

From: [REDACTED]
To: [REDACTED]
Cc: [REDACTED]
Subject: RE: CEN23LA199 (N451PH, Bell 407) - Document Request
Date: Friday, June 9, 2023 8:18:53 AM
Attachments: [image001.png](#)

[CAUTION] This email originated from outside of the organization. Do not click any links or open attachments unless you recognize the sender and know the content is safe.

I do not believe we have courseware on it.

James Maner | Chief Pilot, PHI Americas

[REDACTED]

Lafayette, LA 70508

Office: [REDACTED]

Cell: [REDACTED]

[REDACTED]



From: Hodges Michael [REDACTED]
Sent: Friday, June 9, 2023 8:18 AM
To: Maner, James [REDACTED]
Cc: Hardwick, Robert (FAA) [REDACTED]
Subject: RE: CEN23LA199 (N451PH, Bell 407) - Document Request

James,

Thank you, do you have separate academic training materials on it also, that you share?

Mike

Mike J. Hodges, MS
Aviation Accident Investigator, Central Region
National Transportation Safety Board

14291 East 4th Avenue, Suite 7-300
Aurora, Colorado 80011

Cellular: [REDACTED]
Facsimile: [REDACTED]
Response Operations Center (24/7): 1-844-373-9922
Work Hours: Monday-Friday, 0900-1730 Central Time

“Don’t let yesterday use up too much of today.” – Will Rogers

From: Maner, James [REDACTED]
Sent: Friday, June 9, 2023 8:06 AM
To: Hodges Michael [REDACTED]
Cc: Hardwick, Robert (FAA) [REDACTED]
Subject: RE: CEN23LA199 (N451PH, Bell 407) - Document Request

[CAUTION] This email originated from outside of the organization. Do not click any links or open attachments unless you recognize the sender and know the content is safe.

Michael,

From our FAA Approved Part 135 Pilot Training Manual-

4.4.4.36- Standards for power plant failure

4.6.6.2- B407 Qualification Objectives

Additionally, we have a maneuver guide but the standards for it are the same as PTM here, which are drafted from the FAA PTS

James Maner | Chief Pilot, PHI Americas

[REDACTED]
Lafayette, LA 70508

Office: [REDACTED]

Cell: [REDACTED]
[REDACTED]



From: Hodges Michael [REDACTED]
Sent: Thursday, June 8, 2023 5:37 PM
To: Maner, James [REDACTED]
Cc: Hardwick, Robert (FAA) [REDACTED]
Subject: CEN23LA199 (N451PH, Bell 407) - Document Request

CAUTION: This email originated from outside of PHI. **DO NOT** click links or attachments unless you recognize the sender and know the content is safe. **NEVER** provide your username or password.

Hi James,

Can I please request a copy of the PHI training information (that has the task, conditions, standards, etc.) for a practice touchdown autorotation in the Bell 407 series?

Thank you sir.

Mike

Mike J. Hodges, MS
Aviation Accident Investigator, Central Region
National Transportation Safety Board

14291 East 4th Avenue, Suite 7-300
Aurora, Colorado 80011

Cellular: [REDACTED]
Facsimile: [REDACTED]
Response Operations Center (24/7): 1-844-373-9922
Work Hours: Monday-Friday, 0900-1730 Central Time

“Don’t let yesterday use up too much of today.” – Will Rogers

CONFIDENTIALITY NOTICE - THIS E-MAIL TRANSMISSION MAY CONTAIN INFORMATION THAT IS PRIVILEGED, CONFIDENTIAL, PROPRIETARY, SUBJECT TO COPYRIGHT, AND/OR EXEMPT FROM DISCLOSURE UNDER APPLICABLE LAW. IT IS FOR THE USE OF INTENDED RECIPIENTS ONLY. If you are not an intended recipient of this message, please notify the original sender immediately by forwarding what you received and then delete all copies of the correspondence and attachments from your computer system. Any use, distribution, or disclosure of this message by unintended recipients is not authorized and may be unlawful.

CONFIDENTIALITY NOTICE - THIS E-MAIL TRANSMISSION MAY CONTAIN INFORMATION THAT IS PRIVILEGED, CONFIDENTIAL, PROPRIETARY, SUBJECT TO COPYRIGHT, AND/OR EXEMPT FROM DISCLOSURE UNDER APPLICABLE LAW. IT IS FOR THE USE OF INTENDED RECIPIENTS ONLY. If you are not an intended recipient of this message, please notify the original sender immediately by forwarding what you received and then delete all copies of the correspondence and attachments from your computer system. Any use, distribution, or disclosure of this message by unintended recipients is not authorized and may be unlawful.



4.4.4.36 Power Plant Failure Standard

- a. Exhibits knowledge of the elements related to a straight in or 180 degree auto rotation terminating with a power recovery or full down.
- b. Selects a suitable touchdown area.
- c. Initiates the maneuver at the proper point.
- d. Establishes proper aircraft trim and auto rotation airspeed, ± 5 knots.
- e. Maintains rotor RPM within normal limits.
- f. Compensates for windspeed and direction as necessary to void undershooting or overshooting the selected landing area.
- g. Utilizes proper deceleration, collective pitch application.
- h. Comes to a hover or touchdown within 100 feet of a designated point

4.4.4.37 Hovering Auto Rotation – (Single Engine Only) Standard

- a. Exhibits knowledge of the elements related to power failure at a hover.
- b. Determines that the terrain below the aircraft is suitable for a safe touchdown.
- c. Performs auto rotation from a stationary or forward hover into the wind at recommended altitude, and RPM, while maintaining established heading, $\pm 10^\circ$.
- d. Touches down with minimum sideward movement, and no rearward movement.
- e. Exhibits orientation, division of attention, and proper planning.

4.4.4.38 Dynamic Rollover – Oral

- a. Exhibits knowledge of the elements related to the aerodynamics of dynamic rollover.
- b. Understands the interaction between the anti torque thrust, crosswind, slope, CG, cyclic and collective pitch control in contributing to dynamic rollover.
- c. Explains preventive flight technique during takeoffs, landings, and slope operations

4.4.4.39 Low Rotor RPM – Oral

- a. Exhibits knowledge of the elements related to low rotor RPM.
- b. Exhibits the techniques used to recover from Low rotor RPM.

4.4.4.40 Tail Rotor Failure – Oral

Exhibits knowledge of the elements related to anti-torque system failure.

4.4.4.40.1 Stuck Pedal

Exhibits knowledge of the elements related to stuck pedals.

4.4.4.40.2 Fixed Pitch

Exhibits knowledge of the elements related to fixed pitch.

4.4.4.40.3 Broken Cable

Exhibits knowledge of the elements related to broken cables.

4.4.4.40.4 Loss of Thrust

Exhibits knowledge of the elements related to a loss of thrust.



4.6.6 Qualification Segment

[14 CFR § 135.293, 135.297, and 135.299]

4.6.6.1 Description

The Qualification Segment consists of Oral Examination, Flight training device, and Aircraft Modules, as necessary to complete the required tests. Any item not completed in the flight training device will be completed in the aircraft.

4.6.6.2 Objectives

To determine a pilot's knowledge of all tasks of the Appropriate Practical Test Standards and any applicable Flight Standards Board Report requirements, and to determine his ability to complete each task to the required standard.

- a. Appropriate Test Standards Events.
- b. Additional items for completion of a 14 CFR § 135.293 and/or 135.297 check.
- c. Additional takeoffs and approaches, if the operator is approved for lower than standard takeoffs and precision instrument approaches (Lower than Standard Minimums, IAW the Training Summary Checklist (TSC) form).
- d. Completion of a 14 CFR § 135.299 (Line Check) (normally conducted by the "operator").

4.6.6.3 Completion Standards – Minimum Acceptable Performance Guidelines

Each pilot shall fly the appropriate maneuvers as specified in the PHI, Inc. Testing Standards Checking Module.

The Check Airman will determine the applicable standards prior to the start of any evaluation session. The required standards will be discussed with the pilot being tested.

4.6.6.4 Examination Module

- a. Preflight
- b. Oral and/or Written Examination

4.6.6.5 Aircraft Module

This module evaluates a pilot's ability to demonstrate a knowledge of aircraft systems, checklist procedures, and the ability to control the aircraft and direct a crew within the minimum standards outlined in the PHI, Inc. Testing Standards.

- a. Additional items required for a 14 CFR § 135.293 and/or 135.297 check.
- b. Maneuvers prescribed in the PHI, Inc. testing standards.
- c. Lower than standard minimum takeoffs and approaches, IAW the Training Summary Checklist (TSC) form.
- d. Line Qualification, IAW 14 CFR § 135.299.

NOTE: Line qualification may be completed separately.

the green range. In the execution of the flare, care must be taken that the cyclic be moved rearward neither so abruptly that it causes the helicopter to climb, nor so slowly that it fails to arrest the descent, which may allow the helicopter to settle so rapidly that the tail rotor strikes the ground. In most helicopters, the proper flare attitude is that resulting in a groundspeed of a slow run. When forward motion decreases to the desired groundspeed—usually the lowest possible speed (position 4)—move the cyclic forward to place the helicopter in the proper attitude for landing.

This action gives the student an idea of airframe attitude to avoid, because a pilot should never allow ground contact unless the helicopter is more nose-low than that attitude. Limiting the flare to that attitude may result in slightly faster touchdown speeds but will eliminate the possibility of tail rotor impact on level surfaces.

The landing gear height at this time should be approximately 3–15 feet AGL, depending on the altitude recommended by the manufacturer. As the apparent groundspeed and altitude decrease, the helicopter must be returned to a more level attitude for touchdown by applying forward cyclic. Some helicopters can be landed on the heels in a slightly nose high attitude to help decrease the forward groundspeed, whereas others must land skids or landing gear level, in order to spread the landing loads equally to all of the landing gear. Extreme caution should be used to avoid an excessive nose high and tail low attitude below 10 feet. The helicopter must be close to the landing attitude to keep the tail rotor from contacting the surface.

At this point, if a full touchdown landing is to be performed, allow the helicopter to descend vertically (position 5). This collective application uses some of the kinetic energy in the rotor disk to help slow the descent rate of the helicopter. When the collective is raised, the opposite antitorque pedal used in powered flight will be needed due to the friction within the transmission/drive train. Touch down in a level flight attitude.

Control response with increased pitch angles will be slightly different than normal. With a decrease in main rotor rpm, the antitorque authority is reduced (the pedals react more slowly), requiring larger control inputs to maintain heading at touchdown.

Some helicopters, such as the Schweizer 300, have a canted tail stabilizer. With a canted stabilizer, it is crucial that the pilot apply the appropriate pedal input at all times during the autorotation. If not the tailboom tends to swing to the right, which allows the canted stabilizer to raise the tail. This can

result in a severe nose tuck which is quickly corrected with right pedal application.

A power recovery can be made during training in lieu of a full touchdown landing. Refer to the section on power recovery for the correct technique.

After the helicopter has come to a complete stop after touchdown, lower the collective pitch to the full-down position. Do not try to stop the forward ground run with aft cyclic, as the main rotor blades can strike the tail boom. By lowering the collective slightly during the ground run, an increase in weight is placed on the landing carriage, slowing the helicopter; however, this is dependent on the condition of the landing surface.

One common error is the holding of the helicopter off the surface, versus cushioning it onto the surface during an autorotation. Holding the helicopter in the air by using all of the rotor rpm kinetic energy usually causes the helicopter to have a hard landing, which results in the blades flexing down and contacting the tail boom. The rotor rpm should be used to cushion the helicopter on to the surface for a controlled, smooth landing instead of allowing the helicopter to drop the last few inches.

Common Errors

1. Not understanding the importance of an immediate entry into autorotation upon powerplant or driveline failure.
2. Failing to use sufficient antitorque pedal when power is reduced.
3. Lowering the nose too abruptly when power is reduced, thus placing the helicopter in a dive.
4. Failing to maintain proper rotor rpm during the descent.
5. Applying up-collective pitch at an excessive altitude, resulting in a hard landing, loss of heading control, and possible damage to the tail rotor and main rotor blade stops.
6. Failing to level the helicopter or achieve the manufacturers preferred landing attitude.
7. Failing to minimize or eliminate lateral movement during ground contact. (Similar for items 8 and 9)
8. Failing to maintain ground track in the air and keeping the landing gear aligned with the direction of travel during touchdown and ground contact.
9. Failing (in a practice run) to go around if not within limits and specified criteria for safe autorotation.

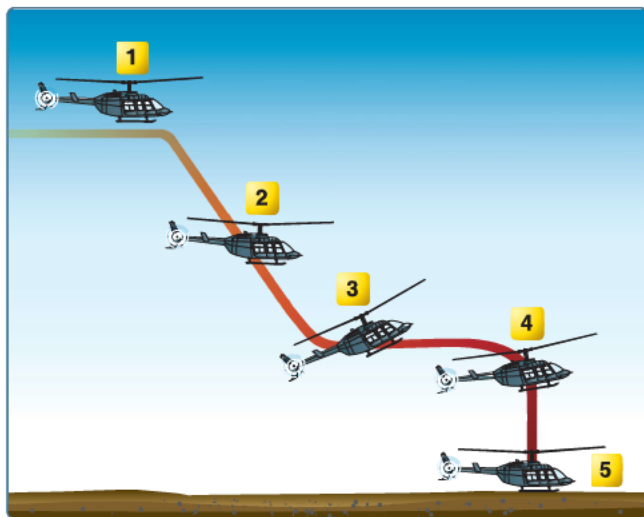


Figure 12-2. *Straight-in autorotation.*

Demonstrate the maneuver using the manufacturer's recommended airspeeds for autorotative descent or the best gliding speed. The instructor should require the student to review the performance charts and know the minimum and maximum glide airspeeds for the day's conditions. Especially during the early phases of training, the flights should be conducted at higher altitudes to give the new student more time to understand the different descent angles available, using minimum rate of descent airspeeds and maximum glide airspeeds. Some helicopter RFMs also advise of different rotor rpm values for gliding descents. In those cases, substantial care should be exercised to maintain the proper rotor rpm for the glide and then restoring the proper rpm value for the landing in a safe manner, even if performing a power recovery. Emphasize coordinating the collective movement with proper antitorque pedal for trim to prevent nose tuck. Nose tuck mainly occurs to certain helicopters, usually those with canted tail surfaces. Nose tuck is the rapid nose-down pitching resulting from a yawing motion causing excessive lift in a stabilizer. This only occurs when the stabilizer is canted upward from the horizontal. Instruct the student to apply cyclic control to maintain proper airspeed. After entering the maneuver, have the student verify and call out needle split, rotor revolutions per minute (rpm) in the green arc, helicopter in trim, and airspeed.

During the descent, instruct the student to adjust collective pitch control as necessary to maintain rotor rpm. Emphasize avoiding large collective pitch increases because they result in a rapid decay of rotor rpm. Demonstrate how aft cyclic movements cause a temporary increase in rotor rpm.

At approximately 40–100 feet above the surface, or at the altitude recommended by the manufacturer, demonstrate the deceleration with aft cyclic control. Explain how the deceleration is used to both reduce forward airspeed and

decrease the rate of descent. Point out that the cyclic control is not moved rearward so abruptly as to cause the helicopter to climb.

Show how the helicopter is placed in the landing attitude at approximately 8–15 feet, or the altitude recommended by the manufacturer. Explain that extreme caution should be used to avoid an excessive nose high and tail low attitude below 10 feet. Demonstrate the application of collective pitch, as necessary, to slow the descent and cushion the landing. Explain that additional antitorque pedal is required to maintain heading as collective pitch is raised due to the reduction in rotor rpm and the resulting reduced effect of the tail rotor. Emphasize touching down in a level flight attitude.

NOTE: A power recovery can be made during training in lieu of a full touchdown landing. (Refer to the section on power recoveries for the correct technique.)

After touchdown, and after the helicopter has come to a complete stop, lower the collective pitch to the full-down position. Discuss the hazards of using the cyclic or collective to slow the helicopter's ground run.

NOTE: Numerous tail boom strikes have occurred due to improper collective pitch response upon ground contact and completion of the maneuver. Particular attention must be emphasized as to the proper rate and timing of lowering collective to avoid potential damage to aircraft components. Emphasize the minimum requirements for rotor rpm, airspeed, and trim conditions throughout the maneuver.

If the instructor or the student feels uncomfortable with the autorotation, do not hesitate to initiate a go-around. The instructor is responsible and should terminate the maneuver anytime the parameters vary from normal, or if either pilot determines something is not right. These are common comments that are submitted on accident or incident reports. Therefore, the instructor should be especially aware of these occurrences and err on the side of caution by making power recoveries or go-arounds if any doubts exist. The instructor's primary duty is to ensure the student has safe flights and does not get into trouble.

The instructor should highlight the student's understanding of the wind's effects as related to airspeed versus ground speed, and the amount of flare necessary to slow for the landing. The instructor should help the student to cope with the increased airflow through the rotor system in the flare and how to control rpm, both increasing and decreasing.

The importance of landing gear alignment cannot be overemphasized during actual touchdowns. If the helicopter

4-9. PRACTICE AUTOROTATION

Rotor “blowback”:

Main rotor blowback is present in all rotorcraft. Factors that influence the extent of its effect on helicopter operations are determined by aircraft gross weight, flare/deceleration capabilities, and the surface area of the rotor disk.

The blowback condition describes the forward portion of the rotor disk being displaced upward, while the rear portion of the disk displaces downward.

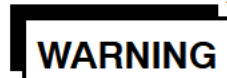
The blowback condition is exacerbated by ground contact speeds in excess of 30 knots (maximum recommended speed for a running landing), low rotor RPM, and high collective angle pitch setting which causes blade stall over a large portion of the rotor disk. If the resulting blowback is excessive, the main rotor may contact the tail boom.

The above factors should be taken into consideration during the ground run-out phase following an autorotation or while performing certain types of anti-torque failure procedures (Ref. Section III, “Flight Control Malfunctions”) where rotor speed decay occurs faster than forward speed decay.



Avoid use of aft cyclic control during initial ground contact. When ground contact is made, lower collective to approximately mid-travel (depending on surface conditions) and center the cyclic within 2 seconds.

Make practice autorotation landings as follows:



Avoid cross-hatched regions of the Height – Velocity Diagram (Ref. Section V) and observe gross weight limitations when performing practice autorotations.

Uncoordinated turns/maneuvers may cause fuel starvation with less than 60 pounds of fuel. Do not practice autorotations if FUEL LEVEL LOW caution indicator is ON.



Intentional touchdown autorotations with blade tracking reflectors installed is not allowed.

For autorotation descent, the twistgrip should be in the full open or ground idle position. However, if a practice autorotation landing (minimum engine power) is desired, rotate the twistgrip to the ground idle position.

Increase collective pitch after establishing autorotation to prevent rotor overspeed if flight is at high gross weight or high density altitude. To reduce rate of descent or to extend gliding distance, operate at minimum rotor rpm. Restore ROTOR RPM (N_R) by lowering collective prior to flareout.

NOTE: Refer to Section II “Power turbine (N_P) speed avoid range”.

If a power recovery is desired, lower collective to full down, rotate the twistgrip to the full open position, verify that N_P engine speed is 100% prior to increasing collective.