DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

ULTRASONIC INSPECTION OF AH-1 AND UH-1 CROSSTUBES

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

12 May 1981

REPORTING OF ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to: Commander, US Army Troop Support and Aviation Materiel Readiness Command, ATTN: DRSTS-MTT, 4300 Goodfellow Blvd., St. Louis, MO 63120. A reply will be furnished to you.

1. Purpose of Inspection. The purpose of this bulletin is to provide the instructions necessary for ultrasonic inspection of crosstubes for cracks as required by the special inspection section of the applicable aircraft maintenance manuals. These instructions are limited to the inspection for transverse cracks in the crosstube between rivet holes under the fuselage mounts and transverse cracks in the radius areas adjacent to the skid saddles.

2. Priority Classification. This inspection is in the NORMAL category.

a. Equipment in Use. As required by applicable aircraft maintenance manuals.

b. Prepositioned Stock. Not applicable.

3. End Item or System to be Inspected.

UH-1B	55-4461
	58-2078
	60-3546 thru 60-3619
	61-686 thru 61-803
	62-1372 thru 62-2105
	62-4566 thru 62-4605
	62-12515 thru 62-12555
	63-8500 thru 63-8683
	63-8685 thru 63-8738
	63-12903 thru 63-12952
UH-1B	63-13086 thru 63-13089
	63-13586 thru 63-13593
	64.13902 thru 64-14100
UH-1C	64-14101 thru 64-14191
or	
UH-1M	65-9416 thru 65-9564
	65-12738 thru 65-12744
	66-0491 thru 66-0745
	66-15000 thru 66-15245
UH-1V	60-6028 thru 60-6034
or	62-2106 thru 62-2113
UH-1H	62-12351 thru 62-12372
	63-8739 thru 63-8859
	63-12956 thru 63-13002
	64-13492 thru 64-13901
	65-9565 thru 65-10135
	65-12773 thru 65-12776
	65-12847 thru 65-12852
	65-12857 thru 65-12895
	66-0746 thru 66-1210
	66-8574 thru 66-8577
	66-16000 thru 66-17144
	67-17145 thru 67-17859
	67-18411 thru 67-18413
	67-18558 thru 67-18577
	67-19475 thru 67-19537
	68-15214 thru 68-15794
	68-16050 thru 68-16628

UH-1H	69-15000 thru 69-15577
	69-15579 thru 69-15705
	69-15707 thru 69-15712
	69-15714 thru 69-15959
	69-16609
	69-16650 thru 69-16679
	69-16692 thru 69-16712
	69-16714 thru 69-16732
	70-15700 thru 70-15874
	70-15913 thru 70-15932
	70-16200 thru 70-16496
	70-16515 thru 70-16518
	71-20000 thru 71-20333
	72-21465 thru 72-21648
	73-21661 thru 73-21793
	73-21801 thru 73-21810
	73-21818 thru 73-21840
	73-21850 thru 73-21860
	73-22066
	73-22067
	73-22072 thru 73-22075
	73-22078 thru 73-22082
	73-22090 thru 73-22094
	73-22097 thru 73-22102
	73-22122 thru 73-22135
	74-22295 thru 74-22483
	74-22489 thru 74-22516
	74-22521 thru 74-22524
	74-22526 thru 74-22529
	74-22533 thru 74-22544
	76-22670 thru 76-22672
EH-1H	69-15706
	69-15713
	69-15578
	69-16713
AH-1G	66-15246 thru 66-15357
AH-1S(MOD)	67-15450 thru 67-15869
AH-1S(MC)	68-15000 thru 68-15213
	68-17020 thru 68-17113
	69-16410 thru 69-16447
	70-15936 thru 70-16105
	71-20983 thru 71-21052
AH-1S(PROD)	76-22567 thru 76-22610
	76-22692 thru 76-22713
	77-22729 thru 77-22810
	78-23043 thru 78-23125
TH-1G	66-15249
	66-15252 thru 66-15254
	66-15266
	66-15268
	66-15270
	66-15278 thru 66-15282
	66-15286
	66-15288 thru 66-15291
	66-15303
	66-15315
	66-15335
	66-15356 thru 66-15357
	67-15450
	67-15470 and 67-15471
	67-15473
	67-15498 and 67-15499
	67-15613
	67-15623
	67-15642
	67-15658 and 67-15659
	67-15661
	67-15741

4. Modules (components, assemblies, subassemblies, boards and cards) to be Modified. The following items, whether installed or in stock, will be inspected. Not applicable.

5. Parts to be Inspected. The following items whether installed or in depot stock shall reinspected. Items in stock shall reinspected before issuing and so marked that it can be easily determined if inspection has been accomplished.

NATIONAL STOCK NO.	PART NUMBER	NOMENCLATURE
1560-00-737-6601	204-050-152-35	UH-1B/C/M Crosstubes
1620-00-886-1283	204-050-152-55	UH-1B/C/M Crosstubes
1620-00-076-9036	205-050-152-49	UH-1V/H/E Crosstubes
1620-00-967-7624	205-050-152-41	UH-1V/H/E Crosstubes
1620-00-106-0033	209-050-002-45	AH-1/TH-1G Crosstubes
1620-00-106-0034	209-050-002-41	AH-1/TH-1G Crosstubes

6. Application.

a. Time Compliance Schedule. Not applicable.

b. Level of Maintenance. Depot maintenance with assistance from AVIM/AVUM as required.

c. Applied By. Certified Ultrasonic inspector, per MIL-STD-41OD, NDT Personnel Qualification and Certification, DARCOM personnel. DARCOM-R-702-22.

d. Time for Completion of TB application to one End Item.

(1) Total of 2 manhours using one person.

(2) Total of 5 hours downtime for one helicopter.

e. Time for Completion of one Assembly or Component. Not applicable.

f. Time for Completion of one Part. Not applicable.

g. TB to be Applied Prior to or Concurrently with this TB. Not applicable.

h. Additional Information. None.

7. Technical Publications Affected/Changed as a result of this TB. Not applicable.

8. Supply Kits, Parts and Disposition.

a. Kits/Parts Required to accomplish TB. Not applicable.

b. NSN, Weight, Dimensions and Cube of Kit(s). Not applicable.

c. Distribution and Issue Instructions. Not applicable.

d. Bulk and Consumable Materials.

NSN	Item Name and Part No.	Quantity Required Per End Item/System Module	Part	Figure and Item No. (Where Applicable)
6850-00-264-9038	Couplant (Glycerine, Petroleum Jelly) P-D-680 Solvent Type II		A/R	

e. Parts Disposition. Crosstubes found to contain cracks shall be removed from service, mutilated and scrapped locally.

9. Special Tools: Jigs, Test, Measurement and Diagnostic Equipment (TMDE), and Fixtures Required.

Nomenclature	NSN	Part or Reference Number	Quantity
Branson Flaw/Thickness Tester		Sonorary Mark II Model 301A	
Transducer (5MHz, 45° shear wave 1/4 inch)	6635-00-018-5830		
Transducer (5MHz, 90° surface W wave 1/4 inch)			
Calibration Standard - Fuselage mount		J.04V(CCAD)	
Calibration Standard - Saddle mount		J.04V(CCAD)	

10. Test Equipment Adjustment.

a. Shear Wave Equipment Adjustment. (Where alternate/equivalent equipment is used some variation to the following procedures maybe necessary.)

(1) Connect 45° shear wave transducer to cable before unit is plugged in or turned ON.

(2) Plug in unit and turn power ON-OFF switch to ON. Allow CRT to warm up until a trace appears on screen.

(3) Turn Rep rate switch to 1000 CPS position (located in back of instrument).

(4) Turn filter switch to OUT position (located in back of instrument).

(5) Turn selector switch to 1 position.

(6) Turn damping knob to 8 position.

(7) Position all DB switches to OUT position.

(8) Turn Range switch to 5 INCH position.

(9) Turn delay switch to 1 position.

(10) Turn Reject control knob to 10 position.

(11) Position initial pulse on far left of CRT using vernier delay adjustment.

(12) Position transducer, using an oil couplant, on J.04V calibration standard opposite 0.040 inch crack between rivet holes.

NOTE

Signal should have lateral movement on CRT screen. When transducer is moved near simulated crack, the signal should move toward the left of CRT screen. When moved away from simulated crack, signal should move to the right.

(13) Position crack return signal at desired index mark of CRT by adjusting vernier material calibration knob.

(14) Readjust vernier material calibration knob to position initial pulse at left of CRT screen and the return signal (crack) at desired index mark.

(15) Position transducer, using oil couplant, on sample standard at 0.007 inch crack between rivet holes.

(16) Turn damping knob counterclockwise until crack indication disappears.

(17) Repeat instructions numbers 12, 15 and 16 until return signal is obtained from 0.040 inch crack but not from 0.007 inch crack.

(18) Instrument is now ready to inspect fuselage mount area of crosstubes.

b. Surface Wave Equipment Adjustment. (Where alternate/equivalent equipment is used some variation to following procedures maybe necessary.)

(1) Connect 90° surface wave transducer to cable and connect cable to transmit T connector.

(2) Plug in the unit and turn the power ON-OFF switch to ON. Allow CRT to warm up until a trace appears on screen.

(3) Turn Rep rate switch to 1000 CPS position (located in back of instrument).

(4) Turn filter switch to OUT position (located in back of instrument).

(5) Turn selector switch to 1 position.

(6) Turn damping knob to 7 position.

(7) Position all DB switches to OUT position.

(8) Turn Range switch to 2 INCH position.

(9) Turn Delay switch to 1 position.

(10) Turn Reject control knob to 10 position.

(11) Position initial pulse at far left of CRT using vernier delay adjustment.

(12) Position transducer, using proper couplant, on calibration standard J.04VI approximately 1.0 inch from lower radius of crosstube.

(13) Use damping knob to adjust reflection from radius edge to within 60-76%. peak height on CRT.

(14) Traverse radius area on standard in slow sideward path keeping transducer perpendicular to radius and parallel to crosstube.

(15) Scribed crack indications should appear between edge back reflection and initial pulse on CRT screen. Radius edge reflection should be greatly diminished upon appearance of crack. Crack indication should move across screen when transducer is moved forward and back on crosstube.

(16) Instrument is now ready to inspect radius area of crosstubes.

11. Inspection Procedure,

a. Inspection Procedure for Shear Wave Inspection.

(1) Clean crosstube of dirt film 3 inches on both inboard and outboard sides of fuselage mounts,

(2) Position transducer, using oil couplant, on crosstube approximately one inch from fuselage mount in line with end rivet. A back reflection will appear on CRT screen. Slowly move transducer laterally and back and forward about 3/4 inch to inspect area between rivet holes.

CAUTION

Be sure to keep transducer parallel to crosstube and perpendicular to fuselage mount edge. If a back reflection from edge of fuselage mount is detected, recalibrate instrument on standard.

NOTE

A crack between rivet holes will produce a definite peak that moves across time base line on CRT screen as transducer is moved back and forth about 3/4 inch.

(3) Proceed to inspect between rivet holes on both inboard and outboard sides of fuselage mounts using rivet holes to confidence check instrument by obtaining a return signal.

(4) If a definite peak, indicating a crack, appears on CRT screen, locate and mark crack on fuselage mount with grease marking pencil.

(5) Confidence check instrument on standard.

(6) Check to see if crack indication can be repeated, and check to verify crack location.

(7) Proceed with inspection of remaining fuselage mount/crosstube areas.

b. Inspection Procedure for Surface Wave Inspection of the Crosstubes.

(1) Check to see that area to be inspected has been stripped of all paint, and clean crosstube of dirt film 5 inches inward from crosstube/saddle interface.

(2) Position transducer, using couplant, on crosstube approximately one inch from saddle. A back reflection from radius edge of crosstube will appear on CRT screen.

CAUTION

Be sure to keep transducer parallel to crosstube and perpendicular to radius edge. Do not allow couplant to run down crosstube into radius area of crosstube.

(3) A crack indication will produce a definite peak on CRT screen between radius edge back reflection and initial pulse. Crack indication will move across time baseline as transducer is moved back and forth.

(4) Slowly move transducer laterally around crosstube keeping radius edge back reflection on CRT screen.

(5) If crack indication appears in CRT screen locate and mark on crosstube.

(6) Confidence check instrument on sample standard.

(7) Check to see if crack indication can be repeated and verify crack location.

(8) Proceed with inspection of rest of crosstube surface.

(9) Crosstubes found to contain cracks will be removed from service, mutilated, and scrapped locally.

12. Calibration Requirements. Not applicable,

13. Weight and Balance Data. Weight and balance are not significantly affected.

14. Quality Assurance Requirements. Inspection of completed TB application for full compliance with the technical requirements of the instructions will be accomplished by qualified personnel in accordance with an approved prescribed inspection system. The inspection system in effect will be determined on the basis of instruction issued at the site of work, i.e., Army Unit Intermediate, Army depot, contractors.

15. Recording. Record accomplishment of the inspection in accordance with the procedures in TM 38-750. The following forms are applicable.

a. DA Form 2408-13, Aircraft Inspection and Maintenance Record (Aircraft).

b. DA Form 2408-18, Equipment Inspection List (Aircraft).

By Order of the Secretary of the Army:

E. C. MEYER
General, United States Army
Chief of Staff

Official:

J. C. PENNINGTON
Major General, United States Army
The Adjutant General

DISTRIBUTION:
To be distributed in accordance with DA Form 12-31, TB requirements for AH-1G, UH-1B, UH-1C/M, UH-1D/H, AH-1S(MOD) and AH-1S(PROD).

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