URGENT

TB 1-2835-205-20-4

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

ONE TIME INSPECTION FOR ALL CH–47D, MH–47D, AND MH–47E AIRCRAFT

OPERATIONAL RESTRICTIONS AND REVISION TO HISTORICAL RECORDS FOR T–62T–2B, AUXILIARY POWER UNIT (APU)

Headquarters, Department of the Army, Washington, D. C.
15 November 1999

NOTE

THIS PUBLICATION IS EFFECTIVE UNTIL SUBJECT AIRCRAFT HAS BEEN INSPECTED UNLESS SOONER RESCINDED OR SUPERSEDED.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 paragraphs 8 and 9 below are 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 technical bulletin within the timeframe specified will cause the status symbol of the affected aircraft to be upgrade to a **red // X //.**

b. Aircraft in Depot Maintenance. Same as paragraph 1.a.

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

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

(1) Surface/Air Shipment. Same as paragraph 1.a.

(2) Ferry Status. Same as paragraph 1.a.

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

f. Component/Parts in Stock at All Levels (Depot and Others) Including War Reserves. Same as paragraph 1.a. above.

g. Component/Parts in Work (Depot Level and Others). Same as paragraph 1.a. above.

This TB supersedes USAAMCOM CH–47–00–01 and CH–47–00–02 Messages.

2. **Task/Inspection Suspense Date.** Prior to next flight or APU start.

NOTE

Aircraft may complete a one time flight, with intermediate stops, to a suitable maintenance facility prior to inspection. The one time flight will not exceed 20 APU starts.

3. **Reporting Compliance Suspense Date**. No later than 29 October 1999 IAW paragraph 14.a. of this TB.

4. **Summary of the Problem**.

a. Background.

(1) In 1995 there was an incident where an APU compressor wheel burst during start−up (see reference 13.a.). The failure was attributed to fatigue which originated from bolt holes on the back of the wheel (see reference 13.b.). The damaging fatigue cycles are incurred by starting the APU.

(2) Previously, APU starts have not been recorded and have not been maintained and transferred with the APU. Currently, start cycles for a particular compressor wheel are estimated based on the hours logged on the aircraft records. The estimates use four APU starts for one flight hour.

(3) APU's overhauled since November 1996 were subject to magnetic particle inspection of the compressor wheel for fatigue cracks and are given a one time life extension of 2100 starts since inspection at depot (see "NOTE" in para 9). Only APU's specifically listed in paragraph 9.b. below are authorized to operate up to 525 hours or 2100 starts since inspection (SSI). Future APU's from depot shall have forms and records reflecting this new retirement life.

(4) The data from these inspections indicate that with no life limit, which is the current situation, the T−62T−2B APU compressor wheel has a high probability of catastrophic failure. In the event of an impeller burst, up to three pieces of the impeller may exit the APU radially. These pieces will weigh up to 1.1 pounds each and will be moving at extremely high velocity.

(5) A new design has been approved for the compressor wheel which will have a greater fatigue life. The new wheels will be incorporated by OLR team using MWO or by depot.

b. For manpower/downtime and funding impacts see para 12.

c. The purpose of this message is to impose a retirement life on APU compressor wheels installed on APU P/N 160150−10 or 160150−100 and starts since inspection (SSI) limits from time of depot inspection. Additionally, this message adds historical record requirements that will allow tracking of APU usage by starts. It also imposes restrictions on APU's with non−inspected wheels.

5. **End Items to be inspected**. All CH−47D and MH−47D and MH−47E aircraft.

NOTE

APUs received from depot accounts direct from Cherry Point will Not require inspection. APUs in ASL/PLLS will require compliance with this technical bulletin.

6. **Assembly Components to be Inspected**.

NOMENCLATURE	PART NUMBER	NATIONAL STOCK NUMBER
Auxiliary Power Unit	160150−10	
	160150−100	2835−01−092−2037

7. **Parts to be Inspected**. N/A.

8. **Inspection Procedures**.

a. Inspect aircraft condition change DA Form 2408−16 to determine time since new (TSN) of the APU (based upon aircraft flight hours).

b. If the APU serial number is listed paragraph 9.b. below, it has a compressor wheel which was inspected during depot overhaul. Determine the time it has been operating since the inspection. If hours cannot be determined, contact either 2410 Hotline (listed in para 16.d.) or logistical POC (listed in para 16.b.).

NOTE

All historical record data for APU hours refers to aircraft operating time, not APU operating time.

c. The TSN (8.a. above and time since inspected if applicable (8.b. above). Calculate the starts accumulated. Multiply the TSN and the aircraft time since inspected by 4. This calculated number of starts based upon APU time since new will be used to determine the life limit and restrictions as stated in paragraph 9.c. below as well as the basis for recording and maintaining APU starts in the future. The time since inspected start number will be used to allow extended life of the APU wheel based upon the inspection and predicted crack growth propagation.

9. **Correction Procedures.**

NOTE

The 5360 starts since new may only be exceeded if the APU's have undergone NDI inspection of the compressor wheel. In this case an additional 2100 starts since inspection is authorized regardless of the original starts since new.

a. Any APU exceeding 5360 starts is unserviceable (1340 times 4 equals 5360) and the aircraft will be placed on a **red //X//** and reported as NMCM Depot, unless a NDI inspection of compressor wheel was performed at overhaul or extension is authorized IAW paragraph 9.b.

b. The following T–62T–2B APU's have an operating limit of 2100 starts since inspection (SSI) (525 hours times 4 equals 2100 starts). For APUs listed use either starts since new (5360) or starts since inspection (2100) to establish the limit, whichever yields the greater remaining life. In addition, compressor wheels inspected in the future will be identified with a serial number suffix //IW//. This will be reflected in the DA Form 2410 accompanying the unit. The compressor wheels in all T–62–2B APUs inspected at Cherry Point since February 1996 have been NDI'd. If an APU's serial number is not listed below but it can be established through the 2410 hotline or PMO that it has been through Cherry Point after February 1996, it will have an additional 2100 starts or 525 hours of unrestricted use from the date and time of that inspection.

827502	827503	827504	827514	827516	827517
8275523	8275528	8375504	837508	837509	837511
837515	837519	837520	837523	837524	837525
847504	847507	847509	847512	847514	847515
847516	847519	847520	847523	847802	850606
857501	857519	857525	857529	857538	857540
857546	857548	857555	857565	857566	857567
857571	867501	867502	867503	867506	867508
867516	867519	867527	867532	867533	867535
867545	867548	867558	867591	867559	877501
877502	877505	877507	877508	877509	877525
877528	877529	877535	877539	877552	877556
877557	877562	877563	877564	877570	877572

887507	887511	887514	887528	887530	887533
887536	887543	887556	887557	887558	897507
897509	897511	897514	897517	897520	897521
897524	897526	897537	897539	897546	897547
897549	897550	897561	897564	897568	897569
897570	897572	897575	897583	910004	910010
920074	920077	920115	920119	930135	930138
930152	930167	930168	930191	930199	
A00001	A00002	A00003	A00014	A00028	
A00029	A00031	A00050	A00053	A00066	
A00059	A00060	A00067	A00077	A00082	
A00083	A00095	A00104			
SP−E910004	SP−E910010	SP−E920077			
SP−E920093	SP−E920119	SP−E930135			
SP−E930136	SP−E930145	SP−E930146			
SP−E930158	SP−E920130	SP−E930137			
SP−E93167	SP−E930168	SP−E930170			
SP−E930191	SP−E930199				

c. The following restrictions apply to serviceable APUs with over 2100 starts (525 APU hours times 4 equals 2100 starts TSN or TSI) which do not have a service life extension authorized per paragraph 9.b. Those aircraft will have the condition status code changed to a **circled red //X//**. The **circled //X//** entry shall state: “Aircraft restricted to APU ground and flight operations IAW SOF CH−47−00−01”. while the aircraft is on a **circled red //X//** it may be reported as fully mission capable (FMC).

(1) Do not operate the APU in−flight unless an emergency condition exists. Acceptable emergency conditions are found in Chapter 9 of TM 55−1520−240−10 and TM 1−1520−252−10.

(2) Only maintenance requiring APU operation should be performed with the APU running. Every effort should be made to minimize APU starts.

(3) During operational use of the aircraft, no one other than essential personnel shall be on board at any time the APU is in operation (except in case of emergencies). Avoid standing in the plane of rotation of the APU, either on the ramp, or to either side of the aircraft at station 594 when the APU is in operation. No one shall be permitted to move into or out of the aircraft by way of the ramp when the APU is in operation. Any movement through the plane of rotation of the APU alongside of the aircraft shall be accomplished as quickly as possible.

(4) No APU with greater than 2100 starts TSN or TSI shall be used in public displays.

(5) Utilize aviation ground power unit (AGPU) for starting and maintenance whenever possible.

(6) Do not operate the APU while inside a hangar.

(7) The person in the cockpit while the APU is started will monitor the APU until the “APU ON” light is on. This person will activate the APU shutoff switch in the event a compressor burst occurs during APU start.

(8) Post a fire guard any time the APU is started.

(9) Minimize APU starts in high density areas (personnel, equipment or structures).

d. The following forms and records instructions will apply.

(1) APU starts will now be counted. Once the APU start number has been calculated IAW paragraph 8 above, enter the number of starts on the DA form 2408−13, Block 7 (APU History) Current Starts.

(2) APU starts for each flight will be documented on DA Form 2408−12, Block 6A (APU: Starts) and at the end of the mission day totaled in Block 8 (APU: Starts), then transferred to DA Form 2408−13, Block 7, Today Starts. APU starts for maintenance or other purposes (Dailies, Raising the Ramp, Using the Heater, etc.) not associated with a flight nor accounted for on the DA Form 2408−12 will be recorded, in pencil on the DA Form 2408−13, Block 7, APU History Starts Today Block. When closing out the forms at the end of a mission day, the total from the DA Form 2408−12 will be brought forward and appended to the starts in the DA Form 2408−13, APU History Starts Today Block, before adding to current starts to get the total starts.

(3) A running total of starts will be kept on the DA Form 2408−13. APU starts will not be zeroed at the 15th or end of the month. Any time a T−62T−2B APU is removed/replaced or turned in for repair, copy the total number of accumulated starts from the latest DA Form 2408−13 to the APU DA Form 2408−5−1 (Equipment Modification Record Component) and the DA Form 2408−16 (For the APU) along with the date, and the aircraft tail number. Also, complete block 16 (APU SSN) on the DA Form 2410.

(4) Ensure that the DA Form 2408−13, Block 7, Current Starts, are changed when an APU is removed/replaced. Get the new APU starts from the APU DA Form 2408−5−1 or the APU 2408−16.

(5) Units will create a DA Form 2408−16 for each APU. Any time an APU is moved from one aircraft to another or turned in for overhaul, the total number of accumulated starts will be taken from the latest DA Form 2408−13 and entered in block 7, Significant Historical Data, of DA Form 2408−16 and block 16 of the DA Form 2410. For APUs received from overhaul, the number of accumulated starts will be tracked against the compressor wheel.

(6) New compressor wheels, P/N 4503340 and new turbine wheel P/N 4503999, which make up the new turbine assy, P/N 4504001, will have accumulative starts tracked. These parts are used on APU P/N 160150−10A or 160150−100A.

10. **Supply/Parts and Disposition.**

a. Parts Required. Items cited in paragraph 6 may be required to replace defective items.

b. Requisitioning Instructions. Contact logistical point of contact in paragraph 16.b. for requisitioning instructions for items cited in paragraph 6.

c. Bulk and Consumable Materials. N/A.

d. Disposition. Hold any discrepant part/component pending disposition instructions from logistical point of contact in paragraph 16.b., if disposition was not received with requisitioning instructions. In order to provide the quickest turnaround of serviceable assets, returned unserviceable APUs should be shipped in the most expeditious manner possible. Use an “FTE” document identifier for the turn−in document with a Project Code of “XF3” (X−RAY−FOXTROT−THREE), a RIC of “AJ5” (ALPHA−JULIET−FIVE), a SHIP TO DODDAC of W34TVE and a “P” Code in CC54. Do not use the automative return address in the ARIL.

e. Disposition of Hazardous Material. IAW Environmental Protection Agency directives as implemented by your servicing environmental coordinator (AR 200−1).

11. **Special Tools and Fixtures Required. N/A**

12. **Application.**

a. Category of Maintenance AVUM/AVIM/Depot/Contractor Team, as applicable. Aircraft downtime is − N/A.

b. Estimated Time Required. 0.5 hours for records checks.

c. Estimated Cost Impact to the Field. $23,775.80 per end item.

d. Publications Which Require Change as a Result of this Message.

(1) TB 1–1500–341–01

(2) TM 55–1520–240–23–1

(3) TM 1–1520–252–23–1

(4) TM 55–2835–205–23P

(5) DA Pam 738–751

13. **References.**

a. Message, CDR ATCOM, CH–47–96–ASAM–02

b. Message, CDR ATCOM, CH–47–97–ASAM–09

c. TM 55–1520–240–10, CH–47D, Operators Manual

d. TM 1–1520–252–10, MH–47E, Operators Manual

e. TB 55–1500–341–01, Aircraft Components Requiring Maintenance Management and Historical Reports

14. **Recording and Reporting Requirements.**

a. Reporting Compliance Suspense Date (Aircraft). Upon entering requirements of this technical bulletin on DA form 2408–13–1 on all subject MDS aircraft, forward a priority message, datafax or e–mail to CDR, AMCOM, ATTN: AMSAM–SF–A (SOF Compliance Officer), IAW AR 95–1. Datafax number is DSN 897–2111 or (256) 313–2111. E–mail address is, “SAFEADM@redstone.army.mil. The report will cite this technical bulletin, 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). Upon completion of inspection, units will forward a priority message to the logistical point of contact identified in paragraph 16.b. The report will cite aircraft serial number, APU serial number, and APU time since new (TSN), SSI, the new recorded starts and the date records were converted. Inspection and report will be completed no later than 7 days after receipt of this message.

c. Reporting Message Receipt (Spares). N/A.

d. Task/Inspection Reporting Suspense Date (Spares). Report S/N and TSN of all APUs in stock at all levels to the logistical point of contact in paragraph 16.b. Units upon receipt of spare APUs that have not converted the hours will convert to starts at this time.

e. The following forms are applicable and are to be completed IAW DA Pam 738–751, 15 Mar 99.

NOTE

ULLS–A Users will use applicable “E” forms.

(1) DA Form 2408–5–1, Equipment Modification Record (APU).

(2) DA Form 2408–13, Aircraft Status Information Record.

(3) DA Form 2408–13–1, Aircraft Inspection and Maintenance Record.

(4) DA Form 2408–15, Historical Record for Aircraft.

(5) DA Form 2408–16, Aircraft Component Historical Record.

15. **Weight and Balance.** N/A**.**

16. **Points of Contact.**

a. Technical Point of Contact for this message is Mr. James M. Wilson, AMSAM−RD−AE−I−C−H, DSN 897−3337 or (256) 313−3337, datafax is DSN 897−4348. E−mail is james.wilson@redstone.army.mil.

b. Logistical Point of Contact for this message is CW5 Al Trivitt, SFAE−AV−CH−L, DSN 897−3381 or (256) 313−3381, datafax DSN 897−4348. E−mail is trivitta@peoavn.redstone.army.mil.

c. Wholesale Materiel Point of Contact (Spares). N/A.

d. Forms and Records Point of Contact for this Message is Ms Ann Waldeck, AMSAM−MMC−RE−FF, DSN 746−5564 or (256) 876−5564, datafax is DSN 746−4904. E−mail is waldeck−ab@redstone.army.mil. The 2410 HOTLINE is DSN 897−2410 or (256) 313−2410. Alternate number is DSN 788−6092 or (256) 842−6092.

e. Safety Point of Contact for this Message is Mr. Robert D. Brock, AMSAM−SF−A, DSN 788−8632 or (256) 842−8632, datafax is DSN 897−2111 or (256) 313−2111. E−mail is bob.brock@redstone.army.mil.

f. Foreign Military Sales Recipients Requiring clarification of action advised by this technical bulletin should contact: CW5 Joseph L. Wittstrom, Security Assistance Management, AMSAM−SA, DSN 897−0681 or (256) 313−0681. E−mail is wittstrom−jl@redstone.army.mil or Mr. Ronnie W. Sammons, AMSAM−SA−CS−NF, DSN 897−0869 or (256) 313−0869, datafax is DSN 897−0411 or (256) 313−0411. E−mail is sammons−rw@redstone.army.mil. Huntsville, AL is GMT minus 6 hours.

g. After hours contact the AMCOM Command Operations Center (COC) DSN 897−2066/7 or (256) 313−2066/7.

17. **Reporting of Errors and Recommending Improvements.** You can improve this TB. If you find any mistakes or if you know of a way to improve these procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to: Commander, US Army Aviation and Missile Command. ATTN: ATTN: AMSAM−MMC−LS−LP, Redstone Arsenal, AL 35898−5230. You may also send in your comments electronically to our e−mail address: ls−lp@redstone.army.mil or by fax, 205−842−6542/DSN 788−6546. Instructions for sending an electronic 2028 may be found at the back of this manual immediately preceding the hard copy 2028.

The following format must be used if submitting an electronic 2028. The subject line must be exactly the same and all fields must be included; however only the following fields are mandatory: 1, 3, 4, 5, 6, 7, 8, 9, 10, 13, 15, 16, 17, and 27.

From: "Whomever" <whomever@avma27.army.mil>
To: <ls–lp@redstone.army.mil>

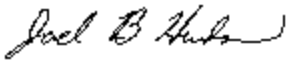
Subject: DA Form 2028

1. ***From:*** Joe Smith
2. *Unit:* home
3. ***Address:*** 4300 Park
4. ***City:*** Hometown
5. ***St:*** MO
6. ***Zip:*** 77777
7. ***Date Sent:*** 19–OCT–93
8. ***Pub no:*** 55–2840–229–23
9. ***Pub Title:*** TM
10. ***Publication Date:*** 04–JUL–85
11. *Change Number:* 7
12. *Submitter Rank:* MSG
13. ***Submitter FName:*** Joe
14. *Submitter MName:* T
15. ***Submitter LName:*** Smith
16. ***Submitter Phone:*** 123–123–1234
17. ***Problem:*** **1**
18. *Page:* 2
19. *Paragraph:* 3
20. *Line:* 4
21. *NSN:* 5
22. *Reference:* 6
23. *Figure:* 7
24. *Table:* 8
25. *Item:* 9
26. *Total:* 123
27. ***Text:***

This is the text for the problem below line 27.

By Order of the Secretary of the Army:

Official:



JOEL B. HUDSON
Administrative Assistant to the Secretary of the Army
9931301

ERIC K. SHINSEKI
General, United States Army
Chief of Staff

Distribution:

To be distributed in accordance with Initial Distribution Number (IDN) 313861 requirements for TB 1-2835-205-20-4.

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

THEN...JOT DOWN THE DOPE ABOUT IT ON THIS FORM. CAREFULLY TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL.

SOMETHING WRONG WITH PUBLICATION

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)

DATE SENT

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE

BE EXACT PIN-POINT WHERE IT IS

PAGE NO.	PARA-GRAPH	FIGURE NO.	TABLE NO.

IN THIS SPACE, TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT.

PRINTED NAME, GRADE OR TITLE AND TELEPHONE NUMBER	SIGN HERE

TEAR ALONG PERFORATED LINE

DA FORM 1 JUL 79 2028-2

PREVIOUS EDITIONS ARE OBSOLETE.

P.S.--IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigram = .035 ounce
1 dekagram = 10 grams = .35 ounce
1 hectogram = 10 dekagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	*To*	*Multiply by*	*To change*	*To*	*Multiply by*
inches	centimeters	2.540	ounce-inches	newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29,573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	newton-meters	1.356	metric tons	short tons	1.102
pound-inches	newton-meters	.11296			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

PIN: 077672-000