

IX.D. Lazy Eights

About: Designed to develop proper coordination of flight controls across a wide range of airspeeds and attitudes. At no time will flight control pressure be constant.

TSW: Learn refined coordination of aileron and rudder.

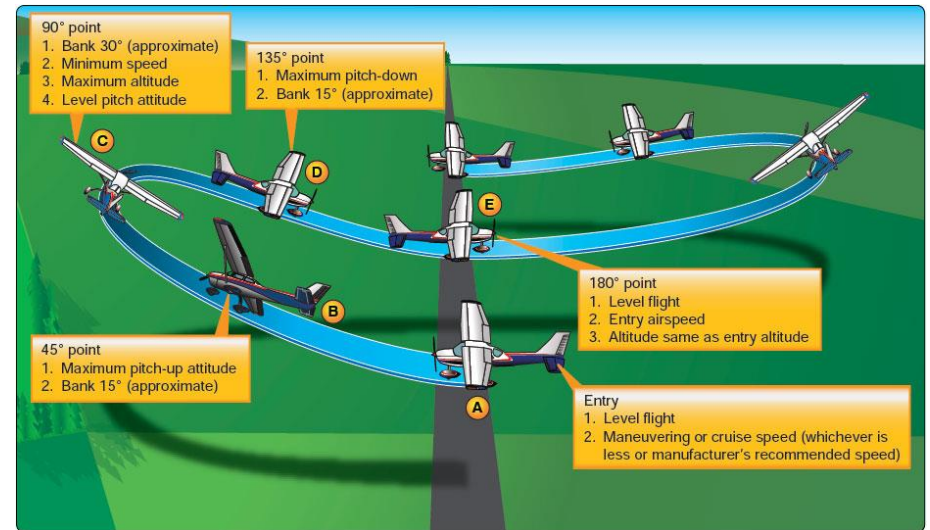
How: This is shown by flying a series of 180° turns each entailing a climb and a decent.

Procedure:

1. No lower than 1500 AGL
2. Two 90 degree clearing turns
3. Bug heading, pick outside references 45°, 90°, 135°
4. Airspeed V_a , trim for level flight
5. Simultaneously increase pitch and bank (SLOWLY)
 - a. 45° point: 15° pitch up, 15° bank
6. Reduce pitch, increase bank
 - a. 90° Point: 0° pitch, 30° bank
7. Reduce pitch, reduce bank
 - a. 135° Point: 15° pitch down, 15° bank
8. 180° Point: level flight: entry airspeed and altitude
9. Repeat in opposite direction

Discussion Points:

1. As pitch attitude is raised, the airspeed decreases, which causes the rate of turn to increase (overbanking tendency). Thus maneuver is started slowly.
2. Since airspeed is decreasing as the airplane climbs, additional R-rudder pressure is needed to overcome P-factor.
 - a. When turning or rolling out to the right an increase in R-rudder will be needed.
 - b. In left climbing turns or rolling out to the left, the left yawing P-factor tends to cancel out the adverse yaw to the right. Thus less R-Rudder is required
3. Smoothly increase pitch and bank together to reach maximum pitch up and ½ maximum bank at 45° of turn.
4. Continue to increase bank while starting to decrease pitch to attain maximum bank and minimum airspeed while pitch transitions through level flight at 90° of turn.
5. Decrease bank while simultaneously continuing to decrease pitch to reach maximum pitch down and ½ maximum bank at 135° of turn.
6. Continue to decrease bank while increasing pitch to arrive at 180°
 - a. ±10° entry heading, entry alt ±100' ±10 knots entry airspeed.



Common errors:

10. Poor selection of reference points (**use points toward or on horizon**)
11. Uncoordinated use of flight controls (**changing airspeed -> P-factor**)
12. Unsymmetrical loops resulting from poorly planned pitch and bank attitude changes
13. Inconsistent airspeed and altitude at key points (**use recommended pitch, bank, and power and make adjustments as necessary**)
14. Loss of orientation (**Divide attention, preplan each 45° section**)
15. Excessive deviation from reference points

Evaluations/ Standards (Commercial ACS):

16. Clear the area.
17. Select an altitude that will allow the maneuver to be performed no lower than 1,500 feet AGL.
18. Establish the recommended entry configuration, power, and airspeed.
19. Maintain coordinated flight throughout the maneuver.
20. Complete the maneuver in accordance with the following:
 - a. Approximately 30° bank at the steepest point
 - b. Constant change of pitch and roll rate and airspeed
 - c. Altitude at 180° point, **±100 feet from entry altitude**
 - d. Airspeed at the 180° point, **±10 knots from entry airspeed**
 - e. Heading at the 180° point, **±10 degrees**
21. Continue the maneuver through the number of symmetrical loops specified, then resume straight-and-level flight.