

URGENT

TB 1-1520-238-20-118

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

TAIL ROTOR BLADE INSPECTION FOR ALL AH-64 SERIES HELICOPTERS

Headquarters, Department of the Army, Washington, D. C.

17 January 2002

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.

NOTE

THIS PUBLICATION IS EFFECTIVE UNTIL RESCINDED OR SUPERSEDED.

1. Priority Classification. Urgent

NOTE

MACOM Commanders may authorize temporary exception from message requirements. Exception may only occur when combat operations or matter of life or death in civil disasters or other emergencies are so urgent that the override the consequences of continued aircraft operation.

a. Aircraft in Use. Upon receipt of this Technical Bulletin (TB) make the following entry on the DA Form 2408-13-1: Enter a red horizontal dash "-" status symbol with the following statement: "Conduct records check IAW TB 1-1520-238-20-118 prior to next flight, but no later than (NLT) 1 Oct 01". The red horizontal dash "-" may be cleared when the inspection of paragraph 8 is completed. The affected aircraft shall be inspected as soon as practical but no later than (NLT) 1 Oct 01 prior to next flight. Failure to comply with the requirements of this TB within the time frame will cause the status symbol to be upgraded to a red "x".

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

(1) Aircraft in AVIM or Depot. Same as paragraph 1a.

(2) Aircraft at Contractor Facility. Boeing will inspect DD 250 aircraft prior to those aircraft departing for ferry to final destination.

c. Aircraft in Transit.

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

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

d. Maintenance Trainers (Category A and B). Same as paragraph 1a .

e. Component/Parts in Stock Including War Reserves at All Levels (Depot and Others). Upon receipt of this TB, the materiel condition tags of all items in all condition codes listed in paragraph 6 and 7 shall be annotated to read "(TB 1-1520-238-20-118), Tail Rotor Inspection, Not Complied With".

This TB supersedes USAATCOM Safety of Flight Message 252112Z Aug 01 (AH-64-01-09).

TB1-1520-238-20-118

(1) Wholesale Stock –Upon receipt of this message, depot and materiel activity commanders will ensure all items in condition codes "A", "B", "C", "D", and "E", listed in paragraph 6 and 7, are placed in condition code "J" and tagged with a suspended tag/label–materiel, DD Form 1575/DD Form1575-1. Do not remove original condition tags. Report compliance with this TB IAW paragraph 14b(2) NLT 30 Nov01.

(2) Retail Stock – Report receipt of this TB IAW paragraph 14c(2). Upon Receipt of this message Commanders and others maintaining retail stock at installation level and below shall contact the supported aviation unit to perform the inspection required by paragraph 8 and the correction procedures of paragraph 9 on suspect materiel. Disposition of discrepant materiel will be IAW paragraph 10. Report compliance with this TB IAW paragraph 14c(2) NLT 30 Nov 01.

f. Component/Parts in Stock Including War Reserves at All Levels (Depot and Others). Items listed in paragraph 6 and 7 in work will not be issued until compliance with this TB.

2. Task/Inspection Suspense Date. N/A.

3. TAMMS Reporting Compliance Suspense Date. No report required per this TB.

4. Summary of the Problem.

a. SOF message AH-64-01-09 was issued on 28 Aug 01 requiring an initial inspection and a recurring 250 hour inspection of AH-64 Tail Rotor Blades. Additional assessment and evaluation of completed inspections will allow for a change to the recurring inspection interval.

b. For manpower/downtime and funding impacts. N/A.

c. The purpose of this TB is to ensure the following:

(1) Change the Task Inspection requirements on new blades with serial number C12--B052 and subsequent.

(2) Change the first note in paragraph 8c(2).

(3) Delete previous and add new note in paragraph 8f(2)

5. End Items to be inspected. All AH-64 Series aircraft.

6. Assembly Components to be Inspected.

NOMENCLATURE	PART NUMBER	NATIONAL STOCK NUMBER
Head, Rotary Wing	7-311421036	1615-01-154-7080
Head, Rotary Wing	7-311421036-7	1615-01-224-6951
Head, Rotary Wing	7-311421036-9 /-11 /-13	1615-01-307-0156

7. Parts to be Inspected.

NOMENCLATURE	PART NUMBER	NATIONAL STOCK NUMBER
Blade, Rotary Rudder	7-311422050- --3/ -5/ -7/ -9	1615-01-312-2387
Blade, Rotary Rudder	7-311422050- --3/ -5/ -7/ -9	1615-01-154-7139
Blade, Rotary Rudder	7-311422050- --5A/ -7A/ -9A	1615-01-441-6248
Blade, Rotary Rudder	7-311422050-3A	1615-01-441-6249

8. Inspection Procedures.

a. Conduct a records check of all tail rotor blades, to include recently installed new blades, to determine if the inspection IAW SOF AH-64-01-05 has been completed.

b. If initial inspection per SOF AH-64-01-05 has been completed, proceed to paragraph 8d.

NOTE

The plus or minus 10 percent tolerance window referenced in TM 1-1500-328-23 is not applicable for this inspection. Align these inspections with phase inspections when possible. Tail Rotor blades with 250 flight hours since last inspection are not released for flight until radiographs have been evaluated and results are received. Tail Rotor Blades inspected with less than 250 flight hours since last evaluated inspection, may continue to fly until the X-rays have been approved, but will not exceed 250 flight hours since last evaluated inspection or 250 hours Time Since New (TSN) for blade serial numbers C12-B052 and subsequent.

c. Tail Rotor Blades (0 TSN) with serial numbers C12-B052 and subsequent, must complete the initial X-ray inspection at or before 250 flight hours TSN. An initial X-ray inspection prior to installation is not required.

d. Visual Inspection –

(1) Every 250 hours, visually inspect the doublers and spars, both front and back side in the transition area and around the rivets for crazing (appearance of paint cracks) and/or delaminations using a 10x magnifier.

(a) If no crazing or delaminations are found, visual inspection is complete.

(b) If crazing is found in the transition area, inspect/repair IAW paragraph 9.

(c) If crazing is found around the rivets, contact the technical POC in paragraph 16a.

(d) If delamination is found, replace tail rotor blade. Submit Cat I QDR. Contact technical POC in paragraph 16a.

(2) Units will use this TB as authority to use their 800 inspection numbers for the new 250 hour visual inspection and AMB A/D 01-06 inspection on the DA 2408-18.

(a) Delete the old 125 hour AMB A/D 01-06 inspection.

(b) Create 4 new inspections (one for each blade by serial number) for the 250 hour visual and AMB A/D 01-06 inspection.

(1) If one or more blades are removed from the aircraft, delete that blade's inspection from DA Form 2408-18. Calculate the blade time remaining until next 250 hour inspection is due. Complete DA Form 2410 copy 1. Enter time remaining until next 250 hour inspection in the remarks block. Enter the date, aircraft serial number (S/N), aircraft hours (when blade is removed), and the blade hours remaining until the next 250 hour inspection is due on the DA Form 2408-5-1 for the blade.

(2) When a new/used blade is installed, add a new 250 hour inspection requirement based upon the new blade serial number to the DA Form 2408-18. If the blade is not new, obtain the blade time until the next 250 hour inspection from the DA Form 2408-5-1. Annotate the DA Form 2408-5-1 to show the date, aircraft serial number (S/N), aircraft hours (when blade was installed). Complete a DA Form 2410, copy 3 and annotate the remarks block with the blade time until the next 250 hour inspection.

(c) Any time the blades are removed in order to comply with the inspection requirements, units are required to complete a set of DA Form 2410. Copy 1 to show the removal of the blade, copy 2 to show NDI/Maintenance due, and copy 3 to show installation.

NOTE

The use of alternate radiographic equipment must be approved by the NDI POC at para 16c. Alternate radiographic equipment must meet the required 2T sensitivity requirements.

WARNING

Assure compliance with all applicable safety precautions set forth in TM 1-1500-335-23 (Non-Destructive Inspection Methods Manual). A hazard associated with exposure to ionizing radiation is that serious injury can be inflicted without pain, burning, or other sense of discomfort during the exposure period. Radiation protection shall be used utilized in accordance with AR 11-9.

WARNING

The laser light beam is dangerous and can cause blindness if it enters the eye either directly or reflected from a surface. Personnel should wear approved laser protection whenever in controlled area when laser rangefinder or laser target designators are being used. Laser shall be used only in controlled area by qualified personnel.

NOTE

The use of alternate radiographic equipment must be approved by the NDI POC at paragraph 16c. Alternate radiographic equipment must meet the required 2T sensitivity requirements.

e. NDT Inspection Procedure:

(1) Safe helicopter IAW para 13 a, b.

(2) Develop a "safe" radiation location for required X-ray exposures of tail rotor blades.

(3) Preparation of Tail Rotor Blade: Shall be free of any loose dirt or contaminants, which may generate film artifacts. Partial inspection for cause (visual indications, sites of mechanical damage) maybe performed on all exposed surfaces. Suspect damage will be suitable cause for further non-destructive evaluation.

(4) NDI Equipment Settings:

Typical equipment settings, inspection setup and exposure data are given in Table 1. Radiography process controls shall be in accordance with TM 1-1500-335-23.

(5) Equipment Setup: See Figure 1 and Figure 3 for assistance with equipment setup.

(6) Inspect the area where the root fittings and skin doublers intersect from inboard edge of doubler to the third rivet row. See Figure 2.

(7) Position film and desired nameplate data for exposure. The nameplate shall contain tail rotor serial number and date as a minimum. Nameplate should be placed next to tail rotor blade with steel shim backing.

(8) Place the 0.010" lead screen against the back of film pack for control of backscatter.

(9) Position Penetrimeters per page Figure 2 using 1.0, 1.7, 1.2, and .87 as shown. Note:

NOTE

Penetrimeters should be adjacent to area of interest and 2T hole resolution is required.

(10) Assure blade is vertical and in flat pitch. Assure inspection surface is perpendicular to the X-ray beam. The emergency hydraulic system may need to be activated to accurately position the tail rotor blade.

NOTE

SThe stabilator position must be in "horizontal" position to avoid contact and damage with the lift supporting the X-ray tube.

SX-ray procedures are allowed for blade positioning off the aircraft. If the blade is not installed on the aircraft, position the tail rotor blades using lead-shot bags or equivalent while maintaining the inspection surface perpendicular to the X-ray beam.

(11) Position the X-ray tube head for exposure.

(a) Using a "line level", level the X-ray tube by placing the line level on the upper surface of the case and adjusting.

(b) Extend a string from the center of the X-ray port to the rivet identified for the central radiation ray as shown in Figure 4. Using the line level on the string, make any height adjustments to the X-ray tube as necessary to perform a basic level test set-up.

(c) Using the laser and mirror set-up in Figure 5 and Figure 6, make any rotation and height adjustments necessary to achieve a perpendicular laser reflection. The laser should strike the mirror in close proximity to the rivet identified for "central ray" location.

(12) Maintain focus of the X-ray beam determined with laser for exposure E1 and E2.

(13) Set X-ray unit to the values given in Table 1.

(14) Make E1 and E2 exposures to cover both 301 stainless steel and aluminum areas.

Radiographic Inspection Data

Exposure No.	KV	MA	FFD (inches)	Time (sec)	Film Type	Film Size	Film Processing
E1	130	5	48	4 min 20 sec	M	4 1/2 X 10	Manual
E2	130	5	48	2 min 30 sec	M	4 1/2 X 10	Manual
E1	130	5	48	2 min	M	4 1/2 X 10	Auto
E2	130	5	48	1 min 20 sec	M	4 1/2 X 10	Auto

Remarks:

- The film density of the area of interest shall be between 1.6 to 3.7 H&D units. See Figure 2 for film density points to be taken.
- Exposure time may be changed as required to achieve density, reference TM 1-1500-335-23.
- Development of film should be conducted in a dry, cool, temperate environment, preferably in conditioned air.

Table 1

f. Recurring 250 hour Tail Rotor Blade inspections will be conducted IAW SOF AH-64-01-05, paragraph 8, TM 1-1520-238-23, IETM and this TB. This inspection will be accomplished by Level III or equivalent personnel trained in performance of this inspection.

(1) If a Level III or equivalent person trained in performance of this inspection is available, inspection may be completed locally. If additional interpretation of radiographs is required, contact the technical POC in paragraph 16a.

(2) If a Level III or equivalent person trained in the performance of this inspection is not available, trained N2 radiographers may make X-ray shots. X-Rays or blades from units without certified Level III radiographers trained in the Tail Rotor Blade inspection procedure and approve by the AMCOM Non-Destructive Test Center of Excellence (NDT COE) will be sent to: NonDestructive Test Center of Excellence, USAAM-COM, AMSAM--DSA--AS--AG (NDT COE S.Ratley), Redstone Arsenal, AL 35898-5000.

NOTE

When aircraft or individual blades are transferred, to include from contractor facilities, or if local storage facilities are not available, forward all X-rays to the NDT COE for storage/disposition. See paragraph 8f(2) for mailing address. The transferring facility/unit will provide the unit address of the gaining unit to the NDT COE along with the X-rays upon transfer.

(3) X-Rays sent to AMCOM NDT COE will be retained at AMCOM NDT COE. The following information will be included with each X-Ray: Aircraft Tail Number, Tail Rotor Blade serial number, current blade hours, name, address, phone number (commercial and DSN), and e-mail address of person shooting the X-Ray's. Units with certified Level III radiographers will submit the above information to NDT COE but retain the X-Rays. X-Rays will be stored IAW TM 1-1500-335-23 Nondestructive Inspection Methods, paragraph 6.7.20.2.

9. Correction Procedures.

a. Paint Cracking/ Cracks Inspection/ Repair Procedure-



Prior to sanding filler material, install masking tape (or equivalent) from the edge of the filler material inboard ensuring the complete coverage of the root fitting.



No sanding of the root fitting is authorized. Sanding of the fitting may cause damage, which would lead to blade rejection. Do not use power tools.

(1) Hand sand the affected area with 160 to 220 grit sandpaper to remove the topcoat and primer. Do not remove metal from root fitting or feather edges of doublers.

(2) Solvent wipe the area with isopropyl alcohol. Hand-wipe solvent. Allow to dry.

(3) Inspect for cracks with 10x magnifier. If no crazing/cracks is found, continue to paragraph 9b.

NOTE

There is distinct color difference between filler and adhesive.

(4) If crazing/ cracks are visible, carefully sand filler material using 220/320 grit sandpaper until crack indication disappears. While sanding stay focused on sanding only on the filler material. Incidental sanding of spar edges and doubles is acceptable: however it should be kept to a minimum.

(5) Solvent wipe the area with isopropyl alcohol. Hand-wipe solvent. Allow to dry.

(6) Cracks or debonds remaining after removal of filler material is cause for rejection. Cracks extending into adhesive, delaminated doublers, or corrosion pits on root fitting are not allowed. Submit a CAT 1 QDR and notify technical POC in paragraph 16a

NOTE

Scrim cloth (mesh like appearance) is embedded in the adhesive underneath the filler material. The surface of the scrim cloth may give visual indications of crazing.

- b. If no debonding or cracks is found, touch up area as follows--
 - (1) Smooth sanded repair area using 320 grit sandpaper then use 400 grit sandpaper to finish blending the area.
 - (2) Solvent wipe the area with isopropyl alcohol. Hand-wipe solvent. Allow to dry 15 minutes.
 - (3) Apply chemical conversion coating by brush or swab to any bare metal. Allow coating to remain on surface until color develops. Color need not be uniform in appearance. If the metal is stainless, the conversion coating will not change color and will not adversely affect the metal.
 - (4) Rinse with water or blot to remove excess (do not rub new coating).
 - (5) Air dry for 1 hour minimum or oven dry for 20 to 30 minutes at a temperature not to exceed 125 degrees F (52 C).
 - (6) Apply MIL-P-23377 to sanded area. Allow primer to dry for a minimum of 1 hour prior to top-coating or handing of part.
 - (7) Apply topcoat, MIL-C-46168, Type IV or MIL-C-53039. Allow to dry for minimum of 1 hour before handling.

NOTE

Newly painted surface will dry to touch in one hour and will dry hard in approximately 3 hours.

- c. Repeat this recurring blade inspection every 250 hours. Make appropriate entry on DA Form 2408-18 IAW paragraph 8d(2) to reflect the 250 hour recurring inspection for each blade.
- d. Verify DA Form 2408-16, Block 6j, reflects a life limit of 6201 hours. This includes the -7 blades. The interim 1000 hour life limit per SOF AH-64-01-04 is rescinded.

10. Supply/Parts and Disposition.

NOTE

HQDA will prioritize units and repair parts distribution.

- a. Parts Required. Items cited in paragraph 7 and/or 12 may be required to replace defective items.
- b. Requisitioning Instructions. Requisition replacement parts through normal supply channels using normal supply procedures. All requisitions shall use project code (cc 57-59) "X1G" (X-Ray -One -Golf).

NOTE

Project code "X1G" is required to track SOF costs in an attempt to establish a future fund to reimburse units for stock fund expenditures created by SOF messages.

- c. Bulk and Consumable Materials. N/A.

NOTE

X-Ray film and developer are identified in AMB A/D 01-06. Contact the Technical POC paragraph 16a for additional requirements.

NOMENCLATURE	PART NUMBER	NATIONAL STOCK NUMBER
Bushing	7-211421034	3120-01-163-4660
Bolt	HS4243V9-63	5306-01-177-5717
Washer, Pli	FT4162-9D287	5310-01-176-7025
Nut, Self-Locking	HS4133V9	5310-01-176-7064
Nut, Self-Locking	MS21224-8	5310-00-004-5119

NOMENCLATURE	PART NUMBER	NATIONAL STOCK NUMBER
Pin, Cotter	293-1014P19	5315-00-241-7330
Washer, Recessed	MS21206-C9	5310-01-058-6838

d. Disposition. Submit a CAT I QDR for blades failing the inspection per this TB. Hold any discrepant part/component pending disposition instructions for technical POC in paragraph 16a.

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

11. Special Tools, Jigs and Fixtures Required.

- a. LPX 160 digital X-Ray System, NSN 6635-01-417-1830 or equivalent, with laser attachment and tripod.
- b. Set, Penetrometer NSN 6635-01-059-2306 or equivalent.
- c. Film processing capability.
- d. Tape, Lead Identification.
- e. Three (3) inch line level.
- f. B1 Maintenance Stand.
- g. X-Ray film, Kodak, 4.5" x 17", 5073432 or 7" x 17", 5057690, or MX 125-7, 7" x 17" 5245246.

12. Application.

a. Category of Maintenance. AVIM/Depot/Contractor Team with AVIM Support. Aircraft downtime will be charged to AVIM. Report aircraft Non-Mission Capable Maintenance (NMCM) while undergoing inspection and correction IAW this TB. Report Aircraft Non-Mission Capable Supply (NMCS) IAW AR 700-138.

- b. Time Required.
 - (1) Time to Complete Inspection.
 - (a) Total of 16 man-hours using 4 persons.
 - (b) Total of 4 hours downtime for one end item.
 - (2) Time for Repair/Replacement.
 - (a) Total of 8 man-hours using 2 persons.
 - (b) Total of 4 hours downtime for one end item.
- c. Estimated Cost Impact of Stock Fund Items to the Field.

NOMENCLATURE	PART NUMBER/ NATIONAL STOCK NUMBER	QUANTITY	COST EACH	TOTAL \$
Blade Rotary Rudder	7-311422050-7 1615-01-312-2387	4	\$10,321.49	\$41,285.96
Maximum total cost per aircraft = \$41,285.96				

- 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. TM 1-1520-238-23 and TM 1-1520-Longbow/Apache IETM shall be changed to reflect this TB. A copy of this TB shall be inserted in the appropriate TM as authority to implement the change until the printed change is received.

13. References.

- a. Interactive Electronic Technical Manual (IETM): TM 1-1520-Longbow/Apache IETM, CD No. 1, Version 3.1.2, Data 19 Nov. 98, CD Date 1 Dec 98 or subsequent.
- b. TM 1-1520-238--23, Aviation Unit and Intermediate Maintenance Manual for AH-64A Apache Attack Helicopter, 16 May 94.
- c. DA PAM 738--751, 15 Mar 99.
- d. Safety of Flight Message (SOF), AH-64--01--05.
- e. Apache Maintenance Bulletin (AMB) A/D 01-06 rev 5 (or subsequent).

14. Recording and Reporting Requirements.

- a. The following forms are applicable and are to be completed in accordance with 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 (Blade Rotory Rudder).
- (2) DA Form 2408-13, Aircraft Status Information Record.
- (3) DA Form 2408-13-1, Aircraft Inspection and Maintenance Record.
- (4) DA Form 2408-18, Equipment Inspection List. The 250 Phase Inspection will be carried on this form until incorporated into the TM. ULLS--A users will use one of their 800 inspection numbers.

15. Weight and Balance. N/A.

16. Points of Contact.

- a. Technical point of contact for this TB is:
 - (1) Primary – Mr. Tim Powell, AMSAM-RD--AE--I--P--A, DSN 897-4919 or commercial (256) 313-4919. Datafax is DSN 897-4894 or (256) 313--4894 E-mail is Timothy.Powell@redstone.army.mil.
 - (2) Alternate– Mr. Ken Muzzo, AMSAM-RD--AE--I--P--A, DSN 897-4812 or commercial (256) 313-4812. Datafax is DSN 897-4894 or (256) 313--4894 E-mail is Kenneth.Muzzo@redstone.army.mil.
- b. Logistical point of contact for this TB is:
 - (1) Primary – Mr. Jim Mason, SFAE-AV-AAH-LF, DSN 897-4242 or commercial (256) 313-4242. Datafax is DSN 897--4343 or (256) 313-4343 E-mail is MasonJ@peoavn.redstone.army.mil.
 - (2) Alternate– Mr. Mike Sharp, SFAE-AV-AAH-LF, DSN 897-4236 or commercial (256) 313-4236. Datafax is DSN 897-4343 or (256) 313--4343 E-mail is Mike.Sharp@peoavn.redstone.army.mil.
- c. Wholesale material point of contact (spares) is Kathy Elfrink, AMSAM-MMC--AV--AA, DSN 897-1350 or commercial (256) 313-1350, datafax is DSN 897--1556 or commercial (256) 313-1556, E--Mail is Kathy.Elfrink@redstone.army .mil.
- d. Non-Destructive Test Center of Excellence Point of Contact is Ms. Sandra Ratley, AMSAM--DSA--AS--AG, DSN 788-8043 or commercial (256) 842-8043. Datafax is DSN 788--0572 or (256) 842- 0572 E-mail is Sandra.Ratley@redstone.army .mil.
- e. Forms and records point of contact for this TB is Ms. Ann Waldeck, AMSAM-MMC-MA--NM, DSN 746-5564 or commercial (256) 876-5564, Datafax is DSN 746-4904 or commercial (256) 876-4904, E--mail is Ann.Waldeck@redstone.army .mil.
- f. Safety point of contact for this TB is:
 - (1) Primary-- Mr. Randall Rushing (SAIC), AMSAM-SF--A, DSN 897-2092 or commercial (256) 313-2092, Datafax is DSN 897-2111 or commercial (256) 313--2111, E--mail is Randall.Rushing@redstone.army.mil.

TB1-1520-238-20-118

(2) Alternate- Mr. Howard Chilton. AMSAM-SF-A, DSN 897-2068 or commercial (256) 313-2068, Datafax is DSN 897-2111 or commercial (256) 313-2111, E-mail is Howard.Chilton@redstone.army.mil.

g. Foreign Military Sales (FMS) recipients requiring clarification of action advised by this TB should contact - (Huntsville, AL is GMT minus 6 hours.)

(1) Primary- Mr. Ronnie W. Sammons, AMSAM-SA-CS-NF, DSN 897-6856 or commercial (256) 313-6856, Datafax is DSN 897-6630 or commercial (256) 313-6630, E-mail is Ronnie.Sammons@redstone.army.mil.

(2) Alternate- Mr. Paul Tarr, AMSAM-SA-CS-NF, DSN 897-6861 or commercial (256) 313-6861, Datafax is DSN 897-6630 or commercial (256) 313-6630, E-mail is Paul.Tarr@redstone.army.mil.

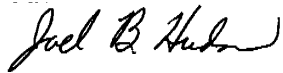
h. After hours contact AMCOM Command Operations Center (COC) DSN 897-2066/7 or commercial (256) 313-2066/7.

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.: AMSAM-MMC-MA-NP, Redstone Arsenal, AL 35898-5230. You may also submit your recommended changes by E-mail directly to 2028@Redstone.Army.Mil. Instructions for sending an electronic 2028 may be found at the back of this manual. A reply will be furnished directly to you.

By Order of the Secretary of the Army:

Official:

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



JOEL B. HUDSON
Administrative Assistant to the
Secretary of the Army
0131303

DISTRIBUTION:

To be distributed in accordance with Initial Distribution Number (IDN) 313999, requirements for TB 1-1520-238-20-118.

TB1-1520-238-20-118

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: <mpmt%avma28@st-louis-emh7.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.

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.

TEAR ALONG PERFORATED LINE

PRINTED NAME, GRADE OR TITLE AND TELEPHONE NUMBER

SIGN HERE

THE METRIC SYSTEM AND EQUIVALENTS

WEIGHT MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
 1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
 1 Kilometer = 1000 Meters = 0.621 Miles

WEIGHTS

1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
 1 Kilogram = 1000 Grams = 2.2 lb.
 1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
 1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

1 Sq. Centimeter = 100 Sq. Millimeters = 0.155 Sq. Inches
 1 Sq. Meter = 10,000 Sq. Centimeters = 10.76 Sq. Feet
 1 Sq. Kilometer = 1,000,000 Sq. Meters = 0.386 Sq. Miles

CUBIC MEASURE

1 Cu. Centimeter = 1000 Cu. Millimeters = 0.06 Cu. Inches
 1 Cu. Meter = 1,000,000 Cu. Centimeters = 35.31 Cu. Feet

TEMPERATURE

$5/9(^{\circ}\text{F} - 32) = ^{\circ}\text{C}$
 212° Fahrenheit is equivalent to 100° Celsius
 90° Fahrenheit is equivalent to 32.2° Celsius
 32° Fahrenheit is equivalent to 0° Celsius
 $9/5^{\circ}\text{C} + 32 = ^{\circ}\text{F}$

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
its	Liters	0.473
arts	Liters	0.946
allons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Square Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
ers	Gallons	0.264
ms	Ounces	0.035
ograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pounds-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
ometers per Liter	Miles per Gallon	2.354
ometers per Hour	Miles per Hour	0.621



PIN: 079409-000