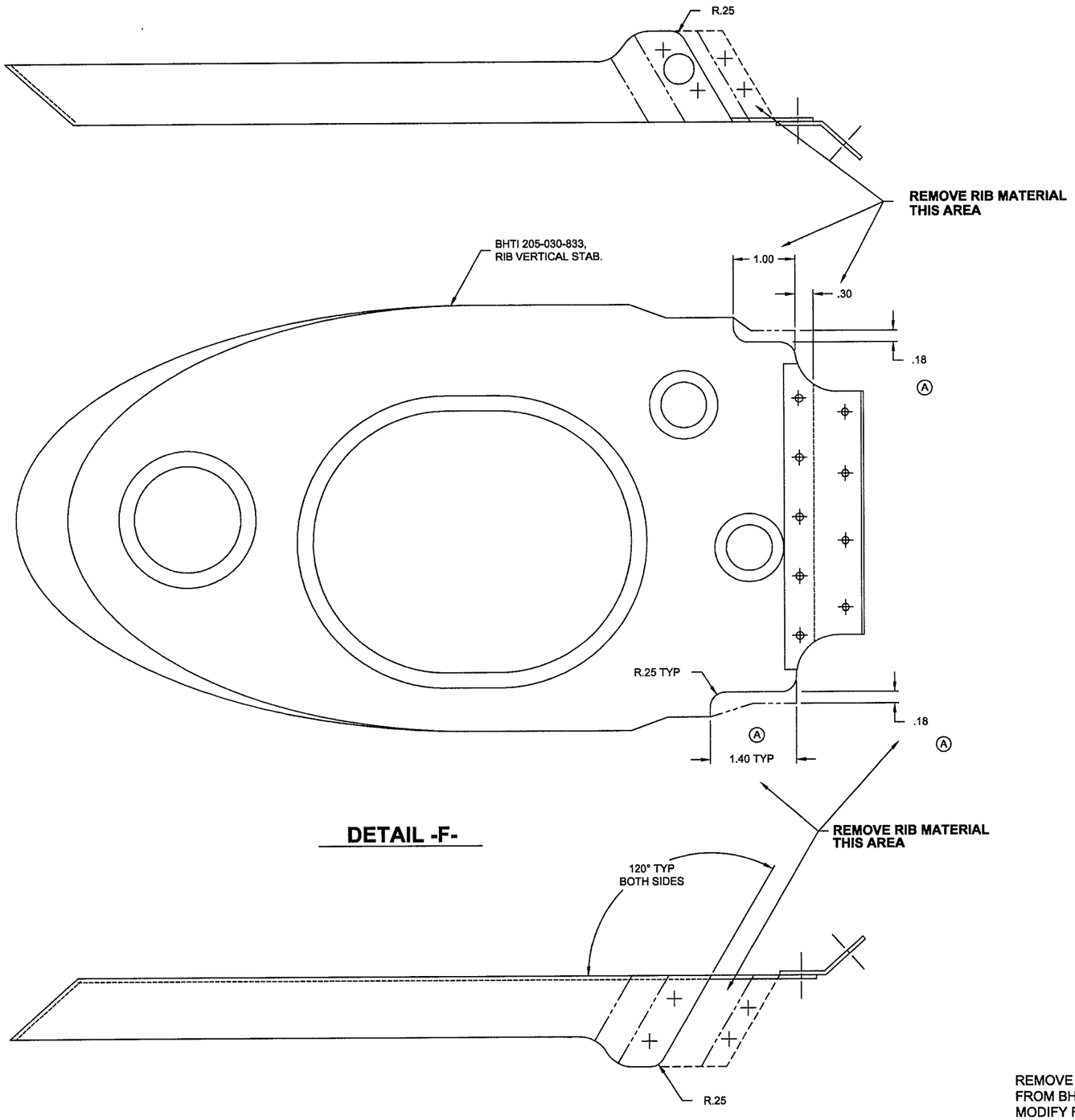
DETAIL -E-

FROM PAGE 3

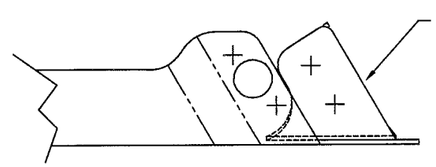
42° GEAR BOX SUPPORT DELETED FOR CLEARITY

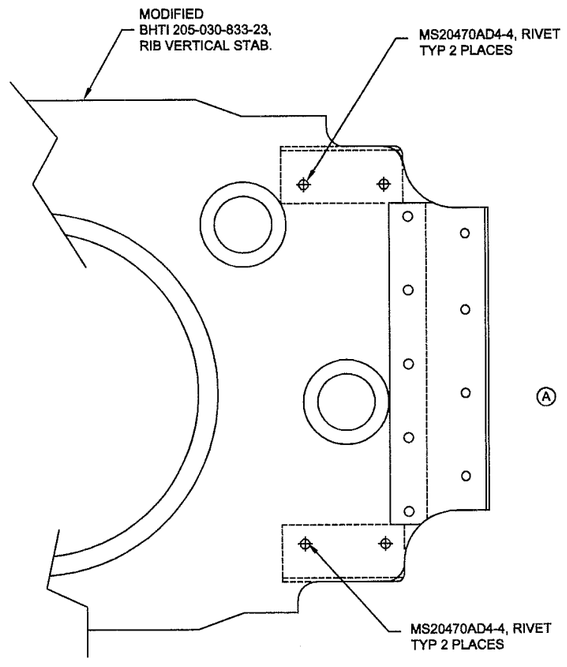
GHTI PROPRIETARY

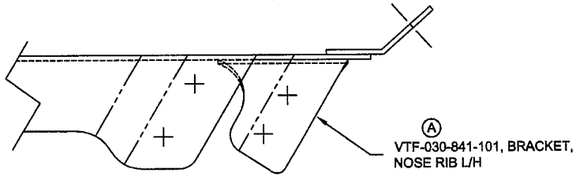
DRAWN BY: J.D. FINLEY	DATE	GHTI	GLOBAL HELICOPTER TECHNOLOGY INC. ARLINGTON, TEXAS
STRESS	DATE		
CHECKED BY	DATE	TITLE	SPAR, FORWARD, VERTICAL FIN INSTALLATION
PROJ. ENG. S. GARDNER	DATE 10-31-00		SCALE 1 = 2
DER	DATE	DRAWING NUMBER	VTF-030-800 REV F SHEET 5 OF 9



DETAIL -F-



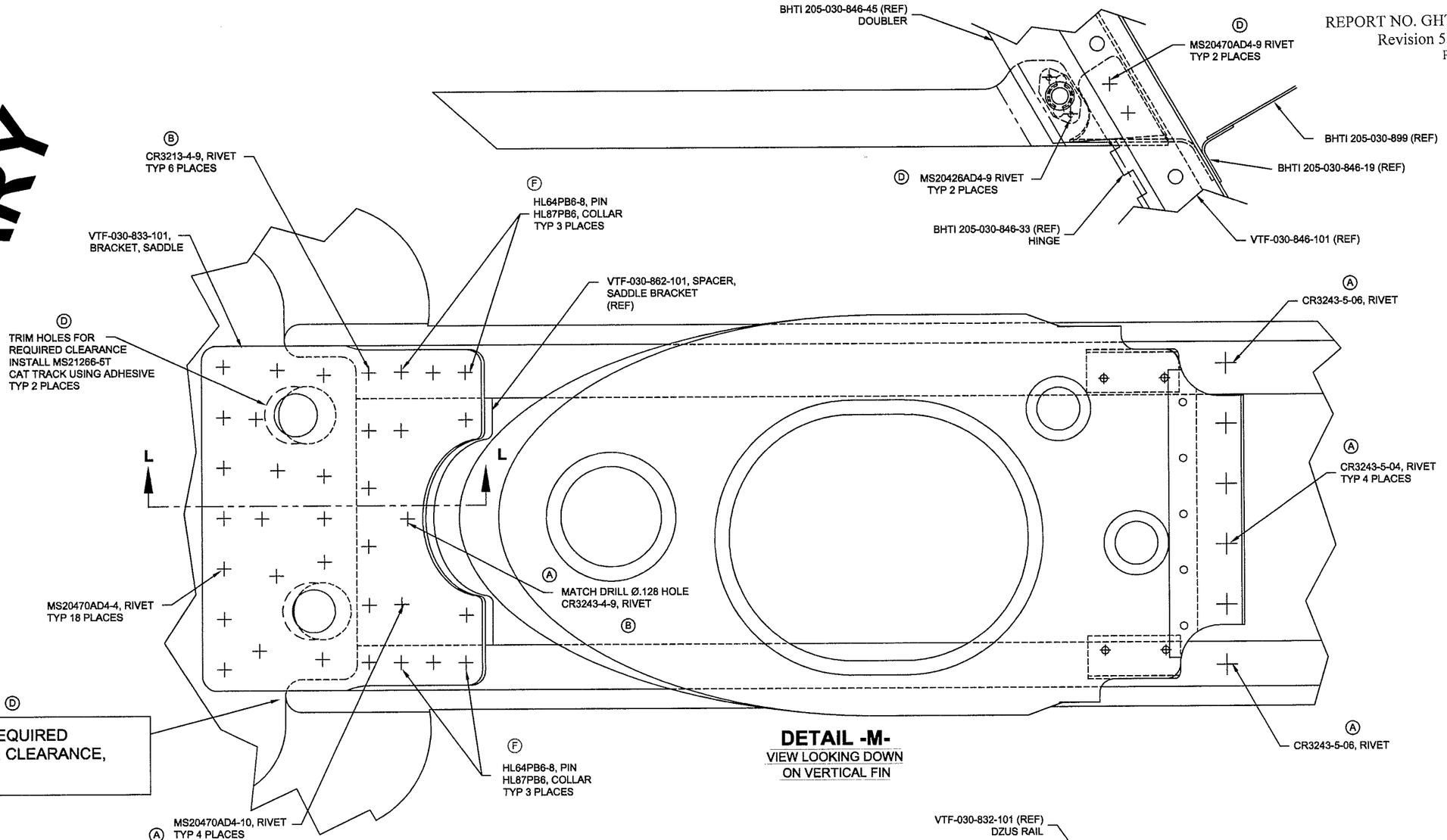




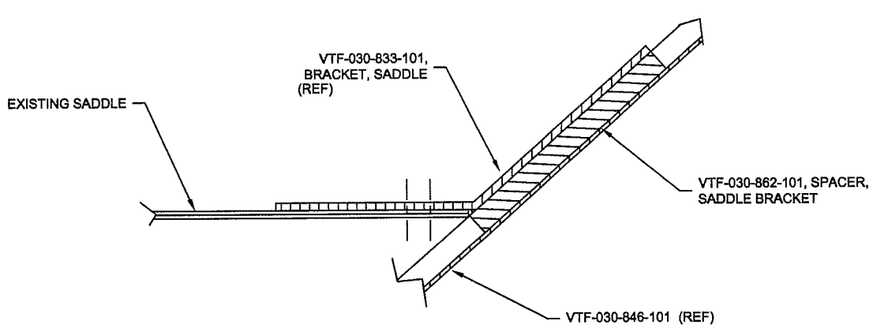
REMOVE BHTI 205-030-833-23 RIB, VERTICAL STABILIZER
FROM BHTI 205-030-846 SPAR ASSY.
MODIFY RIB AS SHOWN.

VERTICAL RIB MODIFICATION

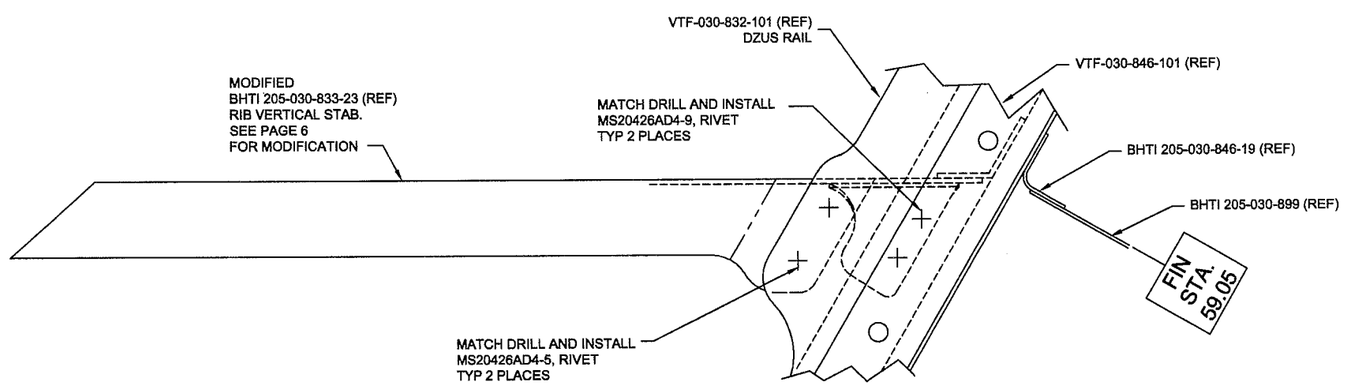
DRAWN BY: JD FINLEY	DATE: 9-8-00	GHTI	GLOBAL HELICOPTER TECHNOLOGY INC. ARLINGTON, TEXAS
STRESS			
CHECKED BY	DATE	TITLE: SPAR, FORWARD, VERTICAL FIN INSTALLATION	SCALE: 1 = 1
PROJ. ENG.: S. GARDNER	DATE: 10-31-00	DRAWING NUMBER: VTF-030-800	REV: F
DER	DATE		SHEET: 6 OF 9



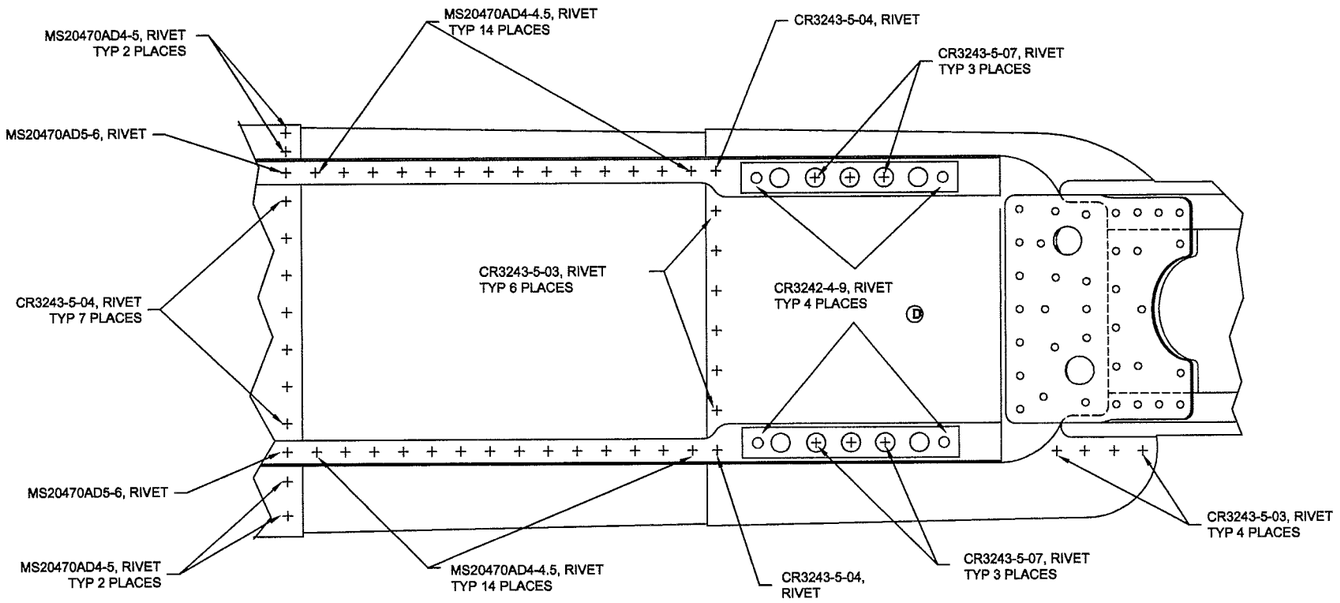
DETAIL -M-
VIEW LOOKING DOWN
ON VERTICAL FIN



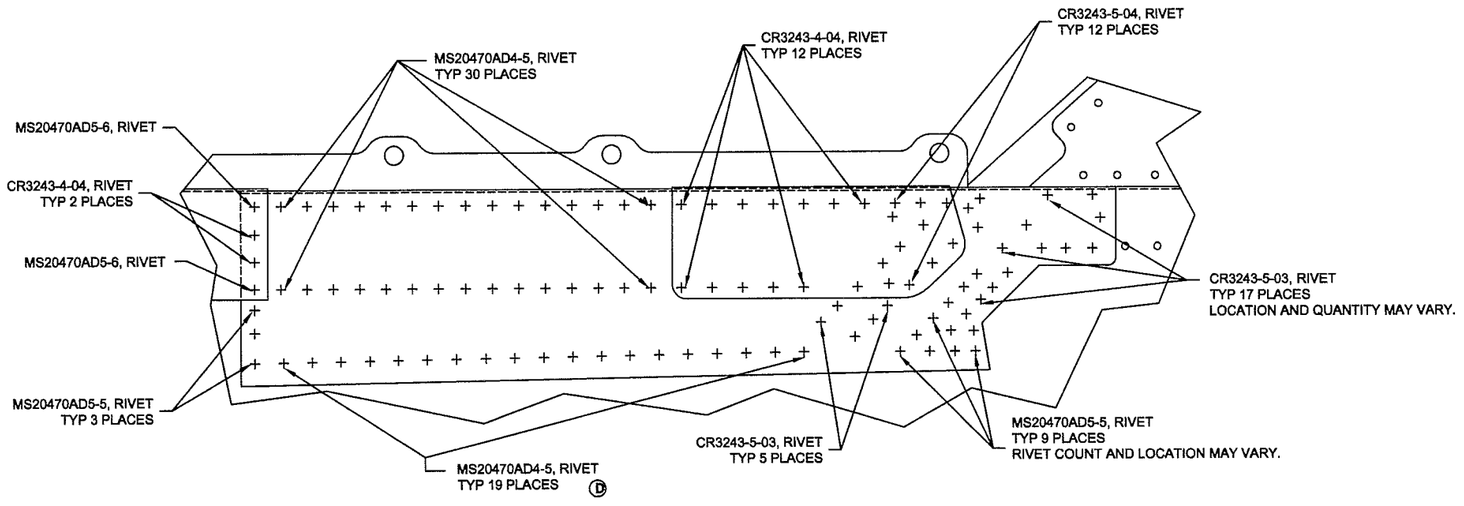
SECTION L-L



DRAWN BY: J.D. FINLEY		GLOBAL HELICOPTER TECHNOLOGY INC.	
STRESS	DATE	GHTI ARLINGTON, TEXAS	
CHECKED BY	DATE	TITLE: SPAR, FORWARD, VERTICAL FIN INSTALLATION	SCALE: 1 = 1
PROJ. ENG.: S. GARDNER	DATE: 10-31-00		
DER	DATE	DRAWING NUMBER: VTF-030-800	REV: F / SHEET: 7 OF 9



GHTI PROPRIETARY

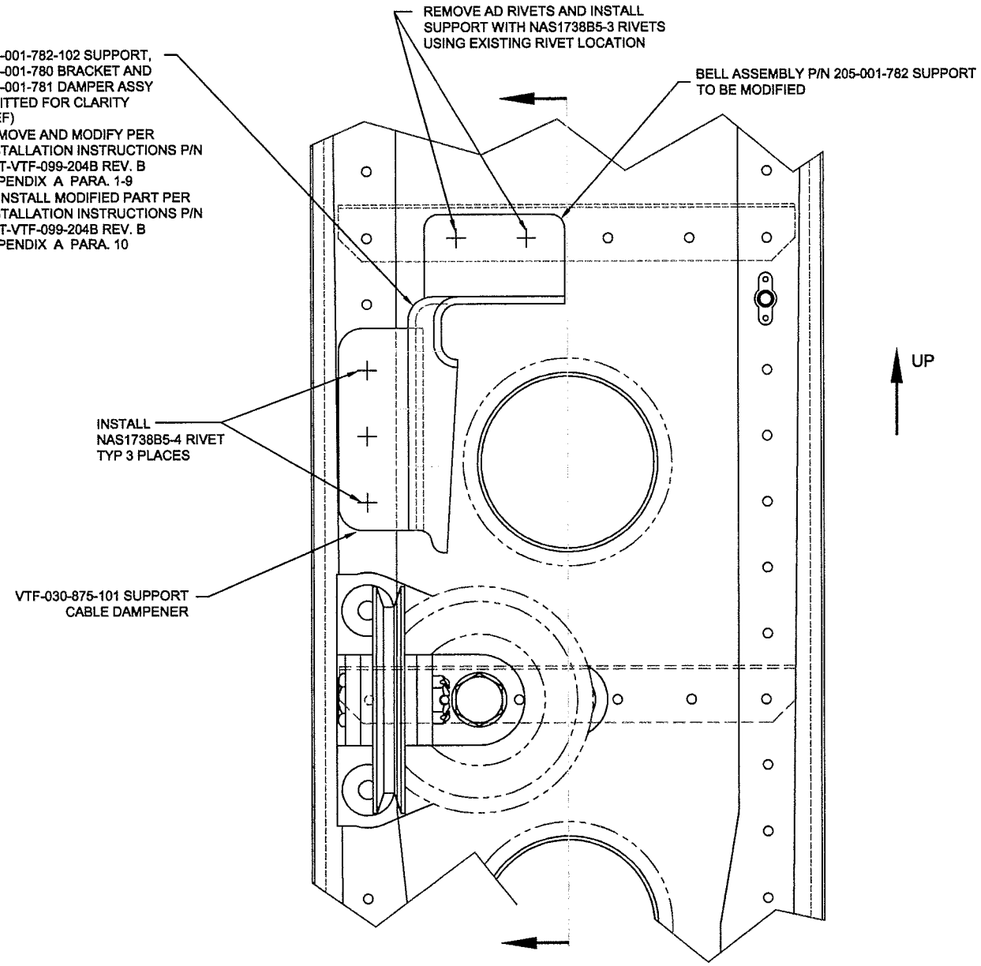


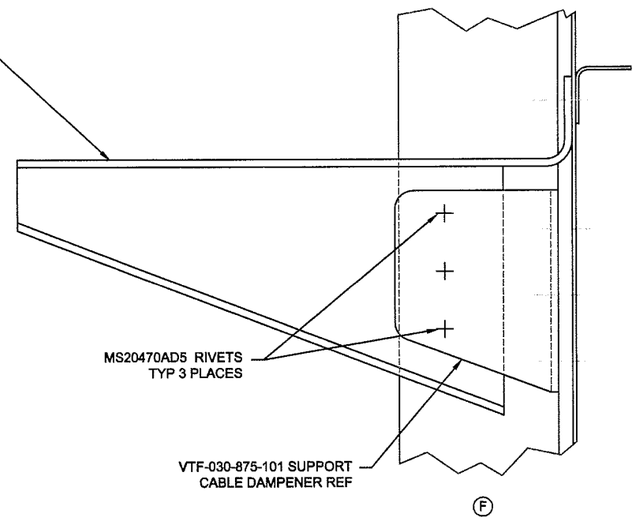
LEFT SIDE OF TAIL BOOM (SHOWN)
RIGHT SIDE OF TAIL BOOM (TYP) D

USE MS20470AD RIVETS FOR THE ASSEMBLY OF SKINS ON TAILBOOM AT LOCATIONS WHERE RIVETS CAN BE BUCKED AND RIVET HOLES HAVE NOT BEEN ENLARGED.

DRAWN BY J.D. FINLEY		GHTI	GLOBAL HELICOPTER TECHNOLOGY INC. ARLINGTON, TEXAS
STRESS	DATE		
CHECKED BY	DATE	TITLE	SPAR, FORWARD, VERTICAL FIN INSTALLATION — SCALE 1 = 2
PROJ. ENG. S. GARDNER	DATE 10-31-00		
DER	DATE	DRAWING NUMBER	VTF-030-800 — REV F — SHEET 8 OF 9

8 MODIFICATION FOR 204B ONLY





8 Ⓕ **DETAIL -P-**

FROM PAGE 3

P/N: 205-001-782-102 SUPPORT ASSEMBLY (CABLE DAMPENER SUPPORT) THIS MODIFICATION IS ONLY APPLICABLE TO BELL P/N 205-001-782-102 WHEN INSTALLED ON A GHTI VERTICAL FIN SPAR P/N GHT-VTF-099-204B FOR A BELL 204B MODEL AIRCRAFT.