HELICOPTER FLIGHT TRAINING · ROBINSON R44

ACS Maneuver Standards Student Workbook

The 24 flight maneuvers of the Private and Commercial Pilot — Helicopter Airman Certification Standards: how each is flown, the exact standard the examiner holds you to, and room to write.

Student _____

Instructor _____

Started _____

Helicopter _____

North Country Heli Flight · Harris Airport (83K), Fort Ann, NY · flyheliadk.com · (518) 634-6375
Standards: FAA-S-ACS-15 and FAA-S-ACS-16 · Figures and technique: FAA Helicopter Flying Handbook (FAA-H-8083-21B) · October 2026

HOW TO USE THIS WORKBOOK

Each maneuver starts on a new page. First comes the flying: the FAA handbook figures and the sequence of control inputs, plus the errors the handbook warns about. Read it the night before the lesson and again in the pre-brief. Then the standard: every Skill element from the Private ACS, with the Commercial difference beside it where the tolerance tightens, the Knowledge and Risk Management elements your examiner will ask about orally, the checkride rules from ACS Appendix 3 where they exist, followed by a full lined page for your own notes and the instructor sign-off.

After each flight, write your actual numbers in the notes (your hover height, your airspeed on final, how far off the point you terminated) and the one thing you will fix next flight. Tick **P** on a Skill row when you flew it to the Private standard and **C** when you flew it to the Commercial standard, and date it. Your instructor initials the sign-off boxes at the bottom of each maneuver; the tracker below is the summary.

The knowledge-only tasks (antitorque failure, dynamic rollover, ground resonance, low-G) have no flight Skill elements in the ACS — the examiner tests them orally. Use their notes space to write your own answer to every Knowledge and Risk element until you can give it without looking.

Tolerances are reproduced from the ACS editions current at printing. Confirm them against the ACS in force on your checkride date and every procedure against the R44 POH/RFM.

PROGRESS TRACKER

	Maneuver	ACS tasks	Introduced	Private std met	Commercial std met	Checkride ready
01	Traffic Patterns	PH.III.C / CH.III.C				
02	Vertical Takeoff and Landing	PH.IV.A / CH.IV.A				
03	Hover Taxi	PH.IV.B / CH.IV.B				
04	Air Taxi	PH.IV.C / CH.IV.C				
05	Slope Operations	PH.IV.E / CH.IV.E				
06	Normal Takeoff and Climb	PH.V.A / CH.V.A				
07	Normal and Crosswind Approach	PH.V.B / CH.V.B				
08	Maximum Performance Takeoff and Climb	PH.V.C / CH.V.C				
09	Steep Approach	PH.V.D / CH.V.D				
10	Go-Around	PH.V.E / CH.V.G				
11	Confined Area Operations	PH.V.F / CH.IX.A				
12	Pinnacle Operations	PH.V.G / CH.IX.B				
13	Shallow Approach and Running/Roll-On Landing	PH.V.H / CH.V.F				
14	Rapid Deceleration / Quick Stop	PH.VI.A / CH.VI.A				
15	Straight-In Autorotation	PH.VI.B / CH.VI.B				

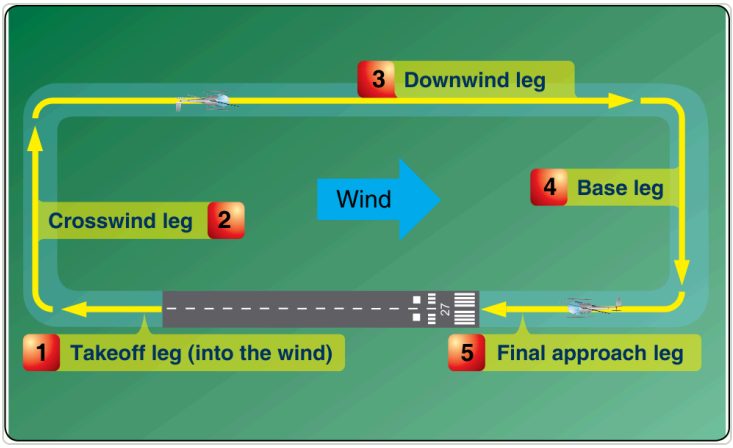
	Maneuver	ACS tasks	Introduced	Private std met	Commercial std met	Checkride ready
16	Autorotation with Turns	PH.VI.C / CH.VI.C				
17	Powerplant Failure in a Hover	PH.VIII.A / CH.VIII.A				
18	Powerplant Failure at Altitude	PH.VIII.B / CH.VIII.B				
19	Vortex Ring State (VRS)	PH.VIII.E / CH.VIII.E				
20	Low Rotor RPM Recognition and Recovery	PH.VIII.F / CH.VIII.F				
21	Antitorque System Failure	PH.VIII.G / CH.VIII.G				
22	Dynamic Rollover	PH.VIII.H / CH.VIII.H				
23	Ground Resonance	PH.VIII.I / CH.VIII.I				
24	Low-G Recognition and Recovery	PH.VIII.J / CH.VIII.J				

01 Traffic Patterns

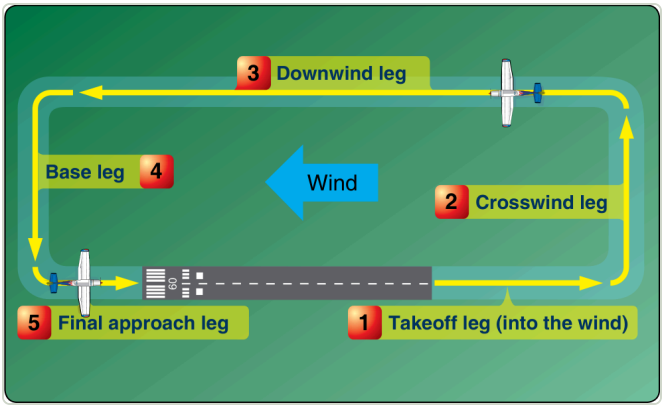
Area of Operation III — Airport and Heliport Operations · **Private** PH.III.C · **Commercial** CH.III.C

Objective. To determine the applicant exhibits satisfactory knowledge, risk management, and skills associated with traffic patterns. lighting. traffic, as appropriate.

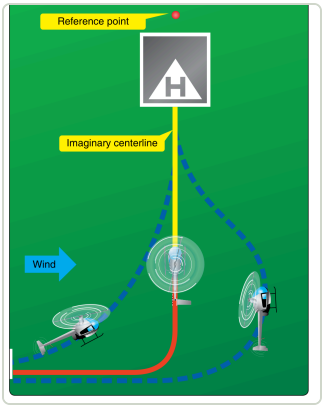
HOW IT IS FLOWN — condensed from the FAA Helicopter Flying Handbook, Chapter 9 — Traffic Patterns, Approaches



HFH Figure 9-19. *A standard helicopter traffic pattern consists of right turns, has 5 designated legs, and is flown at 500' AGL.*



HFH Figure 9-18. *A standard fixed-wing traffic pattern consists of left turns, has five designated legs, and is flown at 1,000' AGL.*



HFH Figure 9-20. *Plan the turn to final so the helicopter rolls out on an imaginary extension of the centerline for the final approach path. This path should neither angle to the landing area, as shown by the helicopter on the left, nor require an S-turn, as shown by the helicopter on the right.*

1. A helicopter pattern is flown at 500–1,000 ft AGL, normally with right turns, to stay out of the flow of fixed-wing traffic (airplane pattern: left turns, 1,000 ft AGL).
2. Take off into the wind; turn crosswind (right) after 300 ft AGL or as needed to stay within reach of forced-landing areas.
3. At 500 ft AGL turn to parallel the takeoff path for downwind. Fly downwind at pattern altitude and distance.
4. When the landing point is about 45° behind the abeam position, turn base and begin the descent to about 300 ft AGL.
5. Turn final considering wind and obstructions; roll out on an imaginary extension of the approach centerline — no angling in, no S-turn (Figure 9-20).
6. Keep the landing area in sight. The approach angle should never be too high (base too close) or too low (landing area too far away).

7. At towered airports expect clearance direct to an approach point; at non-towered airports follow local procedures and announce call sign, position and intentions.

WATCH FOR — DRAWN FROM THE HFH DISCUSSION

- Mixing with the fixed-wing flow instead of avoiding it.
- Base turn too early or too late for the wind.
- Rolling out on final angled to the landing area or needing an S-turn.
- Losing sight of the landing point.
- Poor radio calls: call sign, position, request.

SKILLS — THE STANDARD — the applicant exhibits the skill to:

	PRIVATE · ACS-15 / COMMERCIAL · ACS-16	MET: P / C · DATE
S1	Identify and interpret airport/heliport/helipad/landing area runways, taxiways, markings, signs, and	☐ P ☐ C ___/___
S2	Comply with recommended helicopter traffic pattern procedures, as appropriate.	☐ P ☐ C ___/___
S3	Correct for wind drift to maintain the proper ground track.	☐ P ☐ C ___/___
S4	Maintain orientation with the runway/landing area in use, as applicable.	☐ P ☐ C ___/___
S5	Maintain traffic pattern altitude, **±100 feet**, and the appropriate airspeed, **±10 knots**.	☐ P ☐ C ___/___
S6	Maintain situational awareness and proper spacing from other traffic or avoid the flow of fixed-wing	☐ P ☐ C ___/___

☐ Shaded = Commercial tolerance is tighter. Tick P when flown to the Private standard, C when flown to the Commercial standard; write the date.

KNOWLEDGE

PH.III.C.K1–K4 · demonstrates understanding of:

- Towered and nontowered airport/heliport/helipad/landing area operations and restrictions.
- Traffic pattern for the current conditions.
- Right-of-way rules.
- Use of automated weather and airport/heliport information.

RISK MANAGEMENT

PH.III.C.R1–R3 · identify, assess and mitigate risk associated with:

- Collision hazards.
- Distractions, task prioritization, loss of situational awareness, or disorientation.
- Windshear and wake turbulence.

01 · TRAFFIC PATTERNS — NOTES

My numbers each flight (hover height, airspeed on final, where I terminated), the error I made, and the one thing to fix next flight.

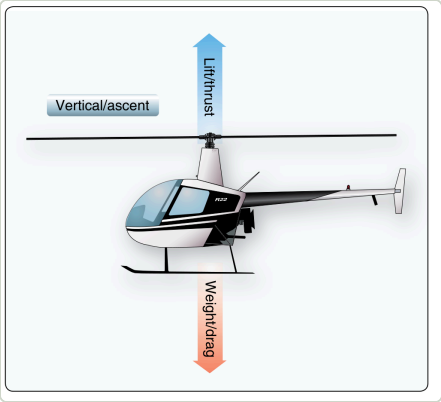
Introduced	**Private standard met**	**Commercial standard met**	**Checkride ready**
date · lesson	date · CFI initials	date · CFI initials	date · CFI initials

02 Vertical Takeoff and Landing

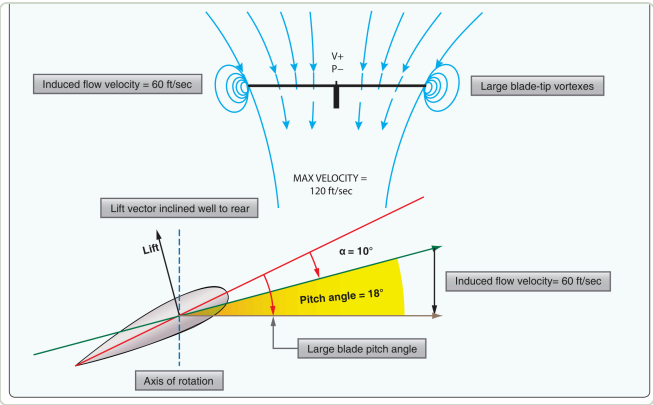
Area of Operation IV — Hovering Maneuvers · **Private** PH.IV.A · **Commercial** CH.IV.A

Objective. To determine the applicant exhibits satisfactory knowledge, risk management, and skills associated with vertical takeoff and landing from a hover.

HOW IT IS FLOWN — condensed from the FAA Helicopter Flying Handbook, Chapter 9 — Vertical Takeoff to a Hover, Hovering



HFH Figure 2-32. *Balanced forces: hovering in a no-wind condition.*



HFH Figure 2-22. *In ground effect (IGE).*

1. Clear left, right and above; stay focused outside. Collective full down, cyclic neutral or slightly into the wind.
2. Very slowly raise collective until light on the skids. As torque rises, add pedal to hold heading; coordinate cyclic for a vertical ascent.
3. As the skids leave the ground check control response, attitude and CG. A slow ascent lets you stop if anything is wrong (hung skid, CG, controls). If a roll or tilt starts: lower the collective and find the cause.
4. At hover height (about 2–3 ft skid height) adjust the controls to hold position. Expect the helicopter to hover slightly left-side low. Check engine instruments and note hover power.
5. Collective = height and rate of climb/descent; pedals = heading; cyclic = position; throttle/governor = rpm. Small, smooth, coordinated corrections — remove each correction as it takes effect.
6. Landing: lower collective slowly for a vertical descent, hold heading with pedals and position with cyclic, no drift at touchdown; continue lowering collective until the full weight is on the skids.

COMMON ERRORS — HFH LIST

- Failing to ascend vertically; pulling excess collective and ballooning.
- Overcontrolling the pedals (changes heading and rpm).
- Failing to ascend slowly.
- Hovering too high (check the H/V diagram) or too low with occasional touchdown.
- Overconfidence on level surfaces — dynamic rollover usually happens on level ground.
- Looking too close or straight down → overcontrolling.

SKILLS — THE STANDARD — the applicant exhibits the skill to:

	PRIVATE · ACS-15	COMMERCIAL · ACS-16	MET: P / C · DATE
S1	Complete the appropriate checklist(s).		☐ P ☐ C ___/___
S2	Comply with air traffic control (ATC) or evaluator instructions and make radio calls as appropriate.		☐ P ☐ C ___/___
S3	Maintain powerplant and main rotor (Nr) speed within normal limits.		☐ P ☐ C ___/___
S4	Ascend to and maintain recommended hovering altitude, and descend from recommended hovering altitude in headwind, crosswind, and tailwind conditions, without drift.		☐ P ☐ C ___/___
S5	Maintain recommended hovering altitude, **±1/2 of that altitude** within 10 feet of the surface, if above 10 feet, **±5 feet**.		☐ P ☐ C ___/___
S6	Maintain position **within 4 feet** of a designated point with no aft movement.	Maintain position **within 2 feet** of a designated point with no aft movement.	☐ P ☐ C ___/___
S7	Descend vertically to **within 4 feet** of the designated touchdown point.	Descend vertically to **within 2 feet** of the designated touchdown point.	☐ P ☐ C ___/___
S8	Maintain specified heading, **± 10°**.		☐ P ☐ C ___/___

☐ Shaded = Commercial tolerance is tighter. Tick P when flown to the Private standard, C when flown to the Commercial standard; write the date.

KNOWLEDGE

PH.IV.A.K1–K4 · demonstrates understanding of:

- Elements related to a vertical takeoff to a hover and landing from a hover.
- Effect of wind on flight control inputs.
- Effect of weight and balance and various centers of gravity.
- Ground effect.

RISK MANAGEMENT

PH.IV.A.R1–R4 · identify, assess and mitigate risk associated with:

- Loss of tail rotor effectiveness (LTE).
- Dynamic rollover.
- Ground resonance.
- Powerplant failure during hover.

02 · VERTICAL TAKEOFF AND LANDING — NOTES

My numbers each flight (hover height, airspeed on final, where I terminated), the error I made, and the one thing to fix next flight.

Introduced	**Private standard met**	**Commercial standard met**	**Checkride ready**
date · lesson	date · CFI initials	date · CFI initials	date · CFI initials

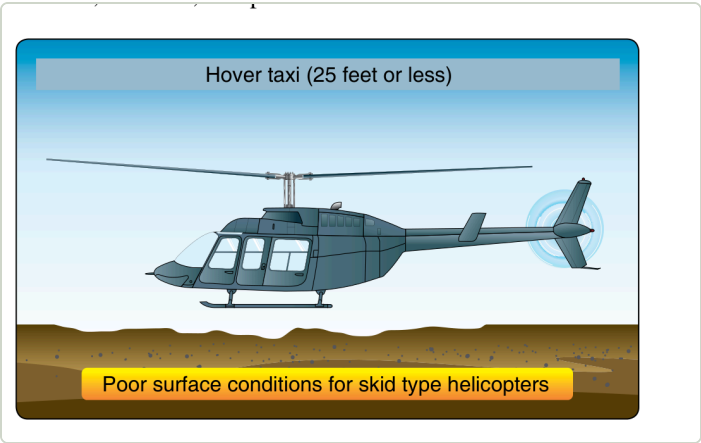
03 Hover Taxi

Area of Operation IV — Hovering Maneuvers · **Private** PH.IV.B · **Commercial** CH.IV.B

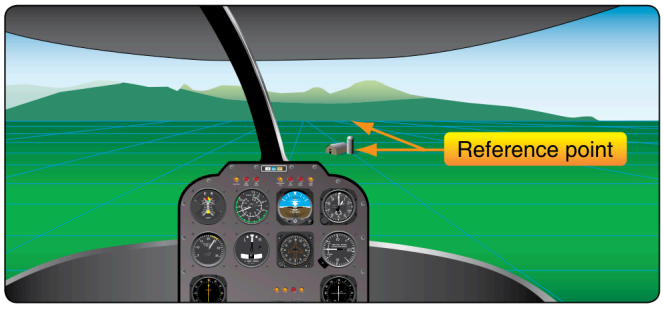
Objective. To determine the applicant exhibits satisfactory knowledge, risk management, and skills associated with hover taxi operations, including runway incursion avoidance.

HOW IT IS FLOWN — condensed from the FAA Helicopter Flying Handbook, Chapter 9 — Hovering

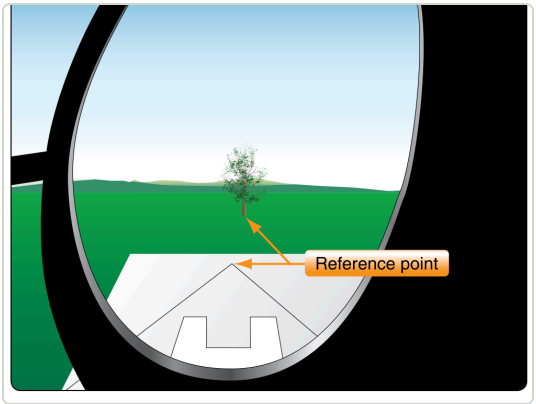
Forward/Sideward/Rearward, Hovering Turn, Hover Taxi



HFH Figure 9-9. *Hover taxi.*



HFH Figure 9-7. *To maintain a straight ground track, use two reference points in line and at some distance in front of the helicopter.*



HFH Figure 9-8. *The key to hovering sideward is establishing at least two reference points that help maintain a straight track over the ground while keeping a constant heading.*

1. Hover taxi = hovering flight below 25 ft AGL, used to reposition on the airport. Technique is forward, sideward or rearward hovering flight.
2. Pick two reference points in line in the direction of travel and keep them in line throughout (Figures 9-7, 9-8).
3. From a normal hover, apply cyclic toward the direction of travel; as movement begins, return the cyclic toward neutral to hold a groundspeed no faster than a brisk walk.
4. Hold constant groundspeed and track with cyclic, heading with pedals, height with collective, rpm with throttle. Pedal changes alter rpm — correct with collective/throttle.
5. To stop, apply opposite cyclic until motion stops, then neutralize before it reverses. Rearward: clear behind first, use a slightly higher hover height, guard the tail rotor.

6. Hovering turn: pedal starts the turn; use cyclic (usually into the wind) to stay over the spot. Left turns need more power. Expect the pedal load to change through the crosswind and downwind portions — anticipate opposite pedal as the tail weathervanes.

COMMON ERRORS — HFH LIST

- Exaggerated cyclic → erratic movement over the surface.
- Improper pedal use → excessive heading change.
- Failing to hold hover height or rpm.
- Failing to hold a slow, constant rate of turn or position over the pivot point.
- Not clearing the area (and the tail rotor) before starting.

SKILLS — THE STANDARD — the applicant exhibits the skill to:

	PRIVATE · ACS-15	COMMERCIAL · ACS-16	MET: P / C · DATE
S1	Complete the appropriate checklist(s).		☐ P ☐ C ___/___
S2	Receive and correctly read back clearances/instructions, if applicable.		☐ P ☐ C ___/___
S3	Use an airport diagram or taxi chart during taxi, if published, and maintain situational awareness.		☐ P ☐ C ___/___
S4	Comply with airport/heliport taxiway markings, signals, and signs.		☐ P ☐ C ___/___
S5	Maintain powerplant and main rotor (Nr) speed within normal limits.		☐ P ☐ C ___/___
S6	Maintain a straight ground track within **±4 feet** of a designated ground track.	Maintain a straight ground track within **±2 feet** of a designated ground track.	☐ P ☐ C ___/___
S7	Maintain recommended hovering altitude, **±1/2 of that altitude** within 10 feet of the surface, if above 10 feet, **±5 feet**.		☐ P ☐ C ___/___
S8	Hover taxi over specified ground references, demonstrating forward, sideward, and rearward hovering and hovering turns.		☐ P ☐ C ___/___
S9	Maintain a constant rate of turn at pivot points.		☐ P ☐ C ___/___
S10	Maintain a position **within 4 feet** of each pivot point during turns.	Maintain a position **within 2 feet** of each pivot point during turns.	☐ P ☐ C ___/___
S11	Make a 360° pivoting turn, left and right, stopping **within 10°** of a specified heading.		☐ P ☐ C ___/___
S12	Make smooth, timely, and correct control application during the maneuver.		☐ P ☐ C ___/___

☐ Shaded = Commercial tolerance is tighter. Tick P when flown to the Private standard, C when flown to the Commercial standard; write the date.

KNOWLEDGE

PH.IV.B.K1–K11 · demonstrates understanding of:

- Current airport aeronautical references and information resources such as the Chart Supplement, airport diagram, and Notices to Air Missions (NOTAMs).
- Hover taxi instructions, clearances, and limitations.
- Airport/heliport/helipad/landing area, signs, markings, and lighting.
- Visual indicators for wind.
- Aircraft lighting, as appropriate.
- Procedures for:
  a. Pilot activities during taxiing
  b. Safe hover taxi at towered and non-towered airports/heliports/helipads/landing areas
  c. Entering or crossing runways
- Height/Velocity (H/V) considerations.
- Aircraft operating limitations.

RISK MANAGEMENT

PH.IV.B.R1–R8 · identify, assess and mitigate risk associated with:

- Distractions, task prioritization, loss of situational awareness, or disorientation.
- Reduced visibility or night taxi operations.
- Runway incursion.
- Other aircraft, vehicles, persons, and hazards.
- Hazardous effects of downwash.
- Main rotor, tail rotor, and tail strike hazards.
- Height/Velocity (H/V) considerations.
- Confirmation or expectation bias as related to taxi instructions.

03 · HOVER TAXI — NOTES

My numbers each flight (hover height, airspeed on final, where I terminated), the error I made, and the one thing to fix next flight.

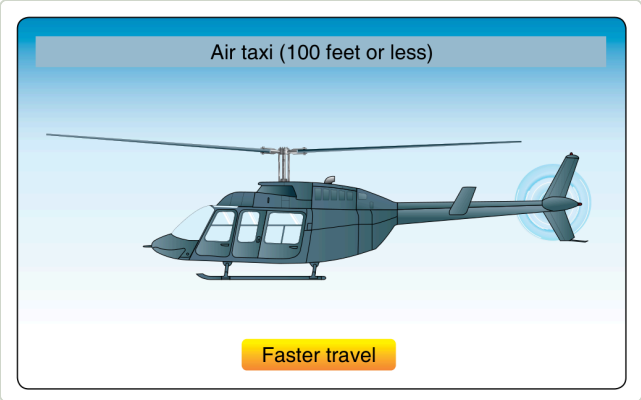
Introduced	**Private standard met**	**Commercial standard met**	**Checkride ready**
date · lesson	date · CFI initials	date · CFI initials	date · CFI initials

04 Air Taxi

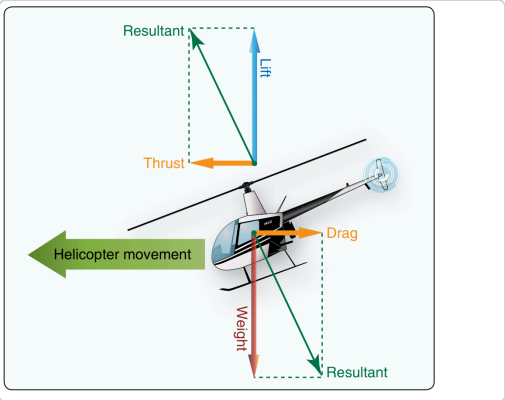
Area of Operation IV — Hovering Maneuvers · **Private** PH.IV.C · **Commercial** CH.IV.C

Objective. To determine the applicant exhibits satisfactory knowledge, risk management, and skills associated with air taxi operations.

HOW IT IS FLOWN — condensed from the FAA Helicopter Flying Handbook, Chapter 9 — Air Taxi



HFH Figure 9-10. *Air taxi.*



HFH Figure 2-33. *To transition to forward flight, more lift and thrust must be generated to overcome the forces of weight and drag.*

1. Air taxi is used for longer movements inside the airport boundary: fly to the new location, staying below 100 ft AGL at an appropriate airspeed, never overflying aircraft, vehicles or people.
2. Before starting, pick an airspeed/altitude combination that keeps you out of the shaded areas of the height/velocity diagram, and consider crosswinds that could lead to loss of tail rotor effectiveness.
3. Pick two references in line along the desired ground path and keep them in line.
4. From a normal hover, ease the cyclic forward; set the desired airspeed with cyclic, altitude with collective, rpm with throttle. Hold heading with pedals.
5. To stop: aft cyclic to reduce speed while lowering collective to descend toward hover height; as motion stops, cyclic to neutral; add collective to stop the descent at hover height — much like a quick stop.

COMMON ERRORS — HFH LIST

- Erratic cyclic → poor airspeed control.
- Excessive heading change from poor pedal use.
- Failing to hold altitude or rpm.
- Overflying parked aircraft (downwash damage).
- Flying inside the H/V shaded area; crosswind LTE exposure.
- Excessive tail-low attitude; excessive power used to stop; skids not aligned with direction of travel.

SKILLS — THE STANDARD — the applicant exhibits the skill to:

	PRIVATE · ACS-15	COMMERCIAL · ACS-16	MET: P / C · DATE
S1	Complete the appropriate checklist(s).		☐ P ☐ C ___/___
S2	Use an airport diagram or taxi chart during taxi, if published, and maintain situational awareness.		☐ P ☐ C ___/___
S3	Select a safe airspeed and altitude.		☐ P ☐ C ___/___
S4	Maintain desired track and groundspeed in headwind and crosswind conditions, avoiding conditions that might lead to loss of tail rotor/antitorque effectiveness.		☐ P ☐ C ___/___
S5	Maintain powerplant and main rotor (Nr) speed within normal limits.		☐ P ☐ C ___/___
S6	Comply with airport/heliport/helipad/landing area markings, lights, signs, and ATC instructions.		☐ P ☐ C ___/___
S7	Maintain specified altitude, **±10 feet**.		☐ P ☐ C ___/___

☐ Shaded = Commercial tolerance is tighter. Tick P when flown to the Private standard, C when flown to the Commercial standard; write the date.

KNOWLEDGE

PH.IV.C.K1–K10 · demonstrates understanding of:

- Current airport aeronautical references and information resources such as the Chart Supplement, airport diagram, and Notices to Air Missions (NOTAMs).
- Air taxi instructions, clearances, and limitations.
- Airport/heliport/helipad/landing area, signs, markings, and lighting.
- Visual indicators for wind.
- Aircraft lighting, as appropriate.
- Procedures for:
  a. Pilot activities during taxiing
  b. Safe air taxi at towered and nontowered airports
  c. Overflying of runways
- Height/Velocity (H/V) considerations.

RISK MANAGEMENT

PH.IV.C.R1–R6 · identify, assess and mitigate risk associated with:

- Distractions, task prioritization, loss of situational awareness, or disorientation.
- Reduced visibility or night taxi operations.
- Runway incursion.
- Main rotor, tail rotor, and tail strike hazards.
- H/V diagram performance in case of powerplant failure.
- Confirmation or expectation bias as related to taxi instructions.

04 · AIR TAXI — NOTES

My numbers each flight (hover height, airspeed on final, where I terminated), the error I made, and the one thing to fix next flight.

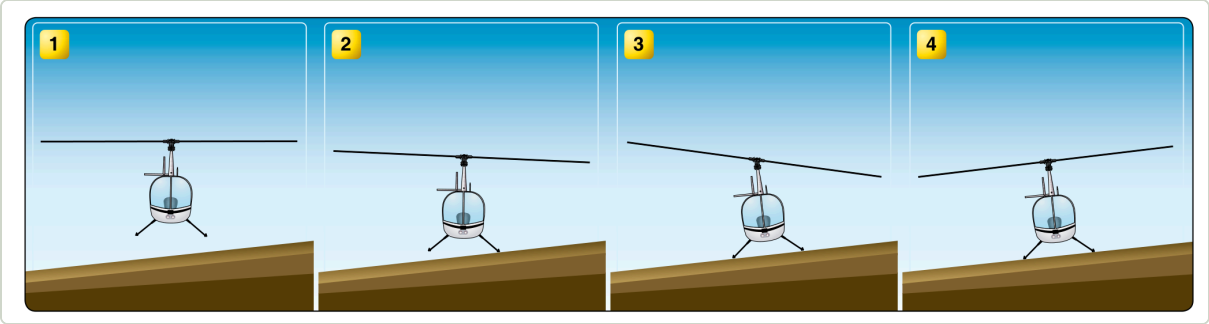
Introduced	**Private standard met**	**Commercial standard met**	**Checkride ready**
date · lesson	date · CFI initials	date · CFI initials	date · CFI initials

05 Slope Operations

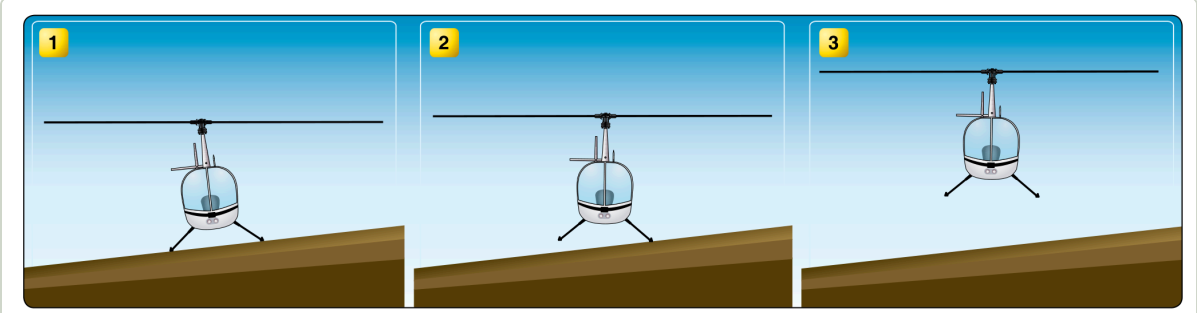
Area of Operation IV — Hovering Maneuvers · **Private** PH.IV.E · **Commercial** CH.IV.E

Objective. To determine the applicant exhibits satisfactory knowledge, risk management, and skills associated with slope operations.

HOW IT IS FLOWN — condensed from the FAA Helicopter Flying Handbook, Chapter 10 — Slope Landing, Slope Takeoff



HFH Figure 10-6. *Slope landing.*



HFH Figure 10-7. *Slope takeoff.*

1. Know dynamic rollover and mast bumping before any slope work. Land across the slope, headed into the wind, never tail upslope. Anticipate turbulence and downdrafts from the slope.
2. Landing (Figure 10-6): stabilized hover over the spot (1). Lower collective; as the upslope skid touches, hesitate level, then apply slight lateral cyclic toward the slope (2) and keep lowering the downslope skid with collective while moving the cyclic toward the slope to hold position (3).
3. Once the downslope skid is down: collective full down, cyclic and pedals neutral (4). Keep operating rpm until the full weight is on the skids; move the cyclic to confirm the helicopter is firmly on the ground before reducing rpm.
4. If cyclic reaches its limit, mast bumping or slope limits are felt before the helicopter is firmly down — return to a hover and pick a lesser slope. 5° is the recommended training maximum; see the POH/RFM.
5. Takeoff (Figure 10-7): rpm to normal, collective full down, cyclic toward the slope (1). Raise collective slowly — the downslope skid rises; move the cyclic to keep the rotor level with the horizon (2). Level with cyclic centered, pause, then raise collective gradually to lift off (3). Keep the tail away from the slope.

COMMON ERRORS — HFH LIST

- Ignoring wind during the approach and landing.
- Not holding rpm or heading (pivoting).
- Turning the tail into the slope.
- Lowering the downslope skid too rapidly.
- Excessive cyclic into the slope → mast bumping.
- Holding excessive cyclic into the slope as the downslope skid comes up.

SKILLS — THE STANDARD — the applicant exhibits the skill to:

	PRIVATE · ACS-15	COMMERCIAL · ACS-16	MET: P / C · DATE
S1	Select a suitable slope.		☐ P ☐ C ___/___
S2	Complete the appropriate checklist(s).		☐ P ☐ C ___/___
S3	Properly approach the slope considering wind effect and obstacles.		☐ P ☐ C ___/___
S4	Maintain powerplant and main rotor (Nr) speed within normal limits.		☐ P ☐ C ___/___
S5	Maintain heading and ground position and prevent movement of aircraft on slope.		☐ P ☐ C ___/___
S6	Make a smooth positive descent to touch the upslope skid or wheel(s) on the sloping surface.		☐ P ☐ C ___/___
S7	Recognize if slope is too steep and abandon the operation prior to reaching cyclic control stops.		☐ P ☐ C ___/___
S8	Maintain positive control while lowering the downslope skid or wheel to touchdown.		☐ P ☐ C ___/___
S9	Neutralize controls after landing.		☐ P ☐ C ___/___
S10	Make a smooth transition from the slope to a stabilized hover parallel to the slope.		☐ P ☐ C ___/___
S11	Properly move away from the slope.		☐ P ☐ C ___/___
S12	Maintain a specified heading throughout the operation, **±10°**.	Maintain a specified heading throughout the operation, **±5°**.	☐ P ☐ C ___/___

☐ Shaded = Commercial tolerance is tighter. Tick P when flown to the Private standard, C when flown to the Commercial standard; write the date.

CHECKRIDE RULES — ACS APPENDIX 3
Demonstration of parallel slope operations must be conducted in accordance with the helicopter manufacturer's limitations, if published. If no slope limitations are published for the helicopter being used, parallel slope operations of approximately 5-10 degrees may be demonstrated. Landings with the helicopter facing downhill or uphill will not be tested during certification. A thorough review of the intended slope operations area must be conducted to ensure clearance from hazards.

KNOWLEDGE

PH.IV.E.K1–K5 · demonstrates understanding of:

- Elements related to slope operations.
- Factors used for selecting an appropriate slope.
- Effect of wind on slope operations.
- Dynamic rollover considerations during slope operations and preventive/recovery techniques.
- Helicopter slope limitations.

RISK MANAGEMENT

PH.IV.E.R1–R7 · identify, assess and mitigate risk associated with:

- Operations on a slope.
- Conditions leading to loss of tail rotor/antitorque effectiveness.
- Embarking or disembarking passengers and rotor blade hazards.
- Conditions leading to dynamic rollover.
- Surface conditions.
- Collision hazards.
- Exceeding the manufacturer's slope limitations.

05 · SLOPE OPERATIONS — NOTES

My numbers each flight (hover height, airspeed on final, where I terminated), the error I made, and the one thing to fix next flight.

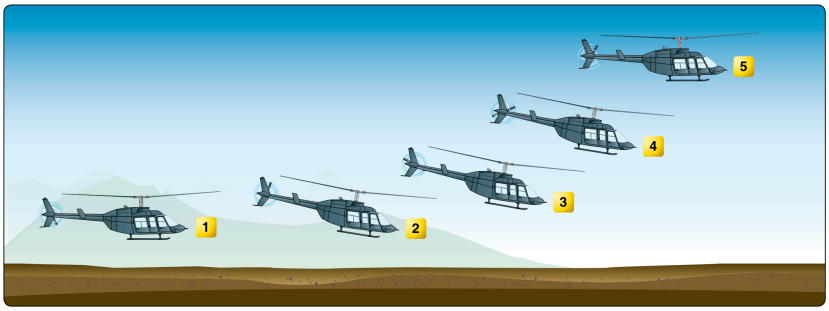
Introduced	**Private standard met**	**Commercial standard met**	**Checkride ready**
date · lesson	date · CFI initials	date · CFI initials	date · CFI initials

06 Normal Takeoff and Climb

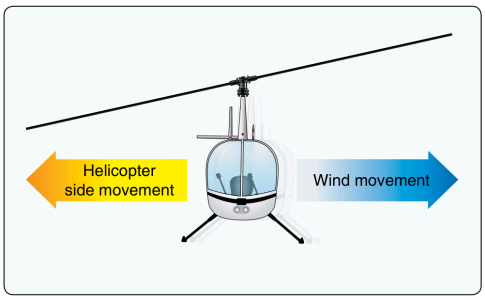
Area of Operation V — Takeoffs, Landings, and Go-Arounds · **Private** PH.V.A · **Commercial** CH.V.A

Objective. To determine the applicant exhibits satisfactory knowledge, risk management, and skills associated with normal takeoff, climb operations, and rejected takeoff procedures.

HOW IT IS FLOWN — condensed from the FAA Helicopter Flying Handbook, Chapter 9 — Normal Takeoff from a Hover, Crosswind Considerations



HFH Figure 9-12. *The helicopter takes several positions during a normal takeoff from hover.*



HFH Figure 9-13. *During a slip, the rotor disk is tilted into the wind.*

1. At a hover (1) perform the hover and systems check: power (excess power = power available minus hover power), balance (cyclic position), flight controls. Clear the area.
2. Ease the cyclic forward smoothly (2). As the helicopter moves, add collective to stop any sink, throttle for rpm, pedal for heading. Keep a straight takeoff path.
3. Through effective translational lift (3) the helicopter climbs and the nose tends to rise: set climb power and add enough forward cyclic to hold the attitude.
4. Hold an attitude (4) that accelerates smoothly toward climb airspeed with a matching gain in altitude — a profile that stays out of the shaded areas of the H/V diagram.
5. As airspeed increases (5) trim, let a crab develop to hold ground track, then raise the nose smoothly to the normal climb attitude at best rate of climb.
6. Crosswind: hold the cyclic into the wind (slip) early in the takeoff and heading with pedals; after about 50 ft, turn into the wind (crab) to hold ground track.

COMMON ERRORS — HFH LIST

- Not enough collective → altitude loss before translational lift.
- Adding power too fast without forward cyclic → climbing before gaining airspeed.
- Extreme nose-down attitude near the surface.
- Not holding the ground track.
- Wrong airspeed in the climb; rpm not held with throttle.
- Not transitioning from slip to a level crab.

SKILLS — THE STANDARD — the applicant exhibits the skill to:

	PRIVATE · ACS-15	COMMERCIAL · ACS-16	MET: P / C · DATE
S1	Complete the appropriate checklist(s).		☐ P ☐ C ___/___
S2	Make radio calls as appropriate.		☐ P ☐ C ___/___
S3	Verify assigned/correct runway, if at an airport.		☐ P ☐ C ___/___
S4	Determine wind direction with or without visible wind direction indicators.		☐ P ☐ C ___/___
S5	Clear the area, taxi into the takeoff position, and align the helicopter on the runway centerline or with takeoff path.		☐ P ☐ C ___/___
S6	Establish a stationary position on the surface or a stabilized hover prior to takeoff in headwind and crosswind conditions.		☐ P ☐ C ___/___
S7	Confirm takeoff power and instrument indications prior to forward movement.		☐ P ☐ C ___/___
S8	After clearing all obstacles, transition to normal climb attitude, airspeed, **±10 knots**, and power setting.	After clearing all obstacles, transition to normal climb attitude, airspeed, **±5 knots**, and power setting.	☐ P ☐ C ___/___
S9	Maintain powerplant and main rotor (Nr) speed within normal limits.		☐ P ☐ C ___/___
S10	Maintain proper ground track with crosswind correction, as needed.		☐ P ☐ C ___/___
S11	Comply with noise abatement procedures, as applicable.		☐ P ☐ C ___/___
S12	Use runway incursion avoidance procedures, if applicable.		☐ P ☐ C ___/___

☐ Shaded = Commercial tolerance is tighter. Tick P when flown to the Private standard, C when flown to the Commercial standard; write the date.

KNOWLEDGE

PH.V.A.K1–K2 · demonstrates understanding of:

- Effects of atmospheric conditions, including wind, on takeoff and climb performance.
- Factors affecting the profile of the height/velocity (H/V) diagram.

RISK MANAGEMENT

PH.V.A.R1–R13 · identify, assess and mitigate risk associated with:

- Selection of takeoff path based on helicopter performance and limitations, available distance, and wind.
- Effects of:
  a. Crosswind
  b. Windshear
  c. Tailwind
  d. Turbulence, including wake turbulence
  e. Runway/departure point surface/condition
- Abnormal operations, including planning for:
  a. Rejected takeoff
  b. Powerplant failure in takeoff/climb phase of flight
- Collision hazards.
- Distractions, task prioritization, loss of situational awareness, or disorientation.
- Runway incursion.

06 · NORMAL TAKEOFF AND CLIMB — NOTES

My numbers each flight (hover height, airspeed on final, where I terminated), the error I made, and the one thing to fix next flight.

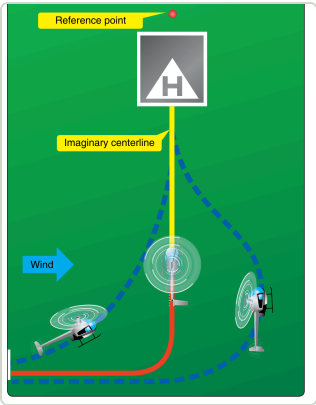
Introduced	**Private standard met**	**Commercial standard met**	**Checkride ready**
date · lesson	date · CFI initials	date · CFI initials	date · CFI initials

07 Normal and Crosswind Approach

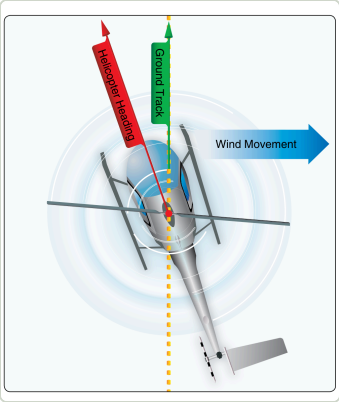
Area of Operation V — Takeoffs, Landings, and Go-Arounds · **Private** PH.V.B · **Commercial** CH.V.B

Objective. To determine the applicant exhibits satisfactory knowledge, risk management, and skills associated with a normal and crosswind approach.

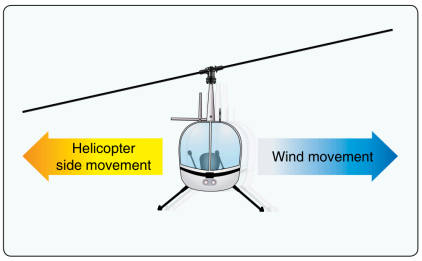
HOW IT IS FLOWN — condensed from the FAA Helicopter Flying Handbook, Chapter 9 — Normal Approach to a Hover / to the Surface, Crosswind During Approaches



HFH Figure 9-20. *Plan the turn to final so the helicopter rolls out on an imaginary extension of the centerline for the final approach path. This path should neither angle to the landing area, as shown by the helicopter on the left, nor require an S-turn, as shown by the helicopter on the right.*



HFH Figure 9-14. *To compensate for wind drift at altitude, crab the helicopter into the wind.*



HFH Figure 9-13. *During a slip, the rotor disk is tilted into the wind.*

1. Normal approach angle 7°–12°. On final at approach airspeed and about 300 ft AGL, be on the correct ground track; the fuselage need not be aligned until 50–100 ft AGL.
2. Just before intercepting the angle, lower collective enough to start descending and decelerating; aft cyclic to hold the approach airspeed attitude; pedals for trim.
3. Visualize the line from the landing point to the middle of the skids and fly down it. Collective controls the angle; cyclic controls rate of closure. A consistent angle is the most important standard.
4. Hold entry airspeed until the apparent groundspeed/rate of closure appears to increase, then decelerate slowly with slight aft cyclic and lower collective to stay on the angle. Rate of closure: a brisk walk.
5. At about 25 kt effective translational lift is lost: add collective to hold the angle (and rpm); the nose tends to rise — forward cyclic to keep the closure rate.
6. Arrive at hover height with rate of descent and groundspeed reaching zero together; aft cyclic stops forward movement, pedals hold heading. To the surface (dust/snow): continue to a skids-level, zero-groundspeed touchdown.
7. Crosswind: crab into the wind above 50–100 ft, then slip (cyclic into the wind, pedals for heading) to align the fuselage with the ground track.

COMMON ERRORS — HFH LIST

- Not holding rpm throughout.
- Using collective improperly for the angle.
- No pedal corrections for collective changes.
- Constant airspeed on final instead of an apparent brisk walk.
- Not arriving at hover height, attitude and zero groundspeed together.
- Too much aft cyclic near the surface → tail rotor strike.
- Crab/slip transition at the wrong height.

SKILLS — THE STANDARD — the applicant exhibits the skill to:

	PRIVATE · ACS-15	COMMERCIAL · ACS-16	MET: P / C · DATE
S1	Complete the appropriate checklist(s).		☐ P ☐ C ___/___
S2	Make radio calls as appropriate.		☐ P ☐ C ___/___
S3	Determine wind direction with or without visible wind direction indicators.		☐ P ☐ C ___/___
S4	Align the helicopter with the correct/assigned runway or touchdown point.		☐ P ☐ C ___/___
S5	Scan the landing area/touchdown point and adjoining area for traffic and obstructions.		☐ P ☐ C ___/___
S6	Maintain proper ground track with crosswind correction, if necessary.		☐ P ☐ C ___/___
S7	Establish and maintain a normal approach angle and rate of closure.		☐ P ☐ C ___/___
S8	Maintain powerplant and main rotor (Nr) speed within normal limits.		☐ P ☐ C ___/___
S9	Arrive at the termination point, on the surface or at a stabilized hover, **±4 feet**.	Arrive at the termination point, on the surface or at a stabilized hover **±2 feet**.	☐ P ☐ C ___/___
S10	Use runway incursion avoidance procedures, if applicable.		☐ P ☐ C ___/___

☐ Shaded = Commercial tolerance is tighter. Tick P when flown to the Private standard, C when flown to the Commercial standard; write the date.

KNOWLEDGE

PH.V.B.K1–K4 · demonstrates understanding of:

- Effects of wind, weight, altitude, and temperature on performance.
- Wind correction techniques on approach and landing.
- Landing surface, obstructions, and selection of a suitable touchdown point.
- Factors affecting the profile of the height/velocity (H/V) diagram.

RISK MANAGEMENT

PH.V.B.R1–R12 · identify, assess and mitigate risk associated with:

- Selection of approach path and landing based on aircraft performance and limitations, and wind.
- Effects of:
  a. Crosswind
  b. Windshear
  c. Tailwind
  d. Turbulence, including wake turbulence
  e. Vortex ring state (VRS)
  f. Touchdown surface and condition
- Go-around/rejected landing.
- Collision hazards.
- Distractions, task prioritization, loss of situational awareness, or disorientation.
- Loss of tail rotor effectiveness (LTE).

07 · NORMAL AND CROSSWIND APPROACH — NOTES

My numbers each flight (hover height, airspeed on final, where I terminated), the error I made, and the one thing to fix next flight.

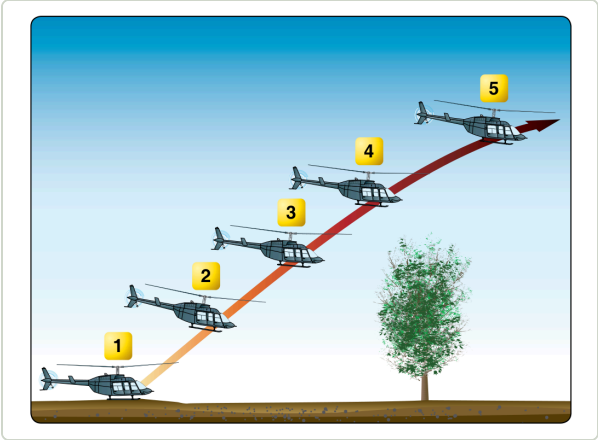
Introduced	**Private standard met**	**Commercial standard met**	**Checkride ready**
date · lesson	date · CFI initials	date · CFI initials	date · CFI initials

08 Maximum Performance Takeoff and Climb

Area of Operation V — Takeoffs, Landings, and Go-Arounds · **Private** PH.V.C · **Commercial** CH.V.C

Objective. To determine the applicant exhibits satisfactory knowledge, risk management, and skills associated with maximum performance takeoff and climb.

HOW IT IS FLOWN — condensed from the FAA Helicopter Flying Handbook, Chapter 10 — Maximum Performance Takeoff



HFH Figure 10-1. *Maximum performance takeoff.*

1. Used to climb steeply over barriers. Requires power to hover OGE — do a hover power check first. Consider wind, temperature, density altitude, gross weight and CG. Expect to pass through the shaded H/V area.
2. Reposition to the most downwind point of the area, note excess power, check balance and controls, position into the wind if possible, return to the surface. Pick reference points along the takeoff path and an abort plan.
3. Light on the skids (1): pause and neutralize all movement. Slowly increase collective and set the cyclic for a lift-off in about a 40-kt attitude (about the light-on-skids attitude).
4. Continue increasing collective slowly to maximum power available (takeoff power is normally about 10% above hover power) — this needs a large pedal input to hold heading (2). Cyclic controls the climb angle (3).
5. Hold rotor rpm at maximum; never let it droop (you would have to lower collective to regain it). Hold these inputs until clear of the obstacle, or 50 ft for demonstration (4), then set normal climb attitude and power (5).
6. If forward airspeed is impossible, a vertical takeoff is acceptable: climb vertically, do not accelerate until clear of obstacles — but it keeps you in the H/V avoid area longer and needs OGE hover power.

COMMON ERRORS — HFH LIST

- Not checking performance data and the H/V diagram.
- Nose too low initially → horizontal rather than vertical flight.
- Not holding maximum permissible rpm.
- Abrupt control movements.
- Not resuming normal climb power and airspeed after clearing the obstacle.

SKILLS — THE STANDARD — the applicant exhibits the skill to:

	PRIVATE · ACS-15	COMMERCIAL · ACS-16	MET: P / C · DATE
S1	Complete the appropriate checklist(s).		☐ P ☐ C ___/___
S2	Make radio calls as appropriate.		☐ P ☐ C ___/___
S3	Use control inputs to initiate lift-off from the takeoff position using a forward climb attitude to fly the departure profile.		☐ P ☐ C ___/___
S4	Maintain powerplant and rotor rpm within normal limits.		☐ P ☐ C ___/___
S5	Use required takeoff power, or power as specified by the evaluator.		☐ P ☐ C ___/___
S6	After clearing all obstacles, transition to normal climb attitude, airspeed, **±5 knots**, and power setting.		☐ P ☐ C ___/___
S7	Maintain directional control, ground track, and proper wind-drift correction throughout the maneuver.		☐ P ☐ C ___/___

☐ Shaded = Commercial tolerance is tighter. Tick P when flown to the Private standard, C when flown to the Commercial standard; write the date.

KNOWLEDGE

PH.V.C.K1–K3 · demonstrates understanding of:

- Situations where this maneuver is appropriate.
- Effects of atmospheric conditions, including wind and temperature, on takeoff and climb performance.
- Factors affecting the profile of the height/velocity (H/V) diagram.

RISK MANAGEMENT

PH.V.C.R1–R13 · identify, assess and mitigate risk associated with:

- Selection of takeoff path based on helicopter performance and limitations, available distance, and wind.
- Effects of:
  a. Crosswind
  b. Windshear
  c. Tailwind
  d. Turbulence, including wake turbulence
  e. Surface conditions
- Abnormal operations including:
  a. Rejected takeoff
  b. Powerplant failure in takeoff/climb phase of flight
- Collision hazards.
- Low rotor rpm.
- Distractions, task prioritization, loss of situational awareness, or disorientation.

08 · MAXIMUM PERFORMANCE TAKEOFF AND CLIMB — NOTES

My numbers each flight (hover height, airspeed on final, where I terminated), the error I made, and the one thing to fix next flight.

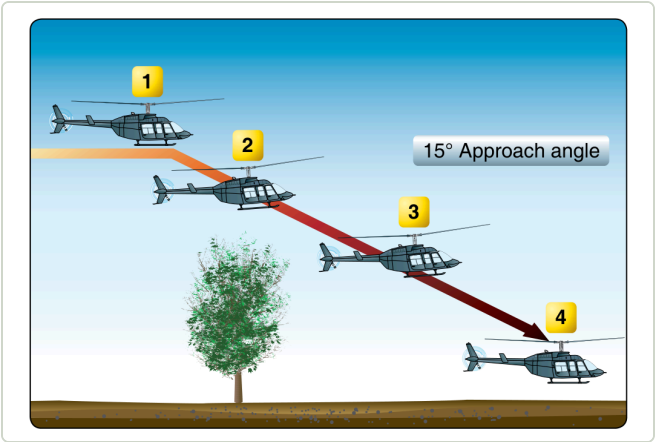
Introduced	**Private standard met**	**Commercial standard met**	**Checkride ready**
date · lesson	date · CFI initials	date · CFI initials	date · CFI initials

09 Steep Approach

Area of Operation V — Takeoffs, Landings, and Go-Arounds · **Private** PH.V.D · **Commercial** CH.V.D

Objective. To determine the applicant exhibits satisfactory knowledge, risk management, and skills associated with steep approach.

HOW IT IS FLOWN — condensed from the FAA Helicopter Flying Handbook, Chapter 10 — Steep Approach



HFH Figure 10-4. *Steep approach to a hover.*

1. Used when obstacles in the approach path are too high for a normal approach; enters most confined areas. Approach angle about 13°–15°.
2. Avoid vortex ring state parameters: 20–100% power, airspeed under 10 kt, descent over 300 fpm.
3. On final (1), on track and into the wind at approach airspeed. Intercepting 13°–15°, lower collective enough to start down the angle and decelerate (2) — more collective reduction than a normal approach. Pedal for trim.
4. Decelerate with slight aft cyclic and lower collective smoothly to hold the angle. Collective = angle and rate of descent; cyclic = rate of closure; pedals = trim. Aft cyclic is needed sooner than on a normal approach.
5. Keep the helicopter in trim before loss of ETL (about 25 kt). Below 100 ft AGL align the helicopter with the touchdown point. Visualize the tail rotor and fly the skids to 3 ft above the landing point.
6. ETL is lost higher on a steep approach (3): add collective to prevent settling and forward cyclic for the closure rate. Terminate at a hover with zero groundspeed over the spot (4) — about 3 ft, with little extra power needed if flown well. Below the barriers the wind effect is lost and the helicopter settles faster.

COMMON ERRORS — HFH LIST

- Not holding rpm.
- Using collective improperly for the selected angle.
- No pedal correction for collective changes.
- Slowing excessively to stay on the angle.
- Not recognizing loss of ETL.
- Not arriving at hover height, attitude and zero groundspeed together.
- Low rpm in the transition to hover.
- Too much aft cyclic near the surface → tail rotor strike.
- Skids not aligned with direction of travel by loss of ETL.

SKILLS — THE STANDARD — the applicant exhibits the skill to:

	PRIVATE · ACS-15	COMMERCIAL · ACS-16	MET: P / C · DATE
S1	Complete the appropriate checklist(s).		☐ P ☐ C ___/___
S2	Make radio calls as appropriate.		☐ P ☐ C ___/___
S3	Consider the wind direction and conditions, landing surface, and obstacles.		☐ P ☐ C ___/___
S4	Select a suitable termination point.		☐ P ☐ C ___/___
S5	Establish and maintain a steep approach angle, (15° maximum) and proper rate of closure.		☐ P ☐ C ___/___
S6	Maintain proper ground track with crosswind correction, if necessary.		☐ P ☐ C ___/___
S7	Maintain powerplant and main rotor (Nr) speed within normal limits.		☐ P ☐ C ___/___
S8	Arrive at the termination point, on the surface or at a stabilized hover, **±4 feet**.	Arrive at the termination point, on the surface or at a stabilized hover **±2 feet**.	☐ P ☐ C ___/___
S9	Use runway incursion avoidance procedures, if applicable.		☐ P ☐ C ___/___

☐ Shaded = Commercial tolerance is tighter. Tick P when flown to the Private standard, C when flown to the Commercial standard; write the date.

KNOWLEDGE

PH.V.D.K1–K6 · demonstrates understanding of:

- A stabilized steep approach.
- Approach techniques and applicability.
- Performance data and the height velocity (H/V) diagram.
- Effects of atmospheric conditions on approach and landing performance.
- Wind correction techniques.
- Aircraft performance and limitations.

RISK MANAGEMENT

PH.V.D.R1–R15 · identify, assess and mitigate risk associated with:

- Selection of approach path and landing based on aircraft performance and limitations, and wind.
- Effects of:
  a. Wind Direction
  b. Windshear
  c. Turbulence, including wake turbulence
- Planning for.
  a. Rejected landing and go-around
  b. Powerplant failure during the approach
- Collision hazards.
- Vortex ring state (VRS).
- Landing surface.
- Aircraft limitations.
- Distractions, task prioritization, loss of situational awareness, or disorientation.
- Loss of tail rotor effectiveness (LTE).
- Degraded Visual Environment (DVE) and flat light conditions.

09 · STEEP APPROACH — NOTES

My numbers each flight (hover height, airspeed on final, where I terminated), the error I made, and the one thing to fix next flight.

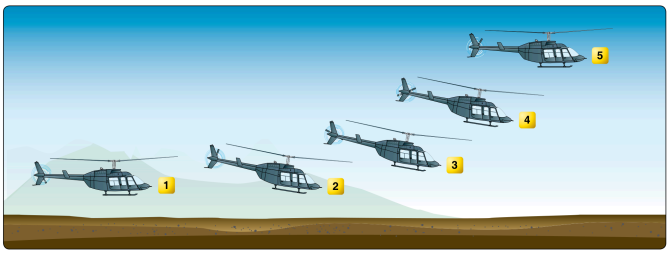
Introduced	**Private standard met**	**Commercial standard met**	**Checkride ready**
date · lesson	date · CFI initials	date · CFI initials	date · CFI initials

10 Go-Around

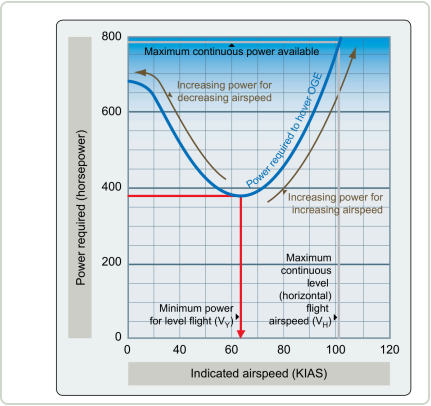
Area of Operation V — Takeoffs, Landings, and Go-Arounds · **Private** PH.V.E · **Commercial** CH.V.G

Objective. To determine the applicant exhibits satisfactory knowledge, risk management, and skills associated with go-around with emphasis on factors that contribute to landing conditions that may require a go-around.

HOW IT IS FLOWN — condensed from the FAA Helicopter Flying Handbook, Chapter 9 — Go-Around



HFH Figure 9-12. *The helicopter takes several positions during a normal takeoff from hover.*



HFH Figure 2-34. *Power versus airspeed chart.*

1. A go-around keeps you airborne after an approach is discontinued: tower instruction, traffic conflict, or any approach that is uncomfortable, incorrect or potentially dangerous.
2. Make the decision positively and early, before a critical situation develops; once decided, carry it out without hesitation.
3. Power is usually low when the go-around starts: first action is to increase collective to takeoff power, coordinated with throttle for rpm and the proper pedal for heading.
4. Establish a climb attitude and hold climb airspeed; fly a profile that avoids the shaded H/V areas (as on a normal takeoff, Figure 9-12).
5. Go around for another approach; re-enter the pattern or comply with ATC. Decide on a go-around in a confined area before decelerating below ETL or descending below the barriers.

WATCH FOR — DRAWN FROM THE HFH DISCUSSION

- Deciding late; hesitating once decided.
- Adding power without pedal → heading swings; rpm droop from poor throttle coordination.
- Pitching for airspeed before establishing a positive climb.
- Climbing through the H/V avoid area at low airspeed.
- Losing track of traffic and the landing area during the climb-out.

SKILLS — THE STANDARD — the applicant exhibits the skill to:

	PRIVATE · ACS-15	COMMERCIAL · ACS-16	MET: P / C · DATE
S1	Make a timely decision to discontinue the approach or at the direction of the evaluator.		☐ P ☐ C ___/___
S2	Maintain powerplant and rotor rpm within normal limits while applying proper control input to stop descent and initiate climb.		☐ P ☐ C ___/___
S3	Transition to a positive rate of climb and appropriate airspeed of **±10 knots**.	Transition to a positive rate of climb and appropriate airspeed of **±5 knots**.	☐ P ☐ C ___/___
S4	Maintain directional control, ground track, and proper wind-drift correction throughout the maneuver.		☐ P ☐ C ___/___
S5	Notify/coordinate with air traffic control (ATC) or evaluator instructions as required.		☐ P ☐ C ___/___
S6	Complete the appropriate checklist(s).		☐ P ☐ C ___/___
S7	Use single-pilot resource management (SRM) or crew resource management (CRM), as appropriate.		☐ P ☐ C ___/___
S8	Use runway incursion avoidance procedures, if applicable.		☐ P ☐ C ___/___

☐ Shaded = Commercial tolerance is tighter. Tick P when flown to the Private standard, C when flown to the Commercial standard; write the date.

KNOWLEDGE

PH.V.E.K1–K3 · demonstrates understanding of:

- Situations and considerations on approach that could require a go-around.
- Effects of atmospheric conditions on a go-around.
- Go-around procedures and the importance of a timely decision.

RISK MANAGEMENT

PH.V.E.R1–R5 · identify, assess and mitigate risk associated with:

- Recognition of the need for a go-around.
- Application of power and flight control inputs.
- Collision hazards.
- Distractions, task prioritization, loss of situational awareness, or disorientation.
- Runway incursion.

10 · GO-AROUND — NOTES

My numbers each flight (hover height, airspeed on final, where I terminated), the error I made, and the one thing to fix next flight.

Introduced	**Private standard met**	**Commercial standard met**	**Checkride ready**
date · lesson	date · CFI initials	date · CFI initials	date · CFI initials

11 Confined Area Operations

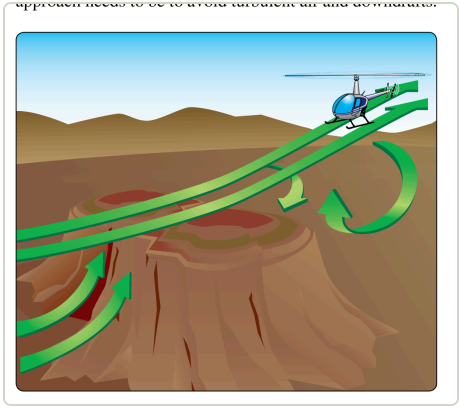
Area of Operation V — Takeoffs, Landings, and Go-Arounds · **Private** PH.V.F · **Commercial** CH.IX.A

Objective. To determine the applicant exhibits satisfactory knowledge, risk management, and skills associated with confined area operations.

HOW IT IS FLOWN — condensed from the FAA Helicopter Flying Handbook, Chapter 10 — Reconnaissance Procedures, Confined Area Operations



HFH Figure 10-8. *If the wind velocity is 10 knots or greater, expect updrafts on the windward side and downdrafts on the lee side of obstacles. Plan the approach with these factors in mind, but be ready to alter plans if the wind speed or direction changes.*



HFH Figure 10-9. *When flying an approach to a pinnacle or ridgeline, avoid the areas where downdrafts are present, especially when excess power is limited. If downdrafts are encountered, it may become necessary to make an immediate turn away from the pinnacle to avoid being forced into the rising terrain.*

1. High reconnaissance at 300–500 ft, about a 45° view angle: wind direction/speed, touchdown point, suitability, approach and departure axes, obstacles, and forced-landing areas. Keep a forced-landing area within reach.
2. Low reconnaissance during the approach: confirm what you saw and look for wires (poles and towers reveal them), slopes and crevices. Decide to land or go around before decelerating below ETL or descending below the barriers.
3. Use the wind to best advantage — a crosswind leg over open ground, then into the wind for the final portion. With wind 10 kt or more expect updrafts on the windward side and downdrafts on the lee side of obstacles (Figure 10-8).
4. Angle of descent no steeper than needed to clear the barrier with the tail rotor and land on the spot. Land to a specific point well forward in the area, keep it in sight all the way, and terminate to a hover to check the spot before setting down.
5. Takeoff is altitude over airspeed: reconnoiter from the ground/cockpit, position for the longest run (most downwind), fix the departure heading on the compass, form a line from the leading edge to the top of the highest obstacle and fly it with power to spare; after clearing, keep power and accelerate to climb speed, then set climb power.
6. A barrier cleared by a few feet with normal rpm and reserve power beats a wide margin with low rpm and no reserve. Once on the ground, keep rpm up until stability is checked.

COMMON ERRORS — HFH LIST

- Poor or no high/low reconnaissance.
- Approach angle too steep or too shallow for conditions.
- Not holding rpm.
- Ignoring emergency landing areas.
- No specific landing spot.
- Ignoring wind and turbulence.
- Wrong takeoff/climb technique for conditions.
- Inadequate clearance from obstructions — especially the tail rotor.

SKILLS — THE STANDARD — the applicant exhibits the skill to:

	PRIVATE · ACS-15	COMMERCIAL · ACS-16	MET: P / C · DATE
S1	Complete the appropriate checklist(s).		☐ P ☐ C ___/___
S2	Make radio calls as appropriate.		☐ P ☐ C ___/___
S3	Confirm power available meets or exceeds the power required for the selected arrival or departure profile(s).		☐ P ☐ C ___/___
S4	Determine wind direction with or without visible wind direction indicators.		☐ P ☐ C ___/___
S5	Accomplish a proper high and low reconnaissance of the confined landing area.		☐ P ☐ C ___/___
S6	Select a suitable approach path, termination point, and departure path.		☐ P ☐ C ___/___
S7	Track the selected approach path at an acceptable approach angle and rate of closure to the termination point.		☐ P ☐ C ___/___
S8	Continually evaluate the suitability of the confined landing area and termination point.		☐ P ☐ C ___/___
S9	Maintain powerplant and main rotor (Nr) speed within normal limits.		☐ P ☐ C ___/___
S10	Accomplish a proper ground reconnaissance.		☐ P ☐ C ___/___
S11	Terminate in a hover or on the surface, as appropriate.		☐ P ☐ C ___/___
S12	Select a suitable takeoff point, considers factors affecting takeoff and climb performance under various conditions.		☐ P ☐ C ___/___
S13	Use single-pilot resource management (SRM) or crew resource management (CRM), as appropriate.		☐ P ☐ C ___/___

☐ Shaded = Commercial tolerance is tighter. Tick P when flown to the Private standard, C when flown to the Commercial standard; write the date.

KNOWLEDGE

PH.V.F.K1–K4 · demonstrates understanding of:

- Effects of wind, weight, temperature, and density altitude.
- Situations when a confined area approach and landing is recommended and factors related to landing performance including H/V diagram information.
- High and low reconnaissance, including takeoff and departure planning.
- Power requirements versus power available for the departure or arrival profile(s).

RISK MANAGEMENT

PH.V.F.R1–R18 · identify, assess and mitigate risk associated with:

- Selection of approach path, termination point and departure path based on aircraft performance and limitations, wind, and availability of alternate sites.
- Effects of:
  a. Wind Direction
  b. Windshear
  c. Turbulence
- H/V diagram information.
- Go-around.
- Forced landing during the maneuver.
- Landing surface.
- Dynamic rollover.
- Ground resonance.
- Low rotor rpm.
- Loss of tail rotor effectiveness (LTE).
- Collision hazards.
- Vortex ring state (VRS).

- Aircraft limitations.
- Distractions, task prioritization, loss of situational awareness, or disorientation.
- Power requirements versus power available for the departure or arrival profile(s).

11 · CONFINED AREA OPERATIONS — NOTES

My numbers each flight (hover height, airspeed on final, where I terminated), the error I made, and the one thing to fix next flight.

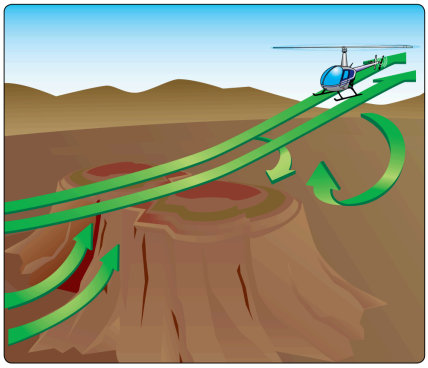
Introduced	**Private standard met**	**Commercial standard met**	**Checkride ready**
date · lesson	date · CFI initials	date · CFI initials	date · CFI initials

12 Pinnacle Operations

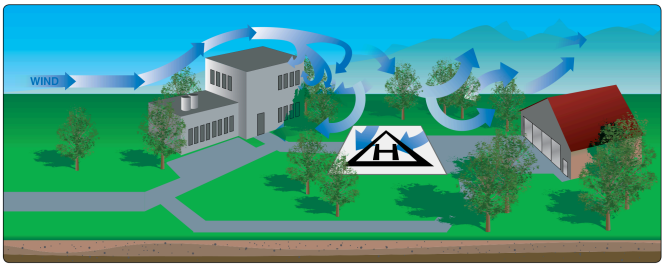
Area of Operation V — Takeoffs, Landings, and Go-Arounds · **Private** PH.V.G · **Commercial** CH.IX.B

Objective. To determine the applicant exhibits satisfactory knowledge, risk management, and skills associated with pinnacle operations.

HOW IT IS FLOWN — condensed from the FAA Helicopter Flying Handbook, Chapter 10 — Pinnacle and Ridgeline Operations



HFH Figure 10-9. *When flying an approach to a pinnacle or ridgeline, avoid the areas where downdrafts are present, especially when excess power is limited. If downdrafts are encountered, it may become necessary to make an immediate turn away from the pinnacle to avoid being forced into the rising terrain.*



HFH Figure 10-8. *If the wind velocity is 10 knots or greater, expect updrafts on the windward side and downdrafts on the lee side of obstacles. Plan the approach with these factors in mind, but be ready to alter plans if the wind speed or direction changes.*

1. A pinnacle drops away steeply on all sides; a ridgeline on one or two sides. No obstacles does not mean easy: updrafts, downdrafts, turbulence and poor forced-landing terrain remain.
2. Climb to the pinnacle on the upwind side to use updrafts. Fly the approach parallel to the ridgeline and into the wind as much as possible (Figure 10-9).
3. Load, altitude, wind and terrain set the final approach angle: the stronger the wind, the steeper the approach to stay above turbulence and downdrafts. Stay clear of the lee side; if a crosswind landing is hazardous, make a low coordinated turn into the wind just before terminating.
4. Groundspeed is hard to judge because references are far away — judge closure by the apparent change in size of landing-zone features; aim for a brisk-walk rate of closure.
5. Land in the forward portion using the long axis; keep the tail rotor out of any personnel walkway (rooftop pads). Stability check before reducing rpm: move cyclic and pedals slowly while lowering collective; if the helicopter moves, reposition.
6. Takeoff is airspeed over altitude: as the helicopter moves out of ground effect, hold altitude and accelerate to normal climb airspeed, then set climb attitude. Never dive down the slope after clearing the pinnacle; higher airspeed shortens time in the H/V avoid area and gives a better glide and flare if the engine fails.

COMMON ERRORS — HFH LIST

- Poor or no high/low reconnaissance.
- Approach angle too steep or too shallow.
- Not holding rpm.
- Ignoring emergency landing areas and wind/turbulence.
- Not maintaining pinnacle elevation after takeoff (diving).
- Wrong rate of closure.
- Not reaching climb airspeed in a timely manner.

SKILLS — THE STANDARD — the applicant exhibits the skill to:

	PRIVATE · ACS-15	COMMERCIAL · ACS-16	MET: P / C · DATE
S1	Complete the appropriate checklist(s).		☐ P ☐ C ___/___
S2	Confirm power available meets or exceeds the power required for the selected arrival or departure profile(s).		☐ P ☐ C ___/___
S3	Make radio calls as appropriate.		☐ P ☐ C ___/___
S4	Accomplish high and low reconnaissance.		☐ P ☐ C ___/___
S5	Determine wind direction with or without visible wind direction indicators.		☐ P ☐ C ___/___
S6	Select a suitable approach path, termination point, and departure path.		☐ P ☐ C ___/___
S7	Select an approach path considering wind direction.		☐ P ☐ C ___/___
S8	Track the selected approach path at an acceptable approach angle and rate of closure to the termination point.		☐ P ☐ C ___/___
S9	Maintain powerplant and main rotor (Nr) speed within normal limits.		☐ P ☐ C ___/___
S10	Accomplish a proper ground reconnaissance.		☐ P ☐ C ___/___
S11	Terminate in a hover or on the surface, as appropriate.		☐ P ☐ C ___/___
S12	Select a suitable takeoff point and consider factors affecting takeoff and climb performance under various conditions.		☐ P ☐ C ___/___

☐ Shaded = Commercial tolerance is tighter. Tick P when flown to the Private standard, C when flown to the Commercial standard; write the date.

KNOWLEDGE

PH.V.G.K1–K5 · demonstrates understanding of:

- Elements of pinnacle/platform operations.
- Effects of wind, weight, temperature, and density altitude.
- Suitable takeoff point and departure flight path during climb.
- Situations when a pinnacle/platform approach, landing and takeoff is recommended and factors related to aircraft performance.
- Elements of a high and low reconnaissance.

RISK MANAGEMENT

PH.V.G.R1–R19 · identify, assess and mitigate risk associated with:

- Selection of approach path, termination point and departure path based on aircraft performance and limitations, and wind.
- Effects of:
  a. Wind Direction
  b. Windshear
  c. Turbulence
- H/V diagram information.
- Go-around.
- Powerplant failure during approach/landing phase of flight.
- Collision hazards.
- Vortex ring state (VRS).
- Landing surface.
- Low rotor rpm.
- Dynamic rollover.
- Ground resonance.
- Loss of tail rotor effectiveness (LTE).
- Aircraft limitations.
- Distractions, task prioritization, loss of situational awareness, or disorientation.
- Main and tail rotor hazards for passengers.
- Forced landing.

12 · PINNACLE OPERATIONS — NOTES

My numbers each flight (hover height, airspeed on final, where I terminated), the error I made, and the one thing to fix next flight.

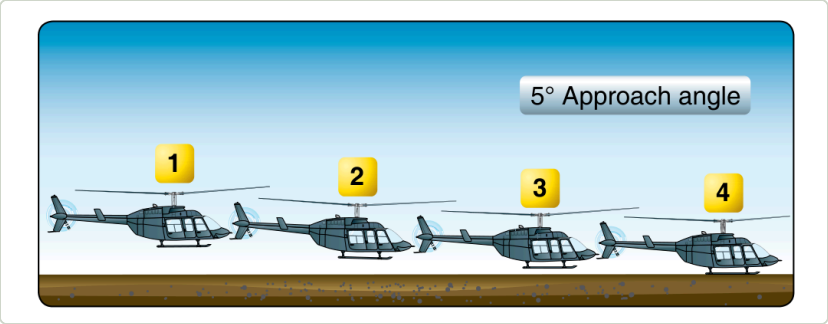
Introduced	**Private standard met**	**Commercial standard met**	**Checkride ready**
date · lesson	date · CFI initials	date · CFI initials	date · CFI initials

13 Shallow Approach and Running/Roll-On Landing

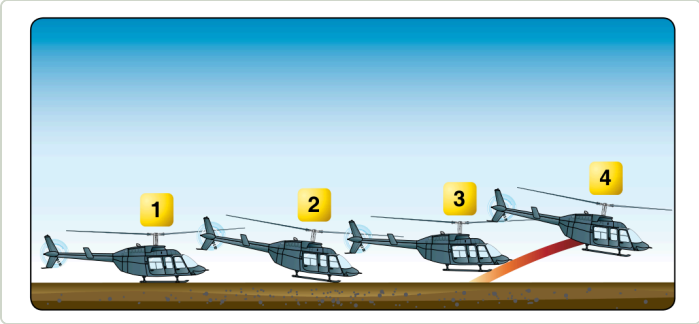
Area of Operation V — Takeoffs, Landings, and Go-Arounds · **Private** PH.V.H · **Commercial** CH.V.F

Objective. To determine the applicant exhibits satisfactory knowledge, risk management, and skills associated with shallow approach and running/roll-on landing operation.

HOW IT IS FLOWN — condensed from the FAA Helicopter Flying Handbook, Chapter 10 — Shallow Approach and Running/Roll-On Landing, Running/Rolling Takeoff



HFH Figure 10-5. *Shallow approach and running landing.*



HFH Figure 10-2. *Running/rolling takeoff.*

1. Used when high density altitude and/or high gross weight leave insufficient power to hover: translational lift is used until surface contact. Glide angle about 3°–5° (like an ILS). The area must be smooth and long enough; skids aligned with the direction of travel to prevent dynamic rollover.
2. Begin like a normal approach but with a shallower angle; the power reduction is smaller (1). Pedals for heading, throttle for rpm. Hold approach airspeed until the apparent rate of closure increases, then slow with aft cyclic (2).
3. Collective = angle and rate of descent; cyclic = groundspeed. Arrive at the touchdown point at or slightly above ETL — translational lift goes away quickly at low airspeed, so decelerate smoothly while keeping enough lift to avoid settling abruptly.
4. Just before touchdown, level the attitude with cyclic, heading with pedals, direction of travel = ground track (3). Descend gently to the surface straight and level, cushioning with collective. After contact, slight forward cyclic for tail boom clearance; cyclic holds the surface track (4).
5. Hold the collective stationary until stopped (lower slightly for more braking). Beware an abrupt stop pitching the nose forward — never correct with aft cyclic (rotor/tail boom contact). Keep normal rpm and heading with pedals.
6. Running takeoff (Figure 10-2): align to the path, takeoff rpm, raise collective until light on the skids (1), slight forward cyclic plus collective to start moving (2), skids aligned until airborne; lift off level through

ETL (3), accelerate in ground effect, then climb through the clear H/V area (4). If the helicopter cannot hover at all, do not attempt it — wait or off-load.

COMMON ERRORS — HFH LIST

- Excessive nose-high attitude near the surface.
- Insufficient collective/throttle to cushion the landing.
- Not holding heading → turning or pivoting on contact.
- No pedal as collective is added → sideward touchdown.
- Losing ETL speed too early; touching down too fast for conditions.
- Wrong touchdown attitude; rpm not held through and after touchdown.
- Poor alignment with direction of travel.

SKILLS — THE STANDARD — the applicant exhibits the skill to:

	PRIVATE · ACS-15 / COMMERCIAL · ACS-16	MET: P / C · DATE
S1	Complete the appropriate checklist(s).	☐ P ☐ C ___/___
S2	Make radio calls as appropriate.	☐ P ☐ C ___/___
S3	Maintain powerplant and main rotor (Nr) speed within normal limits.	☐ P ☐ C ___/___
S4	Establish and maintain the recommended approach angle and proper rate of closure.	☐ P ☐ C ___/___
S5	Determine wind direction and maintain ground track with crosswind correction.	☐ P ☐ C ___/___
S6	Maintain effective translational lift during surface contact with landing gear parallel to the ground track.	☐ P ☐ C ___/___
S7	Make smooth, timely, and correct control inputs after surface contact to maintain directional control.	☐ P ☐ C ___/___
S8	Use runway incursion avoidance procedures, if applicable.	☐ P ☐ C ___/___

☐ Shaded = Commercial tolerance is tighter. Tick P when flown to the Private standard, C when flown to the Commercial standard; write the date.

KNOWLEDGE

PH.V.H.K1–K2 · demonstrates understanding of:

- Elements related to shallow approach and running/roll-on landing, including when to use the maneuver, aircraft limitations, and effect of landing surface texture.
- Effects of wind, weight, temperature, and density altitude.

RISK MANAGEMENT

PH.V.H.R1–R13 · identify, assess and mitigate risk associated with:

- Selection of approach path and landing based on aircraft performance and limitations, and wind.
- Effects of:
  a. Wind Direction
  b. Windshear
  c. Turbulence, including wake turbulence
- Planning for:
  a. Powerplant failure during approach/landing phase of flight
- Collision hazards.
- Landing surface.
- Dynamic rollover.
- Ground resonance.
- Aircraft limitations.
- Distractions, task prioritization, loss of situational awareness, or disorientation.

13 · SHALLOW APPROACH AND RUNNING/ROLL-ON LANDING — NOTES

My numbers each flight (hover height, airspeed on final, where I terminated), the error I made, and the one thing to fix next flight.

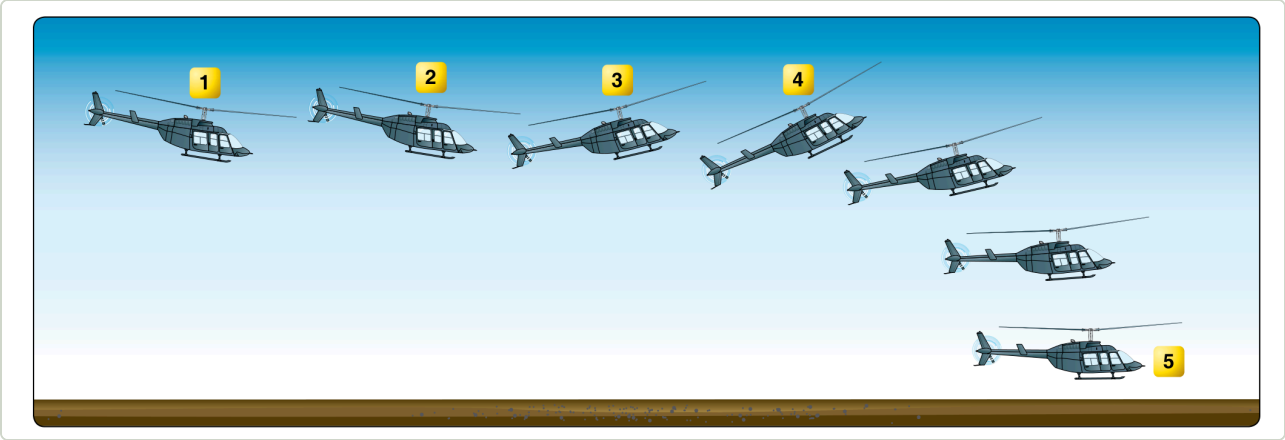
Introduced date · lesson	**Private standard met** date · CFI initials	**Commercial standard met** date · CFI initials	**Checkride ready** date · CFI initials

14 Rapid Deceleration / Quick Stop

Area of Operation VI — Performance Maneuvers · **Private** PH.VI.A · **Commercial** CH.VI.A

Objective. To determine the applicant exhibits satisfactory knowledge, risk management, and skills associated with rapid deceleration/quick stop and conditions that may require a rapid deceleration/quick stop.

HOW IT IS FLOWN — condensed from the FAA Helicopter Flying Handbook, Chapter 10 — Rapid Deceleration or Quick Stop



HFH Figure 10-3. *Rapid deceleration or quick stop.*

1. Decelerates from forward flight to a hover: abort a takeoff, stop for something blocking the path, or end an air taxi. Practice on a runway or large open area, into the wind (1). Done slowly and smoothly — coordination is the point.
2. Height: enough tail-rotor clearance at the highest pitch attitude, but low enough to stay out of the H/V shaded area and to recover to a hover; completion no higher than the manufacturer's maximum safe hover height. Level off at 25–40 ft and accelerate to entry speed, about 45 kt for most training helicopters (2).
3. At (3) apply aft cyclic to reduce groundspeed while lowering collective to counter the climb. Timing must match: too little down collective → climb; too much → descent. Rapid aft cyclic needs equally rapid down collective.
4. As collective comes down, add pedal to hold heading and throttle to hold rpm. Rotor G-load rises with pitch attitude — too much nose-up can stall the rotor.
5. At the desired speed (4) lower the nose, let the helicopter descend to hover height in level flight with zero groundspeed (5); add collective to stop at hover height, throttle for rpm, pedal for heading. Visualize rotating about the tail rotor's horizontal axis.

COMMON ERRORS — HFH LIST

- Lowering collective without aft cyclic → altitude loss.
- Aft cyclic too fast → ballooning.
- Not controlling the rate of deceleration.
- Stopping in a tail-low attitude.
- Not holding rpm.
- Waiting too long to add collective → over-torque on recovery.
- Unsafe terrain clearance; erratic heading from pedals.
- Excessively nose-high attitude.

SKILLS — THE STANDARD — the applicant exhibits the skill to:

	PRIVATE · ACS-15	COMMERCIAL · ACS-16	MET: P / C · DATE
S1	Complete the appropriate checklist(s).		☐ P ☐ C ___/___
S2	Maintain powerplant and main rotor (Nr) speed within normal limits.		☐ P ☐ C ___/___
S3	Coordinate all controls throughout the execution of the maneuver to terminate in a hover at an appropriate hover height.		☐ P ☐ C ___/___
S4	Maintain an altitude that permits safe clearance between the tail boom and the surface.		☐ P ☐ C ___/___
S5	Maintain heading throughout the maneuver, **±10°**.	Maintain heading throughout the maneuver, **±5°**.	☐ P ☐ C ___/___

☐ Shaded = Commercial tolerance is tighter. Tick P when flown to the Private standard, C when flown to the Commercial standard; write the date.

KNOWLEDGE

PH.VI.A.K1–K3 · demonstrates understanding of:

- Purpose of the maneuver.
- Effects of atmospheric conditions on a rapid deceleration/quick stop.
- Wind correction techniques during rapid deceleration/quick stop.

RISK MANAGEMENT

PH.VI.A.R1–R5 · identify, assess and mitigate risk associated with:

- Recognition of the need for a rapid deceleration/quick stop.
- Powerplant and rotor management.
- Vortex ring state (VRS).
- Collision hazards.
- Distractions, task prioritization, loss of situational awareness, or disorientation.

14 · RAPID DECELERATION / QUICK STOP — NOTES

My numbers each flight (hover height, airspeed on final, where I terminated), the error I made, and the one thing to fix next flight.

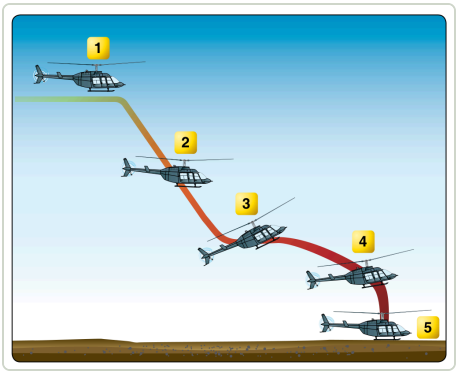
Introduced	**Private standard met**	**Commercial standard met**	**Checkride ready**
date · lesson	date · CFI initials	date · CFI initials	date · CFI initials

15 Straight-In Autorotation

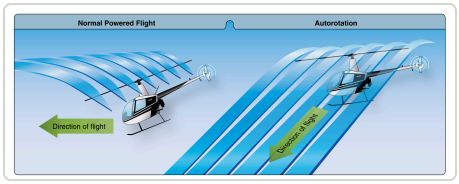
Area of Operation VI — Performance Maneuvers · **Private** PH.VI.B · **Commercial** CH.VI.B

Objective. To determine the applicant exhibits satisfactory knowledge, risk management, and skills associated with a straight-in autorotation to a power recovery.

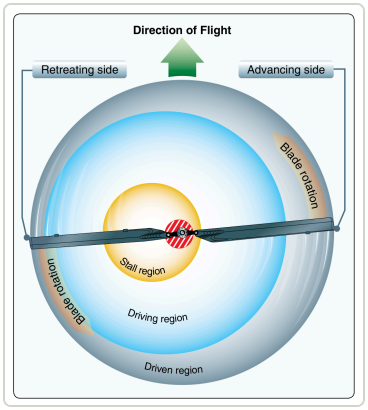
HOW IT IS FLOWN — condensed from the FAA Helicopter Flying Handbook, Chapter 11 — Autorotation, Straight-In Autorotation, Power Recovery



HFH Figure 11-2. *Straight-in autorotation.*



HFH Figure 11-1. *During an autorotation, the upward flow of relative wind permits the main rotor blades to rotate at their normal speed. In effect, the blades are "gliding" in their rotational plane.*



HFH Figure 2-49. *Blade regions in forward autorotation descent.*

1. Entry (1): from level flight at the appropriate airspeed, 500–700 ft AGL, into the wind — smoothly but firmly lower the collective full down, aft cyclic to prevent a nose-low attitude, pedal for trim. Reduce throttle to split the needles, then reset it above idle.
2. Descent (2): set the manufacturer's autorotation (best glide) airspeed with cyclic; hold rotor rpm in the lower green with collective — small increases only; a large increase decays rpm fast and leads to 'chasing the rpm'. Crosscheck attitude, trim, rotor rpm and airspeed; don't stare straight down.
3. Headwind steepens the glide (slower groundspeed) and reduces the flare needed. Rate of descent is lowest near 50–60 kt; very low or very high airspeeds are more critical.
4. Flare (3) at the recommended height: aft cyclic to reduce airspeed and rate of descent, pedals for heading, rpm in the green. Not so abrupt that it climbs; not so slow that it fails to arrest the descent (tail strike risk). Proper flare attitude gives a slow-run groundspeed.
5. At the slowest desired groundspeed (4), forward cyclic to a level landing attitude at about 3–15 ft skid height; avoid an excessive nose-high, tail-low attitude below 10 ft. Touchdown (5): collective to cushion, opposite pedal to normal flight, land level and sliding straight. Collective full down only after stopping; never use aft cyclic to stop the slide.
6. Power recovery (training): at 3–15 ft level with forward cyclic; just before level, coordinate up collective with throttle to join the needles at operating rpm; pedal for heading; go to a hover or go around. Use rotor energy to cushion — holding the helicopter off the surface causes a hard landing.

COMMON ERRORS — HFH LIST

- Not entering immediately on power loss.
- Insufficient pedal when power is reduced.
- Nose lowered too abruptly → dive.
- Rotor rpm not held in the descent.
- Up collective at excessive altitude → hard landing, heading loss.
- Not leveling to the landing attitude; lateral movement or misalignment at touchdown.
- Not going around when outside limits.

SKILLS — THE STANDARD — the applicant exhibits the skill to:

	PRIVATE · ACS-15	COMMERCIAL · ACS-16	MET: P / C · DATE
S1	Complete the appropriate checklist(s).		☐ P ☐ C ___/___
S2	Make radio calls as appropriate.		☐ P ☐ C ___/___
S3	Select a suitable landing area.		☐ P ☐ C ___/___
S4	Clear the area.		☐ P ☐ C ___/___
S5	Select an appropriate entry altitude.		☐ P ☐ C ___/___
S6	Initiate the maneuver at the proper point.		☐ P ☐ C ___/___
S7	Establish power-off glide with the helicopter trimmed and autorotation airspeed, **±10 knots**.	Establish power-off glide with the helicopter trimmed and autorotation airspeed, **±5 knots**.	☐ P ☐ C ___/___
S8	Maintain main rotor (Nr) within normal limits.		☐ P ☐ C ___/___
S9	Compensate for wind speed and direction as necessary to avoid undershooting or overshooting the selected landing area.		☐ P ☐ C ___/___
S10	Use proper deceleration and collective pitch application that permits safe clearance between the aircraft tail boom and the surface.		☐ P ☐ C ___/___
S11	Initiate proper power recovery.		☐ P ☐ C ___/___
S12	Terminate autorotation to a stabilized hover **within 200 feet** of a designated point.	Terminate autorotation to a stabilized hover, **within 100 feet** of a designated point.	☐ P ☐ C ___/___

☐ Shaded = Commercial tolerance is tighter. Tick P when flown to the Private standard, C when flown to the Commercial standard; write the date.

CHECKRIDE RULES — ACS APPENDIX 3
The minimum entry altitude must be a least 500 feet AGL or a suitable higher entry altitude in strong wind conditions. Initiating a go-around as a result of an applicant's inability to complete this Task within the tolerances specified in the skill elements is considered unsatisfactory. Landing area safety concerns beyond the control of the applicant or evaluator that necessitate a go-around would not be considered unsatisfactory. The applicant and evaluator must not sacrifice the safety of flight and force a landing to complete this Task.

KNOWLEDGE

PH.VI.B.K1–K5 · demonstrates understanding of:

- Effects of wind, weight, temperature, and density altitude.
- Main rotor (Nr) speed.
- Energy management.
- Causes and effects of high descent rates.
- Effect of varying bank angles, airspeeds, and rotor rpm.

RISK MANAGEMENT

PH.VI.B.R1–R14 · identify, assess and mitigate risk associated with:

- Low entry altitudes.
- Flight control inputs.
- Turbulence, including wake turbulence.
- Windshear.
- Energy management.
- Main rotor (Nr) speed.
- Low rotor rpm or rotor stall.
- Main rotor (Nr) overspeed.
- Excessive rate of descent.
- Powerplant failure during the maneuver.
- Collision hazards.
- Terminating an autorotation.
- Power recovery and go-around.
- Distractions, task prioritization, loss of situational awareness, or disorientation.

15 · STRAIGHT-IN AUTOROTATION — NOTES

My numbers each flight (hover height, airspeed on final, where I terminated), the error I made, and the one thing to fix next flight.

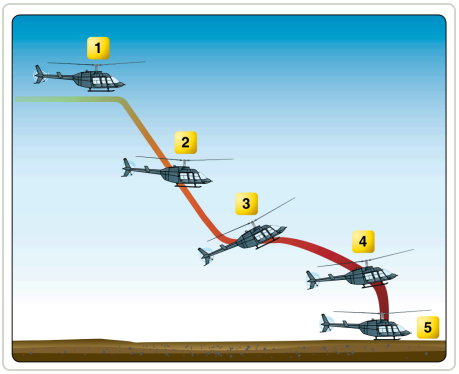
Introduced	**Private standard met**	**Commercial standard met**	**Checkride ready**
date · lesson	date · CFI initials	date · CFI initials	date · CFI initials

16 Autorotation with Turns

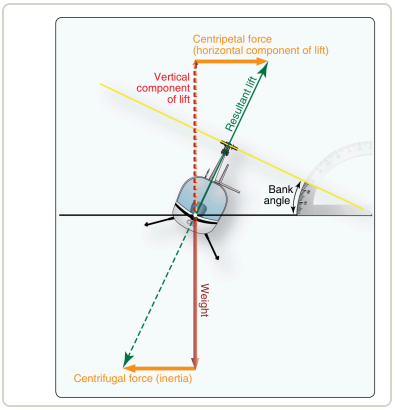
Area of Operation VI — Performance Maneuvers · **Private** PH.VI.C · **Commercial** CH.VI.C

Objective. To determine the applicant exhibits satisfactory knowledge, risk management, and skills associated with autorotation with turns.

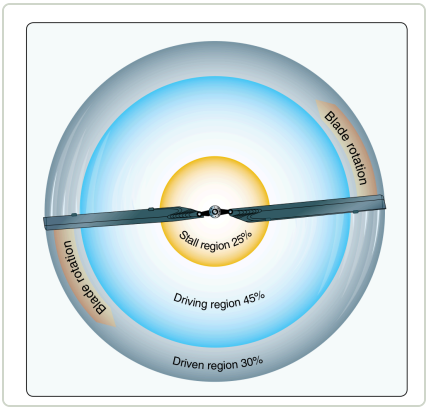
HOW IT IS FLOWN — condensed from the FAA Helicopter Flying Handbook, Chapter 11 — Autorotation with Turns (180°)



HFH Figure 11-2. *Straight-in autorotation.*



HFH Figure 2-45. *Forces acting on the helicopter during turning flight.*



HFH Figure 2-47. *Blade regions during autorotational descent.*

1. Turns are made early so the rest of the autorotation is flown like a straight-in. The common turns are 90° and 180°.
2. Set up downwind at the RFM entry airspeed, parallel to the touchdown point, about 200 ft laterally offset from the course line (closer/farther in strong crosswind).
3. Abeam the touchdown point: smoothly lower collective, reduce throttle to split the needles, pedal for trim, cyclic for attitude/airspeed. Keep crosschecking attitude, rotor rpm, airspeed and trim ball.
4. With airspeed established, roll into the 180° turn: at least 30° bank, never more than 60°. Rotor rpm builds with G-load — use timely up collective to hold it in range, then lower it again on rollout. Pitot airspeed may lag in the turn; fly attitude. Nose pitching up or down causes rpm excursions.
5. Approaching 90°, check the landing area: too close → shallow the bank; too far → steepen. Roll out on the course line aligned into the wind with as much altitude as possible; set the crosswind correction.
6. Abort with a smooth power recovery and go-around if, by 200 ft AGL, you are not stabilized, aligned, within rpm limits and at the proper attitude/airspeed. Then fly the flare, level-off and touchdown/recovery as for a straight-in; the scan goes almost entirely outside once on the course line.

COMMON ERRORS — HFH LIST

- Wrong entry altitude or airspeed; entering uncoordinated or not level.
- Not correcting the initial deceleration to a steady attitude.
- Poor pedal use on entry; drifting without crosswind correction.
- Uncoordinated flight through the turn (sink rate rises).
- Rotor rpm outside the RFM range.
- Flaring too high/low or too much/little.
- Late power reapplication; heading loss when power is reapplied; landing not level or misaligned.

SKILLS — THE STANDARD — the applicant exhibits the skill to:

	PRIVATE · ACS-15	COMMERCIAL · ACS-16	MET: P / C · DATE
S1	Complete the appropriate checklist(s).		☐ P ☐ C ___/___
S2	Make radio calls as appropriate.		☐ P ☐ C ___/___
S3	Select a suitable landing area.		☐ P ☐ C ___/___
S4	Clear the area.		☐ P ☐ C ___/___
S5	Select an appropriate entry altitude.		☐ P ☐ C ___/___
S6	Initiate the maneuver at the proper point.		☐ P ☐ C ___/___
S7	Establish power-off glide with the helicopter trimmed and autorotation airspeed, **±10 knots**.	Establish power-off glide with the aircraft properly trimmed and autorotation airspeed, **±5 knots**.	☐ P ☐ C ___/___
S8	Maintain main rotor (Nr) within normal limits.		☐ P ☐ C ___/___
S9	Maneuver to avoid undershooting or overshooting the selected landing area.		☐ P ☐ C ___/___
S10	Roll out no lower than 300 feet above ground level (AGL) along the flight path to the selected landing area.		☐ P ☐ C ___/___
S11	Use proper deceleration and collective pitch application that permits safe clearance between the aircraft tail boom and the surface.		☐ P ☐ C ___/___
S12	Initiate proper power recovery.		☐ P ☐ C ___/___
S13	Terminate autorotation to a stabilized hover **within 200 feet** of a designated point.	Terminate autorotation to a stabilized hover, **within 100 feet** of a designated point.	☐ P ☐ C ___/___

☐ Shaded = Commercial tolerance is tighter. Tick P when flown to the Private standard, C when flown to the Commercial standard; write the date.

CHECKRIDE RULES — ACS APPENDIX 3
The minimum entry altitude must be above 700 feet AGL or a suitable higher entry altitude in strong wind conditions. At least two 90 degree turns in the same direction or one continuous 180-degree turn must be performed. The 180-degree turn refers to a change in direction with respect to ground track, and not an exact reciprocal heading. If the applicant does not roll out of the turn by 300 feet AGL then the evaluator must direct the applicant to perform a power recovery and initiate a go-around, and the Task is considered unsatisfactory.

KNOWLEDGE

PH.VI.C.K1–K5 · demonstrates understanding of:

- Effects of wind, weight, temperature, and density altitude.
- Main rotor (Nr) speed.
- Energy management.
- Causes and effects of high descent rates.
- Effect of varying bank angles, airspeeds, and rotor rpm.

RISK MANAGEMENT

PH.VI.C.R1–R14 · identify, assess and mitigate risk associated with:

- Low entry altitudes.
- Flight control inputs.
- Turbulence, including wake turbulence.
- Windshear.
- Energy management.
- Main rotor (Nr) speed.
- Low rotor rpm or rotor stall.
- Excessive rate of descent.
- Powerplant failure during the maneuver.
- Rolling out of the turn.
- Collision hazards.
- Terminating an autorotation.
- Power recovery and go-around.
- Distractions, task prioritization, loss of situational awareness, or disorientation.

16 · AUTOROTATION WITH TURNS — NOTES

My numbers each flight (hover height, airspeed on final, where I terminated), the error I made, and the one thing to fix next flight.

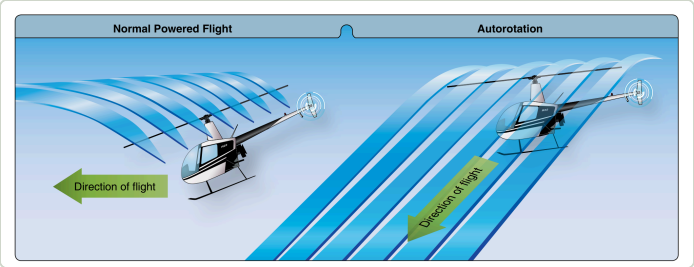
Introduced	**Private standard met**	**Commercial standard met**	**Checkride ready**
date · lesson	date · CFI initials	date · CFI initials	date · CFI initials

17 Powerplant Failure in a Hover

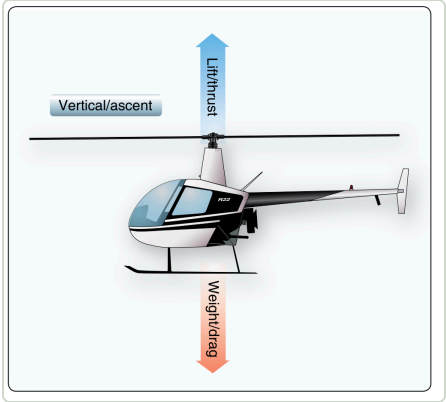
Area of Operation VIII — Emergency Operations · **Private** PH.VIII.A · **Commercial** CH.VIII.A

Objective. To determine the applicant exhibits satisfactory knowledge, risk management, and skills associated with powerplant failure in-ground effect (IGE) hover

HOW IT IS FLOWN — condensed from the FAA Helicopter Flying Handbook, Chapter 11 — Practicing Power Failure in a Hover (Hovering Autorotation)



HFH Figure 11-1. *During an autorotation, the upward flow of relative wind permits the main rotor blades to rotate at their normal speed. In effect, the blades are "gliding" in their rotational plane.*



HFH Figure 2-32. *Balanced forces: hovering in a no-wind condition.*

1. Practiced so the correct response is automatic when the engine stops at a hover. Establish a normal hover height (about 2–3 ft skids) into the wind at maximum allowable rpm.
2. Simulate the failure by firmly rolling the throttle to idle. As the throttle closes, apply pedal to hold heading; a little right cyclic is usually needed to stop the left drift that comes with losing tail rotor thrust. Do not adjust the collective on entry.
3. Keep a level attitude and a vertical descent with cyclic, heading with pedals. Avoid any lateral movement — dynamic rollover risk. As rpm decays, cyclic response drops, so wind corrections need more input.
4. At about 1 ft AGL apply up collective to slow the descent and cushion the landing — usually full collective arrives just as the skids touch. Hold the throttle in the idle detent so the engine does not re-engage.
5. When the full weight is on the skids stop raising collective; once fully stopped lower collective full down. Too early → not enough rpm for a soft landing; too late → ground contact before the pitch is in. Never hold the helicopter off the surface with collective — blade stall and a fall to the ground.

COMMON ERRORS — HFH LIST

- Insufficient pedal when power is reduced.
- Not stopping all sideward or backward movement before touchdown.
- Mistimed collective → hard touchdown.
- Not touching down level.
- Not rolling the throttle fully to idle.
- Hovering too high or too low for type, conditions and proficiency.
- Not going around when outside limits.

SKILLS — THE STANDARD — the applicant exhibits the skill to:

	PRIVATE · ACS-15	COMMERCIAL · ACS-16	MET: P / C · DATE
S1	Complete the appropriate checklist(s).		☐ P ☐ C ___/___
S2	Make radio calls as appropriate.		☐ P ☐ C ___/___
S3	Clear the area.		☐ P ☐ C ___/___
S4	Select a suitable landing area.		☐ P ☐ C ___/___
S5	Establish a stationary or forward hover into the wind.		☐ P ☐ C ___/___
S6	Simulate powerplant failure.		☐ P ☐ C ___/___
S7	Maintain a heading, **±10°**, throughout the maneuver.	Maintain a heading, **±5°**, throughout the maneuver.	☐ P ☐ C ___/___
S8	Touchdown with minimum sideward movement and no rearward movement.		☐ P ☐ C ___/___
S9	Use appropriate flight control inputs to cushion the touchdown.		☐ P ☐ C ___/___
S10	After touchdown, lower collective and neutralize flight controls.		☐ P ☐ C ___/___

☐ Shaded = Commercial tolerance is tighter. Tick P when flown to the Private standard, C when flown to the Commercial standard; write the date.

KNOWLEDGE

PH.VIII.A.K1–K5 · demonstrates understanding of:

- Elements related to powerplant failure in a hover, including energy management concepts.
- Effects of wind, weight, temperature, and density altitude.
- High and low inertia of rotor systems.
- Aerodynamics associated with powerplant failure in a hover.
- Proper orientation, division of attention, and proper planning.

RISK MANAGEMENT

PH.VIII.A.R1–R5 · identify, assess and mitigate risk associated with:

- Powerplant failure in a hover.
- Flight control inputs.
- Helicopter movement.
- Dynamic rollover.
- Distractions, task prioritization, loss of situational awareness, or disorientation.

17 · POWERPLANT FAILURE IN A HOVER — NOTES

My numbers each flight (hover height, airspeed on final, where I terminated), the error I made, and the one thing to fix next flight.

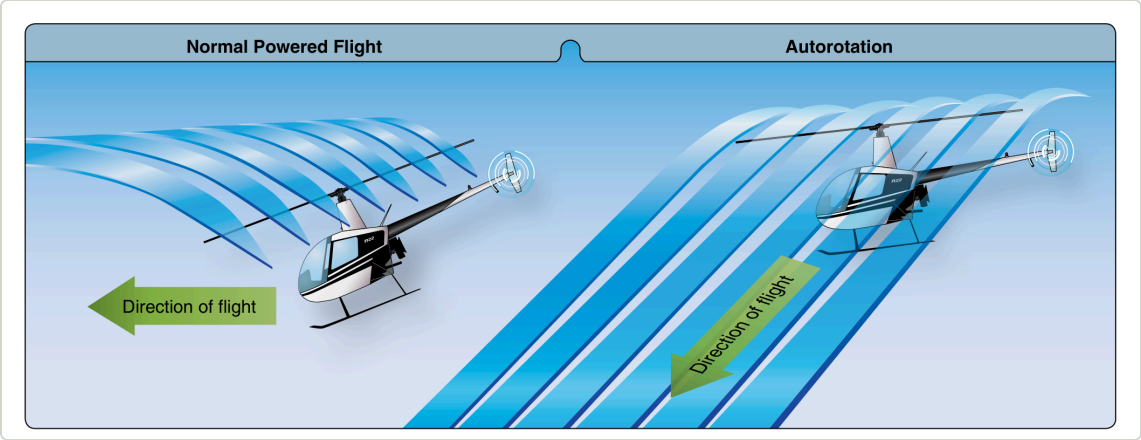
Introduced	**Private standard met**	**Commercial standard met**	**Checkride ready**
date · lesson	date · CFI initials	date · CFI initials	date · CFI initials

18 Powerplant Failure at Altitude

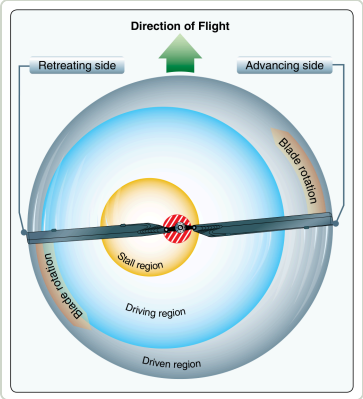
Area of Operation VIII — Emergency Operations · **Private** PH.VIII.B · **Commercial** CH.VIII.B

Objective. To determine the applicant exhibits satisfactory knowledge, risk management, and skills associated with a simulated powerplant failure at altitude.

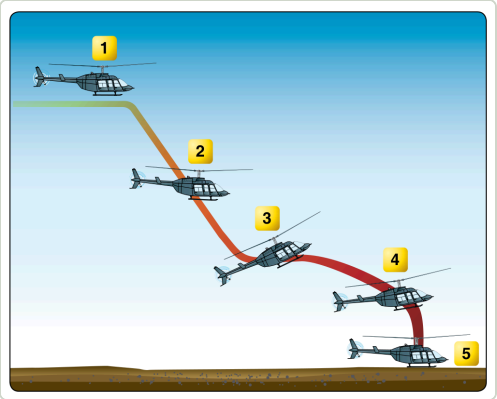
HOW IT IS FLOWN — condensed from the FAA Helicopter Flying Handbook, Chapter 11 — Autorotation, RPM Control, Straight-In Autorotation



HFH Figure 11-1. *During an autorotation, the upward flow of relative wind permits the main rotor blades to rotate at their normal speed. In effect, the blades are "gliding" in their rotational plane.*



HFH Figure 2-49. *Blade regions in forward autorotation descent.*



HFH Figure 11-2. *Straight-in autorotation.*

1. On engine or driveline failure the freewheeling unit disengages the engine; the rotor keeps turning only if you lower the collective immediately — this starts the upward flow through the disk that drives the rotor (Figure 11-1). Heading is still controlled with the pedals.
2. Simultaneously: down collective, aft cyclic (to prevent the nose tuck and the rpm loss that comes with it) and pedal/trim. Accident studies show pilots fail to do all three together at cruise speed. Low-inertia rotors lose rpm fast.
3. Set the RFM autorotation airspeed and rpm; adjust for conditions: heavy/high/gusty → slightly faster; light/low → slightly slower. Rpm in the low green gives more distance. Collective manages rpm: up to reduce, down to regain; keep it in the recommended range.
4. If rpm has dropped, a moderate aft cyclic (possibly with a turn) increases airflow up through the rotor and rebuilds it — without over-speeding.

5. Pick the landing area, turn toward it and into the wind early, keep crosschecking attitude, trim, rpm and airspeed; crosswind correction on the course line. Then fly the flare, level-off and cushioned touchdown as for a straight-in autorotation.
6. A helicopter's glide ratio is much less than an airplane's — plan for it. Note: rotor rpm is the most critical element; it provides the lift for a stable descent and the energy to cushion the landing.

COMMON ERRORS — HFH LIST

- Not understanding the need for an immediate entry.
- Insufficient pedal when power is lost.
- Lowering the nose too abruptly → dive.
- Not holding rotor rpm in the descent.
- Collective pulled too high → hard landing and heading loss.
- Not leveling to the landing attitude; lateral drift or misalignment at touchdown.

SKILLS — THE STANDARD — the applicant exhibits the skill to:

	PRIVATE · ACS-15	COMMERCIAL · ACS-16	MET: P / C · DATE
S1	Establish an autorotation.		☐ P ☐ C ___/___
S2	Establish power-off glide with the helicopter trimmed and autorotation airspeed, **±10 knots**.	Establish power-off glide with the helicopter trimmed and autorotation airspeed, **±5 knots**.	☐ P ☐ C ___/___
S3	Maintain main rotor (Nr) within normal limits.		☐ P ☐ C ___/___
S4	Select a suitable landing area considering altitude, wind, terrain, and obstructions.		☐ P ☐ C ___/___
S5	Maneuver to avoid undershooting or overshooting the selected landing area.		☐ P ☐ C ___/___
S6	Make radio calls as appropriate.		☐ P ☐ C ___/___
S7	Terminate approach with a power recovery at a safe altitude as directed by the evaluator.		☐ P ☐ C ___/___

☐ Shaded = Commercial tolerance is tighter. Tick P when flown to the Private standard, C when flown to the Commercial standard; write the date.

CHECKRIDE RULES — ACS APPENDIX 3
The altitude, airspeed, and location must be considered so the helicopter is in a position to achieve a safe landing if an actual powerplant failure occurs. The minimum altitude to initiate a power failure must be at least 1,000 feet AGL with a power recovery completed by at least 500 feet AGL.

KNOWLEDGE

PH.VIII.B.K1–K6 · demonstrates understanding of:

- Elements of a powerplant failure at altitude.
- Effects of wind, weight, temperature, and density altitude.
- Main rotor (Nr) speed.
- Energy management.
- Causes and effects of high descent rates.
- Effect of varying bank angles, airspeeds, and rotor rpm.

RISK MANAGEMENT

PH.VIII.B.R1–R11 · identify, assess and mitigate risk associated with:

- Low entry altitudes.
- Selection of landing area.
- Flight control inputs.
- Turbulence, including wake turbulence.
- Low rotor rpm or rotor stall.
- Windshear.
- Powerplant failure during the maneuver.
- Collision hazards.
- Autorotation power-off never-exceed speed (VNE) limitation.
- Helicopter trim.
- Distractions, task prioritization, loss of situational awareness, or disorientation.

18 · POWERPLANT FAILURE AT ALTITUDE — NOTES

My numbers each flight (hover height, airspeed on final, where I terminated), the error I made, and the one thing to fix next flight.

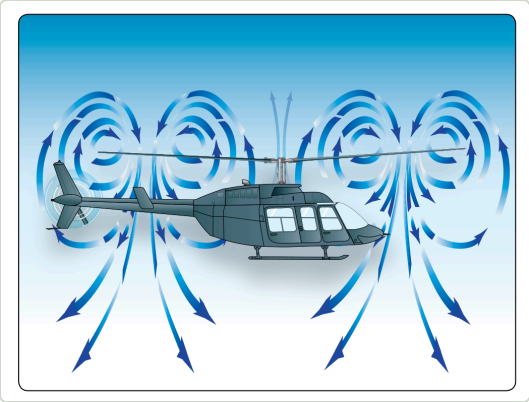
Introduced	**Private standard met**	**Commercial standard met**	**Checkride ready**
date · lesson	date · CFI initials	date · CFI initials	date · CFI initials

19 Vortex Ring State (VRS)

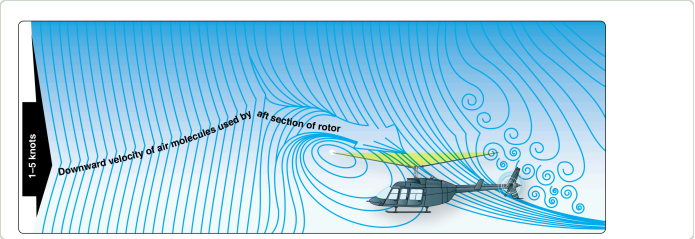
Area of Operation VIII — Emergency Operations · **Private** PH.VIII.E · **Commercial** CH.VIII.E

Objective. To determine the applicant exhibits satisfactory knowledge, risk management, and skills associated with main rotor Vortex Ring State (VRS).

HOW IT IS FLOWN — condensed from the FAA Helicopter Flying Handbook, Chapter 11 — Vortex Ring State



HFH Figure 11-3. *Vortex ring state.*



HFH Figure 2-39. *The airflow pattern for 1–5 knots of forward airspeed. Note how the downwind vortex is beginning to dissipate and induced flow down through the rear of the rotor disk is more horizontal.*

1. Formerly 'settling with power': a vertical descent with 20% up to full power applied and little or no climb performance — the rotor settles into its own downwash and the power goes into circulating a doughnut of air around the disk.
2. Conditions: (1) a vertical or nearly vertical descent of at least 300 fpm; (2) the rotor using 20–100% of engine power; (3) horizontal velocity slower than effective translational lift.
3. Typical setups: OGE hover without precise altitude control; approaches, especially steep approaches, with a tailwind; quick-stop type maneuvers; autorotation recoveries.
4. Recognition: shudder/turbulence, uncommanded pitch and roll oscillations, little or no collective authority, a sink rate that can approach 6,000 fpm if allowed to develop. Pulling collective only enlarges the stalled area and increases the descent.
5. Traditional recovery: forward cyclic to gain airspeed and/or partially lower collective to exit the vortex; complete when through ETL and a normal climb is established. Vuichard recovery: lateral cyclic thrust with an increase in power and lateral antitorque thrust — eliminates the descent rate rather than flying out of the vortex.
6. Training: recover no lower than 1,000 ft AGL or the manufacturer's altitude, whichever is higher. Recover at the first sign.

COMMON ERRORS — HFH LIST

- Too much lateral speed on entry (demonstration).
- Excessive decrease of collective (traditional).
- Excessive lateral cyclic; failure to maintain heading (Vuichard).
- Trying to arrest the descent with collective alone.

SKILLS — THE STANDARD — the applicant exhibits the skill to:

	PRIVATE · ACS-15	COMMERCIAL · ACS-16	MET: P / C · DATE
S1	Complete the appropriate checklist(s).		☐ P ☐ C ___/___
S2	Clear the area.		☐ P ☐ C ___/___
S3	Select an altitude that allows recovery to be completed no lower than 1,000 feet AGL or as recommended by the manufacturer, whichever is higher.		☐ P ☐ C ___/___
S4	Establish conditions leading to VRS entry.		☐ P ☐ C ___/___
S5	Promptly recognize, announce, and recover at the first indication of VRS.		☐ P ☐ C ___/___
S6	Use single-pilot resource management (SRM) or crew resource management (CRM), as appropriate.		☐ P ☐ C ___/___

☐ Shaded = Commercial tolerance is tighter. Tick P when flown to the Private standard, C when flown to the Commercial standard; write the date.

CHECKRIDE RULES — ACS APPENDIX 3
The evaluator must conduct a briefing with the applicant regarding the selection of a safe entry altitude, recognition of the onset of VRS, and recovery within the Task standards. The area must be free of obstructions should a landing become necessary.

KNOWLEDGE

PH.VIII.E.K1–K6 · demonstrates understanding of:

- Elements of vortex ring state.
- Effects of wind, weight, temperature, and density altitude.
- Requirements for the formation of VRS.
- Aerodynamics and indications of VRS.
- Flight scenarios under which VRS can occur.
- Effective recovery techniques.

RISK MANAGEMENT

PH.VIII.E.R1–R6 · identify, assess and mitigate risk associated with:

- Pilot recognition and response to VRS.
- Entering the maneuver at a lower altitude than planned.
- Application of power or exceeding powerplant limitations.
- Collision hazards.
- Distractions, task prioritization, loss of situational awareness, or disorientation.
- Loss of tail rotor effectiveness (LTE).

19 · VORTEX RING STATE (VRS) — NOTES

My numbers each flight (hover height, airspeed on final, where I terminated), the error I made, and the one thing to fix next flight.

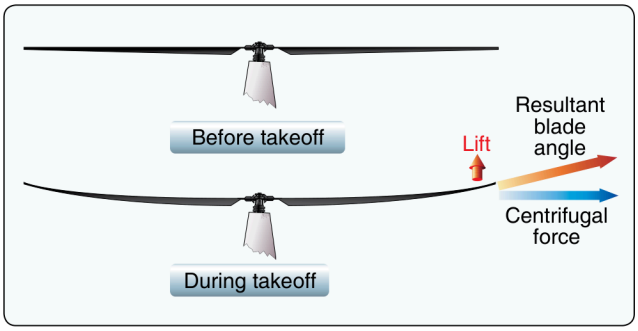
Introduced	**Private standard met**	**Commercial standard met**	**Checkride ready**
date · lesson	date · CFI initials	date · CFI initials	date · CFI initials

20 Low Rotor RPM Recognition and Recovery

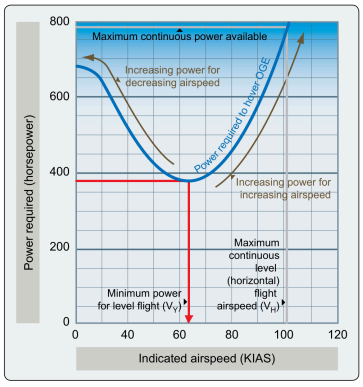
Area of Operation VIII — Emergency Operations · **Private** PH.VIII.F · **Commercial** CH.VIII.F

Objective. To determine the applicant exhibits satisfactory knowledge, risk management, and skills associated with low rotor rpm recognition and recovery.

HOW IT IS FLOWN — condensed from the FAA Helicopter Flying Handbook, Chapter 11 — Low Rotor RPM and Rotor Stall



HFH Figure 2-29. *During takeoff, the combination of centrifugal force and lift cause the rotor disk to cone upward.*



HFH Figure 2-34. *Power versus airspeed chart.*

1. Helicopters will not fly below a certain rotor rpm, just as airplanes will not fly below a certain airspeed. Below the safe range the helicopter is in a low-rpm situation; if rpm keeps falling the rotor stalls — and rotor stall is not recoverable. Above about 50 ft it is likely fatal.
2. Power-on causes (the most common accidents): 'overpitching' — pulling more collective than the engine can support, especially at high density altitude or heavy out of a confined area; rolling the throttle the wrong way; governor failure. As rpm falls, engine horsepower falls with it (10% rpm ≈ 10% horsepower), so the situation feeds on itself.
3. Power-off causes: not lowering the collective quickly after an engine failure; raising collective too high at the bottom of an autorotation.
4. Recognition: rotor tachometer decreasing, a yaw from the torque change, a noticeable drop in engine noise, increasing vibration at speed or in turns, the low-rpm warning horn/light.
5. Recovery — simultaneously: lower the collective, increase throttle if available, aft cyclic to hold a level attitude. At higher airspeeds additional aft cyclic helps rebuild rpm. Recover first, investigate second; practice until it is a conditioned reflex.
6. Why it is unrecoverable once stalled: the retreating blade stalls first, the disk blows back, the tail boom and stabilizer pitch the nose down, and the blades can strike the tail boom; tail rotor thrust is lost with main rotor rpm.

WATCH FOR — DRAWN FROM THE HFH DISCUSSION

- Pulling collective to stop the settling as rpm decays.
- Raising collective at too great a height at the bottom of an autorotation.
- Not lowering collective immediately on engine failure.
- Ignoring the horn, the yaw and the change in engine note.
- Investigating before recovering.

SKILLS — THE STANDARD — the applicant exhibits the skill to:

	PRIVATE · ACS-15	COMMERCIAL · ACS-16	MET: P / C · DATE
S1	Complete the appropriate checklist(s).		☐ P ☐ C ___/___
S2	Clear the area.		☐ P ☐ C ___/___
S3	Detect the development of low rotor rpm and initiate prompt corrective action.		☐ P ☐ C ___/___
S4	Execute the recovery procedure to return rotor rpm to normal limits.		☐ P ☐ C ___/___

☐ Shaded = Commercial tolerance is tighter. Tick P when flown to the Private standard, C when flown to the Commercial standard; write the date.

CHECKRIDE RULES — ACS APPENDIX 3
The evaluator must test the applicant orally on this Task if the helicopter used for the practical test has a governor that cannot be disabled. During the pre-flight briefing, evaluators must discuss avoiding any condition that may lead to rotor stall during the demonstration of this Task. If the skills are tested in flight, evaluators and applicants must ensure the helicopter's main rotor system remains in a safe operating range in accordance with the POH/RFM. Evaluators must not test this Task during critical phases of flight (e.g., takeoffs or landings).

KNOWLEDGE

PH.VIII.F.K1–K6 · demonstrates understanding of:

- Elements related to low rotor rpm recovery energy management, including the combination of conditions that may lead to this situation.
- Effects of wind, weight, temperature, and density altitude.
- Aerodynamics that affect low rotor rpm conditions.
- Powerplant performance.
- Main rotor (Nr) limitations.
- Difference between low rotor rpm and blade stall.

RISK MANAGEMENT

PH.VIII.F.R1–R5 · identify, assess and mitigate risk associated with:

- Powerplant limitations.
- Powerplant governor operation.
- Collision hazards.
- Distractions, task prioritization, loss of situational awareness, or disorientation.
- Low inertia rotor systems.

20 · LOW ROTOR RPM RECOGNITION AND RECOVERY — NOTES

My numbers each flight (hover height, airspeed on final, where I terminated), the error I made, and the one thing to fix next flight.

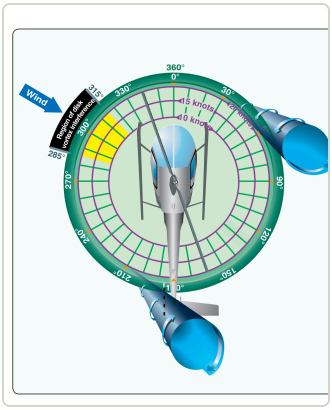
Introduced	**Private standard met**	**Commercial standard met**	**Checkride ready**
date · lesson	date · CFI initials	date · CFI initials	date · CFI initials

21 Antitorque System Failure

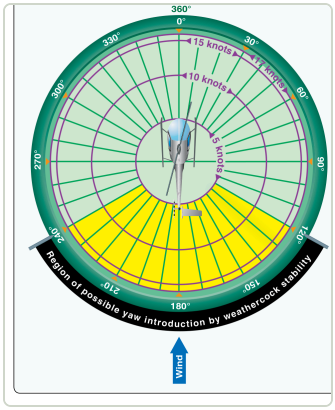
Area of Operation VIII — Emergency Operations · **Private** PH.VIII.G · **Commercial** CH.VIII.G

Objective. To determine the applicant exhibits satisfactory knowledge and risk management associated with an antitorque system failure.

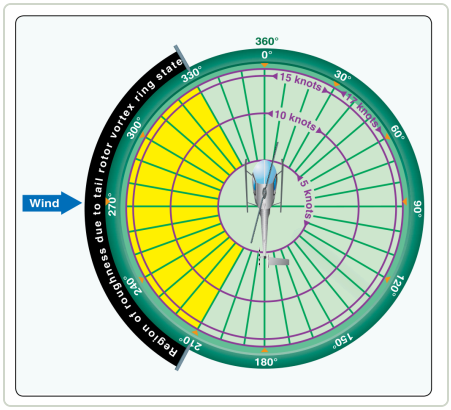
HOW IT IS FLOWN — condensed from the FAA Helicopter Flying Handbook, Chapter 11 — Antitorque System Failure, Loss of Tail Rotor Effectiveness



HFH Figure 11-9. *Main rotor disk vortex interference.*



HFH Figure 11-10. *Weathercock stability.*



HFH Figure 11-11. *Tail rotor vortex ring state.*

1. Two categories: loss of the tail rotor drive (driveshaft, gearbox, or the tail rotor itself) = complete loss of antitorque; or a control failure where the tail rotor still thrusts but the pedals no longer change it.
2. Drive failure: the nose spins right immediately (counterclockwise rotor). Severity grows with power and falls with airspeed. Power must be reduced to reduce torque — the end result is an autorotation.
3. At a hover: enter a hovering autorotation by rolling off the throttle. In forward flight: lower collective and roll off the throttle into a normal autorotation. Near cruise speed the vertical fin may give enough directional control to reach a better landing site; slight cyclic opposite the yaw helps.
4. Stuck pedals: fly to an area for a running/roll-on landing; use a normal-to-steep approach so a lower power setting keeps the nose to the right, arriving at 2–3 ft skid height as ETL is lost; increase collective smoothly to align the nose and cushion; a little forward cyclic stops the nose continuing right.
5. LTE (unanticipated right yaw, below about 30 kt): main-rotor disk vortex interference (wind 285°–315°), weathercock stability (120°–240°), tail rotor vortex ring state (210°–330°), plus high power, slow airspeed, high density altitude and low rpm. Recover with full left pedal and forward cyclic to gain airspeed; reduce power if altitude permits.
6. Reduce the onset of LTE: maximum power-on rotor rpm; avoid tailwinds below 30 kt; avoid OGE hovers and high-power demand at low airspeed in the critical wind azimuths; stay alert to any uncommanded right yaw and stop it immediately.

WATCH FOR — DRAWN FROM THE HFH DISCUSSION

- Not reducing power/entering autorotation after a drive failure.
- Letting a right yaw rate build in a left crosswind.
- Landing with the nose still turning.
- Low rotor rpm reducing tail rotor thrust.
- Ignoring wind azimuth at a hover in high-power conditions.

SKILLS — THE STANDARD — the applicant exhibits the skill to:

NO FLIGHT SKILL ELEMENTS
This Task has no Skill elements in the ACS — it is evaluated orally through the Knowledge and Risk Management elements below, for both certificates. Use the notes area to write your own answers to each element.

KNOWLEDGE

PH.VIII.G.K1–K5 · demonstrates understanding of:

- Elements related to antitorque system failure by describing:
  a. Indications of an antitorque system failure(s)
  b. Differences between complete loss of antitorque and mechanical flight control failures
  c. RFM procedures for antitorque system(s) failure
- Wind conditions that favor a landing with an antitorque failure.

RISK MANAGEMENT

PH.VIII.G.R1–R3 · identify, assess and mitigate risk associated with:

- Preflight inspection of the antitorque system.
- Antitorque failure(s) for the aircraft supplied for the practical test.
- Use of antitorque failure procedures.

21 · ANTITORQUE SYSTEM FAILURE — NOTES

My numbers each flight (hover height, airspeed on final, where I terminated), the error I made, and the one thing to fix next flight. Write your own answer to every Knowledge and Risk element here.

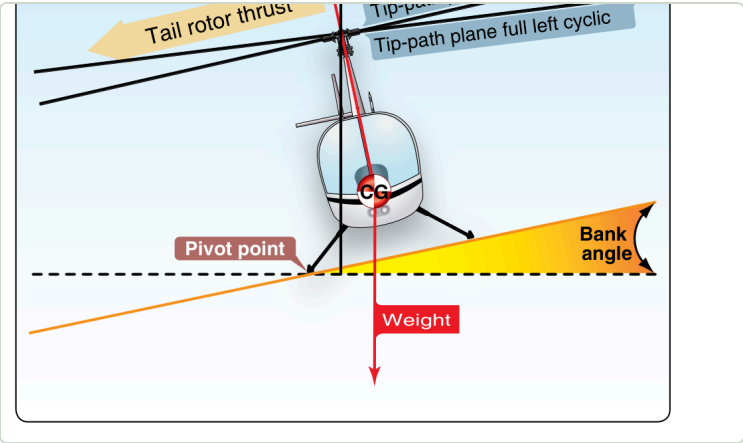
Introduced	**Private standard met**	**Commercial standard met**	**Checkride ready**
date · lesson	date · CFI initials	date · CFI initials	date · CFI initials

22 Dynamic Rollover

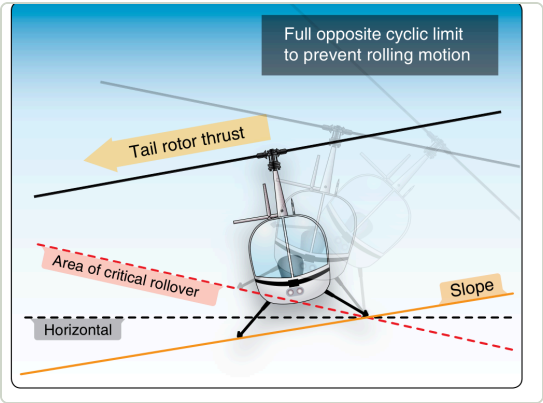
Area of Operation VIII — Emergency Operations · **Private** PH.VIII.H · **Commercial** CH.VIII.H

Objective. To determine the applicant exhibits satisfactory knowledge and risk management associated with dynamic rollover.

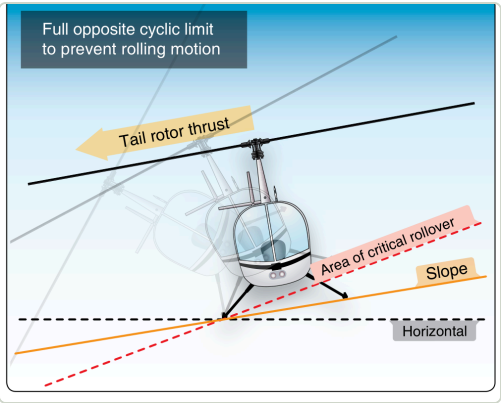
HOW IT IS FLOWN — condensed from the FAA Helicopter Flying Handbook, Chapter 11 — Dynamic Rollover



HFH Figure 11-5. *Forces acting on a helicopter with right skid on the ground.*



HFH Figure 11-6. *Upslope rolling motion.*



HFH Figure 11-7. *Downslope rolling motion.*

1. Dynamic rollover: a lateral rolling tendency when in contact with the surface. Three factors must be present: a rolling moment, a pivot point other than the CG (a skid), and thrust greater than weight. Beyond the critical rollover angle, main rotor thrust continues the roll and no cyclic can stop it (Figure 11-5).
2. Causes: tie-down or skid-securing device left on; a skid catching an object while hovering sideward; skid stuck in ice, soft asphalt or mud; improper takeoff/landing technique; slope operations.
3. Most critical (counterclockwise rotor): right skid down (translating tendency adds to the roll), right lateral CG, crosswind from the left, left yaw inputs; also high gross weight with thrust about equal to weight. A faster roll rate reduces the angle from which recovery is still possible.
4. Recovery: quickly reduce collective — the only effective way to remove the thrust. A smooth, moderate reduction (slower than full-up-to-full-down in about two seconds) is usually enough; dumping it can drive a blade into the fuselage or, on a slope, bounce the helicopter into a roll the other way (Figure 11-7). If the bank reaches about 5°–8° and full cyclic does not reduce it, lower the collective.
5. Prevention: two-step lift-off (light on the skids, feel for equilibrium, then lift gently); keep roll, pitch and yaw rates small; hover high enough for skid clearance near obstacles; hovering autorotations into the wind,

wary above 10 kt or gusty; avoid tailwinds on slopes; do not let the cyclic reach its limit — if it does, return to a hover and pick a lesser slope.

WATCH FOR — DRAWN FROM THE HFH DISCUSSION

- Trying to stop the roll with opposite cyclic alone.
- Pulling collective suddenly to get airborne on a slope.
- Excessive cyclic into the slope with excessive collective (upslope rolling motion, Figure 11-6).
- Hovering close to fences, lights, cables or nets that can catch a skid.
- Forgetting that lateral cyclic needs change as passengers or fuel shift.

SKILLS — THE STANDARD — the applicant exhibits the skill to:

NO FLIGHT SKILL ELEMENTS
This Task has no Skill elements in the ACS — it is evaluated orally through the Knowledge and Risk Management elements below, for both certificates. Use the notes area to write your own answers to each element.

KNOWLEDGE

PH.VIII.H.K1–K3 · demonstrates understanding of:

- Elements related to dynamic rollover.
- Interactions between thrust, crosswind, slope, lateral CG, aircraft weight, and flight controls that contribute to dynamic rollover.
- Preventive flight technique and recovery during flight operations, including slope operations.

RISK MANAGEMENT

PH.VIII.H.R1–R7 · identify, assess and mitigate risk associated with:

- Surface conditions conducive to dynamic rollover.
- Landing gear proximity to obstructions on the ground during low altitude hover.
- Flight control inputs during takeoff or landing.
- Sideward hover.
- Aircraft slope limitations.
- Critical rollover angle and rolling moment.
- Translating tendency.

22 · DYNAMIC ROLLOVER — NOTES

My numbers each flight (hover height, airspeed on final, where I terminated), the error I made, and the one thing to fix next flight. Write your own answer to every Knowledge and Risk element here.

Introduced	**Private standard met**	**Commercial standard met**	**Checkride ready**
date · lesson	date · CFI initials	date · CFI initials	date · CFI initials

23 Ground Resonance

Area of Operation VIII — Emergency Operations · **Private** PH.VIII.I · **Commercial** CH.VIII.I

Objective. To determine the applicant exhibits satisfactory knowledge and risk management associated with ground resonance.

HOW IT IS FLOWN — condensed from the FAA Helicopter Flying Handbook, Chapter 11 — Ground Resonance



HFH Figure 11-4. *Ground resonance.*

1. A destructive vibration that occurs at certain rotor speeds when a helicopter with a fully articulated rotor (usually three or more blades) is on the ground. The airframe's natural frequency is excited by an out-of-balance rotor and the engine keeps adding energy, so the oscillation grows until the structure fails — it can destroy a helicopter in seconds.
2. Trigger: hard contact on one corner (usually wheel gear) sends a shock to the rotor head; the blades move about their drag hinges out of their normal 120° spacing, e.g. 122°, 122°, 116° (Figure 11-4). Another gear contact can aggravate the imbalance.
3. Recovery, rpm in the normal operating range: fly the helicopter off the ground and let the blades re-phase, then make a normal touchdown. Do not re-contact firmly before they realign — a second shock can start a violent, uncontrollable oscillation.
4. Recovery, rpm low: close the throttle immediately and lower the collective fully to put the blades in low pitch.
5. Rigid and semi-rigid rotors (the R44's two-bladed teetering system has no drag hinge) do not experience it; skid gear is less prone than wheel gear because tires' resonant frequency can match the rotor's. Know it because you will fly other types.

WATCH FOR — DRAWN FROM THE HFH DISCUSSION

- Landing hard on one corner; dragging a skid or wheel on touchdown.
- Attempting to 'ride it out' on the ground with rpm in the operating range.
- Lifting off and re-contacting the surface before the blades re-phase.
- Not matching the action to the rpm available.

SKILLS — THE STANDARD — the applicant exhibits the skill to:

NO FLIGHT SKILL ELEMENTS

This Task has no Skill elements in the ACS — it is evaluated orally through the Knowledge and Risk Management elements below, for both certificates. Use the notes area to write your own answers to each element.

KNOWLEDGE

PH.VIII.I.K1–K6 · demonstrates understanding of:

- Exhibits knowledge of the elements related to ground resonance by describing:
  a. Conditions that contribute to ground resonance
  b. Preventive flight technique during takeoffs and landings
  c. Landing surface
- Inspection of items that may contribute to ground resonance.
- Corrective actions during low and normal rotor rpm speeds.

RISK MANAGEMENT

PH.VIII.I.R1–R3 · identify, assess and mitigate risk associated with:

- Factors that may contribute to the onset of ground resonance.
- Recognition of the onset of ground resonance.
- Recovery procedure selection.

23 · GROUND RESONANCE — NOTES

My numbers each flight (hover height, airspeed on final, where I terminated), the error I made, and the one thing to fix next flight. Write your own answer to every Knowledge and Risk element here.

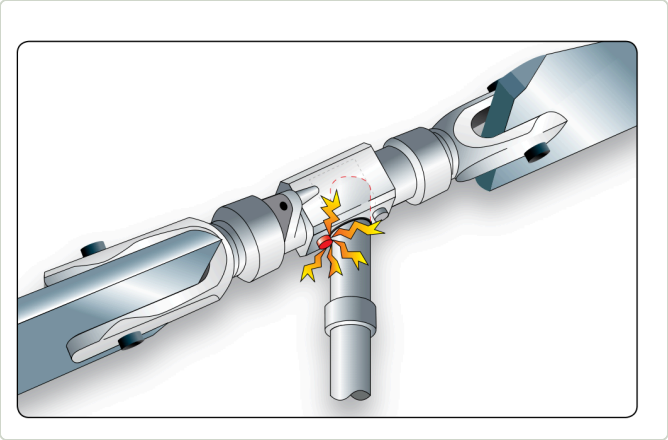
Introduced	**Private standard met**	**Commercial standard met**	**Checkride ready**
date · lesson	date · CFI initials	date · CFI initials	date · CFI initials

24 Low-G Recognition and Recovery

Area of Operation VIII — Emergency Operations · **Private** PH.VIII.J · **Commercial** CH.VIII.J

Objective. To determine the applicant exhibits satisfactory knowledge and risk management associated with low G conditions.

HOW IT IS FLOWN — condensed from the FAA Helicopter Flying Handbook, Chapter 11 — Low-G Conditions and Mast Bumping



HFH Figure 11-8. *Result of improper corrective action in a low-G condition.*

1. Low G is the weightless feeling of starting down in an elevator. Helicopters rely on positive G for their control response; a two-bladed teetering rotor (R22/R44) relies entirely on the tilt of the thrust vector — so low G can be catastrophic in these helicopters.
2. Cause: an abrupt forward cyclic input or pushover, particularly at higher airspeeds; also turbulence and severe downdrafts, especially combined with high airspeed. Slow-speed forward cyclic (takeoff from hover, VRS recovery) does not cause low G.
3. What happens: thrust drops and the pilot loses control of fuselage attitude without realizing it; tail rotor thrust often rolls the fuselage right (counterclockwise rotor). Correcting the roll with left cyclic puts the disk and fuselage at a large angle to each other, exceeding hub clearances — mast bumping (Figure 11-8) — which can sever the mast or let the blades strike the airframe.
4. Recovery: first gently apply aft cyclic to restore normal G, then and only then correct any roll. Uncommanded right roll means loss of control is imminent — act immediately.
5. Prevention: no abrupt forward cyclic in two-bladed helicopters (lower the collective for a rapid descent instead); in turbulence reduce power and fly slower than normal cruise — mast bumping is less likely at lower airspeeds; smooth, gentle inputs, no overcontrolling.

WATCH FOR — DRAWN FROM THE HFH DISCUSSION

- Pushing over abruptly, airplane-style, for collision avoidance or a descent.
- Correcting the right roll with left cyclic before restoring G.
- Not recognizing the weightless onset.
- Cruising fast in turbulence.

SKILLS — THE STANDARD — the applicant exhibits the skill to:

NO FLIGHT SKILL ELEMENTS
This Task has no Skill elements in the ACS — it is evaluated orally through the Knowledge and Risk Management elements below, for both certificates. Use the notes area to write your own answers to each element.

KNOWLEDGE

PH.VIII.J.K1–K6 · demonstrates understanding of:

- Exhibits knowledge of the elements related to low G conditions by describing:
  a. Aerodynamic factors related to low G conditions
  b. Situations that contribute to low G conditions
  c. Avoidance, recognition, and appropriate recovery procedures
- Effects of low G conditions on various rotor systems.
- Pilot responses that lead to mast bumping in a low G condition, if applicable.

RISK MANAGEMENT

PH.VIII.J.R1–R3 · identify, assess and mitigate risk associated with:

- Control inputs that cause low G conditions.
- Turbulence/gusty wind conditions.
- Control inputs that cause mast bumping.

24 · LOW-G RECOGNITION AND RECOVERY — NOTES

My numbers each flight (hover height, airspeed on final, where I terminated), the error I made, and the one thing to fix next flight. Write your own answer to every Knowledge and Risk element here.

Introduced	**Private standard met**	**Commercial standard met**	**Checkride ready**
date · lesson	date · CFI initials	date · CFI initials	date · CFI initials

SOURCES AND CREDITS

Standards. Private Pilot for Rotorcraft Category Helicopter Rating Airman Certification Standards (FAA-S-ACS-15) and Commercial Pilot for Rotorcraft Category Helicopter Rating Airman Certification Standards (FAA-S-ACS-16), Federal Aviation Administration. Task objectives, Knowledge, Risk Management and Skill elements, and Appendix 3 task notes are reproduced verbatim. Tasks specific to wheel-type landing gear and multiengine helicopters are omitted.

Figures and technique. Helicopter Flying Handbook (FAA-H-8083-21B), Federal Aviation Administration, chapters 2, 9, 10 and 11. Figures are reproduced unmodified; the "how it is flown" sequences and error lists are condensed from the handbook text. These U.S. Government works are in the public domain.

Always fly the procedures in the Robinson R44 Pilot's Operating Handbook / Rotorcraft Flight Manual and the limitations of the helicopter you are in. This workbook is a study aid, not a substitute for the ACS, the handbook, the POH or your instructor.

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Walter Dusseldorp, CFII (Helicopter), owner and chief pilot. Free online ground school: groundschool.flyheliadk.com