Helicopter Pilot

ORAL EXAM GUIDE

RYAN DALE

COMPREHENSIVE PREPARATION FOR THE FAA PRIVATE HELICOPTER CHECKRIDE

THIRD EDITION

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Third Edition
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About the Author

Ryan Dale is a helicopter and airplane certified flight instructor (CFI) who enjoys encouraging people as much as he enjoys flying. Ryan's aviation journey started in 2000, and he has personally trained hundreds of helicopter pilots and impacted thousands more through his written works.

At the start of his career, while Ryan was working toward his instructor certificate, he saw the need for more resources for aspiring helicopter pilots. He wrote the *Helicopter Oral Exam Guide* (2006) and *Helicopter Maneuvers Manual* (2011) to help other pilots pass exams and reach their goals in flying. Now, in view of the recent FAA update from Practical Test Standards (PTS) to Airman Certification Standards (ACS), Ryan felt the need to give the helicopter community an updated resource to integrate helicopter training and the new ACS.

In recent years, Ryan has extended his expertise beyond the flight deck to his online training platform *3G Heli Prep*, where he offers affordable, comprehensive helicopter pilot courses and personal tutoring. Ryan is dedicated to making the dream of flying accessible and affordable for everyone, from aspiring pilots taking their first discovery flight to seasoned pilots seeking advanced certifications.

Ryan currently resides in North Idaho with his wife, son, and daughter. When he's not in the air, writing, or developing coursework, you will find him sharing his journey on social media and encouraging others. For more information about Ryan and *3G Heli Prep* courses, visit 3GHeliPrep.com.

Introduction

This *Helicopter Pilot Oral Exam Guide* is designed for pilots who are involved with helicopter training. It provides information specific to helicopter operations, preparing you for the FAA practical exam (also called checkride), including the knowledge, risk management, and skills applicants will need to demonstrate. This guide will also prove beneficial to pilots who wish to refresh their knowledge or who are preparing for a flight review.

The *Private Pilot for Helicopter Airman Certification Standards* (FAA-S-ACS-15) specifies the areas in which knowledge and skills must be demonstrated by the applicant before issuance of a pilot certificate or rating. The *Helicopter Pilot Oral Exam Guide* is designed to evaluate a pilot's knowledge of those areas. You will find questions and appropriate responses for all Areas of Operations and Tasks required for the Private Pilot Certificate with a Helicopter Rating.

In this guide, questions and answers are organized into chapters that represent the areas of operations and tasks from the ACS, including knowledge, risk management and skills. At any time during the practical test, an examiner may ask questions pertaining to any of the subject areas within these divisions. This book provides you with the questions or topics commonly asked along with the information and/or appropriate reference necessary for a knowledgeable response.

Questions specific to aircraft operations refer to a Robinson R-22 helicopter. This guide does not take the place of the rotorcraft flight manual (RFM) for the helicopter in which your flight will take place.

You may supplement this guide with other comprehensive study materials as noted in brackets at the end of each answer; for example [PH.I.A.K1; 14 CFR 61.109]. The first of these items are ACS codes for the relevant Areas of Operation and Tasks from the *Private Pilot for Helicopter Airman Certification Standards* (FAA-S-ACS-15). Additional references pertaining to the questions can be found in the ACS listed under the Tasks corresponding to the provided ACS codes.

The next reference(s) in the brackets are other study materials for which abbreviations and corresponding titles are listed below.

Be sure that you use the latest revision of these references when reviewing for the test. Also, check the ASA website at asa2fly.com/oegh for the most recent updates to this book due to changes in FAA procedures and regulations as well as for Reader Resources containing additional relevant information and updates.

14 CFR Part 1	*Definitions and Abbreviations*
14 CFR Part 61	*Certification: Pilots, Flight Instructors, and Ground Instructors*
14 CFR Part 67	*Medical Standards and Certification*
14 CFR Part 68	*Requirements for Operating Certain Small Aircraft Without a Medical Certificate*
14 CFR Part 91	*General Operating and Flight Rules*
14 CFR Part 97	*Standard Instrument Approach Procedures*
14 CFR Part 133	*Rotorcraft External-Load Operations*
AC 68-1	*BasicMed*
AFM	*FAA-Approved Rotorcraft Flight Manual*
AIM	*Aeronautical Information Manual*
FAA-H-8083-1	*Aircraft Weight & Balance Handbook*
FAA-H-8083-2	*Risk Management Handbook*
FAA-H-8083-21	*Helicopter Flying Handbook*
FAA-H-8083-25	*Pilot's Handbook of Aeronautical Knowledge*
FAA-H-8083-28	*Aviation Weather Handbook*
FAA-S-ACS-15	*Private Pilot Helicopter Airman Certification Standards*
POH	*Pilot Operating Handbook* (be sure to reference the one specific to the helicopter you'll be flying for the checkride)
SFAR No. 73	*14 CFR Part 61, Special Federal Aviation Regulation No. 73—Robinson R–22/R–44 Special Training and Experience Requirements*

Most of these documents are available on the FAA website (faa.gov). Additionally, many of the publications are printed by ASA (asa2fly.com) and are available from aviation retailers worldwide.

A review of the information and references presented within this guide should provide the necessary preparation for the FAA Private Pilot Helicopter checkride.

Hovering Maneuvers 4

A. Vertical Takeoff and Landing

1. What are the key elements a pilot must understand for a vertical takeoff to a hover in a helicopter?

For a vertical takeoff to a hover, the pilot must understand the importance of smooth control inputs, particularly in the collective and cyclic controls, to maintain stability. The pilot should be aware of the helicopter's power requirements, wind conditions, and surrounding obstacles.

[PH.IV.A.K1; FAA-H-8083-21]

2. What considerations should a pilot keep in mind when landing a helicopter from a hover?

When landing from a hover, the pilot should consider the wind direction and speed, ensuring that the helicopter is aligned properly. The descent should be controlled and gradual, using the collective to reduce altitude while maintaining a stable hover. The pilot must also be aware of the surface condition of the landing area, and potential obstacles. Proper coordination of cyclic, collective, and antitorque pedals is essential for a smooth landing.

[PH.IV.A.K1; FAA-H-8083-21]

3. How do environmental factors affect vertical takeoff and landing in helicopter operations?

Environmental factors like wind, temperature, altitude, and air density can significantly impact helicopter performance during vertical takeoffs and landings. Wind can affect lift and rotor disc stability, while high temperatures and altitude reduce air density, affecting lift and engine performance. Pilots must adjust their techniques based on these conditions to ensure safe and efficient operations.

[PH.IV.A.K1; FAA-H-8083-21]

4. How does wind affect helicopter flight control inputs?

Wind significantly impacts helicopter flight control inputs. Winds require adjustments in cyclic control to maintain a stable hover or flight path. Wind conditions can cause the helicopter to drift,

demanding constant input adjustments to compensate for these movements and maintain intended flight direction with the pedals and altitude with the collective.

[PH.IV.A.K2; FAA-H-8083-21]

5. What considerations should a pilot make regarding wind when controlling a helicopter?

Pilots should consider wind direction and speed to anticipate necessary control inputs. In strong winds, more aggressive cyclic, collective, and antitorque pedal inputs might be needed. Pilots must also be aware of potential wind gusts and changes in wind direction, which can require sudden and precise control adjustments to maintain stability and control.

[PH.IV.A.K2; FAA-H-8083-21]

6. What considerations should a pilot make regarding the center of gravity (CG) when performing a vertical takeoff?

When performing a vertical takeoff, the pilot must ensure the CG is within the allowable limits. A forward CG might result in a nose-down attitude, requiring more rearward cyclic input, while an aft CG might require forward cyclic input. An off-center CG can cause the helicopter to drift laterally. Proper CG positioning is essential for stability and control during takeoff.

[PH.IV.A.K3; FAA-H-8083-21]

7. How does weight affect a helicopter's hover performance?

The weight of the helicopter affects hover performance by influencing the power required to maintain a hover. Heavier helicopters need more power and produce more downwash, which can affect ground handling. In contrast, lighter helicopters are more responsive and require less power to hover. Pilots must adjust control inputs based on the weight to maintain a stable hover.

[PH.IV.A.K3; FAA-H-8083-21]

8. Why is understanding the effect of weight and balance on landing from a hover important?

Understanding the effect of weight and balance on landing is important for maintaining control and stability during descent. An improperly balanced helicopter may be difficult to control, especially close to the ground. Pilots need to make precise control inputs to counteract any imbalances and ensure a smooth and controlled landing.

[PH.IV.A.K3; FAA-H-8083-21]

9. What is ground effect, and how does it impact a helicopter during a vertical takeoff to a hover?

Ground effect refers to the increased lift and decreased aerodynamic drag that a helicopter experiences near the ground. During a vertical takeoff to a hover, ground effect makes the helicopter more efficient, requiring less power to hover as the rotor system benefits from the reduced vortices and increased air pressure beneath it.

[PH.IV.A.K4; FAA-H-8083-25]

10. How should a pilot account for ground effect when hovering close to the ground?

When hovering close to the ground, pilots should be aware that less power is required to maintain a hover due to ground effect. As a helicopter rises out of ground effect, more power is needed. Pilots must be prepared to adjust collective inputs smoothly to maintain the desired altitude and control the helicopter's position, especially during transitions in and out of ground effect.

[PH.IV.A.K4; FAA-H-8083-25]

11. How does ground effect vary with different surface types and conditions?

Ground effect can vary depending on the surface type and condition. Over smooth, hard surfaces like concrete, ground effect is more pronounced, whereas over rough or soft surfaces, such as water or tall grass, the effect is less significant. Pilots must consider the landing environment and adjust their technique accordingly to account for these variations.

[PH.IV.A.K4; FAA-H-8083-25]

12. How can a pilot recognize the signs of LTE during a vertical takeoff to a hover?

Signs of LTE may include unanticipated right yaw for counterclockwise main rotors, which is the helicopter's nose turning to the right without pilot input. Pilots should be alert to wind direction and speed. Prompt recognition and anticipation is key to preventing a loss of control.

13. What is dynamic rollover in helicopter operations, and how can it occur during vertical takeoffs and landings?

Dynamic rollover refers to a situation where a helicopter pivots around one of its skids or wheels and rolls over, potentially leading to a catastrophic accident. It can occur during vertical takeoffs or landings if one skid or wheel becomes snagged or if the helicopter tilts excessively to one side, surpassing the critical rollover angle. Factors such as pilot error, uneven terrain, and external forces like wind can contribute to dynamic rollover.

[PH.IV.A.R2; FAA-H-8083-21]

14. What are the best practices for a pilot to avoid dynamic rollover?

Best practices to avoid dynamic rollover include maintaining proper cyclic control to keep the helicopter level, ensuring that skids or wheels are not snagged or obstructed during takeoff and landing, and being aware of the helicopter's pivot point. Pilots should also avoid excessive lateral cyclic inputs, especially when one skid or wheel is in contact with the ground.

[PH.IV.A.R2; FAA-H-8083-21]

15. How can a pilot identify the risk of ground resonance during vertical takeoff and landing?

A pilot can identify the risk of ground resonance by being aware of factors that trigger it, such as uneven terrain, hard landings, or incorrect cyclic position during start-up. Vigilance in monitoring the helicopter's vibrations and rotor behavior during takeoff and landing can help in early identification.

[PH.IV.A.R3; FAA-H-8083-21]

16. How can pilots mitigate the risks associated with ground resonance?

Pilots can mitigate ground resonance risks by ensuring proper maintenance and alignment of rotor blades and landing gear components. Conducting smooth, controlled landings to avoid hard impacts that could trigger resonance is crucial. Pilots should also be prepared to react quickly if ground resonance signs are detected, either by lifting off again to re-stabilize the rotors or by shutting down the rotor system immediately if safe takeoff is not feasible.

[PH.IV.A.R3; FAA-H-8083-21]

17. Why is proper preflight inspection crucial in managing ground resonance risk?

Proper preflight inspection is crucial because it can detect issues like imbalanced or damaged rotor blades and malfunctioning landing gear dampers, which are potential ground resonance triggers. Ensuring that all components are in good condition and functioning correctly is a key preventive measure against ground resonance.

[PH.IV.A.R3; FAA-H-8083-21]

18. How can a pilot identify the risk of powerplant failure during a hover?

By monitoring engine performance indicators such as temperature, pressure, and RPM, any unusual noises, vibrations, or fluctuations in these readings can be early warning signs. Awareness of factors that increase the risk, such as high-density altitude, heavy loads, is also crucial for early identification.

[PH.IV.A.R4; FAA-H-8083-21]

19. What methods can a pilot use to assess the severity of powerplant failure risk during hovering maneuvers?

To assess the severity of powerplant failure risk, a pilot should consider the helicopter's current weight, environmental conditions, engine performance history, and maintenance records. Evaluating whether the helicopter is operating within safe power margins, especially in demanding conditions like high altitudes or hot temperatures, is vital in this assessment.

[PH.IV.A.R4; FAA-H-8083-21]

20. How can pilots mitigate the risks associated with powerplant failure during hovering?

Mitigating risks of powerplant failure during hovering includes conducting thorough preflight checks of the engine and fuel system, ensuring proper maintenance, and being vigilant about engine performance throughout the flight. Pilots should be proficient in hovering autorotation and maintain awareness of potential emergency landing sites when hovering. Avoiding over-stressing the engine by managing weight and power settings also helps reduce risk.

[PH.IV.A.R4; FAA-H-8083-21]

21. What are the best practices for a pilot to follow in preparation for potential powerplant failure during hovering?

Best practices include staying within the helicopter's performance limitations, especially regarding weight and balance, and avoiding operations that place excessive demand on the powerplant. Maintaining situational awareness of the surroundings during hovering for potential emergency landing sites and keeping proficient in emergency procedures are also critical. Regular maintenance checks and adhering to service intervals for the powerplant can prevent many mechanical failures.

[PH.IV.A.R4; FAA-H-8083-21]

Skills to be demonstrated:

- Complete the appropriate checklist(s).
- Comply with air traffic control (ATC) or evaluator instructions and make radio calls as appropriate.
- Maintain engine and rotor RPM within normal limits.
- Ascend to and maintain recommended hovering altitude, and descend from recommended hovering altitude in headwind, crosswind, and tailwind conditions, without drift.
- Maintain recommended hovering altitude, ±½ of that altitude within 10 feet of the surface, if above 10 feet, ±5 feet.

(continued)

- Maintain position within 4 feet of a designated point with no aft movement.
- Descend vertically to within 4 feet of the designated touchdown point.
- Maintain specified heading, ±10°.

B. Hover Taxi

1. What should a pilot understand about using the *Chart Supplement* for airport operations?

A pilot should understand that the *Chart Supplement* (formerly the *Airport/Facility Directory*) provides comprehensive data on airports, heliports, and seaplane bases. This includes information on runway dimensions, surface types, lighting, navigational aids, available services, and contact details. Familiarity with how to interpret and use this resource is essential for safe flight planning and operations.

[PH.IV.B.K1; FAA-H-8083-25]

2. How does knowledge of airport diagrams benefit a pilot?

Knowledge of airport diagrams benefits a pilot by providing a detailed layout of runways, taxiways, aprons, and important airport facilities. Understanding these diagrams aids in navigating the airport ground environment, helps in planning taxi routes, and enhances situational awareness, especially in complex or unfamiliar airports.

[PH.IV.B.K1; FAA-H-8083-25]

3. Why is it important for a pilot to be familiar with Notices to Air Missions (NOTAMs)?

Familiarity with NOTAMs is crucial as they provide timely and critical information about temporary changes or unusual conditions at an airport or in the airspace. This can include runway closures, equipment outages, construction activities, or temporary flight restrictions. Checking NOTAMs is a vital part of preflight planning for ensuring safety and compliance with current airspace rules and conditions.

[PH.IV.B.K1; FAA-H-8083-25]

Helicopter Pilot ORAL EXAM GUIDE

Other Oral Exam Guides available from ASA:

- Private Pilot
- Instrument Pilot
- Commercial Pilot
- Multi-Engine Pilot
- Flight Instructor
- Airline Transport Pilot
- Aircraft Dispatcher
- Flight Review
- Aviation Mechanic

ASA's Oral Exam Guide Series is an excellent study tool for students and instructors alike. Arranged in a question-and-answer format, this comprehensive guide lists the questions most likely to be asked by evaluators during the practical exam and provides succinct, ready responses. FAA references are provided throughout for further study.

The *Helicopter Pilot Oral Exam Guide* aligns with the knowledge topics, risk management, and skill tasks including scenario-based training elements in the Private Pilot for Helicopter Airman Certification Standards (FAA-S-ACS-15). As an all-in-one study tool, this third edition no longer requires the use of a corresponding *Private Pilot Oral Exam Guide*.

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