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AIRWORTHINESS

Group Chair's Factual Report – Attachment 6

Interagency Committee for Aviation Policy UH-1 Inspection Planning Guide Revision 2

UH-1 SERIES

INSPECTION PLANNING GUIDE

INTERAGENCY COMMITTEE
for
AVIATION POLICY

This UH-1 Inspection Planning Guide (IPG) supersedes
the UH-1 IPG dated March 26, 1996 and includes
Revision 1 (12 March 1997) and Revision 2 (March 1, 2002) |

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1 March 2002 |

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RECORD OF REVISIONS

Originally accepted by the FAA on 26 March 1996.
Revision 1 (12 March 1997):

POSTED:		REVISION NUMBER	PAGE NUMBER(S)
DATE	BY		
		Rev. 1 (12 March 1997)	Removed page 18, Inserted new page 18.
		Rev. 1 (12 March 1997)	Removed pages 23 to 26, Inserted new pages 23-26.
		Rev. 1 (12 March 1997)	Removed page 29, Inserted new page 29.
		Rev. 2 (1 Mar 2002)	Cover page date "March 12, 1997" Changed to "This UH-1 Inspection Planning Guide (IPG) supersedes the UH-1 IPG dated March 26, 1996, and includes Revision 1 (12 March 1997) and Revision 2 1 March 1, 2002) and "1 March 2002"
		Rev. 2 (1 Mar 2002)	Page 2 Changed to include "Points of Contact", "Definitions" and "Appendix"
		Rev. 2 (1 Mar 2002)	Page 3 Changed to indicated "Revision 2, 1 March 2002" updates.
		Rev. 2 (1 Mar 2002)	Page 6, General, "WARNING" changed to include "UH-1 D and H" helicopters.

		Rev. 2 (1 Mar 2002)	Page 6, third sentence from end of page now states, "An owner/operator shall develop a checklist for each inspection outlined in this document. Refer to (current version) TM 55-1520-210-PMD UH-1H/V, and EH-1H/X Aircraft Preventive Maintenance Daily Inspection Checklist when developing checklist."
		Rev. 2 (1 Mar 2002)	Page 4 Added to 1-1. General in the first paragraph, "This includes a review of the aircraft, aircraft engines, appliances, and the forms and records for any recorded discrepancies and for any applicable Airworthiness Directives, Safety of Flight Messages, ASAMS, TM's TB's, etc. that must be complied with."
		Rev. 2 (1 Mar 2002)	Page 6, "POINTS OF CONTACT" added.
		Rev. 2 (1 Mar 2002)	New Page 10 Now includes "Definitions".
		Rev. 2 (1 Mar 2002)	Page 8 Now page 16. Chapter 2, Inspection Descriptions, 2-7, "NOTE", 3., changed to include, "THE "ANNUAL CYCLE" STARTS AGAIN WHEN ALL INSPECTIONS ARE COMPLETED."
		Rev. 2 (1 Mar 2002)	Page 12 Now page 20. Chapter 3, Preventive Maintenance Inspection (P.M. I.), Section I, 2., now states, 2., "Review service instructions for maintenance and inspection requirements for installed kits, MWOs and STCs as appropriate."

		Rev. 2 (1 Mar 2002	Page 12 Now page 20. Chapter 3, Preventive Maintenance Inspection (P.M. I.), Section I, 5., now states, 5., "Ensure all applicable Airworthiness Directives (Safety of Flight
		Rev. 2 (1 Mar 2002	Page 13 Now page 21. Chapter 3, Preventive Maintenance Inspection (P.M. I.), Section III, 19., now states, "Check main rotor for proper lubricant level, inspect for evidence of leakage, and obvious contamination. Not applicable if aircraft is modified with grease hub."

1. All personnel to whom this IPG is furnished shall keep it up to date with the changes and additions furnished to them.

2. Each IPG shall have the date of the last revision on each page.

CHAPTER 1

INTRODUCTION

1-1. GENERAL

This document, the UH-1 Series Inspection Planning Guide (IPG) is available to operators of UH-1 series helicopters (except UH-1N models) for the purpose of providing operators with a choice in maintenance programs. In accordance with the inspection standards set forth in the specific aircraft type certificate, the owner/operator must use the complete inspection program developed by the applicable military service. This includes a review of the aircraft, aircraft engines, appliances, and the forms and records for any recorded discrepancies and for any applicable Airworthiness Directives, Safety of Flight Messages, ASAMS, TM's TB's, etc. that must be complied with.

This document, the IPG, has been developed as an alternative reasonable basis for inspection program development.

The owner/operator conducting public use operations may use this document as a reasonable basis for the development of an inspection program to assure an equivalent level of safety.

WARNING

UNLESS SPECIFICALLY DESIGNATED HEREIN, STANDARDS FOR SERVICEABILITY FOR THE AIRFRAME MAINTENANCE AND INSPECTION CONTAINED IN THIS DOCUMENT ARE FOUND IN THE APPLICABLE MILITARY MAINTENANCE DOCUMENT FOR THESE SPECIFIC MAKE AND MODELS OF AIRCRAFT, I.E. NAVY UH-1E, UH-1L, TH-1L, HH-1K; ARMY UH-1B, UH-1C/M, UH-1D/H; AIR FORCE HH-1H).

UNLESS SPECIFICALLY DESIGNATED HEREIN STANDARDS FOR SERVICEABILITY FOR THE ENGINE MAINTENANCE AND INSPECTION CONTAINED IN THIS DOCUMENT ARE FOUND IN THE APPLICABLE MILITARY MAINTENANCE DOCUMENT OR THE APPLICABLE ALLIED SIGNAL LYCOMING DOCUMENT FOR THESE SPECIFIC MODELS OF ENGINE.(T53L11, T53L13, T53L703)

This document contains the requirements for the Preventive Maintenance Inspection (P.M.I.), Detail (#1-#2-#3) Inspections, Special Inspections and Conditional Inspections that shall be performed on the UH-1 series helicopters.

Inspections required herein shall be performed by a properly rated repairman (under 14 Code of Federal Regulations, Part 65) or a Federal Aviation Administration certified Airframe and Powerplant mechanic.

An owner/operator shall develop a checklist for each inspection outlined in this document. Refer to (current version) TM 55-1520-210-PMD UH-1H/V, and EH-1H/X Aircraft Preventive Maintenance Daily Inspection Checklist when developing checklist.

Maintenance functions and definitions of terms shall be in accordance with applicable military maintenance manual for the UH-1 Series unless otherwise stipulated in this document.

The IPG is applicable to a standard UH-1 series helicopter operating in a flight profile similar to the US military.

NOTE

UH-1 HELICOPTERS USED FOR **REPETITIVE** HEAVY LIFT AND OTHER UNIQUE OPERATIONS (LOGGING, WATER BUCKET, LONG LINE, ETC.), SHALL REQUIRE ADDITIONAL AND/OR MORE FREQUENT INSPECTIONS AS DEEMED NECESSARY BASED ON OPERATIONAL EXPERIENCE AND/OR ALERT SERVICE BULLETINS AND/OR AIRWORTHINESS DIRECTIVES. UH-1 HELICOPTERS MODIFIED THROUGH INCORPORATION OF SUPPLEMENTAL TYPE CERTIFICATES OR EQUIPPED WITH SPECIAL MISSION KITS SHALL REQUIRE ADDITIONAL INSPECTIONS AS DEEMED NECESSARY.

The IPG is primarily presented for UH-1H model helicopters. Inspection requirements peculiar to 540 main rotor equipped helicopters are denoted "540 M/R". The IPG is also primarily presented for the T53L11, T53L13 and T53L703 engines. The engine should be maintained and inspected in accordance with the manufacturer's maintenance manual and the appropriate manufacturer's service bulletins.

NOTE

AN ENGINE HEALTH INDICATOR TEST IS NORMALLY A PRE-FLIGHT FUNCTION PERFORMED BY THE PILOT AND HAS NOT BEEN INCLUDED IN THE IPG. HOWEVER, THE OPERATOR SHOULD ESTABLISH A METHOD FOR ENGINE TREND MONITORING TO EVALUATE ENGINE HEALTH AND PERFORMANCE. A SUGGESTED METHOD FOR ENGINE TREND MONITORING IS THE HEALTH INDICATOR TEST (HIT) AS DESCRIBED IN APPROPRIATE US ARMY MANUALS.

1-2. WARNING, CAUTIONS, AND NOTES DEFINED.

WARNING

AN INSPECTION PROCEDURE, PRACTICE, ETC., WHICH IF NOT CORRECTLY FOLLOWED, COULD RESULT IN PERSONAL INJURY OR LOSS OF LIFE.

CAUTION

AN INSPECTION PROCEDURE, PRACTICE, ETC., WHICH, IF NOT STRICTLY OBSERVED, COULD RESULT IN DAMAGE TO OR DESTRUCTION OF EQUIPMENT.

NOTE

AN INSPECTION PROCEDURE, CONDITION, ETC., WHICH IS ESSENTIAL TO HIGHLIGHT

1-3. FORMAT DEFINED

The IPG is divided into:

	Example:
Chapters,	**CHAPTER 7 SPECIAL INSPECTIONS**
Sections,	**SECTION V. LOWER PYLON**
Headings,	**8-1. HARD LANDING**
Paragraphs,	**10.** Tail rotor gearbox.
and subparagraphs.	**10.1.** Remove tail rotor gearbox. Check for cracks. Etc.
	a. Main rotor blades.
	(1) Bolt contact etc.
	(a) Remove spline etc.
	1. Tighten bolt etc.

1-4. POINTS OF CONTACT

www.gsa.gov/aircraftpolicy	Web Site for the General Services Administration Aircraft Management Policy Division. The "caretaker" of the Inspection Planning Guides.
Charlie Elkins (256) 955-0773	ATCOM UH-1 contact.
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Dan Grady (602) 231-3348 dan.grady@honeywell.com	Honeywell contacts for T53 engines. Technical publications.
National Technical Information Service 1 800 553-6847 (703) 605-6000 5285 Port Royal Road Springfield, VA 22161	Maintenance manuals for Army helicopters.

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Definitions

AIRCRAFT means a device that is used or intended to be used for flight.

AIRCRAFT ENGINE means an engine that is used or intended to be used for propelling aircraft. It includes turbo-superchargers, appurtenances, and accessories necessary for its functioning, but does not include propellers.

AIRFRAME means the fuselage, booms, nacelles, cowlings, fairings, airfoil surfaces (including rotors but excluding propellers and rotating airfoils of engines), and landing gear of an aircraft and their accessories and controls.

AIRCRAFT MAINTENANCE means that work which is required to be performed by an appropriately certificated and qualified person(s).

AIRWORTHINESS DIRECTIVE means a maintenance procedure dictated by the Federal Aviation Administration that must be performed on an aircraft in order to remain airworthy.

APPROVED unless used with reference to another person, means approved by the FAA Administrator.

APPLIANCE means any instrument, mechanism, equipment, part, apparatus, appurtenance, or accessory, including communications equipment, that is used or intended to be used in operating or controlling an aircraft in flight, is installed in or attached to the aircraft, and is not part of an airframe, engine, or propeller.

CALIBRATION means making precise measurements and adjustments to equipment or systems in order to obtain optimum performance and to certify that output data falls within prescribed tolerances.

CAUTION means a maintenance or inspection procedure, practice, etc., which, if not strictly observed, could result in damage to or destruction of equipment.

CHECK means an action taken to examine and verify, in accordance with established procedures and requirements, the condition or status of an aircraft, its systems, components, and/or accessories.

CIVIL AIRCRAFT means an aircraft that may or may not be owned or leased by the United States Government or a State or local government; that holds, or is cabable of holding an airworthiness certificate; and is cabable of transporting passengers or engaging in commercial purposes. (see PUBLIC AIRCRAFT)

COMPONENT any self-contained part, combination of parts, subassemblies or units, which perform a distinctive function necessary to the operation of the airframe, powerplant or propeller.

CONDITIONAL INSPECTION means an inspection which is contingent upon specific conditions or incidents that arise, and only because of these conditions or incidents. Examples of these conditions or incidents are hard landings, overspeed, and sudden stoppage. An inspection is required in such cases before further flight.

(ENGINE) CYCLE means an engine start and shutdown procedure to be counted as "1". For the purposes of this document and historical purposes (2 cycles per flight hour plus 25%) is the method recommended to determine the number of cycles on engines that have not been logging cycles. After that, 1 cycle per flight hour.

DMWR (pronounced dimwar) means Depot Maintenance Work Requirement. It is a document that details maintenance and inspection criteria for specific components.

FOREIGN OBJECT DAMAGE (FOD) means damage to an aircraft, airframe. or engine caused by a foreign object that is not part of the aircraft, or has broken loose of the aircraft and caused damage.

GROUND RUN (see RUN-UP) means operating the aircraft on the ground, with no intention of taking off, from a normal start thru flight idle, as a minimum.

HARD LANDING means any accident or incident in which ground impact of the helicopter causes severe pitching of main rotor, allowing hard contact of hub with mast, or results in yielding or noticeable cracking of fuselage pylon support structure or landing gear.

HARD-TIME means a primary maintenance process that requires an appliance or part be periodically overhaul in accordance with the Agency's maintenance manual or that it be removed from service.

HEALTH INDICATOR (ENGINE) TEST (HIT) means a method for engine trend monitoring to evaluate engine health and performance.

INSPECT means a method of qualifying the condition or status of the aircraft, its systems, components, and/or accessories to specific standards and requirements.

INTERMEDIATE INSPECTION means an inspection that is performed each 25 hours.

MAINTENANCE INSPECTIONS include daily/preflight, segment, safety, service, special, and numbered inspections. These inspections vary in scope and frequency of performance according to types of aircraft.

MODIFICATION WORK ORDER (MWO) means an authorization to perform a modification on an aircraft to correct or enhance an existing condition. This is a military term and is similar to a commercial model service instruction.

MAJOR ALTERATIONS means an alteration not listed in the aircraft, or aircraft engine/rotor specifications that (1) might appreciably affect weight, balance, structural strength, performance, powerplant operation, flight characteristics, or other qualities affecting airworthiness; or (2) is not done according to accepted practices, or cannot be done by elementary operations (refer to Part 43).

MAJOR REPAIR means a repair that (1) if improperly done, might appreciably affect weight, balance, structural strength, performance, powerplant operations, flight characteristics, or other qualities of airworthiness; or (2) is not done according to accepted practices, or cannot be done by elementary operations (refer to Part 43).

MAST BUMPING or flapping-stop contact means the condition which occurs when the main yoke contacts the mast and may result in a fractured mast and rotor seperation. It usually occurs during; slope landings, rotor startup/coastdown, or when the flight envelope is exceeded.

MINIMUM EQUIPMENT LIST (MEL) means a regulatory authorization to continue to operate an aircraft with inoperable instruments or equipment. The aircraft may be operated under all applicable conditions and limitations contained in the minimum equipment list.

MINOR ALTERATION means a modification that is an alteration other than a major alteration.

MINOR REPAIR means a repair that is other than a major repair.

NOTE means an inspection or maintenance procedure, condition, et**c.**, which is essential to highlight

ON CONDITION ITEM (OC) means an item of equipment that must be restricted to one on which a determination of continued airworthiness may be made by a visual check, measurement, test, or other means.

OPERATIONAL CHECK means an "in motion" or "power on" test for determining that an item of equipment will operate at a specified performance level.

OVERHAUL means the complete disassembly, cleaning, inspection, necessary replacement or repair of parts, reassembly, adjustment, and testing of an item or equipment in accordance with recommended procedures.

PREVENTIVE MAINTENANCE means simple or minor preservation operations and the replacement of small standard parts not involving complex assembly operations. It is corrective action taken before it becomes necessary to make a major repair.

PREVENTIVE MAINTENANCE INSPECTION (P.M.I.) means an inspection which is accomplished each 12 1/2 flight hours or every 14 calendar days, whichever occurs first.

PUBLIC AIRCRAFT means an aircraft used only for the United States Government, an aircraft owned by the Government and operated by any person for purposes related to crew training, equipment development, or demonstration, an aircraft owned and operated by the government of a State, the District of Columbia, or a territory or possession of the United States or a political subdivision of one of these governments, an aircraft exclusively leased for at least 90 continuous days by the government of a State, the District of Columbia, or a territory or possession of the United States or a political subdivision of one of these governments, an aircraft owned or operated by the armed forces or chartered to provide transportation to the armed forces. In this definition, the following definitions apply:
(1) COMMERCIAL PURPOSES means the transportation of persons or property for compensation or hire, but does not include the operation of an aircraft by the armed forces for reimbursement when that reimbursement is required by any Federal statute, regulation, or directive, in effect on November 1, 1999, or by one government on behalf of another government under a cost reimbursement agreement if the government on whose behalf the operation is conducted certifies to the Administrator of the Federal Aviation Administration that the operation is necessary to respond to a

significant and imminent threat to life or property (including natural resources) and that no service by a private operator is reasonably available to meet the threat.
(2) GOVERNMENTAL FUNCTION means an activity undertaken by a government, such as national defense, intelligence missions, firefighting, search and rescue, law enforcement (including transport of prisoners, detainees, and illegal aliens), aeronautical research, or biological or geological resource management.
(3) QUALIFIED NON-CREWMEMBER means an individual, other than a member of the crew, aboard an aircraft--

(A) operated by the armed forces or an intelligence agency of the United States Government; or
(B) whose presence is required to perform, or is associated with the performance of, a governmental function.
(4) ARMED FORCES has the meaning given such term by section 101 of title 10.
An aircraft does not qualify as a public aircraft when the aircraft is used for commercial purposes or to carry an individual other than a crewmember or a qualified non-crewmember.
AIRCRAFT OWNED OR OPERATED BY THE ARMED FORCES qualifies as a public aircraft if:
(A) the aircraft is operated in accordance with title 10;
(B) the aircraft is operated in the performance of a governmental function under title 14, 31, 32, or 50 and the aircraft is not used for commercial purposes; or
(C) the aircraft is chartered to provide transportation to the armed forces and the Secretary of Defense (or the Secretary of the department in which the Coast Guard is operating) designates the operation of the aircraft as being required in the national interest.
LIMITATION An aircraft that is owned or operated by the National Guard of a State, the District of Columbia, or any territory or possession of the United States, qualifies as a public aircraft only to the extent that it is operated under the direct control of the Department of Defense.

REPAIR means the restoration of an item of equipment to a serviceable condition after fault detection.

RUN UP (see GROUND RUN) means operation of the aircraft from normal start thru flight idle. Flight of the aircraft may be planned.

SPECIAL INSPECTION means an inspection, in addition to the P.M.I., Intermediate and Periodic Inspections, that are inspections performed on a calendar basis, a cycle basis, a combination of hourly/calendar basis, or following the installation of a major component such as a gearbox installation.

TIME CONTROLLED COMPONENT means a part or component which has an established service life, at which time certain maintenance must be performed or the item disposed of as unserviceable. The service life may be based on operating hours, cycles, landings, calendar time, or combinations of these.

UNSALVAGEABLE means an aircraft part that should not be returned to aviation use as defined by Federal Aviation Administration (FAA) Advisory Circular (AC) No. 21-38 "Disposition of Unsalvageable Aircraft Parts and Materials (7-5-94).". Persons disposing of unsalvageable aircraft parts and materials should, when appropriate, mutilate those parts and materials prior to release. Mutilation should be accomplished in such a manner that the parts become unusable for their original intended use (see AC No. 21-38).

VISUAL INSPECTION means an inspection of an item of equipment for cleanliness, and deterioration of parts or materials by visual means.

WARNING means a maintenance or inspection procedure, practice, etc., which if not correctly followed, could result in personal injury or loss of life.

WIRE STRIKE Protection System (WSPS) means a basic system consisting of an upper cutter assembly, a windshield deflector/cutter assembly, and a lower cutter assembly that provides protection against frontal impacts with horizontally strung mechanical and power transmission wires.

SAFETY OF FLIGHT MESSAGE means an Army issued message that details a method to inspect, maintain, repair, or replace a component of a U.S. Army aircraft, usually an OH-58 or UH-1 helicopter. SOF could also apply to flight procedures, operating limits, or operational policy.

CHAPTER 2

INSPECTION DESCRIPTIONS

NOTE
PRIOR TO PLACING AN AIRCRAFT ON THIS PROGRAM, A P.M.I., DETAIL'S #1, #2, AND #3, AND ANY OTHER SPECIAL INSPECTIONS THAT MAY BE REQUIRED, OR AN INSPECTION FOR INITIAL CERTIFICATION, SHOULD BE ACCOMPLISHED.

2-1. P.M.I.
P.M.I. is found in Chapter 3 and is accomplished each 10 flight hours or every 14 calendar days, whichever occurs first.

2-2. Detail #1
Is found in Chapter 4 and is accomplished each 50 flight hours.

2-3. Detail #2
Is found in Chapter 5 and is accomplished each 100 flight hours.

2-4. Detail #3
Is found in Chapter 6 and is accomplished each 150 flight hours.

2-5. SPECIAL INSPECTIONS
In addition to the P.M.I. and the Detail #1, #2, and #3 Inspections, required Special Inspections found in Chapter 7 of the IPG are performed on a calendar basis, a combination of hourly/calendar basis, or following the installation of a major component such as a gearbox installation.

2-6. CONDITIONAL INSPECTIONS (AIRFRAME)
Conditional Inspections (Airframe) found in Chapter 8 of the IPG are inspections required as a result of unusual events such as hard landings or sudden stoppage of rotor.

2-7. CONDITIONAL INSPECTIONS (ENGINE)
Conditional Inspections (Engine) found in Chapter 9 of the IPG are inspections required as a result of an unusual event such as engine oil filter bypass or engine overtemperature.

NOTE
THERE ARE NO PRESCRIBED INTERVALS FOR CONDITIONAL INSPECTIONS.

INSPECTION SCHEDULE CHART

INSPECTION SCHEDULES

	Flight Hours					
/	50	100	150	200	250	300
Inspection						
P.M.I.	***Every 10 Flight Hours or 14 Days, whichever occurs first.***					
DETAIL #1	***X***	***X***	***X***	***X***	***X***	***X***
DETAIL #2		***X***		***X***		***X***
DETAIL #3			***X***			***X***

NOTE

1. IF AN AIRCRAFT WILL BE OUT OF SERVICE MORE THAN 30 DAYS, A P.M.I. SHALL BE PERFORMED PRIOR TO RETURNING THE AIRCRAFT TO SERVICE.

2. IF AN AIRCRAFT IS OUT OF SERVICE MORE THAN 14 DAYS, A RUN-UP IN ACCORDANCE WITH APPROPRIATE MANUALS IS STRONGLY RECOMMENDED.

3. THE COMPLETE AIRCRAFT MUST BE INSPECTED WITHIN 12 CALENDAR MONTHS, WHICH MEANS ALL THREE DETAILS MUST HAVE BEEN PERFORMED. IF AN AIRCRAFT FLIES LESS THAN 150 HOURS IN 12 CALENDAR MONTHS, THE REMAINDER OF THE DETAIL INSPECTIONS MUST BE PERFORMED. IF AN AIRCRAFT FLIES GREATER THAN 150 HOURS, THE INSPECTION CYCLE IS CONTINUED. THE "ANNUAL CYCLE" STARTS AGAIN WHEN ALL INSPECTIONS ARE COMPLETED. SEE INSPECTION SCHEDULE CHART ABOVE.

4. ENGINE INSPECTIONS AND RETIREMENT LIFE LIMITED INTERVALS - REFER TO MILITARY MAINTENANCE DOCUMENT OR THE ALLIED SIGNAL LYCOMING MAINTENANCE DOCUMENT.

5. COMPONENT OVERHAUL AND RETIREMENT LIFE LIMITED INTERVALS - REFER TO APPLICABLE MILITARY MAINTENANCE DOCUMENT OR MANUFACTURERS MAINTENANCE DOCUMENT.

2-8. SPECIAL INSPECTIONS LISTING (CHAPTER 7)

In addition to the P.M.I. and the Detail #1, #2, and #3 Inspections, Special Inspections are performed on a calendar basis, a combination of hourly/calendar basis, or following the installation of a major component such as a gearbox installation.

2-9. CONDITIONAL INSPECTIONS (AIRFRAME) (CHAPTER 8)

Inspections required as a result of unusual events such as hard landings or sudden stoppage of rotor.

2-10. CONDITIONAL INSPECTIONS (ENGINE) (CHAPTER 9)

A Conditional Inspection (Engine) is performed as a result of an unusual event such as engine oil filter bypass or engine overtemperature.

NOTE
THERE ARE NO PRESCRIBED INTERVALS FOR THESE INSPECTIONS.

CHAPTER 3

PREVENTIVE MAINTENANCE INSPECTION (P.M.I.)

SECTION I. GENERAL (SEE INSPECTION SCHEDULE CHART, PAGE 8)

1. Inspect aircraft forms and records for recorded discrepancies.

2. Ensure all applicable Airworthiness Directives (Safety of Flight, Alert Service Bulletin's, ASAM's, TM's, TB, MIM's , etc) are complied with.

3. Review records for SPECIAL or CALENDAR inspection items which are due.

4. Review component listing for overhaul or retirement items which need to be replaced.

5. Review service instructions for maintenance and inspection requirements for installed kits, MWOs and STCs as appropriate.

6. Perform a general visual inspection of aircraft for condition and cleanliness.

7. Clean the aircraft, particularly the areas being inspected.

SECTION II. LUBRICATION REQUIREMENTS

8. Refer to applicable UH-1 lubrication chart.

SECTION III. FORWARD FUSELAGE AREA

9. Inspect nose structure and following components for condition and security.
- **a.** Windshields, nose structure and external equipment.
- **b.** Battery compartment structure and components and wiring.
- **c.** Pitot and static ports.

10. Inspect crew and cargo doors and windows for damage and proper operation.

11. Check cabin exterior for damage. Inspect stencils, decals, and or placards for legibility.

12. Inspect flight, engine controls and manual cargo release assembly if installed.

13. Inspect Instrument panel, consoles and installed equipment.
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14. Inspect crew and passenger seats, and seat belts and shoulder harnesses for damage and security.

15. Inspect navigation, search and landing lights for condition and check for proper operation.

SECTION IV. UPPER PYLON

16. Inspect the upper fuselage structure, antennas, cowling and air intake screens for debris, damage and security.

17. Inspect upper and lower main rotor blade surfaces for damage, evidence of corrosion and cracks. Particular attention shall be given to the doubler area and all bond lines. Hairline cracks in the paint finish should be inspected closely for possible voids.

18. Inspect leading edge scarf joints for filler erosion, if splice cover is not installed.

19. Check main rotor for proper lubricant level, inspect for evidence of leakage, and obvious contamination. Not applicable if aircraft is modified with grease hub. |

20. Inspect main rotor grips for evidence of corrosion and visible damage. Inspect shield area for trapped contamination.

21. Inspect drag brace attachment lugs for damage, cracks and security.

22. Inspect main rotor hub static stops for obvious deformation and/or cracks.

23. Inspect main rotor yoke for general condition and security of pillow block assembly attachment, paying particular attention to the area surrounding the pillow block bushing bores. Visually inspect for sealant integrity around yoke to pillow block mating surface and around head and nut of yoke to pillow block attachment bolt.

24. Inspect pillow block bushing flange and outside area of bushing holes for evidence of cracks/corrosion.

25. Inspect main rotor pitch change links, damper tubes and connecting links for scratches, nicks, dents, security of attachment and obviously worn bearings.

26. Inspect mast assembly for obvious damage, particularly in the area of main rotor hub static stop contact area.

27. Check security of mast nut and mast.

28. Inspect mast seal for evidence of leakage.

29. Check stabilizer bar dampers for proper fluid level and security of attachment.

30. Inspect scissors and sleeve assembly for worn bearings and foreign object damage.

31. Inspect swashplate assembly for worn bearings and foreign object damage.

32. Inspect control lugs (3 ea.) on swashplate inner ring and (2 ea.) on swashplate outer ring for cracks.

33. Inspect collective levers for security of attachment and foreign object damage.

34. Inspect the transmission and pylon support structure area for damage, cracks, and leaks.

35. Inspect main drive shaft and ensure freewheel unit functions properly.

36. Inspect hydraulic reservoir for proper level, and inspect for abnormal oil discoloration.

SECTION V. LOWER PYLON

37. Inspect transmission oil filter for bypass indication.

38. Inspect transmission for proper oil level, and inspect for abnormal oil discoloration.

39. Inspect transmission mounts and supports for cracks and security.

40. Inspect the transmission tail rotor output quill for grease leakage and for over temperature indications.

41. Inspect hydraulic system components for damage and leaks, and the filter for bypass indication.

42. Inspect hydraulic servo cylinder mount nuts for slippage marks.

43. Inspect hell hole area for leaks, working fasteners, and general security of components. Pay particular attention to the servo/linkage area and the lift beam and support case area.

44. If external loads are anticipated - Clean and inspect hook assembly for wear and damage.

45. Inspect landing gear for damage and security. Inspect cross tubes for visual indications of excess spread and saddle areas for slippage, cracks and fretting.

SECTION VI. ENGINE

NOTE
PERFORM A COMPRESSOR WASH WHEN INSPECTION REVEALS AN ACCUMULATION OF DIRT, WHEN ENGINE PERFORMANCE DECREASES EXCESSIVELY, AND WHENEVER EXHAUST GAS TEMPERATURE INCREASES STEADILY DURING NORMAL OPERATION.

46. Inspect engine cowlings and fairings for security, damage, and loose or missing fasteners.

47. Inspect Foreign Object Damage (FOD) screen and particle separator as follows:

47.1. Inspect FOD screen for damage which would permit foreign object entry. If screen is damaged inspect compressor for damage. Inspect as outlined in **9-1 FOREIGN OBJECT DAMAGE IS NOTED** inspection.

47.2. Inspect FOD screen exterior for presence of foreign material. If material such as rags, paper, grass or other vegetation is present enough to disturb airflow to the inlet perform an inlet blockage inspection in accordance with **9-8 Engine Inlet Blockage Inspection** of the IPG.

48. If the screen or separator is not installed, inspect the inlet as follows:

48.1. Inspect inlet for accumulation of dirt conforming to contour of inlet housing. Buildup of dirt may conform to the shape of the inlet housing and be difficult to detect. ALL foreign matter must be completely removed. Any evidence of inlet blockage shall result in the **9-8 Engine Inlet Blockage Inspection** of the IPG being performed.

48.2. Visually inspect compressor blades, inlet housing air passages and variable guide vanes as visible from inlet housing. Inspection shall be for; foreign object damage, partial or complete inlet blockage, and salt, dirt oil and varnish deposits. If required, perform a compressor wash in accordance with the appropriate maintenance manual. Foreign object damage shall be repaired if it exceeds the limits in the appropriate maintenance manual.

49. Inspect droop cam assembly for signs of binding and cleanliness and linear actuator for proper operation (except 540 M/R).

50. Inspect engine mounts and shims for damage and security.

51. Check that oil tank is filled to the proper level. If oil filter has a by-pass button, inspect for extension of that button. If button is extended, remove and clean filter elements. Reset button and after next flight check for extension of the bypass button. If button is found extended, perform an engine oil contamination inspection in accordance with **9-9 Engine Oil Contamination Inspection** of the IPG.

52. Inspect power turbine blades through exhaust diffuser and inspect exhaust diffuser for, cracks and burnt areas.

SECTION VII. TAIL BOOM

53. Inspect the tail boom attachment bolt areas for cracks and security. Pay particular attention to the upper left attachment area on both the fuselage and tail boom. (Check attachment hardware slippage marks).

54. Inspect oil cooler blower assembly for cleanliness, blockage and rough bearings.

55. Inspect tail rotor servo for security and leakage.

56. Inspect elevators for damage, cracks and looseness.

57. Inspect the external portions of vertical splice area, just forward of intermediate gearbox, for cracks and corrosion.

58. Inspect the external portions of the vertical fin structure for signs of fretting, corrosion and cracks.

SECTION VIII. TAIL ROTOR/DRIVE SYSTEM

59. Clean and inspect tail rotor control chain and sprocket. Inspect tail rotor cross head for axial and radial movement.

60. Inspect intermediate and tail rotor gearbox attachment areas for signs of fretting and movement.

61. Check intermediate and tail rotor gearboxes for proper oil level and service if required. Inspect for abnormal oil discoloration.

62. Visually inspect tail rotor drive flex couplings and hanger assemblies for overheat indications, grease leakage, security and foreign objects.

63. Visually inspect tail rotor blades for damage, cracks, and skin delamination, with special attention to the area on both sides between the doublers and six inches outboard of doublers.

CHAPTER 4

DETAIL #1 - 50 FLIGHT HOURS

SECTION I. GENERAL

1. Perform a P.M.I. Refer to **INSPECTION SCHEDULE CHART, PAGE 8.**

SECTION II. MAIN ROTOR

NOTE

THE UH-1 INSPECTION PLANNING GUIDE (IPG) WAS DEVELOPED TO PROVIDE GUIDANCE IN PLANNING INSPECTION PROGRAMS FOR TEN MODELS OF THE UH-1 SERIES HELICOPTER. THE PRIMARY DIFFERENCE| BETWEEN THE UH-1 SERIES OF HELICOPTERS ARE THOSE MODELS THAT INCORPORATE THE "540" ROTOR SYSTEM. COMPONENTS OR PARTS LISTED BY PART NUMBER IN THE UH-1 IPG HAVE SPECIFIC INSPECTION CRITERIA THAT APPLY TO THAT PARTICULAR PART NUMBER. IN ADDITION, THE LISTING OF A COMPONENT OR PART, BY PART NUMBER IN THE IPG, INDICATES THAT DUE TO THE DESIGN OF THAT PARTICULAR COMPONENT OR PART, SPECIAL ATTENTION IS REQUIRED OF THE REPAIRMAN OR INSPECTOR IN ORDER TO VERIFY CONTINUED AIRWORTHINESS.

OTHER COMPONENTS OR PARTS, NOT LISTED BY PART NUMBER IN THE UH-1 IPG, DO NOT REQUIRE SPECIAL ATTENTION OR INSPECTION OTHER THAN WHAT IS CALLED FOR IN THE UH-1 IPG OR REFERENCED MANUALS.

2. Inspect stabilizer bar assembly for visual damage in the form of scratches, nicks, dents, cracks, corrosion, and worn bearings.

2.1. Inspect stabilizer tubes, 204-011-328-001, -011, for cracks, paying particular attention to an area covering 360 degrees and 1-1/2 inches outboard from vertical bolt.

3. Inspect main rotor drag braces for evidence of corrosion and security of attachment. Make a close visual examination of inboard end (grip end) of drag brace assembly for corrosion and/or cracks.

4. Check torque on main rotor pillow block bolt nuts 64 to 79 foot-pounds. Do not loosen nut. Apply sealant, as required, to area in accordance with applicable manual.

SECTION III. PYLON

5. Inspect swashplate gimbal ring joint.

NOTE

DO NOT ATTEMPT TO TURN BOLTS. BOLT MOVEMENT WILL FAIL LOCTITE BOND AND CAUSE BOLT WEAR.

5.1. Grasp swashplate rotating ring (204-011-403) and attempt to move it in a horizontal plane on an axis in line with gimbal ring attach points to support assembly (204-011-404). Maximum allowable axial looseness across the gimbal ring bearings and attaching bolts is 0.010 inch.

5.2. Repeat subparagraph **5.1.**, on axis 90 degrees to the check in subparagraph **5.1.**, attempt to move it in a vertical plane to detect looseness in line with gimbal ring attach points in inner ring (204-011-402). Maximum allowable axial looseness across the gimbal ring bearings and attaching bolts is 0.010 inch.

5.3. Inspect swashplate trunnion bearings for wear and security. For 204-011-451 trunnion: Disconnect scissors drive links from trunnion and check swashplate bearing for roughness, binding and vertical play. Rotate and lubricate trunnion before reconnecting.

SECTION IV. TRANSMISSION

6. Inspect web above input quill for cracks. Any indication of a crack is cause for removal of case.

7. Inspect internal filter and chip detector. If metallic chips or particles are found, investigate to determine cause.

8. Inspect oil lines and hoses for pin holes or cracks due to chafing.

9. Inspect oil line quick disconnect for leaks, wear and proper pin engagement.

10. Inspect wire bundles and controls for chafing.

11. Check oil sight gage for discoloration and contamination.

12. Inspect transmission tail rotor drive quill coupling and main drive shaft seals and surrounding area for evidence of grease leakage, visual overheat indicator for discoloration and overheat condition. A change in color of indicator indicates a possible overheat and/or component degradation. Cause of discoloration shall be determined and corrected prior to flight.

13. Remove and visually inspect generator drive quill magnetic chip plug for contaminants.

14. Visually inspect generator condition, (Spline wear and brush inspection is performed during the Special Inspection, **7-9. EACH 600 HOURS OR 12 MONTHS OF COMPONENT OPERATION, WHICHEVER OCCURS FIRST:** of the IPG).

15. Perform an operational check of transmission chip detector system.

SECTION V. FUSELAGE (PYLON AREA)

16. Inspect fuselage pylon structure for cracks, distortion, missing rivets. Inspect transmission support for cracks, distortion, defective/missing rivets. Inspect lift beam assembly for cracks.

17. Inspect friction dampers. Move pylon fore and aft, using mast as lever. Check friction dampers for freedom of movement and smooth operation. Repair or replace dampers found binding.

18. Inspect isolation mounts, mount boots, mounting brackets and structure for

cracked or broken parts.

19. Inspect fifth mount attachment for damage and security. Inspect mount and support beam for cracks.

20. Inspect lift link, lift beam fitting and lower sump case attachment for security and cracks.

NOTE
REFER TO PAGE 5, **NOTE**, FOR REPETITIVE LIFTS.

SECTION VI. HYDRAULIC SYSTEM

21. Inspect all lines, fittings and hoses for leakage and security, kinks, general condition, and pitting. Pay particular attention to the condition of the hoses.

22. Inspect hydraulic actuators for leakage and security. Clean exposed area of cylinder piston with hydraulic fluid and lint free cloth.

23. Inspect actuator attachment brackets for security, cracks, and corrosion in immediate area.

24. Inspect pump for damage and leakage.

SECTION VII. TAIL ROTOR/DRIVE SYSTEM

25. Perform operational check of intermediate and tail rotor gearbox chip detector system.

26. Check torque of intermediate gearbox attachment bolts; and check torque of tail rotor gearbox retaining nuts. Do not loosen bolts/nuts.

27. Inspect tail rotor pitch change mechanism as follows:

27.1. Mount dial indicator on tail rotor gearbox output shaft with dial indicator lever on outboard edge of crosshead adjacent to pitch link bolt.

27.2. Apply and hold full left pedal. Move crosshead in a radial (rocking motion) and note amount of maximum radial movement. Maximum movement should not exceed 0.020 inch.

27.3. Apply and hold full right pedal. Perform check as stated in subparagraph **27.2,** above. Maximum movement should not exceed 0.035 inch.

27.4. If tolerances stated in subparagraphs **27.2** and **27.3** are exceeded, inspect inner splines of tail rotor crosshead slider and mating splines on tail rotor gearbox output shaft.

27.5. Place control pedals in neutral position. Move crosshead in axial direction (in and out), being careful not to cause radial movement. Maximum movement should not exceed 0.018 inch.

27.6. If tolerance in subparagraph **27.5** above, is exceeded, inspect crosshead

bearings, control quill bearings and acme thread of control tube and mating threads in control nut.

CHAPTER 5

DETAIL #2 - 100 FLIGHT HOURS

SECTION I. GENERAL

1. Perform a P.M.I. See **INSPECTION SCHEDULE CHART, PAGE 8.**

SECTION II. FORWARD FUSELAGE AREA

2. Inspect landing gear for wear of skids and shoes, security of mountings for skids and crosstubes. Inspect skid tubes and crosstubes for cracks, distortion, or yielding.

3. Inspect fuselage exterior structure for cracks, dents, corrosion, defective and missing rivets or screws.

SECTION III. PILOT AND PASSENGER COMPARTMENTS

4. Check all safety equipment for inspection due dates and operation.

5. Inspect all heating and cooling ducts and controls for cracks, security, and operation.

6. Inspect cabin structure for cracks, loose rivets and other damage.

7. Functionally check crew door mechanism and jettison mechanism, and inspect for wear, corrosion and distortion. Inspect hinges for cracks.

8. Inspect seat adjustment mechanism and tracks for wear, positive locking and lubrication.

9. Functionally check cargo door window jettison mechanism.

10. Inspect cargo door latching mechanism and door rollers for wear and damage.

11. Drain pitot static system, if necessary.

SECTION IV. LOWER PYLON, ENGINE and AFT/CENTRAL AREA

12. Inspect lift beam and surrounding area for cracks and working rivets.

NOTE
SEE PAGE 5, **NOTE**, FOR REPETITIVE LIFTS.

13. Inspect droop compensator shear pin.

14. Inspect fuel cell X-connector, surrounding structure, and fuel lines for condition.

15. Check engine idle solenoid for operation, freedom of plunger, inspect for corrosion and security. Check for proper clearance.

16. Inspect bleed air discharge line for chafing and blockage.

17. Inspect voltage regulator for damage and security of mounting and terminals.

18. Inspect relays and main bus area for security of mounting and connections.

SECTION V. FLIGHT CONTROLS

19. Inspect all control rods for clearance, security and general condition.

20. Inspect tail rotor and synchronized elevator control tubes for wear.

21. Check all controls for freedom of motion.

22. Check collective stick for proper minimum friction. Check shoes and liners for excessive wear.

23. Check collective sleeve mast friction collet for proper minimum friction (540 M/R).

24. Check swashplate uniball for proper minimum tilt friction (540 M/R).

SECTION VI. TAIL ROTOR

25. Dynamically track and balance.

CHAPTER 6

DETAIL #3 - 150 FLIGHT HOURS

SECTION I. GENERAL

1. Perform a P.M.I. **SEE INSPECTION SCHEDULE CHART, PAGE 8.**

SECTION II. MAIN ROTOR

2. Check torque on the 8 bolts attaching stabilizer bar supports to trunnion.

SECTION III. TAIL ROTOR

3. Inspect tail rotor hub assembly for worn bearings.

4. Clean tail rotor blades to maintain improved visibility.

5. Clean and inspect tail rotor control chain and aft cables for wear, corrosion, cracks, broken strands and proper tension.

SECTION IV. TAIL ROTOR DRIVE SECTION

6. Inspect intermediate and tail rotor gearbox sealants for condition and re-seal as needed.

7. Inspect both gearbox vents and filler cap packing for condition.

8. Check condition of clamps for tail rotor shaft coupling to gearbox couplings. Inspect clamps for evidence of cracks in or near the bolt hole lugs.

9. Externally examine shaft hanger bearings and shaft couplings for evidence of grease leakage, overtemperature condition, and excessive play and/or movement.

SECTION V. TRANSMISSION

10. Remove and inspect the external oil filter (paper filter) for metal chips or particles, investigate to determine cause if metal chips are found, and replace with new filter element.

SECTION VI. TAIL BOOM

11. Inspect internal and external structure of tail boom for cracks, distortion, corrosion and security.

12. Visually inspect all tail boom attachment fittings for cracks and security as follows:

NOTE
ANY CRACK, CORROSION, OR BOND SEPARATION IS CAUSE FOR IMMEDIATE GROUNDING OF AN AIRCRAFT UNTIL THE PROBLEM HAS BEEN ELIMINATED.

12.1. Using a bright light and mirror, inspect visible portions of attachment fittings for cracks. Special attention must be given to upper left attachment fitting, particularly in area of most forward rivets. Inspect longeron, left and right sides, from attachment fittings to next aft bulkhead for any evidence of corrosion.

12.2. Remove access panels on lower skin of tail boom to expose lower attachment fittings. Using a bright light and mirror, inspect visible portions of attachment fittings for any indications of cracking, particularly in area of most forward rivets. Inspect longeron left and right sides, from attachment fittings to the next aft bulkhead, for any evidence of corrosion.

12.3. Remove access plugs at bore for barrel nuts and visually inspect tail boom attachment fittings. Check torque of tail boom attachment bolts. **DO NOT BACK OFF NUTS.** Be sure that no less than one, nor more than three threads protrude through the barrel nut.

12.4. Open access door on right side of fuselage and inspect the four tail boom attachment fittings on fuselage aft bulkhead for cracks giving special attention to the area around tail boom attachment bolts and most aft fasteners. Particular attention must be given to inspection of left hand fittings.

13. Inspect vertical fin rib along rivet row at fin station 10.08 for cracks, (tail rotor 90 degree gearbox casting area accessed through topmost lightning holes).

14. Inspect vertical skin splice area at boom station 194.3, just forward of intermediate gearbox, for cracks and corrosion.

15. Inspect tail rotor gearbox support casting for cracks and corrosion.

16. Inspect tail rotor and synchronized elevator push-pull tubes for chafing, cracks and corrosion.

17. Inspect tail rotor control cables and pulleys for wear, damage, chafing, corrosion or fraying.

18. Inspect elevator and horn assembly for security, condition, and corrosion.

SECTION VII. ENGINE

NOTE
FOR ENGINES WITH PARTICLE SEPARATOR AND FOD SCREENS INSTALLED, PERFORM PARAGRAPH 18., BELOW. IF THERE IS NO PARTICLE SEPARATOR OR SCREEN, PERFORM PARAGRAPH 19., BELOW.

19. Remove particle separator. Clean and inspect seals and gaskets for tears, separations of material, cracks in the separator and other damage.

20. Visually inspect compressor blades and inlet housing air passages and variable guide vanes as required in the IPG, **Chapter 3**, **P.M.I.**, **Section VI.**, **ENGINE**, Paragraph **48.**

21. Inspect starter and mounts for security of mounting, burned or arced connections, and cooling air ducts for obstructions, kinking and security. (Spline wear and brush inspection is performed during Special Inspection,

22. Inspect engine mounts for security, and tubes for scratches, dents, cracks, and worn bearings.

23. Inspect engine bleed air actuator strainer for condition and cleanliness. Clean if required. Inspect bleed band assembly for bends, cracks and security.

24. Inspect air diffuser for security and damage:

24.1. Inspect brazed joints including vanes brazements for cracks. Inspect brazed joints of air outlet pan (P3) fitting for cracks. Inspect engine mounts for security and cracks. Refer to the manufacturer's maintenance manual for repair procedures.

25. Functionally check anti-ice valve.

26. Inspect and clean fuel control inlet strainer.

27. Inspect and clean/replace fuel control servo strainer and replace paper filter if installed.

28. Replace main fuel filter element.

29. Inspect and functionally test chip plug.

30. Inspect and clean engine oil filter assembly.

31. Inspect quick disconnects and breakaway fittings for security and wear.

32. Inspect engine decks for damage and de-bonding.

33. Inspect deck drain holes and channels for obstruction.

34. Inspect N1 controls for wear and binding. Verify fuel control lever contacts stops with both pilot and co-pilot twist grips. Check idle detent operation and condition.

35. Inspect N2 controls for wear and binding. Verify pin condition. Functionally test linear actuator for proper operation.

36. Functionally test heater actuator valve.

37. Inspect bleed air lines and fittings for wear and blockage.

38. Inspect engine wiring harness for chafing, loose or corroded connections.

39. Inspect ignition exciter and leads for damage, chafing, and security.

40. Inspect oil lines and hoses for damage, chafing, leakage, and security.

41. Inspect fuel lines and hoses for leakage, chafing and security.

42. Inspect combustion chamber housing, support cone, fire shield, and exhaust diffuser for cracks, hot spots, burned areas, and buckling.

43. Through the aft end of the combustion housing, inspect for missing and cracked ⓿ power turbine blades or cracks in the exhaust diffuser.

44. Inspect the remainder of engine for condition. Inspection shall include but not be limited to items such as; corrosion of magnesium parts, fasteners not torqued properly, oil or fuel leaks found on accessories or their hoses. All discrepancies shall be inspected to the limits found in the appropriate maintenance manual.

CHAPTER 7

SPECIAL INSPECTIONS

In addition to the P.M.I. and the Detail #1, #2, and #3 Inspections, Special Inspections are performed on a calendar basis, a combination of hourly/calendar basis, or following the installation of major components such as the intermediate gearbox.

7-1. AFTER EACH INSTALLATION

1. Dynamic balance and track tail rotor hub and blade assembly.

2. Perform an in flight track and balance of the main rotor assembly, if main rotor hub maintenance has been performed or the main rotor blades have been replaced.

7-2. AFTER FIRST FLIGHT, AFTER EACH INSTALLATION

1. Main drive shaft Bell Helicopter Textron (BHT Shaft) - Inspect drive shaft for excessive grease leakage, security and condition.

2. Tail Boom - Check torque of attachment bolts. Do not loosen bolts.

3. Scissors and sleeve collective mast friction collet (540 M/R) - Check friction as outlined in applicable manual.

7-3. BETWEEN 5 AND 10 HOURS, AFTER EACH INSTALLATION

1. Main rotor hub - Check torque of hub retention nut. Do not loosen nut.

2. Tail rotor hub - Check torque of tail rotor retaining nut. Do not loosen nut.

3. Tail rotor control chain and/or sprocket. Check control cable tension and adjust as required.

4. Intermediate gearbox - Check torque of gearbox attachment bolts. Do not loosen bolts.

5. Tail rotor gearbox - Check torque of gearbox retaining nuts. Do not loosen nuts.

7-4. EACH 25 HOURS OF OPERATION

1. 540 M/R main rotor hub - Inspect feathering bearings for squeaking, binding and ratcheting while feathering grips to each limit of travel, with pitch change links disconnected (one grip at a time). Remove sand defector for a more detailed visual inspection of feathering bearings for deteriorated or loose Teflon lining. Inspect Teflon trunnion bearings for squeaking, binding and ratcheting while flapping hub to each limit of travel.

WARNING:
DO NOT FLAP THE ROTOR HARD AGAINST THE MAST.

7-5. EACH 100 HOURS OR 120 DAYS, WHICHEVER OCCURS FIRST

1. Voltage regulator - Check voltage regulator setting.

7-6. 100 HOURS AFTER EACH INSTALLATION

1. Tail boom - Check torque of attachment bolts. Do not loosen bolts.

7-7. 300 HOURS OR 6 MONTHS OF BATTERY OPERATION

1. Remove NICAD battery, check capacity and perform re-conditioning cycle, if necessary, in accordance with the battery manufacturer's instructions.

7-8. EACH 12 MONTHS MAGNETIC (MAG) COMPASS AND RADIO MAGNETIC INDICATOR (RMI) CALIBRATION

1. Verify calibration of MAG compass and the RMI.

2. Correct as necessary and update calibration placards.

7-9. EACH 600 HOURS OR 12 MONTHS OF COMPONENT OPERATION, WHICHEVER OCCURS FIRST:

1. Battery overtemperature - Perform operational check of battery temperature system (if installed). (Refer to the manufacturers instructions).

2. Emergency Locator Transmitter (ELT) - Functionally check ELT (if installed) and replace batteries if expired.

3. Oil Cooler – Remove oil cooler screens and clean fan blades and assembly. Check bearings for roughness and binding. Inspect cooler for obstructions and leaks.

4. Main Drive Shaft (KAFLEX) - Remove drive shaft and inspect internal fail-safe diameters for evidence of contact. If contact is noticed, drive shaft must be replaced. Visually inspect drive shaft for obvious mechanical damage, flexplate looseness, corrosion, and/or fretting at flex plate bolted joints.

4.1 Main Drive Shaft (BHT) - Remove drive shaft and clean, inspect, lubricate and reassemble in accordance with applicable TM.

5. Starter/Main Generator **-** Remove starter generator and; inspect accessory gearbox generator drive splines for wear and lubricate, inspect the starter generator splines for wear and lubricate, and inspect the starter generator brushes for wear.

6. Lead Acid Battery - Check for proper fluid level and condition in accordance with battery instruction manual.

7. Drain transmission and transmission oil cooler. Inspect and clean transmission oil pump screen. Inspect and functionally check chip plug. Replace external filter. Service transmission with oil.

8. Drain engine oil and engine oil cooler. Inspect and functionally check chip plug. Replace external filter. Service engine with oil.

9. Drain intermediate gearbox oil. Inspect and functionally check chip plug. Service gearbox with oil.

10. Drain tailrotor gearbox oil. Inspect and functionally check chip plug. Service gearbox with oil.

11. Replace hydraulic filter element(s).

12. Remove and inspect all tail rotor flex couplings for cracks and condition of internal splines and couplings. ⑦

7-10. EACH 24 MONTHS OF COMPONENT OPERATION

1. Perform functional check of the Pitot Static System.

2. Main rotor yoke - Remove, dissemble and inspect main rotor hub as follows: Remove bearing races, spacers, and radius rings from yoke spindles. Inspect yoke spindle for cracks and corrosion pits, paying particular attention to the inboard radius of the spindle. Inspect yoke center section for cracks, paying particular attention to areas surrounding the pillow block bushing bores. Any crack is cause for rejection of the yoke. Clean up any corrosion. Replace tension torsion straps if calendar life is expired. Reassemble hub using new pillow block attaching hardware.

3. Main rotor mast - Inspect inside and outside diameters of mast for corrosion and mechanical damage.

4. Airframe - The operator will perform a thorough and searching airframe inspection to find and preclude airframe deterioration. This inspection will provide the operator with a structural evaluation to determine if the airframe has aged to a point that major refurbishment is necessary. Using the applicable model TM for damage and repair limits, accomplish the following:

4.1. Inspect forward and aft upper and lower cargo door tracks for wear and cracking.

4.2. Inspect cargo door rollers and guides for wear.

4.3. Inspect cabin door post(s) vertical angles for cracks.

4.4. Inspect following honeycomb panels for delamination, voids, surface damage (dents, punctures) and corrosion:

- **a.** Forward fuselage, main beams under cabin floor.
- **b.** L/H and R/H pylon island panels.
- **c.** Aft cabin bulkhead panels.
- **d.** Transmission and engine work/service deck panels.
- **e.** Roof deck panels.
- **f.** L/H and R/H aft outboard fuel cell bulkheads.
- **g.** L/H and R/H lower outboard fuel cell panels.
- **h.** L/H and R/H aft main beam panels (viewed through fuselage compartment doors).
- **i.** Forward main fuel cell panel and aft center fuselage panel (viewed in hell hole area).

5. Inspect following areas for cracks, corrosion, and loose or working rivets.

a. Pylon lift bean webs and lift link fitting.
b. Pylon structure.
c. Aft fuselage lower skin.
d. Aft fuselage tail boom attachment fittings and longerons.
e. Tail boom and vertical fin interior and exterior skin, fuselage attachment fittings and longerons.
f. Intermediate and tail rotor gearbox castings.

6. Inspect electrical wire bundles in main fuselage and tail boom for oil and hydraulic fluid soaked insulation, discolored wire indicating overheating, cracked or broken insulation.

CHAPTER 8

CONDITIONAL INSPECTIONS (AIRFRAME)

Conditional Inspections found in Chapter 8 are inspections required as a result of unusual events such as a hard landing or sudden stoppage of rotor.

8-1. HARD LANDING - Hard landing is defined as any accident or incident in which ground impact of the helicopter causes severe pitching of main rotor, allowing hard contact of hub with mast, or results in yielding or cracking the mounting lugs of the transmission support case or noticeable yielding or cracking of fuselage pylon support structure or landing gear. This definition is confined only to those accidents or incidents not involving sudden stoppage of main rotor or tail rotor.

NOTE

COMPONENTS REMOVED FROM A HELICOPTER FOLLOWING A HARD LANDING SHALL BE EVALUATED AS AN INTERRELATED GROUP. REMOVAL RECORDS ACCOMPANYING EACH COMPONENT SHALL CROSS REFERENCE PART AND SERIAL NUMBERS OF OTHER DRIVE SYSTEM COMPONENTS REMOVED FOR EVALUATION.

If a hard landing is suspected, the following Paragraphs 1 through 6 below, shall be accomplished.

1. Inspect main and tail rotor blades for evidence of strike damage. If such evidence is found on either rotor, perform **8-2. SUDDEN STOPPAGE - POWER ON OR OFF INSPECTION**, of the IPG.

2. Visually inspect underside of fuselage and tail boom for evidence of ground contact.

3. Perform landing gear deflection check.

3.1. If crosstubes have yielded, remove landing gear and inspect support and structure to which they are attached for signs of yielding or other damage.

3.2. If supports and attaching structure are not damaged, replace damaged landing gear components.

4. Inspect mast for deformation due to rotor hub contact.

4.1. Inspect area around lower supports of pylon dampers for loose rivets or other damage.

5. If no damage other than yielded landing gear crosstubes has been found at this point it can reasonably be determined that a true hard landing did not occur. Complete a P.M.I. and return helicopter to flight status provided no further evidence of damage is found.

6. If damage is more extensive than landing gear crosstube yielding, **a hard landing has occurred, the following Paragraphs 7 through 21 below, shall be accomplished:**

7. Remove and perform an overhaul evaluation inspection of the following components.

a. Mast assembly.

NOTE
IF THERE IS ANY DEFORMATION IN AREA CONTACTED BY MAIN ROTOR HUB, OR ANY OTHER OBVIOUS DAMAGE, THE MAST IS NOT AIRWORTHY AND IS UNSERVICEABLE.

b. Transmission.
c. Main input drive shaft. (Grease lubricated type.)

8. Perform a thorough visual inspection of the following components, which may be kept in service if no discrepancy or obvious damage is found. Replace any damaged component.

a. Main rotor blades.
b. Main rotor hub.
c. Tail rotor blades.
d. Tail rotor hub.
e. Anti-torque controls.
f. Intermediate gearbox.
g. Tail rotor gearbox.
h. Tail rotor drive shafts.
i. Tail rotor drive shaft hangers.
j. Swashplate and support assembly.
k. Scissors and sleeve assembly.
l. Stabilizer bar assembly.
m. Main rotor controls.
n. Visually inspect KAFLEX drive shaft for the following conditions:

(1) Bolt contact with adjacent plate(s).
(2) Plate contact with end fitting(s).
(3) Interconnect contact with end fitting(s).
(4) Contact of fail-safe surface(s).

NOTE
IF ANY OF THE CONDITIONS DESCRIBED IN SUBPARAGRAPHS n., (1) THROUGH (4) ABOVE ARE FOUND, REPLACE KAFLEX SHAFT.

9. Check all cowling and doors for proper fit and alignment. Remove cowling and inspect all attachment fittings.

NOTE
IF SIGNIFICANT DAMAGE HAS BEEN FOUND IN ANY AREA OF THE AIRFRAME, INSPECTION SHALL BE EXPANDED BEYOND THE ZONE OF DAMAGE.

10. Using 10-power magnifying glass make a complete inspection of pylon support structure for loose or sheared rivets, cracked brackets, buckled or cracked support angles or webs. Pay particular attention to pylon mounts attaching points and damper support attaching points.

11. Remove lift link and make a complete inspection of lift link, lift link attachment fittings and lift beam for cracks and other evidence of damage. If lift link is damaged it is not airworthy and is unserviceable.

12. Remove both pylon dampers, disassemble and check for internal yielding. Reassemble and reinstall if no evidence of damage. If pylon dampers have yielded they are not airworthy and are unserviceable.

13. Install serviceable mast, transmission assembly and main drive shaft assembly. Re-install removed pylon control components.

14. Check all engine mount fittings and bolts for damage and looseness.

15. Inspect engine firewalls for evidence of warping, crushing, or other damage.

16. Make a complete inspection of area where tail boom is attached to forward fuselage section. This includes both sets of attachment fittings and the longerons, beam caps, skins, webs, bulkhead flanges and other structural members. Check torque on attachment bolts to determine if yielding has occurred.

17. Completely inspect flight control system from pilots controls to rotor head for bent or damaged tubes, bellcranks, bellcrank supports and for damage to control system bearings. Particular attention shall be given to pylon controls, lower cylinder attachment support fitting and adjacent airframe structure.

18. Pressurize hydraulic system and check for leaks, interference, binding and for satisfactory operation.

19. Inspect fuel, oil and pneumatic system for damage, perform engine ground run and visually check fuel, oil and pneumatic lines for leaks.

20. Inspect wire strike protection system (WSPS) as follows:

20.1. Inspect lower assembly for obvious damage to WSPS and attachment area for damage.

20.2. Inspect windshield deflector and upper WSPS assembly for obvious damage to WSPS and attachment area for damage.

21. Inspect power plant in accordance with engine manufacturer’s inspection guide.

NOTE
IF NO SIGNIFICANT DAMAGE HAS BEEN FOUND, NO FURTHER INSPECTION IS NECESSARY.

8-2. SUDDEN STOPPAGE - POWER ON OR OFF. Sudden stoppage is defined as any rapid deceleration of the drive system whether caused by seizure within the helicopter transmission or by contact of the main or tail rotor blades with the ground, water, snow, dense vegetation or other object of sufficient inertia to cause rapid deceleration. Main or tail rotor blade damage, when caused by striking some object sufficient to require blade replacement, is considered sudden stoppage. When sudden stoppage occurs, inspect helicopter and replace components as follows:

NOTE
COMPONENTS REMOVED FROM A HELICOPTER, FOLLOWING A SUDDEN STOPPAGE, SHALL BE EVALUATED AS AN INTERRELATED GROUP. REMOVAL RECORDS ACCOMPANYING EACH COMPONENT SHALL CROSS REFERENCE PART AND SERIAL NUMBERS OF OTHER DRIVE SYSTEM COMPONENTS REMOVED FOR EVALUATION.

Perform a sudden stoppage inspection as follows:

NOTE
IF SUDDEN STOPPAGE INSPECTION IS THE RESULT OF A TAIL ROTOR STRIKE, COMPLY WITH **8-2. SUDDEN STOPPAGE - POWER ON OR OFF**, PARAGRAPHS **7.** through **12.**, BELOW.

1. Main rotor blades.

1.1. Visually inspect both main rotor blades for evidence of damage. Check closely for wrinkled skin.

1.2. If either blade is damaged sufficiently to require blade replacement, return both blades to an authorized overhaul facility. Make an entry in component record to show that reason for removal was Sudden Stoppage.

1.3. If no evidence of damage is found on either blade, both blades may be returned to service.

2. Main rotor hub.

2.1. If main rotor blades were not damaged, the main rotor hub may be returned to service.

2.2. If main rotor blades were damaged sufficiently to require blade replacement, perform an overhaul evaluation inspection on main rotor hub assembly. Make an entry in component records to show that reason for removal was Sudden Stoppage

2.3. If any main rotor blade is damaged beyond repair, grip is unserviceable and not airworthy. Perform overhaul evaluation inspection on main rotor hub. Make an entry in component record to show that reason for removal was Sudden Stoppage.

3. Pylon control components.

3.1. If one or more of the following discrepancies in subparagraphs **a.** through **e.** below are found, the swashplate assembly, stabilizer bar assembly, and scissors and sleeve assembly shall be removed and an overhaul evaluation shall be performed.

a. Severe main rotor blade damage.
b. Pitch horn failure.
c. Yielded stabilizer bar tube.
d. Control tube buckled or broken.
e. Transmission main support case mounting leg broken.

3.2. Using a ten-power magnifying glass, make a complete inspection of pylon support structure for loose or sheared rivets, cracked support angles and webs. Pay particular attention to pylon mounts attaching points and damper support attach points.

3.3. If no condition exists as listed in preceding subparagraph **3.2.**, above, perform a close visual inspection and if no evidence of damage is found, the swashplate assembly, stabilizer assembly, and scissors and sleeve assembly may be returned to service.

4. Replace all bolts in rotating controls. Discard removed bolts.

5. Remove and inspect main drive shaft visually. If evidence of yielding or deformation is noted, scrap the drive shaft assembly. If no visual evidence of damage is detected, perform an overhaul evaluation. Make an entry in component record to show that the reason for removal is Sudden Stoppage.

OR Visually inspect KAFLEX drive shaft for the following conditions:

a. Bolt contact with adjacent plate(s).
b. Plate contact with end fitting(s).
c. Interconnect contact with end fitting(s).
d. Contact of fail-safe surface(s).

NOTE
IF ANY ONE OF THE ABOVE CONDITIONS IN PARAGRAPH **5, a.** THROUGH **d.**, ARE FOUND, REPLACE SHAFT. RETURN SHAFT TO SERVICE IF NO DAMAGE IS FOUND.

6. Transmission and mast assembly.

6.1. If mast has evidence of torsional yielding, the mast and transmission shall be considered unserviceable and scrapped.

6.2. If mast does not have torsional yielding and transmission has no obvious damage that would render it unserviceable, then transmission and mast shall have an overhaul evaluation performed. Make an entry in component record to show that the reason for removal was Sudden Stoppage.

7. Tail rotor drive shaft hangers.

7.1. If a tail rotor drive shaft section has been damaged by main rotor strike or other circumstances, the hangers to which the damaged section was attached shall be considered unserviceable and not airworthy. If a tail rotor drive shaft fails as a result of torsional load then all hangers and sections shall be considered unserviceable and not airworthy. Make a complete inspection of area where tail boom is attached to forward fuselage section. This includes all attachment fittings and the longerons, beam caps, skins, webs, bulkhead flanges and other structural members. Check torque on attachment bolts to determine if yielding has occurred.

7.2. If no damage is found in the preceding subparagraph **7.1**, overhaul the bearings in accordance with the applicable maintenance manual. Make an entry in component record to show that the reason for removal was Sudden Stoppage.

8. Tail rotor drive shaft.

8.1. Remove all tail rotor drive shaft sections and inspect for the following conditions listed below. If one or more conditions listed in subparagraphs **a.**, through **e.**, below, are noted, all drive shaft sections and bearing hangers shall be considered unserviceable and not airworthy. Make a complete inspection of area where tail boom is attached to forward fuselage section. This includes both sets of attachment fittings and the longerons, beam caps, skins, webs, bulkhead flanges and other structural members. Check torque on attachment bolts to determine if yielding has occurred.

a. Curvic faces distorted.
b. Evidence of overload.
c. Cracks.
d. Loose or sheared rivets.
e. Scratches in excess of limits. (Refer to applicable Model TM.)

8.2. If inspection reveals no condition as listed in subparagraphs **8.1.,a.** through **e.**, above exists, then perform an inspection in accordance with applicable TM. Make an entry in component record to show that the reason for removal was Sudden Stoppage.

9. Tail rotor hub and blade assembly.

9.1. If sudden stoppage originated at tail rotor blades, the tail rotor hub and blade assembly shall be considered unserviceable and not airworthy.

9.2. If sudden stoppage originated at main rotor or transmission, the tail rotor hub and blade assembly may remain in service provided there is no visible external damage. If visible damage is noted on tail rotor hub and blade assembly; remove tail rotor hub and blade assembly and perform overhaul evaluation inspection. Make an entry in component records to show that the reason for removal was Sudden Stoppage. The tail rotor grips and blade attachment bolts must be considered unserviceable and not airworthy.

9.3. If sudden stoppage originated at tail rotor drive shaft, intermediate gearbox or tail rotor gearbox, remove tail rotor hub and blade assembly and perform overhaul evaluation inspection. Make an entry in component record to show that the reason for removal was Sudden Stoppage.

10. Tail rotor gearbox.

10.1. Remove tail rotor gearbox. Check for cracks, sheared or bent attaching studs and evidence of case distortion. If any of the listed is noted, then the gearbox is not airworthy and is unserviceable.

10.2. If no damage is found in the preceding subparagraph **10.1.**, above, overhaul the gearbox in accordance with the applicable overhaul manual. Make an entry in component record to show that the reason for removal was Sudden Stoppage.

11. Intermediate gearbox.

11.1. Remove intermediate gearbox. Inspect for cracks, case distortion or broken lugs. If any of the above is noted then the gearbox is not airworthy and is unserviceable.

11.2. If no damage is found in the preceding subparagraph **11.1.**, overhaul the gearbox in accordance with the applicable overhaul manual. Make an entry in component record to show that the reason for removal was Sudden Stoppage.

NOTE
IF NO EVIDENCE OF DAMAGE WAS FOUND IN HEADING **8-2.**, PARAGRAPH **7.** THROUGH **11.**, ABOVE, THEN OMIT HEADING **8-2.**, PARAGRAPH **12.**, BELOW.

12. Transmission sump case.

12.1. If damage was found on bearing hangers, tail rotor drive shaft, intermediate gearbox or tail rotor gearbox, then remove tail rotor drive output quill from transmission sump case assembly.

12.2. Inspect output quill pinion for unusual load patterns on both sides of teeth. If no damage is found; reinstall quill, and transmission can be returned to service.

12.3. If tail rotor drive quill reveals discrepancies, remove transmission and perform an overhaul evaluation. Make an entry in component record to show reason for removal was Sudden Stoppage.

8-3. OVERSPEED - Overspeed is defined as any incident in which 356 main rotor rpm and/or engine overspeed limits in engine manufacturer's manual are exceeded. Perform overspeed inspection as follows:

NOTE
COMPONENTS REMOVED FROM HELICOPTER, FOLLOWING AN OVERSPEED, SHALL BE EVALUATED AS AN INTERRELATED GROUP. REMOVAL RECORDS ACCOMPANYING EACH COMPONENT SHALL CROSS REFERENCE PART AND SERIAL NUMBERS OF OTHER DRIVE SYSTEM COMPONENTS REMOVED FOR EVALUATION.

NOTE
REFER TO ENGINE MANUFACTURER'S INSPECTION GUIDE FOR ENGINE OVERSPEED AND INSPECTION REQUIREMENTS.

1. Main rotor hub assembly.

1.1. Remove main rotor hub. Remove main rotor blades. Perform an overhaul evaluation inspection. Make an entry in component record to show that the reason for removal was Overspeed.

1.2. Visually inspect main retention bolts and drag brace for shear offset.

2. Main rotor blades.

2.1. Inspect main rotor blade for wrinkles and deformation.

2.2. Remove each rotor blade tip cap and inspect for evidence of looseness of inertia weight inside blade spar. If blades have visible screws through the leading edge abrasion strip to attach inertia weight inside spar, inspect for loose screws or distorted holes. Tighten loose balance weight retention nuts to torque specified in applicable main rotor blade TM or DMWR.

2.3. If no discrepancies are found in inspections outlined in subparagraphs **2.1** and **2.2.**, above, the main rotor can be returned to service.

2.4 If discrepancies are found in subparagraphs **2.1** and/or **2.2** above, return both blades to an authorized blade repair station. Make an entry in component record to show that the reason for removal was Overspeed. Indicate RPM and duration if known.

3. Tail rotor hub and blades.

3.1. Remove tail rotor hub and blade assembly.
3.2. Remove tail rotor blades.
3.3. Replace tail rotor blade retention bolts.

4. Tail rotor blades.
4.1. Check for bond separations anywhere on the blade. If any separation exists, the blade is unserviceable and not airworthy.

4.2. If any movement of the tip or root and balance weights has occurred, the blade is unserviceable and not airworthy.

4.3. Check the retention bushings for evidence of looseness. If any bushing is loose, scrap the blade.
4.4. If blades pass the above inspection requirements and no other discrepancies exist, the blade can be returned to service.

5. Perform a close inspection of the following components. If no visual damage is found, the component may be returned to service.

a. Main transmission.
b. Intermediate gearbox.
c. Tail rotor gearbox.
d. Main rotor mast.
e. Main input drive shaft.
f. Tail rotor drive shaft hangers.
g. Stabilizer bar.
h. Swashplate.
i. Scissors and sleeve.
j. Tail rotor hub.
k. Tail rotor drive shaft (204-040-620-11).

NOTE
REMOVE AND CONDEMN ONLY THE 204-040-620-3 OR -7 LONG TAIL ROTOR DRIVE SHAFTS.

6. Install a serviceable main rotor hub and blade assembly. Install serviceable tail rotor blades. Balance and install tail rotor hub and blade assembly.

8-4. OVERTORQUE (AIRFRAME/ENGINE) - Overtorque is defined as any incident in which torsional loads are introduced into the helicopter dynamic system in excess of established limits.

NOTE
COMPONENTS REMOVED FROM HELICOPTER, FOLLOWING ANY OVERTORQUE, SHALL BE EVALUATED AS AN INTERRELATED GROUP. REMOVAL RECORDS ACCOMPANYING EACH COMPONENT SHALL CROSS REFERENCE PART AND SERIAL NUMBERS OF OTHER DRIVE SYSTEM COMPONENT REMOVED FOR EVALUATION AND SHALL REFLECT OVERTORQUE AS REASON FOR REMOVAL.

1. When overtorque has not exceeded 56 PSI perform thorough visual inspection of the following components. If inspection does not reveal any discrepancies or obvious damage to components, they may be retained in service.

a. Main rotor blades.
b. Tail rotor blades.
c. Main rotor hub.
d. Tail rotor hub.
e. Intermediate gearbox.
f. Tail rotor gearbox.
g. Tail rotor drive shafts.
h. Tail rotor drive shaft hangers.
i. Stabilizer bar assembly.
j. Swashplate.
k. Scissors and sleeve assembly.
l. Main drive shaft (BHT) as per TM.
m. KAFLEX drive shaft, visually inspect for the following conditions:

(1) Bolt contact with adjacent plate(s).
(2) Plate contact with end fitting(s).
(3) Interconnect contact with end fitting(s).
(4) Contact of fail-safe surface(s).

NOTE
IF DISCREPANCIES ARE FOUND IN **1. m.**, **(1)** THROUGH **(4)** ABOVE, REPLACE SHAFT.

n. Mast.
o. Transmission.

2. When overtorque exceeds 56 PSI but does not exceed 61 PSI:

2.1. Perform thorough visual inspection of components listed in Paragraph **1.** ,subparagraphs **a.** through **m.**, above.

2.2. Inspect main transmission chip detector.

2.3. Inspect main transmission internal filter and pump inlet screen.

2.4. If metal particles indicating internal failure are found, remove the transmission for overhaul evaluation. Make entry in component record that reason for removal was overtorque. Remove all transmission system oil lines

and oil cooler. Replace external oil filter element. Flush and reinstall lines. Install new oil cooler. Tag old cooler, "metal particle contaminated", and return to overhaul facility.

2.5. If chip detector, internal filter and pump inlet screen appear normal, and there is no evidence of internal failure, operate the transmission for five hours, then check chip detector, internal filter and pump inlet screen. If chip detector, filter and screen inspection does not reveal particles, the transmission is satisfactory for service. If metal particles are found or if there is an evidence of internal failure, remove the transmission for overhaul evaluation. Clean oil lines, replace oil cooler, replace external oil filter element and make record entries as prescribed in preceding subparagraph **2.4.**

2.6. Replace main rotor hub pillow block bolts.

2.7. Replace main rotor trunnion cap bolts (540 M/R).

2.8. Remove fifth mount bolts, remove fifth mount. Perform a thorough inspection of bolts and fifth mount support. Check for bent bolts and bent fifth mount support. Check for proper bolt hole alignment between transmission and fifth mount support. Install fifth mount.

3. When overtorque has exceeded 61 PSI:

3.1. Remove and condemn 204-040-620-3 or -7 long tail rotor drive shaft.

3.2. Return following components to an overhaul facility for overhaul evaluation:

- **a.** transmission,
- **b.** main drive shaft (BHT and KAFLEX),
- **c.** main rotor hub, and
- **d.** mast.

3.3. Perform thorough visual inspection of components listed in Paragraph **1.**, of Heading **8-4.**, page 39.

3.4. Remove fifth mount bolts, remove fifth mount. Perform a thorough inspection of bolts and fifth mount support. Check for bent bolts and bent fifth mount support. Check for proper bolt hole alignment between transmission and fifth mount support. Install fifth mount.

3.5. Install serviceable components.

T53L13B/703 ENGINES - OVERTORQUE LIMITS

OUTPUT SHAFT TORQUE SHALL NOT EXCEED THE FOLLOWING VALUES:

MILITARY (30 MINUTES) - 64 PSI (114%)

NORMAL (CONTINUOUS) - 60 PSI (107%)

T53L11 SERIES ENGINES - OVERTORQUE LIMITS

OUTPUT SHAFT TORQUE SHALL NOT EXCEED THE FOLLOWING VALUES:

TAKEOFF (5 MINUTES) - 50 PSI (926 foot pounds)

MILITARY (30 MINUTES) - 48 PSI (888 foot pounds)

NORMAL (CONTINUOUS) - 46 PSI (850 foot pounds)

4. When an **ENGINE** has been subjected to an overtorque condition exceeding the preceding limits, perform the following:

4.1. Check chip detector for metal chips.
4.2. Check oil filter for metal chips or other foreign matter.
4.3. If slight accumulation of foreign matter is observed, clean chip detector and oil filter; operate engine for 10 minutes; then repeat subparagraphs **4.1.** and **4.2.**, above.

4.4. If excessive accumulation of metal or foreign matter is observed, accomplish the following:

a. Perform an oil contamination inspection. (Ref. 72-00-00, ENGINE - TROUBLESHOOTING, Para. 1.C.)

b. Inspect output reduction carrier and gear assembly.

4.5. Repeat subparagraph **4.3.**, above, increasing engine operating time to 30 minutes.

4.6. Perform flight test and repeat subparagraphs **4.1** and **4.2** above. If no excessive accumulation of metal or foreign matter is noted, engine may be released for normal operation.

8-5. LIGHTNING STRIKES - When the helicopter is suspected of receiving a lightning strike, the following inspections shall be performed.

NOTE
COMPONENTS REMOVED FROM A HELICOPTER, FOLLOWING A LIGHTNING STRIKE, SHALL BE EVALUATED AS AN INTERRELATED GROUP. REMOVAL RECORDS ACCOMPANYING EACH COMPONENT SHALL CROSS REFERENCE PART AND SERIAL NUMBERS OF OTHER DRIVE SYSTEM COMPONENTS REMOVED FOR EVALUATION.

1. Visually inspect all external surfaces of the helicopter with particular attention to main rotor blades and the hub, the transmission and mast assembly, tail rotor blades and hub, tail rotor gearbox, and vertical fin. Check electrical instruments and systems. Replace defective and/or damaged parts.

2. If visual indications of damage are present, proceed as follows:

2.1. Inspect main rotor blades. If blades show any sign of burns (burn marks can be very minute) or de-bond in any bonded areas, scrap blades.

2.2. Inspect main rotor hub for indication of arcing or burning. Remove main rotor hub and return to overhaul facility. State lightning strike as reason for removal.

2.3. Remove transmission and mast assembly and return to overhaul facility. State lightning strike as the reason for removal.

2.4. Inspect tail rotor blades and hub, scrap blades if indications of burns or de-bonding are found. Remove tail rotor hub and return to

overhaul facility. State lightning strike as the reason for removal.

2.5. Remove gearboxes and return to overhaul facility. State lightning strike as the reason for removal.

2.6. Inspect vertical fin for indication of electrical arcing burns around mounting point of intermediate and tail rotor gearboxes.

3. If no visual indications or damage is found, remove main rotor hub grips and:

3.1. Visually inspect bearings for signs of electrical arcing or burning.

3.2. Check bearing for smooth rotation.

3.3. If indications of electrical arcing or burning are present or rough bearings, overhaul main rotor hub.

NOTE
IF NO INDICATIONS ARE FOUND, REASSEMBLE MAIN ROTOR HUB.

3.2. Remove main rotor mast assembly and visually inspect balls in the upper mast bearing for signs of electrical arcing or burning. Rotate bearing during inspection so that all the surface of each ball may be observed. Check bearing for smooth rotation. Visually inspect the lower bearing race on the mast, and driving spline on the mast for signs of electrical arcing or burning.

a. If indications of electrical arcing or burning are present, remove transmission and mast assembly and return to overhaul facility. State lightning strike as reason for removal.

b. If no indications are found, reassemble transmission and mast assembly and return to service. After five hours, remove chip detectors and oil filter and inspect for chips. If no indications are found, return transmission to service. If indications are found, remove transmission and mast assembly and return to overhaul facility. State lightning strike as the reason for removal.

3.3. Remove output quill assembly from tail rotor gearbox. Visually inspect gear teeth for signs of electrical arcing or burning. Rotate tail rotor mast to check for smooth rotation of bearings.

a. If evidence of electrical arcing or burning is found or if bearings do not rotate smoothly, remove gearbox and return to overhaul facility. State lightning strike as the reason for removal.

b. If no indications of damage are found, and if bearings rotate smoothly, reassemble tail rotor gearbox and return to limited service as defined below:

(1) After five hours, remove chip detector and inspect for chips.

(2) If no indications are found, return tail rotor gearbox to service.

(3) If indications are found, return tail rotor gearbox to overhaul facility. State lightning strike as the reason for removal.

(4) Remove output quill assembly from intermediate gearbox. Visually inspect gear teeth for signs of electrical arcing or burning. Rotate quills to check for smooth rotation of bearings.

(a) If evidence of arcing or burning is found or if bearings do not rotate smoothly, remove intermediate gearbox and return to overhaul facility. State lightning strike as the reason for removal.

(b) If no indications of damage are found, and if bearings rotate smoothly, reassemble intermediate gearbox and return to limited service as defined below:

1. After five hours, remove chip detector and inspect for chips.

2. If no indications are found, return intermediate gearbox to service.

3. If indications are found, return intermediate gearbox to overhaul facility. State lightning strike as the reason for removal.

8-6. MAST BUMPING

1. Visually inspect the mast area where the static stop would contact the mast. If no surface deformation of the mast has occurred, the inspection is complete.

2. If there is visual evidence of surface deformation of the mast due to static stop contact, perform the following:

2.1. Evaluate the condition of the mast per the damage limits. (Refer to applicable TM.)

2.2. Inspect and replace the following items if damage is found:

- **a.** Main rotor hub trunnion cap or pillow block attach bolts and drag brace jam nuts and attach bolts for security.
- **b.** Flight control system for bent or damaged tubes and rod end bearings.
- **c.** Structure at transmission mounting points.
- **d.** Lift link and structure for damage, security and distortion.
- **e.** Transmission sump oil filter, external oil filter, and chip detector for metal particles.
- **f.** Main drive shaft.
- **g.** Tail rotor drive shafts and hanger assemblies for obvious damage.
- **h.** Main transmission output tail rotor drive quill.
- **i.** Top forward section of fuselage.

8-7. AFTER WIRE STRIKE

1. Lower Wire Strike Protection System (WSPS) Assembly.

1.1. Inspect for obvious damage to WSPS.
1.2. Inspect attachment area for damage.

2. Windshield Deflector and Upper WSPS Assembly.

2.1. Inspect for obvious damage to WSPS.
2.2. Inspect attachment area for damage.

3. Windshield Wiper Deflector (WWD).

3.1. Inspect for obvious damage to WWD.
3.2. Inspect attachment area for damage.

8-8. AFTER LOWER WSPS GROUND CONTACT

1. Inspect for obvious damage.

2. Inspect attachment area for damage.

3. Remove panel and inspect structure and directional control tubes and bellcranks for damage.

4. Replace breakaway tip assembly.

NOTE
LOSS OF BREAKAWAY TIP OR DAMAGE NOT AFFECTING STRUCTURAL INTEGRITY OF INSTALLATION ARE NOT CAUSES FOR GROUNDING OF AIRCRAFT. HOWEVER, REPLACEMENT OF TIP AND DAMAGE REPAIR SHALL BE ACCOMPLISHED AS SOON AS PRACTICAL.

8-9. AFTER AIRCRAFT IS FLOWN INTO AREA WITH BLOWING SAND AND/OR LOOSE GRASS ENVIRONMENT.

NOTE
IF FOD SCREEN AND SAND AND DUST SEPARATOR ARE INSTALLED, REMOVE UPPER HALVES TO ACCOMPLISH THIS INSPECTION. IF BLOCKAGE IS EVIDENT, THE LOWER HALF OF THE SEPARATOR MUST BE REMOVED TO ENSURE COMPLETE REMOVAL OF GRASS OR FOREIGN MATERIAL.

NOTE
IF THE IMPROVED PARTICLE SEPARATOR (IPS) IS INSTALLED, REMOVE ANY FOREIGN OBJECTS FROM THE SCREEN OR SIDE OF VORTEX TUBE PANELS. BLOWING SAND CAN PENETRATE THROUGH VORTEX TUBES AND IF ENGINE IS NOT RUNNING, WILL NOT BE SCAVENGED OVERBOARD. IN THESE CIRCUMSTANCES SAND CAN SETTLE IN BOTTOM PLENUM OF IPS. THE TOP OF IPS SHOULD BE REMOVED AND ALL SAND REMOVED FROM IPS BOTTOM HALF.

8-10. AFTER WASHING HELICOPTER.

1. Remove left and right pylon access doors. Using a clean cloth, wipe water deposits from pylon structural members. Reaching aft onto forward engine deck through rear pylon structures, wipe water from engine deck.

2. Check pitot static system for moisture (drain plug removed).

3. Purge lubricate tail rotor grip assemblies.

8-11. AFTER HELICOPTER HAS BEEN SUBJECTED TO SALT WATER OR SALT WATER SPRAY.

1. Wash entire helicopter with fresh water, particularly inside of engine compartment doors. Wash all compartments which were exposed to salt water. Make a detail check of all surfaces for corrosion. Apply corrosion preventive compound to exposed non painted, anodized, or cadmium plated assemblies. Clean engine compressor in accordance with applicable engine TM.

8-12. HELICOPTERS OPERATED IN SALT LADEN ENVIRONMENT:

1. Using a mild soap detergent, wash blades daily. Rinse with clear water and dry. All aircraft down for maintenance or non-flyable storage are not subject to blade wash inspection.

8-13. AFTER HELICOPTER HAS BEEN PARKED OR OPERATED IN RAIN, ICE, OR SNOW.

1. Purge lubricate tail rotor hub and blade grip bearings.

2. Open engine inlet area and remove upper air filter assembly. Inspect and clean particle separator parts.

NOTE
INSPECTION DOES NOT APPLY TO HELICOPTERS WITH SELF-PURGE TYPE SEPARATORS.

NOTE
INSPECTION NOT REQUIRED IF HELICOPTER WAS PARKED WITH PROTECTIVE COVERS INSTALLED.

8-14. AFTER OVERFLOW OF BATTERY AND/OR BATTERY SUMP JAR (IF SUMP JAR IS INSTALLED).

1. Inspect sheet metal surfaces and overlaps, both internal and external, for damage.

2. Inspect rivets, bolts, screws, and other hardware in area, internally and externally for damage.

3. Inspect hidden areas in vicinity of battery and sump jar for damage.

4. Inspect all metal parts throughout contaminated area for damage.

8-15. TRANSMISSION OIL OVER TEMPERATURE.

1. Troubleshoot transmission system to determine cause.

2. Replace transmission, mast, oil cooler and external oil filter if cause is due to transmission internal failure.

3. If cause is due to oil system external to transmission and oil temperature did not exceed 130 degrees C (266 degrees F) for 15 minutes, drain and refill transmission oil system.

4. If temperature exceeded above limits, replace transmission and mast. If abnormal contamination is present, also replace oil cooler and external filter.

8-16. COMPLETE LOSS OF TRANSMISSION OIL.

1. Troubleshoot transmission oil system to determine cause.

2. If engine power was applied after complete loss of oil, replace transmission and mast. If abnormal contamination is present, also replace oil cooler and external oil filter

3. Inspect quick disconnects for engagement and wear.

CHAPTER 9

CONDITIONAL INSPECTIONS (ENGINE)

Conditional Inspections (Engine) found in **Chapter 9** of the IPG are inspections required as a result of an unusual event such as engine oil filter bypass or engine over temperature.

NOTE
THERE ARE NO PRESCRIBED INTERVALS FOR CONDITIONAL INSPECTIONS.

9-1. INSPECT FOR FOREIGN OBJECT DAMAGE (FOD).

1. Open inlet guide vanes manually and conduct a visual inspection of the inlet housing (inlet guide vane and first stage compressor rotor through the inlet ducts).

2. If damage exceeds limits or appears to extend beyond the first stage compressor rotor, remove the upper compressor housing half and inspect compressor blades, vanes, centrifugal impellers, and compressor housings. (Ref. 72-30-XX, of appropriate maintenance manuals).

If centrifugal compressor impeller is damaged beyond limits, return engine to Overhaul.

3. Inspect all visible air diffuser vanes for nicks, dents, and burrs. Minor nicks, dents and burrs are acceptable provided that mutilation has not occurred as defined by the appropriate manual.

9-2. SUSPECTED COMPRESSOR STALL OR SURGE.

Engine compressor stall or surge is characterized by a sharp rumble or a series of load sharp reports, severe engine vibration and a rapid rise in exhaust gas temperature (EGT), depending on severity of surge. When a surge has been reported, progressively perform **9-2. SUSPECTED COMPRESSOR STALL OR SURGE.**,Paragraphs **1.**, **2.**, and **3.** below, as indicated by discrepant conditions.

NOTE
STALL INSPECTION IS NOT REQUIRED FOR NOISE CAUSED BY BLEED BAND CYCLING OR SURGE BELOW 85 PERCENT N1 THAT IS NOT ACCOMPANIED BY A RAPID RISE IN EGT.

NOTE
COMPONENTS REMOVED FROM A HELICOPTER, FOLLOWING A COMPRESSOR STALL OR SURGE, SHALL BE EVALUATED AS AN INTERRELATED GROUP. REMOVAL RECORDS ACCOMPANYING EACH COMPONENT SHALL CROSS REFERENCE PART AND SERIAL NUMBERS OF OTHER DRIVE SYSTEM COMPONENTS REMOVED FOR EVALUATION.

Discuss circumstances of reported compressor stall with pilot. Determine N1 speed at which reported stall occurred. Check helicopter and engine log for any pertinent history.

1. Power plant.

1.1. Examine inlet screen for blockage.

1.2. Inspect the engine in accordance with engine manufacturer's inspection guide.

1.3. If compressor is dirty, wash in accordance with approved engine manufacturer's method.

2. Power train.

If compressor stall occurs below 85 percent N1 speed, comply with the following subparagraphs **2.1.**, through **2.3.** below:

2.1. Remove magnetic chip detectors from transmission, intermediate gearbox and tail rotor gearbox, and inspect for metal particles.

2.2. If no evidence of damage is found on tail boom vertical fin and no indication of metal particles are found on chip detectors; clean chip detectors and reinstall. Return helicopter to flight status and repeat chip detector inspection in 5 to 10 hours. If positive indication of damage is found on tail boom pylon or metal chips are found on chip detectors on initial 5 to 10 hour inspection, comply with subparagraphs **2.4** through **2.7** below.

2.3. Visually inspect main drive shaft. Main BHT drive shaft, inspect for internal and curvic coupling damage. KAFLEX drive shaft, inspect for the following conditions:

a. Plate contact with end fitting(s).
b. Interconnect contact with end fitting(s).
c. Contact of fail-safe surface(s).

NOTE
IF ANY ONE OF THE ABOVE CONDITIONS ARE FOUND, REPLACE SHAFT.
RETURN SHAFT TO SERVICE IF NO DAMAGE IS FOUND.

If compressor stall occurs at 85 percent N1 or above, comply with the preceding Paragraph **2.**, (including subparagraphs **2.1**, **2.2** and **2.3**) and the following subparagraphs **2.4**, through **2.7.** and Paragraph **3.**

2.4. Remove and condemn 204-040-620-3 and -7 long tail rotor drive shaft.

2.5. Remove tail rotor gearbox from helicopter and remove input quill. With a 10 power glass, inspect gear teeth on pinion and gear for damage. If no evidence of scoring or scuffing is found and there is no other damage that would render gearbox unserviceable, it may be reassembled and reinstalled for continued use. If gear teeth are scored or scuffed or there is other damage that would render gearbox unserviceable, replace gearbox.

2.6. Remove input and output drive quill from intermediate gearbox and inspect gear teeth on pinion and gear for damage with a 10 power glass. If no evidence of scoring or scuffing is found and there is no mechanical damage that would render gearbox unserviceable, reassemble and return to service. If gear teeth are scuffed or scored or gearbox has sustained other damage; replace gearbox.

2.7. Remove the tail rotor drive quill from the transmission and inspect the gear teeth for damage with a 10 power glass. If there is no indication of scoring or scuffing and there is no other damage that would render the transmission unserviceable, it is suitable for continued use. If gear teeth are scored or scuffed or there is other damage that would render the transmission unserviceable, replace transmission and comply with subparagraph **2.8.**, below.

2.8. If transmission is replaced, the tail rotor hanger bearing assemblies and tail rotor hub and blade assembly must also be replaced and procedures outlined in subparagraphs **a.** through **e.** below, performed.

NOTE

PERFORM AN OVERHAUL EVALUATION ON TAIL ROTOR HUB AND BLADE. MAKE AN ENTRY IN COMPONENT RECORD TO SHOW THAT THE REASON FOR REMOVAL WAS COMPRESSOR STALL.

a. Remove inboard and outboard drag brace bolts. Check bolts for deformation, and perform a magnetic particle inspection. If satisfactory, return to service.

b. Visually inspect stabilizer bar outer tubes for bending. (Allowable deflection is 0.150 inch in each tube.)

c. Remove main rotor pillow blocks from main rotor yoke and check for deformation of bushing holes in pillow blocks and yoke. Replace main rotor trunnion cap bolts (540 M/R).

d. Perform close visual inspection of all main rotor components.

e. If any discrepancies are noted as a result of inspection in subparagraphs **a.** through **d.** above, remove and replace main rotor hub and blade assembly, stabilizer bar assembly, and mast assembly. Removed assemblies shall have an overhaul evaluation performed. Make an entry in component records to show that the reason for removal was Compressor Stall.

3. Airframe.

3.1. Check tail boom vertical fin for evidence of damaged skin panels and/or structure and rivets for looseness and/or sheared heads. If inspection shows no indications of damage, return helicopter to service. If positive evidence of damage is found, comply with subparagraphs **3.2** through **3.4** below.

3.2. Remove skin from tail boom vertical fin adjacent to tail rotor gearbox mounting. Inspect all support structures in this area and repair as required. Install new skin.

3.3. Make close visual inspection of complete tail boom structure for distortion, buckles, skin cracks and sheared or loose rivets, paying particular attention to tail boom attachment points and adjacent fuselage to tail boom structure and intermediate gearbox support structure.

3.4. Make close visual inspection of main pylon support and engine mount attachment structure for distortion buckles, cracks, sheared or loose rivets, etc.

9-3. ENGINE IS DROPPED DURING HANDLING.

CAUTION

IF ENGINE IS IN SHIPPING CONTAINER, INSPECT CONTAINER AND CONTAINER ENGINE MOUNTS FOR DAMAGE. IF EXTENSIVE DAMAGE TO SHIPPING CONTAINER OR SHIPPING CONTAINER ENGINE MOUNTING SYSTEM IS FOUND, ENGINES MUST BE RETURNED TO OVERHAUL FOR INSPECTION OF ALL MAIN BEARINGS

1. Check accessory drive gearbox for cracked mount flanges or loose bolts.

2. Check overspeed governor and tachometer drive for cracks, distortion, and bent shafts.

3. Check oil filter for loose bolts and damaged filter elements.

4. Check power-driven rotary (oil) pump for loose bolts and cracked flanges.

5. Check engine mounting pads for cracks.

6. Check all hose connections for security.

7. Check all accessories for loose bolts, nuts, connections, and cracked mount flanges.

8. Check inlet, compressor, and combustor housings for cracks or loose bolts.

9. If no visual damage is apparent, accomplish the following inspections:

9.1. Perform a complete engine ground operational test (with engine on aircraft) and include vibration and coastdown checks.

NOTE

THE MINIMUM TEST TIME IS 30 MINUTES. VIBRATION LEVELS MUST BE WITHIN ESTABLISHED LIMITS. IF NO DEFECTS ARE NOTED, ENGINE IS CONSIDERED SERVICEABLE. (REF. 71-00-00, PARA. 12.E.)

9.2. Perform inspection of oil filter, screens, and chip detector for chips, lint, or other foreign material.

NOTE

IN THE EVENT THE SEVERITY OF DROP IS SUCH THAT ITEMS AS CALLED OUT IN HEADING **9-3. ENGINE IS DROPPED DURING HANDLING.**, PARAGRAPHS **1.** THROUGH **8.**, ABOVE ARE DISCREPANT, IT IS RECOMMENDED THAT ENGINE BE RETURNED TO A DESIGNATED OVERHAUL FACILITY FOR FURTHER CORRECTIVE ACTION.

9-4. ENGINE SUDDEN STOPPAGE.

CAUTION
THE FOLLOWING ENGINE INSPECTION MUST BE COMPLETED IN THE EVENT OF AIRCRAFT DRIVE SYSTEM STOPPING, EVEN MOMENTARILY. SUDDEN STOPPAGE IS INTERPRETED TO INCLUDE THE SHOCK FELT BY THE DRIVE SYSTEM WHEN THE AIRCRAFT ROTOR BLADES COME IN CONTACT WITH THE GROUND, WATER, TREES, OR OTHER OBSTACLES THAT WOULD CAUSE DAMAGE REQUIRING AIRCRAFT ROTOR BLADE CHANGE. **IT IS ADVISED THAT ENGINES SUBJECTED TO SUDDEN STOPPAGE BE RETURNED TO A DESIGNATED OVERHAUL FACILITY FOR THE FOLLOWING INSPECTION, AS FAILURE TO DO SO MAY AFFECT AIRWORTHINESS. DETAILED DISASSEMBLY, INSPECTION AND ASSEMBLY INSTRUCTIONS ARE PROVIDED IN THE OVERHAUL MANUAL, ALLIED SIGNAL NO. 330.3.**

1. Inspect output reduction carrier and gear assembly (1-030-350-08 or 1-030-350-12) and sun gearshaft (1-030-192-03 or 1-030-192-04).

1.1. Perform a magnetic particle or fluorescent penetrant inspection on all parts included in the reduction gearing system.

NOTE
CRACKING MAY OCCUR LONGITUDINALLY ALONG GEAR TEETH. CRACKS CAN BE CONSIDERED PARTIAL SEPARATION OF METAL RESULTING FROM UNDUE STRESSES. CHIPPING AND FLAKING REPRESENT VARIOUS FORMS OF CRACKING.

1.2. Perform **8-4 Overtorque (Airframe/Engine) Inspection**, of the IPG.

1.3. If there is no damage found in the preceding inspections, perform **9-9 Engine Oil Contamination Inspection**, of the IPG.

1.4. If damage is found in the preceding inspection, perform overspeed inspection found in **9-5 Engine Overspeed Inspection, Chapter 9**, of the IPG.

2. If damage is found during **9-5 Engine Overspeed Inspection**, perform **9-9 Engine Oil Contamination Inspection**, of the IPG.

9-5. ENGINE OVERSPEED.
If engine has been subjected to an overspeed condition, proceed as follows:

1. Remove and check oil filter for metal chips or other foreign matter.

2. Remove and check chip detector for metal chips.

NOTE
IF CHIPS ARE FOUND IN OIL FILTER OR CHIP DETECTOR, PERFORM AN OIL CONTAMINATION INSPECTION. (REF. 72-00-00, ENGINE - TROUBLESHOOTING, PARA. 1.C).

3. If gas producer (N1) overspeed limits are exceeded, proceed as follows:

3.1. Perform an INTERNAL (HOT END) INSPECTION. (REF. 72-00-00, ENGINE - TROUBLESHOOTING, PARA. 1.D)

3.2. Check compressor rotor assembly by mechanically rotating and listening for indications of rubbing.

4. If output shaft (N2) overspeed limits are exceeded, proceed as follows:

T53L11 OVERSPEED LIMITS

101 PERCENT AT TAKE-OFF POWER.

101 PERCENT AT MAXIMUM CONTINUOUS POWER.

T53L13B OVERSPEED LIMITS

1. AN N2 OVERSPEED CONDITION EXISTS UNDER THE FOLLOWING CONDITIONS:

WHEN N2 SPEED EXCEEDS 101 PERCENT (21,300 POWER TURBINE RPM, OUTPUT SHAFT 6637 RPM) AT THE TAKEOFF POWER POSITION.

2. THE FOLLOWING MAXIMUM STEADY-STATE N2 SPEEDS MAY BE ATTAINED, PROVIDING THE MAXIMUM CORRESPONDING TORQUE PRESSURE IS NOT EXCEEDED WITHOUT CREATING AN OVERSPEED CONDITION:

STEADY STATE COMBINATIONS

N2 SPEED - MAX	TORQUE PRESSURE - MAX
107% (7,032 RPM)	10 PSI
106% (6,966 RPM)	21 PSI
105% (6,900 RPM)	32 PSI
103% (6,769 RPM)	42 PSI
102% (6,703 RPM)	53 PSI
101% (6,637 RPM)	60 PSI

T53L703 OVERSPEED LIMITS

109% (7,163 RPM) AT TAKE-OFF POWER.

4.1. Visually inspect power turbine rotor assembly for damaged or missing blades (view through tailpipe).

4.2. Perform tip clearance inspection on second stage power turbine blades through exhaust diffuser (0.025 inch minimum.)

NOTE

IF DISCREPANCIES ARE NOTED, PERFORM AN INTERNAL (HOT END INSPECTION). (REF. 72-00-00, ENGINE - TROUBLESHOOTING, PARA. 1.D.)

4.3. Determine and correct cause of overspeed.

4.4. Perform engine operation check. If no discrepancies are noted, the engine is serviceable.

9-6. ENGINE OIL OVERTEMPERATURE.

An engine overtemperature condition exists when limits given are exceeded.

1. Observe the following limits for normal operating conditions:

1.1. The maximum (red line) OIL-IN temperature is 99 degrees C (210 degrees F). When oil temperature exceeds 99 degrees C (210 degrees F) refer to Paragraphs/subparagraphs below as appropriate.

1.2. A steady-state engine OIL-IN temperature of 100 degrees C (212 degrees F) is acceptable provided the oil filter is inspected every 50 hours of engine operation for excessive accumulation of carbon or metal particles.

Under abnormal (emergency) conditions, such as an oil cooling system malfunction or failure, the following procedures and engine oil temperature limits will minimize the risk involved in operating an engine which has exceeded temperature limits.

CAUTION
IT MUST BE CLEARLY UNDERSTOOD THERE IS A POSSIBILITY THAT MECHANICAL COMPONENTS MAY SUFFER DAMAGE IF ENGINE OPERATING CONDITIONS ARE EXTENDED BEYOND THESE LIMITS.

2. At oil temperatures from 99 degrees C (210 degrees F) to 130 degrees C (266 degrees F) for 10 minutes or less, check engine oil screens and main oil filter.

3. At temperature from 99 degrees C (210 degrees F) to 130 degrees C (266 degrees F) for more than 10 minutes, but no more than 30 minutes, proceed as follows:

3.1. Change oil, clean all screens and main oil filter. Ground run engine for 30 minutes and recheck main oil filter for carbon and metal particles. If contamination is found, clean oil screens and oil filter. Repeat oil change and ground run engine.

4. At temperatures from 99 degrees C (210 degrees F) to 130 degrees C (266 degrees F) for greater than 30 minutes, perform following oil overtemperature inspection, Paragraph **7.**, below.

5. When oil temperature reaches 131 degrees C (268 degrees F) and above for any length of time, perform following oil overtemperature inspection, Paragraph **7.**, below.

6. When oil temperature reaches 150 degrees C (302 degrees F), the engine must be returned to Overhaul.

7. Perform following oil overtemperature inspection as required:

7.1. Remove combustor turbine assembly. (Ref. 72-40-00)

7.2. Disassemble combustor turbine assembly to permit removal of power turbine rotor and bearing housing assembly.

7.3. Disassemble power turbine rotor and bearing housing assembly to permit removal of No. 3 and 4 position main bearings. Determine part numbers of bearings and:

a. Replace bearing 1-300-176-04, 1-300-584-02, and 1-300-015-02/04.

b. Inspect other bearings for coke/general condition. Replace if necessary

c. Inspect No. 2 main bearing seals for coke/general condition. Replace if necessary.

7.4. Disassemble gas producer system components to permit removal of No. 2 position main bearing and No. 2 main bearing seals. Determine part numbers of bearings and:

a. Replace bearing 1-300-584-02, 1-300-176-04.

b. Inspect other No. 2 bearing part numbers for coke and condition. Replace if necessary.

c. Reassemble gas producer system components, power turbine rotor and bearing housing assembly, and combustor turbine assembly. Reinstall combustor turbine assembly.

7.5 Remove accessory drive gearbox.

a. Disassemble gearbox to permit removal of bearings 1-300-002-01/02 and 1-300-0001/02 from pinion gearshaft and bearing assembly, bearings 1-300-0001/02 from thrust bearing liner assembly and bearings 1-300-12-01/02 from starter generator drive gearshaft assembly. (Ref. 72-60-01) Determine part number of bearing and:

b. Replace bearing 1-300-002-01/02, and 1-300-012-01.

c. Inspect bearing 1-300-012-02 and all remaining installed bearings for coking and heat discoloration. Replace if necessary.

d. Inspect all gears and splined parts for coking and heat discoloration. Replace if necessary.

e. Remove output reduction carrier and gear assembly.

f. Inspect accessible gears and splined parts for signs of heat distortion. Replace any part that is discolored.

9-7. ENGINE SUBJECTED TO EXCESSIVE G-LOADS (HARD LANDING, SEVERE MANEUVERS).
If it is suspected that excessive G loads have been imposed on engine, conduct the following inspections immediately after flight during which the excessive loads occurred:

1. Inspect accessory drive gearbox for cracked mount flanges or loose bolts.
2. Inspect overspeed governor and tachometer drive for cracks, distortion and bent shaft.

3. Inspect oil filter for loose bolts and damaged filter elements.

4. Inspect oil pump for loose bolts and cracked flanges.

5. Inspect fuel control assembly for cracked flanges and loose nuts.

6. Inspect engine and aircraft mounts for cracks, loose bolts, bending, or distortion in any of the following areas:

a. Engine mounts.
b. Accessory drive gearbox mount flanges.
c. Accessory mount flanges.
d. Inlet, compressor, or combustor housings..

NOTE
IF THE AIRCRAFT-FURNISHED ENGINE MOUNT LEGS EXHIBIT ANY CRACKS, BENDING, OR DISTORTION, IT IS RECOMMENDED THAT THE ENGINE BE RETURNED TO OVERHAUL AS EXTREMELY HIGH G-LOADS HAVE BEEN IMPOSED. IT IS FURTHER RECOMMENDED THAT ALLIED SIGNAL BE CONTACTED TO PROVIDE ADDITIONAL DIRECTION.

7. Inspect air, oil, and fuel hose connections for tightness.

8. Inspect all accessories for loose bolts, nuts, and connections.

9.8. ENGINE INLET BLOCKAGE.

NOTE
ANY TIME THE AIRCRAFT IS FLOWN IN A LOOSE GRASS/FOLIAGE ENVIRONMENT, OR IF IT IS SUSPECTED THAT RAGS, PAPER OR OTHER DEBRIS COULD HAVE BEEN INGESTED, THE ENGINE SHALL BE INSPECTED FOR BLOCKAGE AROUND THE INLET GUIDE VANES. FAILURE TO PERFORM THIS INSPECTION COULD RESULT IN LOSS OF POWER.

1. Inlet blockage inspection.

1.1. Remove the particle separator (both halves) and aircraft inlet screen (if installed), and inspect the engine inlet area.

1.2. Inspect the inlet housing struts and each inlet guide vane for rags, paper, grass, foliage or other foreign material blockage or partial blockage.

1.3. Completely remove any foreign material that may be lodged on the inlet strut or guide vanes. Special attention should be given to the lower (4 through 8 o'clock) portion of the vane assembly.

1.4. If blockage or partial blockage is evident or suspected, remove and scrap all the first and second stage blades and replace with new blades.

1.5. If removed, reinstall particle separator and aircraft inlet screen.

1.6. Perform standard engine vibration check with the engine installed in the aircraft. (Ref. 71-00-00, Para 12.E.)

9-9. ENGINE OIL CONTAMINATION.

Whenever an oil contamination inspection has revealed a continuance or an increase of chips in the oil filter or on the chip detector, but output reduction carrier and gear assembly has freedom of movement and emits no unusual noises, proceed as follows:

WARNING

PROLONGED CONTACT WITH LUBRICATING OIL MAY CAUSE A SKIN RASH. THOSE AREAS OF SKIN AND CLOTHING THAT MAY COME IN CONTACT WITH LUBRICATING OIL SHOULD BE THOROUGHLY WASHED IMMEDIATELY. SATURATED CLOTHING SHOULD BE REMOVED IMMEDIATELY. AREAS IN WHICH LUBRICATING OIL IS USED SHOULD BE ADEQUATELY VENTILATED TO KEEP MIST AND FUMES TO A MINIMUM.

CAUTION

LUBRICATING OIL MAY SOFTEN PAINT UPON CONTACT. IF LUBRICATING OIL IS SPILLED ON PAINTED SURFACES, THESE SURFACES SHOULD BE THOROUGHLY WASHED.

1. Check main oil filter elements for chip accumulation which could have placed the filter into bypass. Clean with dry cleaning solvent (Ref. 72-00-00, 62, Table 203, or appropriate manual) and reinstall.

2. Remove and inspect No. 2 bearing strainer and No. 3 and 4 bearing strainer bore for metal chips. If chips are present, remove and inspect three reduction gear oil transfer tube strainers (Ref. 72-10-01) and overspeed governor and tachometer drive oil throttle strainer (Ref. 72-60-02). Forward engine to Overhaul if metal chips have clogged more than one-third of flow area of any one of previously mentioned strainers. If amount of chips is not excessive, clean and reinstall strainers and proceed to Paragraph **3.** below.

3. Presence of chips in previously mentioned strainers indicates that bypass of oil filter has occurred. Replace oil filter.

4. Drain all oil from accessory gearbox, aircraft, oil tank, and oil cooler.

5. Remove metal chips from chip detector. Clean with dry cleaning solvent (Ref. 72-00-00, 62, Table 203).

6. Check No. 2 bearing scavenge line for metal contamination. If chips are evident, disassemble gas producer as necessary, inspect all oil wetted components; replace parts as needed. Flush components with dry cleaning solvent (Ref. 72-00-00, 62, Table 203) and reinstall.

7. Check No. 3 and 4 bearings scavenge line for metal contamination. If chips are evident, remove combustor turbine assembly, disassemble power turbine and bearing housing assembly, and inspect bearings and other oil wetted components. Replace if required (Ref. 72-50-04). Flush components with dry cleaning solvent (Ref. 72-00-00, 62, Table 203) and reinstall.

8. If chips are suspected to come from reduction gearing, remove reduction gearing, inspect its condition and replace if required.

9. Remove accessory drive gearbox (Ref. 72-60-01). Remove and inspect shaft gear assembly. Particularly note condition of upper and lower bearings on this shaft. Inspect and clean scavenge strainer. Flush shaft gear assembly and internal components of gearbox with dry cleaning solvent (Ref. 72-00-00, 62. Table 203) and reassemble.

10. Flush aircraft oil system and replace oil cooler on aircraft not equipped with auxiliary external oil filter.

11. Service oil system with lubricating oil (Ref. 41 or 42, Table 203) Operate engine at 70 to 80 percent N1 for 5 minutes. Shut down engine and allow to cool.

CAUTION

ANY MALFUNCTION IN OIL PRESSURE IN EXCESS OF PLUS OR MINUS 5 PSI, OR RAPID RISE IN OIL TEMPERATURE AT ANY PRESET POWER SETTING, IS CAUSE FOR IMMEDIATE ENGINE SHUTDOWN.

12. Check oil filter elements, chip detector, and strainers.

13. Inspect chip detector and oil filter strainers for chips. Amount of chips noted should be less than original amount. If so, repeat preceding Paragraphs **10.** and **11.**, increasing engine operating time to 10 minutes.

NOTE

CHIPS IN OIL FILTER MAY ORIGINATE IN OIL SUPPLY TANK; CHIPS ON CHIP DETECTOR ORIGINATE IN ENGINE.

14. Repeat inspection, servicing and operating cycle, increasing engine operating time to 30 minutes. If no appreciable amount of chips or other contaminates is noted, engine may be returned to service. If amount of chips or other contaminants remains the same or increases, perform oil sample analysis (Ref. 72-00-00, ENGINE - INSPECTION, Para. 1.G.); forward engine to Overhaul.

NOTE

THE FOLLOWING ACTIONS ARE RECOMMENDED TO ENSURE THAT OIL, CHIPS, OR OTHER CONTAMINANT SAMPLES ARE AVAILABLE TO AID IN THE DIAGNOSIS OF THE PROBLEM. IF AN ALLIED SIGNAL REPRESENTATIVE IS CALLED IN, RETAIN THE SAMPLE FOR HIS EVALUATION AND ACTION.

a. Exercise care to prevent additional contamination of sample.

b. Mark oil, chips, or contaminant sample to include operator’s name, address, location on the engine from which the sample was taken, engine model and seal number, time since new, time since overhaul, and last related maintenance action. Include the oil vendor’s name, batch number, and date of manufacture on the sample.

c. If the engine is being returned for repair or overhaul, return marked sample in engine container.

15. If the amount of carbon particles found on the engine oil filter elements covers 15 percent or more of the surface area, proceed as follows:

15.1. Clean and reinstall oil filter assembly.

15.2. Drain all oil from accessory drive gearbox, oil tank, and oil cooler.

15.3. Remove and inspect No. 2 strainer, and No. 3 and 4 bearing strainers. If carbon particles are present, oil filter has bypassed. Remove, clean, and reinstall reduction gear oil transfer tube strainers and overspeed governor and tachometer drive oil throttle strainer. Clean and reinstall No. 2 bearing strainer and No. 3 and 4 bearing strainers.

15.4. Refill oil tank to capacity with new oil.

15.5. Start engine and run at 70 to 80 percent N1 for 15 minutes.

15.6. Shut down engine; then remove, inspect, and clean oil filter and strainers. Reinstall oil filter and strainers.

15.7. If contamination is excessive, repeat procedure until filter is clean after engine run.

9-10. LOSS OF POWER OR HIGH EXHAUST GAS TEMPERATURE CONDITION.

Thoroughly investigate the engine inline (engine de-ice) valve for proper functioning prior to proceeding with troubleshooting procedures. (Refer to applicable engine manual).

9-11. ENGINE OVERTEMPERATURE.

Perform an engine over-temperature inspection. (Refer to applicable engine TM.)

NOTE
IF ENGINE CANNOT BE OPERATED WITHOUT EXCEEDING EGT LIMITS AS SPECIFIED IN TM, IT IS AN INDICATION OF ENGINE MALFUNCTION OR INSTRUMENT ERROR. REFER TO TROUBLESHOOTING TO DETERMINE CAUSE AND CORRECT ACTION, AS OVER-TEMPERATURE INSPECTION MAY NOT BE REQUIRED.

APPENDIX

Letter from Bell Textron

Ref: Overhaul and Retirement Schedule, Manuals, and Technical assistance.

Bell Helicopter
A Textron Company

Post Office Box 482
Fort Worth, Texas 76101

Dear Bell Helicopter Excess/Surplus Aircraft Operators:

Bell Helicopter is aware of several situations in which many operators need technical assistance in maintaining their UH-1 Helicopters. When the helicopters are surplused by the Defense Logistics Agency (DLA), many operators do not receive the appropriate Technical Manuals to maintain their helicopters.

The military Technical Manuals (TM's) required to maintain the UH-1 are:

TM 55-1520-210-23P-1/-2/-3	PARTS MANUAL
TM 55-1520-210-10	OPERATORS MANUAL
TM 55-1520-210-23-1/-2/-3	MAINTENANCE MANUAL
TM 55-1520-210-CL	CHECKLIST
TM 55-1520-210-PMD	PREVENTATIVE MAINTENANCE DAILY
TM 55-1520-210-PM	PHASE MAINTENANCE
TM 55-2840-229-23 T53	ENGINE MAINTENANCE. MANUAL

These are not Bell Helicopter manuals, Bell Helicopter doesn't maintain, update or distribute these manuals. These manuals are available for purchase at:

NTIS- National Technical Information Service
Military Publications Department
5285 Port Royal Road
Springfield, V A 22161
PHONE: 703-605-6000
800-553-6847
FAX: 703-605-6900
Email ORDERS@NTIS.GOV

In order to assist operators operating in the Public Use, Bell Helicopter has developed and recommends the Overhaul and Retirement Schedule. Unfortunately Bell Helicopter cannot assist operators in Type Certified Restricted Category. These operators are obligated to maintain their aircraft in accordance with the Type Certificate Holder requirements.

The rationale behind Bell Helicopter developing this recommended Overhaul and Retirement Schedule is to remove the Gearboxes out of a "On-Condition": Airworthy Limitation. In compliance with the TM's an operator is required to take an oil analysis every 25 hours and submit for a lab analysis. Bell Helicopter is aware that all operators are not performing this maintenance task and therefore Bell Helicopter has developed a recommend Overhaul/Retirement schedule, it's only provided to assist Public Use operators.

Regards
/Andrew L. Kelley/
Product Support Engineer

4/18/2002

UH-1 Retirement/Overhaul Schedule
4/18/2002

OVERHAUL INTERVAL (HOURS)	RETIREMENT INTERVAL (HOURS)	ITEM	PART NUMBER
		Main Rotor	
	2500 .	Main rotor blade Assembly	204-011-250-5/113
	10,000	Composite main rotor blade	205-015-150-101
	3600	Main Rotor Yoke	204-011-102-17
1100		Main Rotor Hub Assembly.	204-011-101-3/-5/-9
1200		Main Rotor Hub Assembly	204-011-101-11
1200		Main Rotor Hub Assembly	204-012-101-139/-141
	9000	Main Rotor Grip	204-011-121-117 Note 1
	5000	Plate Assembly	204-011-207-105
	5000	Bolt	Ms21250H06000
	2400	Inboard strap fitting	204-012-102-1/5
	2400	Outboard Strap Fitting	204-012-103-1
	2400	Strap Pin	204-012-104-1, -3, -5
	2400	Retention Strap	2601399, 204-012-112-5
		Retention Strap	204-012-122-1/5
	3600	Clevis	204-011-142-3
	3600	Clevis	204-011-179-1
	15000	Center Frame Assembly	204-011-307-11
	5 Years	Stabilizer Bar Tube	201-011-328-1
	2400	Retention Strap	2606650
	2400	Strap Fitting Inboard Main	204-012-102-9
	1200/24 months	Strap Assy Main Rotor	204-310-101-101
	1200/24 months	Strap Assy Main Rotor	2601139
	5000	Support Assembly Transmission	204-011-208-101
1100		Transmission Assembly	204-040-016-1/-3
2000		Transmission Assembly	204-040-016-5
1500		Main input quill Assembly	205-040-263-003/-111
1500		Mast assemblv	204-040-366-009/-015
	1500	Mast Bearing	AMM9122-44-101
	1500	Bearing	204-040-136-7/-9
	1500	Bearing	212-040-136-1
	1500	Mast Assembly	204-011-450-105
	1500	Mast Assembly	204-011-450-7
		Tail Rotor & Drive System	
	1100	Blade Assembly	204-011-702-11
	1200	Blade Assembly	204-011-702-15
	1000	Blade Assembly	204-011-702-121 Note #2

OVERHAUL INTERVAL (HOURS)	RETIREMENT INTERVAL (HOURS)	ITEM	PART NUMBER
		Tail Rotor & Drive System (Continued)	
	300	Grip Assembly	204-011-728-1
	300	Grip Assembly	204-011-728-19
	2500	Grip Assembly	205-011-711-101
	1500	Yoke Assembly	204-011-722-5
1500		Gearbox 42°	04-040-003-7/-13 -19, -23, -29
	3000	Slider, Tail Rotor	204-010-720-3
	600 .	Bearing Hanger	204-040-623-5 or PAM9107NPPA2702
600		Gearbox 90°	204-040-012-1
1200		Gearbox 90°	204-040-012-7
1200		Gearbox 90°	204-040-012-13
		Main Rotor Mast Controls	
1100		Swashplate & Support Assy	204-011-400-1/-3/-5/-7/-9
1200		Swashplate & Support Assy	204-011-400-11
	ON CONDITION	Scissors and Sleeve Assembly	212-010-400-129 Note 3
	9000	Outer Ring	204-011-403-001 Note 3
	1000	Support	204-011-404-125 Note 3
	9000	Outer Ring	204-011-403-001
	1000	Support	204-011-404-125
	3300	Support	204-011-404-1
	3600	Support	204-011-404-5
	500	Pin	204-011-446-3
	4800	Collective Lever	212-010-403-5
	1000	Collective Lever	204-011-438-1
	3600	Scissors Assembly	204-011-406-1/-9/-13/-15
1100		Scissors and Sleeve Assembly	204-011-401-1/-7/-9
1200		Scissors and Sleeve Assembly	204-011-401-011
	ON CONDITION	Scissors and Sleeve Assembly	212-010-401-021 Note 4
	9000	Scissors & Hub	204-011-405-013 Note 4
	9000	Drive Link	204-011-407-001 Note 4
	9000	Collective Sleeve	204-011-408-105 Note 4
	ON CONDITION	Scissors lever assembly	212-010-407-109
	9000	Scissors Hub	204-011-405-021
	9000	Drive Link	204-011-407 -001
	9000	Collective Sleeve	204-011-408-105

Notes:

#1. Reference BHT Technical Bulletin SU 95-5, Alternate Spare Part: Main Rotor Grip PIN 204-011-121-117

#2. Reference BHT Technical Bulletin SU94-2, Alternate Spare Part: Tail Rotor Blade PIN 204-011-702-121

#3. Reference BHT Technical Bulletin SU 95-4, Alternate Spare Part, Swashplate and Support Assembly

#4. Reference BHT Technical Bulletin SU-94-3, Alternate Spare Part and Scissor and Sleeve Assembly PIN 204-011-401-021