

Flight Maneuvers- Chandelle



AIR ECHO ALPHA 51, LLC.

Objective: The objective of this maneuver is to develop the pilot's coordination, orientation, planning, and accuracy of control during a maximum performance climbing turn in which the most amount of altitude is gained for a given bank angle & power setting.

Common Errors

- Not clearing the area
- Initial bank is too shallow resulting in a stall
- Initial bank is too steep resulting in failure to gain maximum performance
- Bank angle increased after initial establishment
- Allowing the pitch attitude to increase as the bank is rolled out during the second 90° of turn
- Leveling wings prior to the 180° point being reached
- Pitch attitude is low on recovery resulting in airspeed well above stall speed
- Poor flight control coordination
- Stalling at any point during the maneuver
- Execution of a steep turn instead of a chandelle
- Not scanning for other traffic during the maneuver
- Performing by reference to the flight instrument rather than visual references

Completion Standards

- Adheres to recommended safety precautions
- Understands the objective of a the chandelle
- Divides attention between the outside & inside of the plane
- Holds a constant bank of 30° and changing pitch during the first 90° of turn
- Holds a constant pitch and changing bank during the second portion of the turn
- Completes the maneuver @ Min Controllable airspeed
- Uses Checklists

PAVE & Preflight Discussion

20- Min

- The **Pilot & Crew**
P/M Safe Checklist & Delegate Duties
- The **Plane**
POH - Stall speeds, CG location, Weight, Configuration (flaps) & bank angles
- The **Environment**
Weather Briefing
The effects of environmental elements on aircraft performance (turbulence, wind shear, and high-density altitude)
- External Pressures**
Aerodynamics associated with Chandelles
Loss of vertical component of lift
Increased load factor
Overbanking tendency
Left turning tendencies
Factors & situations that could lead to an inadvertent stall
Limitations of stall warning horns/speeds
Distractions, improper task management, loss of situational awareness, or disorientation.
Coordinated and uncoordinated flight
- Energy management
 Δ Pitch, power & bank = Δ Airspeed & altitude
- Rate and radius of turn
Function of airspeed & angle of bank
- Left vs. Right turns - turning tendencies
- Load Factor & Stall speed
Load factor in 30° bank = 1.15 G's

Bank	G's
0°	1
30°	1.155
45°	1.414
60°	2

The stall speed increases as the square root of the G's applied

- Inadvertent stalls while turning
Reduce AOA before leveling the wings
- Spin Awareness
Cause & recovery

Flight Maneuver - Chandelle

15-Min

- Clear the Area
Altitude: Task completed > 1,500 ft
Airspeed: @ or below V_A
Airspace: E or G
Area Clear: No traffic
- The Set-up
Choose a ground reference point and/or set heading bug to note starting heading & note altitude
Aircraft Configuration
Flaps – Up
Gear – Up
Props – full forward
Throttle – As needed
Airspeed - V_A
- The Chandelle
A maximum performance, 180° climbing turn that begins from approximately straight-and-level flight and concludes with the airplane in a wings-level, nose-high attitude just above stall speed.
A chandelle is best described in two specific Phases.....
- Phase 1: **Constant Bank, Changing Pitch**
Enter a coordinated climbing turn with 30° of bank
Apply back-elevator pressure to increase the pitch rate to attain the highest attitude as 90° of the turn is completed
Verify props full forward
Simultaneously increase throttle to max RPM or recommended climb setting
**As AOA, pitch & power ↑ left turning tendencies ↑*
**If the pitch is not set correct by the end of the first 90°, the aircraft may stall prior to reaching the 180° point*
- Phase 2: **Constant Pitch, Changing bank**
Slowly roll out of the bank at a rate to achieve wings level at the 180° point
Maintain a constant pitch attitude set at the completion of the first 90° of turn
At the 180° point, the wings should be level, airspeed just above stall speed
Reduce pitch attitude and return to S&L flight