

(c) Emergency landing/ditching procedures.

(d) Bail out.

(e) Survival.

(f) Recovery.

SECTION II. OPERATING PROCEDURES AND MANEUVERS

8-4. OPERATING PROCEDURES AND MANEUVERS.

This section deals with normal procedures and includes all steps necessary to ensure safe, efficient operation of the helicopter from the time a preflight begins until the flight is completed and the helicopter is parked and secure. Unique feel, characteristics, and reaction of the helicopter during various phases of operation and the techniques and procedures used for taxiing, takeoff, climb, etc., are described, including precautions to be observed. Your flying experience is recognized; therefore, basic flight principles are avoided. Only the duties of the minimum crew necessary for the actual operation of the helicopter are included. Additional crew duties are covered as necessary in Section I, CREW DUTIES. Mission equipment checks are contained in Chapter 4, MISSION EQUIPMENT. Procedures specifically related to instrument flight that are different from normal procedures are covered in this section, following normal procedures. Descriptions of functions, operations, and effects of controls are covered in Section IV, FLIGHT CHARACTERISTICS, and are repeated in this section only when required for emphasis. Checks that must be performed under adverse environmental conditions, such as desert and cold-weather operations, supplement normal procedures checks in this section and are covered in Section V, ADVERSE ENVIRONMENTAL CONDITIONS.

8-5. SYMBOLS DEFINITION.

Items which apply only to night or only to instrument flying shall have a "N" or an "I," respectively, immediately preceding the check to which it is pertinent. The symbol "O" shall be used to indicate "if installed." Those duties which are the responsibility of the copilot, will be indicated by a circle around the step number; i.e., 4. The symbol star "*" indicates that a detailed procedure for the step is located in the performance section of the condensed checklist. The symbol asterisk "*" indicates that performance of step is mandatory for all thru-flights. The asterisk applies only to checks performed prior to takeoff.

Placarded items such as switch and control labels appear in upper case.

8-6. CHECKLIST.

Normal procedures are given primarily in checklist form and amplified as necessary in accompanying paragraph form, when a detailed description of a procedure or maneuver is required. A condensed version of the amplified checklist, omitting all explanatory text, is contained in the operator's checklist. To provide for easier cross-referencing, the procedural steps in the checklist are numbered to coincide with the corresponding numbered steps in this manual.

8-7. PREFLIGHT CHECK.

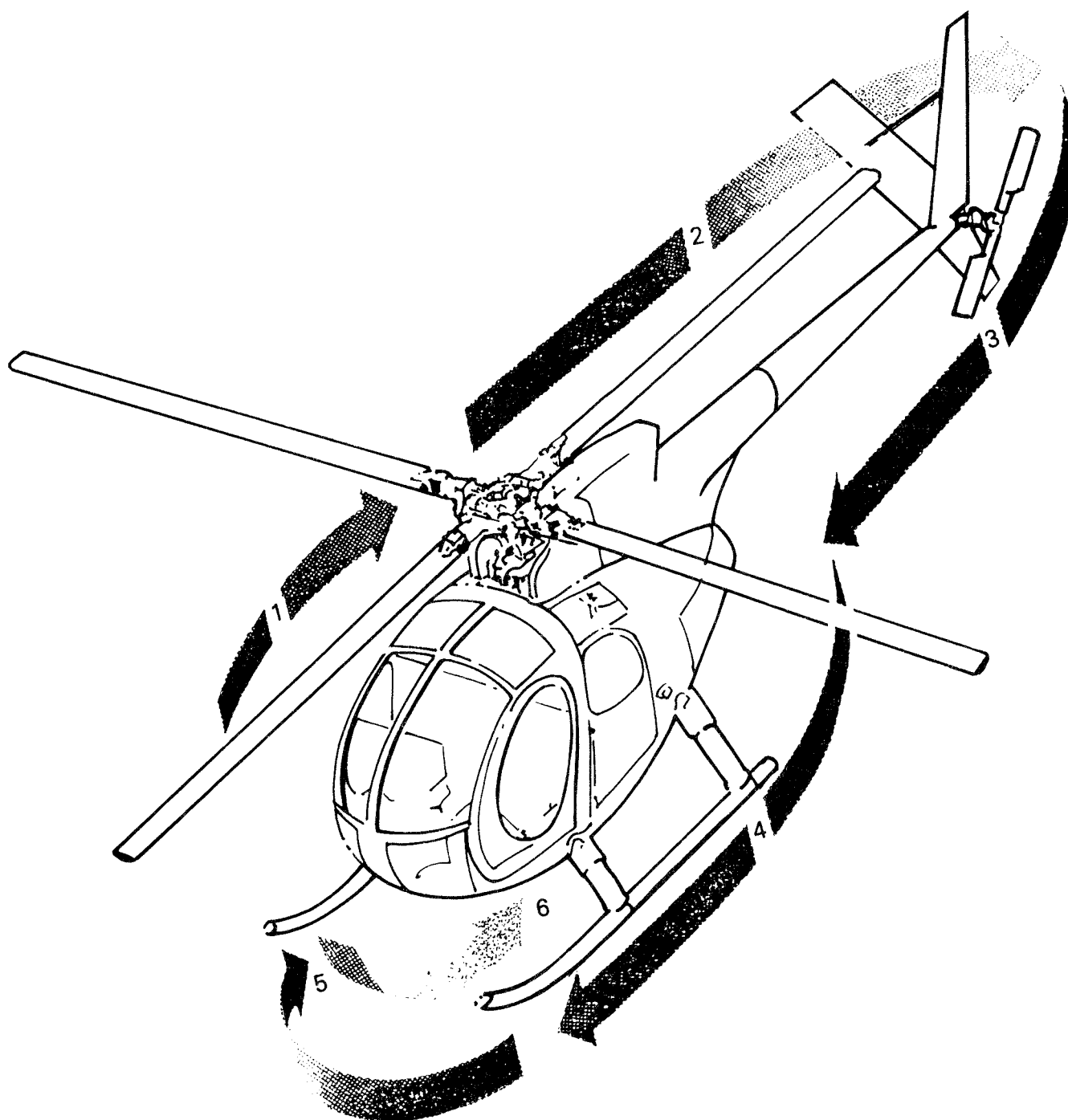
The pilot's "walk-around" interior checks are outlined in the following procedures. The preflight check is not intended to be a detailed mechanical inspection, but simply a guide to help the pilot check the condition of the helicopter. The steps that are essential for safe helicopter operation are included. The preflight may be made as comprehensive as conditions warrant at the discretion of the pilot.

8-8. BEFORE EXTERIOR CHECK.

WARNING

Do not preflight until armament systems are safe.

- O* 1. Armament system — Safe as follows:
 - O a. Armament systems — Safe; ground safety pins in, safing devices installed, and gun clear.
 - O b. ARMAMENT SAFE switch — SAFE if armament is installed.
 - O c. ARMAMENT MASTER switch — OFF if armament is installed.



- AREA 1. FUSELAGE-CABIN RIGHT SIDE
- AREA 2. AFT FUSELAGE-RIGHT SIDE
- AREA 3. AFT FUSELAGE-LEFTSIDE
- AREA 4. FUSELAGE-CABIN LEFT SIDE
- AREA 5. FUSELAGE-FRONT
- AREA 6. FUSELAGE-UNDER SIDE

Figure 8-1. Inspection Areas

2. Publications — check DA Forms 2408-12, -13, -14, and -18; DD Form 1896 if required; DD Form 365-4, Compass Cards; locally required forms, records and publications; and availability of operator's manual (-10) and checklist (-CL).
- O* 3. Covers, locking devices, tiedowns, and grounding cables — Removed and secured.
- * 4. Ignition lock switch — ON.
5. Cockpit — Check as following items are checked.
 - a. FUEL PUMP switch — OFF.
 - b. BATT switch — BATT.
 - c. Fuel gage — Check quantity.
 - d. Lights — Check if use is anticipated (landing, anticollision, position, and interior lights, and NVG lighting), then, OFF.
 - e. Caution and warning lights — Check illumination. On series 1 and 2 aircraft, the XMSN OIL PRESS and ENGINE OUT warning lights should be flashing; the GENERATOR OUT caution light should illuminate. On series 3 aircraft the TRANS OIL PRESS and ENGINE OUT warning and MASTER CAUTION lights should be flashing. The DC GEN light should be illuminated. During daylight operation, check that Flight-OFF-BRT-light Rheostat is OFF. All other lights — press to test.
 - f. NVF position lights — ON, IR searchlight — ON; check lights for condition and operation as required, then OFF.
 - g. BATT switch — OFF.
 - h. First aid kit — Check.
 - i. Pilot seat, seat belts, shoulder harness, and armor. Check condition.
 - j. Fire extinguisher — Check.
 - k. Radio access compartment — Check.
 - l. Pilot pedals — Adjust.

- m. Cabin door jettison pins — Check.
- n. Crew door — Check condition.

8-9. EXTERIOR CHECK.

See Figure 8-1.

8-10. FUESLAGE — CABIN RIGHT SIDE (AREA 1).

1. Cabin interior — Check as following items are checked:
 - a. Forward landing gear dampers — Check for extension and condition.
 - O* b. Cargo/loose equipment — Check for proper loading and tiedown.
 - * c. Passenger seat and belts — Check condition. Ensure shoulder harnesses and seat belts are properly fastened together and tightened when not in use.
 - * d. Transmission oil level — Check.
 - O e. Cabin door — Check condition.
2. Main rotor system — Check condition.
3. Engine and transmission air inlets — Check unobstructed engine air filter bypass door secure.
4. Fuselage — Check as following items are checked:
 - a. Landing gear — Check condition of fairing, skid, and skid shoe — Handling wheel removed.
 - b. IR searchlight — Check condition and security.

WARNING

Do not fly aircraft with ground handling wheels installed.

- c. Fuel sample — Check for contamination before first flight of the day. If the fuel sump has not been drained, drain a sample and check.

d. Fuel — Check quantity on first flight of the day and when refueled. Cap secure.

e. Engine oil tank — Check condition, oil level and cap secure.

f. Static port — Check unobstructed.

g. ADF antenna — Check condition.

8-11. AFT FUSELAGE — RIGHT SIDE (AREA 2).

1. Fuselage — check condition as following items are checked.

O a. Antennas — Check condition.

b. Stabilizers and strut — Check condition.

c. Tail skid — Check condition.

8-12. AFT FUSELAGE — LEFT SIDE (AREA 3).

*1. Tail rotor transmission and oil level — Check condition.

*2. Tail rotor and controls — Check condition and free movement.

*3. Main rotor blades — Check condition. Do not handle trim tabs.

4. Fuselage — Check.

8-13. FUSELAGE — CABIN LEFT SIDE (AREA 4).

1. Engine compartment — Check condition; door secure.

2. Fuselage — Check condition as following items are checked.

O* a. Mission equipment — Check weapons and other equipment as required to support the mission. Refer to Chapter 4, MISSION EQUIPMENT, for equipment checks.

b. Landing gear — Check condition of fairing, skids, and skid shoe. Handling wheel removed.

O c. Cabin door — Check condition.

3. Cockpit — Check as following items are checked:

a. Copilot seat, seat belt, shoulder harness, and armor — Check condition. Secure seat belt and shoulder harness if seat is not used.

b. Cyclic — Check secure or stow as required.

c. Pedals — Adjust as required.

d. Battery compartment — Check condition

e. Cabin door jettison pins — Check.

f. Crew door — Check condition.

8-14. FUSELAGE — FRONT AND UNDERSIDE (AREAS 5 AND 6).

1. Fuselage Front — check as following items are checked:

a. Canopy/windshield — Check condition.

b. Air inlet — Check unobstructed

c. FM homing antenna — Check condition.

d. Pitot tube — Check unobstructed.

e. Pedals — Check control linkages unobstructed.

2. Fuselage underside — Check condition as following items are checked.

O a. ADF sense antenna — check condition.

b. Fuel vent — Check unobstructed.

*3. Crew and passenger briefing — Complete as required. Refer to crew and passenger briefing in Section II, CREW DUTIES.

8-15. BEFORE STARTING ENGINE

O* 1. Armament system — Check and set as required.

2. Shoulder harness lock(s) — Check operation and leave unlocked.

*3. Overhead controls and switches — Set as follows:

a. Utility light — OFF.

b. CABIN HEAT AND DEFOG lever — OFF.

c. ENGINE DE-ICER lever — OFF.

d. BYPASS AIR control — Check full aft position.

4. Magnetic compass — Check.

5. Instrument panel instruments and switches — Check and set as follows:

a. Flight instruments.

b. Systems instruments.

c. PITOT HEAT switch — OFF.

6. Console switches and circuit breakers — Set as follows:

a. Avionics — OFF; set as required.

b. Circuit breakers — In.

c. INVERTER switch — OFF.

d. GEN switch — GEN.

e. DIR GYRO switch — MAGNETIC or SLAVE.

f. AUX TANK or UTILITY POWER switch — OFF.

g. FUEL PUMP switch — OFF.

h. FUEL VALVE — Check open (Down).

*i. BATT switch — As required. BATT for battery start: EXT for GPU start.

*j. LIGHTS switches — Set as required.

(1) POS LT switch — As required.

(2) ANTI-COLLISION switch — ANTICOLLISION.

(3) NVG POS LT switch — ON, adjust intensity.

a. NVG filters — Check.

*7. GPU — Connect for GPU start.

8. Engine out audible and RE-IGN system — Check for warning tone is headset and illumination of the RE-IGN light. GEN switch — ON then OFF.

9. Flights controls — Check and set as follows:

a. Control frictions — OFF.

b. Check full travel. Center cyclic and pedals. The cyclic must be laterally in the center of the friction slot and longitudinally one-third from full aft to avoid droop stop damage. Collective pitch unobstructed and down.

c. Control frictions — As required.

*10. Throttle — Check and set for start. Move to full open, then idle stop, then to the fuel cutoff position.

8-16. STARTING ENGINE

*1. Fireguard — Posted if available.

*2. Rotor blades — Check clear and untied.

*3. Engine — Start as follows:

a. Starter switch — Press to hold.

b. TOT — Check below 200°C.

c. Throttle — Open to the idle position at peak of N1 rpm provided the following N1 limits are maintained.

FAT	MINIMUM N-1
7° and above	15%
7°C thru -18°C	13%
-18°C FAT and below	12%

d. Main rotor — Check moving by 30% N1.

- e. TOT — Monitor for over—temperature conditions.
 - f. Starter switch — Release at 58% N1.
 - g. Engine oil pressure — Check.
 - h. XMSN OIL PRESSURE warning light — Check out.
 - i. N1 — 62 to 65 percent.
- O*4. SCAV AIR switch — SCAV AIR. A slight but discernible increase in TOT should follow. If not, operation of the scavenge air system may be checked by hand, feeling for air flow out the scavenge air outlet, then OFF.
- * 5. Ground power unit (GPU start) — Disconnect.
 - * 6. BATT switch (GPU start) — BATT.
 - 7. GEN switch — GEN.
 - * 8. DC Amps — Check 60 amps or less before inverter is turned on.
 - * 9. INVERTER switch — INVERTER. The attitude gyro and homing, heading, bearing indicator should be operating properly.
 - *10. Avionics — ON as required.
- 8-17. ENGINE RUN UP.**
- * 1. Engine instruments — Check. Control Frictions — Off as required.
 - * 2. Throttle — Slowly increase to full open. Set N2 to 101 percent.
 - 3. HEAT and DE-ICER systems — Check if use is anticipated as follows; then, set as required.
 - a. ENGINE DE-ICER — By moving the control lever full aft, check for a rise in TOT and then forward. TOT should decrease.
 - b. CABIN HEAT and DE-FOG — Check by moving the switch to PITOT HEAT; check for a rise in TOT then forward. TOT should decrease.
 - c. PITOT HEAT — Check by moving the switch to PITOT HEAT; check for increase in DC AMPs, then OFF.
- 4. Avionics — Check as required.
 - *5. Flight instruments — Check and set as follows:
 - a. Altimeter — Set and compare altitude with field elevation.
 - b. Heading indicators — Check that the heading indicator is aligned and corresponds with the magnetic compass. Set heading indicator as required.
- O*6. Doors — Secured.
- 7. Health Indicator Test (HIT Check). Perform before first flight of the day; refer to HIT TOT log in helicopter log book.
- O*8. SCAV AIR switch — As required.
- 9. Deceleration check — Perform (if required, see Chapter 5, FUEL OPERATION LIMITS) as follows:
- NOTE**
- Above check is only required when using alternate fuel.
- a. N2 RPM — 101 percent and stabilize 15 seconds.
 - b. Throttle — Idle. Simultaneously start a time count.
 - c. Stop time as N1 passes through 65 percent.
- NOTE**
- Multiple attempts may be required before proficiency is obtained in timing the deceleration.
- d. Check deceleration time. Minimum allowable time is 2 seconds. If deceleration time is less than 2 seconds, make two checks to confirm the time.
 - e. If deceleration time is less than 2 seconds, aircraft will not be flown until maintenance action is accomplished as prescribed in TM 55-1520-231-23. Enter con-

ditions in "Remarks" section on DA Form 2408-13.

f. Throttle — Open.

8-18. HOVER CHECK.

Perform the following checks at a hover:

1. Engine instruments — Check.
2. Power — Check. The power check is performed by comparing torque required to hover with the predicted values from performance charts in Chapter 7.
3. Flight instruments — Check as required.
 - a. Altimeter — Check for indication.
 - b. Slip indicator — Ball free in race.
 - c. Heading indicator and magnetic compass — Check for turn indications left and right.
 - d. Attitude indicator — Check indications nose high and low and banks left and right.

8-19. BEFORE TAKEOFF.

Immediately prior to takeoff, the following checks shall be accomplished:

- *1. N2 — 101% (103% hover).
- *2. Systems — Check engine, transmission, electrical, and fuel quantity indications.
- *3. Crew, passengers, and mission equipment — Check.
- *4. Avionics — As required.

8-20. TAKEOFF.

8-21. MAXIMUM PERFORMANCE.

A takeoff that demands maximum performance from the helicopter is necessary because of various combinations or heavy helicopter loads, restricted performance due to high-density altitudes, barriers that must be cleared, and other terrain features. The decision to use either of the following takeoff techniques must be based on an evaluation of the conditions and helicopter performance.

CAUTION

During takeoff, nose low altitudes close to the ground can result in ground contact of the WSPS.

a. *COORDINATED CLIMB.* Align the helicopter with the desired takeoff course at a stabilized hover of approximately 3 feet (skid height). Apply forward cyclic pressure smoothly and gradually while simultaneously increasing collective to begin a coordinated acceleration and climb. Adjust pedal pressure as necessary to maintain the desired heading. Maximum torque available should be applied is established that will permit safe obstacle clearance. The climbout is continued at that attitude and power setting until the obstacle is cleared. After the obstacle is cleared, adjust helicopter altitude and collective as required to establish a climb at the desired rate and airspeed. Continuous coordinated application of control pressures is necessary to maintain trim, heading, flight path, airspeed, and rate of climb. Takeoff may be made from the ground by positioning the cyclic control slightly forward of neutral, prior to increasing collective.

b. *LEVEL ACCELERATION.* Align the helicopter with the desired takeoff course at a stabilized hover of approximately 3 feet (skid height). Apply forward cyclic pressure smoothly and gradually while simultaneously increasing collective pitch to begin an acceleration at approximately 3 to 5 feet skid height. Adjust pedal pressure as necessary, to maintain the desired heading. Maximum torque available should be applied (without exceeding translational lift). Additional forward cyclic pressure will be necessary to allow for level acceleration to the desired climb airspeed. Approximately 5 knots prior to reaching the desired climb airspeed, gradually release forward cyclic pressure and allow the helicopter to begin a constant airspeed climb to clear the obstacle. Care must be taken not to decrease airspeed during the climbout, since this may result in the helicopter descending (falling through). After the obstacle is cleared, adjust helicopter attitude and collective, as required, to establish a climb at the desired rate and airspeed. Continuous coordinated application of control pressures is necessary to maintain trim, heading, flight path, airspeed, and rate of climb. Takeoff may be made from the ground by positioning the cyclic control slightly forward of neutral, prior to increasing collective.