

 BELL A Textron Company	Single-Engine Maneuver Description Guide		BTA SEH MDG Emergency Maneuvers		
APPROVED BY W. Todd Bufkin	PUBLISHED BY: Bell Training Academy		DATE 01 Jun 2023	Part 4	REV 2

4.3.5 Night or NVG Considerations

4.3.5.1 Proper scanning techniques are necessary to avoid spatial disorientation. Orient on areas of good contrast to aid in maintaining position over the ground.

4.4 **206B/L / 505 STANDARD AUTOROTATION**

4.4.1 Training Objective

4.4.1.1 Action: The pilot will perform a standard autorotation.

4.4.1.2 Condition: In the Bell 206B/L/505 without assistance from the instructor pilot.

4.4.1.3 Standard:

4.4.1.3.1 Entry Airspeed: As directed +/- 5 knots

4.4.1.3.2 Entry Altitude: As directed +/- 100 feet

4.4.1.3.3 Power: Reduce throttle to flight idle (See Caution associated with C.1.)

4.4.1.3.4 Lower collective to full down

4.4.1.3.5 Descent Speed: As directed +/- 5 knots, normal 60 knots

4.4.1.3.6 Rotor RPM: Within normal power off limits

4.4.1.3.7 Deceleration Entry Altitude: 50 – 70 feet

4.4.1.3.8 Deceleration Entry Airspeed: (206B/L: 52 – 69 knots, 505: 50 – 70 knots)

4.4.1.3.9 Initial Collective Pitch Pull: 10 – 15 feet

4.4.1.3.10 Touchdown heading: As directed +/- 10 degrees

4.4.1.3.11 Touchdown Point: As directed +/- 50 feet longitudinally

4.4.1.3.12 Touchdown Attitude: Skids level

4.4.1.3.13 Touchdown Speed: Speed to allow ½ to 1½ helicopter length ground slide depending on conditions

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4.4.2 Maneuver Requirements

WARNING Instructors must ensure that prior to entering any Emergency Procedure, i.e. Autorotation or Forced Landing, that the aircraft is not positioned inside the Height Velocity Curve and a safe landing can be made. The instructor must consider the effect of wind on expected maneuver outcome.

- 4.4.2.1 Before landing check complete
- 4.4.2.2 Airspeed and Altitude as directed
- 4.4.2.3 Maintain RPM within limits
- 4.4.2.4 Maintain aircraft in trim
- 4.4.2.5 Proper deceleration for safe touchdown
- 4.4.2.6 Proper use of collective for safe touchdown

4.4.3 Analysis of Maneuver

- 4.4.3.1 From an assigned altitude and airspeed, and on the proper ground track, reduce the throttle to the flight idle stop. Lower the collective to the full down position. Maintain rotor RPM within limits using collective. Ground track should be maintained with the aircraft in trim above 50 feet. Below 50 feet, maintain heading with ground track.

NOTE: Prior to reducing throttle to idle, visually check student pilot hand position on collective/throttle to ensure idle stop release is not being pressed by student

NOTE: For the 505, ensure that the right seat throttle switch is in the “IDLE” position so that the IP can control the RPM switch during autorotations

CAUTION: Unless required by training purposes and specifically briefed, the instructor should reduce the throttle to idle.

- 4.4.3.2 Adjust cyclic for the required attitude for the desired airspeed. (60 knots nominal). Coordinate cyclic and pedals to maintain the desired ground track. Check rotor RPM within limits. Before passing 70 feet the helicopter must be at 52 – 69 knots (206B/L) or 50 – 70 knots (505) with RPM within limits and in a position to safely land.

NOTE: Minimum rotor RPM and maximum glide distance airspeed will extend glide distance. Higher rotor RPM and lower airspeed will shorten glide distance.

- 4.4.3.3 At 50 – 70 feet, use aft cyclic pressure to initiate a deceleration. As ground speed decreases, additional aft cyclic pressure may be required for best

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deceleration effect. Use collective to maintain rotor RPM within limits. Apply aft cyclic carefully to avoid climbing or stopping the descent.

4.4.3.4 At 10 to 15 feet, use enough initial collective to start slowing the rate of descent and ground speed. The amount of collective used will depend on wind and rate of descent. A ground slide of ½ to 1½ helicopter lengths is nominal. Before ground contact, coordinate forward cyclic with cushioning collective to make a smooth, soft landing touching down with skids level. Touchdown rotor RPM should not be less than 70%.

4.4.3.5 After touchdown, maintain ground track with lateral cyclic and heading with pedals. Do not use aft cyclic for braking. The collective may be reduced slowly and carefully if braking is necessary. In the event of a low rotor RPM touchdown, lower the collective.

NOTE: In practicing precision autorotations, varying the angle of bank, airspeed and rotor RPM may be used to affect a precision spot landing.

CAUTION: Care should be taken to avoid vertical descents caused by excessive deceleration or by flaring too early. Also, extreme caution must be used at altitudes below 15 feet during deceleration to avoid excessive nose high / tail low attitudes that could cause the tail stinger to strike the ground.

4.4.4 Common Errors

- 4.4.4.1 Failure to maintain proper ground track
- 4.4.4.2 Failure to maintain proper attitude during descent
- 4.4.4.3 Failure to initiate deceleration at proper altitude
- 4.4.4.4 Improper amount of deceleration
- 4.4.4.5 Failure to use proper initial collective
- 4.4.4.6 Failure to use proper cushion collective
- 4.4.4.7 Failure to touchdown skids level
- 4.4.4.8 Failure to touchdown aligned with intended ground slide

4.4.5 Night or NVG Considerations

- 4.4.5.1 Attitude control is critical during night autorotations. The lack of visual references at night reduces the aviator's ability to estimate airspeed and altitude. To compensate for the lack of visual references, the *student* should attain a steady

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state autorotation by 200 feet AGL. If the searchlight is used, it should be turned on prior to descending through 100 feet AGL.

4.5 **206B/L/505 STANDARD AUTOROTATION WITH TURN**

4.5.1 **Training Objective**

4.5.1.1 Action: The *student* will perform a standard autorotation with turn.

4.5.1.2 Condition: In the 206B/L/505 without assistance from the instructor pilot.

4.5.1.3 Standard:

4.5.1.3.1 Entry Airspeed: As directed +/- 5 knots

4.5.1.3.2 Entry Altitude: As directed +/- 100 feet

4.5.1.3.3 Power:

4.5.1.3.4 Reduce throttle to flight idle (See Caution associated with C.1.)

4.5.1.3.5 Lower collective to full down

4.5.1.3.6 Descent Speed: As directed +/- 5 knots, normal 60 knots

4.5.1.3.7 Rotor RPM: Within normal power off limits

4.5.1.3.8 Lane alignment before 70 feet AGL

4.5.1.3.9 Deceleration Entry Altitude: 50 – 70 feet

4.5.1.3.10 Deceleration Entry Airspeed: (206B/L: 52 – 69 knots, 505: 50 – 70 knots) attitudes

4.5.1.3.11 Initial Collective Pitch Pull: 10 – 15 feet

4.5.1.3.12 Touchdown heading: As directed +/- 10 degrees

4.5.1.3.13 Touchdown Point: As directed +/- 50 feet

4.5.1.3.14 Touchdown Attitude: Skids level

4.5.1.3.15 Touchdown Speed: Sufficient speed to allow ½ to 1½ helicopter length ground slide depending on conditions

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4.5.2 Maneuver Requirements

WARNING Instructors must ensure that prior to entering any Emergency Procedure, i.e. Autorotation or Forced Landing, that the aircraft is not positioned inside the Height Velocity Curve and a safe landing can be made. The instructor must consider the effect of wind on expected maneuver outcome.

- 4.5.2.1 Before landing check complete
- 4.5.2.2 Entry altitude and airspeed as directed
- 4.5.2.3 Coordinated turn during descent
- 4.5.2.4 Maintain rotor RPM within limits
- 4.5.2.5 Proper deceleration for safe touchdown
- 4.5.2.6 Proper use of collective for safe touchdown

4.5.3 Analysis of Maneuver

- 4.5.3.1 From an assigned altitude and airspeed and on the proper ground track, reduce the throttle to the flight idle stop. Lower the collective to the full down position. Maintain rotor RPM within limits using collective. Adjust pedals to maintain trim.

NOTE: Prior to reducing throttle to idle, visually check student pilot hand position on collective/throttle to ensure idle stop release is not being pressed by student

NOTE: For the 505, ensure that the right seat throttle switch is in the “IDLE” position so that the IP can control the RPM switch during autorotations

CAUTION: Unless required by training purposes and specifically briefed, the instructor should reduce the throttle to idle.

- 4.5.3.2 Start the turn with lateral cyclic pressure and at the same time adjust the cyclic for the required attitude for the desired airspeed. While turning, utilize collective, as necessary, to control N_r and reduce rate of decent.

NOTE: Minimum rotor RPM and maximum glide airspeed will extend glide distance. Maximum rotor RPM and minimum airspeed will shorten glide distance.

- 4.5.3.3 Prior to passing through 70 feet, the helicopter must be aligned with the touchdown area, with 52 – 69 knots (206B/L) or 50 – 70 knots (505) airspeed, in a normal rate of descent, and in position to safely terminate in the touchdown area

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4.5.3.4 At 50 to 70 feet, use aft cyclic pressure to initiate a deceleration. As ground speed decreases, additional aft cyclic pressure may be required for best deceleration effect. Use collective to maintain rotor RPM within limits. Apply aft cyclic carefully to avoid climbing or stopping the descent.

4.5.3.5 At 10 to 15 feet, use enough initial collective to start slowing the rate of descent and ground speed. The amount of collective used will depend on wind and rate of descent. A ground slide of ½ to 1½ helicopter lengths is nominal. Before ground contact, coordinate forward cyclic with cushioning collective to make a smooth, soft landing, touching down with skids level. Touchdown rotor RPM should not be less than 70%.

4.5.3.6 After touchdown, maintain ground track with lateral cyclic and heading with pedals. Do not use aft cyclic for braking. The collective may be reduced slowly and carefully if braking is necessary. In the event of a low rotor RPM touchdown, lower the collective.

NOTE: In practicing precision autorotations, varying the angle of bank, airspeed and rotor RPM may be used to affect a precision spot landing.

CAUTION: Care should be taken to avoid vertical descents caused by excessive deceleration or by flaring too early. Also, extreme caution must be used at altitudes below 15 feet during deceleration to avoid excessive nose high / tail low attitudes that could cause the tail stinger to strike the ground.

4.5.4 Common Errors

- 4.5.4.1 Failure to maintain proper trim control
- 4.5.4.2 Failure to maintain proper attitude control
- 4.5.4.3 Failure to maintain proper rotor rpm
- 4.5.4.4 Failure to maintain proper rate of turn
- 4.5.4.5 Failure to initiate deceleration at proper altitude
- 4.5.4.6 Improper amount of deceleration
- 4.5.4.7 Failure to use proper initial collective
- 4.5.4.8 Failure to use proper cushion collective
- 4.5.4.9 Failure to touchdown skids level
- 4.5.4.10 Failure to touchdown aligned with intended ground slide

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4.5.5 Night or NVG Considerations

4.5.5.1 Attitude control is critical during night autorotations. The lack of visual references at night reduces the aviator's ability to estimate airspeed and altitude. To compensate for the lack of visual references, the aviator should attain a steady state autorotation by 200 feet AGL. If the searchlight is used, it should be turned on prior to descending through 100 feet AGL.

4.6 407 STANDARD AUTOROTATION

4.6.1 Training Objective

4.6.1.1 Action: The *student* will perform a standard autorotation.

4.6.1.2 Condition: In the Bell 407 without assistance from the instructor pilot.

4.6.1.3 Standard:

4.6.1.3.1 Entry Airspeed: As directed +/- 5 knots

4.6.1.3.2 Entry Altitude: As directed +/- 100 feet

4.6.1.3.3 Power: Reduce throttle to flight idle (See Caution associated with C.1.)

4.6.1.3.4 Lower collective to full down

4.6.1.3.5 Descent Speed: As directed +/- 5 knots, normal 65 knots

4.6.1.3.6 Rotor RPM: Within normal power off limits

4.6.1.3.7 Deceleration Entry Altitude: 50 – 70 feet

4.6.1.3.8 Deceleration Entry Airspeed: 65 +/- 5 KIAS attitude

4.6.1.3.9 Initial Collective Pitch Pull: 10 – 15 feet

4.6.1.3.10 Touchdown heading: As directed +/- 10 degrees

4.6.1.3.11 Touchdown Point: As directed +/- 50 feet longitudinally

4.6.1.3.12 Touchdown Attitude: Slightly nose up on the heel of the skids.