DMWR 55-1560-198

DEPOT MAINTENANCE WORK REQUIREMENT

FOR

MAIN ROTOR BLADES

PART NUMBER	NATIONAL STOCK NUMBER
204-011-001-15	1615-00-756-9140
204-011-250-5	1615-00-072-5799
204-011-250-113	1615-01-092-1256

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US ARMY AVIATION AND MISSILE COMMAND
30 June 1987

WARNING PAGE

WARNING

Personnel performing operations, procedures, and practices which are included or implied in this Depot Maintenance Work Requirement shall observe the following instructions. Disregard of these warnings and precautionary information can cause serious injury or death.

TOXIC CHEMICALS

Solvent and Cleaning Solutions. These materials are generally toxic and many (toluene, benzene, xylene, methyl-ethyl-ketone, perchlorethylene, naphtha, trichloroethylene) are highly flammable. Work in a well-ventilated area away from open flames. Avoid inhaling fumes and prolonged contact with skin. Wear protective clothing and goggles. Wash thoroughly after using. Solvent flash point must not be less than 100 degrees F.

Epoxy, Resins, Cements, and Adhesives. These materials may contain toxic or irritating substance. They may also be flammable. Work in a well-ventilated area away from open flames. Avoid inhaling fumes and prolonged contact with skin. Wash thoroughly after using.

Paint, Varnishes, Dopes, Thinners, Lubricants, and Fuels. These materials are generally highly flammable and may be irritants. Work in a well-ventilated area away from open flames. Avoid inhaling fumes and prolonged contact with the skin. Wash thoroughly after using.

ACIDS AND ALKALINES

Do not add water to acids. A violent action will result. ACIDS should be added to WATER in SMALL quantities. Rust stripper is an alkaline solution. Avoid contact with skin. Wear protective clothing. Wash thoroughly after using.

COMPRESSED AIR

Do not use more than 30 psi compressed air for cleaning purposes. Wear protective goggles. Debris trajected under pressure can cause injury to eyes. Compressed air shall not be used for cleaning purposes except where reduced to less than 30 psi and only then with an effective chip guarding and personnel protection equipment.

CHANGE

NO. 8

US Army Aviation and Missile Command
Redstone Arsenal, AL 30 July 2002

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for

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REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

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ENVIRONMENTAL/HAZARDOUS MATERIAL INFORMATION

This document has been reviewed for the presence of Class I Ozone Depleting Chemicals. As of Change 7 dated 10 August 1998, all references to Class I Ozone Depleting Chemicals have been removed from this document by substitution with chemicals that do not cause atmospheric ozone depletion.

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Remove pages	Insert pages
A and B	A and B
i and ii	i and ii
1-1 and 1-2	1-1 and 1-2
3-51 thru 3-54	3-51 thru 3-54
3-67 and 3-68	3-67 and 3-68
3-73 thru 3-75/(3-76 blank)	3-73 thru 3-75(3-76 blank)
4-1 thru 4-4	4-1 thru 4-4

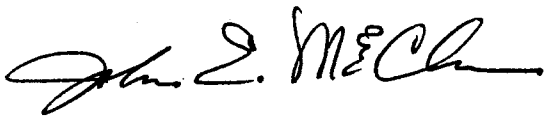
Remove pages	Insert pages
5-1 and 5-2	5-1 and 5-2
6-1/(6-2 blank)	6-1/(6-2 blank)
A-1 and A-2	A-1 and A-2
C-3 thru C-5/(C-6 blank)	C-3 thru C-5/(C-6 blank)
Cover	Cover

2. Retain this sheet in front of manual for reference purposes.

FOR THE COMMANDER:

EDWARD L. STONE
Colonel, OD
Chief of Staff

OFFICIAL:



JOHN E. MCCLURE
Director
Maintenance Directorate
Integrated Materiel Management Center

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Dates of issue for original and changed pages are:

Original - 30 June 1987
Change 1 - 15 July 1988
Change 2 - 31 Jan 1989
Change 3 - 15 October 1989
Change 4 - 15 May 1990
Change 5 - 28 February 1992
Change 6 - 1 March 1993
Change 7 - 10 August 1998
Change 8 - 30 July 2002

Page No.	*Change No.
Cover	8
Blank	0
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b blank	0
A	8
B blank	8
i and ii	8
iii	6
iv blank	0
1-1 and 1-2	8
1-3 thru 1-5	0
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C-2	7
C-3 thru C-5	8

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DEPOT MAINTENANCE
WORK REQUIREMENT
NO. 55-1560-198

US ARMY AVIATION AND MISSILE COMMAND
REDSTONE ARSENAL, AL 35898-5000
30 June 1987

DEPOT MAINTENANCE WORK REQUIREMENT FOR MAIN ROTOR BLADES

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CHAPTER 1
INTRODUCTION

Section I. GENERAL

1-1. Scope.

WARNING

Repairs performed in accordance with this Work Requirement do not return the blade fatigue life time to zero.

a. These instructions are for use by depot/contractor personnel. They apply to main rotor blades, part numbers 204-011-001-15, 204-011-250-5, and 204-011-250-113 and, in case of conflict, take precedence over all other documents pertinent to their overhaul and inspection. Throughout this manual in text, figures, and tables, 204-011-001-15 blades may be identified as Code A blades or 204-011-250-5 and -113 blades may be identified as Code B blades instead of referencing their part number.

b. This Work Requirement establishes the requirements for disassembly, cleaning, inspection, repair, reconditioning, rehabilitation, modification, reassembly, servicing, testing, and storage of specified equipment.

c. Parts, components, subassemblies, or assemblies found worn or defective beyond the repairable limits established by this Work Requirement will be condemned and disposed of as directed in supply provisions of the contract.

d. The repair, rehabilitation and/or reconditioning of equipment and their components specified herein shall be accomplished in accordance with specific instructions set forth in this Work Requirement. Tolerances and limits set forth herein are the minimum acceptable standards; however, the repair procedures are not mandatory if the contractor is able to develop satisfactory procedures for repair. Any repair procedures developed by the contractor shall be subject to approval by the Contracting Officer or designated representative.

e. This Work Requirement requires repair and renovation of parts to the dimensional and tolerance specifications noted.

1-2. Maintenance Forms and Records. Department of the Army forms and procedures used for equipment maintenance shall be those prescribed by DA PAM 738-751.

1-3. Reporting Equipment Improvement Recommendations (EIR). EIR will be prepared using Standard Form 368, Quality Deficiency Report. Instructions for preparing EIRs are provided in DA PAM 738-751, The Army Maintenance Management System Aviation (TAMMS-A). EIRs should be mailed directly to Commander U.S. Army Aviation and Missile Command, ATTN: AMSAM-MMC-MA–NM Redstone Arsenal Al, 35898. A reply will be furnished directly to you.

1-3.1 Engineering Change Proposals. Engineering change proposals (ECP) will be submitted using DD Form 1693 (Engineering Change Proposal) (Short Form). (See MIL-STD-973 for instructions.) Completed forms should be mailed direct to Commander U.S. Army Aviation and Missile Command, ATTN: AMSAM-RD-SE-TD-CM Redstone Arsenal AL, 35898. A reply will be furnished to you.

1-4. Deviations and Exceptions.

a. Contractors.

(1) These instructions are for use by contractor personnel. They apply to requests for work deviations and exceptions and take precedence over similar procedures specified in the applications Depot Maintenance Work Requirement (DMWR). Care must be taken to assure that all active AMCOM Engineering Directives (AEDs) relevant to the DMWR have been considered

(2) When any work segment as set forth in this Depot Maintenance Work Requirement (DMWR) cannot be accomplished or can be accomplished only in a manner other than specified, the contractor shall submit a Request for Depot Engineering Support (AMSAT-I-M Form 1379, located in the back of this manual), through the Contracting Officer to AMSAM-MMC-VS-EC with a copy to AMSAM-MMC-BM-D. The request shall state the problems, the reason for urgency, and give the specifics listed below

(a) Serial Number (SN), if applicable, Part Number (PN), and National Stock Number (NSN) of the affected equipment.

(b) Work elements which will not be completed or which will not be accomplished as specified herein.

(c) Reason for non-accomplishment or deviation.

(d) Action taken to correct the condition causing non-accomplishment or need for deviation.

(e) Data relative to non-availability of parts required, if applicable.

(f) Estimated man-hours.

(g) Instructions and inspection required to maintain the integrity of the end item because of such omission or deviation.

(h) For Reporting of Errors submittal, refer to Table of Contents of this publication. Provide a copy of the DA Form 2028-2, located in the back of this manual to AMSAM-MMC-MA–NP.

b. **Depot.** Defects shall be processed in accordance with DESCOM-R 702-1.

Section II. DESCRIPTION, DATA PLATES, AND TABULATED DATA

1-5. Description. The main rotor blade (figure 1-1) is an all metal bonded assembly consisting of three structural members: an aluminum spar, spar doublers, and a trailing edge strip. Skins, stabilized by honeycomb core, are bonded to the major section by adhesive applied under heat and pressure. Reinforcing doublers, grip plates, and drag plates are bonded to the blade butt end. Metal abrasion strips cover the leading edge for resistance to abrasion. An adjustable trim tab is installed on blade.

1-6. Data Plates.

CAUTION

Stamping directly on surface of an installed data plate is prohibited.

a. Equipment Data Plate. Equipment identification plate 100-028-1 (figure 1-2) shall be located as shown and stamped with permanent and legible lettering. Lettering shall be standard Gothic type and applied before plate is bonded to the main rotor blade assembly. Bond data plate in accordance with paragraph 1-6c. Stamped data shall include assembly part number, blade serial number, and weight.

b. Modification Data Plate. Modification data plate MS27253-2 or locally manufactured replacement data plate (figure 1-3) shall be located as shown (figure 1-2).

(1) When sufficient space is not available on the existing data plate to add information, the plate shall be replaced and all pertinent data transferred to the new plate. Data shall not be stamped directly on any part, assembly, or item of equipment.

(a) Vibro-etching may be used in lieu of stamping.

(b) Replacement data plate may be locally manufactured per figure 1-3.

(2) Stamped data shall include:

(a) Initials of facility performing overhaul or modification.

(b) Contract number.

(c) Part number and total operating time (if applicable).

(d) Date of overhaul or modification.

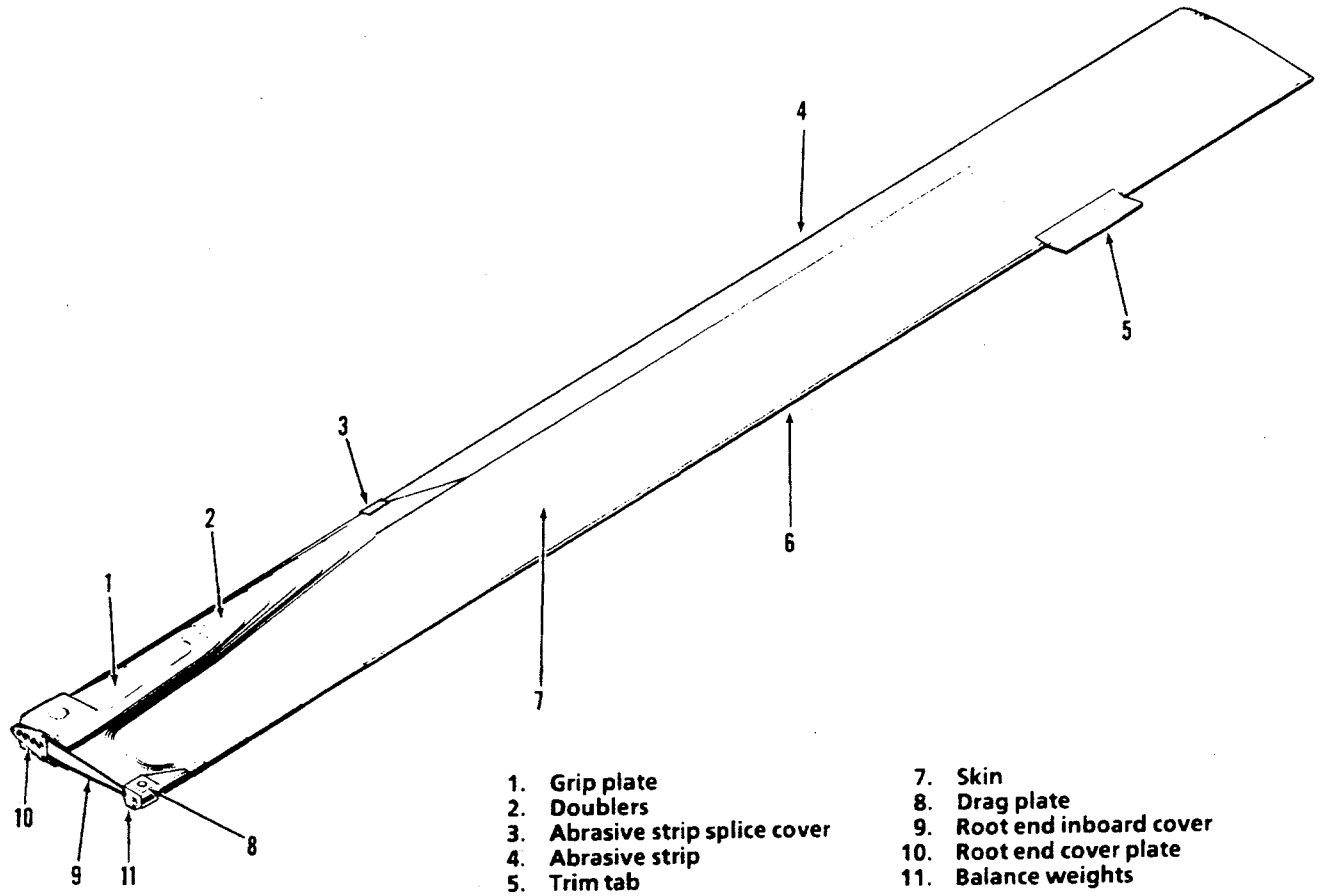
(3) Bond data plate to blade in accordance with paragraph 1-6c.

c. Application Procedure.

WARNING

Cleaning solvents are flammable and toxic. Use only in well-ventilated area. Avoid skin contact and inhalation of vapors. Protect eyes with safety goggles.

(1) Sand bonding area of parts with 120-180 grit abrasive paper (item 36, Appendix C) until 100 percent abraded.



1. Grip plate
2. Doublers
3. Abrasive strip splice cover
4. Abrasive strip
5. Trim tab
6. Trailing edge strip
7. Skin
8. Drag plate
9. Root end inboard cover
10. Root end cover plate
11. Balance weights

Figure 1-1. Main Rotor Blade

(2) Clean sanded area of parts with safety solvent (item 65, Appendix C) and clean cloth (item 59, Appendix C).

(3) Mix adhesive (item 35, Appendix C). Apply adhesive within 30 minutes to both faying surfaces and join parts.

WARNING

Cleaning solvents are flammable and toxic. Use only in well-ventilated area. Avoid skin contact and inhalation of vapors. Protect eyes with safety goggles.

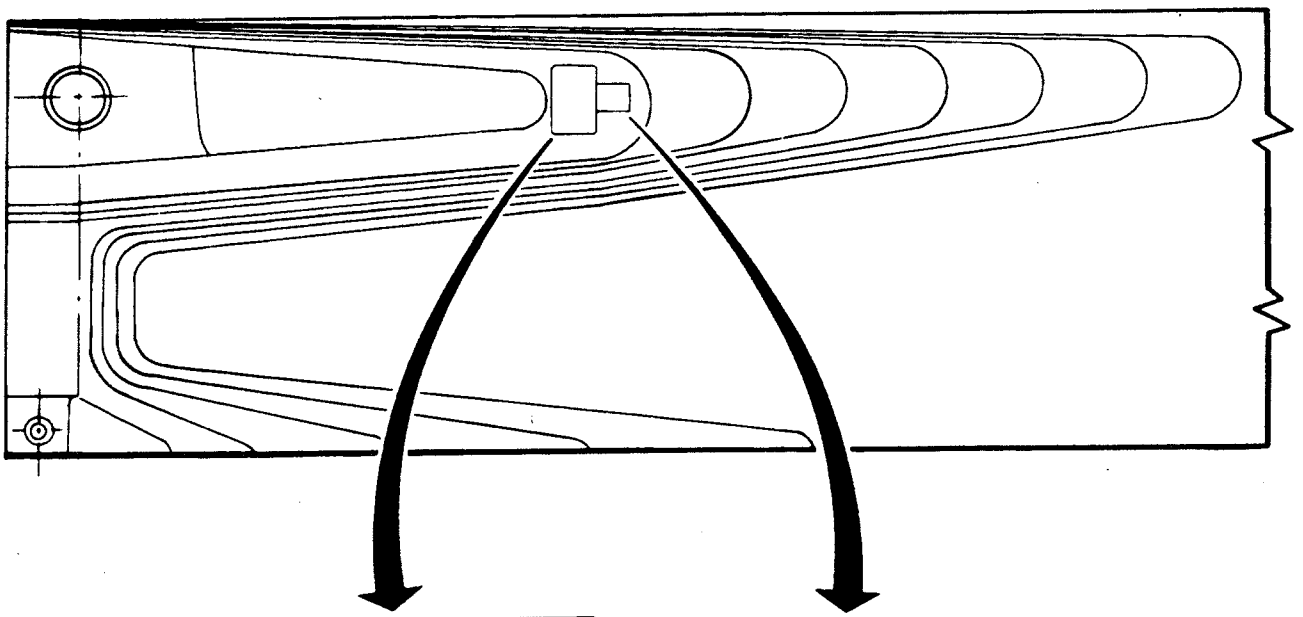
(4) Press faying surfaces together to fair out adhesive. Remove excess adhesive with safety solvent (item 65, Appendix C) and clean cotton cloth (item 59, Appendix C).

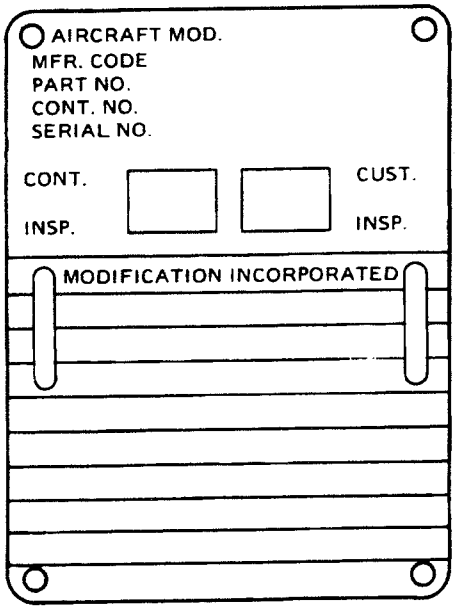
(5) Maintain firm contact pressure and cure for 24 hours at 70°F (21°C) or one hour at 180°F (82°C). Edge voids are not allowed.

1-7. Tabulated Data.

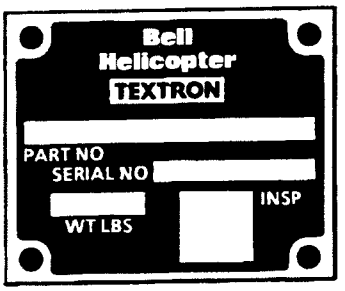
Table 1-1. Leading Particulars

Main Rotor Blade Span Length	
204-011-001-15	20.0 feet
204-011-250-5	22.0 feet
204-011-250-113	22.0 feet
Main Rotor Blade Chord Width	
204-011-001-15, 204-011-250-5, and 204-011-250-113	21.0 inches
Blade Weight	
204-011-001-15	191.0 (± 1.5) pounds
204-011-250-5	203.6 (± 2.0) pounds
204-011-250-113	203.6 (± 2.0) pounds





MODIFICATION DATA PLATE
MS27253-2



EQUIPMENT IDENTIFICATION
DATA PLATE
100-028-1

Figure 1-2. Data Plates

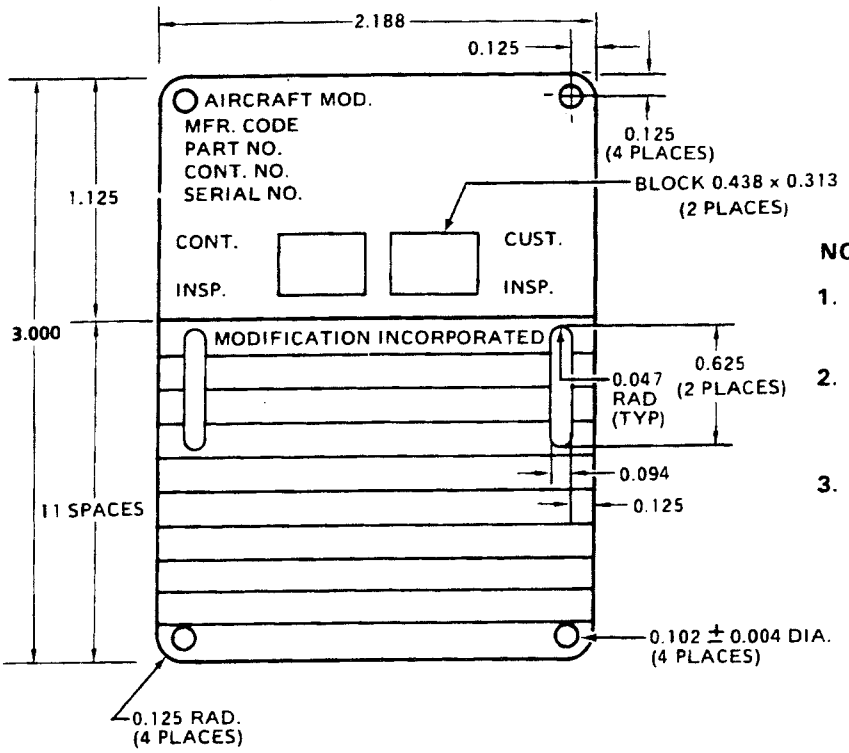
1-8. Differences Between Models. The primary difference between the models is in the spar assembly which has been used in the individual blade.

a. *Main Rotor Blade Assembly Part No. 204-011-001-15.*

(1) Spar assembly part No. 204-011-003-5 is effective on S/N A2-536 through A2-3649.

(2) Spar assembly part No. 204-011-003-11 is effective on S/N A2-3650 through A2-3700 and on S/N T2-1945 through T2-2262.

(3) Spar assembly part No. 204-011-003-15 is effective on S/N A2-3701 and subsequent and on S/N T2-2263 and subsequent.



NOTES:

1. **All dimensions are in inches unless otherwise specified.**
2. **Material to be aluminum alloy QQ-A-250/1C, 0.032 inch maximum thickness. Temper-O. Deburr edges.**
3. **Lettering shall be permanent, legible and standard gothic type approximately 0.10 inch high.**

Figure 1-3. Local Manufacture of Modification Data Plate

NOTE

If alternate skins part No. 204-011-009-9 were used in lieu of 204-011-009-3, spar assembly part No. 204-011-003-19 is effective in lieu of 204-011-003-15.

b. *Main Rotor Blade Assembly Part No. 204-011-250-5.*

(1) Spar assembly part No. 204-011-003-9 is effective on S/N A2-1 through A2-1415.

(2) Spar assembly part No. 204-011-003-13 is effective on S/N A2-1416 through A2-1934 and on S/N A2-1938 through A2-1990.

(3) Spar assembly part No. 204-011-003-17 is effective on S/N A2-1935 through A2-1937, A2-1991 and subsequent, and T2-1 and subsequent.

NOTE

If alternate skins part No. 204-011-009-11 were used in lieu of 204-011-009-7, spar assembly part No. 204-011-003-21 is effective in lieu of 204-011-003-17.

c. *Main Rotor Blade Assembly Part No. 204-011-250-113.*

(1) Spar assembly part No. 204-011-003-115 is effective on main rotor blade assembly part No. 204-011-250-113.

CHAPTER 2

REQUIREMENTS

Section I. General

2-1. Facilities. Facilities required to do the operations specified in this DMWR are as follows:

a. An enclosed disassembly and cleaning area with smooth walls, sealed cement or tiled floors, and exhaust fans capable of removing vapors and foreign materials which constitute contaminants.

b. Miscellaneous tanks for cleaning solvents and bonding and finishing agents.

c. Vapor degreaser for heating of cleaning solvents.

d. Low-pressure, clean, dry air source (0 to 50 psi).

e. Electrical power source.

(1) 110 vac.

(2) 28 vdc.

(3) 220 vac.

f. A bonding room with forced air ventilation, smooth walls, and temperature and humidity control.

(1) Relative humidity to 60 percent maximum.

(2) Temperature between 65°F and 85°F (18°C and 29°C).

g. A balancing room, well lighted and free of wind currents, with temperature maintained between 65°F and 80°F (19°C and 27°C).

h. An environmental stabilization room (for stabilization of blade temperature prior to inspection and/or balancing) with temperature maintained between 65°F and 80°F (19°C and 27°C).

i. Fluorescent penetrant inspection equipment.

j. Magnetic particle inspection equipment.

2-2. Support Items.

a. *Special Tools and Equipment*. Required special tools are listed in table 2-1, shown in figure 2-1, and described in the following subparagraphs.

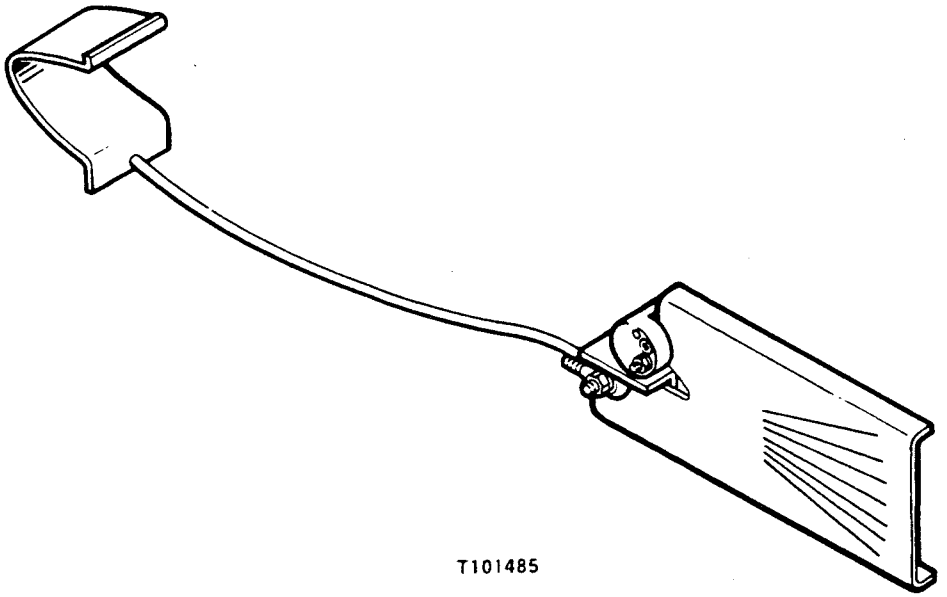
Table 2-1. Special Tools and Equipment

Nomenclature	NSN or part No. (or equivalent)	Reference paragraph of use
Clinometer	TB101	2-2, 3-7
Trim Tab Bending Gage	T101485	2-2, 3-31
Trim Tab Bending Tool	T101525	2-2,3-31
Incidence Bar	T1256-0-7002	2-2, 3-7
Abrasive Strip Bonding Fixture	T1256-0-7003-1	2-2, 3-26
Patch Bonding Fixture	T1256-0-7003-2	2-2, 3-29
Control Panel	T1256-0-7003-3	2-2, 3-20, 3-26, 3-29
Trim Tab Bond Fixture	T1256-0-7003-4	2-2, 3-20
Bushing Installation Fixture	T1256-0-7007	2-2, 3-21, 3-22, 3-24, 3-25
Inspection Fixture	T1256-0-7011	2-2,3-7
Balance Fixture	T1256-0-7012	2-2, 3-7, 4-2
Honing Fixture	T1256-0-7016	2-2, 3-21, 3-22
Blade Suspended Vapor Hone Fixture	T1256-0-7023	2-2, 3-20, 3-26
Hone Guide Bracket Assembly	T1256-0-7034	2-2, 3-21, 3-22
Abrasion Strip Drill Jig	T1256-0-7035	2-2, 3-26
Oversize Stud Drill Fixture	T1256-0-7038	2-2, 3-30
Stud Driver-Extractor	T1256-0-7039	2-2, 3-30
Trim Tab Oversize Bond Fixture	T1256-0-7040	2-2, 3-20
Control Master Blade (204-011-001-15)	T1256-0-7043	2-2, 4-2
Control Master Blade (204-011-250-5 and -113)	T1256-0-7044	2-2, 4-2
Static Droop Check Fixture	T1256-0-7047	2-2, 3-7
Patch Routing Fixture	T1256-0-7048	2-2, 3-29
Steel Hammer	T75449-1	2-2, 3-7, 3-26
Aluminum Hammer	T75449-2	2-2, 3-7

(1) Incidence bar, T1256-0-7002, consists of a bar, with a "V" shaped block on one end which will self center over the blunt leading edge of the rotor blade, and an adjustable narrow "V" block on the other end which will fit over the thin trailing edge of the rotor blade. The surface of the bar on which these blocks are mounted forms a surface parallel to the center lines of the V shaped notches and, therefore, a surface from which to measure the angle of the center of "chord" line of the curved airfoil shape.

(a) The tool is used by placing the bar over the blade, fitting it on the leading edge, then adjusting the trailing edge block by lightly turning the adjusting screw until the incidence bar is lightly firm on the blade.

(b) The clinometer TB101, an instrument to measure angles off of horizontal, is placed on the bar surface and adjusted to read the "incidence" angle. The condition where the leading edge is lower than the trailing edge is a negative (−) angle of incidence. The opposite condition is a positive (+) angle of incidence.



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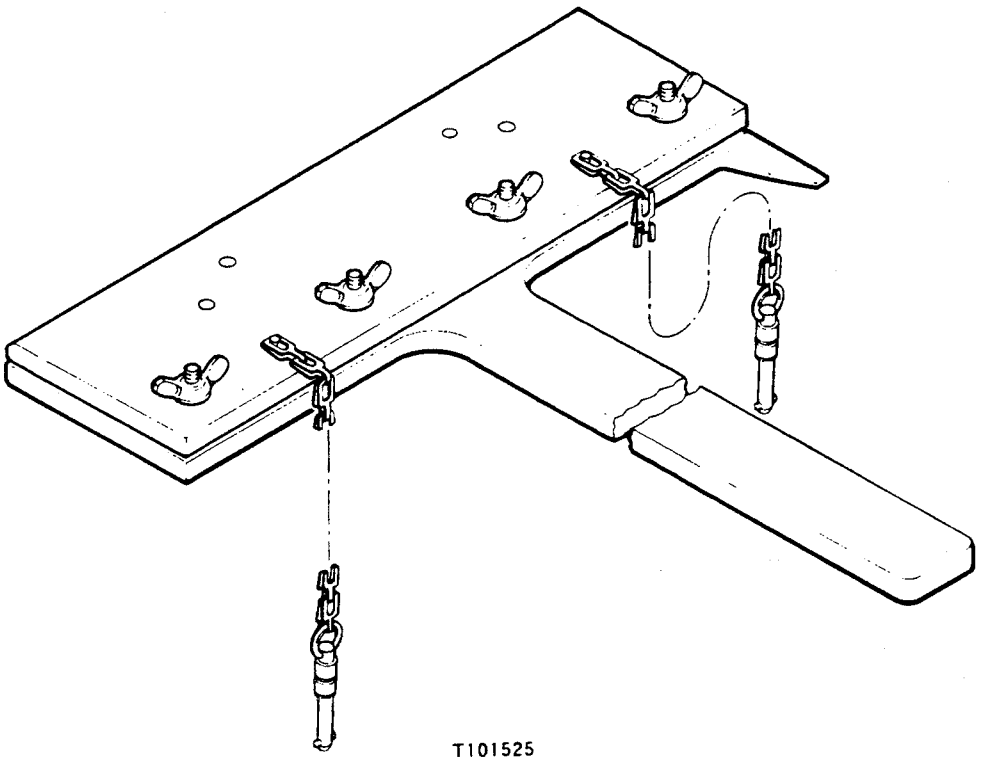

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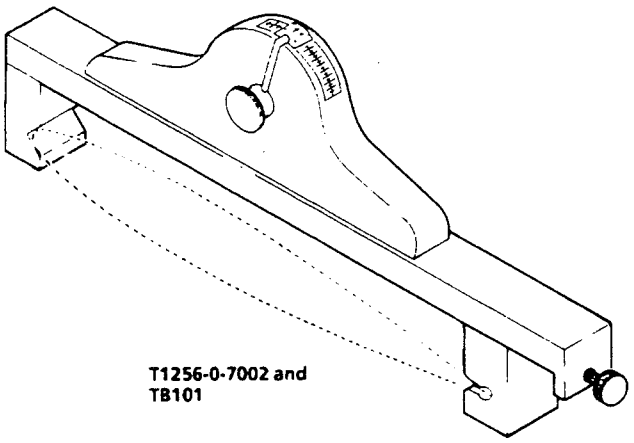
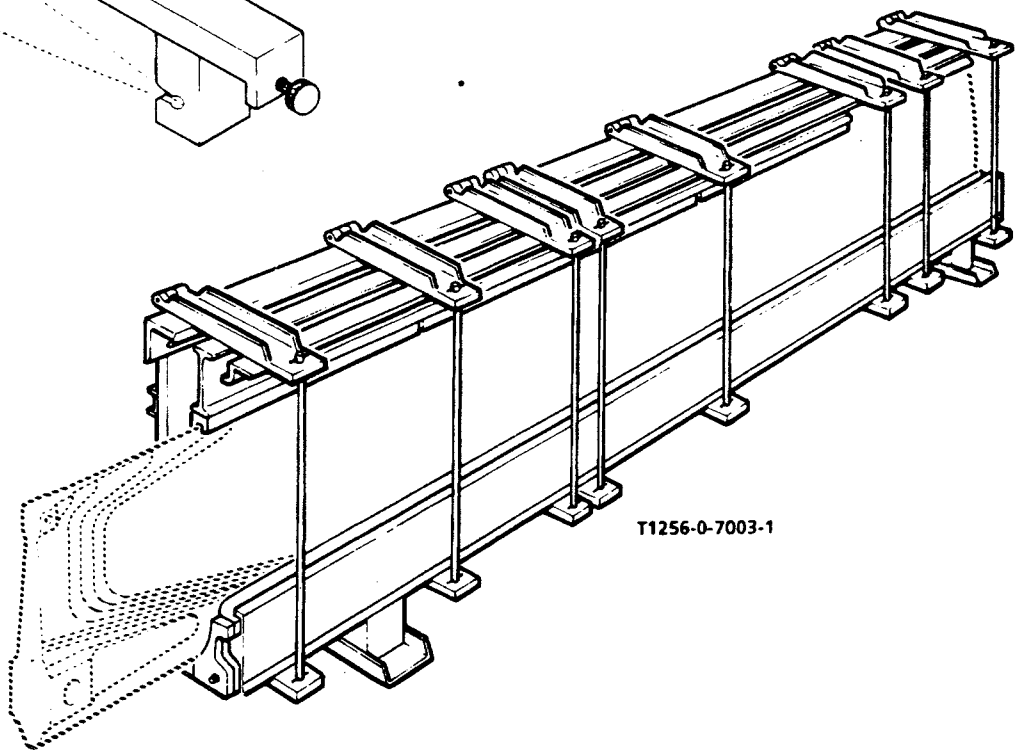
Figure 2-1. Special Tools and Equipment (Sheet 1 of 6)



T1256-0-7002 and
TB101



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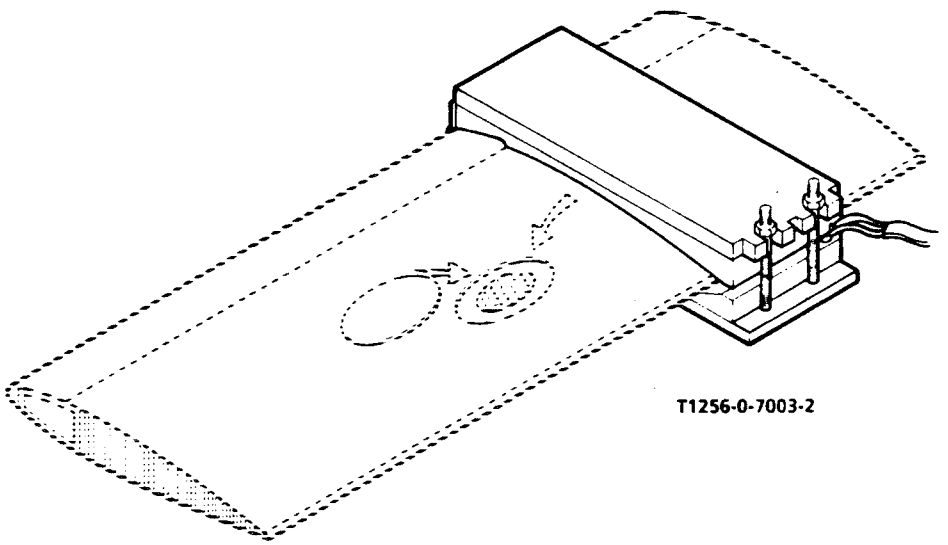
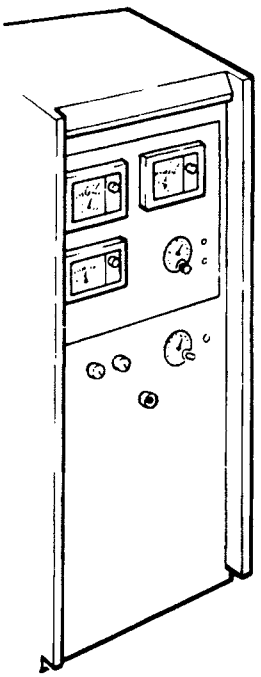


T1256-0-7003-2

Figure 2-1. Special Tools and Equipment (Sheet 2 of 6)



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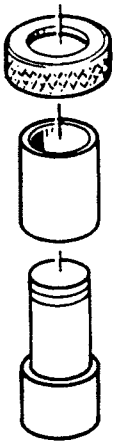
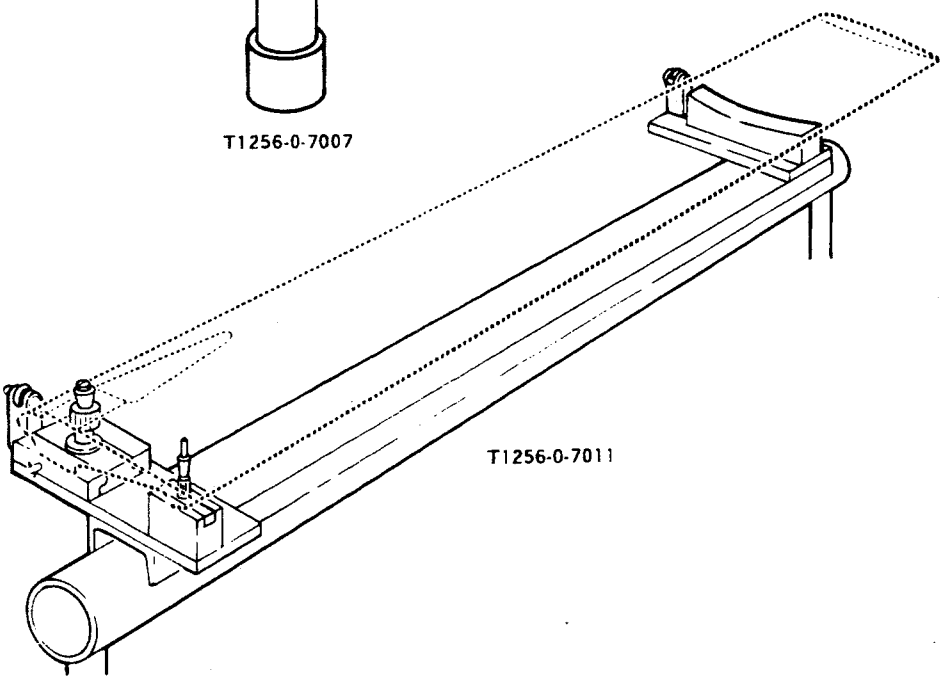
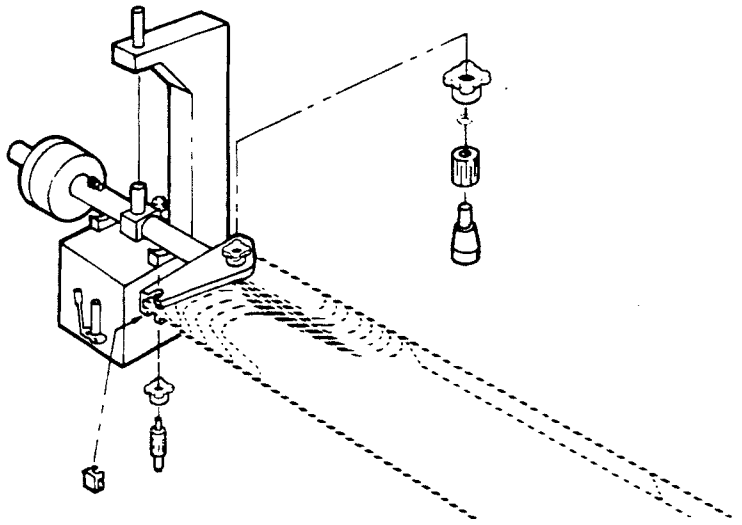


T1256-0-7007

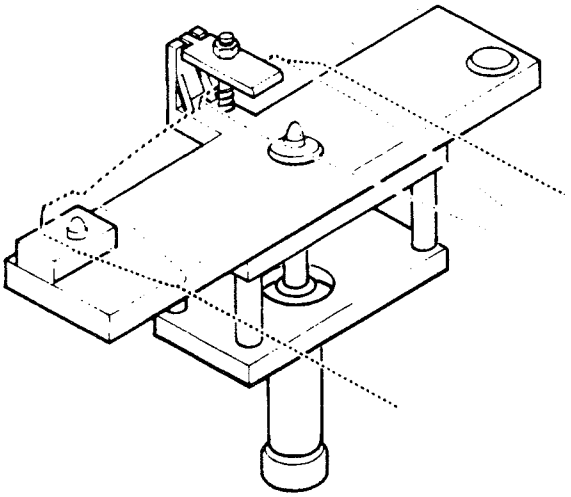


T1256-0-7011



T1256-0-7012

Figure 2-1. Special Tools and Equipment (Sheet 3 of 6)



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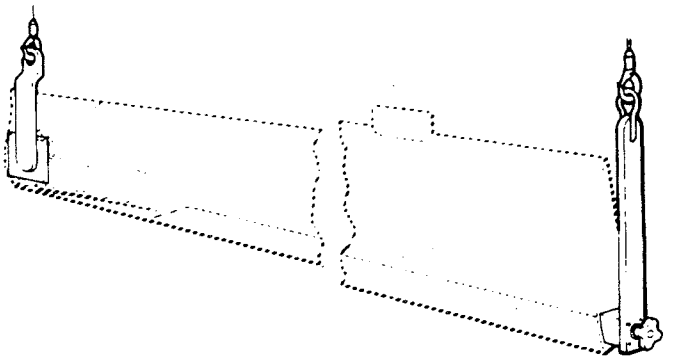
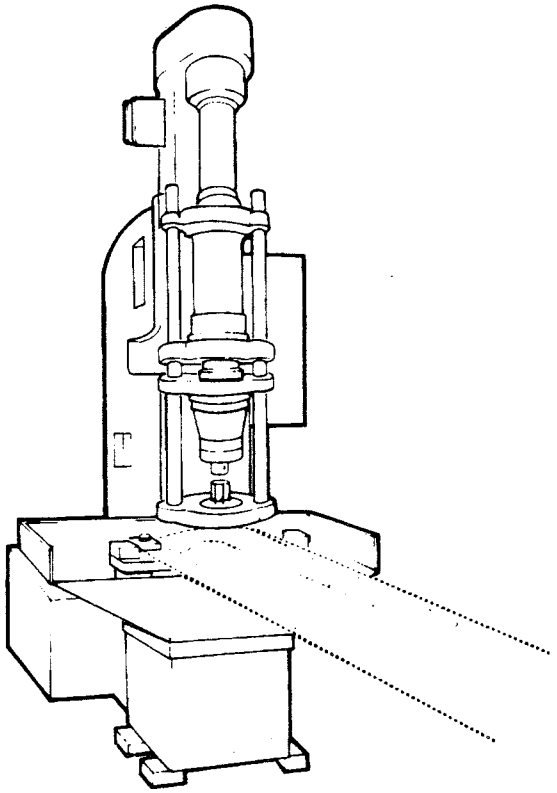


T1256-0-7023



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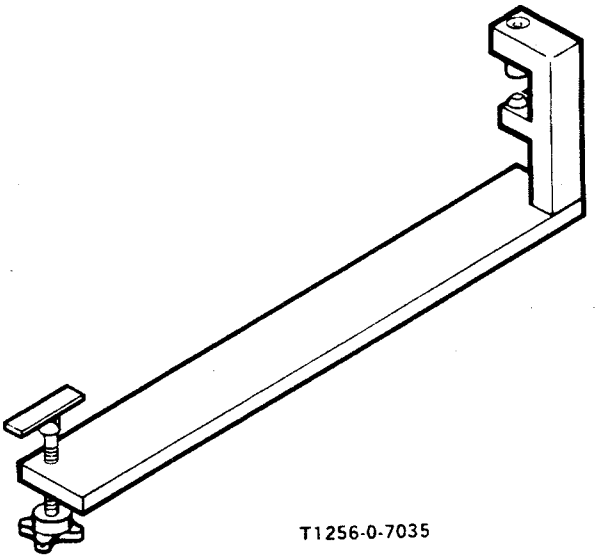
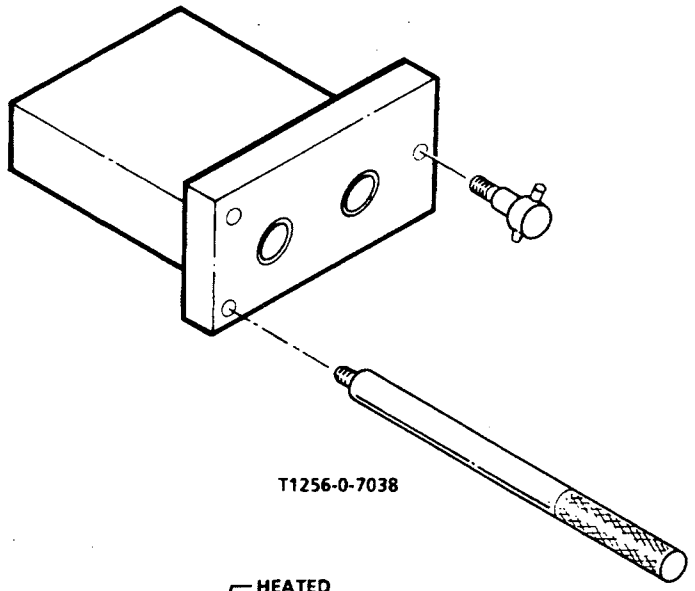
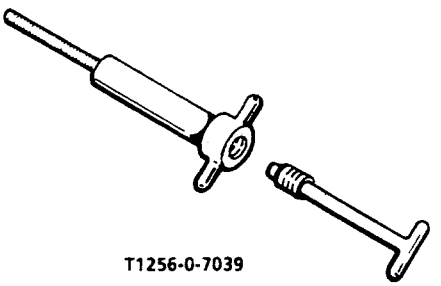


T1256-0-7035

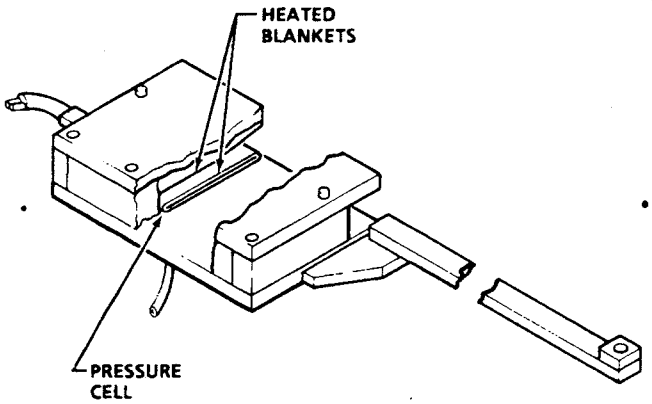
Figure 2-1. Special Tools and Equipment (Sheet 4 of 6)



T1256-0-7038



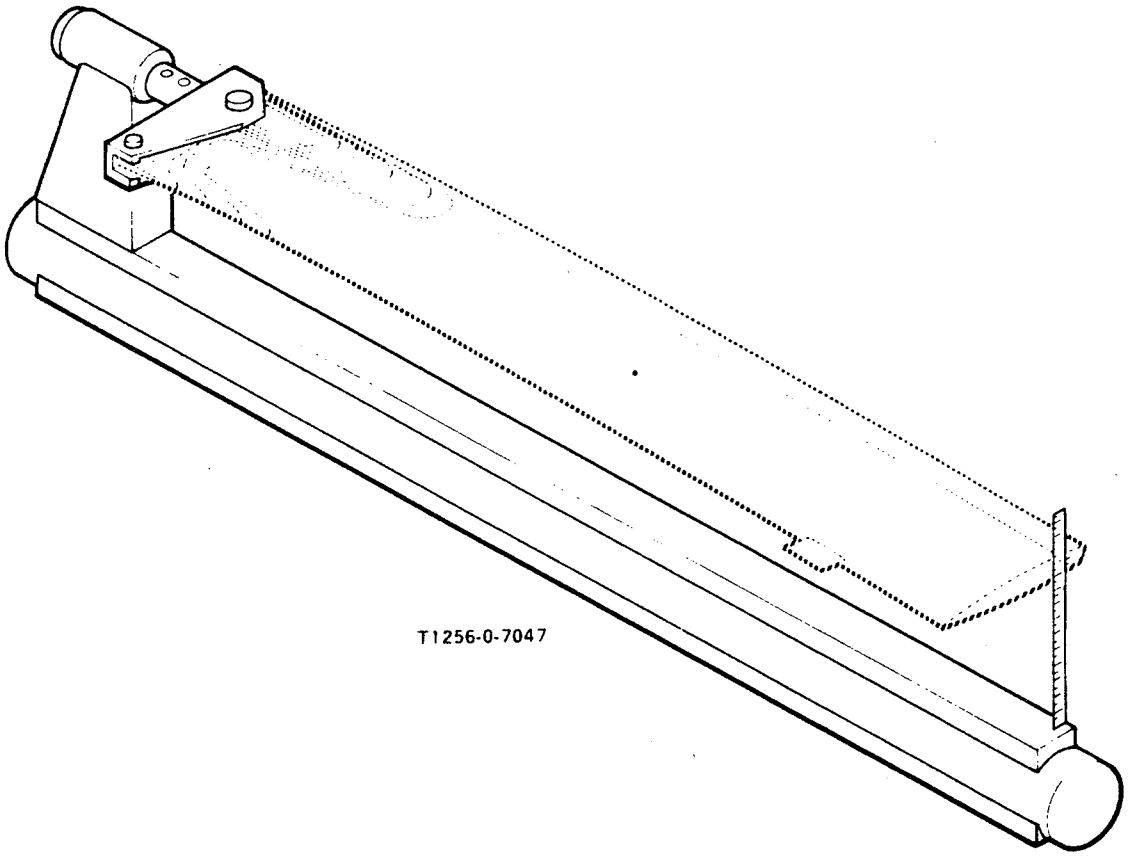
T1256-0-7039



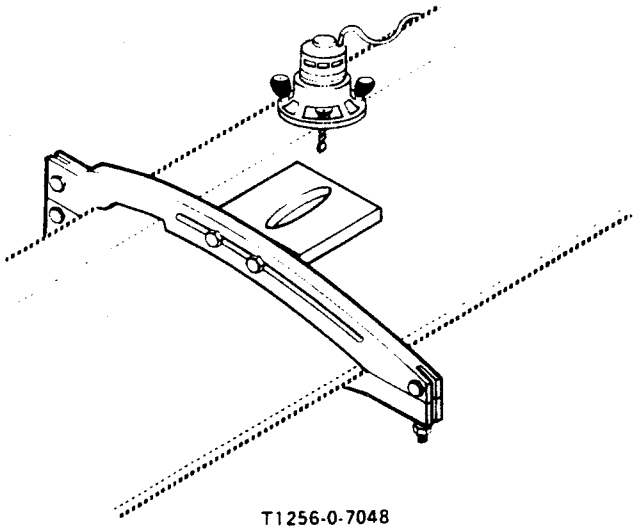
T1256-0-7040
T1256-0-7003-4

T1256-0-7043 AND T1256-0-7044

Figure 2-1. Special Tools and Equipment (Sheet 5 of 6)

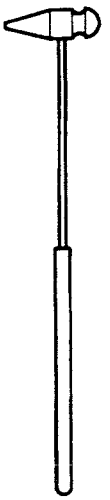


T1256-0-7047



T1256-0-7048

NOTE: The difference between hammers is the material, for one hammer head is aluminum and the other is steel.



T75449-1 HAMMER
T75449-2 HAMMER

Figure 2-1. Special Tools and Equipment (Sheet 6 of 6)

(2) Abrasive strip bond fixture, T1256-0-7003-1, is a "fixture" or frame used to hold a rotor blade in a fixed position and provide a means of applying both pressure and heat to the leading edge abrasive strip in a controlled manner, to accomplish the bonding of a new abrasive strip onto the rotor blade. This fixture contains a long rigid box which is made to the shape of the leading part of the rotor blade. This box contains inflatable air bags to provide continuing pressure to the abrasive strips to provide heat to soften, flow, and cure the adhesive material.

(3) Patch bonding fixture, T1256-0-7003-2, is a pair of rigid boxes, shaped to fit over the rotor blade. It contains inflatable air bags and electrical heating strips to apply heat and pressure in a controlled manner. This fixture will accomplish the bonding of a skin patch to blade in same manner as bonding of a new abrasive strip to blade leading edge.

(4) Control panel, T1256-0-7003-3, is used with the abrasive strip, skin patch, and trim tab bonding fixtures and is the means to apply a controlled cycle of heat and pressure to the rotor blade parts being bonded. It consists of electrical switches, timers, and monitor equipment to reproduce, self control, and record a desired sequence of occurrences at the place work is being done. By a prescribed list of actions to the dials, timer clocks, and switches, a cycle of events may be set to cause the electrical heaters to turn on, apply heat to the part, hold the heat at a desired level, and hold down, over desired periods of time, with the proper air pressure on the part.

(5) Trim tab bond fixture, T1256-0-7003-4, and trim tab oversize bond fixture, T1256-0-7040, are used to apply heat and pressure to the trim tab when bonding replacement trim tab to main rotor blade. They consist of a box containing an air bag to provide pressure to squeeze the trim tab onto the blade, two heater strips to soften, flow, and cure the adhesive, and a locator bar to the blade tip to properly locate the trim tab fixture. The bonding cycle of these fixtures is controlled by the T1256-0-7003-3 control panel.

(6) Bushing installation fixture, T1256-0-7007, consists of a round pin, one end of which is the proper size to slip into the hole in the blade and the other end is sized to accomplish the placement of the new bushing over the pin. On top of this, a cap is fitted which receives the pressure from the arbor press and transmits it to the bushing to accomplish pressing the bushing into the blade hole to proper depth. There is a pin and cap set for both the main (large) bushing and the drag (small) bushing, and they are used in conjunction with arbor press, a frame and mechanism to provide the push down required to either remove an old bushing or insert a new bushing.

(7) Inspection fixture, T1256-0-7011, consists of a frame and attachments on which to place the rotor blade in a position relative to the frame surfaces and the horizon to accomplish various inspection tasks. It is on this fixture that such tasks as the incidence angle, the contour gaging, the bushing size and location, and the general over-all condition survey will be accomplished.

(8) Balance fixture, T1256-0-7012, represents a rotor hub and the opposite rotor blade, and provides a blade grip or retainer in which to attach the rotor blade to be balanced, in the proper position relative to the center of the helicopter.

(a) The opposite blade is represented by a large weight mounted on a tube at a specific distance from the center.

(b) The rotor shaft is represented by a cable, mounted in a ring, with a specific clearance around the cable, such that when balance weights are added to the root and tip of the rotor blade, either at the front or rear attachment points, in the proper amounts, the cable does not touch the edge of the ring when the whole system is suspended by the cable.

(9) Honing fixture, T1256-0-7016, and hone guide bracket assembly, T1256-0-7034, are used to position the blade in the hone machine so that the main retention and drag bushings may be honed to size and smooth finish. A hone is a tool on which is mounted several fine stones, which, when rotated in a hole, like a drill, will remove an equal amount of material off all inside surfaces and leave a fine finish. The hone fixture has two position blade mountings, depending on which hole is to be honed.

(10) Blade suspended vapor hone fixture, T1256-0-7023, consists of a hanger for the blade root end, fitting into the bushing holes, and a hanger for tip end, fitting into the spar hole at the tip. These provide hooks on which to suspend the rotor blade by the ends without damage for application of a water and solid particle mixture under pressure for the purpose of cleaning the surfaces in preparation for adhesive bonding.

(11) Abrasive strip drill jig, T1256-0-7035, is used to provide a guide through which to drill holes in a new abrasive strip at the tip end to line up with the holes in the spar for attaching the tip cover. This is done only on those blades which have the type of tip cover which uses the six screws. The hand screw at the trailing edge is used to adjust the angle of the drill hole perpendicular to the blade surface.

(12) Oversize stud drill fixture, T1256-0-7038, consists of a block which fits into the spare tip, providing two holes through which to drill properly located holes in the tip weight, preparatory for installing oversize studs. In addition to the block, an extended tap drill of the proper size is used to make the minor diameter of the screw threads. This guide fixture is also used to guide the tap (thread cutting tool) to cut the threads in the drilled holes.

(13) Stud driver-extractor, T1256-0-7039, is used to grip the new oversize studs so they can be screwed into the newly tapped (threaded) holes in the top balance block. The tool consists of an internally threaded tube with a "T" handle for turning and a threaded rod which screws up tight against the stud end to lock the stud in the tube so that it can be turned into place.

(14) Balance blades (204-011-001-15, 204-011-250-5, and 204-011-250-113), T1256-0-7043 and T1256-0-7044, are control master blades for each model blade being output, and working master blade for each blade balancing fixture.

(a) Control master blades shall be used by the blade DMWR activity only to monitor and verify their working master blades.

(b) Working master blades shall be checked against the control master blades at least once each month, anytime repair activity personnel consider a recheck is required, or anytime the government representative deems it necessary.

(15) Static droop check fixture, T1256-0-7047, provides a horizontal mounting for the blade at the grip plates, such that the droop of the blade can be measured at the tip. The blade is then rotated to the opposite side up and remeasured at the tip.

(16) Patch routing fixture, T1256-0-7048, consists of a saddle or caul (block cut to the shape of the blade) which is clamped around the blade. A routing guide block is attached to the slots in the saddle by bolts which lock it over the slots in the saddle and by bolts which lock it over the affected skin area. The block provides an elliptical guide for the router to follow while it removes the skin.

(17) Trim tab bending gage, T101485, is designed to fit the contour of the blade and has a degree scale etched into the end that fits over the trailing edge of the blade. When installed on the blade next to the trim tab, it is used in conjunction with the trim tab bending tool, T101525, to determine the proper angle of the trim tab.

(18) Trim tab bending tool, T101525, consists of a slotted metal block with a hand grip extension. The slot engages that portion of the trim tab extending aft of the blade trailing edge. The trim tab is bent to the proper angle by deflecting the tool.

(19) Tapping hammers, T75449-1 and -2, are used as an alternate method of inspection for voids from station 82 to tip end of the blade. The hammer head on one is constructed of aluminum and the other is steel.

b. *Inspection and Test Equipment*. Inspection and test equipment required to determine conformance to specifications and requirements contained in this DMWR are listed in table 2-2.

Table 2-2. Inspection and Test Equipment

Nomenclature	NSN or part No. (or equivalent)	Reference paragraph of use
Ultrasonic Bond Tester	NSN 6635-00-038-4312	3-7, 3-20, 3-26, table 3-4

c. *Fabricated Tools and Equipment.* Instructions for fabricating special tools are shown in table 2-3.

Table 2-3. Fabricated Tools and Equipment

Nomenclature	Reference or part No.	Material required
Work Aid for Removing Abrasive Strip	Paragraph 3-26	1.00 in. OD Steel Pipe

Fabrication Instructions:

1. Cut two pieces of 1.00 inch OD pipe: 30.00 inches and 24.00 inches long.
2. Arc weld the two pieces together as shown in sketch.
3. Use a hacksaw or band saw and cut a slot 4.00 inches deep in end of long piece as shown in sketch.

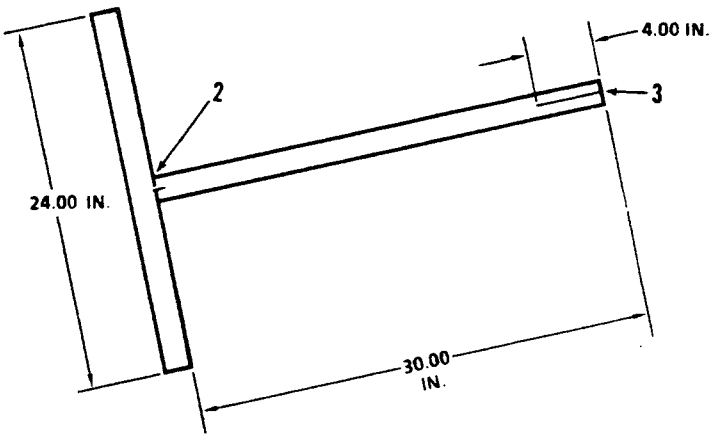
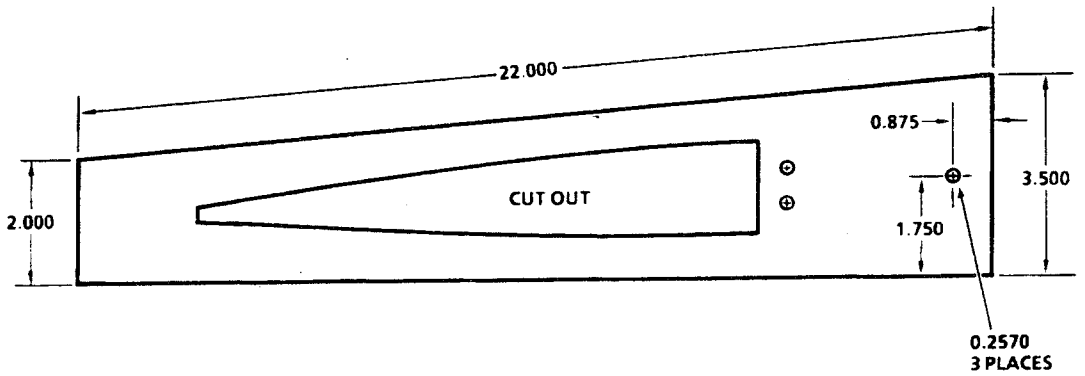


Table 2-3. Fabricated Tools and Equipment (Cont)

Nomenclature	Reference or part No.	Material required
Template Work Aid for Removing Tip Cover	Paragraph 3-28	0.250 in. aluminum alloy sheet or equivalent

Fabrication Instructions:

1. Cut material to dimensions as shown in sketch.
2. Using a tip cap as a guide, drill three 0.2570 inch holes in wide end of template work aid as shown in sketch.
3. Install template work aid on blade using screws and tip cap holes.
4. Mark leading and trailing edge of tip cover on template work aid.
5. Draw outline of part of blade containing tip cover on template work aid.
6. Remove template work aid from blade and cut out portion covering tip cover 0.300 inch smaller than outline of blade.



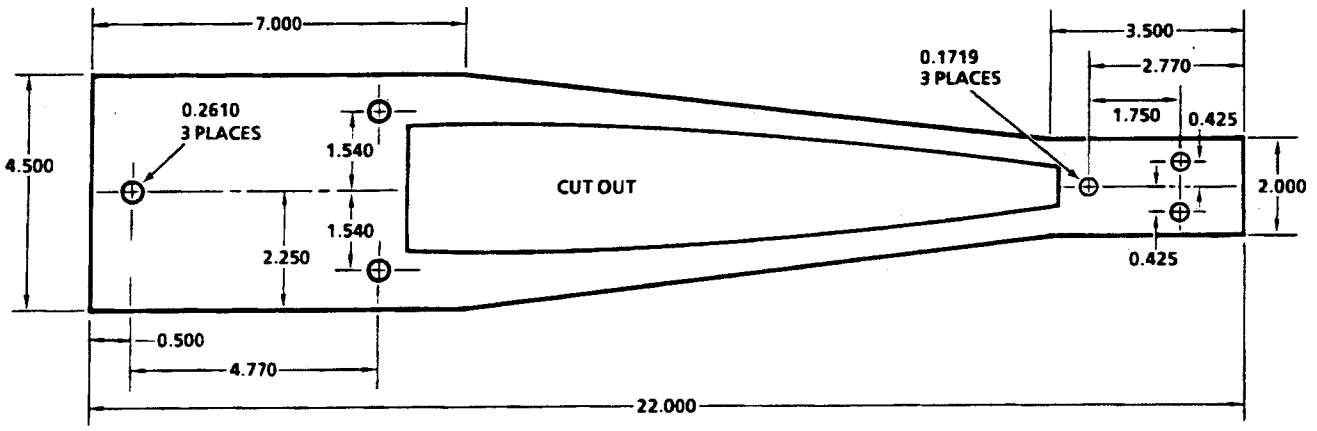
NOTE: All dimensions are in inches.

Table 2-3. Fabricated Tools and Equipment (Cont)

Nomenclature	Reference or part No.	Material required
Work Aid Template for Removing Root End Inboard Cover	Paragraph 3-28c	0.250 in. aluminum alloy sheet or equivalent

Fabrication Instructions:

1. Cut material to dimensions as shown in sketch.
2. Drill six holes in template work aid as show in sketch.
3. Position a 204-012-023-1 root end inboard cover on template work aid to correspond with position in blade.
4. Trace outline of root end inboard cover on template work aid.
5. Cut out center of template work aid 0.250 inch smaller than outline of root end inboard cover.



NOTE: All dimensions are in inches.

d. *Repair Parts.* Refer to TM 55-1520-210-23P for parts required for repair or overhaul of the main rotor blade assemblies, part Nos. 204-011-001-15, 204-011-250-5, and 204-011-250-113.

2-3. Modification Work Orders. No published MWO applicable to the subject main rotor blade assemblies is listed in the DA PAM 25-30, Index of MWO.

Section II. STANDARDS

2-4. Quality of Material. Parts and material used for replacement, repair, or modification shall meet equipment drawings and specifications.

2-5. Work-Hour Standards. Estimated work-hour standards for performance of depot maintenance are listed in table 2-4.

Table 2-4. Work-Hour Standards

Task	Estimated average work-hours
Preshop Analysis	4.0
Disassembly	1.5
Cleaning	2.0
Inspection	1.0
Repair	15.0
Assembly	2.5
Final Assembly and Testing	3.0
Preservation, Packaging, and Packing	1.5

2-6. Flight Safety Parts Program. Parts, assemblies, or installation identified under the flight safety parts program require special handling during overhaul. Throughout the overhaul procedures, warnings appear emphasizing critical instructions to be followed. These warnings are identified as "flight safety parts: warnings and are inserted whenever

a. A flight safety part is defined as a part, assembly, or installation procedure with one or more critical characteristics that, if not conforming to the design data or quality requirements, could result in serious injury or death of crew members and/or serious damage to the helicopter.

b. A critical characteristic is any dimension, tolerance, finish, material, manufacturing, assembly or inspection process, or other feature which, if nonconforming or missing could cause

c. Critical characteristics are listed in table 2-5.

Table 2-5. Critical Characteristic Identification

Flight Safety Part	Critical Characteristic
204-011-250-5 204-011-250-113	a. Adhesive must meet requirements of bell procurement on (BPS) 299-947-121, Type 1 and application accomplished in accordance to BPS 4458 with exception that maximum cure temperature will not exceed 285 degrees F.
204-011-001-15	b. Accomplishment of shot peening in the following areas: (1) Grip plate (upper surface) and grip pad (lower surface) to station 44.0. (2) Entire hole for main bolt bushing. (3) 3/4 inch wide band inside the box

CHAPTER 3

MAINTENANCE, OVERHAUL, AND REPAIR

Section I. GENERAL

3-1. Arrangement. This chapter provides instructions for depot level maintenance tasks. The following sections are arranged to provide the sequence in which the tasks are most logically accomplished. These tasks include preshop analysis, disassembly, cleaning, inspection, repair, and assembly.

3-2. References. References are provided in Appendix A.

Section II. SAFETY

3-3. Precautions. No special safety precautions need to be taken for overhaul and repair of the main rotor blade assembly. Standard warnings, cautions, and notes are provided where required.

WARNING

Observe all cautions and warnings on containers when using consumables. When applicable, wear necessary protective gear during handling and use. If a consumable is flammable or explosive, assure consumable and its vapors are kept away from heat, spark, and flame. Assure firefighting equipment is readily available prior to use.

Section III. PRESHOP ANALYSIS

3-4. Purpose and Scope of Preshop Analysis.

a. *Purpose.* The purpose of preshop analysis is to determine, prior to beginning overhaul activities, the extent of overhaul required to return the main rotor blade assembly to a serviceable condition as specified herein.

WARNING

Repairs performed in accordance with this Work Requirement do not return the blade fatigue life time to zero.

NOTE

When it has been determined that a 100 percent teardown will be done, a preshop analysis is not mandatory.

b. *Scope.*

(1) Replace/repair (as applicable) any parts that, through inspection, do not meet serviceable standards. Discard all common hardware items (bolts, nuts, screws, and washers) and replace with new items.

(2) The blade shall be modified as specified in this DMWR unless otherwise specified by contract or project work directives.

(3) Repairs required to restore the main rotor blade to a serviceable condition will be at the discretion of the preshop analysis (PSA) evaluator.

3-5. Unpacking. Remove all packing material and inspect for damage and condition before disassembly.

3-6. Tags and Forms.

a. Examine all tags and forms attached to the main rotor blade to determine the reason(s) for removal from service, or statements describing any malfunction or improper operation. Tags and forms shall not be removed from the main rotor blade.

b. If tags are missing, contact the Contracting Officer or National Maintenance Point.

c. The PSA evaluator will review historical records to assure correct documents are available. The evaluator will use all historical data received as evaluation criteria.

d. If tags are coded "crash damage" or "accident damage," all applicable records shall be reviewed in an attempt to determine the details of the accident-failure.

e. Every effort shall be made during processing to maintain the integrity of the main rotor blade operating history in accordance with DA PAM 738-751, The Army Maintenance Management System, Aviation (TAMMS-A).

f. The contractor shall record all defects encountered for each specific serial number blade and maintain appropriate permanent inspection records.

(1) A separate permanent inspection record sheet shall be required for each specific serial number blade, including all those condemned.

(2) The design of the record sheet will be at the option of the blade DMWR activity, but it is recommended that a blade plan form be included on the sheet. Each specific defect encountered shall cite specific blade station and chord line location for each serial number blade.

(3) At least one copy of each record shall be presented with each blade at final acceptance; a separate copy of each record shall be furnished to the Contracting Officer. Acceptance of the blades shall not be permitted unless those specific records accompany each blade, as well as those blades which are candidates for condemnation.

(4) Each blade serial number record sheet shall also specifically cite all voids encountered in compliance with the preceding. Blade station will be identified. Cited on the record sheet shall be the specific test equipment and method used to identify voids.

3-7. Preshop Analysis.

a. *Initial Setup.* Install blade in inspection fixture, T1256-0-7011 (2, figure 3-1), to accomplish preshop analysis inspections. Clean blade surfaces with solvent (item 3, Appendix C) or equivalent.

b. *Accident or Incident.* If records or physical appearance of a main rotor blade indicate the assembly has been subjected to an accident or incident outside normal usage, such as overspeed, lightning strike, hard landing, or sudden stoppage, inspect and evaluate according to criteria set forth in table 3-1, items 1 and 2.

c. *Normal.* For normal preshop analysis inspection required for all blades not subject to an accident or incident, accomplish item 3 in table 3-1.

d. *Blade Twist Check.*

NOTE

Twist check is not required for overspeed condition.

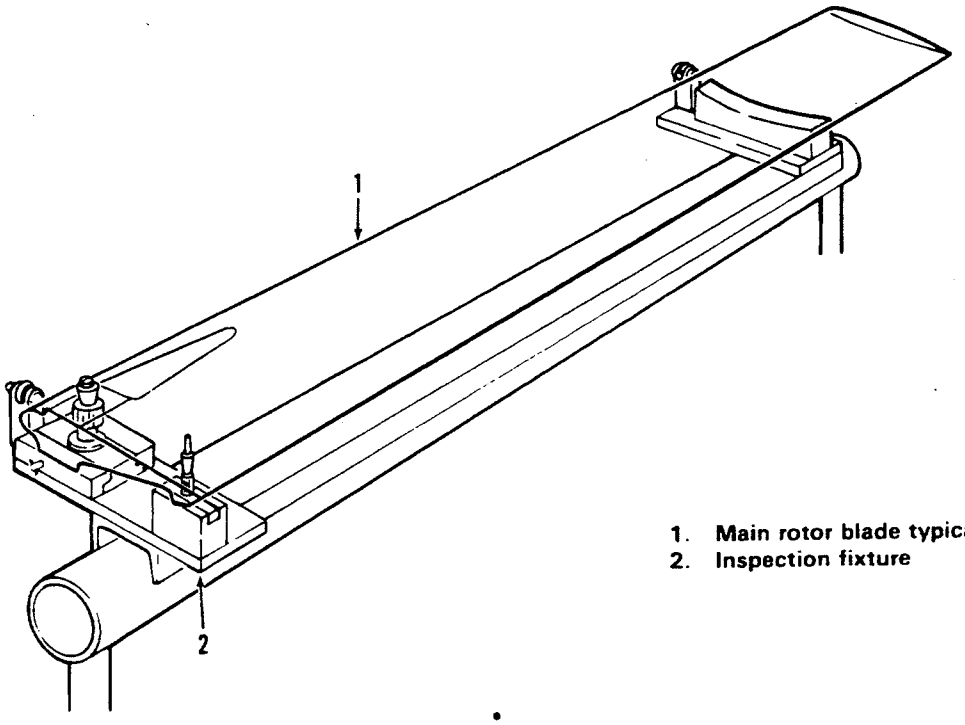
(1) Position incidence bar, T1256-0-7002 (1, figure 3-4), on blade (5) as shown. Adjust the trailing edge block (4) by lightly turning adjusting screw (3) until incidence bar (1) is lightly firm on blade.

(2) Place clinometer, TB101 (2) on top, flat surface of incidence bar (1). Adjust the clinometer to read the incidence angle of blade. Record clinometer readings.

NOTE

The condition where leading edge is lower than trailing edge is a negative (–) angle of incidence. The opposite condition is positive (+) angle of incidence.

(3) Loosen screw (3). Reposition incidence bar (1) to various locations as necessary and repeat step (2).



1. Main rotor blade typical
2. Inspection fixture

204011-2050

Figure 3-1. Inspection Fixture T1256-0-7011

Table 3-1. Preshop Analysis Checklist

NOM _____ NSN _____

Serial No. _____ INSPECTOR _____ DATE _____

Item No.	Type of inspection	Condition	Corrective action	Remarks	Initial here
1	Lightning strike	a. Burn holes, arcing, or any evidence of damage caused by lightning on any part of blade.	Scrap blade.	Inspect carefully. Burn and arcing indications (marks) can be quite small.	
		b. Unbonded (void) areas in excess of those permitted in para 3-7e. and table 3-4.	Scrap blade.		

Table 3-1. Preshop Analysis Checklist (Cont)

Item No.	Type of inspection	Condition	Corrective action	Remarks	Initial here
2	Sudden stoppage, hard landing, and overspeed	a. Either blade comes in contact with the ground, tailboom, or other foreign solid objects.	Both blades shall be scrapped.		
		b. Check bushings (4 and 5, figure 3-2) in grip plate (1) and drag plate (3) for looseness. None allowed.	Scrap blade.		
		c. Dimensionally check bushings (4 and 5) in grip plate (1) and drag plate (3). If hole is elongated (egged) in excess of 0.0015 inch, remove the bushing and measure ID of hole in blade for elongation.			
		(1) Elongation in excess of 0.0015 inch.	Scrap blade.		
		(2) Elongation less than 0.0015 inch.	Replace bushing.		
		d. Bond separations (voids) at root end doublers (2), grip plates (1), and drag plates (3) exceed void limits of para 3-7e and table 3-4.	Scrap blade.		

Table 3-1. Preshop Analysis Checklist (Cont)

Item No.	Type of inspection	Condition	Corrective action	Remarks	Initial here
2	Sudden stoppage, hard landing, and overspeed - continued	e. Edge voids or separations in the outboard 3.00 inches of doubler (2) or grip plate (1), or in the outboard 1.00 inch of a drag plate (3) are not allowed.	Scrap blade.		
		f. Check blade static droop (para 3-7f). Blade exceeds 3.00 inch limits.	Scrap blade.		
		g. Check blade twist (para 3-7d). Blade twist exceeds limits.	Scrap blade.	Not required for overspeed	
		h. Skin wrinkles and deformation other than dents of skin are not allowed.	Scrap blade.		
		i. Blade tip cover attaching screws and hole deformation not allowed.	Scrap blade.		
3	Normal Preshop Analysis (Required to determine necessary maintenance actions).	a. Check blade static droop (para 3-7f). Blade exceeds 3.00 inch limits.	Scrap blade.		
		b. Perform a radiographic inspection to detect corrosion and water or moisture damage (para 3-7g).			
		(1) Damage exceeds limits (para 3-7g).	Scrap blade.		

Table 3-1. Preshop Analysis Checklist (Cont)

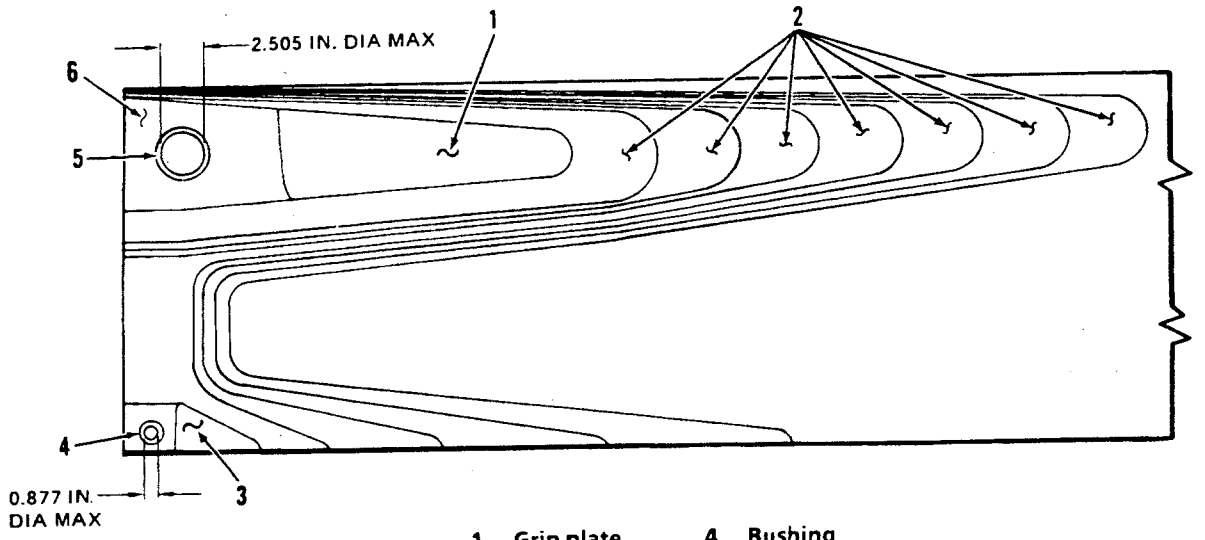
Item No.	Type of inspection	Condition	Corrective action	Remarks	Initial here
3	Normal Preshop Analysis (Required to determine necessary maintenance actions) - continued.	(2) Damage within limits (para 3-7g).	Repair blade.	Repair (para 3-29)	
		c. Blades 204-011-001-15 received with less than 200 hours remaining prior to retirement.	Scrap blade.		
		d. Blades 204-011-250-5 or -113 received with less than 300 hours remaining prior to retirement.	Scrap blade.		
		e. Holes or cracks in spar (10, figure 3-3).	Scrap blade.		
		f. Holes, nicks, or dents in trailing edge strip (13).			
		(1) Exceed 0.125 inch depth inboard of trim tab (7).	Scrap blade.		
		(2) Exceed 0.25 inch depth outboard of trim tab (7).	Scrap blade.		
		g. Crack in trailing edge (13).	Scrap blade.		
		h. Crack in blade skin (12) extending from a previous repair.	Scrap blade.		
		i. Visible corrosion in honeycomb core (11).	Scrap blade.		

Table 3-1. Preshop Analysis Checklist (Cont)

Item No.	Type of inspection	Condition	Corrective action	Remarks	Initial here
3	Normal Preshop Analysis (Required to determine necessary maintenance actions) - continued.	j. Skin damage that would require patching within 2.00 inches of the same chordline; one side of blade only.	Scrap blade.		
		k. Hole in skin (12) within 1.00 inch of spar (10), trailing edge strip (13), doublers (2), or blade tip.	Scrap blade.		
		l. Erosion through skin (12).	Scrap blade.		
		m. Paint deterioration in blade area immediately behind the leading edge abrasive strips (3), (4), and (5).	Repair blade.	Clean (para 3-13a) and refinish blade (para 3-36). Complete refinishing required when warranted by paint condition of blade.	
		n. Blade previously painted with acrylic lacquer.	Repair blade.	Clean and completely refinish blade (para 3-13 and 3-36).	
		o. Cracks, bond separations, and unstraightenable damage to trailing edge of trim tab (7).	Repair blade.	Replace trim tab (para 3-20).	
		p. Hole in abrasive strip (4 or 5).	Repair blade.	Replace abrasive strip (para 3-26).	
		q. Hole in abrasive strip (3).	Scrap blade.		
		r. Nicks and scratches exceed limits of table 3-2.	Repair blade.	Repair (para 3-31).	

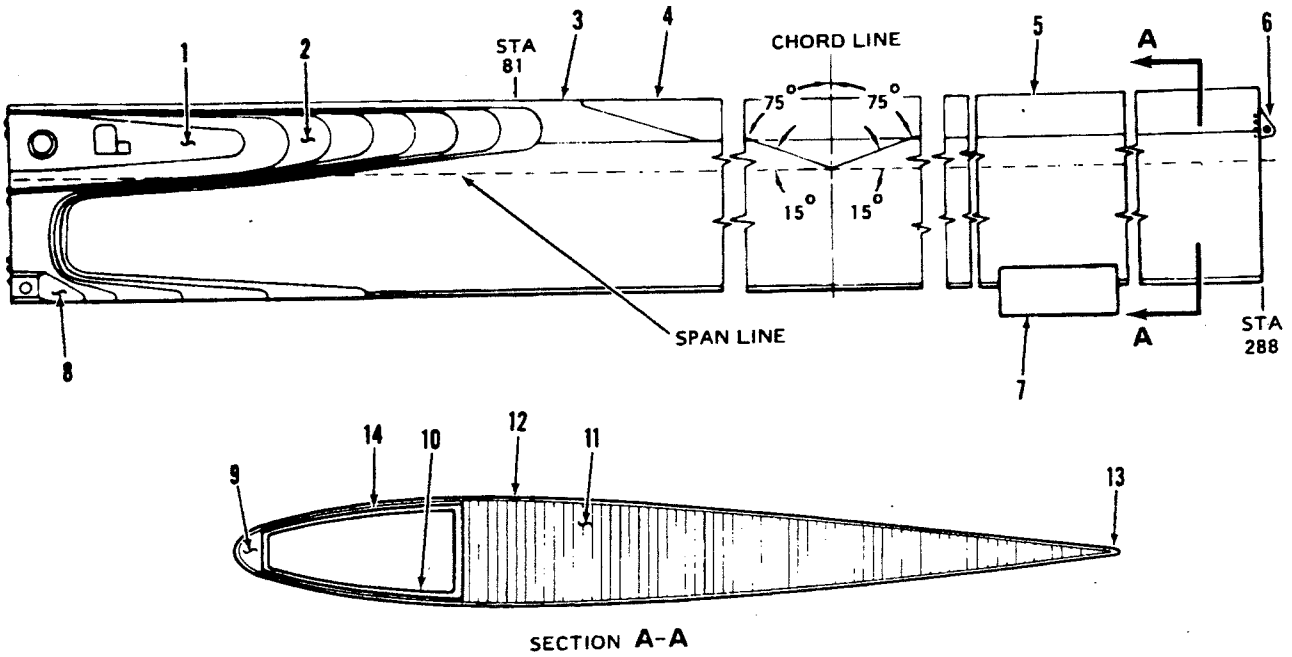
Table 3-1. Preshop Analysis Checklist (Cont)

Item No.	Type of inspection		Condition	Corrective action	Remarks	Initial here
3	Normal Preshop Analysis (Required to determine necessary maintenance actions) - continued.	s.	Nicks or scratches in a sharp dent and total depth of both nick and dent is in excess of that permitted for sharp dent alone in table 3-3. The same applies to nicks in nonsharp dents in table 3-3.	Repair blade.	Repair (para 3-29).	
		t.	Voids exceed limits (table 3-4 and para 3-7e).	Repair or scrap blade.	Table 3-4 and para 3-7e identify reparable and nonreparable void areas. Refer to para 3-29 for repair procedures.	
		u.	Corrosion or water damage exceeds radiographic inspection limits (para 3-7g).	Scrap blade.		
		v.	Erosion of abrasive strip when wrinkles or other deformation indicate severe material loss.	Replace abrasive strip.	Replace abrasive strip (para 3-26).	
		w.	Material is noticeably eroded from around the forward attaching screw hole in tip cap (6).	Replace tip cap.	Replace tip cap (para 3-12 and 4-2).	
		x.	Bushing (5, figure 3-2) exceeds 2.505 in. inside dia limit.	Replace bushing.	Replace bushing (para 3-21).	
		y.	Bushing (4) exceeds 0.877 in. inside dia limit.	Replace bushing.	Replace bushing (para 3-24).	



1. Grip plate
2. Doublers
3. Drag plate
4. Bushing
5. Bushing
6. Grip pad

Figure 3-2. Doubler, Grip Plate, and Drag Plate Inspection Areas



1. Grip plate
2. Doublers
3. Inboard abrasive strip
4. Center abrasive strip
5. Outboard abrasive strip
6. Tip cap
7. Trim tab
8. Drag plate
9. Nose block
10. Spar
11. Honeycomb core
12. Skin
13. Trailing edge strip
14. Box beam doubler

Figure 3-3. Blade Inspection Areas

Table 3-2. Nick and Scratch Limits

NOTE

Refer to chapter 1, paragraph 1-1, page 1-1 for blade code information and part numbers

Blade code	Part(s) affected figure 3-3	Max depth of defect (inches)	Span location
A and B	Skin (12)	0.008	Entire span
	Abrasive strips (3 4, and 5)	0.012	Entire span
	Doublers (2), grip plate (1), and drag plate (8)	0.012	Entire span
	Trailing edge strip (13)	0.120	Inboard of trim tab (7)
	Trailing edge strip (13)	0.250	Outboard of trim tab (7)

Table 3-3. Dent Limits

Blade code	Part(s) affected (figure 3-3)	Depth of defect (inches)	Dent severity	Span station
A	Doublers (2), grip plate (1), drag plate (8), and abrasive strips (3 and 4)	0.016	Sharp	Inboard of 165.0
B	Doublers (2), grip plate (1), drag plate (8), and abrasive strips (3, 4, and 5)	0.016	Sharp	Inboard of 220.0
A	Doublers (2), grip plate (1), drag plate (8), and abrasive strips (3 and 4)	0.030	Nonsharp	Inboard of 165.0
B	Doublers (2), grip plate (1), drag plate (8), and abrasive strips (3, 4, and 5)	0.030	Nonsharp	Inboard of 220.0
A and B	Skin (12)	Any depth without puncture	- - - - - - - -	Outboard four feet

Table 3-3. Dent Limits (Cont)

Blade code	Part(s) affected (figure 3-3)	Depth of defect (inches)	Dent severity	Span station
A and B	Skin (12)	0.100	-------	Inboard of a station four feet from the tip.
A	Abrasive strip (4)	0.030 0.045	Sharp Nonsharp	Outboard of 165.0
B	Abrasive strip (4 and 5)	0.030 0.045	Sharp Nonsharp	Outboard of 220.0

(4) Blade twist shall not exceed the following limits:

NOTE

Blade twist is determined by the difference between clinometer readings at station 90.0 and station 264.0 on Code A blade, and between station 90.0 and station 288.0 on Code B blade.

(a) Twist of Code A blade (figure 3-4) shall be 6 degrees, 35 (± 30) minutes between station 90.0 through 264.0.

(b) Twist of Code B blade shall be 7 degrees, 30 (± 30) minutes between stations 90.0 through 288.0.

(c) Rate of twist on either Code A or B blade shall be 0 degrees, 27.27 (± 15) minutes per foot (12 inches).

(d) Accumulated error shall not exceed 0 degrees, 30 minutes from nominal.

(5) Scrap blade that exceeds limits.

e. *Voids.* A void shall be defined as an unbonded area that is supposed to be bonded. Many sub-definitions of voids are often given such as lack of adhesive, gas pocket, misfit, etc. This section shall make no distinction among these but shall group them in the one general term "Void". All dimensions are in inches.

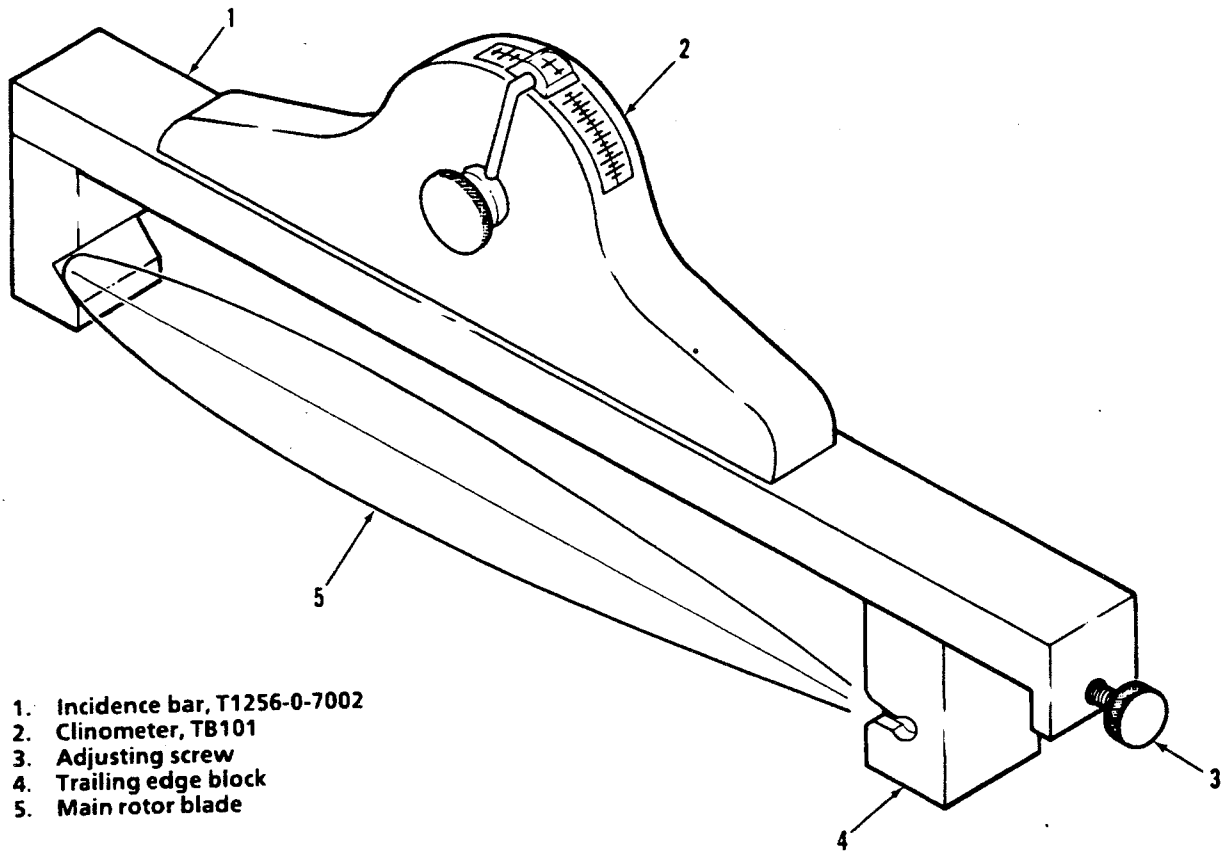
(1) Void limits are given in table 3-4

(2) Methods of void detection.

(a) Voids may be detected by mechanically tapping the blade surfaces. A special steel hammer, part No. T75449-1, or equivalent, should be used on the abrasive strips and an aluminum hammer, part No. T75449-2, or equivalent, should be used on all aluminum surfaces. Approximately 200 taps per minute will produce a constant sound level that will change in tone over voided areas.

(b) Portable contact ultrasonic devices are available and should be used to supplement the tapping hammer inspection in areas where the results of the tapping hammer inspection are inconclusive.

(3) Seal all voids open to an edge, not deeper than 0.100 inch, with adhesive (item 2, Appendix C).



1. Incidence bar, T1256-0-7002
2. Clinometer, TB101
3. Adjusting screw
4. Trailing edge block
5. Main rotor blade

Figure 3-4. Main Rotor Blade Twist Check

Table 3-4. Void Limits

Nomenclature	Bondline	Station location: Span	Station location: Chord	Size	Minimum spacing	Remarks
Spar Assembly (See figure 3-3)	Abrasive strip (4) to nose block (9)	100.00 to blade tip	Nose to 0.30 in. aft of nose both top and bottom	1.00 in. by 134.00 in. on Code A blades		Seal if void is at tip. If void is inboard of tip replace abrasive strip.
	Abrasive strip (4 and 5) to nose block (9)	100.00 to blade tip	Nose to 0.30 in. aft of nose both top and bottom	1.00 in. by 158.00 in. on Code B blades		Seal if void is at tip. If void is inboard of tip replace both abrasive strips (4 and 5).

Table 3-4. Void Limits (Cont)

Nomenclature	Station location: Bondline	Station location: Span	Station location: Chord	Size	Minimum spacing	Remarks
Spar Assembly (Cont.)	Abrasive strip (4) Code A blades or (4 and 5) Code B blades	100.00 to tip	0.65 in. aft of nose to 0.50 in. fwd. of aft edge of abrasive strip	100 sq in. max, 20 sq in. any single void, 1.75 in. max width	1.00 in.	Voids closer than 1.00 in. considered one void. Replace abrasive strip.
	Box beam doubler (14) and spar (10)	Outboard of 100.00	Bondline	30 sq in. max area, 1.00 by 3.00 in. area per void	5.00 in. between centers	Scrap blade if voids exceed limits
	Nose block (9) and spar (10)	234.00 to tip on Code A blades, 258.00 to top on Code B blades	Bondline	0.50 by 2.00 in., 18.00 sq. in. max	6.00 in. on center	Scrap blade if voids exceed limits
	Abrasive strips (3 and 4) and nose block (9)	Inboard of 100.00	Bondline	1.00 wide inboard of 100.00		Seal if void is at butt end. Scrap blade if abrasive strip (3) exceeds limits. Replace abrasive strip (4) if limits are exceeded.
	Abrasive strips (3 and 4) to spar (10)	Inboard of 100.00	Within 0.50 in. of abrasive strip edge	None Allowed		Scrap blade if abrasive strip (3) exceeds limits. Replace abrasive strip (4) if limits are exceeded.
	Box beam doublers (14) to spar (10)	Inboard of 100.00	Bondline	0.50 by 1.00 in. single void, 10.00 sq in. max area	1.00 in. separation between edges of void	Voids closer than 1.00 in. shall be considered a single void. Scrap blade.

Table 3-4. Void Limits (Cont)

Nomenclature	Station location: Bondline	Station location: Span	Station location: Chord	Size	Minimum spacing	Remarks
Spar Assembly (Cont)	Nose block (9) to spar (10)	Inboard of 100.00	Bondline	0.50 by 1.00 in. single void, 5.00 sq in. total	3.00 in. on center	Scrap blade.
Blade Assembly	Nose block (9) to spar (10)	Butt end	Bondline	3.00 in. deep		Scrap blade.
	Trailing edge strip (13) extrusion to skin (12)	Butt end	Bondline	1.00 in. deep by 1.00 in. wide		Scrap blade.
	Grip plate (1) to doublers (2) and grip plate (1) to grip pad (6, figure 3-2)	Butt end	Bondline	1.00 in. long by 0.35 in. deep	No void allowed within 0.50 in. of fwd. or aft edge.	Scrap blade
	All other areas	Butt end	Bondline	1.00 in. long by 0.35 in. deep		All voids at butt end of blade to be sealed.
Retention Area	Doubler (2, figure 3-3) to doubler (2) and skin (12)	Inboard of 100.00	Edge of doublers	0.06 in. deep along fwd. edge, 0.10 in. deep along aft edge		Repair or scrap blade (para 3-7e).
	Doubler (2) to doubler (2) and skin (12)	Inboard of 100.00	Edge of doublers	None allowed in outboard 7.00 in. of doubler		Repair or scrap blade (para 3-7e).

Table 3-4. Void Limits (Cont)

Nomenclature	Station location: Bondline	Station location: Span	Station location: Chord	Size	Minimum spacing	Remarks
Retention Area (Cont)	Drag plate (8) to doublers (2)	Inboard of 100.00	Edge	None allowed in outboard 1.50 in.		
	Grip plate (1) to doublers (2)	Inboard of 100.00	Edge	None allowed in outboard 3.00 in.		
	Grip plate (1) and drag plates (8) (in remaining areas)	Inboard of 100.00	Edge	0.06 in. deep by 2.00 in. length max any single void		Total void length shall not exceed 10 percent of bond length.
	Doublers (2) to doublers (2), skin (12), grip plate (1), and drag plates (8)	Retention holes	Within 1.00 in. radially from holes	No void		Scrap blade.
Blade Assembly	Skin (12) to honeycomb core (11)	Inboard of 100.00	Between trailing edge strip (13) and 5.00 in. forward	1.00 in. wide by 20.00 in. long	1.00 in. between edges of voids	Total area of voids not to exceed 60.00 sq. in. Scrap blade.
	Skin (12) to trailing edge strip (13)	Inboard of 100.00	Edge of skin	0.06 in. wide by any length		Seal with adhesive.
	Skin (12) to trailing edge strip (13)	Inboard of 100.00	Edge of skin	0.25 in. wide by 7.00 in. long	3.00 in. between ends of voids	Seal with adhesive.

Table 3-4. Void Limits (Cont)

Nomenclature	Bondline	Station location Span	Chord	Size	Minimum spacing	Remarks
Blade Assembly (Cont)	Skin (12) to trailing edge strip (13)	Inboard of 100.00	Width of trailing edge strip (13) (Not void to edge)	1/3 of width of extrusion by 20.00 in. long	3.00 in. between ends of voids	Scrap blade.
	Skin (12) to box beam doublers (14)	Inboard of 100.00	Width of bondline	0.25 in. wide. Not closer than 0.25 in. from edge		Inspect bondline with ultrasonic bond tester
	Skin (12) to trailing edge strip (13)	Outboard of 100.00	Edge of skin	0.06 in. deep by any length		Seal with adhesive
	Skin (12) to trailing edge strip (13)	Outboard of 100.00	Edge of skin	0.25 in. deep by 10.00 in.		Seal with adhesive.
	Skin (12) to trailing edge strip (13)	Outboard of 100.00	Width of faying surface	1/3 the width of the trailing edge strip/skin faying surface by any length		This limit applies where not covered by edge limits above.
	Skin (12) to honeycomb core (11)	Outboard of 100.00	Width of core	1.00 in. wide by 25.00 in. long	1.00 in.	Voids closer than 1.00 in. to be considered one void.
	Skin (12) to box beam doublers (14)	100.00 to 240.00	Width of bondline	0.25 in. wide. Not closer than 0.25 in. from edge		Inspect bondline with ultrasonic bond tester.
	Skin (12) to box beam doublers (14)	240.00 to tip	Width of bondline	0.25 in. wide by 2.00 in. long. Not closer than 0.25 in. from edge	6.00 in. between void centers	Inspect bondline with ultrasonic bond tester.

WARNING

Cleaning sovents are flammable and toxic. Use only in well-ventilated area. Avoid skin contact and inhalation of vapors. Do not direct compressed air near or directly against skin. Wear protective apron, rubber gloves, and safety goggles.

WARNING

FLIGHT SAFETY PART

Adhesive must meet bell procurement specification 299-947-212, Type I. This is a critical characteristic.

(4) Edge voids where permitted deeper than 0.100 inches shall be repaired by removing old adhesive and cleaning with methyl-ethyl-ketone (item 8, Appendix C) or equivalent. Insert adhesive (item 11, Appendix C) and cure as directed in paragraph 3-20.v. Use local heat and pressure.

NOTE

Where two voids of two different types (example: Void between skin and trailing edge extrusion next to a void between skin and the core) are closer than 1.0 inch apart they shall be considered as one void and the stricter limit shall apply.

(5) A 0.50 inch maximum may be removed from the outboard tip of the drag plate (8, figure 3-3) tang to eliminate a void. Cut off tang in a straight line running chord wise exercising care to avoid cutting into doubler to which dragplate is bonded. Deburr and break sharp edges.

(6) Skin voids not exceeding patch limits shown in paragraph 3-29 may be repaired by patching. Scrap blade if skin voids exceed limits shown in table 3-4.

f. Blade Static Droop Check.

(1) Install blade on static droop check fixture, T1256-0-7047, (1, figure 3-5).

(2) Using gage (3) at tip end of blade (2), as shown, measure and record static droop position of blade.

(3) Rotate blade (2) to position opposite side up and repeat step (2).

(4) If the difference between the two measurements, recorded in steps (2) and (3), exceeds 3.00 inches scrap the blade.

NOTE

Operators performing radiographic inspection shall be certified in accordance with MIL-STD-453, MIL-STD-410, and DARCOM R-702-22.

NOTE

"If available, real-time radiography may be used in lieu of film. The effectiveness of the real-time equipment will be verified by use of an image quality indicator (IQI) attached to each blade inspected. The IQI will be the Deutsche Industrie Norm (DIN 54109) wire standard, DIN62AL, largest set (1 IS07). The IQI will be placed on the thickest part of the doublers that cover the honeycomb. The area is located at the blade butt, near the blade bolt hole and just aft of the spar. All seven (7) wires must be resolved during the inspection."

g. Corrosion. Perform a radiographic inspection over the full length of blade to determine if any water or defects are present. Preliminary settings of radiographic equipment are shown in table 3-5.

(1) If water or corrosion is detected in honeycomb section, scrap the blade.

(2) Areas of corrosion which penetrate entirely through the skin, larger than area allowed for patching, are cause for rejection.

(3) Corrosion on the remaining areas of the blade in excess of the nick-scratch repair criteria is cause for rejection.

(4) All areas of corrosion must be located and removed within the limits contained herein.

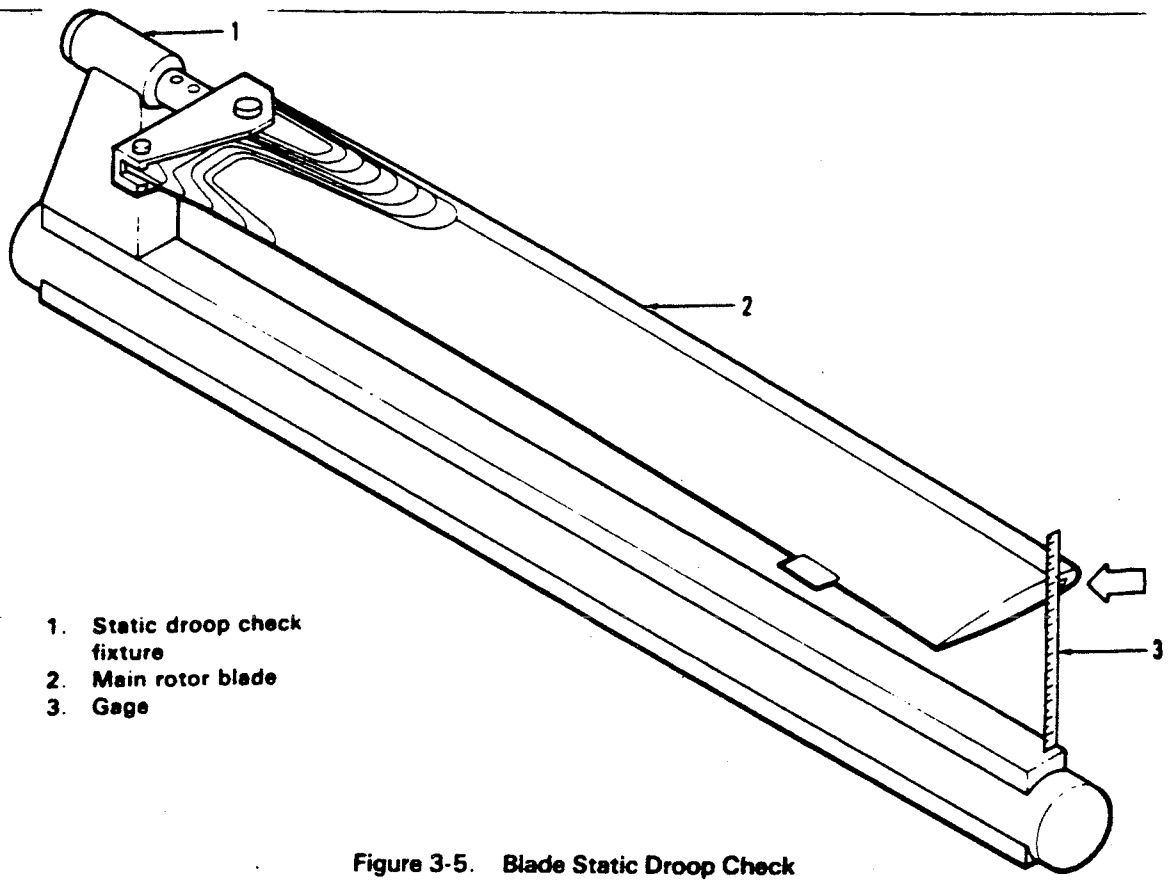
3-8. Temporary Preservation. If main rotor blade is not scheduled for refinishing immediately after preshop analysis, coat the surface area of blade with corrosion preventive compound (item 4, Appendix C) and wrap with kraft paper (item 16, Appendix C).

3-9. Special Handling and Condemnation Procedures.

Record and tag parts that are defective with reason for rejection.

Table 3-5. Preliminary Settings for Radiographic Equipment

Radiographic equipment	Preliminary settings
KVP	90
MAM (Milliamp-minutes)	1
Effective Focal Spot	Not to exceed 1.5 mm square
Isotope	Not acceptable
Film Type	ASTM Class 1
Focal film distance	36 inches
Screens	None
Penetrameter	Type placement, and wire resolution of penetrameter shall be the same as specified for real-time radiography in second NOTE after paragraph 3-7.f.
Angle of shot	90 degrees to major chord line of blade
Film Density	0.80 to 1.00 taken within a honeycomb cell.



1. **Static droop check fixture**
2. **Main rotor blade**
3. **Gage**

Figure 3-5. Blade Static Droop Check

Section IV. IN-PROCESS INSPECTION

3-10. Inspection Requirements. Inspection requirements are provided in Section VI, Disassembly. Used components and refinished parts recovered as products of disassembly will be examined 100 percent by the depot/contractor personnel to determine serviceability.

3-11. Tolerances, wear limits, corrosion limits, torque values, and adjustments. Information is provided for each task to which they apply.

Section V. REMOVAL OF MAJOR ASSEMBLIES (Not Applicable)

Section VI. DISASSEMBLY

3-12. Disassembly. Except for the removal of root end cover (1, figure 3-6), weight support assembly (23), cover plate (45), and tip cap (52) as covered in following steps, the extent of disassembly performed shall be based on the results of preshop analysis accomplished in paragraph 3-7 and overhaul inspection procedures in paragraph 3-14.

NOTE

There are two root and tip configurations as shown in figure 3-6. Discard all common hardware items (bolts, nuts, screws, and washers) and replace with new items.

a. Remove root end cover (1) and weight support assembly (23) as follows:

(1) Remove screws (2 and 4) and washers (3 and 5) attaching cover plate (1).

(a) Remove nut (6), bolt (14), and washers (7, 8, and 16).

(b) Remove nuts (6), bolts (13), washers (7, 8, 15, and 16), retainers (9, 10, and 11), and weights (12).

(2) Remove screws (24) and washers (25) attaching weight support assembly (23). Remove nuts (26), washers (27 and 28), retainer (29), and weights (30).

b. Remove cover plate (45), tip cap (52), and weights (47, 48, and 59) as follows:

(1) Remove screws (46) attaching weights (47 and 48).

(2) Remove screws (32) and washers (33) attaching cover plate (45).

(a) Remove nuts (34), bolts (43), washers (35, 36, and 44), retainer (37), and weights (38).

(b) Remove nuts (34), bolts (41 and 42), washers (35, 36, and 44), retainer (39), and weights (40).

(3) Remove screws (50 and 51) attaching tip cover (52).

(4) Remove nuts (53), washers (54 and 55), retainers (57 and 58), lock tab (56), and weights (59) from studs (61).

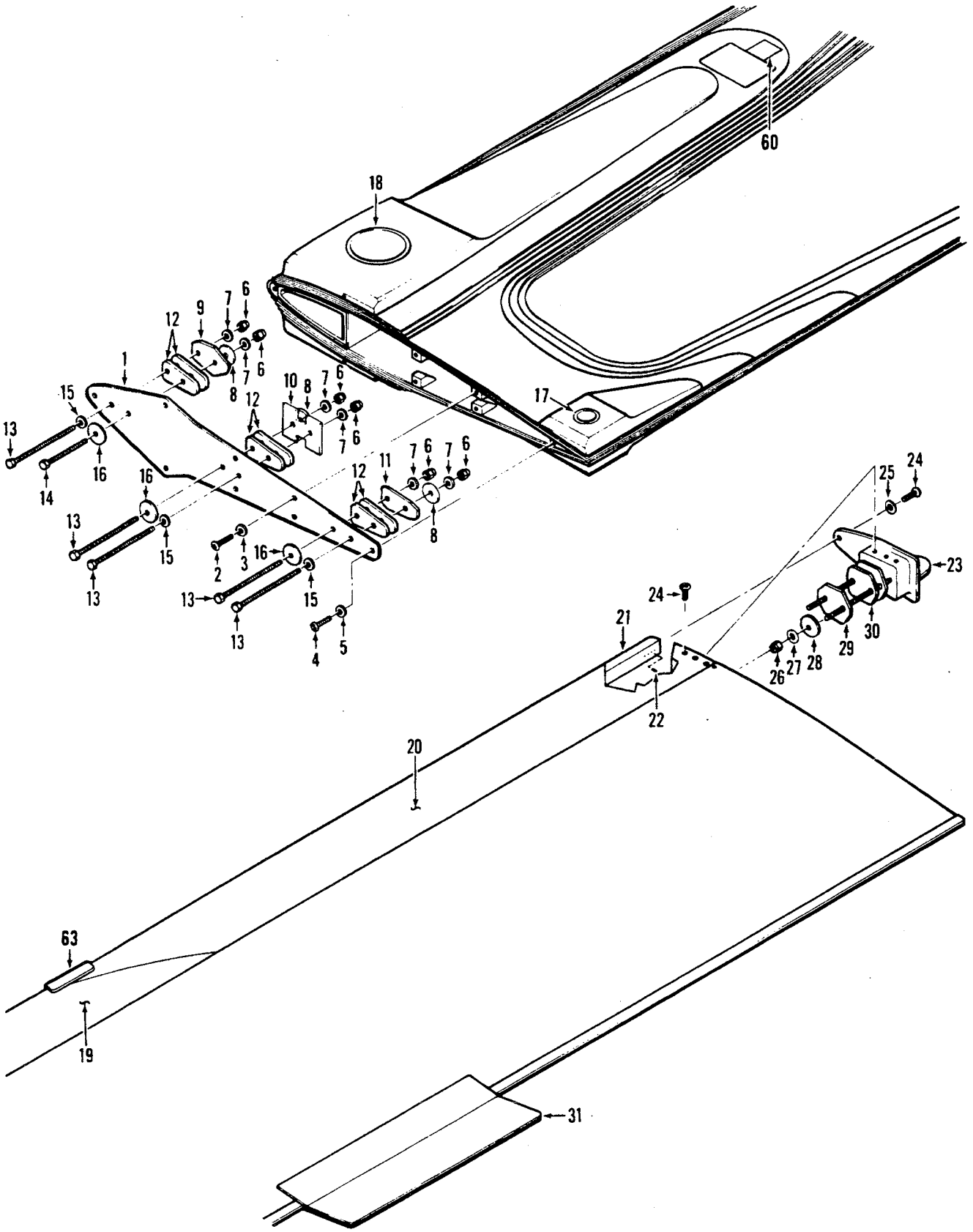


Figure 3-6. Main Rotor Blade Assembly (Sheet 1 of 4)

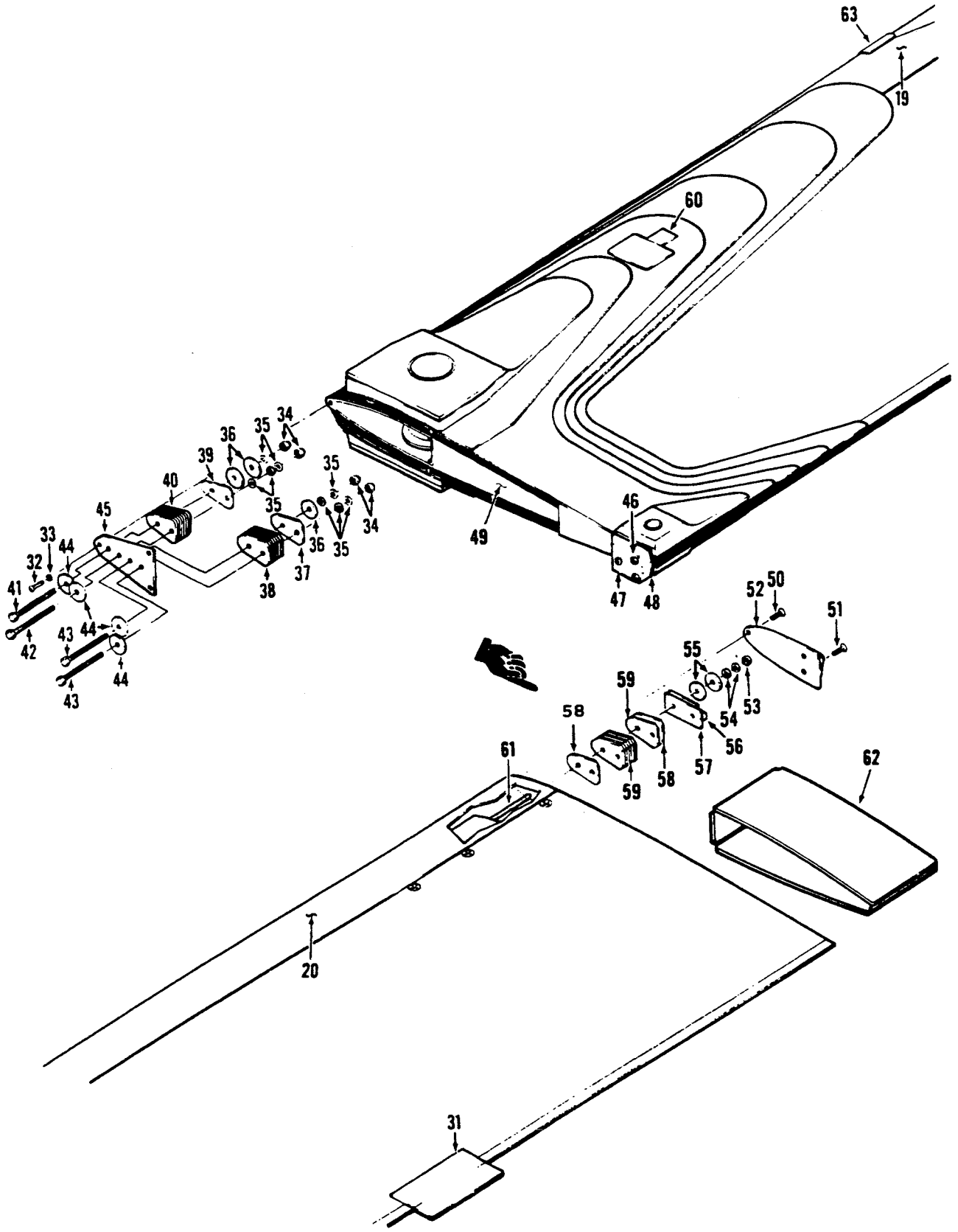


Figure 3-6. Main Rotor Blade Assembly (Sheet 2 of 4)

FIG & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY. PER ASSY	USABLE ON A	USABLE ON B
3-6	204-011-001-15	MAIN ROTOR BLADE ASSY	1	A	
	204-011-250-5	MAIN ROTOR BLADE ASSY	1		B
	204-011-250-113	MAIN ROTOR BLADE ASSY	1		B
-1	204-011-016-1	.ROOT END COVER (Rpl by 204-012-016-1)	1	A	
	204-011-016-3	.ROOT END COVER (Rpl by 204-012-016-1)	1	A	
	204-011-016-5	.ROOT END COVER (Rpl by 204-012-016-1)	1		B
	204-011-016-7	.ROOT END COVER (Rpl by 204-012-016-1)	1	A	
-2	NK525-416R9	.SCREW	4	A	B
-3	AN960PD416	.WASHER	4	A	B
-4	NAS604-10	.SCREW	4	A	B
-5	AN960PD416	.WASHER	4	A	B
-6	MS21042-6	.NUT	6	A	B
-7	AN960PD416	.WASHER, Balance	AR	A	B
-8	AN970-4	.WASHER, Balance	AR	A	B
-9	204-011-043-1	.RETAINER, not reqd if 204-010-088 not used	1	A	B
-10	204-011-043-3	.RETAINER, not reqd if 204-010-088 not used	1	A	B
-11	204-011-043-7	.RETAINER, not reqd if 204-010-088 not used	1	A	
	204-011-043-9	.RETAINER, not reqd if 204-010-088 not used	1	A	B
-12	204-010-088-1	.WEIGHT, Balance	AR	A	B
-13	NAS428-4-40	.BOLT (Rpl by NAS 428-4-46 when more weights are needed)	5	A	B
-14	NAS428-4-24	.BOLT	1	A	B
-15	AN960PD416	.WASHER	3	A	B
-16	AN970-4	.WASHER	3	A	B
-17	204-011-023-3	.BUSHING,Drag Bolt	AR	A	B
	204-011-023-5	.BUSHING, Drag Bolt	AR	A	B
	204-011-023-7	.BUSHING,Drag Bolt	AR	A	B
	204-011-023-9	.BUSHING, Drag Bolt	AR	A	B
-18	204-011-022-3	.BUSHING, Main Retention	AR	A	B
	204-011-022-5	.BUSHING, Main Retention	AR	A	B
	204-011-022-7	.BUSHING, Main Retention	AR	A	B
	204-011-022-9	.BUSHING,Main Retention	AR	A	B
	204-011-022-11	.BUSHING, Main Retention	AR	A	B
	204-011-022-13	.BUSHING, Main Retention	AR	A	B
-19	204-011-010-17	.ABRASIVE STRIP, Center (Blade S/N A2-1 thru A2-1415, Rpl by 204-011-010-25)	1		B
	204-011-010-21	.ABRASIVE STRIP, Center (Blade S/N 3650 and sub. and T2-1945 and sub)	1	A	
	204-011-010-25	.ABRASIVE STRIP, Center (Blade S/N A2-1416 and T2-1 and sub, Rpls 204-011-010-17)	1		B
-20	204-011-010-1	.ABRASIVE STRIP, Outboard (Blade S/N A2-1 thru A2-535)	1	A	
	204-011-010-9	.ABRASIVE STRIP, Outboard (Blade S/N A2-536 thru A2-3649. Rpl by 204-011-010-21 and 204-011-010-35)	1	A	
	204-011-010-19	.ABRASIVE STRIP, Outboard (Blade S/N A2-1 thru A2-1415. Rpl by 204-011-010-35)	1		B
	204-011-010-23	.ABRASIVE STRIP, Outboard Code A eff. (Blade S/N A2-3650 thru A2-3838 & T2-1945 thru T2-2262; Code B Eff. Blade S/N A2-1416 thru A2-1848 Rpl by 204-011-010-35)	1	A	B
	204-011-010-35	.ABRASIVE STRIP, Outboard Code A Eff. (Blade S/N A2-3839 & T2-2263 & Sub., Code B Eff. Blade S/N A2-1840 & T2-1 & Sub. Rpls 204-011-010-19 & 204-011-010-23)	1	A	B
	205-015-010-101	.ABRASIVE STRIP	1		B
	205-015-010-103	.ABRASIVE STRIP	1	A	
		NOTE Items 21 & 22 applicable only on Blades modified to 204-011-010-35 configuration.			
-21	204-011-005-25	.NOSE BLOCK, Aluminum	1	A	B
-22	AN122718	.DOWEL PIN	4	A	B
-23	204-011-037-3	.WEIGHT SUPPORT ASSY (Rpl by 204-011-052-1)	1	A	

Figure 3-6. Main Rotor Blade Assembly (Sheet 3 of 4)

FIG & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY. PER ASSY.	USABLE ON A	USABLE ON B
-23	204-011-052-1	.WEIGHT SUPPORT ASSY (Rpl by 204-011-037-5)	1	A	
	204-011-037-5	.WEIGHT SUPPORT ASSY (Rpl by 204-011-052-5)	1	A	
	204-011-052-5	.WEIGHT SUPPORT ASSY (Rpls 204-011-037-3, 204-011-037-5, 204-011-052-1)	1	A	B
		ATTACHING PARTS			
-24	NK509-416R12	.SCREW	6	A	B
-25	AN960-416L	.WASHER, Shim	AR	A	B
-26	MS21042-5	.NUT	2	A	B
-27	AN960PD416	.WASHER, Balance	AR	A	B
-28	AN970-4	.WASHER, Balance	AR	A	B
-29	204-011-043-5	.RETAINER, not required if 204-011-025 not used	1	A	B
-30	204-011-025-1	.WEIGHT, balance	AR	A	B
	204-011-025-3	.WEIGHT, balance	AR	A	B
-31	204-011-039-1	.TRIM TAB (Rpl by 204-011-039-107)	1	A	B
	204-011-039-107	.TRIM TAB (Rpl 204-011-039-1)	1	A	B
		NOTE The following parts shown in figure 3-6 occur on Code B blades S/N effectivity A2-7423, I2, T2, and sub and on Code A blades after rework.			
-32	NK525-416R12	.SCREW	3	A	B
-33	AN960PD416	.WASHER	3	A	B
-34	NAS679A4	.NUT (Rpl by MS21042-5)	4	A	B
-35	AN960PD416	.WASHER	AR	A	B
-36	AN970-4	.WASHER	3	A	B
-37	204-011-043-5	.RETAINER	AR	A	B
-38	204-011-025-1	.WEIGHT	AR	A	B
-39	204-012-022-3	.RETAINER	AR	A	B
-40	204-012-021-1	.WEIGHT	AR	A	B
-41	NAS428-4-46	.BOLT	1	A	B
-42	NAS428-4-24	.BOLT	1	A	B
-43	NAS428-4-10	.BOLT	2	A	B
-44	206-010-202-1	.WASHER	4	A	B
-45	204-012-016-1	.COVER PLATE (Rpls 204-011-016-1, -3, -5, -7)	1	A	B
-46	NAS1190-3P10L	.SCREW	3	A	B
	NAS1190-3P12L	.SCREW (AR)	3	A	B
	NAS1190-3P14L	.SCREW (AR)	3	A	B
	NAS1190-3P16L	.SCREW (AR)	3	A	B
	NAS1190-3P18L	.SCREW (AR)	3	A	B
	NAS1190-3P20L	.SCREW (AR)	3	A	B
-47	204-012-027	.WEIGHT -3 thru -17	AR	A	B
-48	204-012-027	.WEIGHT -1, -19, -21	AR	A	B
-49	204-012-023-1	.ROOT END INBOARD COVER	1		B
	204-012-023-5	.ROOT END INBOARD COVER	1	A	
		NOTE The following parts shown in figure 3-6 occur on Code B blades effectivity A2-7888, T2-9771, I2-1548 and sub.			
-50	NK509-416R12	.SCREW	3		B
-51	NK509-416R12	.SCREW	2		B
-52	204-011-205-1	.TIP CAP (Rpl by 204-011-062-1)	1		B
	204-011-062-1	.TIP CAP (Rpl 204-011-205-1)	1		B
-53	NAS679A4	.NUT (Rpl by MS21042-5)	2		B
	MS21042-5	.NUT (Rpls NAS679A4)	2		B
-54	AN960PD516	.WASHER	AR		B
	AN960C516	.WASHER, Assembly	AR		B
-55	AN970-5	.WASHER	AR		B
	204-011-269-1	.WASHER (Rpls AN970-4) (Made from AN970-4)	2		B
-56	204-011-268-3	.LOCK TAB	1		B
-57	204-011-267-3	.RETAINER	AR		B
-58	204-011-266-3	.RETAINER	AR		B
-59	204-011-025-3	.WEIGHT	AR		B
-60	100-028-1	.NAMEPLATE	1		B
-61	204-011-053-1	.STUD (Rpl by 540-011-023-3)	2		B
	204-011-023-3	.STUD (Rpls 204-011-053-1)	2		B
	540-011-023-5	.STUD (Rpls 540-011-023-3)	2		B
-62	204-011-042-9	.TIP COVER	1		B
-63	204-015-011-1	.SPLICE COVER	2	A	B

Figure 3-6. Main Rotor Blade Assembly (Sheet 4 of 4)

3-13. Cleaning.

WARNING

Observe all cautions and warnings on containers when using consumables. If a consumable is flammable or explosive, ASSURE consumable and its vapors are kept away from heat, spark, and flame. ASSURE firefighting equipment is readily available prior to use. Solvent is harmful. Use only with adequate ventilation. Avoid prolonged or repeated breathing of vapors and contact with skin. Smoking is prohibited in immediate areas. Wear protective apron, rubber gloves, and safety goggles.

a. Degrease blade using rags or cloth dampened with aliphatic naphtha (item 3, Appendix C) or safety solvent (item 65, Appendix C).

b. Remove paint from blades painted with acrylic lacquer as follows:

CAUTION

Do not flood surface with methyl-ethyl-ketone. Do not allow cloth dampened with methyl-ethyl-ketone to remain on surface for longer than necessary to clean area.

NOTE

All blades painted with acrylic lacquer shall be stripped down to the primer, except in areas where primer is cracked or deteriorated or in areas where metal appears to be corroded or otherwise damaged, and repainted with urethane (paragraph 3-36).

(1) Strip all lacquer finish from blade using rags or cloth pads soaked with methyl-ethyl-ketone (item 8, Appendix C) or equivalent. Do not remove primer unless necessary for maintenance.

NOTE

When removing primer, it is not necessary to remove the stain which may remain on bare metal.

(2) Remove primer in areas where primer is cracked or deteriorated or in areas where metal surface is corroded. Scrub primed surface using methyl-ethyl-ketone (item 8, Appendix C), or equivalent, dampened abrasive pads (item 38, Appendix C), or sand with 180 grit or finer abrasive paper (item 36, Appendix C) until primer is removed.

c. Remove paint from blades painted with urethane paint only in areas of blade where patches or repairs are to be made.

(1) To remove urethane paint from damaged areas, sand area using 120 grit abrasive paper (item 36, Appendix C).

(2) Clean and prepare skin that is pitted or eroded. Refer to following steps d and e.

d. Clean and prepare skin (12, figure 3-3) that is pitted or eroded in the 0.62 inch wide strip just behind abrasion strips (3, 4, and 5) as follows:

(1) Polish out pits with 400 grit sandpaper (item 7, Appendix C).

(2) Finish-polish damaged area, rubbing spanwise; remove burnish or sand marks and all traces of pitting using fine aluminum wool (item 21, Appendix C), 600 grit sandpaper (item 39, Appendix C) or abrasive pad (item 38, Appendix C).

(3) Finish shall be a minimum of 32 rms.

(4) If depth of pitted or eroded area after finish is no greater than 0.008 inch inboard of station 120.00 or 0.010 inch outboard of station 120.00, no further repair is necessary. If further repairs are required refer to paragraph 3-31.

(5) If no further repairs are required, prepare blade for final cleaning and preparation. Refer to step f.

e. Clean and prepare pitted skin (12), located aft (behind) of the 0.62 inch wide area covered in step d., as follows:

(1) Polish out pits and finish damaged area in accordance with step d.

(2) If the depth of the repaired areas is no greater than 0.006 inch the repair is acceptable and no further repair is necessary. Refer to paragraph 3-31 for repair, if required.

NOTE

Blade shall have all repairs accomplished before proceeding to final cleaning and preparation.

(3) If no further repairs are required, prepare blade for final cleaning and preparation. Refer to step f.

f. Final cleaning and preparation for painting main rotor blade.

(1) Using 180 grit abrasive paper (item 36, Appendix C) with a circular motion, thoroughly sand stainless leading edge. Do not allow sandpaper to overlap aluminum surface while sanding leading edge.

(2) Remove all surface oxidation from the entire blade by scrubbing thoroughly with abrasive pad (item 38, Appendix C) and a solution of detergent soap (item 40, Appendix C). Rinse thoroughly with clean demineralized water (item 15, Appendix C).

(3) Apply cleaner (item 42, Appendix C) using a clean cloth or brush. Rub briskly for approximately 30 to 60 seconds.

NOTE

The eroded area on the lower skin just aft of the abrasive strip and the steel grip pad should receive special care to achieve thorough coverage in this treatment.

(a) Rinse thoroughly with clean running demineralized water (item 15, Appendix C) and wipe dry with a clean cloth.

(b) Apply brush-on LHE cadmium solution (item 47, Appendix C) to grip pad. Refer to paragraph 3-16.

NOTE

From completion of this step through final paint, surfaces of blades shall not be handled with bare hands.

(4) On all bare aluminum, apply chemical film (item 24, Appendix C). Refer to paragraph 3-17. If not available, use application of cleaner (item 42, Appendix C) or a 10 percent solution of chromic acid (item 51, Appendix C).

g. If blade is not scheduled for repairs or refinishing, preserve in accordance with paragraph 3-8.

h. Paint will be in accordance with TM 55-1500-345-23, Painting and Marking of Army Aircraft.

i. All corrosion control will be in accordance with TM 55-1500-344-23, Corrosion Control for Army Aircraft.

3-14. Inspection. The inspection is basically visual or mechanical to detect damage or wear which will affect serviceability of parts. Detailed inspection requirements for individual parts are specified in the Overhaul Inspection Procedures (O.I.P.) in this chapter.

a. *Visual and Mechanical Inspection.*

(1) *Visual.* Use at least a 10-power magnifying glass and amplified lighting as necessary to determine cracks. Damage indicated by visual inspection shall be verified by measurement or gage before discarding part.

(2) *Mechanical.* Mechanical inspection shall be done using standard micrometers and gages. A surface table or flat surface shall be used to check for distortion of parts.

b. *Overhaul Inspection Procedures. (O.I.P.)*

(1) Inspect cover plates in accordance with O.I.P. figure 3-7.

(2) Inspect retainers and balance weights in accordance with O.I.P. figures 3-8 and 3-9.

(3) Inspect weight support assembly in accordance with O.I.P figure 3-10.

ITEM: Cover Plate REFERENCE: 1 and 45, Figure 3-6.

NO.	REF LTR	CHARACTERISTIC	INSP METHOD	REQUISITE
1		Cracks	Visual	Replace
2		Deformation	Visual	Replace
3		Elongated holes	Visual	Replace
4		Corrosion	Visual/measure	Replace if defect exceeds 0.010 inch
5		Nicks, scratches	Visual/measure	Replace if defect exceeds 0.010 inch.

NOTE

If the blade has a 204-011-016 cover (ref 1, figure 3-6) it shall be replaced with a 204-012-023 and a 204-012-016. See paras 4-2a. and 3-28b.

Figure 3-7. Cover Plate (204-011-016 or 204-012-016) – O.I.P.

ITEM: Retainers and Lock Tab REFERENCE: 9, 10, 11, 29, 37, 39,57, and 58, Figure 3-6, Lock Tab 56

NO.	REF LTR	CHARACTERISTIC	INSP METHOD	REQUISITE
1		Cracks	Visual	Replace
2		Deformation	Visual	Replace
3		Corrosion	Visual	Replace
4		Elongated holes	Visual	Replace

Figure 3-8. Retainers and Lock Tab – O.I.P.

ITEM: Balance Weights

REFERENCE: 12, 30, 38, 40, 47, 48 and 59, Figure 3-6

NO.	REF LTR	CHARACTERISTIC	INSP METHOD	REQUISITE
1		Deformation	Visual	Replace
2		Elongated holes	Visual	Replace
3		Corrosion	Visual	Replace

Figure 3-9. Balance Weights — O.I.P.

ITEM: Weight Support Assembly

REFERENCE: 23, Figure 3-6

NO.	REF LTR	CHARACTERISTIC	INSP METHOD	REQUISITE
1	A	Cracks	Visual	Replace
2	A	Deformation	Visual	Replace
3	A	Stripped or damaged studs	Visual	Replace
4	A	Elongated holes	Visual	Replace
5	A	Corrosion	Visual	Replace

Figure 3-10. Weight Support Assembly — O.I.P.

(4) Inspect tip cap in accordance with O.I.P. figure 3-11. If tip cap does not have a 0.094 inch drain hole at centerline, approximately 1.600 inches from its leading edge, it must be modified (paragraph 3-32).

(5) Inspect splice cover in accordance with O.I.P. figure 3-12.

(6) Inspect aluminum nose block and dowel pins in accordance with O.I.P. figure 3-13. Blades with aluminum nose block shall be scrapped when either center or outboard abrasive strips are damaged beyond limits.

(7) Inspect blade with brass nose block in accordance with O.I.P. figure 3-14. If tip end of brass nose block does not have seven dowel pins through leading edge of box beam into the nose block it must be modified (paragraph 3-33).

(8) Inspect root and tip end cover plates in accordance with O.I.P. figure 3-14.

(9) Inspect new main retention and drag brace bushings prior to installation in accordance with O.I.P. figures 3-15 and 3-16.

(10) Inspect studs in accordance with O.I.P. figure 3-17. All 1/4-28 studs part No. 204-011-053-1, shall be replaced with 5/16-24 UNF studs, part No. 540-011-023-3 (paragraph 3-30).

3-15. Processing. When surface treatments are required to restore finishes on parts, use applicable process outlined in following paragraphs. Refer to table 3-6 and figure 3-18 for process requirements.

3-16. Brush Cadmium Plating. Brush cadmium plating is used on main rotor blade grip pad (3, figure 3-18). Repair or touch up surfaces by brush cadmium plating method.

a. *Equipment and Materials.*

(1) Power source of 0 to 15 amperes at 0 to 20 volts, with voltage control. A typical power pack is Selectron Type 1520 (FSCM 13929).

(2) MS-1 and MS-4 rod, FSCM 13929, with replaceable carbon anodes.

(3) LHE cadmium solution per MIL-STD-865A (item 47, Appendix C) for cadmium plating and chromate conversion coating, Macro-Bronze No. 1 per QQ-P-416.

b. *Surface Preparation.*

WARNING

Cleaning solvents are flammable and toxic. Use only in well-ventilated area. Avoid skin contact and inhalation of vapors. Do not direct compressed air near or directly against skin. Wear protective apron, rubber gloves, and safety goggles.

(1) Remove surface contamination with cheesecloth (item 17, Appendix C) dampened with acetone (item 60, Appendix C). Wipe dry before acetone evaporates.

(2) Remove oxides or scale with abrasive pads (item 38, Appendix C). Repeat step (1) above.

c. *Procedure.*

(1) Mask surface surrounding area to be plated, using platers tape (item 68, Appendix C).

(2) Use area to be plated as cathode.

(3) Pour small amount of LHE cadmium solution (item 47, Appendix C) into suitable container. Saturate wrapped anode with solution.

(4) Apply saturated anode to repair area in circular or figure -eight motions while adjusting voltage to stylus and anode. Continue until uniform plating and complete coverage is obtained.

(5) Thoroughly rinse with water and wipe with cheesecloth (item 17, Appendix C) dampened with water. Dry thoroughly with clean cloth or dry, compressed air.

Table 3-6. Process Requirements

Figure and index No.	Nomenclature	Brush cadmium plate	Chemical film aluminum	Urethane compatible	Urethane topcoating	Acrylic lacquer	Remarks and references
3-18-1	Main rotor blade 204-011-001						
-2	Main rotor blade 204-011-250						
-3	Grip pad	X			X	X	Para 3-16 and 3-36 (1)
-4	Grip plate		X		X	X	Para 3-17 and 3-36
-5	Doublers		X		X	X	Para 3-17 and 3-36
-6	Abrasive strip				X	X	Para 3-26
-7	Skin		X	X	X	X	Para 3-17, 3-29, and 3-36 (2)
-8	Drag plate		X		X	X	Para 3-17, 3-24, and 3-36 (1)

(1) Protect bushing from brush cadmium plate or chemical film and paint.

(2) Acrylic lacquer or urethane coating is applied to 6.00 inch area at blade tip on main rotor blade (1) only.

ITEM: Tip Cap REFERENCE: 52, Figure 3-6.

NO.	REF LTR	CHARACTERISTICS	INSP METHOD	REQUISITE
1	B	Has not been modified with 0.094 inch drain hole	Visual	Modify (para 3-32)
2	B	Cracks	Visual	Replace
3	B	Elongated holes	Visual	Replace
4	B	Corrosion	Visual	Replace

Figure 3-11. Tip Cap — O.I.P.

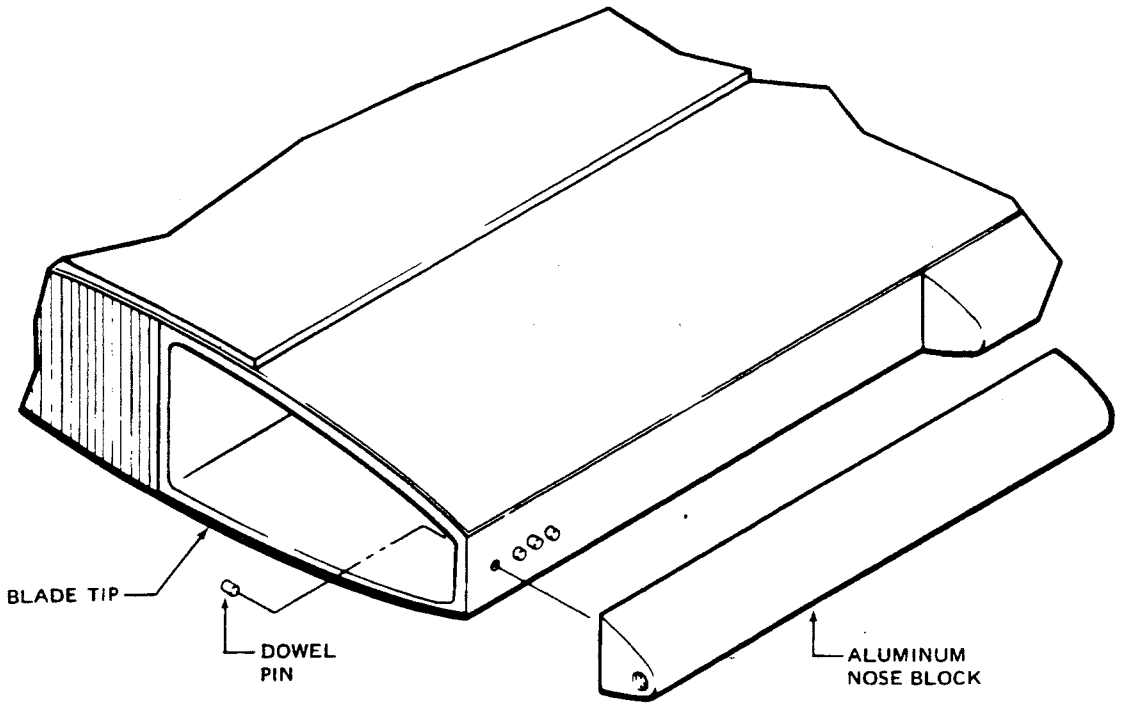
ITEM: Splice Cover REFERENCE: 63, Figure 3-6

NO.	REF LTR	CHARACTERISTICS	INSP METHOD	REQUISITE
1		Voids	Mechanically tap using T75449-1 steel hammer.	Replace splice cover (para 3-27)
2		Erosion or hole	Visual	Replace splice cover
3	Crack	Visual	Replace splice cover	
4	Corrosion	Visual	Replace splice cover	

Figure 3-12. Splice Cover — O.I.P.

ITEM: Nose Block (Aluminum) and Dowel Pin REFERENCE: 21 and 22, Figure 3-6

NO.	REF LTR	CHARACTERISTICS	INSP METHOD	REQUISITE
1		Loose, unbonded nose block or dowel pins	Mechanically tap nose block with T75449-2 aluminum hammer	Scrap blade
2		Corrosion	Visual/measure	Scrap blade if corrosion exceeds 0.010 inch depth

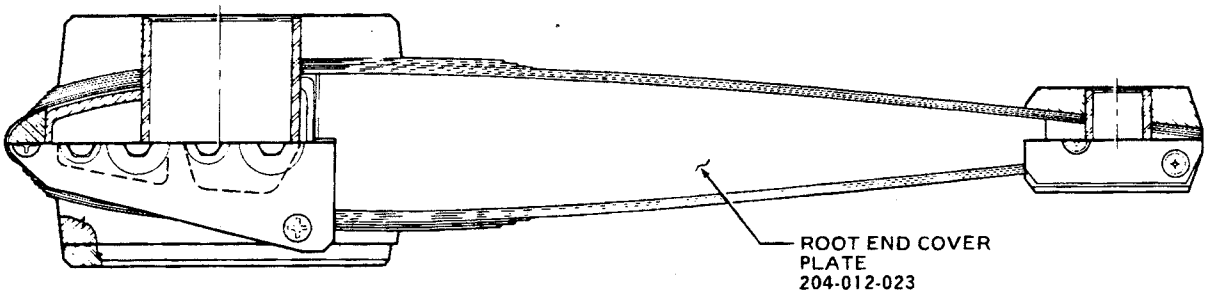


NOTE: Parts are shown exploded for clarity only; they are actually installed during inspection. Abrasive strip is not shown for clarity.

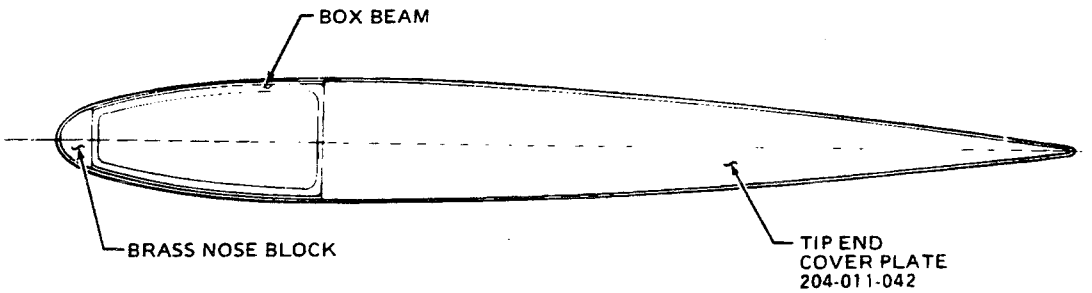
Figure 3-13. Nose Block, Aluminum, and Dowel Pin — O.I.P.

ITEM: Brass Nose Block and Cover Plates REFERENCE: Figure 3-6

NO.	REF LTR	CHARACTERISTICS	INSP METHOD	REQUISITE
1		Brass nose block has not been modified with seven dowel pins through leading edge of box beam into nose block.	Visual	Modify nose block (para 3-33).
2		Punctures through skin of cover plate 204-011-042 or 204-012-023.	Visual	Replace cover plate (para 3-28).
3		Unbonded cover plate 204-011-042 or 204-012-023.	Mechanically tap with T75449-2 aluminum hammer.	Replace cover plate (para 3-28).
4		Nicks and scratches 204-011-042 or 204-012-023.	Visual/measure	Repair if damage exceeds 0.008 inch depth (para 3-28).
5		Corrosion in cover plate 204-011-042 or 204-012-023.	Visual/measure	Repair if damage exceeds 0.008 inch depth (para 3-28).



VIEW OF ROOT END OF BLADE



VIEW OF TIP END OF BLADE

Figure 3-14. Brass Nose Block and Cover Plates (204-011-042 and 204-012-023) — O.I.P.

ITEM: Bushing, Main Retention

REFERENCE: 18, Figure 3-6

NO.	REF LTR	CHARACTERISTICS	INSP METHOD	REQUISITE
1		Serviceability	Visual	Examine for burrs.
2		Inside diameter	Measure	Replace bushing when limit chart dimensions are exceeded (para 3-21).
3		Outside diameter	Measure	Replace bushing when limit chart dimensions are exceeded (para 3-21).
4		Length	Measure	Replace bushing when chart dimensions are exceeded (para 3-21).

LIMITS CHART FOR NEW REPLACEMENT BUSHING 204-011-022

DASH NUMBER	A	B AFTER PLATING	C
- 3	2.5005 2.5010	2.7510 2.7515	4.4800 4.4850
- 5	2.5005 2.5010	2.8775 2.8780	4.4800 4.4850
- 7	2.5005 2.5010	2.8780 2.8785	4.4800 4.4850
- 9	2.5005 2.5010	2.8785 2.8790	4.4800 4.4850
- 11	2.5005 2.5010	2.8790 2.8795	4.4800 4.4850
- 13	2.5005 2.5010	2.8795 2.8800	4.4800 4.4850

NOTE: All dimensions are in inches.

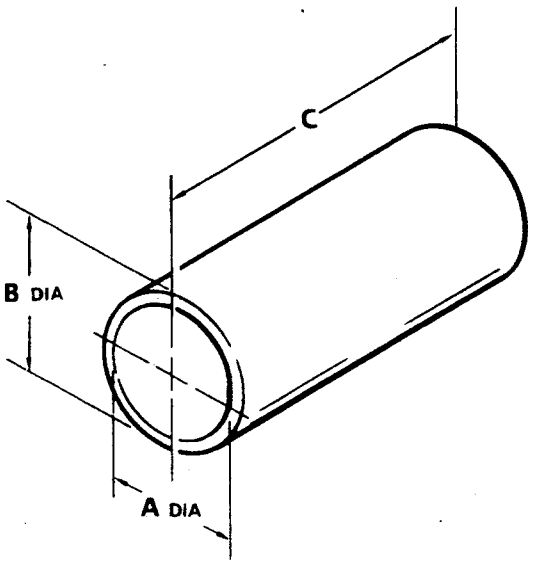


Figure 3-15. New Replacement Main Retention Bushing (204-011-022) — O.I.P.

ITEM: Bushing, Drag Bolt REFERENCE: 17, Figure 3-6

NO.	REF LTR	CHARACTERISTICS	INSP METHOD	REQUISITE
1		Serviceability	Visual	Examine for burrs.
2		Outside diameter	Measure	Replace bushing when limit chart dimensions are exceeded (para 3-24).
3		Inside diameter	Measure	Replace bushing when limit chart dimensions are exceeded (para 3-24).
4		Length	Measure	Replace bushing when limit chart dimensions are exceeded (para 3-24).

LIMITS CHART FOR NEW REPLACEMENT BUSHINGS 204-011-023

DASH NUMBER	A AFTER PLATING	B	C
- 3	1.1260 1.1265	0.8747 0.8752	1.885 1.890
- 5	1.1360 1.1365	0.8747 0.8752	1.885 1.890
- 7	1.1460 1.1465	0.8747 0.8752	1.885 1.890
- 9	1.1560 1.1565	0.8747 0.8752	1.885 1.890

NOTE: All dimensions are in inches.

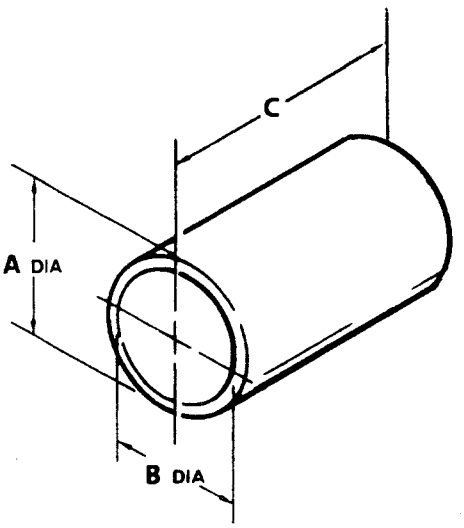


Figure 3-16. New Replacement Drag Bolt Bushing (204-011-023) — O.I.P.

ITEM: Stud

REFERENCE: 61, Figure 3-6

NO.	REF LTR	CHARACTERISTICS	INSP METHOD	REQUISITE
1	B	Corrosion	Visual	Replace corroded stud (para 3-30).
2	B	Loose	Feel	Replace loose stud (para 3-30).
3	B	Stripped or damaged threads	Visual	Replace damaged stud (para 3-30).
4	B	1/4-28 studs 204-011-053-1 installed	Measure	Replace all 1/4-28 studs with 5/16-24 UNF studs 540-011-023-3 (para 3-30).

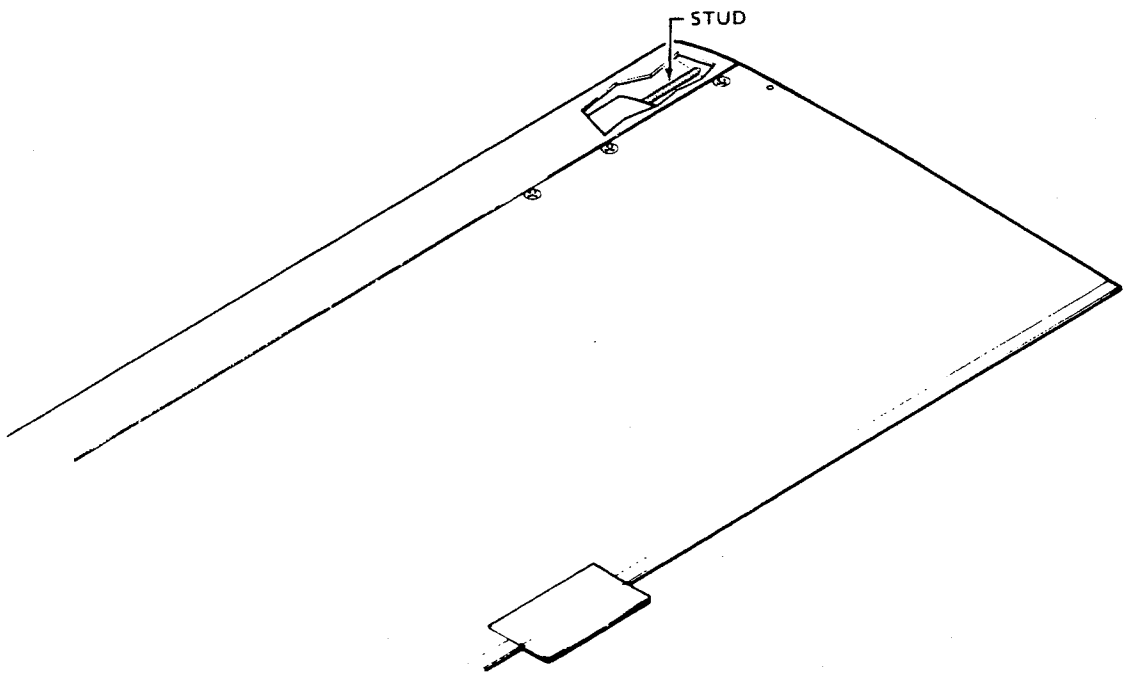
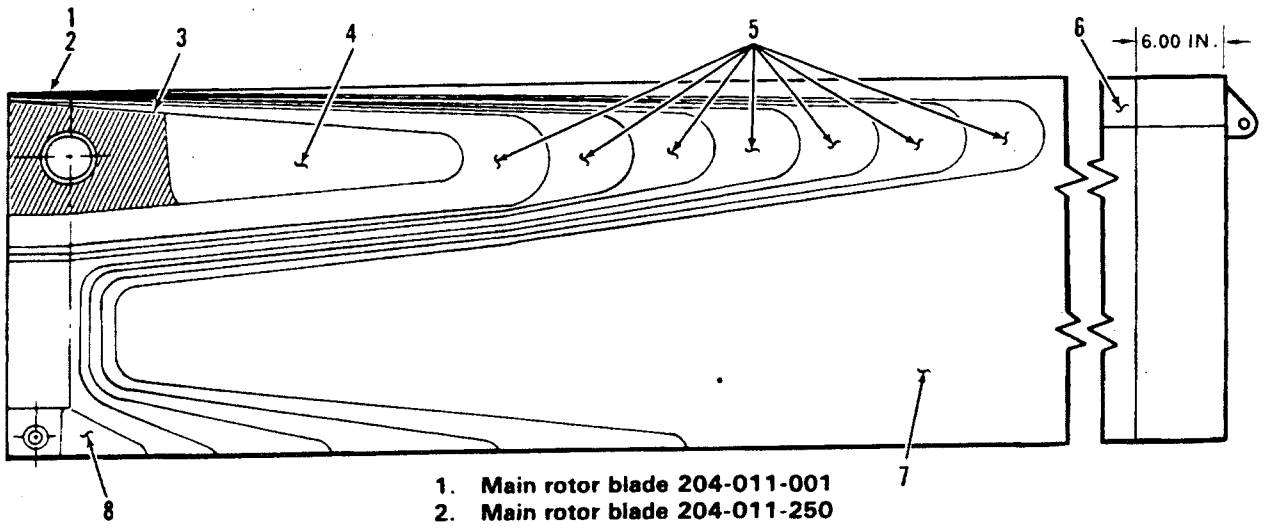


Figure 3-17. Stud – O.I.P.



1. **Main rotor blade 204-011-001**
2. **Main rotor blade 204-011-250**
3. **Grip pad**
4. **Grip plate**
5. **Doublers**
6. **Abrasive strip**
7. **Skin**
8. **Drag plate**

Figure 3-18. Main Rotor Blade Process Requirements

WARNING

Nitric acid is extremely dangerous. Avoid breathing fumes. Contact with organic materials may cause explosion. Chemical conversion materials are extremely dangerous. Observe fire and safety precautions. Contact with combustible materials will cause explosion or fire. Wear protective apron, rubber gloves, and safety goggles. Avoid contact with skin, eyes, or clothing.

(6) Mix supplementary chromate finish with solution of 6.50 ounces LHE cadmium solution (item 47, Appendix C) and 2.75 ounces nitric acid (item 53, Appendix C) per gallon of water.

(7) Apply chromate solution with swab or brush for 30 seconds, then rinse and dry thoroughly.

3-17. Chemical Film for Aluminum. Repair or touch-up chemical film treatment on main rotor blade aluminum surfaces as follows:

a. *Surface Preparation.*

(1) Scrub area to be treated with abrasive mats (item 48, appendix C), and solution of cleaning compound (item 52, Appendix C) mixed 10 to 15 percent by volume in water.

(2) Thoroughly rinse with water.

(3) Check surface for cleanliness. Spray a mist of demineralized water (item 15, Appendix C) on surface. If water forms a continuous film without sudden flashout, surface is acceptable. If water gathers in droplets within 25 seconds, repeat cleaning and testing.

b. *Procedure.*

WARNING

Chemical film material is dangerous. Observe fire and safety precautions. Contact with combustible materials can cause explosion or fire. Wear protective apron, rubber gloves, and safety goggles. Avoid contact with skin or eyes.

(1) Mix 3 ounces by weight of chemical film materials, (item 24, Appendix C) and 0.5 fluid ounce of nitric acid (item 53, Appendix C) to 1 gallon distilled or demineralized water (item 15, Appendix C). Mix thoroughly and store solution in plastic container.

(2) Brush-apply solution liberally to cleaned area. Allow to remain until surface color ranges from golden iridescent to brown, usually 30 seconds to 1 minute. Rinse or wipe off with cloth (item 59, Appendix C) dampened in distilled or demineralized water (item 15, Appendix C).

WARNING

Do not direct compressed air against skin.

(3) Air dry surface, or force dry with cloths (item 59, Appendix C) or compressed air.

Section VII. REPAIR

3-18. General Repair. Parts that do not meet inspection requirements listed in paragraph 3-7, table 3-1, and O.I.P.s shall be either repaired or replaced. Only those authorized repair instructions given in this section shall be done. When no repair is given for a part, it is considered nonreparable, and it shall be replaced.

3-19. Repair and Replacement. All materials, parts, and special tools needed are identified in text at point of usage. Special bonding room and handling requirements are as follows:

a. Bonding shall be accomplished under controlled temperature and humidity. The relative humidity shall not exceed 60 percent and the temperature shall be maintained between 65°F (18°C) and 85°F (29°C).

b. Bench tops and other assembly areas shall be maintained clean in a manner consistent with their intended use.

c. All adhesives and primers used in the bonding processes must be handled and stored properly.

d. Upon removal from refrigeration, all materials shall be warmed to room temperature in a polyethlene bag prior to use. To prevent moisture condensation on the adhesive, allow adhesive to reach room temperature before removing it from the polyethylene bag.

e. Unrefrigerated adhesives should be stored in such a manner that they are protected from dust and from unauthorized handling.

f. Cleanliness in adhesive bonding. Effective adhesion in metal bonding is eminently dependent upon a high degree of cleanliness. Extreme care should be exercised by every operator to assure that all bonding surfaces, adhesive materials, and all equipment used in the process are immaculate. The use of clean, lint-free gloves (item 69, Appendix C) is mandatory in preventing finger-printing of bonding surfaces and adhesive films. The gloves should be used only and solely in the handling of adhesive films and bonding surfaces. The function of the gloves is the protection of these materials. The handling of any other objects with the gloves may result in contamination.

g. Bonding tools for installing patches or replacement components with film adhesive shall be capable of applying 30 psi uniformly over an area larger than the heated area by an amount sufficient to assure that pressure is applied to any area heated to more than 160°F (71°C). The tools shall be capable of heating the bondlines being cured to a controlled temperature of 220°F to 230°F (140°C to 110°C) and of reaching that temperature at minimum rise rate of 1°/minute between 100°F (38°C) and 220°F (104°C). The abrasion strip bonding fixture must restrain the blade at the tip and at the trailing edge to prevent thermal distortions and maintain the blade twist.

h. Tests and in-process inspections required to determine blade serviceability are specified in text where applicable.

3-20. Trim Tab Replacement.

NOTE

Clean gloves shall be worn when handling clean parts. Cleaned parts shall be protected by clean kraft paper.

CAUTION

If the damaged trim tab has rivets in the leading edge of the tab on top and bottom side of blade, use extreme care in removing these rivets. These are "blind" type rivets and do not extend through to the opposite side. When drilling out these rivets, use caution so as not to drill into skin on opposite side. The other row of rivets (0.40 inch from trailing edge of blade) are countersunk rivets extending through the trailing edge strip and may be removed in the conventional manner.

a. Remove damaged trim tab (1, figure 3-19) as follows:

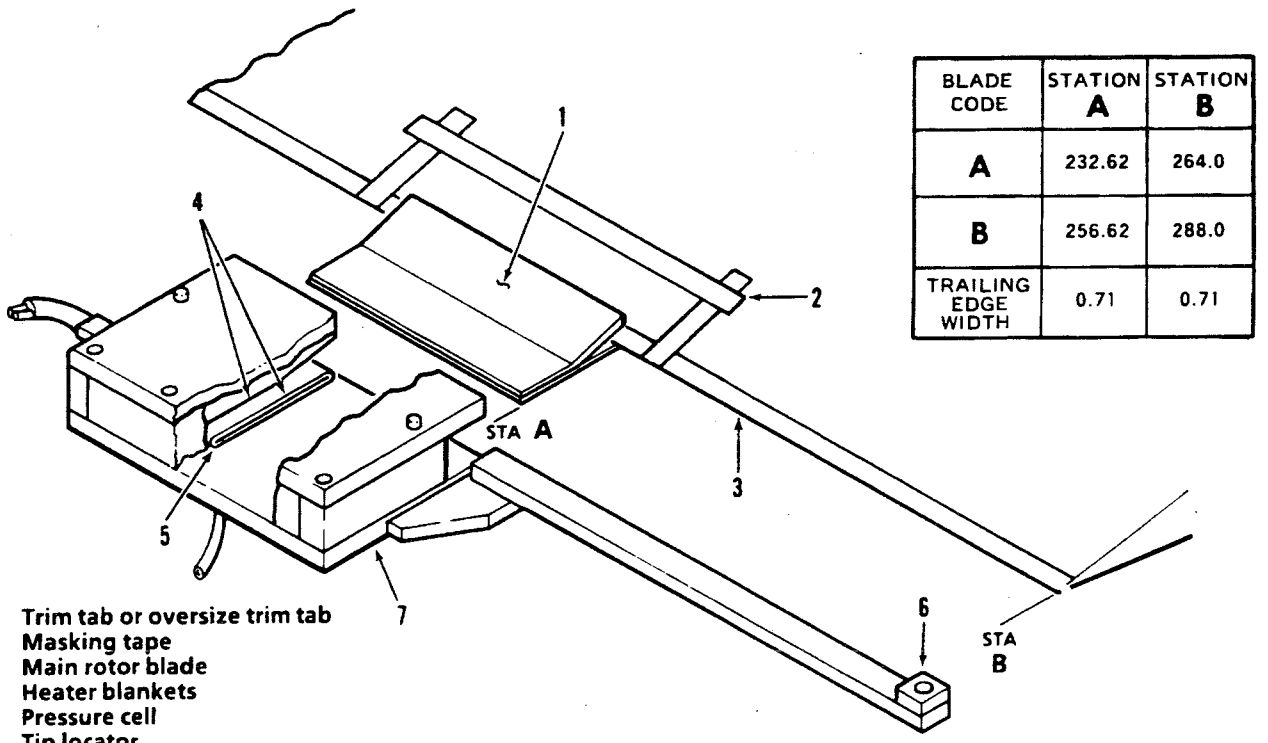
(1) Tap trailing edge corner with hammer to separate trim tab in order that a thin blade such as a putty knife can be inserted between the two pieces of the trim tab.

(2) Separate two pieces of trim tab enough to get hold of each piece. Peel each piece from rotor blade.

b. Inspect skin and trailing edge strip, on both sides of blade in area where trim tab was removed, for nicks, scratches, dents, holes, corrosion, and voids. Repair damage if limits of tables 3-2, 3-3, and 3-4 and paragraphs 3-7e and 3-7g are not exceeded.

c. Mask off the trim tab area, on both sides of blade (3), allowing a 0.50 inch border for adhesive squeeze-out. Use masking tape (2) (item 6, Appendix C).

d. Prepare blade surface as follows:



BLADE CODE	STATION A	STATION B
A	232.62	264.0
B	256.62	288.0
TRAILING EDGE WIDTH	0.71	0.71

1. Trim tab or oversize trim tab
2. Masking tape
3. Main rotor blade
4. Heater blankets
5. Pressure cell
6. Tip locator
7. Bonding fixture (T1256-0-7003-4) or oversize bonding fixture (T1256-0-7040)

Figure 3-19. Trim Tab Bonding

WARNING

Cleaning solvents are flammable and toxic. Use in well-ventilated area. Avoid skin contact and inhalation of vapors. Do not direct compressed air near or directly against skin. Wear protective apron, rubber gloves, and safety goggles.

NOTE

When corrosion repair was made around the periphery of the existing trim tab, prepare the area to accept oversize trim tab.

(1) Clean the blade surface for bonding by sanding with progressively finer sandpaper (item 7, Appendix C). Wipe off all sanding residue with cheesecloth (item 17, Appendix C) dampened with methyl-ethyl-ketone (item 8, Appendix C) or isoprophyl alcohol (item 49, Appendix C).

(2) Repeat wiping until cloth remains clean and all old adhesive has been removed; follow with a final wipe using cheesecloth (item 17, Appendix C) dampened with isoprophyl alcohol (item 49, Appendix C).

(3) As an alternate, the following procedure may be used:

(a) Attach T1256-0-7023 fixture hangers (1 and 3, figure 3-20) in suitable supports (4).

(b) Install hanger (1) into blade (2) main retention bushing hole and hanger (3) into spar hole at tip end as shown. Adjust knob (5) as necessary to prevent blade from turning in tool.

(c) Cover all exposed honeycomb core areas of blade with masking tape (item 6, Appendix C).

WARNING

Use blasting material only in well-ventilated area. Avoid skin contact and inhalation of dust. Do not direct compressed air near or directly against skin. Wear protective apron, rubber gloves, and safety goggles.

(d) Clean the blade surface for bonding by grit blasting area with 3/0 or 4/0 quartz abrasive (item 30, Appendix C) or with 180 - 220 grit aluminum oxide, (item 55, Appendix C).

(e) Remove tape covering core areas and vacuum core cell to remove dust and blasting material.

e. Clean out the rivet holes through the trailing edge strip removing all traces of corrosion. Inside of holes to be free of nicks and scratches. Fill holes with lacquer putty (item 61, Appendix C) and sand flush with blade surface

WARNING

Cleaning solvents are flammable and toxic. Use only in well-ventilated area. Avoid skin contact and inhalation of vapors. Do not direct compressed air near or directly against skin. Wear protective apron, rubber gloves, and safety goggles.

f. Degrease area to be bonded using paper wipers (item 44, Appendix C) and methyl-ethyl-ketone (item 8, Appendix C), followed by a final wipe with isopropyl alochol (item 49, Appendix C).

g. Spray rinse bonding areas with demineralized water (item 15, Appendix C) and check for water break free surface.

WARNING

FLIGHT SAFETY PART

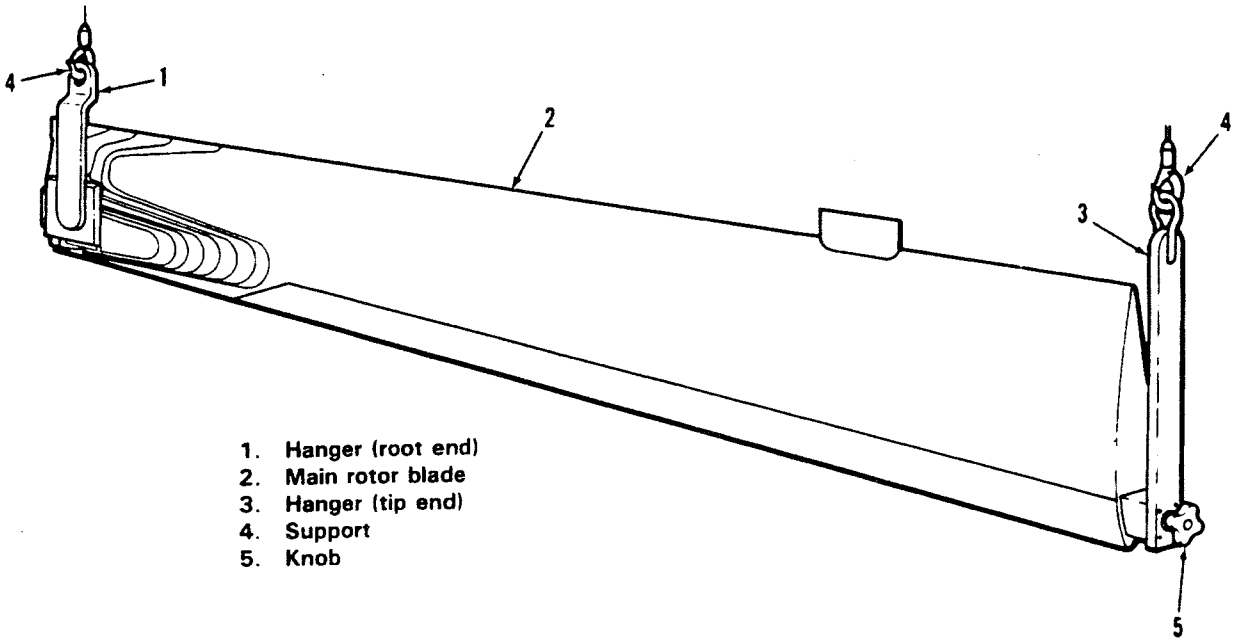
Adhesive primer must meet Bell Procurement Specification 299-947-121, Type I. This is a critical characteristic.

NOTE

The brush or roller brush shall be discarded after use. Spray equipment shall be purged regularly during extended periods of use and at the end of each operation.

h. Apply one coat of adhesive primer (item 12, Appendix C) by using brush (item 10, Appendix C) or roller brush (item 9, Appendix C) or by spraying. Air- dry for minimum of two hours at room temperature. The dry film thickness should be from 0.00004 to 0.00010 inch.

i. Inspection point. Inspect operations as required from preceding steps a. through h.



1. Hanger (root end)
2. Main rotor blade
3. Hanger (tip end)
4. Support
5. Knob

Figure 3-20. Blade Installation in Fixture T1256-0-7023

j. Cover primed bonding areas with kraft paper (item 16, Appendix C) to prevent contamination during drying.

k. If corrosion damage around the periphery of the removed trim tab was repaired, fabricate oversize trim tab in accordance with figure 3-21. If no damage was found in trim tab area, use standard replacement trim tab part number 204-011-039-1 (31, figure 3-6). If part number 204-011-039-107 trim tab is used, proceed to step s.

WARNING

Sulfuric acid and methyl-ethyl-ketone are extremely dangerous. Avoid contact with skin and breathing vapors. Contact with organic materials may cause explosions. When diluting, always pour acid into the water.

l. Clean standard trim tab part number 204-011-039-1 or oversized trim tab as follows:

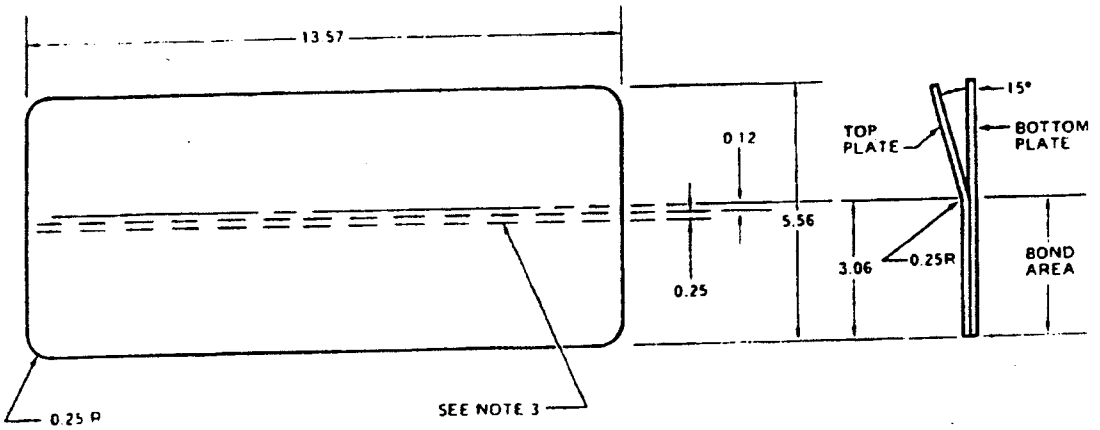
(1) Degrease parts by wiping with paper wipers (item 44, Appendix C) saturated with methyl-ethyl-ketone (item 8, Appendix C) followed by immersing them for 15 minutes in a solution of alkaline cleaner (item 34, Appendix C) (6.00 to 8.00 ounces per gallon of demineralized water) (item 15, Appendix C) maintained at a temperature of 140° F to 150° F (51° C to 61° C).

(2) Rinse thoroughly with demineralized water (item 15, Appendix C).

(3) Acid etch, in a solution of sodium dichromate (item 13, Appendix C) (2.00 to 3.00 percent by weight), sulfuric acid (item 14, Appendix C) (22.00 to 28.00 percent by weight), and the remainder of water, at a temperature of 150° F to 160° F (66° C to 71° C) for 9 to 11 minutes. Part shall have a bright clean uniform surface at the completion of this operation.

NOTE

Treated parts which have become conta minated through handling, water stains, etc., may be re-treated; however, etch time shall be confined to 1 to 10 minutes. Parts may be treated, as required, provided dimensional tolerances are not exceeded.



NOTES: 1. Fabricate parts from aluminum sheet 0.032 thick (item 1, Appendix C).

WARNING

FLIGHT SAFETY PART

Adhesive must meet Bell Procurement Specification 299-947-121, Type 1.This is a critical characteristic.

2. Bond assembly using AF-163-2K (item 11, Appendix C) using a suitable fixture capable of applying 40 psi pressure while maintaining bondline temperature of 225-235°F (107-113°C) for two hours.
3. Apply layer of mylar tape (item 72, Appendix C) to either top or bottom plate.
4. All dimensions are in inches.

Figure 3-21. Fabrication of Oversize Trim Tab

(4) Spray rinse part with demineralized water (item 15, Appendix C) at room temperature (70°F to 80°F).

(5) Hot-rinse part with demineralized water (item 15, Appendix C) at 140°F to 160°F (60°C to 71°C) temperature for 1/2 to 1 minute. Part should show no signs of staining or water break.

(6) Dry parts with room temperature air (70°F to 80°F). If parts cannot be used immediately, they must be wrapped in clean kraft paper (item 16, Appendix C) and stored in an area free from high humidity and air-borne contamination. Storage time limit is 30 days. It is permissible to retreat the parts, providing dimensional tolerances are not exceeded.

NOTE

Spot cleaning: Should a part become contaminated with fingerprints, dust, dirt, and other minor contamination after processing as previously described, the soiled area shall be spot-cleaned with cleaning solution per step 3-20,l.

CAUTION

The spot cleaning process above is not applicable to cases of major contamination such as chemical stains resulting from the sodium dichromate (pickle) process.

m. Inspection point. Inspect for complete removal of all spot defects.

NOTE

The brush or roller-brush must be discarded after use. The spray equipment shall be purged regularly during extended periods of use and at the end of each operation.

n. Apply one coat of adhesive primer (item 12, Appendix C) by using brush (item 10, Appendix C) or roller brush (item 9, Appendix C) or by spraying. Air dry for 30 minutes at room temperature (70°F to 80°F), plus two hours at 225°F to 235°F (107°C to 113°C). The dry film thickness should be from 0.00004 to 0.00010 inch.

WARNING

FLIGHT SAFETY PART

Adhesive primer must meet Bell Procurement Specification 299-947-121, Type I. This is a critical characteristic.

o. Cut a piece of adhesive (item 11, Appendix C) to fit the inside surface of the trim tab, remove the protective backing from it, then place the adhesive sheet back inside the trim tab.

p. Position standard replacement trim tab (31, figure 3-6) over trailing edge of blade and locate as shown in figure 3-19. Position oversized replacement trim tab over trailing edge of blade in approximate location shown in figure 3-19 so as to cover any repairs made as a result of defects found in step b.

q. Cut a 0.25 inch wide strip of adhesive (item 11, Appendix C) long enough to reach around the sqeeze-out region on both sides of the blade. Remove the protective backing and lay adhesive in place.

r. Cover the adhesive filler material with a 0.50 inch wide strip of "name tag tape" (item 18, Appendix C) which has been treated with parting agent (item 19, Appendix C) to inhibit sticking, overlapping the edge of the trim tab by approximately 0.09 inch. Do this to top and bottom surfaces.

s. If 204-011-039-107 trim tab is being used proceed as follows:

WARNING

FLIGHT SAFETY PART

Adhesive must meet Bell Procurement Specification 299-947-121, Type I. This is a critical characteristic.

(1) Cut a piece of adhesive (item 11, Appendix C) to fit the inside of the trim tab.

(2) Position adhesive (item 11, Appendix C) over trailing edge of blade and locate as shown in figure 3-19. Remove protective backing from adhesive.

(3) Remove protective backing from adhesive in trim tab and position trim tab over adhesive on blade and locate trim tab as shown in figure 3-19.

t. Inspection point. Inspect operations as required from steps k. through s.

u. Cover the trim tab and 0.50 inch border around it, on both sides of the blade, with two layers of wicking cloth (item 20, Appendix C).

NOTE

It is desirable to use local heat (trim tab area only) as described below in order to keep the main bolt hole and grip plates below 200°F (93°C), and avoid having to shot peen and rebush the blade and to avoid having to replace the tip cover.

v. Apply a special heated, clamping type, bonding fixture T1256-0-7040 or T1256-0-7003-4 (7, figure 3-19) or equivalent to the trim tab. The bonding cycle of the T1256-0-7040 or T1256-0-7003-4 is controlled by T1256-0-7003-3 control panel. The pressure to be from 20 to 25 psi. The temperature of the blade, near the trim tab to be 225°F to 235°F (107°C to 113°C). Cure for 2 hours.

w. Inspection point. Inspector check and verify pressure, heat, and time cycle.

x. Remove bonding fixture and clean up with abrasive paper (item 36, Appendix C) and methyl-ethyl-ketone (item 8, Appendix C).

y. Quality control requirements of bonds: Test specimens are not required. Bonds are to be inspected by mechanical tapping or ultrasonic methods. Edge voids up to 0.06 inch deep shall be filled with adhesive (item 5, Appendix C), deeper than 0.06 inch shall be repaired. Voids may not come nearer than 0. 50 inch to the edge. Maximum void area on a side not to exceed 10 percent of the total area, of that side. Voids exceeding limits shall require replacement of the trim.

z. Apply chemical film treatment (item 24, Appendix C) to the bare areas around the trim tab. Refer to paragraph 3-17. Also treat the trim tab if it is not already treated.

aa. Use adhesive (item 5, Appendix C) or adhesive (item 35, Appendix C) to fair around the edges of the trim tab.

NOTE

Do not replace rivets in trim tab.

ab. Touch up paint if required and balance blade. (Refer to paragraphs 3-35 and 4-2.)

3-21. Main Retention Bolt Bushing Replacement.

a. Install blade in a suitable arbor press (1, figure 3-22). Assure blade is properly supported at both root and tip ends. Use tool, T1256-0-7007(2), (used for both removal and installation) in conjunction with arbor press to press main retention bolt bushing (3) out of blade. An alternate procedure may be accomplished as follows:

(1) Enlarge the inside diameter of the bushing, by carefully machining, until only a thin shell (0.010 inch approximately) remains.

(2) Carefully remove the thin shell by collapsing it with a punch.

b. Clean zinc chromate from the hole by scrubbing with cleaning cloth (item 59, Appendix C) soaked in toluene (item 28, Appendix C).

c. Inspect main retention bolt hole (figure 3-23) surfaces for cracks; if found, scrap blade.

d. Inspect hole surfaces for nicks and scratches; if found, the hole shall be prepared for the "first oversize" bushing as described in paragraph 3-22.

NOTE

It is not permissible to remove the nicks and scratches by reaming unless the hole is subsequently shot peened. (Refer to paragraph 3-23.)

e. Measure size of hole. It must not be larger than 2.8775 inches in the grip areas. In the doubler areas the diameter may be as large as 2.8790 inches.

f. Inspection point. Inspect hole for accomplishment of steps a. through e.

g. Select a 204-011-022-5, -7, -9, -11 or -13 (figure 3-15) or select maximum oversize bushing fabricated per paragraph 3-22 which is 0.002 to 0.003 inch larger than the average hole size in the grip area.

h. Chill the bushing to minus 60° F (-51° C).

i. Apply polyamide epoxy primer, (item 43, Appendix C), or corrosion preventive compound (item 27, Appendix C) to the hole then proceed immediately to next step.

j. Press the chilled bushing (3, figure 3-22) (from step h.) into place using tool T1256-0-7007(2). End of bushing must not protrude outside the grip plate face or the grip pad of the blade. Bushing should be recessed approximately 0.005 inch below grip plate surface.

k. Measure the inside diameter of the bushing (3). In the restrained areas the diameter shall be 2.5005 to 2.5010 inches. If necessary, ream the ID as follows:

(1) Install blade in honing guide T1256-0-7034 (2, figure 3-24). Assure blade is properly supported at tip end.

(2) Using honing fixture, T1256-0-7016(1), hone replacement bushing to 2.5005 to 2.5010 inches, surface finish of 63 rms or smoother.

(3) Immediately after reaming, apply a coat of corrosion preventive (item 4, Appendix C) to inside surface of bushing.

3-22. Main Retention Bolt Bushing Replacement in Damaged Hole.

NOTE

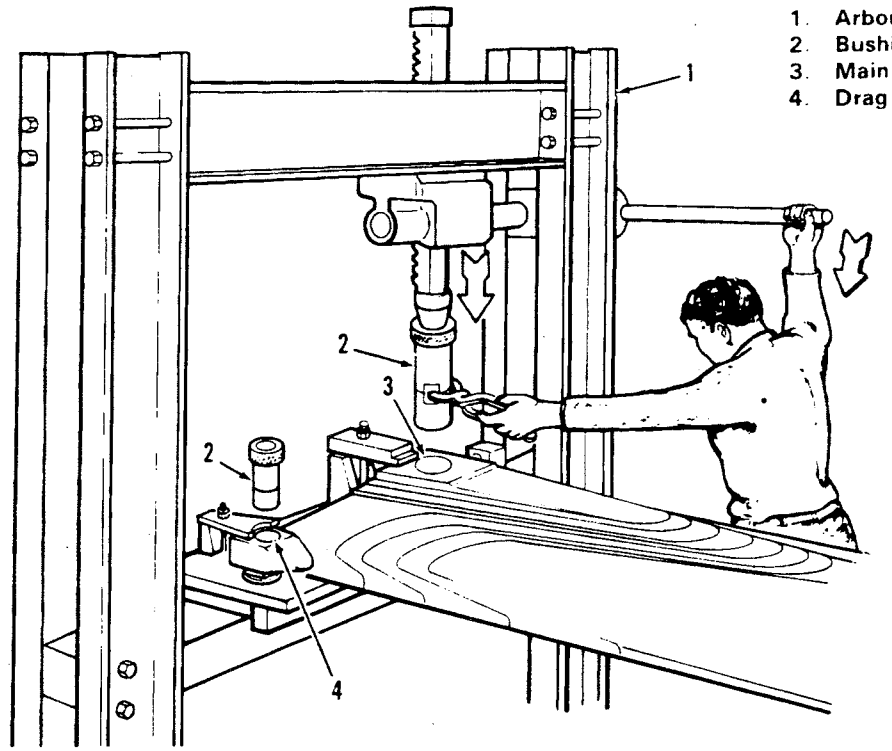
Whenever the hole for the main retention bolt bushing (figure 3-23) has been damaged (while removing a bushing, etc.), it is necessary to remove the damaged material (a concentric shell) and shot peen the entire surface of the hole again. This part assumes that the hole has been damaged.

a. Bore the hole out only enough to clean out the damaged condition with a surface finish of 63 rms or less. A diameter of 2.920 inches is the maximum allowable.

b. Smooth the ends of the hole (four places) with 0.020 to 0.040 inch radii or 45 degree chamfers.

c. Inspection point. Inspect and check hole dimension and surface finish.

d. Shot peen the hole only per paragraph 3-23.



1. Arbor press
2. Bushing installation fixture (T1256-0-7007)
3. Main retention bolt bushing.
4. Drag bolt bushing.

Figure 3-22. Main Rotor Blade Bushing Replacement

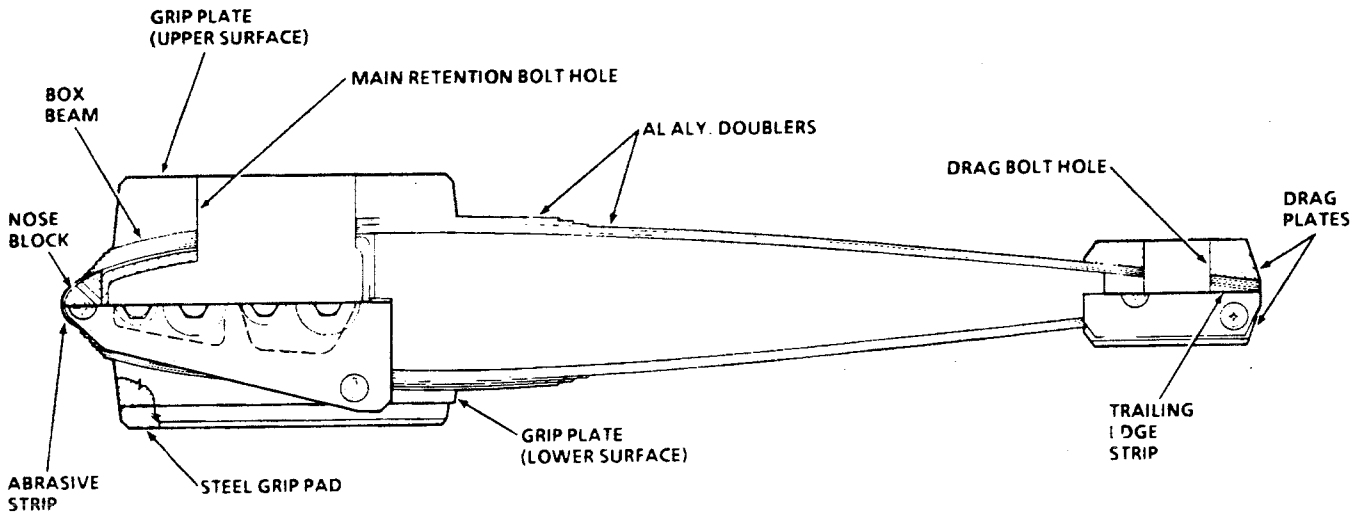


Figure 3-23. Repair of Main Retention Bolt Hole and Drag Bolt Hole

e. Hone the hole using honing fixture T1256-0-7016 (1, figure 3-24) and hone guide T1256-0-7034 (2) until approximately 40% to 95% of the shot peened surface peaks have been removed.

f. Measure the size of the honed hole in the grip plate area, not down in the doublers. (See figure 3-23.) Evidence of shot peen "pits" should exist on the entire peened area.

g. Fabricate a special bushing from 4130 tube stock (item 56, Appendix C) in accordance with figure 3-25. Outside diameter of bushing (after plating) shall be 0.002 to 0.003 inch larger than the average dimension found in step f. above.

h. Chill the bushing to minus 60°F (-51°C).

i. Apply polyamide epoxy primer; (item 43, Appendix C), or corrosion preventive compound (item 27, Appendix C) to the hole then proceed immediately to next step.

j. Immediately following the previous step, press in the chilled special bushing, using tool T1256-0-7007 (2, figure 3-22); the ends of the bushing shall not protrude outside the grip plate face or the grip pad of the blade. Bushing ends should be recessed approximately 0.005 below grip plate and grip pad surfaces.

k. Ream or hone the inside diameter of the bushing to 2.5005 to 2.5010 inches per paragraph 3-21, step k. The inside diameter of the bushing may be oversize in the unsupported area in the middle.

l. Inspection point. Inspect and check hole dimension and surface finish.

NOTE

The bushing replacement procedure previously described may be repeated as often as necessary (without exceeding the 2.920 inches maximum diameter).

m. Apply a coat of corrosion preventive (item 4, Appendix C) to the inside surface immediately after reaming.

3-23. Shot Peen Procedure.

WARNING

The most critical application areas for shot peening are referenced in Bell Helicopter Design Process Specification (DPS) #2, paragraph 3.8. These areas are specifically called out in the paragraph 3-23b, items (1), (2), and (3). Ensure that the shot peening processes are performed correctly on each surface. Proper shot peening is a critical characteristic and must be performed by a Bell or AVSCOM approved source.

a. Shot peening will be repeated when machining of a shot peened area exceeds the following limits:

(1) Scratches 0.003 inch deep and 0.750 inch long and not within 1.00 inch of the main retention bolt bushing hole. Polishing shall be accomplished over as small an area as possible to remove the scratches.

(2) A maximum of three such scratches shall be allowed.

b. Whenever the blade is heated above 250°F (121°C) at the root end, three areas shall be shot peened as follows:

(1) The hole in the blade for the main retention bolt bushing (figure 3-23).

(2) The grip plate (top) and grip pad (bottom) out to station 44.0.

(3) The inside surfaces (top and bottom) of the box beam (washer shaped areas 0.750 inch wide band) concentric with the hole.

(4) Coverage of shot peened area shall be 98 percent.

(5) Overspray is allowed inside the box beam and on the grip plate tangs. No overspray is allowed on the doublers.

c. The hole alone must be shot peened each time the hole is enlarged. In both cases the hole shall be honed after shot peening, per instructions in paragraph 3-22. If the paint has not already been removed from the areas to be shot peened, it shall be done at this point. Refer to paragraph 3-13.

d. Inspect shot peen test specimen (No. 1545 Test Strip A, Metal Improvement Company, per MIL-S-13165A, Test Strip A, figure 1, page 6, AMS2431A or equivalent) in an approved tool (similar to No. 1105 Almen Gage, Metal Improvement Company, per MIL-S-1365A, Test Gage, figure 5, page 8 or AMS2431A)I Flatness must equal or better 0.0015 inch arc height.

e. Install approved strip (in the crosswise position) on a suitable holding fixture.

f. Install the holding fixture with strip into the receiver of a shot peening machine (similar to Metal Improvement Company Peenamatic Machine No. 968E534).

g. Service the shot peening machine with cast steel shot (item 29, Appendix C) and 60 psi air supply.

h. Cycle shot peen machine per manufacturer's instructions.

i. Remove the test strip holder and remove the test specimen.

j. Check the test specimen, as in step d. except the intensity is to be 0.008 A2 to 0.015 A2.

k. Install the butt end of the blade and a new test strip in a suitable holding fixture then mask the blade around the grip plates out to station 44.0 with approximately 0.062 inch thick rubber sheet. Mask as far out on the blade as the closure on the cabinet. Use Tuck Tape (item 50, Appendix C) or equivalent for attachment.

NOTE

Holding fixture shall provide accurate location of the blade to cover the desired area and to accept the test strip.

l. Insert a suitable box beam plugging tool to restrict the flow of shot outboard of the affected area.

m. Install the blade in the shot peening machine and insert the shot peen lance through the main retention bolt hole (figure 3-23).

n. Cycle the shot peening machine per manufacturer's instructions.

o. Remove the shot peen lance and test strip.

p. Inspection point. Inspect hole for 98 percent coverage and inspect test strip for 0.008 A2 to 0.014 A2 intensity.

NOTE

This completes the shot peening of the hole for the main bushing. The shot peening of the grip plates is described below.

q. Shot peen grip plates (figure 3-23) as follows:

(1) Inspect two test strips for tang (refer to step d).

(2) Locate the test strips near the butt end of the blade adjacent to the area to be shot peened.

(3) Plug the main bushing hole with cork or expanding rubber plugs.

(4) Position blade in cabinet with the butt end of blade from the inside of the cabinet centered between the blast nozzles. Adjust the height of the blade to ensure complete coverage of the tang area on the vertical stroke. Use a suitable tool which holds the blade in a sealed cabinet while moving the spray nozzle along each side of the blade.

(5) Install the forward and rear cabinet enclosures and shot peen per manufacturer's instructions.

(6) Blow any remaining shot out of the butt end of the box beam (figure 3-23).

(7) Remove blade from shot peening machine.

(8) Remove the Almen test strips and check for an intensity of 0.008 A2 to 0.016 A2 intensity.

(9) Inspection point. Inspect for 98 percent coverage.

(10) Remove plugs and tools from the blade.

(11) Blade shall be refinished on the grip plates per paragraph 3-36.

3-24. Drag Bolt Bushing Replacement.

a. Install blade in a suitable arbor press (1, figure 3-22). Assure blade is properly supported at both root and tip end. Use tool, T1256-0-7007(2), (used for both removal and installation) in conjunction with arbor press to press drag bolt bushing (4) out of blade. An alternate procedure may be accomplished as follows:

(1) Enlarge the inside diameter of the bushing by carefully machining until only a thin shell (approximately 0.010 inch) remains.

(2) Carefully remove the thin shell by collapsing it with a punch.

b. Clean corrosion preventive compound from drag bolt hole (figure 3-23) by scrubbing with cleaning cloth (item 59, Appendix C), soaked in toluene (item 28, Appendix C). Inspect hole surface for cracks; if cracks are found, scrap blade.

c. Inspect hole surfaces for nicks and scratches; if found, the hole shall be prepared for the "first oversize" bushing as described in paragraph 3-25.

d. Measure size of hole. It must not be larger than 1.1655 inches diameter.

e. Inspection point. Inspect hole for accomplishment of steps a. through d.

f. Select a new bushing 204-011-023-1, -3, -5, -7, or -9, figure 3-16 or select maximum oversize bushing fabricated per paragraph 3-25 which is 0.0010 inch larger than the average hole size in the drag plate.

g. Chill the bushing to minus 60° F (-51° C).

h. Apply polyamide epoxy primer (item 43, Appendix C), or corrosion preventive compound (item 27, Appendix C) to the hole then proceed immediately to next step.

i. Press the chilled bushing (17, figure 3-6) into place using tool T1256-0-7007(2, figure 3-22). End of bushing must not protrude outside the drag plate face on either side of the blade (figure 3-23).

3-25. Drag Bolt Bushing Replacement in Damaged Hole.

NOTE

Whenever the hole for the drag bolt bushing (figure 3-23) has been damaged (while removing a bushing, etc) it is necessary to remove the damaged material. This part assumes that the hole has been damaged.

a. Bore the hole out only enough to clean out the damaged condition with a surface finish of 63 rms or less. A diameter of 1.1655 inches is the maximum allowable.

b. Smooth the ends of the hole with 0.020 to 0.040 inch radii or 45 degree chamfer.

c. Inspection point. Inspect and check hole dimension and surface finish.

d. Measure the size of the bored out hole and select a bushing from figure 3-16 that after plating is 0.0010 inch larger than the bored out hole or fabricate a special bushing from 4130 tube stock (item 41, Appendix C) per figure 3-26.

e. Chill bushing from step d. to minus 60° F (-51° C).

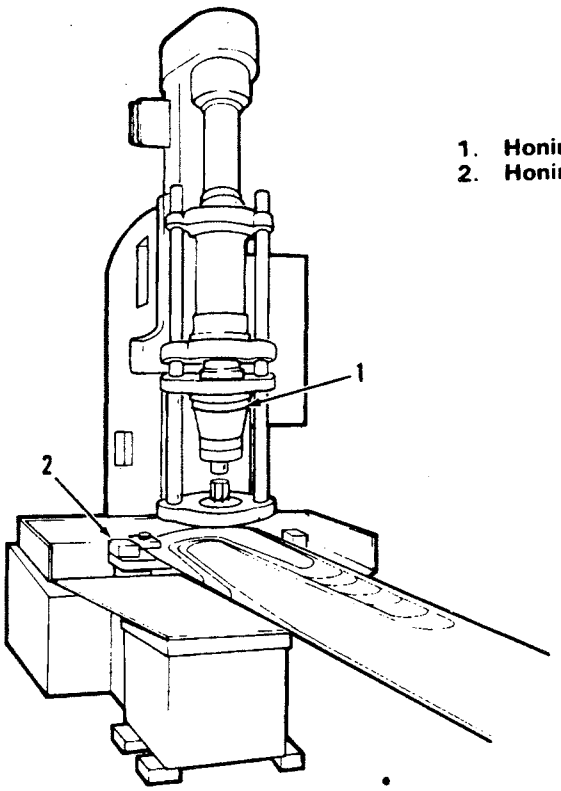
f. Apply polyamide epoxy primer (item 43, Appendix C) or corrosion preventive compound (item 27, Appendix C) to the inside of the hole.

g. Press the chilled replacement bushing (17, figure 3-6) into place using tool T1256-0-7007 (2, figure 3-22). End of bushing must not protrude outside drag plate face surfaces (figure 3-23).

3-26. Abrasive Strip (Leading Edge Cover) Replacement.

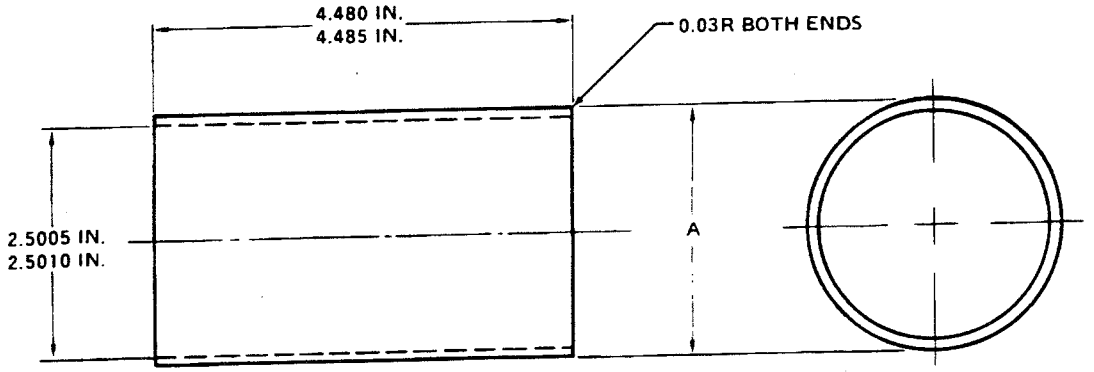
WARNING

All blades that have been modified with an aluminum nose block (figure 3-13) shall be scrapped if either center or outboard abrasive strips (19 or 20, figure 3-6) require replacement.



1. Honing fixture, T1256-0-7016
2. Honing guide, T1256-0-7034

Figure 3-24. Honing Main Rotor Blade Bushings



NOTES

1. Fabricate a special bushing using 4130 tube stock (item 56, Appendix C).
2. Outside diameter A (after plating is to be 0.0020 to 0.0030 inch larger than the average dimension found in paragraph 3-22f).
3. Outside diameter A (before plating is to be 0.0007 to 0.0013 inch less than the diameter after plating). Plate O.D. only per QQ-P-416B, Class 2, Type II.
4. After machining inspect for finish and dimensions.
5. Use magnetic particle inspection to check for cracks.

Figure 3-25. Fabrication of Special Main Retention Bolt Replacement Bushing

a. Determine if blade has been modified with aluminum nose block (21, figure 3-6) or if the nose block is brass. Only blades with brass nose block shall have damaged abrasive strips replaced.

WARNING

Protective gloves shall be worn to protect against sharp pointed coils sticking hands, arms, etc. Protective eye covering shall be worn when removing cobalt abrasive strip.

NOTE

The blade may be changed from the three piece abrasive strip installation to two piece abrasive strip installation which is standard on 204-011-250-113 blade. If either the outboard or center abrasive strip needs replacement, then both shall be removed and replaced by a single 205-015-010-101 abrasive strip or a 205-015-010-103 abrasive strip on 204-011-001-15 blade.

b. Remove abrasive strips as follows:

(1) Remove abrasive strip splice cover per paragraph 3-27, step a.

(2) To locate bond line remove paint from tip end of abrasive strip by sanding with abrasive paper (item 36, Appendix C).

(3) Using a putty knife, or equivalent, carefully pry up one corner of abrasive strip. Carefully work abrasive strip loose inboard and to leading edge.

(4) Measure approximately 2.00 inches from trailing edge of abrasive strip. Being careful not to damage spar use a chisel and make a cut in tip end of abrasive strip so that it will start tearing.

(5) Using pliers, bend pryed up corner of abrasive strip over so that it will catch in slot of work aid fabricated per table 2-3.

WARNING

Stay clear of abrasive strip when rolling on work aid. When abrasive strip comes off or breaks it will unroll on work aid.

(6) Catch corner of abrasive strip in slot of work aid. Carefully turn work aid and abrasive strip will tear where it was cut with chisel and roll up on work aid. Roll complete length of abrasive strip on work aid and remove.

(7) Turn blade over and repeat steps (1) thru (6).

(8) Repeat steps (1) thru (7) to remove the rest of the abrasive strip from both sides of the blade.

(9) Remove thin strip of abrasive strip that is left on leading edge of blade by placing putty knife or chisel against abrasive strip and tapping with hammer.

c. Remove old adhesive and prepare blade surface as follows:

(1) Remove all old adhesive by carefully sanding with progressively finer abrasive paper (item 36, Appendix C).

(2) Clean blade surface with a clean cheesecloth (item 17, Appendix C) saturated with methyl- ethyl-ketone (item 8, Appendix C).

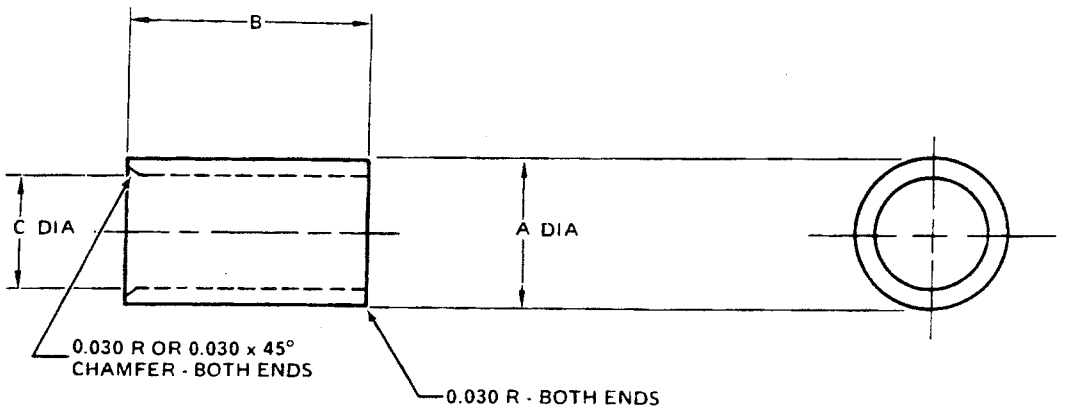
d. Inspection point. Inspect surface before proceeding.

e. Tightly press the abrasive strip to the blade leading edge; it must "nest" into the inboard abrasive strip within 0.080 inch along the diagonal cut and within 0.150 inch at the inboard end.

f. Trim off the outboard end of the abrasive strip allowing it to extend 0.0625 to 0.1250 inch beyond end of the blade.

g. Mark the blade skins (with non-abrasive material) intermittently along the trailing edge of abrasive strip on top and bottom sides.

h. Remove the abrasive strip from the blade.



NOTES

1. All dimensions are in inches.
2. Fabricate maximum oversized drag bolt bushing from 4130 steel tube stock, (item 41, Appendix C) as follows:
   a. Length dimension B to be 1.885 to 1.890 inches.
   b. Inside diameter dimension C to be 0.8747 to 0.8752 inches.
   c. Outside diameter dimension A shall be 0.0010 inch larger than the average dimension of the drag bolt hole after cleanup. Average dimension of hole shall not exceed 1.1655 inch diameter.
   d. Chamfer inside and outside diameter at both ends of bushing to dimensions shown.
   e. Plate outside diameter of bushing only in accordance with QQ-P-416B, Class 2, Type II.
3. After machining inspect for finish and dimensions.
4. Use magnetic particle inspection to check for cracks.

Figure 3-26. Fabricate Special Replacement Drag Bolt Bushing

i. Measure the distances from the marks on the blade skins to the front edge of the skins. Add 0.030 inch to these distances and transfer them to the proper side of the abrasive strip at the same spanwise station from which they were originally taken.

(1) Using a straight edge, connect these points on the abrasive strip and trim both sides along these lines.

(2) The back edges of the abrasive strip must be smooth and deburred, and must have no more than 0.250 inch gap to the front edges of the skin, after the abrasive strip has been bonded in place.

j. Inspection point. Inspect operations as required for steps e. through i.

k. Mask off the entire blade with masking tape (item 23, Appendix C) and kraft paper (item 16, Appendix C), except for the area of the leading edge cover. Also, mask off (or plug) the open end of the box beam and the screw holes to prevent entry of vapor blast slurry. Install blade in vapor blast fixture T1256-0-7023 as shown in figure 3-20.

NOTE

The surface shall be bonded or adhesive primer applied within 72 hours after treatment.

l. If part cannot go to vapor blast immediately, wrap in clean kraft paper (item 16, Appendix C) for storage (no time limit).

WARNING

Use blasting material only in well-ventilated area. Avoid skin contact and inhalation of dust. Do not direct compressed air near or directly against skin. Wear protective apron, rubber gloves, and safety goggles.

m. Vapor blast the exposed part of blade with a light slurry of 3/0 grit flint quartz (item 30, Appendix C) and water. Blast evenly; dry abrasive blasting may be used as an alternate method for cleaning stainless steel abrasive strips as follows:

(1) Parts shall be dry-abrasive blasted with 80 grit aluminum oxide (item 71, Appendix C).

(2) Blasting pressure and distance of the nozzle from the part shall be controlled to prevent warpage.

(a) Use a blasting pressure of 50 to 80 psi.

(b) The abrasive blasting shall be done with the abrasive stream perpendicular to the surface insofar as possible.

WARNING

Cleaning solvents are flammable and toxic. Use only in well-ventilated area. Avoid skin contact and inhalation of vapors. Do not direct compressed air near or directly against skin. Wear protective apron, rubber gloves, and safety goggles.

n. Stains are permissible. Small spots may be removed using a clean cheesecloth (item 17, Appendix C) dampened in methyl-ethyl-ketone (item 8, Appendix C).

o. Brush-rinse blade with demineralized water (item 15, Appendix C). Use a plater's brush to remove all abrasive and residue.

p. Spray rinse with demineralized water (item 15, Appendix C) and check for water break free surface.

q. Dry blade in room temperature air (70°F to 80°F) that is dust free for a minimum of 10 minutes.

r. Inspection point. Inspect surface for required cleanliness. (A water break free surface).

NOTE

The adhesive film and adhesive primer must be removed from refrigerated storage and then allowed to warm to room temperature prior to use. Adhesive primer must be thoroughly agitated prior to and during use.

WARNING

FLIGHT SAFETY PART

Adhesive primer must meet Bell Procurement Specification 299-947-121, Type I. This is a critical characteristic.

s. Apply one coat of adhesive primer (item 12, Appendix C) by using brush (item 10, Appendix C) or roller-brush (item 9, Appendix C) or by spraying.

NOTE

The brush or roller-brush must be discarded after use. The spray equipment shall be purged regularly during extended periods of use and at the end of each operation.

t. Air dry for minimum of two hours at room temperature. The dry film thickness should be from 0.00004 to 0.00010 inch.

u. Clean stainless steel abrasive strip as follows:

WARNING

Paint remover and cleaning solvents are harmful. Use only with adequate ventilation. Avoid prolonged or repeated breathing of vapors and contact with skin. Smoking is prohibited in immediate areas. Wear protective apron, rubber gloves, and safety goggles.

(1) Vapor degrease the stainless steel abrasive strip with perchloroethylene (item 32, Appendix C) at 188°F to 205°F (87°C to 97°C) or wipe clean with methyl-ethyl-ketone (item 8, Appendix C) or isopropyl alcohol (item 49, Appendix C).

(2) To remove any paint or ink on the parts, dip them in paint remover (item 33, Appendix C) or equivalent.

(3) If paint remover is used, water-rinse part to remove paint remover.

(4) Alkaline clean parts in 140°F to 160°F (60°C to 71°C) cleaner (item 42, Appendix C) (4 to 8 oz/gal) or equivalent, for 5 to 10 minutes or use method described in paragraph 3-20 steps l. (1) and (2).

(5) Demineralized water (item 15, Appendix C) rinse for 3 to 5 minutes at a temperature of 140°F to 160°F (60°C to 71°C).

CAUTION

The tank used for the solution in following step shall be lined with plastic and the heating coils shall be plastic or plastic coated. No lead or lead bearing materials shall be allowed to contact the solution.

(6) Immerse the parts in a solution of 1 lb/gal sodium bisulfate (item 46, Appendix C) and 7.5 (Vol.) percent of sulfuric acid (item 14, Appendix C) in water. The stainless steel parts shall be processed for 7 to 9 minutes at 135°F to 145°F (57°C to 63°C). Dry abrasive blasting may be used as an alternate method of cleaning stainless steel abrasive strips. (Refer to paragraph 3-26, steps m.(1) and (2) and step n. for procedure.

CAUTION

Do not wipe off the smut produced in this operation; it is beneficial in obtaining a quality bond.

(7) Rinse in cold, running, demineralized water (item 15, Appendix C) to remove excess smut. Check for a water break free surface.

(8) Repeat step (7) if necessary.

(9) Demineralized water rinse for 1 to 3 minutes at 140°F to 160°F (60°C to 71°C) to facilitate drying if necessary.

(10) Dry parts in room air (70°F to 80°F), cover with kraft paper (item 16, Appendix C) to prevent contamination if next step cannot be done at once.

v. Inspection point. Inspect that surface is clean and free of contamination, finger prints, and soils. Check for water break free surface.

NOTE

The adhesive film and adhesive primer must be removed from refrigerated storage and then allowed to warm to room temperature prior to use. Adhesive primer must be thoroughly agitated prior to and during use.

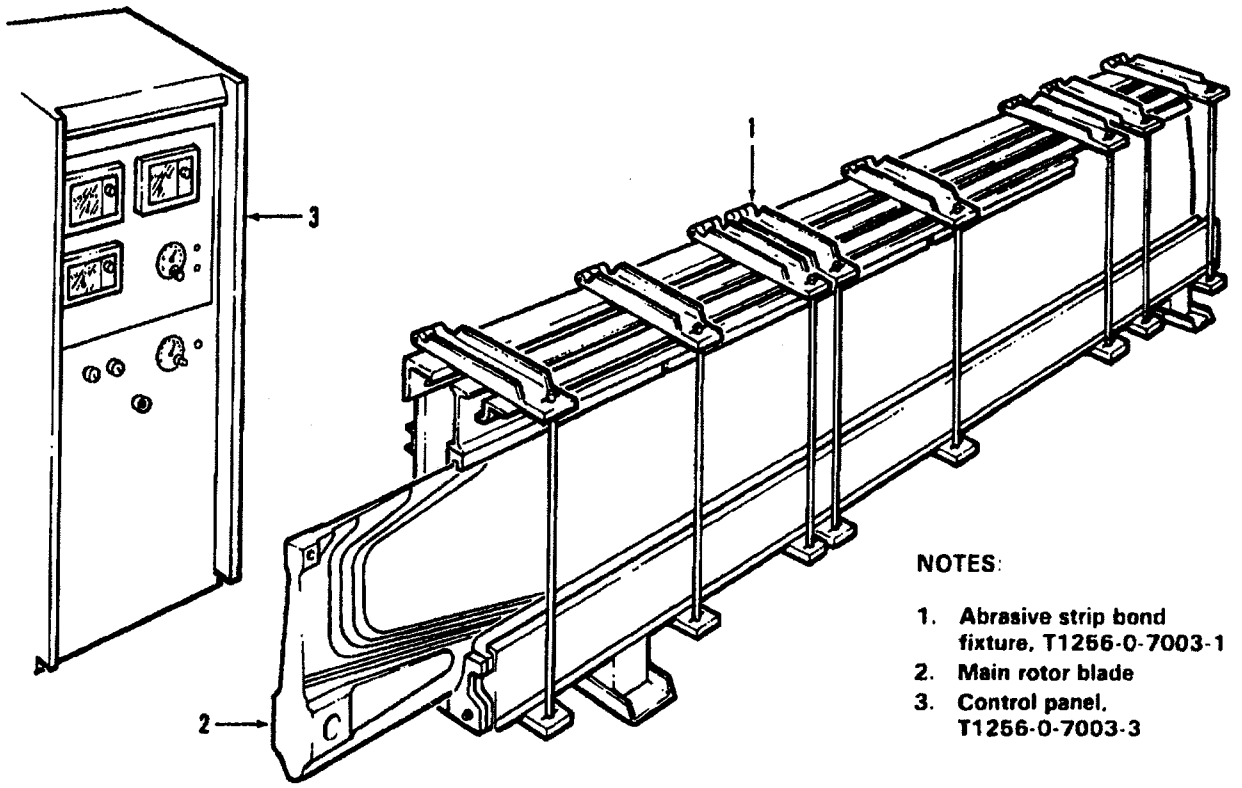


Figure 3-27. Bonding Abrasive Strip

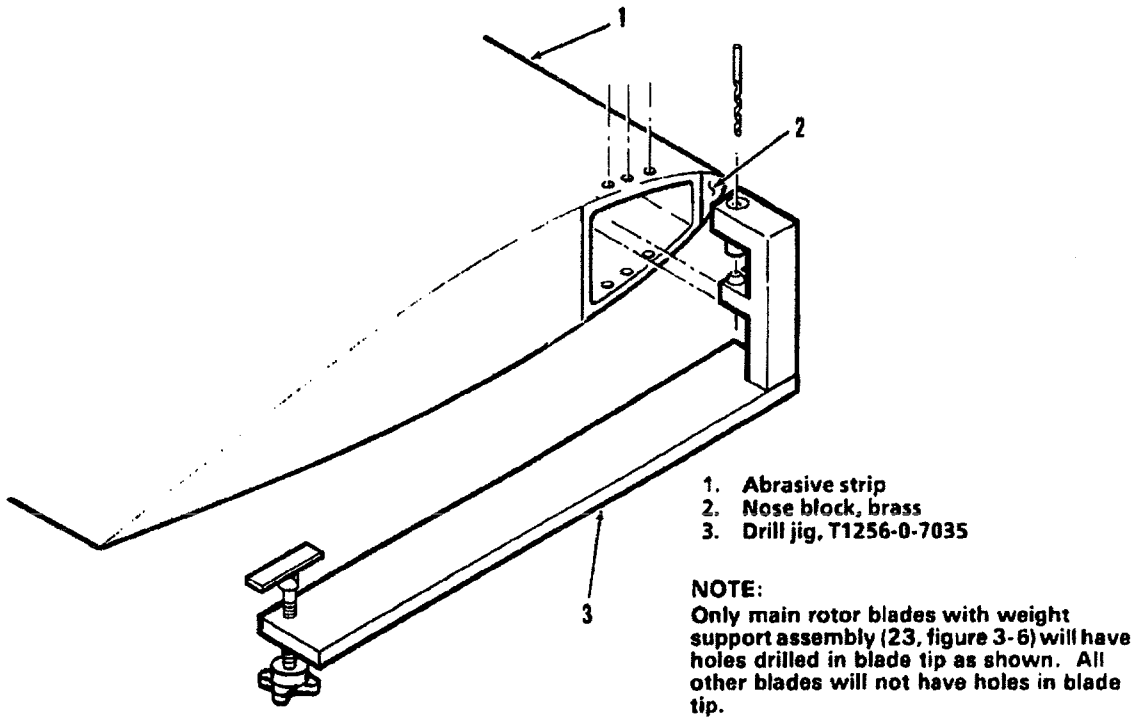


Figure 3-28. Abrasive Strip Inspection and Drill Jig Installation

WARNING

FLIGHT SAFETY PART

Adhesive primer must meet Bell Procurement Specification 299-947-121, Type I. This is a critical characteristic.

w. Apply one coat of adhesive primer (item 12, Appendix C) to inside surface of abrasive strip by using brush (item 10, Appendix C) or roller-brush (item 9, Appendix C) or by spraying.

NOTE

The brush or roller-brush must be discarded after use. The spray equipment shall be purged regularly during extended periods of use and at the end of each operation.

x. Air dry for 30 minutes at room temperature plus two hours at 225°F to 235°F (107°C to 113°C). The dry film thickness should be from 0.00004 to 0.00010 inch.

CAUTION

Surfaces to be bonded shall be free from water, fingerprints or any other contamination.

y. Inspection point. Inspect surface for moisture, fingerprints, and contamination.

z. Remove the masking from the blade.

WARNING

FLIGHT SAFETY PART

Adhesive primer must meet Bell Procurement Specification 299-947-121, Type I. This is a critical characteristic.

aa. Cut a piece of adhesive (item 11, Appendix C) to fit the inside surface of the abrasive strip. Install adhesive strip to leading edge surface of blade. Smooth out all wrinkles and air bubbles. Remove the protective thin wax paper backing from adhesive.

ab. Place the abrasive strip on the blade.

ac. Paddle the leading edge with a thick rubber paddle (or equivalent) to seat the abrasive strip.

ad. Install the blade in the unitized abrasive strip bonding fixture, T1256-0-7003-1 (1, figure 3-27) and proceed as follows:

(1) Install tip caul (part of tool T1256-0-7003-1) in blade spar cavity and install blade in bonding fixture.

(2) Place insulation blanket on both sides of aft section.

(3) Close hold-down straps and tighten nuts handtight and connect heater cables.

(4) Record blade model and serial number, name of operator, time, and date on pressure-temperature recorder control panel T1256-0-7003-3 (3).

NOTE

On single cell use 27 + 2 psi.

(5) Actuate air cell switch and set control panel (3) as follows:

(a) Nose cell 20 ± 1 psi.

(b) Aft side cell 27 ± 1 psi.

(c) Main cell 20 ± 1 psi.

(6) Set heat cycle temperature control for 2 hours, ± 5 minutes.

(7) Set cooldown cycle control for 40 ± 5 minutes.

(8) Set temperature controller for root and tip at 225°F to 235°F (107°C to 113°C). Bondline cure temperature shall be 225°F to 235°F (107°C to 113°C).

(9) Set temperature control for main blanket at 220°F (105°C). Bondline cure temperature shall be 225°F to 235°F (107°C to 113°C).

NOTE

Temperature rise rate shall be between 15 to 90 minutes.

(10) Remove blade from fixture after cool down to 150°F ± 5°F (65°C ± 3°C).

ae. Remove blade from fixture after cool down and clean with aluminum wool (item 21, Appendix C) and methyl-ethyl-ketone (item 8, Appendix C) as necessary.

af. Check the quality of the bond (amount of void area and location) by either mechanically tapping with steel hammer T-75449-1 or with ultrasonic methods. Void inspection requirements for abrasive strip are as follows:

(1) 1.00 inch wide (maximum) void between the abrasive strip (1, figure 3-28) and the nose block (2) is acceptable inboard of station 216.0. Seal at the inboard and outboard ends with adhesive (item 2, Appendix C) or adhesive (item 5, Appendix C).

(2) Other voids not exceeding 35.0 square inches total, with a maximum of 5.0 square inches in any single void, are acceptable.

(3) No voids within 0.50 inches of the edge of the abrasive strip (1) except on the ends, per step (1) above, are acceptable.

CAUTION

Do not use power grinder to dress tip end of abrasive strip.

ag. Repair surface irregularities on leading edge abrasive strip as follows:

(1) Use file to remove portion of abrasive strip extending beyond end of blade. File abrasive strip flush with end of blade being careful not to damage blade spar.

(2) Abrasive strip override. In the splice area between the abrasive strips, either abrasive strip may extend 0.020 inch above adjacent abrasive strip aft of the splice cover, but must be faired with adhesive (item 5, Appendix C).

(3) Gaps. A gap of 0.250 inch maximum between skin and abrasive strips is acceptable. These gaps shall be filled with adhesive (item 5, Appendix C).

ah. Blades repaired having weight support assembly (23, figure 3-6) shall require the drilling of six holes in abrasive strip as follows:

(1) Install abrasive strip drill jig (3) on blade tip as shown in figure 3-28.

(2) Back drill the size 0.249 to 0.255 inch diameter holes (all six holes) through the abrasive strip (1) at the tip end of the blade; then countersink the abrasive strip 100 degrees by 0.507 inch diameter.

ai. Accomplish paragraph 3-21 (oversize bushing replacement) and paragraph 3-23 (shot peening) if root end was exposed to a temperature of 200°F (93°C) or greater.

aj. Refinish the blade (paragraph 3-36).

ak. Balance the blade (paragraph 4-2).

al. Inspection point. Inspect and verify operations as required for steps ad. through ak.

3-27. **Abrasive Strip Splice Cover Replacement.** The splice cover (63, figure 3-6) is designed to prevent erosion and corrosion in exposed area of the spar leading edge between the abrasive strips at stations 83.0 and 240.0 (P/N 204-011-250-5 only) or stations 83.0 and 216.0 (P/N 204-011-001-15 only). Blades that have the single 205-015-010-101 abrasive strip installed have splice cover at station 83.0 only. Some main rotor blades were manufactured with splice covers installed. All blades received without splice covers or required replacement of splice covers shall have splice covers installed in accordance with this paragraph.

WARNING

Protective gloves shall be worn to prevent injury.

a. If installed, remove damaged or improperly bonded splice cover (63, figure 3-6) as follows:

(1) To locate bond line, remove paint from corner of abrasive strip splice cover by sanding with abrasive paper (item 36, Appendix C).

(2) Using a putty knife or equivalent, carefully pry up one corner of abrasive strip splice cover. Grasp pryed up corner with pliers and carefully peel off.

b. Position cover on blade so inboard end of cover is between 0.65 and 0.85 inch from scarf joint at extreme leading edge. Pencil mark around the cover outline.

c. Remove all paint and prime to bare metal in area receiving cover. Extend removal area 0.50 inch over the cover outline. Use 180 grit abrasive paper (item 36, Appendix C).

WARNING

Cleaning solvents are flammable and toxic. Use only in well-ventilated area. Avoid skin contact and inhalation of vapors. Do not direct compressed air near or directly against skin. Wear protective apron, rubber gloves, and safety goggles.

d. Prior to installation of cover, inspect scarf joint for filler erosion and evidence of corrosion. If corrosion is present, flush the scarf joint with cleaner (item 42, Appendix C) to remove and arrest corrosion products. Allow solution to rdmain on surfaces approximately 5 minutes. Rinse by flushing with demineralized water (item 15, Appendix C). Force dry with heated air to assure that all moisure is removed.

e. Inspection point. Inspect removal of paint and corrosion.

f. Fill eroded scarf joint with adhesive (item 2, Appendix C) or adhesive (item 35, Appendix C). Allow adhesive to cure 24 hours at room temperature or 2 hours at 145° to 160° F (63° C to 71° C). Apply heat locally only and do not exceed maximum temperature prior to cover installation.

g. Wipe area with paper wipers (item 44, App. C) dampened with MEK (item 8) or acetone (item 60). Repeat with successive clean cloths and MEK or acetone until cloth remains clean after wiping. Wipe dry with a final clean cloth.

h. Remove peel ply from inside of cover assembly. Lightly sand composite bonded adhesive on inside of cover with 320 grit sandpaper (item 7, Appendix C). Wipe area with a clean cheesecloth (item 17), dampened with MEK (item 8) or acetone (item 60).

i. Apply adhesive (item 35, Appendix C) to inside of cover and to blade surface. Rub adhesive around on blade and cover to assure complete "wetting" of the contact surfaces.

j. Position cover on blade and move slightly back and forth to expel air pockets. Wipe off excessive adhesive. Fair in edges of cover with adhesive (item 35, Appendix C).

k. Hold cover in place with heavy rubber bands or bungee cords.

l. Allow adhesive to cure for 24 hours at room temperature or 2 hours at 145°F to 160°F(63° C to 71°C). Apply heat locally only and do not exceed 300°F (149°C).

m. Check the quality of bond by either mechanically tapping with steel hammer T75449-1 or with ultrasonic methods. Remove and replace splice cover with any void area.

n. Inspection point. Inspect and verify operations as required for steps f. through m.

3–28. Tip Cover and Root End Cover Replacement. Tip or root end cover shall be replaced if it is loose or it is damaged to an extent that it cannot be repaired without removing.

a. *Tip Cover Replacement.*

(1) Use heat gun to apply heat to tip cover (3, figure 3-29) on both upper and lower surface of blade. Do not exceed 300°F (149°C).

(2) Using a putty knife, or equivalent, separate tip cover from upper and lower blade skin.

WARNING

Protective gloves shall be worn to protect against sharp metal.

CAUTION

Take care not to damage blade skin while removing tip cover.

(3) Remove tip cover (3, figure 3-29) from rotor blade (1) as follows:

CAUTION

Use stop on drill to prevent drilling into honeycomb behind tip cover.

(a) Being careful not to hit spar, drill a 0.5 inch hole in tip cover close to spar. Use existing tip cap holes and install template worn aid fabricated per table 2-3.

NOTE

Router may be set to cut just the tip cover or set deep enough to cut out adhesive behind tip cover. If adhesive is cut out some honeycomb in blade will have to be replaced.

(b) Using router, cut out center portion of tip cover to within 0.250 inch of outer flange of tip cover.

(c) Using pliers, peel flanges of tip cover from blade and remove from blade.

(4) Inspect honeycomb core in blade tip area for corrosion, punctures, and deformation. If any corrosion is found in honeycomb core the blade shall be scrapped. Inspect inner surfaces of skin for nicks and scratches.

(5) Repair damaged honeycomb core, maximum 2.00 inches, using following procedures:

(a) Cut out damaged honeycomb core, maximum 2.00 inches.

(b) Obtain a piece of honeycomb core (item 54, Appendix C).

WARNING

Cleaning solvents are flammable and toxic. Use only in well-ventilated area. Avoid skin contact and inhalation of vapors. Do not direct compressed air near or directly against skin. Wear protective apron, rubber gloves, and safety goggles.

(c) Support core so as to prevent warping and vapor degrease using perchloroethylene (item 32, Appendix C). Clean gloves (item 69, Appendix C) should be used for handling in the remaining steps.

(d) Cut a piece of honeycomb core to fit cut out portion of core at tip end of blade.

(6) Prepare a new tip cover, part No. 204-011-042-7; clean per paragraph 3-20, steps I. (1) through I. (6).

(7) Inspection point. Inspect for staining, water break, and contamination.

(8) Mix adhesive (item 35, Appendix C) parts A and B as follows: 100 parts by weight Epon 934A to 33 parts by weight Epon 934B. Parts to be mixed in a clean container. Adhesive should be used within 50 minutes.

(9) Coat inside of blade skin, top and bottom, and honeycomb core with adhesive (item 35, Appendix C) across face of core.

(10) Apply adhesive (item 35, Appendix C) to inside surface of tip cover, including interior of flanges.

(11) Install the tip cover (3) and honeycomb core flush with tip of blade.

WARNING

Cleaning solvents are flammable and toxic. Use only in well-ventilated area. Avoid skin contact and inhalation of vapors. Do not direct compressed air near or directly against skin. Wear protective apron, rubber gloves, and safety goggles.

(12) Clean off the adhesive on outside surface of blade skin. Wipe clean with cheesecloth (item 17, Appendix C) saturated with methyl-ethyl-ketone (item 8, Appendix C).

CAUTION

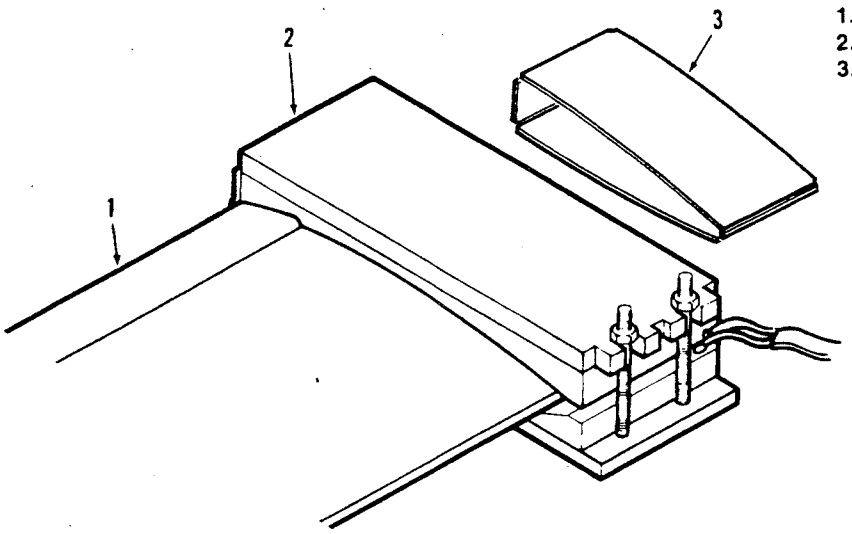
Do not apply heat to bonding fixture. Use pressure only.

(13) Install a bonding fixture (2, figure 3-29) to provide pressure on tip end of blade. Activate pressure cell to 20 to 25 psi.

(14) Cure for 24 hours at room temperature.

(15) Inspection point. Inspect bond for cure, seal, and fit of tip cover.

(16) If no further repair is necessary, refinish the blade per paragraph 3-36 and balance the blade per paragraph 4-2.



1. Blade
2. Patch bonding fixture (T1256-0-7003-2)
3. Tip cover

Figure 3-29. Tip Cover Replacement

NOTE

All blades with 204-011-016-1, -3, -5, or -7, root end covers (1, figure 3-6) shall be reworked to accept the 204-012-016-1 cover plate (45) and 204-012-023-1 root end inboard cover (49) (for 204-011-250 blades) or a 204-012-023-5 (for 204-011-001 blades).

b. *Rework Blades with 204-011-016-1, -3, -5, or -7 Root End Covers*

(1) Rework all blades with 204-011-016-1, -3, -5, or -7 root end cover (1, figure 3-30) as follows:

(2) Remove screws (2 and 4) and washers (3 and 5). Remove root end cover (1) from blade (6).

(3) To locate rivets (7) use abrasive paper (item 36, Appendix C) to remove paint from both sides of blade (6).

(4) Drill out rivets (7) (both sides of blade (6)) securing nutplates (8) to blade. Remove nutplates (8).

(5) Trim out damaged honeycomb core (9) as required to a maximum depth of 2.0 inches. Inspect honeycomb core (9) for corrosion. If any corrosion is found in honeycomb core the blade shall be scrapped.

(6) Fill screw hole (10) with adhesive (item 35, Appendix C). Screw a 10-32 UNF aluminum screw with a minimum of one inch threads into screw hole (10) until it bottoms out. Allow adhesive to cure for 24 hours at room temperature.

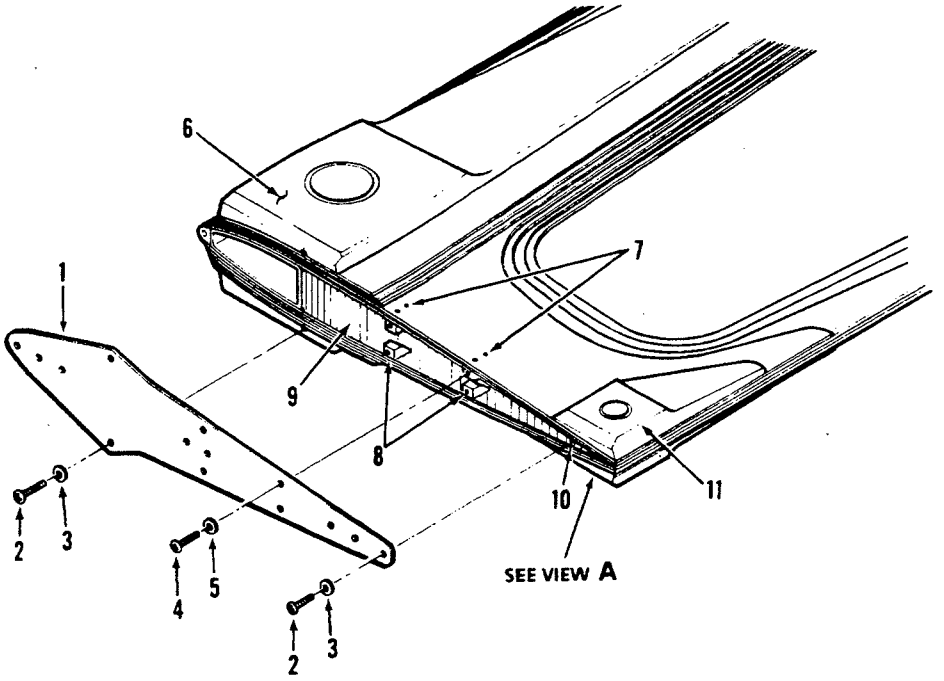
(7) Cut off screw installed in above step and dress it down flush with blade.

(8) Drill three 0.1590 inch (number 21 drill) holes 0.900 inch deep in drag plates (11) as shown in view A. Tap holes 0.750 inch deep with 10-32 UNF-3B threads.

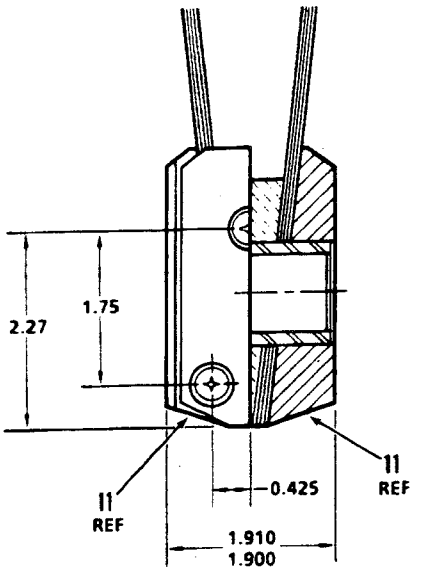
(9) Inspection point. Inspect step (8) to assure that holes are in correct positions and properly threaded.

(10) Install 204-012-023-1 or -5 root end inboard cover (2, figure 3-31) per paragraph 3-28 c. Fill holes with adhesive (item 35, Appendix C) where rivets (7, figure 3-30) were drilled out in step (4).

(11) Install 204-012-016-1 cover plate (7, figure 4-1) per paragraph 4-2, steps m. through o.



1. Root end cover
2. Screws
3. Washers
4. Screws
5. Washers
6. Blade
7. Rivets
8. Nutplates
9. Honeycomb core
10. Screw hole
11. Drag plates



VIEW A

Figure 3-30. Rework Blade with 204-011-016-1, -3, -5, or -7 Root End Cover

c. *Root End Inboard Cover Replacement.*

(1) Remove 204-012-023-1 and -5 root end inboard covers (2, figure 3-31) as follows:

(a) Remove three screws (46, figure 3-6) securing weight (47 and 48) to blade. Remove weights.

(b) Remove three screws (32) and washers (33) securing cover plate (45) to blade. Remove cover plate.

CAUTION

Use stop on drill to prevent drilling into honeycomb behind root end cover.

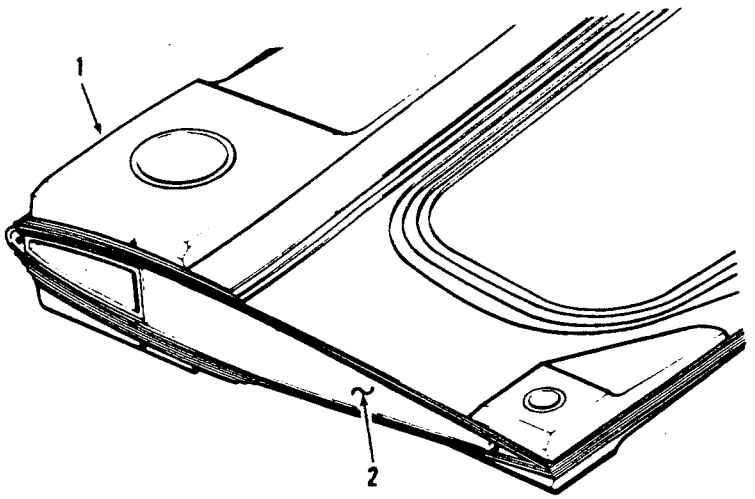
(c) Carefully drill a 0.5 inch hole in root end inboard cover close to spar. Using screws in holes where cover plate and weights were installed, install template work aid fabricated per table 2-3 on root end of blade.

NOTE

Router may be set to cut out just the root end inboard cover or set deep enough to cut out adhesive behind root end inboard cover. If adhesive is cut out some honeycomb in blade will have to be replaced.

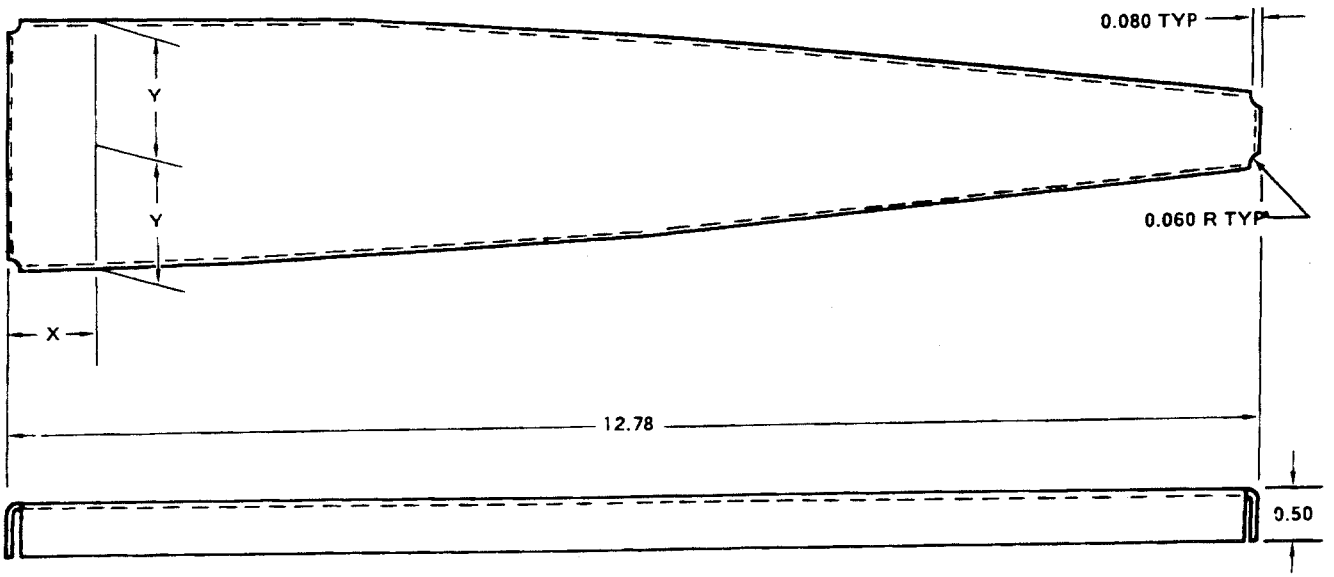
(d) Using router, cut out center portion of root end inboard cover to within 0.250 inch of outer flange of root end inboard cover.

(e) Being careful not to damage honeycomb or skin, use hammer and putty knife or chisel to break bond between flange of root end inboard cover and skin. Use pliers to peel root end inboard cover flange from blade.



1. Blade
2. Root end inboard cover

Figure 3-31. Root End Inboard Cover Replacement



X	Y
0.00	1.210
0.16	1.211
0.85	1.220
2.95	1.178
5.05	1.071
7.15	0.918
9.25	0.729
11.35	0.510
12.69	0.354
12.85	0.035
13.49	0.263
14.12	0.184

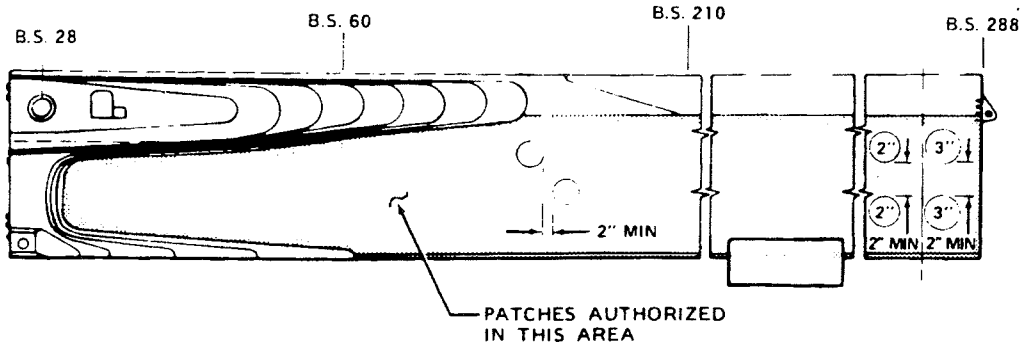
MATERIAL:

0.032 x 4.0 x 14.3 5052 AL ALY
QQ-A-250/8 NO TEMP

NOTES:

1. **All dimensions are in inches.**
2. **Bend radii 0.030.**

Figure 3-32. Fabrication of Root End Inboard Cover

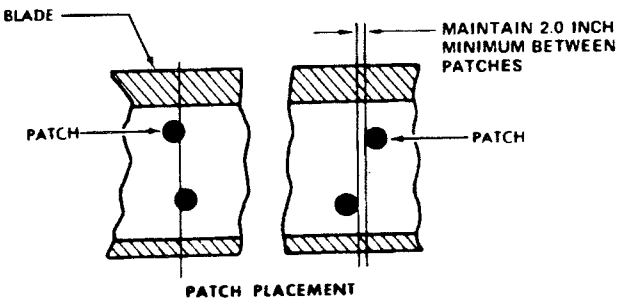


NOTE: No patches authorized within one inch of the doublers, spar, trailing edge strip, or tip of blade. This is the shaded area shown above. The spar extends 5.400 inches aft of the leading edge. The trailing edge strip extends 2.800 inches forward of the trailing edge from the butt end to B.S. 60 and tapers uniformly to 0.750 inch at B.S. 210 and remains constant to the tip.

PATCH SIZE AND LOCATION

BLADE ASSEMBLY	ELLIPSE 2 X 4	ELLIPSE 3 X 5
204-011-001-15	INBOARD OF STATION 240.0	OUTBOARD OF STATION 240.0
204-011-250-5 204-011-250-113	INBOARD OF STATION 264.0	OUTBOARD OF STATION 264.0

NOTE: Two inch circular patch inboard of station 264 and three inch circular patch outboard of station 264 are acceptable alternatives to ellipses.



NOTE: More than one patch on the same chord line on the same side of the blade is not permitted except in outboard 48 inches of blade.

Figure 3-33. Patch Size and Location (Sheet 1 of 2)

1. Patch routing fixture, T1256-0-7048
2. Router
3. Main rotor blade
4. Guide

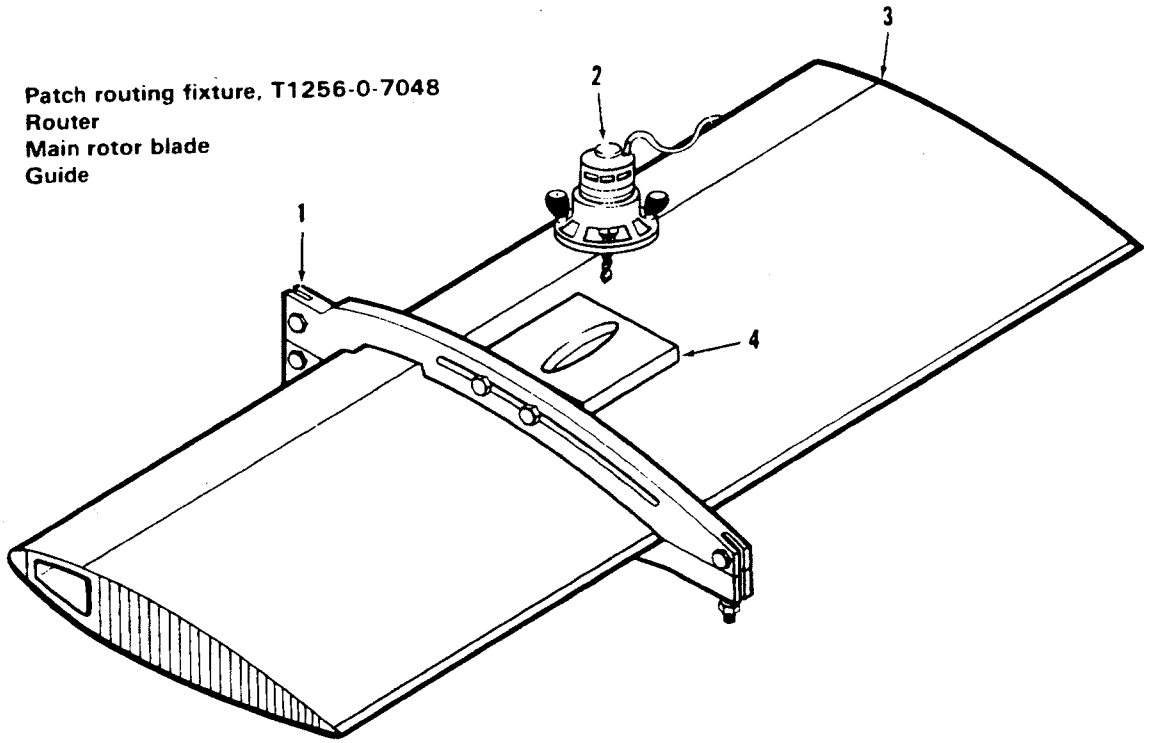


Figure 3-33. Patch Size and Location (Sheet 2 of 2)

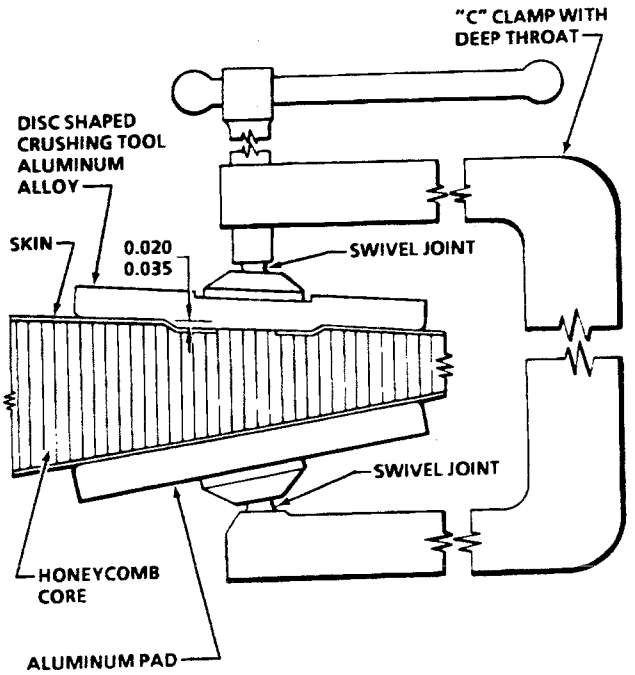
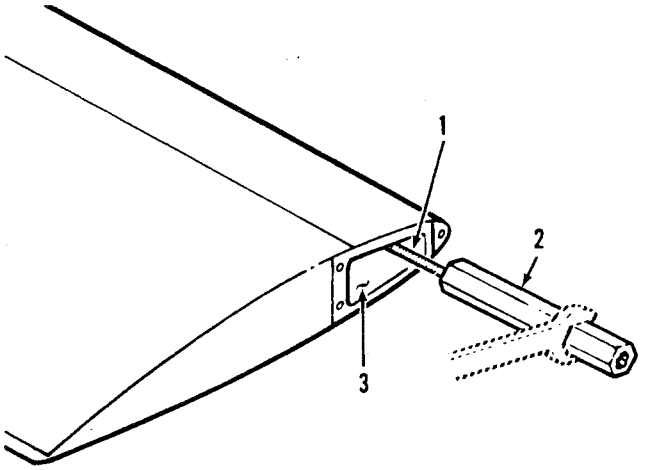
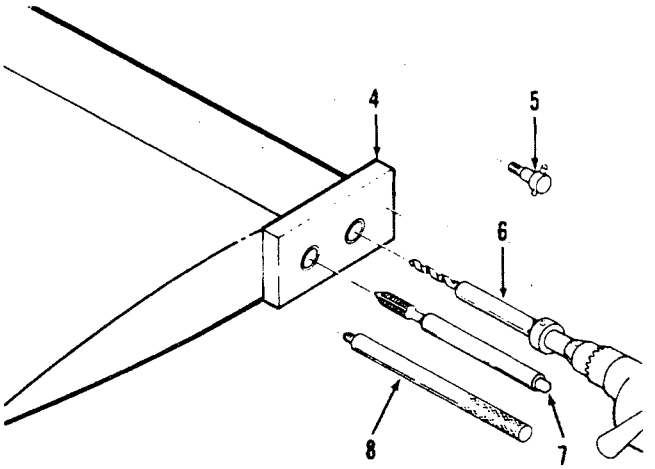


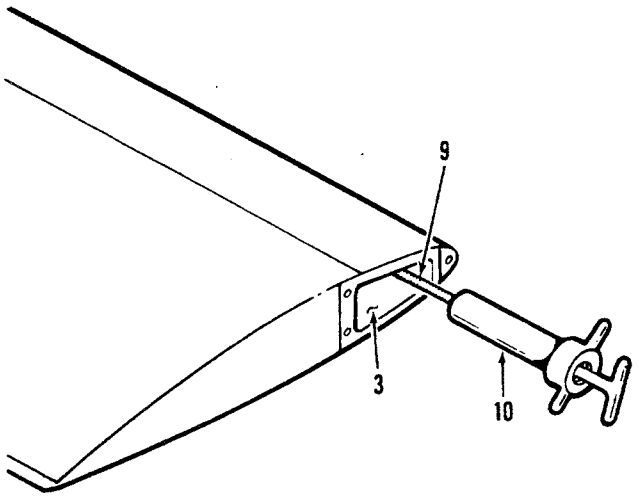
Figure 3-34. Skin Crushing Procedure



DETAIL **A**
1/4 - 28 STUD REMOVAL



DETAIL **B**
THREADING HOLES FOR OVERSIZED STUDS



DETAIL **C**
OVERSIZE STUD REMOVAL OR INSTALLATION

1. Stud, 1/4-28UNF
2. Stud extractor
3. Spar assembly
4. Drill fixture, T1256-0-7038
5. Tip cap screw
6. Drill bit
7. Tap
8. Locating pin
9. Stud, 5/16-24UNF
10. Stud driver/extractor, T1256-0-7039

Figure 3-35. Tip Stud Replacement

(2) Inspect honeycomb core in blade for corrosion, punctures, and deformation. If any corrosion is found in honeycomb core the blade shall be scrapped.

(3) Repair honeycomb core, maximum two inches, per step a. (5).

(4) Using a putty knife, or equivalent, provide a 0.75 inch slot for the flange of the new 204-012-023-1 root end inboard cover.

(5) Fabricate per figure 3-32, or procure new 204-012-023-1 root end inboard cover (2, figure 3-31), and clean per paragraph 3-20, steps I. (1) through I.(6).

(6) Mix adhesive (item 35, Appendix C) parts A and B as follows: 100 parts by weight Epon 934A to 33 parts Epon 934B. Parts to be mixed in a clean container. Adhesive should be used within 50 minutes.

(7) Apply adhesive (item 35, Appendix C) to upper and lower surfaces (inside) of blade. Apply generously to assure ample squeeze-out to seal blade.

(8) Apply adhesive (item 35, Appendix C) to upper and lower flanges of root end inboard cover.

WARNING

Cleaning solvents are flammable and toxic. Use only in well-ventilated area. Avoid skin contact and inhalation of vapors. Do not direct compressed air near or directly against skin. Wear protective apron, rubber gloves, and safety goggles.

(9) Install root end inboard cover and honeycomb core flush with root end of the blade. Remove excess adhesive by wiping with a clean cloth (item 59, Appendix C) saturated with methyl-ethyl-ketone (item 8, Appendix C).

NOTE

Cover manufactured plate with teflon tape or bond release material prior to installation.

(10) Install locally manufactured plate drilled to match existing screw holes in root end of blade to maintain even pressure on bond line. (204-011-016-1, -3, -5, or -7 root end cover may be used).

(11) Cure for 24 hours at room temperature and remove pressure plate.

(12) Inspection point. Inspect bond for cure, seal, and fit of cover.

(13) If no further repair is necessary, refinish the blade per paragraph 3-36 and balance the blade per paragraph 4-2.

3-29. Patching Damaged Skins.

NOTE

All temporary patches or repairs shall be replaced with permanent repairs within the limitations of paragraph 3-29.

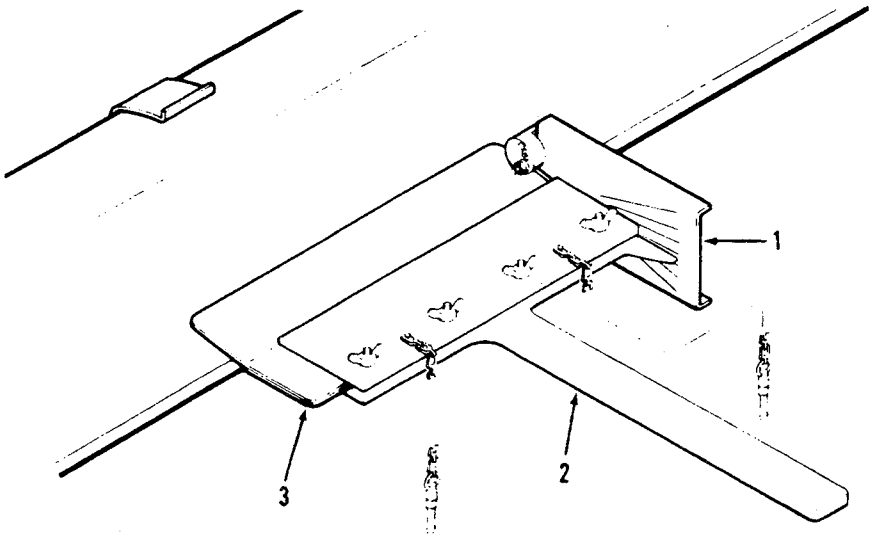
NOTE

Scratches, nicks, gouges, tears, holes, etc., in the skin that exceed the limits specified in paragraph 3-7 and table 3-1 but do not exceed the limits specified in steps a. and b., paragraph 3-29 may be repaired by patching as described in the subsequent steps. The number of patches shall not exceed seven (7) individual patches, or the area affected shall not exceed 50.0 square inches per side.

a. Defects in the skin (holes, dents, nicks, etc.) shall be repaired by patching within the limits shown in figure 3-33. Patch in major axis shall be between 0° and 15° of the span axis. Defective skin area shall not be nearer than 1.00 inch of the trailing edge strip, doublers, box beam, and tip of blade as shown in figure 3-33.

WARNING

Paint remover is harmful. Use only with adequate ventilation. Avoid prolonged or repeated breathing of vapors and contact with skin. Smoking is prohibited in immediate areas. Wear protective apron, rubber gloves, and safety goggles.



1. Bending gage, T101485
2. Bending tool, T101525
3. Trim tab

Figure 3-36. Trim Tab Adjustment

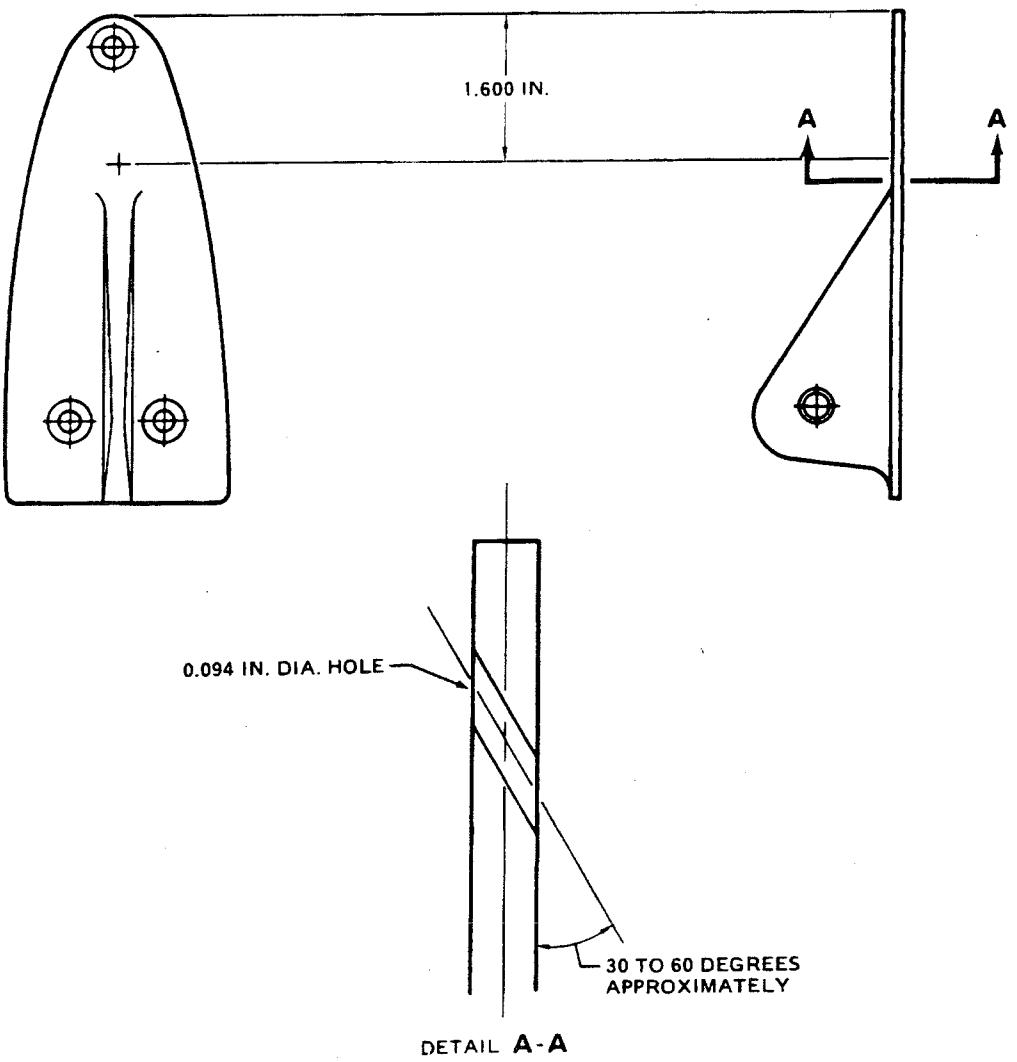


Figure 3-37. Tip Cap Modification

b. Remove the paint in the affected area 0.500 inch larger than the patch. Paint may be removed by methods described in paragraph 3-13.

NOTE

Damage near the tip which does not violate the 1.00 inch minimum edge distance will be repaired using a circular patch when the damage cannot be repaired using an elliptical patch due to proximity to the tip. Maximum diameter for circular patches is 3.00 inches.

c. Remove the skin in affected area as follows:

(1) Install patch routing fixture (1, figure 3-33) on main rotor blade (3).

(2) Position routing fixture (1) and adjust guide (4) as necessary over damaged skin area.

(3) Use router (2) placed in guide (4) to cut an elliptical pattern in skin area to be patched.

NOTE

Edge of cut out hole shall be a minimum of 1.00 inch from box beam, trailing edge strip, tip of blade, and doublers.

d. Heat the cut out disc of skin to 200° F (94° C) maximum.

e. Lift out the area of skin carefully (while heated) so as not to damage core.

f. Debur edges of the hole and sand smooth using 400 grit sandpaper (item 7, Appendix C).

g. If the core has been damaged below the surface of the repair area remove damage as follows:

CAUTION

Exercise care to avoid damaging opposite skin if no repair is required on opposite side. Use a tool similar to the one shown in figure 3-34 for crushing the skin to prevent deforming skin outside of the crushed area and to prevent cracking skin in the joggle area.

(1) Trim out the damaged core to inscribe the smallest area containing the damage.

(2) Remove the affected core area down to the opposite skin. Allow removal through to opposite side if patch is required on damage passing through opposite skin.

(3) To salvage core material from "scrapped" blades, follow these steps:

(a) From inspection records, determine the reasons for blade "scrapped". Do not use a blade that has been "scrapped" due to life retirement; all other blades are acceptable.

(b) Loosen skin at tip end by prying skin away from tip cap, by using the clamping device, e.g., clamps, vise grips, etc., and if required, by heating the shin to 250°F (138°C). Peel skin form core material.

(c) Turn blade over and repeat step (b) to remove skin on this side.

(d) Using a saw blade, Exacto knife, or equivalent, separate core from trailing edge and spar.

(e) Lift out core and dispose of remaining scrapped blade pieces per contractual requirements.

WARNING

Cleaning solvents are flammable and toxic. Use only in well-ventilated area. Avoid skin contact and inhalation of vapors. Do not direct compressed air near or directly against skin. Wear protective apron, rubber gloves, and safety goggles.

(f) Vapor degrease core using perchloroethylene (item 32, Appendix C) and proceed to visually inspect for condition of honeycomb, adhesive, and corrosion. Safety solvent (item 65, Appendix C) rinse may be used as an alternate. Evidence of corrosion leaves a dull finish rather than the normal shiny aluminum.

g. Acceptable core material will be stored and, prior to use for patches, fillers, etc., will be cleaned per paragraph 3-20 steps I. (1) through I. (6). Immersion in solution, however, shall be limited to one minute only.

h. Crush the skin 0.020 to 0.035 inch deep in an elliptical pattern around the hole. (See figure 3-34.) Radius of the crushed area to be a minimum of 0.500 inch larger than the cut out hole in the skin. Joggle the crushed area up to the normal contour over a distance of 0.180 inch and a radius in the joggle of 0.090 inch. Also exposed core inside the hole to be crushed flush with the outside of crushed skin.

i. Mask off the damaged area with a 0.50 inch border using masking tape (item 6, Appendix C). Remove the paint in the crushed area up to taped border. Paint may be removed by methods described in paragraph 3-13.

CAUTION

Do not flood surface with methyl-ethyl-ketone (item 8, Appendix C). Do not allow cloth dampened with methyl-ethyl-ketone to remain on surface for longer than necessary to clean area.

j. Degrease the area by wiping with cleaning cloth (item 59, Appendix C) saturated with methyl-ethyl-ketone (item 8, Appendix C) or isopropyl alcohol (item 49, Appendix C).

k. Clean the blade surface by sanding with progressively finer sandpaper (item 7, Appendix C) and wipe all sanding residue off with cheesecloth (item 17, Appendix C) dampened with methyl-ethyl-ketone (item 8, Appendix C). Repeat wiping until cloth remains clean. Then follow with a final wipe using cheesecloth (item 17, appendix C) dampened with isopropyl alcohol (item 49, Appendix C). As an alternate the surface may be blasted with 3/0 or 4/0 quartz abrasive (item 30, Appendix C). Masking tape (item 6, Appendix C) may be used to protect exposed core during blasting. After removal of tape, the core cells should be vacuumed and then wiped with isopropyl alcohol (item 49, Appendix C) as above.

l. If core was removed, fabricate a plug of core material to fit cavity using core material (item 54, Appendix C). To salvage core material, follow the steps given in paragraph 3-29g.(3). Then proceed as follows:

(1) Clean core plug as directed in paragraph 3-20 steps I.(1) through I.(6) except immersion in solution shall be limited to one minute only.

(2) Coat sides and one end., if repair is not open to opposite side, with adhesive (item 35, appendix C) prepared as directed in paragraph 3-28, step a. (8).

m. Fabricate an elliptical patch of bare aluminum alloy (item 1, Appendix C) 0.020 inch thick, that is the same geometry as the crushed area described in step h. The patch shall be free of scratches, burrs, and other defects.

n. Inspection point. Inspect for required cleanliness lines. Inspect joggle. Check patch for defects.

o. Prepare the patch for bonding in the same manner as the trim tab. (See paragraph 3-20, step I.(1) through I.(6).)

NOTE

The adhesive film and adhesive primer must be removed from refrigerated storage and allowed to warm up to room temperature (70° to 80°F) prior to use. Adhesive primer must be agitated thoroughly prior to and during use.

WARNING

FLIGHT SAFETY PART

Adhesive primer must meet Bell Procurement Specification 299-947-121, Type I. This is a critical characteristic.

p. Apply a uniform coating of adhesive primer (item 12, Appendix C) to bottom side of patch and to the crushed area around hole in blade. The desired dry primer thickness is 0.00004 to 0.00010 inch. The dry or cure cycle for patch is a minimum 30 minutes at room temperature (70°F to 80°F) plus two hours at 225°F to 235°F (107°C to 113°C). Cure primer on blade for minimum of two hours at room temperature (70° to 80°F).

q. Inspection point. Inspect operations as required for steps o. and p.

WARNING

Adhesive primer must meet Bell Procurement Specification 299-947-121, Type I. This is a critical characteristic.

r. Cut a piece of adhesive (item 11, Appendix C) 1/4 inch larger than the patch, remove the protective backing and place the adhesive on the bottom side of the patch.

s. Place the patch over the crushed area around the hole in the blade and cover with peel ply (item 19, Appendix C).

t. When using the unitized clamping type bonding fixture T1256-0-7003-2, proceed as follows:

(1) Install blade with patch intact in bonding fixture (2,figure 3-29).

(2) Locate bonding cauls with bonding blanket (item 22, Appendix C) over patch area.

(3) Activate pressure cell to 20 to 25 psi and attach heater cables to power control panel (3, figure 3-27).

(4) Adjust heater controls on control panel (3) to attain cure temperature within 2 hours.

(5) Cure patch at 225° F to 235° F (107° C to 113° C) for 2 hours. Cool to 140° F (52° C) and release pressure.

u. Remove the bonding blanket (item 22, Appendix C) and clean the bonded area with aluminum wool (item 21, Appendix C) and methyl-ethyl-ketone (item 8, Appendix C).

v. Inspection point. Inspect bonding.

w. Apply touch up chemical film treatment to patch and bare areas around patch per paragraph 3-17.

x. Use adhesive (item 5, Appendix C) to fill and fair around the patch.

NOTE

If blade is scheduled for refinishing, this repair may be considered complete.

y. If all repair actions have been accomplished, paint blade as required per paragraph 3-36.

3-30. Tip Stud Replacement. All blades having 1/4-28 studs (61, figure 3-6) installed in the tip inertia weight shall require replacement of the 1/4-28 studs with 5/16-24 (540-011-023-3) studs. Loose or damaged 5/16-24 studs (61) may also be removed and replaced using following procedures.

a. *Stud Removal.*

(1) Remove 1/4-28 studs (1, figure 3-35) using stud extractor (2) (part of tool T1256-0-7038).

(2) Remove damaged 5/16-24 studs (9) using stud driver extractor (10). Disregard steps b. through j. and accomplish steps k. and l.

b. Install drill fixture (4) in spar (3) at tip of blade as shown. Secure fixture with three screws (5).

c. Install the two locating pins (8) (part of tool T1256-0-7038) through drill fixture bushings and engage threads into stud holes.

d. Tighten the three attaching screws (5).

e. Remove the two locating pins (8).

f. Drill new holes using special piloted "I" drill bit (6) (part of tool T1256-0-7038) to a depth of 0.75 inch.

WARNING

Do not direct compressed air near or directly against skin. Wear protective apron, rubber gloves, and safety goggles.

g. Remove all chips from drilling operation with compressed air.

h. Thread the hole using a 5/16-24UNF tap (7) (part of tool T1256-0-7038) to a depth of 0.620 inch.

i. Remove tap (7) and fixture (4). Blow out tapping debris with compressed air.

j. Inspection point. Inspect tapped hole using 5/16-24UNF thread gage with "go" and "No-go" gage per MIL-G-45654 or equivalent. If "go" gage will fit and "No-go" will not, hole is acceptable. If "No-go" will fit, reject assembly.

k. Install studs, 540-011-023-3 (9), or equivalent as follows:

WARNING

Cleaning solvents are flammable and toxic. Use only in well-ventilated area. Avoid skin contact and inhalation of vapors. Do not direct compressed air near or directly against skin. Wear protective apron, rubber gloves, and safety goggles.

(1) Clean approximately 1.00 inch of the stud end to be engaged in threads with methyl-ethyl-ketone (item 8, Appendix C).

(2) Mix sealing compound (item 58, Appendix C) part A (gray in color) 100 parts by weight with 10 parts by weight of part B (white in color). Parts to be mixed in a clean container. Adhesive shall be used within 2 hours.

(3) Coat the portion of the stud to be engaged in the threads with sealing compound (item 58, Appendix C).

(4) Install stud (9) to bottom of threaded hole with stud driver (10).

(5) Wipe away all chips and excessive adhesive squeeze-out.

l. Inspection point. Inspect stud installation and cure of adhesive.

m. Increase hole diameter in lead tip weight (59, figure 3-6), retainers (57 and 58), tab lock (56), and washer (55) to 0.328 inch using a 21/64 inch drill.

n. Rebalance the blade per paragraph 4-2.

3-31. Repair Nicks, Scratches, Dents, Notches, and Bent Trim Tab.

a. Polish out all nicks and scratches not exceeding limits of table 3-2 using sandpaper (item 7, Appendix C). Lightly sandpaper the painted surfaces immediately surrounding the polished areas. This is not applicable to the abrasive strip. If a nick or scratch in the skin in excess of 0.008 inch deep can be completely removed by polishing without leaving the skin in the polished area so thin that it can be dented with fingernail pressure, then a patch may be applied over the area without cutting a hole.

b. Polish out all nicks and scratches in the leading edge abrasive strip, not exceeding limits of table 3-2, using 180 grit abrasive paper (item 36, Appendix C) or equivalent. Steel wool (item 37, Appendix C) may also be used providing no aluminum parts are touched with it.

c. Repair nicks, scratches, and notches in the trailing edge up to 0.120 inch deep inboard of the trim tab. Depth of damage outboard of trim tab may not exceed a depth of 0.250 inch. Fair out over a length either side of defect which is eight (8) times the depth of rework.

d. Straighten the trailing edge of the trim tab (3, figure 3-36) with a heavy mallet and heavy back-up block or suitable tool. Penetrant inspect for cracks after straightening trim tab. Reset the trim tab to a zero degree angle using a trim tab bending tool (2) and bending gage (1) as shown.

e. Repair dents in the trailing edge strip which are between 0.020 and 0.040 inch deep by working the metal lightly with a plastic mallet.

3-32. Tip Cap Modification.

a. Locate drain hole on external face of tip cap (52, figure 3-6) per figure 3-37.

b. Drill hole along centerline at approximately 30 to 60 degrees through tip cap as shown.

c. Reidentify part number of tip cap 204-011-062-1 to 204-011-062-002.

3-33. Brass Nose Block Modification.

NOTE

Accomplish nose modification on 204-011-250 main rotor blades with brass nose block.

a. Layout desired hole pattern on inside face of box beam (2,figure 3-38) as shown in detail A.

b. Drill seven 0.251 to 0.257 inch diameter holes 0.50 inch deep inside front web of box beam (2) into brass nose block (1).

WARNING

Do not direct compressed air near or directly against skin. Wear protective apron, rubber gloves, and safety goggles.

c. Remove all drilling chips from box beam (2) with low pressure air.

WARNING

Cleaning solvents and adhesives are flammable and toxic. Use only in well-ventilated area. Avoid skin contact and inhalation of vapors. Do not direct compressed air near or directly against skin. Wear protective apron, rubber gloves, and safety goggles.

d. Clean inner face of box beam (2) and dowel pins (3) using clean cloth (item 59, Appendix C) dampened with naphtha (item 3, Appendix C) or methyl-ethyl-ketone (item 8, Appendix C).

e. Mix adhesive (item 35, Appendix C) parts A and B as follows: 100 parts by weight of EA934A to 33 parts by weight of EA934B. Parts to be mixed in a clean container. Adhesive to be used within 50 minutes.

f. Insert adhesive (item 35, Appendix C) into drilled holes. Install seven dowel pins (3) in holes. Press pins in holes until pins bottom out.

g. Inspection point. Inspect for adhesive squeeze out around pins.

h. Allow adhesive to cure for 24 hours at room temperature.

i. Balance blade. Refer to paragraph 4-2.

3-34. Installation of Safety Rivets.

NOTE

This information is applicable to 204-011-250-5 blades only.

a. Remove drive pin (2, figure 3-39) from upper surface of blade.

b. Layout rivet pattern for two additional rivets on upper surface of blade, in line with drive pin (2) as shown.

c. Layout same rivet pattern at same location on lower surface of blade per figure 3-39.

CAUTION

Exercise care not to drill into radius of box beam.

d. Drill six 0.125 inch diameter holes through blade skin surface and box beam.

e. Install a round head or brazier head aluminum rivet in first hole (top and bottom) of blade surface.

f. Countersink the remaining four holes on upper and lower surface.

g. Install four 100 degree countersunk aluminum rivets on upper and lower surface.

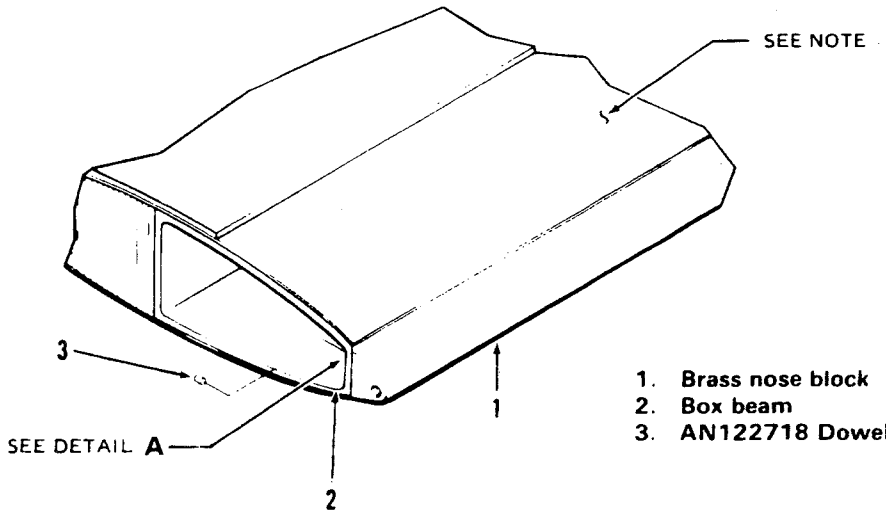
Section VIII. ASSEMBLY

3-35. Assembly. Final assembly will be accomplished in conjunction with main rotor blade balancing per paragraph 4-2.

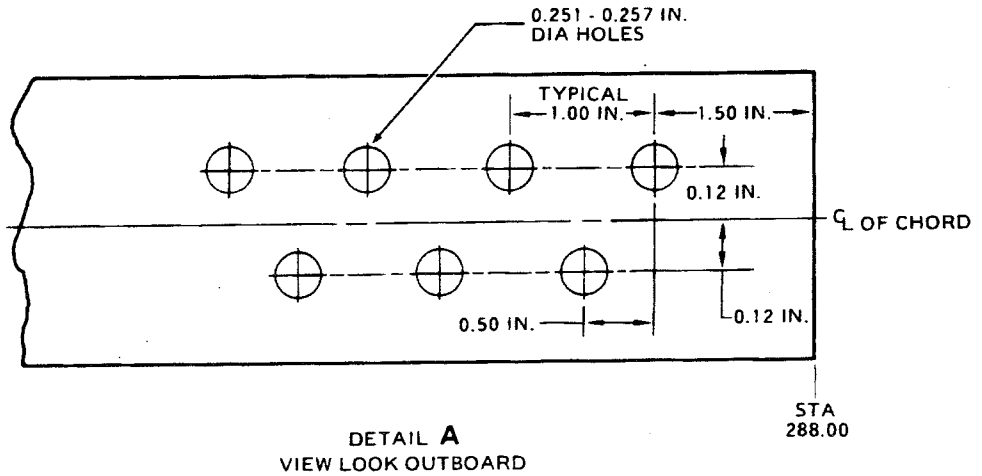
3-36. Painting, Refinishing, and Marking.

NOTE

Main rotor blades previously painted with acrylic lacquer shall be completely stripped to remove all lacquer and primer.

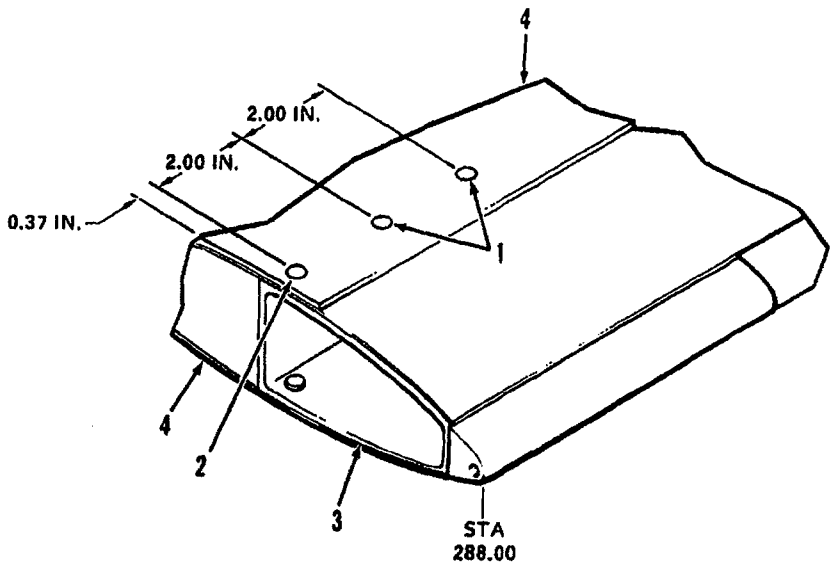


NOTE: Abrasive strip not shown installed for clarity



DETAIL A
VIEW LOOK OUTBOARD

Figure 3-38. Brass Nose Block Modification



1. **Rivets**
2. **Drive pin AN535-0-2**
3. **Box beam**
4. **Skin**

Figure 3-39. Installation of Safety Rivets

a. Clean blade per paragraph 3-13 if not previously accomplished.

b. Clean blade to obtain a water break free surface by scrubbing with abrasive pads (item 38, Appendix C) and an alkaline cleaner (item 34, Appendix C) (4 to 6 oz/gallon in water). Cleaning shall be followed by a thorough rinse to verify a water break free surface has been obtained.

WARNING

Primers, paints, and paint thinners are flammable and toxic. Use only in well-ventilated area. Avoid skin contact and inhalation of vapors. Wear protective mask, apron, rubber gloves, and safety goggles.

NOTE

Allow primer materials to reach room temperature, 50°F (24°C) to 95°F (32°C), prior to mixing. When primer is mixed, storage life is limited to eight hours.

c. Mix and thin polyamide primer (item 43, Appendix C), which consists of primer base and curing solution, in accordance with manufacturers instructions.

d. Mask drag plate (3, figure 3-40) and grip plate (4), both sides of blade, using tape (item 23, Appendix C).

e. Apply polyamide compatible primer (item 43, Appendix C) to blade surface by spraying as follows:

(1) Apply one coat, approximately 1.0 to 1.5 mil dry film thickness of polyamide primer to entire length of blade, both sides.

(2) Allow surface to air dry for a period of one to four hours maximum.

(3) When required, filler materials may be applied to achieve a satisfactory surface as follows:

WARNING

Cleaning solvents are flammable and toxic. Use only in well-ventilated area. Avoid skin contact and inhalation of vapors. Do not direct compressed air near or directly against skin. Wear protective apron, rubber gloves, and safety goggles.

(a) Clean primed surfaces using safety solvent (item 65, Appendix C) or naphtha (item 3, Appendix C).

(b) Apply lacquer putty (item 61, Appendix C) to blade surface using plastic squeegee, or any suitable applicator.

(c) Air dry lacquer putty (item 61, Appendix C) for a minimum of 20 minutes.

(d) Sand lacquer putty using sandpaper (item 39, Appendix C).

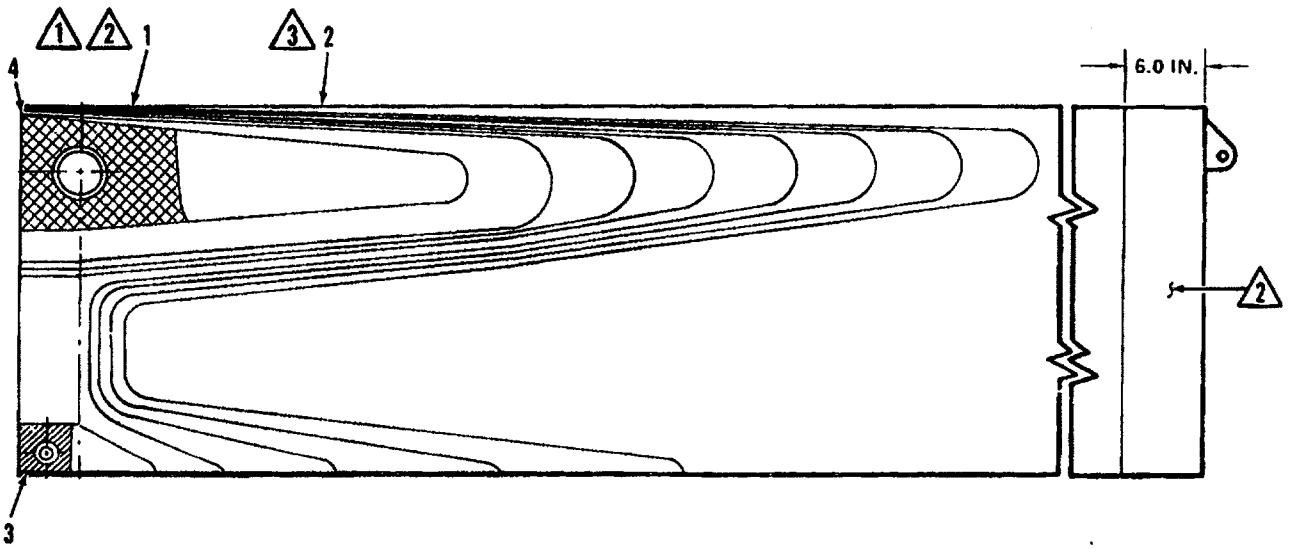
(e) Remove sanding residue using clean compressed air and tack rag (item 63, Appendix C).

(f) Apply a light coat of compatible primer (item 43 Appendix C) over the lacquer putty; air dry primer one to four hours.

NOTE

The first topcoat of MIL-C-46168, Type IV should be applied in one to four hours after application of the primer. The second coat may be applied within a few minutes or any time thereafter. MIL-C-46168, Type IV coating fully cures in seven days.

f. Apply final finish to both sides of main rotor blade, 204-011-001 or 204-011-250 as follows:



1. Main rotor blade 204-011-001
2. Main rotor blade 204-011-250
3. Drag plate
4. Grip plate

NOTES:

1. Finish blade with lusterless olive drab, urethane coating.
2. Tip of blade painted with gloss orange yellow, urethane coating or acrylic lacquer.
3. Finish blade with lusterless black urethane coating. Tip will not have a yellow strip.

Figure 3-40. Main Rotor Blade Painting and Marking

(1) Mix and thin as required MIL-C-46168, Type IV (item 74, Appendix C) in accordance with manufacturer instructions.

(2) Spray two coats, 1.8 to 3.0 mil dry film thickness, of MIL-C-46168,Type IV, #37038 aircraft black, polyurethane coating (item 74, Appendix C) to entire length of blade, both sides.

(3) Remove masking material from blade surface.

(4) Allow blade to air dry for 24 hours.

g. Touch-up of MIL-C-46168, Type IV.

(1) Thoroughly clean area to be repainted. Feather edges of peel section and scuff sand other areas to be coated, using 300 grit paper (item 7, Appendix C) or nylon abrasive matting (item 48, Appendix C).

(2) Solvent wipe scuffed area(s) with thinner (item 75, Appendix C), military specification MIL-T-19588.

NOTE

Touch-up shall be accomplished with brush and rollers only on open areas.

(3) Apply one thin coat of epoxy primer (item 43, Appendix C), MIL-P-23377 on area to be touched-up.

(4) Apply one full coat of MIL-C-46168 , Type IV (item 74, Appendix C), topcoat. If required, apply a second coat after allowing 1 to 4 hours curing period for the first coat.

h. Inspection point. Inspect final blade finishing.

i. When general appearance of the finished blade does not pass inspection, accomplish the following:

(1) Sand entire blade using 300 grit sandpaper (item 7, Appendix C).

(2) Repaint blade surfaces per step f.

j. Balance main rotor blade per paragraph 4-2.

CHAPTER 4
FINAL ASSEMBLY AND TESTING

Section I. GENERAL

4-1. General Procedures for Final Testing.

a. General Requirements. The DMWR activity shall have one control master blade for each model blade being output and one working master blade for each blade balancing fixture.

(1) The control master blades T1256-0-7043 and T1256-0-7044 shall be used by the DMWR activity only to monitor and verify their working master blades.

(2) Working master blades shall be checked against the control master at least once each month, anytime any of the DMWR activity personnel considers a check is required and/or needed, or anytime the Government representative deems it necessary.

(3) Whenever the working master differs from the control master by more than 0.25 inch pound, it shall be returned to the blade manufacturer for calibration. In such cases, the existing control master becomes the replacement for the working master, and replacement control master must be acquired from the blade manufacturer. The Contracting Officer shall be notified accordingly, in writing, of such instances.

(4) The control master shall be forwarded to blade manufacturer for calibration every 12 months. The DMWR activity shall maintain a calibration record with traceability back to the "grand" master.

b. Painting, Refinishing, and Marking. Main rotor blade shall be painted prior to any balancing procedure. Refer to paragraph 3-36 for painting. Ensure that weight support assembly (31, figure 4-1), cover plate (7), and tip cap (20) are also painted.

Section II. FINAL PERFORMANCE CHECK

4-2. Weight and Balance Procedure.

NOTE

All blade modifications, hardware changes, repairs, and refinishing shall be performed prior to weighing and balancing blades.

a. All blades with 204-011-016-1, -3, -5, or-7, root end cover (1, figure 3-6) shall be reworked as directed in paragraph 3-28 to accept the 204-012-016-1 cover plate (45) and 204-012-023-1 root end inboard cover (49) (for 204-011-250 blades) or a 204-012-023-5 root end inboard cover (49) (for 204-011-001 blades).

b. All blades with 1/4-28 studs (61) shall be reworked to accept 5/16-inch studs per paragraph 3-30.

CAUTION

The operation in step c. shall be done as a minimum at the beginning and the end of balancing operations everyday up to a maximum of 15 blades per day balanced. Variations in room temperature may effect the balancing accuracy. Assure that the repaired blades are at the same temperature as the balance blade. All blades shall be wiped free of dust. Changes in temperature and wind currents shall be held to a very small amount.

NOTE

The working master blade (3 or 4, figure 4-2) shall be matched to its individual balance fixture (1) within 0.25 inch-pound in both spanwise and chordwise moments.

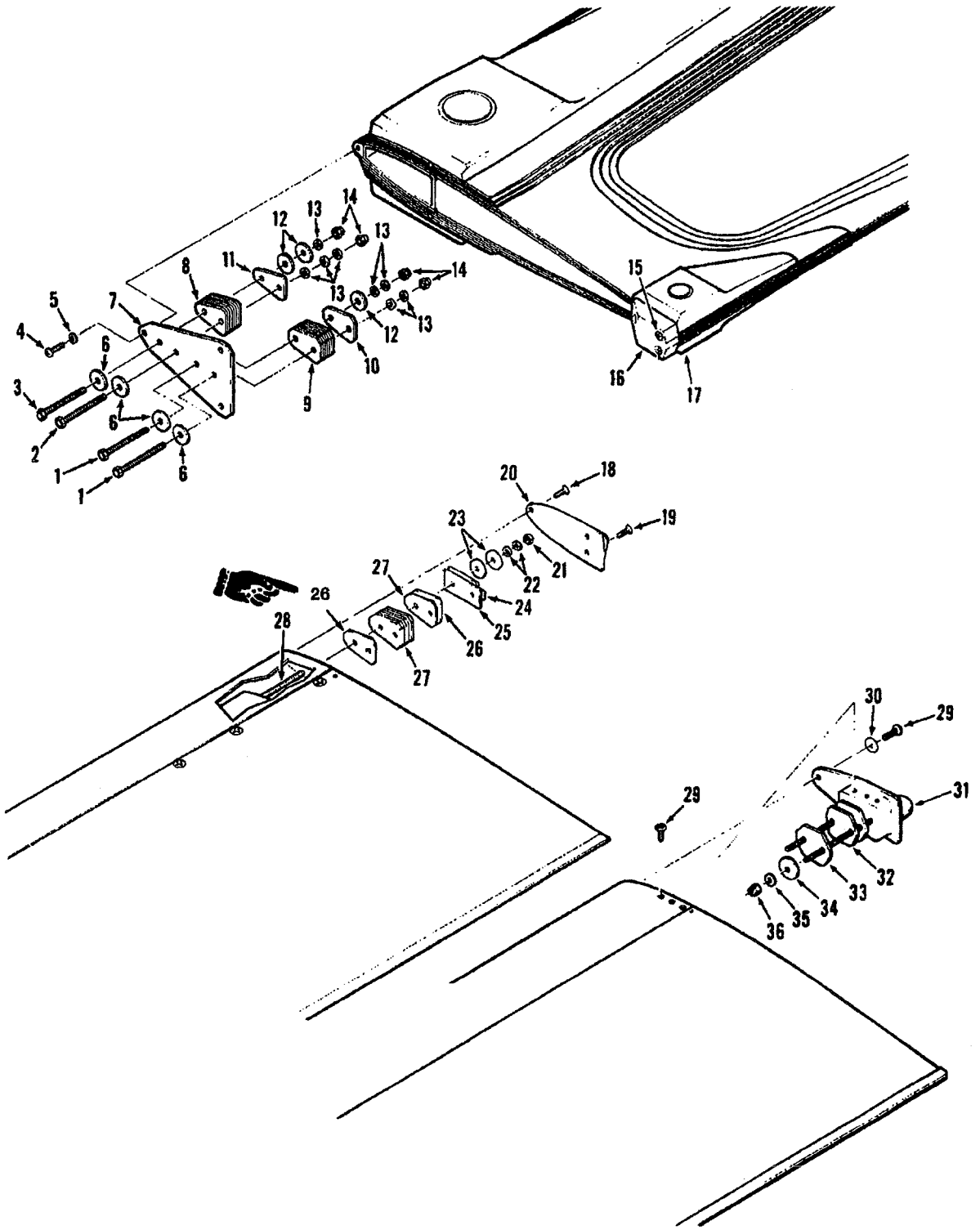


Figure 4-1. Main Rotor Blade Assembly – Installation (Sheet 1 of 2)

FIG & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY. PER ASSY	USABLE ON A	USABLE ON B
4-1	204-011-001-15	. MAIN ROTOR BLADE ASSY	1	A	
	204-011-250-5	. MAIN ROTOR BLADE ASSY	1		B
	204-011-250-113	. MAIN ROTOR BLADE ASSY	1		B
-1	NAS428-4-10	. BOLT	2	A	B
-2	NAS428-4-24	. BOLT	1	A	B
-3	NAS428-4-46	. BOLT	1	A	B
-4	NK525-416R12	. SCREW	3	A	B
-5	AN960PD416	. WASHER	3	A	B
-6	206-010-202-1	. WASHER	4	A	B
-7	204-012-016-1	. COVER PLATE	1	A	B
-8	204-012-021-1	. WEIGHT	AR	A	B
-9	204-011-025-1	. WEIGHT	AR	A	B
-10	204-011-043-5	. RETAINER	AR	A	B
-11	204-012-022-3	. RETAINER	AR	A	B
-12	AN970-4	. WASHER	3	A	B
-13	AN960PD416	. WASHER	8	A	B
-14	MS21042-5	. NUT	4	A	B
-15	NAS1190-3P10L	. SCREW	3	A	B
	NAS1190-3P12L	. SCREW (AR)	3	A	B
	NAS1190-3P14L	. SCREW (AR)	3	A	B
	NAS1190-3P16L	. SCREW (AR)	3	A	B
	NAS1190-3P18L	. SCREW (AR)	3	A	B
	NAS1190-3P20L	. SCREW (AR)	3	A	B
-16	204-012-027	. WEIGHT -3 through -17	AR	A	B
-17	204-012-027	. WEIGHT -1, -19, -21	AR	A	B
-18	NAS1189-416P12	. SCREW	1		B
-19	NK509-416R12	. SCREW	2		B
-20	204-011-062-1	. TIP CAP	1		B
-21	MS21042-5	. NUT	2		B
-22	AN960PD516	. WASHER	AR		B
	AN960C516	. WASHER	AR		B
-23	204-011-269-1	. WASHER	AR		B
	AN970-5	. WASHER	AR		B
-24	204-011-268-3	. LOCK TAB	1		B
-25	204-011-267-3	. RETAINER	AR		B
-26	204-011-266-3	. RETAINER	AR		B
-27	204-011-025-3	. WEIGHT	AR		B
-28	540-011-023-5	. STUD	2		B
-29	NK509-416R12	. SCREW	6	A	B
-30	AN960-416L	. WASHER SHIM	AR	A	B
-31	204-011-052-5	. WEIGHT SUPPORT ASSY	1	A	B
-32	204-011-025-1	. WEIGHT, Balance	AR	A	B
	204-011-025-3	. WEIGHT Balance	AR	A	B
-33	204-011-043-5	. RETAINER Not Required if; 204-011-025 Not Used	1	A	B
-34	AN970-4	. WASHER	AR	A	B
-35	AN960PD416	. WASHER	AR	A	B
-36	NAS670A4	. NUT	2	A	B

Figure 4-1. Main Rotor Blade Assembly- Installation (Sheet 2 of 2)

1. Balance fixture T1256-0-7012
2. Grip plate attaching hardware (part of balance fixture)
3. Working master blade, T1256-0-7043
4. Working master blade, T1256-0-7044
5. Main rotor blade, 204-011-001
6. Main rotor blade, 204-011-250
7. Drag plate attaching hardware (part of balance fixture)

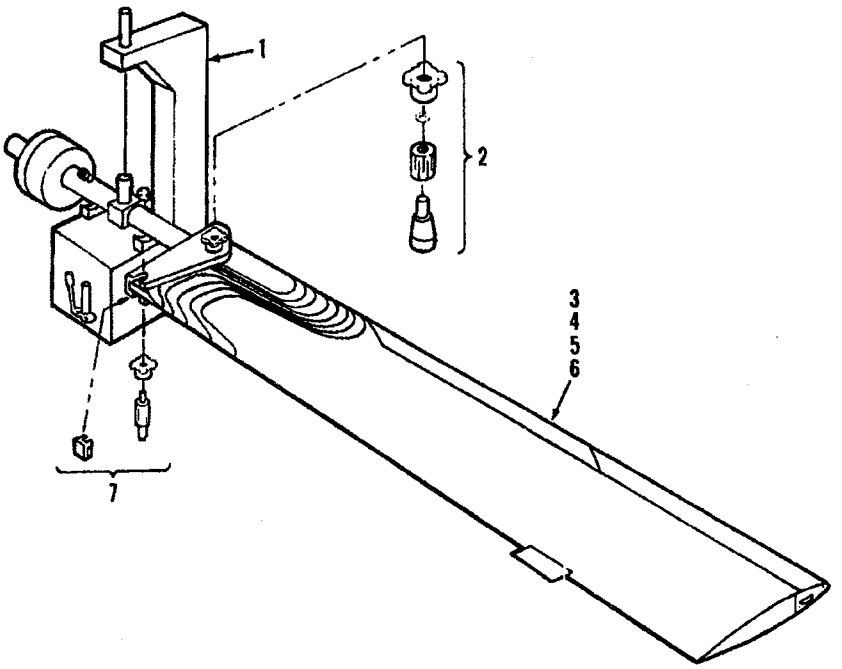


Figure 4-2. Blade Balancing

c. Install the master working blade (3 or 4) in balance fixture (1), secure using attaching hardware (2 and 7),then "zero" the fixture. Remove the working master blade.

d. Inspection Point. Inspect and verify steps a through c.

e. Weigh the repaired blade (complete with tip cap sealant and root end cover plate). Add sufficient balance weights to achieve spanwise and chordwise balancing. Weight for balanced blade shall be 191.0 ± 1.5 pounds for 204-011-001-15 blade, 203.6 ± 2.0 pounds for 204-011-250-5 and 203.6 ± 2.0 for 204-011-250-113.

f. Install the repaired blade (5 or 6) in its balance fixture (1) and secure using attaching hardware (2 and 7).

NOTE

If the final blade weight is 0.10 pound more than is shown on Bell Helicopter Co. data plate, vibro-etch new blade weight on modification data plate. Replace all common hardware (bolts, nuts, screws, and washers) with new like items.

NOTE

Total height of 204-012-027 (16 and 17, fig. 4-1) weight stack shall not exceed 1.60 inches.

g. Distribute and install balance weights (8, 9, 16, and 17, fig. 4-1), with retainers (10 and 11), washers 5, 6, 12, and 13), bolts 1, 2, and 3), cover plate (7), screws (4 and 15), and nuts (14) such that chordwise balance and weight is achieved (refer to table 4-1). Distribute tip weight (27) or (32) with retainers (33) or (25 and 26) and lock tab (24), dependent on tip configuration, as required to achieve spanwise moment. Install washers (22 and 23 or 30 and 34), nuts (21 or 36), weight support assembly (31) or tip cap (20), and screws (29, or 18 and 19).

Table 4-1. Blade Weight and Balance Properties

Blade part number	Weight lbs. (1) (See Note)	Span moment (About line "B" fig. 4-3) In Lb	Chordwise moment (About line "A" fig. 4-3) In Lb
204-011-001-15	191.0 ± 1.5	23,250.0 ± 0.5	20.0 ± 0.5 (2)
204-011-250-5	203.6 ± 2.0	28,866.0 ± 0.5	105.0 ± 0.5 (3)
204-011-250-113	203.6 ± 2.0	28,866.0 ± 0.5	105.0 ± 0.5 (3)

NOTES:
(1) Weight of blades may be 2.00 pounds above maximum limit if blade is within balance limits.
(2) Nose heavy.
(3) Trailing edge heavy.

h. Install weight (16 and 17) by applying adhesive (item 35, Appendix C) to butt of blade and to mating surface of the weight adjacent to the butt. **Install screws (15) with primer (item 43, Appendix C) and torque screws (15) 20 to 25 inch pounds.**

i. Inspection Point. Inspect and verify steps e. through h.

j. When blades (204-011-001-15) are tip-heavy, proceed as follows:

CAUTION

Exercise care in drilling hole to prevent wandering into spar or leading edge.

(1) Drill a 0.42 inch diameter hole in the brass nose block to a depth sufficient to lighten blade.

(2) Thread the hole using a 1/2-13 NC-2B tap 0.80 inch deep.

(3) Fabricate a 0.75 inch long plug from aluminum rod (item 73, Appendix C) with 1/2-13 NC-2A threads.

(4) Coat threads with adhesive (item 35, Appendix C) and install plug.

(5) Upon cure of adhesive, drill and tap plug for 1/4-28UNF-3B to mate with weight support assembly (31, figure 4-1) hole to depth of 0.75 inch.

(6) Remove all debris and assure tapped hole is clear of chips.

k. If blade cannot be balanced using procedures in preceding step j, proceed as follows.

(1) Alter the weight support assembly (31) as shown in figure 4-4.

(2) If more weight removal is needed, drill a hole up to 0.50 inch in diameter in the tip inertia weight to depth required to remove enough weight to balance blade. Locate hole 0.550 inch from forward edge of weight and coat with zinc chromate primer (item 26, Appendix C).

l. Inspection point. Inspect steps j. and k.

m. Remove the cover plate assembly (7, figure 4-1) and apply a bead of sealing compound (item 25, Appendix C) around the root of the blade and the rear web of the box beam under the heads of bolts (1, 2, and 3) and under washers (6). Torque weight retainer nuts (14) 80 to 100 inch pounds.

n. Apply a ring of sealing compound (item 25, Appendix C) under the head of each of the three attaching screws (4).

NOTE

Make sure to use screws (4) in the three tapped holes in the blade.

o. Install washers (5) and screws (4) and torque screws (4) 40 to 60 inch pounds. Fair out sealing compound (item 25, Appendix C) squeeze out around edges of cover plate and screws.

p. Remove weight support (31) from blade. Reinstall using washer shim (30) between the weight support and the inside upper and/or lower surfaces of the box beam as required. Bond the washer shims (30) to the weight support (31) with adhesive (item 2, Appendix C). Torque nuts (36) 80 to 100 inch pounds. Install screws (29) and torque 40 to 60 inch pounds.

q. Remove tip cap (20). Torque nuts (21) 80 to 100 inch-pounds. Apply a bead of sealing compound (item 25, Appendix C) around box beam and tip cover mating surfaces. Attach tip cap (20) with screws)18 and 19). Torque screws 40 to 60 inch-pounds.

r. Inspection point. Inspect sealing and verify torques in steps m. through q.

s. Weigh blade and verify that weight is within limits of table 4-1. Vibro-etch new blade weight on modification data plate.

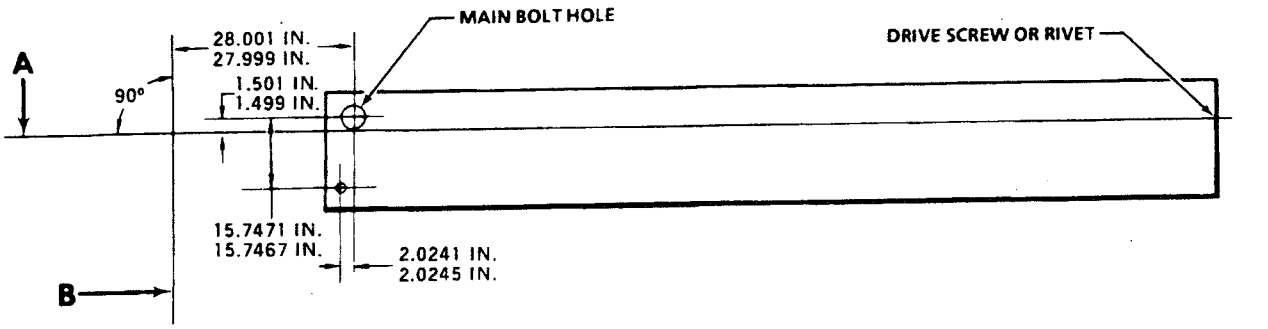


Figure 4-3. Dimensional Check — Main Motor Blade

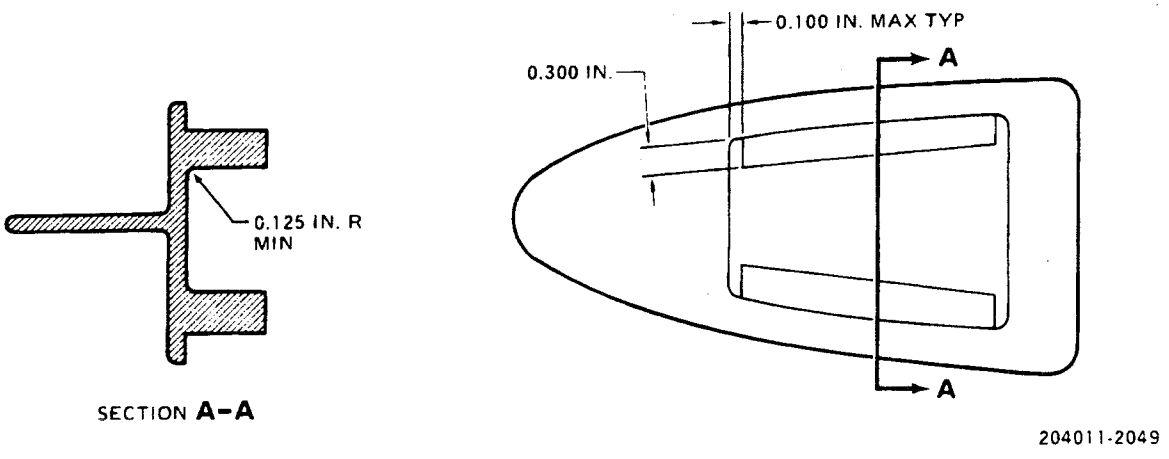


Figure 4-4. Weight Support Assembly Modification

CHAPTER 5
QUALITY ASSURANCE/QUALITY CONTROL REQUIREMENTS

Section I. GENERAL

5-1. Responsibility. The contractor/depot quality assurance activity is responsible for the performance of the inspections specified in the DMWR. The contractor/depot may utilize their own facilities or any commercial laboratory acceptable to the procuring activity/commodity manager (PA/CM). The PA/CM reserves the right to perform any of the inspections specified in the DMWR, when such inspections are necessary to assure that supplies or services conform to the prescribed requirements.

5-2. Quality Assurance Terms and Definitions. For quality assurance terms and definitions refer to MIL-STD-109.

5-3. TEST, MEASUREMENT AND DIAGNOSTIC EQUIPMENT (TMDE). The overhaul facility is responsible for acquisitions, maintenance, calibration, and disposition of all TMDE. Items of TMDE to be used by AMC (Army) elements will be acquired in accordance with AR 750-43 and AMC Supplement 1 AR 750-43. All TMDE used in compliance with this DMWR shall be maintained and controlled in accordance with MIL-I-45607 (Acquisition, Maintenance and Disposition of Inspection Equipment),and MIL-STD-45662A (Calibration Systems Requirements) and DESCOM-R 702-1(Depot Quality Systems - Army facility). Calibration documents for all TMDE shall be traceable to the National Institute of Standards and Technology (NIST).

5-4. Certification of Personnel, Materials, and Processes. The contractor/depot QA activity shall be responsible for ascertaining and certifying personnel skills, equipment, and material meet the requirements of the work to be accomplished. Unless otherwise specified in the contract or by PA/CM representative, the contractor/depot QA activity shall provide the PA/CM with statements or other evidence that specifications for such special processes as welding, nondestructive testing, plating, and the like, have been complied with. Personnel performing magnetic particle and penetrant tests shall be certified in accordance with NAS 410.

Section II. INSPECTION REQUIREMENTS

5-5. General.

a. Quality Inspectors (QI) are required to witness all tests and those inspections which are marked "QI" or otherwise designated by the PA/CM.

b. The Maintenance Technicians shall inspect, check, and determine the conditions of all other areas to insure compliance with the DMWR.

5-6. Product Verification Audit. A product verification audit maybe performed in accordance with AVSCOM-R 702-1 on one of the first five items produced to verify compliance with the DMWR and contractual terms.

5-7. In-Process and Acceptance Inspections.

a. Used components and refinished parts recovered as products of disassembly shall be examined-100% by the contractor/depot, to determine serviceability. The contractor/depot, shall maintain a log containing the Maintenance Technician's comments for all parts removed; such as parts inspected, replaced, inspected by QI, tested by NDI, modified by MWO, or other notes or actions.

b. Diagnostic and nondestructive tests such as magnetic particle, penetrant, radiographic, and ultrasonic inspections as required by this DMWR shall be in accordance with referenced military specifications, and AVSCOM AA-STD-1 and AA-STD-2 where not otherwise specified. Personnel performing magnetic particle, penetrant, or other nondestructive inspections will be certified in accordance with MIL-STD-410.

c. A list of inspection definitions, Table 5-1, are included at the end of this chapter. Accept and reject criteria for these inspections and unique repair methods are found in applicable areas of this DMWR.

5-8. Test Check List. A check list indicating each required test shall be included as a part of this DMWR. The list shall show name of test and test set-up (per figure if applicable). List the input readings, such as position of valves, switches, etc. List the required readings, such as time, meter readings, etc. List the accept/reject criteria for each test as applicable.

Table 5-1. Inspection Definitions

TERM	DEFINITION	PROBABLE CAUSE
Abrasion	Roughened surface, varying from light to severe	Foreign material present between moving parts
Bend	Any change in the in intended configuration	Application of severe or excessive force
Break	Separation of part	Severe force, pressure or overload
Brinelling (False)	Surface marks or blemishes on balls, rollers, and raceways that normally have a polished or satin finish appearance. These marks will appear as lines at each position for roller bearings, and as points (or ellipses) at each ball position on ball bearings.	Vibration or low-radial angle oscillation, or both, while not rotating
Brinelling (True)	Shallow, smooth indentations on balls, rollers, or raceways that have the original surface finish lines at the bottom of the depressions. The contour on the indentation in the raceway is the same as the ball or roller radius.	Impact during mounting, or stationary overload.
Burn	Loss of metal	Excessive heat
Burnishing	The smoothing of a metal surface by mechanical action, but without loss of material. Generally found on plain bearing surfaces. Surface discoloration is sometimes present around outer edges of burnished area **NOTE** Normal burnishing from operational service is not detrimental if coverage approximates the carrying load and if there is no evidence of burns.	Excessive heat
Burr	A rough edge or sharp projection	Impact from foreign object, or poor machining
Chipping	Breaking away of small metallic particles	Heavy impact of foreign object
Corrosion	Surface chemical action that results in surface discoloration, a layer of oxide, rust, and removal of surface metal	Improper corrosion preventive procedures and excessive moisture
Crack	A break in material	Severe stress from overloading or shock; possible extension of a scratch

Table 5-1. Inspection Definitions (continued)

TERM	DEFINITION	PROBABLE CAUSE
Dent	A small smoothly rounded depression	A sharp blow or excessive pressure
Distortion	A change from original shape	Application of severe heat or irregular forces
Erosion	Wearing away of metal	Hot gases, corrosive liquids, or grit
Fatigue failure	Sharp indentions, cracks, toolmarks, and inclusions that result in progressive yielding of one or more local areas	Cyclic stress. As stress is repeated, cracks develop, then spread, usually from surfaces (or near surface) of the particular section. Finally, so little sound material remains that normal stress on part exceeds strength of the remaining material. This type of failure is not caused by metal crystalization. This condition can easily be determined by visual inspection of part. Striations will be evidence by several lines, more or less concentric. The center (or focus) of lines indicates origin of the failure
Flaking	Loose particles of metal or evidence of surface covering removal	Imperfect bond or severe load
Fracture	See break	
Gouging	Removal of surface metal. Typified by rough and deep depressions	Protruding objects, misalignment
Heat oxidizing	Characterized by a discoloring film Color varies from yellow to brown and blue to purple	High temperature operation
Indenting	Cavities with smooth bottoms and sides. Occurs on rolling contact surfaces of bearing components	Loose or foreign particles rolling between rotating elements of a bearing
Nick	A sharp-bottomed depression that may have rough outer edges	Dropping, banging
Off-square or mis-alignment of Anti-Friction Bearing	Indicated by retainer deterioration, retainer bore erosion, and gouged retainer rolling element pockets of the inner and outer race. Two distinct rolling element paths may be seen on the race where off-square conditions exist	Caused by rolling element speed variation, which jams rolling elements into separator pockets

Table 5-1. Inspection Definitions (continued)

TERM	DEFINITION	PROBABLE CAUSE
Pitting	Small indentions in a surface	Chemical pitting: Oxidation of surface or electrolytic action. Mechanical pitting: Chipping of loaded surfaces caused by improper clearances and overloading, and by pressure of foreign material
Scoring	Deep scratch following path of part travel	Result of localized lubrication breakdown between sliding surfaces
Scraping	A furrow	Rubbing with any hard, or rough pointed object
Scratch	A very shallow furrow or irregularity, usually longer than wide	Movement of a sharp object across the surface
Seizure	Fusion or binding of two adjacent surfaces preventing continued movement	Improper lubrication or wear
Stripped thread	Thread of a nut, stud, bolt, or screw damaged by tearing away part of thread	Improper installation or thread pitch or size
Tear	Parting of parent material	Excess tension, caused by an external force
Wear	Slow removal of parent material Frequently, wear is not visible to the naked eye	Result of abrasive substances contacting rolling surfaces, and acting as a lapping compound

CHAPTER 6
PACKAGING

6-1. Output components will be preserved, packed, and marked in accordance with the Delivery Order/Contract, Depot Maintenance Interservice Support Agreement (DMISA), Statement of Work (SOW) including , Memorandum of Agreement, or other authorized document. Overhaul will not be complete until the output component is properly packaged.

6-2. Output components from organic depot maintenance and overhaul (M&O) programs will be packaged in accordance with the FEDLOG Packaging File and marked in accordance with MIL-STD-129. Components for which a special or multi-application container is specified will be packed in the assigned container. All other components will be packed level A/B unless weight and dimension requirements of MIL-STD-2073-1 and MIL-STD-2073-2 specify a wood container. The level of packaging shall be level A/A when a special/multi-application reusable container is specified. When components are received at the overhaul maintenance facility, the container will be inspected for serviceability in accordance with Chapter 2 of TB 55-8100-200-24. Containers will be requisitioned as required to replace missing, improper, or unserviceable containers to insure availability of container when component is returned from the overhaul maintenance facility. Waivers, deviations, container substitution must be approved by the AMCOM Packaging Branch. Written communication should be submitted to HQ, AMCOM, AMSAM-MMC-MM-DP, (Packaging Branch) Redstone Arsenal Al 35898-5000. Telephone inquires may be made to commercial (256) 876-5972/2526, DSN 746-5972/2526.

6-3. All contractual matters shall be submitted through the assigned Contracting Officer (KO). Technical communication concerning packaging should be submitted to HQ, AMCOM, AMSAM-MMC-MM-DP, (Packaging Branch) Redstone Arsenal AL 35898-5000. Telephone inquiries may be made to Commercial (256) 876-5972/2526, DSN 746-5972/2526.

APPENDIX A
REFERENCES

AMC Supplement 1 AR 750-43	Test Measurement and Diagnostic Equipment, Including Prognostic Equipment and Calibration Test/Measurement Equipment
AMSAV Form 6525(J)	Memorandum of Agreement, Preservation and Packaging
AMSAT-I-M Form 1379	Request for Depot Engineering Support
AR 750-43	Test, Measurement and Diagnostic Equipment Including Prognostic Equipment and Calibration Test Measurement Equipment
ATCOM-R 702-1	Depot Quality System
AVSCOM-R 702-1	Product Verification Audit
AVSCOM AA-STD-1	AVSCOM Acceptance Standard Quality Acceptance Criteria for Magnetic Particle Inspection
AVSCOM AA-STD-2	AVSCOM Acceptance Standard Quality Acceptance Criteria for Penetrant Inspection
CTA 50-970	Consolidated Index of Army Publications and Blank Forms
DA FORM 2028	Recommended Change to Publications and Blank Forms
DA Form 2028-2	Recommended Changes to Equipment Technical Publications
DA FORM 2410	Component Removal and Repair/Overhaul Record
DA PAM 25-30	Consolidated Index of Army Publications and Blank Forms
DA PAM 738-751	The Army Maintenance Management System - Aviation (TAMMS-A)
DARCOM R-702-22	Certification of NDI Personnel
DD FORM 1693	Engineering Change Proposal (Short Form)
DESCOM-R 702-1	Depot Quality System
(DPS) #2	Bell Helicopter Design Process Specification
MIL-I-45607	Acquisition Maintenance and Disposition of Inspection Equipment
MIL-S-13165A	Shot Peening of Metal Parts Ferrous
MIL-STD-109	Quality Assurance Terms and Definitions
MIL-STD-129	Marking for Shipment and Storage
MIL-STD-410	NDT Personnel Qualification and Certification
MIL-STD-453	Radiographic Inspection
MIL-STD-2073-1	DOD Material Procedures for Development and Application of Packaging Requirements
MIL-STD-2073-2	Packaging Requirement Codes
MIL-STD-45662	Calibration System Requirements
NAS 410	NAS Certification and Qualification of Nondestructive Test Personnel
QQ-P-416B	Plating, Cadmium (Electrodeposited)
STANDARD FORM 368	Quality Deficiency Report (QDR)
TB 55-8100-200-24	Maintenance of Specialized Reuseable Containers for Aircraft Equipment

TM 55-1500-244-23	Aircraft Weapons System Cleaning and Corrosion Control
TM 55-1500-344-23	Corrosion Control for Army Aircraft
TM 55-1500-345-23	Painting and Marking of Army Aircraft
TM 55-1520-210-23P	Aviation Unit and Intermediate Maintenance Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools) for Helicopter Utility Tactical Transport, UH-1B, UH-1C, UH-1H, UH-1M, EH-1H (Bell), UH-1V

APPENDIX B

REPAIR PARTS AND SPECIAL TOOL LIST

Repair parts are listed in TM 55-1520-210-23P (UH1/EH1) and DMWR 55-1560-198.

APPENDIX C

EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

C-1. Scope. This appendix lists expendable supplies and materials you will need to repair part number 204-011-001-15, 204-011-250-5, and 204-011-250-113 main rotor blades. These items are authorized to you by CTA 50-970, Expendable Items (except Medical, Class V, Repair Parts, and Heraldic Items).

C-2. Explanation of Columns.

a. *Column 1-Item Number.* This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., Use lubricating oil (item 21, Appendix C).).

b. *Column 2-National Stock Number.* This is the National Stock Number assigned to the item: use it to request or requisition the item.

c. *Column 3-Description.* Indicates the Federal Item name and, if required, a description to identify the item. The last line for each item indicates the part number followed by the Federal Supply Code for Manufacturers (FSCM) in parenthesis, if applicable.

d. *Column 4-Unit of Measure (U/M).* Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two- character alphabetical abbreviation (e.g., ea, in., pr). If the unit of measure differs from the unit of issue, requisition the lowest unity of issue that will satisfy your requirements.

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) Item Number	(2) National Stock Number	(3) Description	(4) U/M
1	9535-00-084-4484	Aluminum Alloy, 2024-T-3 0.020, 0.032 and 0.062 in. thick QQ-A-250/5 (FSCM 81343)	SH
2	8040-00-145-0432	Adhesive, Structural P/N EC2216 (FSCM 04963)	EA
3	6810-00-238-8119	Aliphatic Naphtha, Type II TT-N-95 (FSCM 81348)	GL
4	8030-00-231-2363	Corrosion Preventive, Class 3 MIL-C-11796 (FSCM 81348)	CN
5	8030-01-208-6003	Adhesive, Hysol EA960, (FSCM 33564)	
6	7510-00-266-7612	Tape, Common Masking MIL-T-21595 (FSCM 81348)	YD
7	5350-00-224-7201	Sandpaper, 300-400 Grit Commercial	SH

SECTION II. (Cont)

(1) Item Number	(2) National Stock Number	(3) Description	4) U/M
8	6810-00-281-2785	Methyl-Ethyl-Ketone (MEK) TT-M-261 (FSCM 81348)	GL
9		Brush, Roller, Sleeve-type, Adhesive priming	EA
10		Brush. Adhesive priming	EA
11	8040-	Adhesive, AF163-2K (FSCM 04963)	SH
12	8040-00-943-2502	Adhesive Primer EC 3924B (FSCM 04963)	QT
13	6810-00-262-8566	Sodium Dichromate, Dihydrate, Technical O-S-595A	5 LB
14	6810-00-227-1845	Acid Sulfuric, Technical, Class 1, Type 1	PT
15	6810-00-107-1510	Water, Demineralized, Commercial	5 GL
16	8135-00-160-7759	Paper, Kraft UU-P-268E (FSCM 81349), Type 1, Grade B	SH
17	8305-00-267-3015	Cheesecloth, Cotton CCC-C-440C (FSCM 81348)	YD
18	9535-01-087-1311	Tape, Aluminum Name Tag 11/16-in. wide or equivalent MIL-A-2877B, 0.014 - 0.016 thick	RL
19	8305-01-120-3541	Peel Ply, (Untreated) Burlease No. 51789 (88730)	YD
20	8305	Cloth, Wicking No. 183 Fiberglass or equivalent (FSCM 91775)	YD
21	5330-00-286-4851	Aluminum Wool MIL-A-4864A	
22	5330-	Blanket Bonding, Rubber Sheeting, (FSCM 80473) Commercial	SH
23	7510-00-884-3698	Tape, High Temperature Masking No. 213 or equivalent (FSCM 76381)	RL
24	8030-01-023-7468	Film, Chemical, alodine 1200 or equivalent MIL-C-5541	LB

SECTION II. (Cont)

(1) Item Number	(2) National Stock Number	(3) Description	(4) U/M
25	8030-00-723-2746	Sealing Compound MIL-S-8802, Class B-2 (FSCM 83527)	KT
26	8010-00-297-0593	Primer, Zinc Chromate MIL-P-8585	PT
27	8030-00-231-2345	Corrosion Preventive Compound MIL-C-16173B Grade 1	QT
28	6810-00-290-0048	Toluene, TT-T-548 (FSCM 81348)	GL
29	5350-	Cast Steel Shot 0.028 Dia., MIL-S-851B	LB
30	5350-	Blasting Abrasive Flint Quartz, No. 3/0 MIL-A-21380A	
31	8010-01-340-7060	Coating, Urethane, Aliphatic Isocyanate, Lusterless Black Color No. 37038 per Federal Standard 595 (Mar Resistant) MIL-C-46168	GL
32	6810-00-819-1128	Perchloroethylene O-T-236C, Grade B	GL
33	8010-00-515-2258	Paint Remover, E-Z Strip 19A TT-R-248	QT
34	6850-00-285-4314 or 6850-01-019-0665	Cleaner, Alkaline, P-C-535 (FSCM 95511)	GL
35	8040-00-102-2098	Adhesive Hysol, EA934-NA (FSCM 32564)	PT
36	5350-00-721-8117	Paper, Abrasive 120-180 Grit, Commercial	SH
37	5350-00-494-8325	Wool, Steel, FF-S-740	
38	7920-00-727-6258	Abrasive Pad, Scotchbrite, 3M Co., St. Paul, MN., or equivalent (FSCM 76381)	EA
39	5350-00-224-7215	Sandpaper 600 Grit, Commercial	SH
40	6850-	Detergent Soap MIL-L-18687	
41	4710-	4130 Steel Tubing, 1.25 in. OD by 0.25 in. Wall Thickness 2.2 in. Long, Heat Treat 160-180 KSI, AMS-6381	
42	6850-00-270-5551	Cleaner, Turco, WO. No. 1 (Alcoholic, Phosphoric Acid Solution) MIL-C-10578 (FSCM 95511)	GL

SECTION II. (Cont)

(1) Item Number	(2) National Stock Number	(3) Description	(4) U/M
43	8010-00-082-2450	Primer, Polyamide Epoxy, Type I, MIL-P-23377	KT
44	7920-00-721-8884	Paper Wipers, Scott or equivalent, Commercial	
45	DELETED		
46		Sodium Bisulphate, Technical Grade	
47		LHE Cadmium Solution; (Brush-on) Macro Bronze No. 1 Enthox 982, MIL-STD-865 (FSCM 13929)	PT
48	5350-00-967-5092	Abrasive Mats, Nonwoven, Nonmetallic, MIL-A-9962 Type I, Class 1, Grade C (FSCM 81349)	EA
49	6810-00-855-6160	Alcohol, Isopropyl TT-I-735	GL
50	8135-	Tuck Tape, PPP-T-0060a	
51	6810-00-264-6517	Acid, Chromic O-C-303	LB
52	6850-00-935-0996	Cleaning compound, MIL-C-87936 (FSCM 81349)	LB
53	6810-00-237-2918	Acid, Nitric Technical Grade	PT
54	5680-00-763-0869	Honeycomb Core Material-Type 3.1, 3/16-10N cell; Hexcell Products Inc. 5056 EX 2.500 x 24.0 x 24.0 (FSCM 81349) MIL-C-7438	SH
55	5350-00-192-5051	180 - 220 Grit Aluminum Oxide	
56	4710-	4130 Tube, 3.00 in. OD by 0.38 Wall, 4.8 in. Long, Heat Treat 165-180 KSI AMS 6381	
57	DELETED		
58	8030-00-723-4599	Sealing Compound, MIL-S-8802, Proseal 890 (FSCM 83527)	KT
59	7920-00-044-9281	Cloth, Cleaning, Low-lint MIL-C-85043 (FSCM 81349)	RL

SECTION II. (Cont)

(1) Item Number	(2) National Stock Number	(3) Description	(4) U/M
60	6810-00-184-4796	Acetone, Technical Grade O-A-51D	GL
61		Putty, Lacquer, spot -05960 and 05964	EA
62	8010-01-055-2319	Coating, Urethane, Aliphatic Isocyanate Lusterless Olive Drab Color No. 34087	GL
63	7920-00-166-7154	Tack rag, G-99-2 (FSCM 16241)	DZ
64		Coating, Urethane, gloss grey sealer-aliphatic Isocyanate Color No. 16440 MIL-C-83286	GL
65	6850-00-597-9765	Safety solvent, hydrocarbon base, O-C-1889	GL
66	9150-00-166-3158	Lacquer, Acrylic	GL
67	8010-01-235-8059	Coating, urethane, aliphatic Isocyanate gloss orange, yellow, color No. 33538	GL
68	7510-00-833-7311	Platers Tape HH-T-0025	RL
69	8415-00-268-8353	Gloves, Cotton, White, MIL-G-3866 (FSCM 81349)	PR
70		DELETED	
71	5350-00-192-5047	80 Grit Aluminum oxide	
72		Tape, Mylar, 3M Company, St. Paul, MiN.	RL
73		Rod, Aluminum 2024-T4 0.50 Dia.	
74	8010-01-340-7060	Coating, Polyurethane, Aircraft Black, MIL-C-46168, Type IV	
75	6810-00-286-0458	Thinner, MIL-T-19588	

APPENDIX D

DEPOT MOBILIZATIONS REQUIREMENTS

D-1. This DMWR pertains to an on condition item and is used as a guide during depot maintenance to perform only those corrective maintenance tasks essential to achieving serviceability. The exception is when mandatory convenience maintenance taksk, necessary to assure the inherent reliability and/or longevity of the item are stipulated in the Pre-Shop Analysis Section of the DMWR. All of the above are essential, even under a state of mobilization.

GLOSSARY

A

ASSEMBLY — A group of two or more physically connected and related parts, which is capable of disassembly, and when combined with other assemblies and parts, creates a component.

B

BRINELLING — Surface depressions produced by a severe blow, extremely heavy pressure, or rollers skidding or sliding instead of rolling.

C

CHAFED — Frictional wear. A rubbing action between two parts having limited relative motion.

CHECK — Act of testing or verifying.

CORROSION — 1. Etching. Appears on a polished surface as a dulling of the surface; if allowed to continue, surface becomes rough and frosted in appearance. 2. Pitting. Small irregular pits or holes. Appears on surface as a white or gray-powdery deposit. 3. Fretting or Erosion. Loss of material due to abrasives or chemical action. 4. Rust. Oxides formed by chemical attack.

D

DEFORMATION/DISTORTION — Loss of original contour.

DISASSEMBLY — As used herein, describes the operations necessary to reduce an assembly to its separate components and parts.

E

F

G

GALLING — Transfer of metal from one surface to another.

H

I

INSPECT — View or examine critically either visually or using prescribed method contained in this DMWR.

J

K

L

M

MECHANICAL DAMAGE — Includes nicks, cracks, dents, scratches, scores, cuts, and scrapes.

N

NSN — National Stock Number.

O

O.I.P. — Overhaul Inspection Procedures

OVERHAUL — To restore an item to a completely serviceable condition as prescribed by serviceability standards.

P

PITTING — Small holes or indentations, generally caused by corrosion, high compression, stresses, or metal to metal pounding.

PROCESSING — As used herein, is the series of procedures outlined in this DMWR to accomplish overhaul. This includes the restoration of finishes such as painting, plating, and treatment of metal surfaces.

Q

R

REPAIR — To restore a defective part, component, subassembly, or assembly to a seriviceable condition in accordance with the instructions contained in this DMWR.

REPLACE — Removal and disposition of a defective part and replace the part with a new or serviceable like item.

S

SCORING — Very deep scratches caused by foreign particles between surfaces that are moving or between one moving and one stationary surface. Scores follow the travel direction of the part.

SCRATCHING — Narrow shallow lines resulting from movement of foreign particles across a surface.

SERVICING — The lubricating, treating, cleaning, or preservation necessary to maintain the equipment and other respective parts in serviceable condition.

SPALLING — Chipped or flaked surface caused by the breaking away of the hardened metal and separation of the case from the core.

T

TEST — As used herein, is the testing of equipment using shop test equipment to determine that the unit functions properly within the limits set forth in this DMWR.

TOLERANCE — The difference between two limiting sizes as a means of specifying the degree of accuracy.

U

V

VOID — A void shall be defined as an unbonded area that is supposed to be bonded. Many sub-definitions of voids are often given such as lack of adhesive, gas pocket, misfit, etc.

W

X

Y

Z

FOR THE COMMANDER:

CLIFTON J. BRODERICK
Colonel, OD
Chief of Staff

OFFICIAL:

Richard E. Turner

RICHARD E. TURNER
Director
Logistics Support Directorate
Integrated Materiel Management Center

REQUEST FOR DEPOT ENGINEERING SUPPORT	CONTRACT NO	PRIORITY OF REQUEST ☐ URGENT ☐ ROUTINE	DATE OF REQUEST
TO:	FROM:		
THRU:	POINT-OF-CONTACT:		
COPIES:	PUBLICATION NO.	CHANGE NO.	PUBLICATION DATE
	PUBLICATION TITLE		

AREA OF PUBLICATION WHERE PROBLEM EXISTS

BE EXACT PIN-POINT WHERE IT IS				IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO	
				(Use Continuation Sheet If Necessary)

TITLE	SIGNATURE	DATE

RECOMMENDED SOLUTIONS OR DISPOSITION:

(Use Continuation Sheet If Necessary)

TITLE	SIGNATURE	DATE

These are the instructions for sending an electronic 2028

The following format must be used if submitting an electronic 2028. The subject line must be exactly the same and all fields must be included; however only the following fields are mandatory: 1, 3, 4, 5, 6, 7, 8, 9, 10, 13, 15, 16, 17, and 27.

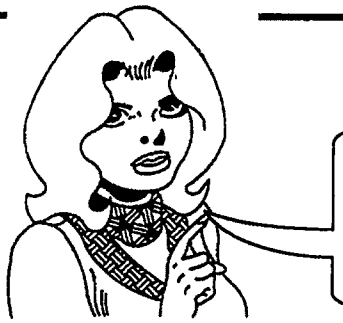
From: "Whomever" <whomever@avma27.army.mil>
To: 2028@redstone.army.mil

Subject: DA Form 2028

1. ***From:*** Joe Smith
2. *Unit:* home
3. ***Address:*** 4300 Park
4. ***City:*** Hometown
5. ***St:*** MO
6. ***Zip:*** 77777
7. ***Date Sent:*** 19-OCT-93
8. ***Pub no:*** 55-2840-229-23
9. ***Pub Title:*** TM
10. ***Publication Date:*** 04-JUL-85
11. *Change Number:* 7
12. *Submitter Rank:* MSG
13. ***Submitter FName:*** Joe
14. *Submitter MName:* T
15. ***Submitter LName:*** Smith
16. ***Submitter Phone:*** 123-123-1234
17. ***Problem:*** 1
18. *Page:* 2
19. *Paragraph:* 3
20. *Line:* 4
21. *NSN:* 5
22. *Reference:* 6
23. *Figure:* 7
24. *Table:* 8
25. *Item:* 9
26. *Total:* 123
27. ***Text:***

This is the text for the problem below line 27.

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS



THEN . .JOT DOWN THE DOPE ABOUT IT ON THIS FORM, CAREFULLY TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL!

SOMETHING WRONG WITH THIS PUBLICATION?

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)
PFC John DOE
CO A 3rd Engineer Bn
Ft. Leonardwood, MO 63108

DATE SENT
22 August 1992

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 1-1520-250-10	15 June 1992	Operator's manual MH60K Helicopter

BE EXACT PIN-POINT WHERE IT IS

PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO
6	2-1 a		
B1		4-3	

IN THIS SPACE, TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

In line 6 of paragraph 2-1a the manual states the engine has 6 cylinders. The engine on my set only has 4 cylinders. Change the manual to show 4 cylinders.

Callout 16 in figure 4-3 is pointed at a bolt. In key to figure 4-3, item 16 is calle a shim. Please correct one or the other

EXAMPLE

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER

JOHN DOE, PFC (268) 317-7111

SIGN HERE

JOHN DOE John Doe

DA FORM 1 JUL 79 2028-2

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DRSTS-M verprint2, 1 Nov 80

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OFFICIAL BUSINESS

COMMANDER
U.S. ARMY AVIATION AND MISSILE COMMAND
ATTN: AMSAM-MMC-MA-NP
REDSTONE ARSENAL, AL 35898-5000

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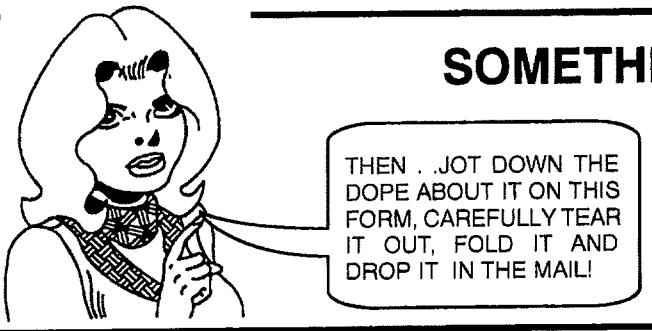

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DATE SENT

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
DMWR 1-1560-198	30 July 2002	Main Rotor Blades

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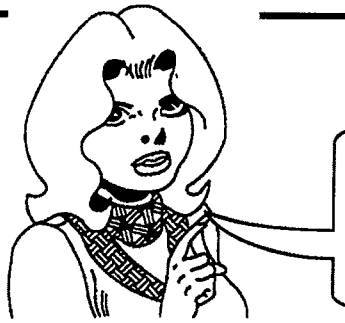

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The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigram = .035 ounce
1 dekagram = 10 grams = .35 ounce
1 hectogram = 10 dekagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	*To*	*Multiply by*	*To change*	*To*	*Multiply by*
inches	centimeters	2.540	ounce-inches	newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29,573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	newton-meters	1.365	metric tons	short tons	1.102
pound-inches	newton-meters	.11375			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C