Section XIV
Structural Repair

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Section XIV
Structural Repair

Note

All repairs to aircraft structures not specified in the Maintenance and Overhaul Manual will be in accordance with the recommended procedures of the U.S. Department of Transport, publication FAR 43. On all aircraft registered outside the United States, structural repairs will be in accordance with the governing agency responsible.

Note

This section contains written instructions and illustrations for repairs considered to be typical for the helicopter. Typical repairs and damage limits covered in this section shall be applied subject to component limitations, and shall not be accomplished if weight and balance, structural integrity, interchangeability or operational characteristics will be adversely affected.

14-1. TYPE OF CONSTRUCTION. The forward section, which consists of the cabin, fuel cell enclosure and pylon support, utilizes an aluminum honeycomb structure and provides the major load carrying elements of the forward cabin. The intermediate area, extending from the bulkhead aft of the passenger compartment to the tail boom, supports the engine and employs an aluminum semi-monocoque construction. The tail boom, which supports the vertical fin, stabilizer and tail rotor, employs a basic monocoque structure which utilizes aluminum bulkhead and aluminum skin. The transparent enclosures are fabricated of clear, blue tinted, transparent sheet and are supported by formed aluminum alloy sections. The landing gear is of the skid type, constructed of tubular aluminum alloy. The engine and transmission cowling is constructed of aluminum alloy, fiberglass and honeycomb material. See figure 14-1 for materials identification.

14-2. INVESTIGATING DAMAGE.

a. When any part of the airframe has been damaged, the first step is to clean off all grease, dirt and paint in the vicinity of the damage so that the extent of the damage can be determined.

b. Next, a thorough check of the structure for dents, scratches, abrasions, punctures, cracks, distortion, loose joints, breaks, worn spots, and corrosion should be made. All riveted and bolted joints in the vicinity of the damaged area should be checked for damaged rivets or bolts. If there is any doubt whether a rivet or bolt has failed, remove the fastener so that any damage can be detected. Fittings should receive special investigation. Full advantage of all access panels, doors, and openings should be taken to obtain proper access to the damaged area as well as surrounding area.

c. The adjacent structure should be inspected in order to determine what secondary damage may have resulted from the transmission of the shock or load which caused the primary damage. For example, a shock at one end of a structural member, such as a rib or bulkhead, may be transmitted to the opposite end of the member, causing sheared rivets or other damage at a considerable distance from the area of the primary damage. In estimating the extent of the damage, be certain that no secondary damage remains unnoticed.

d. Neither the existance of suspected cracks nor the full extent of apparent cracks in major structural members can be accurately determined by simple visual inspection. In cases where it is important that cracks be accurately defined, it is necessary to perform a dye penetrant inspection on the structural member.

14-3. DAMAGE EVALUATION.

The following preliminary inspections are of a general nature. Detailed inspection data is provided in the applicable sections.

a. Inspect skins for dents, cracks, holes, wrinkles, buckles and popped or loose rivets.

b. Inspect doors and access panels for misalignment, damage and security of mounting.

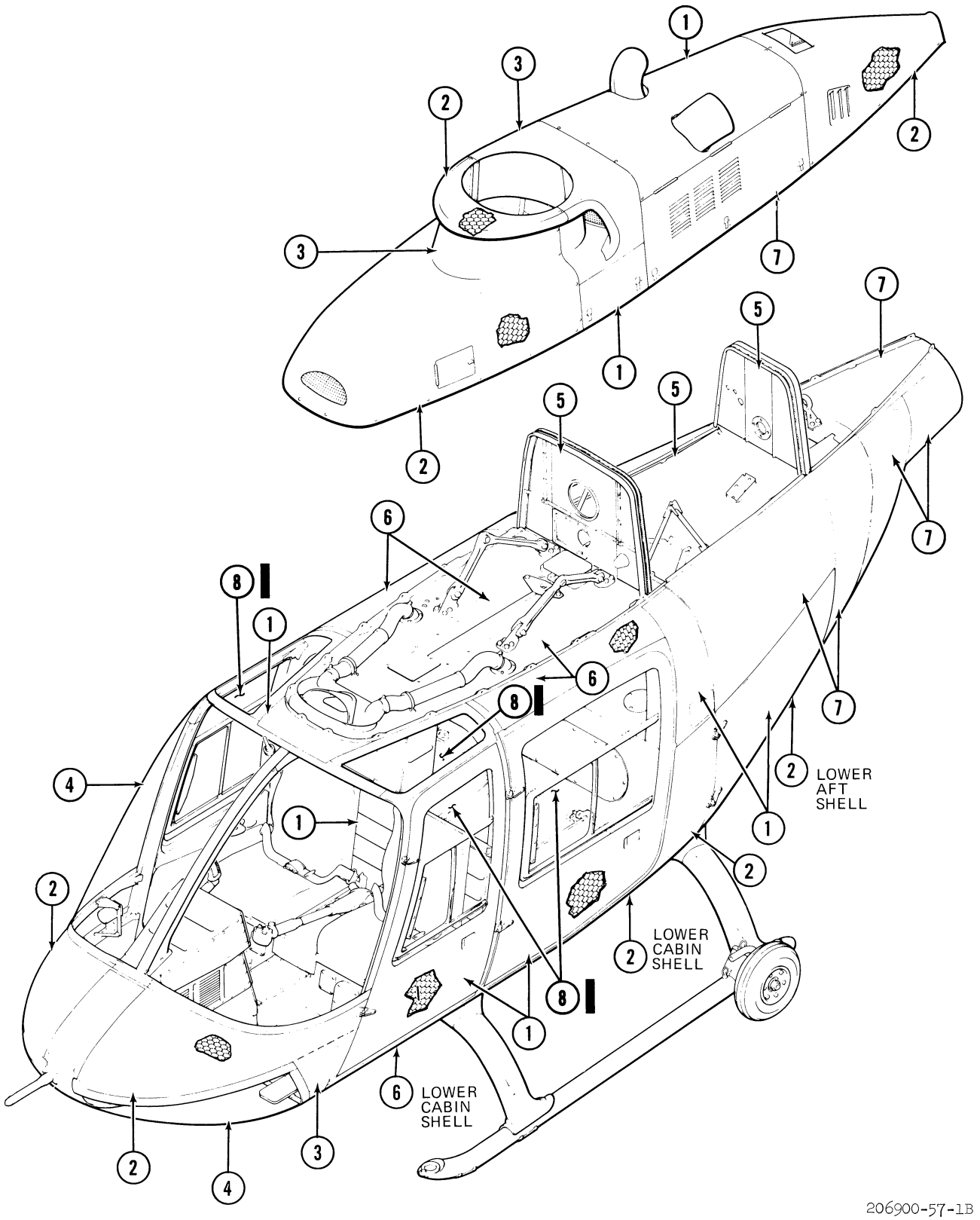
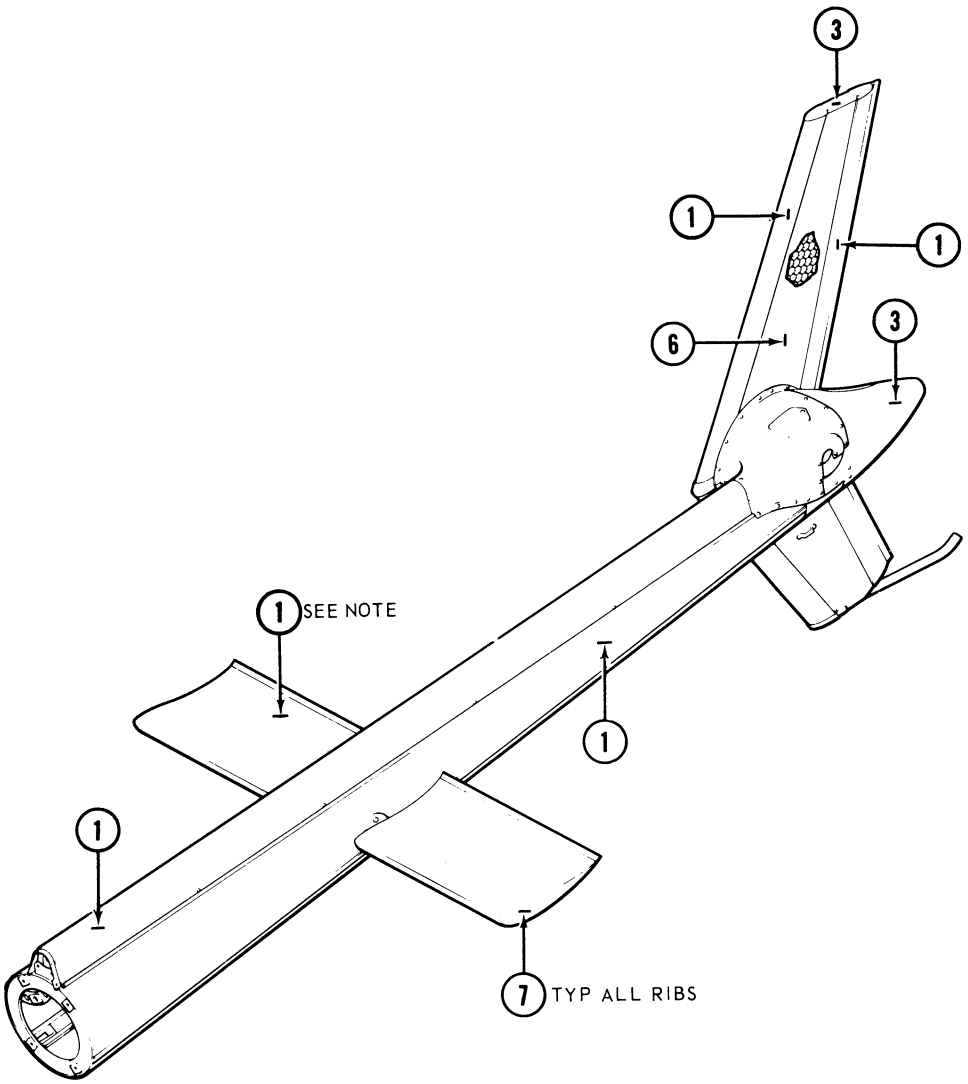


Figure 14-1. Body Group Skin Identification (Sheet 1 of 2)



Note: Skins on helicopters 154 through 1241 are same as item 1. See figure 14-20 for general construction of vertical fin. For differences on helicopters 1252 and subsequent see figure 14-2, 14-3 and 14-4.

ITEM	MATERIAL
1.	2024T3 Aluminum Alloy QQ-A-250/5
2.	Honeycomb-Fiberglass Facing
3.	Fiberglass
4.	Acrylic Plastic 0.125 inch MIL-P-5425
5.	Titanium MIL-T-9046
6.	Honeycomb-Aluminum Facing
7.	2024 T-42 Aluminum Alloy QQ-A-250/5
8.	Polycarbonate Plastic

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Figure 14-1. Body Group Skin Identification (Sheet 2 of 2)

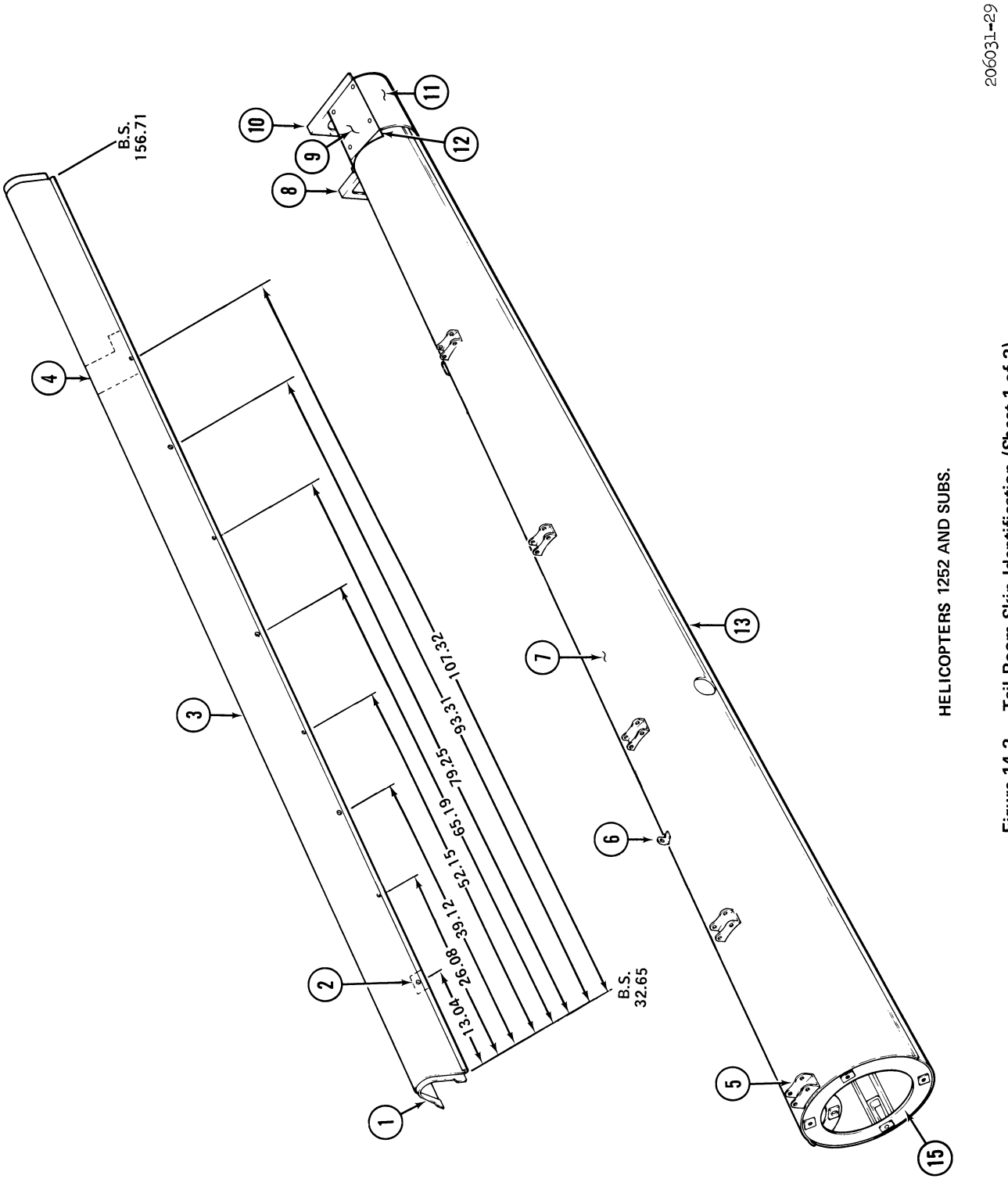

Figure 14-2. Tail Boom Skin Identification (Sheet 1 of 2)

1. Doubler - Aluminum Alloy 2024 QQ-A-250/5 T3 0.020 Inch
2. Doubler - Aluminum Alloy 2024 QQ-A-250/5 T3 0.016 Inch, 14 Required
3. Cover - Aluminum Alloy 2024 QQ-A-250/5 T3 0.016 Inch
4. Splice - Aluminum Alloy 2024 QQ-A-250/5 T3 0.020 Inch
5. Bracket - Aluminum Alloy 2024 QQ-A-250/5 T4 0.080 Inch
6. Clip - Aluminum Alloy 2024 QQ-A-250/5 T42 0.040 Inch, 16 Required
7. Upper Skin - Aluminum Alloy 2024 QQ-A-250/5 T3 0.040 Inch
8. Support (206-031-417)
9. Plate - Aluminum Alloy 2024 QQ-A-250 T42 0.063 Inch
10. Support (206-031-426)
11. Aft Skin - Aluminum Alloy 2024 QQ-A-250/5 T3 0.040 Inch
12. Angle (206-032-418-1)
13. Lower Skin - Aluminum Alloy 2024 QQ-A-250/5 T3 0.040 Inch
14. Intercostals - Aluminum Alloy 2024 QQ-A-250/5 T42 0.040, 0.050 and 0.063 Inch
    Clips - Aluminum Alloy 2024 QQ-A-250/5 T42 0.025 Inch
15. Bulkhead - Aluminum Alloy 2024 QQ-A-250/5 T42 0.032 Inch

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Figure 14-2. Tail Boom Skin Identification (Sheet 2 of 2)

c. Inspect plexiglass panels for cracks, scratches, holes and security of mounting.

d. Inspect work decks and honeycomb panels for cracks, holes, voids, missing or loose rivets and misalignment or deformation.

e. Inspect skid landing gear for deformation, dents, holes and security of fasteners.

f. Inspect tail rotor gear boxes and hanger mounting areas for cracks, deformation and other damage.

g. Inspect internal structural members for cracks, dents, deformation, popped or loose rivets and misalignment.

h. Inspect fittings and supports for cracks and damage. Carefully examine not only local damage but also adjacent structure for possible hidden damage.

i. Inspect pylon area for damage and misalignment.

j. Inspect engine mounts and mount fittings for cracks and deformation.

k. Inspect rotating controls in accordance with instructions contained in Section IV.

l. Inspect power train components in accordance with instructions contained in Section IV.

m. Inspect all parts for corrosion damage.

14-4. CLASSIFICATION OF DAMAGE.

a. Negligible Damage. Negligible damage is that damage which can be permitted to remain as it is or made acceptable by a simple procedure, such as removing dents, polishing or smoothing nicks, priming or spot painting and stop drilling short cracks, without placing restrictions on flight.

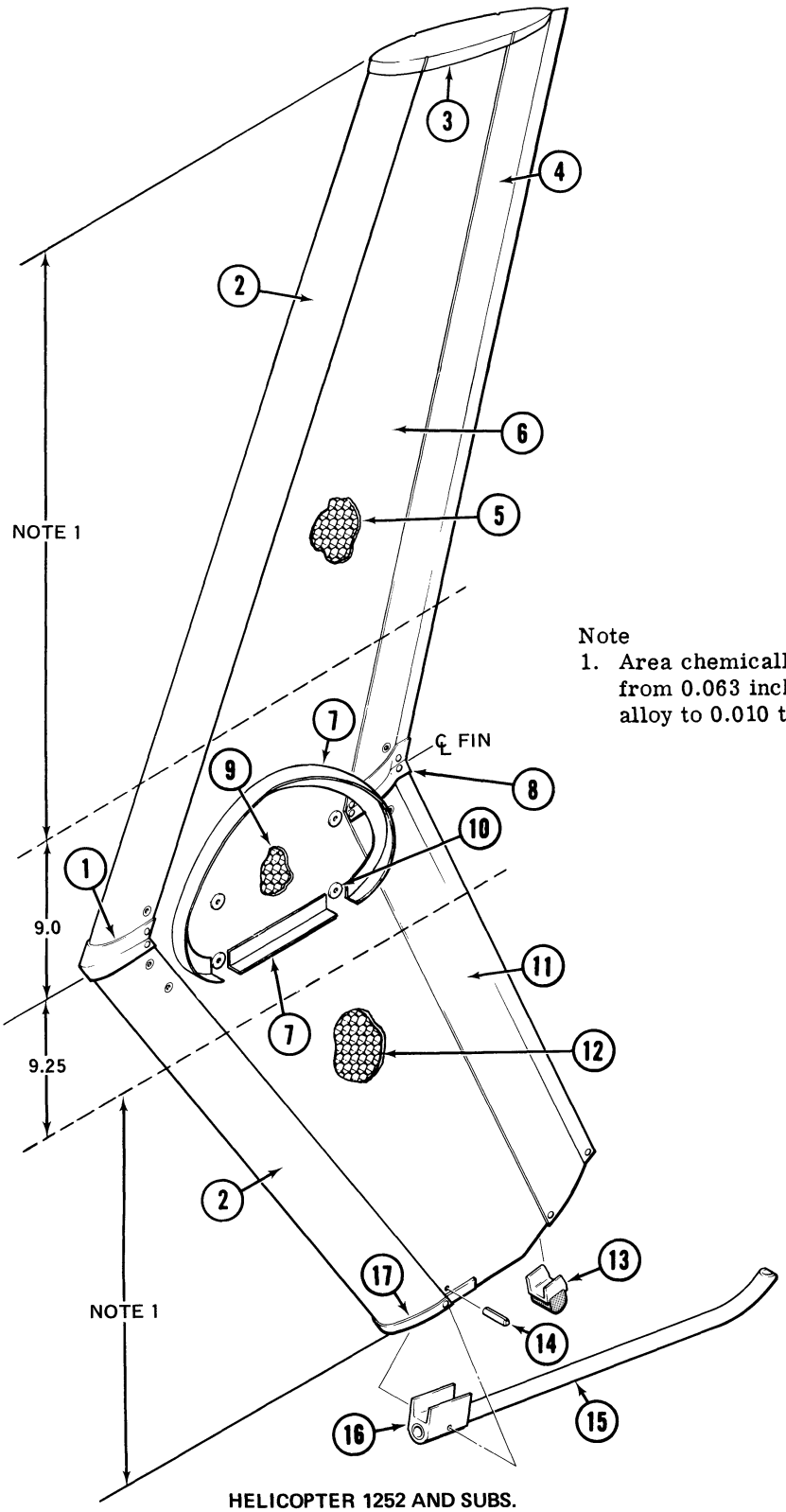
b. Repairable Damage. Damage exceeding the specified negligible damage limits, but not so severe as to warrant replacement. Components damaged beyond the limits shown as repairable must be replaced.

c. Crash Damage. Because of the many possible combinations resulting from crash damage it is not possible to include specific repair schemes in this category. Crash damage must be evaluated for individual situations, and repairs carried out in accordance with the specific information included in this publication.

14-5. TYPES OF REPAIRS.

a. Repairs by Patching. Damage exceeding that determined as negligible damage may be repaired by patching in some areas. (Refer to paragraph 14-4a.) Patches may be applied to a damaged area provided the damage is first trimmed to a suitable shape, and the repair patch cut with sufficient overlap to allow proper edge distance for attachment rivets.

b. Repairs by Insertion. Insertion type repairs are accomplished by removing a damaged section of material



Note
1. Area chemically milled from 0.063 inch T3 aluminum alloy to 0.010 to 0.015 inch.

Figure 14-3. Vertical Fin Skin Identification (Sheet 1 of 2)

1. Doubler - Aluminum Alloy 2024 QQ-A-250/5T3 0.012 Inch
   Splice - Glass Fabric MIL-C-9035, Type III, 2 Ply
2. Cap - Aluminum Alloy 2024 QQ-A-250/5 T3 0.012 Inch
3. Cap - Glass Fabric MIL-C-9085, Type III, 1 Ply
4. Trailing Edge - Aluminum Alloy 2024 QQ-A-250/5 T3 0.012 Inch
5. Upper Core - Aluminum Honeycomb STD 5052, 1.250 Inch
6. Skin - Aluminum Alloy 2024 QQ-A-250/4 T4 0.063 Inch (Refer to Note 1.)
7. Former - Aluminum Alloy 6061 QQ-A-250/11 T6 0.033 Inch
8. Doubler - Aluminum Alloy 2024 QQ-A-250/5 T3 0.012 Inch
   Splice - Glass Fabric MIL-C-9085, Type III, 2 Ply
9. Center Core - Aluminum Honeycomb H.D. 5052 1.250 Inch
10. Sleeve (S102F25-20) 4 Required
    Plug (P102F25-2) 4 Required
11. Trailing Edge - Aluminum Alloy 2024 QQ-A-250/5 T3 0.016 Inch
12. Lower Core - Aluminum Honeycomb STD 5052 1.250 Inch
13. Bumper (206-020-113-27)
    Fitting, Support Bumper (206-020-108-1)
14. Pin (MS171655)
15. Tail Skid (206-020-110-5)
16. Tail Skid Fitting (206-020-109-1)
17. Cap - Glass Fabric MIL-C-9085, Type III, 2 Ply

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Figure 14-3. Vertical Fin Skin Identification (Sheet 2 of 2)

and inserting a newly fabricated section of material having identical characteristics to the area removed, plus the necessary reinforcement.

c. Riveted Repairs. Riveted repairs are specified throughout this section. Each repair provides details of the rivet pattern to be used. Where applicable heat treatment details are provided for the detail to be repaired.

d. Welded Repairs. No welded repairs are permitted to structural components or engine mounts of this helicopter. Welded repairs to skid shoes and engine exhaust ducts are permitted. (Refer to paragraph 14-97.)

e. Bonded Repairs. Structural aluminum faced honeycomb panels may be repaired within the limits specified. (Refer to paragraph 14-11.)

14-6. FUSELAGE.

14-7. DESCRIPTION. (Refer to paragraph 14-1.)

14-8. NEGLIGIBLE DAMAGE LIMITS.

a. Honeycomb panels. (Refer to paragraph 14-11.)

b. Sheetmetal Surfaces.

(1) Nicks and scratches not in a radius area less than 2.0 inches long and less than 10 percent of material thickness after clean-up.

(2) Smooth contoured dents, free of cracks or gouges. Dent limits are as follows:

DIAMETER (Inch)	DEPTH (Inch)
1.0	1/64 (0.015)
2.0	3/64 (0.046)
3.0	1/16 (0.062)

(a) A minimum of 3.0 inches of undamaged material between dents and a minimum of 1.0 inch from supporting structure.

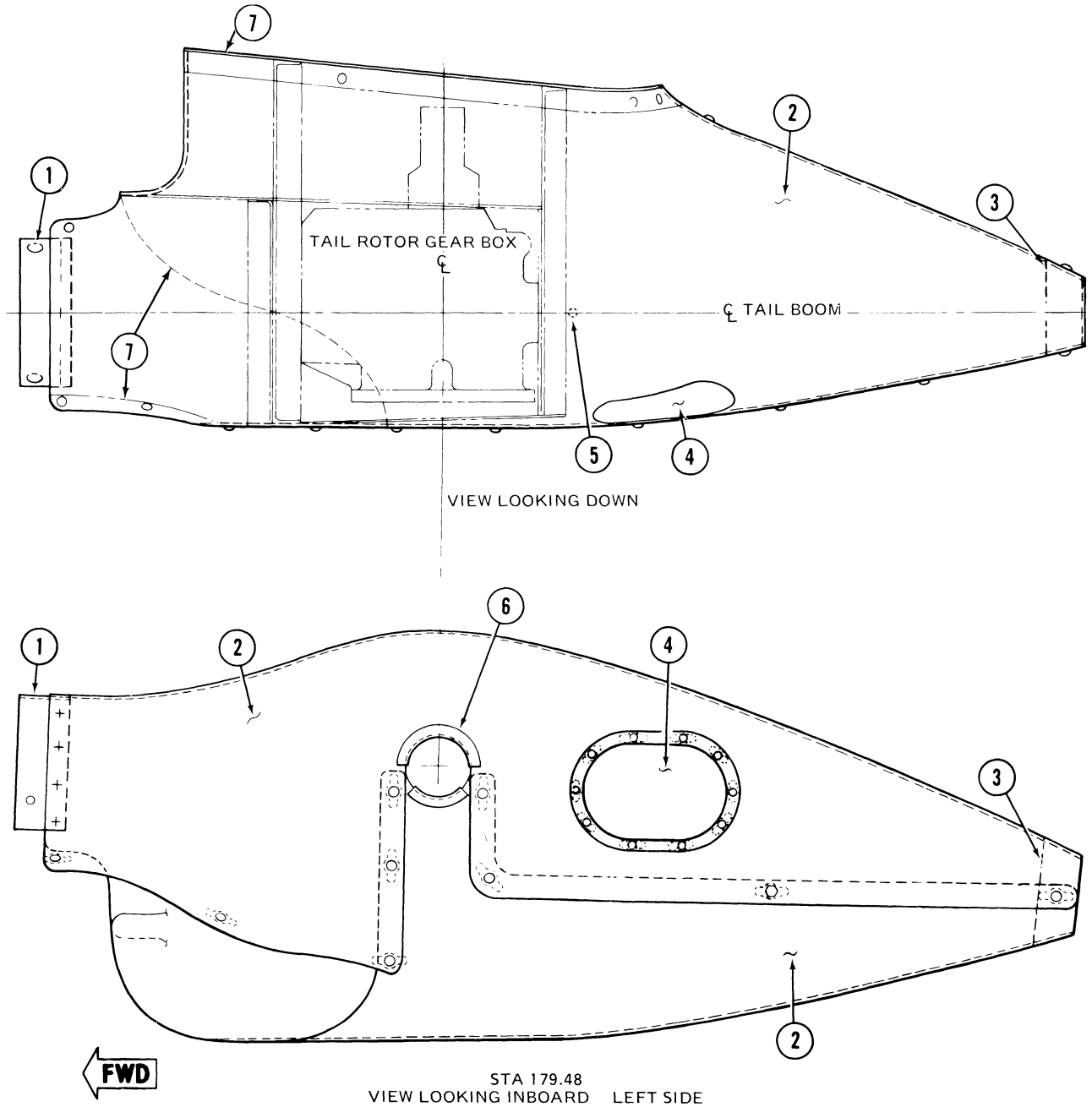
(b) Dents closer than 1.0 inch (edge-to-edge) are considered one dent.

(3) Corrosion damage less than 10 percent of material thickness and less than 10 percent of panel area after cleanup and treatment.

c. Stringers and longerons (excluding tailboom). Scratches or smooth shallow dents not extending into formed radius and less than 10 percent of material thickness and 0.50 inch length after cleanup.

(1) Edge damage not to exceed 0.025 inch depth and 0.75 inch length after cleanup.

(2) Damage in a radius shall be considered as a crack and must be repaired.



1. Doubler — Aluminum Alloy 2024 QQ-A-250/5 T3 0.040 Inch
2. Fairing Skin — Aluminum Alloy 6061 QQ-A-250/11 T6 0.032 Inch
3. Bulkhead — Aluminum Alloy 6061 QQ-A-250/11 T6
4. Window — Acrylic 0.063 Inch
5. Drain Hole
6. Edge Cover
7. Chafing Tape

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Figure 14-4. Tail Rotor Gear Box Fairing (Helicopters 1252 and Subsequent)

(3) Two negligible damage areas allowed between bulkheads with 2.0 inches minimum distance between cleanup areas.

(4) Corrosion areas not extending into formed radius, less than 10 percent of material thickness, less than 25 percent of flange width, and less than 1.0 inch in length after cleanup.

14-9 REPAIRABLE DAMAGE LIMITS.

a Honeycomb panels. (Refer to paragraph 14-14.)

(1) Replacement of honeycomb panels is limited to the following:

(a) Nose panel

(b) Crew seat panel

(c) Passenger seat panel

(d) Lower aft fairing

(e) Baggage compartment floor.

Note

All other honeycomb panels require special tools or holding fixtures for their replacement. Critical mounting surfaces such as pylon mounts, engine mounts, bearing hanger supports, etc., are located by special fixtures; repairs must not interfere with or change location of these surfaces.

(2) Repairs to honeycomb panels shall be limited to limits specified in paragraph 14-14 and limitations shown on illustrations. (See figures 14-5 through 14-13.)

b. Sheetmetal surfaces.

(1) Dents and scratches which show evidence of a crack or nicks and scratches in a dent which exceed 10 percent of material thickness.

(2) Repair to fuselage metal skins is limited to 20 percent of a skin panel area.

(3) Sheetmetal surface repair to fuselage metal skins is limited to 20 percent of a skin panel area.

(a) Seal all exterior aluminum repairs with sealant (item 7, table 1-1).

(b) Seal all titanium repairs with sealant (item 110, table 1-1).

(4) Corrosion or mechanical damage that exceeds negligible damage limits shall be repaired. (Refer to paragraph 14-8.)

(5) No repairs are permitted to bearing hanger mounting surfaces or oil cooler blower mounting surfaces without engineering approval.

c. Stringers and longerons (excluding tailboom). One repair per length between bulkheads.

(a) Repairs shall not extend into a splice or bulkhead.

(b) No repairs are allowed on longerons attached to the aft bulkhead, longeron fittings and splice areas.

(c) If combined stringer or longeron and skin damage is present, the damage limit of 20 percent shall not be exceeded.

14-10. REPAIR – FUSELAGE.

a. Honeycomb panels. (Refer to paragraph 14-11 .)

b. Sheetmetal Surfaces. Repairs shall be in accordance with U.S. Department of Transport, Publication AC43.13-1A, Aircraft Inspection and Repair. On helicopters registered outside the United States, structural repairs will be in accordance with the governing agencies responsible.

14-11. HONEYCOMB PANELS.

14-12. DESCRIPTION. Honeycomb panels constructed of 5052 aluminum alloy core with glass cloth and/or aluminum alloy facings are utilized throughout the helicopter. The transmission and engine fairings, cabin nose, fuel cell area and lower shell are fiberglass faced panels. Aluminum alloy faced panels are utilized in the cabin roof, lower shell, seat supports, vertical fin and flooring. (See figure 14-1 .)

14-13. NEGLIGIBLE DAMAGE LIMITS.

a. Smooth dents up to 5 percent of panel thickness provided that:

(1) Total damage does not exceed 5 percent of panel area or a maximum diameter of 4.0 inches for a single dent.

(2) Edge of any dent must be at least 1.0 inch from any structural member, fitting, control support and from the panel edge bevel.

(3) Dents closer than 1.0 inch are considered one dent.

(4) No voids present under skin.

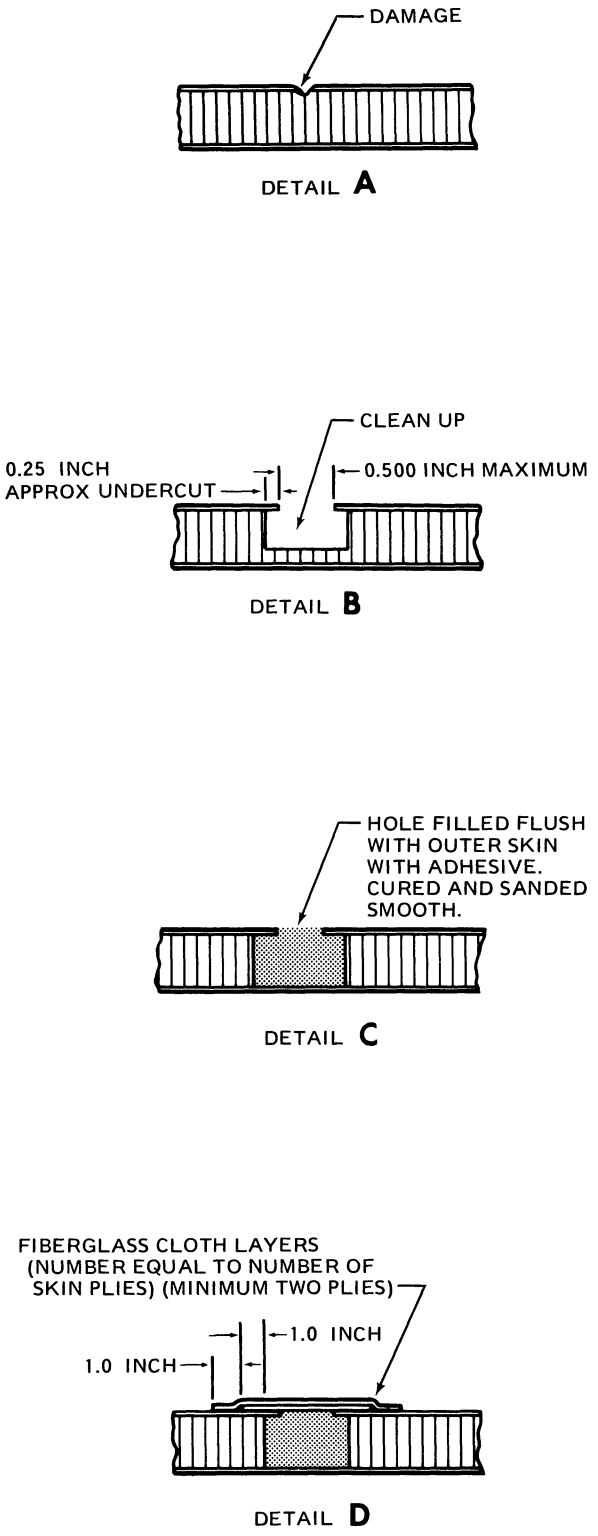


Figure 14-5. Honeycomb Panels – Damage Repair

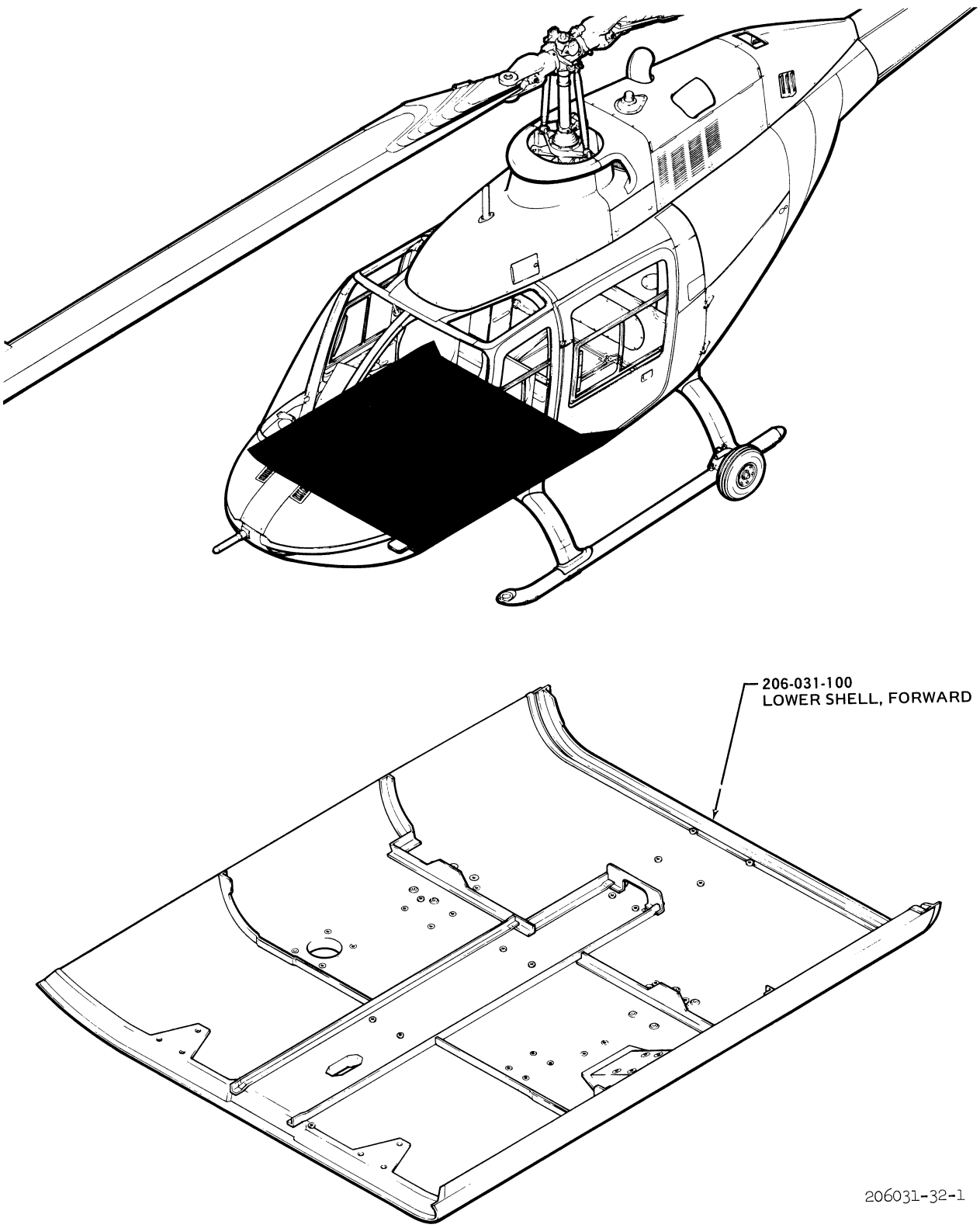
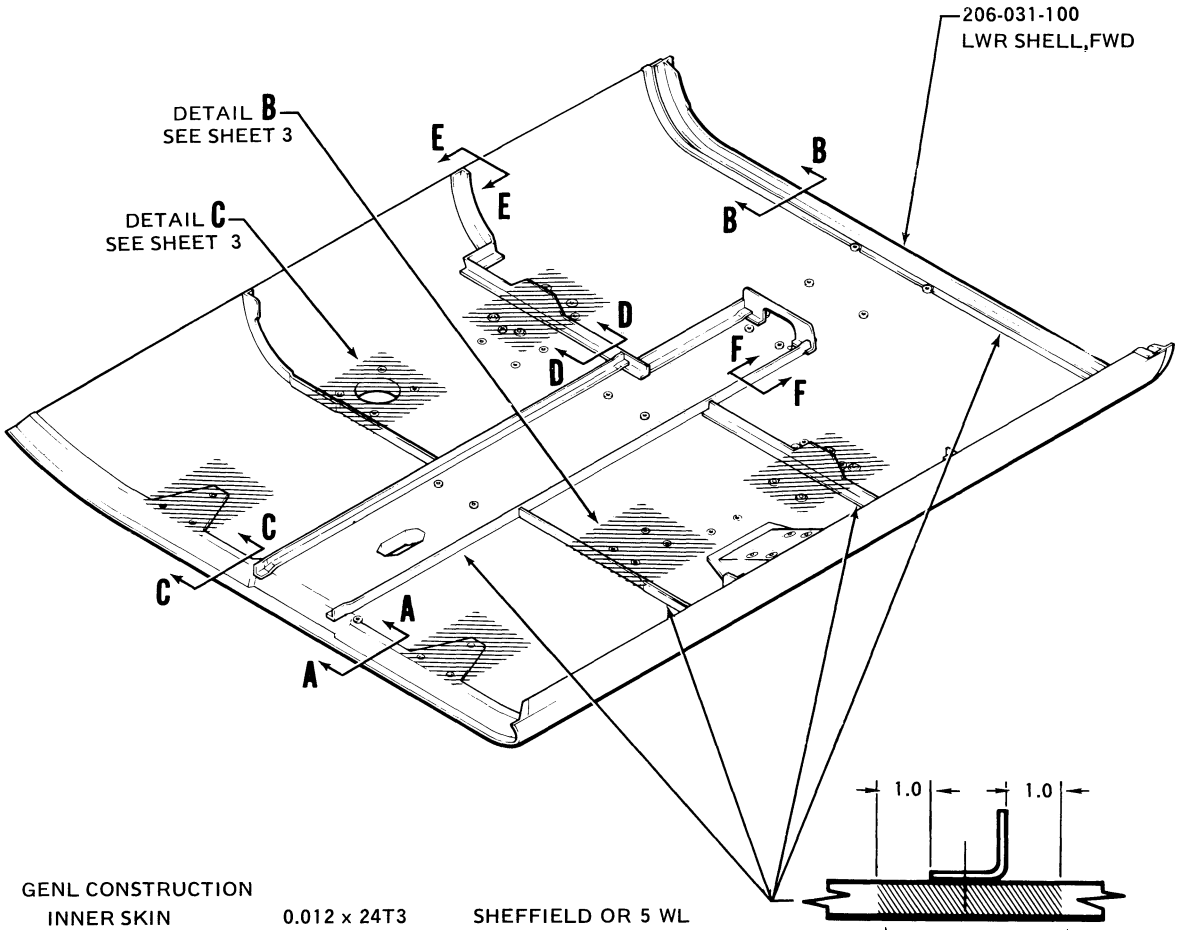


Figure 14-6. Honeycomb Panels – Lower Shell Repairs (Sheet 1 of 7)



GENL CONSTRUCTION

INNER SKIN	0.012 x 24T3	SHEFFIELD OR 5 WL
OUTER SKIN	0.012 x 24T3	SMOOTH
CORE	1.0 INCH THICK ALUMINUM HONEYCOMB	

ALLOWABLE REPAIR LIMITS

STD EXCEPT:

a) ENGR APPROVAL REQUIRED FOR REPAIR IN HATCHED AREAS

b) DETAIL A

c) NOTE CRITICAL MOUNTING SURFACES

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Figure 14-6. Honeycomb Panels — Lower Shell Repairs (Sheet 2 of 7)

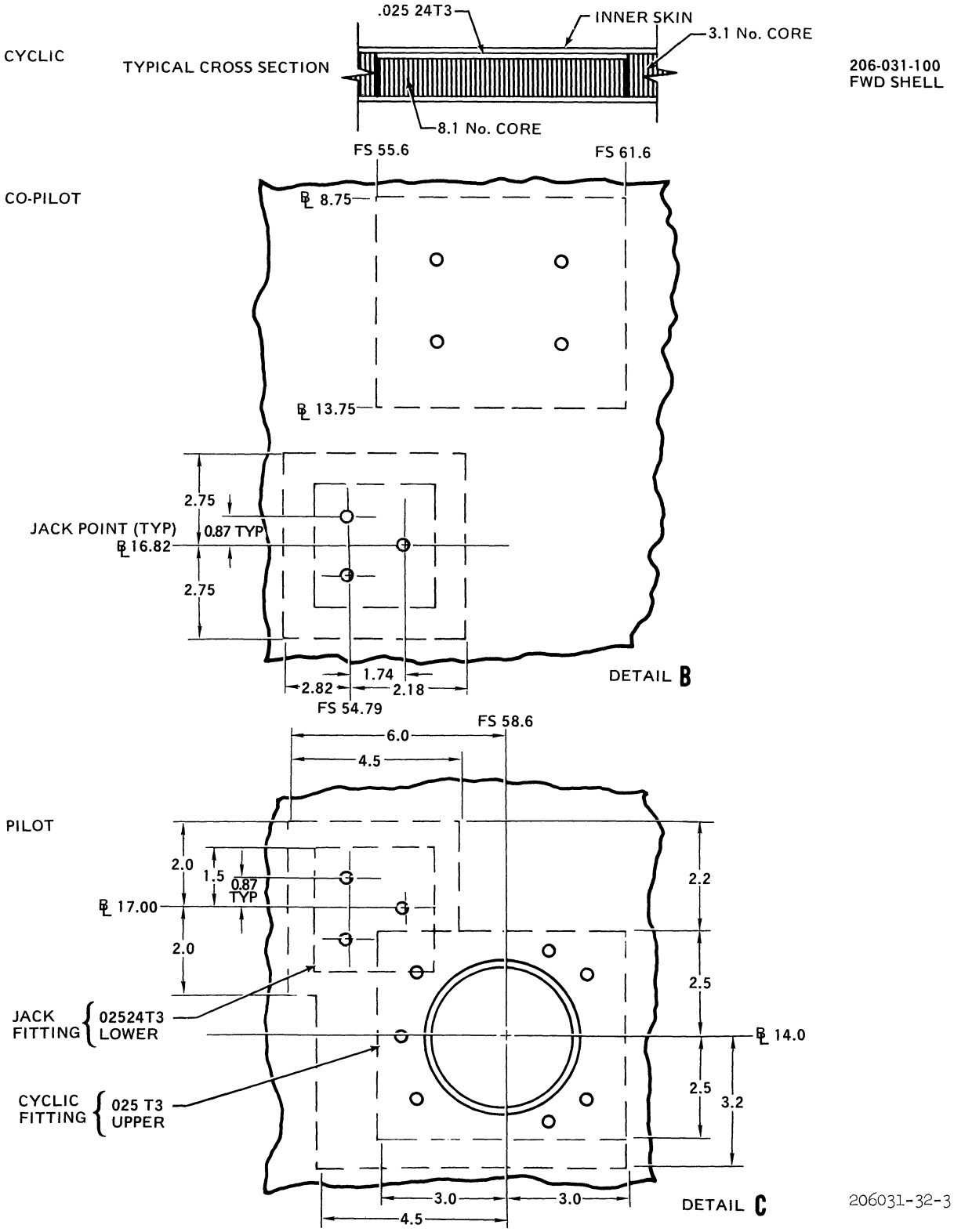
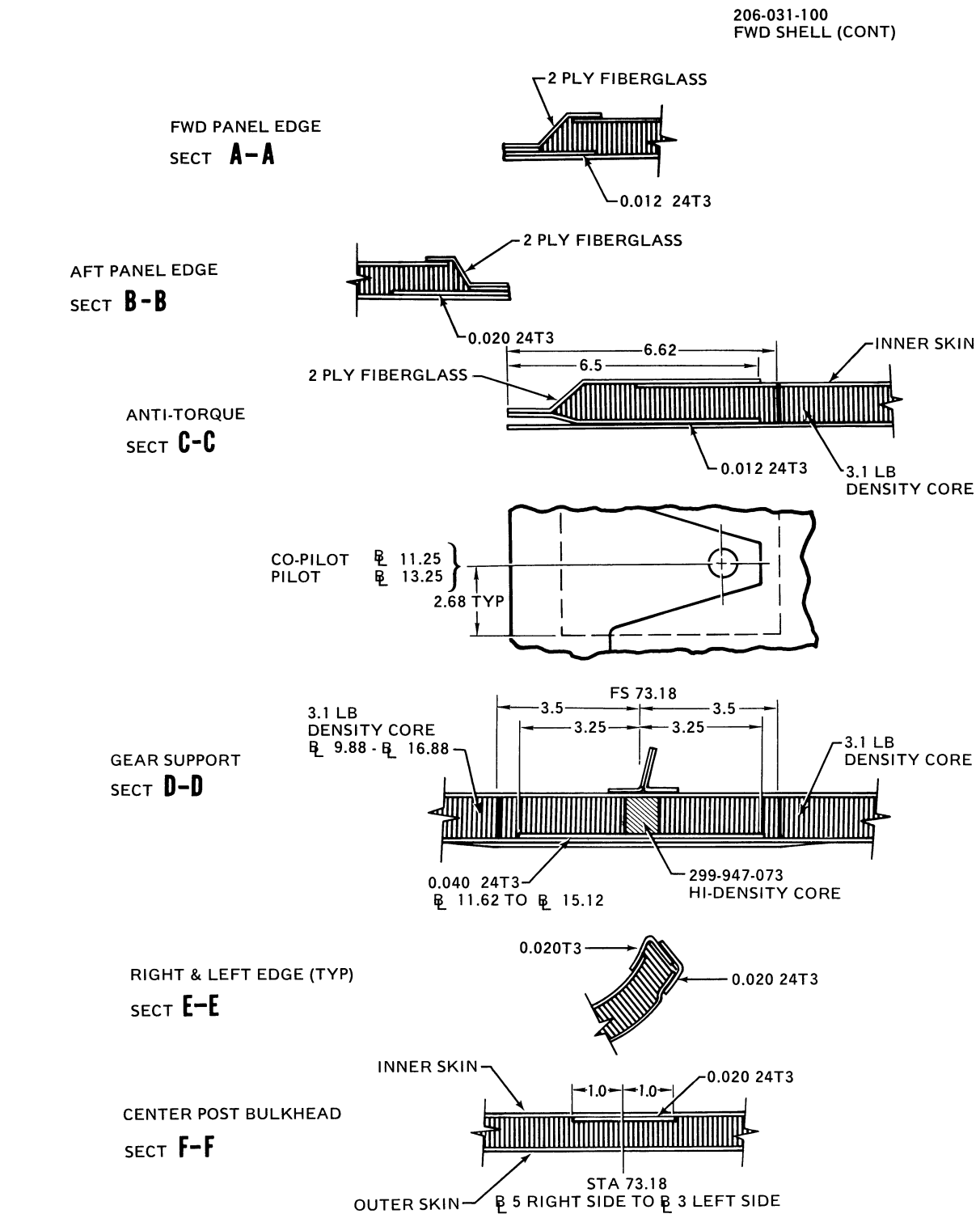


Figure 14-6. Honeycomb Panels — Lower Shell Repairs (Sheet 3 of 7)



NOTE: DIMENSIONS & LOCATIONS ARE APPROXIMATE.

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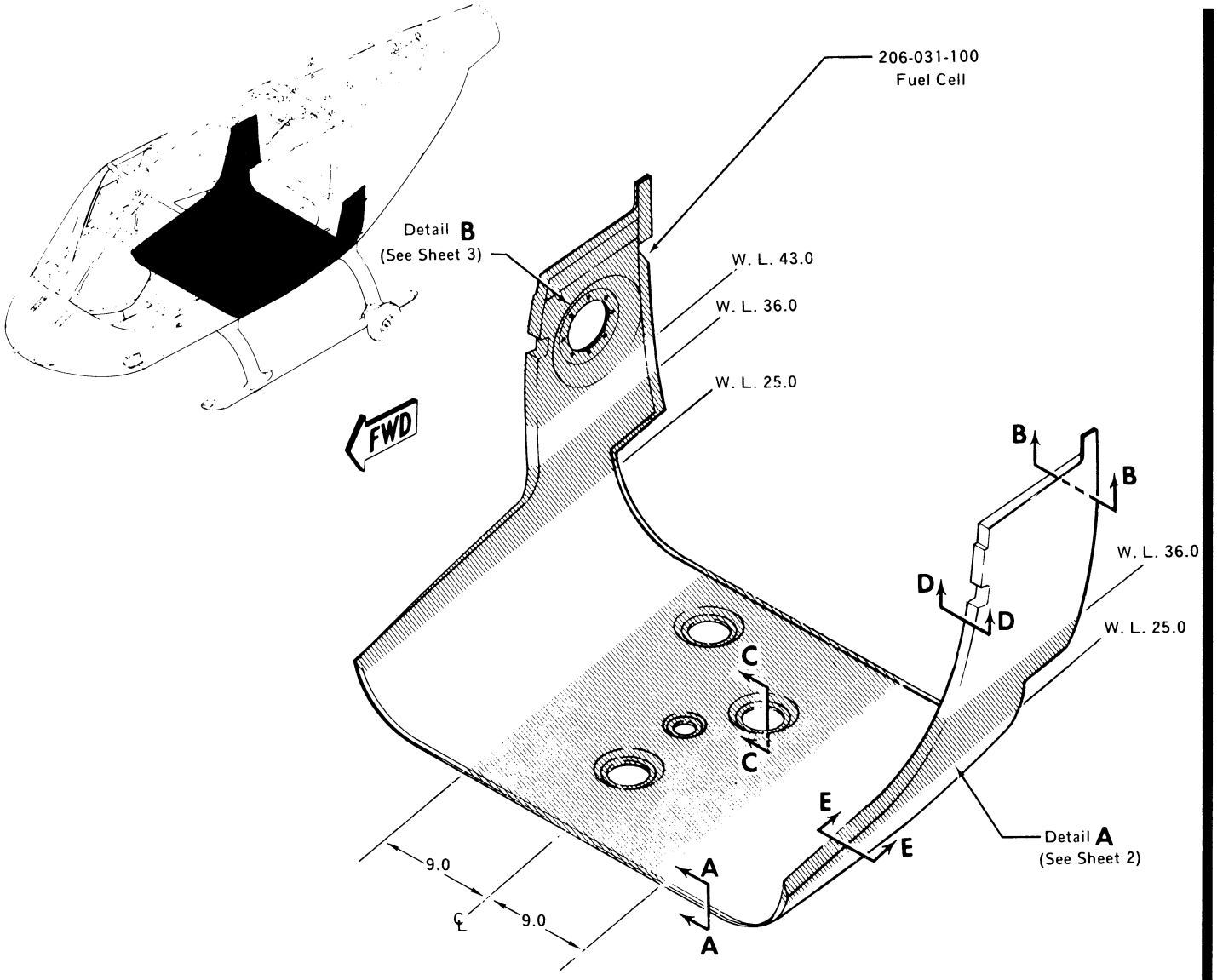
Figure 14-6. Honeycomb Panels — Lower Shell Repairs (Sheet 4 of 7)



General Construction:
Outside Skin 1 Ply Fiberglass
Inner Skin 2 Ply Fiberglass
Core 1.0 Inch Thick Aluminum Honeycomb

Allowable Repair: Standard Except:

(a) Engineer's Approval Required for Repairs in Hatched Areas.

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Fgirue 14-6. Honeycomb Panels — Lower Shell Repairs (Sheet 5 of 7)

206-031-100
Fuel Cell (Continued)

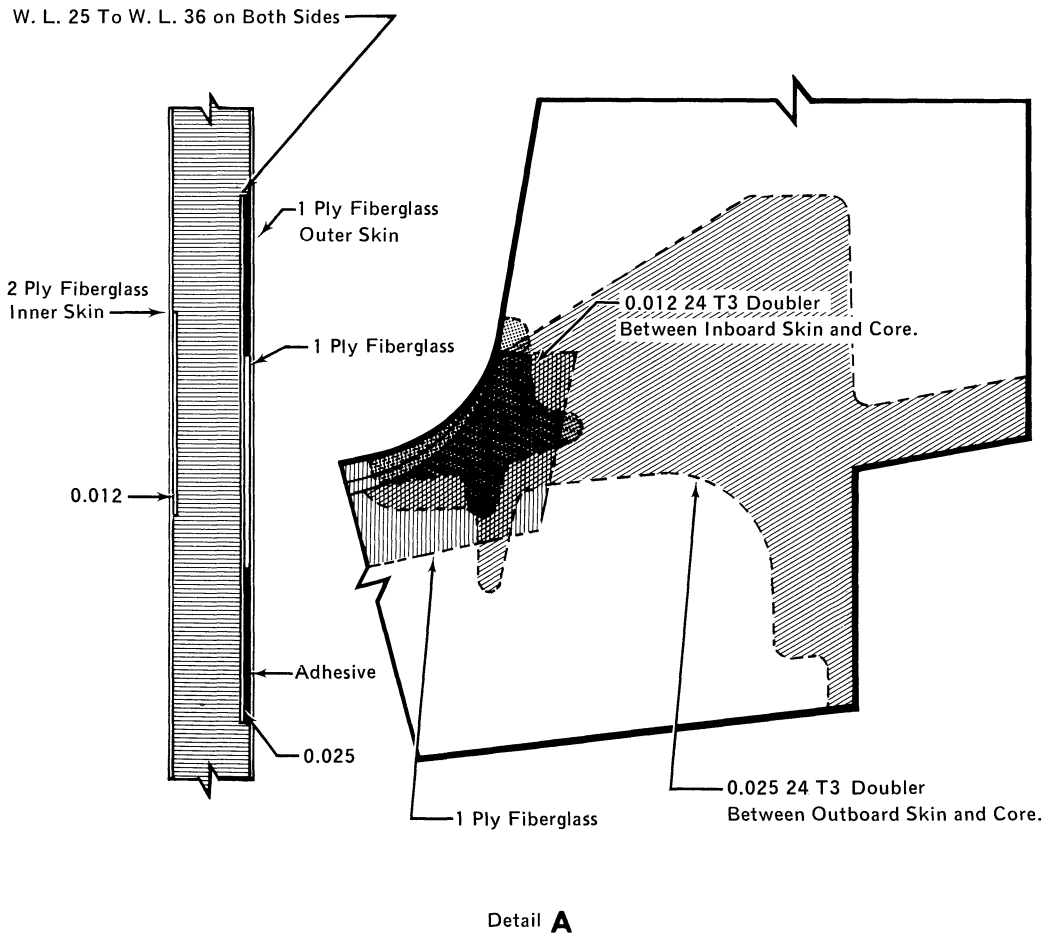

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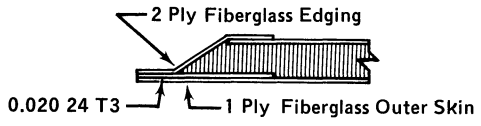
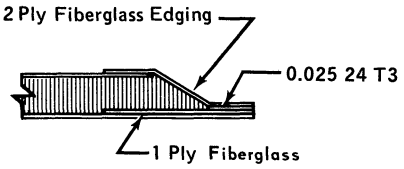
Figure 14-6. Honeycomb Panels – Lower Shell Repairs (Sheet 6 of 7)

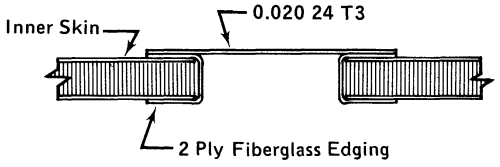
206-031-100
Fuel Cell (Continued)



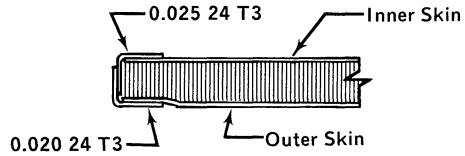
View **A-A** Forward Edge



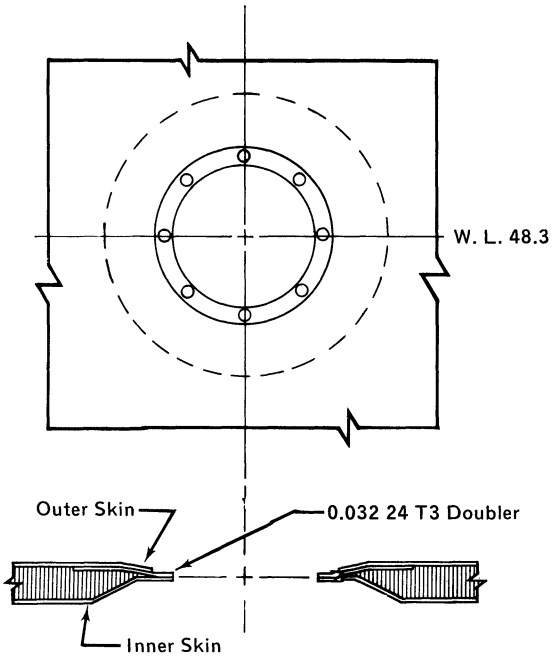
View **B-B** Aft Edge



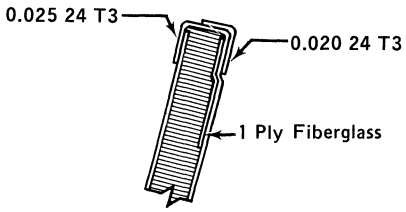
View **C-C** Sump Area Typ. 4 holes



View **D-D** Door Edge (Upper)



DETAIL **B** FUEL FILLER (RIGHT SIDE ONLY)



View **E-E** Door Edge (Lower)

206031-32-7

Figure 14-6. Honeycomb Panels — Lower Shell Repairs (Sheet 7 of 7)

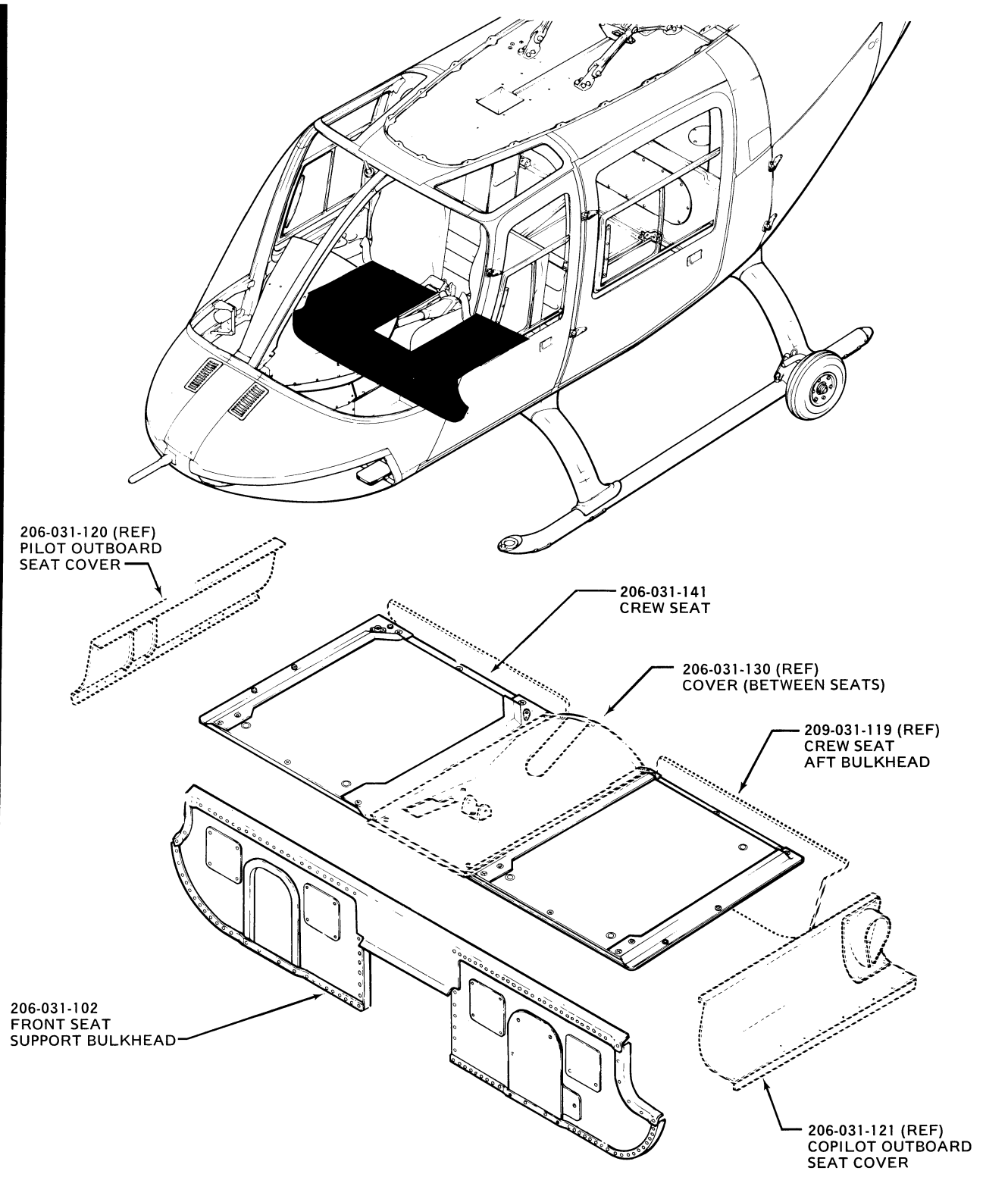
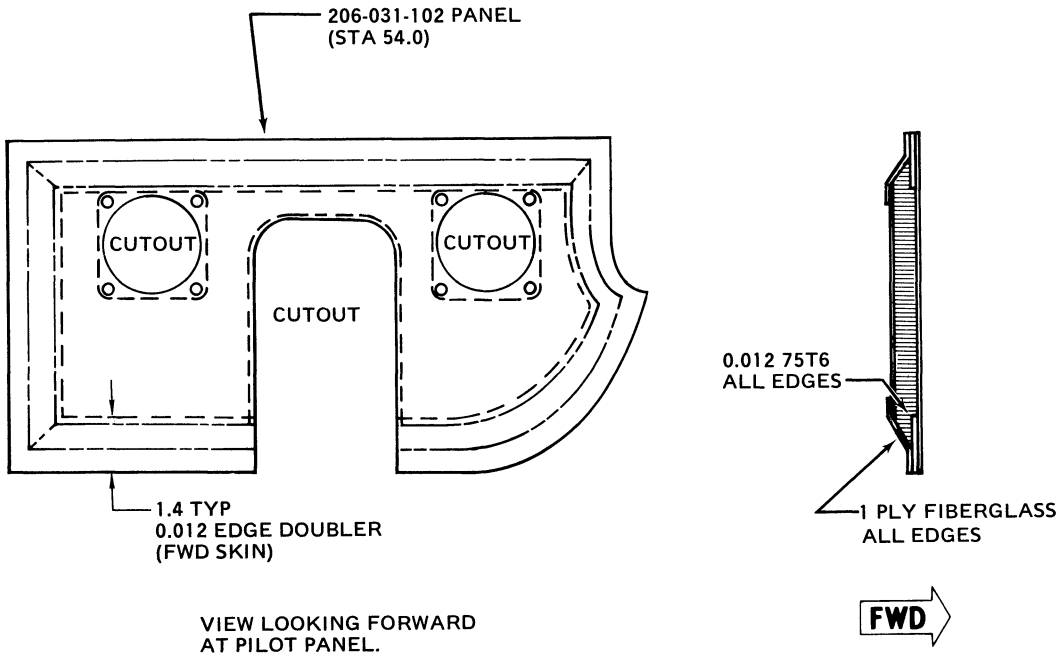


Figure 14-7. Honeycomb Panels — Crew Seat Structure Repairs (Sheet 1 of 4)



GEN'L CONSTRUCTION:

FWD SKIN	0.012 x 75T6	SHEFFIELD OR 5 WL	RIGIDIZED PANEL
AFT SKIN	0.008 x 75T6	SMOOTH	
CORE	0.5 INCH THICK ALUMINUM HONEYCOMB		

ALLOWABLE REPAIR:
STANDARD

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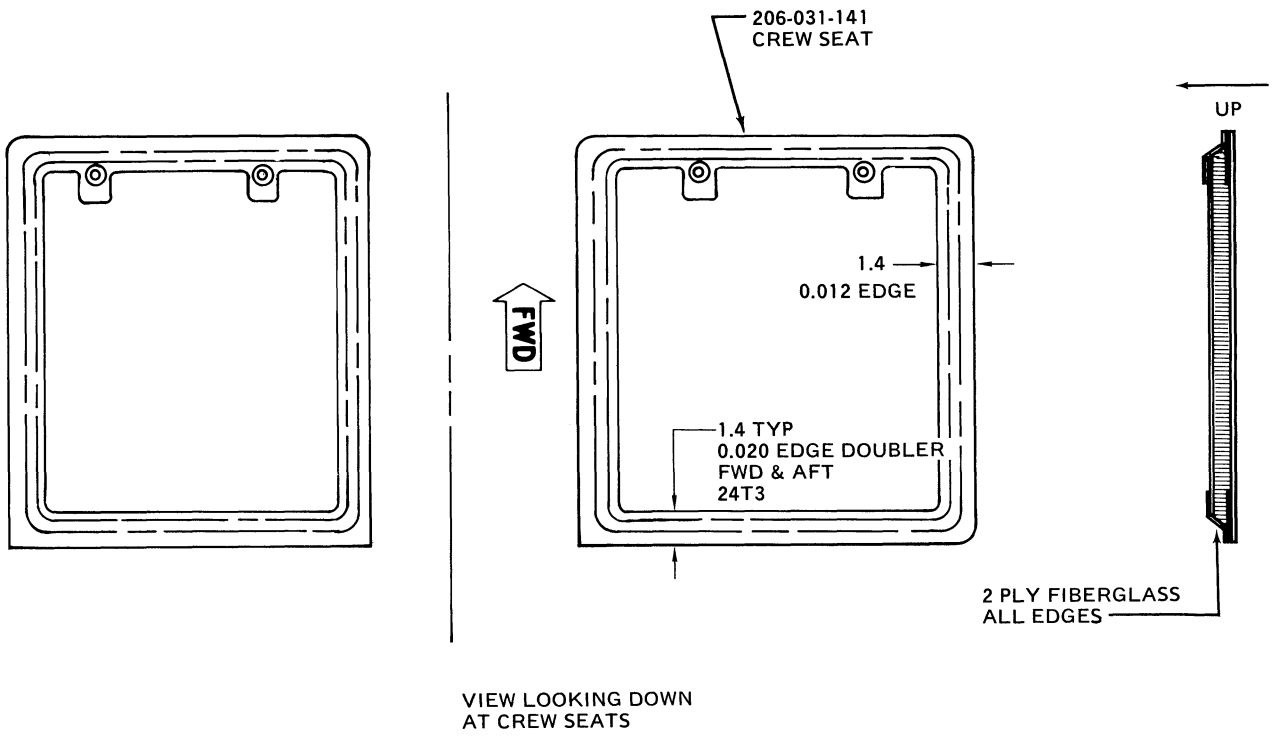
Figure 14-7. Honeycomb Panels — Crew Seat Structure Repairs (Sheet 2 of 4)



GEN'L CONSTRUCTION:

UPPER SKIN	0.020 x 24T3	SHEFFIELD OR 5 WL	RIGIDIZED
LOWER SKIN	0.012 x 24T3	SMOOTH	PATTERN
CORE	0.50 INCH THICK ALUMINUM HONEYCOMB		

ALLOWABLE REPAIR:

STANDARD

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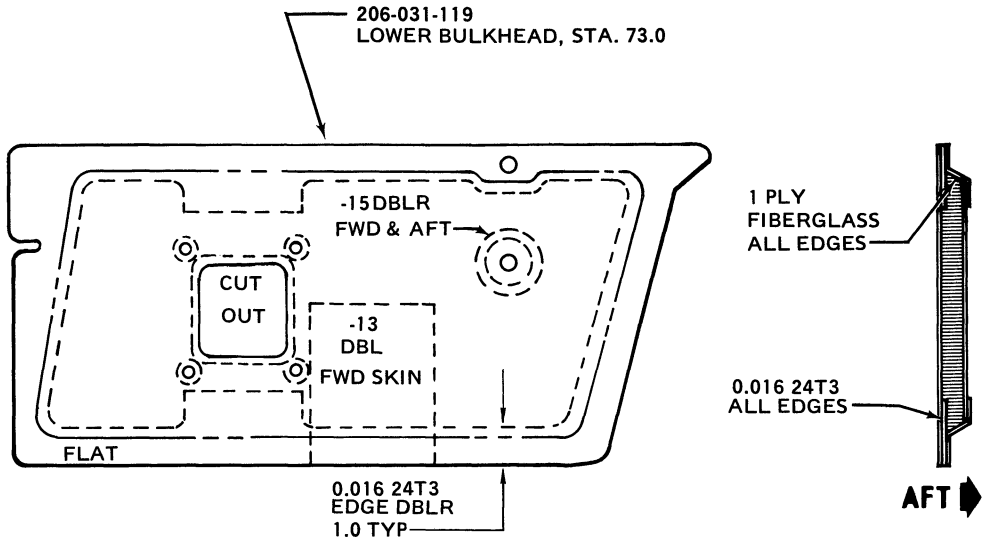
Figure 14-7. Honeycomb Panels – Crew Seat Structure Repairs (Sheet 3 of 4)



VIEW AFT - CO-PILOT PANEL
PILOT PANEL OPPOSITE

GENL CONSTRUCTION:

FWD SKIN	0.008 x 24T3	SMOOTH
AFT SKIN	0.008 x 24T3	SMOOTH
CORE	0.5 INCH THICK ALUMINUM HONEYCOMB	SMOOTH

REPAIR LIMITS: MAJOR REPAIRS REQUIRE ENGR. APPROVAL

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Figure 14-7. Honeycomb Panels — Crew Seat Structure Repairs (Sheet 4 of 4)

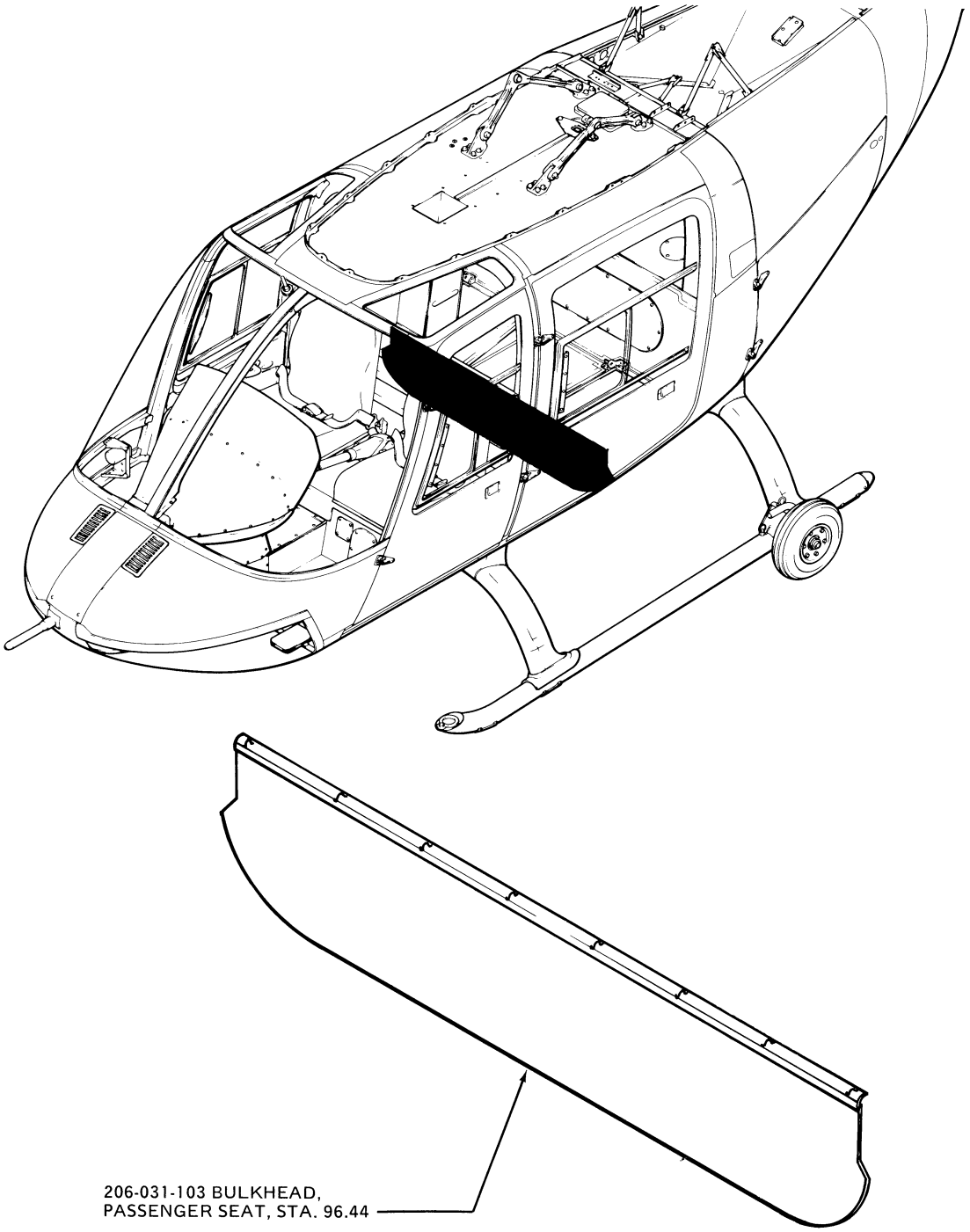
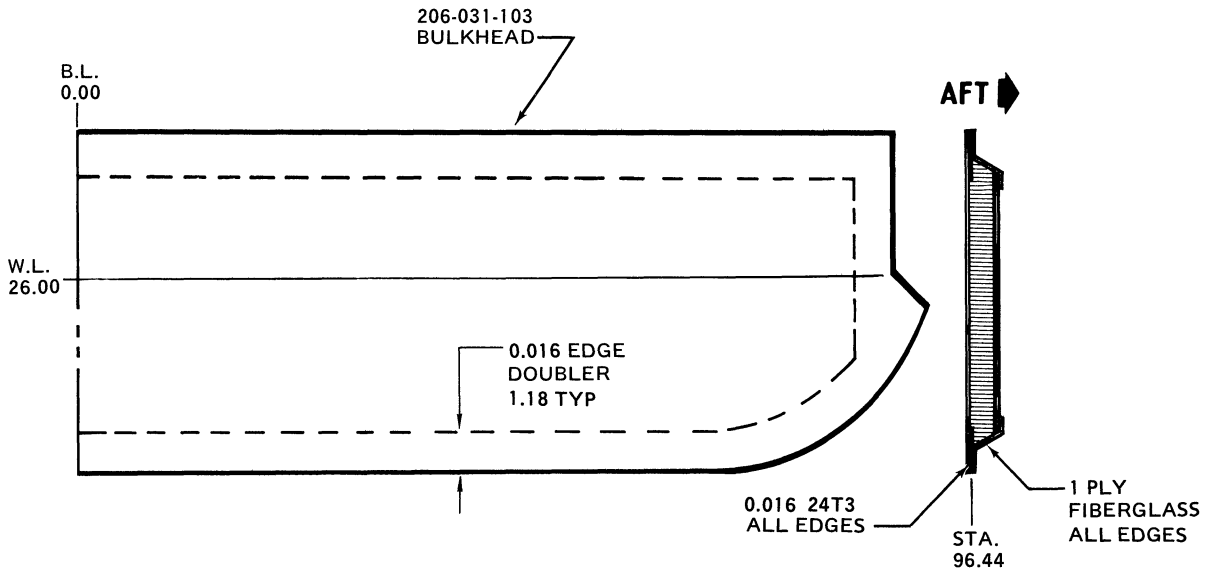


Figure 14-8. Honeycomb Panels — Passenger Seat Structure Repairs (Sheet 1 of 4)



VIEW LOOKING AFT ON LEFT SIDE

GENL CONSTRUCTION:

FWD FACE	0.008 x 24T3	SHEFFIELD OR 5 WL	RIGIDIZED PATTERN
AFT FACE	0.008 x 24T3	SHEFFIELD OR 5 WL	
CORE	0.375 INCH THICK ALUMINUM HONEYCOMB		

ALLOWABLE REPAIR:
STANDARD

206031-34-2

Figure 14-8. Honeycomb Panels — Passenger Seat Structure Repairs (Sheet 2 of 4)

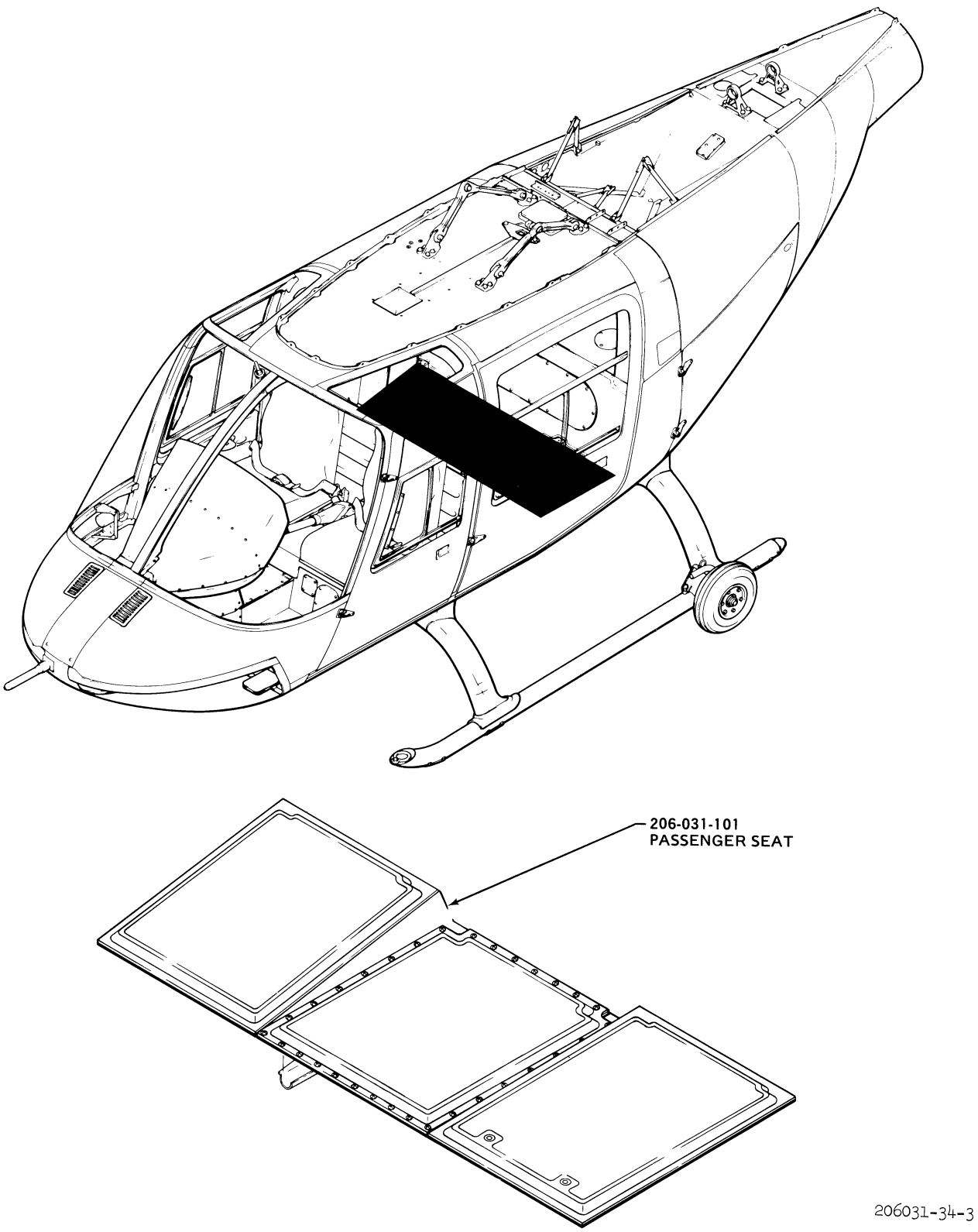
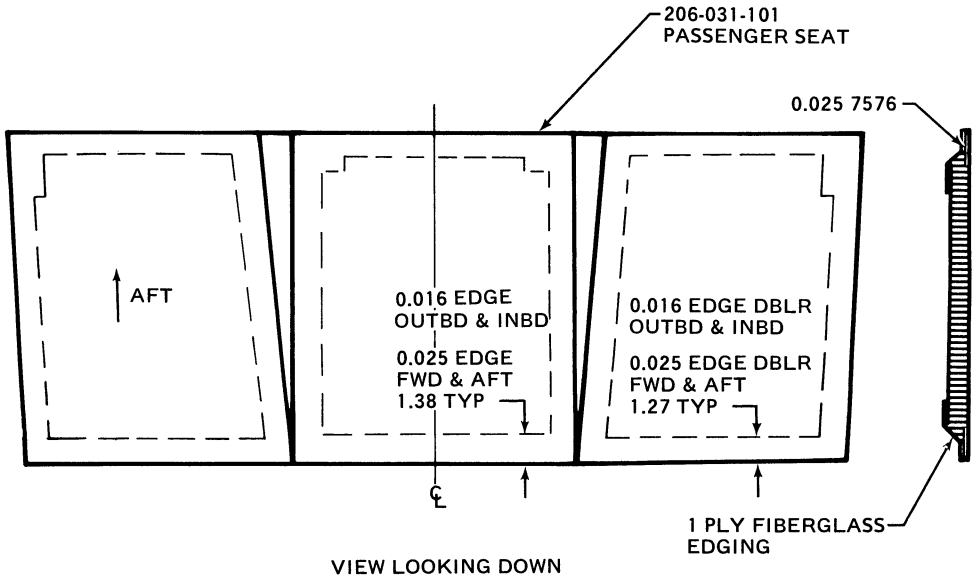


Figure 14-8. Honeycomb Panels – Passenger Seat Structure Repairs (Sheet 3 of 4)



VIEW LOOKING DOWN

GEN'L CONSTRUCTION:

UPPER SKIN	0.010 x 75T6	2 WL, SHEFFIELD OR 5 WL	RIGIDIZED
LOWER SKIN	0.008 x 75T6	2 WL, SHEFFIELD OR 5 WL	PATTERN
CORE	0.5 INCH THICK ALUMINUM HONEYCOMB		

ALLOWABLE REPAIR:
STANDARD

206031-34-4

Figure 14-8. Honeycomb Panels — Passenger Seat Structure Repairs (Sheet 4 of 4)

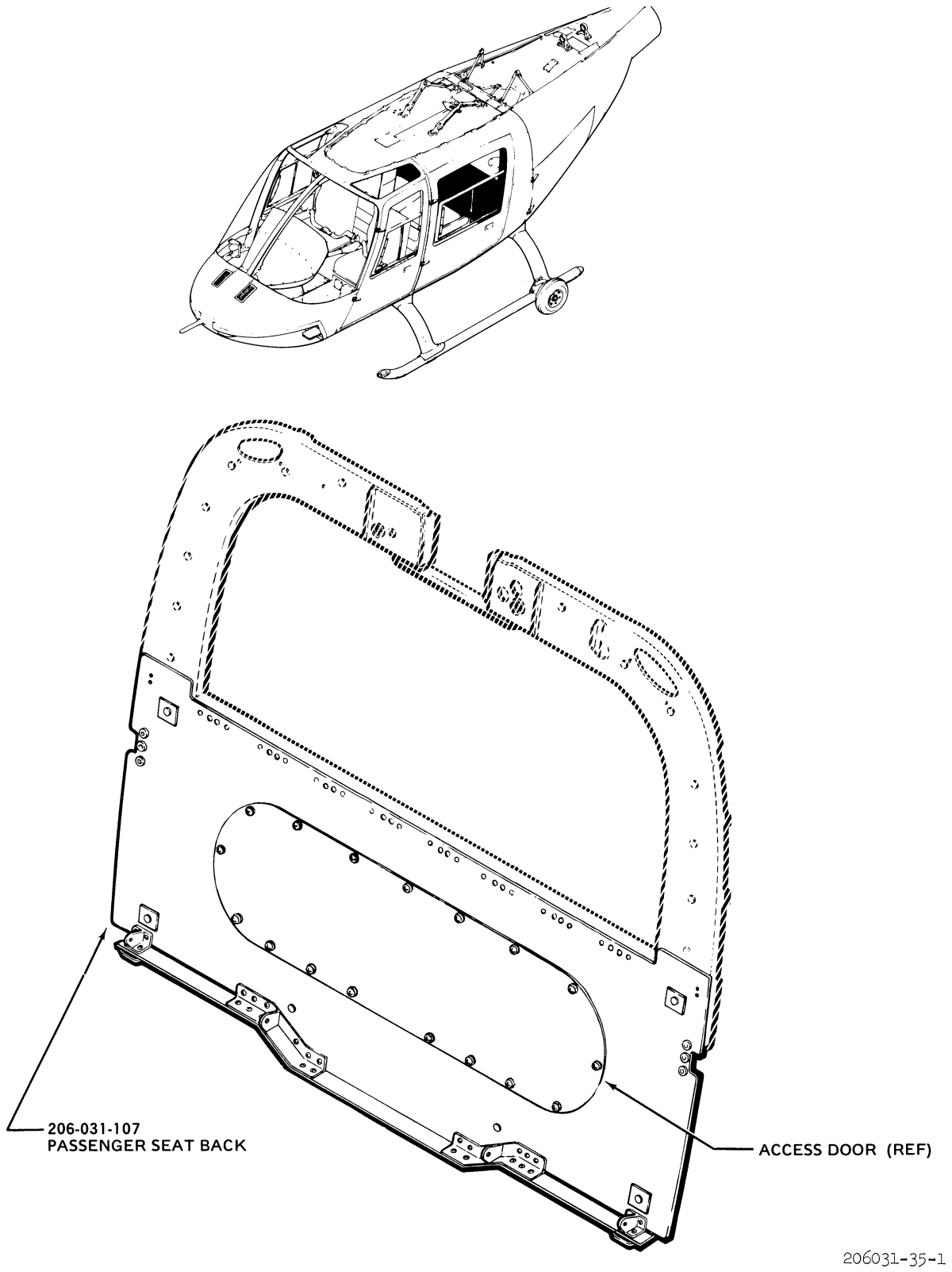
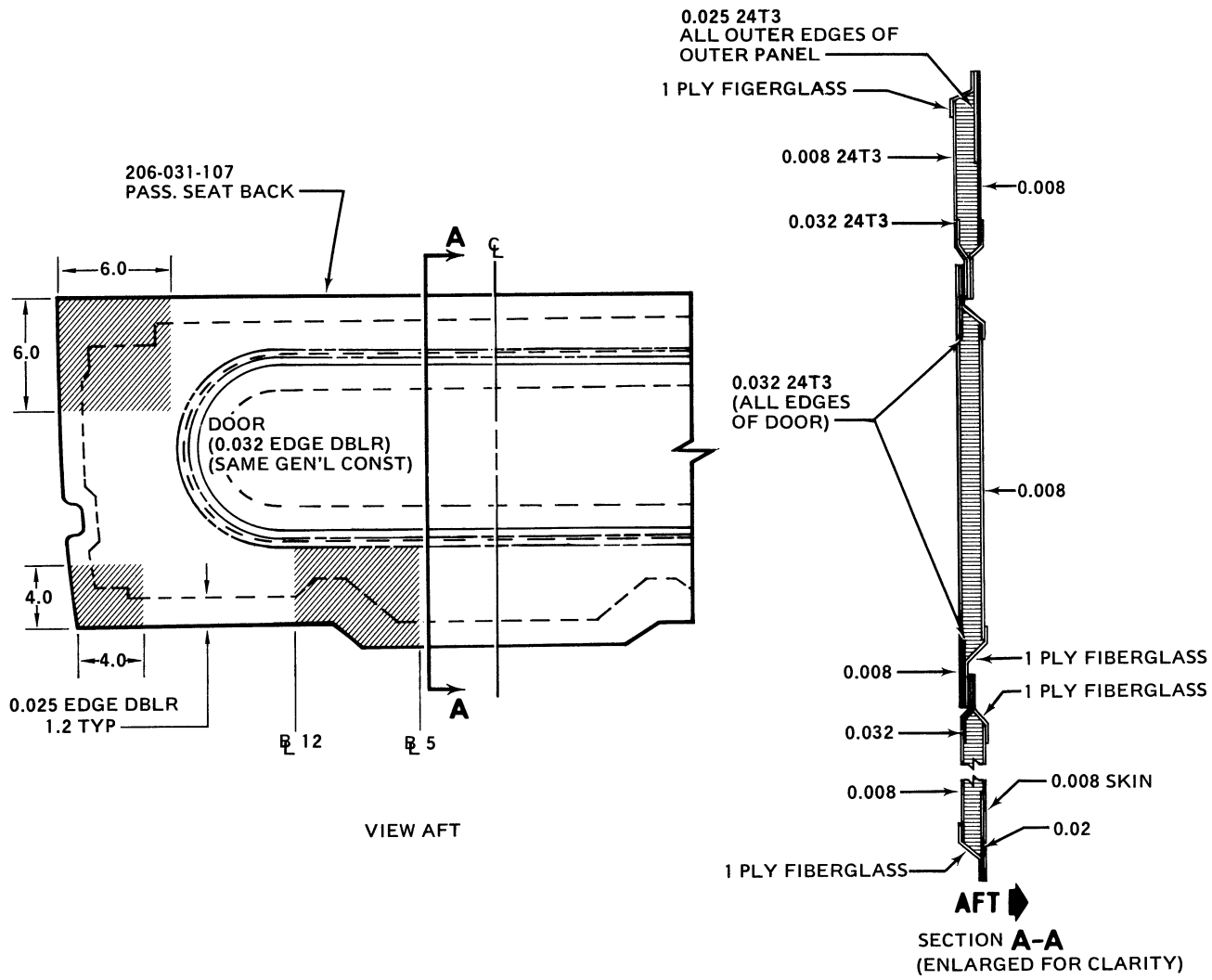


Figure 14-9. Honeycomb Panels — Passenger Seat Back Repairs (Sheet 1 of 2)



GEN'L CONSTRUCTION

FWD SKIN	0.008 x 24T3 5 WL OR SHEFFIELD	→ RIGIDIZED PATTERN
AFT SKIN	0.008 x 24T3 5 WL OR SHEFFIELD	
CORE	0.375 INCH THICK ALUMINUM HONEYCOMB	

ALLOWABLE REPAIR
STD EXCEPT:
a. ENGINEERING APPROVAL REQUIRED FOR REPAIRS IN HATCHED AREA

306031-35-2

Figure 14-9. Honeycomb Panels — Passenger Seat Back Repairs (Sheet 2 of 2)

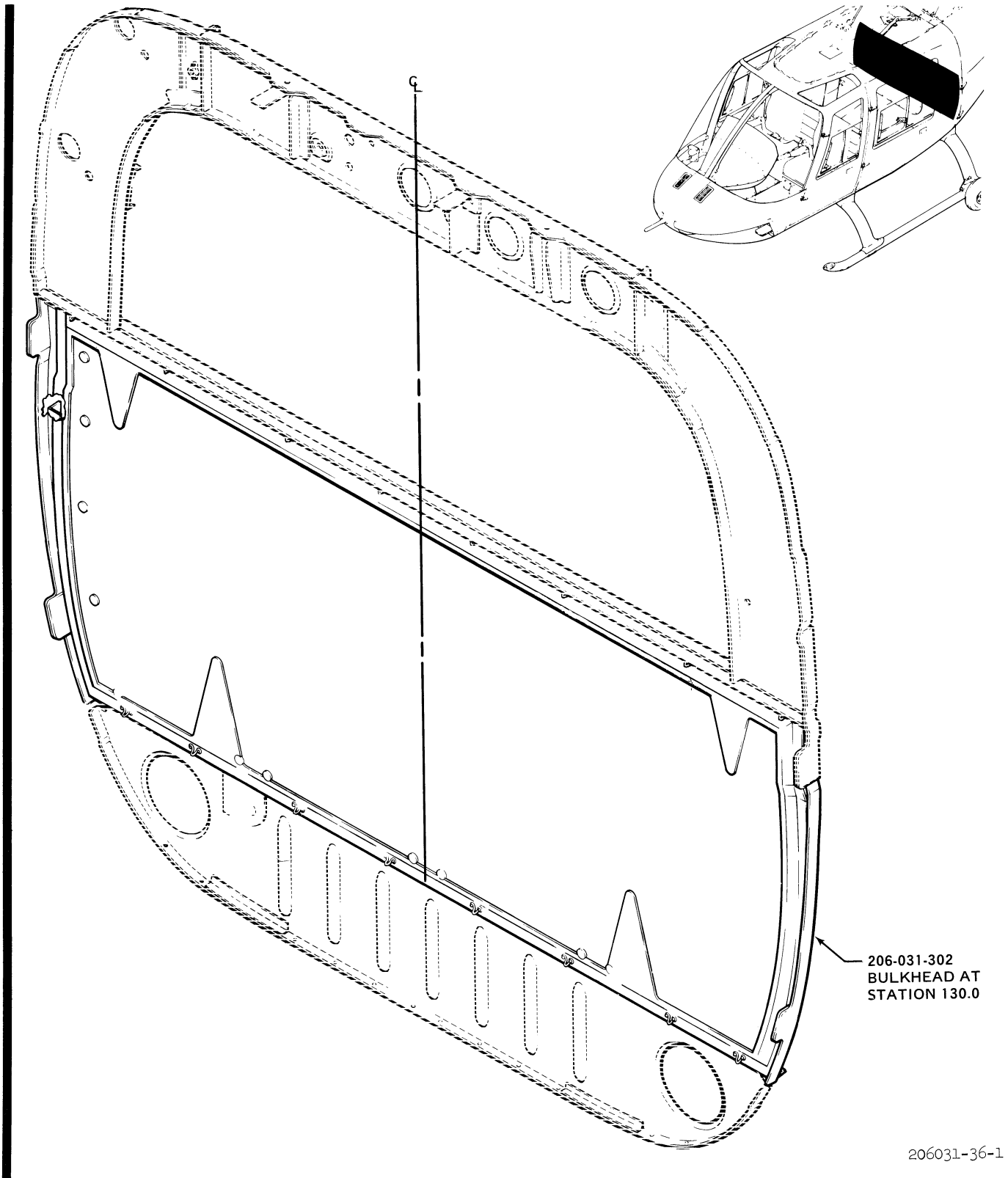
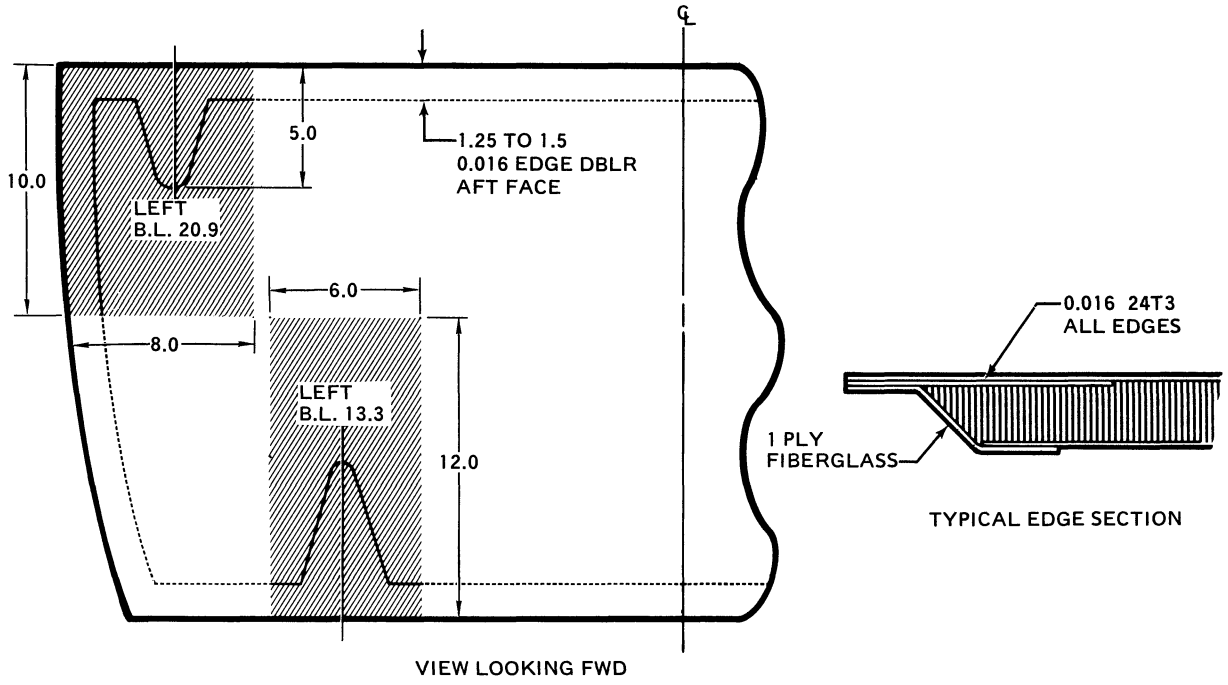


Figure 14-10. Honeycomb Panels – Fuel Cell Aft Bulkhead Repairs (Sheet 1 of 2)



GEN'L CONSTRUCTION:

AFT SKIN	0.008 x 24T3	SHEFFIELD OR 5 WL
FWD SKIN	0.008 x 24T3	SHEFFIELD OR 5 WL
CORE	0.5 INCH THICK ALUMINUM HONEYCOMB	

ALLOWABLE REPAIR:

STD REPAIRS EXCEPT
ENGINEERING APPROVAL REQUIRED FOR REPAIRS
IN HATCHED AREAS.

206031-36-2

Figure 14-10. Honeycomb Panels – Fuel Cell Aft Bulkhead Repairs (Sheet 2 of 2)

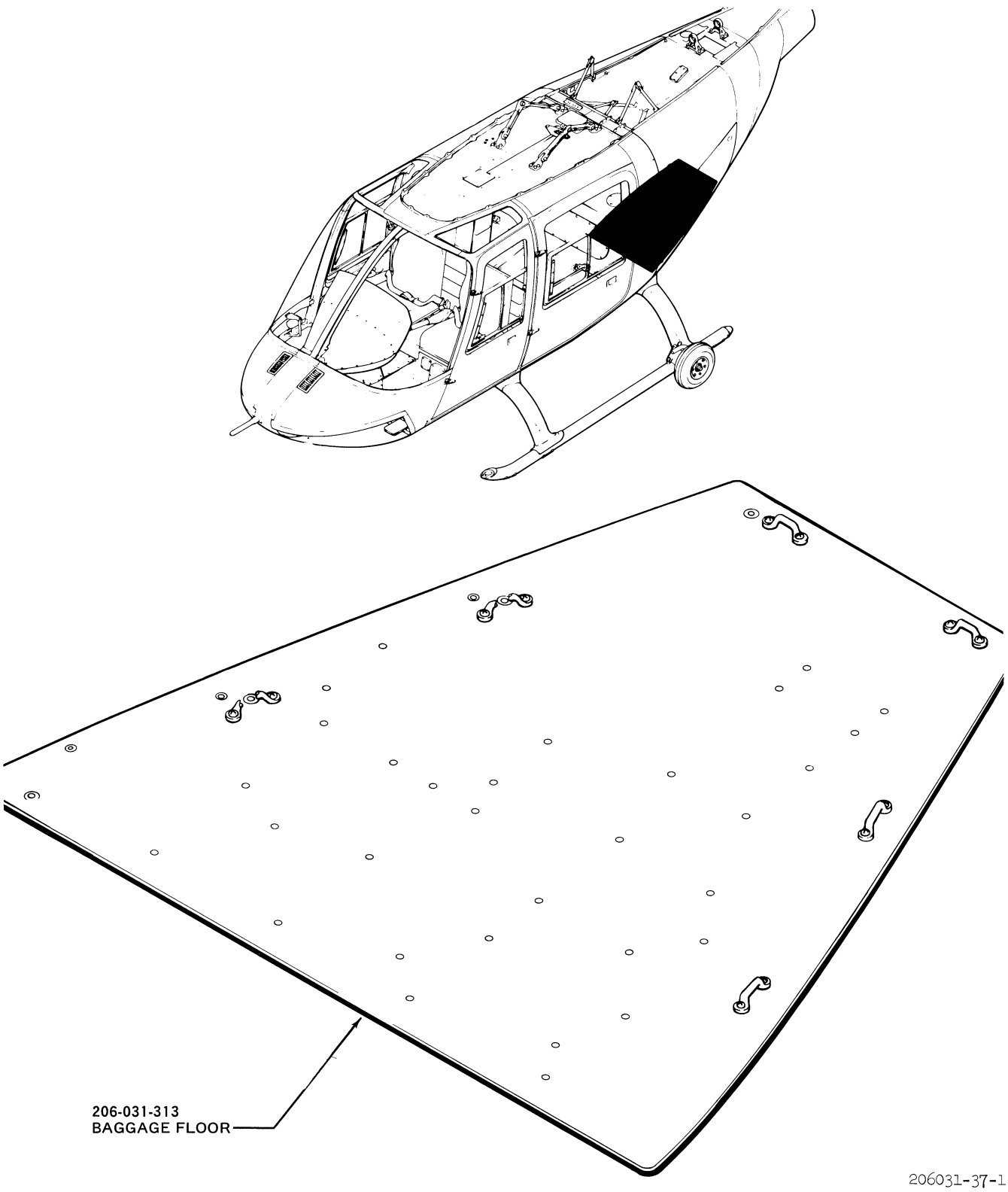
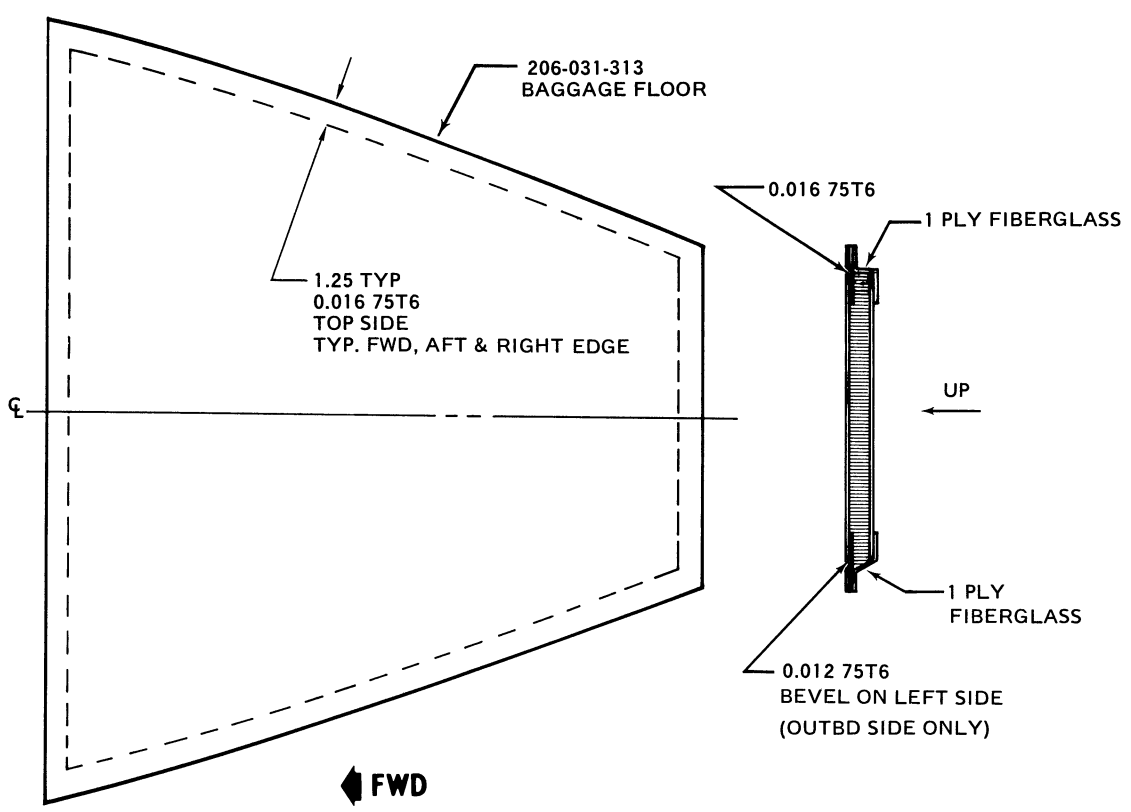


Figure 14-11. Honeycomb Panels – Baggage Compartment Floor Repairs (Sheet 1 of 2)



GENL CONSTRUCTION:

UPPER SKIN	0.012 x 75T6	SHEFFIELD OR 5WL	RIGIDIZED PATTERN
LOWER SKIN	0.008 x 75T6	SHEFFIELD OR 5 WL	
CORE	0.5 INCH THICK ALUMINUM HONEYCOMB		

ALLOWABLE REPAIRS:

STANDARD

206031-37-2

Figure 14-11. Honeycomb Panels — Baggage Compartment Floor Repairs (Sheet 2 of 2)

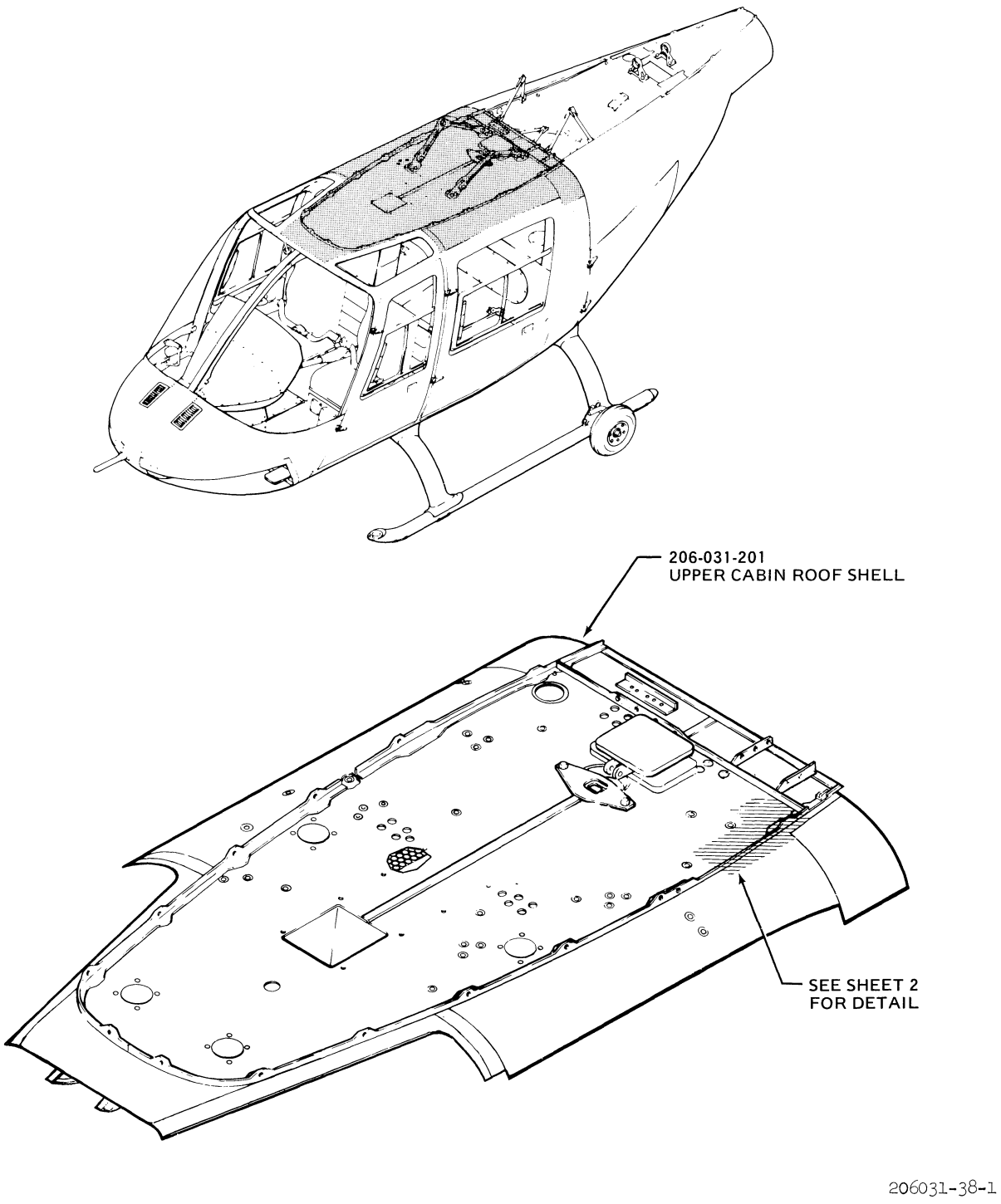
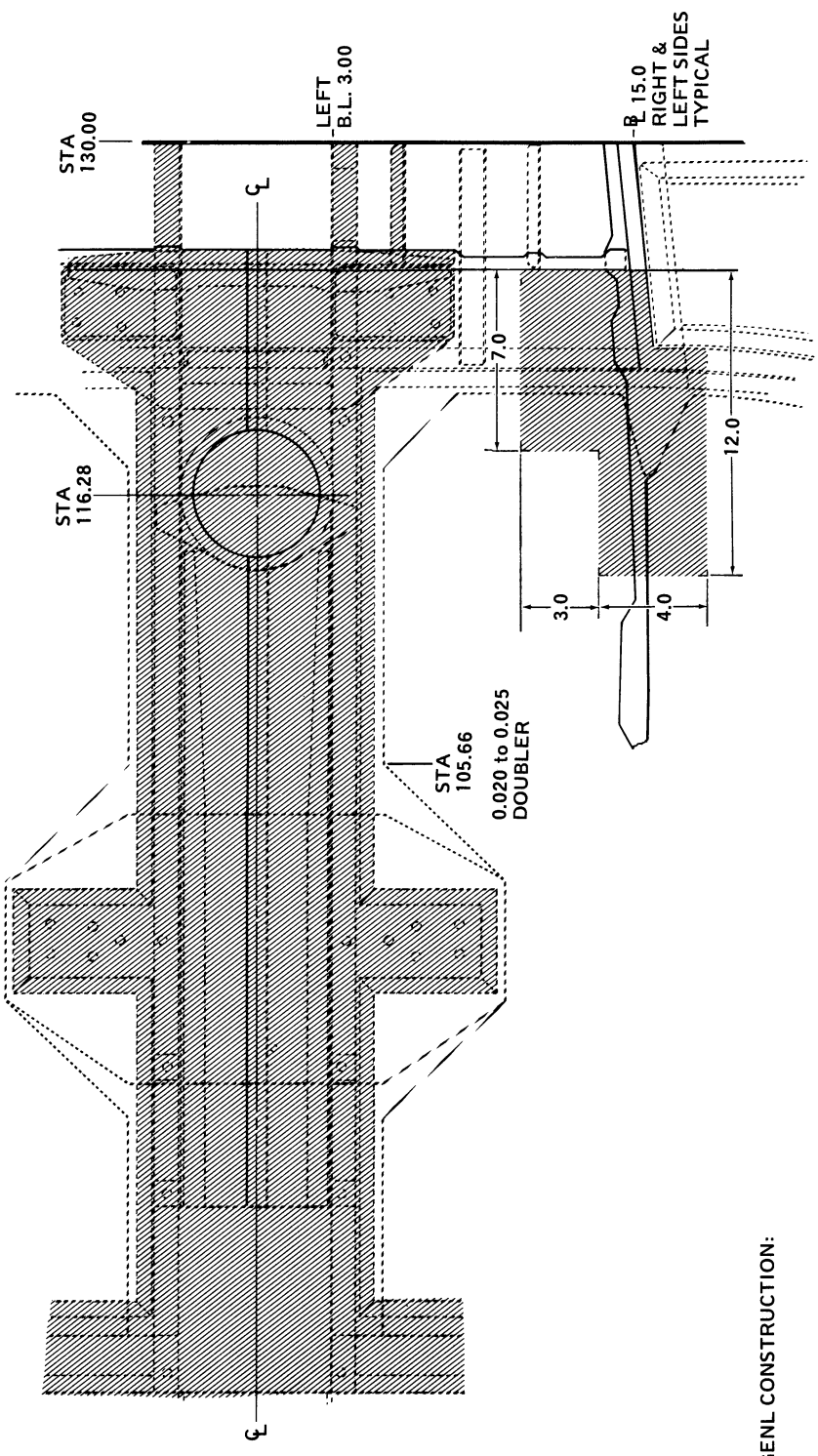


Figure 14-12. Honeycomb Panels – Cabin Roof Repairs (Sheet 1 of 2)



GENL CONSTRUCTION:

OUTER SKIN	0.012 x 24T3	5WL OR SHEFFIELD	RIGIDIZED PATTERN
INNER SKIN	0.008 x 75T6	5WL OR SHEFFIELD	RIGIDIZED PATTERN
CORE	0.5 INCH THICK ALUMINUM HONEYCOMB		

DAMAGE LIMITS:

STD EXCEPT:

REPAIR AREA SHOWN (IN SHADED PORTION) WITH ENGR APPROVAL ONLY. TYPICAL BOTH SIDES.
NO REPAIR WITHIN 3 INCHES OF INSERTS AT STA 108.5, B.L. 18.83, TYPICAL BOTH SIDES

Figure 14-12. Honeycomb Panels — Cabin Roof Repairs (Sheet 2 of 2)

b. Smooth dents up to 10 percent of panel thickness provided that:

(1) Diameter does not exceed 0.750 inch.

(2) No more than three dents can be encompassed by a 4.0 inch diameter circle.

(3) Dents closer than 1.0 inch (edge to edge) are to be considered as one dent.

(4) The edge of any dent must be at least 1.0 inch from any structural member, fitting, control support or the panel edge bevel.

(5) No voids present under skin.

Note

Voids or bonding separation can be detected by tapping. A dead or flat sound will be produced if a void exists. Outline affected area with a grease pencil (item 18, table 1-1).

c. Voids (bond failures) up to 0.25 inch square (½ x ½) provided that:

(1) No more than two such void areas can be encompassed by a 4.0 inch circle.

(2) Voids closer than 1.0 inch (edge to edge) must be considered as one void.

(3) The edge of any void must be at least 3.0 inches from the panel edge bevel, structural member, fitting or control support of any cutout.

Note

Edge separation (delamination) must never be classified as negligible damage.

14-14, REPAIRABLE DAMAGE LIMITS.

Note

Restrictions outlined on figures 14-6 through 14-12 for specific panels will take precedence over these limits.

a. Punctures, sharp dents, creases and dents to only one skin and core exceeding 10 percent of the panel thickness but not exceeding 0.500 inch diameter after clean-up is considered repairable damage. (See figure 14-5, detail A.)

(1) Maximum diameter of hole after clean-up must not exceed 0.500 inch. (See figure 14-5 , detail B.)

(2) No more than two such areas are to be encompassed by a 4.0 inch diameter circle with any two damaged edges not closer than 1.0 inch. Damage closer than 1.0 inch must be considered as one area.

(3) Edge of clean-up must be a minimum of 3.0 inches from any attachment point or insert attaching a structural member, fitting or control support or as noted on the illustration for a specific panel. (See figure 14-6 through 14-12.)

(4) The edge of the clean-up must be a minimum of 3.0 inches from any panel edge or cut-out or as noted on the illustration for a specific panel.

b. The following edge damage criteria applies only to those panels with a fiberglass skin on the edge bevel:

(1) Damage must be restricted to fiberglass edge and core (metal skins and doublers are not damaged).

(2) Damage to the core must not extend more than 0.500 inch inside the inboard edge of the bevel (top) after clean-up.

(3) Maximum length of damage must not exceed 2.0 inches after clean-up.

(4) Maximum number of repairs not to exceed three per panel with a minimum of 2.0 inches between edges of clean-up.

c. Damage exceeding the above limits to honeycomb panels is considered as major damage and repairs may be accomplished only with engineering approval of Bell Helicopter Company.

14-15. PRECAUTIONS – HONEYCOMB REPAIR. The following precautions should be observed in the finish, removal, cleaning and bonding of damaged honeycomb panels:

a. "Paint Strippers" must not be used. Contamination of core, adhesive bond line or fiberglass skin and edging by "paint stripper" will be cause for panel replacement.

b. Trichlorethylene and vapor degreasers are not to be used to clean or strip any surface adjacent to a damaged area.

c. Do not allow any solvent to come in contact with fiberglass skins and edging or exposed adhesive bond lines.

d. Conventional finishes, such as lacquers, varnishes, alkyd enamels, zinc chromate primer, etc. must be removed as follows:

(1) Mask off area to be stripped.

(2) Brush apply methyl-ethyl-ketone, or equivalent.

(3) Remove loosened material with a stiff fibre bristle brush.

(4) Wipe clean with cheesecloth moistened with methyl-ethyl-ketone.

e. No sparking electrical equipment or open flame is permitted near the work area.

f. All phases of preparation and bonding must be performed in a clean dust free environment.

g. Cover work benches with clean, heavy, paper. Paper must be replaced when soiled.

h. Personnel should wear clean, dry, white cloth, gloves when handling processed parts.

i. After application of adhesive, parts must be kept dry and free from dirt, grease, oil, wax, silicone or other foreign material until final cure.

j. Processed details and work units should be wrapped or covered with clean heavy paper until ready for use.

14-16. REPAIR MATERIALS – HONEYCOMB PANELS. (Refer to Table 14-1.)

a. Fiberglass. To conform to specification MIL-C-9084, Type VIII or Type VIIIA (1581 or 150 weave) Volan finish (item 108, table 1-1). Thickness of this material is 0.008 to 0.012 inch.

b. Composite Bond Patch: This sheet metal patch material with a pre-bonded surface. To be used for patching metal skinned panels.

c. Adhesive EA 828 (item 100, table 1-1):

(1) Description: A component epoxy resin base general purpose adhesive with the consistency of medium syrup. Used primarily for fiberglass wet lay-up bonding and as a protective coating for rigid foam.

(2) Mixing ratio: 100 parts 828 base (resin) to 10 parts DTA catalyst (item 101, table 1-1) by weight. Material contained in kit is pre-measured, in a common container with separator. (Refer to table 14-1.)

(3) Pot life: 20 to 30 minutes at 70° to 80°F (21° to 27°C).

(4) Cure time: 24 hours at 70° to 80°F (21° to 27°C). Alternate cure 1 hour at 150°F (66°C).

d. Adhesive EA 934 (item 31, table 1-1):

(1) Description: A two component epoxy base general purpose adhesive, has light paste consistency.

(2) Mixing ratio: Three parts base to one part catalyst by weight.

(3) Pot life: 30 minutes.

(4) Cure time: 24 hours at 70° to 80°F (21° to 27° C). Alternate cure, 2 hours at 150° to 160°F (66° to 71°C).

Note

EA 934 adhesive should be used for making fiberglass wet lay-up repairs when a bond to metal is required. Exercise care to ensure that cloth is thoroughly impregnated.

e. 934B Adhesive Promoter (item 109, table 1-1):

(1) Description: This is used to obtain better adhesion. Recommended on metal surface which is to receive a composite bond patch.

(2) Application: Apply one brush coat and allow to air dry 15 minutes minimum before bonding.

f. A complete assortment of fiberglass repair materials is contained in Bonding Kit (206-1743-1). (Refer to table 14-1 for additional adhesive materials, description, mixing ratio, pot life and cure time).

Table 14-1. Adhesives Contained in Bonding Kit No. 206-1743-1

Note Components of Bonding Kit 206-1743-1 may be replenished by ordering direct from Talco Industries Inc., 5621 East Rosedale, Fort Worth, Texas 76112	
ADHESIVE RP1257-3	
DESCRIPTION	A two component adhesive filler of paste consistency used as an aerodynamic filler-smoother. Excellent for sealing exposed honeycomb and for fairing rough areas.

Table 14-1. Adhesives Contained in Bonding Kit No. 206-1743-1 (Cont)

MIXING RATIO	One part base to one part activator by weight. Material contained in kit is pre-measured, in a common container with separator.
POT LIFE	30 Minutes at 70° to 80°F (21° to 27°C).
CURE TIME	24 hours at 70° to 80°F (21° to 27°C). Alternate 1 hour at 180°F (82.22°C).
	EPON 828
DESCRIPTION	A two component epoxy base general purpose adhesive with the consistency of medium syrup. Used primarily for fiberglass wet lay up bonding as void filler and as a protective coating for rigid foam. (May be injected using a syringe).
MIXING RATIO	100 parts 828 base to 10 parts DTA catalyst by weight. Material contained in kit is pre-measured, in a common container with separator.
POT LIFE	20 - 30 minutes at 70° to 80°F (21° to 27°C).
CURE TIME	24 hours at 70° to 80°F (21° to 27°C). Alternate 1 hour at 150°F (66°C).
	PROSEAL 890
DESCRIPTION	A two component adhesive sealer of heavy paste consistency. Has excellent fuel and oil resistance. Used to seal against water, fuel, oil or other fluids and to provide dis-similar metal protective. This is an excellent adhesive for bonding Kydex 100.
MIXING RATIO	100 parts base (white) to 10 parts accelerator (grey black) by weight. Material contained in kit is pre-measured, in a common container with separator.
POT LIFE	1.5 hours at 70° to 80°F (21° to 27°C).
CURE TIME	15 hours minimum handling at 70° to 80°F (21° to 27°C). 72 hours maximum cure at 70° to 80°F (21° to 27°C). Alternate-Apply firm contact at 70° to 80 °F (21° to 27°C) for 1 hour then heat to 190°F (88°C) for 1 hour.
	EP 711 B-2
DESCRIPTION	A two component equal part mix by weight or volume injection and filleting polysulphide sealant.
MIXING RATIO	One part base to one part accelerator by weight or volume or equal lengths of the same size beads.
POT LIFE	2 hours at room temperature.
CURE TIME	72 hours at 77°F (25°C) for handling and other operations. Fully cured in two weeks.
	METAL SET A4
DESCRIPTION	A two component, epoxy base, general purpose adhesive. Has light paste consistency.
MIXING RATIO	1 part resin to 1 part hardener by weight or volume. Material contained in kit is one tube each of resin and hardener per box.
POT LIFE	15 to 20 minutes at 70° to 80°F (21° to 27°C).

Table 14-1. Adhesives Contained in Bonding Kit No. 206-1743-1 (Cont)

CURE TIME	4 Hours at 70° to 80°F (21° to 27°C). Alternate 1 hour at 180°F (82°C).
	EC 2126
DESCRIPTION	A pre-mixed general purpose adhesive of thin syrup consistency. Used to bond rubber to rubber, metal, plastic, wood or glass. **Note** This adhesive is not intended for use on silicone seals.
APPLICATION	Stir or agitate material in container. Apply one thin even coat to both surfaces. Porous surfaces will require a second coat after the first coat has dried for 10 minutes. Air dry adhesive until it exhibits an aggressive tack (the adhesive sticks, but it will not transfer to finger), usually 1 to 3 minutes. Join surfaces and press firmly to remove all trapped air.
MIXING RATIO	Not applicable. This is a single component adhesive.
POT LIFE	Not applicable. Re-seal container after use.
CURE TIME	2 to 3 hours at 70° to 80°F (21 to 27°C) for handling strength. 24 hours at 70° to 80°F (21 to 27°C) for full cure. Alternate – 1 hour at 120°F (49°C).
	3M SUNSET PATCHES
DESCRIPTION	A pre-wet fiberglass patch. Fiberglass patch is saturated with adhesive and has protective covering. May be used for repair in lieu of fiberglass wet lay up. Two layers will equal one ply of type C fiberglass cloth.
APPLICATION	Clean surface as outlined in surface preparation. Cut patch to size, strip off colored back up and apply patch with clean plastic film up. Smooth out all air bubbles. Remove plastic film after cure.
CURE CYCLE	1 to 4 hours at 40°F (4°C) or above. Patch must be exposed to sunlight or sunlamp to effect a cure.
	A 934B ADHESIVE PROMOTER
DESCRIPTION	This is not an adhesive. It is used to obtain better adhesion. Recommended on metal surface which is to receive a composite bond patch.
APPLICATION	Apply one brush coat and allow to air dry 15 minutes minimum before bonding.

14-17. REMOVAL OF PAINTS AND PRIMERS.

CAUTION

"Paint Strippers" are NOT to be used. Contamination of core, adhesive bond line or fiberglass skin and edging with "Paint Stripper" will be cause for panel replacement. Trichloroethylene and vapor degreasers are not to be used to clean or strip any surface adjacent to a damaged area. Use only methyl-ethyl-ketone or acetone to remove paint from skins and edging or exposed adhesive bond lines.

Note

Excessive application of methyl-ethyl-ketone or acetone can affect bonding agents. Strip these areas by wiping rather than soaking.

a. Conventional Finishes (varnishes, alkyd enamels, zinc chromate primer, etc.).

(1) Mask off area to be stripped.

(2) Brush apply methyl-ethyl-ketone (item 17, table 1-1).

(3) Remove lifted paint with a stiff fibre bristle brush.

(4) Final clean by wiping with clean cheesecloth moistened with methyl-ethyl-ketone (item 17, table 1-1).

b. Acrylic Finishes.

(1) Mask off area to be stripped.

(2) Remove paint by wiping with clean cheesecloth moistened with methyl-ethyl-ketone (item 17, table 1-1).

c. Epoxy Finish.

(1) Mask off area to be stripped.

(2) Remove paint using non-silicon abrasive paper grit No. 240 or finer (item 15, table 1-1).

(3) Wipe with clean cheesecloth until all evidence of residue has been removed.

14-18. CLEANING ON HONEYCOMB CORE CAVITY.

a. Remove all loose debris from cavity.

b. Flush cavity using methyl-ethyl-ketone (item 17, table 1-1), acetone (item 111, table 1-1) or Naphtha (item 36, table 1-1) and dry immediately with filtered, dry compressed air.

CAUTION

Air pressure not to exceed 30 PSI.

CAUTION

Any core of skin contaminated by fuel, oil, water, corrosion or debris must be cut out.

c. Protect cleaned cavity from contamination until ready for subsequent operation with clean wrapping paper (item 98, table 1-1).

14-19. PREPARATION OF PANEL BONDING SURFACES.

Note

Prebond (composite) material does not require cleaning. Remove "peel ply" only and bond.

a. Clean foreign material from parts to be bonded with clean cheesecloth moistened with methyl-ethyl-ketone (item 17, table 1-1).

b. Thoroughly sand surfaces to be bonded or to which filler is to be applied with non-silicone No. 240 grit wet or dry sandpaper or abrasive paper (item 15, table 1-1) to remove finish, primer and foreign material.

c. Mask off sanded surface area to protect surrounding area from cleaning solution.

d. Wipe sanded area with clean cheesecloth moistened with methyl-ethyl-ketone (item 17, table 1-1). Change cheesecloth frequently until all evidence of residue is removed, and wipe dry with clean cheesecloth.

e. Immediately coat cleaned surface (metal only) with adhesive promoter (item 109, table 1-1); allow a minimum of 30 minutes drying time.

f. Remove all tape from masked area.

g. Protect surface from contamination until final bonding is accomplished; recommend use of clean wrapping paper (item 98, table 1-1).

14-20. REPAIR – HONEYCOMB PANELS WITH REPAIRABLE DAMAGE.

a. Protect the opening to prevent entry of cleaning agents and solvents.

b. Remove paint and primer from an area extending 3.0 inches beyond the edge of damage. (Refer to paragraph 14-17.)

CAUTION

Any core or skin contaminated by fuel oil, water, corrosion or debris must be cut out.

c. Cut away skin and core to remove all damaged and contaminated material. (See figure 14-5, detail B.)

d. Flush cavity with methyl-ethyl-ketone (item 17, table 1-1) or acetone (item 111, table 1-1). Dry promptly with clean, dry compressed air.

e. Fill cavity with adhesive (item 31, table 1-1). (See figure 14-5, detail C.)

f. When adhesive has cured, sand smooth to contour with No. 400 grit abrasive paper (item 15, table 1-1). (See figure 14-5, detail C.)

g. Fiberglass face repaired area with two plies of fiberglass cloth. (Refer to paragraph 14-21.)

h. Refinish panel surface to match existing finish. (Refer to Section I, table 1-3.)

14-21. FIBERGLASS FACING REPAIRS – HONEYCOMB PANELS.

a. Prepare a patch from fiberglass cloth (item 108, table 1-1). The fiberglass cloth patch shall equal the number of plies lost or a minimum of two plies to provide a minimum of a 1.0 inch minimum overlap outside the damaged skin trim area and provide a minimum of 1.0 inch minimum overlap, over each preceeding layer. (See figure 14-5, detail D.)

b. Saturate the first patch with epoxy resin (item 100, table 1-1). Apply resin to the exposed filler and to the exposed clean area of the panel around the damage.

c. Fit the impregnated patch into place. Smooth out air pockets and wrinkles.

Note

Ensure that adequate resin is forced through the patch ply in the core area.

d. Saturate each succeeding ply with resin and brush coat the entire repair area with resin and apply the patch. Work each ply to remove the wrinkles and entrapped air prior to application of the next ply. Minimum number of plies to be the same as existing skin.

CAUTION

Use of vacuum bag will remove resin from patch area unless adequate seal is accomplished.

e. Cover repair with cellophane and apply firm contact pressure to the patch with shot bags, clamps, vacuum bag or other suitable means.

14-22. EDGE REPAIRS – HONEYCOMB PANELS.

a. Protect the opening to prevent entry of cleaning agents and solvents.

b. Remove paint and primer for an area extending 3.0 inches beyond the edge of damage. (Refer to paragraph 14-17.)

CAUTION

Any core or skin contaminated by fuel, oil, water, corrosion or debris must be cut out.

c. Cut away edge skin and core to remove all damaged and contaminated material.

d. Fill damaged area with adhesive (item 31, table 1-1). Blend to undamaged surface and allow to cure.

e. Prepare patch layers of fiberglass cloth (item 108, table 1-1) to equal number of plies lost or a minimum of two plies. Provide a minimum of a 1.0 inch overlap outside the damaged skin trim, and to provide a minimum of 1.0 inch overlap over each preceding layer.

f. Saturate the first patch with epoxy resin (item 100, table 1-1). Apply resin to the exposed core of filler and to the exposed clean area of the panel around the damage.

g. Fit the impregnated patch into place. Smooth out air pockets and wrinkles.

Note

Ensure that adequate resin is forced through the patch ply in the core area.

h. Saturate each succeeding ply with resin and brush coat the entire repair area with resin and apply the patch. Work each ply to remove the wrinkles and entrapped air prior to application of the next ply. Number of plies to be the same as existing skin or a minimum of two plies.

CAUTION

Use of vacuum bag will remove resin from patch area unless adequate sealing is accomplished.

i. Cover repair with cellophane and apply firm contact pressure to the patch with shot bags, clamps, vacuum bag or other suitable means.

14-23. INSERT REPLACEMENT – HONEYCOMB PANELS.

a. Replace damaged inserts in accordance with figure 14-13.

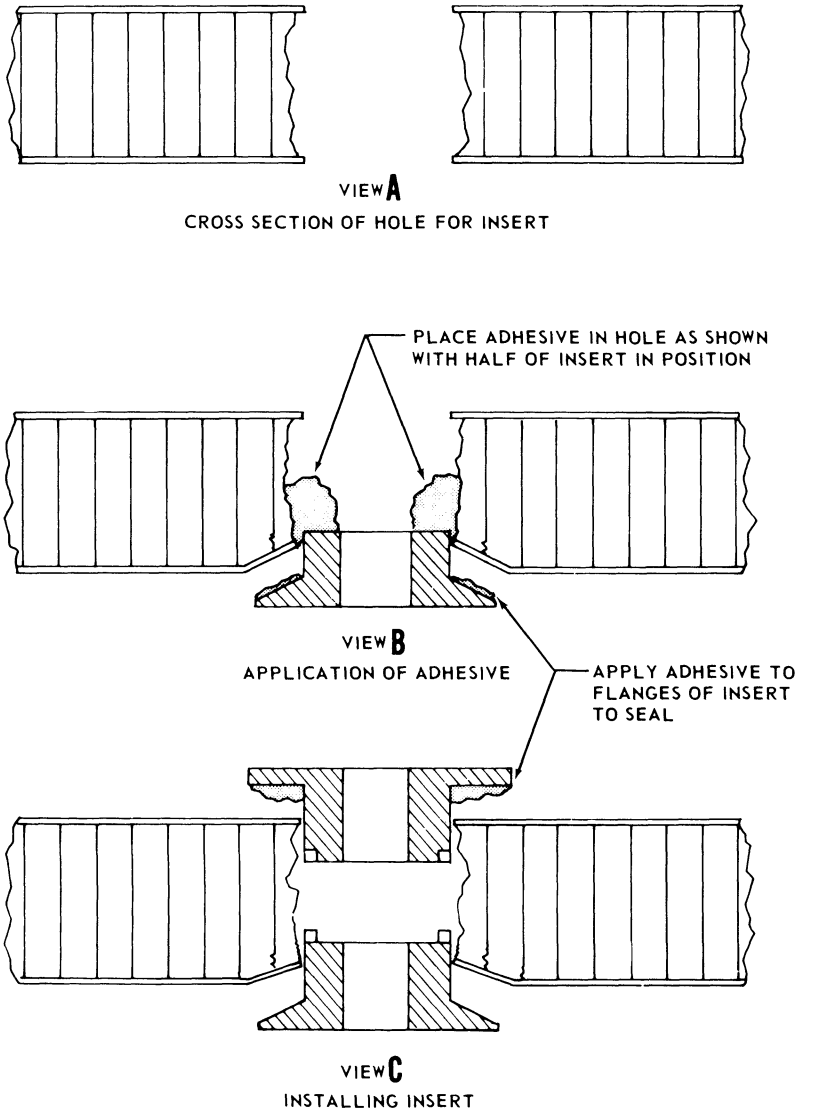
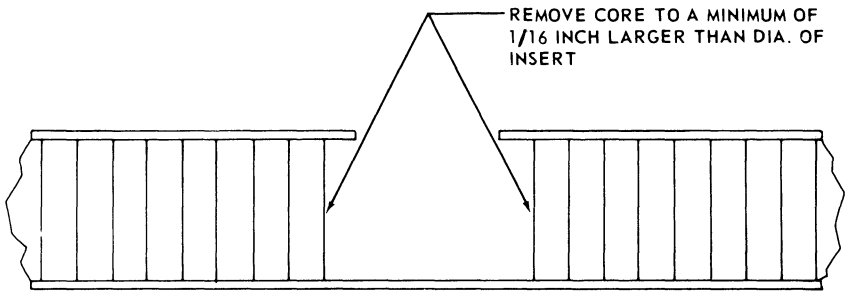
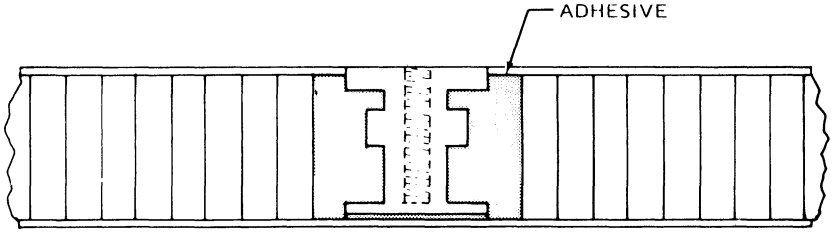


Figure 14-13. Honeycomb Panels — Insert Replacement (Sheet 1 of 4)



VIEW A
CROSS SECTION OF HOLE FOR INSERT



VIEW B
CROSS SECTION OF INSTALLED INSERT

206900-109-2

Figure 14-13. Honeycomb Panels — Insert Replacement (Sheet 2 of 4)

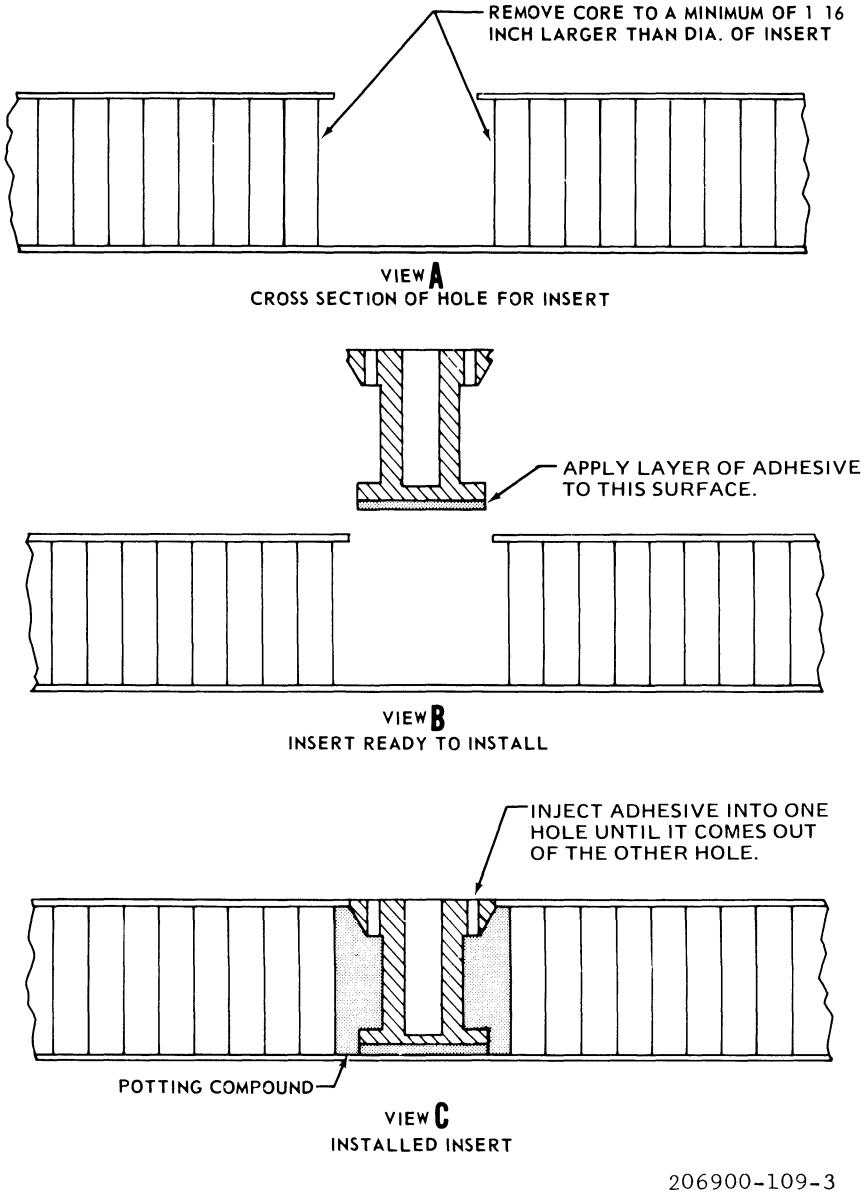


Figure 14-13. Honeycomb Panels — Insert Replacement (Sheet 3 of 4)

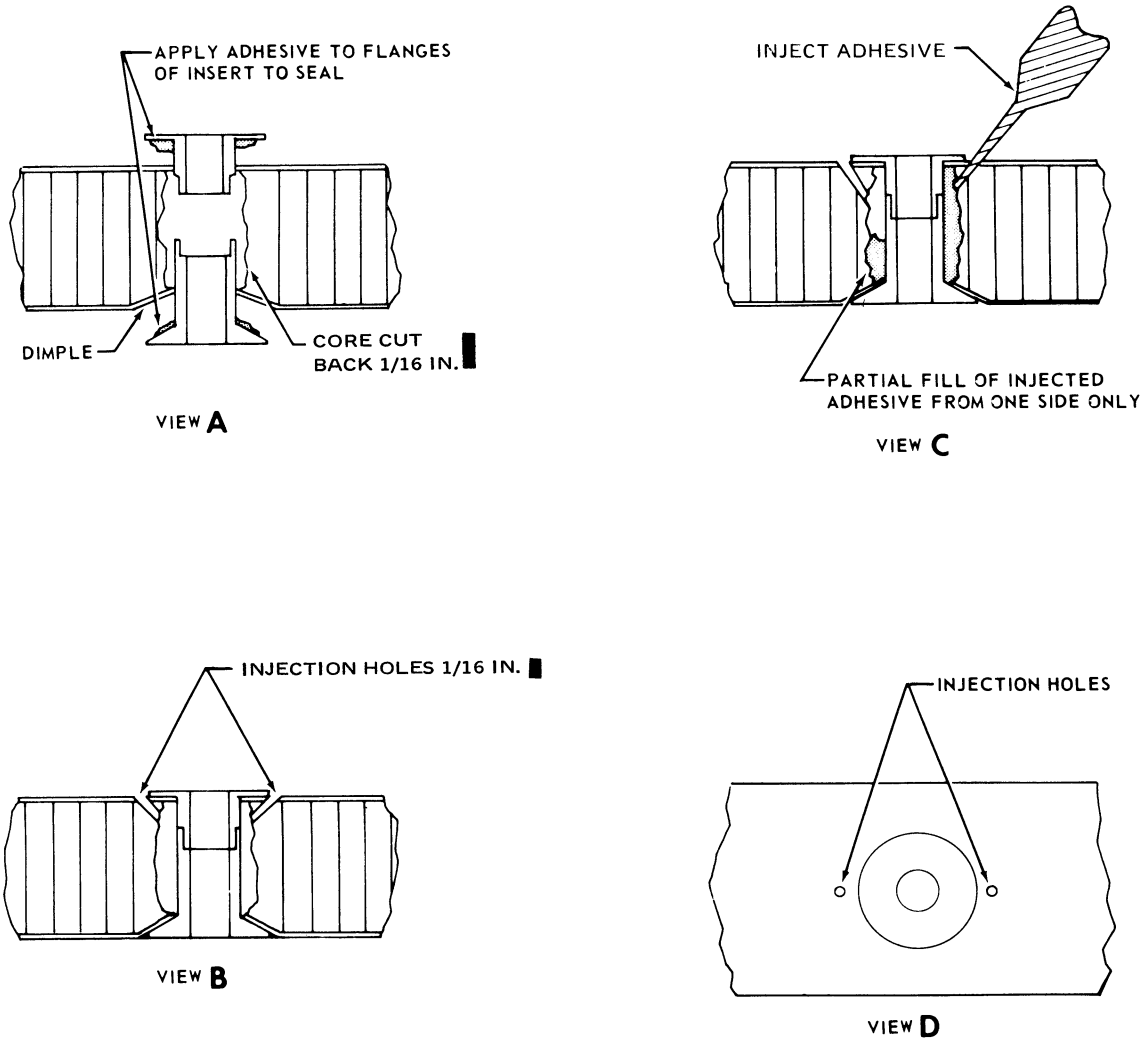


Figure 14-13. Honeycomb Panels — Insert Replacement (Sheet 4 of 4)

b. Bond inserts in honeycomb panels with adhesive (item 31, table 1-1) as illustrated in figure 14-13, sheets 1 through 4.)

Note

Remove honeycomb core to a depth of 1/16 inch diameter around insert If adhesive is found cracked after insert removal all old adhesive must be removed. New inserts will be bonded with adhesive (item 31, table 1-1).

14-24. WINDSHIELD.

14-25. DESCRIPTION. The windshields are fabricated of blue tinted acrylic plastic, MIL-P-5425, and are supported by formed aluminum alloy sections. Water tight sealant is applied to the faying surfaces of the windshield.

14-26. REMOVAL – WINDSHIELD.

a. Remove rivets from retainer strips. (See figure 14-14.) Rivets securing the retainer strip are the MS20600AD4 blind type.

b. Clean sealant (item 7, table 1-1) from faying surfaces of supports and retainer strip by scraping. Clean surfaces with naphtha (item 36, table 1-1).

14-27. INSPECTION — WINDSHIELD. Inspect for abrasions, scratches, cracks, holes or other damage. (See figure 14-15 for critical areas and repair limits.)

14-28. REPAIR – WINDSHIELD.

a. Repair water leaks by using a small bead of sealing compound (item 7, table 1-1) to the affected area.

b. Repair windshield within the limits specified in figure 14-15 Notes. Cracks, holes, or other damage may be temporarily repaired by stop drilling, patching or other standard approved methods for acrylic plastics.

14-29. INSTALLATION – WINDSHIELD.

a. Trim window to fit, leaving expansion gap of 0.06 inch. (See figure 14-14, View DD.)

b. Install windshield and check fit. Remove windshield and apply a bead of sealant (item 7, table 1-1) to faying surfaces of the retainer strips and support

c. Install windshield; align retainer strips and holes and install (MS20600AD4) rivets with (140-001-3) rivet washers. (See figure 14-14.)

d. Trim sealant squeeze-out with a sharpened piece of acrylic plastic.

e. Clean windshield. (Refer to Section I.)

14-30. CABIN DOOR – WINDOWS.

14-31. DESCRIPTION. The cabin door windows are fabricated of tinted polycarbonate plastic and secured to the door assembly with rivets. Sliding windows constructed of acrylic plastic are provided for ventilation. Each window is provided with a water tight sealant of urethane adhesive applied to the faying surface of the window and door. (Refer to Section I for cleaning instructions.)

14-32. LOWER WINDOWS.

14-33. DESCRIPTION. Two blue tinted transparent lower windows constructed of acrylic plastic (MIL-P-5425) are provided in the cabin nose section. Sealant is applied to the mating areas of window panels and nose structure. providing a water tight seal. The windows are secured by aluminum alloy retainer strips riveted to the nose structure. (Refer to Section I for cleaning instructions.)

14-34. REMOVAL – LOWER WINDOW.

a. Remove rivets from retainer strips. (See figure 14-16.) Rivets securing the retainer strip are the (MS20600AD4) blind type.

b. Clean sealant from faying surfaces of supports and retainer strip by scraping. Clean surfaces with naphtha (item 36, table 1-1).

14-35. INSPECTION – LOWER WINDOW. Inspect for abrasions, scratches, cracks, holes or other damage. (See figure 14-15 for critical areas and repair limits.

14-36. REPAIR – LOWER WINDOW.

a. Repair water leaks by using a small bead of sealant (item 7, table 1-1) in the affected area.

b. Repair cabin door and lower windows within the limits specified in figure 14-15 Notes. Cracks, holes or other damage may be temporarily repaired in accordance with paragraph 14-44.

14-37. INSTALLATION – LOWER WINDOW.

a. Trim window to fit. See figure 14-16, views AA, BB and CC for clearance.

b. Apply a thin even coat of sealant (item 7, table 1-1) to faying surfaces of window support.

c. Position window on supports. Fill all void areas between edge of window support with sealant (item 113, table 1-1).

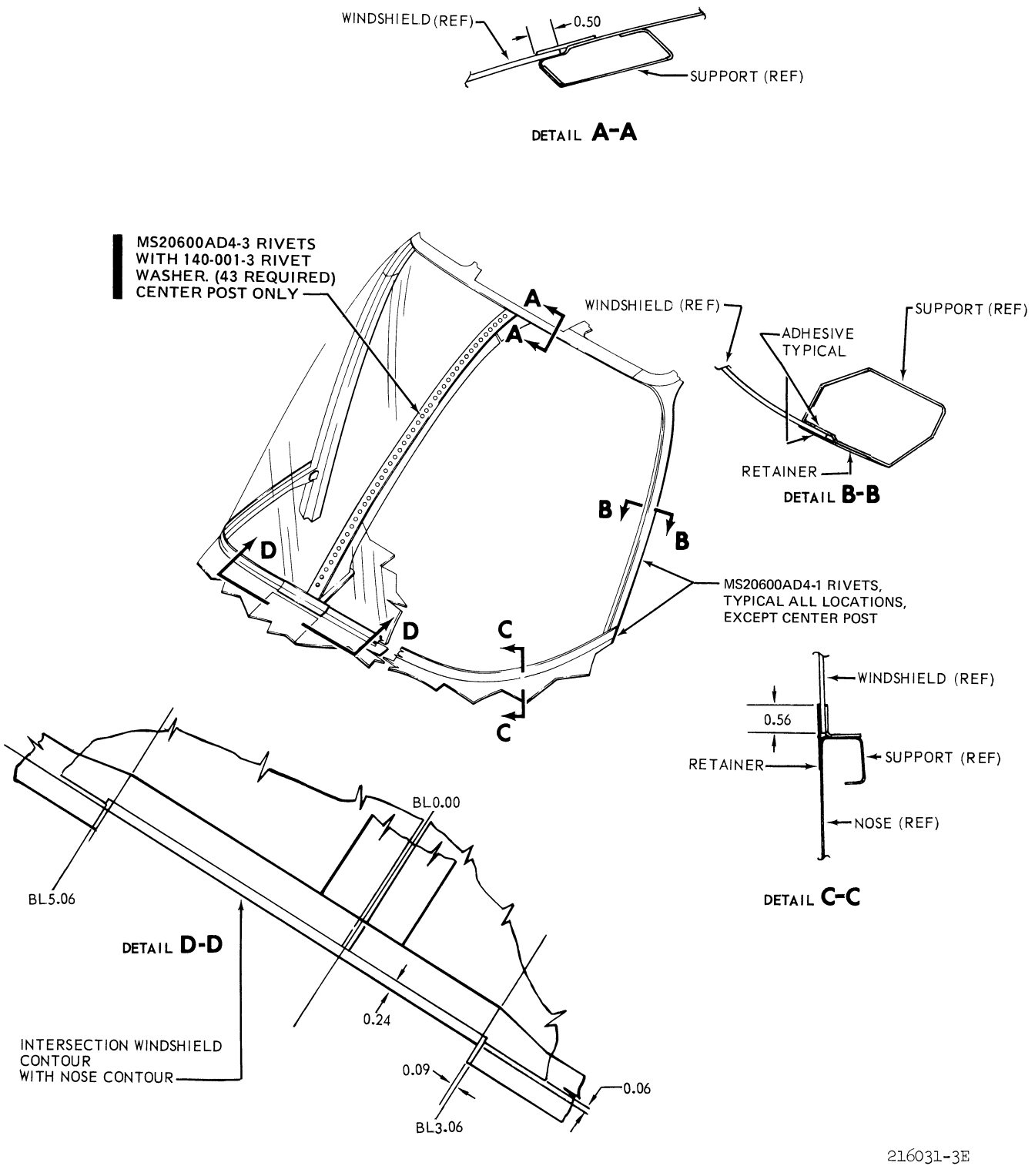


Figure 14-14. Windshield Installation

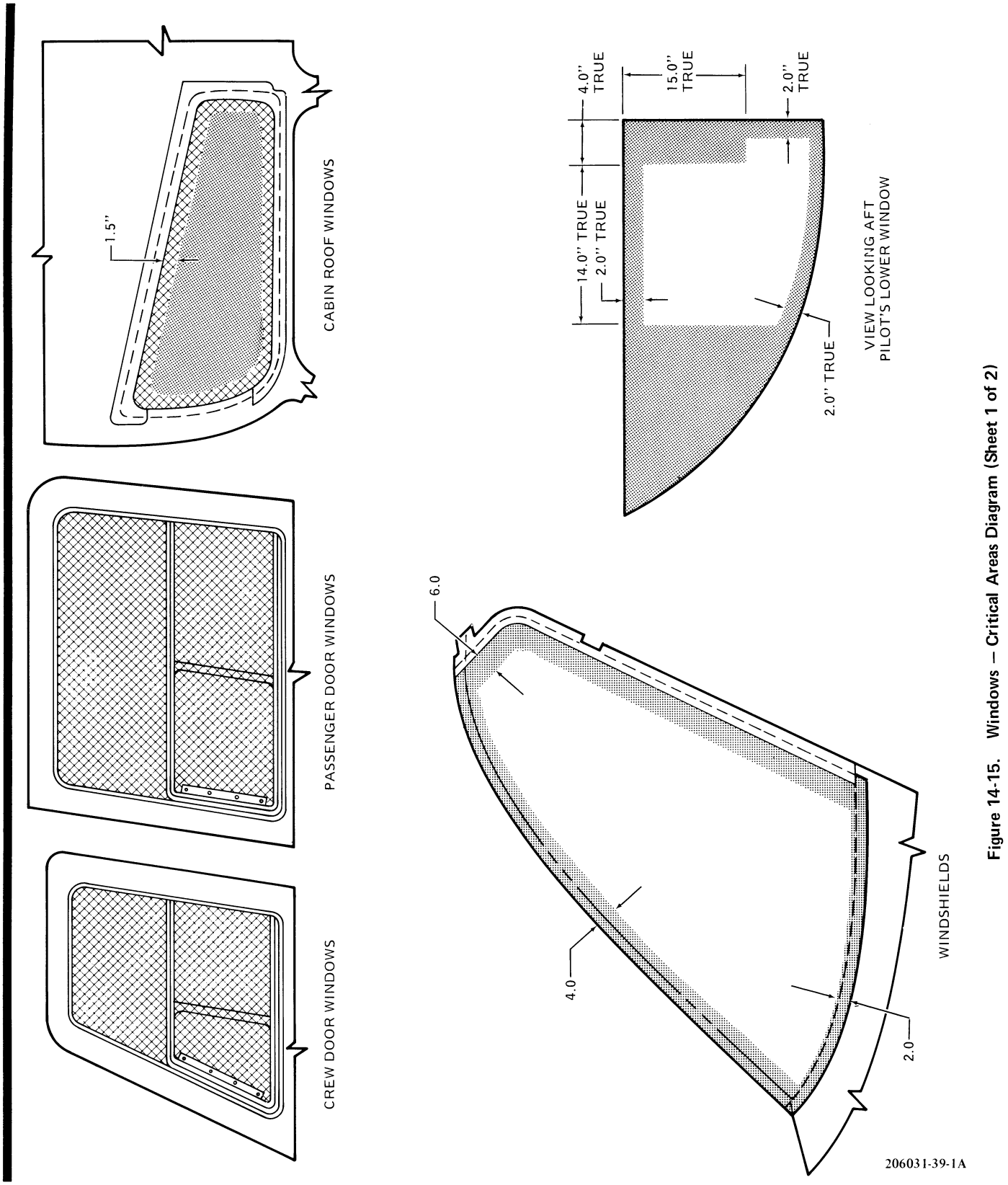
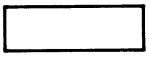
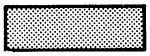


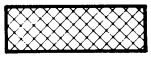
Figure 14-15. Windows — Critical Areas Diagram (Sheet 1 of 2)

Area "A": 

Scratches and pits may be polished out to the extent that vision is not distorted. Distortion of vision is cause for replacement. Cracks, holes or other damage may be temporarily repaired, if vision of crew members will not be impaired, by stop drilling, patching or other approved methods, but window must be replaced at the earliest opportunity.

Area "B": 

Scratches and pits are permitted in this area provided they are not so numerous or form such a pattern as to be objectionable to the viewer. Cracks, holes or other damage may be temporarily repaired by stop drilling, patching or other approved methods, but window must be replaced at the earliest opportunity.

Area "C": 

Scratches and pits are permitted in this area, provided the structural integrity of the window is not impaired. Cracks, holes or other damage may be repaired by stop drilling, patching or other approved methods provided structural integrity is not impaired.

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Figure 14-15. Windows – Critical Areas Diagram (Sheet 2 of 2)

d. Secure window in place with retainer strip and (MS20600AD4-3 and -4) rivets.

Note

Only five (MS20600AD4-4) rivets are used on each lower window at sta. 36.22 at bottom. Remainder of rivets are -3.

e. Trim sealant squeeze-out with sharpened piece of plastic.

f. Clean window. (Refer to Section 1.)

14-38. ROOF – WINDOWS.

14-39. DESCRIPTION. Two skylight windows constructed of tinted polycarbonate plastic are provided in the roof of the forward compartment. The windows are supported by formed aluminum alloy sections and secured by aluminum alloy retainer strips. Sealant is applied to the faying surfaces of the retainer strip and support to provide a water tight seal.

14-40. REMOVAL – ROOF WINDOW. Remove rivets from retainer strip that secures the window to the roof. (See figure 14-17 for rivet identification.)

14-41. INSPECTION – ROOF WINDOW. Inspect for abrasions, scratches, cracks, holes or other damage. (See figure 14-15 for critical areas and repair limits.)

14-42. REPAIR – ROOF WINDOW.

a. Repair water leaks by using a small bead of sealant (item 7, table 1-1) in the affected area.

b. Repair roof windows within the limits specified in figure 14-15 . Cracks, holes or other damage may be temporarily repaired in accordance with paragraph 14-44.

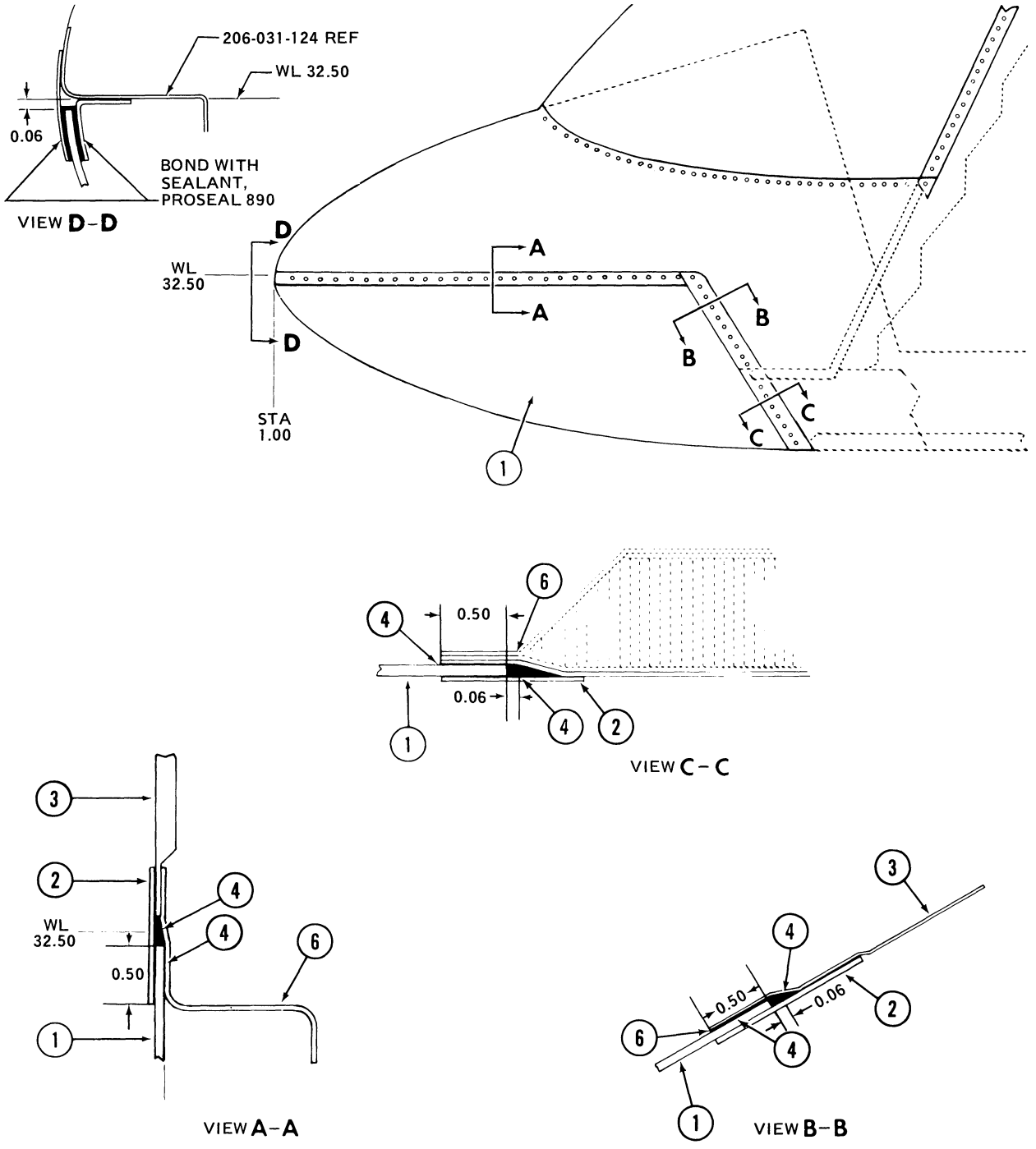
14-43. INSTALLATION – ROOF WINDOW.

a. Remove the old sealant from the retainer strip and roof by scraping. Clean the mating surfaces with naphtha (item 36, table 1-1). Do not use solvent on polycarbonate for cleaning.

Note

Do not trim window panel to final size until all mounting holes have been drilled. Retainer strip should overlap the window a minimum of 0.50 inch, and rivet edge distance should equal minimum twice rivet diameter. (See figure 14-17 .)

b. Center window and retainer strip over the roof opening and drill two 0.128 inch holes in inboard and outboard edge using the retainer strip as a template. Install screws or fasteners as necessary to secure window in position and complete drilling operation.



1. Window
2. Retainer
3. Nose Skin
4. Proseal 890
5. Deleted
6. Support

206031-15B

Figure 14-16. Lower Window Replacement

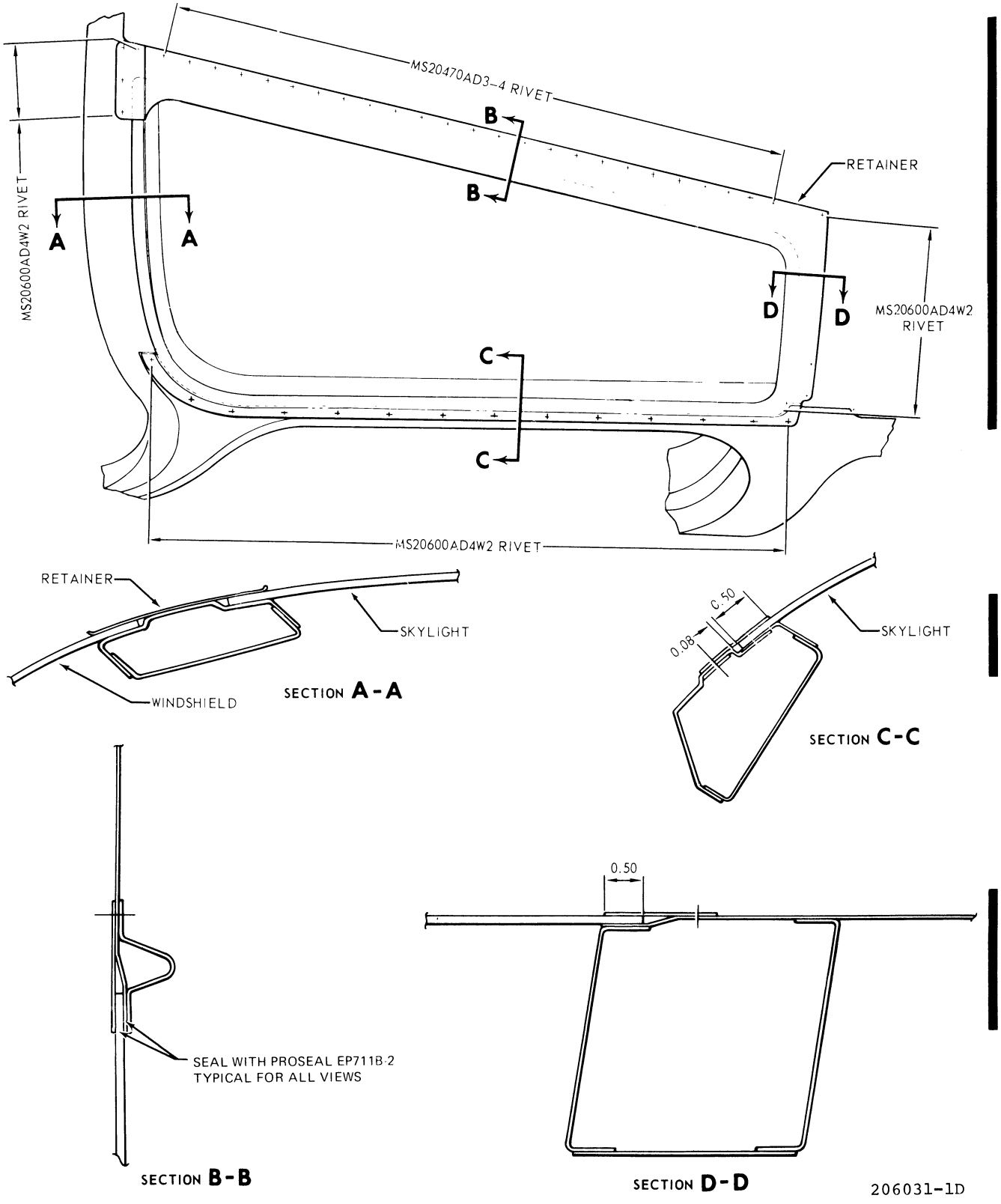


Figure 14-17. Roof Window Replacement

c. Remove retainer and window and clean-up drilling area.

d. Apply a bead of sealant, (item 113, table 1-1) to roof mounting flange and retainer strip. (See figure 14-17.) (Refer to table 14-1 for mixing sealant.) Install the window and retainer strip, align the holes and install (MS20600AD3, AD4 and B4) rivets.

e. Trim adhesive squeeze-out with a sharpened piece of acrylic plastic.

f. Clean window. (Refer to Section I.)

g. Alternate methods for installation of roof windows.

(1) Windows with two rows of rivets (one through window) in retainer, countersink inboard row of holes in structure under window and install blind rivets.

(2) Install windows as stated in subparagraph a. through f. above, except that outboard row of rivets in retainer is required.

Note

Replace retainer or fill rivet holes that are not used.

Note

In late model helicopters that have only one row of rivets in the retainer, install roof window as stated in subparagraph g.(1) and (2).

14-44. POLYCARBONATE.

14-45. REPAIR – POLYCARBONATE.

a. Stop drill each end of crack, using number 40 drill.

CAUTION

Do not use any solvents on polycarbonate surfaces.

b. Lightly sand area to be repaired with No. 240 grit sandpaper (item 90, table 1-1). Sand approximately 3/4 inch beyond crack for adhesive application.

Note

Do not allow area to come in contact with any mold release agents such as silicone, wax oil, grease, or talcum. Wear clean, dry cotton gloves avoid hand contact with cleaned area, and change gloves when soiled.

c. Wipe area with clean dry cloth to remove all residue.

d. Mix adhesive (item 12, table 1-1) as directed by manufacturer.

e. Apply adhesive to repair area using brush or spatula.

Note

Maximum strengths can be obtained by applying a 10 mil thickness of adhesive.

f. Normal cure time is from 2 to 3 days. Handling strength can be developed after 24 hours.

g. Accelerated cure time may be accomplished in 2 to 3 hours by using a heat lamp at 150° to 160°F (66° to 71°C).

14-46. HEAT DUCTS.

14-47. REPAIR – HEAT DUCTS.

a. Follow subparagraphs a. through c. in paragraph 14-45.

b. Cut a section of fiberglass cloth (item 108, table 1-1) to extend a minimum 1/2 inch around periphery of crack or repair area.

c. Apply one brush coat of adhesive (item 112, table 1-1) to repair area.

d. Lay fiberglass cloth (item 108, table 1-1) over repair area and rub lightly to adhere fiberglass to repair.

e. Apply one brush coat of adhesive (item 112, table 1-1) over fiberglass cloth.

f. Cure as in paragraph 14-45.

14-48. GENERAL CLEANING PROCEDURE REQUIREMENTS.

a. Surface Preparation. Surfaces must be clean, dry and free from oil or grease. Faying surfaces shall be cleaned for cementing as follows:

CAUTION

Before using solvents, extinguish all flame and pilot lights. Keep product and its vapors away from heat, sparks and flame. During application and until vapors are gone, avoid using spark producing electrical equipment such as switches, appliances, etc. AVOID prolonged breathing of vapors and repeated contact with skin.

CAUTION

Do NOT spray adhesives directly on acrylic or polycarbonate surfaces. Spray adhesives shall ONLY be applied to vinyl, felt, foam or rubber surfaces.

CAUTION

Thoroughly clean all parts. After cleaning parts with proper cleaning material, do NOT handle (or touch) areas to be bonded.

b. Metal Surfaces. Abrade lightly with No. 400 grit abrasive paper or cloth (item 15, table 1-1). Remove the sanding residue with naphtha (item 36, table 1-1). toluene (item 37, table 1-1), or methyl-ethyl-ketone (item 17, table 1-1).

c. Rubber. Abrade area to be bonded with a wire brush or coarse No. 80 grit abrasive paper (item 15, table 1-1) and wipe with toluene or methyl-ethyl-ketone (item 37 or 17, table 1-1). The parts shall be wiped dry with clean, dry cloths.

d. Plastics. Lightly abrade the faying surfaces with No. 400-grit sandpaper (item 15, table 1-1). Remove sanding residue with a dry air blast or a dry, clean, soft cloth. Faying surfaces must be clean and dry.

e. Fabrics, Foams, Etc. These materials shall be clean and dry.

f. Painted Surfaces. Painted surfaces shall have the faying area wiped with naphtha (item 36, table 1-1). Wipe the area dry with a clean, dry cloth.

Where additional bond strength is desired, the paint may be removed by sanding lightly with No. 400 grit abrasive paper (item 15, table 1-1), and the sanding residue removed with naphtha or methyl-ethyl-ketone (item 36 or 17, table 1-1).

14-49. ENGINE MOUNTS.

14-50. DESCRIPTION The engine is supported on the service deck with three bi-pod mounts located on the right, left and lower side of engine. Shims are provided at each mount leg for engine alignment. (Refer to Section VII .)

CAUTION

If mounts are removed, do not remove bonded shims. If removal is required, index shims and reinstall in exact position as before removal.

14-51. NEGLIGIBLE DAMAGE LIMITS – ENGINE MOUNTS. Smooth dents which do not remove any material and are less than 0.004 inch deep are considered to be negligible. Dents cannot be closer than 3.0 inch edge-to-edge.

14-52. DAMAGE REQUIRING REPLACEMENT – ENGINE MOUNTS. Any damage in excess of that specified for negligible damage necessitates replacement of the engine mount. (Refer to Section VII for removal and installation.)

14-53. ENGINE EXHAUST STACKS.

14-54. DESCRIPTION. The engine exhaust stacks are constructed of 0.025 inch thick stainless steel and clamped to the engine with V-ring clamps. (See figure 14-18 .)

14-55. NEGLIGIBLE DAMAGE LIMITS — EXHAUST STACKS.

a. Minor nicks, scratches, and smooth contour dents that do not puncture exhaust stack are classified as negligible. (See figure 14-18A .)

b. Dents are allowed to a maximum depth of 0.19 inch and not exceeding 0.75 inch in length.

14-56. REPAIRABLE DAMAGE LIMITS — EXHAUST STACKS.

a. Cracks or small holes may be repaired by patching. There are no absolute limits for damage to exhaust stacks. The decision to repair or replace a damaged stack must be based on probability of repair and availability of parts.

b. No dent may be closer than 3.0 inches from another dent. Maximum dents allowable is five. No dent is allowed within 1.0 inch of mounting flange or boss.

c. All sharp dents shall be treated as cracks. Any dent in a weld joint shall be checked for a crack.

14-57. REPLACEMENT DAMAGE LIMITS — EXHAUST STACKS.

a. Exhaust stacks that are burned out must be replaced.

b. Cracks in mounting flange; exhaust stack must be replaced.

14-58. REPAIR — EXHAUST STACKS.

a. All scores, scratches, and corrosion shall be smoothed out. Repair after smoothing shall be 0.020 inch maximum. (See figure 14-18A .)

CAUTION

Repairs must be made before next flight.

b. Cracks, tears or puncture holes in any area (other than mounting flange) may be repaired. Use stop-drill (0.094 inch diameter) on each end of damaged area.

c. Apply external patch of like material and gauge overlapping crack by 0.38 inch minimum. Weld around exterior patch. Weld crack closed inside shell and smooth area as required. (See figure 14-18 .)

d. Repair exhaust stack using corrosion resistant steel. Heliarc weld per MIL-W-8611, using welding rod Type 347 per MIL-R-5031 or use Type N-155, as an alternate.

14-59. ENGINE FIREWALL

14-60. DESCRIPTION. Firewalls constructed of titanium sheet specification MIL-T-9046, are provided at the forward end, aft end and below the engine.

14-61. NEGLIGIBLE DAMAGE LIMITS – FIREWALL. Smooth contour dents, nicks and scratches that do not penetrate.

14-62. REPAIRABLE DAMAGE LIMITS – FIREWALL. Damage that penetrates the firewall shall be repaired.

14-63. REPAIR – FIREWALL.

a. Repair penetration of the firewall as illustrated in figure 14-19.

(1) Install repairs with monel rivets or standard close tolerance steel fasteners. Install gasket material (Style 89, type II asbestos, Johns-Manville Corp. or equivalent) between repairs to provide a fire tight seal.

(2) If titanium is not available for a repair, the substitute material should be 18-8 stainless steel.

b. Replace asbestos chafing strips as follows:

(1) Remove chafing strip and clean surface to bare metal.

(2) Clean metal with toluene (item 37, table 1-1) and wipe dry with clean cloth.

(3) Clean strip with toluene and apply sealant (item 110, table 1-1) to strip and firewall.

(4) Press strip to firewall and continue pressure until cured. Allow sealant to cure at 70° to 80° (21° to 27°C) for 24 hours or heat with a heat lamp for 1 hour at 120°F (49°C).

14-64. ENGINE AND TRANSMISSION COWLING.

14-65. DESCRIPTION. The engine and transmission cowling consist of four sections: forward fairing, induction fairing, engine cowl assembly and aft fairing. The cowling is constructed of aluminum alloy, fiberglass and honeycomb material and is readily removable for engine and transmission changes. Cowling access panels are provided with snap-open fasteners which permit inspection without removing the cover unit.

14-66. NEGLIGIBLE DAMAGE LIMITS – COWLING.

a. Honeycomb panels.

(1) Dent is smooth, crack free without voids under dents.

(a) Single dent maximum damage is 3.0 inch diameter by 0.025 inch depth, or 1.0 inch diameter, if dent is 0.50 inch in depth.

(b) Dents closer than 1.0 inch (edge to edge) are to be considered as one dent.

(c) Maximum area of all dents combined must not exceed 15 percent of a bay area.

(d) No more than three dents can be encompassed by a 4.0 inch circle.

(e) Minimum distance of 0.5 inch must be maintained from inserts or beveled edges.

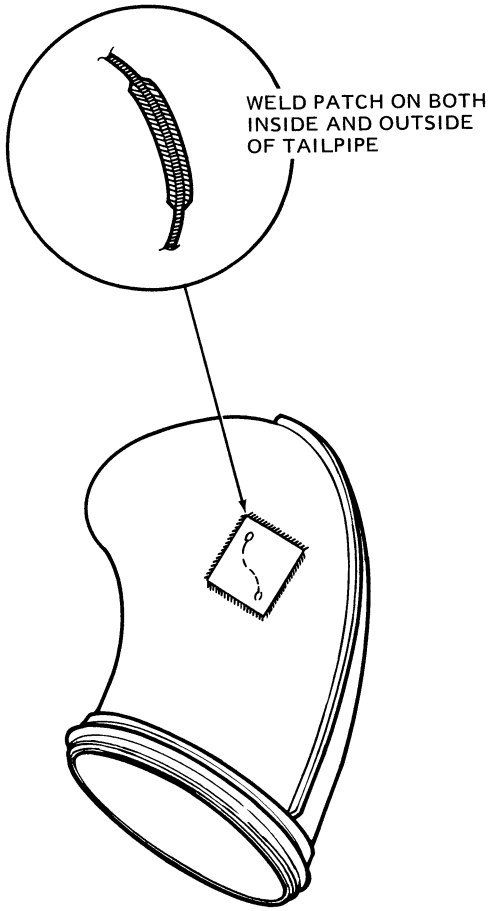
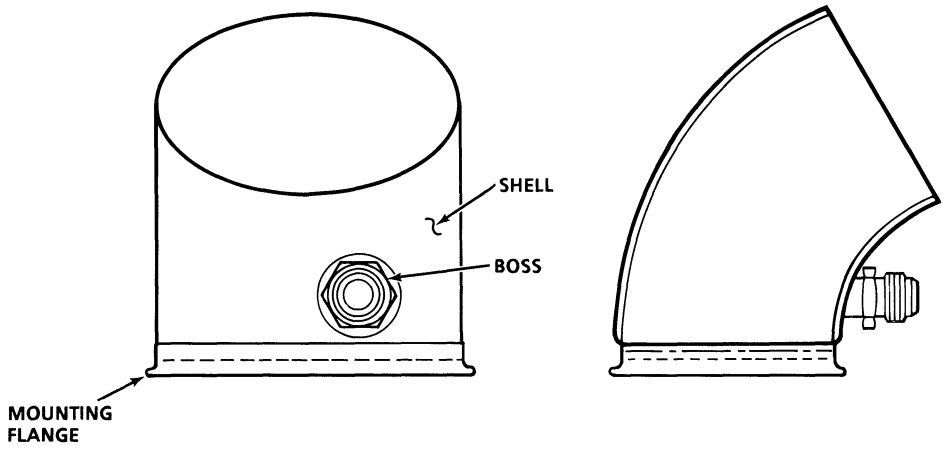


Figure 14-18. Exhaust Stack Repair



206-061-300 EXHAUST STACK ASSEMBLY

TYPE OF DAMAGE:	
NEGLIGIBLE DAMAGE	Minor nicks, scratches, smooth contour dents
CORROSION DAMAGE	Corrosion shall be smoothed (maximum depth 0.020 inch)
MAXIMUM AREA PER FULL DEPTH REPAIR	Dents allowed maximum depth 0.19 inch not exceeding 0.75 inch in length
NUMBER OF REPAIRS	Maximum 2 (with 5.0 inch minimum between repairs)
MOUNTING FLANGE	No dents allowed in mounting flange
CRACKS	No cracks allowed in boss or mounting flange

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Figure 14-18A. Engine Exhaust Stack Mechanical and Corrosion Damage Limits

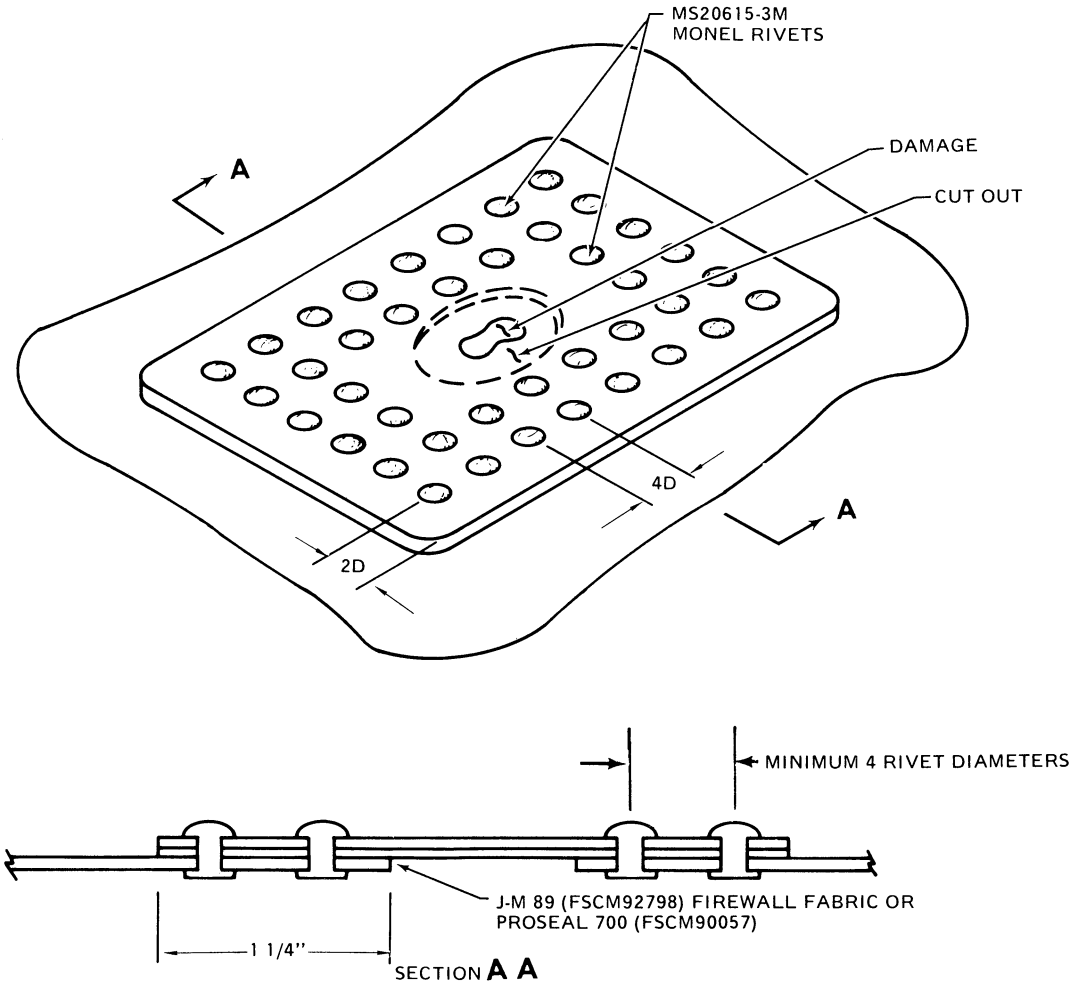


Figure 14-19. Firewall Repair

(2) Voids (bond failure) of honeycomb panels up to 0.50 square inch (0.7 x 0.7) provided that:

(a) No more than two voids can be encompassed by a 4.0 inch circle.

(b) Voids closer than 1.0 inch (edge to edge) are to be considered as one.

(c) Void edge is 1.0 inch minimum from a beveled edge, structural member, fitting or cutout.

(d) No edge separation (delamination).

b. Aluminum panels.

(1) Nicks and scratches less than 2.0 inches in length and 10 percent of material thickness after cleanup.

(2) Corrosion (after cleanup) less than 10 percent of material thickness and 25 percent of bay area for a skin or 25 percent of an area for a member.

(3) Smooth contoured dents, free of cracks or gouges and a depth less than two times material thickness by 3.0 inch diameter.

(4) Dents closer than 1.0 inch (edge to edge) are to be considered as one dent.

14-67. REPAIRABLE DAMAGE LIMITS – COWLING.

a. Honeycomb panels. (Refer to paragraph 14-14.)

b. Aluminum panels.

(1) Damage exceeding negligible damage. (Refer to paragraph 14-66.) Replace parts where damage is extensive and repair would interfere with fit or function of the part.

(2) For additional repair limitations on aluminum structures refer to paragraph 14-9.

14-68. REPAIR – COWLING.

a. Repair honeycomb panels in accordance with paragraph 14-17 through 14-21, as applicable.

b. Repair aluminum panels using standard repair procedures.

CAUTION

Do not use filler material (adhesive) or blind type rivets forward of the engine air intake ducts.

c. Replace cowling if repair affects air flow.

14-69. TAIL BOOM.

14-70. DESCRIPTION. The tail boom is a full monocoque structure except for the forward 10 inches, where the loads are redistributed by means of four intercostal load carrying members. Tail rotor driveshaft bearing supports are mounted to the top of the tail boom. The supports located underneath the bearing support and inside the tail boom support tail rotor control guide tubes. The tail rotor gearbox and vertical fin are mounted on the aft cone of the tail boom. (See figures 14-1 and 14-2.)

14-71. NEGLIGIBLE DAMAGE LIMITS – TAIL BOOM.

Note

Inspect for scratches and creases. Any scratch or crease which obviously exceeds the thickness of the paint must be inspected with dye-penetrant.

a. Scratches not in excess of 10 percent of the skin thickness in depth and at angles greater than 45 degrees from the longitudinal axis of the tail boom may be blended out provided they do not exceed one sixth the circumference of the tail boom, and provided they are not also accompanied by creasing. Scratches not in excess of 10 percent of the skin thickness in depth and at angles less than 45 degrees from the longitudinal axis may also be blended out. No limit on length or number of longitudinal scratches provided damage is not clustered. Cumulative scratch cleanup is limited to a total skin thickness reduction of 10 percent. After scratches have been blended out, tail boom surface is to be refinished. (Refer to Section I, table 1-3.)

b. Tail boom waviness, excluding dents and creases aft of the horizontal stabilizer (between BS 88.4 and 163.6) is considered negligible provided the irregularities do not exceed 0.090 inch deep when measured with a straight edge and stand-off, and provided the change in profile is gradual.

c. Tail boom waviness, excluding dents and creases forward of the horizontal stabilizer (between BS 42.6 and 80.8) is considered negligible provided the irregularities do not exceed 0.060 inch deep when measured with a straight edge and stand-off, and also provided the change in profile is gradual.

d. Dent negligible damage limits.

(1) Smooth contour and free of cracks, nicks or scratches.

(2) Maximum of one dent per station plane and a minimum of 2.0 inches (edge to edge) between dents.

(3) Maximum diameter of dents 1.25 inches. The maximum depth and location of dents that are acceptable without repair are as follows:

Boom Station (BS)	Lower RS Quadrant	Other Three Quadrants
31.92 – 42.59	0.005	0.005
42.59 – 55.00	no dents	*0.005
55.00 – 80.0	no dents	*0.010
80.0 – 136.0	0.010	0.020
136.0 – 163.0	0.020	0.030

***Note**

No dents are permitted in either the lower left side (LS) or right side (RS) quadrant between BS 42.59 to 80.0.

(4) If the limits are exceeded, repair of tail boom as described in paragraph 14-74 is required.

e. Corrosion is limited to 10 percent of the skin thickness after clean-up for 10 percent of the tailboom circumference and a maximum of 4.0 inches in longitudinal length.

(1) A maximum of two corrosion damaged areas per cross section of the tail boom is permitted. Example: A line drawn around the circumference of the tail boom must not touch more than two damaged areas.

(2) Damage areas must be a minimum of 8.0 inches apart.

(3) Total damage to the tail boom is not to exceed 5 percent of the tail boom area (approximately 160.0 square inches.

14-72. REPAIRABLE DAMAGE LIMITS – TAIL BOOM.

a. Damage in the area between BS 44.0 and BS 163.0 which does not exceed 10 percent of tail boom circumference in height and 30 percent of tail boom circumference in length may be repaired by patching. (Circumference to be measured at aft end of damage.)

b. A maximum of two damaged areas per cross section of the tail boom is permitted. Example: A line drawn around the circumference of the tail boom must not touch more than two damaged areas.

c. Damage areas must be a minimum of eight inches apart.

d. Total damage to the tail boom is not to exceed 5 percent of the tail boom area (approximately 160 sq. inches).

e. If damage is located between tail boom station 80.0 and 89.0, determine if bulkheads, supports, fittings, etc., have sustained damage. Damage to these parts is cause for tail boom replacement.

f. Damage exceeding negligible limits is to be repaired in accordance with limits established for sheet metal damage after cleanup. (Refer to paragraph 14-74.)

g. Inspect forward and aft vertical fin supports, and tail rotor drive shaft bearing brackets for mechanical or corrosion damage. Polish out repairable damage to blend into surrounding surfaces with No. 400 grit abrasive paper (item 15, table 1-1). Do not exceed the dimensions shown in figures 14-19A through 14-19C. Coat all repaired areas with alodine (item 6) and zinc chromate (item 80).

14-73. REPLACEMENT DAMAGE LIMITS – TAIL BOOM.

a. Any damage forward of BS 44.00 or aft of BS 163.00 exceeding negligible limits requires Engineering Approval for Repair.

b. Buckling or distortion of upper or lower skin surface resulting from a hard landing is cause for replacement of tail boom.

14-74. SKIN REPAIR – TAIL BOOM.

a. Clean up damaged skin using a minimum 0.125 inch radius.

b. Prepare a patch of aluminum alloy sheet one gauge thicker than skin to be repaired and shape to contour of tail boom. (See figure 14-1 or 14-2 for skin identification.) The patch must extend a minimum of 3.0 inches forward, 3.0 inches aft, 1.0 inch below and 1.0 inch above the damaged area.

c. Prepare patch and tail boom skin for bonding as follows:

(1) Clean areas to be bonded with methyl-ethyl-ketone (item 17, table 1-1). Clean both the tail boom skin and doubler surface that is to be bonded.

(2) Sand surfaces lightly with No. 320 or No. 400 grit abrasive paper (item 15, table 1-1) to remove all surface finish.

(3) Wipe sanded areas with a clean cloth moistened with methyl-ethyl-ketone (item 17, table 1-1), then wipe dry with a clean cloth before the methyl-ethyl-ketone evaporates.

(4) Apply adhesive (item 31, table 1-1) to patch and position patch over damaged area.

(5) Install a minimum of three rows of (NAS1738B) rivets running circumferentially at the forward and aft end of the patch, and a minimum of one row of (NAS1738B) rivets running longitudinally at the top and bottom of the patch. Rivets are to be installed within pot life of adhesive (item 31, table 1-1).

Note

Rivet size and spacing to be the same as skin lap joints.

14-75. HORIZONTAL STABILIZER.

14-76. DESCRIPTION. The horizontal stabilizer is constructed of aluminum and is attached to a spar with clamps. The inboard rib of the horizontal stabilizers contains a fitting which secures the stabilizer to the tailboom with bolts.

14-77. NEGLIGIBLE DAMAGE LIMITS – HORIZONTAL STABILIZER.

a. Smooth dents that do not gouge the surface are acceptable.

(1) Smooth dents less than 3.0 inches in diameter and 0.040 inch deep are acceptable.

(2) Dents closer than 1.0 inch (edge to edge) are to be considered as one dent.

b. The following damage is classified as negligible and does not require a repair other than blending area smooth, corrosion removal and treatment, and the refinishing of repaired area.

(1) Nicks and scratches less than 10 percent of the skin thickness and less than 2.0 inches long should be blended out, provided they are not accompanied by creasing. Cumulative clean-up is limited to a total skin thickness reduction of 10 percent. Use abrasive cloth (item 13, table 1-1) or No. 240 grit sandpaper (item 90, table 1-1).

(2) Corrosion less than 10 percent of the material thickness after cleanup is acceptable. Cumulative clean-up is limited to a total thickness reduction of 10 percent (10 percent of a bay area for a skin or 10 percent of the adjoining member).

14-78. REPAIRABLE DAMAGE LIMITS – HORIZONTAL STABILIZER.

a. The inboard ribs and the spar except for the outboard 6.0 inches of the spar are not repairable and must be replaced if negligible damage limits are exceeded. (Refer to subparagraph c.)

b. The remainder of the stabilizer can be repaired by standard repair procedures.

c. Replacement of inboard ribs is to be accomplished in accordance with Service Bulletin No. 206-01-73-7.

14-79. REPAIR – HORIZONTAL STABILIZER.

a. Repairs to the horizontal stabilizer are to be accomplished by use of standard airframe repair procedures and Service Bulletin No. 206-01-73-7. (Refer to figure 14-1 for skin identification.)

b. Replace horizontal stabilizer when repairable damage limits are exceeded. (Refer to paragraph 14-78.)

14-80. VERTICAL FIN.

14-81. DESCRIPTION. The vertical fin is constructed of aluminum honeycomb core and aluminum skin. The leading and trailing edge caps are formed aluminum. The tail skid mount fittings and tail skid bumper are bonded into the base of the fin. (See figure 14-1 and 14-3.)

14-82. NEGLIGIBLE DAMAGE LIMITS – VERTICAL FIN.

a. Leading and trailing edge skins.

(1) Nicks or scratches less than 10 percent of the material thickness and less than 2.0 inches long may be blended out provided they are not accompanied by creasing. Cumulative cleanup is limited to a total reduction in thickness of 10 percent.

(2) Corrosion less than 10 percent of the material thickness after cleanup is acceptable. Cumulative clean-up is limited to a total thickness reduction of 10 percent and 25 percent of the surface area.

(3) Smooth dents that are not gouged and less than 3.0 inches in diameter and 0.030 inches deep are acceptable, providing no material is removed. Dents closer than 1.0 inch (edge to edge) are to be considered as one dent.

b. Damage to the honeycomb core that is classified as negligible is considered typical and damage classification should be determined in accordance with paragraph 14-13.

Note

The fin attachment bolt area and the tail skid attachment area are classified as major structural members when defining areas of allowable repairs. (See figure 14-20.)

14-83. REPAIRABLE DAMAGE LIMITS – VERTICAL FIN.

a. Damage exceeding negligible damage must be repaired. (Refer to paragraph 14-82.)

b. A single crack in the honeycomb panel not exceeding 3.5 inches in length from one insert at the four mounting points may be repaired in accordance with Service Letter No. 206-203. When crack is greater than 3.5 inches, more than one crack is present, or both the inboard and outboard skins are damaged at any of the four attachment inserts the vertical fin shall be replaced.

14-84. REPAIR – VERTICAL FIN. (See figure 14-20.)

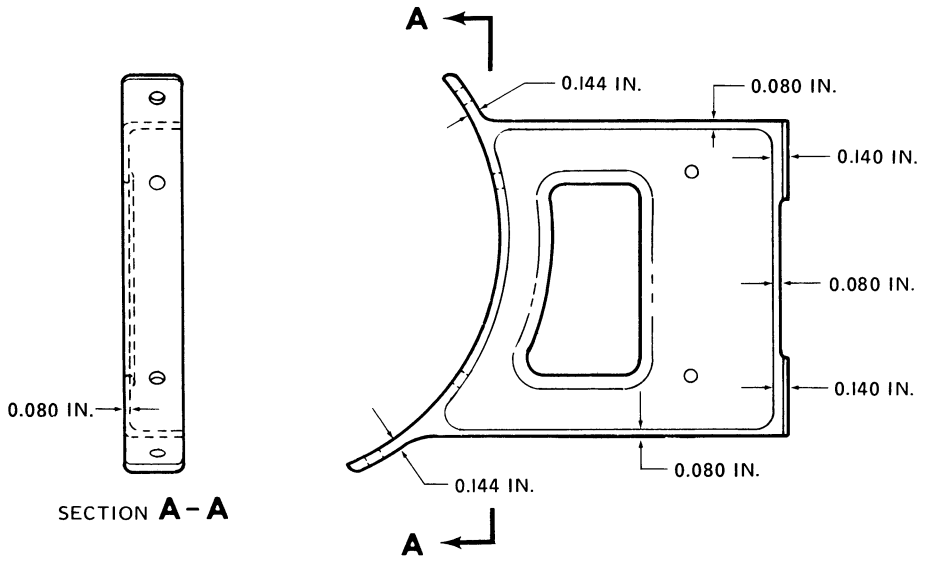
14-85. TAIL ROTOR GEAR BOX FAIRING.

14-86. DESCRIPTION. The tail rotor gear box fairing is constructed of fiberglass on helicopters 4 through 1251. (See figure 14-1.) On helicopters 1252 and subsequent, fairing is constructed of aluminum alloy. (See figure 14-4). Fairing is secured to vertical fin and tail boom by bolts.

14-87. INSPECTION – FAIRING.

a. Inspect fairing for cracks, dents, distortion, and discoloration or crazing of window.

b. Inspect plate nuts for damaged threads and security.



FORWARD VERTICAL FIN SUPPORT 206-031-417

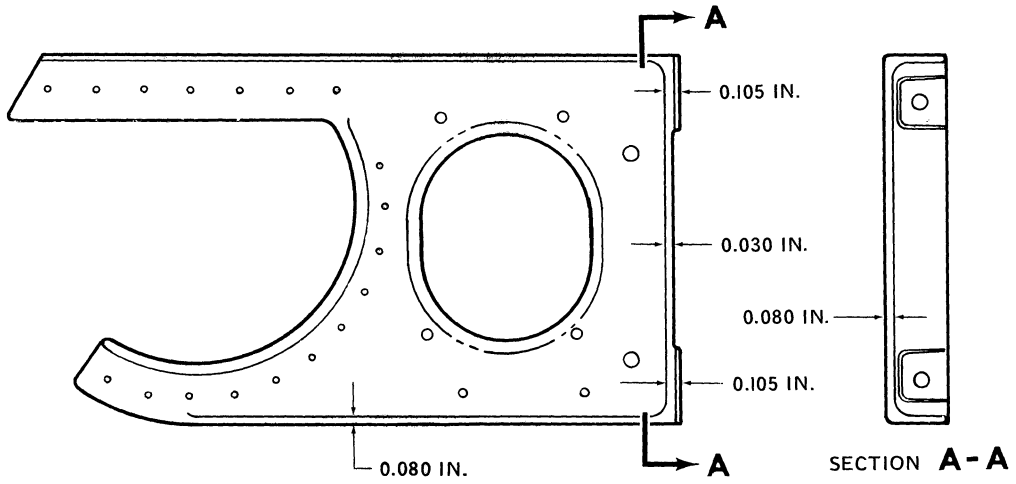
TYPE OF DAMAGE	MAXIMUM DAMAGE AND REPAIR DEPTH
MECHANICAL	Smooth damage exceeding 0.010 inch shall be blended out. Cleanup depth of repairs shall not exceed minimum dimensions shown above.
CORROSION	Repair areas after cleanup shall not exceed minimum dimensions shown above.
MAXIMUM AREA PER FULL DEPTH REPAIR	2.0 Sq. In.
NUMBER OF REPAIRS	Four

NOTES:

1. Blend out repairable damage with No. 400 grit abrasive paper (item 15, table 1-1).
2. Coat all repair areas with alodine (item 6 or 32, table 1-1) and apply zinc chromate primer (item 80, table 1-1).

206031-43

Figure 14-19A. Forward Vertical Fin Support — Damage Limits



AFT VERTICAL FIN SUPPORT 206-031-418

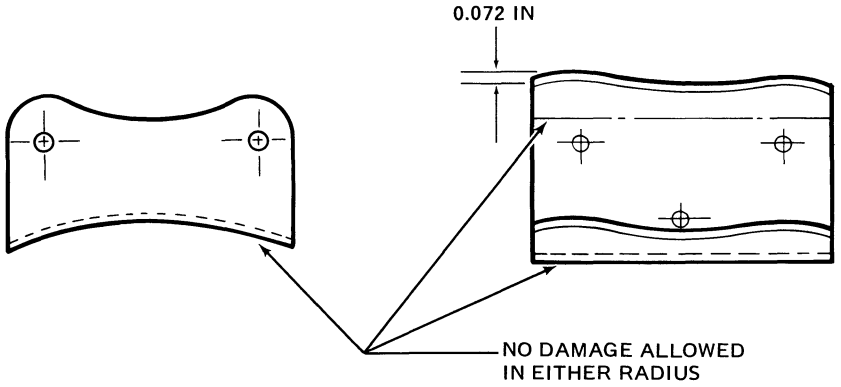
TYPE OF DAMAGE	MAXIMUM DAMAGE AND REPAIR DEPTH
MECHANICAL	Smooth damage exceeding 0.010 inch shall be blended out. Cleanup depth of repairs shall not exceed minimum dimension shown above.
CORROSION	Repair areas after cleanup shall not exceed minimum dimensions shown above.
MAXIMUM AREA PER FULL DEPTH REPAIR	2.0 Sq. In.
NUMBER OF REPAIRS	Four

NOTES:

1. Blend out repairable damage with No. 400 grit abrasive paper (item 15, table 1-1).
2. Coat all repair areas with alodine (item 6 or 32, table 1-1) and apply zinc chromate primer (item 80, table 1-1).

206031-42

Figure 14-19B. Aft Vertical Fin Support – Damage Limits



TAIL ROTOR DRIVE SHAFT BEARING SUPPORT BRACKETS (206-030-433)

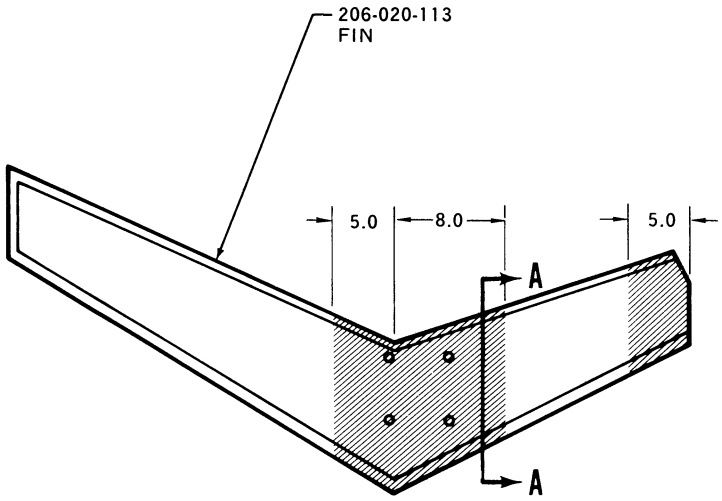
TYPE OF DAMAGE	MAXIMUM DAMAGE AND REPAIR DEPTH
MECHANICAL	Smooth damage not exceeding 10 percent shall be blended out. Cleanup depth of repairs shall not exceed minimum dimension shown above.
CORROSION	Repair areas after cleanup shall not exceed minimum dimensions shown above.
MAXIMUM AREA PER FULL DEPTH REPAIR	2.0 Sq. In.
NUMBER OF REPAIRS	Four

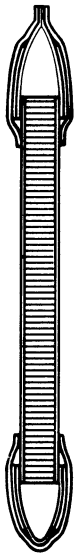
NOTES:

1. Blend out repairable damage with No. 400 grit abrasive paper (item 15, table 1-1).
2. Coat all repair areas with alodine (item 6 or 32, table 1-1) and apply zink chromate primer (item 80, table 1-1).

206030-86

Figure 14-19C. Tail Rotor Drive Shaft Bearing Support Bracket – Damage Limits





SECTION A-A

GENERAL CONSTRUCTION (HELICOPTERS PRIOR TO 1252).
SKINS 0.040 CHEM MILL TO 0.010
CORE 1.25 INCH THICK ALUMINUM HONEYCOMB CENTER SECTION
1.25 INCH THICK ALUMINUM HONEYCOMB UPPER & LOWER SECTION
LEADING EDGE 0.012 24T3
TRAILING EDGE 0.016 24T3 LOWER & 0.012 24T3 UPPER

GENERAL CONSTRUCTION (HELICOPTERS 1252 AND SUBSEQUENT. SEE FIGURE 14-3 .

ALLOWABLE REPAIR:
STANDARD REPAIRS EXCEPT;
(a) REPAIR HATCHED AREAS ONLY WITH ENGR APPROVAL
(b) TRAILING & LEADING EDGES REPAIRED WITH STANDARD SHEET METAL PATCHES

206020-6A

Figure 14-20. Vertical Fin Repairs

14-88. REPAIR – FAIRING.

a. Repair cracks and replace plate nuts in fairing in accordance with accepted sheet metal practices. For skin identification, see figure 14-1 and 14-4.

b. Replace acrylic plastic window if cracked or if discoloration and crazing obstructs vision.

14-89. LANDING GEAR.

WARNING

No components shall be attached to landing gear assembly except as designated by manufacturer. To do otherwise may lead to premature failure of crosstube.

14-90. DESCRIPTION. The landing gear assembly consists of two tubular aluminum alloy main skid tube assemblies and two curved aluminum alloy cross tube assemblies. The landing gear is attached to the fuselage structure with four strap assemblies. Each skid tube is provided with replaceable skid shoes. The skid shoes absorb the wear caused by normal ground contact of the helicopter. (See figures 14-21 through 14-24.)

14-91. NEGLIGIBLE DAMAGE LIMITS – LANDING GEAR.

a. Landing gear skid tubes. (See figure 14-21.)

(1) Circumferential scratches and nicks in the skid tubes not to exceed a depth of 0.015 inch and an arc length of 90°.

(2) Scratches, scuffs and nicks running longitudinally in the skid tube may be of any length but not to exceed a depth of 0.015 inch.

(3) Smooth dents in the skid tubes which do not exceed 0.025 inch in depth and 1.0 inch in diameter.

(4) Corrosion damage not exceeding 0.015 inch deep over an area not exceeding 1/4 the circumference by 3 inches in length after clean-up.

Note

When removing corrosion be sure to check pockets and hidden areas for indications.

(5) Scratches, dents and nicks of any depth and length aft of the aft cross tube saddle.

(6) Scratches, dents and nicks of any depth and length in the curved portion only of the tube forward of the forward cross tube saddle.

b. Landing gear cross tubes. (See figure 14-22.) Scratches, nicks and dents of less than 0.005 inch depth are considered negligible.

14-92. REPAIRABLE DAMAGE LIMITS – LANDING GEAR.

a. Landing gear skid tubes. (See figure 14-21.)

(1) Scratches, scuffs and nicks exceeding 0.015 inch deep may be repaired by patching.

(2) Smooth or sharp dents exceeding 1.0 inch diameter and/or 0.025 inch depth but not to exceed 2.0 inches in diameter may be repaired by patching.

(3) Holes in the skid tubes up to a diameter of 2.0 inches through one surface of the tube only may be repaired by patching.

(4) Scratches, dents and holes in excess of the 2.0 inch limit may be repaired by splicing in a new section of tubing.

b. Landing gear cross tubes. (See figure 14-22.)

(1) Circumferential scratches and nicks that exceed 0.005 inch depth and not exceeding a 45 degree arc may be polished out to the limits shown in figure 14-22.

(2) Longitudinal scratches and nicks of any length that exceed 0.005 inch depth may be polished out to the limits shown in figure 14-22.

14-93. REPAIR – NEGLIGIBLE DAMAGE – LANDING GEAR.

a. Negligible damage to landing gear components may be polished out with Scotchbrite pads (item 9, table 1-1) or No. 400 grit abrasive paper (item 15, table 1-1). (Refer to paragraph 14-91 .) Touch up paint as prescribed in Section I, table 1-3.

b. Clean and treat corroded area on landing gear with chemical film treatment. (Refer to Section I.)

c. Refinish repaired areas to match existing paint finish.

14-94. REPLACEMENT – LANDING GEAR SKID TUBE.

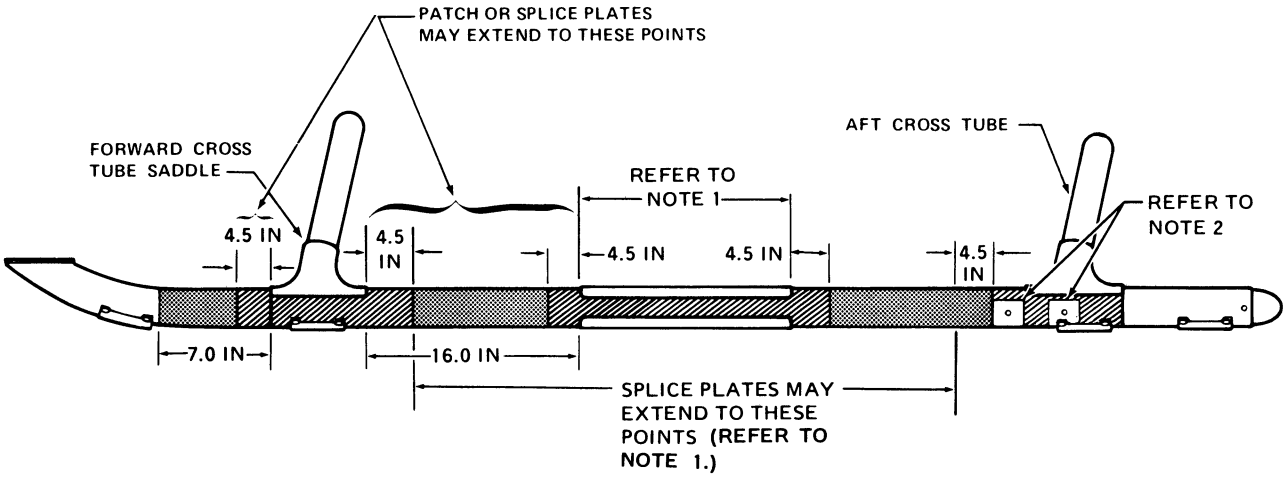
a. Damage to the skid tube in excess of the repairable damage limits necessitates replacement. (Refer to paragraph 14-92.)

b. Damage to the skid tube within 4.5 inches of the crosstube saddles and in excess of the negligible damage limits necessitates replacement. (Refer to paragraph 14-92.)

c. If cross tube deflection exceeds the maximum measurements described in Section VIII, replace defective cross tube.

14-95. PATCH REPAIR – LANDING GEAR SKID TUBE.

a. Lift helicopter and remove skid tube. (Refer to Sections I and VIII.)



NOTE 1: **No patches allowed under doublers on 206-050-107 skid tube. Damage in this area exceeding negligible limits requires repair by splicing entire doubler length using the required length of skid tube and doublers which are undamaged.**

NOTE 2: **Doublers installed on 206-050-118 skid tube only.**

REPAIRS BY PATCHING OR INSERTION NOT PERMITTED

REPAIRS BY PATCHING OR INSERTION PERMITTED

REPAIR NOT REQUIRED IN THIS AREA — HOLES SHOULD BE PLUGGED TO PREVENT MOISTURE ENTRAPMENT.

206050-10A

Figure 14-21. Skid Tube Repairs

b. Polish out scratches, trim and smooth hole.

c. Fabricate a patch from 0.090 inch aluminum alloy sheet (7075-T6, WW-T-700/7), or the same gage and material as the damaged skid tube, of required size.

d. Lay out rivet hole pattern and form patch to fit contour of skid tube.

e. Secure clamp patch in place on skid tube and drill 0.205 to 0.209 inch diameter rivet hole.

f. Remove patch and deburr as necessary.

g. Remove paint and dirt from damaged area and both sides of patch.

h. Apply a coat of zinc chromate primer (item 80, table 1-1) to both sides of patch. Allow primer to dry. Coat side of patch which will mate to skid tube with sealant (item 7, table 1-1).

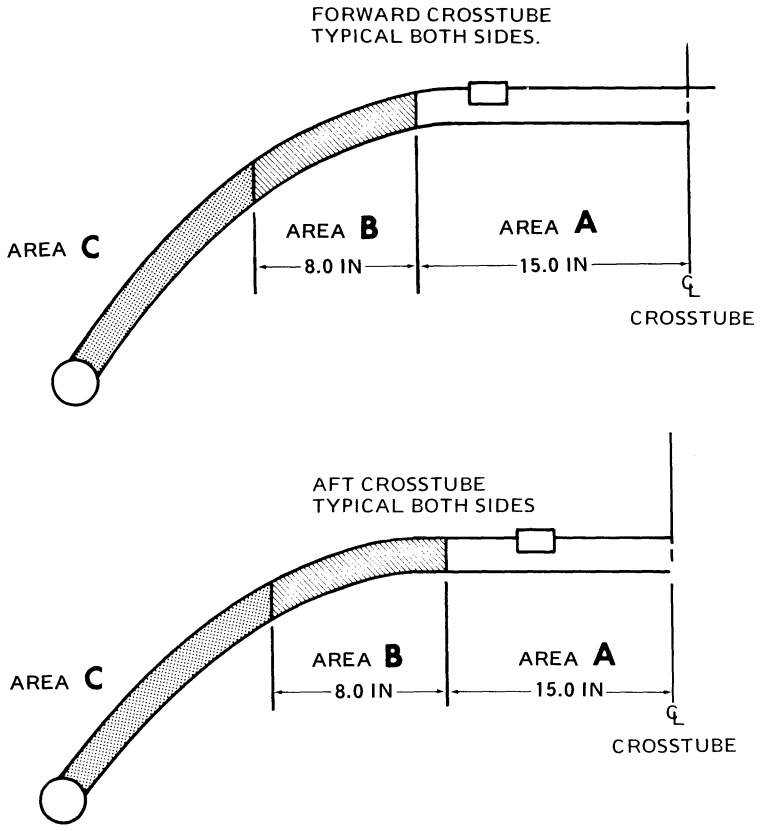
i. Position patch and use (CR 2249-6-3) rivets to rivet in place.

j. Apply a coat of epoxy polyamide primer (item 56, table 1-1) over repaired area. When dry apply two or three coats of acrylic lacquer or polyurethane topcoat (item 5, 45 or 76, table 1-1) of color to match original finish. (Refer to Sections I, table 1-3.)

k. Install skid tubes and lower helicopter. (Refer to Section VIII and I.)

14-96. INSERT REPAIR – LANDING GEAR SKID TUBE. Dents and holes on either top or bottom side of skid tube, which are greater than 2.0 inches across in any direction may be repaired by inserting a splice of new tubing. (See figure 14-21 and 14-23.)

a. Lift helicopter and remove skid tube. (Refer to Sections I and VIII.)



MAXIMUM DAMAGE AND REPAIR DEPTH

TYPE OF DAMAGE		AREA A	AREA B	AREA C
		206-050-118 CROSS TUBE LIMITS		
NICKS AND SCRATCHES	(Fwd and Aft Tube)	0.014	0.012	0.008
		206-050-107 HIGH GEAR AND 206-050-144 POP-OUT FLOAT GEAR CROSS TUBE LIMITS		
NICKS AND SCRATCHES	(Fwd Tube)	0.018	0.016	0.009
	(Aft Tube)	0.035	0.031	0.016

206050-8

Figure 14-22. Landing Gear Crosstube Inspection Limits

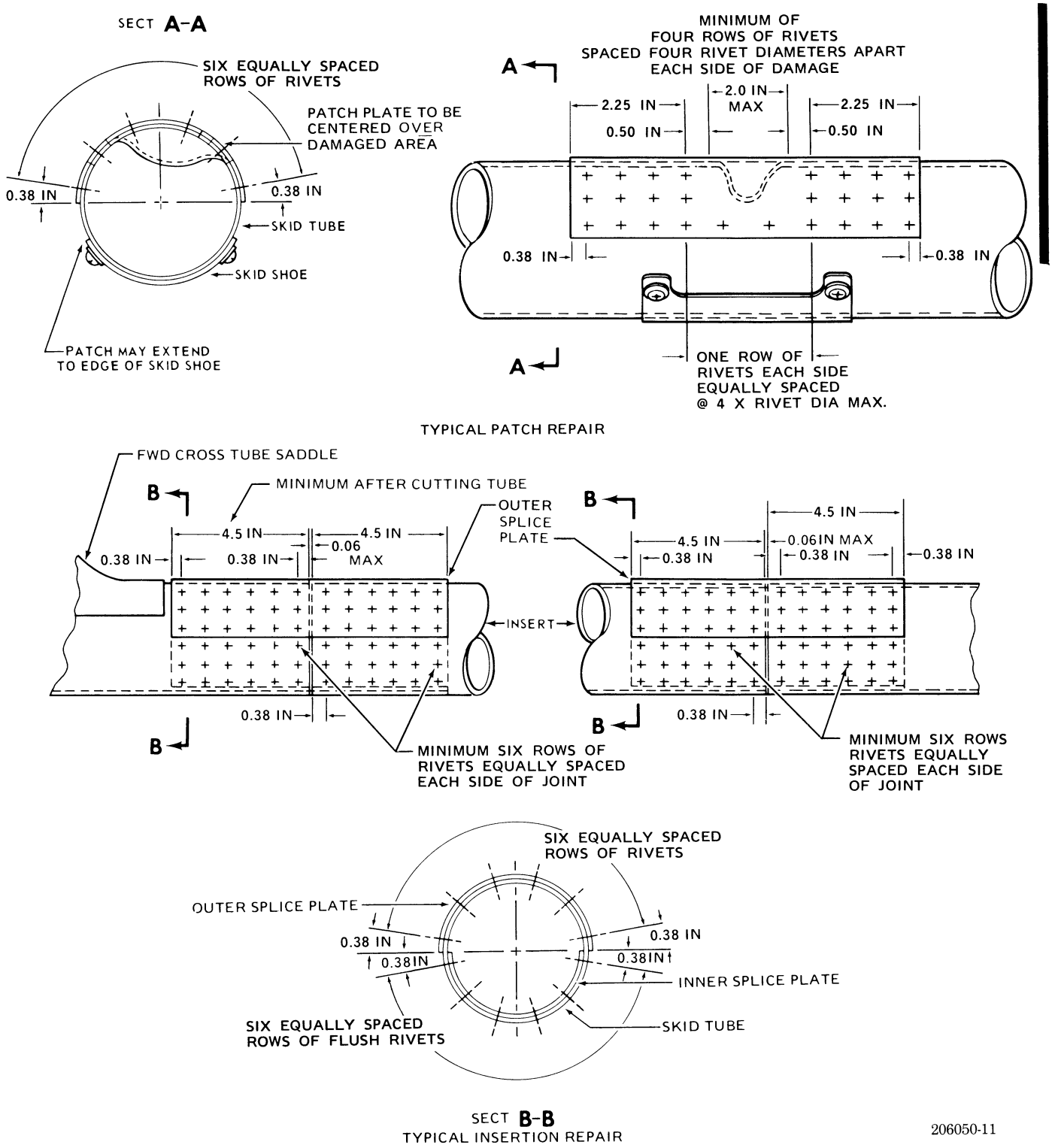


Figure 14-23. Landing Gear Skid Tube Repair

b. Cut out damaged portion of skid tube and deburr.

c. Procure insert tube of same outside diameter and thickness as the original 7075-T6 aluminum alloy tube, Specification WW-T-700/7, or equivalent. Use cut out portion of damaged tube, or measure before making cut out, to make certain that insert tube is of exactly same length as cut out portion.

d. Procure four splice plates of same material and gauge, or one gage heavier, than tube being repaired, two plates to fit the inside diameter, and two plates to fit the outside diameter of the tube being repaired. Plates must be long enough to accommodate rivet patterns shown on figure 14-23.

Note

When drilling rivet hole patterns in lower portion of skid tube repair, consideration must be given to location of skid shoe attachment holes.

e. Layout inner splice plate rivet pattern on forward and aft portions of tube being repaired.

f. Position inner splice plates in skid tube portions and temporarily secure in place. (See figure 14-23 for positioning.)

g. Drill rivet holes and countersink for 100 degree flush rivets. Deburr.

h. Reposition inner splice plates and secure using metal fasteners.

i. Position insert tube over inner splice plates and flush with both forward and aft portions of skid tube being repaired.

j. Continue rivet hole pattern previously drilled. (See figure 14-23.) Countersink for 100 degree flush rivets. Deburr.

k. Clean all paint and dirt from insert tube, both sides of splice plates and areas of both skid tube portions which will be contacted by splice plates.

l. Apply a coat of zinc chromate primer (item 80, table 1-1) to inside and outside of insert tube, both sides of inner splice plates and inner surfaces of both skid tube portions which will be contacted by inner splice plates. Allow primer to dry.

m. Apply a coat of sealant (item 7, table 1-1) to surfaces of inner splice plates which will contact insert tube and forward and aft portions of skid tube being repaired.

n. When positioning insert tube, ends must be flush fit with forward and aft portions of skid tube being repaired.

o. Position inner splice plates and insert tube and rivet in place, using (CR2248-6-3) rivets.

p. Position outer splice plates over insert tube and forward and aft portions of skid tube being repaired, as shown in figure 14-23.

q. Drill rivet hole pattern as shown in figure 14-23. Deburr.

r. Clean all paint and dirt from insert tube, both sides of splice plates and areas of both skid tube portions which will be contacted by splice plates.

s. Apply a coat of zinc chromate primer (item 80, table 1-1) to cleaned areas and allow to dry.

t. Apply a coat of sealant (item 7, table 1-1) to surface of outer splice plates which will contact insert tube and forward and aft portions of skid tube being repaired.

u. Position outer splice plates and rivet in place, using (CR2249-6-3) rivets.

v. Apply a coat of epoxy polyamide primer coating (item 56, table 1-1) over entire repaired area. When dry apply two or three coats of acrylic lacquer or polyurethane topcoat (item 5, 45 or 76, table 1-1) of color to match original finish.

w. Install skid shoes to tube and tube to landing gear. Refer to Section VIII.)

14-97. REPAIR – SKID SHOES. Landing gear skid tube shoes may be repaired by hot reforming, reshaping, or welding. (See figure 14-24.)

a. Remove skid shoes and check riv-nuts for damage. Replace loose or damaged riv-nuts using BN360-1032-2 nut assemblies.

b. Dents in attaching skid shoe tabs may be hot reformed or reshaped provided the borium weld beads on bottom of shoe are not damaged.

CAUTION

Prior to any welding repair remove the skid shoe from skid tube to avoid damage to the aluminum skid tube from excessive heat.

c. Check bottom of skid shoes for evidence of weld bead, if worn off, bead may be reformed. Do

not use skid shoes that have the weld beads completely worn off. (See figure 14-24, view A.)

Note

Transverse cracks across weld beads are permissible and should not be cause for repair or replacement of skid shoes.

(1) Remove cadmium plating from skid shoes in accordance with step d.

(2) Weld two full length beads 0.06 to 0.10 inch high along skid shoe using acetylene and 0.125 inch hard facing weld tube (borium) available from Stoody Manufacturing Company, 12021 E. Slauson Ave., Whittier, California 90608, or DT 600 HM 0.125 inch hard facing weld tube available from Reed Tool Co., 6501 Navigation Blvd., Houston, Texas 77011. (See figure 14-24, view A.)

(3) Hot reform skid shoe, as required, to fit contour of skid tube.

(4) Apply a coat of epoxy polyamide primer (item 56) to skid shoe. When dry apply two or three coats of acrylic lacquer (item 94) to match original finish.

d. Remove cadmium plating from skid shoes prior to welding repair as follows:

Note

Cadmium plated stripped parts are very susceptible to corrosion and shall immediately be repaired and primed.

(1) Mix a solution of 16 ounces of ammonium nitrate per gallon of water.

(2) Maintain solution at a temperature of 120°F (49°C). Immerse skid shoes into solution until all cadmium plating has been removed. Rinse shoes in clean water and air dry.

(3) After repair and cleanup of weld deposits, apply brush cadmium plating (item 58), or two coats of epoxy polyamide primer (item 56). When dry, apply two or three coats of acrylic lacquer (item 94) to match original finish.

e. Elongated holes in tabs on skid shoes may be repaired by fabricating a doubler or new tab as follows:

(1) Fabricate a rectangular doubler of required size from 0.050 inch normalized 4130 steel, MIL-S-18729, as shown in figure 14-24.

(2) Remove cadmium plating from skid shoes in accordance with step d.

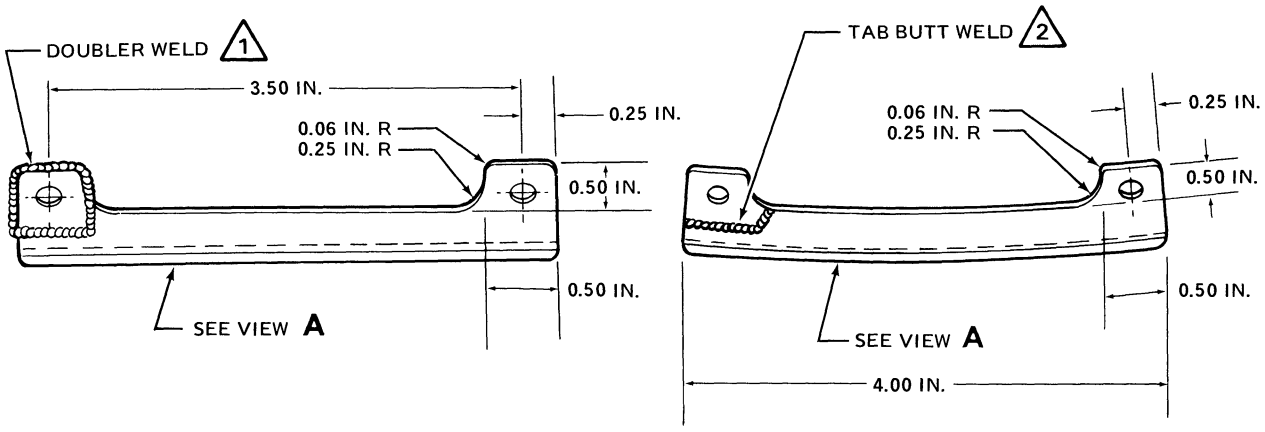
(3) Secure doubler to skid shoe tab by welding (arc or gas method), in accordance with accepted welding practices, around entire periphery of doubler. Grind weld smooth on side adjacent to skid tube and location for retaining screw head. (See figure 14-24., aft shoe.)

f. Severely damaged skid shoe tabs may be replaced or repaired by fabricating a new tab.

(1) Cut off damaged tab parallel to skid tube, or, if damaged tab can be straightened, reshape to original configuration.

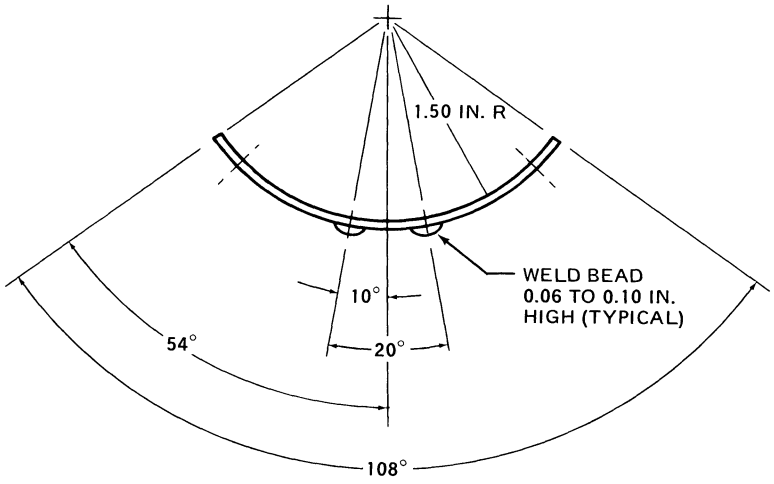
(2) Remove cadmium plating from skid shoes in accordance with step d.

(3) If damaged tab has been cut from skid shoe, fabricate a similar tab from 0.05 inch normalized 4130 steel, MIL-S-18729. Butt weld tab along cut line of skid shoe. Grind weld smooth on side of shoe adjacent to skid tube and location for retaining screw head. (See figure 14-24.)



206-050-128 AFT SHOE

206-050-129 FORWARD SHOE



VIEW A

NOTES:

1. Fabricate doubler of normalized 4130 steel, MIL-S-18729, 0.063 inch thickness and of same configuration as damaged tab. Grind weld smooth on side adjacent to skid tube and under retaining screwhead.

2. Fabricate tab of normalized 4130 steel, MIL-S-18729, and of same configuration as removed tab. Grind weld smooth on side adjacent to skid tube and under retaining screwhead.

L206050-3

Figure 14-24. Landing Gear Skid Shoe Repair

(4) If damaged tab has been reshaped to original configuration, fabricate a doubler and weld in accordance with step e.

14-98. REFINISHING – SKID PANEL ASSEMBLY. After completing bonding repairs, the skid panel assembly shall receive the following finish:

a. Apply a brush solution of alodine or chemical film treatment (item 6 or 32, table 1-1) to all interior and exterior surfaces.

Note

The brush solution shall contain 3 ounces by weight of chemical film material (item 6 or 32, table 1-1) per gallon of distilled or demineralized water and 0.5 ounces of nitric acid. Mix solution thoroughly prior to application. Apply the solution liberally to areas to be treated. Keep the area wet with the solution for 1 to 3 minutes, then flush area thoroughly with clean water.

b. Apply one coat of Super Koropon primer (item 4, table 1-1) to all chemically treated surfaces as follows:

(1) Surface Preparation — Clean surfaces to be primed with a safety solvent (item 84, table 1-1) and wipe with a tack rag (item 67, table 1-1).

(2) Primer Preparation – Shake or stir the pigmented resin component until uniform. Add one volume of the activator thinner component to one volume of the pigmented resin component and mix thoroughly. Use only components from the same two part kit. Strain through a paint strainer after mixing.

Note

Catalyzed primer shall be discarded if not used within four hours after mixing.

(3) Application Procedures. Apply one coat of mixed primer to provide a dry film thickness 0.0005 to 0.0008 (0.5 to 0.8 mil). The primer shall be over coated in not less than 30 minutes and not more than 4 hours. When required, primed surfaces shall be wiped with a tack rag (item 67, table 1-1) prior to overcoating to remove lint and dust.

c. Apply unreduced EC2216 adhesive (item 10, table 1-1) mixed with Super Koropon primer (item 4, table 1-1) but not thinned with methyl-ethyl-ketone, to fill pin holes, grooves, seams or other imperfections. Smooth out excess with plastic squeegee or equivalent.

d. Apply three wet spray coats of EC2216 (item 10, table 1-1) to all epoxy primed and squeegeed surfaces as follows:

Note

Small areas, not exceeding 10 square inches, may be brush coated with unthinned EC-2216 adhesive. The unthinned adhesive shall be air dried for at least 8 hours before overcoating. Large areas shall be coated in accordance with the following procedures.

(1) Adhesive Preparation – Mix the two part adhesive thoroughly to a uniform gray color. The mixing ratio is 100 parts-base to 140 parts-hardener by weight.

CAUTION

The pot life of the mixed adhesive is approximately 2 hours at 75°F (24°C) in a mass of 100 grams. A larger mass and/or higher temperature will decrease the pot life. The adhesive must be thinned within 30 minutes after mixing.

(2) Thinning — The mixed EC2216 adhesive shall be thinned for spraying by adding 6.5 to 7.5 percent (by weight) of Super Koropon primer (item 4, table 1-1) and mixing thoroughly. Thin to a sprayable consistency with Super Koropon curing solution (item 4, table 1-1). A minimum of 25 percent by weight shall be used and approximately 35 percent by weight will produce a sprayable consistency. Add small amounts of the curing solution with constant stirring.

Note

The pot life of the thinned EC2216 adhesive is approximately 3 hours.

(3) Application Procedures – The thinned EC 2216 shall be applied by spraying and shall be used in conjunction with epoxy primer as follows:

Note

The EC2216 adhesive coating shall be applied over epoxy primer (subparagraph b) a minimum of 30 minutes after application or not more than 4 hours.

a. Areas not to be coated with EC 2216 adhesive may be masked as necessary. Use masking tape (item 75, table 1-1) and paper (item 98, table 1-1).

b. Apply three full wet coats of EC 2216 adhesive. Air dry the adhesive for a minimum of 30 minutes between coats.

NOTE

The EC 2216 adhesive does not become tack free in 30 minutes air dry time.

(4) Curing — Air dry for a minimum of 30 minutes, then cure for a minimum of 30 minutes and not more than 2 hours at 160°F ± 10°F (71°C ±6°C). Allow heat cured parts to cool to room temperature (100°F (37.8°C) maximum) prior to overcoating. As an alternate cure air dry for 16 to 24 hours at room temperature.

(5) Overcoating — Apply a mist coat (0.2 to 0.3 mil) of Super Koropon primer (item 4, table 1-1) to the EC 2216 adhesive coating and adjacent areas.

e. Apply final finish to match existing finish specification. (Refer to Section I .)