UNITED STATES ARMY AVIATION SCHOOL
Department of Maintenance Training
Fort Rucker, Alabama

5/69-1764-3
File No. 30/42/43-2297-3
55-2413-3

PERFORMANCE OBJECTIVES

FLIGHT CONTROL SYSTEM, UH-1

1. KNOWLEDGES:

   a. Given a schematic of the UH-1 hydraulic system with the components numbered, the student should be able to identify at least eight of the ten numbered components.

   b. Given a schematic of the UH-1 hydraulic system with the components numbered, the student should be able to match each of the numbered components to their purpose without error.

   c. Given a prepared list of questions pertaining to the purpose and operation of the UH-1 flight control system components, the student should be able to answer the questions with at least five of the seven correct.

   d. Given a schematic of the UH-1 flight control system with the components numbered, the student should be able to identify at least four of the six numbered components.

2. SKILLS: None.

components
function
purpose

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4 systems
cyclic collective
anti torque & synchronized elev. & hyd. assist

STUDENT OUTLINE

FLIGHT CONTROL SYSTEM, UH-1

1. Hydraulic system.

a. Purpose. To assist in control movements and reduce main rotor feedback.

b. Location. aft side, aft cabin bulkhead, rt. of trans

c. Description. open vent, gravity fed, pressured all times, close center type system

d. Components.

(1) Reservoir.

(a) Purpose. 4 pt. reservoir stores hyd. fluid for use

(b) Location. MIL-H-5606 red hyd. fluid
vent type filter, paper type

(c) Inspection. top of cabin roof rt. hand side

(2) Pump.

(a) Purpose. rt. side of pump case on transmission
pressurizes fluid

(b) Location. 1000 psi No flow condition - controls in static position
950 psi Full flow

(c) Description.

(3) Check valve. B 1 way check valve

(a) Purpose. allows flow in 1 direction only
allows flow without running pump or components on B

(b) Location.

(4) Ground test couplings.

(a) Purpose. To press. sys. w/out running engine

(b) Location. aft cabin bulkhead

(5) Inline filters. inboard filters newly pressurized
outboard filters only as returning & used

(a) Purpose.

(b) Location. 50 PSI differential valve for emergency
aft cabin bulkhead

(c) Description.

(6) System Relief Valve.

(a) Purpose. relieves excess pressure from system that might be inadvertently produced by pump

fail reg rotate

(b) Location. press 1100 psi, valve will start to open, is fully open at 1200

(c) Description. when open, excess will be routed to reservoir and spilled over

(d) Inspection. will be hot if used,

(7) Three-way solenoid valve. provides a means of checking flight controls

(a) Purpose. electric, controlled by a switch on panel, hyd on-off 28V. D.C,

(b) Location. electric current shuts off by pressing plug into press port
fail safe valve
even if loss of elect power, still have hyd,

(c) Description.

(8) Pressure switch. operates caution light on panel

(a) Purpose. 28 volt. DC lite

(b) Location. press. at 800 psi light goes off comes back on 500 psi

tells if press. is sufficient

(c) Description.

(9) Power cylinders. 4 power cylinder

(a) Purpose.

reduces force loads required for control movement

2 cyclic cyl. - forward side trans well attach to inner swash plate ring

4th ed in hell hole

(b) Location.

(c) Description.

1. Type.

2. Construction.

a. Power cylinders.
double action piston in a cylinder

b. Servo pilot valve.
directs flow of fluid into cylinder
controls + directs fluid into cylinder

c. Irreversible valve.
prevents feedback in event of hydraulic failure

3. Operation.

a. Power cylinder assembly, hydraulic system on.

(1) Irreversible valve.

(2) Servo pilot valve.

(3) Power cylinder.

b. Power cylinder assembly, hydraulic system off.

(1) Irreversible valve.

(2) Servo pilot valve.

(3) Power cylinder.

c. Maintenance.

(1) Sequence valve malfunction.

(a) Pilot entry.

(b) Effect.

(c) Cause.

(d) Remedial action.

hardover

(2) One-way check valve malfunction.

(a) Pilot's entry.

(b) Effect.

(c) Cause.

(d) Remedial action.

2. Force trim system.

a. Purpose. induces artificial feel + stability into flight controls

b. Location.

c. Description.

(1) Type.

(2) Operation. Force trim

(a) Magnetic brake.

(b) Force gradient.

d. Maintenance.

(1) Pilot's entry.

(2) Effect.

(3) Cause.

(4) Remedial action.

3. Cyclic control system. horizontal control

a. Purpose.

b. Location.

c. Description.

d. Components.

(1) Control stick.

(a) Purpose.

(b) Location.

(c) Description.

gimbal ring universal action

(2) Control tubes.

(3) Intermixing bellcrank. mixes fore & aft & lateral cyclic

(a) Purpose.

(b) Location. attaches to lower end hyd power cyl. from these to horns on swashplate

(4) Power cylinder.

(a) Purpose. spring centers pedal valve

(b) Location.

(5) Cyclic control horn. connects to swashplate

(a) Purpose.

(b) Location.

(c) Description.

e. Maintenance.

(1) Pilot's entry.

(2) Effect.

(3) Cause.

(4) Remedial action.

4. Synchronized elevator assembly. aid in control stability and

a. Purpose. lengthens CG

b. Location. aft end tail boom section

c. Description. connected to aft horn of swashplate - control tube offset bellcrank

fore & aft cyclic controls for - up aft - down

(1) A and B series.

symmetrical or teardrop shape

(2) C, D, and H series.

5-30 hours, asymmetrical

d. Inspection.

check corrosion around rivets

5. Collective pitch control system.

a. Purpose.

b. Location.

c. Components.

(1) Pilot's collective lever.

(a) Purpose. vertical control

(b) Components.

(2) Copilot's collective lever. ① searchlight ② landing lt.

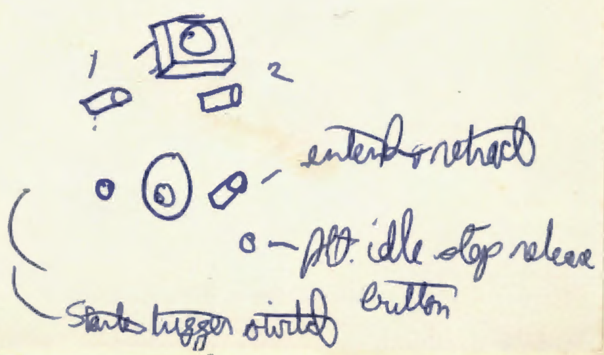
(a) Purpose.

(b) Components.

(3) Torque tube.

(a) Purpose. fixed stops

(b) Location.



(4) Power cylinder.

(a) Purpose.

(b) Location.

(5) Collective levers.

(a) Purpose.

(b) Location.

d. Maintenance.

(1) Pilot's entry.

(2) Effect.

(3) Cause.

(4) Remedial action.

6. Antitorque control system.

a. Purpose. Direction control - counteract effects of torque

b. Components.

(1) Control pedals.

(2) Pedal adjuster.

(3) Power cylinder. no reversable valve no feedback from T/R

(4) Quadrant assembly.

(5) Control cables. creeping pedal, ~~[illegible]~~ position linear cylinder

(a) Purpose. push pull tubes - 2 cable controls

(b) Location. 40-50 lbs tension

(c) Construction. 7/19 cable
strands wires in strand

(6) Sprocket assembly. 6 broken wires in 1 in.

spacing - adjust tension

c. Maintenance.

(1) Pilot's entry. no lubrication points, steel [illegible]

(2) Effect.

(3) Cause.

(4) Remedial action.

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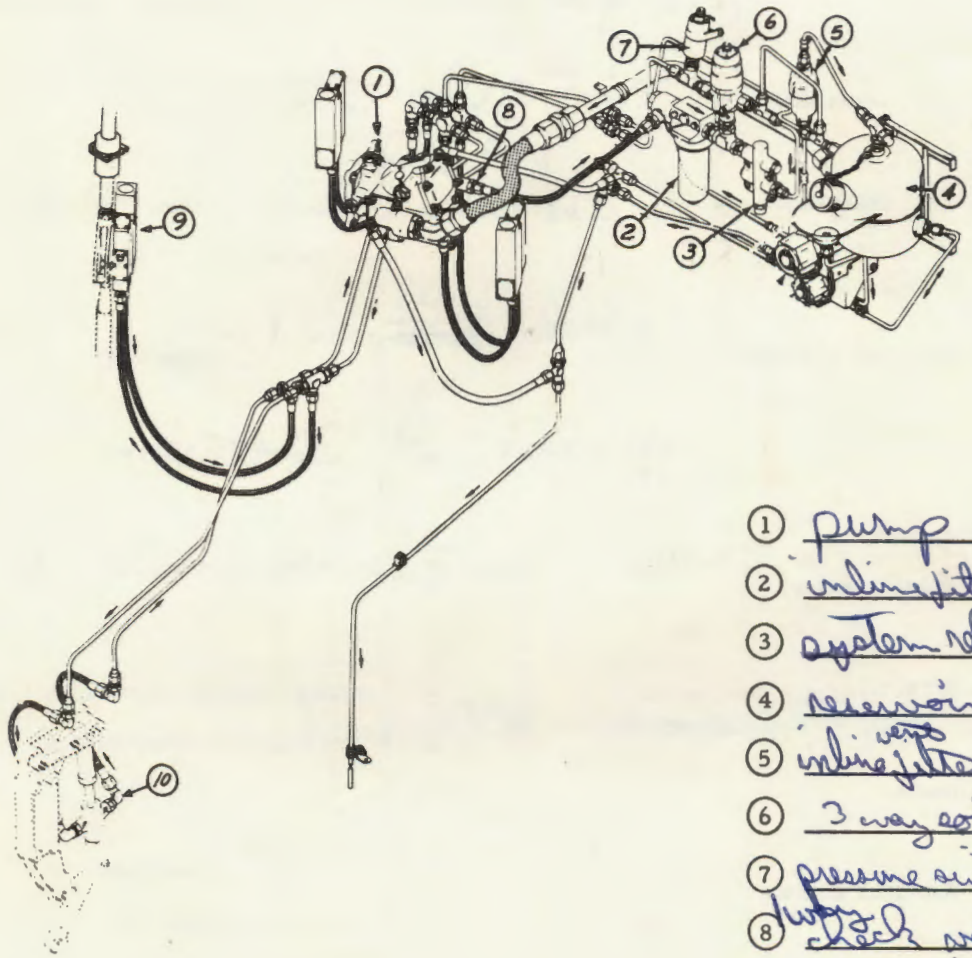
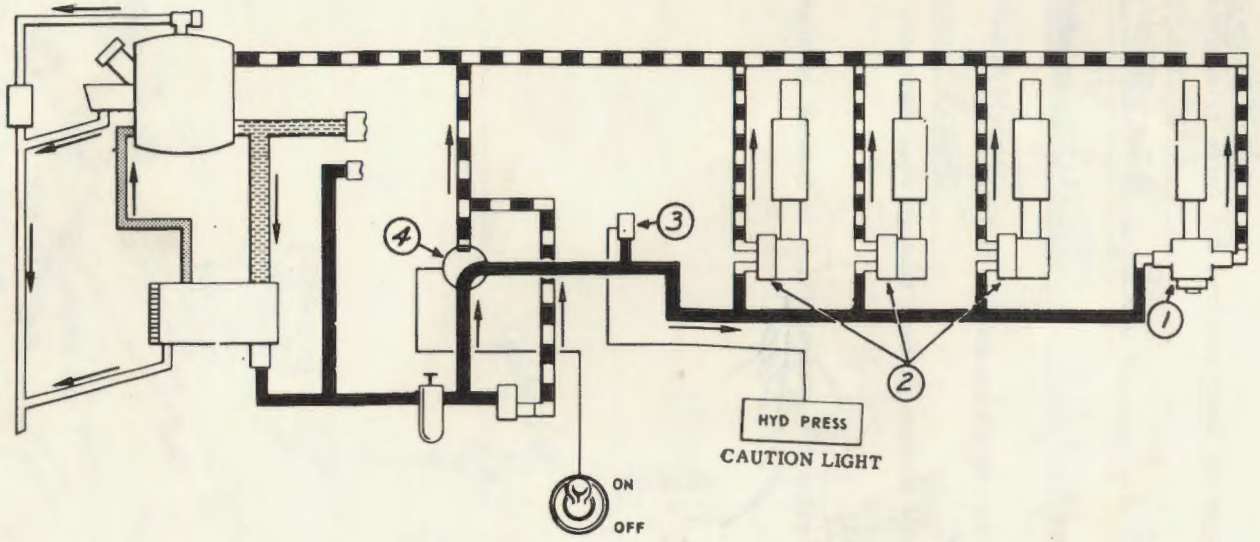
PERFORMANCE CHECK

FLIGHT CONTROL SYSTEM, UH-1

1. Identify at least 8 of the 10 following numbered components:



① pump
② inline filter
③ system relief valve
④ reservoir
⑤ inline vent filter
⑥ 3 way solenoid valve
⑦ pressure switch
⑧ check valve
⑨ irreversible valve provide feedback
⑩ anti-torque power cylinder



a. 2 Prevents main rotor feedback in the event of hydraulic system failure.

b. 4 Provides a means of electrically turning off hydraulic boost.

c. 3 Controls the hydraulic pressure warning light.

d. 1 Does not have an irreversible valve.

3. Complete the following statements on the UH-1 flight control system:

a. The two main components of the force trim assembly are the magnetic brake and force gradients.

b. 28 volt DC is the type of power required for force trim system operation.

c. The cyclic stick is used for fore, aft, and lateral control.

d. Force trims are used to induce artificial feel, _____ and stability into the cyclic control system.

e. What is the purpose of the antitorque system on the UH-1 aircraft?
counteract torque

f. Pedal distant adjustment for crew comfort is made through what component in the antitorque system?

g. The extremes of travel of the collective control stick is limited by what?
friction jack stops

4. Identify at least four of the six following numbered components:

① collective power cylinder
② cyclic bar
③ intermixing bellcrank
④ pedal adjustor
⑤ force gradient
⑥ magnetic brake