Tape #31
Ref #2

DEPARTMENT OF MAINTENANCE
UNITED STATES ARMY PRIMARY HELICOPTER SCHOOL
FORT WOLTERS, TEXAS

A. Design Specifications of Hughes (TH-55)

DIMENSIONS

| | |
|---|---|
| Main rotor diameter | 25 ft. 3-1/2 in. |
| Height (over-all) | 7 ft. 11 in. |
| Length (over-all) | 22 ft. 3 in. |
| Fuselage maximu width | 4 ft. 3 in. |
| Landing gear tread | 6 ft. 6-1/2 in. |
| Tail rotor (total length) | 17.88 in |
| Tail rotor (skin area) | 3.5 in wide x 12 in. long |
| Tail rotor diameter | 3 ft. 4 in. |
| Maximum length over-all (one blade extended forward) | 28 ft. 5-3/4 in. |

WEIGHT

| | |
|---|---|
| Design gross weight | 1670 lbs |
| Empty weight | 935 lbs |
| Useful load | 735 lbs |

PERFORMANCE

Data based on standard conditions and normal gross weight of 1670 lbs.

| | |
|---|---|
| Cruising speed | 50K |
| Economy cruise speed | 60K |
| Maximum speed | 75K |
| Range (economy cruise) | 120KM |
| Disc loading - gross weight | 3.18 lbs. per sq. ft. |
| Disc area | 503 sq. ft. |
| Blade area | 21.3 sq. ft. |
| Tip speed main rotor (2900 eng. RPM) | 635 ft. per sec. - 433 MPH |
| Main rotor speed limits (autorotation) | 400 - 539 RPM |
| Tail rotor tip speed (2900 eng. RPM) | 776 ft. per sec. 528.6 MPH |
| Hovering ceiling | I.G.E. 6000 ft. (3 ft skid height) |
| Rate of climb @ sea level | 1450 RPM |
| Fuel consumption at economy cruise | 8 gallons per hour (min) |
| Best rate of climb | 35 - 40K TAS |

Tape #31
Ref #3

B. Main Rotor Blades - NAC .0015 Airfoil Section

1. .025 anodized aluminum alloy construction.

2. Aluminum alloy spar in leading edge.

3. 8 - 1/2 degree twist in blades from root section to tip.

4. .003 depth scrathes allowable span wise.

5. .002 scratches allowable chord wise.
(Deeper scratches cause for replacement)

6. Scratches can be burnished then treated with chromic acid.

7. Chord wise stresses are critical, especially near holes.

8. Blades have a 30% safety factor over FAA Specs.

C. Dampers - Blade

1. Reasons for dampers.

a. Articulated rotor system allows blades to lead, lag and have flapping motion.

b. Rigid rotor does not necessarily need dampers.

c. Damper restricts movement in the lead, lag positions for smoother operation.

d. Four stage dampering used in 269A-1.

2. Parts of the damper and their functions.

a. Damper is of the rotory friction type composed of the following.

(1) Stack of 12 bronze faced plates installed in groups of four each.

(2) Each group of plates identified by different sized tang.

(3) Between each bronze plate a steel plate is installed.

(4) Cylinder filled with 60cc of No. 5606 red hydraulic fluid.

NOTE: Check sight gage on pre-flight.

Tape #31
Ref #4

3. Main rotor blade phasing.

   a. All three blades must be in correct phase, this is checked on pre-flight. The damper arm retention bolt must be centered on the indentifing mark (painted yellow), which is 4-7/8 on the outside surface of the damper housing.

   b. The low load stage is evident by moving tip of each blade to the lead and lag position, nothing small amount of travel with little resistance.

   c. To re-phase any one blade or blades grasp tail rotor hub while standing on left hand side of ship. Position the blade out of phase parallel to the tail boom. Move this blade gently to reposition it at the 4-7/8 mark as noted above.

Transmission

1. Constructed of magnesium casting.

2. Main single stage ring and pinion gear.

3. Pressure lubricated, SAE 90 oil, three quart capacity.

4. Total reduction engine/main rotor, 6:1.

5. Engine to tail rotor ratio 1:1.153.

6. Dipstick and filler located on right hand side of transmission.

7. A warning light is provided for low oil pressure and/or high oil temperature.

8. Light comes on at 2 lbs. psi and/or 235°F.

E. V-Belt Clutch Assembly

   1. Connected to engine at lower pulley by extension shaft incorporating a spherical splined coupling.

   2. Lower spherical pulley mounted on main gear box pinion which is also splined to tail rotor drive shaft.

   3. Idler pulley for engagement purposes is controlled from cockpit.

   4. Upper pulley also incorporates overrunning clutch (Sprag). Automatically disengages in autorotation.

Tape #31
Ref #5

5. Belt tension is adjusted by tension on cable.

6. If cable is adjusted correctly the fiber guide will be held within the back guide lines. Must be kept in this area (pre-flight inspection).

F. Engine

1. Lycoming HIO-360-B1A, four cylinder horizontally opposed installed facing aft. (180hp.)

2. Take-off - 2900 RPM, Hover power, 2 in. MP

3. Maximum continuous operation 180HP at 2900 RPM, 26.2 in. MP at sea level, varying lineraly to 25.3 in. at 3700 ft.

4. Minimum operation 2700 RPM.
Maximum 11 3200 RPM

5. Range for idle and clutch engagement 1200 to 1600 RPM.

6. Engine idle speed 1200 to 1600 RPM.

7. Compression ratio 8:5.1.

8. 115/145 octane aviation fuel, 25 gallon capacity.

9. Oil SAE 50 above 40°F, SAE 30 below 30°F and SAE 10 below 10°F. Total capacity eight quarts.

10. Cooling is controlled by centrifugal type fan which pumps air through shrounds surrounding cylinders.

11. Bendix fuel injection and internal electric fuel booster pump, plus fuel drain on the tank and sump drain on the low point of the fuel system complete the entire fuel system.

12. Ignition system.

a. Starter button located on pilots collective stick.

b. Ignition switch must be on both to start.

c. Starter system actuates engine vibrators on the left magneto and the right magneto during start. Left and right magnetos are the same with both magnetos having two sets of points. Retard for starting only.

d. The Bendix vibrators are located below cockpit area under pilots seat.

e. Magnetos are Scintilla S4LN-200 Series.

Tape #31
Ref #6

G. Landing Gear

1. Standard air/oil strut.

2. Hydraulic oil is MIL. SPEC. MIL-H-5606 (Red).

3. Fill shock struts with air (weight off ship) 150 psi.

4. Check on pre-flight for proper clearance.

   Front 1/2 in. minimum.
   Rear 3/8 in. minimum.

5. Tires: 60-75 lbs.

H. Electrical System

1. 24 V Batter.

2. Vibrator requires a minimum of 13-30 volts to operate successfully.

3. 28V 70 AMP alternator on left side of A/C.

4. Voltage regulator located under console.

5. Fuses located on console.

6. Warning lights for main rotor gear box, pressure, temperature, engine oil pressure and clutch engagement.

7. Night flying kit.

8. Rotating beasons - two.

9. Emergency start in case of dead battery.

   a. Use APU

I. Tail Boom

1. Fabricated from single piece aluminum extruded tubing.

2. Horizontal stabilizer attached.

J. Tail Rotor Drive Shaft

1. Fabricated from aluminum alloy tubing.

2. Steel (chrome plated) bearing bonded to shaft.

3. Friction damper (Teflon, impregnated with graphite) rides on above bearing - suppresses vibration.

K. Tail Rotor Assembly

1. Two blades connected to Delta hinge hub by tension torsion bar and attaching hardware.

2. Assembly includes links and pitch control (factory balanced unit).

3. Tail rotor voids - blades should be 80% free of voids - check with coin and visually.

NOTE: Any high frequency noticed by pilot on pedals will require investigation of tail rotor assembly.

L. Weight and Balance

1. Pilots responsibility.

a. Keeping continuous history of changes.

2. Aft limits Sta. 100 in. Forward limits Sta. 95 in. Gross weight 1670 lbs.

NOTE: Datum line is 100 in. forward of C/L of the mast.