PRIVATE PILOT

VIII. AREA OF OPERATION: SLOW FLIGHT AND STALLS
B. TASK: POWER-OFF STALLS

OBJECTIVE

To determine that the applicant:

1. Exhibits knowledge of the elements related to power-off stalls.
2. Selects an entry altitude that allows the task to be completed no lower than 1,500 feet (460 meters) AGL.
3. Establishes a stabilized descent in the approach or landing configuration, as specified by the examiner.
4. Transitions smoothly from the approach or landing attitude to a pitch attitude that will induce a stall.
5. Maintains a specified heading +/-10° in straight flight; maintains a specified angle of bank not to exceed 20° +/-10° in turning flight, while inducing the stall.
6. Recognizes and recovers promptly after the stall occurs by simultaneously reducing the angle of attack, increasing power to maximum allowable and leveling the wings to return to a straight-and-level flight attitude with a minimum loss of altitude appropriate for the airplane.
7. Retracts the flaps to the recommended setting; retracts the landing gear, if retractable, after a positive rate of climb is established.
8. Accelerates to V_X or V_Y speed before the final flap retraction; returns to the altitude, heading, and airspeed specified by the examiner.

ELEMENTS

1. A stall occurs when the wing exceeds its critical angle of attack and the smooth airflow over the airplane's wing is disrupted, rapidly degenerating lift.
2. A stall can occur at any airspeed, in any attitude, and with any power setting.
3. Performing intentional stalls familiarizes the pilot with the conditions that produce stalls and develops the habit of taking prompt preventative or corrective action.
4. Intentional stalls should be performed at an altitude that will provide adequate height about the ground for recovery and return to normal level flight (no less than 1500' AGL).
5. Most training airplanes are designed so the wing roots will stall before the wingtips, allowing aileron control during the stall.
6. Depending on the airplane, stall indications can include stall lights, stall horns, full-up elevator, high descent rate, sudden nose-down pitching, or possible buffeting.
7. Setting up for a power-off stall:
    a. The practice area should be cleared of other traffic prior to practicing power-off stalls.
    b. Power-off stalls are performed with normal landing approach conditions in simulation of an accidental stall occurring during landing approaches.
    c. Airplanes equipped with flaps, landing gear and/or carburetor heat should be in the landing configuration (practicing power-off stalls as a transition from slow flight is common).
    d. Airspeed in excess of the normal approach speed should not be carried into a stall entry.
    e. In the landing configuration, retard the throttle to idle (or normal approach power).
    f. Hold the airplane at constant altitude and level flight attitude until the airspeed decreases to that of a normal approach.
    g. Smoothly pitch the nose down into the normal approach attitude to maintain the normal approach airspeed.
8. Performing a power-off stall:
    a. With the approach attitude and airspeed stabilized, smoothly raise the nose to an attitude that will induce a stall.
    b. Maintain directional control with the rudder and wings level with the ailerons.
    c. Maintain a constant pitch attitude with the elevator until the stall occurs (as airspeed is reduced, more back-elevator pressure will be needed to maintain the pitch attitude).
    d. The stall can be recognized by clues such as full-up elevator, high descent rate, sudden nose-down pitching, or possible buffeting.

9. Recovering from a power-off stall:
    a. Simultaneously reduce the angle of attack (lower the nose) release back-elevator pressure, and advance the throttle to maximum.
    b. If the application of carburetor heat was included in the landing configuration, discontinue the use of carburetor heat.
    c. As full power is applied and the nose is lowered, overcome the engine torque effect with right rudder.
    d. Accelerate to the manufacturer's recommended speed for a balked landing (this can be thought of as a best-rate-of-climb speed in the landing configuration).
    e. Maintaining the balked landing speed, smoothly apply back-elevator pressure.
    f. After establishing a positive rate of climb at the balked landing speed, gradually retract the flaps, and retract the landing gear while accelerating to V_Y.
    g. Level off at the desired altitude and set the throttle to an appropriate cruise setting.
10. Recovery from power-off stalls during shallow turns (accelerated stalls) simulates an inadvertent stall during the turn from the base leg to final approach.
11. During accelerated stalls, ensure the turn continues at a uniform rate until the stall occurs.
12. If the airplane is in a skid during an accelerated stall, the inner wing may stall first and abruptly dip down further.
13. If the airplane is in a slip during an accelerated stall, the outer wing may stall first and whip downward abruptly.
14. After the accelerated stall occurs, the recovery should be made straight ahead as normal, with wings being leveled by coordinated use of ailerons.

COMMON ERRORS

a. Failure to adequately clear the area.
b. Failure to establish specified landing gear and flap configuration prior to entry.
c. Improper pitch, heading, and bank control during straight-ahead stalls.
d. Improper pitch and bank control during turning stalls.
e. Rough or uncoordinated control technique.
f. Failure to recognize the first indications of a stall.
g. Failure to achieve a stall.
h. Excessive back-elevator pressure resulting in an exaggerated nose-up attitude during entry.
i. Over-reliance on the airspeed indicator while excluding other cues.
j. Inadequate scanning resulting in an unintentional wing-low condition during entry.
k. Premature recovery.
l. Improper torque correction.
m. Inadequate rudder control.
n. Failure to maintain a constant bank angle during turning stalls.
o. Poor stall recognition and delayed recovery.
p. Excessive forward-elevator pressure during recovery resulting in negative load on the wings.
q. Excessive airspeed buildup during recovery.
r. Excessive altitude loss or excessive airspeed during recovery.
s. Failure to take timely action to prevent a full stall during the conduct of imminent stalls.
t. Inadvertent secondary stall during recovery.

REFERENCES

1. FAA-H-8083-3A, Airplane Flying Handbook, Chapter 4.
2. AC 61-67, Stall and Spin Awareness Training.
3. POH / AFM, Pilot Operating Handbook / FAA-Approved Airplane Flight Manual.