

LESSON NUMBER: _____

SLOW FLIGHT
MINIMUM CONTROLLABLE AIRSPEED (MCA)
APPROACH TO LANDING STALLS
DEPARTURE STALLS

FAA Practical Test Standards: Slow Flight / MCA

Altitude +/- 100 Feet
 Heading +/- 10 Degrees
 Bank Angle +/-10 Degrees
 Coordinated
 All maneuvers performed no lower than 1500AGL

SLOW FLIGHT:	ENTRY	SLOW FLIGHT:	RECOVERY
Clearing Turns:	Performed	Pitch:	Reduce AOA / maintain attitude
Carb Heat:	On	Power:	Add Full (Simultaneously)
Trottle:	1700RPM	Rudder:	Maintain heading
Pitch:	Maintain desired altitude	Carb Heat:	Off
Rudder:	Maintain desired heading	Flaps:	retract in increments
Flaps:	Full	Pitch:	Maintain altitude
Pitch:	40-50 KIAS	Power:	Cruise
Power:	Maintain altitude	Airspeed:	Cruise (90kts-100kts)
Pitch :	Maintain airspeed		

Maneuver may be accomplished with flight in climbs and descents using various flap settings

MCA:	ENTRY	MCA:	RECOVERY
Clearing Turns:	Performed	Pitch:	Reduce AOA /maintain Altitude
Carb Heat:	On	Power:	Full (add simultaneously)
Throttle:	1700RPM or less	Rudder:	Maintain heading
Pitch:	Maintained desired altitude	Carb Heat:	Off
Rudder:	Counteract P-factor	Flaps:	Retract in Increments
Flaps:	Full	Altitude:	Maintain
Airspeed	Pitch for 5kts above Vs	Power:	Cruise
Power:	Maintain altitude	Airspeed:	Cruise (90 -100kts)
Pitch:	Maintain airspeed		

The maneuver will be accomplished straight ahead and while turning. Bank angle should not exceed a Standard Rate Turn during turns to a heading. The aircraft will not be stalled, however, airspeed shall be maintained so that any further increase in AOA or reduction in power will result in the aircraft stalling.

FAA PRACTICAL TEST STANDARDS

POWER OFF APPROACH TO LANDING STALL

Maintains a specified heading, $\pm 10^\circ$, in straight flight; maintains a specified angle of bank not to exceed 20° , $\pm 10^\circ$; in turning flight, while inducing the stall.

Recognizes and recovers promptly after a 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.

Retracts the flaps to the recommended setting after a positive rate of climb is established.

POWER OFF APPROACH TO LANDING STALL

ENTRY

Clearing turns: Performed
Establish aircraft in the landing configuration

- Carb Heat On
- Power: Reduce to 1700RPM
- Flaps: Full
- Airspeed: 65kts
- Descent rate: App. 500FPM

Induce stall:

- Power: Idle
- Pitch: Above horizon so as to induce a stall
- Rudder: Counteract P-factor /Coordinated
- Altitude: Minimize altitude loss; no greater than 300 feet.

Straight ahead and turning stalls shall be performed at no less than 3,000feet AGL.

POWER OFF APPROACH TO LANDING STALL

RECOVERY

Angle of attack: Immediately reduce. Lower nose to the horizon by **releasing** back pressure. Do not push forward on the control wheel.
Power: Full
Rudder: Counteract yaw. Maintain heading
Carb Heat: Off
Flaps: Retract in increments after positive rate of climb is established
Pitch: Desired altitude

**FAA PRACTICAL TEST STANDARDS
POWER ON DEPARTURE STALL**

Performs maneuver at no less than 3,000 feet AGL
 Establishes the takeoff or departure configuration. Sets power to no less than 65 percent available power.
 Transitions smoothly from the takeoff or departure attitude to the pitch attitude that will induce a stall.
 Maintains a specified heading, $\pm 10^\circ$, in straight flight; maintains a specified angle of bank not to exceed 20° , $\pm 10^\circ$, in turning flight, while inducing the stall.
 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.
 Retracts the flaps to the recommended setting after a positive rate of climb is established. accelerates to VX or VY speed before the final flap retraction; returns to the altitude, heading, and airspeed specified by the examiner

**POWER ON DEPARTURE STALL
ENTRY**

Clearing turns: Performed

Establish take off configuration

- Carb heat: On
- Power: Reduce
- Pitch: Lift off speed (65kts)

Induce stall:

- Power Full
- Pitch: Above horizon to induce stall
- Rudder: Counteract P-factor / Coordination

**POWER ON DEPARTURE STALL
RECOVERY**

Angle of Attack: Immediately reduce. Lower nose to the horizon by **releasing** back pressure. Do not push forward on the control wheel.

Power: Full / add remaining available

Rudder: Maintain heading

Altitude: Climb to desired altitude

Airspeed: Cruise

Power: Cruise

Associated readings: Pilots Handbook of Aeronautical Knowledge Chapter 3, pages 3-8 through 3-34. Chapter 8, Weight and Balance.

STABILITY

- 1) The inherent quality of an airplane to correct for conditions that may disturb its equilibrium, and to return to or continue on its original flight path is called _____.
- 2) The capability of an airplane to respond to the pilot's control, especially with respect to the flight path and attitude is called _____.
- 3) The initial tendency for an airplane to return to its original state of equilibrium is called _____.
- 4) The initial tendency for the airplane to continue away from the original state of equilibrium is called _____.
- 5) Longitudinal stability is the quality that makes the airplane stable around its vertical / lateral axis.
- 6) The overall tendency that the airplane displays for a period of time after being disturbed is called _____.
- 7) Lateral stability is the quality that makes the airplane stable around its _____ axis.
- 8) The four main design factors that make an airplane laterally stable are _____, _____, _____, and _____.
- 9) An airplane that is laterally stable means that any imbalance in lift results in the airplane rolling around its lateral / longitudinal axis.
- 10) Stability about the vertical axis is called _____ or _____.

11) Which area(s) of the aircraft contribute most to vertical stability?

BASIC PROPELLER PRINCIPLES

12) The purpose of the propeller is to convert _____ to _____.

13) Why is the propeller twisted?

14) What propeller angle of attack provides the most efficient lift /drag ratio?

15) Name the 4 left turning tendencies.

- a) _____
- b) _____
- c) _____
- d) _____

16) When a force is applied to a spinning object, it is experienced _____ degrees in the direction of the rotation. This is known as _____.

17) Asymmetrical loading of the propeller is called _____.

STALLS /SLOW FLIGHT

1) The direct cause of any stall is an excessive _____.

2) The airplane will always stall at the same angle of attack regardless of

- a) CG, relative wind, wing loading
- b) Airspeed, weight, load factor or density altitude
- c) Altitude, CG, Center of pressure or humidity

- 3) The stalling speed of an airplane is higher/lower in a level turn than in straight and level flight.

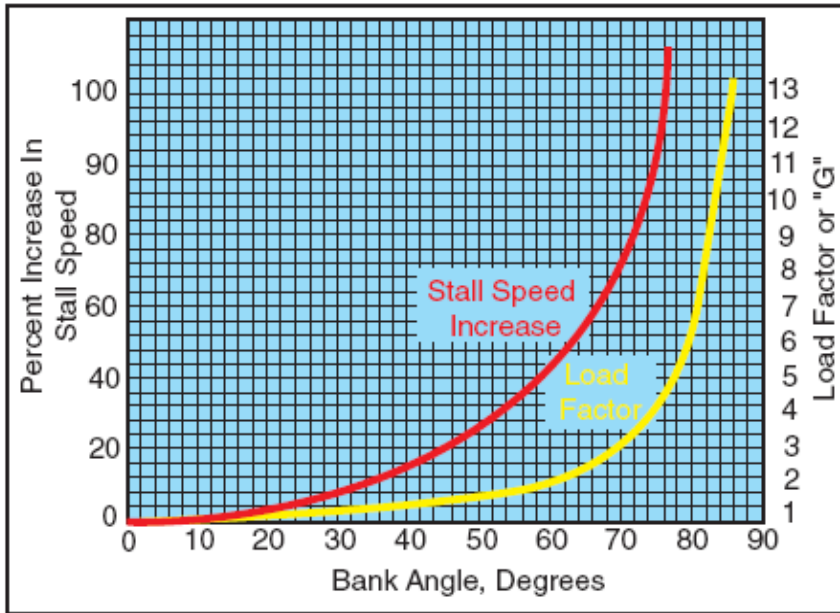


Figure 3-25. Increase in stall speed and load factor.

Use the diagram above to answer questions 4-6

- 4) According to Figure 3-25, a bank angle of 40 degrees increases the load factor to approximately
- 1.3
 - 3.0
 - 2.0
- 5) Using the same bank angle, the stall speed would increase by approximately
- 10%
 - 3%
 - 20%
- 6) In a 60 degree bank the load factor will increase by _____ G's. Using the same bank angle, if an aircraft's normal stall speed is approximately 38kts, what is the new stall speed?
- 70kts
 - 45kts
 - 53kts

WEIGHT AND BALANCE

- 1) The theoretical point about which an airplane would balance if it were suspended is called the
 - a) Arm
 - b) Center of Gravity
 - c) Standard Datum

- 2) The horizontal distance between the reference datum and the center of gravity of an item is called the:
 - a) Center of gravity
 - b) Moment
 - c) Arm

- 3) The airframe, engine(s), all items permanently installed, all fluids, and full engine oil is called the:
 - a) Basic Empty weight
 - b) Standard Empty Weight
 - c) Maximum Take Off weight

- 4) Maximum ramp weight includes / excludes fuel and is greater / less than Take Off weight?

- 5) The location in an airplane that is designated by a number representing it's distance in inches from the datum is called the:
 - a) Arm
 - b) Moment
 - c) Station

Use the following diagram to answer questions 6 and 7

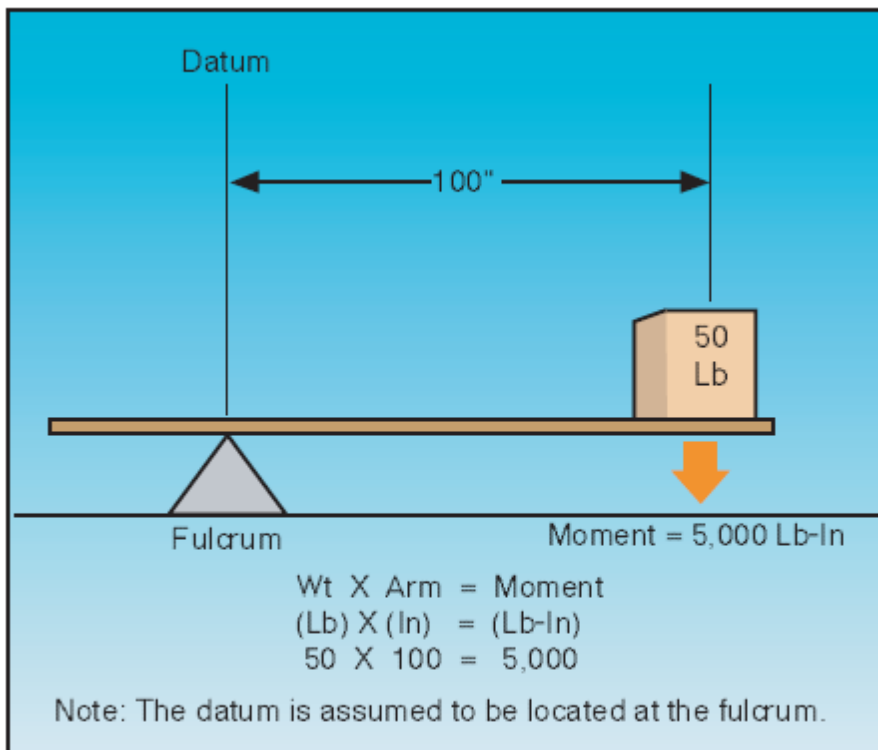


Figure 8-3. Determining moments.

- 6) If the 50 pound box were moved forward to a distance of 80 inches from the datum, the new moment would be _____lb/inches. This would move the CG forward /aft.
- 7) Using Figure 8-3, how much weight would be required to balance the fulcrum? Assume 50 inches from the Datum to the forward end of the plank.
- 8) How would a forward center of gravity affect the stall speed of a normal category aircraft? Why?
- 9) How would an aft center of gravity affect the stall speed of a normal category aircraft? Why?
- 10) An aft CG would increase / decrease the longitudinal stability of an aircraft.
- 11) Stalling an aircraft with an aft CG may result in a flat /forward spin because the CG would rotate about the lateral /vertical axis making spin recovery nearly impossible.

