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Job Performance Tests for U/AH-1 Helicopter Mechanics

Volume I: Hands-On Performance Test

Paul W. Mayberry
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This work comprises two parts: this volume contains the hands-on performance test, and a second volume presents the administrative duties and job knowledge tests.

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Director
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Job Performance Tests for U/AH-1 Helicopter Mechanics

Volume I: Hands-On Performance Test

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ABSTRACT

Hands-on performance tests and job knowledge tests were developed for MOS 6114 (U/AH-1 helicopter mechanic) as part of the Marine Corps Job Performance Measurement Project. The purpose of this information memorandum is to disseminate these performance measures to Marine Corps personnel managers, training instructors, and interested researchers who may find them useful.

This work comprises two parts: this volume contains the hands-on performance test, and a second volume presents the administrative duties and job knowledge tests.

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INTRODUCTION

The Marine Corps Job Performance Measurement (JPM) Project is a major effort to measure on-the-job performance of enlisted Marines. The performance measures are used to validate the enlistment test that selects and classifies military recruits. The performance tests also have value in providing unit commanders and training instructors with detailed information concerning the relative strengths and weaknesses of their personnel.

Representative military occupational specialties (MOSs) within the mechanical occupational field were selected for performance measurement. Hands-on performance tests and written job knowledge tests were developed. This document contains the performance tests for the U/AH-1 helicopter mechanics that were tested (MOS 6114). A forthcoming CNA research memorandum will detail the test development process. The purpose of this document is to disseminate these performance measures to Marine Corps personnel managers, the training community, and interested researchers who may find them useful.

The performance measures are organized into the following sections:

- Hands-on performance tests with equipment/materials required for testing and procedures to set up each testing station
- Tests of administrative duties
- Job knowledge test with correct alternatives noted.

The test development and administration were conducted by the American Institutes of Research under subcontract to the Center for Naval Analyses.

HANDS-ON PERFORMANCE TEST

The hands-on performance test for the U/AH-1 helicopter mechanic MOS (6114) was composed of 15 tasks organized into 8 testing stations. Table 1 is a list of all tasks and the testing stations where they were administered. For each task, the equipment and materials required for testing are also listed. Procedures to set up the testing station before testing a Marine are noted. Specific notes to the test administrators detailing scoring instructions and certain performance conditions to be aware of are listed for each step.

Table 1. Hands-on tasks for U/AH-1 helicopter mechanics

Station	Helicopter/ part	Performance task
1	AH-1W	Remove/replace unitary pedal adjustment
	None	Ground handling and taxiing
2	AH-1W	Remove/replace collective pitch bellcrank
3	AH-1W	Troubleshoot main gear box chip detector
	AH-1W	Remove/replace power train oil filter
4	AH-1W	Remove/replace power train main gear box drive shaft
5	UH-1N	Troubleshoot rotor head
	UH-1N	Remove/replace drive link
6	UH-1N	Remove/replace main rotor head
	AH-1W (part)	Adjust flight control rod
7	UH-1N	Troubleshoot flight controls
	UH-1N	Troubleshoot power plant oil system
8	UH-1N	Remove/replace power plant fuel boost pump
	UH-1N	Troubleshoot power plant fuel system
	UH-1N	Troubleshoot power plant control system

Equipment/Materials Required

1 AH-1W Helicopter
NA 01-H1AAC-2-5, WP010-00, pg. 34-41
Open-ended wrench, 7/16" and 3/8"
3/8" Wrench
5/16" Wrench
Flashlight
1/2" Wrench
7/16" Socket w/extender, 1/4" drive
1/2" Socket with 1/4" drive
1/4" Ratchet
Mallet (rawhide)
Brass Drift

Procedure to Set Up Station

1. Remove access panel around VSS-Actuator.

2. Remove VSS Actuator.

3. Remove cotter pin from bolt connecting adjuster clevis #12 to bell clamp #6.

4. Remove left front and right aft pedal support bolts.

Procedures To Be Performed Before Testing Each Marine

1. Ensure pedal adjuster is completely replaced.

This task covers your ability to remove and replace the co-pilot pedal adjuster clevis (#12), adjuster support (#19), and knob (#16) of the pedal adjuster mechanism. Here is a TM extract to assist you. [Hand to Marine.] Do you have any questions? Begin.

NOTE TO SCORER: Assist Marine when removing adjuster support.

Now, replace the pedal adjuster clevis (#12), the adjuster support (#19), and the knob (#16).

1. Began test without intervention (knew location of pedal adjuster). . . . . .

2. Removed bolt, washers, nut, and cotter pin connecting pedal adjuster clevis (#12) to bellcrank (#6). . . . . .

3. Held knob (#16) and removed nut and washer. . . . . .

4. Threaded knob (#16) from end of clevis (#12) and out of support. . . . . .

5. Removed clevis (#12) from support. . . . . .

6. Removed two bolts, washers, and nuts connecting adjuster support (#19) to pedal support (#23). . . . . .

*7. Removed pedal adjuster completely. . . . . .

8. Inserted threaded end of clevis (#12) into adjuster support (#19) from flared end. . . . . .

9. Positioned knob (#16) on threaded end of clevis with lip engaged in retaining groove. . . . . .

10. Threaded knob (#16) onto clevis and secured with large steel washer and nut. . . . . .

11. Positioned clevis into bellcrank and installed bolt, aluminum washers, nut, and cotter pin. .

12. Placed adjuster support (#19) over floor opening and aligned pedal support. . . . . .

13. Installed two bolts, aluminum washers, and nuts. . . . . .

*14. Replaced pedal adjuster correctly (meets all standards). . . . . .

Equipment/Materials Required

NT-4 Universal aircraft tow bar
Tow bar

Prepare the helicopter for towing by attaching the tow bar. I will assist you if necessary. Do you have any questions. Begin.

Now remove the tow bar. Any questions? Begin.

Now assume you are the taxi director. Show me the proper signal for each command I tell you. Any questions? Begin.

I have command.

Start engines.

Engage rotors.

Insert chocks.

Remove chocks.

1. Positioned the tow bar directly in front of the aircraft. . . . . .

2. Centered the tow bar between the two skid tubes and attached to tow rings . . . . . .

3. Ensured safety pins were extended. . . . . .

4. Removed the tow bar by extracting pins and lifting up. . . . . .

5. Pulled the tow bar away from the aircraft. . . . . .

6. Held right hand open palm forward, motionless, and high above the head. . . . . .

7. Pointed to engine to be started with left hand, then moved right hand in a clockwise circular motion. . . . . .

8. Pointed to rotor head with left hand and twirled right hand in a clockwise circle. . . . . .

9. With arms down, fists closed, thumbs extended inward, swung arms from extended position inward. . . . . .

10. With arms down, fists closed, thumbs extended outward, swung arms outward. . . . . .

Move ahead.

Right turn.

Left turn.

Stop.

Slide to the left.

Cut engines.

Brakes on.

Brakes off.

Move back.

Personnel approaching aircraft.

11. With hands raised to eye level above shoulders, palms backwards, moved arms repeatedly forward and backwards.

12. Pointed left arm downward and moved right hand repeatedly forward and backward at shoulder height.

13. Pointed right arm downward and moved left hand repeatedly forward and backward at shoulder height.

14. Held arms crossed above the head, palms out. . . . . .

15. Pointed left arm downward and right arm extended upward at a slant. . . . . .

16. With one arm pointing at engine, moved other hand sideways across throat, palm down. . .

17. With arms above head, hands open, and palms facing aircraft, then closed fist. . . . . .

18. With arms above head, hands closed, then opened fists. . . . . .

19. With arms by sides, palms facing forward, swept both arms forward and upward repeatedly to shoulder height.

20. Raised left hand overhead, palm toward aircraft. With right hand, repeatedly pointed horizontally to personnel and aircraft.

Hot brakes.

Engine on fire.

21. Pointed to wheel with one hand, and made a rapid fanning motion in front of face with the other hand.

22. While pointing to the fire area with one hand, other hand described a large figure eight in front of body.

Equipment/Materials Required

Swips
7/16" Wrench
3/8" Wrench
1/2" Wrench
1/4" Wrench
5/16" Wrench
1/4" Ratchet
5/16" Socket
3/8" Socket
1/4" Socket
Cotter pins
Droplight
2 Creepers

Procedure to Set Up Station

1. Remove access panel.

2. Remove the balance spring (75), control tube (77) and associated bolts, washers, nuts, and cotter pins as shown in WP 00500, pg. 5.

Procedures to Administer and Score Test

1. Marine should only replace the cotter pin on the mount bolt.

Here is a diagram of the collective control system. This task covers your ability to remove bellcrank #105. You may use the TM extract as needed. Do you have any questions? Begin.

Now install bellcrank (#105). Do not torque, only replace the cotter pin on the mount bolt.

1. Began test without intervention (knew location of bellcrank). . . . . .

2. Removed bolt (108), nut (111), washer (109), and spacer (110), and cotter pin (112) connecting transducer (98) to bellcrank (105).

3. Removed bolt (113) aluminum washers (114), and nut (115), and cotter pin connecting Np drop cable assembly to bellcrank (105).

4. Removed bolt (130) with CRES washers (129), and nut (128), and cotter pin connecting collective control tube (131) to bellcrank (105).

5. Removed bolt (103) with aluminum washers (104), and nut (106), and cotter pin connecting collective control tube (96) to bellcrank (105).

6. Removed bolt (117) with CRES washers (118), nut (122), and cotter pin (123) connecting bellcrank (105) to support (121).

*7. Removed bellcrank completely. . . . . .

---

8. Replaced bolt (117) with CRES washers (118), nut (122), and cotter pin (123) connecting bellcrank (105) to support (121).

9. Replaced bolt (103) with aluminum washers (104), and nut (106), and cotter pin (107) connecting collective control tube (96) to bellcrank (105).

10. Replaced bolt (130) with CRES washers (129), and nut (128), and cotter pin (127) connecting collective control tube (131) to bellcrank (105).

11. Replaced bolt (113), aluminum washers (114), and nut (115), and cotter pin connecting Np drop cable assembly to bellcrank (105).

12. Replaced bolt (108), nut (111), washer (109), and spacer (110), and cotter pin (112) connecting transducer (98) to bellcrank (105).

*13. Replaced bellcrank completely (meets all standards). . . . . .

Equipment/Materials Required

1 AH-1W
1 TM NAVAIR 01-110HCE-2, pp. 4-3, 4-21 to 4-22
Flashlight
Rags
Packing (M83248/1-015

Procedure to Set Up Station

1. Turn off all electrical power.

2. Remove, inspect and replace all five detectors.

Procedures to Administer and Score Test

1. The scorer must physically check steps 6, 9, 12, 15, and 18 to ensure that the detectors are properly seated.

2. Should the Marine disconnect any wiring and forget to reconnect it, be sure to have him reconnect it after the test is finished.

During flight operations, the pilot reported that his transmission chip detector warning light came on. You are to troubleshoot this gripe. Here are extracts of the work packages needed. [Hand to extracts to Marine.] Do you have any questions? Begin.

NOTE TO SCORER: If Marine selects another chip detector first, score step 1 NO-GO and show him the mast detector.

You found that there are no significant chips on the mast chip detector. Continue.

You found that there are no significant chips on this chip detector. Continue.

1. Identified the mast chip detector. . . . . .

2. Pressed in on the knurled body of the chip detector, turned counterclockwise to disengage bayonet pins, and withdrew detector from the drain plug.

3. Inspected for chips from the chip detector and strainer. . . . . .

4. Used a clean rag to wipe all surfaces of the chip detector. . . . . .

5. Checked packing for wear. . . . . .

6. Installed the mast chip detector by inserting the detector into the drain plug, pressing the knurled body of the plug and turning it clockwise to engage the bayonet pins.

7. Found chip detector #2. . . . . .

8. Removed, inspected, and cleaned detector #2. . . . . .

9. Checked packing for wear, then installed the chip detector by inserting the detector into the drain plug, pressing the knurled body of the plug and turning it clockwise to engage the bayonet pins.

10. Found chip detector #3. . . . . .

You found that there are no significant chips on this chip detector. Continue.

You found that there are no significant chips on this chip detector. Continue.

You found that there are no significant chips of this chip detector. Continue.

11. Removed, inspected, and cleaned detector #3. . . . . .

_____

12. Checked packing for wear, then installed the chip detector by inserting the detector into the drain plug, pressing the knurled body of the plug and turning it clockwise to engage the bayonet pins.

13. Found chip detector #4. . . . . .

14. Removed, inspected, and cleaned detector #4. . . . . .

_____

15. Checked packing for wear, then installed the chip detector by inserting the detector into the drain plug, pressing the knurled body of the plug and turning it clockwise to engage the bayonet pins.

16. Found chip detector #5. . . . . .

17. Removed, inspected, and cleaned detector #5. . . . . .

_____

18. Checked packing for wear, then installed the chip detector by inserting the detector into the drain plug, pressing the knurled body of the plug and turning it clockwise to engage the bayonet pins.

Equipment/Materials Required

1 AH-1W
1 TM
Slot head screwdriver
Flashlight
Rags
Container for oil
Phillips head screwdriver
1 spare oil filter
Packing
1 Jackscrew (T102064)
1 Torque wrench (50-70 in-lbs)
1 1/4", 2-1/2" extension

Procedure to Set Up Station

1. Turn off all electrical power.

2. Carefully position rotor head to allow clearance.

3. Open fairing.

4. Remove 2 filter wafers from the spare oil filter.

Procedures To Be Performed Before Testing Each Marine

1. Remove 2 filter wafers from the spare oil filter.

2. On step 12, TA will be the QA.

3. Zero out torque setting.

You are to remove, inspect, and reinstall the oil sump filter. You may use any of the materials here to do this task. [Point.] You must use the jackscrew to remove the filter. Do you have any questions? Begin.

NOTE TO SCORER: Hand extra incorrectly spaced filter to Marine and say:

Is the filter OK?

Fix the filter spacing. [Hand extra filter wafers to Marine.]

NOTE TO SCORER: Marine does not have to apply pressure with push and pull gage.

Now, install the filter you removed.

1. Began the test without intervention. . . . . .

2. Removed clamps from bracket (4, figure 2). . . . . .

3. Removed four nuts (3), washers (1 and 2) and brackets (4). . . . . .

4. Screwed jackscrew (T102064) into cover (a) and pulled filter (5) from sump case. . . . . .

*5. Indicated incorrect spacing of filter washers. . . . . .

6. Removed nut, lockwasher, spacer, and filter discs from body. . . . . .

7. Inspected wafers for nicks, scratches. . . . . .

8. Restacked wafers and spacers alternating 17 spacers and 15 wafers). . . . . .

9. Installed lockwashers and wrench tightened. . . . . .

10. Inserted filter assembly for opening of sump case. . . . . .

11. Installed two brackets, aluminum washers (1), steel washers (2), and nuts (3). . . . . .

12. Torqued nuts (3) 50-70 inch-pounds. (QA) . . . . . .

Equipment/Materials Required

1 AH-1W
1 NAVAIR 01-H1AAC-2-4, WP 01500, pg. 4-17
1 3/8" Wrench
Flashlight
Rags
1 1/2" Socket
1 1/2" Drive ratchet
Depth indicator
1 1/2" Drive torque wrench, 0-750 inch-pounds
Parts bag
Nuts
Bolts
Washers
1 Scribe
1 Drive shaft, damaged

Procedure to Set Up Station

1. Turn off all electrical power.

2. Open fairing.

3. Remove shaft #4. Break torque on shaft #5.

4. Tape holes in the aircraft frame under the aft end of drive shaft #5.

5. Identify defects in the damaged shaft, making sure that there is a large scratch (as defined by figure 4) on the shaft itself. Measure and record the depth of the scratch.

Procedures to Administer and Score Test Each Marine

1. Ensure step 3 is performed before step 4.

2. The order of the washer replacement in step 11 is as shown in the figure below.

You are to remove, inspect and replace the #5 drive shaft. Here are the work packages. Do you have any questions? Begin.

Now, inspect this driveshaft and tell me what you are doing as you do it. [Hand Marine extra drive shaft.]

1. Removed three nuts (11, detail B, figure 3), washers (10), and bolts (9) from the forward end of the drive shaft (15).

2. Removed 6 nuts (20, detail D), radiused steel washers (17), thin steel washers (19), and bolts (16) from the aft end of the driveshaft (15) and disc assembly.

3. Tied disc assembly together using safety wire. . . . . .

4. Removed driveshaft (15). . . . . .

5. Inspected driveshaft for nicks, scratches, and dents. . . . . .

6. Identified defect(s) in driveshaft. . . . . .

7. Calibrated depth dial. . . . . .

8. Used depth dial to measure scratch depth. . . . . .

9. Compared dial measurement with figure 4. . . . . .

*10. Indicated that the driveshaft should be replaced. . . . . .

Now, install this drive shaft.

NOTE TO SCORER: Hand the original drive shaft back to the Marine.

What would you do next?

Wrench tighten only, continue.

What would you do next?

11. Wrapped a protected cover around the shaft. . . . . .

12. Installed bolts (9, detail B), with boltheads forward, washers (10), and nuts (11) in forward end of the driveshaft (15).

13. Said would torque nuts (11) 120-160 inch-pounds. (QA) . . . . . .

14. Installed bolts (16, detail D), radiused steel washers (17), thin steel washers (19), and nuts (20) connecting aft end of driveshaft to disc assembly of coupling (21). (Compare against figure D).

15. Cut safety wire from discs. . . . . .

16. Said would torque nuts (20) 280-300 inch-pounds. . . . . .

*17. Installed drive shaft correctly (meets all standards). . . . . .

Equipment/Materials Required

1 UH-1N Helicopter
TM NAVAIR 01-110HCE-2, section 6-38, pp. 6-33 - 6-39
Protractor, GS18217
7/8" Wrench
1" Wrench
1" Crows foot
Torque wrench
Notepad/pen

Procedure to Set Up Station

1. Open work platforms.
2. Set white blade angle to 6 degrees.
3. Set red blade angle to 6 degrees.
4. Move collective stick to full up position.
5. Move cyclic stick to full down position.
6. Remove safety wire.

Procedures To Be Performed Before Testing Each Marine

1. Move collective and cyclic stick to original position.
2. Ensure both blade angles are 6 degrees.
3. Ensure torque wrench is set at zero.
4. Zero protractor.

This task covers your ability to troubleshoot the main rotor. The crew chief reports rotor RPM are too high during autorotation. You may use this TM extract is you want. [Hand to Marine.] Which procedure would you use to troubleshoot. Do you have any questions? Begin.

NOTE TO SCORER: If Marine fails to operate protractor correctly, score step 5 NO-GO and show him how.

What is the minimum blade angle reading?

Now, adjust the blade angle to the proper minimum setting.

NOTE TO SCORER: Proper minimum blade angle is 8 degrees.

1. Marine indicated he would check for low blade angle. . . . . .

2. Locked collective stick in full down position using friction locking device. . . . . .

3. Locked cyclic stick in approximately neutral position using friction locking device. . . . . .

4. Held main rotor [and stabilizer bar assemblies if present] from flapping on helicopter. . . . . .

5. Placed a protractor, GS18217, clockwise on outboard machined surface or red and white blade grips. . . . . .

6. Recorded readings of both blades. . . . . .

7. Marine said 6 degrees (12/2 = 6) or actual reading. . . . . .

8. Broke torque on red and white pitch links. . . . . .

9. Loosened two nuts with wrench on both pitch links. . . . . .

*10. Adjusted red and white pitch links equally until minimum blade angle on each is 8 (+ or - 1/2) degrees. . .

NOTE TO SCORER: After scoring step 11, say:

Now, lower the blade angles on each link to 6 degrees and torque properly; do not safety wire. I will assist you if needed.

NOTE TO SCORER: Verify torque.

11. Made adjustments on correct blades. . . . . .

12. Marine lowered blade angles to 6 degrees. . . . . .

13. Torqued jamnuts to 650 to 800 inch pounds. . . . . .

Equipment/Materials Required

1 UH-1N Helicopter
1 NAVAIR 01-110HCE-1, pp. 6-59 to 6-60, Figure 6-35
Rawhide mallet
Laminated shims for rotation scissors
Flashlight/droplight
Feeler gage
Notepad and pen
Cotter pins
Micrometer
Safety wire pliers
Knife
Corrosion preventive compound MIL-C-11796
Rags
Razor blade
2 3/4" Wrenches
3/4" Socket
Torque wrench (400 inch-pounds)
7/16" Socket
7/16" Wrench

Procedure to Set Up Station

1. Break torque on nuts on rotating scissors, re-tighten with wrench, and install cotter pins.

Procedures To Be Performed Before Testing Each Marine

1. Install all rotating scissor components correctly before testing.

I want you to remove and replace the drive link and replace the shims. For testing purposes the torque has been broken. You may use this TM extract if you wish. Do you have any questions? Begin.

Now, replace the shims and install the drive link. Torque the drive link to scissor bolt only.

When would you stop shimming?

Assume you are within allowable limits. Use these shims and continue with the task. [Hand Marine original shims.]

1. Separated link from scissor by removing cotter pin, nut, bolt, washers, inner race, shim, housing and thrust washer.

2. Removed bolt, nut, washers attaching link to swashplate trunnion. . . . . .

3. Completely removed drive link. . . . . .

4. Replaced bolt, nut, washers attaching drive link to swashplate trunnion. . . . . .

5. Installed inner race, thrust washers, and housing assembly between arms of link. . . . . .

6. Retained parts in place with bolt. . . . . .

7. Held assembled parts against opposite side of link and measured gap between housing and link using feeler gage.

8. Peeled shim to dimension of gap (measured in step 7). . . . . .

9. Indicated when 0.000 to 0.002" clearance was achieved. . . . . .

10. Removed bolt assembled parts from link. . . . . .

NOTE TO SCORER: Verify torque.

What would you do next?

NOTE TO SCORER: If total end play exceeds 0.090, the thrust washer should be replaced.

11. Inserted inner race in outboard end of scissor. . . . . .

12. Positioned link on scissor with thrust washer, housing assembly, and shim between link and scissor.

13. Installed bolt with washer under head, washer and nut. . . . . .

14. Torqued nut 200 to 400 inch-pounds. . . . . .

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15. Measured end play between scissor and drive link on both sides of scissor. . . . . .

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16. Marine indicated play was (was not) excessive. . . . . .

*17. Replaced drive link correctly (meets all standards. . . . . .

Equipment/Materials Required

1 UH-1N
TM NAVAIR 01-110HCE-2, pp. 6-40 - 6-42
Power dyne (with all components)
Safety wire pliers
Lockwire (.032)
7/16" Wrench
7/16" Ratchet and Socket
Scribe
0-600 in-lb torque wrench
3/8" 1/4" adapter

Procedure to Set Up Station

1. Loosen rotor head retaining nut, re-tighten to 25 ft-lbs. Replace lock and bolt and safety wire.

2. Remove stab bar (if necessary) and install grip positioning links.

Procedures To Be Performed Before Testing Each Marine

1. Make certain the rotor is installed correctly and tighten to 250 ft-lbs before testing.

Procedures to Administer and Score Test

1. The Test Administrator will serve as an assistant as necessary.

This test covers your ability to remove and replace the main rotor on this aircraft. Specifically, I want you to remove the retaining nut and washer. You may use this TM extract as you feel necessary. Do you have any questions? Begin.

Now, assume the rotor has been removed and a new rotor head has been placed on the mast. Complete installation. What would you do first?

Now, complete the installation. What would you do next?

1. Removed lockwire, bolt, and lock at side of nut. . . . . .

2. Positioned PD2660 torque reaction adapter between stabilizer bar mounts and sitting level on top of rotor hub trunnion.

3. Placed PD2659 socket over top of nut. . . . . .

4. Placed PD2501 power wrench on adapter, ensuring that pins on wrench arm engage in two holes in adapter. .

5. Inserted a 1" square drive bar into square drive of wrench, and turned knurled ratchet indexer clockwise until drive bar drops into PD2659 socket.

6. Installed crank handle into power wrench and turned counterclockwise to loosen nut. . . . . .

*7. Removed retaining nut completely. . . . . .

8. Removed washer. . . . . .

9. Indicated would coat most threads with corrosion preventative compound. . . . . .

10. Installed washer. . . . . .

For testing purposes, tighten the nut to 250 ft-lbs.

NOTE TO SCORER: Verify torque.

NOTE TO SCORER: Verify torque.

11. Installed retaining nut on mast finger-tight. . . . . .

12. Positioned PD2660 torque reaction adapter between stabilizer bar mounting faces of hub trunnion and sitting level on top of trunnion.

13. Place PD2659 socket over top of nut. . . . . .

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14. Placed PD2501 power wrench on adapter, engaging pins on wrench arm with two holes in adapter.

15. Inserted a 1" square drive bar into square drive of wrench, and turned ratchet indexer (counter- or clockwise, depending on type of power dyne) until drive bar drops into socket.

16. Installed crank handle and turned clockwise to tighten nut. . . . . .

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17. Torqued nut to 250 ft. lbs. . . . . .

18. Marine observed torque indicator for full 3 minutes. . . . . .

19. Installed lock key and bolt to side of nut. . . . . .

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20. Torqued bolt to 60 in-lbs. . . . . .

21. Installed lockwire (wire pull clockwise round nut, wire through hole, twisted neatly).

*22. Replaced retaining nut correctly (meets all standards). . . . . .

Equipment/Materials Required

AH-1W
1 Adjustable flight control rod with 1 fixed end and 1 adjustable end
TM A1-H53AD-140-000 006 06, pg. 8-9
2 Adjustable wrenches
1 Tape measure
Lockwire
Table

Procedure to Set Up Station

1. Set adjustable flight control rod, rod end, tape measure, wrench, and lockwire on table.

Procedures To Be Performed Before Testing Each Marine

1. Disassemble adjustable flight control rod.

2. Remove jamnuts from rod end.

Procedures to Administer and Score Test

1. Verify length of adjustable control rod when Marine has completed the adjustment.

This task covers your ability to assemble and adjust this flight control rod to its basic length. This is Flight Control Rod #13. Do not torque. Wrench tight the jamnut. Do you have any questions? Begin.

NOTE TO SCORER: Marine must repeat steps 1 and 2. Verify length when Marine has completed the adjustment.

1. Screwed adjustable rod ends into flight control rod. . . . . .

2. Measured length of flight control rod from centers of fixed end and adjustable rod end. . . . . .

3. Tightened jamnut wrench tight. . . . . .

*4. Marine adjusted flight control rod to correct length. . . . . .

5. Checked thread engagement by trying to pass lockwire through inspection hole. . . . . .

Equipment/Materials Required

1 PUSH/PULL gage
1 Flashlight
1 Inspection mirror
1 7/16" Socket and ratchet
1 7/16" Wrench
1 11/32" Socket
1 9/16" Wrench
5/16" Combination wrench
6" Crescent wrench
5/8" Combination wrench
1/4" drive 6" extension

Procedure to Set Up Station

1. Remove panel under pilot seat.
2. Remove floor panel in center of cabin.
3. Decrease length of tail rotor force gradient tube by turning clockwise all the way.
4. Loosen friction on tail rotor pedal friction clamp.
5. Off set pilot's pedals.

Procedures To Be Performed Before Testing Each Marine

1. Decrease length of tail rotor force gradient tube by turning clockwise all the way.
2. Loosen friction on tail rotor pedal friction clamp.
3. Off set pilot's pedals.

Pilot reports tail rotor creeeps when AFCS is engaged and force trim is out of rig. What procedure would you use to troubleshoot the problem or problems? Do you have any questions? Begin.

Now, troubleshoot. Assume that #1 system hydraulics is ON and that the AFCS YAW ACTUATOR is centered.

NOTE TO SCORER: If Marine cannot identify friction clamp score step 4 NO-GO and show him.

What would you adjust the friction clamp to?

Now, rig the tail rotor force trim.

NOTE TO SCORER: If Marine does not remove bolt instruct him to do so.

1. Marine indicated the correct troubleshooting procedure [tail rotor minimum friction]. . . . . .

2. Applied push/pull gage to tail rotor pedals. . . . . .

3. Measured force required to move pedals through their neutral position. . . . . .

4. Marine identified friction clamp. . . . . .

5. Adjusted friction clamp.

6. Marine said 4.25 to 4.75 pounds. . . . . .

7. Placed arm of rotary actuator in center of travel. . . . . .

8. Held pilot's pedal in neutral position. . . . . .

9. Removed bolt from clevis. . . . . .

10. Adjusted tube of force gradient (27) to fit. . . . . .

11. Lengthened force gradient 2 1/2 turns. . . . . .

12. Tightened jamnut against tube assembly. . . . . .

13. Ensured maximum exposed thread does not exceed 1". . . . . .

14. Connected tube assembly to bellcrank of pilot pedal adjuster with bolt. . . . . .

Equipment/Materials Required

1 UH-1N
1 NAVAIR 01-11 OHCE-2, pp. 3-55 to 3-59
Rags
Flashlight/droplight
Container for oil
1/4" 12pt. deep well socket
Scribe
Element packing
Work bench
1/4" Drive torque wrench 30-150 inch-pounds
2 Containers for parts
Extra filter
3/8" 1/4" adapter

Procedure to Set Up Station

1. Open C BOX access cowling.

2. Remove filter, drain and replace filter.

Procedures to Administer and Score Test

1. Replace O-rings at the end of each day.

The pilot reported that the #1 engine oil pressure warning light went on just before landing. The trouble has been traced to the reduction gearbox oil filters. You are to remove and inspect the #1 oil filter. Do you have any questions? Begin.

NOTE TO SCORER: If Marine does not perform step 1, have him do so and score step 1 a NO-GO.

NOTE TO SCORER: Do not allow Marine to remove packing.

Now, replace the filter.

1. Placed container under the filter cover. . . . . .

2. Removed the three nuts and washers. . . . . .

3. Slid filter off bolts, removing the cover and element assembly. . . . . .

4. Removed the retaining ring and filter element from the cover. . . . . .

5. Marine stated he would remove/replace packings. . . . . .

6. Inspected the filter and filter elements for metal particles or other contaminaton. . . . . .

7. Inserted element into the cover with the lugs outward, and secured with a retaining ring. . . . . .

8. Installed filter cover on bolts, and secured with three washers and bolts. . . . . .

9. Tightened nuts to 30-40 inch-pounds. . . . . .

Equipment/Materials Required

1 UH-1N
1 NAVAIR 01-110HCE-2, change 1, pp. 3-199 to 3-201
1 Seal
1 Packing Union
Rags
Caps
Phillips head screwdriver
Dolly
1 6" Extension, 1/4" drive
1 1/4 Ratchet
1 Packing
1 Gasket
1/2" Ratchet
Waste Container
7/16" Socket
1 7/16" Socket, 1/4" drive
1 Pair goggles

Procedure to Set Up Station

1. Disconnect electrical power and battery.
2. Remove sump access panel.
3. Place helicopter in well ventilated area.
4. Ground aircraft.
5. Defuel aircraft.
6. Drain sump and pump through the drain valve.
7. Cut lockwire on the detach cross fitting.

Procedures To Be Performed Before Testing Each Marine

1. Fuel boost pump must be completely installed before testing.

Procedures to Administer and Score Test

1. Make certain that all components, bolts, etc., have been removed before having the Marine replace the fuel boost pump at step 7.
2. Step 11 normally requires quality assurance (QA) notification; TA serves that role if asked by the Marine.
3. Step 8 can be scored by seeing if pump hangs without putting any of the 12 assembly bolts in.

This task covers your ability to remove and replace the #2 fuel boost pump. Do you have any questions? Begin.

Now, replace the pump assembly.

1. Disconnected all electrical leads from the pump. . . . . .

2. Removed the 12 bolts and washers from around the edge of the sump plate. . . . . .

3. Removed pump outlet plug on the fuel boost pump. . . . . .

4. Removed the pump assembly and packing. . . . . .

5. Checked that the cross fitting is clean and unobstructed. . . . . .

*6. Removed fuel boost pump completely. . . . . .

7. Installed fitting, plug and bolt with packing into pump. . . . . .

8. Installed pump assembly with fittings into outlet port and connected fittings to the crossfeed line. . . . . .

9. Assembled pump assembly with gasket to the sump plate using 12 bolts and washers. . . . . .

10. Attached the grounding jumper to the center aft bolt. . . . . .

11. Torqued bolts 50 to 70 inch-pounds. . . . . .

*12. Replaced correctly (meets all standards). . . . . .

Equipment/Materials Required

1 UH-1N
1 NAVAIR 01-110HCE-2, pp. 3-115, 3-122 to 3-123
Rags
1/2" Wrench
Flashlight/droplight
Safety wire pliers
Cotter pins
Safety wire .002"
Elephant stand or step ladder

Procedure to Set Up Station

1. Locate aircraft in a well ventilated area.

2. Move left outboard intake panel out of the way.

3. Place an elephant stand on left side of aircraft near the solenoid.

Procedures To Be Performed Before Testing Each Marine

1. Attach the level end of the control tube to the third hole of lever on the jackshaft.

2. Adjust stop so that pointer is offset from the FULL STOP position.

Procedures to Administer and Score Test

1. Cut safety wire on high side of lever. Turn stop 10 turns.

2. Remove cotter pin, back off nut and move lever three clicks counterclockwise.

The pilot reported that he has low power and torque on the #1 engine. Troubleshoot this problem. Do you have any questions? Begin.

Now that you have adjusted the lever to its proper position, tell me what your next step would be.

The aft ends of the two control tubes (10 and 11) have been disconnected from the lower end of the jackshaft. Tell me what you are doing as you do it. Continue.

Now, check the clearance between the stop and the stop adjustment screw at the full max power setting.

1. Checked that lever is correctly located on the control shaft of the manual fuel control unit. . . . . .

2. Found that lever is incorrectly located. . . . . .

3. Adjusted lever to the proper location. . . . . .

4. Marine said that he would check that the lower ends of the control tubes (13 and 25) are attached to the center holes of the levers on the jackshaft and that the bolt in the upper end of the control tube is installed with the bolt head outboard.

5. Flipped the IDLE STOP REL switch to engine #1 to retract the solenoid. . . . . .

6. Moved lever of the fuel control unit to full max power (90 degrees) and FULL STOP (0 degrees). . . . . .

7. Identified both full max power and full stop positions were OK. . . . . .

8. Marine checked for proper clearance of 0.030" to 0.040". . . . . .

9. Marine adjusted the stop adjustment screw to 0.030" to 0.040". . . . . .

Equipment/Materials Required

1 UH-1N
1 NAVAIR 01-110HCE-2, pp. 3-121 to 3-122
Rags
5/16" Wrench
Slot head screw driver
Flashlight/droplight
Phillips head screw driver
Bolts
Washers
Feeler gage

Procedure to Set Up Station

1. Move idle stop solenoid and bracket assembly out so that there is less than .003" clearance between the solenoid tip and the stop.

2. Ensure aircraft power works.

Procedures To Be Performed Before Testing Each Marine

1. Move idle stop solenoid and bracket assembly out so that plunger does not contact the stop.

2. Perform on #2 engine.

Procedures to Administer and Score Test

1. Assist Marine when asked to move the control levers.

2. Use feeler gage to measure the correct gap for the solenoid.

During preflight inspection, the pilot noted that the flight idle solenoid was not engaging the throttle on the #2 engine. You are to troubleshoot this gripe. Do you have any questions? Begin.

What would you do next?

NOTE TO SCORER: Have Marine engage IDLE STOP REL switch while you check for proper clearance.

1. Loosened 4 mounting bracket screws. . . . . .

2. Manually retracted idle stop plunger. . . . . .

3. Adjusted clearance between plunger and stop to .003 to .015". . . . . .

4. Tightened 4 mounting bracket screws. . . . . .

5. Marine said he would electronically retract the solenoid plunger using the IDLE STOP REL switch, and check for .003" to .015" clearance between the plunger and the face of the stop.

*6. Adjusted the position of the solenoid bracket on the base to obtain the correct clearance and tighten the screws evenly.