

**TECHNICAL MANUAL**

**AVIATION UNIT MAINTENANCE (AVUM) AND  
AVIATION INTERMEDIATE MAINTENANCE (AVIM)  
MANUAL**

**NONDESTRUCTIVE INSPECTION PROCEDURES**

**FOR**

**OH-58D HELICOPTER**

DISTRIBUTION STATEMENT A Approved for Public Release;  
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\*This publication together with TM 1-1520-254-23, dated 30 May 1997, supersedes TM 1-1520-254-23, dated 30 November 1996.

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**HEADQUARTERS, DEPARTMENT OF THE ARMY  
30 MAY 1997**

**WARNING SUMMARY**

Personnel performing inspections involving operations, procedures, and practices which are included or implied in this technical manual shall observe the following instructions.

**WARNING**

Highlights an operation, procedure, practice, condition, statement, etc., if not strictly observed, could result in injury to, or death of, personnel.

**CAUTION**

Highlights an operation, procedure, practice, condition, statement, etc., if not strictly observed, could result in damage to, or destruction of, equipment or loss of mission effectiveness.

**NOTE**

Highlights an essential operation, procedure, condition, or statement.

The following are general safety precautions that are not related to any specific procedures and therefore do not appear elsewhere in this publication. These are recommended precautions that personnel must understand and apply during many phases of nondestructive inspections.

**GENERAL**

Assure compliance with safety requirements in Technical Manual, Nondestructive Inspection Methods, TM 55-1500-335-23.

Assure compliance with the safety and precautionary measures addressed in the applicable technical manuals listed in Table 1-1. Refer to these manuals for detailed information relating to safety considerations for the specific area or system on which the nondestructive inspection procedure is to be performed.

**WARNING**

**Aircraft Grounding**

All aircraft shall be grounded in accordance with FM 55-41 at all times.

**WARNING**

**Electrical Hazard**

Assure that all safety precautions for using electrical equipment near aircraft fuel cells, oxygen systems, and stores have been met.

**WARNING**

**Solvents**

Most solvents are flammable. Keep away from heat and open flame. Vapors may be harmful. Use with adequate ventilation. Avoid prolonged or repeated breathing of vapor. Avoid contact with skin and eyes. Do not take internally. Comply with pollution control rules concerning photochemically reactive solvents.

**WARNING**

**Keep Away From Live Circuits**

Inspection personnel must at all times observe all safety regulations. Do not replace components or make adjustments inside equipment with a high voltage supply turned on. Under certain conditions, dangerous potentials may exist even when the power control is in the off position, due to charges retained by capacitors. To avoid injuries, always remove power. Discharge and ground a circuit before touching it. Make sure that equipment is grounded to same earth ground as aircraft.

**WARNING**

**Electrical and Electronic Equipment**

Do not wear rings, watches, or metal jewelry when working around electrical equipment.

**RESUSCITATION**

Personnel working with or near high voltages should be familiar with modern methods of resuscitation. Such information may be obtained from the Office of Bioenvironment Health or is listed in FM 21-11.

**WARNING**

**Cleaning Solvents**

- Those areas where skin and clothing come in contact with cleaning solvents should be washed thoroughly and immediately after contact.
- Saturated clothing should be removed immediately.
- Areas where cleaning solvents are used should be adequately ventilated to keep vapors to a minimum.
- In case of contact with eyes, nose, or ears, flush them with generous quantities of water and then seek medical attention immediately.

**WARNING**

**Foreign Object Damage**

- Make sure area is clear of foreign objects before closing access doors, panels, and fairings.
- If area is not clear, damage to components or systems could result in personal injury or death.

**WARNING**

**Lifting Components With Hoist**

- Lifting or hoisting of components shall be done only by designated personnel.
- Before lifting, alert personnel in immediate areas.
- Before lifting, balance the load.
- Do not stand under load while it is being moved from one area to another on a hoist.
- Do not stand under load to do inspection work.

**WARNING**

**Compressed Air**

- Do not use more than 30 PSIG compressed air for cleaning purposes.
- Use eye protection to prevent injury to personnel.

The following are warnings and cautions related to specific procedures that appear elsewhere in this publication. These are precautions that personnel must understand and apply during nondestructive inspections.

**WARNING**

To prevent injury to personnel and damage to helicopter, stand only on designated surfaces. These areas are reinforced to withstand frequent use and are treaded to prevent slipping. All other surfaces are NO STEP areas.

**WARNING**

**Maintenance Platforms/Workstands**

Use only appropriate platforms, workstands, or other approved locally procured stands and restraint equipment when working above 10 feet on helicopters in a nontactical environment. Otherwise, personnel injury could result from accidental falls.

**WARNING**

Cleaning solvents P-D-680, Type II and MIL-C-38736 are flammable. Avoid eye and skin contact or breathing of vapors. Protective equipment consisting of goggles, gloves, and respiratory protection is required.

**WARNING**

Electrical equipment shall not be operated in areas where combustible gases or vapors may be present, unless the equipment is explosion proof.

**WARNING**

- Black lights generate considerable heat during use. Extreme care must be exercised to prevent contacting the housing with any part of the body.
- To prevent injury to eyes, do not look directly into black light.
- Prolonged direct exposure of hands to the filtered black light's main beam may be harmful. Suitable gloves shall be worn when exposing hands to the main beam.

**WARNING**

Prolonged or repeated inhalation of vapors or powders may result in irritation of mucous membrane areas of the nose.

**WARNING**

Continual exposure to penetrant inspection material may cause skin irritation.

**WARNING**

Temperatures in excess of 490C (1200F) may cause bursting of pressurized cans and injury to personnel.

**WARNING**

Volatile fumes may occur, creating both a fire and health hazard.

**WARNING**

Prolonged breathing of vapor from organic solvents, degreasers, or paint thinners is dangerous. Use respirators in confined areas per Occupational and Environmental Health Respiratory Protection Program (TB MED 502 (DLAM 1000.2)). Have adequate ventilation. Avoid prolonged skin contact. Wear rubber gloves and goggles.

**WARNING**

**Radiation Hazard**

Assure compliance with all applicable safety precautions set forth in TM 55-1500-335-23 (Nondestructive Inspection Methods manual) listed in Table 1-1. A hazard associated with exposure to ionizing radiation is that serious injury can be inflicted without pain, burning, or other sense of discomfort during the exposure period. Radiation protection shall be utilized in accordance with AR40-14/DLAR 1000.28.

**CAUTION**

Do not use cleaning solvent MIL-C-38736 on acrylic lacquer, as it may soften finish.

**CAUTION**

Penetrant-Emulsifier/Remover Combinations (lipophilic/hydrophilic) from one manufacturer may not be mixed or used in conjunction with materials from a different manufacturer.

**CAUTION**

Do not operate magnetic particle equipment within 36 inches of aircraft instruments.

**CAUTION**

Misinterpretation of indications can result in rejectable parts being accepted and acceptable parts being rejected. Only NDI personnel trained and qualified in accordance with applicable military standards and technical manuals shall perform and interpret nondestructive inspections.

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Washington, D.C. 30 May 1997

Aviation Unit Maintenance (AVUM) and Aviation Intermediate Maintenance (AVIM) Manual  
Nondestructive Inspection Procedures  
for  
OH-58D Helicopter Series

**REPORTING OF ERRORS AND RECOMMENDING IMPROVEMENTS**

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in back of this manual direct to: Commander, U.S. Army Aviation and Troop Command, ATTN: AMSAT-I-MP, 4300 Goodfellow Boulevard, St. Louis, MO 63120-1798. A reply will be furnished to you.

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## SECTION I INTRODUCTION

### 1. INTRODUCTION.

a. This manual contains instructions for accomplishing Nondestructive Inspection (NDI) of the OH-58D helicopter at the AVUM and AVIM levels. The procedures described in this manual are intended to provide instructions for the NDI of locations where service defects would prevent items from performing their designated functions, and of components for serviceability. These procedures were developed through review of OH-58D Technical Manual inspection requirements. The goal is to upgrade these requirements wherever possible using NDI methodology to improve inspection quality, decrease inspection time and increase systems operational readiness. Other factors involved were maintenance engineering analysis, experience and comparison with similar installations. Procedures shall be reviewed and changes and additions made during the service life of the equipment by continually evaluating the following: performance of the equipment, results of scheduled inspections, and thorough study of failure data. Local conditions, such as special utilization or climatic environment, may dictate more detailed inspections. Commanders and their maintenance officers are expected to exercise their prerogative to increase the frequency and scope of any inspection as required.

b. This manual may pertain to part, or all types and series, of a model, and may, therefore, contain requirements applicable to specific equipment that is not installed on an individual model. When this situation is encountered, those requirements that are not applicable should be disregarded.

c. This manual does not contain inspection level or frequency, acceptance and rejection limitations, or instructions for correcting defective conditions. Inspection levels and frequency are provided in the inspection requirements manuals. Detailed acceptance and rejection criteria and instructions for correcting defective conditions are provided in appropriate maintenance manuals and are therefore not contained in this manual. Decision regarding the serviceability of components properly belongs with maintenance technicians trained, skilled, and experienced in their particular specialty, such as airframe, hydraulic, or propulsion. Also, it would duplicate existing information and make the task of incorporating the numerous changes to inspection frequency and repair instructions impractical.

d. The inspection requirements are stated in such a manner as to address the following: (1) What part or area is to be inspected? (2) What conditions are to be sought? (3) What NDI method is to be used? (4) How is the method to be performed? In scope, the inspection procedures are designed to direct attention of maintenance personnel to components and areas where service defects can occur. The procedures also provide detailed instructions on the application of NDI in an effort to ensure the serviceability of these areas.

e. Nondestructive inspection methods require application by trained, experienced, and proficient technicians. This manual provides detailed procedures for the application of nondestructive methods to inspect specific areas or locations. However, it must be emphasized that the reliability of the inspection depends upon the proper evaluation of the results obtained from the inspection equipment.

f. While using this manual, such adjectives as left and right, upper and lower, front and rear, forward and aft, and clockwise and counterclockwise refer to the helicopter as viewed from the rear (aft), looking forward.

g. Changes and supplements to this manual will be published when necessary to add, delete, or change the scope of requirements. Such changes will be based on factual data accumulated as a result of maintenance experience with the equipment. Suggested new or revised field developed - inspection procedures or changes to this manual are encouraged and should be made by submitting a DA Form 2028. Mail to: US Army Aviation Systems and Troop Command, ATTN: AMSAT-I-MP, 4300 Goodfellow Blvd., St. Louis, MO 63120-1798.

h. These NDI procedures are directive in nature and deviation without prior approval is limited to compensation for differences in equipment output. Equipment settings, when given, are reference points only, due to the widely varying outputs from different inspection equipment. The condition that must be satisfied for accurate inspection is that the inspection equipment be adjusted to obtain the specified response from the set-up or defect standard or the specified density reading on radiographic film. Trained NDI technicians are qualified to make these adjustments.

## 1.1. GENERAL INFORMATION.

### CAUTION

**Misinterpretation of indications can result in rejectable parts being accepted and acceptable parts being rejected. Only NDI personnel trained and qualified in accordance with applicable military standards and technical manuals shall perform and interpret nondestructive inspections.**

- a. This manual provides necessary information to enable qualified personnel to perform NDI on OH-58D helicopters. The selection of components in this manual are based on a review of applicable Technical manuals listed in Table 1-1. All existing NDI call outs were updated. New NDI procedures were developed for those parts that required check, inspect or any other NDI related actions. Section I of this manual contains a list of special terms, abbreviations, acronyms, information on how to use the manual, use of NDI symbols, and a list of publications. Section I also contains general information on the OH-58D helicopter, including descriptive data, access panels, major assemblies, stops, handholds, walkways, various NDI method descriptions, and rules of safety to be observed during nondestructive inspections.
- b. Additional information on inspection methods can be found in the Technical Manual, Nondestructive Inspection Methods, TM 55-1500-335-23. Detailed inspection instructions for each main aircraft group are given in Sections II through VI of this manual.

**Table 1-1. Supporting Technical Documentation**

Document	Description
AR40-14/DLAR 1000.28	Medical Services, Control and Recording Procedures for Exposure to Ionizing Radiation and Radioactive Materials
ASTM-E1444	Standard Practice for Magnetic Particle Inspection
DA PAM 738-751	Functional Users Manual for the Army Maintenance Management System - Aviation (TAMMS-A)
DOD 6050.5 (HMIS)	Hazardous Materials Information System (HMIS)
FM 21-11	First Aid For Soldiers
MIL-STD-410	Nondestructive Testing, Personnel Qualification and Certification
MIL-STD-453	Inspection, Radiographic
MIL-STD-2154	Inspection, Ultrasonic, Wrought Metals, Process for
MIL-STD-6866	Inspection, Liquid Penetrant
TB MED 502 (DLAM 1000.2)	Occupational and Environmental Health Respiratory Protection Program
TB MED 251	Surgeon General's Hearing Conservation Criteria
TM 55-1500-335-23	Nondestructive Inspection Methods
TM 1-1500-344-23	Aircraft Weapons Systems Cleaning and Corrosion Control
TM 55-1520-248-23	Aviation Unit and Intermediate Maintenance Manual Army Model
OH-58D Helicopter	
Chapter 1	Introduction
Chapter 2	Airframe
Chapter 3	Alighting Gear
Chapter 4	Power Plant
Chapter 5	Rotors
Chapter 6	Drivetrain System

**Table 1-1. Supporting Technical Documentation - Continued**

Document	Description
Chapter 7	Hydraulic System
Chapter 11	Flight Controls
TM 55-2840-256-23	Aviation Unit and Aviation Intermediate Maintenance Engine, Aircraft, Turboshaft NSN 2840-01-131-3350 (T703-AD-700)

1.1.1. Special Terms. Abbreviations. and Acronyms.

AC	Alternating Current
ATAS	Air-to-Air Stinger
AVIM	Aviation Intermediate Maintenance
AVUM	Aviation Unit Maintenance
BL	Butt Line
BS	Boom Station
BT	Bond Testing Method
CCW	Counterclockwise
CL	Center Line
CPO	Copilot/Observer
CRT	Cathode Ray Tube
CW	Clockwise
DC	Direct Current
EDM	Electrically Discharged Machined
ET	Eddy Current Method
FS	Fuselage Station
FSH	Full Screen Height
FWD	Forward
HdB	Horizontal Decibels (Gain)
H Pos	Horizontal Position
HPF	High Pass Filter
ID	Inside Diameter
IFR	Instrument Flight Rules
IR	Infrared
INBD	Inboard
KHz	Kilohertz
LCD	Liquid Crystal Display

LE	Leading Edge
LH	Left-hand (left side of aircraft aft looking forward)
LPF	Low Pass Filter
MAX	Maximum
MHz	Megahertz
MIA	Mechanical Impedance Analysis
MIN	Minimum
MMS	Mast Mounted Sight
MT	Magnetic Particle Method
NDI	Nondestructive Inspection
OUTBD	Outboard
P/N	Part Number
PSI	Pounds Per Square Inch
PSIG	Pounds Per Square Inch Gauged
PT	Fluorescent Penetrant Method
RH	Right-hand (right side of aircraft aft looking forward)
ROT	Rotation
RT	Radiographic Method
SCAS	Stability and Control Augmentation System
STA	Station
TM	Technical Manual
UT	Ultrasonic Method
VdB	Vertical Decibels (Gain)
V Pos	Vertical Position
VR	Vulnerability Reduction
UWP	Universal Weapons Pylon
WL	Water Line

1.1.2. How to Use This Manual. This manual is divided into six sections as follows:

- I Introduction
- II Rotor Group
- III Transmission/Drivetrain Group
- IV Airframe and Landing Gear Group
- V Engine Group
- VI Flight Control Group

Section I contains the introduction and general information pertaining to the OH-58D helicopter and Nondestructive Inspections. Sections II through VI contain detailed inspection procedures for specific items located within each group. In general, inspection items are grouped with respect to part location and function. To use the manual, it is necessary to know the group and name of the inspection item.



When the group and part name are known:

- a. Turn to the appropriate section of the manual covering that group. Refer to the group inspection index table at the beginning of the section. If the item is listed, the corresponding paragraph and figure number will be referenced in the table.
- b. Turn to referenced inspection paragraph and figure, for detailed inspection information.

1.1.3. Inspection Item Code. When inspection items, due to their proximity, are grouped in one illustration, the figure will be indexed using the inspection item code. This code consists of digits separated by dashes. In the text, the inspection item is identified as follows:

- a. The first digit refers to the section of the manual in which the item appears. Example: Paragraph 2.5 is found in Section II and reference item 5.
- b. The second digit refers to the item number or order that the part procedure occurs in the manual section. Example: Paragraph 2.5 refers to item number five (5) and procedure number five in Section II of the manual.

1.1.4. Use of NDI Symbols. Nondestructive Inspection symbols and their application to detail inspection figures are shown in Figure 1-1. In the main figures of each section, NDI symbols representing the type of inspection associated with a part will appear next to the item number on the figure.

1.1.5. Use of Reference Publications. This manual is applicable to the OH-58D helicopter. The technician shall be responsible for using the applicable referenced TM for the helicopter being inspected.

1.1.6. Related Publications. Supporting TMs and reference materials are listed in Table 1-1.

1.1.7. Description. The OH-58D helicopter is a fully integrated surveillance/target acquisition/designation system. A single T703-AD-700 engine produces sufficient power margin to provide agility and total maneuverability in the nap-of-the-earth environment. The mast mounted sight (MMS) and other integrated electronics and instrumentation provide stand off acquisition and recognition of targets during day or night operations in all types of weather, with reduced crew workload under combat conditions.







The OH-58D(I) is an attack/observation helicopter developed from the OH-58D advanced observation helicopter. The OH-58D(I) has an expanded role with the added weapon systems. The weapon systems enable the OH-58D(I) to engage air-to-air, antiarmor, antipersonnel targets while maintaining enhanced aeroscout mission capability.

1.1.8. Configuration. The general configuration of the OH-58D helicopters is shown in Figure 1-2.


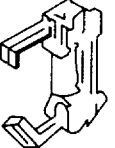
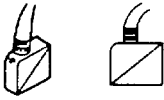

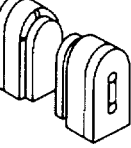
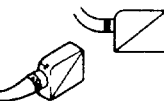


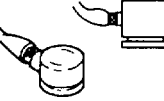



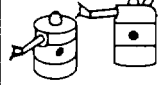




1.1.9. Stations, Water Lines, and Butt Lines (Figure 1-3). Stations, water lines, and butt lines provide an accurate method of locating or installing parts and/or equipment in the airframe.

METHOD OF INSPECTION

USED IN ILLUSTRATIONS TO IDENTIFY THE TYPE OF INSPECTION METHODS BEING ILLUSTRATED

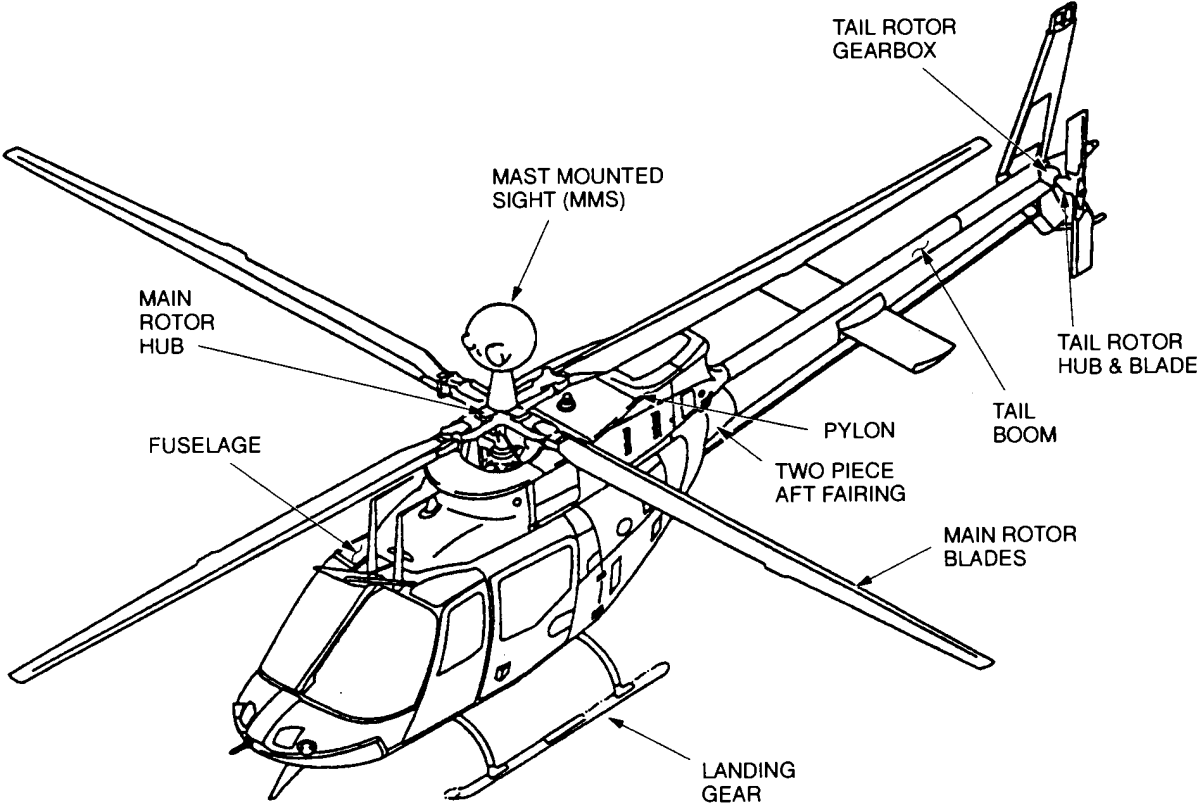
	PENETRANT		ULTRASONIC
	MAGNETIC PARTICLE		RADIOGRAPHIC
	EDDY CURRENT		BOND TEST

SUPPLEMENTAL SYMBOLS

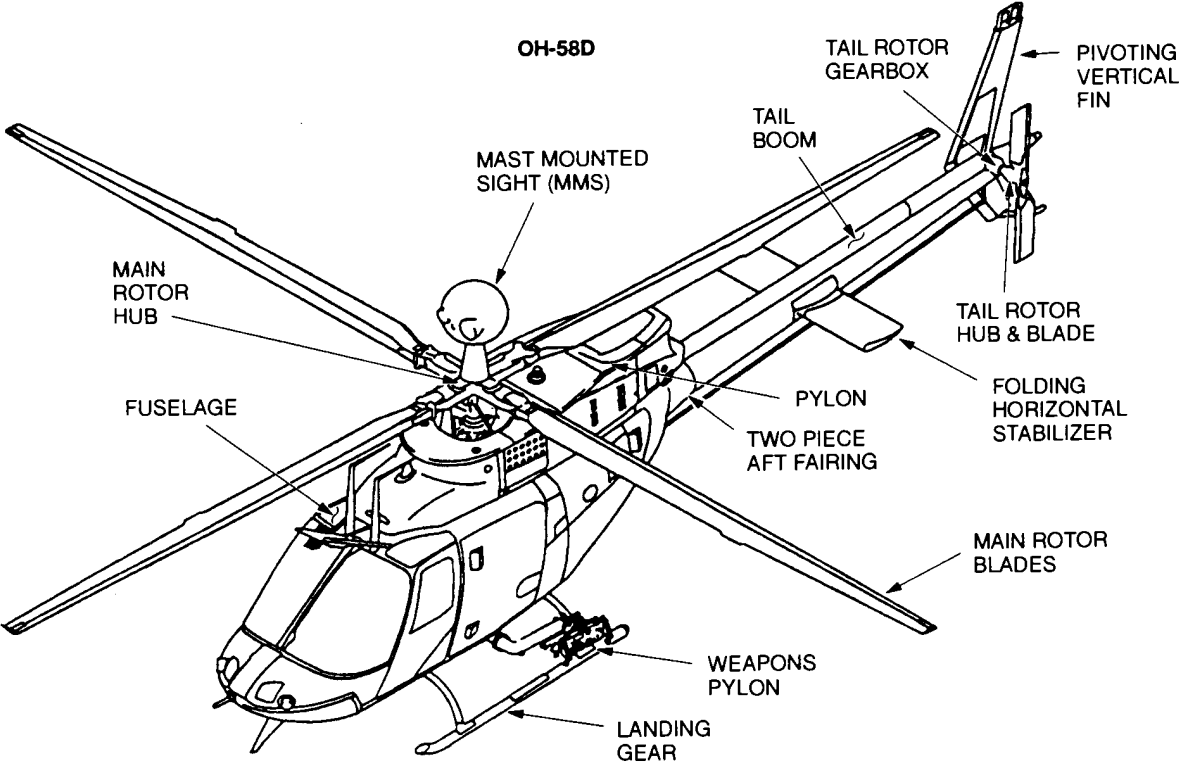
	RADIOGRAPHIC FILM PLACEMENT		MAGNETIC CONTOUR PROBE		ULTRASONIC SHEAR OR SURFACE WAVE TRANSDUCER TOP MOUNTED
	RADIOGRAPHIC FILM IDENTIFICATION MARKER		MAGNETIC STATIONARY UNIT		ULTRASONIC SHEAR OR SURFACE WAVE TRANSDUCER END MOUNTED
	RADIOGRAPHIC AIMING POINT		MAGNETIC PARTICLE COIL		ULTRASONIC LONGITUDINAL WAVE TRANSDUCER
	RADIOGRAPHIC TUBEHEAD LOCATION		DIRECTION OF EDDY CURRENT SCAN		EDDY CURRENT BOLT HOLE PROBE
	BOND TEST STANDARD PROBE				EDDY CURRENT GENERAL PURPOSE PROBE
	BOND TEST NONMETALLIC PROBE				EDDY CURRENT RADIUS PROBE
	BOND TEST MINI-PROBE				

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Figure 1-1. Nondestructive Inspection Symbols

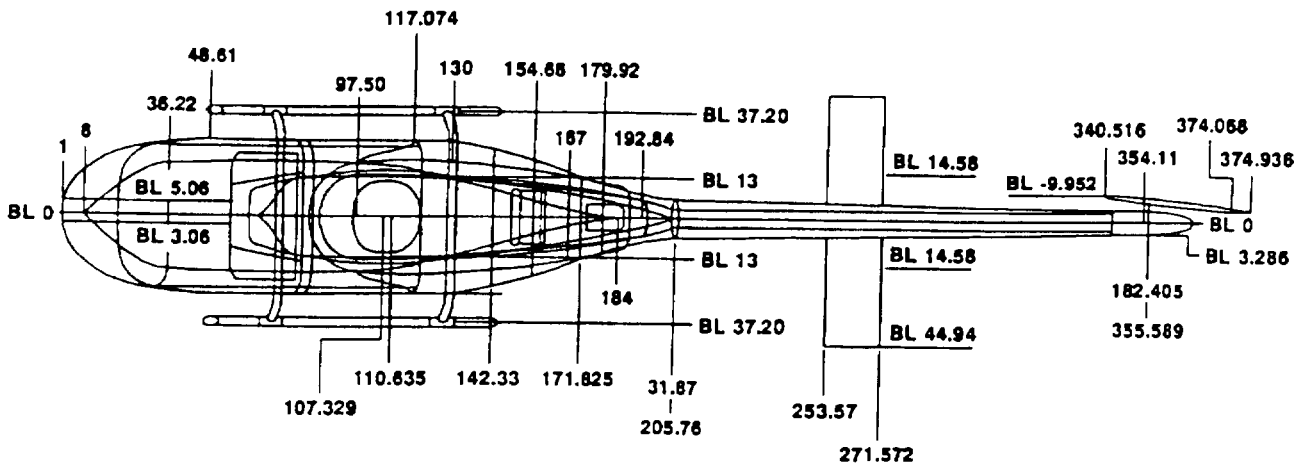
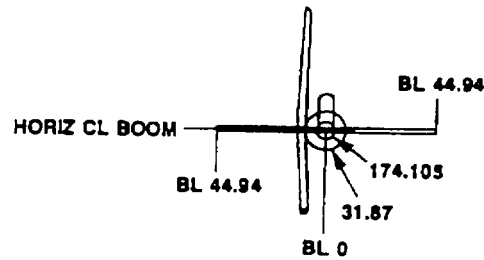
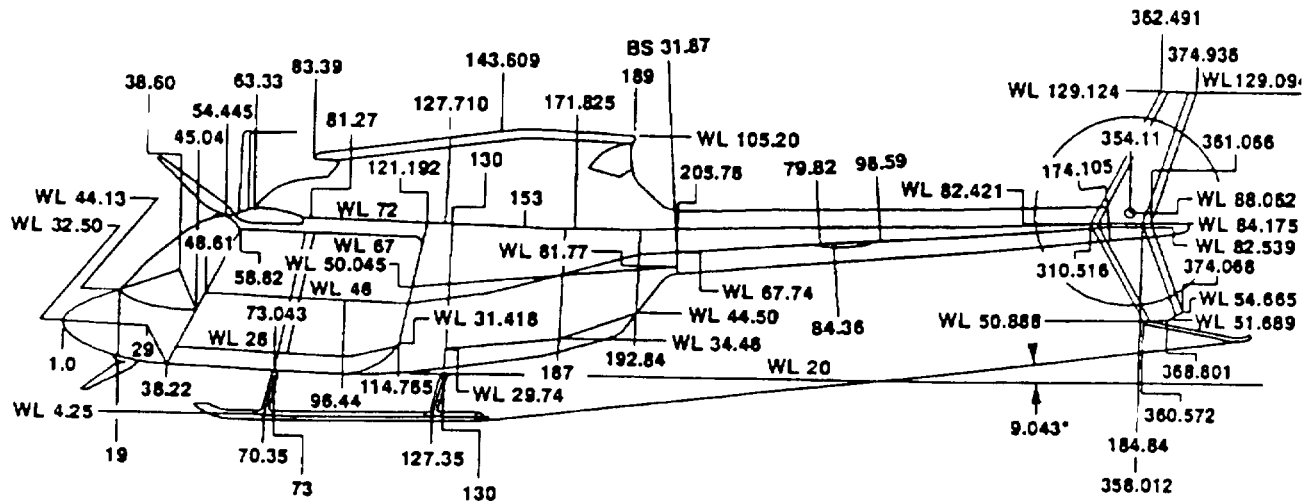


OH-58D



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Figure 1-2. General Configuration of OH-58D



NOTE: UNIDENTIFIED NUMBERS ARE STATION NUMBERS.

Figure 1-3. Stations, Water Lines, Butt Lines

- a. OH-58D helicopter length is divided into stations (STA) 1 inch apart along the longitudinal plane of the helicopter. They begin with station 1.0 at the most forward part of the nose section, and ending at station 374.936 at the upper aft end of the vertical fin.
- b. Helicopter height is divided into water lines (WL) 1 inch apart along the vertical plane of the helicopter. Water lines begin at WL 4.25 on the landing gear and end at WL 129.124 on the forward top end of the vertical fin.
- c. Helicopter butt lines (BL) are 1 inch apart starting at the helicopter centerline (CL) and extending outward, left and right, to the extreme ends of the horizontal stabilizers.

## 1.2. TYPE OF CONSTRUCTION.

### NOTE

The following paragraphs describe the type of construction and materials used in the manufacture of the major OH-58D helicopter components.

1.2.1. Rotor Group. The rotor systems utilized are the main rotor and controls system and the tail rotor and controls system. The OH-58D main rotor consists of four composite blades mounted to the yoke. All blades can be folded for parking, mooring, and transportation. The main rotor controls carry the control inputs from the fixed system to the rotor.

The tail rotor system consists of two fiberglassed blades mounted to a yoke and driven by the tail rotor gearbox. Pitch change inputs from cockpit pedals are made through a control tube that slides through the center of the gearbox output shaft. A crosshead on the end of the control tube serves as the attaching points for the tail rotor pitch change links.

1.2.2. Transmission/Drivetrain Group. The OH-58D transmission/drivetrain system consists of all components between the engine and the rotors. This includes the freewheeling assembly, main driveshaft, transmission and mast assembly, oil cooler fan assembly, tail rotor drive assembly, and tail rotor gearbox. The freewheeling assembly serves as the connecting link between the accessory gearbox and the driveshaft system. It allows free rotation of the rotor system as well as necessary accessories when power is not being applied by the engine. The driveshaft connects the freewheeling assembly with the main transmission. The driveshaft is easily removed with Kalflex couplings at both ends, allowing mounting in either direction. The transmission and mast assembly transfers engine torque to the main rotor system with a two stage gear reduction. The assembly is mounted to the roof, forward of the engine, by the pylon assembly. The pylon is attached to the transmission housing on each side, by two elastomeric mounts. Two restraint springs attach to the lower transmission housing, on each side that connect to the rear of each pylon support arm to dampen the pitching motion of the transmission assembly.

1.2.3. Airframes and Landing Gear Group. The OH-58D airframe consists of the fuselage, tailboom and pylon. The OH-58D(I) incorporates a universal weapons pylon (UWP). The fuselage houses the crew station and electronic compartments. It serves station and electronic components. It serves as a platform for the engine, transmission, main rotor system, and the OH-58D(I) provides a mounting point for the universal weapons pylon (UWP) and ejector racks. The tailboom serves a platform for the tail rotor gearbox, vertical fin, horizontal stabilizer, segmented tail rotor driveshaft, and bearing supports. The pylon provides a cover for the power plant, transmission, hydraulic reservoir, and engine oil tank. Two pylon beam assemblies provide support for the transmission. The landing gear consists of two tubular main skid tubes and two curved cross tube assemblies. The landing gear is attached to the fuselage with four strap assemblies. Ground handling wheels can be attached and tow rings are provided. Each skid tube is provided with replaceable skid shoes.

1.2.4. Engine Group. The OH-58D is equipped with a turboshaft Allison engine, model T703-AD-700.

1.2.5. Flight Control Group. The OH-58D flight control system is a positive mechanical type, actuated by conventional helicopter controls. Complete controls are provided for both pilot and CPO. The system includes a cyclic control system for attitude and directional control, a collective control system for vertical control, tail rotor control system for directional control, a force trim system, and a stability and control augmentation system (SCAS). Hydraulic servoactuators are employed in the control system to prevent feedback forces and reduce pilot fatigue.

1.2.6. Access Panels, Doors, and Fairings. Access panels, doors, and fairings consist of the access doors, covers, screens, platforms, and openings. Inspection of the helicopter and its components can be done through principal access panels. Principal access and inspection openings are shown in Figure 1-4 and listed in Table 1-2.

#### **WARNING**

**To prevent injury to personnel and damage to helicopter, stand only on designated surfaces. These areas are reinforced to withstand frequent use and are treaded to prevent slipping. All other surfaces are NO STEP areas.**

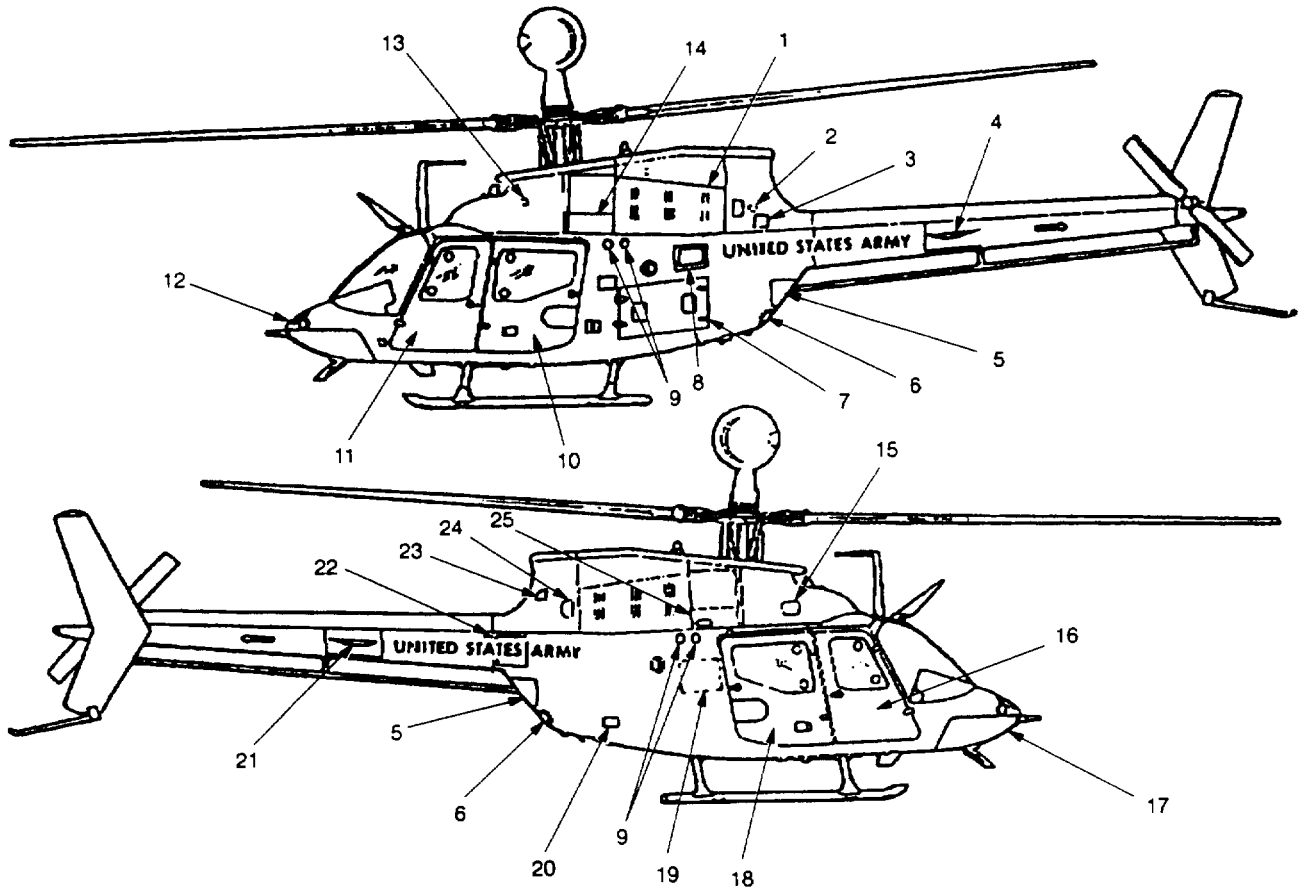
1.2.7. Steps, Handholds, and Walkways. Steps, handholds, and walkways aid in doing maintenance, inspections, and servicing on helicopters.

### **1.3. MARKING AND/OR RECORDING OF INSPECTION RESULTS.**

#### **NOTE**

**Only approved marking pencils listed in Table 1-8 are to be used for temporary marking of indications found during an NDI inspection. The color of the markings shall contrast with the color of the part.**

- a. Wipe the area to be marked with low-lint cleaning cloth, MIL-C-85043.
- b. Mark surface with appropriate color aircraft marking pencil, MIL-P-83953, using a light touch.
- c. Remove markings as soon as there is no further need for them with a low-lint cloth, MIL-C-85043, dampened with tap water. It is allowable for a shadow of the marking to remain on surfaces after removal.



NDI\_OH-58\_F1\_4\_2

Figure 1-4. Access Panels, Doors, and Fairings

**Table 1-2. Access Panels, Doors, and Fairings**

Item NO.	Item
1	Left Engine Cowl
2	Window Oil Tank
3	Oil Tank Drain Access Door
4	Stabilizer and Tailboom Access Panel
5	Antenna Access Door
6	Antenna Access Door
7	Aft Electrical Compartment Door
8	Access Panel
9	Maintenance Platform Attach Fittings
10	Access Door
11	Crew Door
12	Nose Door
13	Window Hydraulic Fluid
14	Left Induction Access Door
15	Transmission Inspection Door
16	Crew Door
17	DC External Power Receptacle Door
18	Access Door
19	Fuel Line Access Panel
20	AC External Power Receptacle Door
21	Stabilizer and Tailboom Access Panel
22	Tailboom Attach Access Panel
23	Driveshaft Inspection Door
24	Right Engine Cowl
25	Right Induction Access Door



**WARNING**

Cleaning solvents P-D-680, Type II and MIL-C-38736 are flammable. Avoid eye and skin contact or breathing of vapors. Protective equipment consisting of goggles, gloves, and respiratory protection is required.

**CAUTION**

Do not use cleaning solvent MIL-C-38736 on acrylic lacquer, as it may soften finish.

- d. Dry-cleaning solvent, P-D-680, Type II shall be used for removal of markings on acrylic lacquer surfaces.
- e. Record inspection results as required by the applicable technical manuals listed in Table 1-1.

**1.4. NONDESTRUCTIVE INSPECTION METHODS.**

1.4.1. Purpose of Nondestructive Inspection (NDI). Methods used in NDI are those that may be applied to inspect a structure or component to determine its ability to perform its intended function without damaging or causing any change in the characteristics of the structure or component. During manufacture, aircraft components are given in-process and final inspections. The most commonly used methods are magnetic particle and liquid penetrant because these two methods are bulk processes that provide 100 percent inspection coverage, and are highly effective. It is unusual, but S, possible, for NDI personnel to locate defects that are inherent (associated with the production of the material) or related to the manufacturing operations. It follows that nearly all maintenance nondestructive inspection requirements are to locate defects that have developed during service (i.e., corrosion and corrosion-induced cracking; fatigue cracks; and defects resulting from mechanical damage, improper maintenance, or inappropriate use). It is important that N DI personnel shall be able to distinguish between inherent or in-service defects. A general knowledge of typical sites for in-service defect occurrence and specific knowledge of the mode and location of previous cracking problems for a particular part are relevant. This knowledge will assure that the crack prone areas are identified for inspection and time will not be wasted inspecting areas not subject to in-service cracking.

This manual summarizes the steps necessary to perform satisfactory inspections. It includes the preparation of the helicopter, the inspection area for NDI, safety rules to be observed, highlights of each inspection method, and specific safety precautions for each of these methods. For a detailed description of each method and its application, refer to the Technical Manual, Nondestructive Inspection Methods, TM 55-1500-335-23. Specific instructions peculiar to each part being inspected will be included in the discussion of that inspection item as it is covered in this manual.

1.4.2. Selecting the NDI Method. Factors governing the selection of an inspection method are: accessibility, portability of equipment, type of suspected damage, material composition of part to be inspected, surface condition, and degree of sensitivity required for the inspection. In many cases the method selected will depend primarily on accessibility and practicality. For example, a threaded item that may qualify for eddy current inspection may instead require the substitution of an ultrasonic inspection due to accessibility constraints. However, the ultrasonic inspection must be capable of providing equivalent sensitivity. Also, the type of inspection desired may adversely affect adjacent parts. Inspection methods in this manual were selected in order to provide maximum detection sensitivity while requiring a minimum of removal or disassembly; and at the same time, protect adjacent areas from damage. Radiographic inspection is used only to examine areas partly or totally hidden, or where the suspected damage is internal to the part. Where one method of inspection (primary) reveals an indication of a crack, another method (backup) should be used to verify if a crack is actually present. Quite often backup procedures are limited to disassembly and a good visual inspection. Certain cases may arise when another NDI method could be used to prevent needless or complicated disassembly. For example, a crack in a spar cap may not appear clearly on radiographic film due to cloudiness caused by sealant or substructure clutter. A backup eddy current or ultrasonic method could be used for verification and if no indications were observed, disassembly would not be necessary. Whenever a backup method is used, it shall be specified in every case where the initial damage indication may not be positive proof that a reject condition exists.

1.4.3. Preparation of Helicopter for NDI. Prior to NDI, the helicopter shall be prepared for safe ground maintenance in accordance with applicable technical manuals listed in Table 1-1.

1.4.4. Preparation of Part or Area for NDI.

#### **WARNING**

**Prolonged breathing of vapor from organic solvents, degreasers, or paint thinners is dangerous. Use respirators in confined areas per Occupational and Environmental Health Respiratory Protection Program (TB MED 502 (DLAM 1000.2)). Have adequate ventilation. Avoid prolonged skin contact. Wear rubber gloves and goggles.**

All NDI methods require proper cleanliness of the part or area being inspected. Refer to Table 1-1 for the applicable cleaning and corrosion control manual. The cleaning technique to be used will be determined by the type of foreign matter present, NDI method to be performed, and if the part is plated, painted, or has a protective coating. Scale and corrosion shall be removed completely before inspection. If removal of protective coatings, such as paint, phosphate coatings, black oxide, etc., is required, do not use removal methods that mechanically abrade the surface of the part to be inspected since this may cause damage or mask over potential surface cracks on the part. Some inspection methods, by their particular nature, will require that small openings and/or oil holes leading to obscure passages or cavities be plugged, such as in the case of engine parts. A suitable nonabrasive material (i.e., Vaseline, grease, paraffin) should be used that is soluble in oil and can be readily removed. Effective masking shall be used to protect those components, such as bearings and certain nonmetallics, that may be damaged by contact with the inspection solution or medium.

1.4.5. NDI General Safety Precautions.**WARNING**

**Electrical equipment shall not be operated in areas where combustible gases or vapors may be present, unless the equipment is explosion proof.**

Prior to conducting an NDI inspection, survey the general area in advance. Eliminate possible hazards created by loose structures, protruding work stands, and support equipment. Secure loose electric cords and remove toxic fluids or fumes. If AC power is supplied to equipment, be sure that equipment is well grounded to prevent electrical hazards. Specific safety instructions for each NDI method used in this manual are contained in the paragraph immediately following the discussion of that method.

1.4.6. Bond Testing (BT) Method.**NOTE**

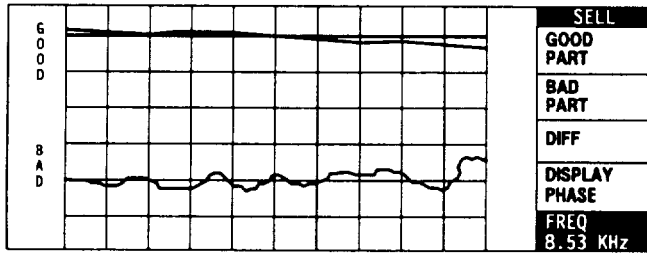
**Inspection of bonded structures shall be performed in accordance with the general applications and techniques in TM 55-1500-335-23 (Nondestructive Inspection Methods manual) and the specific requirements of this technical manual.**

A number of different methods of NDI can be applied to the many configurations and types of bonded structures that are in use. Variables such as skin material and thickness, adhesive type and thickness, underlying structure, and accessibility are all factors in the development of specific inspection procedures. Because of the many inspection methods and structural configurations, each application must be considered and reference standards representative of the structure must be evaluated to verify proposed techniques.

1.4.6.1. Bond Testing Equipment. The bond testing equipment, Bondmaster, used in the procedures in this manual, operates by generating a mechanical vibration into the material being tested. This equipment is designed to detect flaws in bonded metallic and composite structures. The instrument is capable of determining bad bonds, delaminations, unbonds, and crushed honeycomb core defects.

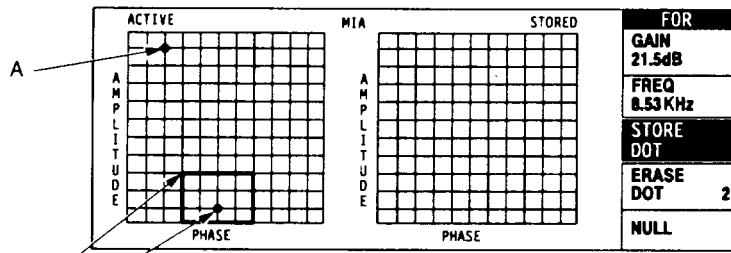
The Bondmaster has the following features:

- a. Resonance. Detects unbonds and delaminations by changes in phase and amplitude at probe resonance. Couplant is required.
- b. Pitch Catch Swept. Measures amplitude and phase changes using a swept frequency method to detect unbonds and deeper defects. Requires no couplant.
- c. Pitch Catch Impulse. Measures amplitude and phase changes using a short burst of energy to detect unbonds. Requires no couplant.
- d. Mechanical Impedance Analysis (MIA). Measures the effect of generated sound waves and the effect of loading as drive frequency is swept in the range of 2.5 KHz to 10 KHz. This method can be used on unbonds, crushed core, and defects on the inside of composites. Requires no couplant. See Figure 1-5, Bond Testing Reference Block Displays.



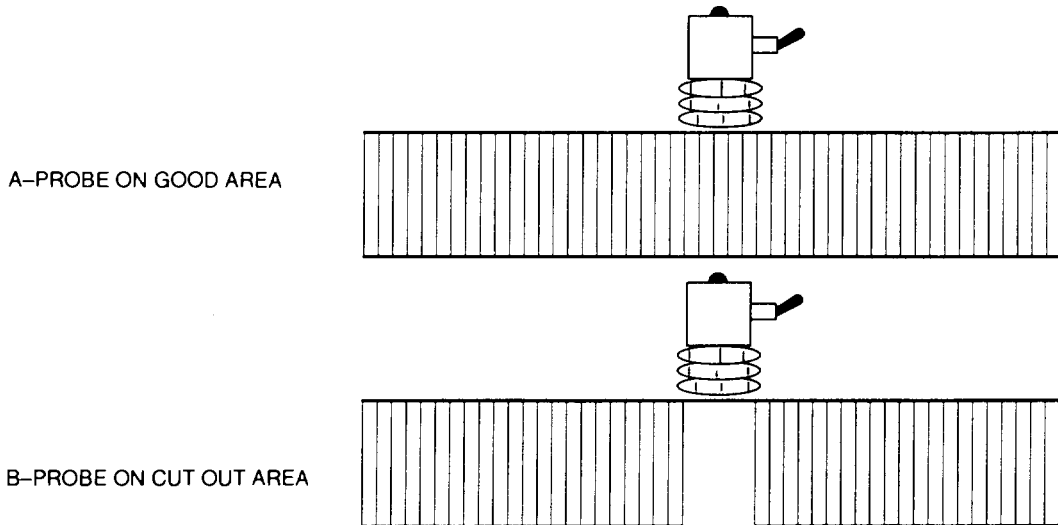
**MIA SET MENU**

(DISPLAYS DIFFERENCE BETWEEN GOOD AND BAD AREAS AT A PARTICULAR OPERATING FREQUENCY)



**MIA RUN MENU**

- (A) RESPONSE OF FLYING SPOT ON GOOD AREA
- (B) RESPONSE OF FLYING SPOT ON BAD AREA
- (C) ALARM GATE



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**Figure 1-5. Bond Testing Reference Block Displays**

Mechanical vibration energy generated by resonance test equipment can be measured, analyzed by the tester, then displayed on a screen. There are several ways this energy can be applied to material and then be analyzed. Because bonded metallic and composite material properties differ substantially, no one test method will detect flaws in all types of material. For this reason, current bond testing equipment incorporates at least one or more of the aforementioned features.

1.4.6.2. Safety Precautions During Bond Testing. Follow safety precautions and instructions contained in this manual and the Nondestructive Inspection Methods manual listed in Table 1-1.

#### **WARNING**

**Electrical equipment shall not be operated in areas where combustible gases or vapors may be present, unless the equipment is explosion proof.**

- a. If instrument is operated using AC power, use a grounded power cord.
- b. Turn power OFF before connecting or disconnecting probe cable or power cable.

1.4.7. Fluorescent Penetrant (PT) Method.

#### **NOTE**

**Fluorescent penetrant inspections shall be performed in accordance with the general applications and techniques in TM 55-1500-335-23 (Nondestructive Inspection Methods manual) and the specific requirements of this technical manual.**

The basic purpose of fluorescent penetrant inspection is to increase the visible contrast between a discontinuity and its background. This method is performed by applying a fluorescent penetrant solution to the inspection area which enters the surface opening of the discontinuity. The area is then wiped or rinsed and a developer is added to draw the fluorescent material from the discontinuity. A flaw or crack in the part will then become visible under the influence of ultraviolet light (black light). This method is effective for detecting surface flaws in forgings, castings, extrusions, formed sections, webs, and skins of materials. The penetrant method of inspection requires that the surface of the inspection area be thoroughly cleaned. Paint on the part must be removed before inspection.

#### **CAUTION**

**Penetrant-Emulsifier/Remover Combinations (lipophilic/hydrophilic) from one manufacturer may not be mixed or used in conjunction with materials from a different manufacturer.**

Four penetrant procedures are given in Tables 1-3, 1-4, 1-5, and 1-6. All four inspections shall be conducted using fluorescent penetrant, MIL-1-25135, Type I, Method A, B, C, or D, Sensitivity Level 3 or 4. Refer to the Nondestructive Inspection Methods manual listed in Table 1-1 for more detailed instructions. Table 1-5 describes the procedure for using Type I, Method C, Level 3 or 4 on a remove( part or parts attached either to a component or to the helicopter. This procedure supports the..

accomplishment of fluorescent penetrant inspection at the AVUM and AVIM levels regardless of geographic location. Therefore, the procedure in Table 1-5 will be the one most frequently referred to in this manual. Table 1-7 lists the equipment and Table 1-8 lists the fluorescent penetrant materials to be used.

**Table 1-3. Penetrant Procedure (Type I, Method A)**

Task	Description
a. Preparation of Part:	Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.
b. Precleaning Procedure:	Refer to TM 1-1500-344-23.
c. Penetrant Application:	The penetrant may be applied by brushing, spraying, or dipping.
d. Penetrant Dwell:	Allow a minimum of 30 minutes dwell time to a maximum of 240 minutes. Extended dwell time may require rewetting of parts.
e. Penetrant Removal/Rinse:	Rinse the part by waterwash using a low-pressure spray (pressure not to exceed 20 PSI) and a temperature of 16°C to 38°C (60°F to 100°F). DO NOT OVERRINSE.
f. Drying Operation:	The parts should be dried in a circulating air dryer with a temperature range from 38°C to 60°C (100°F to 140°F). The time in the dryer should not exceed the time necessary to completely dry the surface of the parts.
g. Developer Application:	The dry developer is sprayed or dusted lightly over the part to be inspected. Shake or blow off with low, oil-free air to remove excess developer.
h. Inspect:	Perform inspection under black light.
i. Materials:	Type I, Method A, Level 3 or 4 (water washable) Penetrant.

**Table 1-4. Penetrant Procedure (Type I, Method B)**

Task	Description
a. Preparation of Part: 1.4.4.	Refer to Preparation of Part of Area for NDI, paragraph
b. Precleaning Procedure:	Refer to TM 1-1500-344-23.
c. Penetrant Application:	The penetrant may be applied by brushing, spraying, or dipping.
d. Penetrant Dwell:	Allow a minimum of 30 minutes dwell time to a maximum of 240 minutes. Extended dwell time may require rewetting of parts.
e. Emulsifier Application:	The emulsifier may be applied by dipping or spraying. The preferred method of application is by dipping the part in the emulsifier. Do not permit emulsifier to remain on the part over 3 minutes.
f. Rinse:	Rinse the part by waterwash using a low-pressure spray (pressure not to exceed 40 PSIG) and a temperature of 16°C to 38°C (60°F to 100°F).
g. Drying/Developer Operation:	If a dry nonaqueous developer is to be used, first dry the part in a drying oven at a temperature not to exceed 60°C (140°F) until dry. Then apply the developer. If an aqueous developer is to be used, then submerge the part in the developer solution immediately after washing. Follow by drying the part in a drying oven as mentioned above. In either case, parts shall be removed from the drying oven as soon as they are dry.
h. Inspect:	Perform inspection under black light.
i. Materials:	Type I, Method B, Level 3 or 4 (post emulsifiable-lypophilic) Penetrant (Refer to Table 1-8).

Table 1-5. Penetrant Procedure-Portable or Field Application  
(Type I, Method C)

Task	Description
a. Preparation of Part:	Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.
b. Precleaning Procedure:	Refer to TM 1-1500-344-23.
c. Penetrant Application:	Apply penetrant either by brushing or spraying. In a confined area, apply with brush to prevent overspray.
d. Penetrant Dwell:	Allow a minimum of 30 minutes penetrant dwell time. In temperature below 16°C (60°F), refer to Nondestructive Inspection Methods manual listed in Table 1-1 for dwell time compensations.
e. Penetrant Removal:	Wipe dry with a dry, lint-free cloth. Wipe down with a solvent-moistening cloth. Check area to be inspected with black light to be sure all surface penetrant has been removed before applying developer. Do not spray cleaner directly onto part.
f. Developer Application:	Spray a light film of developer over area to be inspected.
g. Inspect:	Perform inspection under black light. Observe any obvious bleed-out as developer dries. Complete inspection after developer dwell time is complete.
h. Materials:	Type I, Method C, Level 3 or 4, Solvent - Removable Fluorescent Dye Penetrant (Refer to Table 1-8).



**Table 1-6. Penetrant Procedure (Type I, Method D)**

Task	Description
a. Preparation of Part:	Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.
b. Precleaning Procedure:	Refer to TM 1-1500-344-23.
c. Penetrant Application:	The penetrant may be applied by brushing, spraying, or dipping.
d. Penetrant Dwell:	Allow a minimum of 30 minutes dwell time to a maximum of 240 minutes. Extended dwell times may require rewetting of parts.
e. Penetrant Prerinse:	Prerinse part with a water spray at a temperature of 16°C to 38°C (60°F to 100°F) and a spray pressure of 40 PSIG maximum. Do not overrinse.
f. Remover Application:	Apply a solution as recommended by manufacturer of the specific hydrophilic remover in water to surface of the part. Dwell time shall be kept to an absolute minimum consistent with complete removal of excess penetrant.
g. Postrinse Operation:	Postrinse part with a water spray at a temperature of 16°C to 38°C (60°F to 100°F) and a spray pressure of 40 PSIG maximum. Do not overrinse. Rinse effectiveness should be checked with a black light to ensure complete removal of penetrant remover.
h. Drying/Developer Operation:	If a dry nonaqueous developer is to be used, first dry the part in a drying oven at a temperature not to exceed 60°C (140°F) until dry. Then apply the developer. If an aqueous developer is to be used, then submerge the part in the developer solution immediately after washing. Follow by drying the part in a drying oven as mentioned above. In either case, parts shall be removed from the drying oven as soon as they are dry.
i. Inspect:	Perform inspection under black light.
j. Materials:	Type I, Method D, Level 3 or 4 (hydrophilic remover) Penetrant (Refer to Table 1-8).

1.4.7.1 Safety Precautions During Fluorescent Penetrant Inspection. Follow safety precautions and instructions contained in this manual and the Nondestructive Inspection Methods manual listed in Table 1-1.

**WARNING**

- **Black lights generate considerable heat during use. Extreme care must be exercised to prevent contacting the housing with any part of the body.**
  - **To prevent injury to eyes, do not look directly into black light.**
  - **Prolonged direct exposure of hands to the filtered black light's main beam may be harmful. Suitable gloves shall be worn when exposing hands to the main beam.**
- a. Follow manufacturer's instructions when using black lights and filter.
- b. Do not wear sunglasses or glasses with light-sensitive lenses during fluorescent penetrant inspections. They can contribute to improper interpretation of defects.

**WARNING**

**Prolonged or repeated inhalation of vapors or powders may result in irritation of mucous membrane areas of the nose.**

- c. Provide adequate ventilation when handling cleaner, emulsifier, penetrants, or developers.

**WARNING**

**Continual exposure to penetrant inspection material may cause skin irritation.**

- d. Observe the following when handling cleaners, emulsifiers, penetrants, or developers.
- (1) Avoid contact with penetrant inspection materials by wearing neoprene gloves.
  - (2) Wash inside and outside of gloves.
  - (3) Wash exposed areas of body with soap and water.
  - (4) Check for traces of fluorescent penetrant materials on skin, clothing, and gloves using a black light source.

**WARNING**

**Temperatures in excess of 49°C (120°F) may cause bursting of pressurized cans and injury to personnel.**

- e. Store all pressurized spray cans in a cool, dry area protected from direct sunlight. Avoid exposure of pressurized spray cans to open flames.

**WARNING**

**Volatile fumes may occur, creating both a fire and health hazard.**

- f. Exercise extreme caution when handling penetrants that have been heated to a point where some lighter constituents are driven off.

1.4.7.2 Controlling Excess Fluorescent Penetrant. After fluorescent penetrant inspection, the part shall be thoroughly cleaned to ensure all excess penetrant is removed from the part. This shall include removing the penetrant from cracks as much as possible before disposition of the part. This can be easily accomplished by performing cleaning operations under a black light.

1.4.8 Magnetic Particle (MT) Method.

**NOTE**

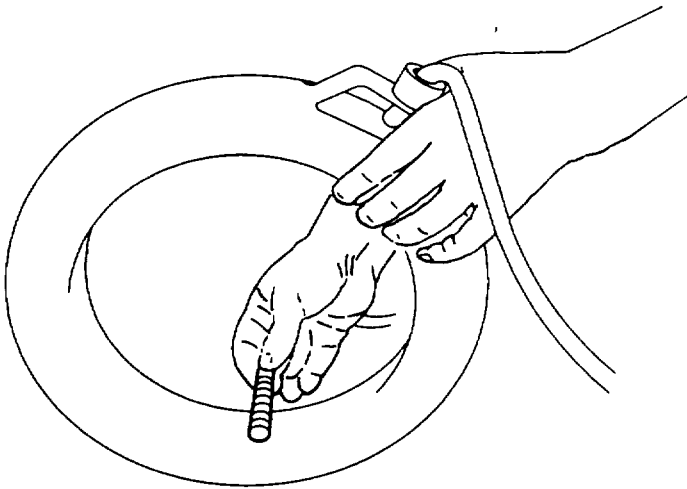
**Magnetic particle inspection shall be performed in accordance with the general application and techniques in TM 55-1500-335-23 (Nondestructive Inspection Methods manual) and the specific requirements of this technical manual.**

**NOTE**

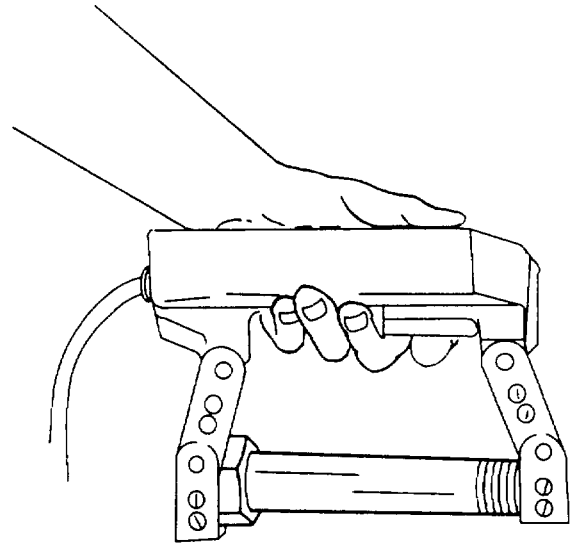
**During magnetic particle inspections performed with portable equipment, the operator shall keep the can of magnetic particle media constantly agitated by continuously shaking the can prior to application.**

Magnetic particle is a method of detecting cracks or other flaws on the surface or near the surface of materials that are ferromagnetic. This method will produce good indications of discontinuities, provided the part is free from grease, oil, loose scale, or other surface contaminants. The inspection is accomplished on either assembled or disassembled parts. As specified in the procedure, the inspection is accomplished by inducing a magnetic field in the part and applying a liquid suspension of iron oxide particles to the surface to be inspected. By controlling the direction of the magnetic flux, the lines of magnetic force shall be positioned perpendicular to the crack or flaw. All magnetic particle inspections in this manual shall be of the wet continuous method using fluorescent magnetic particles.

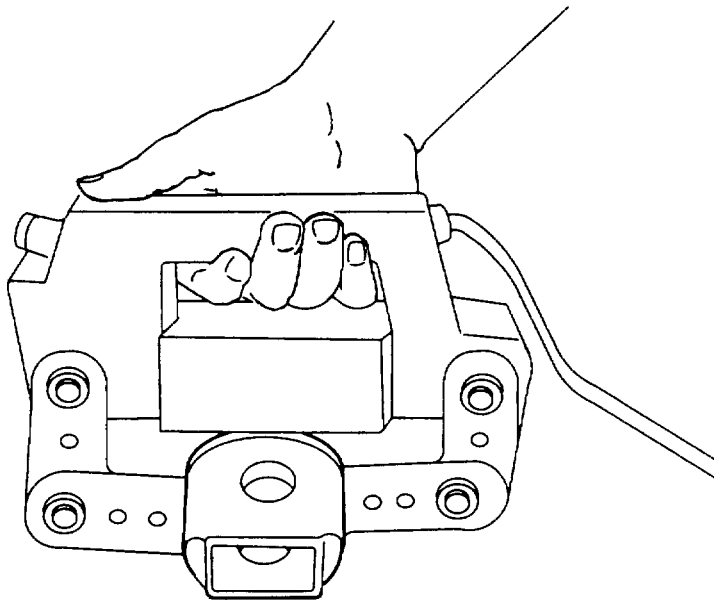
1.4.8.1 Magnetic Particle Inspection Equipment. Considerations involved in the selection of magnetic particle inspection equipment include the type of magnetizing current and the location and nature of the inspection. The purpose of this manual is to support the accomplishment of NDI at the AVUM and AVIM levels. This dictates equipment that can be used on or off the helicopter at remote sites. Therefore, magnetic particle procedures in this manual use the electromagnetic yokes or probes and hand-held coils as shown in Figure 1-6. This equipment is common and readily available to AVUM and AVIM levels. Stationary magnetic particle equipment can be used if facilities, required shop equipment, and qualified NDI technicians are available. Refer to TM 55-1500-335-23 (Nondestructive Inspection Methods manual) for stationary magnetic particle inspection techniques.



**HAND-HELD COIL**



**ARTICULATED OR MOVEABLE YOKE**



**CONTOUR PROBE**

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**Figure 1-6. Portable Magnetic Particle Inspection Equipment**

1.4.8.1.1 **Magnetic Yokes and Probes.** Portable induced field inspection equipment is generally referred to as either a probe or a yoke. These terms are synonymous and differ due to manufacturer's nomenclature. They are small, portable, easy to use, and can be used on or off the helicopter. They induce a strong magnetic field into that portion of a part that lies between the poles or legs. This limits the magnetization to longitudinal; however, by turning the probe 90° on the part for the second position, cracks, either perpendicular or parallel to the axis of the part, can be detected. Some yokes and probes have both AC and DC capabilities while others have AC only.

All procedures in this manual use AC. AC provides a very desirable and useful field. The vibratory action of AC adds significantly to the magnetic particle mobility enhancing the formation and build-up of larger and sharper indications at discontinuities. An AC magnetic field is also used when it is necessary to reveal only surface cracks, common to in-service parts due to fatigue and stress cracking. Yokes and probes utilizing AC for magnetization also have the additional advantage that they can be used for demagnetization.

1.4.8.1.2 **Hand-held Coil.** For longitudinal magnetization of bolts, shafts, spindles, axles, and similar small parts, the hand-held coil offers a simple, convenient method of inspecting for transverse cracks. It allows for equipment maintenance inspections wherever a coil can be applied around the part. Parts are magnetized and demagnetized with the same coil.

1.4.8.2 **Safety Precautions During Magnetic Particle Inspections.** Follow safety precautions and instructions contained in this manual and the Nondestructive Inspection Methods manual listed in Table 1-1.

#### **WARNING**

- **Black lights generate considerable heat during use. Extreme care must be exercised to prevent contacting the housing with any part of the body.**
  - **To prevent injury to eyes, do not look directly into black light.**
  - **Prolonged direct exposure of hands to the filtered black light's main beam may be harmful. Suitable gloves should be worn when exposing hands to the main beam.**
- a. Follow manufacturer's instructions when using black lights and filter.
  - b. Do not wear sunglasses or glasses with light-sensitive lenses during fluorescent magnetic particle inspections. They can contribute to improper interpretation of defects.

#### **CAUTION**

**Do not operate magnetic particle equipment within 36 inches of aircraft instruments.**

1.4.9 Demagnetization of Inspection Parts. Following magnetic particle inspection of a part, the residual magnetic field in the part shall be reduced to the lowest possible level. This must be done prior to returning the part to service or rejecting it as a defective part. Unless this is done properly, the residual magnetism may cause adverse influence on instruments, unnecessary wear on parts, or attract ferrous metal chips and dust into bearing surfaces. After demagnetization, a magnetic field strength meter shall be used to measure residual fields. Readings in excess of three units are not acceptable.

1.4.9.1 Demagnetization Using AC. If AC demagnetization is selected, hold the part about 12 inches in front of the coil. Move it slowly and steadily through the coil to at least 36 inches beyond the end of the coil while current is still flowing. Repeat process as necessary. Rotate and tumble parts of complex configuration while passing through the coil field. All parts can be demagnetized using a contour probe in the AC mode. Place the probe against the magnetized part with the switch in AC position. Turn probe on and withdraw it from the part, or the part from the probe/yoke, about 24 inches before turning the probe off.

1.4.9.2 Demagnetization Using DC. If DC demagnetization is selected, the initial demagnetizing field shall be higher than, and in nearly the same direction as, the field reached during inspection. The field shall then be reversed and decreased in magnitude, and the process repeated (cycled) until an acceptable low value of residual field is reached. Whenever possible, parts that have been circularly magnetized shall be magnetized in the longitudinal direction before being demagnetized. This procedure is limited to stationary equipment.

#### 1.4.10 Radiographic (RT) Method.

##### **NOTE**

**Radiographic inspection shall be performed in accordance with the general application and techniques in TM 55-1500-335-23 (Nondestructive Inspection Methods manual) and the specific requirements of this technical manual.**

Radiographic inspection is used to detect internal and external structural details of all types of parts and materials. This method is used for the inspection of airframe structure for damage, detection of moisture entrapment, structure alignment, and foreign object intrusion. It can sometimes be used in areas otherwise inaccessible to other nondestructive inspections and to verify indications observed by other methods.

Radiographic inspections are accomplished by passing the X-ray beam through the part or assembly to expose a radiographic film emulsion or other sensitized medium. The processed film shows the structural details of the part by variations in film density. Requirements for film density, image quality indicator, identification, and other factors are specified in MIL-STD-453.

Film processing is a series of operations such as developing, fixing, and washing, associated with the conversion of the latent image into a stable visible image and will be provided by manual or automatic film processing.

1.4.10.1 Safety Precautions During Radiographic Inspections. Follow safety precautions and instructions contained in this manual and the Nondestructive Inspection Methods manual listed in Table 1-1.

**WARNING****Radiation Hazard**

**Assure compliance with all applicable precautions set forth in TM 55-1500-335-23 (Nondestructive Inspection Methods manual) listed in Table 1-1. A hazard associated with exposure to ionizing radiation is that serious injury can be inflicted without pain, burning, or other sense of discomfort during the exposure period. Radiation protection shall be utilized in accordance with AR40-14/DLAR 1000.28.**

1.4.10.2 Mixing of Radiographic Film Processing Chemicals. Exercise extreme care when working with film processing chemicals. Fixer solution is highly acidic and developer is highly caustic. Avoid contact with the skin. Flush any skin contact with water.

1.4.11 Eddy Current (ET) Method.

**NOTE**

**Eddy current inspections shall be performed in accordance with the general application and techniques in TM 55-1500-335-23 (Nondestructive Inspection Methods manual) and the specific requirements of this technical manual.**

The eddy current method is used for the detection of discontinuities in electrically conductive materials. The method is effective when inspecting for discontinuities originating: (1) at the radii of mounting lugs, flanges, or crevices; (2) at pressed-in (interference fit) grease fittings, guide pins, etc.; and (3) from fastener holes and bushing/bearing bores. Eddy current method will locate surface cracking on any conductive material, but probes and techniques for inspection of magnetic materials may differ considerably from those used on nonferromagnetic materials.

Eddy current has great value for inspecting areas where paint stripping is not desirable and/or impossible. The method also has wide application in confirming surface indications found by other methods.

The capability and versatility of the eddy current method has been greatly enhanced by the use of modern phase analysis (impedance plane display) instruments used in conjunction with shielded probes. These instruments display a representation of the impedance plane which illustrates both the magnitude and direction of impedance changes. Impedance variables (conductivity, probe lift-off, permeability variations, etc.) can be separated by their characteristic video response and are readily recognized by the trained operator. The interaction of the probe coils and the part is represented by a "flying spot" (or dot) in the video display.

Equipment is standardized on a test block (reference block) which is constructed of a known material that contains known good areas, and either simulated or actual defects of known size. The response of the equipment (eddy current machine and probe) to the good material is set as the starting point by nulling the equipment on the sound area of the block. By this action, all subsequent readings represent deviations from the null point and have both magnitude and direction. Careful manipulation of the controls allows the operator to separate the response (deviation from the null point) for lift-off and flaw (geometric) effects.

Shielded probes have a cylinder of material which encircles the coil of the probe. This serves to constrict the probe's field and, therefore, reduces the spread of eddy currents beyond the probe's diameter. This concentrated electrical field is most useful for scanning around fasteners, near edges, and into specific small areas. Other types of probes are used for wide area scans, alloy sorting, conductivity comparisons, coating thickness comparisons, skin thickness comparisons, etc.

1.4.11.1 Safety Precautions During Eddy Current Inspection. Follow safety precautions and instructions contained in this manual and the Nondestructive Inspection Methods manual listed in Table 1-1.

### WARNING

**Electrical equipment shall not be operated in areas where combustible gases or vapors may be present, unless the equipment is explosion proof.**

1.4.11.2 Eddy Current Scanning Techniques. Eddy current inspection is performed by moving the probe over and as close as possible to the surface of the area of interest. If the coil(s) pass over a defect like a crack, the impedance of the coil will change and be represented as a movement of the "flying spot." Before beginning the inspection, the operator will have separated the response from lift-off and from a flaw by using the test block and manipulating the controls. Therefore, the crack response will be essentially similar to the response from the known defect and different from the response from lift-off. Microprocessor controlled instruments have the ability to store responses in memory. Such stored responses are an invaluable teaching aid.

1.4.11.2.1 Scanning Around Fasteners, Inserts, and Edges of Parts. Shielded probes are recommended any time that the pattern the eddy current field is likely to extend out such that it comes in contact with a feature which would mask the response from a defect. Such features may include edges, fasteners, dissimilar materials attached to the test piece, etc. An unshielded probe can be used around such features, but the effect of those features must be made constant by keeping the distance between the probe and the feature constant. Non-conductive mechanical guides (straight edges, plugs, spacers, etc.) can be used to maintain a constant distance. In fact, the use of non-conductive mechanical guides is useful for shielded and unshielded probes alike. As operators gain experience, they become quite innovative in making guides that maintain constant lift-off, angles, and distance from features which may mask flaw indication. Common materials for mechanical guides are plastic (polyethylene, acrylic, and polycarbonate), wood, phenolic impregnated material, and resins for casting into shapes (epoxy, polyester, or hot glue). Careful selection of probes and construction of suitable mechanical guides will make possible inspection of problem areas such as sharp edges, tight radii, small openings, and areas near potentially masking features.

1.4.11.2.2 Bolthole Inspection. Manual bolthole inspection probes usually consist of a split 90 degree probe with the exposed shaft inserted in an adjustable collar. The shaft is marked increments and the collar secured at the desired increment by means of a set screw through the collar. The probe is then rotated 360 degrees around the hole at each setting until the entire surface of the bore has been inspected. These probes are available in federal or commercial catalogs.

1.4.11.2.3 Scanning Fillets and Radii. Using appropriate radius probe, scan fillets and radii several times in each direction.



1.4.11.3 Eddy Current Instrument Standardization. Eddy current inspection equipment and standards required by the procedures in this manual are listed in Table 1-7. Reference blocks, instrument settings, and standardization instructions for the eddy current instrument, are included in each eddy current procedure. Instrument settings, as they are given in this manual, should be considered typical and present a test block display shown in Figure 1-7. Additional nulling will be required to reestablish the position of the "flying spot" with the probe on the part/area to be inspected (Use Teflon tape listed in Table 1-8 on the probe to reduce wear. Instrument settings shall be made with Teflon tape on the probe, if used.)

1.4.11.4 Sorting Metal Using Eddy Current. In addition to the more common usage for crack detection, eddy current equipment may be used for metal sorting. Electrical conductivity and magnetic permeability are the material characteristics evaluated during this type of inspection. The sorting technique cannot directly identify alloy or even the type of metal. But when there are limited possibilities, conductivity and/or permeability information may permit proper classification (see Figure 1-8). Typically the need for alloy sorting occurs when changes to parts are made to improve performance.

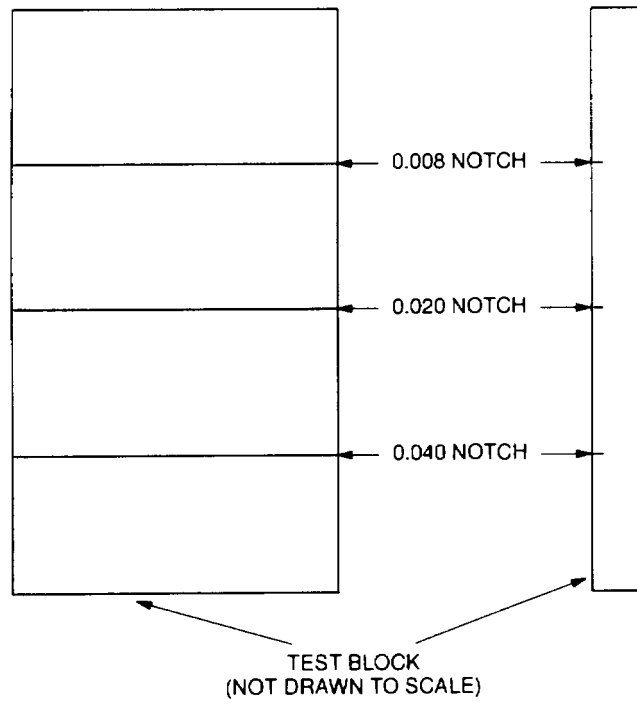
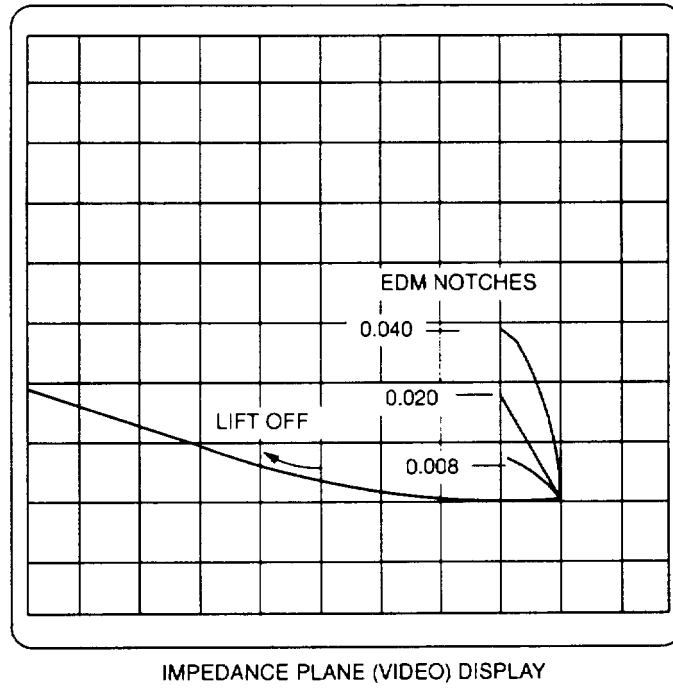
For example, a magnesium part that is experiencing severe corrosion is replaced by one made from aluminum. Another example is the replacement of one aluminum part with another, also of aluminum, but made from an alloy having improved strength or corrosion resistance. In both these examples, there may be a need to verify that replacement has been made, and the electrical conductivity of the alloys involved may be sufficiently different to permit verification by a sorting inspection. Another situation is the requirement to NDI a part to confirm a visual indication where the material is not known and cannot be easily determined. Eddy current sorting will quickly determine if the part is ferromagnetic and should be inspected using the magnetic particle method. Also, if the part is nonferromagnetic, which test block (standard) most closely matches the conductivity of the part and, therefore, should be used to adjust the eddy current equipment for crack inspection/verification.

#### 1.4.12 Ultrasonic (UT) Method.

##### **NOTE**

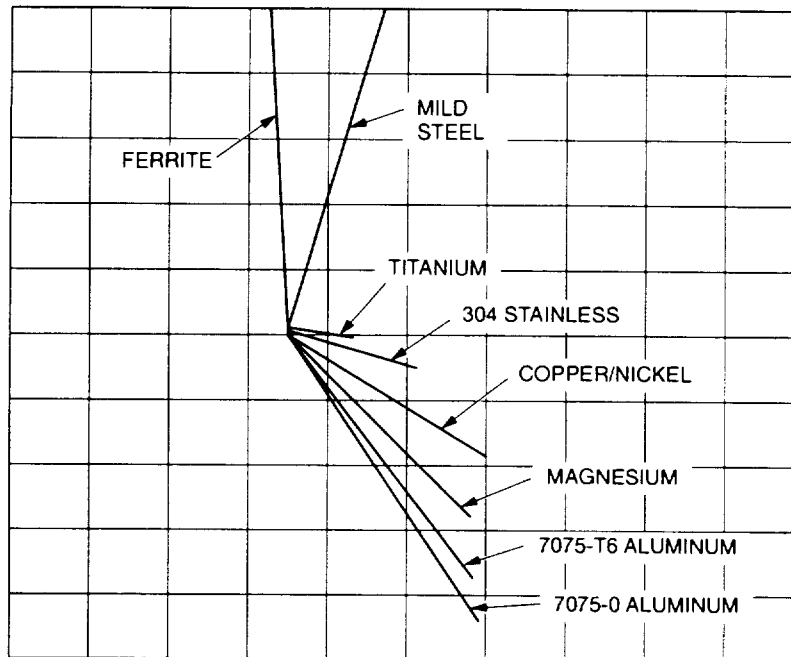
**Ultrasonic inspection shall be performed in accordance with the general application and techniques in TM 55-1500-335-23 (Nondestructive Inspection Methods manual) and the specific requirements of this technical manual.**

Ultrasonic inspection uses high frequency sound waves as a probing medium to provide information as to the state of various materials. This method is effective for the inspection of most metals for surface and subsurface damage. The method requires that at least one surface of the part be accessible for transducer contact in the vicinity of the area to be examined. The inspection is accomplished by inducing the ultrasound into the part by coupling the transducer to the part and picking up reflections of this sound from within the part. Any marked changes in acoustic properties, defect, interface, or back surface will reflect sound back to the transducer. The detected ultrasonic reflections are electronically displayed on a Cathode Ray Tube (CRT) and interpreted for indications of defects. Accessory wedges can be used to provide adequate transducer mating to curved surfaces or to change the angle of the sound beam and wave of mode propagation.



NDI\_OH-58\_F1\_7

Figure 1-7. Signatures of EDM Notches in Test Block



NDI\_OH-58\_F1\_8

**Figure 1-8. Typical Metal Sorting Display**

1.4.12.1 Safety Precautions During Ultrasonic Inspection. Follow safety precautions and instructions contained in this manual and the Nondestructive Inspection Methods manual listed in Table 1-1.

**WARNING**

**Electrical equipment shall not be operated in areas where combustible gases or vapors may be present, unless the equipment is explosion proof.**

- a. If instrument is operated using AC power, use a grounded power cord.
- b. Turn power OFF before connecting or disconnecting transducer cable or power cable.

1.4.12.2 Ultrasonic Instrument Standardization. The ultrasonic instrument used in ultrasonic inspection procedures described throughout this manual is listed in Table 1-7. Reference blocks, instrument settings, and standardization instructions for the ultrasonic instrument are included in the individual ultrasonic inspection procedures. Because of varied circumstances under which the inspections may be performed, instrument settings, as they are given in this manual, should be considered typical. Slight adjustment to the settings may be necessary to achieve the desired CRT presentation. Illustrations representing typical CRT presentation will, in most cases, include reference signals representing initial pulse, transducer, and/or wedge echoes that have been moved off the scope to make room for relevant indications. An effective ultrasonic inspection will depend largely upon the proper handling of the transducer; therefore, the following steps are recommended:

- a. Clean ultrasonic transducer with a low-lint cloth, MIL-C-85043 or equivalent. Clean all contact surfaces when using a wedge or delay block. Apply couplant to these contact surfaces and carefully tighten the assembly prior to test.

**NOTE**

**Scratches or similar surface blemishes remaining on the transducer or wedge may give false indications.**

- b. Use prescribed or equivalent couplant and in sufficient quantity to achieve proper coupling. The use of lubricants containing graphite, silicones, and glycerines is prohibited.
- c. Apply adequate pressure to keep transducer in contact with part.
- d. Use moderate speed for transducer search pattern. If transducer movement is too fast, a flaw could be passed over without a proper indication.

1.4.13 Acceptance/Rejection Criteria.

**CAUTION**

**Misinterpretation of indications can result in rejectable parts being accepted and acceptable parts being rejected. Only NDI personnel trained and qualified in accordance with applicable military standards and technical manuals shall perform and interpret nondestructive inspections.**

Nondestructive inspection procedures in this manual have been selected to enhance the safety of the aircraft and personnel. Inspection procedures (including primary and backup) have been outlined to enable NDI personnel to perform a reliable inspection of parts with respect to their design, composition, and accessibility. In the event that a final interpretation of an indication cannot be made, assistance from the next higher maintenance level shall be requested.

1.4.14 Equipment Used for NDI. Refer to Table 1-7 for a summary of equipment used for NDI in this manual. Equivalent equipment may be used unless specified otherwise in the inspection procedures.

1.4.15 Materials Used for NDI. Refer to Table 1-8 for a summary of materials used for NDI in this manual. Common commercial grade materials (cheesecloth, paper, etc.) are not listed. Equivalent materials may be used unless specified otherwise in inspection procedures.

1.4.16 Post Cleaning and Restoration of Part or Area After NDI. Upon completion of the NDI test and prior to restoration of protective finishes, it is necessary to clean off residual inspection materials from the part. This cleaning will vary based upon test method, contaminant, and subsequent processing of the part. In many instances, methods used for precleaning are acceptable for post cleaning. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

**Table 1-7. Equipment Used for NDI**

<u>Fluorescent Penetrant Method</u>	Fluorescent Penetrant Inspection Kit Black Light UV Kit Black Light Meter Black Light Bulbs Filter UV
<u>Magnetic Particle Method</u>	Yoke and Coil Kit Black Light Magnetic Particle Inspection Probe Magnetometer
<u>Eddy Current Method</u>	Eddy Current Inspection Unit Cable Assembly, Coaxial 6-feet long (1 required) Reference Block Aluminum (0.008, 0.020, and 0.040 EDM notches) Reference Block Titanium (0.008, 0.020, and 0.040 EDM notches) Reference Block Magnesium (0.008, 0.020, and 0.040 EDM notches) Reference Block - Block of Six Conductivity Samples Probe, straight, shielded surface 100 KHz-500 KHz Probe, right angle, shielded surface 100 KHz-500 KHz, 900 1/2 inch drop ,J
<u>Ultrasonic Method</u>	Ultrasonic Inspection Unit Cable Assembly, BNC to microdot Transducer 5 MHz 60° Shear 1/4 x 1/4 inch element
<u>Bond Testing Method</u>	Bond Test Inspection Unit Cable Assembly Probe, Mechanical Impedance Analysis Probe Holder, spring loaded Test Block, Composite Defect Standard #1 Test Block, Composite Defect Standard #3 Test Block, Aluminum Honeycomb with 0.020 inch thick aluminum skin (refer to Appendix C) Test Block, Aluminum Honeycomb with 0.040 inch thick aluminum skin (refer to Appendix C) Test Block, Aluminum Honeycomb with 0.063 inch thick aluminum skin (refer to Appendix C)
<u>Radiographic Method</u>	Tripod X-Ray Tubehead Stand Signal Appliance Lamp Assembly X-Ray Unit (LPX-160 Water Cooled Digital) Film Processor

**NOTE**

**Refer to Appendix B for Equipment Part Number, National Stock Number, and Manufacturer.**

Table 1-8. Materials Used for NDI

Nomenclature	P/N or Specification	Manufacturer	National Stock Number
<u>Fluorescent Penetrant Method</u>			
Type I, Method C	MIL-1-25135	General Services Administration (GSA)	6850-01-703-7406
<u>Magnetic Particle Method</u>			
Fluorescent Magnetic Inspection Compound	14AM	Magnaflux Div. of Illinois Tool Works Inc. 1301 W. Ainsle St. Chicago, IL 60656	6850-00-841-1347
<u>Eddy Current Method</u>			
Teflon Tape	MIL-I-23594	General Service Administration (GSA)	5970-00-812-7387
<u>Ultrasonic Method</u>			
Couplant, Ultrasonic	Ultragel II	Sonotech, Inc. 1413 Frasier St. Suite 2, Bldg. H P.O. Box 2189 Bellingham, WA 98226	6850-01-157-4348
<u>Bond Test Method</u>			
Teflon Tape	MIL-I-23594	General Service Administration (GSA)	5970-00-812-7387
<u>Radiographic Method</u>			
M-2 Film, Ready Pack 8 inch x 10 inch	145 7837	Eastman Kodak Co. 43 State St. Rochester, NY 14650	6635-00-412-2071
M-2 Film, Ready Pack 14 inch x 17 inch	145 8926	Eastman Kodak Co. 343 State St. Rochester, NY 14650	6635-00-838-9116

Table 1-8. Materials Used for NDI - Continued

Nomenclature	P/N or Specification	Manufacturer	National Stock Number
<u>Radiographic Method - continued</u>			
AA-2 Film, Ready Pack 14 inch x 17 inch	145 9205	Eastman Kodak Co. 343 State St. Rochester, NY 14650	6635-00-850-3321
AA-2 Film, Ready Pack 8 inch x 10 inch	827 8137	Eastman Kodak Co. 343 State St. Rochester, NY 14650	6635-00-850-3326
<u>Miscellaneous Materials</u>			
Gloves, Protective	ZZ-G-381	General Services Administration (GSA)	8415-00-823-7456
Gloves, Surgeon	E-008	Defense Services Administration (DSA)	1615-01-149-8843
Apron, General Purpose	A-A-55063	General Services Administration (GSA)	8415-00-082-6108
Face Shield	A-A-1770	General Services Administration (GSA)	4240-00-542-2048
Cloth, Low-Lint Cleaning	MIL-C-85043	General Services Administration (GSA)	7920-00-044-9281
Dry-Cleaning Solvent	P-D-680, Type II	General Services Administration (GSA)	6850-00-274-5421
Cleaning Solvent	MIL-C-38736	General Services Administration (GSA)	6850-00-538-0929
Scotch-Brite, Type A	L-P-0050	General Services Administration (GSA)	7920-00-659-9175
<u>Temporary Marking Materials</u>			
Aircraft Marking Pencils (China Marker)	MIL-P-83953 Yellow	General Services Administration (GSA)	7510-00-537-6930

**WARNING**

**Prolonged breathing of vapor from organic solvents, degreasers, or paint thinners is dangerous. Use respirators in confined areas per Occupational and Environmental Health Respiratory Protection Program (TB MED 502 (DLAM 1000.2)). Have adequate ventilation. Avoid prolonged skin contact. Wear rubber gloves and goggles.**

- a. Following all magnetic particle inspections, clean part by dipping or spraying with dry-cleaning solvent, P-D-680, Type II. Wipe dry with a clean, low-lint cloth, MIL-C-85043, or equivalent.
- b. After post cleaning has been performed, the original protective finish or approved alternate must be restored to the part or area by appropriate personnel. Refer to applicable technical manuals listed in Table 1-1.

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**SECTION II**  
**ROTOR GROUP**

**2. GENERAL.**

**2.1 CONTENTS.** The rotor group inspection items covered in this section are those critical items of the OH-58D rotor blades, rotor head, and components listed in the Rotor Group Inspection Index (Table 2-1). Corresponding inspection figures and applicable text paragraphs are listed opposite each inspection item. The index number for each item may be used to locate it in Figure 2-1.

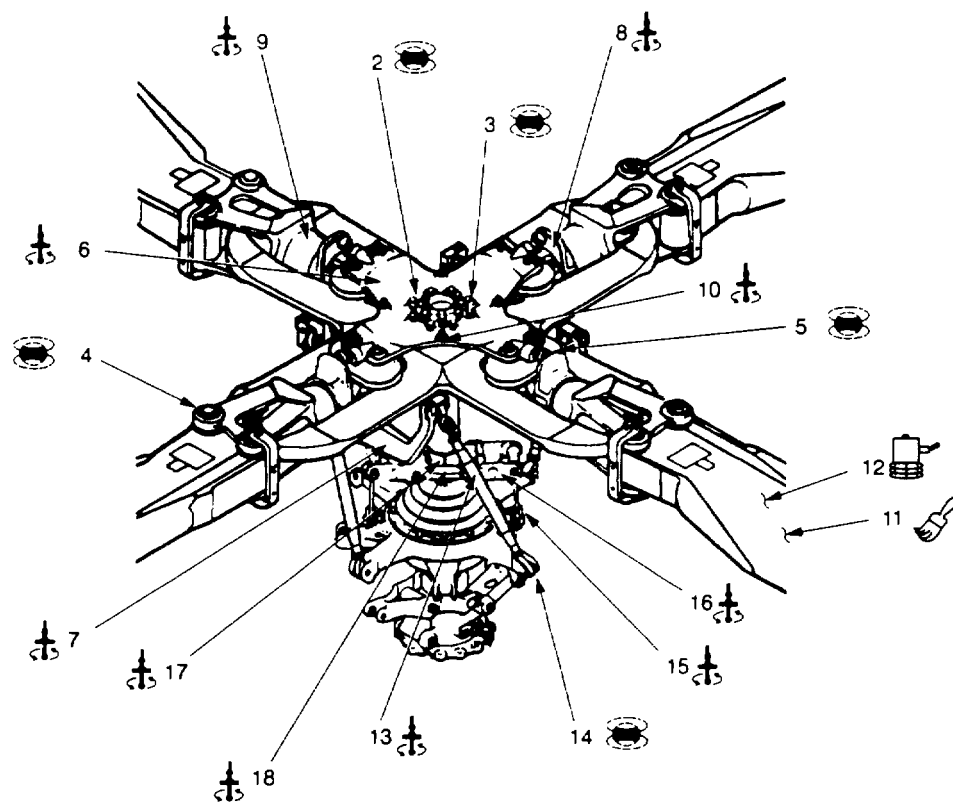
**Table 2-1. Rotor Group Inspection Index**

Index Number	Nomenclature	Inspection Method	Paragraph Number	Figure Number
*2	Main Rotor Hub Lower Cone	MT	2.2	2-2
*3	Upper Cone Plate Assembly	MT	2.3	2-3
*4	Blade Bolt	MT	2.4	2-4
5	Droop Stop Stud	MT	2.5	2-5
*6	Hub Upper Plate	ET	2.6	2-6
*7	Pitch Horn Assembly	ET	2.7	2-7
8	Yoke Adapter Assembly	ET	2.8	2-8
*9	Main Rotor Grip Assembly	ET	2.9	2-9
*10	Hub Lower Plate	ET	2.10	2-10
11	Main Rotor Blade Cover	PT	2.11	2-11
*12	Main Rotor Blade	BT	2.12	2-12
*13	Main Rotor Pitch Link Tube	ET	2.13	2-13
*14	Pitch Link Rod Ends	MT	2.14	2-14
*15	Main Rotor Drive Link	ET	2.15	2-15
*16	Main Rotor Drive Lever	ET	2.16	2-16
*17	Main Rotor Drive Hub Set	ET	2.17	2-17
*18	Main Rotor Gimbal Ring	ET	2.18	2-18
*19	Main Rotor Collective Lever	ET	2.19	2-19
*20	Main Rotor Collective Link	ET	2.20	2-20
*21	Main Rotor Controls Spacer	MT	2.21	2-21
*22	Main Rotor Antidrive Lever	ET	2.22	2-22
*23	Main Rotor Antidrive Link	ET	2.23	2-23

Table 2-1. Rotor Group Inspection Index - Continued

Index Number	Nomenclature	Inspection Method	Paragraph Number	Figure Number
*24	Upper Bearing Race	MT	2.24	2-24
*25	Inner and Outer Cap	ET	2.25	2-25
*26	Drive Link Bearing and Retainer	MT	2.26	2-26
*27	Main Rotor Pivot Sleeve	ET	2.27	2-27
*28	Support Assembly	ET	2.28	2-28
*29	Inner Ring	ET	2.29	2-29
*30	Outer Ring	ET	2.30	2-30
*31	Tail Rotor Pitch Link	ET	2.31	2-31
*32	Tail Rotor Control Tube Driver Plate	MT	2.32	2-32
*33	Tail Rotor Crosshead	MT	2.33	2-33
*34	Tail Rotor Hub Support	ET	2.34	2-34
*35	Tail Rotor Hub Clamp Ring	MT	2.35	2-35
*36	Tail Rotor Hub Yoke	MT	2.36	2-36
37	Flapping Bearing	PT	2.37	2-37
38	Tail Rotor Blades	ET	2.38	2-38
39	Tail Rotor Blades	BT	2.39	2-39
40	Tail Rotor Pitch Change Lever	ET	2.40	2-40
41	Tail Rotor Pitch Change Idler	ET	2.41	2-41
42	Tail Rotor Pitch Change Trunnion Cap	ET	2.42	2-42

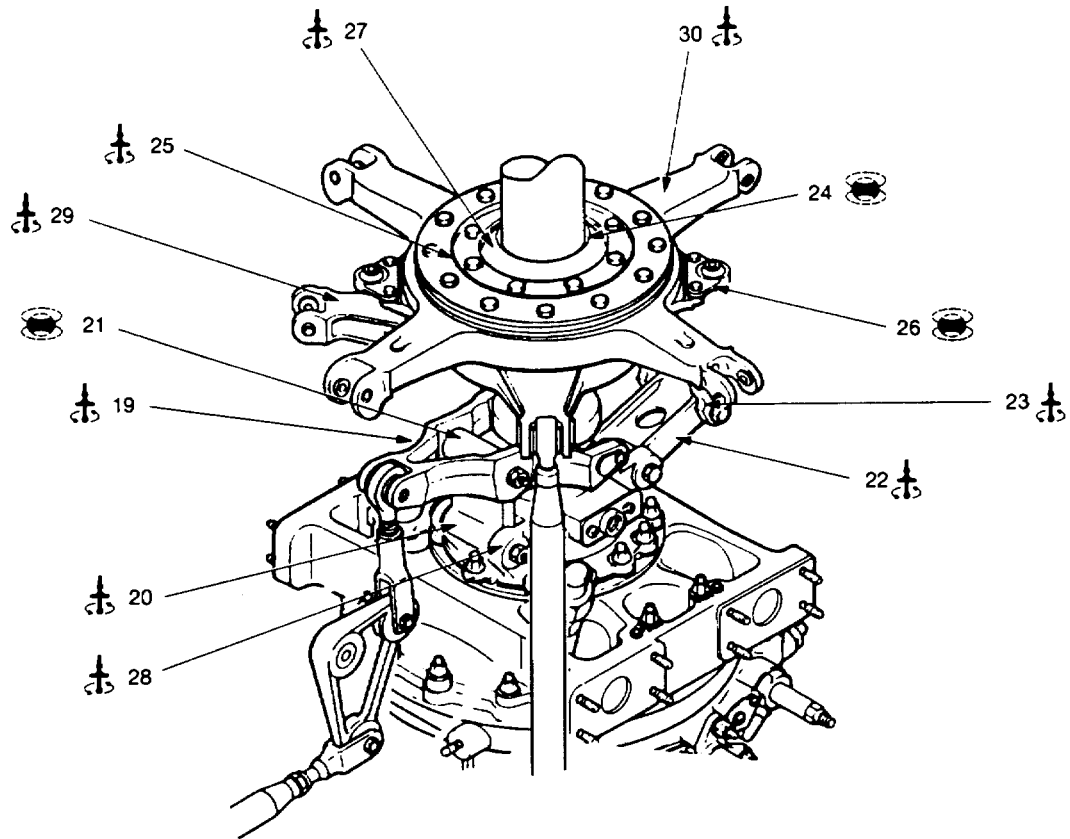
NOTE: \*Indicates Flight Safety Part.



MAIN ROTOR ROTATING CONTROLS

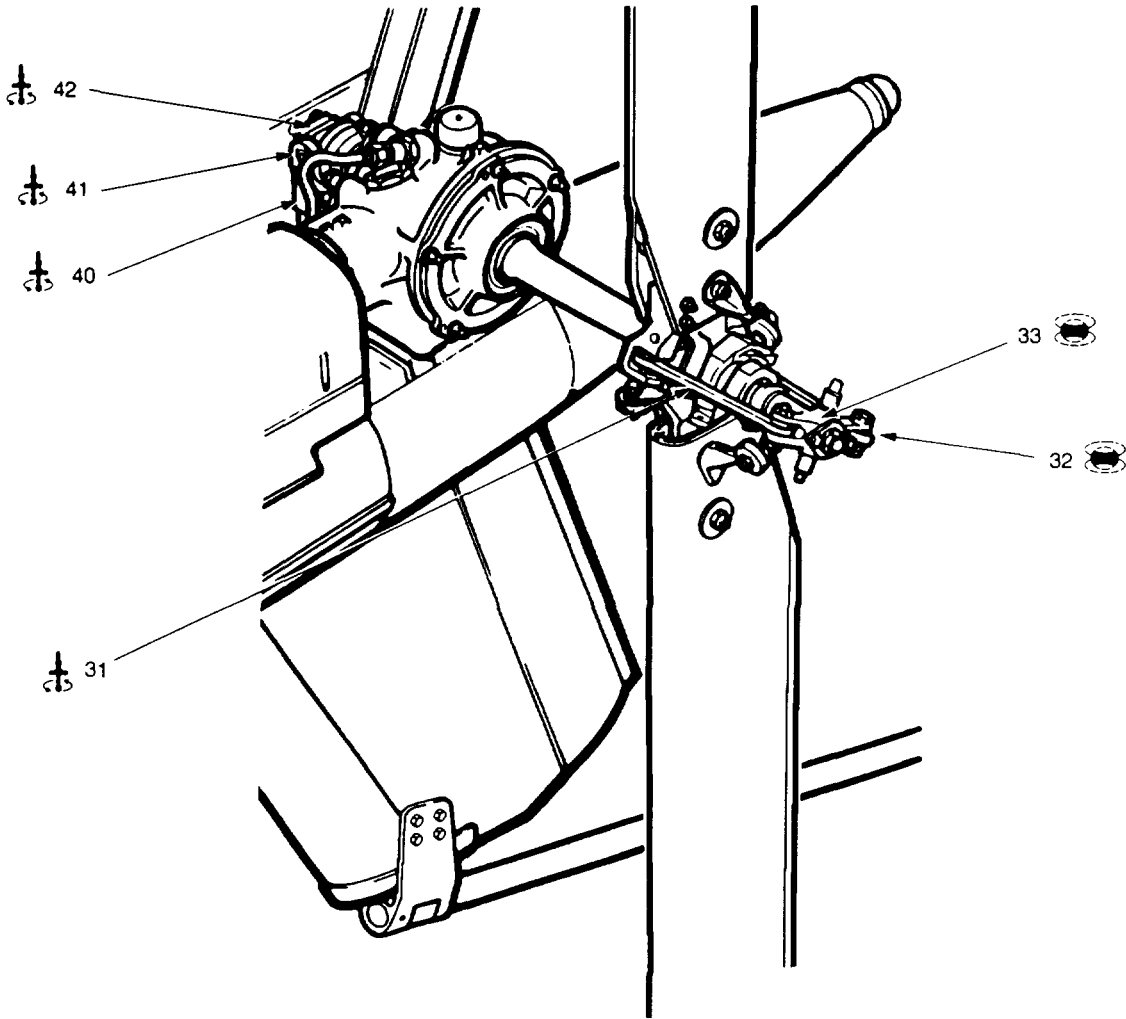
NDI\_OH-58\_F2\_1\_4

Figure 2-1. Rotor Group (Sheet 1 of 4)



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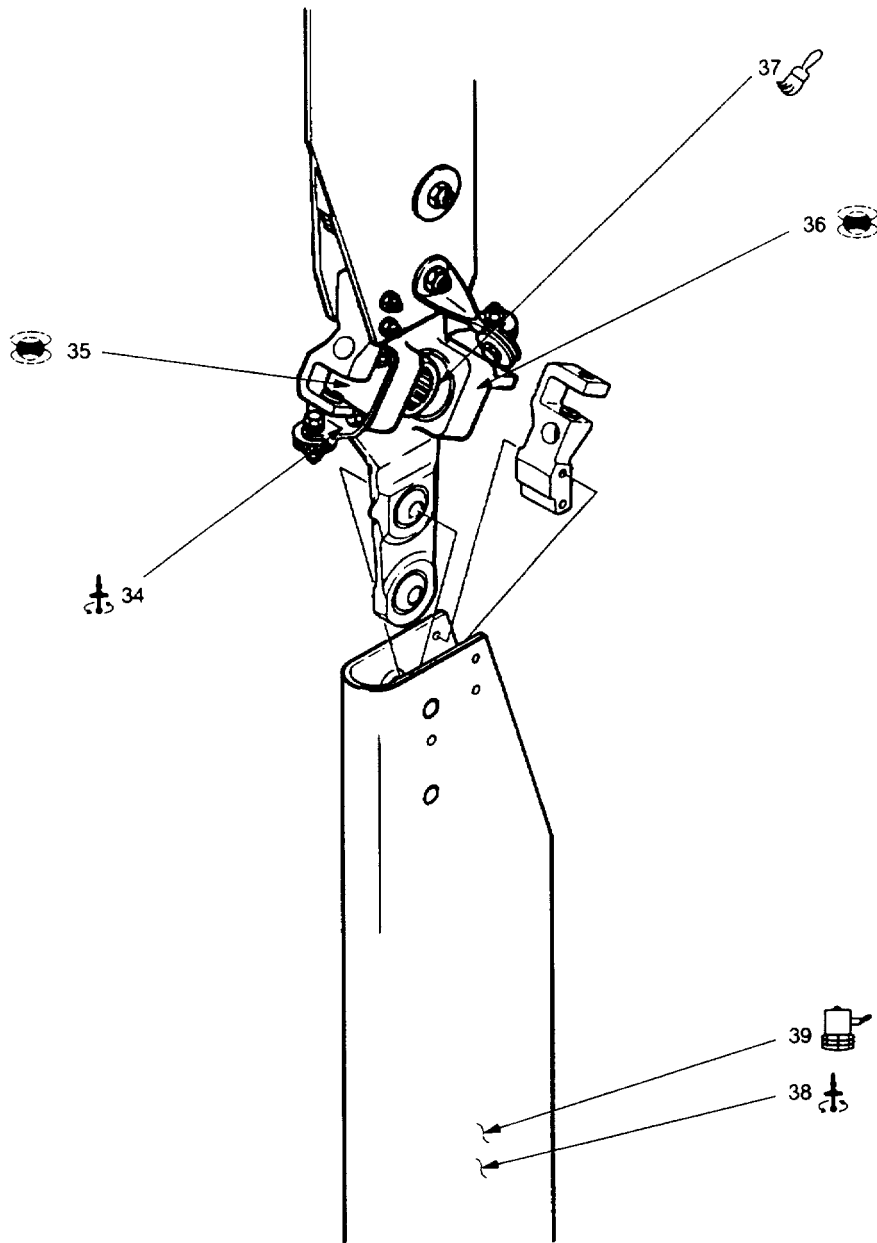
Figure 2-1. Rotor Group (Sheet 2 of 4)



TAIL ROTOR

NDI\_OH-58\_F2\_1\_6

Figure 2-1. Rotor Group (Sheet 3 of 4)



TAIL ROTOR ASSEMBLY

NDI\_OH-58\_F2\_1\_7

Figure 2-1. Rotor Group (Sheet 4 of 4)

## 2.2 MAIN ROTOR HUB LOWER CONE (MT).

2.2.1 Description (Figure 2-1, Index No. 2). The lower cone plate assembly attaches to the lower plate and when properly bolted and torqued provides the clamping forces necessary to retain the lower plate to the mast.

2.2.2 Defects. Defects may occur anywhere on the lower cone. No cracks are allowed.

2.2.3 Primary Method. Magnetic Particle.

2.2.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Magnetic Particle Inspection Probe/Yoke
- b. Magnetometer
- c. Black Light
- d. Fluorescent Magnetic Particles, refer to Table 1-8
- e. Consumable Materials, refer to Table 1-8
- f. Aircraft Marking Pencil, refer to Table 1-8

2.2.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the main rotor hub lower cone removed in accordance with the applicable technical manuals listed in Table 1-1.

2.2.3.3 Access. Not applicable.

### **WARNING**

#### **Maintenance Platforms/Workstands**

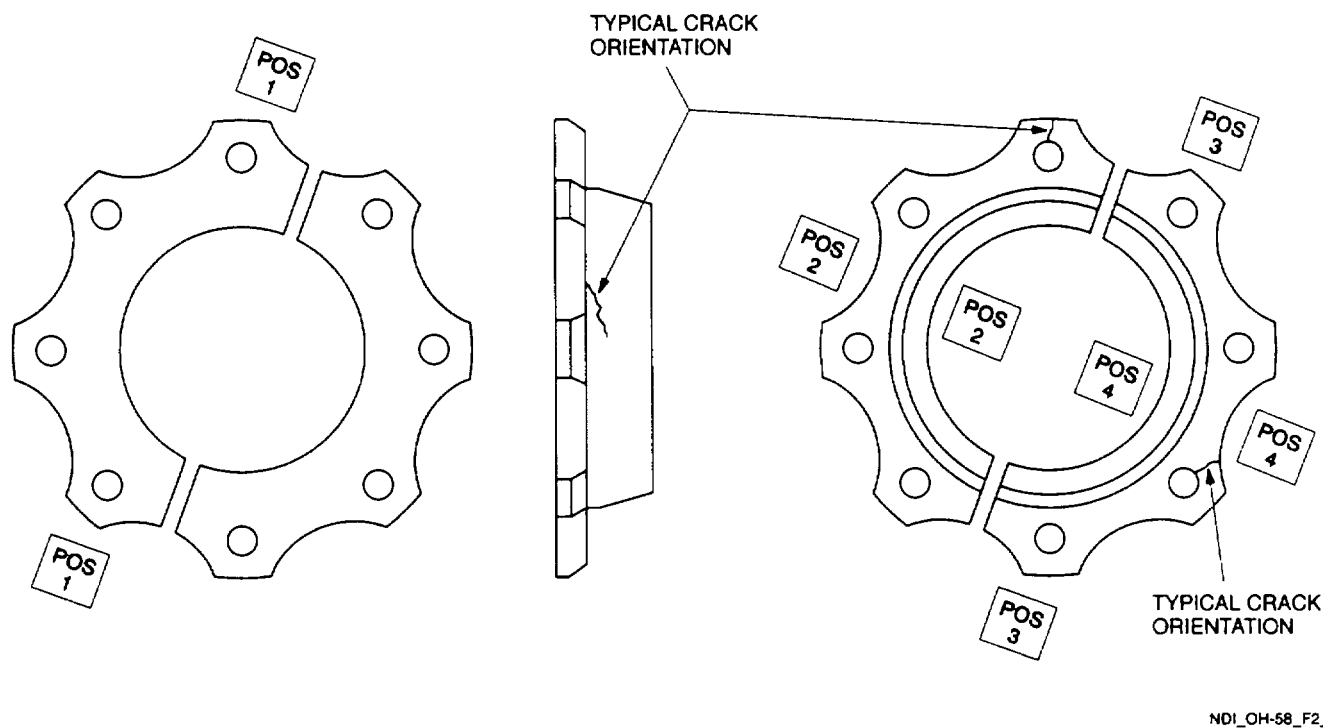
**Use only appropriate platforms, workstands, or other approved locally procured stands and restraint equipment when working above 10 feet on helicopters in a nontactical environment. Otherwise, personnel injury could result from accidental falls.**

2.2.3.4 Preparation of Part. The part shall be thoroughly cleaned. Refer to Preparation of Part of Area for NDI, paragraph 1.4.4.

2.2.3.5 NDI Equipment Settings. Refer to Magnetic Particle Method, paragraph 1.4.8.

2.2.3.6 Inspection Procedure. A magnetic field shall be applied to the part perpendicular to the orientation of possible cracks. Positions required for this inspection are illustrated in Figure 2-2.

- a. Select AC on the AC/DC power switch.
- b. Place probe/yoke on part in Position 1 as shown.
- c. Press the test switch and apply a light coat of Magnetic Particle media at the same time. Remove the media momentarily before removing the current. Current should be applied for no more than five seconds.
- d. Inspect for cracks using the black light.
- e. Demagnetize before moving to the next position. Refer to paragraph 2.2.3.8.
- f. Repeat steps a. through e. for Positions 2 and 3.



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**Figure 2-2. Main Rotor Hub Lower Cone**

2.2.3.7 **Marking and Recording of Inspection Results.** Mark and record the inspection results as necessary per paragraph 1.3.

2.2.3.8 **Demagnetization.** With the switch remaining in the AC position, place the probe/yoke legs in the same position used for magnetizing. Press the test switch and withdraw the probe/yoke from the part for a distance of two feet before releasing the switch.

2.2.4 **Backup Method.** None required.

2.2.5 **System Securing.** Clean the main rotor hub lower cone thoroughly to remove all residual Magnetic Particle media. Refer to Post Cleaning and Restoration of Part or Area After NDI, paragraph 1.4.1 6. The main rotor hub lower cone requires installation in accordance with the applicable technical manuals listed in Table 1-1.

**2.3 UPPER CONE PLATE ASSEMBLY (MT).**

2.3.1 **Description (Figure 2-1, Index No. 3).** The upper cone plate assembly attaches to the upper plate and when properly bolted and torqued provides the clamping forces necessary to retain the " upper plate to the mast.

2.3.2 **Defects.** Defects may occur anywhere on the upper cone plate assembly. No cracks are allowed.



### 2.3.3 Primary Method. Magnetic Particle.

#### 2.3.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Magnetic Particle Inspection Probe/Yoke
- b. Magnetometer
- c. Black Light
- d. Fluorescent Magnetic Particles, refer to Table 1-8
- e. Consumable Materials, refer to Table 1-8
- f. Aircraft Marking Pencil, refer to Table 1-8

2.3.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the upper cone plate assembly shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

2.3.3.3 Access. Not applicable.

#### **WARNING**

##### **Maintenance Platforms/Workstands**

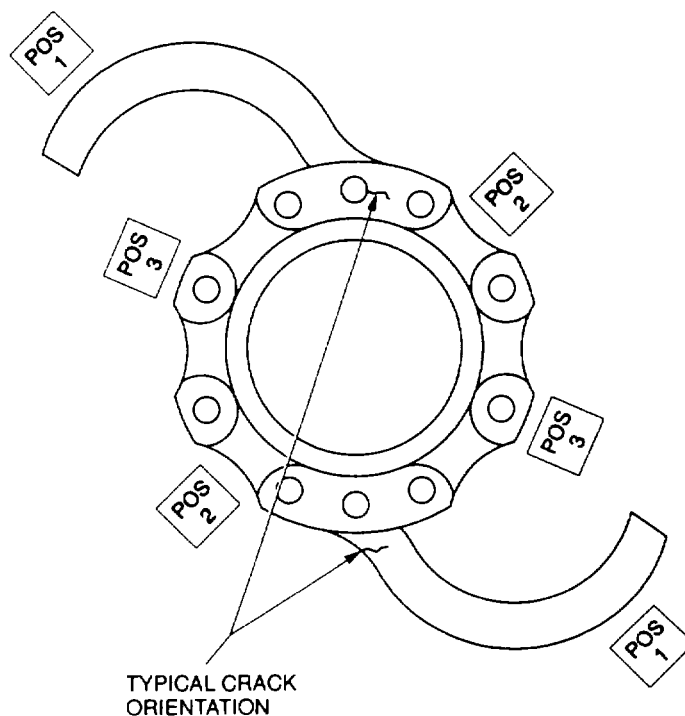
**Use only appropriate platforms, workstands, or other approved locally procured stands and restraint equipment when working above 10 feet on helicopters in a nontactical environment. Otherwise, personnel injury could result from accidental falls.**

2.3.3.4 Preparation of Part. The part shall be thoroughly cleaned. Refer to Preparation of Part of Area for NDI, paragraph 1.4.4.

2.3.3.5 NDI Equipment Settings. Refer to Magnetic Particle Method, paragraph 1.4.8.

2.3.3.6 Inspection Procedure. A magnetic field shall be applied to the part perpendicular to the orientation of possible cracks. Positions required for this inspection are illustrated in Figure 2-3.

- a. Select AC on the AC/DC power switch.
- b. Place probe/yoke on part in Position 1 as shown.
- c. Press the test switch and apply a light coat of Magnetic Particle media at the same time. Remove the media momentarily before removing the current. Current should be applied for no more than five seconds.
- d. Inspect for cracks using the black light.
- e. Demagnetize before moving to the next position. Refer to paragraph 2.3.3.8.
- f. Repeat steps a. through e. for Positions 2 and 3.



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**Figure 2-3. Upper Cone Plate Assembly**

2.3.3.7 **Marking and Recording of Inspection Results.** Mark and record the inspection results as necessary per paragraph 1.3.

2.3.3.8 **Demagnetization.** With the switch remaining in the AC position, place the probe/yoke legs in the same position used for magnetizing. Press the test switch and withdraw the probe/yoke from the part for a distance of two feet before releasing the switch.

2.3.4 **Backup Method.** None required.

2.3.5 **System Securing.** Clean the upper cone plate assembly thoroughly to remove all residual Magnetic Particle media. Refer to Post Cleaning and Restoration of Part or Area After NDI, paragraph 1.4.16. The upper cone plate assembly, if removed, requires installation in accordance with the applicable technical manuals listed in Table 1-1.

## 2.4 BLADE BOLT (MT).

2.4.1 **Description (Figure 2-1. Index No.4).** The main rotor blade bolt secures the main rotor blade to--i the grip assembly.

2.4.2 **Defects.** Defects may occur anywhere on the blade bolt. Particular attention shall be given to the bolt head radius and threaded areas. No cracks are allowed.

### 2.4.3 Primary Method. Magnetic Particle.

#### 2.4.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Magnetic Particle Inspection Probe/Yoke
- b. Magnetometer
- c. Black Light
- d. Fluorescent Magnetic Particles, refer to Table 1-8
- e. Consumable Materials, refer to Table 1-8
- f. Aircraft Marking Pencil, refer to Table 1-8

#### NOTE

**Hand-held magnetic coil may be used. Refer to paragraph 1.4.8.1.2 and Figure 1-6.**

2.4.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the blade bolt removed in accordance with the applicable technical manuals listed in Table 1-1.

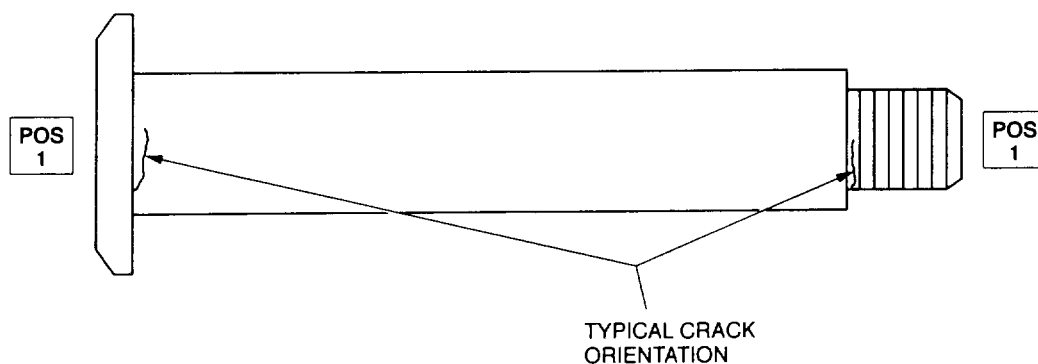
2.4.3.3 Access. Not applicable.

2.4.3.4 Preparation of Part. The part shall be thoroughly cleaned. Refer to Preparation of Part of Area for NDI, paragraph 1.4.4.

2.4.3.5 NDI Equipment Settings. Refer to Magnetic Particle Method, paragraph 1.4.8.

2.4.3.6 Inspection Procedure. A magnetic field shall be applied to the part perpendicular to the orientation of possible cracks. Position required for this inspection is illustrated in Figure 2-4.

- a. Select AC on the AC/DC power switch.
- b. Place probe/yoke on part in position as shown.
- c. Press the test switch and apply a light coat of Magnetic Particle media at the same time. Remove the media momentarily before removing the current. Current should be applied for no more than five seconds.
- d. Inspect for cracks using the black light.



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**Figure 2-4. Blade Bolt**

2.4.3.7 Marking and Recording of Inspection Results. Mark and record the inspection results as necessary per paragraph 1.3.

2.4.3.8 Demagnetization. With the switch remaining in the AC position, place the probe/yoke legs in the same position used for magnetizing. Press the test switch and withdraw the probe/yoke from the part for a distance of two feet before releasing the switch.

2.4.4 Backup Method. None required.

2.4.5 System Securing. Clean the blade bolt thoroughly to remove all residual Magnetic Particle media. Refer to Post Cleaning and Restoration of Part or Area After N DI, paragraph 1.4.16. The blade bolt requires installation in accordance with the applicable technical manuals listed in Table 1-1.

## **2.5 DROOP STOP STUD (MT).**

2.5.1 Description (Figure 2-1, Index No. 5). Droop stop stud is part of the droop stop assembly which is threaded into the hub plates.

2.5.2 Defects. Defects may occur anywhere on the surface of the droop stop stud. No cracks are allowed.

2.5.3 Primary Method. Magnetic Particle.

2.5.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Magnetic Particle Inspection Probe/Yoke
- b. Magnetometer
- c. Black Light
- d. Fluorescent Magnetic Particles, refer to Table 1-8
- e. Consumable Materials, refer to Table 1-8
- f. Aircraft Marking Pencil, refer to Table 1-8

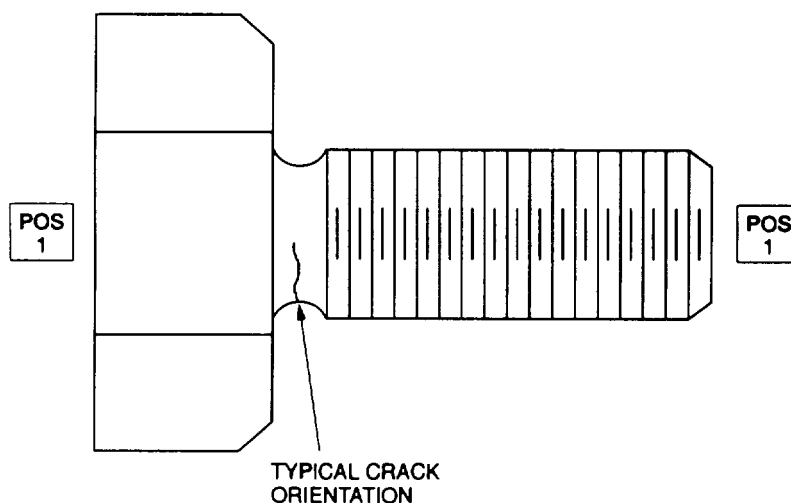
2.5.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the droop stop stud removed in accordance with the applicable technical manuals listed in Table 1-1.

2.5.3.3 Access. Not applicable.

2.5.3.4 Preparation of Part. The part shall be thoroughly cleaned. Refer to Preparation of Part of Area for NDI, paragraph 1.4.4.

2.5.3.5 NDI Equipment Settings. Refer to Magnetic Particle Method, paragraph 1.4.8.

2.5.3.6 Inspection Procedure. A magnetic field shall be applied to the part perpendicular to the orientation of possible cracks. Position required for this inspection is illustrated in Figure 2-5.



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**Figure 2-5. Droop Stop Stud**

- a. Select AC on the AC/DC power switch.
- b. Place probe/yoke on part in position as shown.
- c. Press the test switch and apply a light coat of Magnetic Particle media at the same time. Remove the media momentarily before removing the current. Current should be applied for no more than five seconds.
- d. Inspect for cracks using the black light.

2.5.3.7 Marking and Recording of Inspection Results. Mark and record the inspection results as necessary per paragraph 1.3.

2.5.3.8 Demagnetization. With the switch remaining in the AC position, place the probe/yoke legs in the same position used for magnetizing. Press the test switch and withdraw the probe/yoke from the part for a distance of two feet before releasing the switch.

2.5.4 Backup Method. None required.

2.5.5 System Securing. Clean the droop stop stud thoroughly to remove all residual Magnetic Particle media. Refer to Post Cleaning and Restoration of Part or Area After NDI, paragraph 1.4.16. The droop stop stud requires installation in accordance with the applicable technical manuals listed in Table 1-1.

## 2.6 HUB UPPER PLATE (ET).

2.6.1 Description (Figure 2-1, Index No. 6). The upper plate assembly attaches to the top of the grip o assemblies to keep the grips in a fixed plane.

2.6.2 Defects. Defects may occur anywhere on the surface of the upper plate. Particular attention shall be given to all fastener hole areas. No cracks are allowed.

2.6.3 Primary Method. Eddy Current.

2.6.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100 KHz-500 KHz
- c. Probe, right angle, shielded surface, 100 KHz-500 KHz, 90° 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

2.6.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the hub upper plate shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

2.6.3.3 Access. Not applicable.

### **WARNING**

#### **Maintenance Platforms/Workstands**

**Use only appropriate platforms, workstands, or other approved locally procured stands and restraint equipment when working above 10 feet on helicopters in a nontactical environment. Otherwise, personnel injury could result from accidental falls.**

2.6.3.4 Preparation of Part. The hub upper plate shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

## 2.6.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e<sup>II</sup>.

Frequency F1	-200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 56°		
Probe drive	- mid		
LPF	- 100		
HPF	- 0		
H Pos	- 80%		
V Pos	- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

## 2.6.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 2-6.

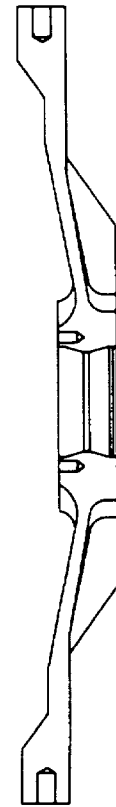
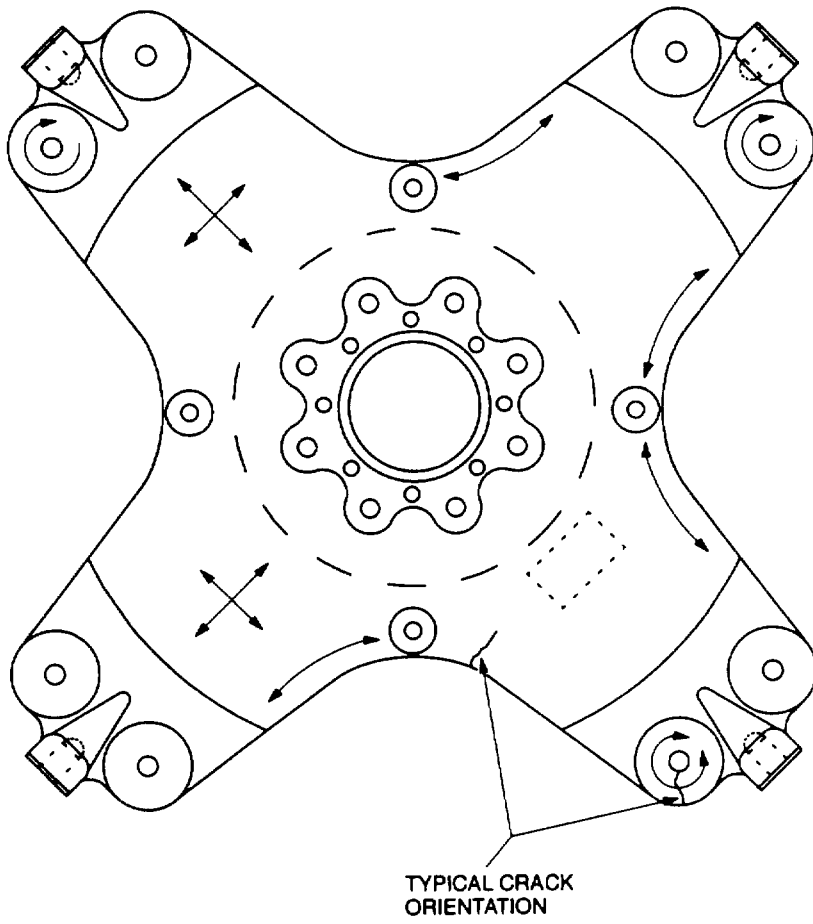
- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

**NOTE**

**Either probe identified in paragraph 2.6.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 2.6.3.5 b. (1), (2), and (3) shall be repeated each time a change is made.**

## 2.6.3.7 Marking and Recording of Indications. Mark and record as required by paragraph 1.3.

2.6.4 Backup Method. None required.2.6.5 System Securing. The hub upper plate, if removed, requires installation in accordance with the applicable technical manual listed in Table 1-1.



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Figure 2-6. Hub Upper Plate



## 2.7 PITCH HORN ASSEMBLY (ET).

2.7.1 Description (Figure 2-1, Index No. 7). The pitch horn is a component of the main rotor hub, used to transmit control inputs to the blade grip.

2.7.2 Defects. Defects may occur anywhere on the surface of the pitch horn. No cracks are allowed.

2.7.3 Primary Method. Eddy Current.

2.7.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100 KHz-500 KHz
- c. Probe, right angle, shielded surface, 100 KHz-500 KHz, 900 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

2.7.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the pitch horn shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

2.7.3.3 Access. Not applicable.

### **WARNING**

#### **Maintenance Platforms/Workstands**

**Use only appropriate platforms, workstands, or other approved locally procured stands and restraint equipment when working above 10 feet on helicopters in a nontactical environment. Otherwise, personnel injury could result from accidental falls.**

2.7.3.4 Preparation of Part. The pitch horn assembly shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

## 2.7.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e<sup>II</sup>.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 56°		
Probe drive	- mid		
LPF	- 100		
HPF	- 0		
H Pos	- 80%		
V Pos	- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

## 2.7.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 2-7.

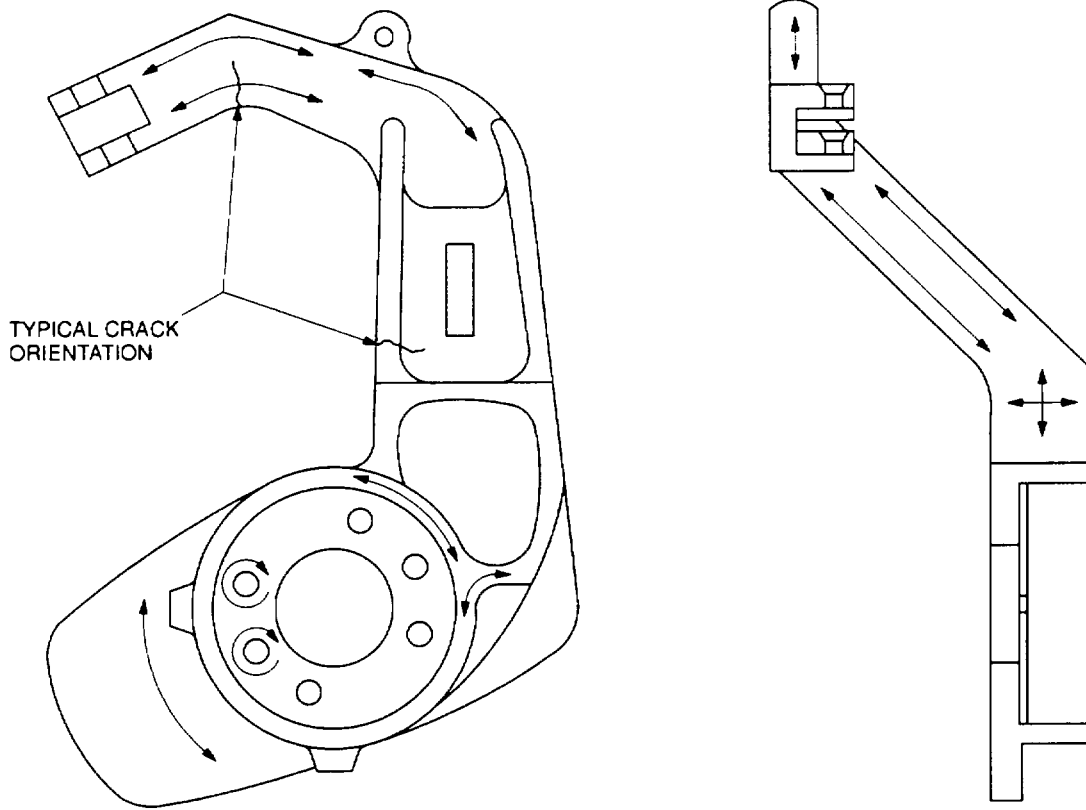
- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

**NOTE**

**Either probe identified in paragraph 2.7.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 2.7.3.5 b. (1), (2), and (3) shall be repeated each time a change is made.**

## 2.7.3.7 Marking and Recording of Indications. Mark and record as required by paragraph 1.3.

2.7.4 Backup Method. None required.2.7.5 System Securing. The pitch horn assembly, if removed, requires installation in accordance with the applicable technical manual listed in Table 1-1.



TYPICAL CRACK ORIENTATION

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Figure 2-7. Pitch Horn Assembly

## 2.8 YOKE ADAPTER ASSEMBLY (ET).

2.8.1 Description (Figure 2-1. Index No. 8). The yoke adapter assembly attaches to the lead lag bearing within the throat of the grip and connects the grip to the yoke.

2.8.2 Defects. Defects may occur anywhere on the surface of the yoke adapter assembly. No cracks are allowed.

2.8.3 Primary Method. Eddy Current.

2.8.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100 KHz-500 KHz
- c. Probe, right angle, shielded surface, 100 KHz-500 KHz, 900 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

2.8.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the yoke adapter assembly shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

2.8.3.3 Access. Not applicable.

### **WARNING**

#### **Maintenance Platforms/Workstands**

**Use only appropriate platforms, workstands, or other approved locally procured stands and restraint equipment when working above 10 feet on helicopters in a nontactical environment. Otherwise, personnel injury could result from accidental falls.**

2.8.3.4 Preparation of Part. The yoke adapter assembly shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

## 2.8.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e<sup>II</sup>.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 56°		
Probe drive	- mid		
LPF	- 100		
HPF	- 0		
H Pos	- 80%		
V Pos	- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

## 2.8.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 2-8.

- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

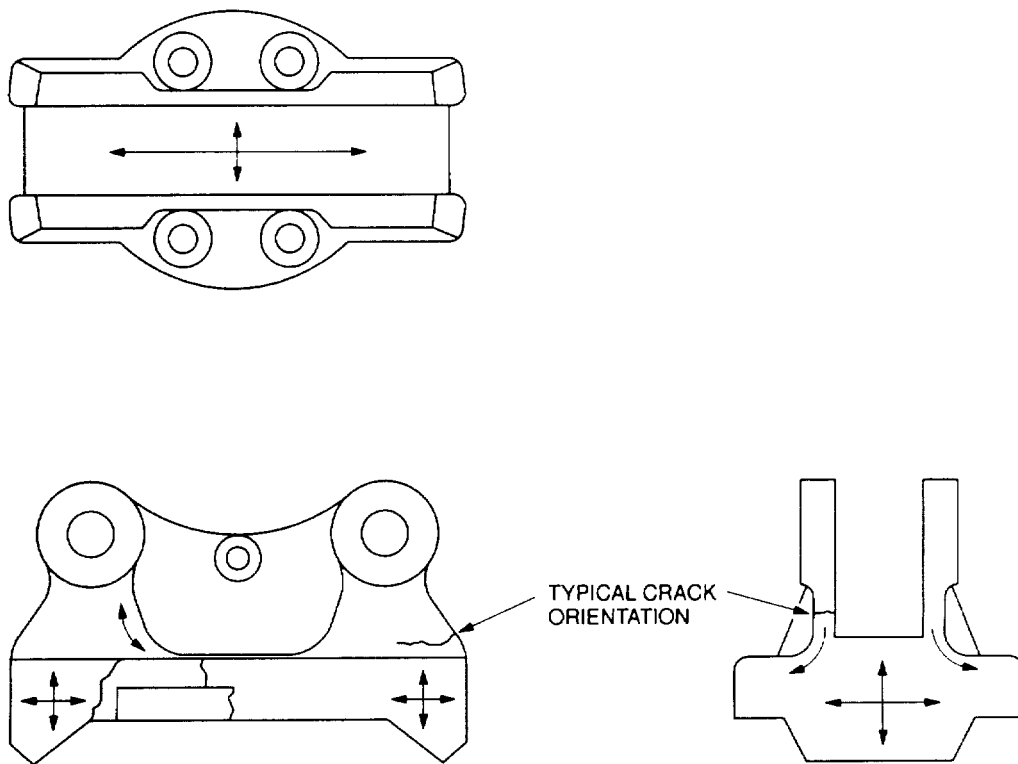
**NOTE**

**Either probe identified in paragraph 2.8.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 2.8.3.5 b. (1), (2), and (3) shall be repeated each time a change is made.**

## 2.8.3.7 Marking and Recording of Indications. Mark and record as required by paragraph 1.3.

2.8.4 Backup Method. None required.

2.8.5 System Securing. The yoke adapter assembly, if removed, requires installation in accordance with the applicable technical manual listed in Table 1-1.



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Figure 2-8. Yoke Adapter Assembly

## 2.9 MAIN ROTOR GRIP ASSEMBLY (ET).

2.9.1 Description (Figure 2-1, Index No. 9). The main rotor hub grips provide for attachment of the main rotor blades to the main rotor hub. The blade grips are retained on the hub yoke by tension/torsion strap assemblies.

2.9.2 Defects. Defects may occur anywhere on the grip assembly. No cracks are allowed.

2.9.3 Primary Method. Eddy Current.

2.9.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100 KHz-500 KHz
- c. Probe, right angle, shielded surface, 100 KHz-500 KHz, 900 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

2.9.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the grip assembly shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

2.9.3.3 Access. Not applicable.

### **WARNING**

#### **Maintenance Platforms/Workstands**

**Use only appropriate platforms, workstands, or other approved locally procured stands and restraint equipment when working above 10 feet on helicopters in a nontactical environment. Otherwise, personnel injury could result from accidental falls.**

2.9.3.4 Preparation of Part. The grip assembly shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

2.9.3.5 NDI Equipment Settings.

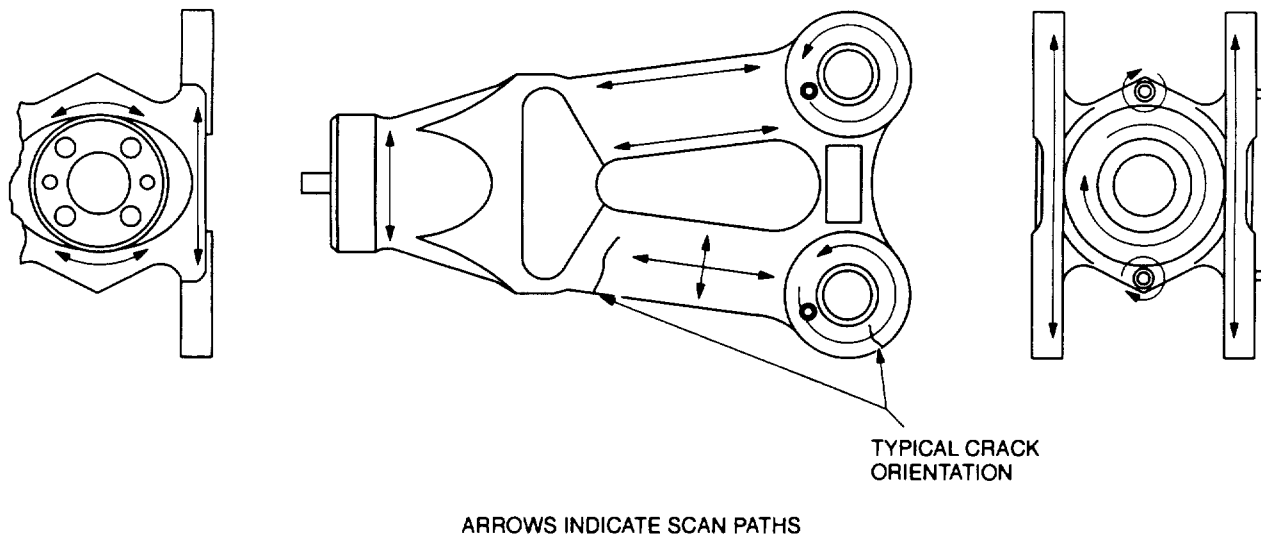
a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e<sup>II</sup>.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 56°		
Probe drive	- mid		
LPF	- 100		
HPF	- 0		
H Pos	- 80%		
V Pos	- 20%		

b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

2.9.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 2-9.



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Figure 2-9. Main Rotor Grip Assembly



- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

**NOTE**

**Either probe identified in paragraph 2.9.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 2.9.3.5 b. (1), (2), and (3) shall be repeated each time a change is made.**

2.9.3.7 Marking and Recording of Indications. Mark and record as required by paragraph 1.3.

2.9.4 Backup Method. None required.

2.9.5 System Securing. The grip assembly, if removed, requires installation in accordance with the applicable technical manual listed in Table 1-1.

## **2.10 HUB LOWER PLATE (ET).**

2.10.1 Description (Figure 2-1. Index No. 10). The hub lower plate attaches to the bottom of the grip assemblies to keep the grips in a fixed plane.

2.10.2 Defects. Defects may occur anywhere on the hub lower plate. No cracks are allowed.

2.10.3 Primary Method. Eddy Current.

2.10.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100 KHz-500 KHz
- c. Probe, right angle, shielded surface, 100 KHz-500 KHz, 900 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

2.10.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the hub lower -late shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

2.10.3.3 Access. Not applicable.

**WARNING**

**Maintenance Platforms/Workstands Use only appropriate platforms, workstands, or other approved locally procured stands and restraint equipment when working above 10 feet on helicopters in a nontactical environment. Otherwise, personnel injury could result from accidental falls.**

2.10.3.4 Preparation of Part. The hub lower plate shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

2.10.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-1 9e".

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 56°		
Probe drive	- mid		
LPF	- 100		
HPF	- 0		
H Pos	- 80%		
V Pos	- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

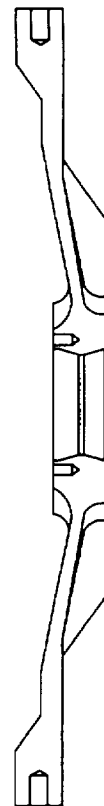
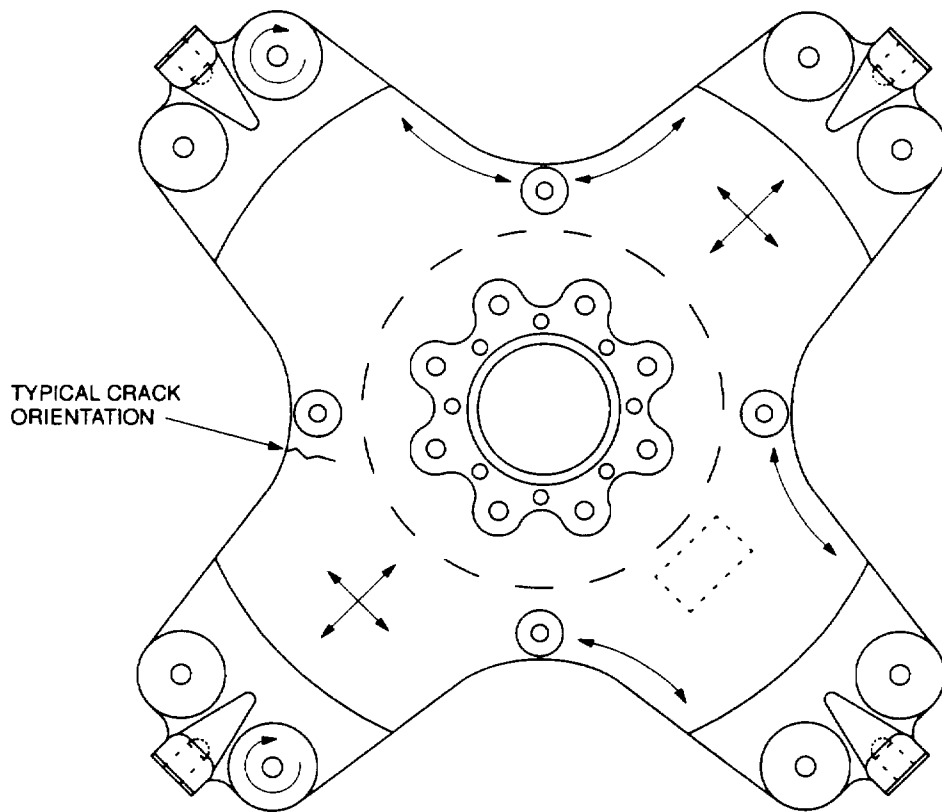
- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.

2.10.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 2-10.

- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

**NOTE**

**Either probe identified in paragraph 2.10.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 2.10.3.5 b. (1), (2), and (3) shall be repeated each time a change is made.**



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Figure 2-10. Hub Lower Plate

2.10.3.7 Marking and Recording of Indications. Mark and record as required by paragraph 1.3.

2.10.4 Backup Method. None required.

2.10.5 System Securing. The hub lower plate, if removed, requires installation in accordance with the applicable technical manual listed in Table 1-1.

## **2.11 MAIN ROTOR BLADE COVER (PT).**

2.11.1 Description (Figure 2-1. Index No. 11). Main rotor blade cover is a cover which is fastened and sealed to the blade tip.

2.11.2 Defects. Defects may occur anywhere on the surface of the tip cap cover. Particular attention shall be given to areas around fastener heads. No cracks are allowed.

2.11.3 Primary Method. Fluorescent Penetrant.

2.11.3.1 NDI Equipment and Materials. (Refer to Appendix B.) Inspection equipment is listed in Table 1-7. MIL-I-25135 level 3 penetrant materials shall be selected from the approved list in Table 1-8.

2.11.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. A partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using applicable positions of this procedure. If required, the main rotor blade cover shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

2.11.3.3 Access. This inspection can be performed either on or off the helicopter.

### **WARNING**

#### **Maintenance Platforms/Workstands**

**Use only appropriate platforms, workstands, or other approved locally procured stands and restraint equipment when working above 10 feet on helicopter in a nontactical environment. Otherwise, personnel injury could result from accidental falls.**

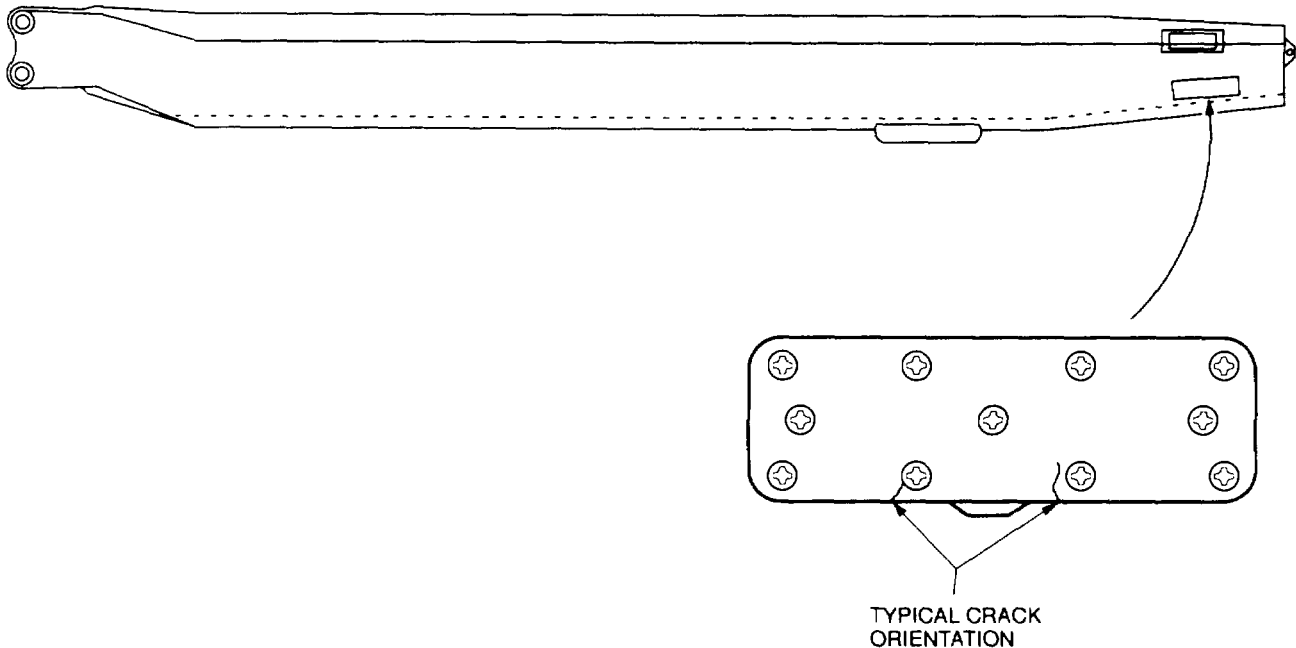
2.11.3.4 Preparation of Part. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

2.11.3.5 Inspection Procedure. Perform fluorescent penetrant inspection. Refer to Fluorescent Penetrant Method, paragraph 1.4.7 and Table 1-5. Inspect area of concern. See Figure 2-11.

2.11.3.6 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.

2.11.4 Backup Method. None required.

2.11.5 System Securing. Clean the part to remove inspection media. Refer to Post Cleaning and Restoration of Part or Area after NDI paragraph 1.4.16. The main rotor blade cover, if removed, requires installation in accordance with the applicable technical manuals listed in Table 1-1.



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**Figure 2-11. Main Rotor Blade Cover**

**2.12 MAIN ROTOR BLADE (BT).**

2.12.1 Description (Figure 2-1. Index No. 12). The main rotor blades use a fiberglass spar and nonmetallic honeycomb bonded to fiberglass skins. The leading edge is protected from damage by sand and small rocks using a two piece abrasion strip. This strip consists of a rubber compound that extends from blade root to mid blade and a formed metal strip that covers the remainder of the leading edge. Additional protection is provided by an abrasion shield near the blade tip. An aluminum trim tab is bonded to the trailing edge.

2.12.2 Defects. Void damage may occur anywhere on either side of the blade.

**NOTE**

**A void is defined as an unbonded area that is suppose to be bonded. Many sub-definitions are given such as lack of adhesive, gas pocket, misfit, etc. This procedure makes no distinction among these instead grouping under the general term "void."**

2.12.3 Primary Method. Bond Testing.

2.12.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Bond Test Unit
- b. Probe, Mechanical Impedance Analysis
- c. Probe Holder
- d. Cable Assembly
- e. Test block, Composite Defect Standard #1
- f. Test block, Composite Defect Standard #3
- g. Teflon Tape, refer to Table 1-8
- h. Aircraft Marking Pencil, refer to Table 1-8

2.12.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance in accordance with applicable technical manuals listed in Table 1-1.

2.12.3.3 Access. Inspection areas are accessible with the main rotor blades on helicopter.

**WARNING**

**Maintenance Platforms/Workstands**

**Use only appropriate platforms, workstands, or other approved locally procured stands and restraint equipment when working above 10 feet on helicopters in a nontactical environment. Otherwise, personnel injury could result from accidental falls.**

2.12.3.4 Preparation of Part. The components shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

2.12.3.5 NDI Equipment Settings. Refer to Bond Testing Equipment, paragraph 1.4.6.1.

- a. Attach cable and probe to Bondmaster. Protect probe with Teflon tape and install in probe holder.
- b. Turn on Bondmaster, press SPCL and make the following adjustments.

H Pos	- 40%
V Pos	- 80%
PHASE REF	- 0
DRIVE	- MID

- c. Press SET and select DISPLAY - PHASE.
- d. Place probe on good area of test block #1 and press GOOD PART. Do this several times while moving the probe to different spots in the good area of the test block. Note the video signature for each. Select and enter a representative good area by pressing GOOD PART one last time.
- e. Place probe on void area of test block #1 and press BAD PART. Do this several times while moving the probe slightly to different positions within the void area. Select and enter a position that gives a strong difference between good and void areas. Use DIFF soft key to observe difference between good and bad areas of test block.

**NOTE**

**If during setup the flying spot deflects upward, or to the side, when the probe passes over the bad part, instead of the desired down deflection toward the alarm box, Press SPCL and toggle to a different phase setting (90, 180, or 270) and repeat (d) and (e). Continue to try phase setting until the flying spot moves in the desired down direction.**

- f. Place probe on good area of test block and press RUN. Flying spot should be near the top-center of the ACTIVE screen. If not, press NULL. Slide probe from good to void area and note response from flying spot. This response should provide both amplitude (vertical) and phase (horizontal) movement. The default gate/alarm setting may be incorrect for this set-up. Turn off or reset gate/alarm as desired.
- g. The Bondmaster is programmed to automatically set test parameters to a start-up or initial bond test. By following the steps outlined above, adjustments to the FREQ, GAIN, and ALARM can help to refine the selectivity in locating defects among differing composite materials.

2.12.3.6 Inspection Procedure. Refer to Bond Test Method, paragraph 1.4.6 and inspection areas are shown in Figure 2-12.

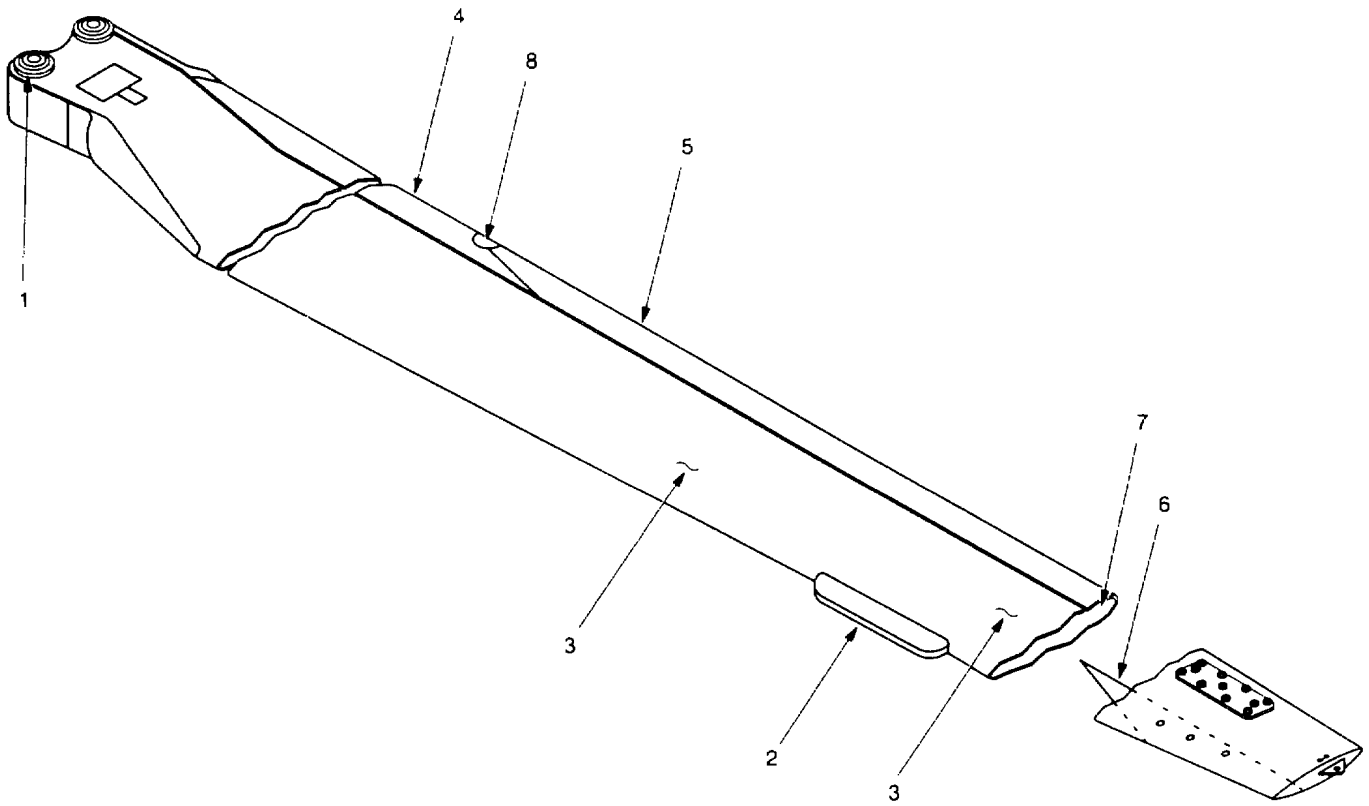
- a. Skin-to-Honeycomb Voids. Place probe on main rotor blade in location where test for skin-to-honeycomb bond separation is desired and press NULL. Move probe from good to suspect area and note response. A strong amplitude change and phase shift similar to the test block is indicative of a void. This set-up is very sensitive to thin skin-to-core bonding. Move probe slowly over the skin and note the slight amplitude change (bounce) as the probe senses alternately the honeycomb cell nodes and cell walls.

**NOTE**

**The basic set-up provided above also selects a frequency that provide a satisfactory inspection for voids associated with skin-to-spar, skin-to-trailing edge, doubler-to-doubler and doubler-to-skin, and trim tab bonding. For the inspection of bonding voids to the spar. Setup on test block #3 may provide some advantage.**

- b. Use the NULL and GAIN adjustments to reset the ACTIVE screen for the areas to be inspected (do not go back to SET mode). Also, compare similar areas. For example, to check for spar to skin voids, check front and back of blade in the same area, or check another blade in the same area. Observe that, when moving the probe chordwise from the spar to the trailing edge, the transitions at the spar-to-honeycomb and the honeycomb-to-trailing edge strip are easily detected. When inspecting these areas, adjust the NULL and GAIN and move the probe carefully along the transition using a straight edge or other guide. A localized phase and amplitude shift similar to the test block indicates a void.

2.12.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.



1. FRETTING PADS FOR ADHESIVE VOIDS.
2. TRIM TABS AND SKIN FOR VOIDS AND DEBONDING.
3. SKIN AND CORE FOR VOIDS.
4. INBOARD EROSION STRIP FOR VOIDS.
5. OUTBOARD EROSION STRIP FOR VOIDS.
6. EROSION SHIELD FOR VOIDS.
7. SKIN AND SPAR FOR VOIDS.
8. SPLICE COVER FOR VOIDS.

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Figure 2-12. Main Rotor Blade



**NOTE**

**Attention shall be directed to accurately marking the boundaries of all voids on both sides of the blade. These marking will be need to determine acceptance/rejection criteria in accordance with the applicable technical manuals listed in Table 1-1.**

2.12.4 Backup Method. None required.

2.12.5 System Securing. None required.

**2.13 MAIN ROTOR PITCH LINK TUBE (ET).**

2.13.1 Description (Figure 2-1. Index No. 13). Pitch link transmits changes of pitch from the swashplate assembly to each individual blade.

2.13.2 Defects. Defects may occur anywhere on the pitch link tube. No cracks are allowed.

2.13.3 Primary Method. Eddy Current.

2.13.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100 KHz-500 KHz
- c. Probe, right angle, shielded surface, 100 KHz-500 KHz, 90° 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

2.13.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the pitch link tube shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

2.13.3.3 Access. Not applicable.

2.13.3.4 Preparation of Part. The pitch link tube shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

## 2.13.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e<sup>II</sup>.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 56°		
Probe drive	- mid		
LPF	- 100		
HPF	- 0		
H Pos	- 80%		
V Pos	- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

## 2.13.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 2-13.

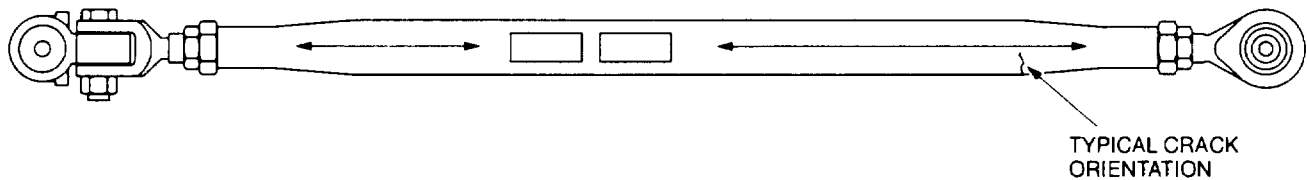
- a. Place probe on a good area in the inspection location and null. Adjust phase as requires. to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

**NOTE**

**Either probe identified in paragraph 2.13.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 2.13.3.5 b. (1), (2), and (3) shall be repeated each time a change is made.**

## 2.13.3.7 Marking and Recording of Indications. Mark and record as required by paragraph 1.3.

2.13.4 Backup Method. None required.2.13.5 System Securing. The pitch link tube, if removed, requires installation in accordance with the applicable technical manual listed in Table 1-1.



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**Figure 2-13. Main Rotor Pitch Link Tube**

## 2.14 PITCH LINK ROD ENDS (MT).

2.14.1 Description (Figure 2-1. Index No.14). The pitch link rod ends are attached to the ends of the pitch link tubes.

2.14.2 Defects. Defects may occur anywhere on the surface of the rod ends. Particular attention shall be given to thread transition and radius areas. No cracks are allowed.

2.14.3 Primary Method. Magnetic Particle.

2.14.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Magnetic Particle Inspection Probe/Yoke
- b. Magnetometer
- c. Black Light
- d. Fluorescent Magnetic Particles, refer to Table 1-8
- e. Consumable Materials, refer to Table 1-8
- f. Aircraft Marking Pencil, refer to Table 1-8

### NOTE

**Hand-held magnetic coil may be used. Refer to paragraph 1.4.8.1.2 and Figure 1-6.**

2.14.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the pitch link rod removed in accordance with the applicable technical manuals listed in Table 1-1.

2.14.3.3 Access. Not applicable.

2.14.3.4 Preparation of Part. The part shall be thoroughly cleaned. Refer to Preparation of Part of Area for NDI, paragraph 1.4.4.

2.14.3.5 NDI Equipment Settings. Refer to Magnetic Particle Method, paragraph 1.4.8.

2.14.3.6 Inspection Procedure. A magnetic field shall be applied to the part perpendicular to the orientation of possible cracks. Position required for this inspection is illustrated in Figure 2-14.

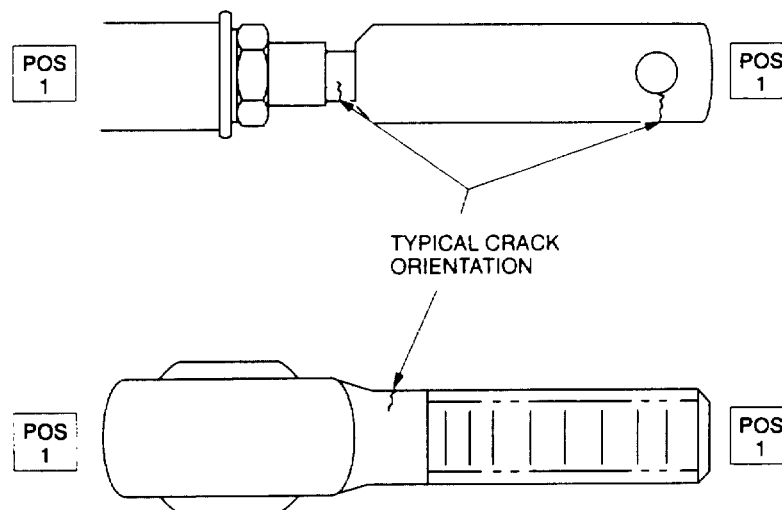
- a. Select AC on the AC/DC power switch.
- b. Place probe/yoke on part in position as shown.
- c. Press the test switch and apply a light coat of Magnetic Particle media at the same time. Remove the media momentarily before removing the current. Current should be applied for no more than five seconds.
- d. Inspect for cracks using the black light.

2.14.3.7 Marking and Recording of Inspection Results. Mark and record the inspection results as necessary per paragraph 1.3.

2.14.3.8 Demagnetization. With the switch remaining in the AC position, place the probe/yoke legs in the same position used for magnetizing. Press the test switch and withdraw the probe/yoke from the part for a distance of two feet before releasing the switch.

2.14.4 Backup Method. None required.

2.14.5 System Securing. Clean the rod ends thoroughly to remove all residual Magnetic Particle media. Refer to Post Cleaning and Restoration of Part or Area After NDI, paragraph 1.4.16. The pitch link rod requires installation in accordance with the applicable technical manuals listed in Table 1-1.



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Figure 2-14. Pitch Link Rod Ends

**2.15 MAIN ROTOR DRIVE LINK (ET)**

2.15.1 Description (Figure 2-1. Index No. 15). The drive link connects the swashplate outer ring to the drive lever.

2.15.2 Defects. Defects may occur anywhere on the surface of the drive link. No cracks are allowed.

2.15.3 Primary Method. Eddy Current.

2.15.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100 KHz-500 KHz
- c. Probe, right angle, shielded surface, 100 KHz-500 KHz, 90° 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

2.15.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the main rotor drive link shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

2.15.3.3 Access. Not applicable.

**WARNING**

**Maintenance Platforms/Workstands**

**Use only appropriate platforms, workstands, or other approved locally procured stands and restraint equipment when working above 10 feet on helicopters in a nontactical environment. Otherwise, personnel injury could result from accidental falls.**

2.15.3.4 Preparation of Part. The main rotor drive link shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

2.15.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e<sup>II</sup>.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 56°		
Probe drive	- mid		
LPF	- 100		

HPF	- 0
H Pos	- 80%
V Pos	- 20%

b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

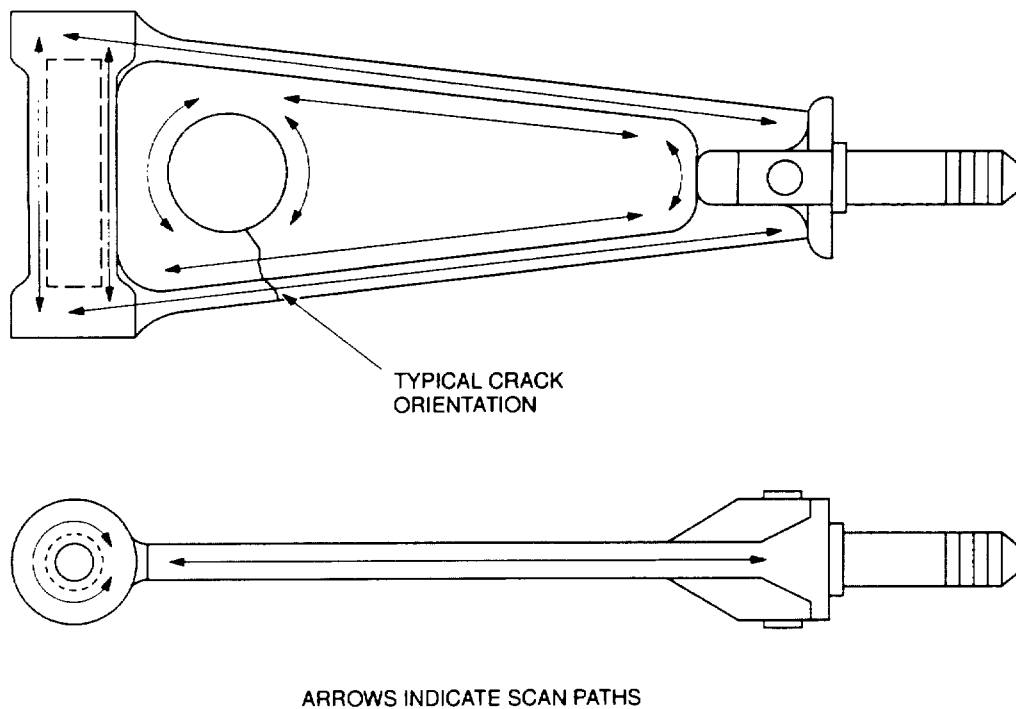
- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

2.15.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 2-15.

- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

**NOTE**

Either probe identified in paragraph 2.15.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 2.15.3.5 b. (1), (2), and (3) shall be repeated each time a change is made.



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**Figure 2-15. Main Rotor Drive Link**

2.15.3.7 Marking and Recording of Indications. Mark and record as required by paragraph 1.3.

2.15.4 Backup Method. None required.

2.15.5 System Securing. The main rotor drive link, if removed, requires installation in accordance with the applicable technical manual listed in Table 1-1.

## **2.16 MAIN ROTOR DRIVE LEVER (ET).**

2.16.1 Description (Figure 2-1, Index No. 16). The drive lever attaches to the drive link and gimble ring to transfer mast movement to the swashplate outer ring.

2.16.2 Defects. Defects may occur anywhere on the surface of the drive lever. No cracks are allowed.

2.16.3 Primary Method. Eddy Current.

2.16.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100 KHz-500 KHz
- c. Probe, right angle, shielded surface, 100 KHz-500 KHz, 90° 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

2.16.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the main rotor drive lever shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

2.16.3.3 Access. Not applicable.

### **WARNING**

#### **Maintenance Platforms/Workstands**

**Use only appropriate platforms, workstands, or other approved locally procured stands and restraint equipment when working above 10 feet on helicopters in a nontactical environment. Otherwise, personnel injury could result from accidental falls.**

2.16.3.4 Preparation of Part. The main rotor drive lever shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

**2.16.3.5 NDI Equipment Settings.**

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e<sup>II</sup>.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 56°		
Probe drive	- mid		
LPF	- 100		
HPF	- 0		
H Pos	- 80%		
V Pos	- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

2.16.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 2-16.

- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

**NOTE**

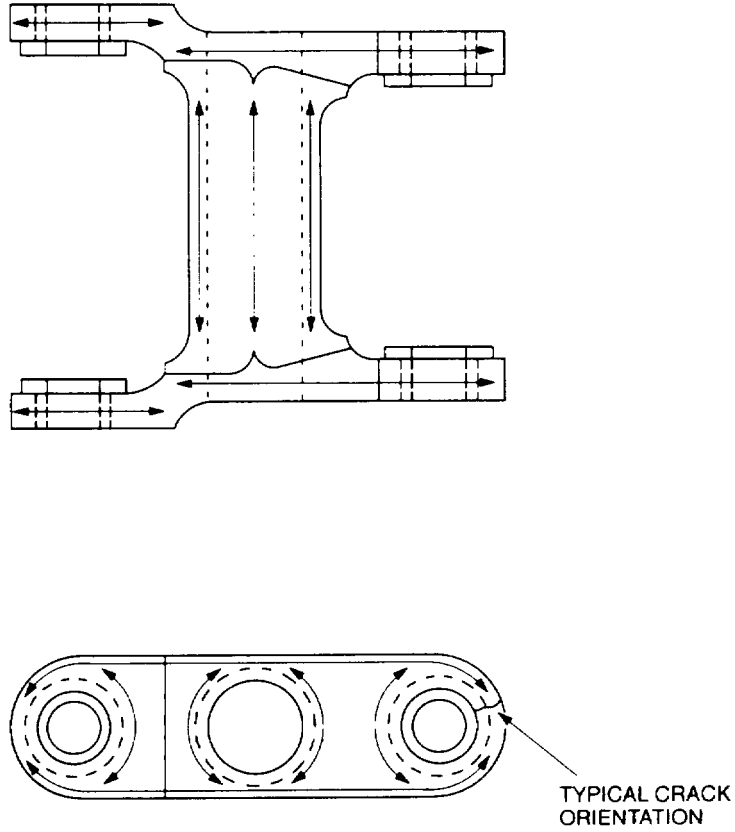
**Either probe identified in paragraph 2.16.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 2.16.3.5 b. (1), (2), and (3) shall be repeated each time a change is made.**

2.16.3.7 Marking and Recording of Indications. Mark and record as required by paragraph 1.3.

2.16.4 Backup Method. None required.

2.16.5 System Securing. The main rotor drive lever, if removed, requires installation in accordance with the applicable technical manual listed in Table 1-1.





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Figure 2-16. Main Rotor Drive Lever

**2.17 MAIN ROTOR DRIVE HUB SET (ET).**

2.17.1 Description (Figure 2-1, Index No. 17). The main rotor drive hub set secures the gimble ring to the main mast.

2.17.2 Defects. Defects may occur anywhere on the surface of the hub set. No cracks are allowed.

2.17.3 Primary Method. Eddy Current.

2.17.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100 KHz-500 KHz
- c. Probe, right angle, shielded surface, 100 KHz-500 KHz, 90° 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

2.17.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the drive hub set shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

2.17.3.3 Access. Not applicable.

**WARNING**

**Maintenance Platforms/Workstands**

**Use only appropriate platforms, workstands, or other approved locally procured stands and restraint equipment when working above 10 feet on helicopters in a nontactical environment. Otherwise, personnel injury could result from accidental falls.**

2.17.3.4 Preparation of Part. The main rotor drive hub set shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

2.17.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e<sup>II</sup>.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 56°		
Probe drive	- mid		
LPF	- 100		

HPF	-0
H Pos	- 80%
V Pos	- 20%

b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

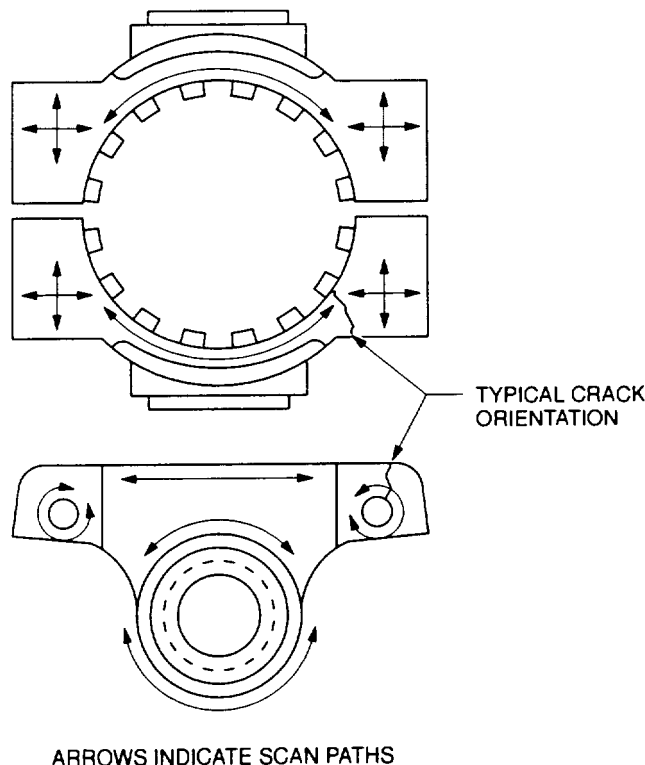
- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

2.17.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 2-17.

- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

**NOTE**

Either probe identified in paragraph 2.17.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 2.17.3.5 b. (1), (2), and (3) shall be repeated each time a change is made.



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**Figure 2-17. Main Rotor Drive Hub Set**

2.17.3.7 Marking and Recording of Indications. Mark and record as required by paragraph 1.3.

2.17.4 Backup Method. None required.

2.17.5 System Securing. The main rotor drive hub set, if removed, requires installation in accordance with the applicable technical manual listed in Table 1-1.

## 2.18 MAIN ROTOR GIMBAL RING (ET)

2.18.1 Description (Figure 2-1. Index No. 18). The gimbal ring attaches the drive link and drive lever to the swashplate outer ring and main mast.

2.18.2 Defects. Defects may occur anywhere on the surface of the gimbal ring. No cracks are allowed.

2.18.3 Primary Method. Eddy Current.

2.18.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100 KHz-500 KHz
- c. Probe, right angle, shielded surface, 100 KHz-500 KHz, 90° 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

2.18.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the main rotor gimbal ring shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

2.18.3.3 Access. Not applicable.

### WARNING

#### Maintenance Platforms/Workstands

**Use only appropriate platforms, workstands, or other approved locally procured stands and restraint equipment when working above 10 feet on helicopters in a nontactical environment. Otherwise, personnel injury could result from accidental falls.**

2.18.3.4 Preparation of Part. The main rotor gimbal ring shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

2.18.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e<sup>II</sup>.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 56°		
Probe drive	- mid		
LPF	- 100		
HPF	- 0		
H Pos	- 80%		
V Pos	- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

2.18.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 2-18.

- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

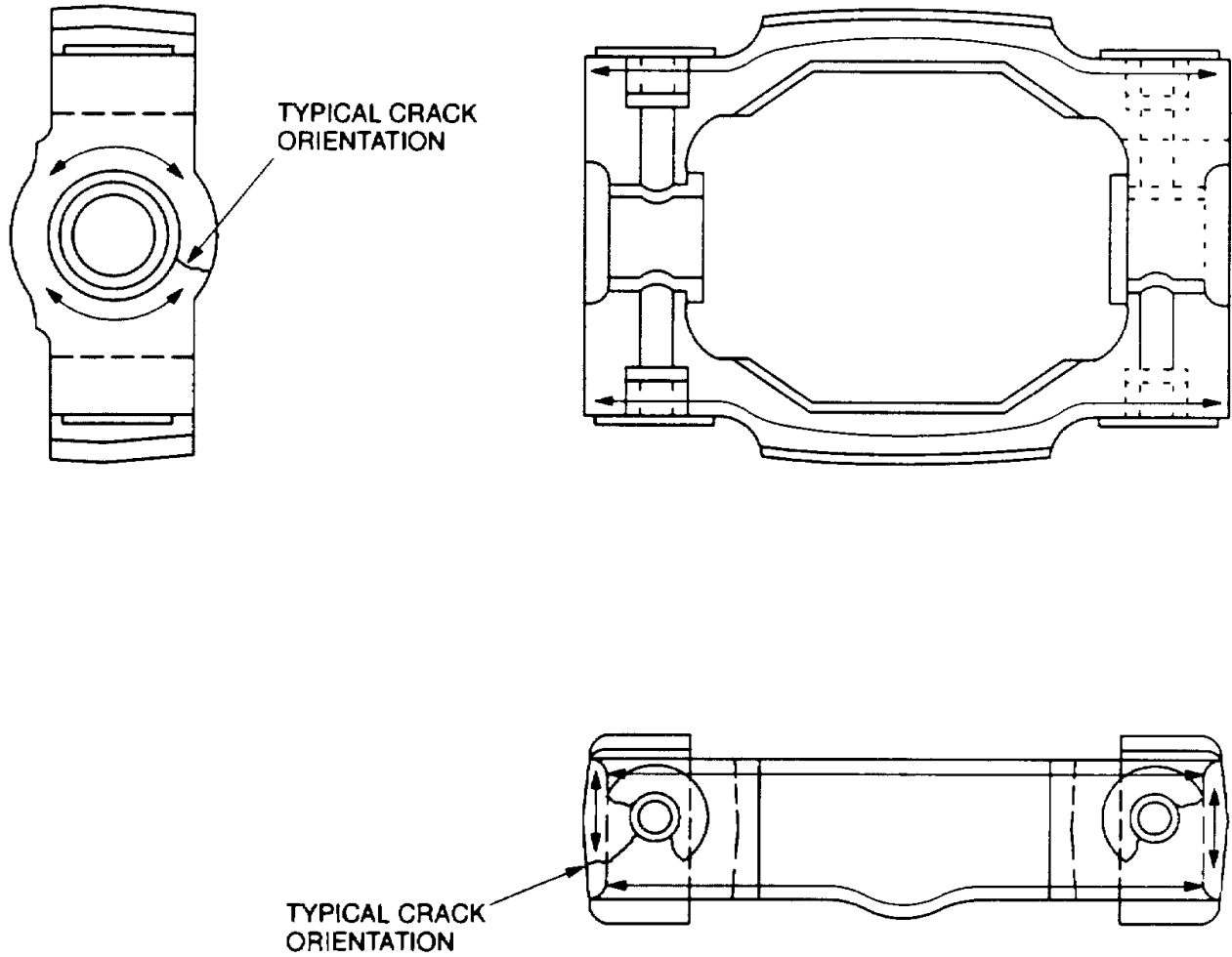
**NOTE**

**Either probe identified in paragraph 2.18.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 2.18.3.5 b. (1), (2), and (3) shall be repeated each time a change is made.**

2.18.3.7 Marking and Recording of Indications. Mark and record as required by paragraph 1.3.

2.18.4 Backup Method. None required.

2.18.5 System Securing. The main rotor gimbal ring, if removed, requires installation in accordance with the applicable technical manual listed in Table 1-1.



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Figure 2-18. Main Rotor Gimbal Ring

**2.19 MAIN ROTOR COLLECTIVE LEVER (ET).**

2.19.1 Description (Figure 2-1. Index No. 19). The collective lever is used in conjunction with the cyclic control to control pitch inputs to the rotor blades.

2.19.2 Defects. Defects may occur anywhere on the surface of the collective lever. No cracks are allowed.

2.19.3 Primary Method. Eddy Current.

2.19.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100 KHz-500 KHz
- c. Probe, right angle, shielded surface, 100 KHz-500 KHz, 90° 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

2.19.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the collective lever shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

2.19.3.3 Access. Not applicable.

2.19.3.4 Preparation of Part. The collective lever shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

2.19.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e<sup>II</sup>.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 56°		
Probe drive	- mid		
LPF	- 100		
HPF	- 0		
H Pos	- 80%		
V Pos	- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:
  - (1) Null probe on test block.
  - (2) Adjust phase as required to obtain horizontal lift-off.
  - (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

2.19.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 2-19.

- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

**NOTE**

Either probe identified in paragraph 2.19.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 2.19.3.5 b. (1), (2), and (3) shall be repeated each time a change is made.

2.19.3.7 Marking and Recording of Indications. Mark and record as required by paragraph 1.3.

2.19.4 Backup Method. Refer to paragraph 1.4.7.

2.19.5 System Securing. The collective lever, if removed, requires installation in accordance with the applicable technical manual listed in Table 1-1.

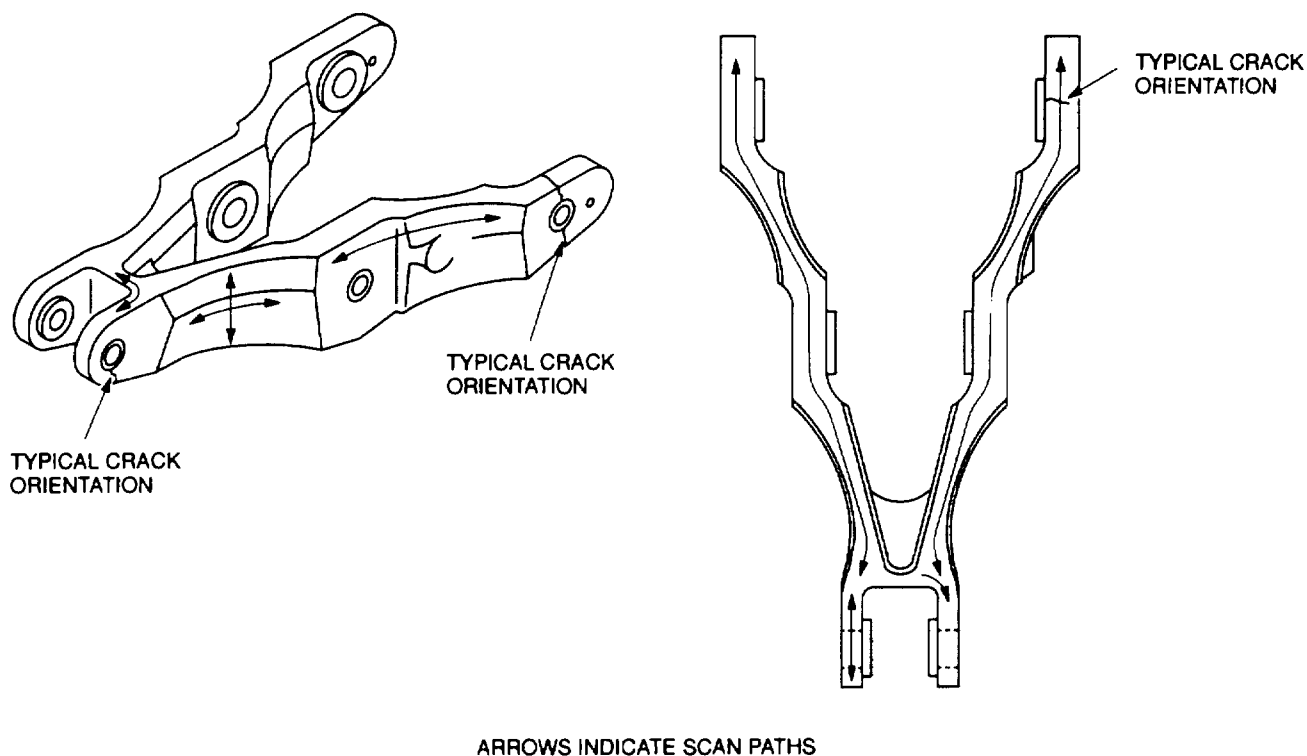


Figure 2-19. Main Rotor Collective Lever



**2.20 MAIN ROTOR COLLECTIVE LINK (ET).**

2.20.1 Description (Figure 2-1. Index No. 20). The collective link attaches to the support pylon and the collective lever to control pitch inputs to the rotor blade.

2.20.2 Defects. Defects may occur anywhere on the surface of the link. No cracks are allowed.

2.20.3 Primary Method. Eddy Current.

2.20.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100 KHz-500 KHz
- c. Probe, right angle, shielded surface, 100 KHz-500 KHz, 90° 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

2.20.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the collective link removed in accordance with the applicable technical manuals listed in Table 1-1.

2.20.3.3 Access. Not applicable.

2.20.3.4 Preparation of Part. The collective link shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

2.20.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e<sup>II</sup>.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 56°		
Probe drive	- mid		
LPF	- 100		
HPF	- 0		
H Pos	- 80%		
V Pos	- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

2.20.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 2-20.

- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

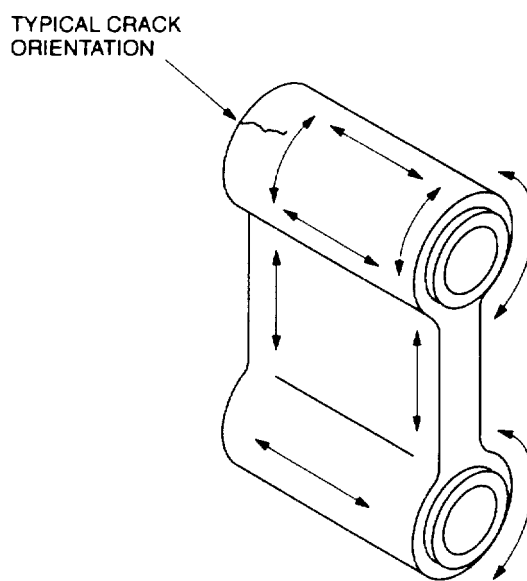
**NOTE**

**Either probe identified in paragraph 2.20.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 2.20.3.5 b. (1), (2), and (3) shall be repeated each time a change is made.**

2.20.3.7 Marking and Recording of Indications. Mark and record as required by paragraph 1.3.

2.20.4 Backup Method. Refer to paragraph 1.4.7.

2.20.5 System Securing. The collective link requires installation in accordance with the applicable technical manual listed in Table 1-1.



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**Figure 2-20. Main Rotor Collective Link**

## 2.21 MAIN ROTOR CONTROLS SPACER (MT).

2.21.1 Description (Figure 2-1. Index No. 21). The main rotor controls spacer is used in the collective link and the antidrive link installation.

2.21.2 Defects. Defects may occur anywhere on the surface of the spacer. No cracks are allowed.

2.21.3 Primary Method. Magnetic Particle.

2.21.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Magnetic Particle Inspection Probe/Yoke
- b. Magnetometer
- c. Black Light
- d. Fluorescent Magnetic Particles, refer to Table 1-8
- e. Consumable Materials, refer to Table 1-8
- f. Aircraft Marking Pencil, refer to Table 1-8

### NOTE

**Hand-held magnetic coil may be used. Refer to paragraph 1.4.8.1.2 and Figure 1-6.**

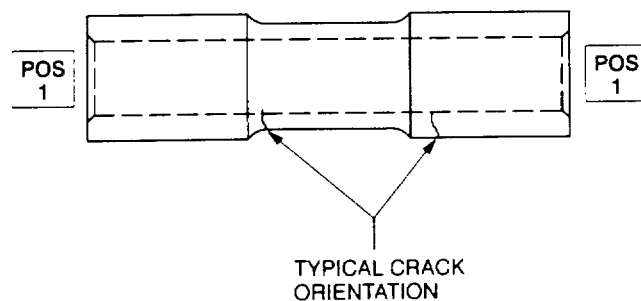
2.21.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the main rotor control spacer removed in accordance with the applicable technical manuals listed in Table 1-1.

2.21.3.3 Access. Not applicable.

2.21.3.4 Preparation of Part. The part shall be thoroughly cleaned. Refer to Preparation of Part of Area for NDI, paragraph 1.4.4.

2.21.3.5 NDI Equipment Settings. Refer to Magnetic Particle Method, paragraph 1.4.8.

2.21.3.6 Inspection Procedure. A magnetic field shall be applied to the part perpendicular to the orientation of possible cracks. Positions required for this inspection are illustrated in Figure 2-21.



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**Figure 2-21. Main Rotor Controls Spacer**

- a. Select AC on the AC/DC power switch.
- b. Place probe/yoke on part in Position 1 as shown.
- c. Press the test switch and apply a light coat of Magnetic Particle media at the same time. Remove the media momentarily before removing the current. Current should be applied for no more than five seconds.
- d. Inspect for cracks using the black light.

2.21.3.7 Marking and Recording of Inspection Results. Mark and record the inspection results as necessary per paragraph 1.3.

2.21.3.8 Demagnetization. With the switch remaining in the AC position, place the probe/yoke legs in the same position used for magnetizing. Press the test switch and withdraw the probe/yoke from the part for a distance of two feet before releasing the switch.

2.21.4 Backup Method. None required.

2.21.5 System Securing. Clean the main rotor controls spacer thoroughly to remove all residual Magnetic Particle media. Refer to Post Cleaning and Restoration of Part or Area After NDI, paragraph 1.4.16. The main rotor controls spacer requires installation in accordance with the applicable technical manuals listed in Table 1-1.

## **2.22 MAIN ROTOR ANTIDRIVE LEVER (ET).**

2.22.1 Description (Figure 2-1, Index No. 22). The antidrive lever attaches to the support and the antidrive link.

2.22.2 Defects. Defects may occur anywhere on the surface of the antidrive lever. No cracks are allowed.

2.22.3 Primary Method. Eddy Current.

2.22.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100 KHz-500 KHz
- c. Probe, right angle, shielded surface, 100 KHz-500 KHz, 90° 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

2.22.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the antidrive lever shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

2.22.3.3 Access. Not applicable.

2.22.3.4 Preparation of Part. The antidrive lever shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

2.22.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e<sup>II</sup>.

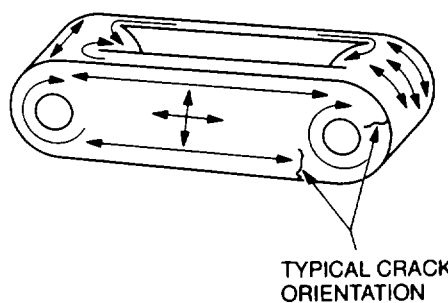
Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 56°		
Probe drive	- mid		
LPF	- 100		
HPF	- 0		
H Pos	- 80%		
V Pos	- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

2.22.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 2-22.

- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.



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Figure 2-22. Main Rotor Antidrive Lever

**NOTE**

**Either probe identified in paragraph 2.22.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 2.22.3.5 b. (1), (2), and (3) shall be repeated each time a change is made.**

2.22.3.7 Marking and Recording of Indications. Mark and record as required by paragraph 1.3.

2.22.4 Backup Method. Refer to paragraph 1.4.7.

2.22.5 System Securing. The antidrive lever, if removed, requires installation in accordance with the applicable technical manual listed in Table 1-1.

**2.23 MAIN ROTOR ANTIDRIVE LINK (ET).**

2.23.1 Description (Figure 2-1. Index No. 23). The antidrive link attaches the inner ring to the support.

2.23.2 Defects. Defects may occur anywhere on the surface of the antidrive link. No cracks are allowed.

2.23.3 Primary Method. Eddy Current.

2.23.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100 KHz-500 KHz
- c. Probe, right angle, shielded surface, 100 KHz-500 KHz, 90° 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

2.23.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the antidrive link shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

2.23.3.3 Access. Not applicable.

2.23.3.4 Preparation of Part. The antidrive lever shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

2.23.3.5 NDI Equipment Settings.

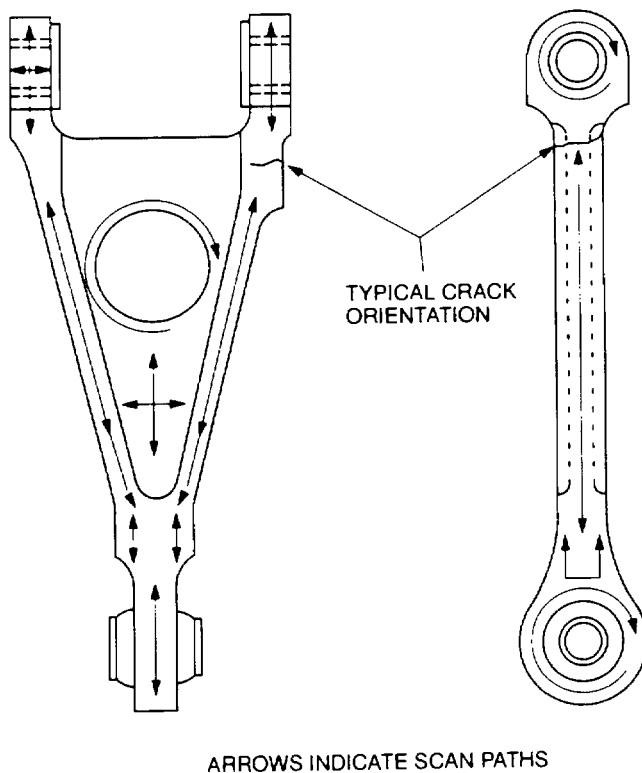
a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e<sup>II</sup>.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 56°		
Probe drive	- mid		
LPF	- 100		
HPF	- 0		
H Pos	- 80%		
V Pos	- 20%		

b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

2.23.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 2-23.



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Figure 2-23. Main Rotor Antidrive Link

- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

#### NOTE

**Either probe identified in paragraph 2.23.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 2.23.3.5 b. (1), (2), and (3) shall be repeated each time a change is made.**

2.23.3.7 Marking and Recording of Indications. Mark and record as required by paragraph 1.3.

2.23.4 Backup Method. Refer to paragraph 1.4.7.

2.23.5 System Securing. The antidrive link, if removed, requires installation in accordance with the applicable technical manual listed in Table 1-1.

### 2.24 UPPER BEARING RACE (MT).

2.24.1 Description (Figure 2-1. Index No. 94). The upper bearing race is attached to the outer ring which houses the duplex bearing.

2.24.2 Defects. Defects may occur anywhere on the race. No cracks are allowed.

2.24.3 Primary Method. Magnetic Particle.

2.24.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Magnetic Particle Inspection Probe/Yoke
- b. Magnetometer
- c. Black Light
- d. Fluorescent Magnetic Particles, refer to Table 1-8
- e. Consumable Materials, refer to Table 1-8
- f. Aircraft Marking Pencil, refer to Table 1-8

2.24.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the upper bearing race removed in accordance with the applicable technical manuals listed in Table 1-1.

2.24.3.3 Access. Not applicable.

2.24.3.4 Preparation of Part. The part shall be thoroughly cleaned. Refer to Preparation of Part of Area for NDI, paragraph 1.4.4.



2.24.3.5 NDI Equipment Settings. Refer to Magnetic Particle Method, paragraph 1.4.8.

2.24.3.6 Inspection Procedure. A magnetic field shall be applied to the part perpendicular to the orientation of possible cracks. Positions required for this inspection are illustrated in Figure 2-24.

- a. Select AC on the AC/DC power switch.
- b. Place probe/yoke on part in Position 1 as shown.
- c. Press the test switch and apply a light coat of Magnetic Particle media at the same time. Remove the media momentarily before removing the current. Current should be applied for no more than five seconds.
- d. Inspect for cracks using the black light.
- e. Demagnetize before moving to the next position. Refer to paragraph 2.24.3.8.
- f. Repeat steps a. through e. for Position 2.

2.24.3.7 Marking and Recording of Inspection Results. Mark and record the inspection results as necessary per paragraph 1.3.

2.24.3.8 Demagnetization. With the switch remaining in the AC position, place the probe/yoke legs in the same position used for magnetizing. Press the test switch and withdraw the probe/yoke from the part for a distance of two feet before releasing the switch.

2.24.4 Backup Method. None required.

2.24.5 System Securing. Clean the upper bearing race thoroughly to remove all residual Magnetic Particle media. Refer to Post Cleaning and Restoration of Part or Area After NDI, paragraph 1.4.16. The upper bearing race requires installation in accordance with the applicable technical manuals listed in Table 1-1.

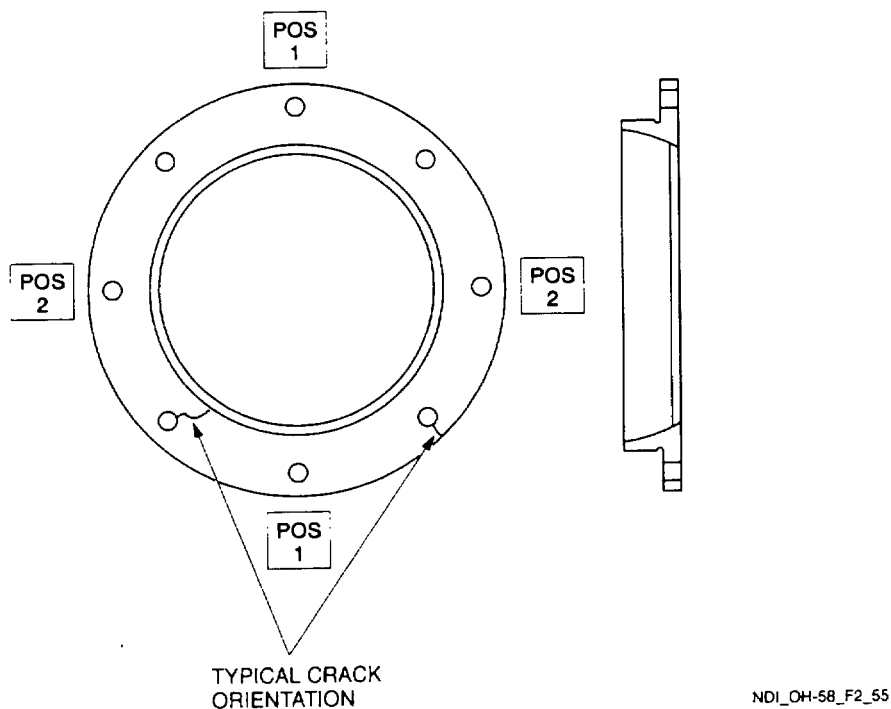


Figure 2-24. Upper Bearing Race

**2.25 INNER AND OUTER CAP (ET).**

2.25.1 Description (Figure 2-1, Index No. 25). The inner and outer cap retains the duplex bearing within the outer ring.

2.25.2 Defects. Defects may occur anywhere on the surface of the inner and outer cap. No cracks are allowed.

2.25.3 Primary Method. Eddy Current.

2.25.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100 KHz-500 KHz
- c. Probe, right angle, shielded surface, 100 KHz-500 KHz, 90° 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

2.25.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the inner and outer cap removed in accordance with the applicable technical manuals listed in Table 1-1.

2.25.3.3 Access. Not applicable.

**WARNING**

**Maintenance Platforms/Workstands**

**Use only appropriate platforms, workstands, or other approved locally procured stands and restraint equipment when working above 10 feet on helicopters in a nontactical environment. Otherwise, personnel injury could result from accidental falls.**

2.25.3.4 Preparation of Part. The inner and outer cap shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

2.25.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e<sup>II</sup>.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 56°		

Probe drive	- mid
LPF	- 100
HPF	- 0
H Pos	- 80%
V Pos	- 20%

b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

2.25.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 2-25.

- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

#### NOTE

**Either probe identified in paragraph 2.25.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 2.25.3.5 b. (1), (2), and (3) shall be repeated each time a change is made.**

2.25.3.7 Marking and Recording of Indications. Mark and record as required by paragraph 1.3.

2.25.4 Backup Method. Refer to paragraph 1.4.7.

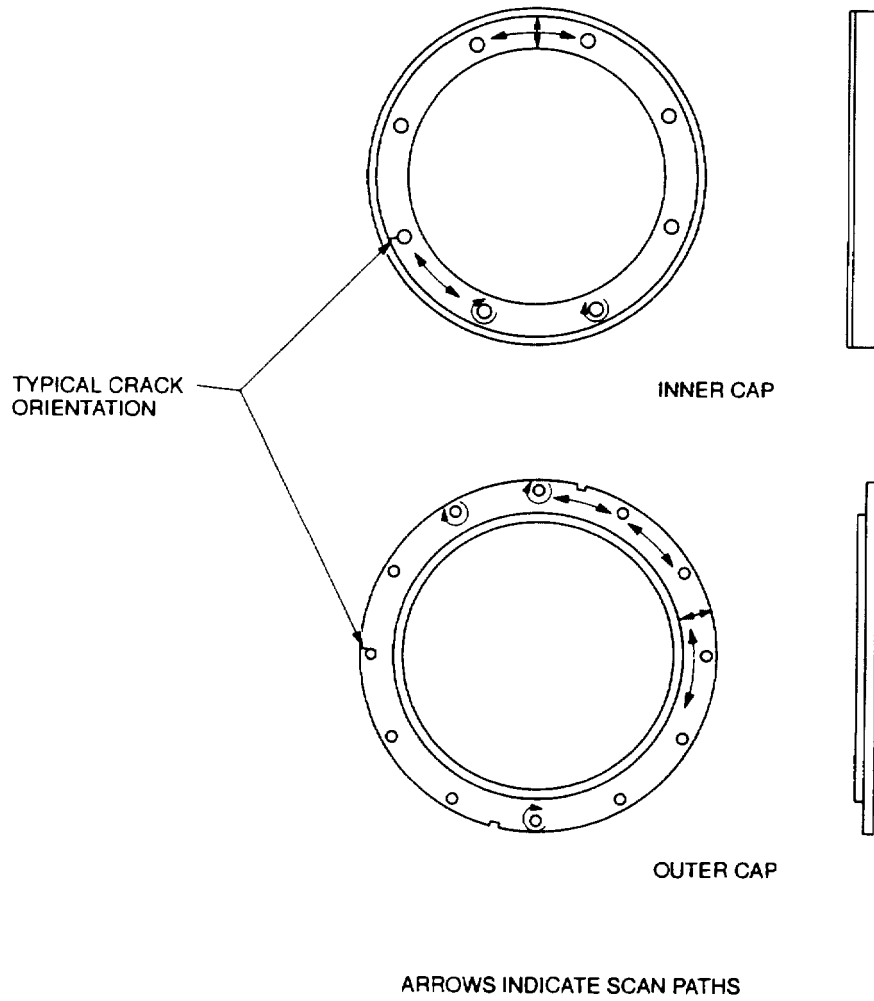
2.25.5 System Securing. The inner and outer cap requires installation in accordance with the applicable technical manual listed in Table 1-1.

## 2.26 DRIVE LINK BEARING AND RETAINER (MT).

2.26.1 Description (Figure 2-1. Index No. 26). The drive link bearing and retainer is attached to the outer ring. A drive link is attached to the retainer and attaches to the gimbal ring.

2.26.2 Defects. Defects may occur anywhere on the surface of the part. No cracks are allowed.

2.26.3 Primary Method. Magnetic Particle.



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Figure 2-25. Inner And Outer Cap

2.26.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Magnetic Particle Inspection Probe/Yoke
- b. Magnetometer
- c. Black Light
- d. Fluorescent Magnetic Particles, refer to Table 1-8
- e. Consumable Materials, refer to Table 1-8
- f. Aircraft Marking Pencil, refer to Table 1-8

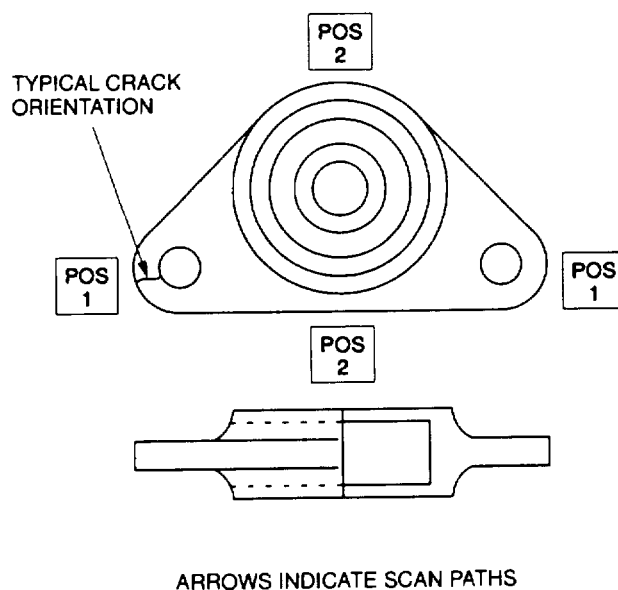
2.26.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the drive link bearing and retainer removed in accordance with the applicable technical manuals listed in Table 1-1.

2.26.3.3 Access. Not applicable.

2.26.3.4 Preparation of Part. The part shall be thoroughly cleaned. Refer to Preparation of Part of Area for NDI, paragraph 1.4.4.

2.26.3.5 NDI Equipment Settings. Refer to Magnetic Particle Method, paragraph 1.4.8.

2.26.3.6 Inspection Procedure. A magnetic field shall be applied to the part perpendicular to the orientation of possible cracks. Positions required for this inspection are illustrated in Figure 2-26.



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Figure 2-26. Drive Link Bearing And Retainer

- a. Select AC on the AC/DC power switch.
- b. Place probe/yoke on part in Position 1 as shown.
- c. Press the test switch and apply a light coat of Magnetic Particle media at the same time. Remove the media momentarily before removing the current. Current should be applied for no more than five seconds.
- d. Inspect for cracks using the black light.
- e. Demagnetize before moving to the next position. Refer to paragraph 2.26.3.8.
- f. Repeat steps a. through e. for Position 2.

2.26.3.7 Marking and Recording of Inspection Results. Mark and record the inspection results as necessary per paragraph 1.3.

2.26.3.8 Demagnetization. With the switch remaining in the AC position, place the probe/yoke legs in the same position used for magnetizing. Press the test switch and withdraw the probe/yoke from the part for a distance of two feet before releasing the switch.

2.26.4 Backup Method. Refer to paragraph 1.4.7.

2.26.5 System Securing. Clean the drive link bearing and retainer thoroughly to remove all residual Magnetic Particle media. Refer to Post Cleaning and Restoration of Part or Area After NDI, paragraph 1.4.16. The drive link bearing and retainer requires installation in accordance with the applicable technical manuals listed in Table 1-1.

## 2.27 MAIN ROTOR PIVOT SLEEVE (ET).

2.27.1 Description (Figure 2-1. Index No. 27). The swashplate assembly is mounted on the pivot sleeve and permits the swashplate assembly to be raised or lowered and tilted in any direction.

2.27.2 Defects. Defects may occur anywhere on the surface of the sleeve assembly. No cracks are allowed.

2.27.3 Primary Method. Eddy Current.

2.27.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100 KHz-500 KHz
- c. Probe, right angle, shielded surface, 100 KHz-500 KHz, 90° 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

2.27.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the swashplate sleeve assembly removed in accordance with the applicable technical manuals listed in Table 1-1.

2.27.3.3 Access. Not applicable.

2.27.3.4 Preparation of Part. The pivot sleeve shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

2.27.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e<sup>II</sup>.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 56°		
Probe drive	- mid		
LPF	- 100		
HPF	- 0		
H Pos	- 80%		
V Pos	- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

2.27.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 2-27.

- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

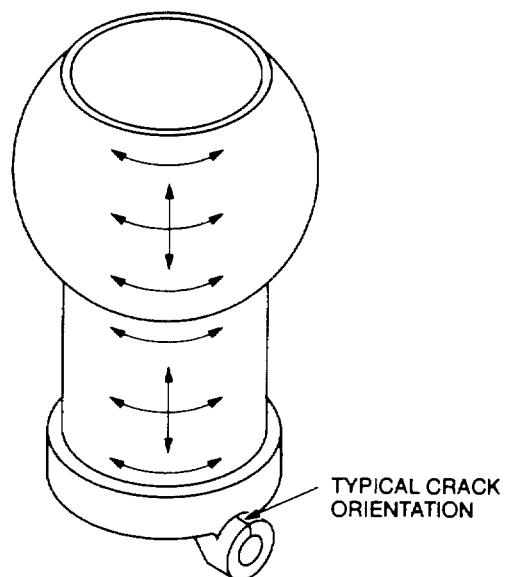
**NOTE**

**Either probe identified in paragraph 2.27.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 2.27.3.5 b. (1), (2), and (3) shall be repeated each time a change is made.**

2.27.3.7 Marking and Recording of Indications. Mark and record as required by paragraph 1.3.

2.27.4 Backup Method. Refer to paragraph 1.4.7.

2.27.5 System Securing. The sleeve assembly requires installation in accordance with the applicable technical manual listed in Table 1-1.



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**Figure 2-27. Main Rotor Pivot Sleeve**

**2.28 SUPPORT ASSEMBLY (ET).**

2.28.1 Description (Figure 2-1, Index No. 28). The support assembly supports the swashplate.

2.28.2 Defects. Defects may occur anywhere on the surface of the support assembly. No cracks are allowed.

2.28.3 Primary Method. Eddy Current.

2.28.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100 KHz-500 KHz
- c. Probe, right angle, shielded surface, 100 KHz-500 KHz, 90° 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8



2.28.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the support assembly shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

2.28.3.3 Access. Not applicable.

**WARNING**

**Maintenance Platforms/Workstands**

**Use only appropriate platforms, workstands, or other approved locally procured stands and restraint equipment when working above 10 feet on helicopters in a nontactical environment. Otherwise, personnel injury could result from accidental falls.**

2.28.3.4 Preparation of Part. The support assembly shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

2.28.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e<sup>II</sup>.

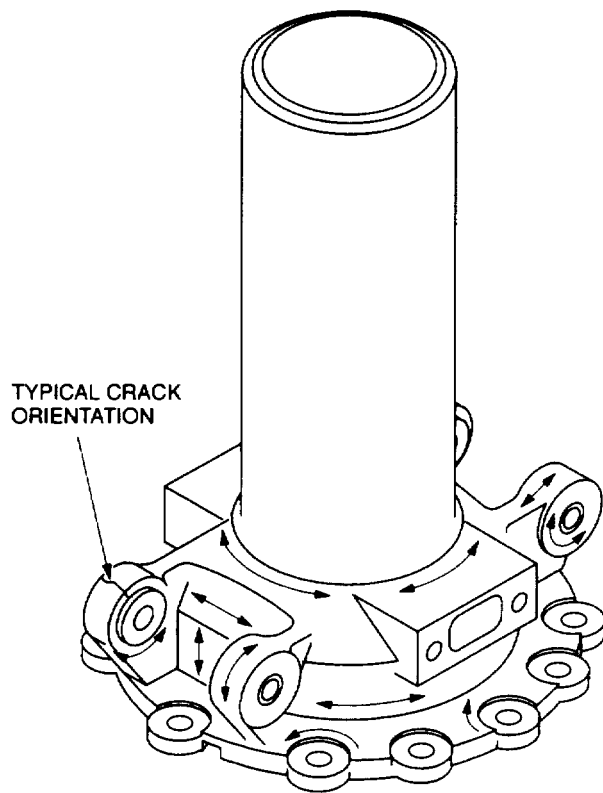
Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 56°		
Probe drive	- mid		
LPF	- 100		
HPF	- 0		
H Pos	- 80%		
V Pos	- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

2.28.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 2-28.

- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.



TYPICAL CRACK  
ORIENTATION

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**Figure 2-28. Support Assembly**

**NOTE**

Either probe identified in paragraph 2.28.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 2.28.3.5 b. (1), (2), and (3) shall be repeated each time a change is made.

2.28.3.7 Marking and Recording of Indications. Mark and record as required by paragraph 1.3.

2.28.4 Backup Method. Refer to paragraph 1.4.7.

2.28.5 System Securing. The support assembly, if removed, requires installation in accordance with the applicable technical manual listed in Table 1-1.

**2.29 INNER RING (ET).**

2.29.1 Description (Figure 2-1, Index No. 29). The inner ring is a stationary component of the swashplate assembly, and through linkage transmits cyclic inputs to the main rotor.

2.29.2 Defects. Defects may occur anywhere on the surface of the inner ring. No cracks are allowed.

2.29.3 Primary Method. Eddy Current.

2.29.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100 KHz-500 KHz
- c. Probe, right angle, shielded surface, 100 KHz-500 KHz, 90° 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

2.29.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the inner ring shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

2.29.3.3 Access. Not applicable.

**WARNING****Maintenance Platforms/Workstands**

Use only appropriate platforms, workstands, or other approved locally procured stands and restraint equipment when working above 10 feet on helicopters in a nontactical environment. Otherwise, personnel injury could result from accidental falls.

2.29.3.4 Preparation of Part. The inner ring shall be thoroughly cleaned. Refer to Preparation of Part ' or Area for NDI, paragraph 1.4.4.

2.29.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19ell.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 56°		
Probe drive	- mid		
LPF	- 100		
HPF	- 0		
H Pos	- 80%		
V Pos	- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

2.29.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 2-29.

- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

**NOTE**

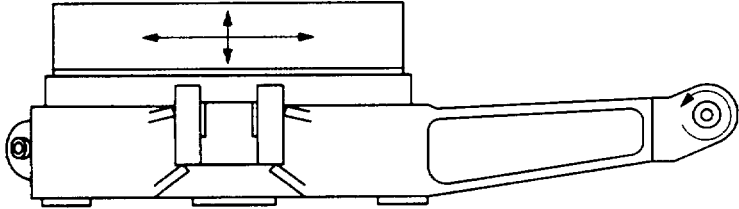
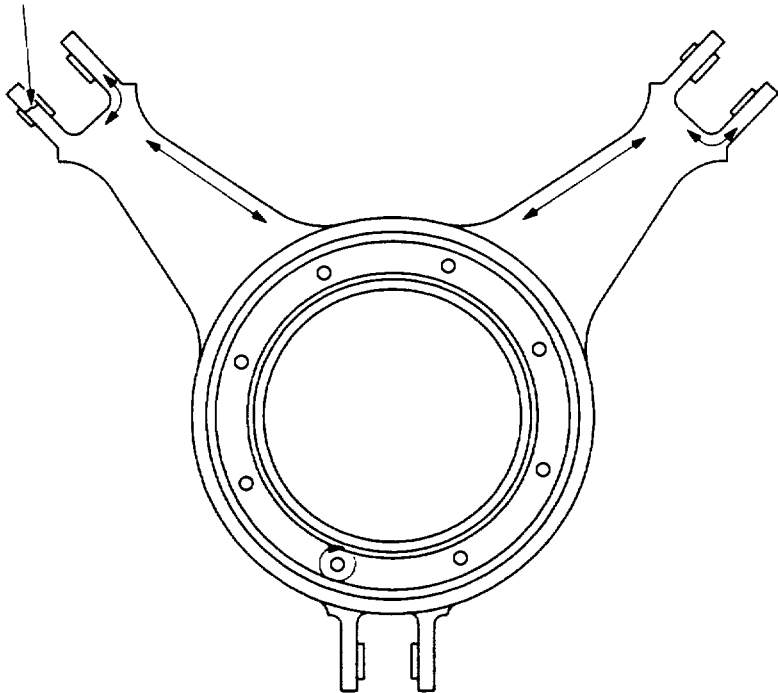
**Either probe identified in paragraph 2.29.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 2.29.3.5 b. (1), (2), and (3) shall be repeated each time a change is made.**

2.29.3.7 Marking and Recording of Indications. Mark and record as required by paragraph 1.3.

2.29.4 Backup Method. Refer to paragraph 1.4.7.

2.29.5 System Securing. The inner ring, if removed, requires installation in accordance with the applicable technical manual listed in Table 1-1.

TYPICAL CRACK  
ORIENTATION



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Figure 2-29. Inner Ring

## 2.30 OUTER RING (ET).

2.30.1 Description (Figure 2-1, Index No. 30). The outer ring is a rotating component part of the swashplate assembly and through linkage transmits pitch control to the main rotor blades.

2.30.2 Defects. Defects may occur anywhere of the surface of the outer ring. No cracks are allowed

2.30.3 Primary Method. Eddy Current.

2.30.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100 KHz-500 KHz
- c. Probe, right angle, shielded surface, 100 KHz-500 KHz, 900 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

2.30.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the outer ring shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

2.30.3.3 Access. Not applicable.

### **WARNING**

#### **Maintenance Platforms/Workstands**

**Use only appropriate platforms, workstands, or other approved locally procured stands and restraint equipment when working above 10 feet on helicopters in a nontactical environment. Otherwise, personnel injury could result from accidental falls.**

2.30.3.4 Preparation of Part. The outer ring shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

2.30.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19ell.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 56°		
Probe drive	- mid		
LPF	- 100		
HPF	- 0		
H Pos	- 80%		
V Pos	- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

2.30.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 2-30.

- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

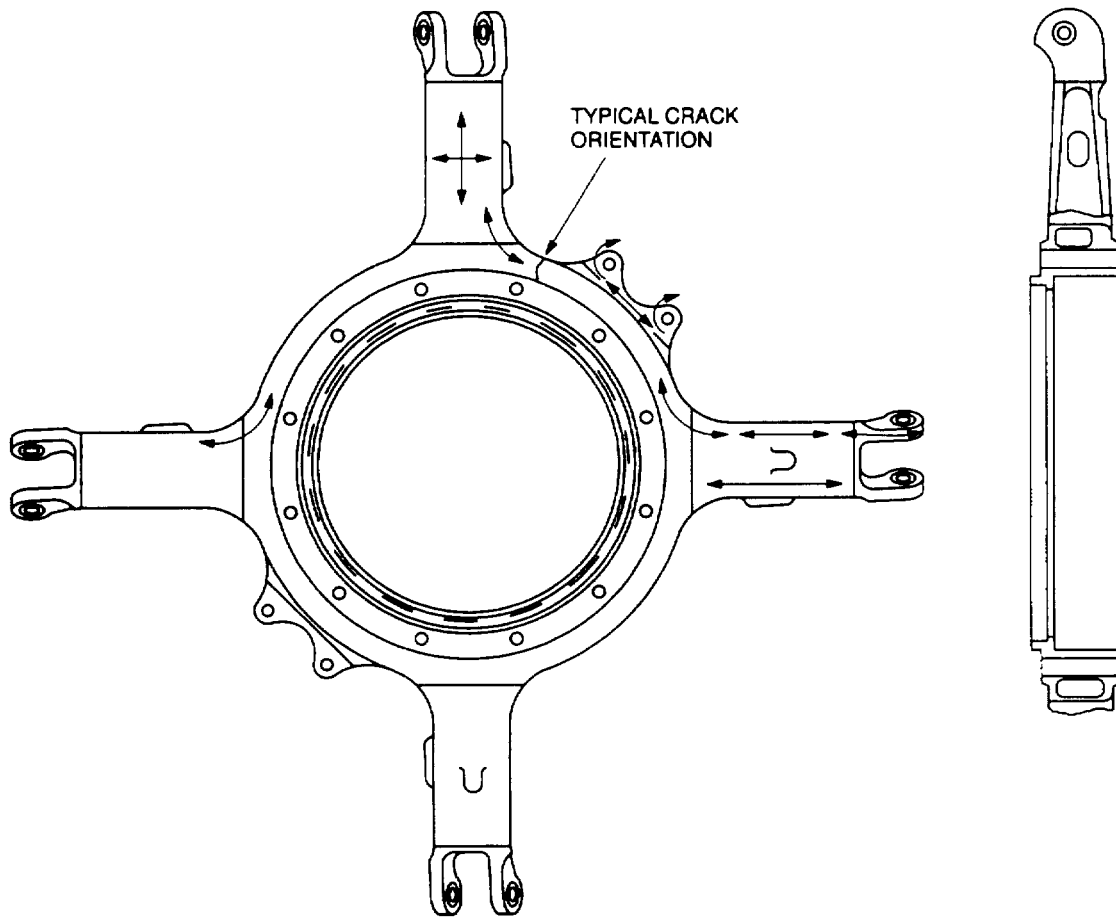
**NOTE**

**Either probe identified in paragraph 2.30.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 2.30.3.5 b. (1), (2), and (3) shall be repeated each time a change is made.**

2.30.3.7 Marking and Recording of Indications. Mark and record as required by paragraph 1.3.

2.30.4 Backup Method. Refer to paragraph 1.4.7.

2.30.5 System Securing. The outer ring, if removed, requires installation in accordance with the applicable technical manual listed in Table 1-1.



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Figure 2-30. Outer Ring



**2.31 TAIL ROTOR PITCH LINK (ET).**

2.31.1 Description (Figure 2-1, Index No. 31). The tail rotor pitch link is attached to the cross head and the blade pitch horn which transmit selected pitch control.

2.31.2 Defects. Defects may occur anywhere on the pitch link. No cracks are allowed.

2.31.3 Primary Method. Eddy Current.

2.31.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100 KHz-500 KHz
- c. Probe, right angle, shielded surface, 100 KHz-500 KHz, 900 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

2.31.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the tail rotor pitch link shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

2.31.3.3 Access. Not applicable.

**WARNING**

**Maintenance Platforms/Workstands**

**Use only appropriate platforms, workstands, or other approved locally procured stands and restraint equipment when working above 10 feet on helicopters in a nontactical environment. Otherwise, personnel injury could result from accidental falls.**

2.31.3.4 Preparation of Part. The tail rotor pitch link shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

2.31.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e'l.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 560		
Probe drive	- mid		
LPF	- 100		

HPF - 0  
 H Pos - 80%  
 V Pos - 20%

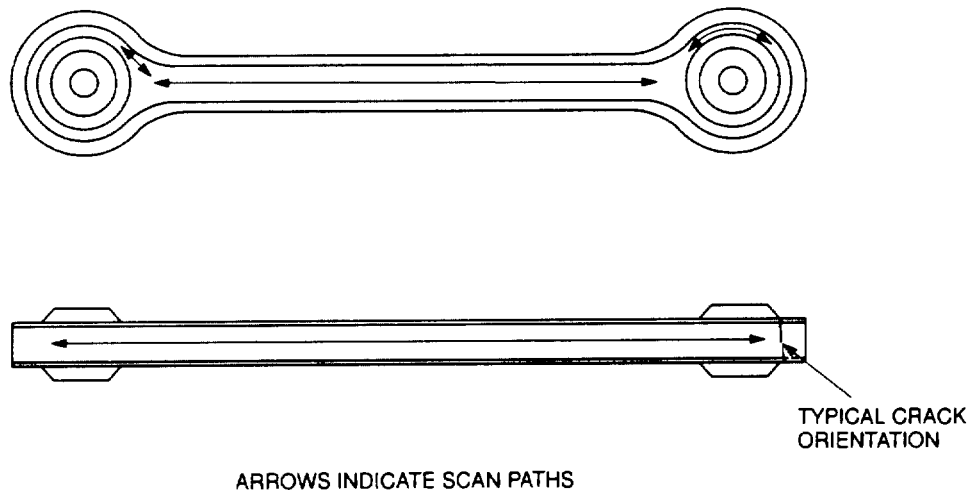
- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:
  - (1) Null probe on test block.
  - (2) Adjust phase as required to obtain horizontal lift-off.
  - (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

2.31.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 2-31.

- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

**NOTE**

Either probe identified in paragraph 2.31.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 2.31.3.5 b. (1), (2), and (3) shall be repeated each time a change is made.



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**Figure 2-31. Tail Rotor Pitch Link**

2.31.3.7 **Marking and Recording of Indications.** Mark and record as required by paragraph 1.3.

2.31.4 **Backup Method.** None required.

2.31.5 **System Securing.** The tail rotor pitch link, if removed, requires installation in accordance with the applicable technical manual listed in Table 1-1.

## **2.32 TAIL ROTOR CONTROL TUBE DRIVER PLATE (MT).**

2.32.1 **Description (Figure 2-1. Index No. 32).** The tail rotor control tube driver plate mounts against the crosshead to secure it in place.

2.32.2 **Defects.** Defects may occur anywhere on the surface of the driver plate. No cracks are allowed.

2.32.3 **Primary Method.** Magnetic Particle.

2.32.3.1 **NDI Equipment and Materials.** (Refer to Appendix B.)

- a. Magnetic Particle Inspection Probe/Yoke
- b. Magnetometer
- c. Black Light
- d. Fluorescent Magnetic Particles, refer to Table 1-8
- e. Consumable Materials, refer to Table 1-8
- f. Aircraft Marking Pencil, refer to Table 1-8

2.32.3.2 **Preparation of Helicopter.** The helicopter shall be prepared for safe ground maintenance and the tail rotor control tube driver plate removed in accordance with the applicable technical manuals listed in Table 1-1.

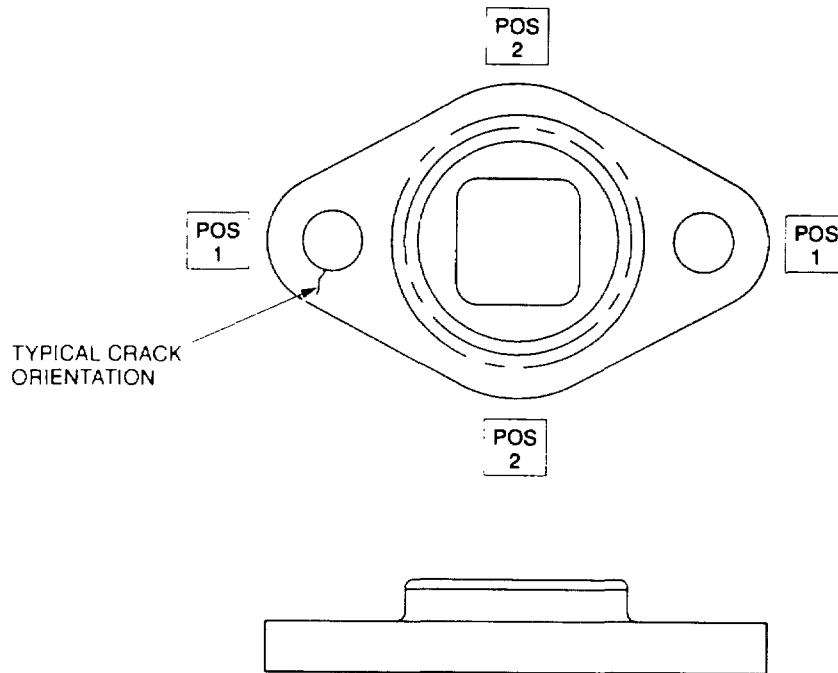
2.32.3.3 **Access.** Not applicable.

2.32.3.4 **Preparation of Part.** The part shall be thoroughly cleaned. Refer to Preparation of Part of Area for NDI, paragraph 1.4.4.

2.32.3.5 **NDI Equipment Settings.** Refer to Magnetic Particle Method, paragraph 1.4.8.

2.32.3.6 **Inspection Procedure.** A magnetic field shall be applied to the part perpendicular to the orientation of possible cracks. Positions required for this inspection are illustrated in Figure 2-32.

- a. Select AC on the AC/DC power switch.
- b. Place probe/yoke on part in Position 1 as shown.
- c. Press the test switch and apply a light coat of Magnetic Particle media at the same time.  
Remove the media momentarily before removing the current. Current should be applied for no more than five seconds.
- d. Inspect for cracks using the black light.
- e. Demagnetize before moving to the next position. Refer to paragraph 2.32.3.8.
- f. Repeat steps a. through e. for Position 2.



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**Figure 2-32. Tail Rotor Control Tube Driver Plate**

2.32.3.7 **Marking and Recording of Inspection Results.** Mark and record the inspection results as necessary per paragraph 1.3.

2.32.3.8 **Demagnetization.** With the switch remaining in the AC position, place the probe/yoke legs in the same position used for magnetizing. Press the test switch and withdraw the probe/yoke from the part for a distance of two feet before releasing the switch.

2.32.4 **Backup Method.** None required.

2.32.5 **System Securing.** Clean the tail rotor control tube driver plate thoroughly to remove all residual Magnetic Particle media. Refer to Post Cleaning and Restoration of Part or Area After NDI, paragraph 1.4.16. The tail rotor control tube driver plate requires installation in accordance with the applicable technical manuals listed in Table 1-1.

### **2.33 TAIL ROTOR CROSSHEAD (MT).**

2.33.1 **Description (Figure 2-1. Index No. 33).** The crosshead is the primary link between the counterweight bellcranks and the blades. It is through the counterweight bellcrank, attached to the crosshead that pitch control is transmitted to the blades.

2.33.2 **Defects.** Defects may occur anywhere on the surface of the crosshead. No cracks are allowed.

2.33.3 **Primary Method.** Magnetic Particle.

2.33.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Magnetic Particle Inspection Probe/Yoke
- b. Magnetometer
- c. Black Light
- d. Fluorescent Magnetic Particles, refer to Table 1-8
- e. Consumable Materials, refer to Table 1-8
- f. Aircraft Marking Pencil, refer to Table 1-8

2.33.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the tail rotor crosshead shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

2.33.3.3 Access. Not applicable.

**WARNING**

**Maintenance Platforms/Workstands**

**Use only appropriate platforms, workstands, or other approved locally procured stands and restraint equipment when working above 10 feet on helicopters in a nontactical environment. Otherwise, personnel injury could result from accidental falls.**

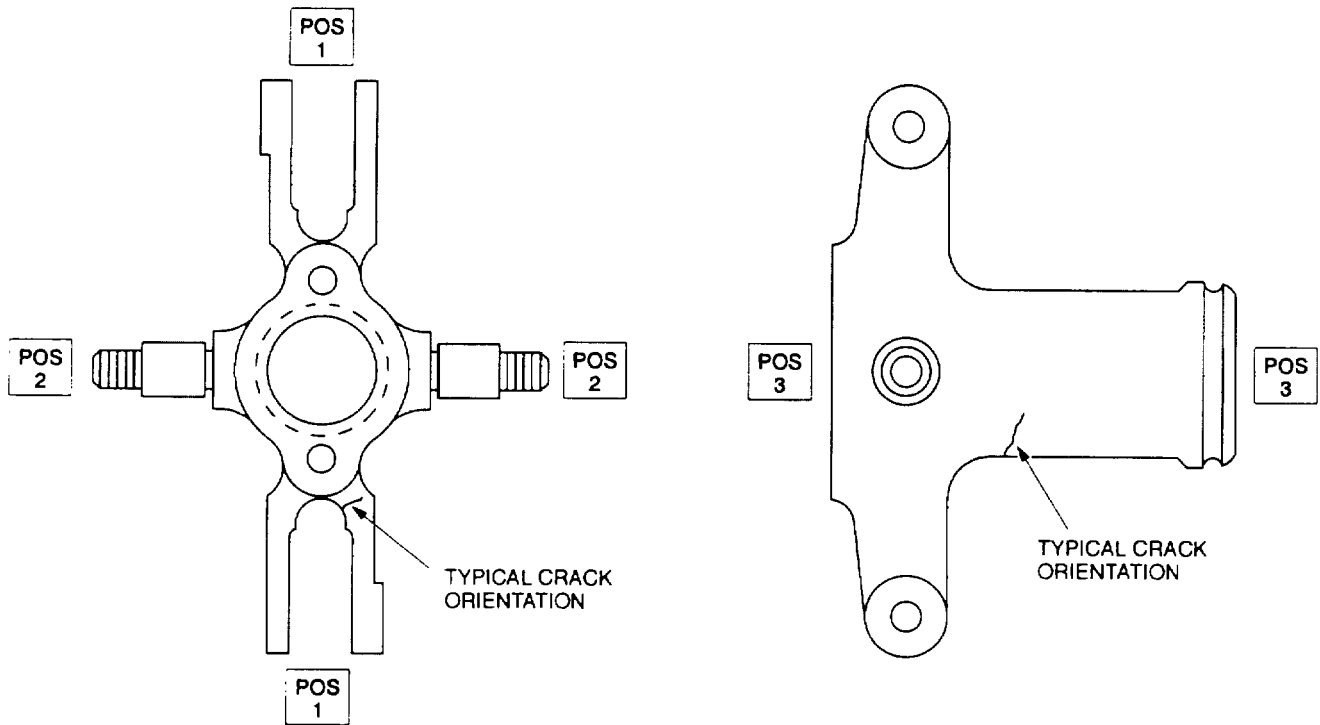
2.33.3.4 Preparation of Part. The part shall be thoroughly cleaned. Refer to Preparation of Part of Area for NDI, paragraph 1.4.4.

2.33.3.5 NDI Equipment Settings. Refer to Magnetic Particle Method, paragraph 1.4.8.

2.33.3.6 Inspection Procedure. A magnetic field shall be applied to the part perpendicular to the orientation of possible cracks. Positions required for this inspection are illustrated in Figure 2-33.

- a. Select AC on the AC/DC power switch.
- b. Place probe/yoke on part in Position 1 as shown.
- c. Press the test switch and apply a light coat of Magnetic Particle media at the same time. Remove the media momentarily before removing the current. Current should be applied for no more than five seconds.
- d. Inspect for cracks using the black light.
- e. Demagnetize before moving to the next position. Refer to paragraph 2.33.3.8.
- f. Repeat steps a. through e. for Position 2 and Position 3.

2.33.3.7 Marking and Recording of Inspection Results. Mark and record the inspection results as necessary per paragraph 1.3.



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**Figure 2-33. Tail Rotor Crosshead**

2.33.3.8 Demagnetization. With the switch remaining in the AC position, place the probe/yoke legs in the same position used for magnetizing. Press the test switch and withdraw the probe/yoke from the part for a distance of two feet before releasing the switch.

2.33.4 Backup Method. None required.

2.33.5 System Securing. Clean the tail rotor crosshead thoroughly to remove all residual Magnetic Particle media. Refer to Post Cleaning and Restoration of Part or Area After NDI, paragraph 1.4.16. The tail rotor crosshead, if removed, requires installation in accordance with the applicable technical manuals listed in Table 1-1.

**2.34 TAIL ROTOR HUB SUPPORT (ET).**

2.34.1 Description (Figure 2-1. Index No. 34). The tail rotor hub support attaches to the clamp ring.

2.34.2 Defects. Defects may occur anywhere on the surface of the support. No cracks are allowed

2.34.3 Primary Method. Eddy Current.

2.34.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100 KHz-500 KHz
- c. Probe, right angle, shielded surface, 100 KHz-500 KHz, 900 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

2.34.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the tail rotor hub support removed in accordance with the applicable technical manuals listed in Table 1-1.

2.34.3.3 Access. Not applicable.

2.34.3.4 Preparation of Part. The tail rotor hub support shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

2.34.3.5 NDI Equipment Settings.

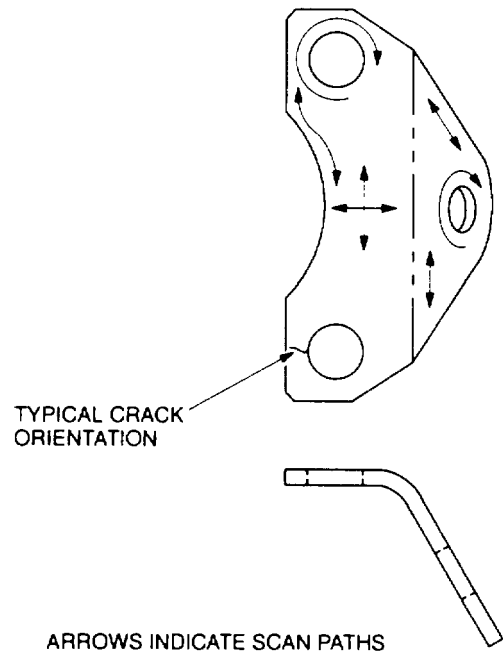
- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e<sup>II</sup>.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 560		
Probe drive	- mid		
LPF	- 100		
HPF	- 0		
H Pos	- 80%		
V Pos	- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

2.34.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 2-34.



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**Figure 2-34. Tail Rotor Hub Support**

- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

**NOTE**

**Either probe identified in paragraph 2.34.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 2.34.3.5 b. (1), (2), and (3) shall be repeated each time a change is made.**

2.34.3.7 Marking and Recording of Indications. Mark and record as required by paragraph 1.3.

2.34.4 Backup Method. None required.

2.34.5 System Securing. The tail rotor hub support requires installation in accordance with the applicable technical manual listed in Table 1-1.



**2.35 TAIL ROTOR HUB CLAMP RING (MT).**

2.35.1 Description (Figure 2-1. Index No. 35). The tail rotor hub clamp ring retains the flapping bearing in place.

2.35.2 Defects. Defects may occur anywhere on the surface of the clamp ring. No cracks are allowed.

2.35.3 Primary Method. Magnetic Particle.

2.35.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Magnetic Particle Inspection Probe/Yoke
- b. Magnetometer
- c. Black Light
- d. Fluorescent Magnetic Particles, refer to Table 1-8
- e. Consumable Materials, refer to Table 1-8
- f. Aircraft Marking Pencil, refer to Table 1-8

2.35.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the tail rotor hub clamp ring removed in accordance with the applicable technical manuals listed in Table 1-1.

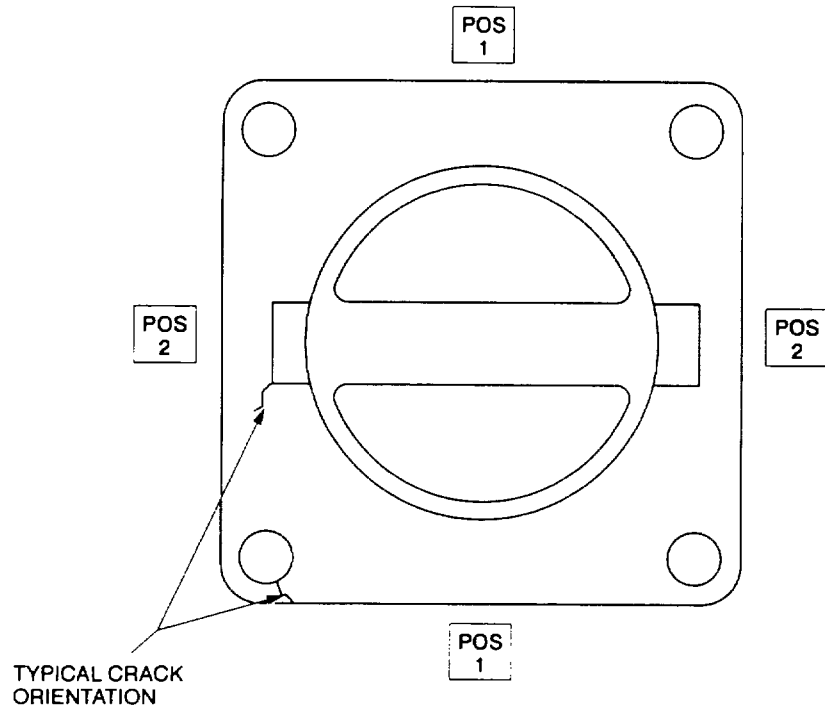
2.35.3.3 Access. Not applicable.

2.35.3.4 Preparation of Part. The part shall be thoroughly cleaned. Refer to Preparation of Part of Area for NDI, paragraph 1.4.4.

2.35.3.5 NDI Equipment Settings. Refer to Magnetic Particle Method, paragraph 1.4.8.

2.35.3.6 Inspection Procedure. A magnetic field shall be applied to the part perpendicular to the orientation of possible cracks. Positions required for this inspection are illustrated in Figure 2-35.

- a. Select AC on the AC/DC power switch.
- b. Place probe/yoke on part in Position 1 as shown.
- c. Press the test switch and apply a light coat of Magnetic Particle media at the same time. Remove the media momentarily before removing the current. Current should be applied for no more than five seconds.
- d. Inspect for cracks using the black light.
- e. Demagnetize before moving to the next position. Refer to paragraph 2.35.3.8.
- f. Repeat steps a. through e. for Position 2.



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**Figure 2-35. Tail Rotor Hub Clamp Ring**

2.35.3.7 **Marking and Recording of Inspection Results.** Mark and record the inspection results as necessary per paragraph 1.3.

2.35.3.8 **Demagnetization.** With the switch remaining in the AC position, place the probe/yoke legs in the same position used for magnetizing. Press the test switch and withdraw the probe/yoke from the part for a distance of two feet before releasing the switch.

2.35.4 **Backup Method.** Refer to paragraph 1.4.7.

2.35.5 **System Securing.** Clean the tail rotor hub clamp ring thoroughly to remove all residual Magnetic Particle media. Refer to Post Cleaning and Restoration of Part or Area After NDI, paragraph 1.4.16. The tail rotor hub clamp ring requires installation in accordance with the applicable technical manuals listed in Table 1-1.

## **2.36 TAIL ROTOR HUB YOKE (MT).**

2.36.1 **Description (Figure 2-1. Index No. 36).** The tail rotor blades are attached to the tail rotor hub yoke which is connected to the gearbox output shaft by the trunnion assembly.

2.36.2 **Defects.** Defects may occur anywhere on the surface of the yoke. No cracks are allowed.

2.36.3 **Primary Method.** Magnetic Particle.

2.36.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Magnetic Particle Inspection Probe/Yoke
- b. Magnetometer
- c. Black Light
- d. Fluorescent Magnetic Particles, refer to Table 1-8
- e. Consumable Materials, refer to Table 1-8
- f. Aircraft Marking Pencil, refer to Table 1-8

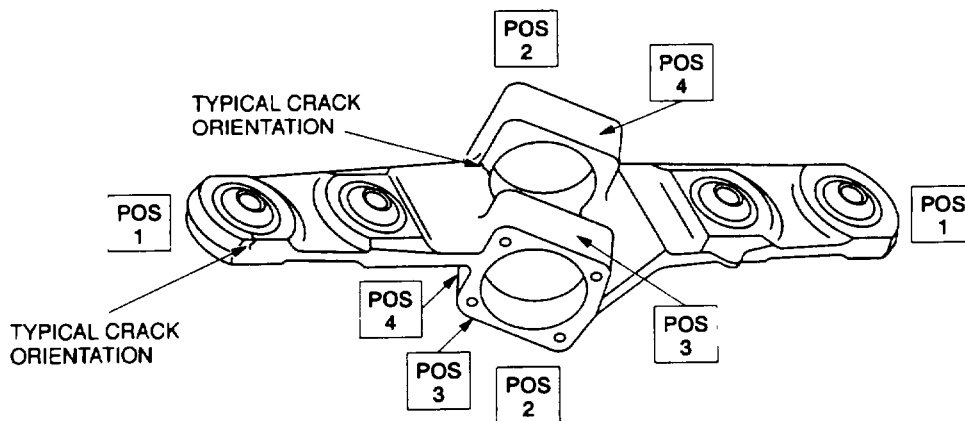
2.36.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the tail rotor hub yoke shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

2.36.3.3 Access. Not applicable.

2.36.3.4 Preparation of Part. The part shall be thoroughly cleaned. Refer to Preparation of Part of Area for NDI, paragraph 1.4.4.

2.36.3.5 NDI Equipment Settings. Refer to Magnetic Particle Method, paragraph 1.4.8.

2.36.3.6 Inspection Procedure. A magnetic field shall be applied to the part perpendicular to the orientation of possible cracks. Positions required for this inspection are illustrated in Figure 2-36.



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Figure 2-36. Tail Rotor Hub Yoke

- a. Select AC on the AC/DC power switch.
- b. Place probe/yoke on part in Position 1 as shown.
- c. Press the test switch and apply a light coat of Magnetic Particle media at the same time. Remove the media momentarily before removing the current. Current should be applied for no more than five seconds.
- d. Inspect for cracks using the black light.
- e. Demagnetize before moving to the next position. Refer to paragraph 2.36.3.8.
- f. Repeat steps a. through e. for Positions 2, 3, and 4.

2.36.3.7 **Marking and Recording of Inspection Results.** Mark and record the inspection results as necessary per paragraph 1.3.

2.36.3.8 **Demagnetization.** With the switch remaining in the AC position, place the probe/yoke legs in the same position used for magnetizing. Press the test switch and withdraw the probe/yoke from the part for a distance of two feet before releasing the switch.

2.36.4 **Backup Method.** Refer to paragraph 1.4.7.

2.36.5 **System Securing.** Clean the tail rotor hub yoke thoroughly to remove all residual Magnetic Particle media. Refer to Post Cleaning and Restoration of Part or Area After NDI, paragraph 1.4.16. The tail rotor hub yoke, if removed, requires installation in accordance with the applicable technical manuals listed in Table 1-1.

## **2.37 FLAPPING BEARING (PT).**

2.37.1 **Description (Figure 2-1, Index No. 37).** The flapping bearing is part of the yoke assembly which allows movement of the yoke so changes in pitch angle can be made.

2.37.2 **Defects.** Defects may occur anywhere on the surface of the flapping bearing. No cracks are allowed.

2.37.3 **Primary Method.** Fluorescent Penetrant.

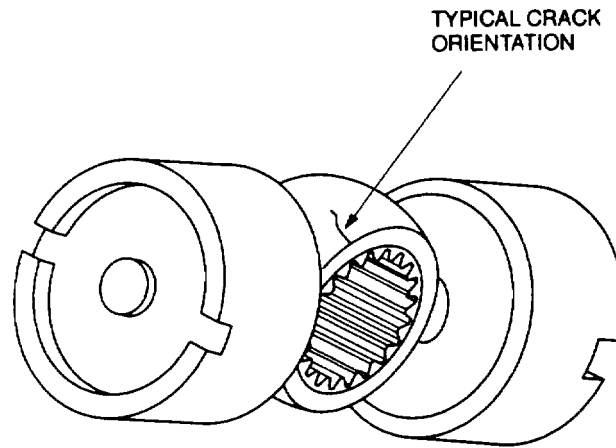
2.37.3.1 **NDI Equipment and Materials.** (Refer to Appendix B.) Inspection equipment is listed in Table 1-7. MIL-1-25135 level 3 penetrant materials shall be selected from the approved list in Table 1-8.

2.37.3.2 **Preparation of Helicopter.** The helicopter shall be prepared for safe ground maintenance and the flapping bearing removed in accordance with the applicable technical manuals listed in Table 1-1.

2.37.3.3 **Access.** Not applicable.

2.37.3.4 **Preparation of Part.** Protective coating shall be removed and the part shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

2.37.3.5 **Inspection Procedure.** Perform fluorescent penetrant inspection. Refer to fluorescent penetrant method, paragraph 1.4.7 and Table 1-5. Inspect area of concern. See Figure 2-37.



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**Figure 2-37. Flapping Bearing**

2.37.3.6 **Marking and Recording of Inspection Results.** Mark and record the inspection results as necessary per paragraph 1.3.

2.37.4 **Backup Method.** None required.

2.37.5 **System Securing.** Clean the part or area to remove inspection media. Refer to Post Cleaning and Restoration of Part or Area after NDI paragraph 1.4.16. Protective coating shall be reapplied as required. Reinstall or assemble parts or components in accordance with the applicable technical manuals listed in Table 1-1.

## **2.38 TAIL ROTOR BLADES (ET).**

2.38.1 **Description (Figure 2-1. Index No.38).** The tail rotor blades are mounted in the tail rotor yoke assembly by means of spherical bearings. The bearing permits pitch change in the blades.

2.38.2 **Defects.** Defects may occur anywhere on the surface of the blades. Particular attention shall be given to the leading edge abrasive strip. No cracks are allowed.

2.38.3 **Primary Method.** Eddy Current.

2.38.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100 KHz-500 KHz
- c. Probe, right angle, shielded surface, 100 KHz-500 KHz, 900 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

2.38.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance in accordance with the applicable technical manuals listed in Table 1-1.

2.38.3.3 Access. Inspection areas are accessible with the tail rotor blade(s) on the helicopter.

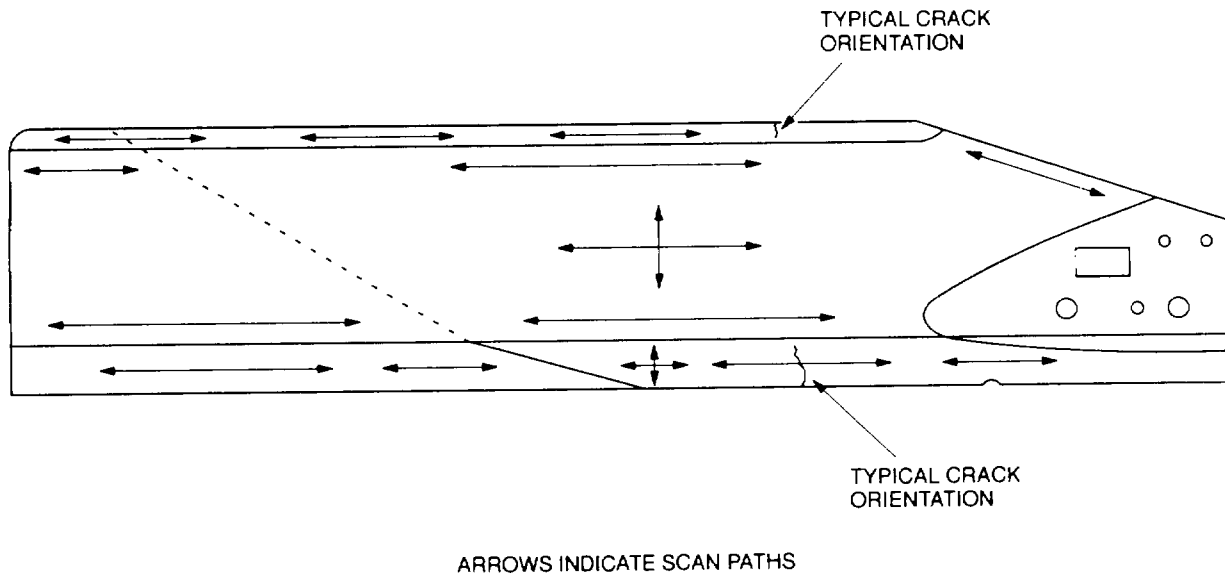
2.38.3.4 Preparation of Part. The tail rotor blade(s) shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

2.38.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e".

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 560		
Probe drive	- mid		
LPF	- 100		
HPF	-0		
H Pos	- 80%		
V Pos	- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:
  - (1) Null probe on test block.
  - (2) Adjust phase as required to obtain horizontal lift-off.
  - (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)
- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.



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**Figure 2-38. Tail Rotor Blades**

**NOTE**

Either probe identified in paragraph 2.38.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 2.38.3.5 b. (1), (2), and (3) shall be repeated each time a change is made.

2.38.3.7 Marking and Recording of Indications. Mark and record as required by paragraph 1.3.

2.38.4 Backup Method. None required.

2.38.5 System Securing. None required.

**2.39 TAIL ROTOR BLADES (BT).**

2.39.1 Description (Figure 2-1. Index No. 39). The tail rotor blades are of bonded, composite construction that use a fiberglass shell (skins) and nonmetallic honeycomb with a stainless steel abrasive strip and erosion shield.

2.39.2 Defects. Void damage may occur anywhere on either side of the blade.

**NOTE**

A void is defined as an unbonded area that is suppose to be bonded. Many sub-definitions are given such as bond separation, delamination, lack of adhesive, gas pocket, misfit, etc. This procedure makes no distinction among these instead grouping under the general term "void."

2.39.3 Primary Method. Bond Testing.

2.39.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Bond Test Unit
- b. Probe, Mechanical Impedance Analysis
- c. Probe Holder
- d. Cable Assembly
- e. Test block, Composite Defect Standard #1
- f. Test block, Composite Defect Standard #3
- g. Teflon Tape, refer to Table 1-8
- h. Aircraft Marking Pencil, refer to Table 1-8

2.39.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance in accordance with applicable technical manuals listed in Table 1-1.

2.39.3.3 Access. The inspection areas are accessible with the tail rotor blades on helicopter.

**WARNING**

**Maintenance Platforms/Workstands**

**Use only appropriate platforms, workstands, or other approved locally procured stands and restraint equipment when working above 10 feet on helicopters in a nontactical environment. Otherwise, personnel injury could result from accidental falls.**

2.39.3.4 Preparation of Part. The blades shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

2.39.3.5 NDI Equipment Settings. Refer to Bond Testing Equipment, paragraph 1.4.6.1.

- a. Attach cable and probe to Bondmaster. Protect probe with Teflon tape and install in probe holder.
- b. Turn on Bondmaster, press SPCL and make the following adjustments.
  - H - Pos 40%
  - V - Pos 80%
  - PHASE REF - 0
  - DRIVE - MID
- c. Press SET and select DISPLAY - PHASE.



- d. Place probe on good area of test block #1 and press GOOD PART. Do this several times while moving the probe to different spots in the good area of the test block. Note the video signature for each. Select and enter a representative good area by pressing GOOD PART one last time.
- e. Place probe on void area of test block #1 and press BAD PART. Do this several times while moving the probe slightly to different positions within the void area. Select and enter a position that gives a strong difference between good and void areas. Use DIFF soft key to observe difference between good and bad areas of test block.

**NOTE**

**If during setup the flying spot deflects upward, or to the side, when the probe passes over the bad part, instead of the desired down deflection toward the alarm box, Press SPCL and toggle to a different phase setting (90, 180, or 270) and repeat (d) and (e). Continue to try phase setting until the flying spot moves in the desired down direction.**

- f. Place probe on good area of test block and press RUN. Flying spot should be near the top-center of the ACTIVE screen. If not, press NULL. Slide probe from good to void area and note response from flying spot. This response should provide both amplitude (vertical) and phase (horizontal) movement. The default gate/alarm setting may be incorrect for this set-up. Turn off or reset gate/alarm as desired.
- g. The Bondmaster is programmed to automatically set test parameters to a start-up or initial bond test. By following the steps outlined above, adjustments to the FREQ, GAIN, and ALARM can help to refine the selectivity in locating defects among differing composite materials.

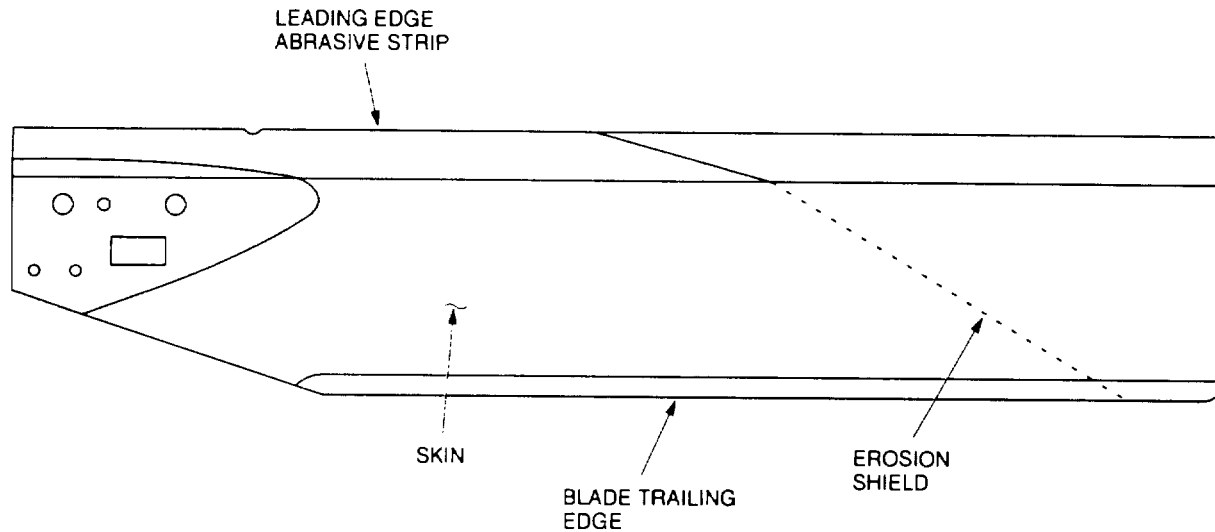
2.39.3.6 Inspection Procedure. Refer to Bond Test Method, paragraph 1.4.6 and inspection areas 'are shown in Figure 2-39.

- a. Skin-to-Honeycomb Voids. Place probe on tail rotor blade in location where test for skin-to-honeycomb bond separation is desired and press NULL. Move probe from good to suspect area and note response. A strong amplitude change and phase shift similar to the test block is indicative of a void. This set-up is very sensitive to thin skin-to-core bonding. Move probe slowly over the skin and note the slight amplitude change (bounce) as the probe senses alternately the honeycomb cell nodes and cell walls.

**NOTE**

**The basic set-up provided above also selects a frequency that provide a satisfactory inspection for voids associated with skin-to-spar, skin-to-trailing edge, doubler-to-doubler and doubler-to-skin, and trim tab bonding. For the inspection of bonding voids to the spar. Setup on test block #3 may provide some advantage.**

- b. Use the NULL and GAIN adjustments to reset the ACTIVE screen for the areas to be inspected (do not go back to SET mode). Also, compare similar areas. For example, to check for spar to skin voids, check front and back of blade in the same area, or check another blade in the same area. Observe that, when moving the probe chordwise from the spar to the trailing edge, the transitions at the spar-to-honeycomb and the honeycomb-to-trailing edge strip are easily detected. When inspecting these areas, adjust the NULL and GAIN and move the probe carefully along the transition using a straight edge or other guide. A localized phase and amplitude shift similar to the test block indicates a void.



**INSPECT FOR:**  
 VOIDS IN LEADING EDGE ABRASIVE STRIP.  
 VOIDS IN EROSION SHIELD.  
 VOIDS BETWEEN SKIN AND TRAILING EDGE.  
 VOIDS BETWEEN SKIN AND CORE.  
 DELAMINATION BETWEEN SKIN AND PLYS.

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**Figure 2-39. Tail Rotor Blades**

2.39.3.7 **Marking and Recording of Inspection Results.** Mark and record as required by paragraph 1.3.

**NOTE**

**Attention shall be directed to accurately marking the boundaries of all voids on both sides of the blade. These markings will be needed to determine acceptance/rejection criteria in accordance with the applicable technical manuals listed in Table 1-1.**

2.39.4 **Backup Method.** None required

2.39.5 **System Securing.** None required.

**2.40 TAIL ROTOR PITCH CHANGE LEVER (ET).**

2.40.1 **Description (Figure 2-1, Index No. 40).** The tail rotor pitch change lever attaches to the control tube and the trunnion to transmit changes in pitch.

2.40.2 **Defects.** Defects can occur anywhere on the surface of the pitch change lever. No cracks are allowed.

2.40.3 **Primary Method.** Eddy Current.

2.40.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100 KHz-500 KHz
- c. Probe, right angle, shielded surface, 100 KHz-500 KHz, 90° 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

2.40.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the tail rotor pitch change lever shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

2.40.3.3 Access. Not applicable.

2.40.3.4 Preparation of Part. The tail rotor pitch change lever shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

2.40.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e<sup>II</sup>.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 56°		
Probe drive	- mid		
LPF	- 100		
HPF	-0		
H Pos	- 80%		
V Pos	- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

2.40.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 2-40.

- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

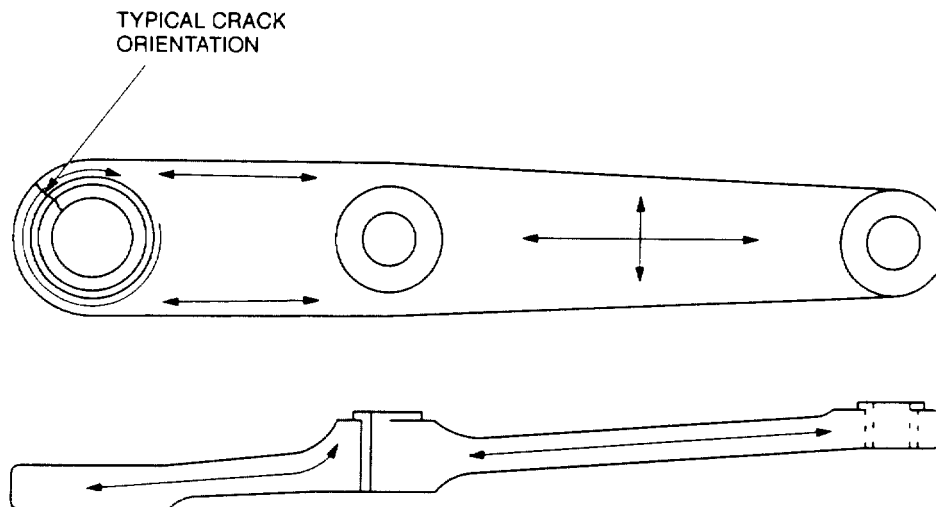
**NOTE**

**Either probe identified in paragraph 2.40.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 2.40.3.5 b. (1), (2), and (3) shall be repeated each time a change is made.**

2.40.3.7 Marking and Recording of Indications. Mark and record as required by paragraph 1.3.

2.40.4 Backup Method. None required.

2.40.5 System Securing. The tail rotor pitch change lever, if removed, requires installation in accordance with the applicable technical manual listed in Table 1-1.



ARROWS INDICATE SCAN PATHS

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**Figure 2-40. Tail Rotor Pitch Change Lever**

**2.41 TAIL ROTOR PITCH CHANGE IDLER (ET).**

2.41.1 Description (Figure 2-1. Index No. 41). The pitch change idler is the pivot point for the pitch change levers.

2.41.2 Defects. Defects may occur anywhere on the surface of the part. No cracks are allowed.

2.41.3 Primary Method. Eddy Current.

2.41.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100 KHz-500 KHz
- c. Probe, right angle, shielded surface, 100 KHz-500 KHz, 900 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

2.41.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the pitch change idler shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

9.41.3.3 Access. Not applicable.

2.41.3.4 Preparation of Part. The pitch change idler shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

2.41.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-1 9e<sup>II</sup>.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 560		
Probe drive	- mid		
LPF	- 100		
HPF	-0		
H Pos	- 80%		
V Pos	- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:
  - (1) Null probe on test block.
  - (2) Adjust phase as required to obtain horizontal lift-off.
  - (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

2.41.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 2-41

- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

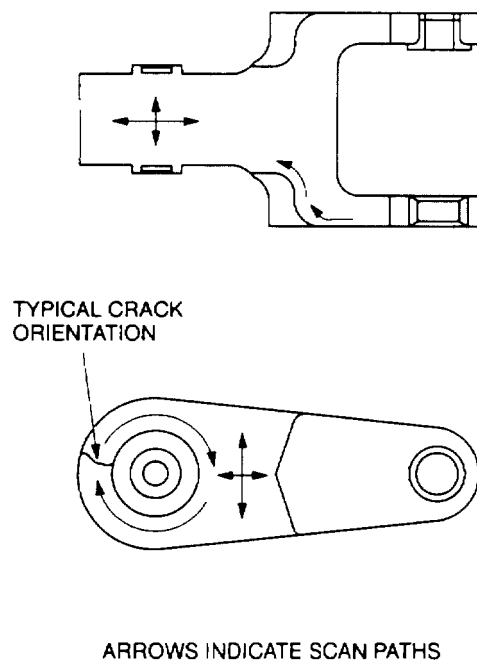
**NOTE**

Either probe identified in paragraph 2.41.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 2.41.3.5 b. (1), (2), and (3) shall be repeated each time a change is made.

2.41.3.7 Marking and Recording of Indications. Mark and record as required by paragraph 1.3.

2.41.4 Backup Method. None required.

2.41.5 System Securing. The tail rotor pitch change idler, if removed, requires installation in accordance with the applicable technical manual listed in Table 1-1.



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**Figure 2-41. Tail Rotor Pitch Change Idler**

**2.42 TAIL ROTOR PITCH CHANGE TRUNNION CAP (ET).**

2.42.1 Description (Figure 2-1. Index No. 42). The tail rotor pitch change trunnion cap attaches to the pitch change trunnion which covers the trunnion attach point.

2.42.2 Defects. Defects may occur anywhere on the trunnion cap. No cracks are allowed.

2.42.3 Primary Method. Eddy Current.

2.42.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100 KHz-500 KHz
- c. Probe, right angle, shielded surface, 100 KHz-500 KHz, 900 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

2.42.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the tail rotor pitch change trunnion cap shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

2.42.3.3 Access. Not applicable.

2.42.3.4 Preparation of Part. The tail rotor pitch change trunnion cap shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

2.42.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19ell.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 560		
Probe drive	- mid		
LPF	- 100		
HPF	-0		
H Pos	- 80%		
V Pos	- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:
  - (1) Null probe on test block.
  - (2) Adjust phase as required to obtain horizontal lift-off.
  - (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

2.42.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 2-42

- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

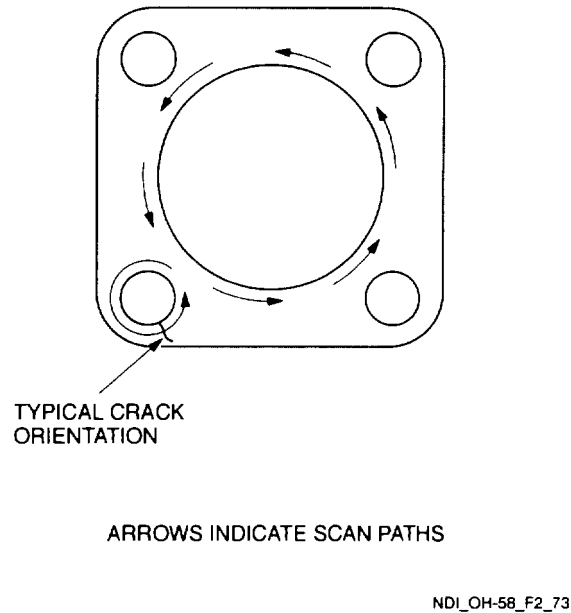
**NOTE**

**Either probe identified in paragraph 2.42.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 2.42.3.5 b. (1), (2), and (3) shall be repeated each time a change is made.**

2.42.3.7 Marking and Recording of Indications. Mark and record as required by paragraph 1.3.

2.42.4 Backup Method. None required.

2.42.5 System Securing. The tail rotor pitch change trunnion cap, if removed, requires installation in accordance with the applicable technical manual listed in Table 1-1.



**Figure 2-42. Tail Rotor Pitch Change Trunnion Cap**



**SECTION III  
TRANSMISSION/DRIVETRAIN GROUP**

**3. GENERAL.**

**3.1 CONTENTS.** The transmission/drivetrain group inspection items covered in this section are those items of the OH-58D transmission, gearboxes, driveshafts, and components listed in the Transmission/Drivetrain Group Inspection Index (Table 3-1). Corresponding inspection figures and applicable text paragraphs are listed opposite each inspection item. The item number for each item may be used to locate it in Figure 3-1.

**Table 3-1. Transmission/Drivetrain Group Inspection Index**

Index Number	Nomenclature	Inspection Method	Paragraph Number	Figure Number
*2	Engine to Transmission Driveshaft	MT	3.2	3-2
3	Pylon Spring Fitting	ET	3.3	3-3
4	Pylon Stop Fitting	ET	3.4	3-4
*5	Torquemeter Support Assembly	ET	3.5	3-5
*6	Bearing Assembly Retainer	ET	3.6	3-6
7	Bearing Sleeve	ET	3.7	3-7
8	Retaining Plate	ET	3.8	3-8
*9	Spring Sleeve	ET	3.9	3-9
*10	Anti-Backlash Spring	PT	3.10	3-10
*11	Anti-Backlash Adapter	ET	3.11	3-11
*12	Rotor Mast	MT	3.12	3-12
*13	Bearing Nut Lock Plate	ET	3.13	3-13
*14	Mast Bearing Nut	MT	3.14	3-14
*15	Seal and Bearing Retaining Plate	MT	3.15	3-15
*16	Upper Mast Bearing Liner	MT	3.16	3-16
*17	Duplex Bearing Nut	ET	3.17	3-17
*18	Shaft Plug Assembly	ET	3.18	3-18
*19	Adapter Bolt	MT	3.19	3-19
*20	Main Driveshaft Adapter	MT	3.20	3-20
21	Forward Seal Cap	ET	3.21	3-21
22	Forward Shaft	MT	3.22	3-22

Table 3-1. Transmission/Drivetrain Group Inspection Index - Continued

Index Number	Nomenclature	Inspection Method	Paragraph Number	Figure Number
*23	Pilot Ring	ET	3.23	3-23
*24	Housing Assembly	ET	3.24	3-24
*25	Cone Set	MT	3.25	3-25
*26	Cone Set Spacer	MT	3.26	3-26
27	Aft Bearing and Seal Cap	ET	3.27	3-27
28	Output Adapter	MT	3.28	3-28
29	Forward Shaft Assembly	ET	3.29	3-29
30	Aft Shaft Assembly	ET	3.30	3-30
31	Coupling Disc Packs	PT	3.31	3-31
32	Shaft Assembly Washer	ET	3.32	3-32
33	Coupling Adapter	ET	3.33	3-33
34	Bearing Hanger Brackets and Links	ET	3.34	3-34
35	Segmented Shaft Assembly	ET	3.35	3-35
36	Steel Impeller	MT	3.36	3-36
37	Aluminum Alloy Impeller Housing	ET	3.37	3-37
38	Fan Shaft	MT	3.38	3-38
39	Tail Rotor Gearbox	ET	3.39	3-39
40	Input Adapter Nut	MT	3.40	3-40
41	Input Duplex Bearing Nut	ET	3.41	3-41
42	Cap Assembly	ET	3.42	3-42

NOTE: \*Indicates Flight Safety Part.

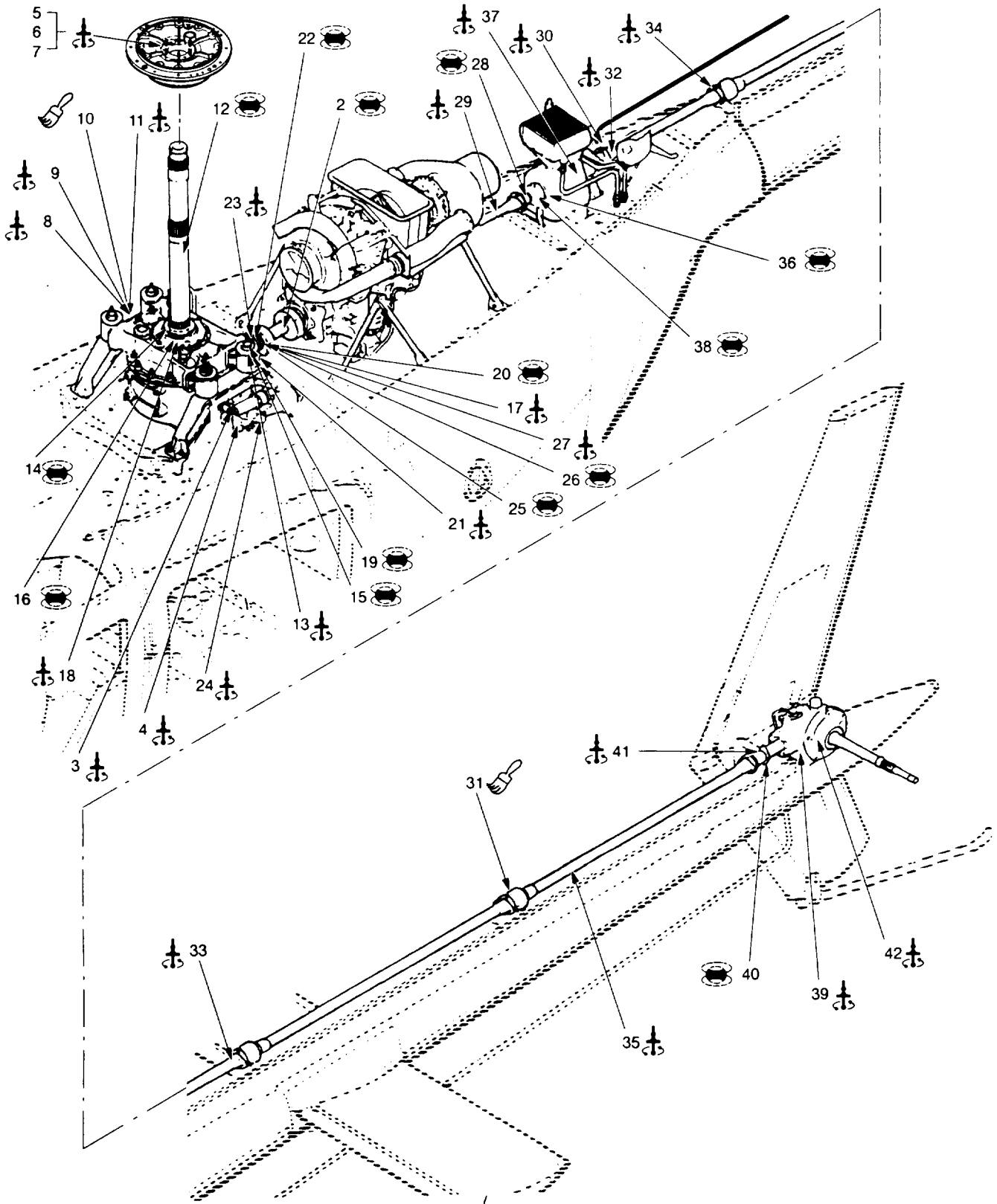


Figure 3-1. Transmission/Drivetrain Group

### 3.2 ENGINE TO TRANSMISSION DRIVESHAFT (MT).

3.2.1 Description (Figure 3-1, Index No. 2). The engine to transmission driveshaft is installed" between the engine and transmission to transmit power from the engine to the transmission.

3.2.2 Defects. Defects may occur anywhere on the driveshaft. No cracks are allowed.

3.2.3 Primary Method. Magnetic Particle.

3.2.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Magnetic Particle Inspection Probe/Yoke
- b. Magnetometer
- c. Black Light
- d. Fluorescent Magnetic Particles, refer to Table 1-8
- e. Consumable Materials, refer to Table 1-8
- f. Aircraft Marking Pencil, refer to Table 1-8

3.2.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the engine to transmission driveshaft shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

3.2.3.3 Access. Not applicable.

3.2.3.4 Preparation of Part. The part shall be thoroughly cleaned. Refer to Preparation of Part of Area for NDI, paragraph 1.4.4.

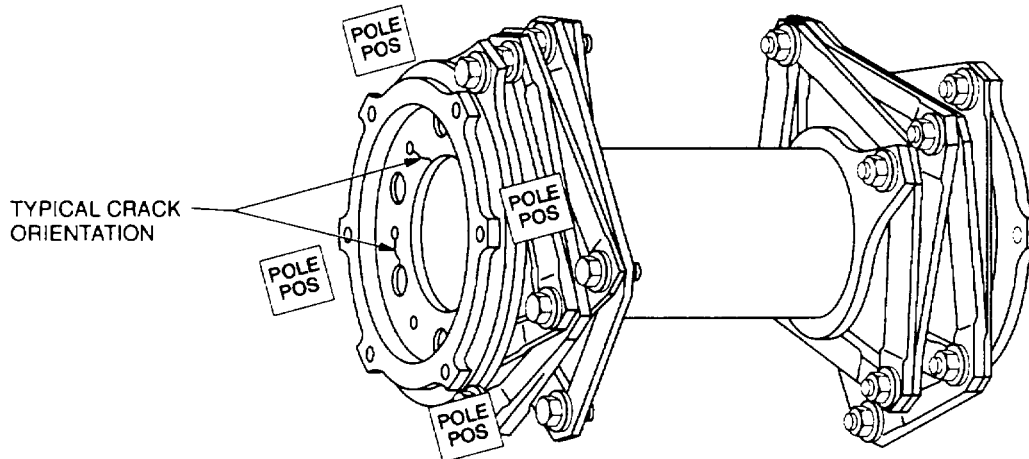
3.2.3.5 NDI Equipment Settings. Refer to Magnetic Particle Method, paragraph 1.4.8.

3.2.3.6 Inspection Procedure. A magnetic field shall be applied to the part perpendicular to the orientation of possible cracks. Positions required for this inspection are illustrated in Figure 3-2.

- a. Select AC on the AC/DC power switch.
- b. Place probe/yoke on part in Position 1 as shown.
- c. Press the test switch and apply a light coat of magnetic particle media at the same time. Remove the media momentarily before removing the current. Current should be applied for no more than five seconds.
- d. Inspect for cracks using the black light.

3.2.3.7 Marking and Recording of Inspection Results. Mark and record the inspection results necessary per paragraph 1.3.

3.2.3.8 Demagnetization. With the switch remaining in the AC position, place the probe/yoke legs in the same position used for magnetizing. Press the test switch and withdraw the probe/yoke from the part for a distance of two feet before releasing the switch.



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**Figure 3-2. Engine To Transmission Driveshaft**

3.2.4 Backup Method. None required.

3.2.5 System Securing. Clean the engine to transmission driveshaft thoroughly to remove all residual magnetic particle media. Refer to Post Cleaning and Restoration of Part or Area After NDI, paragraph 1.4.16. The engine to transmission driveshaft, if removed, requires installation in accordance with the applicable technical manuals listed in Table 1-1.

### 3.3 PYLON SPRING FITTING (ET).

3.3.1 Description (Figure 3-1. Index No. 3). The pylon spring fitting is attached to the pylon beam and the forward and of the spring assembly.

3.3.2 Defects. Defects may occur anywhere on the surface of the fitting. No cracks are allowed.

3.3.3 Primary Method. Eddy Current.

3.3.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100KHz-500KHz

- c. Probe, right angle, shielded surface, 100KHz-500KHz, 90° 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

3.3.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the pylon spring fitting shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

3.3.3.3 Access. Not applicable.

3.3.3.4 Preparation of Part. The pylon spring fitting shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

3.3.3.5 NDI Equipment Settings.

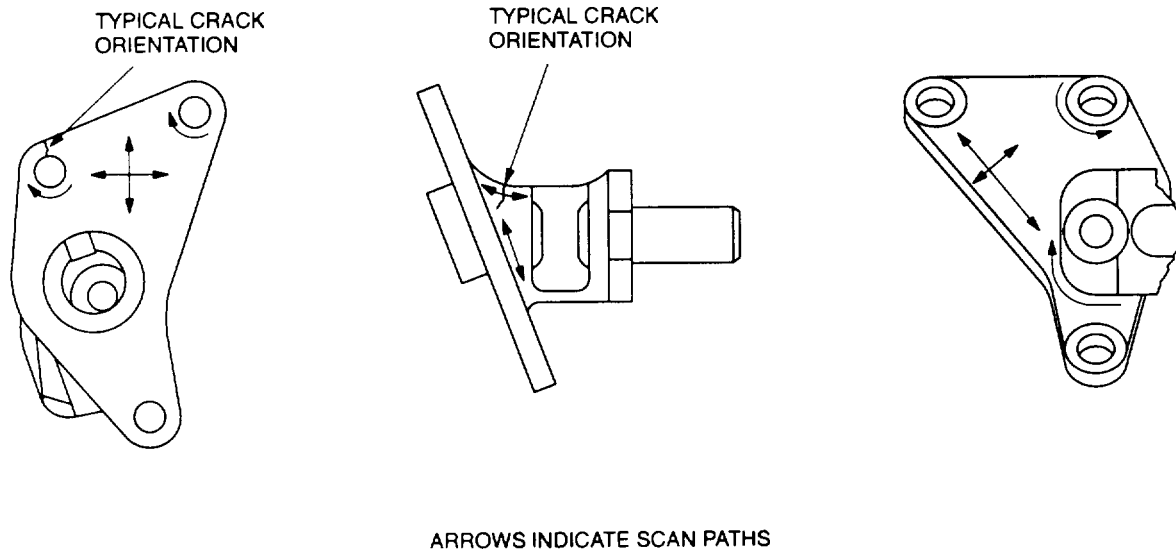
- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e<sup>II</sup>.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 560		
Probe drive	- mid		
LPF	- 100		
HPF	-0		
H Pos	- 80%		
V Pos	- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:
  - (1) Null probe on test block.
  - (2) Adjust phase as required to obtain horizontal lift-off.
  - (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

3.3.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 3-3.

- a. Place probe on a good area in the inspection location and null. Adjust phase as requires to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.



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**Figure 3-3. Pylon Spring Fitting**

**NOTE**

Either probe identified in paragraph 3.3.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 3.3.3.5 b. (1), (2) and (3) shall be repeated each time a change is made.

3.3.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.

3.3.4 Backup Method. Refer to paragraph 1.4.7.

3.3.5 System Securing. The pylon spring fitting, if removed, requires installation in accordance with the applicable technical manual listed in Table 1-1.

**3.4 PYLON STOP FITTING (ET).**

3.4.1 Description (Figure 3-1. Index No. 4). The pylon stop fitting is bolted to the transmission deck and secures the pylon spring fitting.

3.4.2 Defects. Defects may occur anywhere on the surface of the pylon stop fitting. No cracks are allowed.

3.4.3 Primary Method. Eddy Current.

3.4.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100KHz-500KHz
- c. Probe, right angle, shielded surface, 100KHz-500KHz, 900 1/2 inch drop
- d. Cable Assembly, Black Light
- e. Reference Block, three-notched aluminum (0.008, 0.020, 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

3.4.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the pylon stop fitting shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

3.4.3.3 Access.

3.4.3.4 Preparation of Part. The part shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

3.4.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19el.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 560		
Probe drive	- mid		
LPF	- 100		
HPF	-0		
H Pos	- 80%		
V Pos	- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:
  - (1) Null probe on test block.
  - (2) Adjust phase as required to obtain horizontal lift-off.
  - (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to J standard instrument display shown in Figure 1-7.)



3.4.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 3-4.

- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

**NOTE**

**Either probe identified in paragraph 3.4.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed, steps 3.4.3.5 b. (1), (2) and (3) shall be repeated each time a change is made.**

3.4.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.

3.4.4 Backup Method. Refer to paragraph 1.4.7.

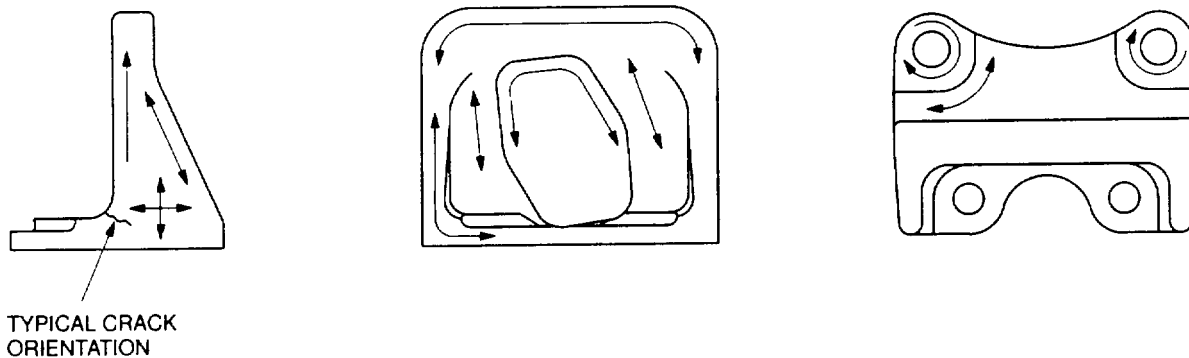
3.4.5 System Securing. The pylon stop fitting, if removed, requires installation in accordance with the applicable technical manual listed in Table 1-1.

**3.5 TORQUEMETER SUPPORT ASSEMBLY (ET).**

3.5.1 Description (Figure 3-1. Index No. 5). The torquemeter support assembly secures the main rotor hub to the mast.

3.5.2 Defects. Defects may occur anywhere on the surface of the torquemeter support assembly. No cracks are allowed.

3.5.3 Primary Method. Eddy Current.



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**Figure 3-4. Pylon Stop Fitting**

3.5.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100KHz-500KHz
- c. Probe, right angle, shielded surface, 100KHz-500KHz, 900 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

3.5.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the torque meter support assembly shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

3.5.3.3 Access. Not applicable.

3.5.3.4 Preparation of Part. The torque meter support assembly shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

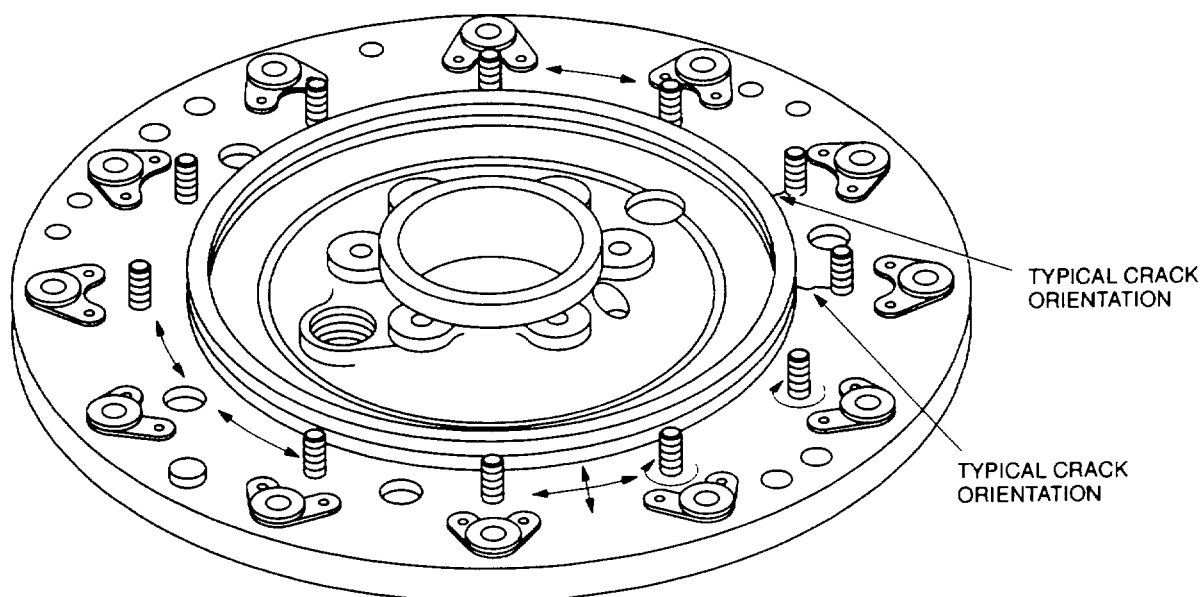
3.5.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19eI.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 560		
Probe drive	- mid		
LPF	- 100		
HPF	- 0		
H Pos	- 80%		
V Pos	- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:
  - (1) Null probe on test block.
  - (2) Adjust phase as required to obtain horizontal lift-off.
  - (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

3.5.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 3-5.



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**Figure 3-5. Torquemeter Support Assembly**

- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

**NOTE**

Either probe identified in paragraph 3.5.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 3.5.3.5 b. (1), (2) and (3) shall be repeated each time a change is made.

3.5.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.

3.5.4 Backup Method. Refer to paragraph 1.4.7.

3.5.5 System Securing. The torquemeter support assembly, if removed, requires installation in accordance with the applicable technical manual listed in Table 1-1.

### 3.6 BEARING ASSEMBLY RETAINER (ET).

3.6.1 Description (Figure 3-1, Index No. 6). The bearing assembly retainer secures the bearing and shims within the bearing assembly.

3.6.2 Defects. Defects may occur anywhere on the bearing assembly retainer. No cracks are allowed.

3.6.3 Primary Method. Eddy Current.

3.6.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100KHz-500KHz
- c. Probe, right angle, shielded surface, 100KHz-500KHz, 90° 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

3.6.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the bearing assembly retainer shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

3.6.3.3 Access. Not applicable.

#### **WARNING**

##### **Maintenance Platforms/Workstands**

Use only appropriate platforms, workstands, or other approved locally procured stands and restraint equipment when working above 10 feet on helicopters in a nontactical environment. Otherwise, personnel injury could result from accidental falls.

3.6.3.4 Preparation of Part. The bearing assembly retainer shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

3.6.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e<sup>II</sup>
- |                        |        |       |
|------------------------|--------|-------|
| Frequency F1 - 200 KHz | F2     | - off |
| Hdb                    | - 57.0 |       |
| Vdb- 69.0              |        |       |
| Rot                    | - 56°  |       |
| Probe drive            | - mid  |       |
| LPF                    | - 100  |       |
| HPF                    | - 0    |       |
| H Pos                  | - 80%  |       |
| V Pos                  | - 20%  |       |

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

3.6.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 3-6.

- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

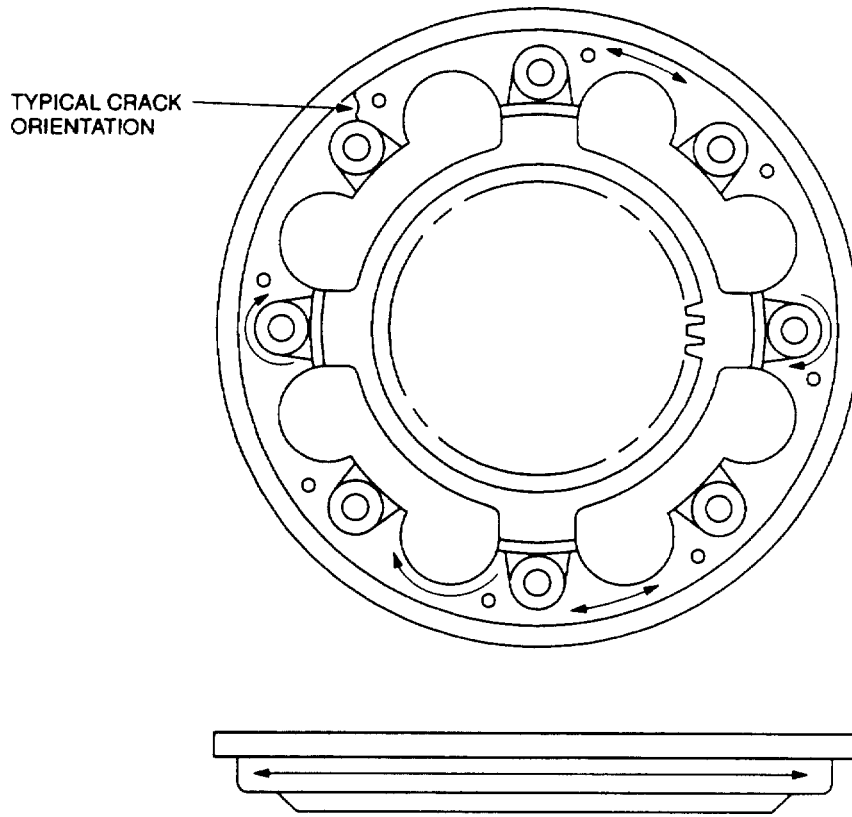
**NOTE**

**Either probe identified in paragraph 3.6.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 3.6.3.5 b. (1), (2) and (3) shall be repeated each time a change is made.**

3.6.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.

3.6.4 Backup Method. Refer to paragraph 1.4.7.

3.6.5 System Securing. The bearing assembly retainer, if removed, requires installation in accordance with the applicable technical manual listed in Table 1-1.



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Figure 3-6. Bearing Assembly Retainer

### 3.7 BEARING SLEEVE (ET).

3.7.1 Description (Figure 3-1. Index No. 7). The bearing sleeve is contained within the bearing assembly which supports the bearing.

3.7.2 Defects. Defects may occur anywhere on the surfaces of the bearing sleeve. No cracks are allowed.

3.7.3 Primary Method. Eddy Current.

3.7.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 1 00KHz-500KHz
- c. Probe, right angle, shielded surface, 100KHz-500KHz, 90° 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

3.7.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the bearing sleeve shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

3.7.3.3 Access. Not applicable.

#### **WARNING**

##### **Maintenance Platforms/Workstands**

**Use only appropriate platforms, workstands, or other approved locally procured stands and restraint equipment when working above 10 feet on helicopters in a nontactical environment. Otherwise, personnel injury could result from accidental falls.**

3.7.3.4 Preparation of Part. The bearing sleeve shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

## 3.7.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e<sup>II</sup>.
- |                        |       |       |
|------------------------|-------|-------|
| Frequency F1 - 200 KHz | F2    | - off |
| Hdb- 57.0              |       |       |
| Vdb- 69.0              |       |       |
| Rot- 56°               |       |       |
| Probe drive            | - mid |       |
| LPF- 100               |       |       |
| HPF- 0                 |       |       |
| H Pos                  | - 80% |       |
| V Pos- 20%             |       |       |

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

## 3.7.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 3-7.

- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

**NOTE**

**Either probe identified in paragraph 3.7.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 3.7.3.5 b. (1), (2) and (3) shall be repeated each time a change is made.**

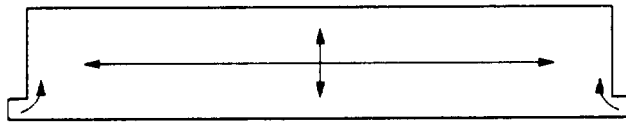
## 3.7.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.

3.7.4 Backup Method. Refer to paragraph 1.4.7.3.7.5 System Securing. The bearing sleeve, if removed, requires installation in accordance with the applicable technical manual listed in Table 1-1.





TYPICAL CRACK  
ORIENTATION



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**Figure 3-7. Bearing Sleeve**

### 3.8 RETAINING PLATE (ET).

3.8.1 Description (Figure 3-1. Index No. 8). The retaining plate secures the anti-backlash adapter to the transmission gear shaft support case.

3.8.2 Defects. Defects may occur anywhere on the surface of the plate. No cracks are allowed.

3.8.3 Primary Method. Eddy Current.

3.8.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100KHz-100KHz
- c. Probe, right angle, shielded surface, 100KHz-500KHz, 900 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

3.8.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the retaining plate shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

3.8.3.3 Access. Not applicable.

#### **WARNING**

##### **Maintenance Platforms/Workstands**

**Use only appropriate platforms, workstands, or other approved locally procured stands and restraint equipment when working above 10 feet on helicopters in a nontactical environment. Otherwise, personnel injury could result from accidental falls.**

3.8.3.4 Preparation of Part. The retaining plate shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

3.8.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e<sup>II</sup>.

Frequency F1 - 200 KHz		F2	- off
Hdb- 57.0			
Vdb- 69.0			
Rot- 560			
Probe drive	- mid		
LPF- 100			
HPF- 0			
H Pos	- 80%		
V Pos- 20%			

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:
- (1) Null probe on test block.
  - (2) Adjust phase as required to obtain horizontal lift-off.
  - (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

3.8.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 3-8.

- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

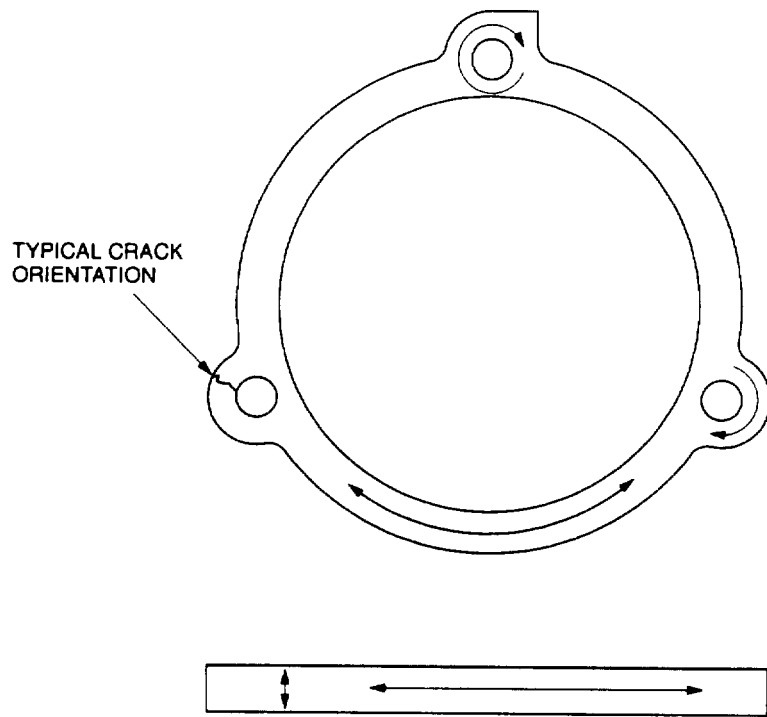
**NOTE**

**Either probe identified in paragraph 3.8.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 3.8.3.5 b. (1), (2) and (3) shall be repeated each time a change is made.**

3.8.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.

3.8.4 Backup Method. Refer to paragraph 1.4.7.

3.8.5 System Securing. The retaining plate, if removed, requires installation in accordance with the applicable technical manual listed in Table 1-1.



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Figure 3-8. Retaining Plate

**3.9 SPRING SLEEVE (ET).**

3.9.1 Description (Figure 3-1. Index No. 9). The spring sleeve is part of the anti-backlash adapter assembly which is located at the base of the transmission.

3.9.2 Defects. Defects may occur anywhere on the surface of the spring sleeve. No. cracks are allowed.

3.9.3 Primary Method. Eddy Current.

3.9.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100KHz-500KHz
- c. Probe, right angle, shielded surface, 100KHz-500KHz, 90° 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

3.9.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the spring sleeve shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

3.9.3.3 Access. Not applicable.

3.9.3.4 3.9.3.4 Preparation of Part. The spring sleeve shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

3.9.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e".

Frequency F1 - 200 KHz	F2	- off
Hdb- 57.0		
Vdb- 69.0		
Rot- 560		
Probe drive	- mid	
LPF- 100		
HPF- 0		
H Pos	- 80%	
V Pos- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

3.9.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 3-9.

- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

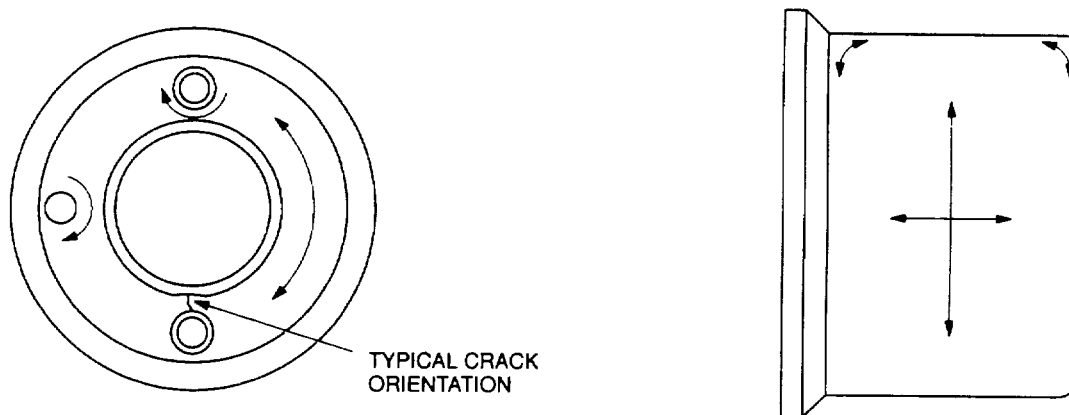
**NOTE**

Either probe identified in paragraph 3.9.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 3.9.3.5 b. (1), (2) and (3) shall be repeated each time a change is made.

3.9.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.

3.9.4 Backup Method. Refer to paragraph 1.4.7.

3.9.5 System Securing. The spring sleeve, if removed, requires installation in accordance with the applicable technical manual listed in Table 1-1.



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**Figure 3-9. Spring Sleeve**

### 3.10 ANTI-BACKLASH SPRING (PT).

3.10.1 Description (Figure 3-1. Index No. 10). The anti-backlash spring attaches to the anti-backlash adapter and is retained within the spring sleeve.

3.10.2 Defects. Defects may occur anywhere on the surface of the spring. No cracks are allowed.

3.10.3 Primary Method. Fluorescent Penetrant.

3.10.3.1 NDI Equipment and Materials. (Refer to Appendix B.) Inspection equipment is listed in Table 1-7. MIL-1-25135 level 3 penetrant materials shall be selected from the approved list in Table 1-8.

3.10.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the anti-backlash spring removed in accordance with the applicable technical manuals listed in Table 1-1.

3.10.3.3 Access. Not applicable.

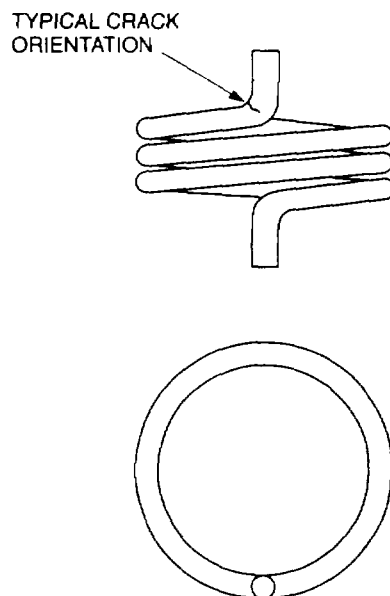
3.10.3.4 Preparation of Part. Protective coating shall be removed and the part shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

3.10.3.5 Inspection Procedure. Perform fluorescent penetrant inspection. Refer to fluorescent penetrant method, paragraph 1.4.7 and Table 1-5. Inspect area of concern. See Figure 3-10.

3.10.3.6 Marking and Recording of Inspection Results. Mark and record the inspection results as necessary per paragraph 1.3.

3.10.4 Backup Method. None required.

3.10.5 System Securing. Clean the part or area to remove inspection media. Refer to Post Cleaning and Restoration of Part or Area after NDI paragraph 1.4.16. Protective coating shall be reapplied as - required. Reinstall or assemble parts or components in accordance with the applicable technical manuals listed in Table 1-1.



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**Figure 3-10. Anti-Backlash Spring**

**3.11 ANTI-BACKLASH ADAPTER (ET).**

3.11.1 Description (Figure 3-1, Index No.11). The anti-backlash adapter is attached by three nuts to, the support studs at the base of the transmission.

3.11.2 Defects. Defects may occur anywhere on the surface of the anti-backlash adapter. No cracks are allowed.

3.11.3 Primary Method. Eddy Current.

3.11.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100KHz-500KHz
- c. Probe, right angle, shielded surface, 100KHz-500KHz, 900 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

3.11.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the anti-backlash adapter removed in accordance with the applicable technical manuals listed in Table 1-1.

3.11.3.3 Access. Not applicable.

3.11.3.4 Preparation of Part. The anti-backlash adapter shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

3.11.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e<sup>II</sup>.

Frequency F1 - 200 KHz	F2	- off
Hdb- 57.0		
Vdb- 69.0		
Rot- 56°		
Probe drive	- mid	
LPF- 100		
HPF- 0		
H Pos	- 80%	
V Pos- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)



3.11.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 3-11.

- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

**NOTE**

**Either probe identified in paragraph 3.11.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 3.11.3.5 b. (1), (2) and (3) shall be repeated each time a change is made.**

3.11.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.

3.11.4 Backup Method. Refer to paragraph 1.4.7.

3.11.5 System Securing. The anti-backlash adapter requires installation in accordance with the applicable technical manual listed in Table 1-1.

### **3.12 ROTOR MAST (MT).**

3.12.1 Description (Figure 3-1. Index No.12). The mast assembly is a tubular steel shaft fitting with a bearing and seal assembly which secures the mast in the top of the transmission and supports the mast in the vertical position.

3.12.2 Defects. Defects may occur anywhere on the surface of the mast. No cracks are allowed.

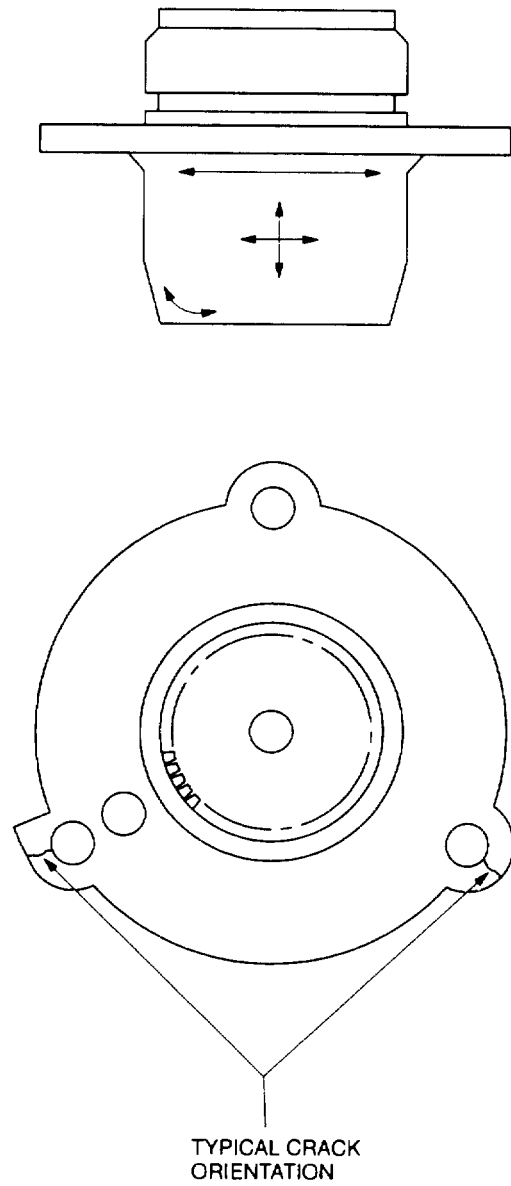
3.12.3 Primary Method. Magnetic Particle.

3.12.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Magnetic Particle Inspection Probe/Yoke
- b. Magnetometer
- c. Black Light
- d. Fluorescent Magnetic Particles, refer to Table 1-8
- e. Consumable Materials, refer to Table 1-8
- f. Aircraft Marking Pencil, refer to Table 1-8

3.12.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the mast removed in accordance with the applicable technical manuals listed in Table 1-1.

3.12.3.3 Access. Not applicable.



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Figure 3-11. Anti-Backlash Adapter

3.12.3.4 Preparation of Part. The part shall be thoroughly cleaned. Refer to Preparation of Part of Area for NDI, paragraph 1.4.4.

3.12.3.5 NDI Equipment Settings. Refer to Magnetic Particle Method, paragraph 1.4.8.

3.12.3.6 Inspection Procedure. A magnetic field shall be applied to the part perpendicular to the orientation of possible cracks. Positions required for this inspection are illustrated in Figure 3-12.

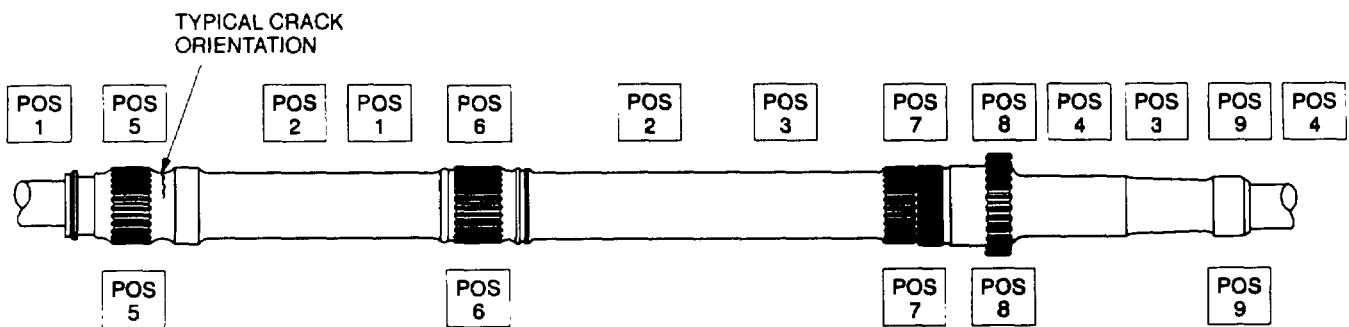
- a. Select AC on the AC/DC power switch.
- b. Place probe/yoke on part in Position 1 as shown.
- c. Press the test switch and apply a light coat of magnetic particle media at the same time. Remove the media momentarily before removing the current. Current should be applied for no more than five seconds.
- d. Inspect for cracks using the black light.
- e. Demagnetize before moving to the next position. Refer to paragraph 3.12.3.8.
- f. Repeat steps a. through e. for positions 2 through 9.
- g. Rotate shaft 90 and repeat steps a through f.

3.12.3.7 Marking and Recording of Inspection Results. Mark and record the inspection results as necessary per paragraph 1.3.

3.12.3.8 Demagnetization. With the switch remaining in the AC position, place the probe/yoke legs in the same position used for magnetizing. Press the test switch and withdraw the probe/yoke from the part for a distance of two feet before releasing the switch.

3.12.4 Backup Method. None required.

3.12.5 System Securing. Refer to Post Cleaning and Restoration of Part or Area After NDI, paragraph 1.4.16. The rotor mast requires installation in accordance with the applicable technical manuals listed in Table 1-1.



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Figure 3-12. Rotor Mast

### 3.13 BEARING NUT LOCK PLATE (ET).

3.13.1 Description (Figure 3-1, Index No.13). The lock plate secures the bearing nut and seal inside the main plate.

3.13.2 Defects. Defects may occur anywhere on the surface of the lock plate. No cracks are allowed.

3.13.3 Primary Method. Eddy Current.

3.13.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100KHz-500KHz
- c. Probe, right angle, shielded surface, 100KHz-500KHz, 900 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

3.13.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the bearing nut lock plate shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

3.13.3.3 Access. Not applicable.

#### **WARNING**

##### **Maintenance Platforms/Workstands**

**Use only appropriate platforms, workstands, or other approved locally procured stands and restraint equipment when working above 10 feet on helicopters in a nontactical environment. Otherwise, personnel injury could result from accidental falls.**

3.13.3.4 Preparation of Part. The bearing nut lock plate shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

3.13.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e<sup>II</sup>.

Frequency F1 - 200 KHz		F2	- off
Hdb- 57.0			
Vdb- 69.0			
Rot- 560			
Probe drive	- mid		
LPF- 100			
HPF- 0			
H Pos	- 80%		
V Pos- 20%			

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

3.13.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 3-13.

- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

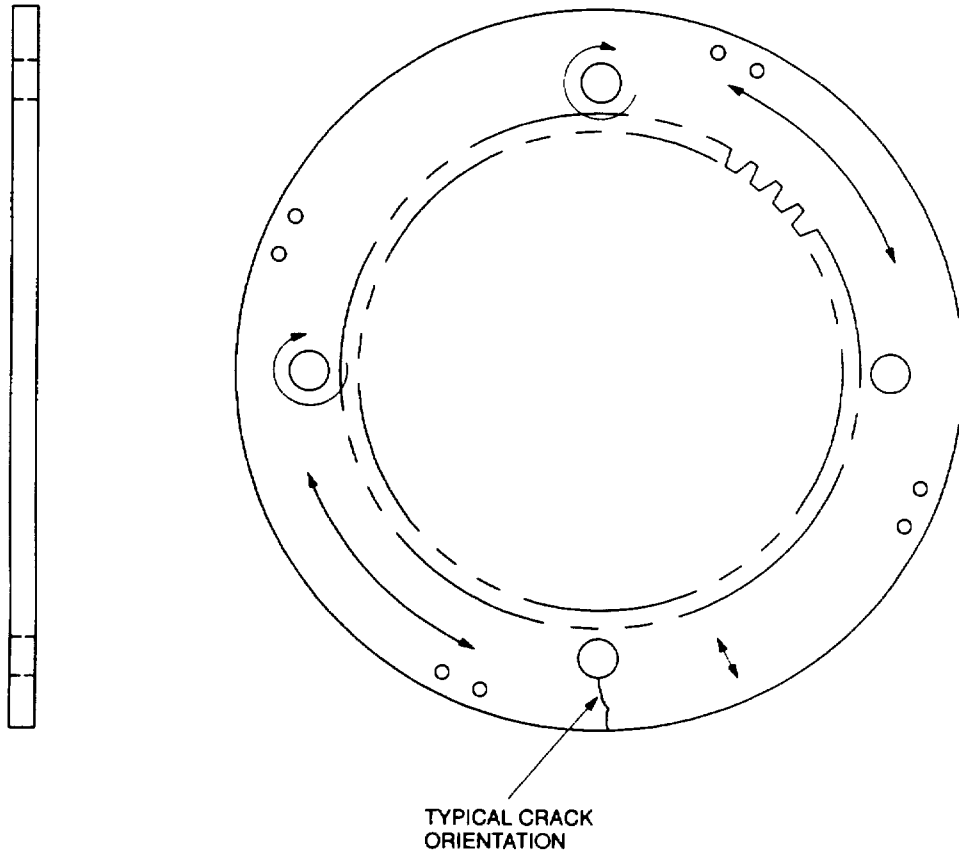
**NOTE**

**Either probe identified in paragraph 3.13.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 3.13.3.5 b. (1), (2) and (3) shall be repeated each time a change is made.**

3.13.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.

3.13.4 Backup Method. Refer to paragraph 1.4.7.

3.13.5 System Securing. The bearing nut lock plate, if removed, requires installation in accordance with the applicable technical manual listed in Table 1-1.



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Figure 3-13. Bearing Nut Lock Plate

### 3.14 MAST BEARING NUT (MT).

3.14.1 Description (Figure 3-1, Index No. 14). The mast bearing nut is secured between the locking plate and the seal.

3.14.2 Defects. Defects may occur anywhere on the surface of the nut. No cracks are allowed.

3.14.3 Primary Method. Magnetic Particle.

3.14.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Magnetic Particle Inspection Probe/Yoke
- b. Magnetometer
- c. Black Light
- d. Fluorescent Magnetic Particles, refer to Table 1-8
- e. Consumable Materials, refer to Table 1-8
- f. Aircraft Marking Pencil, refer to Table 1-8

3.14.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the mast bearing nut removed in accordance with the applicable technical manuals listed in Table 1-1.

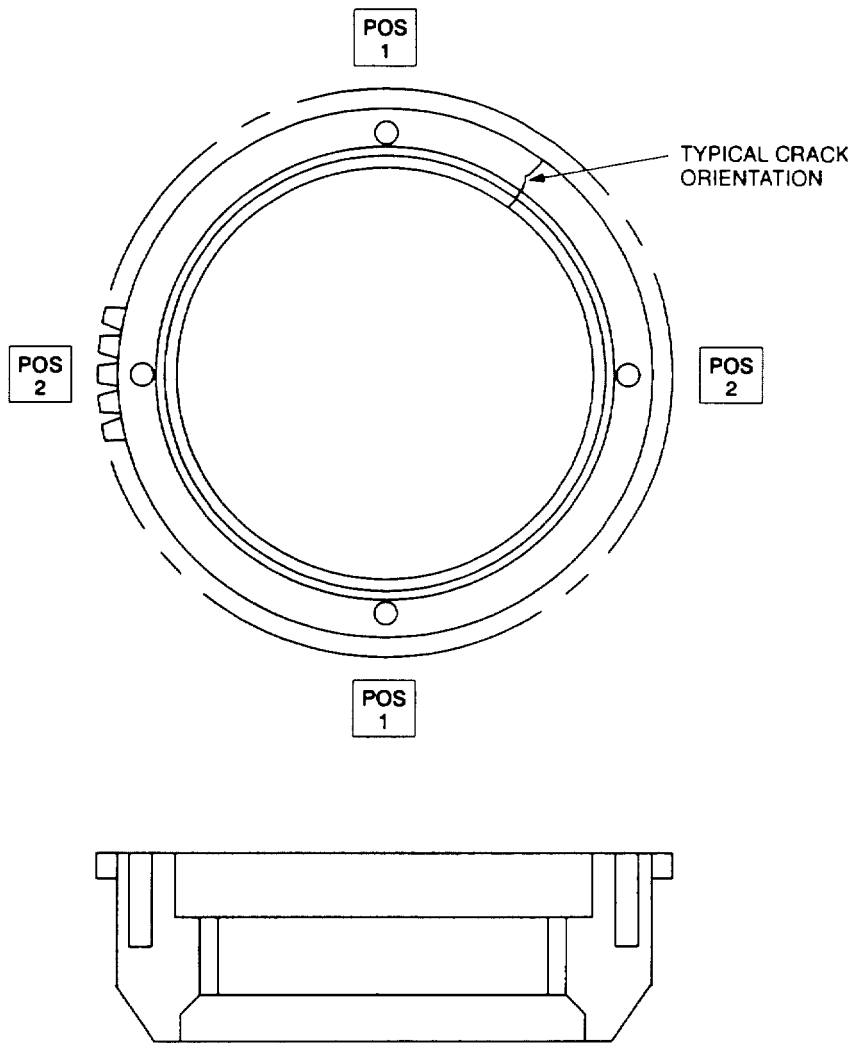
3.14.3.3 Access. Not applicable.

3.14.3.4 Preparation of Part. The part shall be thoroughly cleaned. Refer to Preparation of Part of Area for NDI, paragraph 1.4.4.

3.14.3.5 NDI Equipment Settings. Refer to Magnetic Particle Method, paragraph 1.4.8.

3.14.3.6 Inspection Procedure. A magnetic field shall be applied to the part perpendicular to the orientation of possible cracks. Positions required for this inspection are illustrated in Figure 3-14.

- a. Select AC on the AC/DC power switch.
- b. Place probe/yoke on part in Position 1 as shown.
- c. Press the test switch and apply a light coat of magnetic particle media at the same time. Remove the media momentarily before removing the current. Current should be applied for no more than five seconds.
- d. Inspect for cracks using the black light.
- e. Demagnetize before moving to the next position. Refer to paragraph 3.14.3.8.
- f. Repeat steps a. through e. for Position 2.



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Figure 3-14. Mast Bearing Nut



3.14.3.7 **Marking and Recording of Inspection Results.** Mark and record the inspection results as necessary per paragraph 1.3.

3.14.3.8 **Demagnetization.** With the switch remaining in the AC position, place the probe/yoke legs in the same position used for magnetizing. Press the test switch and withdraw the probe/yoke from the part for a distance of two feet before releasing the switch.

3.14.4 **Backup Method.** Refer to paragraph 1.4.7.

3.14.5 **System Securing.** Clean the mast bearing nut thoroughly to remove all residual magnetic particle media. Refer to Post Cleaning and Restoration of Part or Area After NDI, paragraph 1.4.16. The mast bearing nut requires installation in accordance with the applicable technical manuals listed in Table 1-1.

### **3.15 SEAL AND BEARING RETAINING PLATE (MT).**

3.15.1 **Description (Figure 3-1, Index No. 15).** The seal and bearing retaining plate connects to the liner and retains the locking plate, bearing nut and seal.

3.15.2 **Defects.** Defects may occur anywhere on the surface of the part. No cracks are allowed.

3.15.3 **Primary Method.** Magnetic Particle.

3.15.3.1 **NDI Equipment and Materials.** (Refer to Appendix B.)

- a. Magnetic Particle Inspection Probe/Yoke
- b. Magnetometer
- c. Black Light
- d. Fluorescent Magnetic Particles, refer to Table 1-8
- e. Consumable Materials, refer to Table 1-8
- f. Aircraft Marking Pencil, refer to Table 1-8

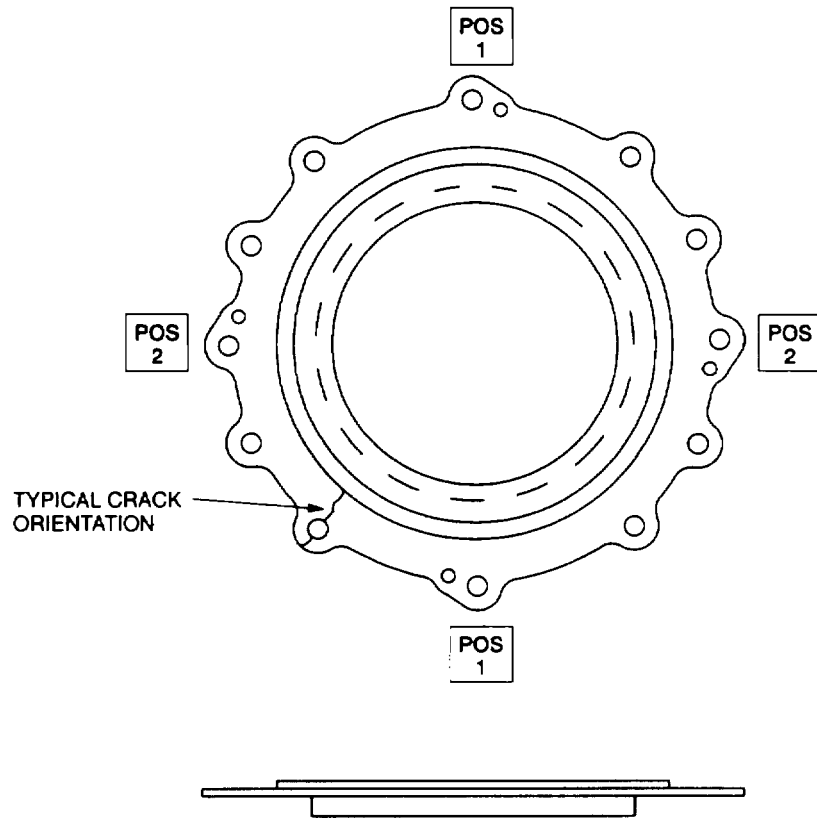
3.15.3.2 **Preparation of Helicopter.** The helicopter shall be prepared for safe ground maintenance and the seal and bearing retaining plate removed in accordance with the applicable technical manuals listed in Table 1-1.

3.15.3.3 **Access.** Not applicable.

3.15.3.4 **Preparation of Part.** The part shall be thoroughly cleaned. Refer to Preparation of Part of Area for NDI, paragraph 1.4.4.

3.15.3.5 **NDI Equipment Settings.** Refer to Magnetic Particle Method, paragraph 1.4.8.

3.15.3.6 **Inspection Procedure.** A magnetic field shall be applied to the part perpendicular to the orientation of possible cracks. Positions required for this inspection are illustrated in Figure 3-15.



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**Figure 3-15. Seal And Bearing Retaining Plate**

- a. Select AC on the AC/DC power switch.
- b. Place probe/yoke on part in Position 1 as shown.
- c. Press the test switch and apply a light coat of magnetic particle media at the same time. Remove the media momentarily before removing the current. Current should be applied for no more than five seconds.
- d. Inspect for cracks using the black light.
- e. Demagnetize before moving to the next position. Refer to paragraph 3.15.3.8.
- f. Repeat steps a. through e. for Position 2.

3.15.3.7 **Marking and Recording of Inspection Results.** Mark and record the inspection results as necessary per paragraph 1.3.

3.15.3.8 **Demagnetization.** With the switch remaining in the AC position, place the probe/yoke legs in the same position used for magnetizing. Press the test switch and withdraw the probe/yoke from the part for a distance of two feet before releasing the switch.

3.15.4 **Backup Method.** Refer to paragraph 1.4.7.

3.15.5 **System Securing.** Clean the seal and bearing retaining plate thoroughly to remove all residual magnetic particle media. Refer to Post Cleaning and Restoration of Part or Area After NDI, paragraph 1.4.16. The seal and bearing retaining plate requires installation in accordance with the applicable technical manuals listed in Table 1-1.

### **3.16 UPPER MAST BEARING LINER (MT).**

3.16.1 **Description (Figure 3-1. Index No. 16).** The bearing liner connects to the mast and seal plate, which retains the shin, bearing and packing.

3.16.2 **Defects.** Defects may occur anywhere on the surface of the liner. No cracks are allowed.

3.16.3 **Primary Method.** Magnetic Particle.

3.16.3.1 **NDI Equipment and Materials.** (Refer to Appendix B.)

- a. Magnetic Particle Inspection Probe/Yoke
- b. Magnetometer
- c. Black Light
- d. Fluorescent Magnetic Particles, refer to Table 1-8
- e. Consumable Materials, refer to Table 1-8
- f. Aircraft Marking Pencil, refer to Table 1-8

3.16.3.2 **Preparation of Helicopter.** The helicopter shall be prepared for safe ground maintenance and the upper mast bearing liner removed in accordance with the applicable technical manuals listed in Table 1-1.

3.16.3.3 Access. Not applicable.

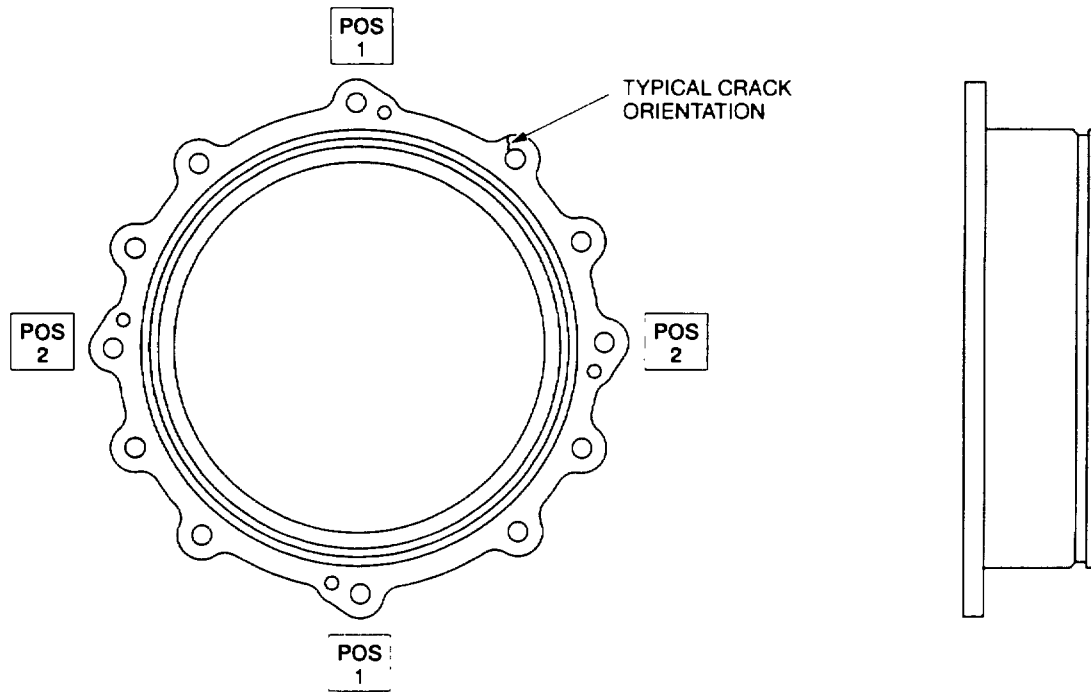
3.16.3.4 Preparation of Part. The part shall be thoroughly cleaned. Refer to Preparation of Part of Area for NDI, paragraph 1.4.4.

3.16.3.5 NDI Equipment Settings. Refer to Magnetic Particle Method, paragraph 1.4.8.

3.16.3.6 Inspection Procedure. A magnetic field shall be applied to the part perpendicular to the orientation of possible cracks. Positions required for this inspection are illustrated in Figure 3-16.

- a. Select AC on the AC/DC power switch.
- b. Place probe/yoke on part in Position 1 as shown.
- c. Press the test switch and apply a light coat of magnetic particle media at the same time. Remove the media momentarily before removing the current. Current should be applied for no more than five seconds.
- d. Inspect for cracks using the black light.
- e. Demagnetize before moving to the next position. Refer to paragraph 3.16.3.8.
- f. Repeat steps a. through e. for Position 2.

3.16.3.7 Marking and Recording of Inspection Results. Mark and record the inspection results as necessary per paragraph 1.3.



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Figure 3-16. Upper Mast Bearing Liner

3.16.3.8 Demagnetization. With the switch remaining in the AC position, place the probe/yoke legs in the same position used for magnetizing. Press the test switch and withdraw the probe/yoke from the part for a distance of two feet before releasing the switch.

3.16.4 Backup Method. None required.

3.16.5 System Securing. Clean the upper mast bearing liner thoroughly to remove all residual magnetic particle media. Refer to Post Cleaning and Restoration of Part or Area After NDI, paragraph

3.4.16. The upper mast bearing liner requires installation in accordance with the applicable technical manuals listed in Table 1-1.

### **3.17 DUPLEX BEARING NUT (ET).**

3.17.1 Description (Figure 3-1. Index No. 17). The duplex bearing nut is threaded into the seal cap assembly of the free wheeling unit.

3.17.2 Defects. Defects may occur anywhere on the surface of the duplex bearing nut. No cracks are allowed.

3.17.3 Primary Method. Eddy Current.

3.17.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100KHz-500KHz
- c. Probe, right angle, shielded surface, 100KHz-500KHz, 900 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

3.17.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the duplex bearing nut removed in accordance with the applicable technical manuals listed in Table 1-1.

3.17.3.3 Access. Not applicable.

3.17.3.4 Preparation of Part. The duplex bearing nut shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

3.17.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e<sup>II</sup>.

Frequency F1 - 200 KHz		F2	- off
Hdb- 57.0			
Vdb- 69.0			
Rot- 560			
Probe drive	- mid		
LPF- 100			
HPF- 0			
H Pos	- 80%		
V Pos- 20%			

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

3.17.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 3-17

- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

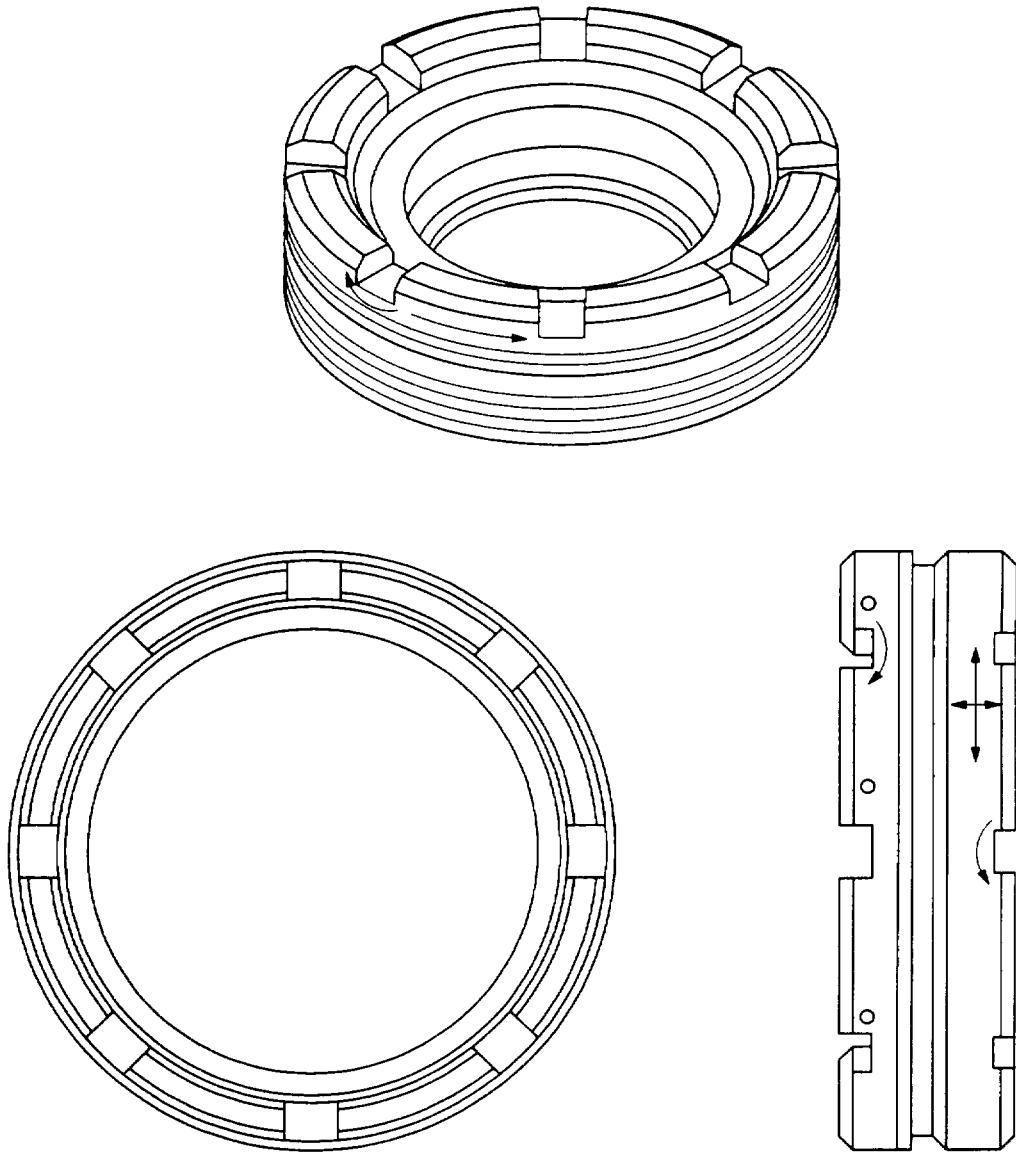
**NOTE**

**Either probe identified in paragraph 3.17.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 3.17.3.5 b. (1), (2) and (3) shall be repeated each time a change is made.**

3.17.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.

3.17.4 Backup Method. None required.

3.17.5 System Securing. The duplex bearing nut requires installation in accordance with the applicable technical manual listed in Table 1-1.



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Figure 3-17. Duplex Bearing Nut

**3.18 SHAFT PLUG ASSEMBLY (ET).**

3.18.1 Description (Figure 3.1. Index No. 18). The shaft plug assembly is part of the free wheeling unit which retains the lubricating oil within the free wheeling unit.

3.18.2 Defects. Defects may occur anywhere on the surface of the shaft plug assembly. No cracks are allowed.

3.18.3 Primary Method. Eddy Current.

3.18.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100KHz-500KHz
- c. Probe, right angle, shielded surface, 100KHz-500KHz, 900 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

3.18.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the shaft plug assembly removed in accordance with the applicable technical manuals listed in Table 1-1.

3.18.3.3 Access. Not Applicable

3.18.3.4 Preparation of Part. The shaft plug assembly shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

3.18.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-1 9e1.
 

Frequency F1 - 200 KHz	F2	- off
Hdb- 57.0		
Vdb- 69.0		
Rot- 56°		
Probe drive	- mid	
LPF- 100		
HPF- 0		
H Pos	- 80%	
V Pos- 20%		

b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)



3.18.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 3-18.

- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

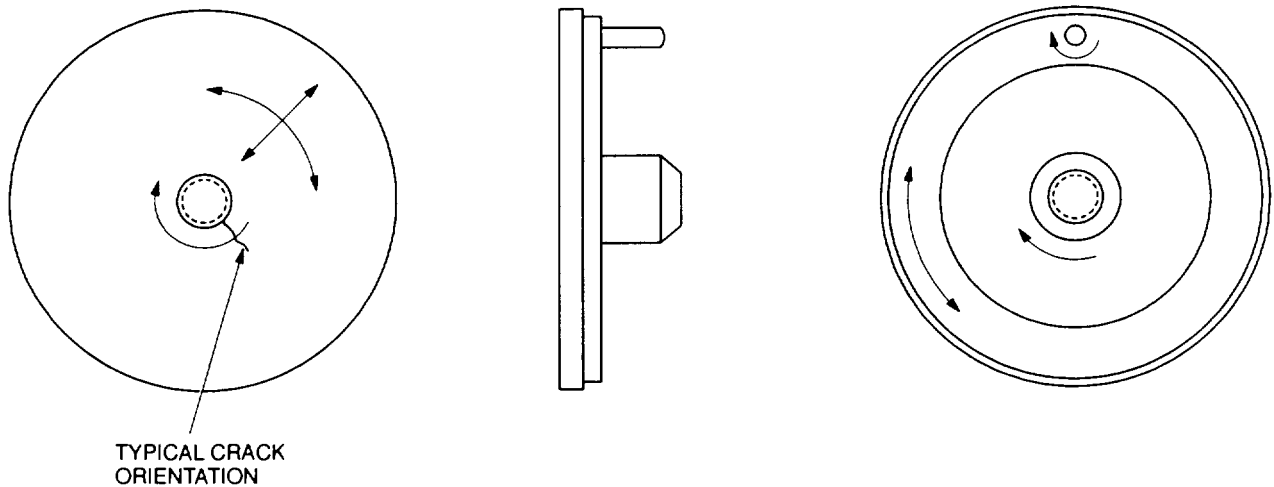
**NOTE**

Either probe identified in paragraph 3.18.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 3.18.3.5 b. (1), (2) and (3) shall be repeated each time a change is made.

3.18.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.

3.18.4 Backup Method. Refer to paragraph 1.4.7.

3.18.5 System Securing. The Shaft plug assembly requires installation in accordance with the applicable technical manual listed in Table 1-1.



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**Figure 3-18. Shaft Plug Assembly**

### 3.19 ADAPTER BOLT (MT).

3.19.1 Description (Figure 3-1. Index No. 19). The adapter bolt secures the main driveshaft adapter to the freewheeling unit.

3.19.2 Defects. Defects may occur anywhere on the surface of the adapter bolt. No cracks are allowed.

3.19.3 Primary Method. Magnetic Particle.

3.19.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Magnetic Particle Inspection Probe/Yoke
- b. Magnetometer
- c. Black Light
- d. Fluorescent Magnetic Particles, refer to Table 1-8
- e. Consumable Materials, refer to Table 1-8
- f. Aircraft Marking Pencil, refer to Table 1-8

3.19.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the adapter bolt shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

3.19.3.3 Access. Not applicable

#### **WARNING**

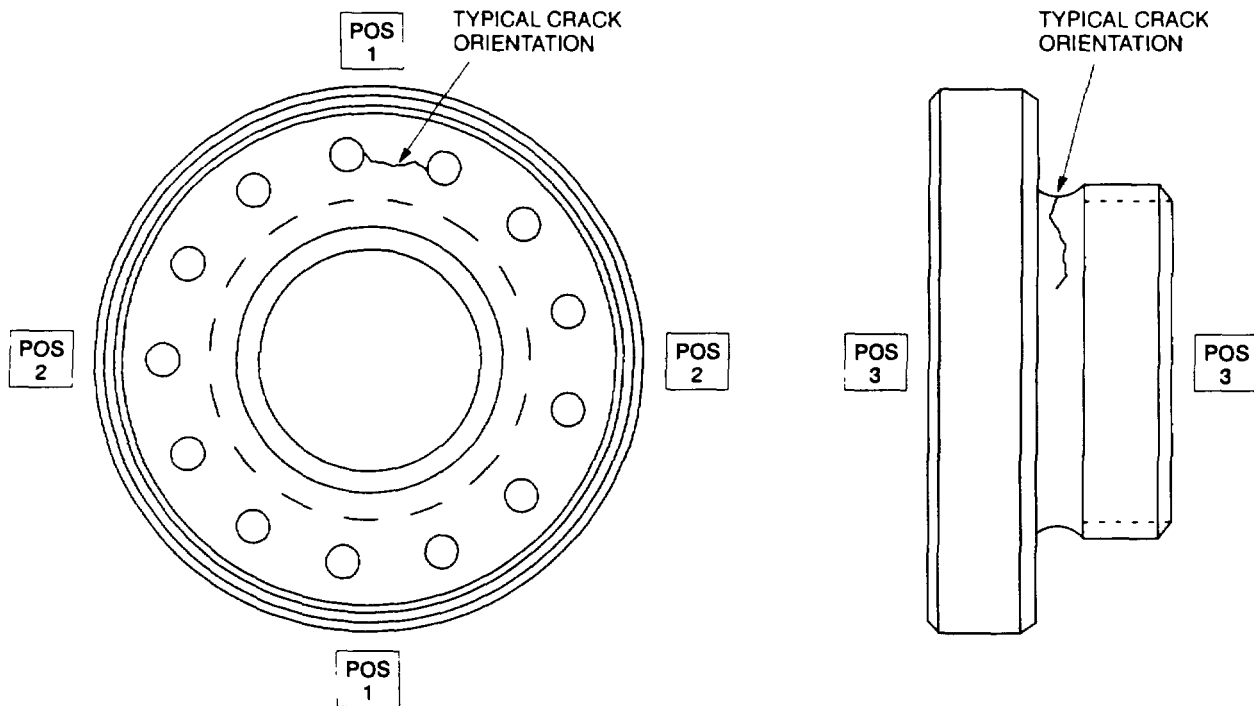
##### **Maintenance Platforms/Workstands**

**Use only appropriate platforms, workstands, or other approved locally procured stands and restraint equipment when working above 10 feet on helicopters in a nontactical environment. Otherwise, personnel injury could result from accidental falls.**

3.19.3.4 Preparation of Part. The part shall be thoroughly cleaned. Refer to Preparation of Part of Area for NDI, paragraph 1.4.4.

3.19.3.5 NDI Equipment Settings. Refer to Magnetic Particle Method, paragraph 1.4.8.

3.19.3.6 Inspection Procedure. A magnetic field shall be applied to the part perpendicular to the orientation of possible cracks. Positions required for this inspection are illustrated in Figure 3-19.



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**Figure 3-19. Adapter Bolt**

- Select AC on the AC/DC power switch.
- Place probe/yoke on part in Position 1 as shown.
- Press the test switch and apply a light coat of magnetic particle media at the same time. Remove the media momentarily before removing the current. Current should be applied for no more than five seconds.
- Inspect for cracks using the black light.
- Demagnetize before moving to the next position. Refer to paragraph 3.19.3.8.

3.19.3.7 **Marking and Recording of Inspection Results.** Mark and record the inspection results as necessary per paragraph 1.3.

3.19.3.8 **Demagnetization.** With the switch remaining in the AC position, place the probe/yoke legs in the same position used for magnetizing. Press the test switch and withdraw the probe/yoke from the part for a distance of two feet before releasing the switch.

3.19.4 **Backup Method.** None required.

3.19.5 System Securing. Clean the adapter bolt thoroughly to remove all residual magnetic particle media. Refer to Post Cleaning and Restoration of Part or Area After NDI, paragraph 1.4.16. The adapter bolt, if removed, requires installation in accordance with the applicable technical manuals listed in Table 1-1.

### 3.20 MAIN DRIVESHAFT ADAPTER (MT).

3.20.1 Description (Figure 3-1. Index No. 20). The main driveshaft adapter is bolted to the freewheeling with output shaft assembly.

3.20.2 Defects. Defects may occur anywhere on the surface of the main driveshaft adapter. No cracks are allowed.

3.20.3 Primary Method. Magnetic Particle.

3.20.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Magnetic Particle Inspection Probe/Yoke
- b. Magnetometer
- c. Black Light
- d. Fluorescent Magnetic Particles, refer to Table 1-8
- e. Consumable Materials, refer to Table 1-8
- f. Aircraft Marking Pencil, refer to Table 1-8

3.20.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the main driveshaft adapter removed in accordance with the applicable technical manuals listed in Table 1-1.

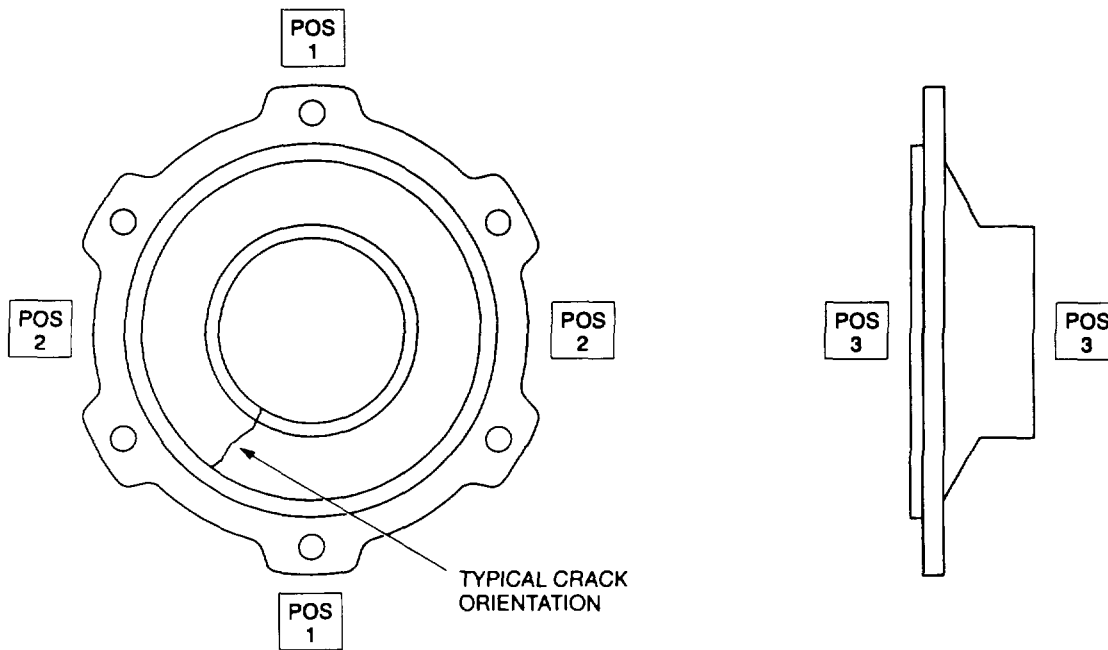
3.20.3.3 Access. Not applicable.

3.20.3.4 Preparation of Part. The part shall be thoroughly cleaned. Refer to Preparation of Part of Area for NDI, paragraph 1.4.4.

3.20.3.5 NDI Equipment Settings. Refer to Magnetic Particle Method, paragraph 1.4.8.

3.20.3.6 Inspection Procedure. A magnetic field shall be applied to the part perpendicular to the orientation of possible cracks. Positions required for this inspection are illustrated in Figure 3-20.

- a. Select AC on the AC/DC power switch.
- b. Place probe/yoke on part in Position 1 as shown.
- c. Press the test switch and apply a light coat of magnetic particle media at the same time. Remove the media momentarily before removing the current. Current should be applied for no more than five seconds.
- d. Inspect for cracks using the black light.
- e. Demagnetize before moving to the next position. Refer to paragraph 3.20.3.8.
- f. Repeat steps a. through e. for Position 2 and 3.



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**Figure 3-20. Main Driveshaft Adapter**

3.20.3.7 **Marking and Recording of Inspection Results.** Mark and record the inspection results as necessary per paragraph 1.3.

3.20.3.8 **Demagnetization.** With the switch remaining in the AC position, place the probe/yoke legs in the same position used for magnetizing. Press the test switch and withdraw the probe/yoke from the part for a distance of two feet before releasing the switch.

3.20.4 **Backup Method.** None required.

3.20.5 **System Securing.** Clean the main driveshaft adapter thoroughly to remove all residual magnetic particle media. Refer to Post Cleaning and Restoration of Part or Area After NDI, paragraph 1.4.16. The main driveshaft adapter requires installation in accordance with the applicable technical manuals listed in Table 1-1.

### 3.21 FORWARD SEAL CAP (ET).

3.21.1 **Description (Figure 3-1. Index No. 21).** The forward seal cap is a component of the freewheeling unit which retains the forward bearing to the output shaft.

3.21.2 **Defects.** Defects may occur anywhere on the surface of forward seal cap. No cracks are allowed.

3.21.3 **Primary Method.** Eddy Current.

3.21.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100KHz-500KHz
- c. Probe, right angle, shielded surface, 100KHz-500KHz, 900 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

3.21.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the forward seal cap removed in accordance with the applicable technical manuals listed in Table 1-1.

3.21.3.3 Access. Not applicable.

3.21.3.4 Preparation of Part. The forward seal cap shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

3.21.3.5 NDI Equipment Settings.

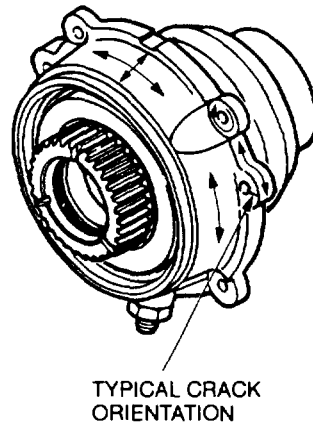
- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e. .

Frequency F1 - 200 KHz		F2	- off
Hdb- 57.0			
Vdb- 69.0			
Rot- 560			
Probe drive	- mid		
LPF- 100			
HPF- 0			
H Pos	- 80%		
V Pos- 20%			

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

3.21.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 3-21. '



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**Figure 3-21. Forward Seal Cap**

- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

**NOTE**

**Either probe identified in paragraph 3.21.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 3.21.3.5 b. (1), (2) and (3) shall be repeated each time a change is made.**

3.21.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.

3.21.4 Backup Method. None required.

3.21.5 System Securing. The forward seal cap requires installation in accordance with the applicable technical manual listed in Table 1-1.

### 3.22 FORWARD SHAFT (MT).

3.22.1 Description (Figure 3-1. Index No. 22). The forward shaft is a component of the freewheeling unit. The forward shaft adapts to the transmission driveshaft and the tail rotor driveshaft to provide power to the main and tail rotor respectively.

3.22.2 Defects. Defects may occur anywhere on the surface of the forward shaft. No cracks are allowed.

3.22.3 Primary Method. Magnetic Particle.

3.22.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Magnetic Particle Inspection Probe/Yoke
- b. Magnetometer
- c. Black Light
- d. Fluorescent Magnetic Particles, refer to Table 1-8
- e. Consumable Materials, refer to Table 1-8
- f. Aircraft Marking Pencil, refer to Table 1-8

3.22.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the forward shaft removed in accordance with the applicable technical manuals listed in Table 1-1.

3.22.3.3 Access. Not applicable.

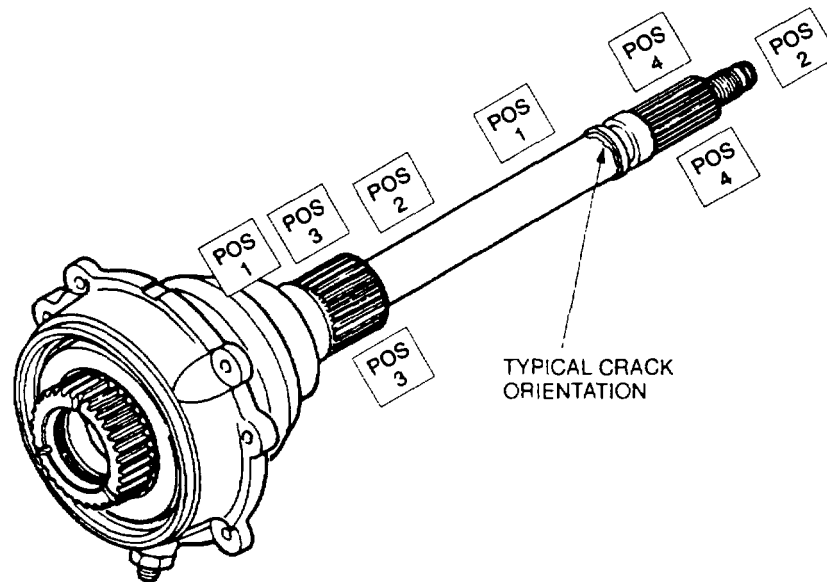
3.22.3.4 Preparation of Part. The part shall be thoroughly cleaned. Refer to Preparation of Part of Area for NDI, paragraph 1.4.4.

3.22.3.5 NDI Equipment Settings. Refer to Magnetic Particle Method, paragraph 1.4.8.

3.22.3.6 Inspection Procedure. A magnetic field shall be applied to the part perpendicular to the orientation of possible cracks. Positions required for this inspection are illustrated in Figure 3-22.

- a. Select AC on the AC/DC power switch.
- b. Place probe/yoke on part in Position 1 as shown.
- c. Press the test switch and apply a light coat of magnetic particle media at the same time. Remove the media momentarily before removing the current. Current should be applied for no more than five seconds.
- d. Inspect for cracks using the black light.
- e. Demagnetize before moving to the next position. Refer to paragraph 3.22.3.8.
- f. Repeat steps a. through e. for Position 2.
- g. Rotate shaft 90 and repeat steps 1 and 2. Identified as Position 3 and Position 4.





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**Figure 3-22. Forward Shaft**

3.22.3.7 **Marking and Recording of Inspection Results.** Mark and record the inspection results as necessary per paragraph 1.3.

3.22.3.8 **Demagnetization.** With the switch remaining in the AC position, place the probe/yoke legs in the same position used for magnetizing. Press the test switch and withdraw the probe/yoke from the part for a distance of two feet before releasing the switch.

3.22.4 **Backup Method.** None required.

3.22.5 **System Securing.** Clean the forward shaft thoroughly to remove all residual magnetic particle media. Refer to Post Cleaning and Restoration of Part or Area After NDI, paragraph 1.4.16. The forward shaft requires installation in accordance with the applicable technical manuals listed in Table 1-1.

### 3.23 PILOT RING (ET).

3.23.1 **Description (Figure 3-1, Index No. 23).** The pilot ring secures the freewheeling housing to the mounting studs of the gearcase.

3.23.2 **Defects.** Defects may occur anywhere on the surface of the pilot ring. No cracks are allowed.

3.23.3 **Primary Method.** Eddy Current.

3.23.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100KHz-500KHz
- c. Probe, right angle, shielded surface, 100KHz-500KHz, 900 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

3.23.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the pilot ring removed in accordance with the applicable technical manuals listed in Table 1-1.

3.23.3.3 Access. Not applicable.

3.23.3.4 Preparation of Part. The pilot ring shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

3.23.3.5 NDI Equipment Settings.

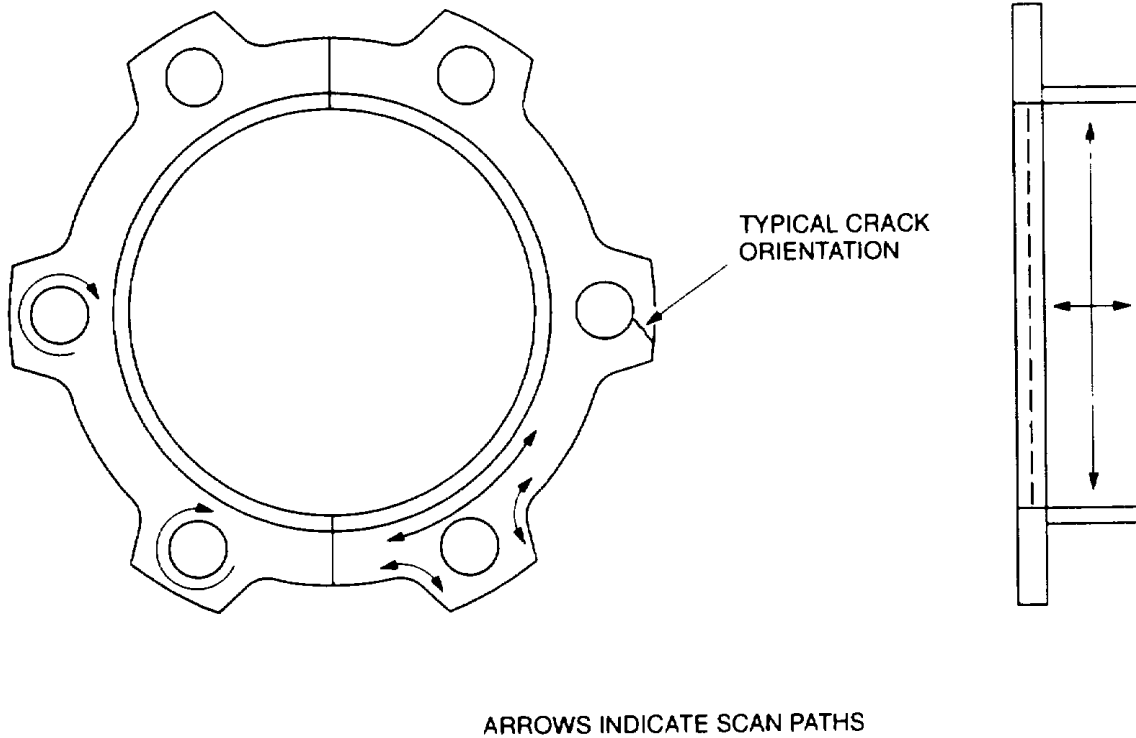
- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-1 9e<sup>II</sup>.
 

Frequency F	-200 KHz	F2	- off
Hdb-	57.0		
Vdb-	69.0		
Rot-	560		
Probe drive	- mid		
LPF-	100		
HPF-	0		
H Pos	- 80%		
V Pos-	20%		

b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

3.23.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 3-23.



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**Figure 3-23. Pilot Ring**

- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

**NOTE**

Either probe identified in paragraph 3.23.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 3.23.3.5 b. (1), (2) and (3) shall be repeated each time a change is made.

3.23.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.

3.23.4 Backup Method. Refer to paragraph 1.4.7.

3.23.5 System Securing. The pilot ring requires installation in accordance with the applicable technical manual listed in Table 1-1.

**3.24 HOUSING ASSEMBLY (ET).**

3.24.1 Description (Figure 3-1. Index No. 24). The housing freewheeling housing assembly is mounted on the forward end of the engine accessory gearcase and provides coupling adaptation of the transmission driveshaft to the tail rotor driveshaft.

3.24.2 Defects. Defects may occur anywhere on the surfaces of the housing assembly. No cracks are allowed.

3.24.3 Primary Method. Eddy Current.

3.24.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100KHz-500KHz
- c. Probe, right angle, shielded surface, 100KHz-500KHz, 900 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched magnesium (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

3.24.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance.

Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the housing assembly shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

3.24.3.3 Access. Not applicable.

3.24.3.4 Preparation of Part. The housing assembly shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

3.24.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-1 9e'.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 56°		
Probe drive	- mid		
LPF	- 100		
HPF	- 0		
H Pos	- 80%		
V Pos	- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:
  - (1) Null probe on test block.
  - (2) Adjust phase as required to obtain horizontal lift-off.
  - (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

3.24.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 3-24.

- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

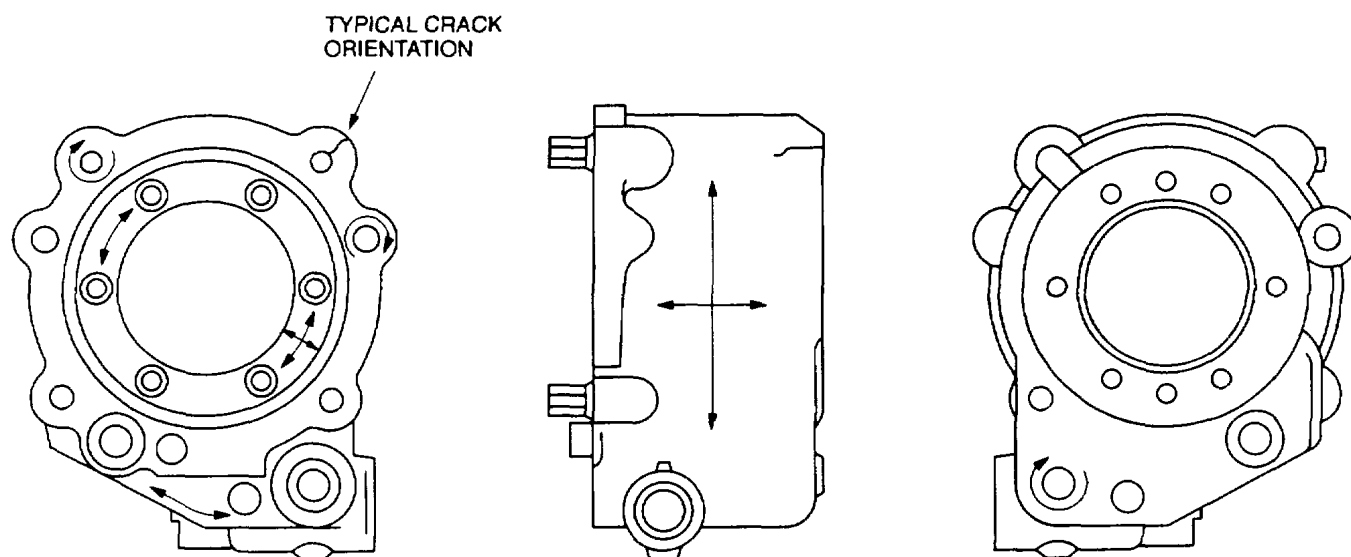
**NOTE**

**Either probe identified in paragraph 3.24.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 3.24.3.5 b.(1), (2) and (3) shall be repeated each time a change is made.**

3.24.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.

3.24.4 Backup Method. Refer to paragraph 1.4.7.

3.24.5 System Securing. The housing assembly, if removed, requires installation in accordance with the applicable technical manual listed in Table 1-1.



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**Figure 3-24. Housing Assembly**

### 3.25 CONE SET (MT).

3.25.1 Description (Figure 3-1. Index No. 25). The cone set is installed on the aft end of the output shaft.

3.25.2 Defects. Defects may occur anywhere on the surface of the cone set. No cracks are allowed

3.25.3 Primary Method. Magnetic Particle.

3.25.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Magnetic Particle Inspection Probe/Yoke
- b. Magnetometer
- c. Black Light
- d. Fluorescent Magnetic Particles, refer to Table 1-8
- e. Consumable Materials, refer to Table 1-8
- f. Aircraft Marking Pencil, refer to Table 1-8

3.25.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the cone set removed in accordance with the applicable technical manuals listed in Table 1-1.

3.25.3.3 Access. Not applicable.

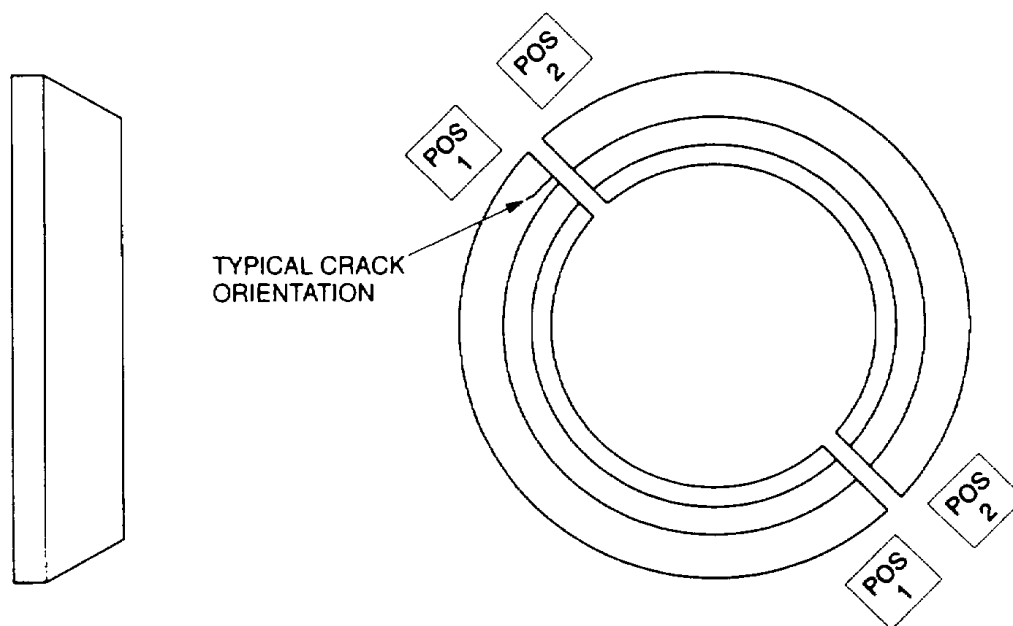
3.25.3.4 Preparation of Part. The part shall be thoroughly cleaned. Refer to Preparation of Part of Area for NDI, paragraph 1.4.4.

3.25.3.5 NDI Equipment Settings. Refer to Magnetic Particle Method, paragraph 1.4.8.

3.25.3.6 Inspection Procedure. A magnetic field shall be applied to the part perpendicular to the orientation of possible cracks. Positions required for this inspection are illustrated in Figure 3-25.

- a. Select AC on the AC/DC power switch.
- b. Place probe/yoke on part in Position 1 as shown.
- c. Press the test switch and apply a light coat of magnetic particle media at the same time. Remove the media momentarily before removing the current. Current should be applied for no more than five seconds.
- d. Inspect for cracks using the black light.
- e. Demagnetize before moving to the next position. Refer to paragraph 3.25.3.8.
- f. Repeat steps a. through e. for Position 2.

3.25.3.7 Marking and Recording of Inspection Results. Mark and record the inspection results as necessary per paragraph 1.3.



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**Figure 3-25. Cone Set**

3.25.3.8 Demagnetization. With the switch remaining in the AC position, place the probe/yoke legs in the same position used for magnetizing. Press the test switch and withdraw the probe/yoke from the part for a distance of two feet before releasing the switch.

3.25.4 Backup Method. None required.

3.25.5 System Securing. Clean the cone set thoroughly to remove all residual magnetic particle media. Refer to Post Cleaning and Restoration of Part or Area After NDI, paragraph 1.4.16. The cone set requires installation in accordance with the applicable technical manuals listed in Table 1-1.

### **3.26 CONE SET SPACER (MT).**

3.26.1 Description (Figure 3-1. Index No. 26). The cone set spacer secures the cone set to the aft end of the output shaft.

3.26.2 Defects. Defects may occur anywhere on the surface of the cone set spacer. No cracks are allowed.

3.26.3 Primary Method. Magnetic Particle.

3.26.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Magnetic Particle Inspection Probe/Yoke
- b. Magnetometer
- c. Black Light
- d. Fluorescent Magnetic Particles, refer to Table 1-8
- e. Consumable Materials, refer to Table 1-8
- f. Aircraft Marking Pencil, refer to Table 1-8

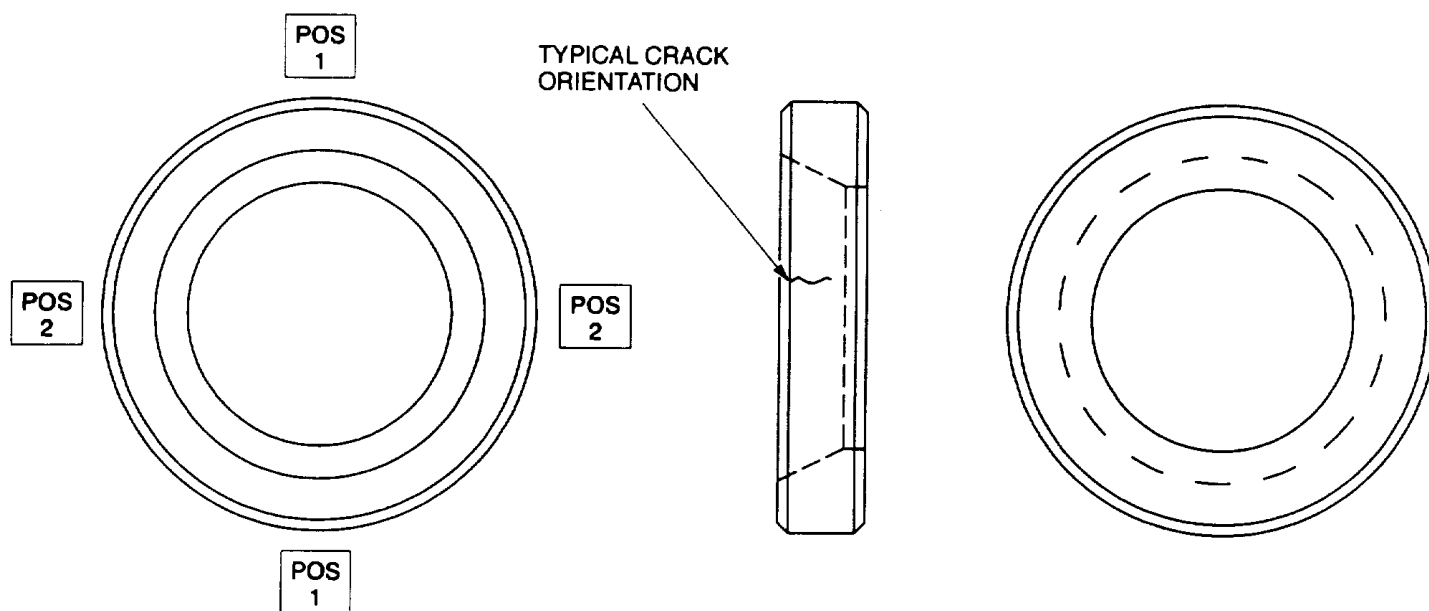
3.26.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the cone set spacer removed in accordance with the applicable technical manuals listed in Table 1-1.

3.26.3.3 Access. Not applicable.

3.26.3.4 Preparation of Part. The part shall be thoroughly cleaned. Refer to Preparation of Part of Area for NDI, paragraph 1.4.4.

3.26.3.5 NDI Equipment Settings. Refer to Magnetic Particle Method, paragraph 1.4.8.

3.26.3.6 Inspection Procedure. A magnetic field shall be applied to the part perpendicular to the orientation of possible cracks. Positions required for this inspection are illustrated in Figure 3-26.



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Figure 3-26. Cone Set Spacer



- a. Select AC on the AC/DC power switch.
- b. Place probe/yoke on part in Position 1 as shown.
- c. Press the test switch and apply a light coat of magnetic particle media at the same time. Remove the media momentarily before removing the current. Current should be applied for no more than five seconds.
- d. Inspect for cracks using the black light.
- e. Demagnetize before moving to the next position. Refer to paragraph 3.26.3.8.
- f. Repeat steps a. through e. for Position 2.

3.26.3.7 **Marking and Recording of Inspection Results.** Mark and record the inspection results as necessary per paragraph 1.3.

3.26.3.8 **Demagnetization.** With the switch remaining in the AC position, place the probe/yoke legs in the same position used for magnetizing. Press the test switch and withdraw the probe/yoke from the part for a distance of two feet before releasing the switch.

3.26.4 **Backup Method.** None required.

3.26.5 **System Securing.** Clean the cone set spacer thoroughly to remove all residual magnetic particle media. Refer to Post Cleaning and Restoration of Part or Area After NDI, paragraph 1.4.16. The cone set spacer requires installation in accordance with the applicable technical manuals listed in Table 1-1.

### **3.27 AFT BEARING AND SEAL CAP (ET).**

3.27.1 **Description** (Figure 3-1. Index No. 27). The aft bearing and seal cap retains the aft bearing and seal within the freewheeling housing.

3.27.2 **Defects.** Defects may occur anywhere on the surface of the aft bearing and seal cap. No cracks are allowed.

3.27.3 **Primary Method.** Eddy Current.

3.27.3.1 **NDI Equipment and Materials.** (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100KHz - 500KHz
- c. Probe, right angle, shielded surface, 100KHz-500KHz, 900 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

3.27.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the aft bearing and seal cap removed in accordance with the applicable technical manuals listed in Table 1-1.

3.27.3.3 Access. Not applicable.

3.27.3.4 Preparation of Part. The aft bearing and seal cap shall be thoroughly cleaned. Refer; Preparation of Part or Area for NDI, paragraph 1.4.4.

3.27.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19eII.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 56°		
Probe drive	- mid		
LPF	- 100		
HPF	- 0		
H Pos	- 80%		
V Pos	- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

3.27.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 3-27.

- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

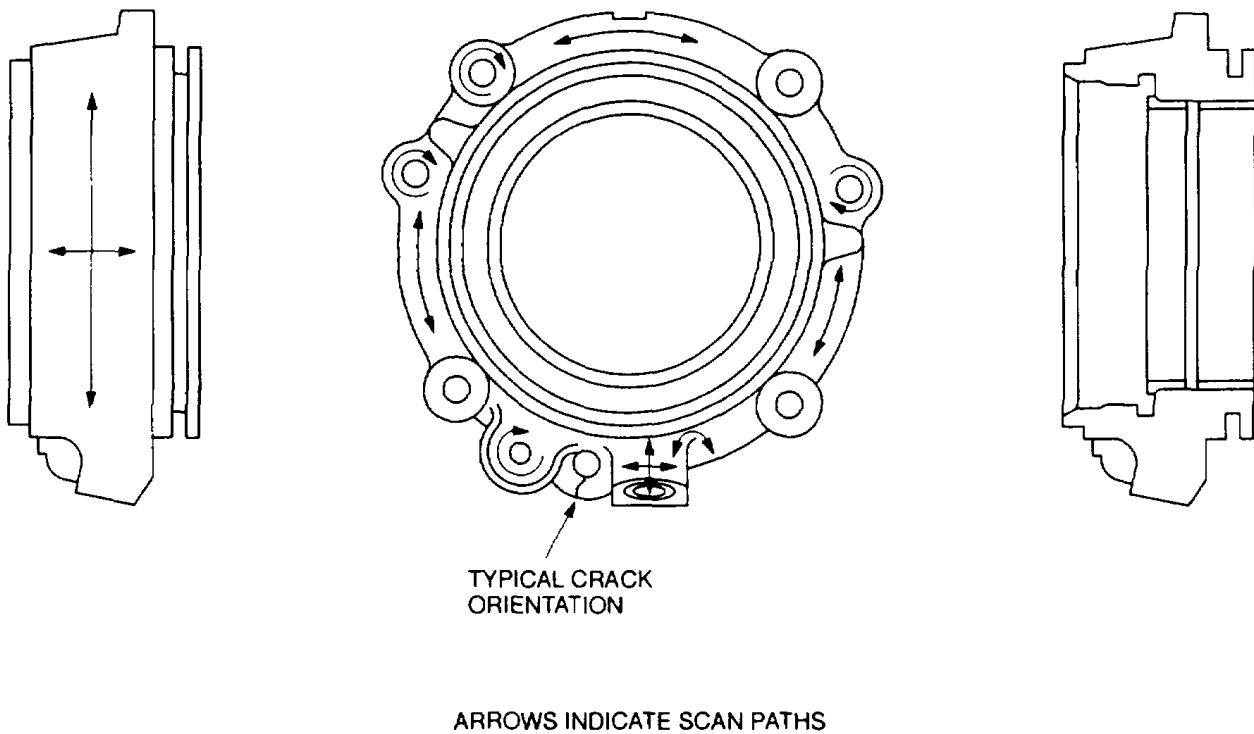
**NOTE**

**Either probe identified in paragraph 3.27.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 3.27.3.5 b. (1), (2) and (3) shall be repeated each time a change is made.**

3.27.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.

3.27.4 Backup Method. None required.

3.27.5 System Securing. The aft bearing and seal cap requires installation in accordance with the applicable technical manual listed in Table 1-1.



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**Figure 3-27. Aft Bearing And Seal Cap**

**3.28 OUTPUT ADAPTER (MT).**

3.28.1 Description (Figure 3-1. Index No. 28). The output adapter connects the tail rotor driveshaft to the output shaft.

3.28.2 Defects. Defects may occur anywhere on the surface of the output adapter. No cracks are allowed.

3.28.3 Primary Method. Magnetic Particle.

3.28.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Magnetic Particle Inspection Probe/Yoke
- b. Magnetometer
- c. Black Light
- d. Fluorescent Magnetic Particles, refer to Table 1-8
- e. Consumable Materials, refer to Table 1-8
- f. Aircraft Marking Pencil, refer to Table 1-8

3.28.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the output adapter removed in accordance with the applicable technical manuals listed in Table 1-1.

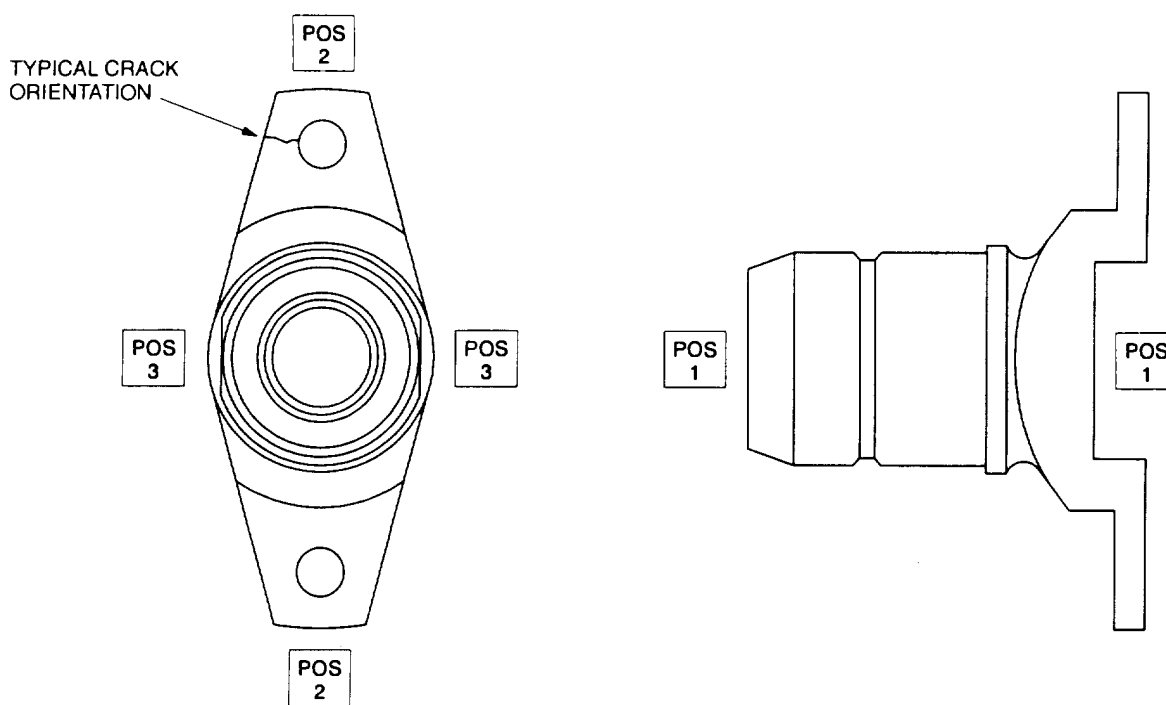
3.28.3.3 Access. Not applicable.

3.28.3.4 Preparation of Part. The part shall be thoroughly cleaned. Refer to Preparation of Part o, Area for NDI, paragraph 1.4.4.

3.28.3.5 NDI Equipment Settings. Refer to Magnetic Particle Method, paragraph 1.4.8.

3.28.3.6 Inspection Procedure. A magnetic field shall be applied to the part perpendicular to the orientation of possible cracks. Positions required for this inspection are illustrated in Figure 3-28.

- a. Select AC on the AC/DC power switch.
- b. Place probe/yoke on part in Position 1 as shown.
- c. Press the test switch and apply a light coat of magnetic particle media at the same time. Remove the media momentarily before removing the current. Current should be applied for no more than five seconds.
- d. Inspect for cracks using the black light.
- e. Demagnetize before moving to the next position. Refer to paragraph 3.28.3.8.
- f. Repeat steps a. through e. for Position 2 and 3.



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Figure 3-28. Output Adapter

3.28.3.7 Marking and Recording of Inspection Results. Mark and record the inspection results as necessary per paragraph 1.3.

3.28.3.8 Demagnetization. With the switch remaining in the AC position, place the probe/yoke legs in the same position used for magnetizing. Press the test switch and withdraw the probe/yoke from the art for a distance of two feet before releasing the switch.

3.28.4 Backup Method. None required.

3.28.5 System Securing. Clean the output adapter thoroughly to remove all residual magnetic particle media. Refer to Post Cleaning and Restoration of Part or Area After NDI, paragraph 1.4.16. The output adapter requires installation in accordance with the applicable technical manuals listed in Table 1-1.

### **3.29 FORWARD SHAFT ASSEMBLY (ET).**

3.29.1 Description (Figure 3-1, Index No. 29). The forward shaft assembly is coupled between the output adapter and the fan shaft.

3.29.2 Defects. Defects may occur anywhere on the surface of the forward shaft assembly. No cracks are allowed.

3.29.3 Primary Method. Eddy Current.

3.29.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100KHz-500KHz
- c. Probe, right angle, shielded surface, 100KHz-500KHz, 90° 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

3.29.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the forward shaft assembly shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

3.29.3.3 Access. Not applicable.

3.29.3.4 Preparation of Part. The forward shaft assembly shall be thoroughly cleaned. Refer to preparation of Part or Area for NDI, paragraph 1.4.4.

3.29.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19d.
 

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 56°		
Probe drive	- mid		
LPF	- 100		
HPF	- 0		
H Pos	- 80%		
V Pos	- 20%		
- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:
  - (1) Null probe on test block.
  - (2) Adjust phase as required to obtain horizontal lift-off
  - (3) Move probe over all three notches in test block. Adjust gain to obtain three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

3.29.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 3-29.

- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

**NOTE**

Either probe identified in paragraph 3.29.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed, steps 3.29.3.5 b. (1), (2) and (3) shall be repeated each time a change is made.

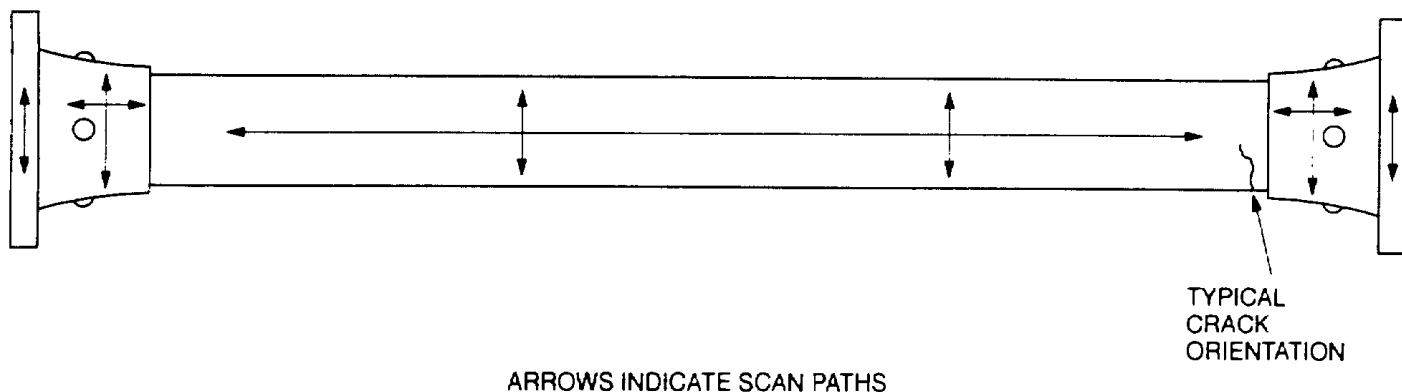


Figure 3-29. Forward Shaft Assembly

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3.29.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.

3.29.4 Backup Method. Refer to paragraph 1.4.7.

3.29.5 System Securing. The forward shaft assembly, if removed, requires installation in accordance with the applicable technical manual listed in Table 1-1.

**3.30 AFT SHAFT ASSEMBLY (ET).**

3.30.1 Description (Figure 3-1. Index No. 30). The aft shaft assembly is coupled between the fan shaft assembly and the segmented shaft assemblies.

3.30.2 Defects. Defects may occur anywhere on the aft shaft assembly. No cracks are allowed.

3.30.3 Primary Method. Eddy Current.

3.30.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100KHz-500KHz
- c. Probe, right angle, shielded surface, 100KHz-500KHz, 900 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

3.30.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the aft shaft assembly removed in accordance with the applicable technical manuals listed in Table 1-1.

3.30.3.3 Access. Not applicable.

3.30.3.4 Preparation of Part. The aft shaft assembly shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

3.30.3.5 NDI Equipment Settings.

a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e<sup>l</sup>.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 56°		
Probe drive	- mid		
LPF	- 100		
HPF	-0		
H Pos	- 80%		
V Pos	- 20%		

b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

3.30.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 3-30.

- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

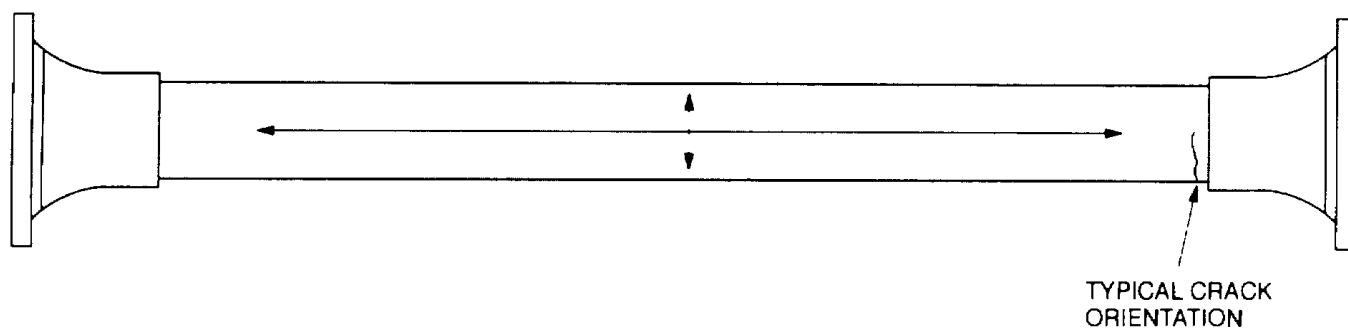
#### NOTE

Either probe identified in paragraph 3.30.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 3.30.3.5 b. (1), (2) and (3) shall be repeated each time a change is made.

3.30.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.

3.30.4 Backup Method. Refer to paragraph 1.4.7.

3.30.5 System Securing. The aft shaft assembly requires installation in accordance with the applicable technical manual listed in Table 1-1.



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Figure 3-30. Aft Shaft Assembly



### 3.31 COUPLING DISC PACKS (PT).

3.31.1 Description (Figure 3-1. Index No. 31). Flexible laminated steel disc couplings are used to connect the shaft section, freewheeling assembly, and the tail rotor gearbox.

3.31.2 Defects. Defects may occur anywhere on the surface of the coupling discs. No cracks are allowed.

3.31.3 Primary Method. Fluorescent Penetrant.

3.31.3.1 NDI Equipment and Materials. (Refer to Appendix B.) Inspection equipment is listed in Table 1-7. MIL-1-25135 level 3 penetrant materials shall be selected from the approved list in Table 1-8.

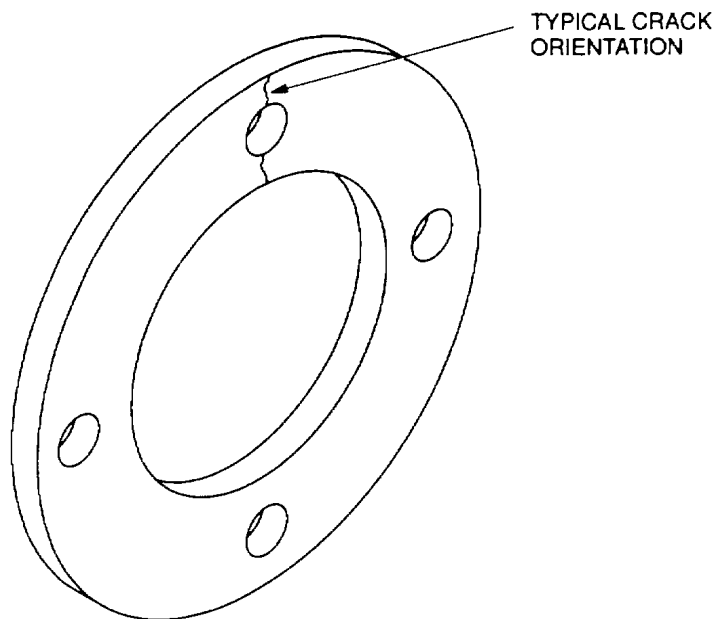
3.31.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the coupling disc packs removed in accordance with the applicable technical manuals listed in Table 1-1.

3.31.3.3 Access. Not applicable.

3.31.3.4 Preparation of Part. Protective coating shall be removed and the part shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

3.31.3.5 Inspection Procedure. Perform fluorescent penetrant inspection. Refer to fluorescent penetrant method, paragraph 1.4.7 and Table 1-5. Inspect area of concern. See Figure 3-31.

3.31.3.6 Marking and Recording of Inspection Results. Mark and record the inspection results as necessary per paragraph 1.3.



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**Figure 3-31. Coupling Disc Packs**

3.31.4 Backup Method. None required.

3.31.5 System Securing. Clean the part or area to remove inspection media. Refer to Post Cleaning L and Restoration of Part or Area after NDI paragraph 1.4.16. Protective coating shall be reapplied as required. Reinstall or assemble parts or components in accordance with the applicable technical manuals listed in Table 1-1.

**3.32 SHAFT ASSEMBLY WASHER (ET).**

3.32.1 Description (Figure 3-1. Index No. 32). The shaft assembly washer is used to secure the coupling adapters against the motors surfaces of thedriveshafts

3.32.2 Defects. Defects may occur anywhere on the surface of the shaft assembly washer. No cracks are allowed.

3.32.3 Primary Method. Eddy Current.

3.32.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100KHz-500KHz
- c. Probe, right angle, shielded surface, 100KHz-500KHz, 900 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

3.32.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the shaft assembly washer removed in accordance with the applicable technical manuals listed in Table 1-1.

3.32.3.3 Access. Not applicable.

3.32.3.4 Preparation of Part. The shaft assembly washer shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

3.32.3.5 NDI Equipment Settings.

a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e<sup>II</sup>.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 56°		
Probe drive	- mid		
LPF	- 100		
HPF	- 0		
H Pos	- 80%		
V Pos	- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:
  - (1) Null probe on test block.
  - (2) Adjust phase as required to obtain horizontal lift-off.
  - (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

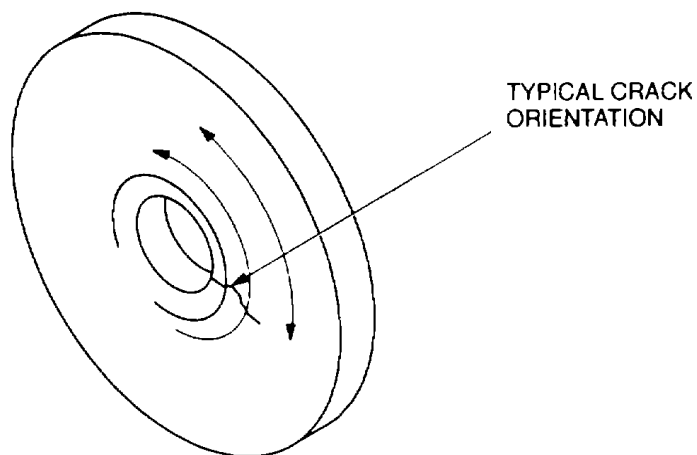
3.32.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 3-32.

- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

**NOTE**

**Either probe identified in paragraph 3.32.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 3.32.3.5 b. (1), (2) and (3) shall be repeated each time a change is made.**

3.32.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.



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**Figure 3-32. Shaft Assembly Washer**

3.32.4 Backup Method. Refer to paragraph 1.4.7.

3.32.5 System Securing. The shaft assembly washer requires installation in accordance with the applicable technical manual listed in Table 1-1.

### 3.33 COUPLING ADAPTER (ET).

3.33.1 Description (Figure 3-1. Index No. 33). The coupling adapter are used to connect the driveshaft assemblies.

3.33.2 Defects. Defects may occur anywhere on the surface of the coupling adapter. Particular attention shall be given to the splined area. No cracks are allowed.

3.33.3 Primary Method. Eddy Current.

3.33.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100KHz-500KHz
- c. Probe, right angle, shielded surface, 100KHz-500KHz, 900 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

3.33.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the coupling adapter removed in accordance with the applicable technical manuals listed in Table 1-1.

3.33.3.3 Access. Not applicable.

3.33.3.4 Preparation of Part. The coupling adapter shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

3.33.3.5 NDI Equipment Settings.

a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-196.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 56°		
Probe drive	- mid		
LPF	- 100		
HPF	-0		
H Pos	- 80%		
V Pos	- 20%		

b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

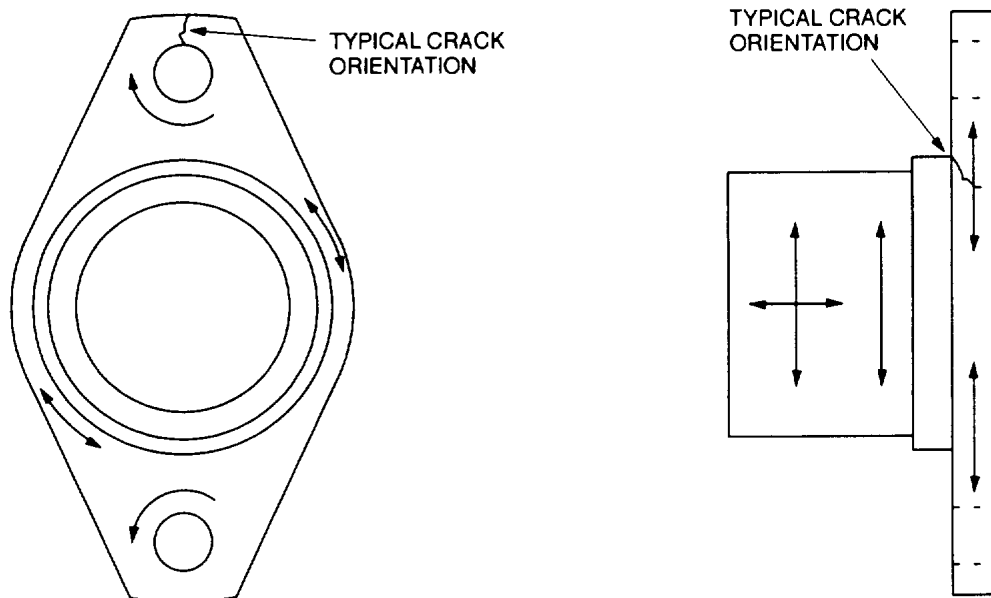
3.33.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 3-33.

- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

**NOTE**

**Either probe identified in paragraph 3.33.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed, steps 3.33.3.5 b. (1), (2) and (3) shall be repeated each time a change is made.**

3.33.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.



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**Figure 3-33. Coupling Adapter**

3.33.4 Backup Method. Refer to paragraph 1.4.7.

3.33.5 System Securing. The coupling adapter requires installation in accordance with the applicable technical manual listed in Table 1-1.

**3.34 BEARING HANGER BRACKETS AND LINKS (ET).**

3.34.1 Description (Figure 3-1, Index No. 34). The bearing hanger brackets and links support the bearing hangers throughout the tail section to support the tail rotor driveshaft.

3.34.2 Defects. Defects may occur anywhere on the surface of the part. No cracks are allowed.

3.34.3 Primary Method. Eddy Current.

3.34.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100KHz-500KHz
- c. Probe, right angle, shielded surface, 100KHz-500KHz, 900 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

3.34.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance.

Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the bearing hanger brackets and links shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

3.34.3.3 Access. Not applicable.

3.34.3.4 Preparation of Part. The bearing hanger brackets and links shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

3.34.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e<sup>II</sup>.
 

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 560		
Probe drive	- mid		
LPF	- 100		
HPF	- 0		
H Pos	- 80%		
V Pos	- 20%		

b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

3.34.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 3-34.

- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

#### NOTE

**Either probe identified in paragraph 3.34.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 3.34.3.5 b. (1), (2) and (3) shall be repeated each time a change is made.**

3.34.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.

3.34.4 Backup Method. Refer to paragraph 1.4.7.

3.34.5 System Securing. The bearing hanger brackets and links, if removed, require installation in accordance with the applicable technical manual listed in Table 1-1.

### 3.35 SEGMENTED SHAFT ASSEMBLY (ET).

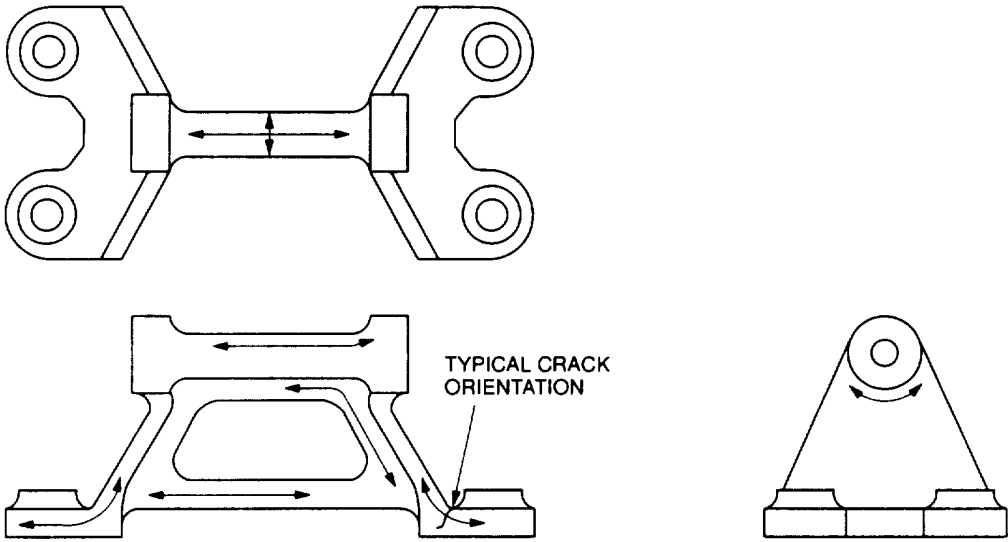
3.35.1 Description (Figure 3-1. Index No. 35). The segmented shaft assembly is coupled to the segmented shaft assembly and the tail rotor gearbox which is supported to the tail section by bearing hangers.

3.35.2 Defects. Defects may occur anywhere on the surface of the segmented shaft. No cracks are allowed.

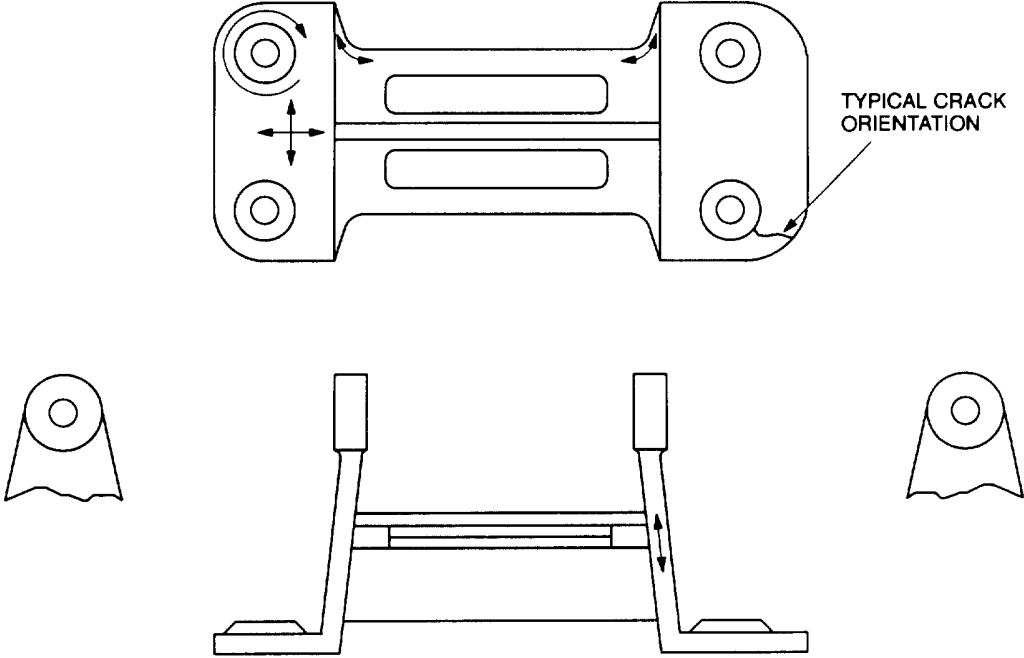
3.35.3 Primary Method. Eddy Current.

3.35.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100KHz-500KHz
- c. Probe, right angle, shielded surface, 100KHz-500KHz, 90° 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8



FORWARD BEARING HANGER BRACKET



AFT BEARING HANGER BRACKET

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Figure 3-34. Bearing Hanger Brackets And Links



3.35.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the segmented shaft assembly shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

3.35.3.3 Access. Not applicable.

3.35.3.4 Preparation of Part. The segmented shaft assembly shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

3.35.3.5 NDI Equipment Settings.

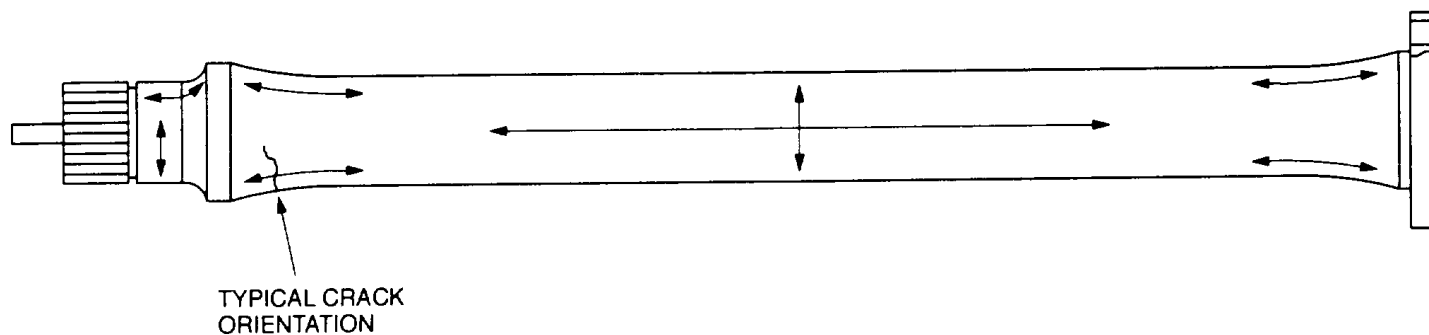
a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19ell.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 560		
Probe drive	- mid		
LPF	- 100		
HPF	- 0		
H Pos	- 80%		
V Pos	- 20%		

b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

3.35.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 3-35.



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Figure 3-35. Segmented Shaft Assembly

- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

#### NOTE

**Either probe identified in paragraph 3.35.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 3.35.3.5 b. (1), (2) and (3) shall be repeated each time a change is made.**

3.35.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.

3.35.4 Backup Method. Refer to paragraph 1.4.7.

3.35.5 System Securing. The segmented shaft assembly, if removed, requires installation in accordance with the applicable technical manual listed in Table 1-1.

### 3.36 STEEL IMPELLER (MT).

3.36.1 Description (Figure 3-1, Index No. 36). The steel impeller is a component of the oil cooling blower assembly, and is contained within the housing assembly.

3.36.2 Defects. Defects may occur any where on the surface of the steel impeller. No cracks are allowed.

3.36.3 Primary Method. Magnetic Particle.

3.36.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Magnetic Particle Inspection Probe/Yoke
- b. Magnetometer
- c. Black Light
- d. Fluorescent Magnetic Particles, refer to Table 1-8
- e. Consumable Materials, refer to Table 1-8
- f. Aircraft Marking Pencil, refer to Table 1-8

3.36.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the steel impeller removed in accordance with the applicable technical manuals listed in Table 1-1.

3.36.3.3 Access. Not applicable.

3.36.3.4 Preparation of Part. The part shall be thoroughly cleaned. Refer to Preparation of Part of Area for NDI, paragraph 1.4.4.

3.36.3.5 NDI Equipment Settings. Refer to Magnetic Particle Method, paragraph 1.4.8.

3.36.3.6 Inspection Procedure. A magnetic field shall be applied to the part perpendicular to the orientation of possible cracks. Positions required for this inspection are illustrated in Figure 3-36.

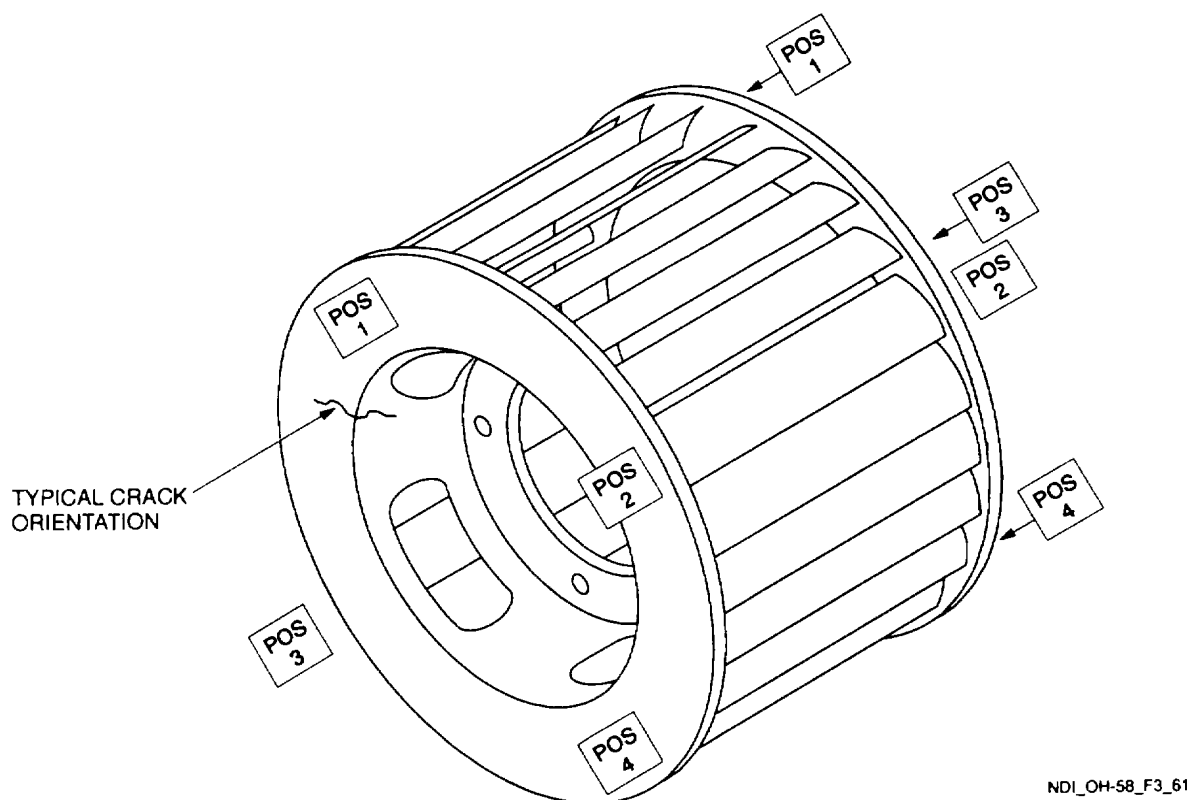
- a. Select AC on the AC/DC power switch.
- b. Place probe/yoke on part in Position 1 as shown.
- c. Press the test switch and apply a light coat of magnetic particle media at the same time.  
Remove the media momentarily before removing the current. Current should be applied for no more than five seconds.
- d. Inspect for cracks using the black light.
- e. Demagnetize before moving to the next position. Refer to paragraph 3.36.3.8.
- f. Repeat steps a. through e. for Position 2, 3, and 4.

3.36.3.7 Marking and Recording of Inspection Results. Mark and record the inspection results as necessary per paragraph 1.3.

3.36.3.8 Demagnetization. With the switch remaining in the AC position, place the probe/yoke legs in the same position used for magnetizing. Press the test switch and withdraw the probe/yoke from the part for a distance of two feet before releasing the switch.

3.36.4 Backup Method. None required.

3.36.5 System Securing. Clean the steel impeller thoroughly to remove all residual magnetic particle media. Refer to Post Cleaning and Restoration of Part or Area After NDI, paragraph 1.4.16. The steel impeller requires installation in accordance with the applicable technical manuals listed in Table 1-1.



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Figure 3-36. Steel Impeller

**3.37 ALUMINUM ALLOY IMPELLER HOUSING (ET).**

3.37.1 Description (Figure 3-1. Index No. 37). The aluminum alloy impeller housing is mounted on the structure, aft of the aft firewall and is driven by the tail rotor driveshaft.

3.37.2 Defects. Defects may occur anywhere on the surface of the housing. No cracks are allowed.

3.37.3 Primary Method. Eddy Current.

3.37.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100KHz-500KHz
- c. Probe, right angle, shielded surface, 100KHz-500KHz, 900 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

3.37.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the aluminum alloy impeller housing shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

3.37.3.3 Access. Not applicable.

3.37.3.4 Preparation of Part. The aluminum alloy impeller housing shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

3.37.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19E.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 560		
Probe drive	- mid		
LPF	- 100		
HPF	- 0		
H Pos	- 80%		
V Pos	- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:
  - (1) Null probe on test block.
  - (2) Adjust phase as required to obtain horizontal lift-off.
  - (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

3.37.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 3-37.

- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

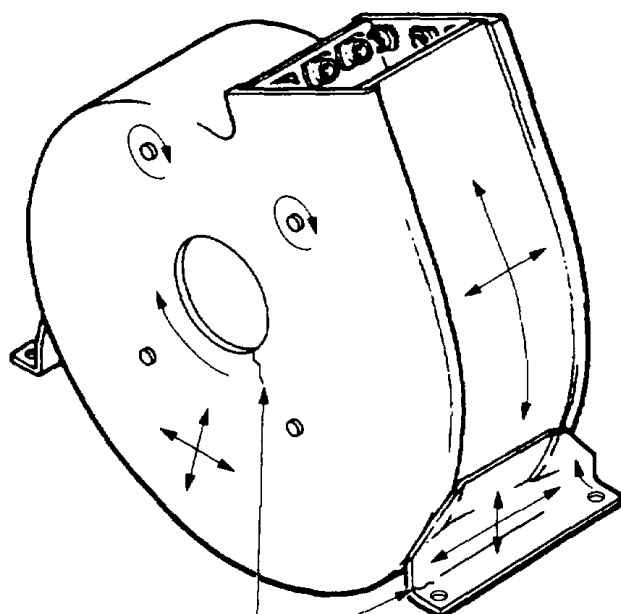
**NOTE**

Either probe identified in paragraph 3.37.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 3.37.3.5 b. (1), (2) and (3) shall be repeated each time a change is made.

3.37.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.

3.37.4 Backup Method. Refer to paragraph 1.4.7.

3.37.5 System Securing. The aluminum alloy impeller housing, if removed, requires installation in accordance with the applicable technical manual listed in Table 1-1.



TYPICAL CRACK  
ORIENTATION

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Figure 3-37. Aluminum Alloy Impeller Housing

**3.38 FAN SHAFT (MT).**

3.38.1 Description (Figure 3-1. Index No. 38). The fan shaft connects the forward and aft short tail' rotor driveshafts and is part of the tail rotor driveshaft system.

3.38.2 Defects. Defects may occur anywhere on the surface of the fan shaft. No cracks are allowed

3.38.3 Primary Method. Magnetic Particle.

3.38.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Magnetic Particle Inspection Probe/Yoke
- b. Magnetometer
- c. Black Light
- d. Fluorescent Magnetic Particles, refer to Table 1-8
- e. Consumable Materials, refer to Table 1-8
- f. Aircraft Marking Pencil, refer to Table 1-8

**NOTE**

**Hand-held magnetic coil may be used. Refer to paragraph 1.4.8.1.2 and Figure 1-6.**

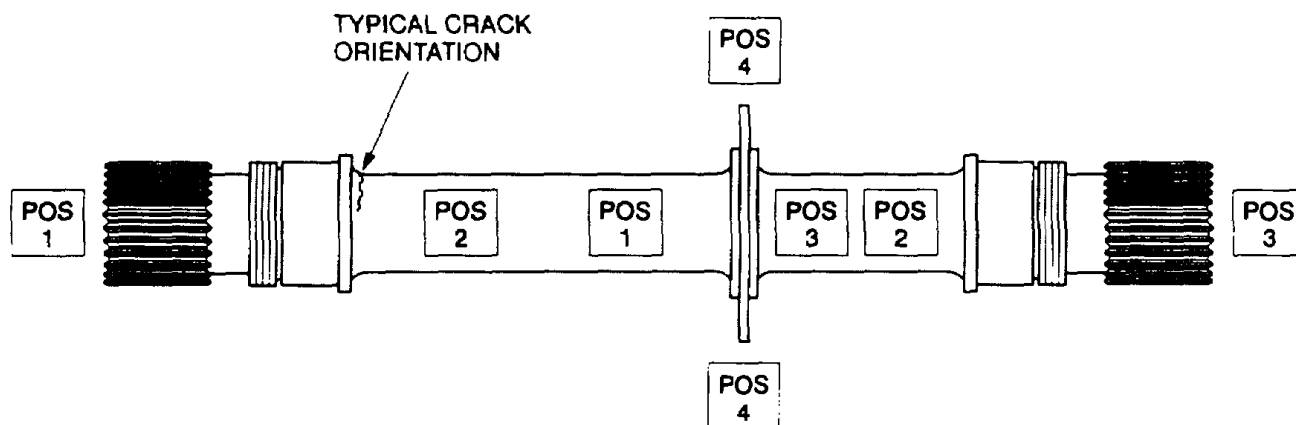
3.38.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the fan shaft assembly removed in accordance with the applicable technical manuals listed in Table 1-1.

3.38.3.3 Access. Not applicable.

3.38.3.4 Preparation of Part. The part shall be thoroughly cleaned. Refer to Preparation of Part of Area for NDI, paragraph 1.4.4.

3.38.3.5 NDI Equipment Settings. Refer to Magnetic Particle Method, paragraph 1.4.8.

3.38.3.6 Inspection Procedure. A magnetic field shall be applied to the part perpendicular to the orientation of possible cracks. Positions required for this inspection are illustrated in Figure 3-38.



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**Figure 3-38. Fan Shaft**

- a. Select AC on the AC/DC power switch.
- b. Place probe/yoke on part in Position 1 as shown.
- c. Press the test switch and apply a light coat of magnetic particle media at the same time.  
Remove the media momentarily before removing the current. Current should be applied for no more than five seconds.
- d. Inspect for cracks using the black light.
- e. Demagnetize before moving to the next position. Refer to paragraph 3.38.3.8.
- f. Repeat steps a. through e. for Position 2, 3, and 4.

3.38.3.7 **Marking and Recording of Inspection Results.** Mark and record the inspection results as necessary per paragraph 1.3.

3.38.3.8 **Demagnetization.** With the switch remaining in the AC position, place the probe/yoke legs in the same position used for magnetizing. Press the test switch and withdraw the probe/yoke from the part for a distance of two feet before releasing the switch.

3.38.4 **Backup Method.** None required.

3.38.5 **System Securing.** Clean the fan shaft thoroughly to remove all residual magnetic particle media. Refer to Post Cleaning and Restoration of Part or Area After NDI, paragraph 1.4.16. The fan shaft requires installation in accordance with the applicable technical manuals listed in Table 1-1.

### **3.39 TAIL ROTOR GEARBOX (ET).**

3.39.1 **Description (Figure 3-1. Index No. 39).** The tail rotor gearbox contains two spiral bevel gears positioned 90 to each other. The gearbox housing is magnesium and is attached to the tailboom with four studs, nuts, washers and two dowel pins for alignment.

3.39.2 **Defects.** Defects may occur anywhere on the surface of the gearbox. No cracks are allowed.

3.39.3 **Primary Method.** Eddy Current.

3.39.3.1 **NDI Equipment and Materials.** (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100KHz-500KHz
- c. Probe, right angle, shielded surface, 100KHz-500KHz, 900 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum, 100KHz-500KHz, 900 1/2 inch drop
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

3.39.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance.

Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be \_ performed on all exposed surfaces of the installed part using this procedure. If required, the tail rotor gearbox shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

3.39.3.3 Access. Not applicable.

3.39.3.4 Preparation of Part. The tail rotor gearbox shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

3.39.3.5 NDI Equipment Settings.

a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e<sup>II</sup>.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 56°		
Probe drive	- mid		
LPF	- 100		
HPF	- 0		
H Pos	- 80%		
V Pos	- 20%		

b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

3.39.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 3-39.

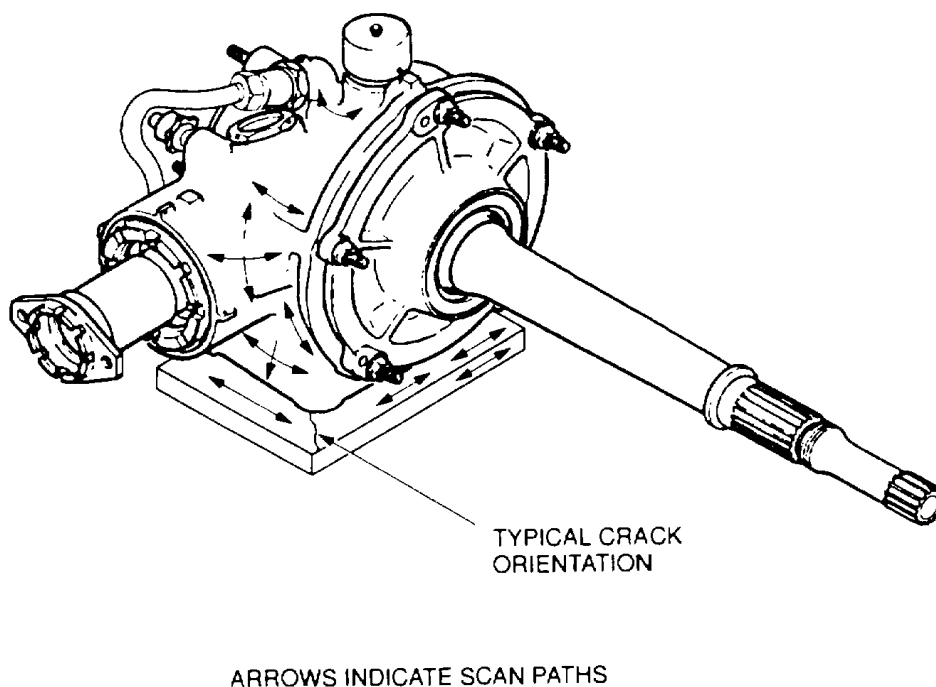
- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

**NOTE**

**Either probe identified in paragraph 3.39.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 3.39.3.5 b. (1), (2) and (3) shall be repeated each time a change is made.**

3.39.3.7 Marking and Recording of Inspections Results. Mark and record as required by paragraph 1.3.





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**Figure 3-39. Tail Rotor Gearbox**

3.39.4 Backup Method. None required.

3.39.5 System Securing. The tail rotor gearbox, if removed, requires installation in accordance with the applicable technical manual listed in Table 1-1.

### **3.40 INPUT ADAPTER NUT (MT).**

3.40.1 Description (Figure 3-1. Index No. 40). The input adapter nut secures the input adapter onto the pinion shaft, attached to the tail rotor gearbox.

3.40.2 Defects. Defects may occur anywhere on the surface of the input adapter nut. No cracks are allowed.

3.40.3 Primary Method. Magnetic Particle.

3.40.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Magnetic Particle Inspection Probe/Yoke
- b. Magnetometer
- c. Black Light
- d. Fluorescent Magnetic Particles, refer to Table 1-8
- e. Consumable Materials, refer to Table 1-8
- f. Aircraft Marking Pencil, refer to Table 1-8

3.40.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the input adapter nut removed in accordance with the applicable technical manuals listed in Table 1-1.

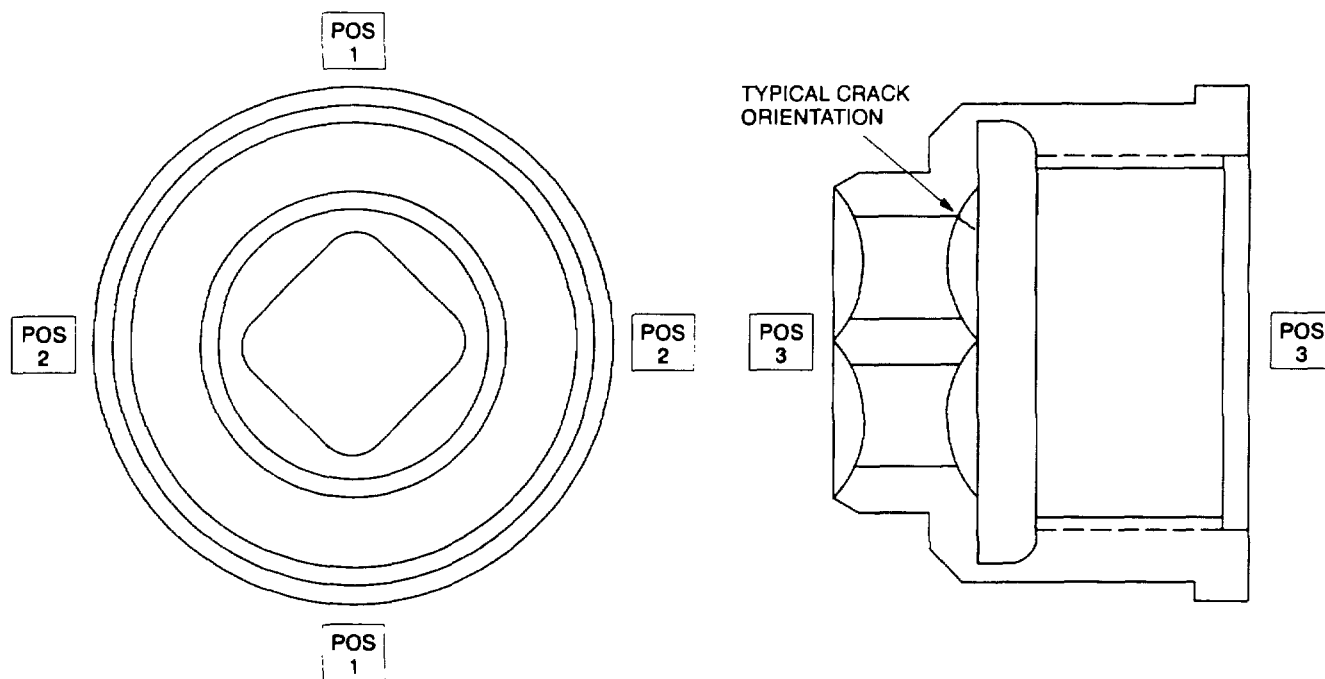
3.40.3.3 Access. Not applicable.

3.40.3.4 Preparation of Part. The part shall be thoroughly cleaned. Refer to Preparation of Part c Area for NDI, paragraph 1.4.4.

3.40.3.5 NDI Equipment Settings. Refer to Magnetic Particle Method, paragraph 1.4.8.

3.40.3.6 Inspection Procedure. A magnetic field shall be applied to the part perpendicular to the orientation of possible cracks. Positions required for this inspection are illustrated in Figure 3-40.

- a. Select AC on the AC/DC power switch.
- b. Place probe/yoke on part in Position 1 as shown.
- c. Press the test switch and apply a light coat of magnetic particle media at the same time. Remove the media momentarily before removing the current. Current should be applied for no more than five seconds.
- d. Inspect for cracks using the black light.
- e. Demagnetize before moving to the next position. Refer to paragraph 3.40.3.8.
- f. Repeat steps a. through e. for Position 2.



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Figure 3-40. Input Adapter Nut

3.40.3.7 Marking and Recording of Inspection Results. Mark and record the inspection results as necessary per paragraph 1.3.

3.40.3.8 Demagnetization. With the switch remaining in the AC position, place the probe/yoke legs in the same position used for magnetizing. Press the test switch and withdraw the probe/yoke from the part for a distance of two feet before releasing the switch.

3.40.4 Backup Method. None required.

3.40.5 System Securing. Clean the input adapter nut thoroughly to remove all residual magnetic particle media. Refer to Post Cleaning and Restoration of Part or Area After NDI, paragraph 1.4.16. The input adapter nut requires installation in accordance with the applicable technical manuals listed in Table 1-1.

### **3.41 INPUT DUPLEX BEARING NUT (ET).**

3.41.1 Description (Figure 3-1, Index No. 41). The input duplex bearing nut secures the input adapter to the tail rotor gearbox.

3.41.2 Defects. Defects may occur anywhere on the surface of the input duplex bearing nut. No cracks are allowed.

3.41.3 Primary Method. Eddy Current.

3.41.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100KHz-500KHz
- c. Probe, right angle, shielded surface, 100KHz-500KHz, 900 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

3.41.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the input duplex bearing nut removed in accordance with the applicable technical manuals listed in Table 1-1.

3.41.3.3 Access. Not applicable.

3.41.3.4 Preparation of Part. The input duplex bearing nut shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4

3.41.3.5 NDI Equipment Settings.

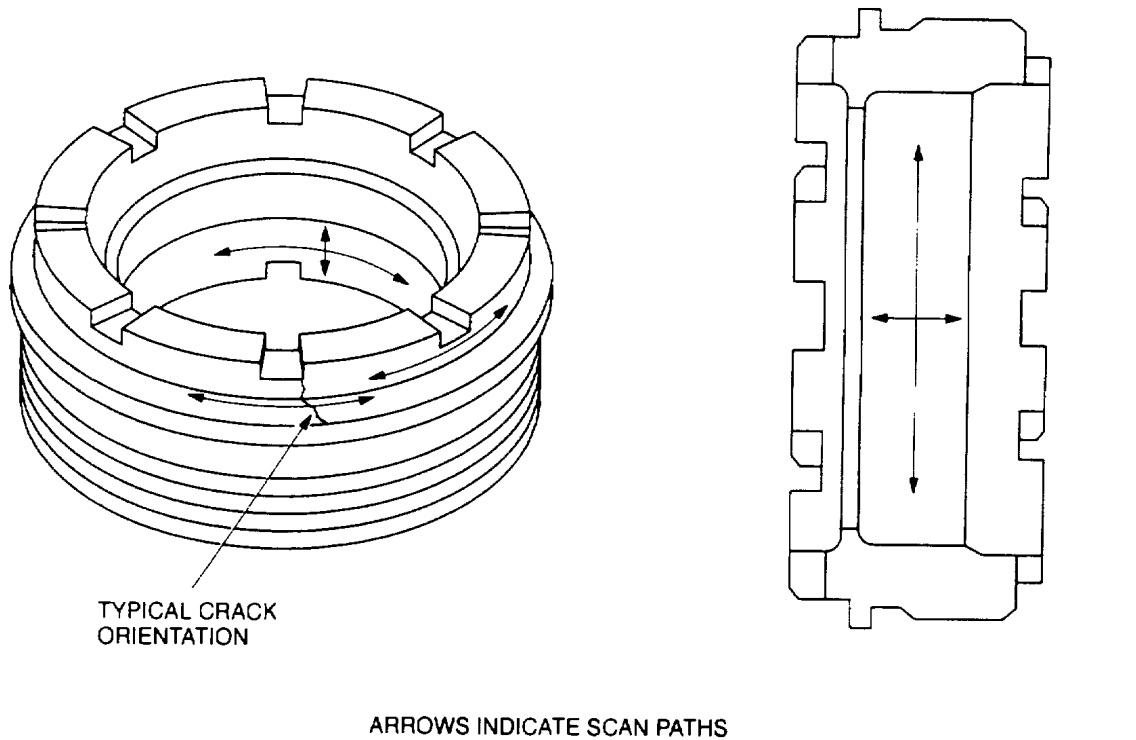
a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19eII.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 560		
Probe drive	- mid		
LPF	- 100		
HPF	- 0		
H Pos	- 80%		
V Pos	- 20%		

b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

3.41.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 3-41.



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Figure 3-41. Input Duplex Bearing Nut

- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

#### NOTE

**Either probe identified in paragraph 3.41.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps cap 3.41.3.5 b. (1), (2) and (3) shall be repeated each time a change is made.**

3.41.3.7 Marking and Recording of Inspections Results. Mark and record as required by paragraph 1.3.

3.41.4 Backup Method. Refer to paragraph 1.4.7.

3.41.5 System Securing. The input duplex bearing nut requires installation in accordance with the applicable technical manual listed in Table 1-1.

### 3.42 CAP ASSEMBLY (ET).

3.42.1 Description (Figure 3-1. Index No. 42). The cap assembly holds in place the seal, bearing retaining ring on the tail rotor gearbox.

3.42.2 Defects. Defects may occur anywhere on the surface of the cap assembly. No cracks are allowed.

3.42.3 Primary Method. Eddy Current.

3.42.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100KHz-500KHz
- c. Probe, right angle, shielded surface, 100KHz-500KHz, 900 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

3.42.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the cap assembly removed in accordance with the applicable technical manuals listed in Table 1-1.

3.42.3.3 Access. Not applicable.

3.42.3.4 Preparation of Part. The cap assembly shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4

3.42.3.5 NDI Equipment Settings.

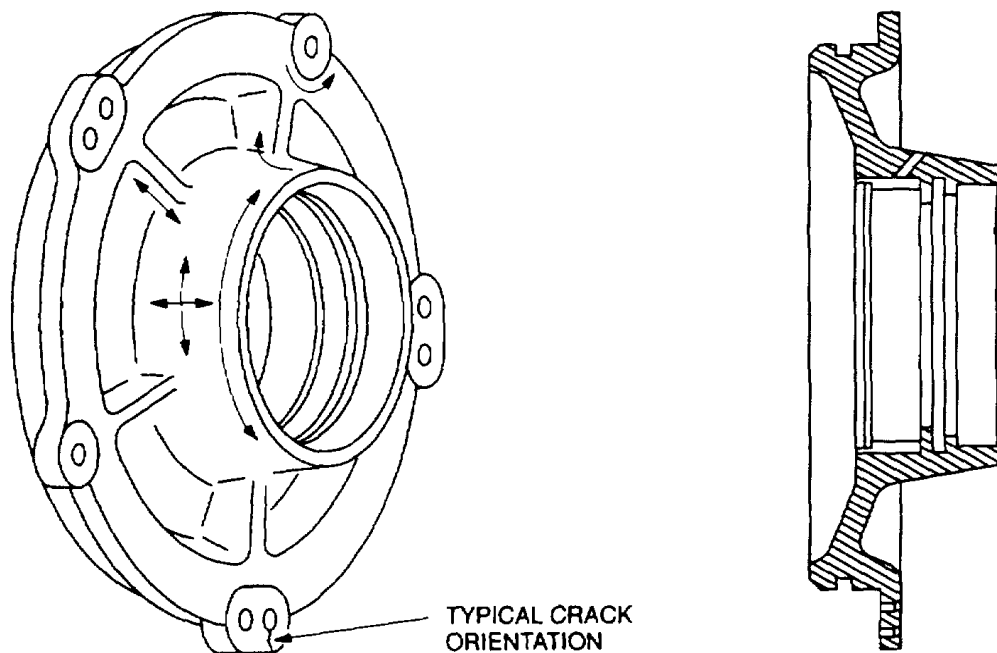
a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e<sup>II</sup>.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 560		
Probe drive	- mid		
LPF	- 100		
HPF	- 0		
H Pos	- 80%		
V Pos	- 20%		

b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

3.42.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 3-42.



ARROWS INDICATE SCAN PATHS

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Figure 3-42. Cap Assembly

- a. Place probe on a good area in the inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

**NOTE**

**Either probe identified in paragraph 3.42.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps cap 3.42.3.5 b. (1), (2) and (3) shall be repeated each time a change is made.**

3.42.3.7 Marking and Recording of Inspections Results. Mark and record as required by paragraph 1.3.

3.42.4 Backup Method. Refer to paragraph 1.4.7.

3.42.5 System Securing. The cap assembly requires installation in accordance with the applicable technical manual listed in Table 1-1.

## SECTION IV

## AIRFRAME AND LANDING GEAR GROUP

4. GENERAL.

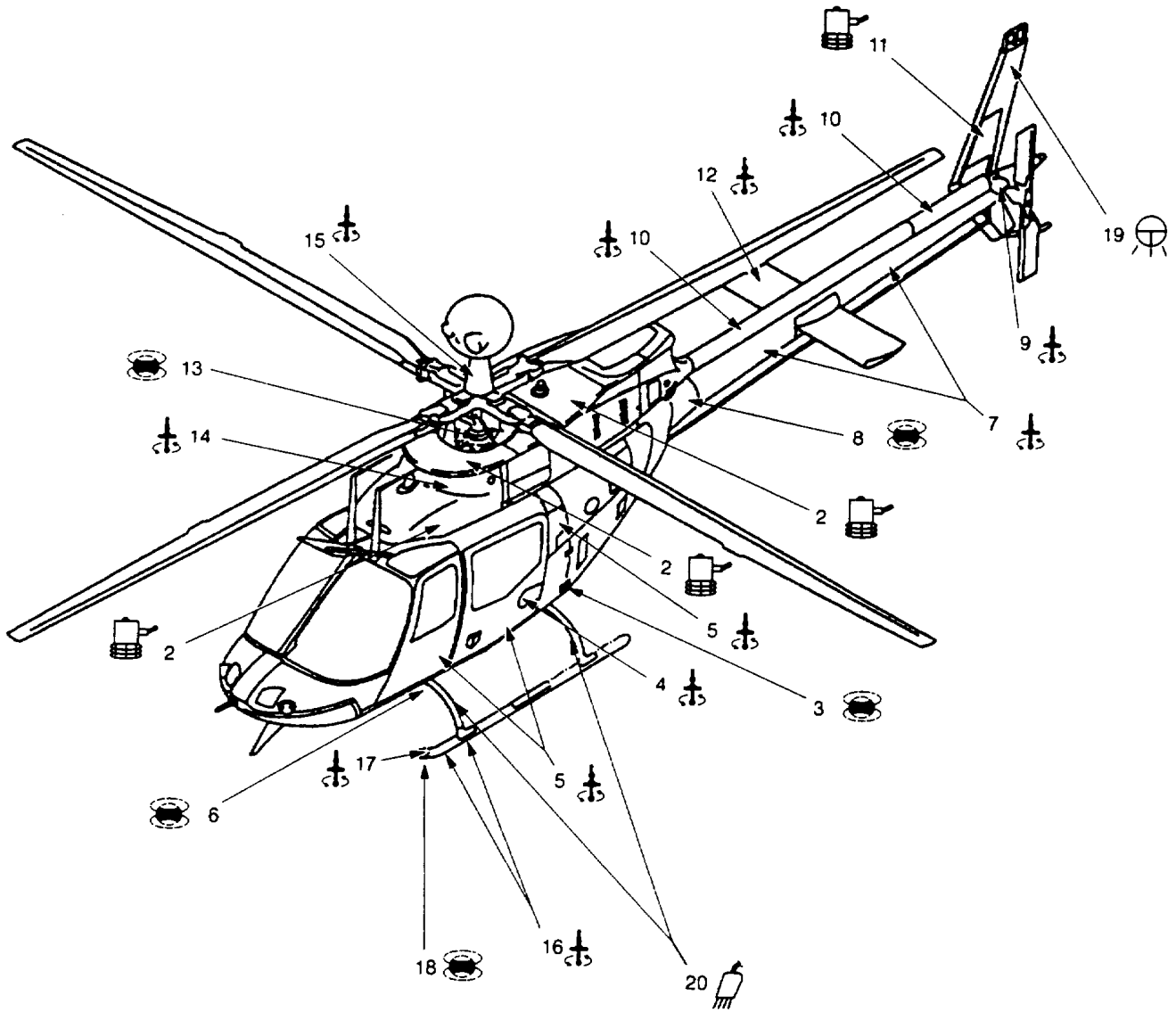
**4.1 CONTENTS.** The airframe and landing gear group inspection items covered in this section are those critical items of the OH-58D listed in the Airframe and Landing Gear Group Inspection Index (Table 4-1). Corresponding inspection figures and applicable text paragraphs are listed opposite each inspection item. The index number for each item may be used to locate it in Figure 4-1.

Table 4-1. Airframe and Landing Gear Group Inspection Index

Index Number	Nomenclature	Inspection Method	Paragraph Number	Figure Number
2	Honeycomb and Bonded Panels	BT	4.2	4-2
3	Armament Hard Points	MT	4.3	4-3
4	Universal Weapons Pylon Mount Fittings	ET	4.4	4-4
5	External Fuselage Fittings	ET	4.5	4-5
6	Landing Gear Support Fitting Assemblies	MT	4.6	4-6
*7	Tailboom	ET	4.7	4-7
8	Tailboom Attach Bolts	MT	4.8	4-8
*9	Tail Rotor Gearbox Support Assembly	ET	4.9	4-9
10	Tail Rotor Driveshaft Covers	ET	4.10	4-10
*11	Vertical Fin Assembly	BT	4.11	4-11
12	Horizontal Stabilizer	ET	4.12	4-12
13	Stop-Down Assembly	MT	4.13	4-13
14	Forward Transverse Beam	ET	4.14	4-14
15	Aft Transverse Beam	ET	4.15	4-15
16	Skid Saddles/Shoes	ET	4.16	4-16
17	Tow Ring Mounting Holes	ET	4.17	4-17
18	Tow Fittings	MT	4.18	4-18
19	Vertical Fin, Fluid in Honeycomb Core	RT	4.19	4-19
20	Fore and Aft Cross Tube Assemblies	UT	4.20	4-20

NOTE: \*Indicates Flight Safety Part.





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Figure 4-1. Airframe/Landing Gear Group

## 4.2 HONEYCOMB AND BONDED PANELS (BT).

4.2.1 Description (Figure 4-1. Index No. 2). The honeycomb panels covered by this inspection consists of upper cabin roof, forward lower cabin shell, crew seat and bulkhead, aft fuel cell bulkhead, lower aft fuselage fairing, electrical compartment floor, oil cooler support, and fuel cell cavity panels.

4.2.2 Defects. Perform the NDI method contained herein on the components listed above for the purpose of verification of void damage identified by visual inspection. Void damage may occur anywhere on either side of honeycomb panels as a result of mechanical damage (dents, punctures, scratches, etc.) or fluid intrusion/corrosion.

### NOTE

**A void is defined as an unbonded area that is suppose to be bonded. Many sub-definitions are given such as bond separation, delamination, lack of adhesive, gas pocket, misfit, etc. This procedure makes no distinction among these instead grouping under the general term "void."**

4.2.3 Primary Method. Bond Testing.

4.2.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Bond Test Unit
- b. Probe Mechanical Impedance Analysis
- c. Probe Holder
- d. Cable Assembly
- e. Test block, metal honeycomb with skin thickness closest to that of the panel to be inspected (refer to Appendix C)
- f. Test block, Composite Defect Standard #1
- g. Test block, Composite Defect Standard #3
- h. Teflon tape, refer to Table 1-8
- i. Aircraft Marking Pencil, refer to Table 1-8

4.2.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance in accordance with applicable technical manuals listed in Table 1-1.

4.2.3.3 Access. Not applicable.

4.2.3.4 Preparation of Part. The components shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

#### 4.2.3.5 NDI Equipment Settings. Refer to Bond Testing Equipment, paragraph 1.4.6.1.

- a. Attach cable and probe to Bondmaster. Protect probe with Teflon tape and install in probe holder.
- b. Turn on Bondmaster, press SPCL, and make the following adjustments.
 

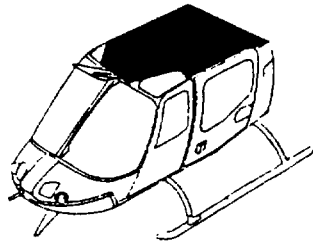
H Pos	- 40%
V Pos	- 80%
PHASE REF	- 0
DRIVE	- MID
- c. Press SET and select DISPLAY - PHASE.
- d. Place probe on good area of test block and press GOOD PART. Do this several times while moving the probe to different spots in the good area of the test block. Note the video signature for each. Select and enter a representative good area by pressing GOOD PART one last time.
- e. Place probe on void area of the test block and press BAD PART. Do this several times while moving the probe slightly to different positions within the void area. Select and enter a position that gives a strong difference between good and void areas. Use DIFF soft key to observe difference between good and bad areas of test block.

#### NOTE

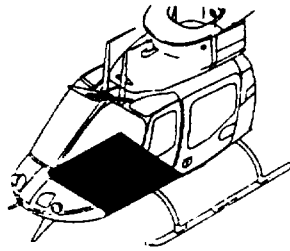
**If during setup the flying spot deflects upward, or to the side, when the probe passes over the bad part, instead of the desired down deflection toward the alarm box, Press SPCL and toggle to a different phase setting (90, 180, or 270) and repeat (d) and (e). Continue to try phase setting until the flying spot moves in the desired down direction.**

- f. Place probe on good area of test block and press RUN. Flying spot should be near the top-center of the ACTIVE screen. If not, press NULL. Slide probe from good to void area and note response from flying spot. This response should provide both amplitude (vertical) and phase (horizontal) movement. The default gate/alarm setting may be incorrect for this set-up. Turn off or reset gate/alarm as desired.
- g. The Bondmaster is programmed to automatically set test parameters to a start-up or initial bond test. By following the steps outlined above, adjustments to the FREQ, GAIN, and ALARM can help to refine the selectivity in locating defects among differing composite materials.

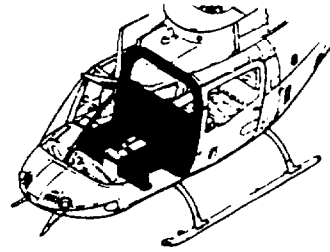
#### 4.2.3.6 Inspection Procedure. Refer to Bond Test Method, paragraph 1.4.6 and inspection areas are shown in Figure 4-2.



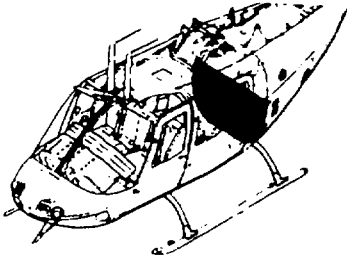
UPPER CABIN ROOF



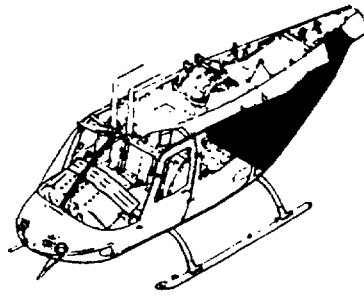
FORWARD LOWER CABIN SHELL



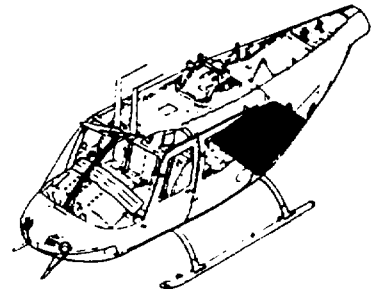
CREW SEAT AND BULKHEAD



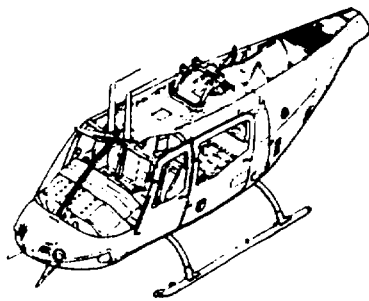
AFT FUEL CELL BULKHEAD



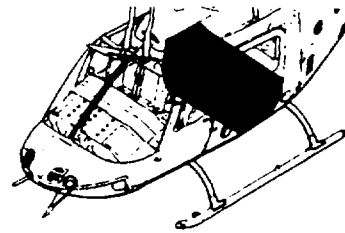
LOWER AFT FUSELAGE FAIRING



ELECTRICAL COMPARTMENT FLOOR



OIL COOLER SUPPORT



FUEL CELL CAVITY PANELS

Figure 4-2. Honeycomb And Bonded Panels.

- a. Skin-to-Honeycomb Voids. Place probe in location where test for skin-to-honeycomb bond separation is desired and press NULL. Move probe from good to suspect area and note response. A strong amplitude change and phase shift similar to the test block is indicative of a void. This set-up is very sensitive to thin skin-to-core bonding. Move probe slowly over the skin and note the slight amplitude change (bounce) as the probe senses alternately the honeycomb cell nodes and cell walls.

**NOTE**

**The basic set-up provided above also selects a frequency that provide a satisfactory inspection for voids associated with skin-to-spar, skin-to-trailing edge, doubler-to-doubler and doubler-to-skin, and trim tab bonding.**

- b. Use the NULL and GAIN adjustments to reset the ACTIVE screen for the areas to be inspected (do not go back to SET mode). Also, compare similar areas. For example, to check for spar to skin voids, check front and back of panel in the same area, or check another panel in the same area. Observe that, when moving the probe chordwise from the spar to the trailing edge, the transitions at the spar-to-honeycomb and the honeycomb-to-trailing edge strip are easily detected. When inspecting these areas, adjust the NULL and GAIN and move the probe carefully along the transition using a straight edge or other guide. A localized phase and amplitude shift similar to the test block indicates a void.

- 4.2.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.

**NOTE**

**Attention shall be directed to accurately marking the boundaries of all voids on both sides of the panel. These markings will be needed to determine acceptance/rejection criteria in accordance with the applicable technical manuals listed in Table 1-1.**

- 4.2.4 Backup Method. None required.

- 4.2.5 System Securing. Reinstall acceptable panels that were removed for inspection in accordance with the applicable technical manual listed in Table 1-1.

### **4.3 ARMAMENT HARD POINTS (MT).**

- 4.3.1 Description (Figure 4-1. Index No. 3). The armament hard points are used to attach special weapons to the fuselage.

- 4.3.2 Defects. Defects may occur anywhere on the surface of the armament hard points. No cracks are allowed.

- 4.3.3 Primary Method. Magnetic Particle.

4.3.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Magnetic Particle Inspection Probe/Yoke
- b. Magnetometer
- c. Black Light
- d. Fluorescent Magnetic Particles, refer to Table 1-8
- e. Consumable Materials, refer to Table 1-8
- f. Aircraft Marking Pencil, refer to Table 1-8

4.3.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance in accordance with the applicable technical manuals listed in Table 1-1.

4.3.3.3 Access. Not applicable.

4.3.3.4 Preparation of Part. The part shall be thoroughly cleaned. Refer to Preparation of Part of Area for NDI, paragraph 1.4.4.

4.3.3.5 NDI Equipment Settings. Refer to Magnetic Particle Method, paragraph 1.4.8.

4.3.3.6 Inspection Procedure. A magnetic field shall be applied to the part perpendicular to the orientation of possible cracks. Positions required for this inspection are illustrated in Figure 4-3.

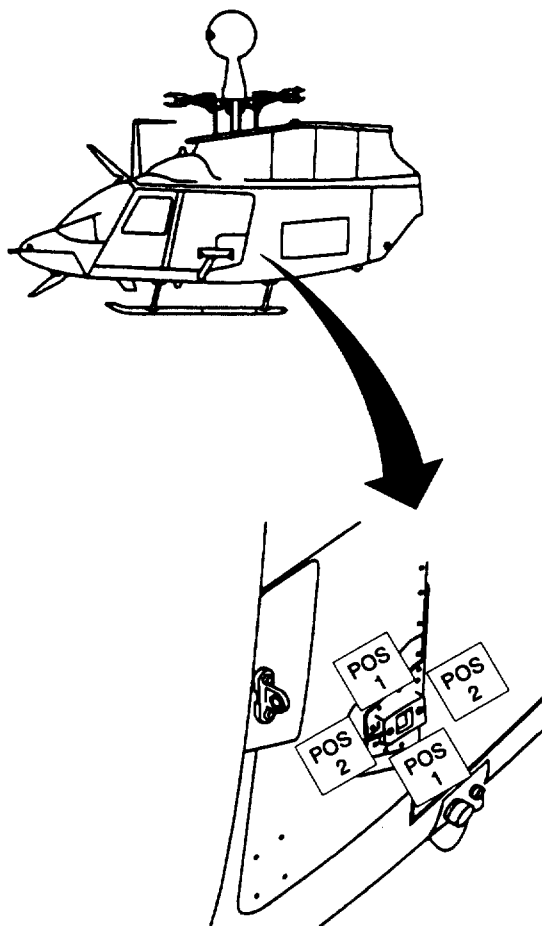
- a. Select AC on the AC/DC power switch.
- b. Place probe/yoke on part in Position 1 as shown.
- c. Press the test switch and apply a light coat of magnetic particle media at the same time. Remove the media momentarily before removing the current. Current should be applied for no more than five seconds.
- d. Inspect for cracks using the black light.
- e. Demagnetize before moving to the next position. Refer to paragraph 4.3.3.8.
- f. Repeat steps a through e for Position 2.

4.3.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.

4.3.3.8 Demagnetization. With the switch remaining in the AC position, place the probe/yoke legs in the same position used for magnetizing. Press the test switch and withdraw the probe/yoke from the part for a distance of two feet before releasing the switch.

4.3.4 Backup Method. None required.

4.3.5 System Securing. Clean the armament hard points thoroughly to remove all residual magnetic article media. Refer to Post Cleaning and Restoration of Part or Area After NDI, paragraph 1.4.16.



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Figure 4-3. Armament Hard Points.

**4.4 UNIVERSAL WEAPONS PYLON MOUNT FITTING (ET).**

4.4.1 Description (Figure 4-1, Index No. 4). The universal weapons pylon mount fitting provides mounting points for offensive and defensive weapons systems.

4.4.2 Defects. Defects may occur anywhere on the surface of the part. Attention shall also be given to the adjacent airframe structure. No cracks are allowed.

4.4.3 Primary Method. Eddy Current.

4.4.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100KHz-500KHz
- c. Probe, right angle, shielded surface, 100KHz-500KHz, 90 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

4.4.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance in accordance with the applicable technical manuals listed in Table 1-1.

4.4.3.3 Access. Not applicable.

4.4.3.4 Preparation of Part. The universal weapons pylon mount fitting shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

4.4.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 56°		
Probe drive	- mid		
LPF	- 100		
HPF	- 0		
H Pos	- 80%		
V Pos	- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:
  - (1) Null probe on test block.
  - (2) Adjust phase as required to obtain horizontal lift-off.
  - (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block (Refer to standard instrument display shown in Figure 1-7).



4.4.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 4-4.

- a. Place probe on a good area in the required inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

**NOTE**

**Either probe identified in paragraph 4.4.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 4.4.3.5 b. (1), (2) and (3) shall be repeated each time a change is made.**

4.4.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.

4.4.4 Backup Method. Refer to paragraph 1.4.7.

4.4.5 System Securing. None required.

#### **4.5 EXTERNAL FUSELAGE FITTINGS (ET).**

4.5.1 Description (Figure 4-1. Index No. 5). This inspection is applicable to the forward/aft lower seat support, right/left upper seat fitting, hoist fitting, clevis assembly, lower cargo hook, right/left aft litter fitting, forward litter support fitting, upper forward external seat support, and ammo box support/support step fitting to verify indications found visually.

4.5.2 Defects. Defects may occur anywhere on the surface of the part. No cracks are allowed.

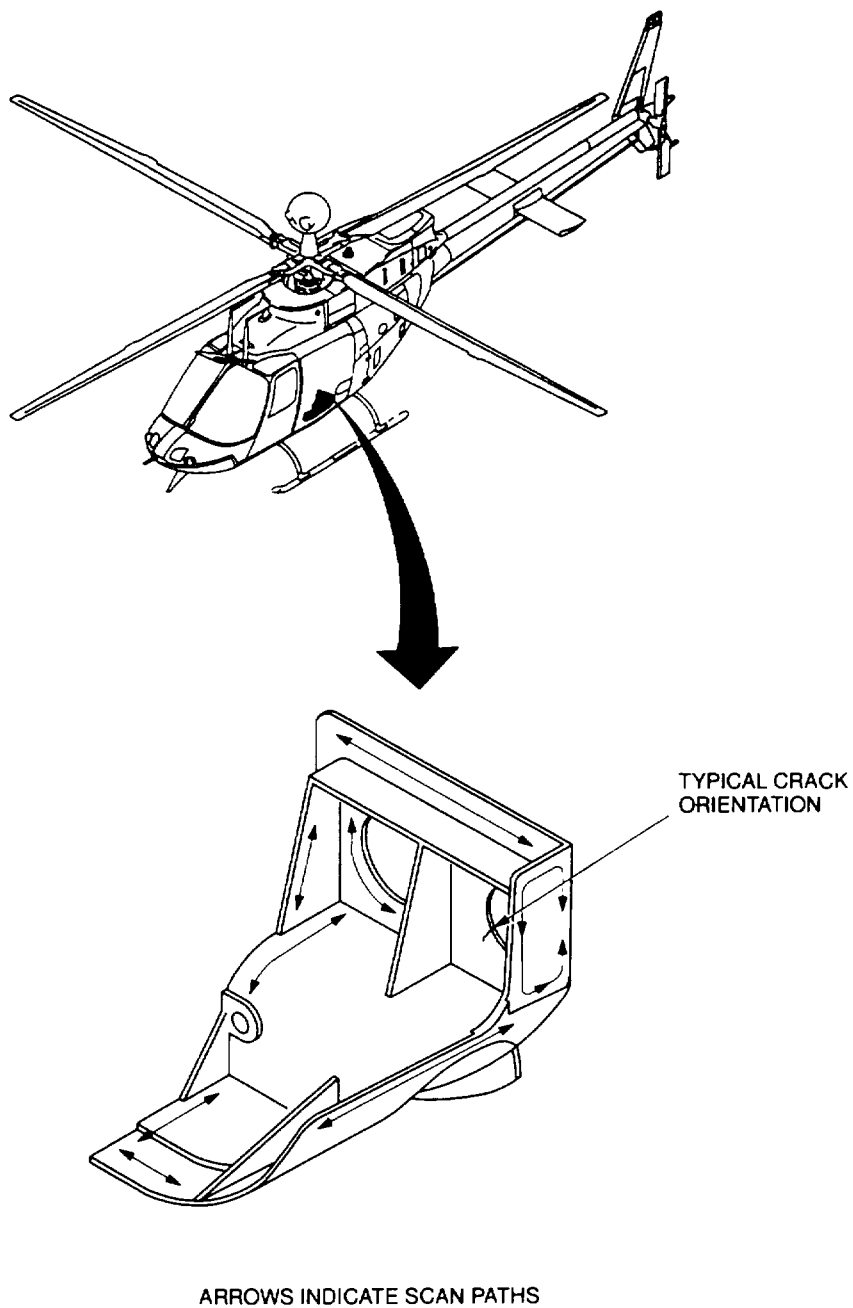
4.5.3 Primary Method. Eddy Current.

4.5.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100KHz-500KHz
- c. Probe, right angle, shielded surface, 100KHz-500KHz, 90° 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

4.5.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance in accordance with the applicable technical manuals listed in Table 1-1.

4.5.3.3 Access. Doors and panels as required. (Refer to Table 1-2 and Figure 1-4).



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Figure 4-4. Universal Weapons Pylon Mount Fitting.

4.5.3.4 Preparation of Part. The identified fittings shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

4.5.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e<sup>II</sup>.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 56°		
Probe drive	- mid		
LPF	- 100		
HPF	- 0		
H Pos	- 80%		
V Pos	- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

4.5.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 4-5.

- a. Place probe on a good area in the required inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

**NOTE**

**Either probe identified in paragraph 4.5.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed, steps 4.5.3.5 b. (1), (2) and (3) shall be repeated each time a change is made.**

4.5.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.

4.5.4 Backup Method. None required.

4.5.5 System Securing. Secure doors and panels in accordance with the applicable technical' manual listed in Table 1-1.

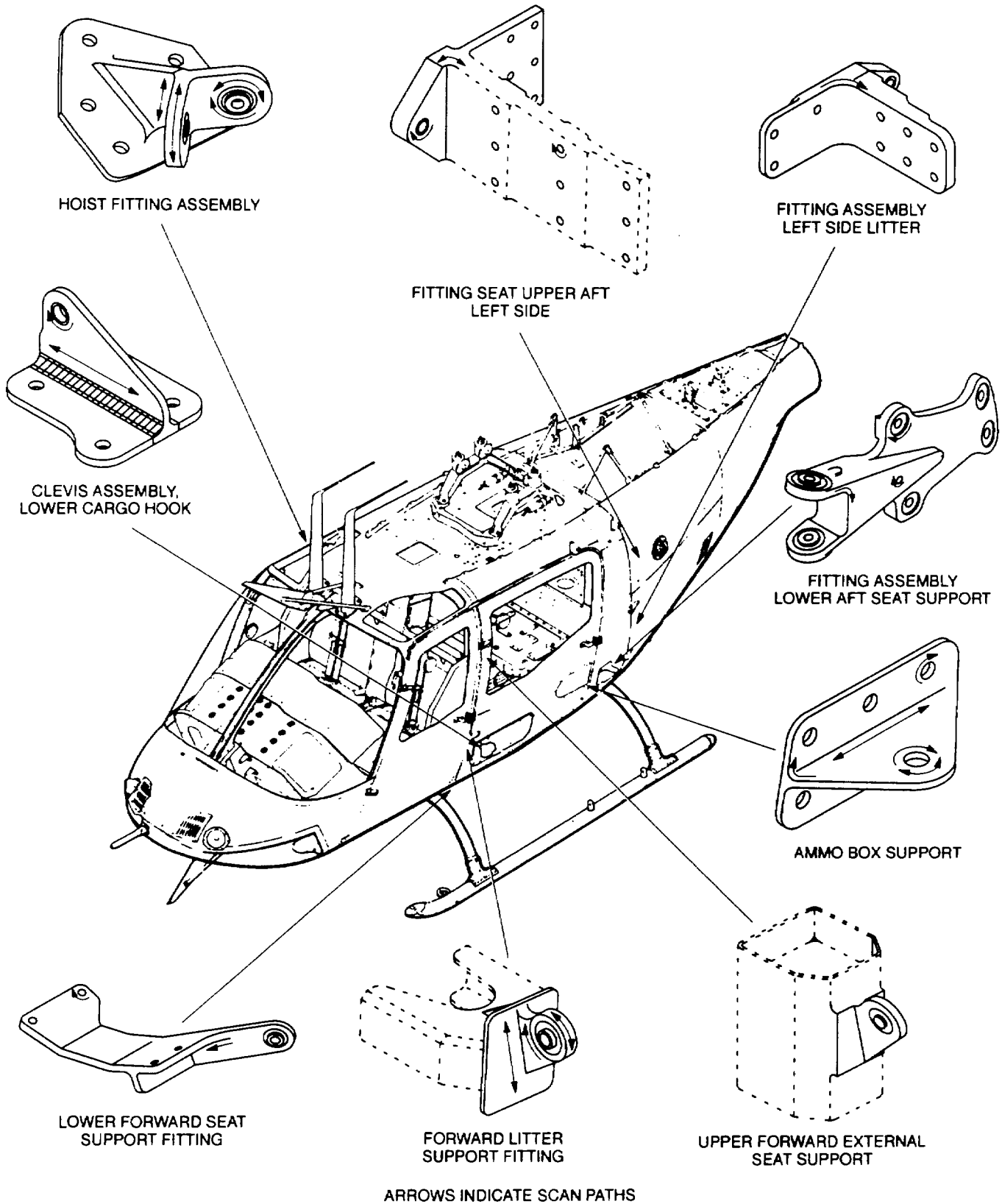


Figure 4-5. External Fuselage Fittings.

#### 4.6 LANDING GEAR SUPPORT FITTING ASSEMBLIES (MT).

4.6.1 Description (Figure 4-1. Index No. 6). The fittings attach the forward crosstubes to the fuselage and two fittings attach the aft crosstube to the fuselage.

4.6.2 Defects. This inspection is to verify crack indications found visually. No cracks are allowed

4.6.3 Primary Method. Magnetic Particle.

4.6.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Magnetic Particle Inspection Probe/Yoke
- b. Magnetometer
- c. Black Light
- d. Fluorescent Magnetic Particles, refer to Table 1-8
- e. Consumable Materials, refer to Table 1-8
- f. Aircraft Marking Pencil, refer to Table 1-8

4.6.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the landing gear support fitting shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

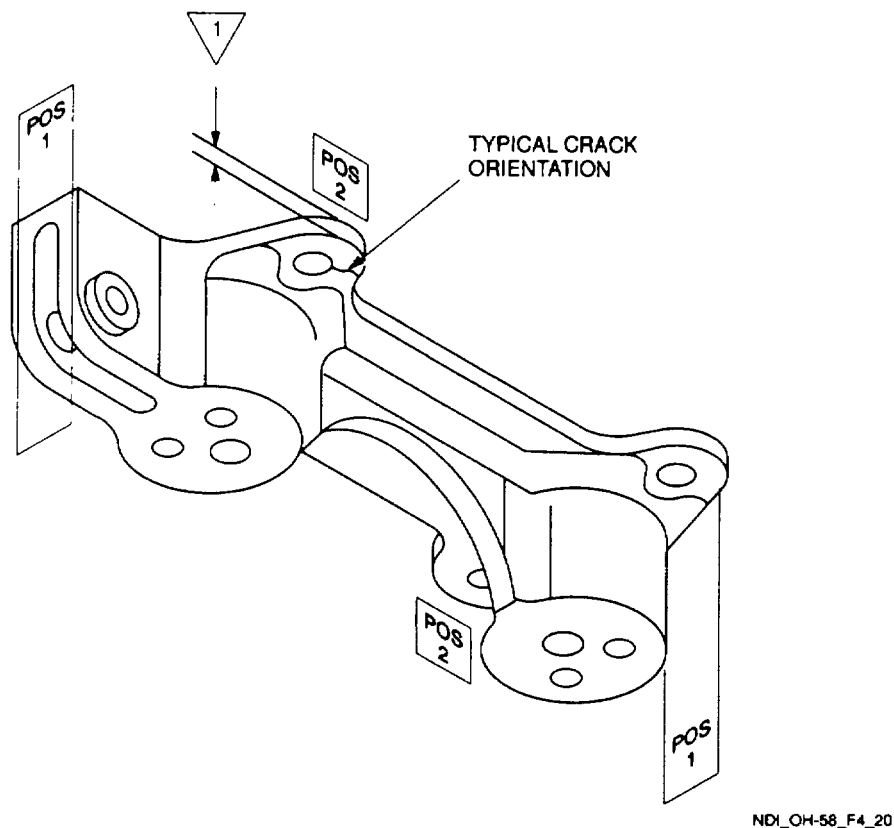
4.6.3.3 Access. Not applicable.

4.6.3.4 Preparation of Part. The part shall be thoroughly cleaned. Refer to Preparation of Part of Area for NDI, paragraph 1.4.4.

4.6.3.5 NDI Equipment Settings. Refer to Magnetic Particle Method, paragraph 1.4.8.

4.6.3.6 Inspection Procedure. A magnetic field shall be applied to the part perpendicular to the orientation of possible cracks. Positions required for this inspection are illustrated in Figure 4-6.

- a. Select AC on the AC/DC power switch.
- b. Place probe/yoke on part in Position 1 as shown.
- c. Press the test switch and apply a light coat of magnetic particle media at the same time. Remove the media momentarily before removing the current. Current should be applied for no more than five seconds.
- d. Inspect for cracks using the black light.
- e. Demagnetize before moving to the next position. Refer to paragraph 4.6.5.
- f. Repeat steps (b) through (e) for Position 2.



**Figure 4-6. Landing Gear Support Fitting Assemblies.**

4.6.3.7 **Marking and Recording of Inspection Results.** Mark and record as required by paragraph 1.3.

4.6.3.8 **Demagnetization.** With the switch remaining in the AC position, place the probe/yoke legs in the same position used for magnetizing. Press the test switch and withdraw the probe/yoke from the part for a distance of two feet before releasing the switch.

4.6.4 **Backup Method.** None required.

4.6.5 **System Securing.** Clean the landing gear support fitting thoroughly to remove all residual magnetic particle media. Refer to Post Cleaning and Restoration of Part or Area After NDI, paragraph 1.4.16. The landing gear support fittings, if removed, require installation in accordance with the applicable technical manuals listed in Table 1-1.

## 4.7 TAILBOOM (ET).

4.7.1 **Description (Figure 4-1. Index No.7).** The tailboom serves as a platform for the tail rotor gearbox as well as the vertical fin, horizontal stabilizer, segmented tail rotor driveshaft and bearing supports.

4.7.2 Defects. Inspect for cracks in the area one inch either side of, and three inches above and below the aft most rivet securing the tail rotor driveshaft cover left hand support to the tailboom. This procedure can also be used to inspect any scratches or creases on the rest of the tailboom for cracks. No cracks are allowed.

4.7.3 Primary Method. Eddy Current.

4.7.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100KHz-500KHz
- c. Probe, right angle, shielded surface, 100KHz-500KHz, 900 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

4.7.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance in accordance with the applicable technical manuals listed in Table 1-1.

4.7.3.3 Access. Not applicable.

4.7.3.4 Preparation of Part. The area of inspection shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

4.7.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-6e.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 56°		
Probe drive	- mid		
LPF	- 100		
HPF	- 0		
H Pos	- 80%		
V Pos	- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

4.7.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 4-7.

- a. Place probe on a good area in the required inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

**NOTE**

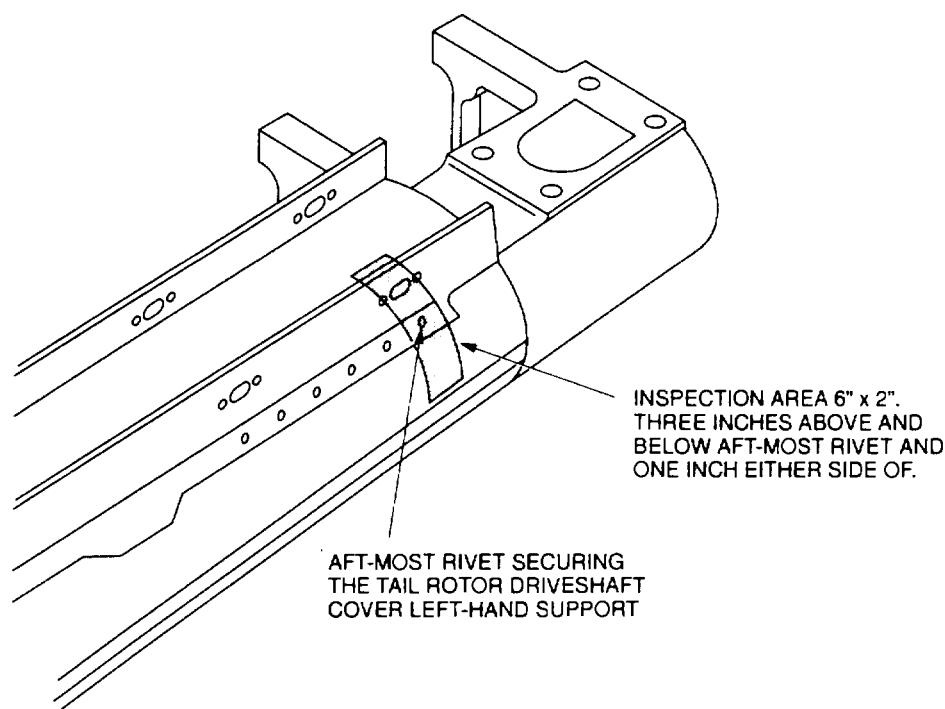
**Either probe identified in paragraph 4.7.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed, steps 4.7.3.5 b. (1), (2) and (3) shall be repeated each time a change is made.**

4.7.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.

4.7.4 Backup Method. Perform fluorescent penetrant inspection as required.

4.7.4.1 NDI Equipment and Materials. (Refer to Appendix B.) Inspection equipment selected from approved list in Table 1-7 and MIL-1-25135 level 3 and 4 penetrant materials selected from the approved list in Table 1-8.

4.7.4.2 Preparation of Helicopter. No additional preparation is required.



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**Figure 4-7. Tailboom.**



4.7.4.3 Preparation of Part. Paint need only be removed from area(s) described in paragraph 4.17.2; then thoroughly clean the same area(s). Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

4.7.4.4 Inspection Procedure. Perform fluorescent penetrant inspection of the suspected defective area(s). Refer to Fluorescent Penetrant Method, paragraph 1.4.7 and Table 1-5.

4.7.5 System Securing. Clean the inspected area(s) to remove inspection media. Refer to Post Cleaning and Restoration of Part or Area after NDI paragraph 1.4.16. Protective coating shall be reapplied as required.

#### **4.8 TAILBOOM ATTACH BOLTS (MT).**

4.8.1 Description (Figure 4-1, Index No. 8). Four bolts attach the tailboom to the aft fuselage attach fittings.

4.8.2 Defects. No cracks are allowed.

4.8.3 Primary Method. Magnetic Particle.

4.8.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Magnetic Particle Inspection Probe/Yoke
- b. Magnetometer
- c. Black Light
- d. Fluorescent Magnetic Particles, refer to Table 1-8
- e. Consumable Materials, refer to Table 1-8
- f. Aircraft Marking Pencil, refer to Table 1-8

#### **NOTE**

**Hand-held magnetic coil may be used. Refer to paragraph 1.4.8.1.2 and Figure 1-6.**

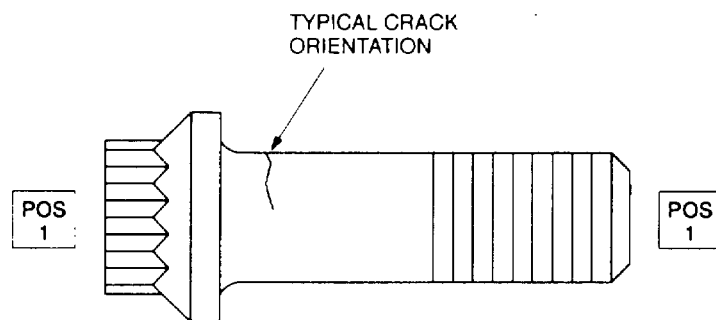
4.8.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the tail boom attach bolts removed in accordance with the applicable technical manuals listed in Table 1-1.

4.8.3.3 Access. Remove tailboom access opening.

4.8.3.4 Preparation of Part. The part shall be thoroughly cleaned. Refer to Preparation of Part of Area for NDI, paragraph 1.4.4.

4.8.3.5 NDI Equipment Settings. Refer to Magnetic Particle Method, paragraph 1.4.8.

4.8.3.6 Inspection Procedure. A magnetic field shall be applied to the part perpendicular to the orientation of possible cracks. Positions required for this inspection are illustrated in Figure 4-8.



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**Figure 4-8. Tailboom Attach Bolts.**

- a. Select AC on the AC/DC power switch.
- b. Place probe/yoke on part in Position 1 as shown.
- c. Press the test switch and apply a light coat of magnetic particle media at the same time. Remove the media momentarily before removing the current. Current should be applied for no more than five seconds.
- d. Inspect for cracks using the black light.
- e. Demagnetize before moving to the next position. Refer to paragraph 4.8.3.8.
- f. Repeat steps a through e for Position 2.

4.8.3.7 **Marking and Recording of Inspection Results.** Mark and record as required by paragraph 1.3.

4.8.3.8 **Demagnetization.** With the switch remaining in the AC position, place the probe/yoke legs in the same position used for magnetizing. Press the test switch and withdraw the probe/yoke from the part for a distance of two feet before releasing the switch.

4.8.4 **Backup Method.** None required.

4.8.5 **System Securing.** Clean the tail boom attach bolts thoroughly to remove all residual magnetic particle media. Refer to Post Cleaning and Restoration of Part or Area After NDI, paragraph 1.4.16. The tail boom attach bolts require installation in accordance with the applicable technical manuals listed in Table 1-1.

## 4.9 TAIL ROTOR GEARBOX SUPPORT ASSEMBLY (ET).

4.9.1 **Description (Figure 4-1. Index No.9).** The tail rotor gearbox support assembly attaches the tailrotor gearbox to the tailboom.

4.9.2 Defects. Cracks can occur anywhere on the part. Inspect the exterior and interior of the assembly. This inspection is to verify crack indications found visually. No cracks are allowed.

4.9.3 Primary Method. Eddy Current.

4.9.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100KHz-500KHz
- c. Probe, right angle, shielded surface, 100KHz-500KHz, 90° 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Reference Block, three-notched magnesium (0.008, 0.020, and 0.040 EDM notches)
- g. Reference Block, three-notched titanium (0.008, 0.020, and 0.040 EDM notches)
- h. Teflon Tape, refer to Table 1-8
- i. Aircraft Marking Pencil, refer to Table 1-8

4.9.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance in accordance with the applicable technical manuals listed in Table 1-1.

4.9.3.3 Access. Remove the tail rotor gearbox support assembly access door to allow inspection of the interior part of the assembly.

4.9.3.4 Preparation of Part. The assembly and area shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

4.9.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-1 9e<sup>II</sup>.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 56°		
Probe drive	- mid		
LPF	- 100		
HPF	-0		
H Pos	- 80%		
V Pos	- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block (Refer to standard instrument display shown in Figure 1-7).

- 4.9.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 4-9.
- Place probe on a good area in the required inspection location and null. Adjust phase as required to obtain horizontal lift-off.
  - Inspect the part.
  - Any signal similar to the notches in the test block are cause for rejection.

**NOTE**

**Either probe identified in paragraph 4.9.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 4.9.3.5 b. (1), (2) and (3) shall be repeated each time a change is made.**

4.9.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.

4.9.4 Backup Method. None required.

4.9.5 System Securing. The removed access door requires installation in accordance with the applicable technical manual listed in Table 1-1.

#### **4.10 TAIL ROTOR DRIVESHAFT COVERS (ET).**

4.10.1 Description (Figure 4-1. Index No. 10). The tail rotor driveshaft cover shields the tail rotor driveshaft between the aft fuselage and the tail rotor gearbox.

4.10.2 Defects. Inspect for cracks on the covers. Inspect scratches or creases which obviously exceed the thickness of the finish. No cracks are allowed.

4.10.3 Primary Method. Eddy Current.

4.10.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- Eddy Current Inspection Unit
- Probe, straight, shielded surface, 100KHz-500KHz
- Probe, right angle, shielded surface, 100KHz-500KHz, 90 1/2 inch drop
- Cable Assembly
- Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- Reference Block, three-notched magnesium (0.008, 0.020, and 0.040 EDM notches)
- Reference Block, three-notched titanium (0.008, 0.020, and 0.040 EDM notches)
- Teflon Tape, refer to Table 1-8
- Aircraft Marking Pencil, refer to Table 1-8

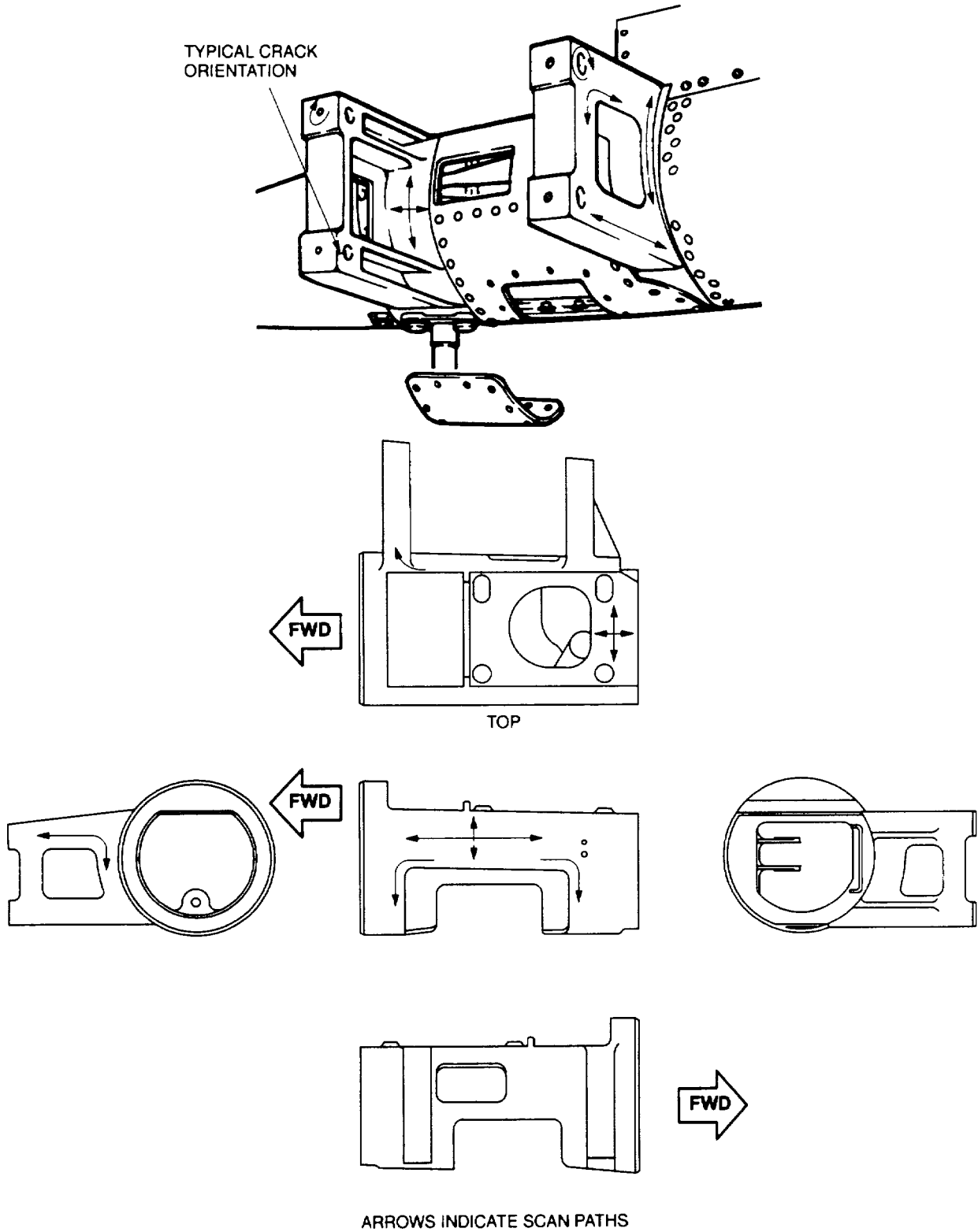


Figure 4-9. Tail Rotor Gearbox Support Assembly.

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4.10.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance in accordance with the applicable technical manuals listed in Table 1-1.

4.10.3.3 Access. Not applicable.

4.10.3.4 Preparation of Part. The driveshaft covers shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

4.10.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-1 9e<sup>II</sup>.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 56°		
Probe drive	- mid		
LPF	- 100		
HPF	- 0		
H Pos	- 80%		
V Pos	- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block (Refer to standard instrument display shown in Figure 1-7).

4.10.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 4-10.

- a. Place probe on a good area in the required inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

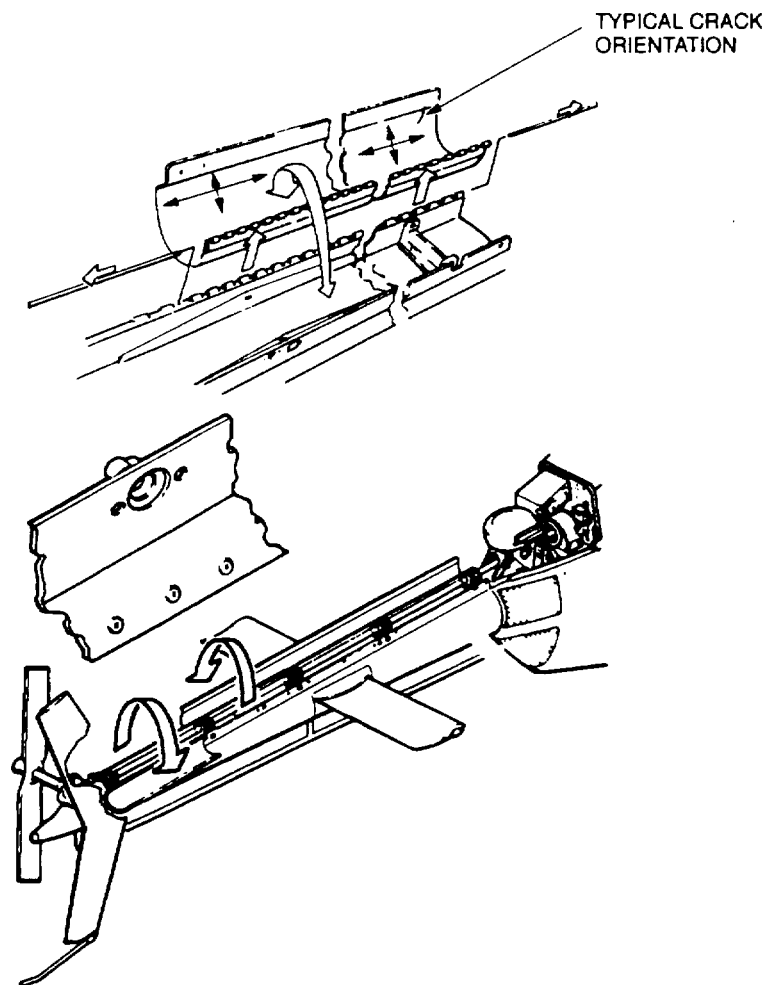
**NOTE**

**Either probe identified in paragraph 4.10.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 4.10.3.5 b. (1), (2) and (3) shall be repeated each time a change is made.**

4.10.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.

4.10.4 Backup Method. Refer to paragraph 1.4.7.

4.10.5 System Securing. None required.



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Figure 4-10. Tail Rotor Driveshaft Covers.

#### 4.11 VERTICAL FIN ASSEMBLY (BT).

4.11.1 Description (Figure 4-101, Index No. 111). This inspection is applicable to the honeycomb (bonded) portions of the fin assembly. The vertical fin provides inflight stability, houses the VHF antenna and is the mounting structure for the tail skid. The general construction consists of chem milled aluminum skins over aluminum honeycomb with fiberglass panel edging.

4.11.2 Defects. Verification of void damage located by visual inspection. Void damage can occur on either side of the vertical fin as a result of mechanical damage (dents, punctures, scratches, etc.) or fluid intrusion/corrosion.

#### NOTE

**A void is defined as an unbonded area that is suppose to be bonded. Many sub-definitions are given such as bond separation, delamination, lack of adhesive, gas pocket, misfit, etc. This procedure makes no distinction among these instead grouping under the general term "void."**

4.11.3 Primary Method. Bond Testing.

4.11.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Bond Test Unit
- b. Probe Mechanical Impedance Analysis
- c. Probe Holder
- d. Cable Assembly
- e. Test block, metal honeycomb with skin thickness closest to that of the panel to be inspected (refer to Appendix C)
- f. Teflon tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

4.11.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance in accordance with applicable technical manuals listed in Table 1-1.

4.11.3.3 Access. Not applicable.

#### WARNING

##### Maintenance Platforms/Workstands

**Use only appropriate platforms, workstands, or other approved locally procured stands and restraint equipment, when working above 10 feet on helicopters in a nontactical environment. Otherwise, personnel injury could result from accidental falls.**

4.11.3.4 Preparation of Part. These portions of the vertical fin to be inspects shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.



#### 4.11.3.5 NDI Equipment Settings. Refer to Bond Testing Equipment, paragraph 1.4.6.1.

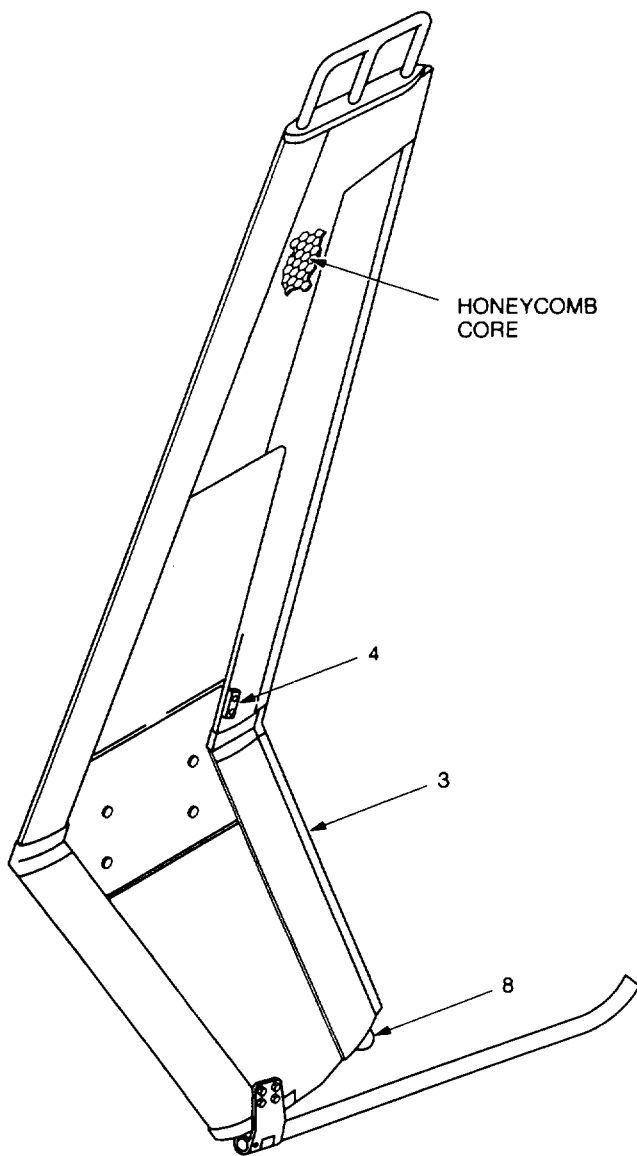
- a. Attach cable and probe to Bondmaster. Protect probe with Teflon tape and install in probe holder.
- b. Turn on Bondmaster, press SPCL and make the following adjustments.
 

H	- Pos 40%
V	- Pos 80%
PHASE REF	- 0
DRIVE	- MID
- c. Press SET and select DISPLAY - PHASE.
- d. Place probe on good area of test block and press GOOD PART. Do this several times while moving the probe to different spots in the good area of the test block. Note the video signature for each. Select and enter a representative good area by pressing GOOD PART one last time.
- e. Place probe on void area of the test block and press BAD PART. Do this several times while moving the probe slightly to different positions within the void area. Select and enter a position that gives a strong difference between good and void areas. Use DIFF soft key to observe difference between good and bad areas of test block.

#### NOTE

**If during setup the flying spot deflects upward, or to the side, when the probe passes over the bad part, instead of the desired down deflection toward the alarm box, Press SPCL and toggle to a different phase setting (90, 180, or 270) and repeat (d) and (e). Continue to try phase setting until the flying spot moves in the desired down direction.**

- f. Place probe on good area of test block and press RUN. Flying spot should be near the top-center of the ACTIVE screen. If not, press NULL. Slide probe from good to void area and note response from flying spot. This response should provide both amplitude (vertical) and phase (horizontal) movement. The default gate/alarm setting may be incorrect for this setup. Turn off or reset gate/alarm as desired.
  - g. The Bondmaster is programmed to automatically set test parameters to a start-up or initial bond test. By following the steps outlined above, adjustments to the FREQ, GAIN, and ALARM can help to refine the selectivity in locating defects among differing composite materials.
- #### 4.11.3.6 Inspection Procedure. Refer to Bond Test Method, paragraph 1.4.6 and inspection areas are shown in Figure 4-11.
- a. Skin-to-Honeycomb Voids. Place probe in location where test for skin-to-honeycomb bone separation is desired and press NULL. Move probe from good to suspect area and note response. A strong amplitude change and phase shift similar to the test block is indicative of a void. This set-up is very sensitive to thin skin-to-core bonding. Move probe slowly over the skin and note the slight amplitude change (bounce) as the probe senses alternately the honeycomb cell nodes and cell walls.



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Figure 4-11. Vertical Fin Assembly.

**NOTE**

**The basic set-up provided above also selects a frequency that provide a satisfactory inspection for voids associated with skin-to-spar, skin-to-trailing edge, doubler-to-doubler and doubler-to-skin, and trim tab bonding.**

- b. Use the NULL and GAIN adjustments to reset the ACTIVE screen for the areas to be inspected (do not go back to SET mode). Also, compare similar areas. For example, to check for spar to skin voids, check front and back of vertical fin in the same area, or check another vertical fin in the same area. Observe that, when moving the probe chordwise from the spar to the trailing edge, the transitions at the spar-to-honeycomb and the honeycomb-to-trailing edge strip are easily detected. When inspecting these areas, adjust the NULL and GAIN and move the probe carefully along the transition using a straight edge or other guide. A localized phase and amplitude shift similar to the test block indicates a void.

4.11.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.

**NOTE**

**Attention shall be directed to accurately marking the boundaries of all voids on both sides of the vertical fin. These markings will be needed to determine acceptance/rejection criteria in accordance with the applicable technical manuals listed in Table 1-1.**

4.11.4 Backup Method. None required.

4.11.5 System Securing. None required.

**4.12 HORIZONTAL STABILIZER (ET).**

4.12.1 Description (Figure 4-1. Index No.12). This inspection is applicable to the horizontal stabilizer ribs, spoiler, and skin, This inspection is also applicable to the hinge fittings or folding horizontal stabilizers.

4.12.2 Defects. Defects may occur anywhere on the horizontal stabilizer. No cracks are allowed.

4.12.3 Primary Method. Eddy Current.

4.12.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100KHz-500KHz
- c. Probe, right angle, shielded surface, 100KHz-500KHz, 90° 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

4.12.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance in accordance with the applicable technical manuals listed in Table 1-1.

4.12.3.3 Access. Not applicable.

4.12.3.4 Preparation of Part. The horizontal stabilizer shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

4.12.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 56°		
Probe drive	- mid		
LPF	- 100		
HPF	- 0		
H Pos	- 80%		
V Pos	- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block (Refer to standard instrument display shown in Figure 1-7).

4.12.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 4-12.

- a. Place probe on a good area in the required inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejecton.

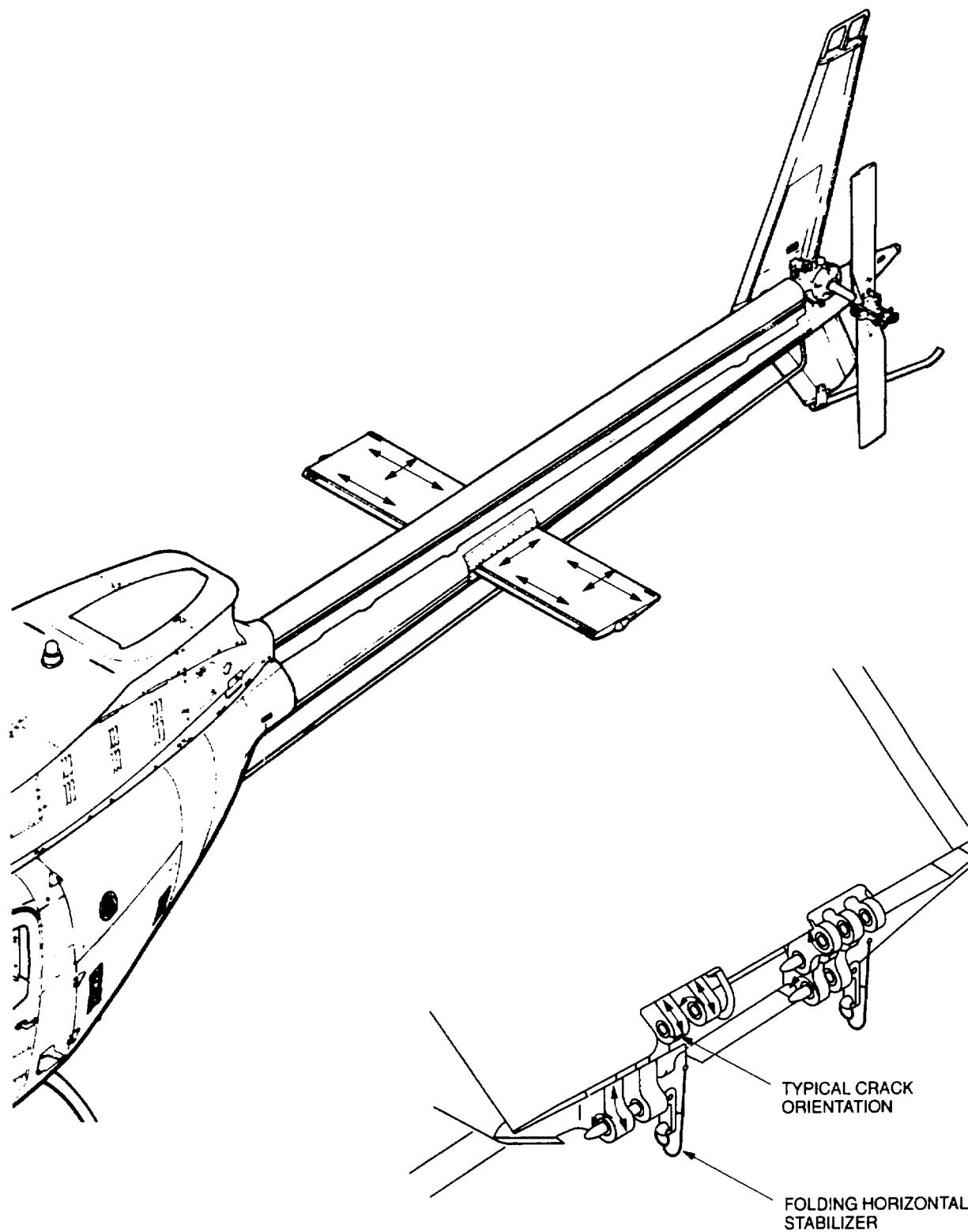
**NOTE**

**Either probe identified in paragraph 4.12.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 4.12.3.5 b. (1), (2) and (3) shall be repeated each time a change is made.**

4.12.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.

4.12.4 Backup Method. None required.

4.12.5 System Securing. None required.



ARROWS INDICATE SCAN PATHS

TYPICAL CRACK ORIENTATION

FOLDING HORIZONTAL STABILIZER

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Figure 4-12. Horizontal Stabilizer.

#### 4.13 STOP-DOWN ASSEMBLY (MT).

4.13.1 Description (Figure 4-1, Index No. 13). The stop-down assembly acts as a spacer between the left and the right support beam assemblies and the corner mounts on the transmission and mast assembly.

4.13.2 Defects. Inspect to verify crack indications found visually on the assembly. No cracks are allowed.

4.13.3 Primary Method. Magnetic Particle.

4.13.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Magnetic Particle Inspection Probe/Yoke
- b. Magnetometer
- c. Black Light
- d. Fluorescent Magnetic Particles, refer to Table 1-8
- e. Consumable Materials, refer to Table 1-8
- f. Aircraft Marking Pencil, refer to Table 1-8

4.13.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the stop-down assembly shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

4.13.3.3 Access.

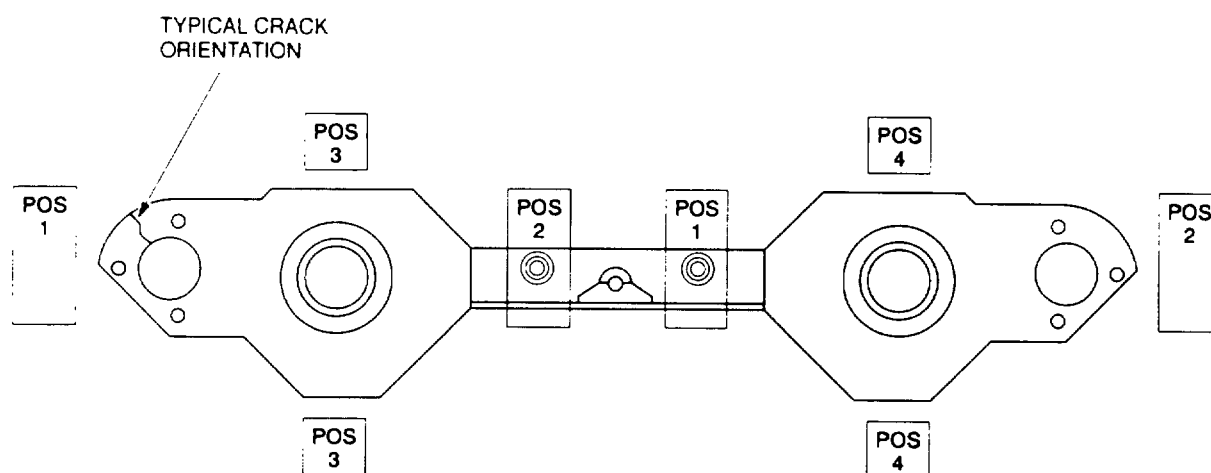
#### **WARNING** **Maintenance Platforms/Workstands**

**Use only appropriate platforms, workstands, or other approved locally procured stands and restraint equipment, when working above 10 feet on helicopters in a nontactical environment. Otherwise, personnel injury could result from accidental falls.**

4.13.3.4 Preparation of Part. The part shall be thoroughly cleaned. Refer to Preparation of Part of Area for NDI, paragraph 1.4.4.

4.13.3.5 NDI Equipment Settings. Refer to Magnetic Particle Method, paragraph 1.4.8.

4.13.3.6 Inspection Procedure. A magnetic field shall be applied to the part perpendicular to the orientation of possible cracks. Positions required for this inspection are illustrated in Figure 4-13.



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**Figure 4-13. Stop-Down Assembly.**

- Select AC on the AC/DC power switch.
- Place probe/yoke on part in Position 1 as shown.
- Press the test switch and apply a light coat of magnetic particle media at the same time. Remove the media momentarily before removing the current. Current should be applied for no more than five seconds.
- Inspect for cracks using the black light.
- Demagnetize before moving to the next position. Refer to paragraph 4.13.3.8.
- Repeat steps a through e for Position 2,3, and 4.

4.13.3.7 **Marking and Recording of Inspection Results.** Mark and record as required by paragraph 1.3.

4.13.3.8 **Demagnetization.** With the switch remaining in the AC position, place the probe/yoke legs in the same position used for magnetizing. Press the test switch and withdraw the probe/yoke from the part for a distance of two feet before releasing the switch.

4.13.4 **Backup Method.** None required.

4.13.5 System Securing. Clean the stop-down assembly thoroughly to remove all residual magnetic particle media. Refer to Post Cleaning and Restoration of Part or Area After NDI, paragraph 1.4.16. The stop-down assembly, if removed, requires installation in accordance with the applicable technical manuals listed in Table 1-1.

#### 4.14 FORWARD TRANSVERSE BEAM (ET).

4.14.1 Description (Figure 4-1. Index No. 14). The forward transverse beam is located forward of and below the transmission. It is attached to the forward ends of the (pylon) beam assemblies and rests upon the upper cabin panel.

4.14.2 Defects. Defects may occur anywhere on the surface of the forward transverse beam. No cracks are allowed.

4.14.3 Primary Method. Eddy Current.

4.14.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100KHz-500KHz
- c. Probe, right angle, shielded surface, 100KHz-500KHz, 90° 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

4.14.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the forward transverse beam shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

4.14.3.3 Access. Not applicable.

#### **WARNING** **Maintenance Platforms/Workstands**

**Use only appropriate platforms, workstands, or other approved locally procured stands and restraint equipment, when working above 10 feet on helicopters in a nontactical environment. Otherwise, personnel injury could result from accidental falls.**

4.14.3.4 Preparation of Part. The forward transverse beam shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.



## 4.14.3.5 4NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 56°		
Probe drive	- mid		
LPF	- 100		
HPF	- 0		
H Pos	- 80%		
V Pos	- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block (Refer to standard instrument display shown in Figure 1-7).

## 4.14.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 4-14.

- a. Place probe on a good area in the required inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

**NOTE**

**Either probe identified in paragraph 4.14.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 4.14.3.5 b. (1), (2) and (3) shall be repeated each time a change is made.**

## 4.14.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.

4.14.4 Backup Method. Refer to paragraph 1.4.7.4.14.5 System Securing. The forward transverse beam, if removed, requires installation in accordance with the applicable technical manuals listed in Table 1-1.

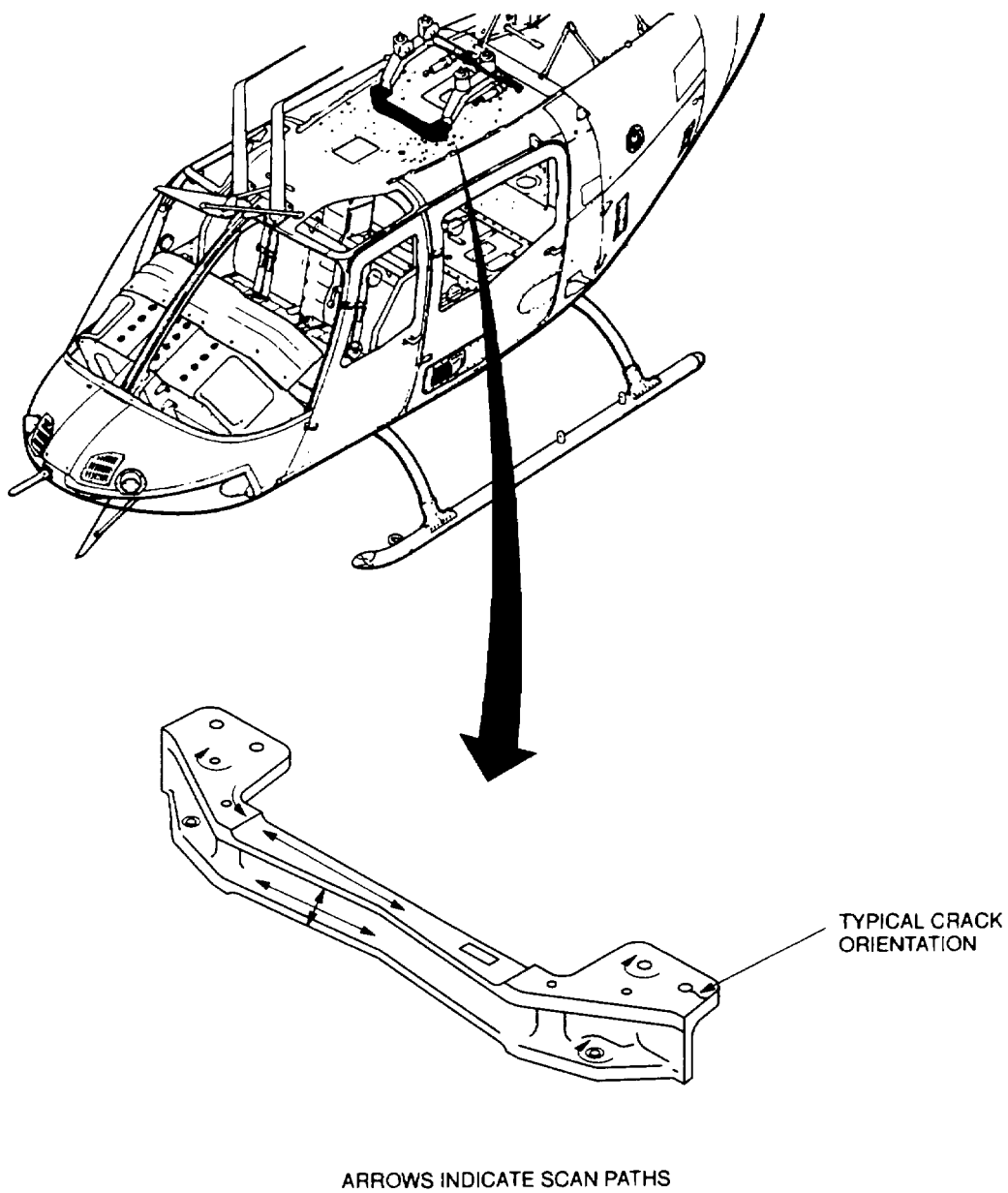


Figure 4-14. Forward Transverse Beam.

#### 4.15 AFT TRANSVERSE BEAM (ET).

4.15.1 Description (Figure 4-1. Index No. 15). The aft transverse beam is located aft of and below the transmission. It is attached to the aft ends of the (pylon) beam assemblies and rests upon the upper cabin panel.

4.15.2 Defects. Defects may occur anywhere on the surface of the aft transverse beam. No cracks are allowed.

4.15.3 Primary Method. Eddy Current.

4.15.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100KHz-500KHz
- c. Probe, right angle, shielded surface, 100KHz-500KHz, 90° 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

4.15.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the aft transverse beam shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

4.15.3.3 Access. Not applicable.

#### **WARNING**

**Maintenance Platforms/Workstands Use only appropriate platforms, workstands, or other approved locally procured stands and restraint equipment, when working above 10 feet on helicopters in a nontactical environment. Otherwise, personnel injury could result from accidental falls.**

4.15.3.4 Preparation of Part. The aft transverse beam shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

4.15.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 56°		
Probe drive	- mid		
LPF	- 100		
HPF	- 0		
H Pos	- 80%		
V Pos	- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block (Refer to standard instrument display shown in Figure 1-7).

4.15.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 4-15.

- a. Place probe on a good area in the required inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

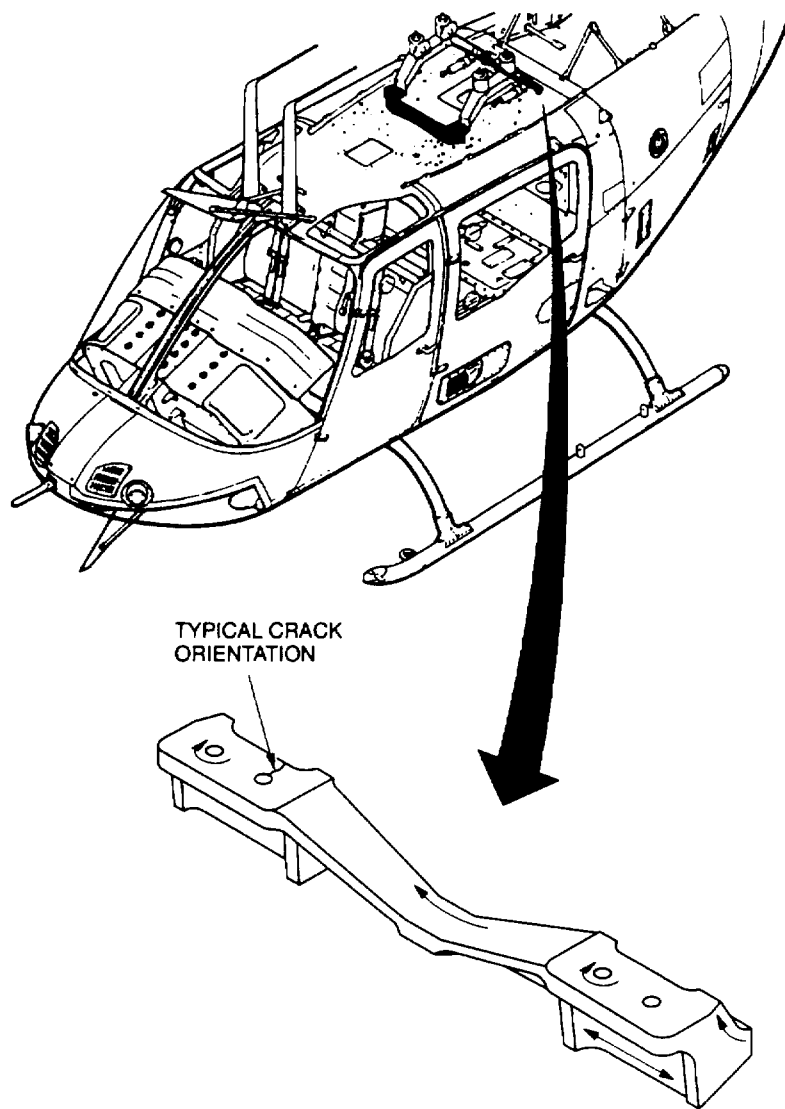
**NOTE**

**Either probe identified in paragraph 4.15.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 4.15.3.5 b. (1), (2) and (3) shall be repeated each time a change is made.**

4.15.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.

4.15.4 Backup Method. Refer to paragraph 1.4.7.

4.15.5 System Securing. The aft transverse beam, if removed, requires installation in accordance with the applicable technical manuals listed in Table 1-1.



TYPICAL CRACK ORIENTATION

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Figure 4-15. Aft Transverse Beam.

**4.16 SKID SADDLES/SHOES (ET).**

4.16.1 Description (Figure 4-1. Index No. 16). The skid saddles are used to attach the landing gear cross tubes to the skid tubes, the skid shoes are attached at the base of the skid tubes to prevent damage to the skid tubes.

4.16.2 Defects. Defects may occur anywhere on the skid saddles/shoes. No cracks are allowed.

4.16.3 Primary Method. Eddy Current.

4.16.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100KHz-500KHz
- c. Probe, right angle, shielded surface, 100KHz-500KHz, 90° 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

4.16.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance in accordance with the applicable technical manuals listed in Table 1-1.

4.16.3.3 Access. Not applicable.

4.16.3.4 Preparation of Part. The skid saddles/shoes shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

4.16.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e<sup>1</sup>.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 56°		
Probe drive	- mid		
LPF	- 100		
HPF	- 0		
H Pos	- 80%		
V Pos	- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block (Refer to standard instrument display shown in Figure 1-7).

4.16.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 4-16.

- a. Place probe on a good area in the required inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

**NOTE**

**Either probe identified in paragraph 4.16.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 4.16.3.5 b. (1), (2) and (3) shall be repeated each time a change is made.**

4.16.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.

4.16.4 Backup Method. None required.

4.16.5 System Securing. None required.

**4.17 TOW RING MOUNTING HOLES (ET).**

4.17.1 Description (Figure 4-1. Index No. 17). The tow ring mounting holes are located in the forward portions of both skid tubes, which provide for attachment of the ton rings.

4.17.2 Defects. Defects may occur anywhere around the circumference of the mounting holes. No cracks are allowed.

4.17.3 Primary Method. Eddy Current.

4.17.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100KHz-500KHz
- c. Probe, right angle, shielded surface, 100KHz-500KHz, 90° 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

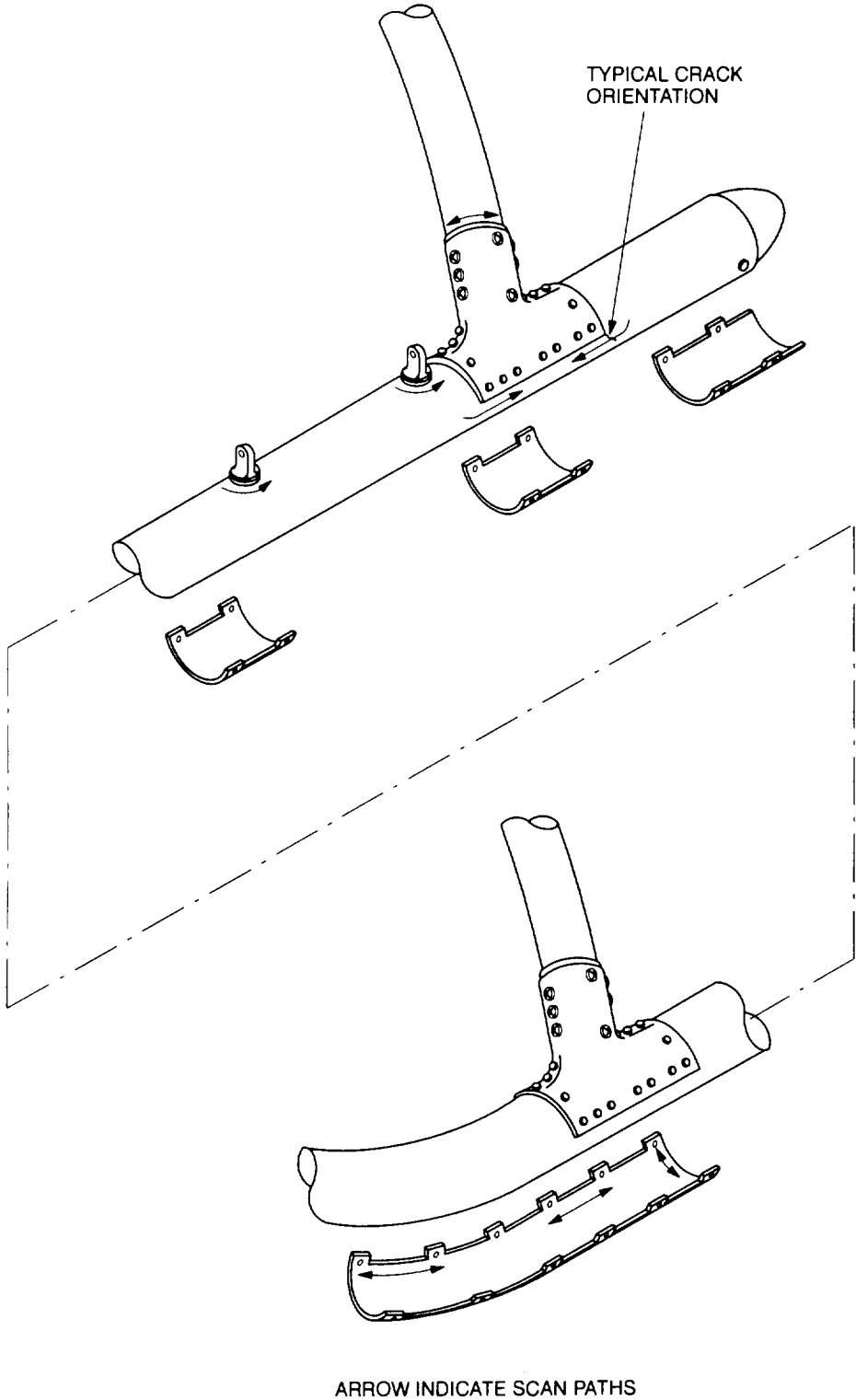


Figure 4-16. Skid Saddles/Shoes.

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4.17.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance in accordance with the applicable technical manuals listed in Table 1-1.

4.17.3.3 Access. Not applicable.

4.17.3.4 Preparation of Part. The tow ring mounting hole area shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

4.17.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 56°		
Probe drive	- mid		
LPF	- 100		
HPF	- 0		
H Pos	- 80%		
V Pos	- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block (Refer to standard instrument display shown in Figure 1-7).

4.17.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 4-17.

- a. Place probe on a good area in the required inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

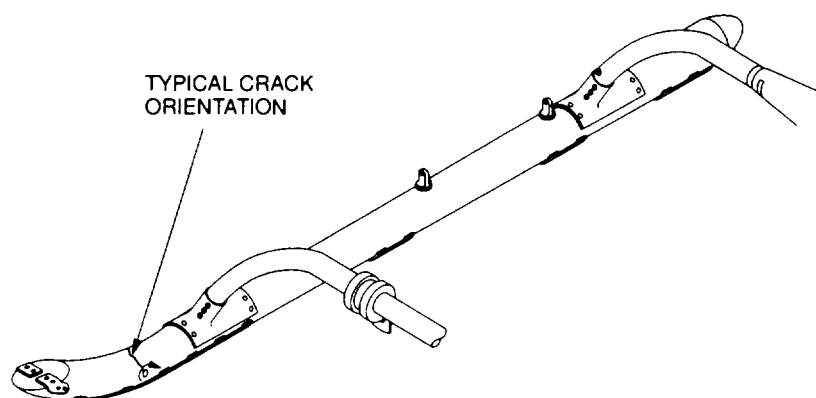
**NOTE**

**Either probe identified in paragraph 4.17.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 4.17.3.5 b. (1), (2) and (3) shall be repeated each time a change is made.**

4.17.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.

4.17.4 Backup Method. Refer to paragraph 1.4.7.

4.17.5 System Securing. None required.



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**Figure 4-17. Tow Ring Mounting Holes.**

#### **4.18 TOW FITTINGS (MT).**

4.18.1 Description (Figure 4-1. Index No. 18). The tow fittings are steel eye bolts that attach through the landing gear skid tubes and facilitate ground handling of the helicopter.

4.18.2 Defects. Cracks may occur anywhere on the surface of the tow fittings. No cracks are allowed.

4.18.3 Primary Method. Magnetic Particle.

4.18.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Magnetic Particle Inspection Probe/Yoke
- b. Magnetometer
- c. Black Light
- d. Fluorescent Magnetic Particles, refer to Table 1-8
- e. Consumable Materials, refer to Table 1-8
- f. Aircraft Marking Pencil, refer to Table 1-8

4.18.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the tow fittings removed in accordance with the applicable technical manuals listed in Table 1-1.

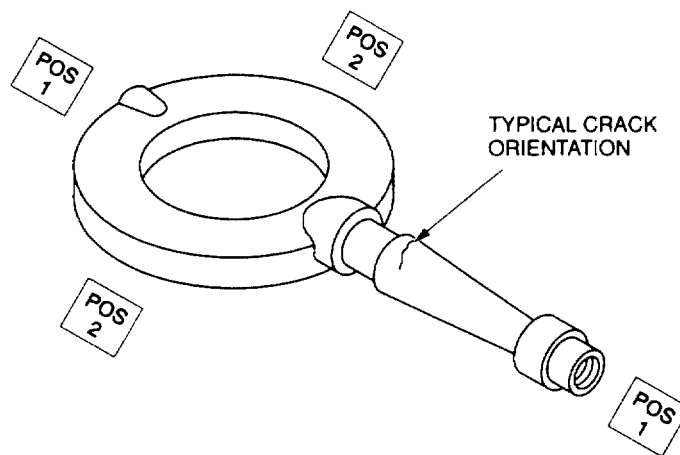
4.18.3.3 Access. Not applicable.

4.18.3.4 Preparation of Part. The part shall be thoroughly cleaned. Refer to Preparation of Part of Area for NDI, paragraph 1.4.4.

4.18.3.5 NDI Equipment Settings. Refer to Magnetic Particle Method, paragraph 1.4.8.

4.18.3.6 Inspection Procedure. A magnetic field shall be applied to the part perpendicular to the orientation of possible cracks. Positions required for this inspection are illustrated in Figure 4-18.

- a. Select AC on the AC/DC power switch.
- b. Place probe/yoke on part in Position 1 as shown.
- c. Press the test switch and apply a light coat of magnetic particle media at the same time. Remove the media momentarily before removing the current. Current should be applied for no more than five seconds.
- d. Inspect for cracks using the black light.
- e. Demagnetize before moving to the next position. Refer to paragraph 4.18.3.8.
- f. Repeat steps a through e for Position 2.



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**Figure 4-18. Tow Fittings.**

4.18.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.

4.18.3.8 Demagnetization. With the switch remaining in the AC position, place the probe/yoke legs in the same position used for magnetizing. Press the test switch and withdraw the probe/yoke from the part for a distance of two feet before releasing the switch.

4.18.4 Backup Method. None required.

4.18.5 System Securing. Clean the tow fittings thoroughly to remove all residual magnetic particle media. Refer to Post Cleaning and Restoration of Part or Area After NDI, paragraph 1.4.16. The tow fittings require installation in accordance with the applicable technical manuals listed in Table 1-1.

#### **4.19 VERTICAL FIN, FLUID IN HONEYCOMB CORE (RT).**

4.19.1 Description (Figure 4-1, Index No.19). The vertical fin is of aluminum honeycomb construction and provides a mount for the tail skid and radio antennas. The vertical fin is attached to the tailboom by means of forward and aft vertical fin supports.

4.19.2 Defects. Fluid in honeycomb core.

4.19.3 Primary Method. Radiography.

### **WARNING**

#### **RADIATION HAZARD**

Assure compliance with all applicable safety precautions set forth in TM 55-1500-355-23 (Nondestructive Inspection Methods manual) listed in Table 1-1. A hazard associated with exposure to ionizing radiation is that serious damage can be inflicted without pain, burning or other sense of discomfort during the exposure period. Radiation protection shall be utilized in accordance with AR40-14/DLAR 1000.28.

4.19.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. X-ray unit
- b. Tripod, X-ray tubehead stand
- c. Film Processor
- d. Film, Ready Pack 8 inch by 10 inch
- e. Marking material, refer to Table 1-8

4.19.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance in accordance with applicable technical manuals listed in Table 1-1.

4.19.3.3 Access. Not applicable.

### WARNING

#### Maintenance Platforms/Workstands

**Use only appropriate platforms, workstands, or other approved locally procured stands and restraint equipment, when working above 10 feet on helicopters in a nontactical environment. Otherwise, personal injury could result from accidental falls.**

4.19.3.4 Preparation of Part. The identified area of interest shall be thoroughly cleaned. Refer to Preparation Of Part or Area for NDI, paragraph 1.4.4.

4.19.3.5 NDI Equipment and Settings.

- a. Refer to Radiographic (X-ray) method, paragraph 1.4.10.
- b. Typical equipment settings, inspection and exposure data are given in Figure 4-19.

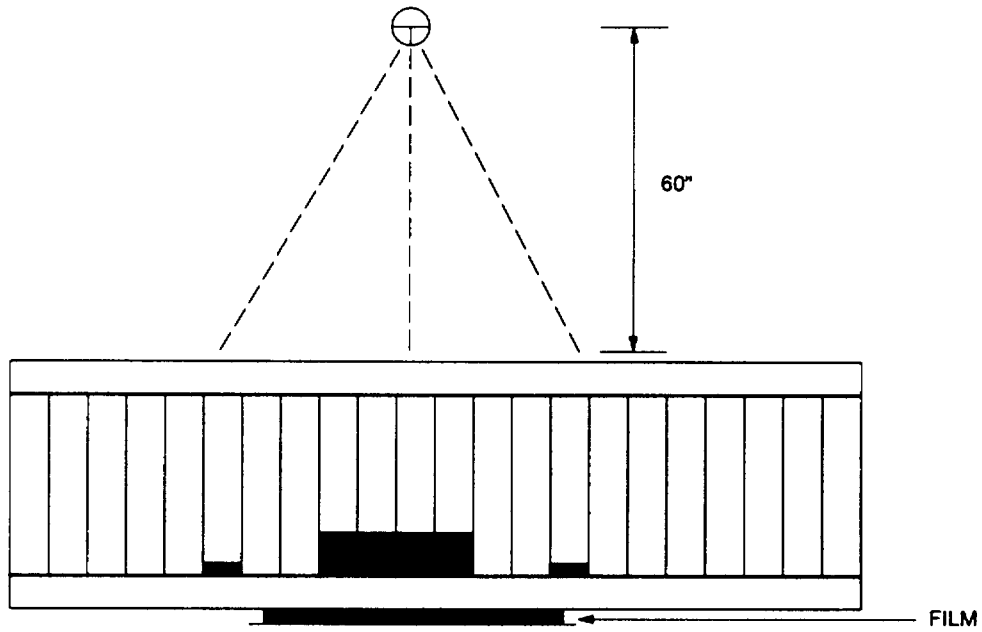
4.19.3.6 Inspection Procedure. Inspect identified areas, refer to Figure 4-19 for typical fluid entrapment and source/film placement.

- a. Position film and desired nameplate data for exposure number 1.
- b. Position X-ray tubehead for exposure number 1.
- c. Set X-ray unit to the values given in the Radiographic Inspection Data chart for exposure number 1.
- d. Make exposure number 1.
- e. Remove exposed film.
- f. Repeat inspection procedure (steps a through e above) for each exposure.
- g. Process and interpret film for defects as noted in paragraph Typical defects are shown in Figure 4-19 (Sheet 3).

4.19.3.7 Marking and Recording of Inspection Results. Mark and record the inspection results as necessary per paragraph 1.3.

4.19.4 Backup Method. None required.

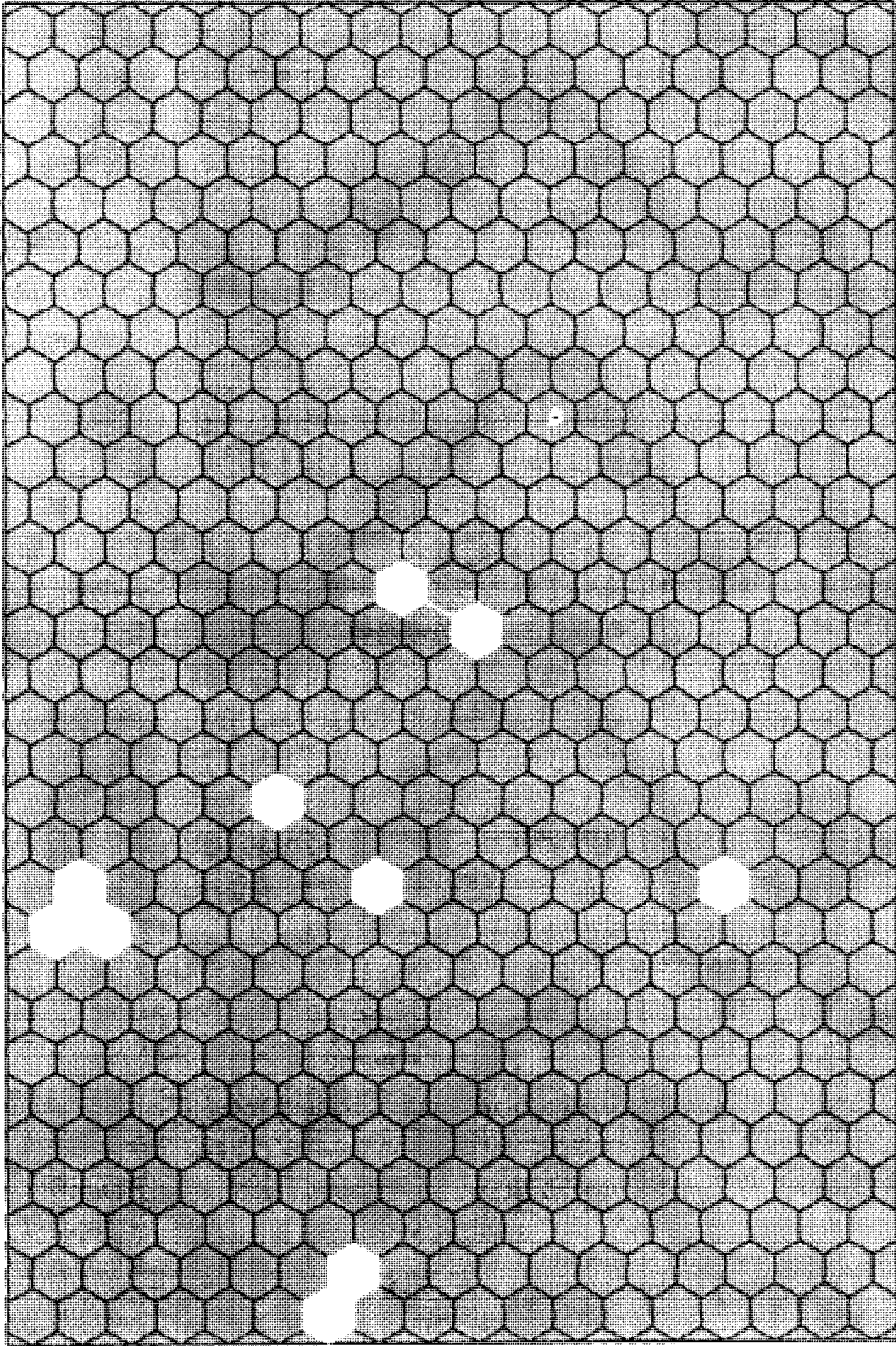
4.19.5 System Securing. The identified area shall be cleaned as necessary. Refer to Post Cleaning And Restoration Of Part Or Area after NDI paragraph 1.4.16.



RADIOGRAPHIC INSPECTION DATA						
EXPOSURE NUMBER	KV	MA	FFD (INCHES)	TIME (SEC)	FILM	
					TYPE	SIZE
E1	50	3.5	60	60	M-2	8 x 10
REMARKS INSPECTION DATA SHALL BE ADJUSTED AS REQUIRED.						

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Figure 4-19. Vertical Fin, Fluid In Honeycomb Core (Sheet 1 of 2)



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Figure 4-19. Vertical Fin, Fluid in Honeycomb Core (Sheet 2 of 2)

**4.20 FORE AND AFT CROSS TUBE ASSEMBLIES (UT).**

4.20.1 Description (Figure 4-1, Index No. 20). The forward and aft cross tubes are the transverse (side-to-side) structure of the landing gear skids and attach the landing gear skid assembly to the helicopter fuselage. The ends of each cross tube have a larger outside diameter (approximately 1/4 inch) and a proportionally thicker wall than the rest of the tube. These reinforced ends are drilled for attachment of the skid tube saddles. Nut plates are fastened inside the cross tubes using blind rivets and are used to secure the saddle bolts.

4.20.2 Defects. Four nut plates are present at the ends of each cross tube. The blind rivet at the inboard end of each nut plate is the potential site for cracking and failure of the cross tube. Cracking may occur at any of the rivets, also may occur the radius at the change of tube thickness. No cracks are allowed.

4.20.3 NDI Equipment and Materials. (Refer to Appendix B.)

4.20.3.1 Primary Method. Ultrasonic

- a. Ultrasonic Inspection Unit
- b. Transducer, 5.0 Mhz, 600 shear wave, 1/4 X 1/4 inch element
- c. Cable Assembly
- d. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- e. Consumable Materials, refer to Table 1-8.
- f. Aircraft Marking Pencil, refer to Table 1-8.

4.20.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance in accordance with applicable technical manuals listed in Table 1-1.

4.20.3.3 Access. Not applicable 4.20.3.4 Preparation of Part. The part or area shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4. Paint removal is not necessary. However, rough and flaking paint and overspray may require smoothing with a Scotch Brite pad.

4.20.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the USD-15S:

(SETUP - DEFAULT SETTINGS)	
DIALOG	ENGLISH
UNIT	INCH
(BASICS)	
GAIN	40db
RANGE	5.0 in
MTL VEL	124.0 in/ms
D-DELAY	0.00 in
P-DELAY	0.00 ms



	(PULSER)	
DAMPING		500 ohm
POWER		1000 PF
PRF-MOD		AUTOLOW
PRF-VAL		See Note 1
	(RECEIVER)	
FREQUENCY		5MHz
REJECT		0%
RECTIF		FULL-W
DUAL		OFF
	(AMPLITUDE)	
FINEdb		0.00db
LO-NOIS		OFF
PUL-AMP		150V
PUL-WID		30NS
	(GATES)	See Note 2
	(MEAS)	See Note 3
	(KEYS)	See Note 3
	(ANGLE)	See Note 3
	(DAC)	
DAC-MOD		OFF
DAC-REC		OFF
A-START		See Note 3
DAC-ECH		0

## NOTE:

- (1) When pulse rep frequency is in an automatic mode the value is electronically determined.
- (2) Not used- disable by selecting logic - OFF
- (3) Not used- leave at default values

b. Refer to Ultrasonic Method, paragraph 1.4.12. Set up on test block as follows:

**NOTE**

**The ideal reference block is a section of OH-58 cross tube, rejected for cracks, having both cracked and uncracked holes. (A hole may have to be drilled in some rejected cross tubes in order to provide a good hole.) Also, set up may be made using the reference block three-notched aluminum, which has the same thickness as the tube wall.**

- (1) Attach transducer to cable and cable to ultrasonic unit. Couple transducer to reference block as shown in Figure 4-20 with the sound path parallel to the long axis of the tube. Position transducer approximately 1 inch from a good hole and manipulate transducer to obtain a reflection. Now, the objective is to manipulate the transducer to obtain two reflections of equal amplitude. These are trapped signals from the top and bottom of the hole. Adjust gain to obtain amplitude of approximately 50 percent FSH. With the delay control move unwanted shoe noise off screen and use range control to position the rivet hole signals at mid screen. The CRT display should appear similar to those shown in Figure 4-20. Now, move the transducer circumferentially and note the amount of transducer movement (distance) from when the signal is first detected, through maximum amplitude, to where the signal is again barely detectable. This will provide a rough measuring guide for and uncracked hole. Rivet holes on the in-service components may be misdrilled or damaged and frequently will not give clean split signal shown by the reference block. Therefore, it is important to note the position and distance of the transducer from the good hole in the reference block so that the transducer may be positioned correctly on parts that do not respond appropriately.
- (2) Position transducer at a cracked hole and note signal from cracks. Typically, the reflection from the cracks (especially large cracks) will be larger than the signal from the hole. Move the transducer circumferentially and note the additional amount of transducer movement (distance) obtained from the cracks. Mark the points at which the amplitude of the crack signals are just detectable (0 percent to 5 percent FSH). By knowing the size of the cracks in the reference block and the differences in transducer movement (distance) between the uncracked and cracked a rough estimate of crack size may be made. If the reference block is used, position transducer on back of the test block (notches down) so that the ultrasonic signal is trapped by the end of the block. "Peak" out the first reflection from the 0.040 inch deep notch and adjust gain level to approximately 50 percent FSH. Use D-delay to position this "Peaked" signal at mid-screen. This block will permit set up of gain, range and delay only.

As experience is gained with this inspection, set up may be made using holes in the test part.

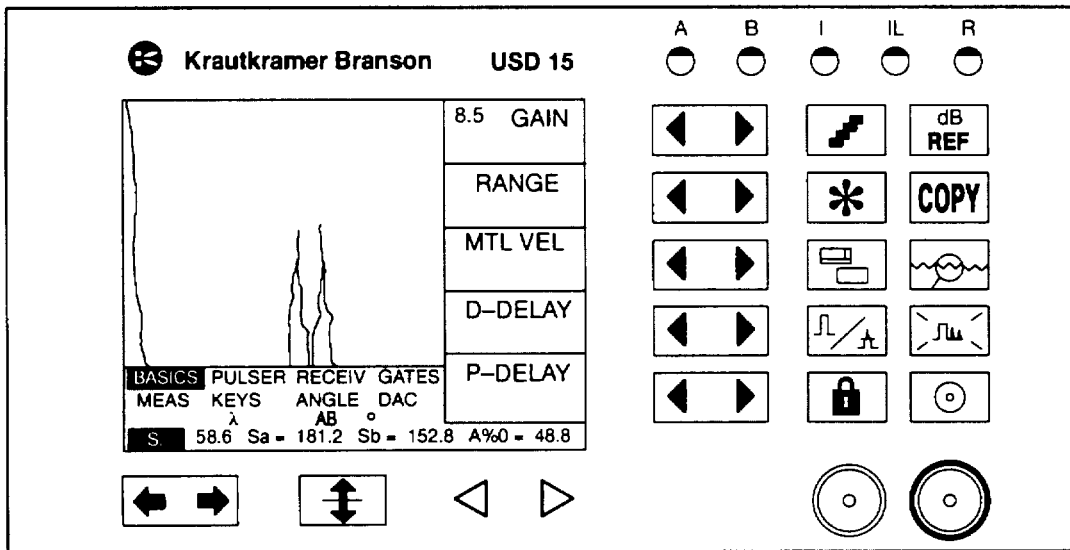
#### 4.20.3.6 Inspection Procedure.

- a. Couple the transducer to the cross tube at the area to be inspected. Locate and peak out signal from one of the rivet holes. Adjust gain to compensate for paint and surface finish differences between reference block and the cross tube requiring inspection. Manipulate the transducer circumferentially. Note transducer travel distance and observe CRT for signals indicative of crack. Transducer movement more than 1/4 inch greater than from a good hole and indication is still present on CRT are cause for rejection. Repeat the inspection for the remaining holes.

#### 4.20.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.

#### 4.20.4 Backup Method. None required.

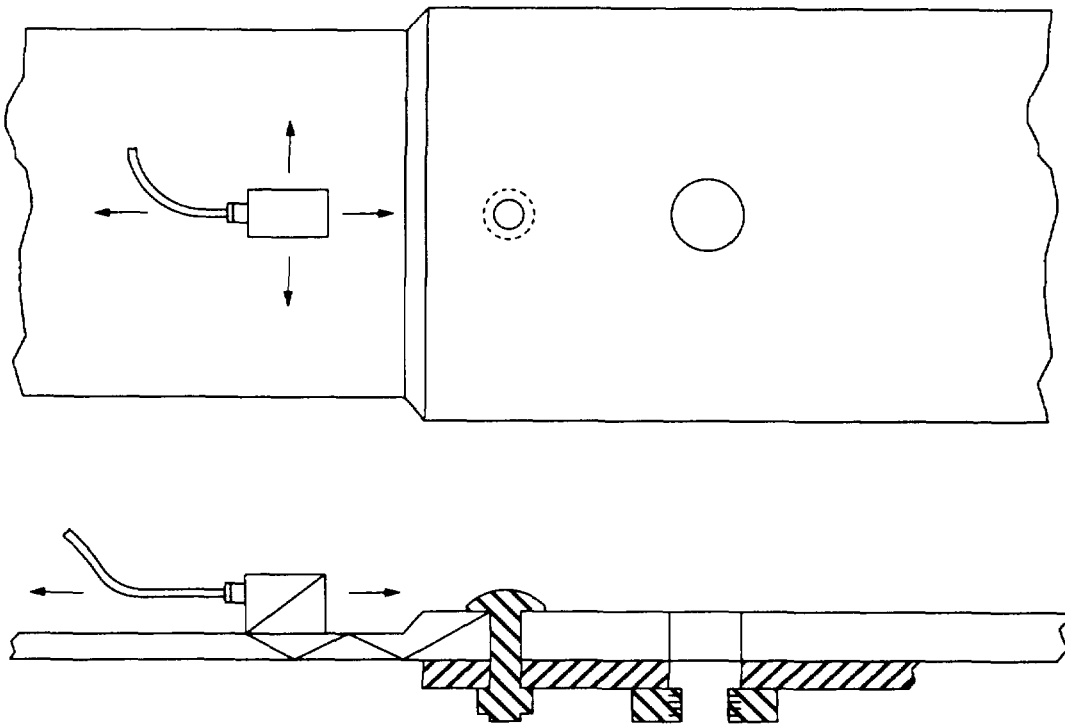
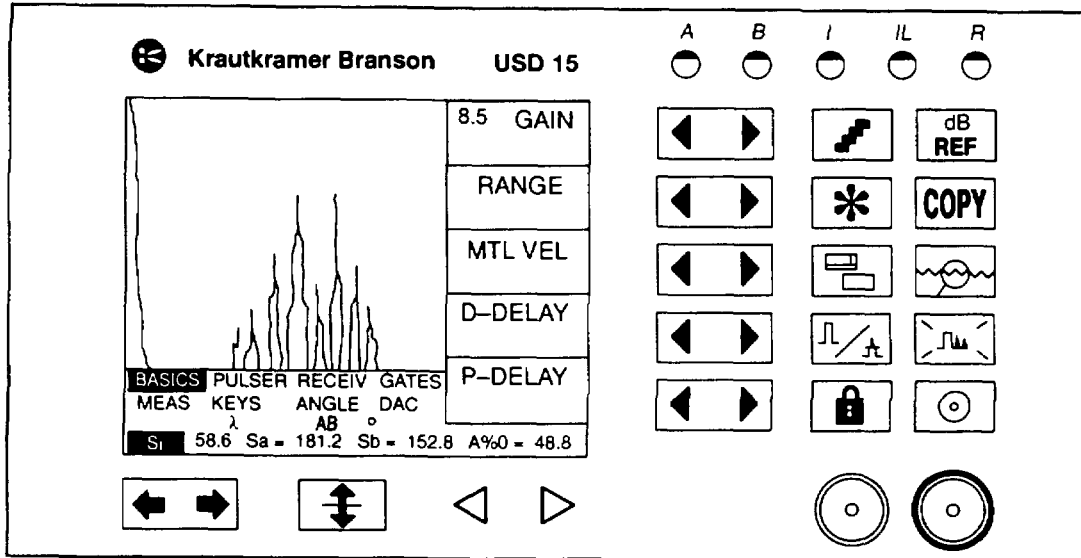
#### 4.20.5 4System Securing. The skid assembly requires cleaning to remove inspection media. Refer to Post Cleaning and Restoration of Part or Area After NDI paragraph 1.4.16.



STANDARD HOLE

NDI\_OH-58\_F4\_34\_1

Figure 4-20. Fore and Aft Cross Tube Assemblies (Sheet 1 of 2)



NDI\_OH-58\_F4\_34\_2

Figure 4-20. Fore and Aft Cross Tube Assemblies (Sheet 2 of 2)

4-53/(4-54 blank)

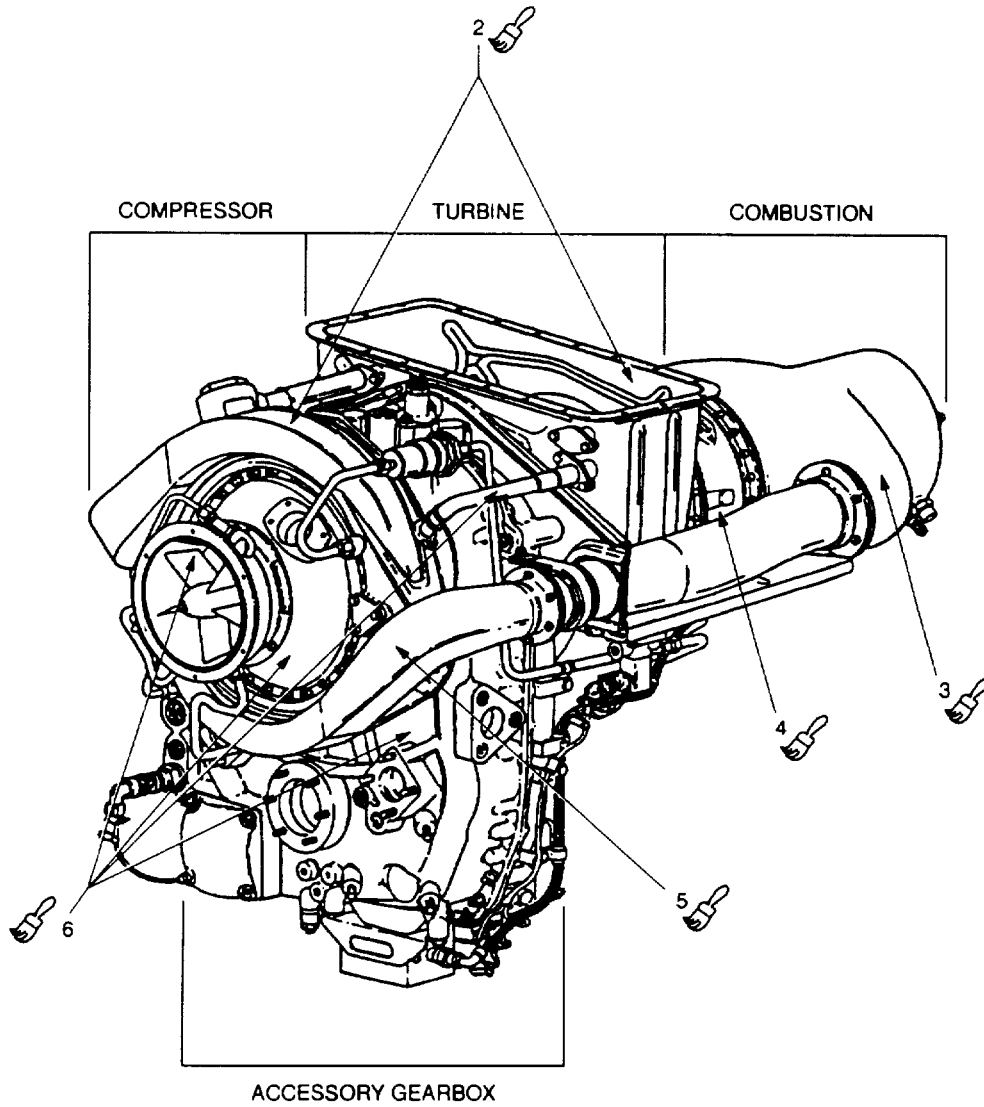
**SECTION V**  
**ENGINE GROUP**

**5. GENERAL.**

**5.1 CONTENTS.** The engine group inspection items covered in this section are those items of the OH-58D gas turbine engine and components listed in the Engine Group Inspection Index (Table 5-1). Corresponding inspection figures and applicable text paragraphs are listed opposite each item. The index number for each item may be used to locate it in Figure 5-1.

**Table 5-1. Engine Group Inspection Index**

Index Number	Nomenclature	Inspection Method	Paragraph Number	Figure Number
2	T703-AD-700 Engine Accessories	PT	5.2	5-2
3	Combustion Outer Case	PT	5.3	5-3
4	Combustion Liner	PT	5.4	5-4
5	Compressor Discharge Tubes	PT	5.5	5-5
6	T703-AD-700 Engine Systems and Components	PT	5.6	5-6



T703-AD-700 TURBO SHAFT ENGINE

NDI\_OH-58\_F5\_1\_2

Figure 5-1. Engine Group

## 5.2 T703-AD-700 ENGINE ACCESSORIES (PT).

5.2.1 Description (Figure 5-1. Index No. 2). This inspection is applicable to unpainted engine accessories to verify indications found visually. Accessories included are: particle separator, exhaust ducts, oil tank support, engine mount, fore and aft firewalls.

5.2.2 Defects. To verify crack indications identified by visual inspection.

5.2.3 Primary Method. Fluorescent Penetrant.

5.2.3.1 NDI Equipment and Materials. (Refer to Appendix B.) Inspection equipment is listed in Table 1-7. MIL-1-25135 level 3 penetrant materials shall be selected from the approved list in Table 1-8.

5.2.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the engine removed and disassembled in accordance with the applicable technical manuals listed in Table 1-1.

5.2.3.3 Access. Access through engine cowl side panels.

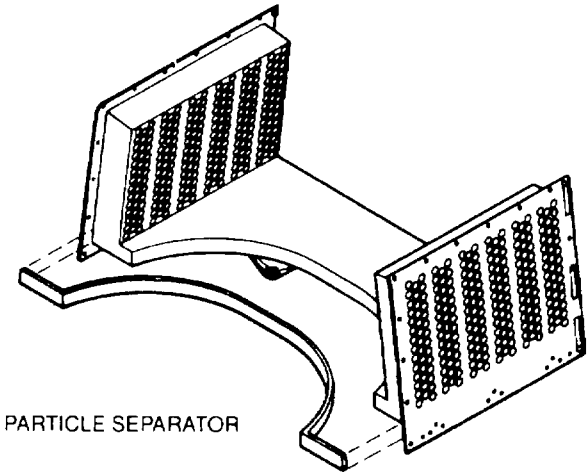
5.2.3.4 Preparation of Part. Protective coating shall be removed and the part shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

5.2.3.5 Inspection Procedure. Perform fluorescent penetrant inspection. Refer to Fluorescent Penetrant Method, paragraph 1.4.7 and Table 1-5. Typical accessories are shown in Figure 5-2.

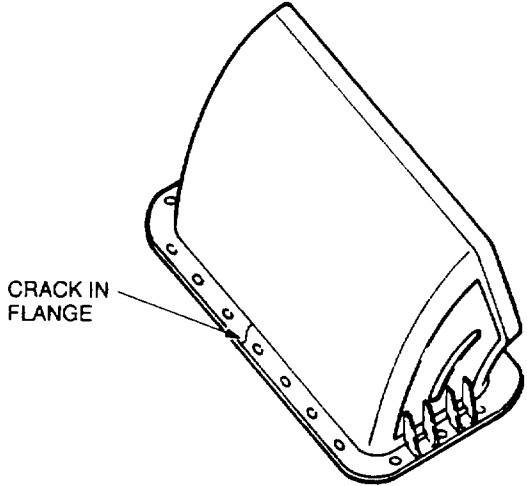
5.2.3.6 Marking and Recording of Inspection Results. Mark and record the inspection results as necessary per paragraph 1.3.

5.2.4 Backup Method. None required.

5.2.5 System Securing. Clean the part or area to remove inspection media. Refer to Post Cleaning and Restoration of Part or Area after NDI paragraph 1.4.16. Protective coating shall be reapplied as required. Parts or components, if removed, require installation or reassembly in accordance with the applicable technical manuals listed in Table 1-1.

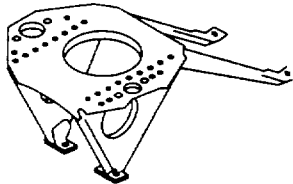


PARTICLE SEPARATOR

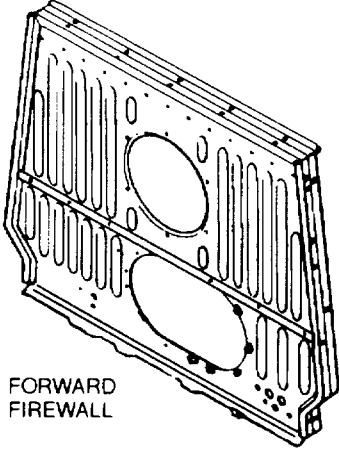


CRACK IN FLANGE

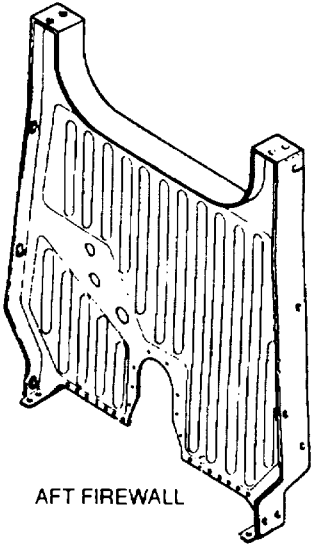
EXHAUST DUCT



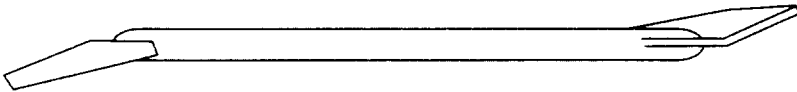
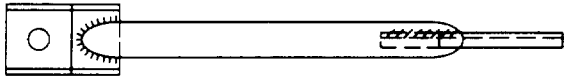
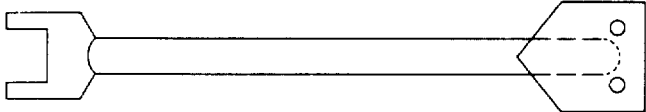
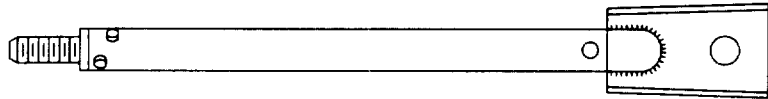
OIL TANK SUPPORT



FORWARD FIREWALL



AFT FIREWALL



ENGINE MOUNTS

NDI\_OH-58\_F5\_4

Figure 5-2. T703-AD-700 Engine Accessories



### 5.3 COMBUSTION OUTER CASE (PT).

5.3.1 Description (Figure 5-1. Index No. 3). The combustion outer case contains the module that mixes and ignites fuel and compressed air. The resulting gases expand forward and drive the turbine rotors.

5.3.2 Defects. Inspect repair welds and repaired dents for cracks. No cracks allowed.

5.3.3 Primary Method. Fluorescent Penetrant.

5.3.3.1 NDI Equipment and Materials. (Refer to Appendix B.) Inspection equipment is listed in Table 1-7. MIL-I-25135 level 3 penetrant materials shall be selected from the approved list in Table 1-8.

5.3.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the engine removed and disassembled in accordance with the applicable technical manuals listed in Table 1-1.

5.3.3.3 Access. Not applicable.

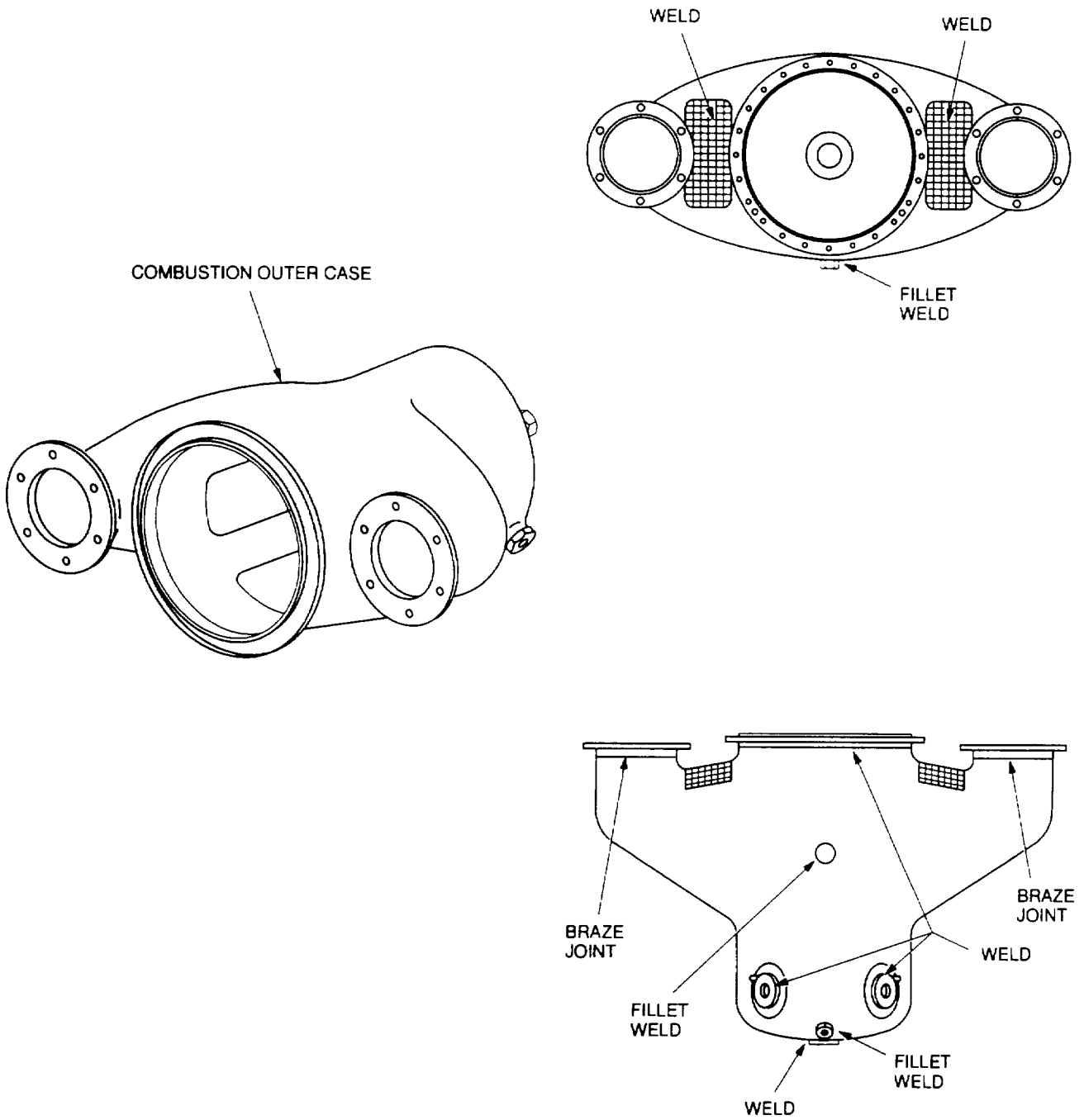
5.3.3.4 Preparation of Part. Protective coating shall be removed and the part shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

5.3.3.5 Inspection Procedure. Perform fluorescent penetrant inspection. Refer to Fluorescent Penetrant Method, paragraph 1.4.7 and Table 1-5. Inspect area of concern. See Figure 5-3.

5.3.3.6 Marking and Recording of Inspection Results. Mark and record the inspection results as necessary per paragraph 1.3.

5.3.4 Backup Method. None required.

5.3.5 System Securing. Clean the part or area to remove inspection media. Refer to Post Cleaning and Restoration of Part or Area after NDI paragraph 1.4.16. Protective coating shall be reapplied as required. Reinstall or assemble parts or components in accordance with the applicable technical manuals listed in Table 1-1.



NDI\_OH-58\_F5\_5

Figure 5-3. Combustion Outer Case

## 5.4 COMBUSTION LINER (PT).

5.4.1 Description (Figure 5-1. Index No. 4). In the combustion module, compressor discharge air is mixed with fuel from the fuel nozzle and ignited in the combustion liner.

5.4.2 Defects. Check the outside surface of the liner, tab ends of inside liner, relief slots, double lip area and expansion slots and repaired dents for cracks. Check for cracks in the fuel nozzle and ignitor ferrules. No cracks allowed.

5.4.3 Primary Method. Fluorescent Penetrant.

5.4.3.1 NDI Equipment and Materials. (Refer to Appendix B.) Inspection equipment is listed in Table 1-7. MIL-1-25135 level 3 penetrant materials shall be selected from the approved list in Table 1-8.

5.4.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the engine removed and disassembled in accordance with the applicable technical manuals listed in Table 1-1.

5.4.3.3 Access. Not applicable.

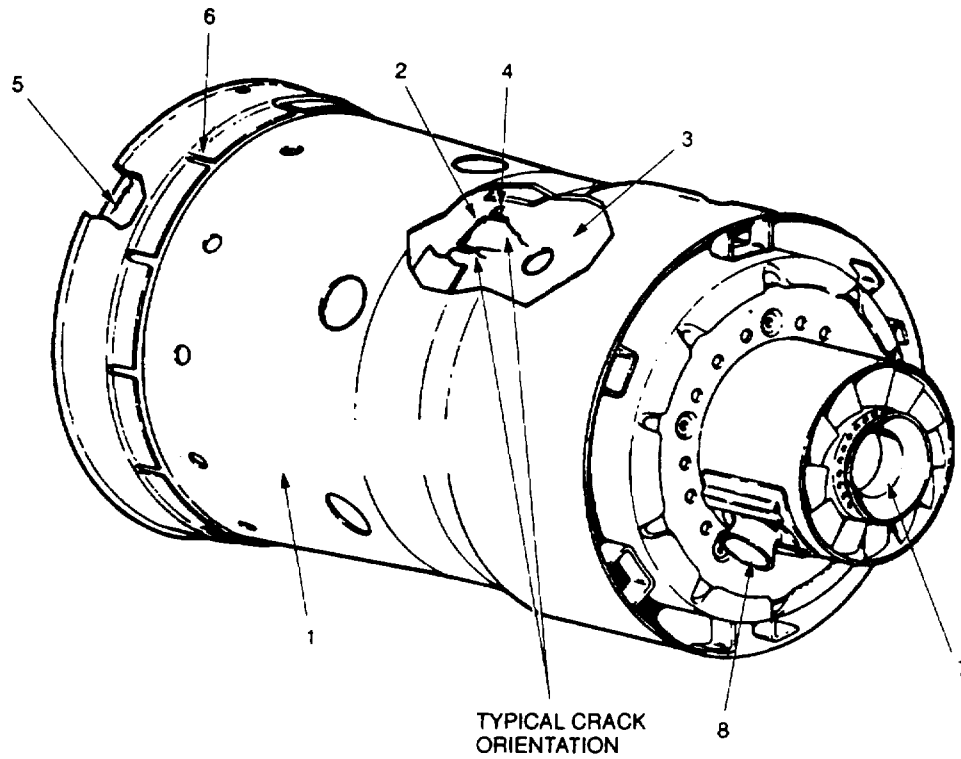
5.4.3.4 Preparation of Part. Protective coating shall be removed and the part shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

5.4.3.5 Inspection Procedure. Perform fluorescent penetrant inspection. Refer to Fluorescent Penetrant Method, paragraph 1.4.7 and Table 1-5. Inspect area of concern. See Figure 5-4.

5.4.3.6 Marking and Recording of Inspection Results. Mark and record the inspection results as necessary per paragraph 1.3.

5.4.4 Backup Method. None required.

5.4.5 System Securing. Clean the combustion liner or area to remove inspection media. Refer to Post Cleaning and Restoration of Part or Area after NDI paragraph 1.4.16. Protective coating shall be reapplied as required. Reinstall the combustion liner in accordance with the applicable technical manuals listed in Table 1-1.



**INSPECT**

- a. COMPLETE OUTSIDE SURFACE OF LINER (1).
- b. TAB END (2) OF INSIDE LINER (3).
- c. RELIEF SLOTS (4).
- d. DOUBLE LIP AREA (5).
- e. EXPANSION SLOTS (6).
- f. ATTACHING WELDS FOR FUEL NOZZLE FERRULE (7) AND IGNITER FERRULE (8).

NDI\_OH-58\_F5\_6

**Figure 5-4. Combustion Liner**

## 5.5 COMPRESSOR DISCHARGE TUBES (PT).

5.5.1 Description (Figure 5-1. Index No. 5). Air is directed through the compressor discharge air tubes to the combustion module.

5.5.2 Defects. Check for cracks after crack or dent repair.

5.5.3 Primary Method. Fluorescent Penetrant.

5.5.3.1 NDI Equipment and Materials. (Refer to Appendix B.) Inspection equipment is listed in Table 1-7. MIL-1-25135 level 3 penetrant materials shall be selected from the approved list in Table 1-8.

5.5.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the compressor discharge tubes removed in accordance with the applicable technical manuals listed in Table 1-1.

5.5.3.3 Access. Not applicable.

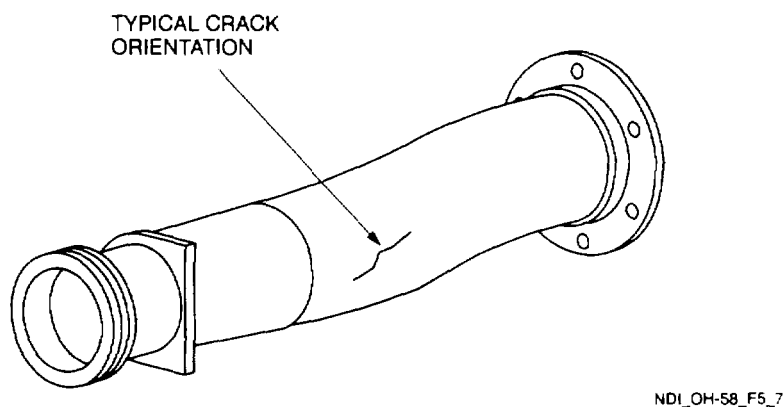
5.5.3.4 Preparation of Part. Protective coating shall be removed and the part shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

5.5.3.5 Inspection Procedure. Perform fluorescent penetrant inspection. Refer to Fluorescent Penetrant Method, paragraph 1.4.7 and Table 1-5. Inspect area of concern. See Figure 5-5.

5.5.3.6 Marking and Recording of Inspection Results. Mark and record the inspection results as necessary per paragraph 1.3.

5.5.4 Backup Method. None required.

5.5.5 System Securing. Clean the tubes to remove inspection media. Refer to Post Cleaning and Restoration of Part or Area after NDI paragraph 1.4.16. Protective coating shall be reapplied as required. Reinstall the compressor discharge tubes in accordance with the applicable technical manuals listed in Table 1-1.



**Figure 5-5. Compressor Discharge Tubes**

## 5.6 T703-AD-700 ENGINE SYSTEMS AND COMPONENTS (PT).

5.6.1 Description (Figure 5-1. Index No. 6). This inspection is applicable to engine components and systems to verify indications found visually during engine repair. Parts included are relative to the compressor, impellar blades, combustion chamber, combustion outer case and first stage nozzle shield, nozzle and turbine wheel.

5.6.2 Defects. To verify cracks indications identified by visual inspection.

5.6.3 Primary Method. Fluorescent Penetrant.

5.6.3.1 NDI Equipment and Materials. (Refer to Appendix B.) Inspection equipment is listed in Table 1-7. MIL-1-25135 level 3 penetrant materials shall be selected from the approved list in Table 1-8.

5.6.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the engine removed and disassembled in accordance with the applicable technical manuals listed in Table 1-1.

5.6.3.3 Access. Not applicable.

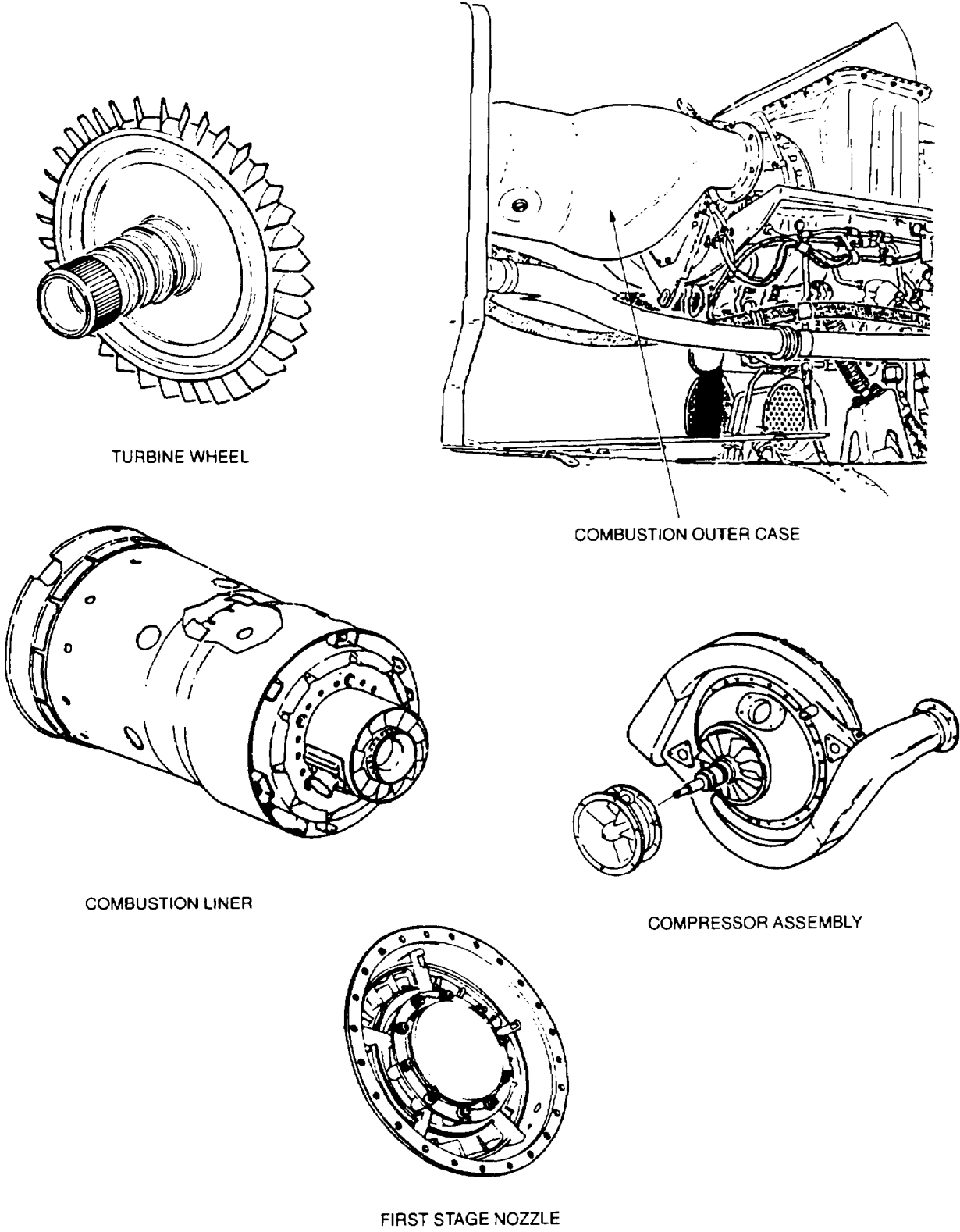
5.6.3.4 Preparation of Part. Protective coating shall be removed and the part shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

5.6.3.5 Inspection Procedure. Perform fluorescent penetrant inspection. Refer to Fluorescent Penetrant Method, paragraph 1.4.7 and Table 1-5. Inspect area of concern. See Figure 5-6.

5.6.3.6 Marking and Recording of Inspection Results. Mark and record the inspection results as necessary per paragraph 1.3.

5.6.4 Backup Method. None required.

5.6.5 System Securing. Clean the part or area to remove inspection media. Refer to Post Cleaning and Restoration of Part or Area after NDI paragraph 1.4.16. Protective coating shall be reapplied as required. Assemble and reinstall the engine in accordance with the applicable technical manuals listed in Table 1-1.



NDI\_OH-58\_F6\_8

Figure 5-6. T703-AD-700 Engine Systems And Components

## SECTION VI

## FLIGHT CONTROL GROUP

6. GENERAL.

**6.1 CONTENTS.** The flight control group inspection items covered in this section are those items of the OH-58D helicopter flight control and related hydraulic systems. The parts and components are listed in the Flight Control Group Inspection Index (Table 6-1). Corresponding inspection figures and applicable text paragraphs are listed opposite each item. The index number for each item may be used to locate it in Figure 6-1.

Table 6-1. Flight Control Group Inspection Index

Index Number	Nomenclature	Inspection Method	Paragraph Number	Figure Number
2	Hydraulic Pump	ET	6.2	6-2
3	Servoactuators	ET	6.3	6-3
4	Clevis Adapter	MT	6.4	6-4
5	Trunnion Bearing Assembly	MT	6.5	6-5
*6	Pilot/Copilot Collective Stick Assemblies	PT	6.6	6-6
*7	Collective Jackshaft	MT	6.7	6-7
8	Collective Jackshaft Spacer	MT	6.8	6-8
9	Collective Friction Clamp	MT	6.9	6-9
10	Jackshaft Bearing Support Assembly	MT	6.10	6-10
*11	Collective Boosted Bellcrank Assembly	ET	6.11	6-11
12	Control Support Assembly	ET	6.12	6-12
*13	Actuator Support Assembly	ET	6.13	6-13
*14	Pilot/Copilot Cyclic Stick Assemblies	PT	6.14	6-14
*15	Flight Control Tube Assemblies	ET	6.15	6-15
*16	Flight Control Bellcranks, Idlers, and Walking Beams	ET	6.16	6-16
*17	Support Assemblies	ET	6.17	6-17

**NOTE:** \*Indicates Flight Safety Part.



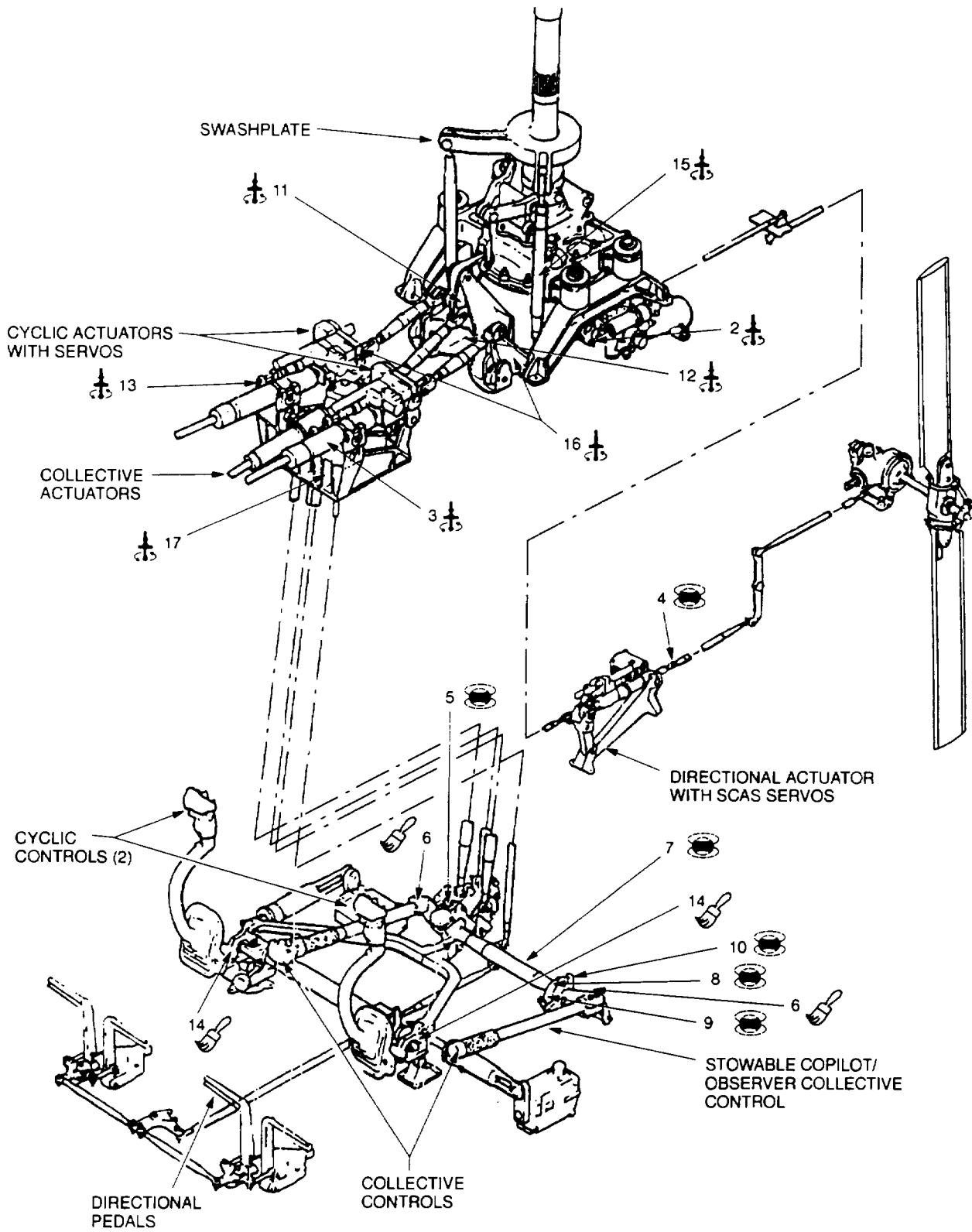


Figure 6-1. Flight Control Group

**6.2 HYDRAULIC PUMP (ET).**

6.2.1 Description (Figure 6-1. Index No. 2). The variable delivery hydraulic pump is mounted on the rotor tachometer generator, on the forward side of the transmission. It is driven by the transmission through the tachometer generator and has three connections, inlet, pressure outlet, and case drain port.

6.2.2 Defects. Defects may occur anywhere on the surface of the hydraulic pump. No cracks are allowed.

6.2.3 Primary Method. Eddy Current.

6.2.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100KHz-500KHz
- c. Probe, right angle, shielded surface, 100KHz-500KHz, 900 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

6.2.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the hydraulic pump shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

6.2.3.3 Access. Not applicable.

6.2.3.4 Preparation of Part. The hydraulic pump shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

6.2.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19eH.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 56°		
Probe drive	- mid		
LPF	- 100		
HPF	- 0		
H Pos	- 80%		
V Pos	- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:
  - (1) Null probe on test block.
  - (2) Adjust phase as required to obtain horizontal lift-off.
  - (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over .040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

6.2.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 6-2.

- Place probe on a good area in the required inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- Inspect the part.
- Any signal similar to the notches in the test block are cause for rejection.

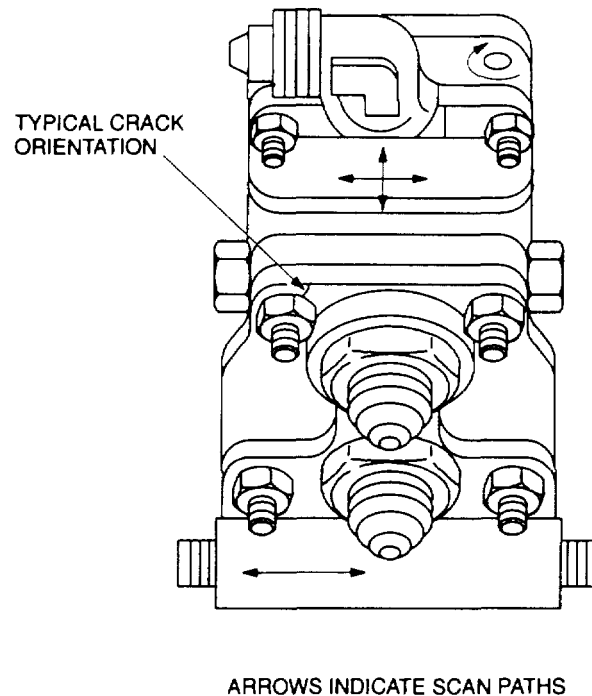
#### NOTE

Either probe identified in paragraph 6.2.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 6.2.3.5 b. (1), (2) and (3) shall be repeated each time a change is made.

6.2.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.

6.2.4 Backup Method. None required.

6.2.5 System Securing. The hydraulic pump, if removed, requires installation in accordance with the applicable technical manual listed in Table 1-1.



NDI\_OH-58\_F6\_7

Figure 6-2. Hydraulic Pump

**6.3 SERVOACTUATORS (ET).**

6.3.1 Description (Figure 6-1, Index No. 3). The cyclic and collective control servoactuators are installed in a support located on the cabin roof. The collective control servoactuator is mounted in the center position, and the two cyclic servoactuators are mounted in the outboard positions. The cyclic and collective servoactuators reduce the operational load of these flight control systems.

6.3.2 Defects. Defect may occur anywhere on the surface of the part. No cracks are allowed.

6.3.3 Primary Method. Eddy Current.

6.3.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100KHz-500KHz
- c. Probe, right angle, shielded surface, 100KHz-500KHz, 900 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

6.3.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the servoactuator removed in accordance with the applicable technical manuals listed in Table 1-1.

6.3.3.3 Access. Not applicable.

6.3.3.4 Preparation of Part. The servoactuator shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

6.3.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e11.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 560		
Probe drive	- mid		
LPF	- 100		
HPF	-0		
H Pos	- 80%		
V Pos	- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:
  - (1) Null probe on test block.
  - (2) Adjust phase as required to obtain horizontal lift-off.
  - (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over 0.040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

6.3.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 6-3.

- a. Place probe on a good area in the required inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

#### NOTE

**Either probe identified in paragraph 6.3.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 6.3.3.5 b. (1), (2) and (3) shall be repeated each time a change is made.**

6.3.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.

6.3.4 Backup Method. None required.

6.3.5 System Securing. The servoactuator requires installation in accordance with the applicable technical manual listed in Table 1-1.

### 6.4 CLEVIS ADAPTER (MT).

6.4.1 Description (Figure 6-1, Index No. 4). The clevis adapter is threaded into the end of the servoactuator and connected to a boosted tube.

6.4.2 Defects. Defects may occur anywhere on the surface of the clevis adapter. Particular attention shall be given to the threaded shank of the adapter. No cracks are allowed.

6.4.3 Primary Method. Magnetic Particle.

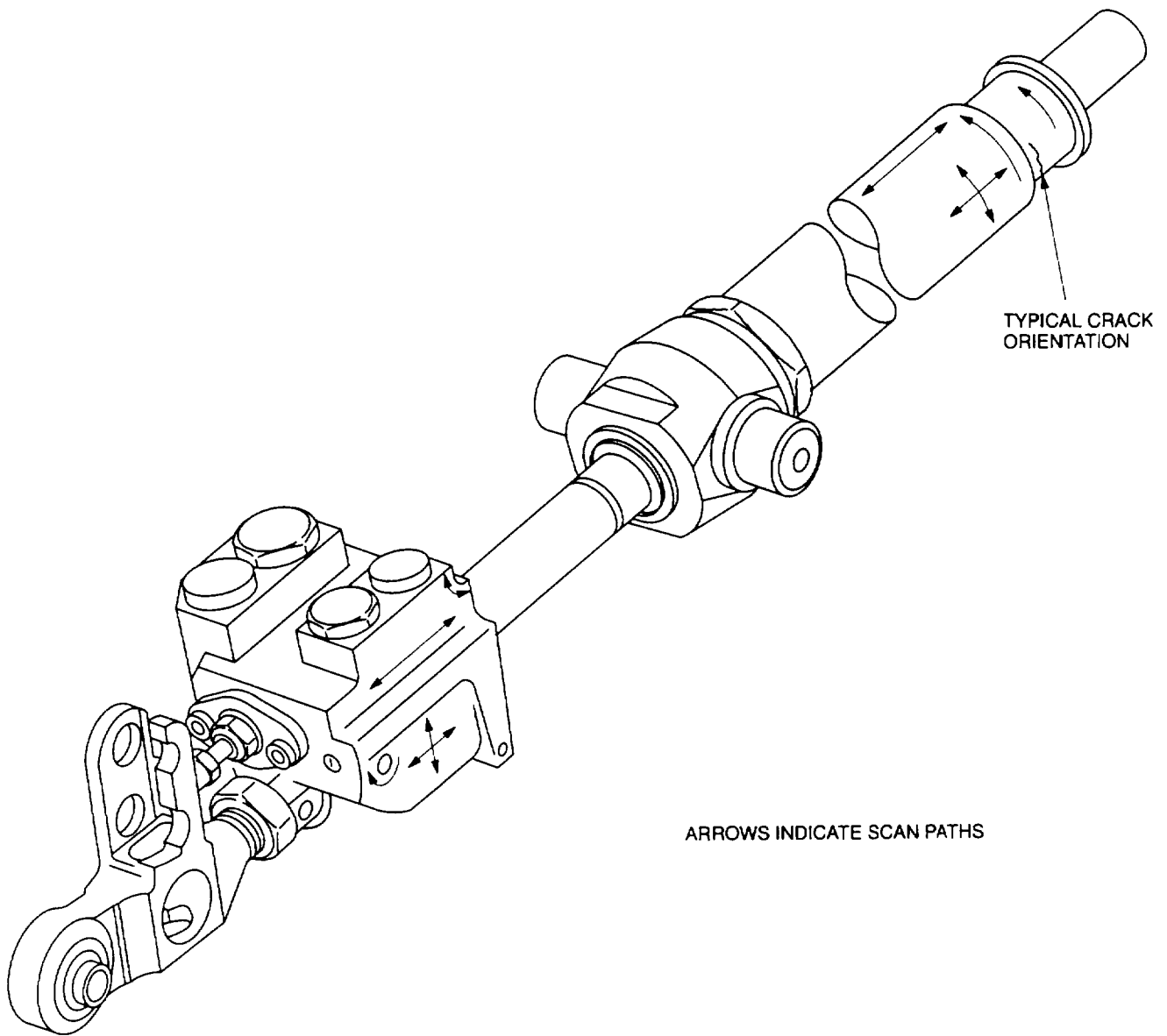
6.4.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Magnetic Particle Inspection Probe/Yoke
- b. Magnetometer
- c. Black Light
- d. Fluorescent Magnetic Particles, refer to Table 1-8
- e. Consumable Materials, refer to Table 1-8
- f. Aircraft Marking Pencil, refer to Table 1-8

6.4.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the clevis adapter removed in accordance with the applicable technical manuals listed in Table 1-1.

6.4.3.3 Access. Not applicable.

6.4.3.4 Preparation of Part. The part shall be thoroughly cleaned. Refer to Preparation of Part of Area for NDI, paragraph 1.4.4.



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Figure 6-3. Servoactuators

6.4.3.5 NDI Equipment Settings. Refer to Magnetic Particle Method, paragraph 1.4.8.

6.4.3.6 Inspection Procedure. A magnetic field shall be applied to the part perpendicular to the orientation of possible cracks. Positions required for this inspection are illustrated in Figure 6-4.

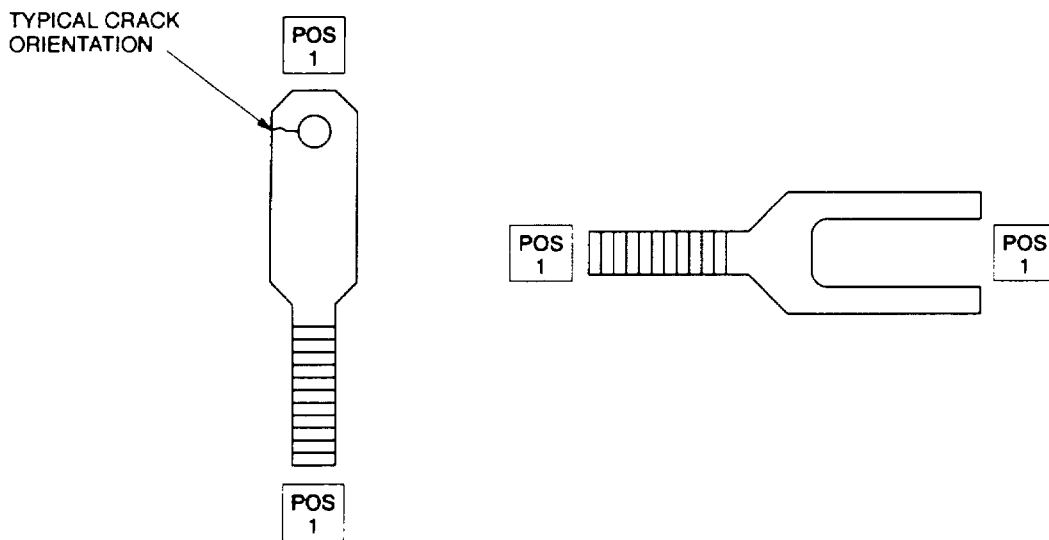
- a. Select AC on the AC/DC power switch.
- b. Place probe/yoke on part in Position 1 as shown.
- c. Press the test switch and apply a light coat of magnetic particle media at the same time. Remove the media momentarily before removing the current. Current should be applied for no more than five seconds.
- d. Inspect for cracks using the Black Light.

6.4.3.7 Marking and Recording of Inspection Results. Mark and record the inspection results as necessary per paragraph 1.3.

6.4.3.8 Demagnetization. With the switch remaining in the AC position, place the probe/yoke legs in the same position used for magnetizing. Press the test switch and withdraw the probe/yoke from the part for a distance of two feet before releasing the switch.

6.4.4 Backup Method. None required.

6.4.5 System Securing. Clean the clevis adapter thoroughly to remove all residual magnetic particle media. Refer to Post Cleaning and Restoration of Part or Area After NDI, paragraph 1.4.16. The clevis adapter requires installation in accordance with the applicable technical manuals listed in Table 1-1.



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Figure 6-4. Clevis Adapter

**6.5 TRUNNION BEARING ASSEMBLY (MT)**

6.5.1 Description (Figure 6-1. Index No. 5). The trunnion bearing assembly connects the bellcrank assembly and the plate assemblies.

6.5.2 Defects. Defects may occur anywhere on the surface assembly. No cracks are allowed.

6.5.3 Primary Method. Magnetic Particle.

6.5.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Magnetic Particle Inspection Probe/Yoke
- b. Magnetometer
- c. Black Light
- d. Fluorescent Magnetic Particles, refer to Table 1-8
- e. Consumable Materials, refer to Table 1-8
- f. Aircraft Marking Pencil, refer to Table 1-8

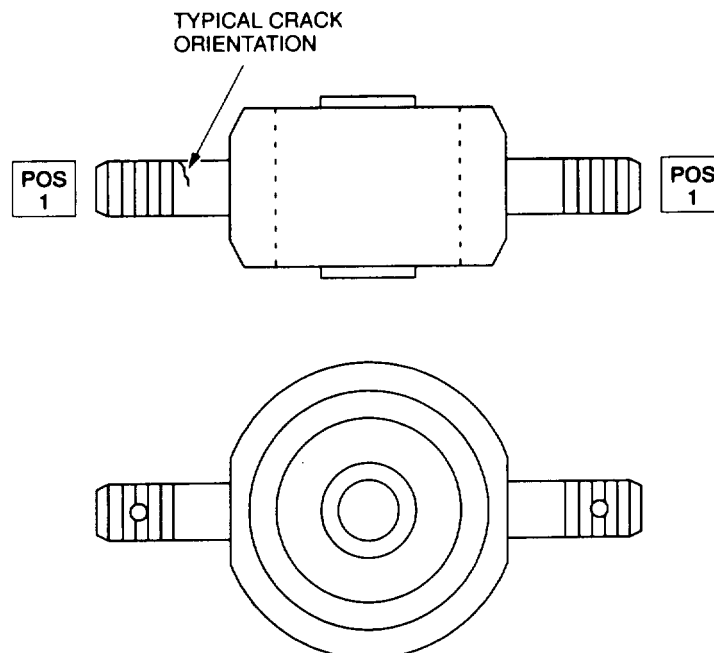
6.5.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the trunnion bearing assembly removed in accordance with the applicable technical manuals listed in Table 1-1.

6.5.3.3 Access. Not applicable.

6.5.3.4 Preparation of Part. The part shall be thoroughly cleaned. Refer to Preparation of Part of Area for NDI, paragraph 1.4.4.

6.5.3.5 NDI Equipment Settings. Refer to Magnetic Particle Method, paragraph 1.4.8.

6.5.3.6 Inspection Procedure. A magnetic field shall be applied to the part perpendicular to the orientation of possible cracks. Positions required for this inspection are illustrated in Figure 6-5.



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**Figure 6-5. Trunnion Bearing Assembly**



- a. Select AC on the AC/DC power switch.
- b. Place probe/yoke on part in Position 1 as shown.
- c. Press the test switch and apply a light coat of magnetic particle media at the same time. Remove the media momentarily before removing the current. Current should be applied for no more than five seconds.
- d. Inspect for cracks using the Black Light.

6.5.3.7 Marking and Recording of Inspection Results. Mark and record the inspection results as necessary per paragraph 1.3.

6.5.3.8 Demagnetization. With the switch remaining in the AC position, place the probe/yoke legs in the same position used for magnetizing. Press the test switch and withdraw the probe/yoke from the part for a distance of two feet before releasing the switch.

6.5.4 Backup Method. None required.

6.5.5 System Securing. Clean the trunnion bearing assembly thoroughly to remove all residual magnetic particle media. Refer to Post Cleaning and Restoration of Part or Area After NDI, paragraph 1.4.16. The trunnion bearing assembly requires installation in accordance with the applicable technical manuals listed in Table 1-1.

## 6.6 PILOT/COPILOT COLLECTIVE STICK ASSEMBLIES (PT).

6.6.1 Description (Figure 6-1. Index No. 6). This inspection is applicable to the pilot/copilot collective stick tubes, grip assemblies. Pilot collection stick control panel box, throttle friction plug. Detect button, and throttle arm contained within the pilot/copilot collective stick assemblies to verify indications found visually. This inspection can also be used to verify any indications found on painted surfaces providing the paint is only removed from the immediate area of interest.

6.6.2 Defects. Defects may occur anywhere on the surface with the part. No cracks allowed.

6.6.3 Primary Method. Fluorescent Penetrant.

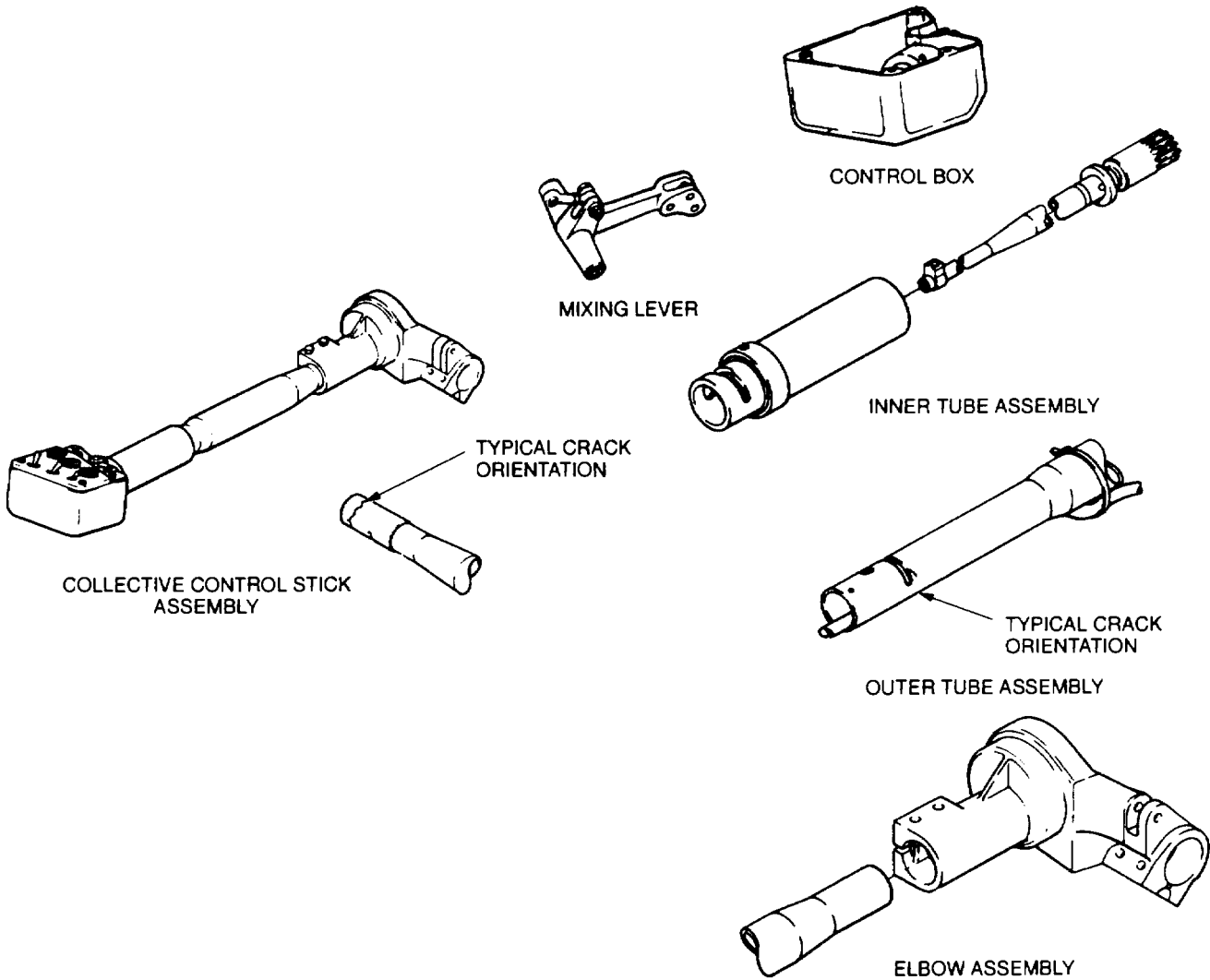
6.6.3.1 NDI Equipment and Materials. (Refer to Appendix B.) Inspection equipment is listed in Table 1-7. MIL-I-25135 level 3 penetrant materials shall be selected from the approved list in Table 1-8.

6.6.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the collective stick assemblies shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

6.6.3.3 Access. Not applicable.

6.6.3.4 Preparation of Part. Protective coating shall be removed and the part shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

6.6.3.5 Inspection Procedure. Perform fluorescent penetrant inspection. Refer to fluorescent penetrant method, paragraph 1.4.7 and Table 1-5. Inspect area of concern. See Figure 6-6.



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Figure 6-6. Pilot/Copilot Collective Stick Assemblies

6.6.3.6 Marking and Recording of Inspection Results. Mark and record the inspection results as necessary per paragraph 1.3.

6.6.4 Backup Method. None required.

6.6.5 System Securing. Clean the part or area to remove inspection media. Refer to Post Cleaning and Restoration of Part or Area after NDI paragraph 1.4.16. Protective coating shall be reapplied as required. Reinstall or assemble parts or components as required in accordance with the applicable technical manuals listed in Table 1-1.

**6.7 COLLECTIVE JACKSHAFT (MT)**

6.7.1 Description (Figure 6-1, Index No. 7). The jackshaft is mounted under the seat section which connects the pilot's and copilot's collective sticks.

6.7.2 Defects. Defects may occur anywhere on the collective jackshaft. No cracks are allowed.

6.7.3 Primary Method. Magnetic Particle.

6.7.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Magnetic Particle Inspection Probe/Yoke
- b. Magnetometer
- c. Black Light
- d. Fluorescent Magnetic Particles, refer to Table 1-8
- e. Consumable Materials, refer to Table 1-8
- f. Aircraft Marking Pencil, refer to Table 1-8

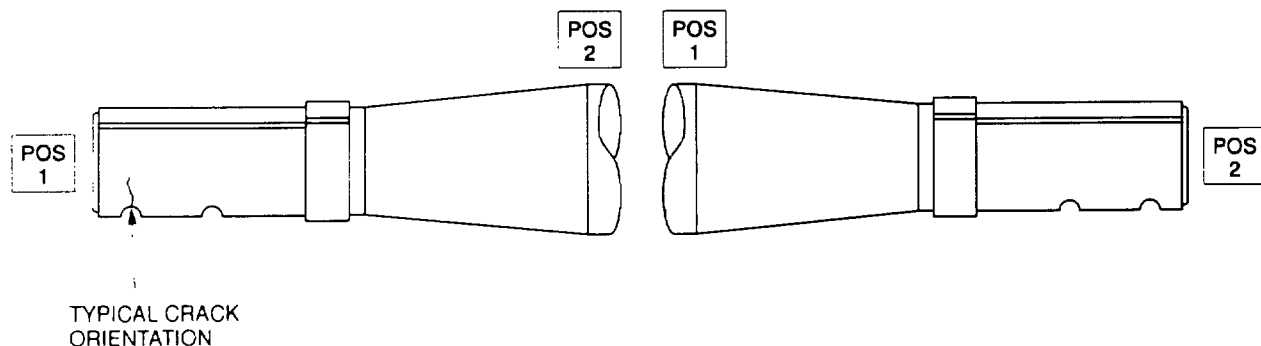
6.7.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the collective jackshaft removed in accordance with the applicable technical manuals listed in Table 1-1.

6.7.3.3 Access. Not applicable.

6.7.3.4 Preparation of Part. The part shall be thoroughly cleaned. Refer to Preparation of Part of Area for NDI, paragraph 1.4.4.

6.7.3.5 NDI Equipment Settings. Refer to Magnetic Particle Method, paragraph 1.4.8.

6.7.3.6 Inspection Procedure. A magnetic field shall be applied to the part perpendicular to the orientation of possible cracks. Positions required for this inspection are illustrated in Figure 6-7.



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**Figure 6-7. Collective Jackshaft**

- a. Select AC on the AC/DC power switch.
- b. Place probe/yoke on part in Position 1 as shown.
- c. Press the test switch and apply a light coat of magnetic particle media at the same time. Remove the media momentarily before removing the current. Current should be applied for no more than five seconds.
- d. Inspect for cracks using the Black Light.
- e. Demagnetize before moving to the next position. Refer to paragraph 6.7.3.8.
- f. Repeat steps (a) through (e) for Position 2.

6.7.3.7 Marking and Recording of Inspection Results. Mark and record the inspection results as necessary per paragraph 1.3.

6.7.3.8 Demagnetization. With the switch remaining in the AC position, place the probe/yoke legs in the same position used for magnetizing. Press the test switch and withdraw the probe/yoke from the part for a distance of two feet before releasing the switch.

6.7.4 Backup Method. None required.

6.7.5 System Securing. Clean the collective jackshaft thoroughly to remove all residual magnetic particle media. Refer to Post Cleaning and Restoration of Part or Area After NDI, paragraph 1.4.1 6. The collective jackshaft requires installation in accordance with the applicable technical manuals listed in Table 1-1.

## 6.8 COLLECTIVE JACKSHAFT SPACER (MT)

6.8.1 Description (Figure 6-1. Index No. 8). The support assembly and friction clamp contain the collective jackshaft spacer.

6.8.2 Defects. Defects may occur anywhere on the spacer. No cracks are allowed.

6.8.3 Primary Method. Magnetic Particle.

6.8.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Magnetic Particle Inspection Probe/Yoke
- b. Magnetometer
- c. Black Light
- d. Fluorescent Magnetic Particles, refer to Table 1-8
- e. Consumable Materials, refer to Table 1-8
- f. Aircraft Marking Pencil, refer to Table 1-8

6.8.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the collective jackshaft spacer removed in accordance with the applicable technical manuals listed in Table 1-1.

6.8.3.3 Access. Not applicable.

6.8.3.4 Preparation of Part. The part shall be thoroughly cleaned. Refer to Preparation of Part of Area for NDI, paragraph 1.4.4.

6.8.3.5 NDI Equipment Settings. Refer to Magnetic Particle Method, paragraph 1.4.8.

6.8.3.6 Inspection Procedure. A magnetic field shall be applied to the part perpendicular to the orientation of possible cracks. Positions required for this inspection are illustrated in Figure 6-8.

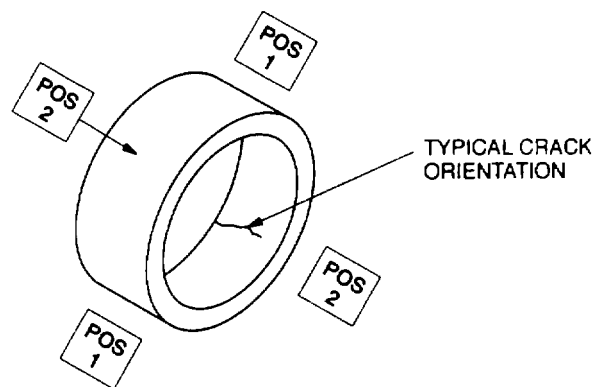
- a. Select AC on the AC/DC power switch.
- b. Place probe/yoke on part in Position 1 as shown.
- c. Press the test switch and apply a light coat of magnetic particle media at the same time. Remove the media momentarily before removing the current. Current should be applied for no more than five seconds.
- d. Inspect for cracks using the Black Light.
- e. Demagnetize before moving to the next position. Refer to paragraph 6.8.3.8.
- f. Repeat steps (a) through (e) for Position 2.

6.8.3.7 Marking and Recording of Inspection Results. Mark and record the inspection results as necessary per paragraph 1.3.

6.8.3.8 Demagnetization. With the switch remaining in the AC position, place the probe/yoke legs in the same position used for magnetizing. Press the test switch and withdraw the probe/yoke from the part for a distance of two feet before releasing the switch.

6.8.4 Backup Method. None required.

6.8.5 System Securing. Clean the collective jackshaft spacer thoroughly to remove all residual magnetic particle media. Refer to Post Cleaning and Restoration of Part or Area After NDI, paragraph \_# 1.4.16. The collective jackshaft spacer requires installation in accordance with the applicable technical manuals listed in Table 1-1.



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**Figure 6-8. Collective Jackshaft Spacer**

## 6.9 COLLECTIVE FRICTION CLAMP (MT).

6.9.1 Description (Figure 6-1, Index No. 9). The collective friction clamp connects the support assembly to the jackshaft.

6.9.2 Defects. Defects may occur anywhere on the surface of the collective friction clamp. No cracks are allowed.

6.9.3 Primary Method. Magnetic Particle.

6.9.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Magnetic Particle Inspection Probe/Yoke
- b. Magnetometer
- c. Black Light
- d. Fluorescent Magnetic Particles, refer to Table 1-8
- e. Consumable Materials, refer to Table 1-8
- f. Aircraft Marking Pencil, refer to Table 1-8

6.9.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance and the collective friction clamp removed in accordance with the applicable technical manuals listed in Table 1-1.

6.9.3.3 Access. Not applicable.

6.9.3.4 Preparation of Part. The part shall be thoroughly cleaned. Refer to Preparation of Part of Area for NDI, paragraph 1.4.4.

6.9.3.5 NDI Equipment Settings. Refer to Magnetic Particle Method, paragraph 1.4.8.

6.9.3.6 Inspection Procedure. A magnetic field shall be applied to the part perpendicular to the orientation of possible cracks. Positions required for this inspection are illustrated in Figure 6-9.

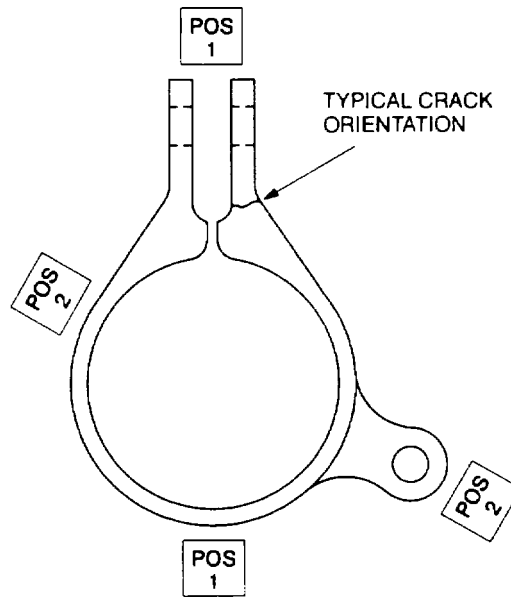
- a. Select AC on the AC/DC power switch.
- b. Place probe/yoke on part in Position 1 as shown.
- c. Press the test switch and apply a light coat of magnetic particle media at the same time. Remove the media momentarily before removing the current. Current should be applied for no more than five seconds.
- d. Inspect for cracks using the Black Light.
- e. Demagnetize before moving to the next position. Refer to paragraph 6.9.3.8.
- f. Repeat steps (a) through (e) for Position 2.

6.9.3.7 Marking and Recording of Inspection Results. Mark and record the inspection results as necessary per paragraph 1.3.

6.9.3.8 Demagnetization. With the switch remaining in the AC position, place the probe/yoke legs in the same position used for magnetizing. Press the test switch and withdraw the probe/yoke from the part for a distance of two feet before releasing the switch.

3.9.4 Backup Method. None required.

6.9.5 System Securing. Clean the collective friction clamp thoroughly to remove all residual magnetic particle media. Refer to Post Cleaning and Restoration of Part or Area After NDI, paragraph 1.4.16. The clamp requires installation in accordance with the applicable technical manuals listed in Table 1-1.



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**Figure 6-9. Collective Friction Clamp**

## 6.10 JACKSHAFT BEARING SUPPORT ASSEMBLY (MT).

6.10.1 Description (Figure 6-1. Index No.10). The jackshaft bearing support assembly is mounted to the airframe under the pilot/copilot seat section.

6.10.2 Defects. Defects may occur anywhere on the surface of the jackshaft bearing support assembly. No cracks are allowed.

6.10.3 Primary Method. Magnetic Particle.

6.10.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Magnetic Particle Inspection Probe/Yoke
- b. Magnetometer
- c. Black Light
- d. Fluorescent Magnetic Particles, refer to Table 1-8
- e. Consumable Materials, refer to Table 1-8
- f. Aircraft Marking Pencil, refer to Table 1-8

6.10.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the jackshaft bearing support assembly shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

6.10.3.3 Access.

6.10.3.4 Preparation of Part. The part shall be thoroughly cleaned. Refer to Preparation of Part of Area for NDI, paragraph 1.4.4.

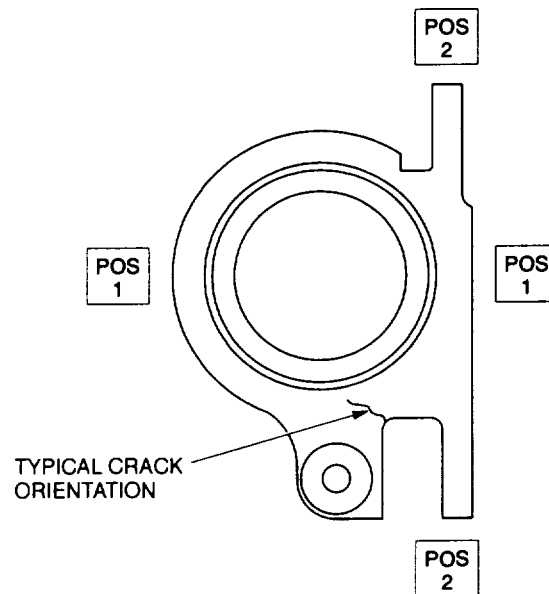
6.10.3.5 NDI Equipment Settings. Refer to Magnetic Particle Method, paragraph 1.4.8.

6.10.3.6 Inspection Procedure. A magnetic field shall be applied to the part perpendicular to the orientation of possible cracks. Position(s) required for this inspection are illustrated in Figure 6-10.

- a. Select AC on the AC/DC power switch.
- b. Place probe/yoke on part in Position 1 as shown.
- c. Press the test switch and apply a light coat of magnetic particle media at the same time. Remove the media momentarily before removing the current. Current should be applied for no more than five seconds.
- d. Inspect for cracks using the Black Light.

6.10.3.7 Marking and Recording of Inspection Results. Mark and record the inspection results as required by paragraph 1.3.

6.10.3.8 Demagnetization. With the switch remaining in the AC position, place the probe/yoke legs in the same position used for magnetizing. Press the test switch and withdraw the probe/yoke from the part for a distance of two feet before releasing the switch.



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Figure 6-10. Jackshaft Bearing Support Assembly



6.10.4 Backup Method. None required.

6.10.5 System Securing. Clean the jackshaft bearing support assembly thoroughly to remove all residual magnetic particle media. Refer to Post Cleaning and Restoration of Part or Area After NDI, paragraph 1.4.16. The jackshaft bearing support assembly, if removed, requires installation in accordance with the applicable technical manuals listed in Table 1-1.

**6.11 COLLECTIVE BOOSTED BELLCRANK ASSEMBLY (ET).**

6.11.1 Description (Figure 6-1, Index No. 11). The collective boosted bellcrank assembly is connected between the collective servoactuator and the collective lever.

6.11.2 Defects. Defects may occur anywhere on the surface of the collective boosted bellcrank assembly. No cracks are allowed.

6.11.3 Primary Method. Eddy Current.

6.11.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100KHz-500KHz
- c. Probe, right angle, shielded surface, 100KHz-500KHz, 90° 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

6.11.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the collective boosted bellcrank assembly shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

6.11.3.3 Access. Not applicable.

6.11.3.4 Preparation of Part. The collective boosted bellcrank assembly shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

6.11.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19<sup>d</sup>.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 560		
Probe drive	- mid		
LPF	- 100		
HPF	- 0		
H Pos	- 80%		
V Pos	- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:
  - (1) Null probe on test block.
  - (2) Adjust phase as required to obtain horizontal lift-off.
  - (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over .040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

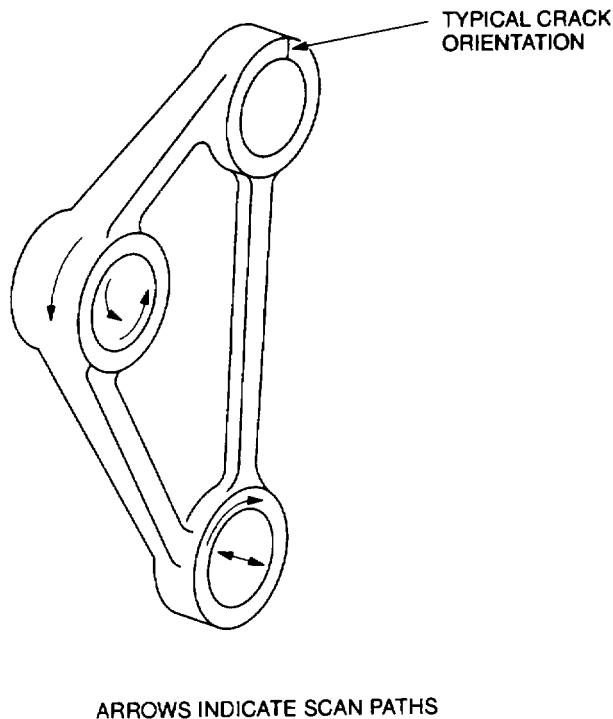
6.11.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 6-11.

- a. Place probe on a good area in the required inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

**NOTE**

**Either probe identified in paragraph 6.11.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 6.11.3.5 b. (1), (2) and (3) shall be repeated each time a change is made.**

6.11.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.



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**Figure 6-11. Collective Boosted Bellcrank Assembly**

6.11.4 Backup Method. Refer to paragraph 1.4.7.

6.11.5 System Securing. The collective boosted bellcrank assembly, if removed, requires installation in accordance with the applicable technical manual listed in Table 1-1.

**6.12 CONTROL SUPPORT ASSEMBLY (ET).**

6.12.1 Description (Figure 6-1. Index No. 12). The control support assembly is belted to the forward case of the main transmission which supports the cyclic and collective bellcrank assemblies.

6.12.2 Defects. Defects may occur anywhere on the surface of the control support assembly. Particular attention shall be give to areas in and around busing bone both after removal and installation. No cracks are allowed.

6.12.3 Primary Method. Eddy Current.

6.12.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100KHz-500KHz
- c. Probe, right angle, shielded surface, 100KHz-500KHz, 90° 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

6.12.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. -, Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the control support assembly shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

6.12.3.3 Access. Not applicable.

6.12.3.4 Preparation of Part. The control support assembly shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

6.12.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEG19e<sup>II</sup>.

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 560		
Probe drive	- mid		
LPF	- 100		
HPF	-0		
H Pos	- 80%		
V Pos	20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:
- (1) Null probe on test block.
  - (2) Adjust phase as required to obtain horizontal lift-off.
  - (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over .040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.) 6.12.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 6-12.
- a. Place probe on a good area in the required inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

**NOTE**

**Either probe identified in paragraph 6.12.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 6.12.3.5 b. (1), (2) and (3) shall be repeated each time a change is made.**

6.12.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.

6.12.4 Backup Method. Refer to paragraph 1.4.7

6.12.5 System Securing. The control support assembly, if removed, requires installation in accordance with the applicable technical manual listed in Table 1-1.

### **6.13 ACTUATOR SUPPORT ASSEMBLY (ET).**

6.13.1 Description (Figure 6-1. Index No. 13). The cyclic and collective control actuator support is installed on the cabin roof. One serves as a mount for the servoactuators and associated bellcranks.

6.13.2 Defects. Defects may occur anywhere on the surface of the actuator support assembly. The actuator support assembly shall be inspected around each hole for cracks after bushing removal and installation. No cracks are allowed.

6.13.3 Primary Method. Eddy Current.

6.13.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100KHz-500KHz
- c. Probe, right angle, shielded surface, 100KHz-500KHz, 90° 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

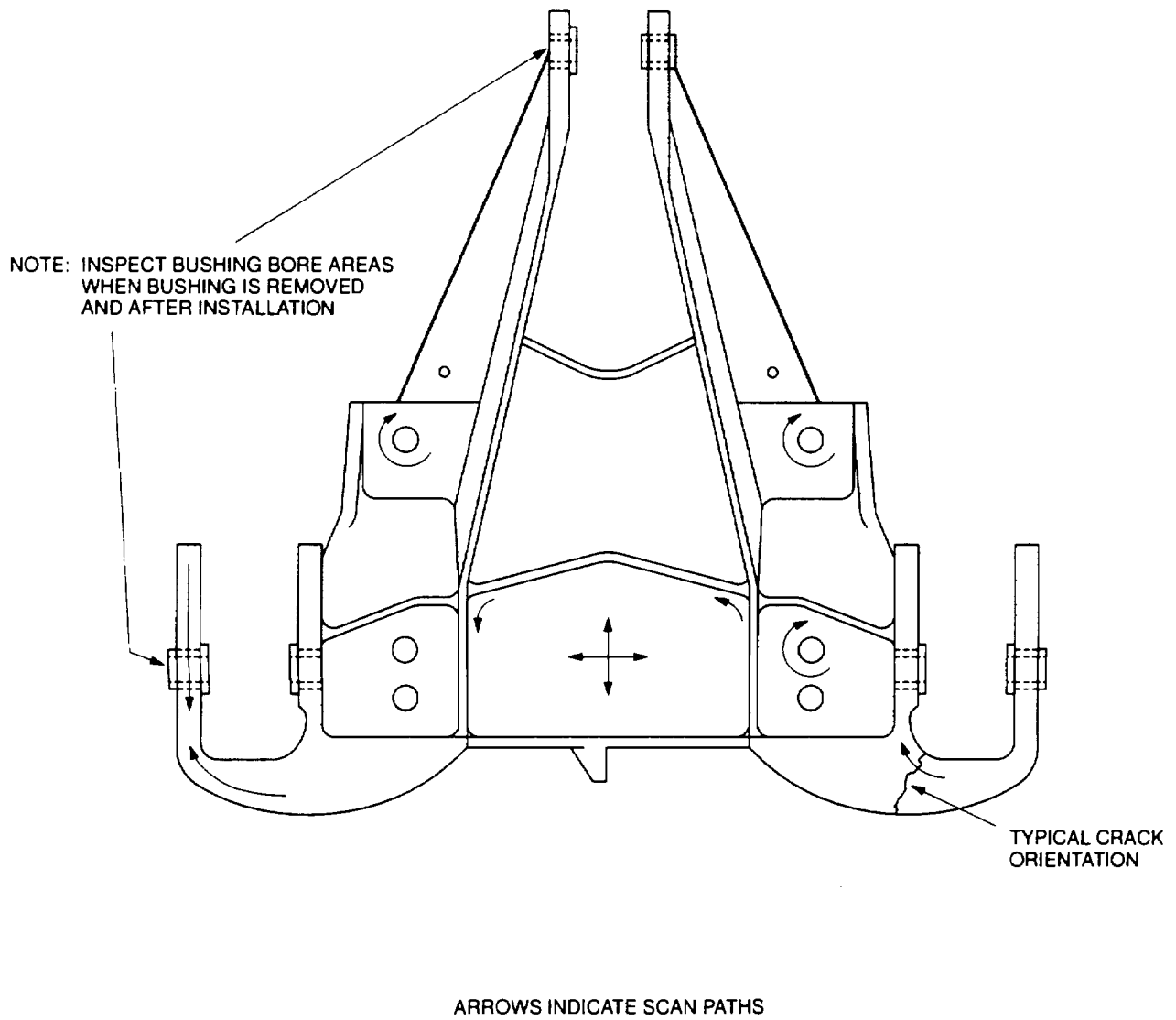


Figure 6-12. Control Support Assembly

6.13.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the actuator support assembly shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

6.13.3.3 Access. Not applicable.

**WARNING**

**Maintenance Platforms/Workstands**

**Use only appropriate platforms, workstand, or other approved locally procured stands and restraint equipment, when working above 10 feet on helicopters in a nontactical environment. Otherwise, personnel in jury could result from accidental falls.**

6.13.3.4 Preparation of Part. The actuator support assembly shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

6.13.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e".

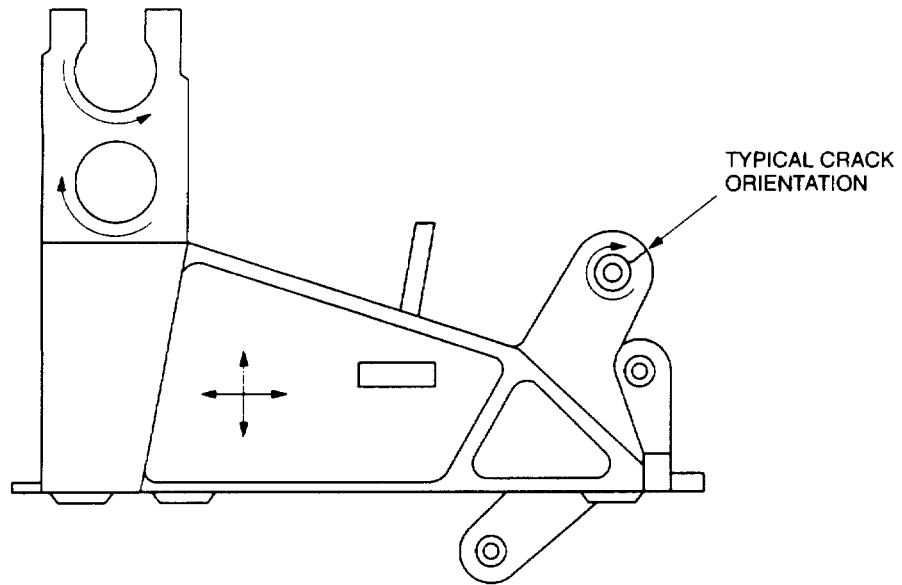
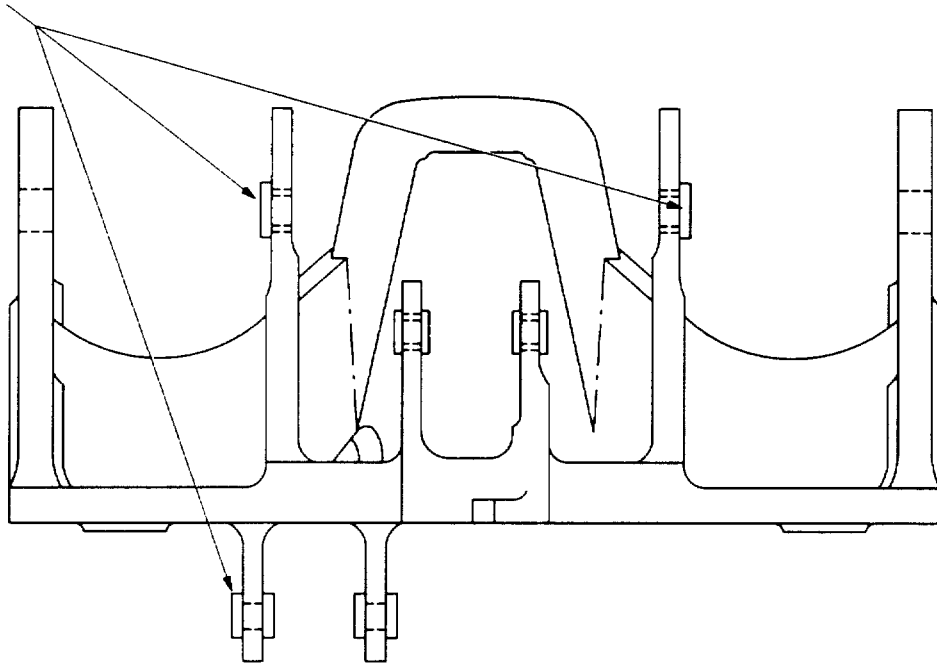
Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 56°		
Probe drive	- mid		
LPF	- 100		
HPF	- 0		
H Pos	- 80%		
V Pos	- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over .040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.) 6.13.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 6-13.

- a. Place probe on a good area in the required inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

NOTE: AREAS IN AND AROUND BUSHING  
BORES SHALL BE INSPECTED WHEN  
BUSHINGS ARE REMOVED AND  
AFTER INSTALLATION



ARROWS INDICATE SCAN PATHS

NDI\_OH-58\_F8\_18

Figure 6-13. Actuator Support Assembly

**NOTE**

**Either probe identified in paragraph 6.13.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 6.13.3.5 b. (1), (2) and (3) shall be repeated each time a change is made.**

6.13.3.7 **Marking and Recording of Inspection Results.** Mark and record as required by paragraph 1.3.

6.13.4 **Backup Method.** None required.

6.13.5 **System Securing.** The actuator support assembly, if removed, requires installation in accordance with the applicable technical manual listed in Table 1-1.

**6.14 PILOT/COPILOT CYCLIC STICK ASSEMBLIES (PT).**

6.14.1 **Description (Figure 6-1. Index No. 14).** This inspection is applicable to all fitting, gimbals, supports, plates, levers, housing, latches, tubes, links, and anchor balls contained within the pilot/copilot cyclic stick assemblies to verify any indications found usually.

6.14.2 **Defects.** Defects may occur anywhere on the surface of the part. No cracks are allowed.

6.14.3 **Primary Method.** Fluorescent Penetrant.

6.14.3.1 **NDI Equipment and Materials.** (Refer to Appendix B.) Inspection equipment is listed in Table 1-7. MIL-1-25135 level 3 penetrant materials shall be selected from the approved list in Table 1-8.

6.14.3.2 **Preparation of Helicopter.** The helicopter shall be prepared for safe ground maintenance.

Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the cyclic stick assemblies shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

6.14.3.3 **Access.** Not applicable.

6.14.3.4 **Preparation of Part.** Protective coating shall be removed and the part shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

6.14.3.5 **Inspection Procedure.** Perform fluorescent penetrant inspection. Refer to Fluorescent Penetrant Method, paragraph 1.4.7 and Table 1-5. Inspect area of concern. See Figure 6-14.

6.14.3.6 **Marking and Recording of Inspection Results.** Mark and record the inspection results as necessary per paragraph 1.3.

6.14.4 **Backup Method.** None required.

6.14.5 **System Securing.** Clean the part or area to remove inspection media. Refer to Post Cleaning and Restoration of Part or Area after NDI paragraph 1.4.16. Protective coating shall be reapplied as required. Parts or components, if removed or disassembled, require installation or reassembly in accordance with the applicable technical manuals listed in Table 1-1.



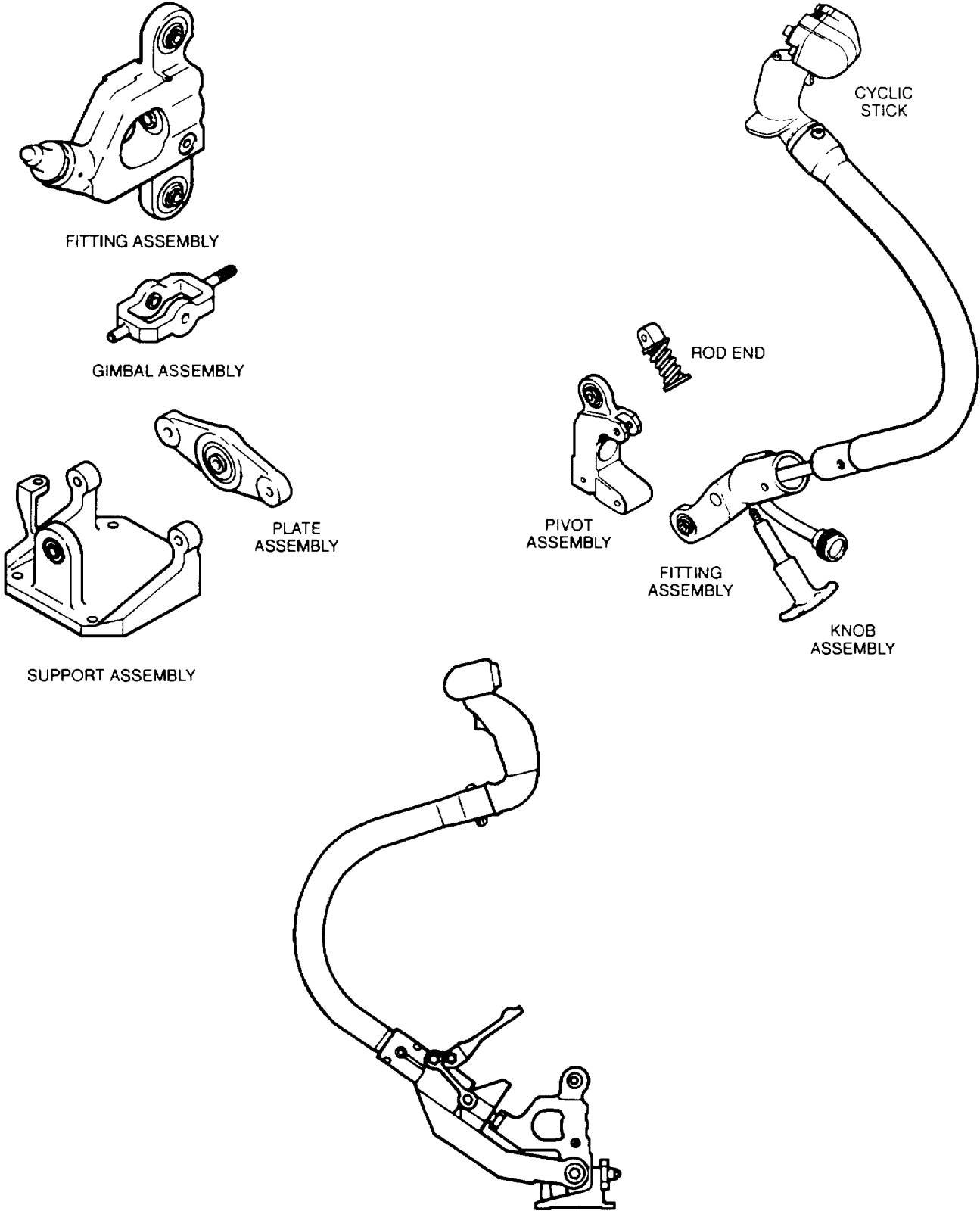


Figure 6-14. Pilot/Copilot Cyclic Stick Assemblies

**6.15 FLIGHT CONTROL TUBE ASSEMBLIES (ET).**

6.15.1 Description (Figure 6-1. Index No. 15). This inspection is applicable to all nonferromagnetic flight control tubes contained within the collective and cyclic pitch control systems to verify all indications found visually.

6.15.2 Defects. Defects may occur anywhere on the surface of the flight control tubes. No cracks are allowed.

6.15.3 Primary Method. Eddy Current.

6.15.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100KHz-500KHz
- c. Probe, right angle, shielded surface, 100KHz-500KHz, 90° 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

6.15.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the flight control tube shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

6.15.3.3 Access. Not applicable.

6.15.3.4 Preparation of Part. The flight control tube shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

6.15.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e".

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 56°		
Probe drive	- mid		
LPF	- 100		
HPF	- 0		
H Pos	- 80%		
V Pos	- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over .040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

6.15.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 6-15.

- a. Place probe on a good area in the required inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

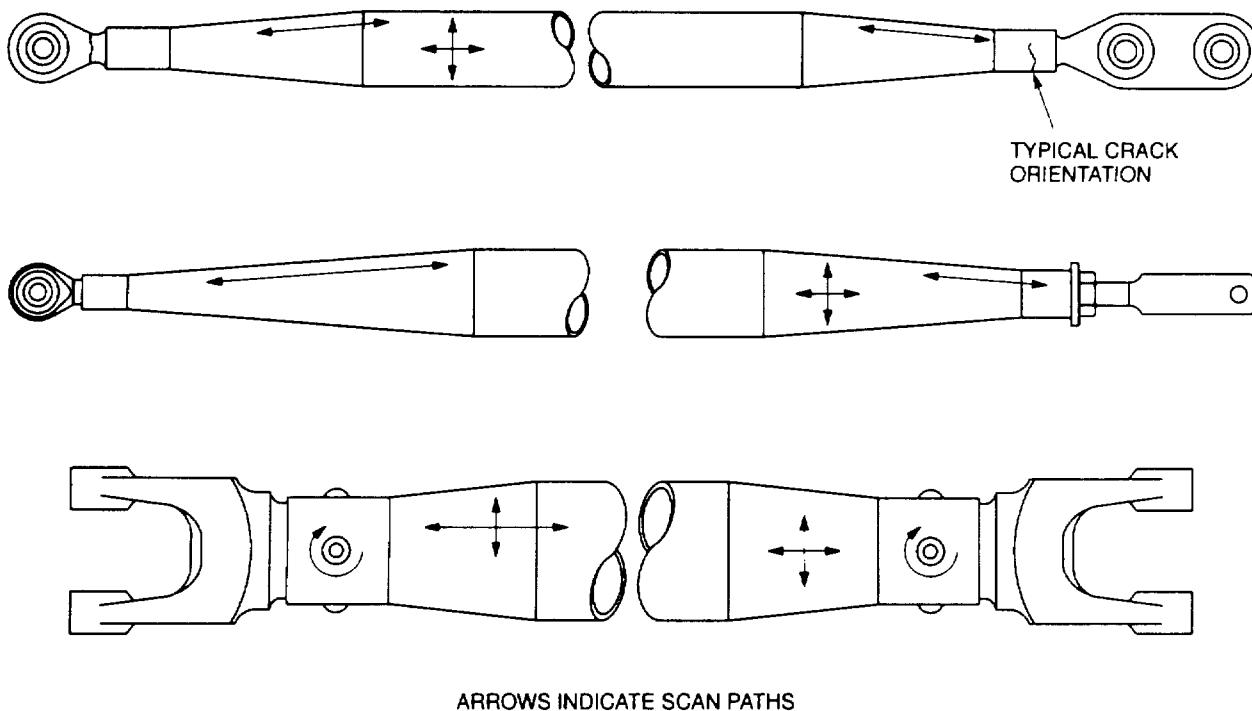
**NOTE**

Either probe identified in paragraph 6.15.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 6.15.3.5 b. (1), (2) and (3) shall be repeated each time a change is made.

6.15.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.

6.15.4 Backup Method. None required.

6.15.5 System Securing. The flight control tubes, if removed, require installation as required in accordance with the applicable technical manual listed in Table 1-1.



NDI\_OH-58\_F6\_20

**Figure 6-15. Flight Control Tube Assemblies**

**6.16 FLIGHT CONTROL BELLCRANKS, IDLERS AND WALKING BEAMS (ET).**

6.16.1 Description (Figure 6-1. Index No. 16). This inspection is applicable to all nonferromagnetic bellcranks, idlers and walking beams contained within the flight control system to verify indications found visually.

6.16.2 Defects. Defects may occur anywhere on the surface of the part. No cracks are allowed.

6.16.3 Primary Method. Eddy Current.

6.16.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100KHz-500KHz
- c. Probe, right angle, shielded surface, 100KHz-500KHz, 90° 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

6.16.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance.

Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, components shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

6.16.3.3 Access. Not applicable.

6.16.3.4 Preparation of Part. The identified component(s) shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

6.16.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-1 9e".

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 56°		
Probe drive	- mid		
LPF	- 100		
HPF	- 0		
H Pos	- 80%		
V Pos	- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over .040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

6.16.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 6-16.

- a. Place probe on a good area in the required inspection location and null. Adjust phase as \_ required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

**NOTE**

**Either probe identified in paragraph 6.16.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 6.16.3.5 b. (1), (2) and (3) shall be repeated each time a change is made.**

6.16.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.

6.16.4 Backup Method. None required.

6.16.5 System Securing. The identified component(s), if removed, require installation in accordance with the applicable technical manual listed in Table 1-1.

### **6.17 SUPPORT ASSEMBLIES (ET).**

6.17.1 Description (Figure 6-1, Index No. 17). This inspection is applicable to all support assemblies contained within the flight control system to verify all indications found visually.

6.17.2 Defects. Defects may occur anywhere on the surface of the part. No cracks are allowed.

6.17.3 Primary Method. Eddy Current.

6.17.3.1 NDI Equipment and Materials. (Refer to Appendix B.)

- a. Eddy Current Inspection Unit
- b. Probe, straight, shielded surface, 100KHz-500KHz
- c. Probe, right angle, shielded surface, 100KHz-500KHz, 90° 1/2 inch drop
- d. Cable Assembly
- e. Reference Block, three-notched aluminum (0.008, 0.020, and 0.040 EDM notches)
- f. Teflon Tape, refer to Table 1-8
- g. Aircraft Marking Pencil, refer to Table 1-8

6.17.3.2 Preparation of Helicopter. The helicopter shall be prepared for safe ground maintenance. Partial inspection for cause (visual indications, sites of mechanical damage, corrosion, etc.) may be performed on all exposed surfaces of the installed part using this procedure. If required, the identified component shall be removed in accordance with the applicable technical manuals listed in Table 1-1.

6.17.3.3 Access. Not applicable.

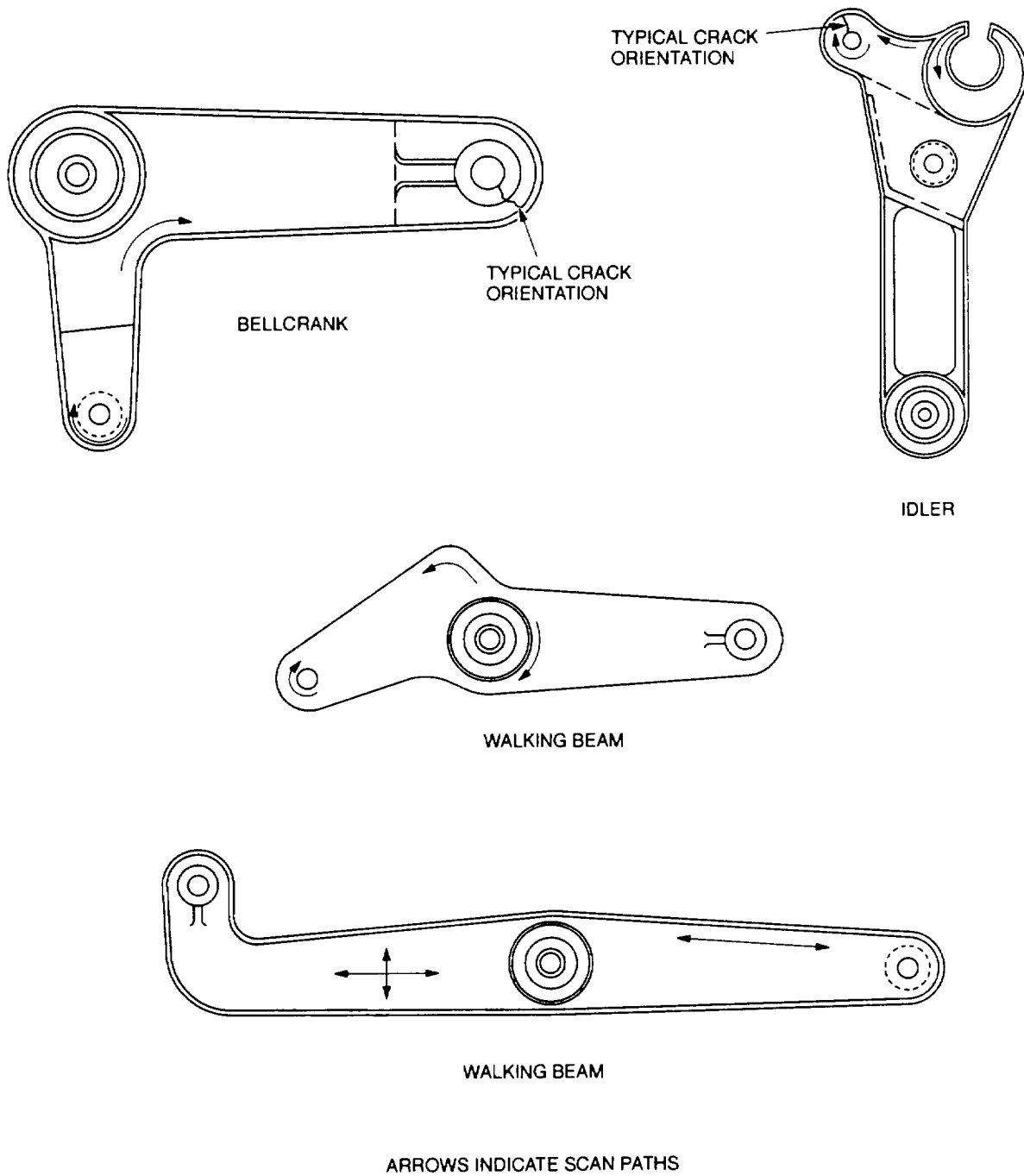


Figure 6-16. Flight Control Bellcranks, Idlers, and Walking Beams

6.17.3.4 Preparation of Part. The support assembly shall be thoroughly cleaned. Refer to Preparation of Part or Area for NDI, paragraph 1.4.4.

6.17.3.5 NDI Equipment Settings.

- a. Make the following initial settings on the Eddy Current Inspection Unit NORTEC-19e".

Frequency F1	- 200 KHz	F2	- off
Hdb	- 57.0		
Vdb	- 69.0		
Rot	- 56°		
Probe drive	- mid		
LPF	- 100		
HPF	- 0		
H Pos	- 80%		
V Pos	- 20%		

- b. Refer to Eddy Current Method, paragraph 1.4.11. Set up on test block as follows:

- (1) Null probe on test block.
- (2) Adjust phase as required to obtain horizontal lift-off.
- (3) Move probe over all three notches in test block. Adjust gain to obtain a three block vertical signal when probe is passed over .040 inch notch in test block. (Refer to standard instrument display shown in Figure 1-7.)

6.17.3.6 Inspection Procedure. Refer to Eddy Current Method, paragraph 1.4.11 and Figure 6-17.

- a. Place probe on a good area in the required inspection location and null. Adjust phase as required to obtain horizontal lift-off.
- b. Inspect the part.
- c. Any signal similar to the notches in the test block are cause for rejection.

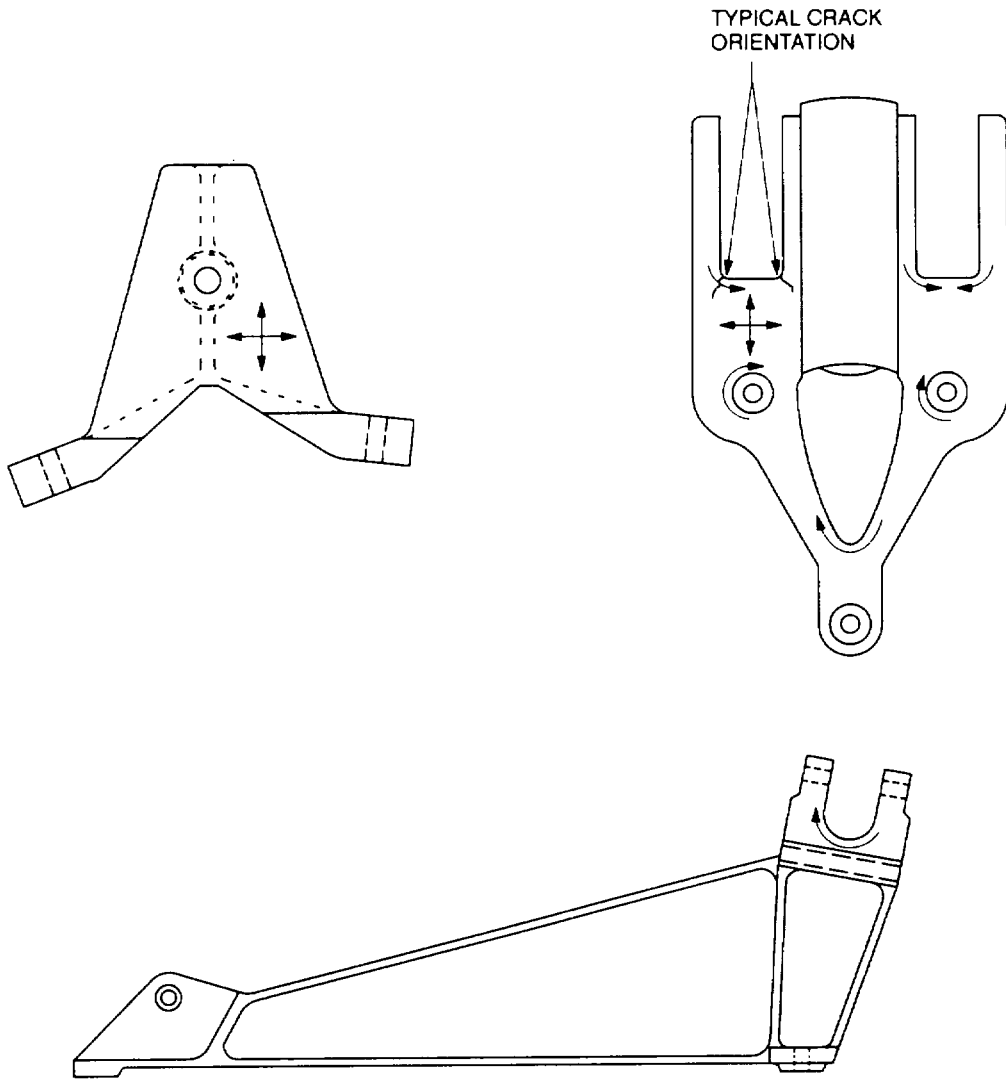
**NOTE**

**Either probe identified in paragraph 6.17.3.1 may be used depending primarily on the ease of accessibility and user friendliness. If the probes are changed steps 6.17.3.5 b. (1), (2) and (3) shall be repeated each time a change is made.**

6.17.3.7 Marking and Recording of Inspection Results. Mark and record as required by paragraph 1.3.

6.17.4 Backup Method. None required.

6.17.5 System Securing. The identified component(s), if removed, requires installation in accordance with the applicable technical manual listed in Table 1-1.



**TYPICAL SUPPORT ASSEMBLIES**

ARROWS INDICATE SCAN PATHS

NDI\_OH-58\_F6\_22

**Figure 6-17. Support Assemblies**

6-33/(6-34 blank)



APPENDIX A

MAINTENANCE ALLOCATION CHART  
NONDESTRUCTIVE INSPECTION

NDI METHODS/EQUIPMENT

- 001 Fluorescent Penetrant Method
- 002 Magnetic Particle Method
- 003 Eddy Current Method
- 004 Ultrasonic Method
- 005 Bond Testing Method
- 006 Radiographic Method

NOMENCLATURE OF END ITEMS  
HELICOPTER, OH-58D

(1) PROCEDURE NUMBER	(2) COMPONENT/ASSEMBLY	(3) INSPECT FOR	(4) MAINTENANCE CATEGORY			(5) INSPECTION EQUIPMENT REQUIREMENTS	(6) REMARKS
			AVUM	AVIM	DEPOT		
2-2	Main Rotor Hub Lower Cone	Cracks		√		002	
2-3	Upper Cone Plate Assembly	Cracks		√		002	
2-4	Blade Bolt	Cracks		√		002	
2-5	Droop Stop Stud	Cracks		√		002	
2-6	Hub Upper Plate	Cracks		√		003	
2-7	Pitch Horn Assembly	Cracks		√		003	
2-8	Yoke Adapter Assembly	Cracks		√		003	
2-9	Main Rotor Grip Assembly	Cracks		√		003	
2-10	Hub Lower Plate	Cracks		√		003	
2-11	Main Rotor Blade Cover	Cracks		√		001	
2-12	Main Rotor Blade	VOIDS		√		005	
2-13	Main Rotor Pitch Link Tube	Cracks		√		003	
2-14	Pitch Link Rod Ends	Cracks		√		002	
2-15	Main Rotor Drive Link	Cracks		√		003	
2-16	Main Rotor Drive Lever	Cracks		√		003	
2-17	Main Rotor Drive Hub Set	Cracks		√		003	
2-18	Main Rotor Gimbal Ring	Cracks		√		003	
2-19	Main Rotor Collective Lever	Cracks		√		003 001	Backup
2-20	Main Rotor Collective Link	Cracks		√		003 001	Backup

NOMENCLATURE OF END ITEMS  
HELICOPTER, OH-58D

(1) PROCEDURE NUMBER	(2) COMPONENT/ASSEMBLY	(3) INSPECT FOR	(4) MAINTENANCE CATEGORY			(5) INSPECTION EQUIPMENT REQUIREMENTS	(6) REMARKS
			AVUM	AVIM	DEPOT		
2-21	Main Rotor Controls Spacer	Cracks		√		002	
2-22	Main Rotor Antidrive Lever	Cracks		√		003	Backup 001
2-23	Main Rotor Antidrive Link	Cracks		√		003	Backup 001
2-24	Upper Bearing Race	Cracks		√		002	
2-25	Inner and Outer Cap	Cracks		√		003	Backup 001
2-26	Drive Link Bearing and Retainer	Cracks		√		002	Backup 001
2-27	Main Rotor Pivot Sleeve	Cracks		√		003	Backup 001
2-28	Support Assembly	Cracks		√		003	Backup 001
2-29	Inner Ring	Cracks		√		003	Backup 001
2-30	Outer Ring	Cracks		√		003	Backup 001
2-31	Tail Rotor Pitch Link	Cracks		√		003	
2-32	Tail Rotor Control Tube Drive Plate	Cracks		√		002	
2-33	Tail Rotor Crosshead	Cracks		√		002	
2-34	Tail Rotor Hub Support	Cracks		√		003	
2-35	Tail Rotor Hub Clamp Ring	Cracks		√		002	Backup 001
2-36	Tail Rotor Hub Yoke	Cracks		√		002	Backup 001
2-37	Flapping Bearing	Cracks		√		001	
2-38	Tail Rotor Blades	Cracks		√		003	
2-39	Tail Rotor Blades	Voids		√		005	
2-40	Tail Rotor Pitch Change Lever	Cracks		√		003	
2-41	Tail Rotor Pitch Change Idler	Cracks		√		003	
2-42	Tail Rotor Pitch Change Trunnion Cap	Cracks		√		003	

**TM 1-1520-266-23**

**NOMENCLATURE OF END ITEMS  
HELICOPTER, OH-58D**

(1) PROCEDURE NUMBER	(2) COMPONENT/ASSEMBLY	(3) INSPECT FOR	(4) MAINTENANCE CATEGORY			(5) INSPECTION EQUIPMENT REQUIREMENTS	(6) REMARKS
			AVUM	AVIM	DEPOT		
3-2	Engine to Transmission Driveshaft	Cracks		√		002	
3-3	Pylon Spring Fitting	Cracks		√		003 001	Backup
3-4	Pylon Stop Fitting	Cracks		√		003 001	Backup
3-5	Torquemeter Support Assembly	Cracks		√		003 001	Backup
3-6	Bearing Assembly Retainer	Cracks		√		003 001	Backup
3-7	Bearing Sleeve	Cracks		√		003 001	Backup
3-8	Retaining Plate	Cracks		√		003 001	Backup
3-9	Spring Sleeve	Cracks		√		003 001	Backup
3-10	Anti-Backlash Spring	Cracks		√		001	
3-11	Anti-Backlash Adapter	Cracks		√		003 001	Backup
3-12	Rotor Mast	Cracks		√		002	
3-13	Bearing Nut Lock Plate	Cracks		√		003 001	Backup
3-14	Mast Bearing Nut	Cracks		√		002 001	Backup
3-15	Seal and Bearing Retaining Plate	Cracks		√		002 001	Backup
3-16	Upper Mast Bearing Liner	Cracks		√		002	
3-17	Duplex Bearing Nut	Cracks		√		003	
3-18	Shaft Plug Assembly	Cracks		√		003 001	Backup
3-19	Adapter Bolt	Cracks		√		002	
3-20	Main Driveshaft Adapter	Cracks		√		002	
3-21	Forward Seal Cap	Cracks		√		003	
3-22	Forward Shaft	Cracks		√		002	
3-23	Pilot Ring	Cracks		√		003 001	Backup

NOMENCLATURE OF END ITEMS  
HELICOPTER, OH-58D

(1) PROCEDURE NUMBER	(2) COMPONENT/ASSEMBLY	(3) INSPECT FOR	(4) MAINTENANCE CATEGORY			(5) INSPECTION EQUIPMENT REQUIREMENTS	(6) REMARKS
			AVUM	AVIM	DEPOT		
3-24	Housing Assembly	Cracks		√		003	Backup 001
3-25	Cone Set	Cracks		√		002	
3-26	Cone Set Spacer	Cracks		√		002	
3-27	Aft Bearing and Seal Cap	Cracks		√		003	
3-28	Output Adapter	Cracks		√		002	
3-29	Forward Shaft Assembly	Cracks		√		003	Backup 001
3-30	Aft Shaft Assembly	Cracks		√		003	Backup 001
3-31	Coupling Disc Packs	Cracks		√		001	
3-32	Shaft Assembly Washer	Cracks		√		003	Backup 001
3-33	Coupling Adapter	Cracks		√		003	Backup 001
3-34	Bearing Hanger Brack- ets and Links	Cracks		√		003	Backup 001
3-35	Segmented Shaft Assembly	Cracks		√		003	Backup 001
3-36	Steel Impeller	Cracks		√		002	
3-37	Aluminum Alloy Impeller Housing	Cracks		√		003	Backup 001
3-38	Fan Shaft	Cracks		√		002	
3-39	Tail Rotor Gearbox	Cracks		√		003	
3-40	Input Adapter Nut	Cracks		√		002	
3-41	Input Duplex Bearing Nut	Cracks		√		003	Backup 001
3-42	Cap Assembly	Cracks		√		003	Backup 001
4-2	Honeycomb and Bonded Panels	Voids		√		005	
4-3	Armament Hard Points	Cracks		√		002	
4-4	Universal Weapons Pylon Mount Fittings	Cracks		√		003	Backup 001
4-5	External Fuselage Fittings	Cracks		√		003	

NOMENCLATURE OF END ITEMS  
HELICOPTER, OH-58D

(1) PROCEDURE NUMBER	(2) COMPONENT/ASSEMBLY	(3) INSPECT FOR	(4) MAINTENANCE CATEGORY			(5) INSPECTION EQUIPMENT REQUIREMENTS	(6) REMARKS
			AVUM	AVIM	DEPOT		
4-6	Landing Gear Support Fitting Assemblies	Cracks		√		002	
4-7	Tailboom	Cracks		√		003	Backup 001
4-8	Tailboom Attach Bolts	Cracks		√		002	
4-9	Tail Rotor Gearbox Support Assembly	Cracks		√		003	
4-10	Tail Rotor Driveshaft Covers	Cracks		√		003	Backup 002
4-11	Vertical Fin Assembly	Voids		√		005	
4-12	Horizontal Stabilizer	Cracks		√		003	
4-13	Stop-Down Assembly	Cracks		√		002	
4-14	Forward Transverse Beam	Cracks		√		003	Backup 001
4-15	Aft Transverse Beam	Cracks		√		003	Backup 001
4-16	Skid Saddles/Shoes	Cracks		√		003	
4-17	Tow Ring Mounting Holes	Cracks		√		003	Backup 001
4-18	Tow Fittings	Cracks		√		002	
4-19	Vertical Fin	Water		√		006	
4-20	Fore and Aft Cross Tube Assemblies	Cracks		√		004	
5-2	T703-AD-700 Engine Accessories	Cracks		√		001	
5-3	Combustion Outer Case	Cracks		√		001	
5-4	Combustion Liner	Cracks		√		001	
5-5	Compressor Discharge Tubes	Cracks		√		001	
5-6	T703-AD-700 Engine Systems and Components	Cracks		√		001	
6-2	Hydraulic Pump	Cracks		√		003	
6-3	Servoactuators	Cracks		√		003	
6-4	Clevis Adapter	Cracks		√		002	

NOMENCLATURE OF END ITEMS  
HELICOPTER, OH-58D

(1) PROCEDURE NUMBER	(2) COMPONENT/ASSEMBLY	(3) INSPECT FOR	(4) MAINTENANCE CATEGORY			(5) INSPECTION EQUIPMENT REQUIREMENTS	(6) REMARKS
			AVUM	AVIM	DEPOT		
6-5	Trunnion Bearing Assembly	Cracks		√		002	
6-6	Pilot/Copilot Collective Stick Assemblies	Cracks		√		001	
6-7	Collective Jackshaft	Cracks		√		002	
6-8	Collective Jackshaft Spacer	Cracks		√		002	
6-9	Collective Friction Clamp	Cracks		√		002	
6-10	Jackshaft Bearing Support Assembly	Cracks		√		002	
6-11	Collective Boosted Bellcrank Assembly	Cracks		√		003	Backup 001
6-12	Control Support Assembly	Cracks		√		003	Backup 001
6-13	Actuator Support Assembly	Cracks		√		003	
6-14	Pilot/Copilot Cyclic Stick Assemblies	Cracks		√		001	
6-15	Flight Control Tube Assemblies	Cracks		√		003	
6-16	Flight Control Bellcranks, Idlers, and Walking Beams	Cracks		√		003	
6-17	Support Assemblies	Cracks		√		003	

**APPENDIX B  
EQUIPMENT LISTING**

<b>Nomenclature</b>	<b>Part Number/ Specification</b>	<b>Manufacturer</b>	<b>National Stock Number</b>
<u>Fluorescent Penetrant Method</u>			
Fluorescent Penetrant Inspection Kit	MIL-I-25135 Type I, Method C, Level 3	General Services Administration (GSA)	6850-00-703-7406
Black Light UV Kit	FMI	Spectronics Corp. 956 Brush Hollow Rd. Westbury, NY 11590-1731	6635-00-566-5198
Black Light Meter	J-221	Ultraviolet Products Inc., DBA UVP Inc. 5100 Walnut Grove Ave. P.O. Box 1500 Upland, CA 91778	6695-00-488-5451
Black Light Bulbs	A-A-1765	General Services Administration (GSA)	6240-00-233-3680
Filter UV	3901	Magnaflux Div. of Illinois Tool Works Inc. 1301 W Ainsle St. Chicago, IL 60656	6635-00-736-5177
<u>Magnetic Particle Method</u>			
Yoke and Coil Kit	YL-61	Magnaflux Div. of Illinois Tool Works Inc. 1301 W. Ainsle St. Chicago, IL 60656	4920-01-145-3924
Black Light	ZB26	Spectronics Corp. 956 Brush Hollow Rd. Westbury, NY 11590-1731	6635-00-611-5617
Magnetic Particle Inspection Probe	DA200	Parker Research Corp. 2642 Enterprise Rd. Clearwater, FL 33575-1917	6635-00-022-0372
Magnetometer	2480	Sterling Mfg. Co. 1845 E. 30th St. Cleveland, OH 44114-4438	6635-00-391-0058

Nomenclature	Part Number/ Specification	Manufacturer	National Stock Number
<u>Eddy Current Method</u>			
Eddy Current Inspection Unit	NORTEC-19e"	Staveley Instruments, Inc. 421 North Quay St. Kennewick, WA 99336	6635-01-419-0694
Cable Assembly, Coaxial 6-foot long (1 required)	CBM-6	NDT Engineering Corp. 7056 S. 220th St. Kent, WA 98032	5995-01-278-1271
Reference Block- Three-Notched Aluminum	TBS-1 1902510	Staveley Instruments, Inc. 421 North Quay St. Kennewick, Wa 99336	
Reference Block- Three-Notched Titanium	SRS-0824T	NDT Engineering Corp 7056 S. 220TH St. Kent, Wa 98032	
Reference Block- Three-Notched Magnesium	SRS-0824M	NDT Engineering Corp 7056 S. 220TH St. Kent, Wa.	
Reference Block- Block of Six Conductivity Sample	1902474	Staveley Instruments, Inc. 421 North Quay St. Kennewick, WA 99336	
Probe, right angle, shielded surface P/100KHz-500KHz /A/90.5/6	MT-905-60	NDT Engineering Corp. 7056 S. 220th St. Kent, WA 98032	
Probe, straight, shielded surface P/100KHz-500KHz/ A/0.0/4	MP-60	NDT Engineering Corp. 7056 S. 220th St. Kent, WA 98032	
<u>Ultrasonic Method</u>			
Ultrasonic Inspection Unit	USD 15S	KrautKramer Branson 50 Industrial Park Road Lewistown, PA 17044	6635-01-417-5467
Transducer, 5.0 MHz, 60 degree shear wave 1/4 x 1/4 inch element			6635-01-057-2761



Nomenclature	Part Number/ Specification	Manufacturer	National Stock Number
<u>Bond Testing Method</u>			
Bondmaster	9016600-99	Staveley Instruments, Inc. 421 North Quay St. Kennewick, WA 99336	6635-01-432-9954
Cable Assembly	SBM-CPM-P11 9117789	Staveley Instruments, Inc. 421 North Quay St. Kennewick, WA 99336	
Probe, Mechanical Impedance Analysis	S-MP-4 9317808	Staveley Instruments, Inc. 421 North Quay St. Kennewick, WA 99336	
Probe Holder, spring loaded	BMM-H 9316874	Staveley Instruments, Inc. 421 North Quay St. Kennewick, WA 99336	
Test Block, Composite Defect Standard #1	1916451	Staveley Instruments, Inc. 421 North Quay St. Kennewick, WA 99336	
Test Block, Composite Defect Standard #3	1916453	Staveley Instruments, Inc. 421 North Quay St. Kennewick, WA 99336	
Test Block, Aluminum Honeycomb with 0.020 inch thick aluminum/fiber- glass skin	Refer to Appendix C		
Test Block, Aluminum Honeycomb with 0.040 inch thick aluminum skin	Refer to Appendix C		
Test Block, Aluminum Honeycomb with 0.063 inch thick aluminum skin	Refer to Appendix C		
<u>Radiographic Method</u>			
Tripod  X-Ray Tubehead Stand	PDSANE480	Staveley Aerospace Systems, Inc. Chatsworth, CA 91311	6635-01-067-6315
AIX Warning Light W/Stand	153001	American Industrial X-ray Inc.	6210-01-374-4594

<b>Nomenclature</b>	<b>Part Number/ Specification</b>	<b>Manufacturer</b>	<b>National Stock Number</b>
X-Ray Unit (LPX-160 water-cooled digital)	3-000-0723	LORAD Corp. 36 Apple Ridge Rd. P.O. Box 710 Danbury, CT 06813-0710	6635-01-417-1830

**APPENDIX C**

**ILLUSTRATED FIELD MANUFACTURE ITEMS LIST**

Introduction

- A. This appendix contains complete instructions for manufacturing nondestructive inspection support accessories in the field.
- B. An index order is provided for cross-referencing the number of the item to be manufactured to the figure number which covers fabrication criteria.
- C. All bulk materials needed for manufacture of an item are listed by part number or specification number.
- D. See Figure C-1.

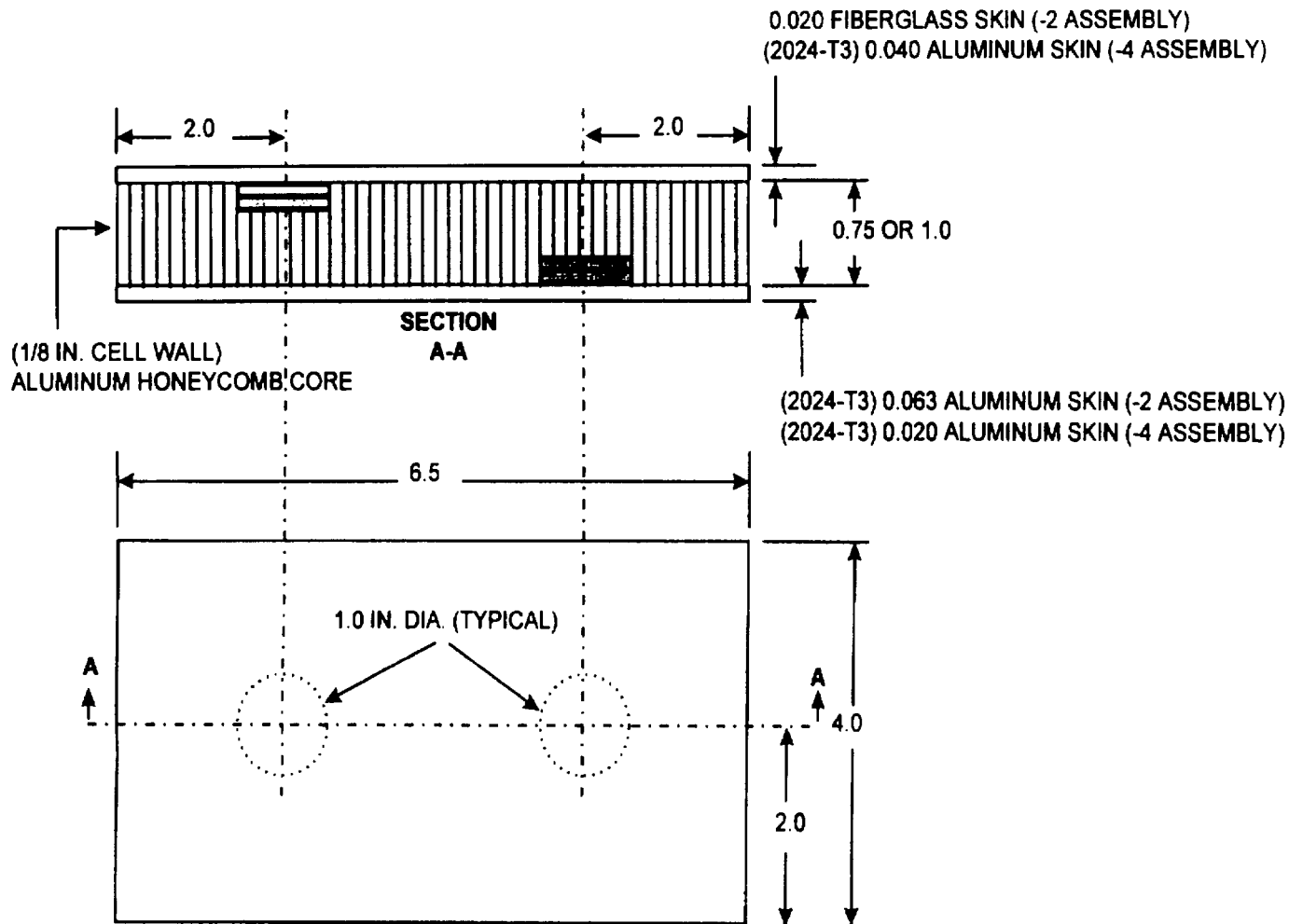
Item Number	Support Accessories
WS-2	Test block with aluminum honeycomb (0.75 or 1.0 inch) between 0.020 fiberglass skin and a 0.063 aluminum skin
WS-4	Test block with aluminum honeycomb (0.75 or 1.0 inch) between a 0.040 aluminum skin and a 0.020 skin

**NOTES**

1. All dimensions (+/-) 1/16 inch. Break all sharp edges and corners.
2. Scuff sand the adhesive side of the fiberglass panel.
3. Scotchbrite scuff and alcohol/acetone rinse the adhesive side of the aluminum panels.
4. Milling or grinding of core cutouts is preferable over crushing techniques. A rotary file or end mill cutter should produce acceptable results.
5. Polyolefin disks (inserts) should be flush with core if not slightly recessed.
6. Mix adhesives per manufacturer's instructions; exercise caution applying around inserts.
7. Moderate weight should be applied to the panels throughout the cure cycle.

**BULK MATERIALS**

1. 2024-T3 aluminum panels (0.020, 0.040 and 0.063 inch thick) specification QQ-4-250/5
2. Fiberglass panel 0.020 inch thick, specification MIL-1-24768/27
3. Aluminum honeycomb core 0.75 or 1.0 inch thick, 1/8 cell size specification MIL-C-7438-G
4. Polyolefin disks 0.025-0.030 inch thick (High-Density Polyethylene or Polypropylene)
5. Adhesive EA934 or equivalent



**WS-2 AND WS-4 ASSEMBLY**

Figure C-1. Composite Test Blocks

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PAGE NO.	PARA-GRAPH	FIGURE NO.	TABLE NO.	<p style="text-align: center; font-weight: bold;">IN THIS SPACE, TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT.</p>
PRINTED NAME, GRADE OR TITLE AND TELEPHONE NUMBER			SIGN HERE	

## 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 decigrams = .035 ounce  
 1 decagram = 10 grams = .35 ounce  
 1 hectogram = 10 decagrams = 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 milliliters = .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

<i>To change</i>	<i>To</i>	<i>Multiply by</i>	<i>To change</i>	<i>To</i>	<i>Multiply by</i>
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	1.356	metric tons	short tons	1.102
pound-inches	Newton-meters	.11296			

## Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C
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