

URGENT

*TB 1-1520-240-20-95

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN
AIRCRAFT ONE TIME RECURRING INSPECTION OF POWER DISTRIBUTION FEEDER WIRING FOR
FRAYING/CHAFFING AND ARCING/BURNING;
CERTAIN POWER DISTRIBUTION PANEL (PDP)
CIRCUIT BREAKERS (CBS) FOR WATER INTRUSION INDUCED CORROSION OR ARCING AND
BURNING, AND INSTALLATION OF CIRCUIT BREAKER (CB)
COVER/SEALS
FOR
ALL CH-47D, MH-47D, AND MH-47E AIRCRAFT

Headquarters, Department of the Army, Washington, D. C.
30 APRIL 1997

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NOTE

THIS PUBLICATION IS EFFECTIVE UNTIL RESCINDED OR SUPERSEDED.

1. Priority Classification. Urgent

a. Aircraft in Use. Upon receipt of this Technical Bulletin (TB) the condition status symbol of the cited aircraft will be changed to a red horizontal dash "-". The red horizontal dash "-" may be cleared when the inspection of paragraph 8 below is completed. The affected aircraft shall be inspected as soon as practical but no later than the task/inspection suspense date. Failure to comply with the requirements of this TB within the time frame required will cause the status symbol to be upgraded to a red 'X'.

b. Aircraft in Depot Maintenance. Inspect and correct prior to issue. Aircraft shall not be issued until compliance with this TB has been completed.

c. Aircraft Undergoing Maintenance. Same as paragraph 1a.

d. Aircraft in Transit. Same as paragraph 1a.

e. Maintenance Trainers (Category A, B). Same as paragraph 1 a.

***This TB supersedes USAATCOM Message 141323Z APR 97 (CH-47-97-ASAM-07)**

- f. Component/Parts in Stock at All Levels (Depot and Others) including War Reserves. N/A.
- g. Components/Parts in Work. N/A.

2. Task/Inspection Suspense Date. Within 10 hours/14 days.

3. Reporting Compliance Suspense Date. No later than 2 May 1997 per paragraph 14a of this TB.

4. Summary of the Problem.

a. The CH-47 helicopter is designed with two redundant three-phase 400 hertz AC electrical power distribution systems. Fault protection is provided through magnetic type CBs and generator control units. The two AC systems are normally isolated and operate independently of each other. If one generator goes off-line, the generator contactor relays and bus tie CBs act to interconnect the systems (number 1 and number 2 main AC busses), allowing the remaining generator to supply all AC power requirements. DC power is also supplied off each AC system through voltage rectifiers.

b. Inherent cockpit water intrusion is subjecting the power distribution panel (PDP) main CBs (i.e., phase A/B/C number 1 and number 2 AC Auxiliary (AUX) PDP feed CBs (MH47E installation only) and phase A/B/C number 1 and number 2 AC bus tie CBs) to water entry. Subsequently, moisture/salt water induced corrosion is causing a conductive path buildup between the individual CB phase case lower power studs and the metal restraint pin which mechanically secures the 3 case CB assembly together. If a sufficient conductive path develops, arcing occurs, resulting in a short circuit between phases.

NOTE

A phase short between power distribution feeder wiring may also result in the problem as described below. Once a phase short occurs, the appropriate generator control unit (GCU) functions normally to take the faulted side generator off-line. With the generator contactor relay switch open (relay de-energized) and bus tie closed (gang bar on position), system design allows the number 1 and number 2 AC distribution systems to become interconnected and the non-faulted side generator to power all AC distribution busses. With the fault still present, the expected design result is an automatic bus tie over-current trip condition. By design, once the bus tie CB trips the initial fault would again be isolated, allowing the non-faulted side generator to maintain power to the non-faulted side busses. However, it is suspected that moisture/salt water induced corrosion may cause an electrical system anomaly wherein the bus tie CB may or may not function to trip prior to the GCU reaction. The end result is both generators going off-line with only 28V DC essential bus availability.

The ramifications of the foregoing can be catastrophic, especially during IMC condition.

c. Our investigation of this cockpit water intrusion and electrical system anomaly problem has revealed that it is common to the CH-47D and MH-47D/E aircraft.

d. For manpower/downtime and funding impacts, see paragraph 12 below.

e. The purpose of this TB is as follows:

(1) Inspect power distribution feeder wiring for evidence of fraying/chaffing and arcing/burning, and to replace any that show signs of such.

(2) Inspect PDP bus tie and AUX feed main CBs for evidence of water/moisture, arcing/burning and corrosion/salt deposits, and to replacement of any that show signs of such.

(3) Establishes a recurring 200 hour phase inspection requirement for all CH-47 aircraft.

(4) Emphasize covering cockpit electrical components such as P.D.P.S, and instrument panels/ console, during aircraft washing and cleaning.

(5) To immediately requisition, and install (as soon as they become available), PDP AUX feed (MH-47E only) and bus tie CB plastic dust boots (water proof covers with sealing capability) over the PDP AUX feed and bus tie CBs. The CB dust boot installation shall be performed subsequent to CB inspection listed in paragraph 9b.

f. These TB procedures simple modification will significantly reduce the possibility of cockpit water intrusion preve inducing PDP bus tie and AUX feed main CB corrosion and the subsequent shorting of the AC electrical system.

5. End Items to be Inspected. All CH-47D, MH-47D, and MH-47E aircraft.

6. Assembly Components to be Inspected. N/A.

7. Parts to be Inspected.

a. CH-47D and MH-47D aircraft:

NOMENCLATURE	PART NUMBER	NATIONAL STOCK NUMBER
NO. 1 AC BUS TIE CIRCUIT BREAKER	AM3-Z370-2	5925-01-130-3573
NO. 2 AC BUS TIE CIRCUIT BREAKER	AM3-Z370-2	5925-01-130-3573

b. MH-47E aircraft:

NOMENCLATURE	PART NUMBER	NATIONAL STOCK NUMBER
NO. 1 AC AUX PDP FEED CIRCUIT BREAKER	AM3C3A45-1N/A	
NO. 1 AC BUS TIE CIRCUIT BREAKER	AM3-Z370-2	5925-01-130-3573
NO. 2 AC AUX PDP FEED CIRCUIT BREAKER	AM3C3A45-1N/A	
NO. 2 AC BUS TIE CIRCUIT BREAKER	AM3-Z370-2	5925-01-130-3573

8. Inspection Procedures.

- a. Prepare the aircraft for safe ground maintenance.
- b. Battery disconnected [refer to Chapter 1, TM 55-1520-240-23-1 (CH-47D and MH-47D) or TM 1-1520-252-23-1 (MH-47E)].
- c. Electrical power off.
- d. Hydraulic power off.
- e. Open No. 1 and No. 2 PDP and remove the No. 1 and No. 2 AC bus tie CBs and No. 1 and No. 2 AUX PDP feed CBs [refer to TM 55-1520-240-23-7, Task 9-10 (CH-47D and MH-47D), or TM 1-1520-252-23-9, Task 9-14 (MH-47E)].

NOTE

Procedure is the same to gain access to CBs in the No. 1 or No. 2 power distribution panels (PDPs) in all CH/MH-47 aircraft.

- f. (CH-47-D and MH47D) Visually inspect the No. 1 and No. 2 AC bus tie CBs (refer to TM 55-1520-240-23P-2, Figure 307, Index 26, and Figure 309, Index 31) for presence of water/moisture, arcing/burning, and CB terminal studs/hardware for evidence of corrosion/salt. Pay particular attention to lower lock washer (washer contacting CB case) area for any signs of corrosion/salt deposits.

NOTE

Corrosion may form on under side of CB terminal stud lower lock washer or in adjacent area of CB case seam.

- g. (MH-47E) Visually inspect the No. 1 and No. 2 AC bus tie CBs (refer to TM 1-1520-252-23P-3, Figure 9-7, Index 35, and Figure 9-8, Index 43) and the No. 1 and No. 2 AUX PDP feed CBs (refer to TM 1-1520-252-23P-3, Figure 9-7, Index 44, and Figure 9-8, Index 43) for evidence of water/moisture, arcing/

burning, and CB terminal studs/hardware for evidence of corrosion/salt. Pay particular attention to lower lock washer (washer contacting CB body) area for any signs of corrosion/salt deposits.

NOTE

Corrosion may form on under side of CB terminal stud lower lock washer or in adjacent area of CB case seam.

h. Replace any CB showing signs of water/moisture intrusion, arcing/burning, or corrosion/salt deposits. Replace the CB in accordance with TM 55-1520-240-23-7, Tasks 9-10 and 9-11 (CH-47D and MH-47D) or TM 1-1520-252-23-9, Tasks 9-14 and 9-15 (MH-47E) within task/inspection suspense date.

i. Visually inspect the No. 1 and No. 2 AC power distribution (feeder) wires for evidence of fraying/chaffing and arcing/burning.

j. Replace any power distribution/feeder wire showing signs of above (refer to TM 55-1500-323-24, Section 14).

k. If no CB shows signs of water/moisture, arcing/burning, or corrosion/salt deposits, record and report compliance with the inspection portion of this TB in accordance with paragraph 14 below.

l. For corrective action for all CH/MH-47D/E aircraft to reduce the possibility of water intrusion from corroding PDP main CB terminal studs and the subsequent shorting of the AC electrical system, refer to para-graph 9 below.

9. Correction Procedures.

a. Immediately requisition dust boot parts kits specified in paragraph 10a below. Requisition two (2) kits for CH-47D and MH-47D aircraft, and four (4) kits for MH-47E aircraft.

NOTE

It may take 6 to 8 months for DLA to procure sufficient parts kits to support this requirement. Ensure your requisitions are submitted immediately through normal supply channels, and continue to monitor status until parts kits are received.

b. Upon receipt of the dust boot parts kits specified in paragraph 10 a below, perform the following main-tenance procedures.

(1) Prepare the aircraft for safe ground maintenance.

(2) Battery disconnected [refer to Chapter 1, TM 55-1520-240-23-1 (CH-47D and MH-47D) or TM 1-1520-252-23-1 (MH47E)].

(3) Electrical power off.

(4) Hydraulic power off.

(5) Open No. 1 and No. 2 PDP and remove the No. 1 and No. 2 AC bus tie CBs and No. 1 and No. 2 AUX PDP feed CBs [refer to TM 55-1520-240-23-7, Task 9-10 (CH-47D and MH-47D), or TM 1-1520-252-23-9, Task 9-14 (MH-47E)].

NOTE

Procedure is the same to gain access to CBs in the No. 1 or No. 2 power distribution panels (PDPs) in all CH/MH-47 aircraft.

(6) (CH-47-D and MH-47D) Visually inspect the No. 1 and No. 2 AC bus tie CBs (refer to TM 55-1520-240-23P-2, Figure 307, Index 26, and Figure 309, Index 31) for evidence of water/moisture, arcing/burning, and CB terminal studs/hardware for evidence of corrosion/salt. Pay particular attention to lower lock washer (washer contacting CB case) area for any signs of corrosion/salt deposits.

NOTE

Corrosion may form on under side of CB terminal stud lower lock washer or in adjacent area of CB case seam.

(7) (MH-47E) Visually inspect the No. 1 and No. 2 AC bus tie CBs (refer to TM 1-1520-252-23P-3, Figure 9-7, Index 35, and Figure 9-8, Index 43) and the No. 1 and No. 2 AUX PDOP feed

CBs (refer to TM 1-1 520-252-23P-3, Figure 9-7, Index 44, and Figure 9-8, Index 43) for presence of water/ moisture, arcing/burning, and CB terminal studs/hardware for evidence of corrosion/salt. Pay particular attention to lower lock washer (washer contacting CB body) area for any signs of corrosion/salt deposits.

NOTE

Corrosion may form on under side of CB terminal stud lower lock washer or in adjacent area of CB body seam.

(8) Immediately replace any CB showing signs of water/moisture intrusion, arcing/burning, or corrosion/salt deposits. Replace the CB in accordance with TM 55-1520-240-23-7, Tasks 9-10 and 9-11 (CH-47D and MH-47D) or TM 1-1520-252-23-9, Tasks 9-14 and 9-15 (MH-47E).

(9) Visually inspect the No. 1 and No. 2 AC power distribution (feeder) wires for evidence of fray-ing/chaffing and arcing/burning.

(10) Replace any power distribution/feeder wire showing signs of above (refer to TM 55-1500-323-24, Section 14).

(11) Prepare aircraft for safe ground maintenance. Disconnect battery and turn off electrical and hydraulic power.

(12) Remove PDP CBs listed in paragraph 6 above. Refer to TM 55-1520-240-23-7, Task 9-10 (CH-47D and MH-47D) or TM 1-1520-252-23-9, Task 9-14 (MH-47E).

(13) Position the plastic boot from the parts kit through the PDP inside CB opening, ensuring that the molded word 'ON' on the plastic boot is in proper alignment with the printed word 'ON' on the CB. Install the steel frame with flanged side facing forward, ensuring that proper contact is made with the plastic boot and PDP inside cover.

NOTE

To attain the proper seal, ensure that the flange is not installed upside down and that the plastic boot contacts the flanged side of the steel frame symmetrically.

(14) Install the CB through the back side of the PDP opening and draw firmly into place using the six (6) screws with O-rings provided in the parts kit.

(15) Complete CB installation in accordance with TM 55-1520-240-23-7, Task 9-11 (CH-47D and MH-47D) or TM 1-1520-252-23-9, Task 9-15.

c. Report compliance with the above in accordance with paragraph 14b below.

10. Supply/Parts and Disposition.

a. Parts Required.

(1) Items cited in paragraph 7 above may be required to comply with above paragraphs 8 and 9 of this TB.

(2) The following items will be required to comply with paragraph 9 above of this TB:

NOMENCLATURE	PART NUMBER	NATIONAL STOCK NUMBER
PARTS KIT, DUST BOOT	HE1050	2530-00-755-6196

b. Requisitioning Instructions. Requisition replacement parts through normal supply channels using normal supply procedures. All requisitions shall use project code "(XDE" per this TB.

NOTE

Project code "(DE" is required to track and establish a data base of stock fund expenditures incurred by the field as a result of TB actions.

c. Bulk and Consumable Materials. N/A.

- d. Disposition. Dispose of removed parts IAW normal supply procedures. A ODR is not required.
- e. Disposition of Hazardous Material. N/A.

11. Special Tools, Jigs and Fixtures Required. N/A.

12. Application.

- a. Category of Maintenance. AVUM. Aircraft downtime will be charged to AVUM.
- b. Estimated Time Required.
 - (1) Total of 3 man-hours using 1 person.
 - (2) Total of 3 hours downtime for one end item.
- c. Estimated Cost Impact of Stock Fund Items to the Field.
 - (1) CH-47D and MH-47D

NOMENCLATURE	PART NO.	NSN	QTY	UNIT COST	TOTAL COST
Parts Kit	HE1050	2530-00-755-6196	2	\$17.10	\$34.20
(2) MH-47E					
Parts Kit	HE1050	2530-00-755-6196	4	\$17.10	\$68.40

- d. TB/MWOs to be Applied Prior to or Concurrently with this Inspection. N/A.
- e. Publications Which Require Change as a Result of This Inspection.
 - (1) TM 55-1520-240-23-7, Tasks 9-10 and 9-11.
 - (2) TM 1-1520-252-23-9, Tasks 9-14 and 9-15.
 - (3) TM 55-1520-240-23P-2, Figures 307 and 309.
 - (4) TM 1-1 520-252-23P-3, Figures 9-7 and 9-8
 - (5) TM 55-1520-240-PM
 - (6) TM 1-1520-252-PM

13. References.

- a. TM 55-1520-240-23-7.
- b. TM 55-1520-240-23P-2.
- c. TM 1-1520-252-23-9.
- d. TM 1-1520-252-23P-3.
- e. TM 55-1520-240-PM.
- f. TM 1-1520-252-PM.
- g. TM 55-1500-323-24.

14. Recording and Reporting Requirements.

- a. Reporting Compliance Suspense Date (Aircraft). Upon entering requirements of this TB on DA Form 2408-13-1 on all subject MDS aircraft, forward a priority message, datafax or E-Mail to Commander, ATCOM, ATTN: AMSAT-R-X (SOF Compliance Officer), per AR 95-3. Datafax number is DSN 693-2064 or commercial (314) 263-2064. E-Mail address is 'AMSATRXS@EMH4.STL.ARMY.MIL'. The report will cite this TB number, date of entry in DA Form 2408-13-1, the aircraft mission design series and serial numbers of aircraft in numerical order.
- b. Task/Inspection Reporting Suspense Date (Aircraft). Units will forward a priority message or datafax to: Commander, ATCOM, AMCPM-CH-L. Datafax number is DSN 693-1485 or Commercial (314)263-1485.

The report will cite this TB number, date of inspection, aircraft serial number, aircraft hours, and results of the Inspection. Inspection and reports will be completed no later than 5 working days after task/inspection suspense date.

- c. Reporting Compliance Suspense Date (Spares). N/A.
- d. Task/Inspection Reporting Suspense Date (Spares). N/A.
- e. The following forms are applicable and are to be completed in accordance with DA PAM 738-751, 15 June 1992:
 - (1) DA Form 2408-13, Aircraft Status Information Record.
 - (2) DA Form 2408-13-1, Aircraft Inspection and Maintenance Record.
 - (3) DA Form 2408-15, Historical Record for Aircraft.
 - (4) DA Form 2408-18, Equipment Inspection List (carry the inspection on the DA Form 2408-18 until it is incorporated into the phase TM). ULLS-A users should use an 800 number for the inspection until it is incorporated into the phase TM.

15. Weight and Balance. N/A.

16. Points of Contact.

- a. Technical point of contact for this TB is Mr. Larry Wieschhaus, AMSAT-R-ECC, DSN 693-6678 or commercial (314)263-6678. His data fax number is DSN 693-1485 or commercial (314)263-1485.
- b. Logistical point of contact for this TB is Mr. Mike Melliere, AMCPM-CH-L, DSN 693-1901 or commercial (314)263-1901. His data fax number is DSN 693-1485 or commercial (314)263-1485.
- c. Wholesale materiel point of contact (Spares) for this TB is Mr. Hal Barnes, AMSAT-I-SACA, DSN 693-6031, commercial (314)263-6031, fax DSN 693-6022 or commercial (314)263-6022.
- d. Forms and records point of contact for this TB is Ms. Ann Waldeck, AMSAT-I-MDM, DSN 490-2318 or commercial (314)260-2318.
- e. Safety point of contact for this TB is Mr. Jim Wilkins. AMSAT-R-X, DSN 693-2258 or commercial (314)263-2258.
- f. Foreign Military Sales (FMS) recipients requiring clarification of action advised by this TB should contact CW5 Jay Nance/Mr. Ron Van RFlees, AMSAT-D-S, DSN 693-7844/3216 or commercial (314)263-7844/3216.
- g. After hours contact ATCOM Command Operations Center (COC) DSN 693-2066/7 or commercial (314)263-206687.

By Order of the Secretary of the Army:

Official:



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