

OPERATIONAL CONSIDERATIONS FOR HELICOPTER USE

Going beyond the normal safety precautions taken by our people working in and around helicopters, there are a number of other considerations that must be taken into account. Some of them are required because of written policy statements. Others are considered sound operational procedure, while still others are just good common sense.

Not too many years ago, fixed wing aircraft with skis were used predominantly for access to the more remote snow courses. As helicopters became more reliable and as more back-country data sites were located in terrain lacking fixed wing landing sites, the use of helicopters for snow surveys became almost commonplace. Early helicopter operations were haphazard at best. Radio communications were poor, weather forecasting was chancy and pilots were just beginning to learn about the effects of mountainous terrain on aircraft performance.

The past ten years have seen dramatic changes in both our utilization of helicopter services and the number of people that are being flown. At some data collection locations, virtually all snow course measurements and ground truth sampling are done with helicopter.

It followed then that as the number of man-hours in helicopters increased, the likelihood of flight related incidents also increased. The seat-of-the-pants operational philosophy gave way to a structured, 100 percent safety oriented policy, which although not perfect, does provide the snow surveyor with certified aircraft, competent pilots, and proven safety and survival equipment. Procedures stress safety and are designed to minimize hazard and maximize survivability both on the ground or in the air should an accident occur.

One of the primary building blocks of a good winter flying program is the training you are receiving here this week. Most SCS helicopter contracts for snow measurement, state that the pilot, snow surveyors or both attend this schooling. The winter survival, mountain medicine and helicopter safety portions have proven invaluable in past accident situations.

In addition to attendance at this school, there are other requirements to be satisfied before SCS snow surveyors can fly. Authorizations for each flight must be secured. General Manual, Subpart L, Section 420.110, states:

"SCS employees shall not be authorized to fly as passenger on other than commercial airlines without the approval of officials having delegated authority. Blanket aircraft authorizations for SCS operations shall not be granted. Authorizations to use chartered, contract or personal owned aircraft will be on an individual trip basis."

At the state level, only the state conservationist or the state administrative officer have approval authority.

In addition to these restrictions on you as a passenger, there are some that apply to the pilot and helicopter as well.

The U. S. Forest Service and Bureau of Land Management have both adopted carding programs for pilot certification based on his demonstrated ability and experience. Aircraft are certified based on capability, installed equipment, and airworthiness. The SCS relies heavily upon both these carding systems when applicable. The General Manual provides similar guidelines for our use in situations involving aircraft not under BLM or USFS contract. Some of the minimum requirements are listed below:

Pilot ----- 1000 hours total flying time.
- 500 hours in class, category, type and model aircraft.
- 200 hours extended cross-country.
- 200 hours operation in terrain and landing facility typical of those of the proposed trip.

Aircraft ----- Current airworthiness certificate.
- Color distinguishable against a snow background.
- Signal flares.
- Radio equipment.
- Emergency locator transmitter.
- Shoulder harnesses.
- Emergency equipment for the pilot.

You, as a passenger, have some common sense responsibilities also. Become familiar with the helicopter in which you will be flying. If the pilot does not answer all your questions during his preflight briefing, do not hesitate to ask him. Find out where the emergency locator transmitter is secured. Know how to use it. Locate the battery switch and know how to operate the fuel shutoff valve. Familiarize yourself with the emergency procedures for both front and rear passenger seats and know how to buckle the seat belt and shoulder harnesses.

Each agency differs somewhat in the kind and amount of personal protective and emergency equipment that it will provide for you. In the SCS it varies from state to state. Personal protective flight gear should consist of a minimum of the following:

- 1) Helmet (SPH-4C or equivalent).
- 2) Fire retardent clothing (NOMEX or equivalent).
- 3) High-topped leather boots.
- 4) Gloves (leather or NOMEX flight).

Similarly, each agency has set up minimum guidelines for emergency gear that it will provide and that you must carry while flying. The list should include, but is not limited to the following:

Sleeping bag	Flashlight
Ground pad	First aid kit
Tent	Rucksack or pack
Small shovel	Snowshoes
Hatchet	Stove and fuel
Compass	Seasonal clothing
3-day food supply	

As you assemble this gear and pack it away, weigh it. The pilot or helicopter manager will need this information as well as your equipped weight to do load calculations and aircraft weight and balance determinations prior to takeoff.

Frequent storms during the snow season make flight planning difficult, but still an absolute necessity. Whenever possible, work with the pilot during route selection. Make him aware of possible landing sites when you are familiar with the terrain at your destination.

Keep abreast of changes in the weather prior to your departure. Destination weather is just as important as departure weather. Conditions can improve or deteriorate rapidly in the mountains. The pilot is completely in charge and the decision whether or not to fly because of weather rests entirely with him.

The pilot is also responsible for filing a flight plan and for flight following. Depending upon the final destination, a flight plan must be filed with the FAA or his own agency. Flight following using frequent radio position checks is a sound procedure and is required for most flights. Broad aerial coverage of USFS, FLM, NPS and SCS radio nets makes this a relatively simple procedure and cheap insurance should problems develop during the mission.

Snow measurement and data site maintenance using helicopters is a very safe, efficient method for getting the job done. By observing the rules, following the regulations and using good common sense, your flights will remain enjoyable, will be completed safely and will become memorable experiences for many years to come.

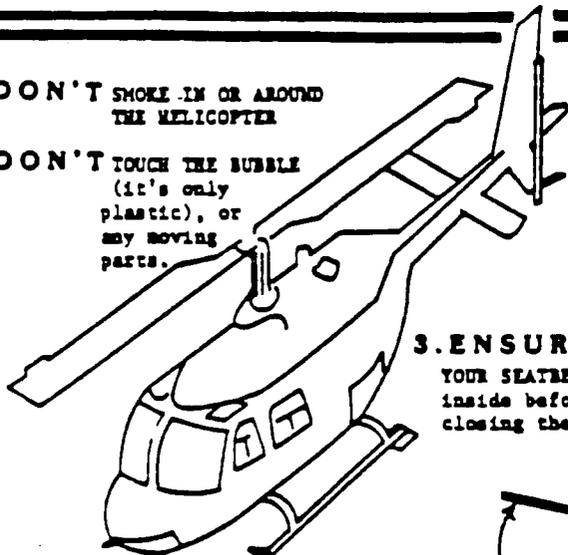
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BE ALERT AND AROUND THE HELICOPTER

LIVE

1. DON'T SMOKE IN OR AROUND THE HELICOPTER

2. DON'T TOUCH THE BUBBLE
(it's only plastic), or any moving parts.



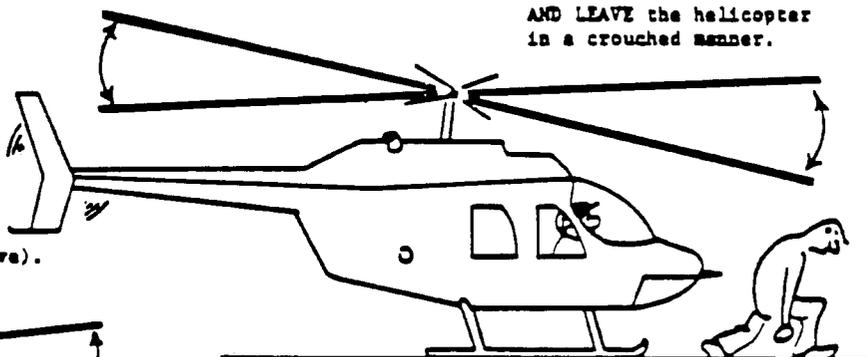
3. ENSURE YOUR SEATBELT is inside before closing the door.

8. PROTECT YOURSELF

- a. FASTEN SEATBELT ON ENTERING helicopter and leave it fastened until the pilot signals to get out.
- b. ASK THE PILOT about emergency exits and escape procedures.
- c. DRESS for the operating environment.
- d. KEEP WELL CLEAR of landing or taking off, especially with external loads.
- e. SHIELD YOUR EYES near a helicopter when it is landing or taking off.
- f. FRONT PASSENGER will unload other passengers at an unmanaged spot.

9. APPROACH

AND LEAVE the helicopter in a crouched manner.

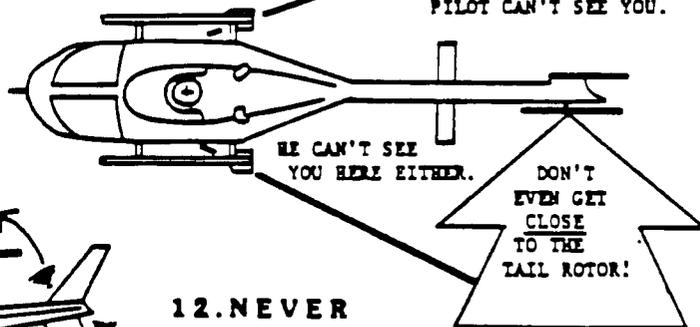


4. NEVER APPROACH OR LEAVE UPHILL
(Rotor blades are expensive).



10. WHEN DIRECTING THE HELICOPTER, stand with your back to the wind, arms outstretched in the direction of the pad.

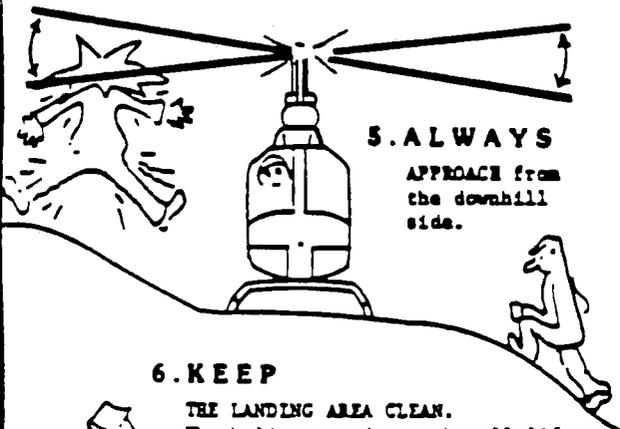
11. ALWAYS AVOID THIS BLIND AREA. THE PILOT CAN'T SEE YOU.



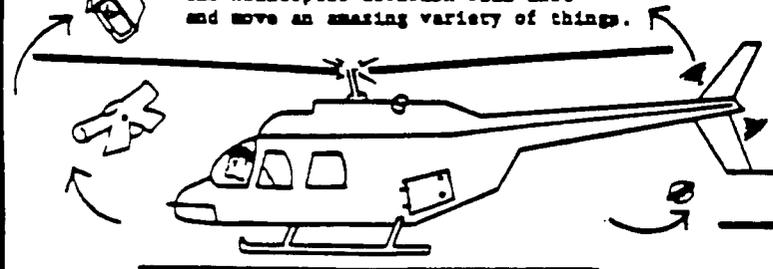
HE CAN'T SEE YOU HERE EITHER.

DON'T EVEN GET CLOSE TO THE TAIL ROTOR!

5. ALWAYS APPROACH from the downhill side.



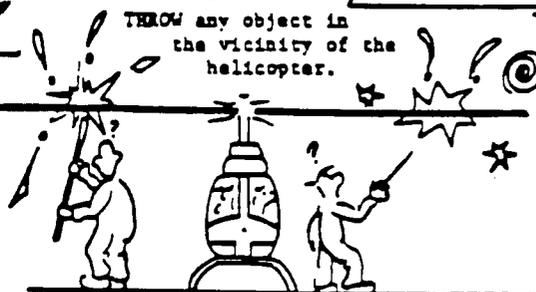
6. KEEP THE LANDING AREA CLEAN.
The helicopter downdraft will lift and move an amazing variety of things.



7. DON'T SLAM THE DOORS, but close them gently and don't let them swing in the wind.



12. NEVER THROW any object in the vicinity of the helicopter.



13. CARRY TOOLS and other long objects horizontally below waist level, not upright or over shoulder.

14. HOLD ON TO YOUR HAT!

OFFICE OF AIRCRAFT SERVICES

HELICOPTER USE TRAINING

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Personal Protective Equipment

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HELICOPTER SAFETY

I. Introduction - The helicopter can be a potentially dangerous machine and continually requires thinking and practicing safety by all personnel who work with it.

Agency personnel must be aware of these inherent hazards and also practice these principles to insure safe operations.

A. General Safety precautions

1. Helicopter operations will comply with the applicable general safety rules for aerial operations and practices prescribed for specialized helicopter operations in the agency manual and Federal, State and OSHA standards.

2. Safety training of ground personnel should include items requiring special care in and around helicopters on the ground or in the air.

3. The pilot is responsible for the safety of the helicopter and his passengers at all times.

4. Prior to each day's operations, a briefing shall be conducted with the pilot.

5. Operation of the helicopter at night will be conducted only after the requirements in DM 351 and Federal Aviation Regulations have been met.

6. Helicopter pilot duty limitations and flight time limitations have been established by the agencies as an effort to reduce accidents caused by pilot fatigue - Follow Them!

7. Personnel trained in helicopter use will be stationed at each helicopter landing area during flight operations to supervise loading operations and enforce safety regulations.

8. Helijumping is not permitted from a helicopter in any phase of flight or hovering without the necessary qualifications, equipment and training. One-skid landings or hovering landings with only the front portion of both skids touching the ground will not be used for off-loading passengers and cargo.

9. Permit only necessary flights. Never carry unauthorized or unnecessary passengers and cargo.

10. Only qualified and trained ground crew personnel will be used during hover hook-ups. Crew must be briefed by the pilot prior to the start of any hover hook-up operation. Emergency procedures must be established between pilot and ground crews.

11. All aircraft accidents or incidents must be immediately reported to responsible authorities.

12. Flight plans are required for all flights except local training and maintenance test flights within a 25-mile radius of the base of operations for all flights conducted by DOI aircraft. An FAA or equivalent agency flight following procedure is required. The flight plan should state the names of people on board, destinations, type and color of aircraft, N-number, fuel available, time of departure and return time. Make regular position reports if possible and don't deviate from flight plan except in emergencies.

13. Before any flight, check pilot and aircraft data cards. Brief pilot on the mission and be sure a flight plan is prepared.

B. Precautions on the Ground - Hazardous points Around Helicopters.

1. Never approach a helicopter without the pilot's knowledge and approval. When approaching, approach at a crouch from the front or side, in full view of the pilot. Main rotor blades can tip below the six-foot level. Never enter the landing area until the helicopter has completed landing.

2. Do not approach a helicopter from an area where the ground is higher than where the helicopter is standing or hovering. Main rotors can easily reach below head height on the uphill side of even moderate slopes. Never run when approaching or leaving a helicopter.

3. When walking in front of a helicopter, be sure not to strike any part of the helicopter such as pitot tube, antenna or mirrors with body or cargo. Keep all long-handled tools clear of the rotor system. A recommended procedure is not to load or unload any object over four feet in length under turning blades.

4. Keep landing areas clear of all unauthorized personnel and also clear of light materials that may blow around. Unless required to go nearer, stay 100 feet from helicopters at all times. Larger helicopters can create wind velocities as high as 60 MPH.

5. Make the pilot aware of any baggage or cargo being placed in or on the helicopter. Always report the correct weight of all personnel and equipment to the pilot before the flight. Cargo packages should be weighed separately so the pilot can distribute the weight as he deems necessary. Explosives, flammables and other hazardous materials can only be transported when the pilot and Government personnel have complied with HMR Part 175, CFR 49. If these regulations are not complied with, all parties involved can and may be cited.

6. All cargo in external racks must be tied down securely. Bring tie-down cords through handles on cargo if possible. Never leave loose tie-down cord in cargo racks. Never stand erect on cargo racks or on door sill.

7. When entering a helicopter, hold on to the door to prevent wind from slamming it against the helicopter. Do not use the door to hold your weight or to pull yourself in. Place your foot on the step first, then have your head and shoulders enter the passenger compartment before your other foot is placed inside. The front passenger must remain clear of all flight controls.

8. Sliding windows or air vent holes on helicopters should not be used to close doors since they may easily be broken. Close doors gently, do not slam shut. Keep hold of papers and all materials that may interfere with flight controls.

9. Before takeoff, fasten and adjust seat belt and shoulder harness. Shoulder harness is required for all front seat passengers. Keep seat belts fastened until after landing is completed. Be sure you know how to unfasten the shoulder harness and seat belt.

10. After landing, unfasten seat belt. Refastening the seat belt behind you before getting out of the helicopter is recommended. Never let the seat belt hang outside of the door. Extensive damage will occur as a result of seat belt being left outside door during flight.

11. Do not throw objects out of helicopters while in flight or on the ground. Hold maps and papers securely, especially if flying with the doors off.

12. All personnel working around helicopters must wear hearing protection, goggles and hard hat with chin straps. All pilots, crew members and DOI employees must wear NOMEX clothing, approved aviation helmets and other protective equipment as required by Departmental policy.

13. Always wear your hard hat with chin strap during takeoff, landing and flight if flight helmets are not available. If chin strap is not available, hold hard hat securely under your arm or in your hand while entering or exiting.

14. The following procedures will be observed when refueling helicopters at landing areas:

- a. Helicopter engine will be shut off and rotor blades stopped.
- b. Helicopter and fuel containers will be grounded.
- c. There will be no passengers aboard.

d. No smoking or unauthorized personnel within 100 feet.

e. Fire extinguishers will be available.

15. All passengers should know the location of the emergency exits, first-aid kits, emergency locator transmitter (ELT), fire extinguisher, and survival gear. You should read all instructions and use these items only in an emergency. These items are required on all DOI contract aircraft. Rental aircraft may or may not have a survival kit or first-aid kit.

C. Precaution in Flight

1. Keep all safety belts fastened and snug during flight. Do not move around during flight unless absolutely necessary.

2. Cigarette smoking during flight only at pilot's discretion. No cigar or pipe smoking. No smoking during takeoffs or landings. No smoking within 100 feet on heliports.

3. Keep alert for hazards, particularly power and telephone lines --inform pilot of their presence, he may not be aware of them. Assist pilot when requested in watching tail rotor clearance during rough field landings.

4. Keep your body, equipment and seat belts clear of controls at all times.

5. Never request a pilot to perform a mission that he or his aircraft have not been approved for. Check pilot qualification card and aircraft data card if in doubt.

6. Pilot should approve all missions, his word is final as to whether or not a flight can be made. Do not put any undue pressure on the pilot to fly in adverse weather. Undue influence to go beyond these limitations may well result in an accident. Stop any flight if there is any doubt that continuing will endanger your safety.

7. Wind restrictions have been established to ensure safe and successful helicopter flights. Helicopter operations will be shut down when winds exceed limitations established or any time the pilot decides that the wind conditions are such that the safety of continuing flight operations is in question, which may be below established wind conditions. Radio communications or hand signals should be used to aid the pilot when needed. Other methods of indicating wind direction and speed are cloth or paper streamers, wind socks or throwing dry dirt into the air.

8. While in flight you should always be prepared for a sudden emergency landing by properly wearing all available personnel

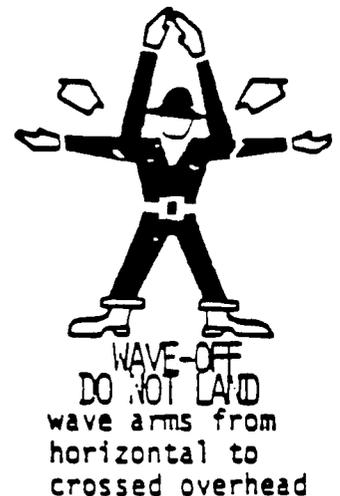
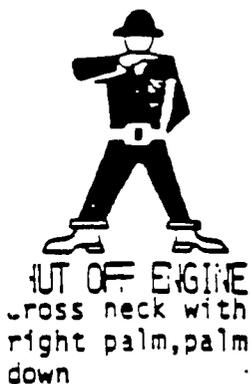
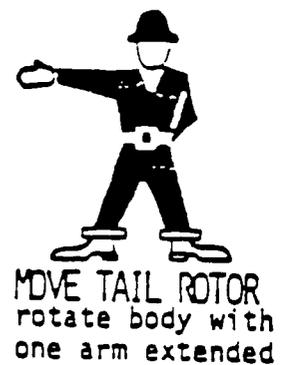
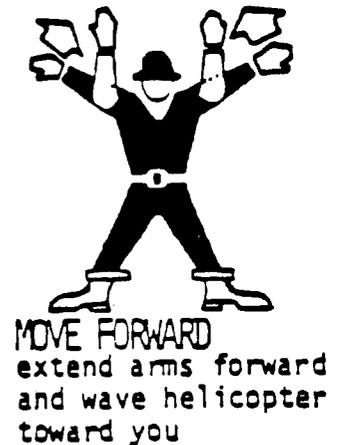
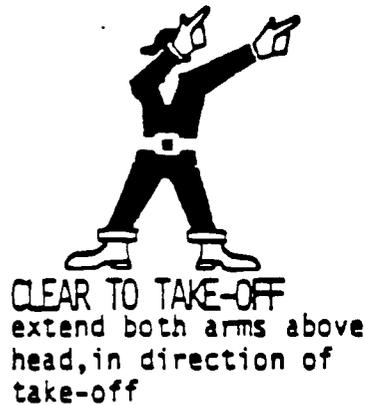
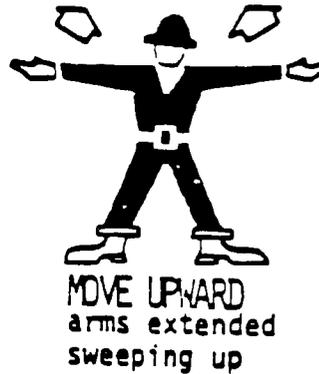
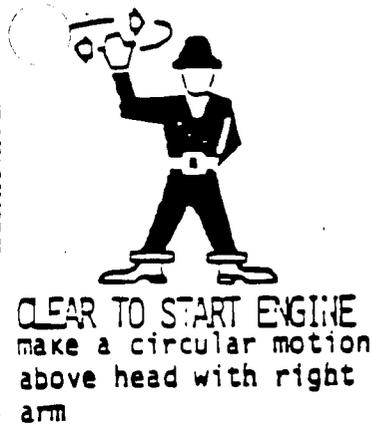
protective gear, keeping your seat belt snug, keeping clear of all controls, securing loose gear and checking emergency exit locations and operation. During an emergency landing assume the proper seating position to reduce the risk of injury.

II. SUMMARY

- A. Never approach a helicopter from behind or without the pilot's knowledge.
- B. Observe the Do's and Don't's that we have pointed out.
- C. Know the location and use of all emergency and survival kits.
- D. Be sure the pilot is aware of types and weights of all cargo placed in the helicopter.
- E. Always wear your seat belts and protective gear.
- F. Stay clear of all rotor blades.

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HELICOPTER HAND SIGNALS



HELICOPTER CAPABILITIES AND LIMITATIONS

I. INTRODUCTION

The helicopter has proven its value and versatility throughout the world. Its ability to operate from restricted areas and to remain above a selected spot are perhaps the helicopter's greatest attributes. Managed by trained personnel and treated with proper respect, it is as inherently safe as any aircraft in use today.

Helicopters have been utilized on an ever-increasing scale for thirty years and is a very valuable tool in a wide variety of uses. To properly manage helicopters for safe and efficient utilization, we must know something of their basic characteristics, capabilities and limitations. A helicopter derives its ability to fly from one or more power driven rotating air foils or rotors; hence it is known as a rotary wing aircraft.

II. BASIC HELICOPTER DESIGN

A. Single Rotor Helicopter

The most common design is a single main rotor which imparts lift and thrust and a smaller tail rotor which compensates for torque induced by the powered turning of the main rotor.

B. Dual Rotor Helicopter

Some helicopters have dual main rotors, mounted in tandem, or side-by-side. Usually, torque compensation is achieved by turning the rotors in opposite directions (add tail fins).

III. HELICOPTER CONTROLS

There are four controls that are used in conjunction with each other when flying a helicopter.

A. Collective Pitch Stick

This changes the angle of pitch (or angle of attack) of the main rotor blades simultaneously. As the pitch of the blades is increased power, lift is induced causing the helicopter to lift off the ground, hover and/or climb.

B. Motorcycle Type Throttle

A hand-grip throttle is mounted on the collective pitch stick for coordinated use with reciprocating engines. As the pitch is increased, power must be added to maintain rotor RPM so the helicopter will lift or climb. On turbine engines this power coordination is accomplished automatically.

C. Rudder or Anti-Torque Control

Two foot pedals are provided to counter-act torque effect and provide heading and directional control. On dual-rotor helicopters, directional fins are used for stability and the pedals control tabs on the main rotor blades.

D. Stick or Cyclic Control

Directional movement of the helicopter and banked turns in forward flight are achieved by use of this control. The main rotor(s) is tilted in the direction of stick movement causing the helicopter to move in that direction.

NOTE: These controls are of no use if obstructed by loose gear, such as canteens or hard hats.

IV. HELICOPTER TERMINOLOGY

Certain terms are commonly used in reference to helicopter operations. Being familiar with these is important to persons involved with helicopter use.

A. Ground Effect

A cushion of air beneath a hovering helicopter caused by air being pushed downward by the main rotor(s) and semi-compresses against the surface creating some additional lift. The additional lift from this ground cushion is normally effective up to a height equal to the radius of the main rotor (or 1/2 the diameter). This distance is from the plane of the main rotor blades to the surface.

1. In-ground effect (IGE) is when the helicopter is hovering on this cushion of air.
2. Out-of-ground effect (OGE) is when the helicopter moves off (or above) this cushion of air. A helicopter can lift less payload by sling because it is usually OGE.

B. Translational Lift

Lift that is gained when translating from a hover into forward flight. This additional lift is gained at about 18 MPH and is caused by the extra volume of air passing through the rotor system.

C. Autorotation:

This is a nonpowered flight condition with the rotor system maintaining required flight RPM. The rotor RPM is maintained by the airflow moving upward through the rotors. The RPM of the rotor system can also be thought of as inertia and is used as the helicopter nears the ground to check the rate of descent and effect a landing.

1. There is a built-in safety device which makes it possible to autorotate. The built-in safety device is called a freewheeling unit. This device releases the drive of the main rotor blades from the engine drive in the event of engine failure. During autorotation, the pilot adjusts the pitch on the main rotor blades so that the blades will continue to turn as the helicopter is gliding downward. During autorotation the blades are turning similar to a windmill. The main rotor blades continue to turn as fast without engine power as with engine power and the pilot continues to maintain complete control of the aircraft.

2. The sequence of events in which a helicopter enters autorotative descent without engine power is as follows:

(a) The helicopter enters an autorotative descent and is in what we call stabilized autorotative flight.

(b) As the aircraft approaches the landing area, the pilot flares the helicopter by gently lifting the nose. This slows his forward and downward speed.

(c) By this time during the autorotation most forward motion of the helicopter has stopped.

(d) The pilot will now use stored-up blade inertia to cushion the aircraft onto the landing area.

(e) The helicopter touches down on the landing area and the autorotation is completed.

D. Height Velocity Curve: This is a chart developed for flight tests for each type of helicopter showing the comparative combination of air speed and altitude required to execute a safe autorotational landing (usually about 475' AGL at zero air speed). (For Light Copters.)

V. DENSITY ALTITUDE

A. Density Altitude

Density Altitude is a given block of air (or atmosphere) with a measured pressure and temperature translated to an "altitude above sea level" for use in figuring its capability to support an aircraft in flight. (Relative humidity has some additional effect, but not to the extent that it would materially affect our calculation for flight loads.)

1. Three factors, (pressure, temperature and humidity) affect Density Altitude, but in varying degrees, i.e.:

a. If we change the pressure 10 points, like from 20% to 30%, we will have affected the Density Altitude by only another 10 to 15 feet.

b. If we change the temperature 10 points like from 70 degrees to 80 degrees on the same altitude reading, we will have changed the Density Altitude 500 feet.

c. If we change the relative humidity 10 points, like from 20% to 30%, we will have affected the Density Altitude by only another 10 to 15 feet.

B. How To Calculate Density Altitude

If the three variables were always standard and constant, Density Altitude would be the same as Pressure Altitude, and they would be the same as actual terrain elevation. However, this very seldom happens, so we must have an in-the-field method of calculating Density Altitude. (Since relative humidity has the least affect on Density Altitude, and is very seldom available to us in the field, we will consider only the primary variables--Air Pressure and Temperature.)

1. Measure the existing air pressure at the point of interest with a barometer.

a. Usually, the only barometer available is the aircraft altimeter. This is a manually variable barometer, so we must use a standard reference point. The reference is 29.92" hg, the standard sea-level atmospheric pressure. Set this reading (29.92) in the "columbus window" of the altimeter. Now read the altitude indicated on the face of the altimeter. Since an altimeter converts barometric pressure to altitude readings, we are now reading pressure in terms of altitude, PRESSURE ALTITUDE!

2. Measure the existing free air temperature with a thermometer. - The thermometer should be in the shade with free air movement around it. (Most aircraft have a free air temperature gauge, but it is not reliable if in direct sunlight.)

3. Apply the pressure and temperature readings to a Density Altitude Chart and read the conversion to Density Altitude. (Density Altitude Charts may be furnished separately or may be found in any aircraft operator's handbook.)

(Note: With no barometer (or altimeter) available, you could use a "known or fixed elevation" (such as a reading from a topographic map) plus the existing free air temperature, plus a Density Altitude Chart to get an approximate Density Altitude. Due to pressure

- F. OPERATING WEIGHT = Add items C, D, and E.
- G. COMPUTED GROSS WEIGHT - Obtain weight from aircraft Hover-in-Ground Effect (HIGE) Chart using External Load Chart if available. Sling load missions and adverse terrain, weather, etc., flights will be computed from aircraft Hover-Out-of-Ground (HOGE) Charts.
- H. WEIGHT REDUCTION - Enter applicable weight reduction for helicopter model as shown on Weight Reduction Chart.
- I. ADJUSTED WEIGHT = Item G minus Item H.
- J. TAKEOFF AND LANDING LIMITS - Enter applicable takeoff and landing limit as found in LIMITATIONS section of handbook.
- K. SELECTED WEIGHT - If line I is greater than line J, line I may be used for JETTISONABLE loads. However, the lowest weight, line I or J, will be used for NONJETTISONABLE loads.
- L. OPERATING WEIGHT - Item F.
- M. ALLOWABLE LOAD - The maximum allowable weight (passenger and/or cargo) that can be carried for the mission.
- N. PASSENGERS AND/OR CARGO - Enter passenger weights and/or type and weights of cargo. Manifest all passengers by name for each flight.
- O. ACTUAL PAYLOAD - Total of all weights listed in Item N.
- P. ACTUAL GROSS WEIGHT - The total of weights in Items L and O.

WEIGHT REDUCTION CHART

MODEL	WEIGHT	MODEL	WEIGHT
AS-350D	130	206B III	130
SA-315B	180	205L-1	150
SA316B	170	212	390
SA-318C	80	214B-1	380
SA-319B	210	UH-12E	90
47-3B	90	UH-12 Soloy	100
47-3B-1	90	FH-1100	100
47-3B-2	90	H-500C	110
47-G-Soloy	120	H-500D	120
204B	200	BO-105C W/250-C20	150
205A-1	260	BO-105C W/250-C30B	180
206B II	100	S-55T	170

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variations, you may have an error of anywhere from 100 to 600 feet, but this would be usable and much better than having no reference to a Density Altitude.)

C. How Density Altitude Affects Aircraft & Flight

The only altitude an aircraft knows or uses (as far as performance is concerned) is Density Altitude. Thin air reduces the lifting capability of aircraft by loss of lift for the wing and less oxygen available for the power plant; e.g., compares to the decreased performance of automobile engines at higher altitudes due to lack of oxygen.

1. Rotary Wing Aircraft: Helicopters rely on the movement of a wing through the air at a speed sufficient to create enough lift to become airborne. Since this is a rotary wing and helicopters start into flight vertically, we cannot extend a ground run to increase the speed of the rotary wing through the air. Also, we are operating at a fixed allowed rotor speed, which cannot be increased to compensate for the thinner air at higher Density Altitudes. All we can do is reduce the gross weight of the helicopter to a point where a fixed rotor system is capable of lifting the helicopter into flight. This can be accomplished only by reducing the fuel supply or the payload, or both.

VI. HELICOPTER LOADING

A. Center-of-Gravity (CG) Effects:

Consideration of CG limitations is important in the loading of all aircraft, but is particularly important and critical in helicopters. In fixed wing aircraft, the load is balanced over a horizontal wing area and has a comparatively wide range. In a helicopter, the load is carried under a single point like a pendulum; therefore, very little "out-of-CG" loading can greatly affect the controllability of the helicopter.

It is important to properly secure all materials loaded on or in a helicopter.

B. Helicopter loads and Weight Definitions

1. Certified Gross Weight: This is the maximum total weight that the helicopter was certificated for by the FAA to safely perform flight at sea level on a standard day. It makes no allowance for weight reductions for higher altitudes. It is also considered as the total weight of the aircraft existing on any one flight.

2. Empty Weight: The weight of the helicopter including the structure, the powerplant, all fixed equipment, all fixed ballast, unusable fuel, undrainable oil, total quantity of engine coolant and total quantity of hydraulic fluid.

3. Equipped Weight: Empty weight of the aircraft plus the weight of accessories required for the mission (or contract), plus weight of oil.

4. Useful Load: The helicopter's adjusted weight minus the equipped weight will be the useful load.

5. Payload: The weight of passengers and cargo that can be carried for any mission. The weight will not include the weight of pilot(s) and fuel.

C. Helicopter Load Calculation- 10% Reduction Method.

1. Prior to each flight a helicopter load calculation will be made out using the format as shown here. Items (1) thru (11) will be completed by the pilot. Your responsibility will then be to complete items (12) and (13) and to make sure that the pilot is not given more weight than the allowable payload as shown on Line (11).

2. It should be noted that Line (3) reads maximum computed gross weight. This is a figure the pilot will obtain from the helicopter's FAA approved flight handbook for existing atmospheric and flight conditions.

3. Line (6) on the form shows 10% of useful load. What this means is that 10% REDUCTION of the total useful load will be made at this point. This is to allow for a safety margin.

4. Keep in mind that the aircraft flight handbook will be the only document for actual flight planning purposes; e.g., Helicopter Performance Charts.

D. Helicopter Load Calculation - Fixed Amount Method

The pilot completes Items 1 through 13. You complete the balance of the form.

ITEM

- A. DEPARTURE BASE - Read altimeter when set to 29.92
- B. DESTINATION BASE - Use mean sea level elevation.
- C. HELICOPTER EQUIPPED WEIGHT - Empty weight of aircraft plus weight of accessories required for mission plus weight of oil.
- D. FLIGHT CREW WEIGHT - Weight of pilot and any additional crew members plus their personal gear.
- E. FUEL - Av Gas = 6.0 lbs/gal. Jet Fuel (JP) = 7 lbs/gal.

PERSONAL PROTECTIVE EQUIPMENT

I. DOI POLICY AND REQUIREMENTS

A. Department of the interior (DOI) Policy

The purpose of this is to establish personal protective equipment standards for selected aviation operations conducted within the DOI (ref. OPM 81-4).

Personal protective equipment is that protective equipment which the individual would bring to the flight and does not include equipment or devices installed on the aircraft or furnished as a part of the aircraft operating equipment. Personal protective equipment includes, but is not necessarily limited to, boots, gloves, protective headgear and fire-resistant clothing.

B. Personnel Requirements

Personnel required to adhere to this policy are as follows:

1. Pilots. All pilots of aircraft involved in the selected operations, including DOI professional, dual-function, incidental and contractor pilots. Pilots used on occasional charter or rental are exempt from this requirement.

2. Crew Members. All personnel, including contractor and DOI employees, who are considered a part of the crew complement and are necessary for the accomplishment of the mission. This includes technical observers and equipment operators normally involved in the selected operation, but does not include occasional passengers or observers.

C. Requirement Criteria

The general considerations used to determine necessity for personal protective equipment are:

1. Operational conditions under which the flight is conducted, including terrain, altitude above the surface and suitability of available landing areas.

2. Nature of the mission flown, such as fire-related missions, survey missions and missions requiring high density altitude (DA) and high gross weight operations.

3. Type of equipment used.

4. Environment in which flights are conducted.
5. Employer responsibilities under the Occupational Safety & Health Act of 1970 (OSHA).
6. Study of data from National Transportation Safety Board (NTSB) and U.S. military organizations relating to aircraft accident cause factors and ensuing injuries.

The following special use activities are identified for selected operations.

1. All direct fire suppression missions.
2. Agricultural application (seed/spray).
3. Aerial game counting, wild horse herding, waterfowl hazing or counting and similar missions conducted below 500 feet above ground.
4. Animal Damage Control (ADC). Standards for ADC are contained in OPM 81-3 "ADC Flight Operations (Fixed Wing and Helicopter)." NOTE: OPM's change annually. Check for current reference before presentation.
5. Overwater flights which extend from the shoreline to a point beyond the autorotation or gliding distance of the aircraft.
6. Powerline patrol.
7. Helicopter sling and rappelling missions and paracargo (helicopter and fixed wing).
8. Any flights requiring the transportation of dangerous articles as defined in code of Federal Regulations 49 revised as of October 1, 1979.
9. Operation in mountainous terrain requiring flight in high density altitudes and landing in confined unimproved areas for helicopters and short dirt or grass landing strips for fixed wing.
10. All operations requiring low-level reconnaissance below 500 feet above ground.

Those items of personal protective equipment required under the provisions of this memorandum are contained on Page 13a.

The requirement for items of personal protective equipment includes the requirements that such equipment be worn or otherwise utilized in the manner for which it is intended; e.g., personal floatation devices are to be worn, not just available.

Requests for deviations from, or exceptions to, this requirement should be addressed to Director, Office of Aircraft Services.
ATTN: Safety Manager -- 3905 Vista Avenue, Boise, Idaho 83705

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