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DN-154\*  
EN-44\*  
FN-33\*

# SERVICE BULLETIN

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\*This Notice supercedes Service Information Notices: DN-2.3, dated 3 February 1981; DN-77.1, dated 1 February 1982 and HN-204, dated 20 May 1986.

**SUBJECT:** MAIN ROTOR HUB ASSEMBLY STRAP PACK LAMINATION INSPECTION AND TRI-FLOW WASH PROCEDURE OF THE MAIN ROTOR HUB ASSEMBLY AND STRAP PACK LAMINATES.

**MODELS AFFECTED:**

**PART I** – All MD Helicopters, Inc. (MDHI) 369 Series helicopters, including the 369A (OH-6A) Series helicopter.

**PART II** – All helicopters contained in Part I which operate over or around marine and other corrosive environments.

**TIME OF COMPLIANCE:**

**PART I** shall be accomplished within the next 100 hours of operation or 90 days, whichever occurs first, and at each subsequent 100 hours of operation for all 369D, 369E and 369F/FF series helicopters; and 300 hours of operation or nine months, whichever occurs first, and at each subsequent annual inspection for all 369H and 369A (OH-6A) series helicopters. In addition, if two laminates have failed in any one leg or tongue area of any strap assembly, the inspection shall be performed at 25 hours of operation or 30 days, whichever occurs first, and at each subsequent 25 hours of operation for 369D, 369E and 369F/FF series helicopters and 100 hours of operation or 90 days, whichever occurs first, and at each subsequent 100 hours of operation for all 369H and 369A (OH-6A) series helicopters.

**NOTE**

PART I shall be considered as part of the HMI and will be incorporated into the applicable section of that manual at the next scheduled revision to the HMI.

**PART II** shall be accomplished daily, prior to engine shut down following the last flight of the day, whenever helicopter operation has taken place over or around salt water environments and other environments found to be corrosive to components of the main rotor hub assembly.

**PREFACE:** The information given in Part I of this Notice provides an inspection of the main rotor strap pack assemblies and adjacent shims. Previously issued Service Information Notices concerning the inspection of main rotor strap packs have been incorporated into this Notice.

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## PREFACE CONT.

If a hub assembly or strap assembly (other than new parts in storage) are subjected to extended periods of non-use, whether installed on the helicopter or not, the strap assembly should be inspected critically for corrosion and pitting due to corrosion before being returned to service. If corrosion is found on the strap pack assemblies, contact MDHI for disposition.

It is acceptable to operate a helicopter with a hub assembly having a strap pack with up to two failed laminates in any one leg of the strap assembly (see Figure 1 ). When a laminate in the strap assembly fails, the remaining laminates pick up and carry the load. This increased load causes slightly more elongation in the remaining laminates of that leg thus shifting the mass of the rotor system. Anytime a vibration develops or there is an increase in vibration level over a short period of time, the main rotor strap pack assembly should be inspected for cracked or failed laminates per Part I of this Notice.

Part II of this Notice provides a wash/rinse procedure to help prevent main rotor hub component corrosion on helicopters operating in marine and other environments found corrosive to helicopter components.

**REFERENCE PUBLICATIONS:** 369H Basic HMI (CSP-H-2) Revised 15 June 1985  
369D/E HMI Vol. I (CSP-D-2) Revised 15 June 1985  
369F/FF HMI Vol. I (CSP-F-2) Revised 15 April 1986

<u>TOOLS AND EQUIPMENT</u>	
Nomenclature	Source
10X Magnifying Glass	Commercial

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MATERIAL	
Nomenclature	Source
Tri-Flow Lubricant  or Break Free	Commercial or Costa Mesa Lubricant P.O. Box 125 Olive Branch, MI 38654  Break Free Corp. 10359 Lynwood Ave. Santa Anna, CA 92705
Zip Wax	Commercial or Turtle Wax, Inc. 5655 West 73rd Street, Chicago, IL 60638

## PART I - INSPECTION PROCEDURE

### NOTE

- Conduct inspection indoors, if possible, or in a shaded area to eliminate glare of sun or bright outdoor light. To facilitate inspection, field fabricate and use plastic tool as shown in Figure 1.
- Used main rotor hub assemblies in storage shall be inspected per the requirements of PART I of this Notice.



Figures 1 thru 3 depict the main rotor hub and strap pack assembly disassembled for clarity of location and area to be inspected for cracks. Under no circumstances should the strap pack or main rotor hub assembly ever be disassembled in the field. MDHI and MDHI Approved Licensees are the only approved repair stations for main rotor hub assembly overhaul.

- Remove main rotor blades per Section 7 of applicable Basic or Vol. I HMI.
- Trim teflon from edges of laminates as shown in Figure 2.
- Field fabricate plastic tool per Figure 1. Run plastic tool in both directions along each laminate, feeling for a "catch" from a crack on a single laminate.

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## PART I PROCEDURE CONT.

- d. Using a light and mirror, visually inspect each of the four (369H, 369A/OH-6A) or five (369D,E,F/FF) main rotor strap pack assemblies for evidence of cracks or breaks in strap pack laminates in the areas of the outboard shoes and pitch housing assemblies. Each strap pack assembly consists of 15 (369H, 369A/OH6A) or 16 (369D,E,F/FF) corrosion resistant steel strap laminates. (See Figure 1.)
- e. Using a 10X magnifying glass, visually inspect the edge of strap pack laminates on both sides at outboard end of blade pitch housing (area between outboard shoes). (See Figure 1, Item 6.)



- A **laminate** has failed: a) If a crack is found in tongue area of the laminate or b) if a crack is found in both legs (lead and lag) of the same laminate.
- A **strap pack** is to be rejected (hub must be returned for overhaul): a) if three or more laminates in a single strap pack have failed, as defined above or b) if three or more laminates in a single strap pack are cracked in the same lag (lead or lag) or c) if one laminate is cracked at the outboard end (area between outboard shoes, see Figure 1, Item 6). A single gap in any one strap pack assembly is allowed. Two or more gaps in the same strap pack requires main rotor hub replacement, (See Figure 2).

### NOTE

- Do not pry at strap pack assemblies with sharp or hard edged tools. If edges become nicked or laminates get scratched, additional cracking can occur thus causing hub replacement.
  - Where accessible, ends of acceptable cracked or broken laminates should be taped to prevent scratching and damaging of adjacent laminates. (Refer to applicable HMI, Vol. I.)
- f. Visually inspect strap pack assemblies for evidence of corrosion. If corrosion is found on strap pack laminates contact MDHC service department for disposition.
  - g. Using a blunt-nosed wooden or phenolic pin (pencil size with 1/16 inch radius point), probe at the upper and lower strap laminations at the outboard ends of the blade pitch housings for evidence of laminate failure. A failed laminate, either at the lead or lag end of the strap pack, will move away from the other laminates. If the adjacent upper and lower laminates remain in tension under the probing operation, no laminate failures have occurred. Refer to Step E Caution for gap limitations.

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## PART I PROCEDURE CONT.

### NOTE

Laminate failures are defined in Step E, refer to the CAUTION.

- h. Inspect upper (369D21271-5), lower (369D21271-7) and center (369D21271-3) laminates for cracks and breaks. (See Figure 3.)

### NOTE

Cracks, breaks or other noticeable damage to the laminate/shims require main rotor hub overhaul/replacement.

- i. Install main rotor blades per Section 7 of applicable HMI.
- j. Perform tracking of main rotor blades per Section 7 of applicable HMI, VoI.I.



The maximum allowable balance weight per pitch case housing on the main rotor hub assembly is 150 grams.

- k. Record location of all cracked/broken laminates in helicopter Log Book including strap serial number, blade color, leg (lead or lag) and laminate position, if possible numbering from the top down.
- l. Record compliance to Part I of this Notice in the Compliance Record section of the helicopter Log Book.

## PART II - TRI-FLOW WASH PROCEDURE

### NOTE

Perform Step A below prior to engine shutdown, following the last flight of the day if possible. When the rotor system stops turning, the laminates of the strap pack assembly spread apart slightly. Contaminates collected on the edges of the strap pack assembly can enter the area between the laminates as they spread apart. If the rotor continues turning until the contaminates are washed away, centrifugal force will keep the laminates compressed and not allow the corrosive substances to enter the area between the laminates.

- a. Bring engine to ground idle (64-65 percent N1 ); set SCAV AIR to ON. (Refer to applicable Pilot's Flight Manual.)



Use extreme caution when working around turning rotor blades. Stay low and remain on right side of helicopter to avoid the tail rotor blades.

- b. Spray fine fresh water mist on main rotor blades.

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## PART II PROCEDURE CONT.

- c. Direct a strong stream of clean and fresh water into main rotor hub and control system surrounding the main rotor hub assembly.
- d. Spray entire main rotor hub assembly with Tri-Flow (or Break Free as an alternate) Lubricant.
- e. Shutdown engine. (Refer to applicable Pilot's Right Manual.) When main rotor blades stop turning, spray strap packs with additional Tri-Row Lubricant.

### NOTE

Lift main rotor blades to separate strap pack laminates and spray Tri-Flow Lubricant directly in between the individual laminates.

- f. Perform engine water wash. (Refer to Section 2 of applicable HMI).
- g. Wash main rotor blades with Zip Wax or equivalent, mixed per manufacturer's instructions.
- h. Record compliance to Part II of this Notice in the Compliance Record section of the helicopter Log Book.

The resultant alteration to affected models as described by procedures in this Notice has been shown to comply with Federal Aviation Regulations and is FAA Approved.

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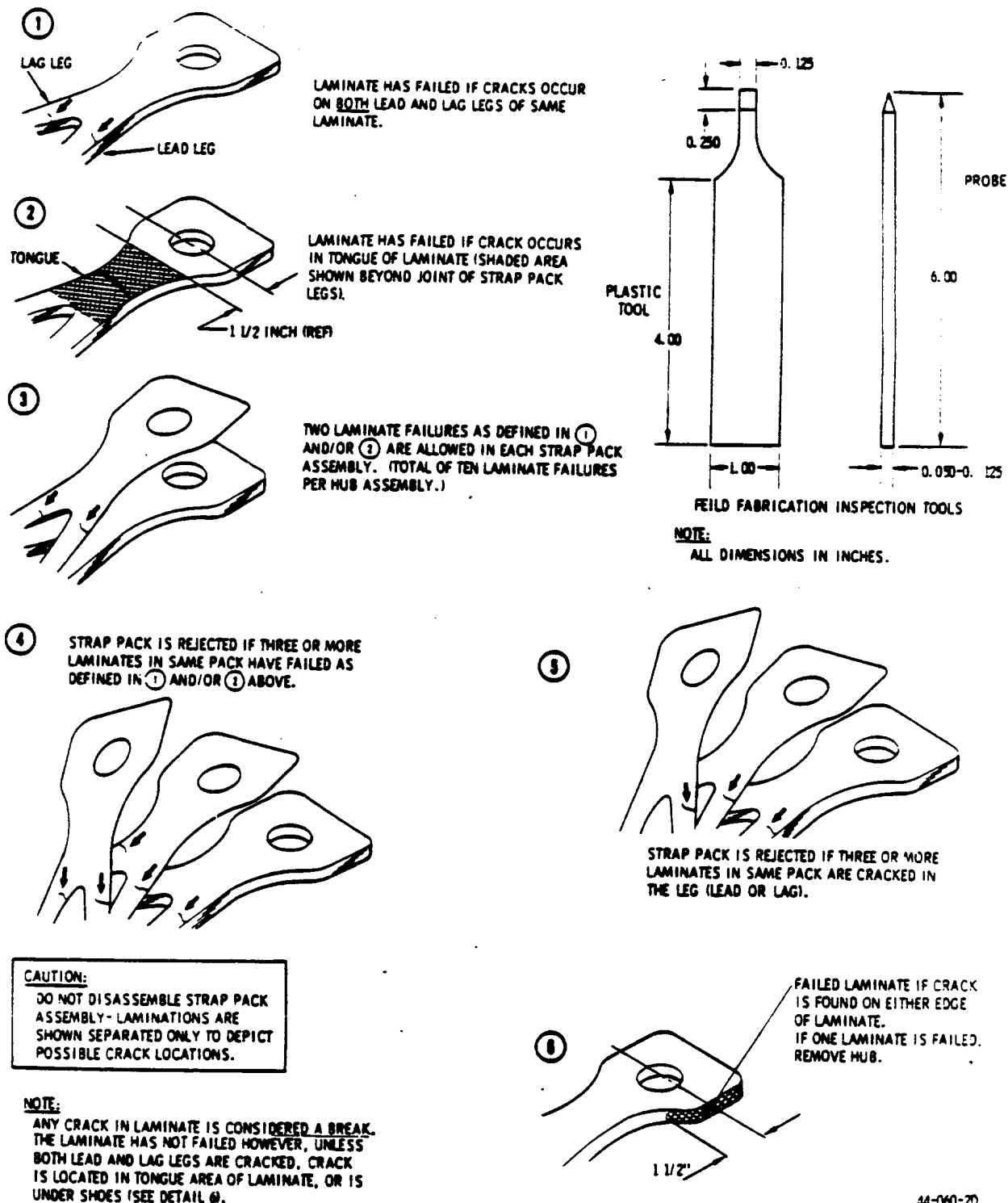
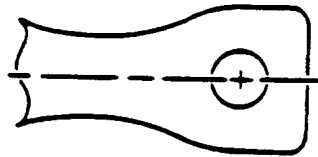


Figure 1. Main Rotor Hub Strap Assembly Inspection

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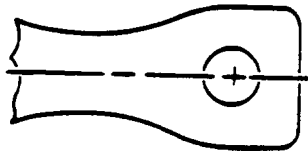
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DETAIL 1 ACCEPTABLE



ALL LAMINATES STRAIGHT.  
NO GAPS.



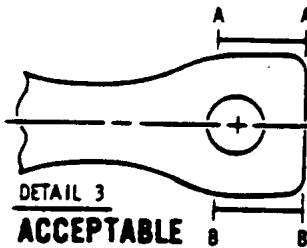
DETAIL 2 ACCEPTABLE



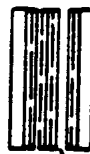
ALL LAMINATES STRAIGHT. SINGLE GAP  
EXISTING ADJACENT TO EITHER SHOE.

NOTE:

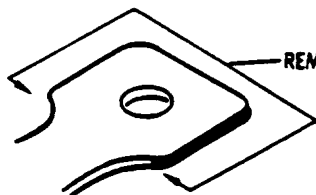
WHITE TEFLON MAY APPEAR WRINKLED AND EXTEND PAST END OF LAMINATES PREVENTING CLEAR VIEW OF LAMINATES. WHEN THIS OCCURS, LOOK ALONG EITHER SIDE IN AREA A-A OR B-B (DETAIL 3).



DETAIL 3  
ACCEPTABLE



ALL LAMINATES STRAIGHT. SINGLE GAP  
EXISTING ANYPLACE WITHIN LAMINATES.



REMOVE EXCESS TEFLON THIS AREA.

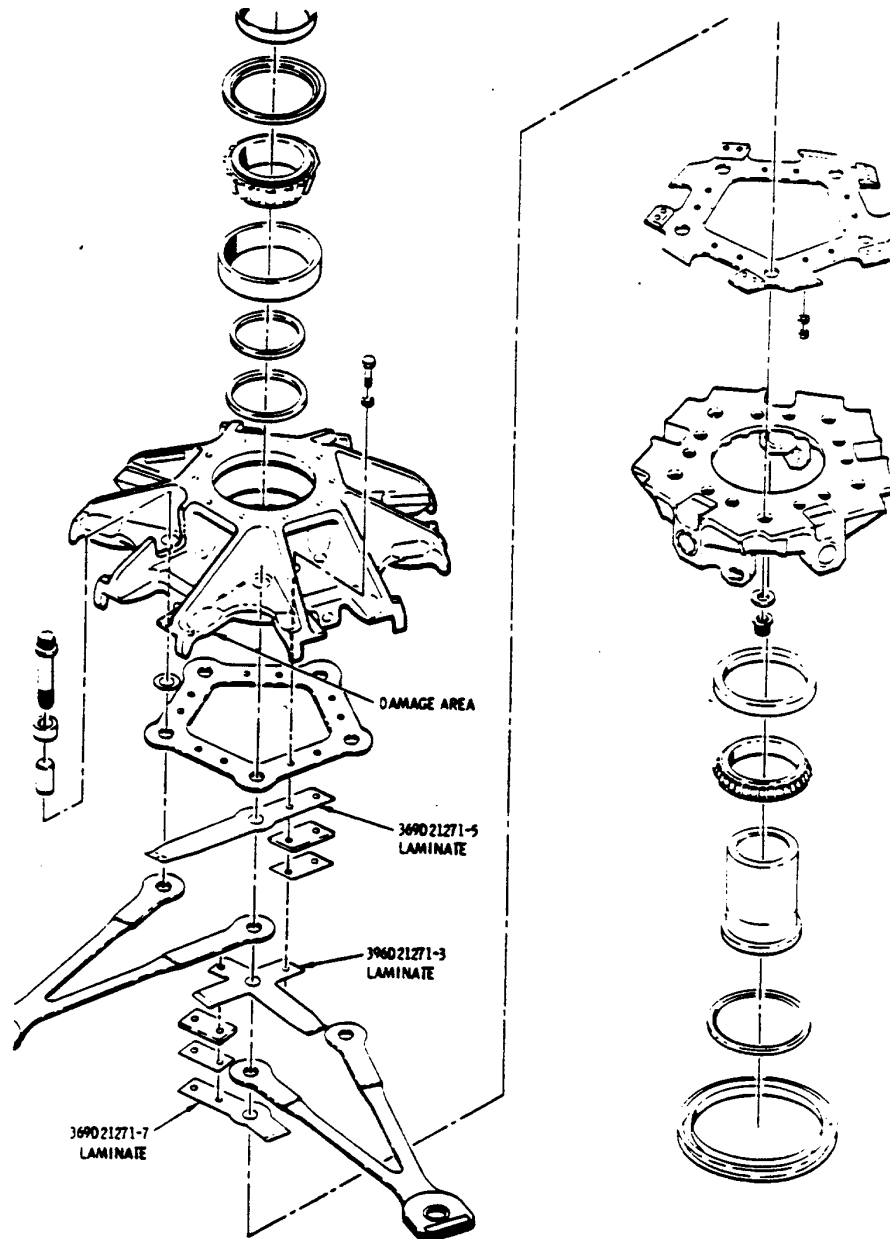
Figure 2. Strap Pack Inspection and Preparation

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### CAUTION

Do not disassemble strap pack or hub assembly. Hub assembly is shown separated only for clarification of location of possible cracks and damage.

NOTE: Model 369D,E,F/FF shown; Model 369H, 369A/OH-6A is similar.

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Figure 3. Main Rotor Hub Laminate Inspection

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