Flight Training Flow

Initial Training EC130

1st Flight (1.0+)

- Full introduction to airframe – start procedure, aborted starts, APU etc...
- Hover work
- Pick-ups and set downs
- Taxi and takeoff
- Perform Power Check
- Give time to get used to the helicopter (climbs, descents, turns)
- Approaches ('return to a point' approaches to get used to the pedals and power changes)
- Engine failure – introduction to Autos

2nd Flight (1.0+)

- Any areas needing improvement from the first flight
- Pinnacle
- Confined
- Slopes
- Quick stops
- Engine failure
- Autos (straight in and 180's)
- Hovering Autos

3rd Flight (1.0+)

- Any areas needing improvement from the first two flights
- Power line departure from the airfield, 'S' turns at the Dam and the tour route through Indian Pass.
- Identify Black Point from Air Tour return route
- Eldorado – locate, approach and departure
- Inadvertent IMC recovery
- While at altitude, introduction to settling with power (approach profile set up) and recovery
- Demonstrate stuck pedals

4th flight (1.0+)

- Review areas of weakness from first 3 flights, or
- Stage Check flight – complete every maneuver and determine if they are ready for a check ride
- Demonstrate/perform Golf Course Arrival

FLIGHT TRAINING MANEUVERS

INDEX

The following pages comprise the flight training maneuvers section of the training program. The maneuvers outlined are for VFR operations

Part A – HELICOPTERS - Continued

Twin Engine (MD900) Specific Maneuvers

Subject: **Normal Approach to a Hover**

References: **FAA-H-8083-21 or Superseded**

1. **Objective:** Proficiency in this maneuver will enable the trainee to transition a helicopter from cruising flight to approximately a 3 foot hover.

2. **Description:** A normal approach to a hover is the accepted way to transition from cruising flight to a hover.

   The Approach is a descent from an altitude of 300-500 feet AGL on a constant angle of descent and at a constant airspeed of no less than best rate of climb airspeed until the helicopter is approximately 75 feet above the ground. From that point a deceleration to zero ground speed is accomplished along the same angle of descent timed so as to reach zero ground speed as the helicopter reaches an altitude of approximately 3 feet AGL at the selected point of landing.

   During the approach the angle of descent is controlled with the collective pitch control. The ground track and heading is controlled with lateral cyclic. The pedals are used to counteract skidding caused by changes in torque.

   The normal approach has an approach angle of approximately 12 degrees. It is begun, in training, from straight and level, aligned into the wind and at the desired approach airspeed.

   The helicopter is flown straight and level until the sight picture for the 12 degree angle is reached. At this time lower the collective a small amount to initiate the descent. Adjust the cyclic as necessary to maintain the airspeed. Maintain the sight picture with the collective- for instance, if the intended landing spot appears to move up on the bubble, you are going low so raise the collective to return to the proper angle and vice versa. If the airspeed is allowed to vary, errors in sight picture will also be evident e.g. If the airspeed is excessive it will appear as if you're going below the desired angle of approach and vice versa. A timely correction with cyclic control will prevent large errors from occurring if airspeed is incorrect.

Subject: **Normal Approach to a Hover - continued**

References: **FAA-H-8083-21 or Superseded**

The final phase of the approach - deceleration is begun when the helicopter is approximately 75 feet AGL. At this point airspeed is no longer a consideration and all attention should be concentrated on the rate of closure of the helicopter to the intended point of landing. Move the cyclic gently aft to initiate the deceleration. A small amount of additional down collective will be necessary, momentarily to prevent ballooning or over arcing the approach. If the rate of closure with the spot is CONSTANT the helicopter will come to a stop at that point. If it is not, adjust cyclic as necessary. As the airspeed decreases the total lift decreases and power will have to be added up (collective) to maintain the angle of approach.

Note: In an AS-350 helicopter, adding power (collective) requires more right pedal to offset the effects of the additional torque.

3. **Acceptable Performance Guidelines:** The trainee shall consider performance data information, consider the wind conditions, landing surface, and obstacle, select a suitable termination point, establishes and maintains the recommended approach angle, and rate of closure, remains aware of the possibility of wind shear and/or wake turbulence, avoid situations that may result in settling-with-power, maintains proper ground track, arrives at the termination point, on the surface or at a stabilized hover, ±2 feet, and completes the prescribed checklist.

Subject: **Crosswind Operations**

References: **FAA-H-8083-21 or Superseded**

1. **Objective:** Proficiency in these maneuvers will enable the trainee to take off and approach to a landing with a helicopter when operations into the wind are not feasible.

2. **Description:** Crosswind departure and approach in helicopters are similar to the operation in fixed wing.

   The primary difference in all crosswind vertical takeoffs and landings is that cyclic must be inclined into the wind in sufficient amounts to offset drifting tendencies. Sufficient downwind pedal to offset the tendency to turn must also be applied. During these operations, the upwind skid will leave the ground last on a vertical takeoff and it will touch the ground first on vertical landing.

   Normal takeoffs in crosswind utilize much the same technique as used by fixed wing aircraft; e.g., during the initial acceleration up to 50 feet AGL, the slip method is used (cyclic inclined into the wind to offset drift and opposite pedal applied as necessary to maintain heading). Above 50 feet, neutralize the controls and establish crab to maintain ground track.

3. **Acceptable Performance Guidelines**: In addition to guidelines established for no wind approaches, all crosswind work will be evaluated on the basis of maintaining proper ground track.

Subject: **Loss of Lift at Altitude (Settling with Power)**

References: **FAA-H-8083-21 or Superseded**

1. **Objective:** The demonstration of this maneuver will graphically show the dangerous results of operating at low airspeeds, moderate to high power settings and high rates of sink. It will also demonstrate the proper prevention and recovery from this phenomenon.

2. **Description:** The Phenomena - Loss of Lift at Altitude-also known as settling with power is most dangerous when it happens at relatively low altitudes. It should be demonstrated at an altitude of at least 1000 feet AGL or, if applicable, the manufactures recommended altitude, whichever is higher upon completion of the maneuver.

   To enter the maneuver, adjust the power to approximately 20% torque while maintaining altitude with aft cyclic, until the airspeed approaches 20 mph. Allow the sink rate to increase to 300 fpm or more as the attitude is adjusted, to obtain an airspeed of less than 10 mph. The aircraft will begin to shudder. Application of additional up collective will increase the vibration.

   Since a well developed loss of lift of altitude can result in rates of sink in excess of 2000 fpm, prompt recovery should be initiated at the first signs.

   There are two recovery techniques commonly used-the first is preferred because it results in the minimum loss of altitude during recovery. First apply forward cyclic to increase airspeed with simultaneous moderate reduction of power (collective). The recovery will be completed when the aircraft reaches effective translational lift airspeed (approximately 17 mph). Normal resumption of flight is recommended.

   The second recovery techniques is the simplest, however, it is also the most costly in terms of altitude loss during recovery. The technique simply is to enter autorotation. Settling with power cannot occur or continue if the helicopter is in autorotation. As previously mentioned, the high rate of sink incurred by the autorotation at slow airspeeds coupled with high rate of sink developed in the maneuver itself will cause a loss of altitude in excess of 1000 feet or more during the recovery.

3. **Acceptable Performance Guidelines:** The trainee shall select an altitude that will allow recovery to be completed no less than 1000 feet AGL or, if applicable, the manufactures recommended altitude, whichever is higher, promptly recognizes and announces the onset of settling with power, and utilizes the proper recovery procedure.

Confined Area Operations

Subject: **Steep Approach, Max performance Takeoff**

References: **FAA-H-8083-21 or Superseded**

1. **Objective:** The above maneuvers are demonstrated by the instructor to acquaint the student with aircraft performance in critical areas where standard operation would not suffice.

2. **Description:** A confined area is an area where the flight of the helicopter is limited in some direction by terrain or the presence of obstructions, natural or manmade.

a. Steep Approach

In the steep approach into the wind, a high angle of descent is used. The degree of approach angle is decided by the height of obstacles to be flown over, by the airspeed and rate of descent that can be maintained, and by the amount of ground space into which the aircraft is to be maneuvered. The steep approach angle, airspeed and rate of descent are controlled in the same manner as the normal approach; that is, by close attention to adjustments of collective and cyclic controls. The amount of airspeed will usually be less than normal and will be dictated by the angle of descent and the amount of wind.

If the ground space is so short and the obstacles so high that the angle of approach necessary would result in airspeed less than 10 mph, extreme care must be exercised to avoid settling with power.

As the aircraft approaches the ground in a steep approach, the airspeed will be so slow, so the pilot must add collective a little earlier than in a normal approach.

b. Max Performance Takeoff

This maneuver is used when departing an area that is confined by natural or man -made obstructions. The takeoff should be made as close to a normal takeoff as possible considering the situation at hand. The Flight path during the takeoff should follow an imaginary line from the front of the helicopter, when in position for takeoff, to the top of the obstacle, allowing sufficient space for tip path plane clearance. Maximum use of ground space available must be made by placing the aircraft as far downwind as possible.

Confined Area Operations

Subject: **Steep Approach, Max performance Takeoff - continued**

References: **FAA-H-8083-21 or Superseded**

The collective is raised to make the aircraft "light on the landing gear." At this time the cyclic is moved slightly forward of neutral and collective is raised to a point that a gradual departure from the ground, along the desired flight path is obtained. If, during the takeoff, it becomes apparent that sufficient power is not available to clear the obstacle, the takeoff should be aborted.

In helicopters (turbine engine) with limited power, turbine temperature, Ng, T4, torque, and N2 speed must be monitored to eliminate exceeding the allowable limits. If during the takeoff, it becomes apparent that the obstacle will not be cleared without exceeding these limits, the takeoff should be aborted.

During the takeoff, the cyclic is adjusted so as to allow the aircraft to clear the obstacles, and anti-torque pedal is applied to maintain heading.

The entire maneuver is conducted into the wind, or as nearly so as possible to take advantage of the translational lift available.

Note: Prior to takeoff, it is important that the pilot note his takeoff position by a reference on the ground. This would be a guide, allowing him to land the aircraft at the takeoff point. This maneuver will initially be practiced in an open area until the trainee displays a high degree of proficiency.

3. **Acceptable Performance Guidelines:**

a. **Steep Approach:** The trainee shall consider situations where this maneuver is recommended and factors related to a steep approach, considers the wind conditions, landing surface, and obstacles, selects a suitable termination point, establishes and maintains the recommended approach angle (15 degrees maximum) and rate of closure, remains aware of the possibility of wind shear and/or wake turbulence, avoid situations that may result in settling-with-power, maintains proper ground track, arrives at the termination point, on the surface or at a stabilized hover, ±2 feet, and completes the prescribed checklist.

Subject: **Pinnacle/Rooftop Operations**

References: **FAA-H-8083-21 or Superseded**

1. **Objective:** These operations provide training and practice in approaching, landing, and departing from elevated areas (pinnacle/rooftops).

2. **Description**: A pinnacle is an area from which the ground drops away steeply on all sides. A rooftop or elevated platform is a landing area on top of a structure which can vary from a height of a few feet above the surrounding surface to several hundred feet above the surrounding surface.

   a. Pinnacle/Rooftop Approach

   Having selected an up-wind approach path to the landing area, initiate the approach from an altitude of 300-500 feet above the landing area on an angle of approximately 12 degrees (normal approach angle) at the best rate of climb speed or higher. Maintain airspeed until the point on the approach is reached where, through evaluation of apparent groundspeed, it is determined that forward speed must be progressively decreased in order to arrive at hovering altitude of 2 to 5 feet at the intended landing spot with zero ground speed. The approach should be made to the forward edge of the landing area, keeping in mind main rotor and tail rotor clearance if obstacles exist.

   During strong and gusty wind conditions, a steeper than normal approach should be used.

   b. Departure from Pinnacle/Rooftop

   An "airspeed over altitude" takeoff is made because the takeoff area is higher than the surrounding terrain. Gaining altitude on takeoff is of secondary importance to gaining a safe airspeed. From a 3-foot hover, the takeoff is made the same as a normal takeoff; except, a climb is NOT initiated until approaching the desired climb speed.

3. **Acceptable Performance Guidelines:** The trainee shall accomplish a proper high and low reconnaissance, selects a suitable approach path, termination point, and departure path, tracks selected approach path at an acceptable approach angle and rate of closure to the termination point, maintains RPM within normal limits, terminates at a hover or on the surface, as conditions allow, accomplishes a proper ground reconnaissance, selects a suitable takeoff point, considers factors affecting takeoff and climb performance under various conditions.

Confined Area Operations

Subject: **Steep Approach, Max performance Takeoff - continued**

References: **FAA-H-8083-21 or Superseded**

b. **Max Performance Takeoff:** The trainee shall consider situations where this maneuver is recommended and factors related to takeoff and climb performance, maintains RPM within normal limits, utilizes proper control technique to initiate takeoff and forward climb airspeed attitude, utilizes the maximum available takeoff power, after clearing all obstacles, transitions to normal climb attitude, airspeed, ±5 Kts, and power setting, remains aware of the possibility of wind shear and/or wake turbulence, maintains proper ground track, and completes the prescribed checklist.