

## **SPIRAL DEMONSTRATION**

### **TRAINING OBJECTIVE**

The spiral demonstration and recovery is conducted to assure that the pilot is aware of the airplane's slight negative stability in the roll axis, the consequences of inattention to airplane roll control and the flying techniques required to safely recover from a well developed spiral. Although the pilot may think that the airplane is trimmed for level flight or for a pitch attitude, it actually is trimmed for an airspeed. This maneuver demonstrates that, at a constant power setting, the airplane is trimmed for an airspeed.

### **LIMITATION**

Do not exceed  $V_A$ . Do not exceed a 60° bank.

### **BEST PRACTICES**

- With the airplane at a constant power setting, precede the spiral demonstration with a discussion and demonstration of positive pitch and yaw stability.
- Displace the airplane in yaw and then in pitch. Note in both instances that the airplane returns closely to the original condition.
- Point out that, at a constant power setting, the airplane is trimmed for an airspeed.
- Discuss slight negative roll stability and probable spiral entry with pilot distraction.
- It may be helpful to demonstrate this maneuver first.
- Describe the spiral recoveries and brief the pilot to initiate recovery approaching  $V_A$  or 60° bank maximum, whichever occurs first.
- Be attentive to airplane response and the pilot's input while managing pitch. The goal is to limit G force

while allowing the nose to attain a shallow climb pitch attitude.

### INSTRUCTION

- Entry airspeed:
  - Bonanza:** 90-100 KIAS (95-115 MPH)
  - Baron/Travel Air/Duke:** 100-120 KIAS (115-135 MPH)
- From level flight, allow the airplane to fall off on one wing and develop a spiral. The spiral entry may be facilitated with slight rudder application.
- Initiate recoveries as described below.

#### Recovery without Power Reduction

This recovery demonstrates airplane positive pitch stability.

- Without reducing power, level the wings and apply forward elevator control force to limit G force and prevent excessively pitch up as the airplane seeks the trim airspeed.
- Note altimeter and airspeed indications reverse as the nose goes through the horizon.
- This demonstration is important to overcome the pilot's natural reaction to apply aft elevator control force, thus imposing additional G force when recovering from an extreme nose down attitude.

#### Recovery with Power Change and Climb

This recovery technique is identical to recovery from a nose low, increasing airspeed unusual attitude.

- Simultaneously, level the wings and reduce power to idle.
- Note pitch behavior. In most cases pitch up occurs without pilot input as the airplane seeks trim airspeed. Pitch up is less dramatic with power reduction than

without. Expect to add forward elevator control force to prevent an excessively nose high pitch attitude.

- Establish and maintain a 10° pitch up attitude, add power as the nose comes up through the horizon and climb to recover lost altitude.

### **NOTE**

Aft elevator control force is not required for spiral recovery.

Following a spiral recovery, discuss entry from cruise airspeed and the resulting very high airspeed, G force and the relatively high forward elevator control force required for a successful outcome.

### **LAZY RUDDER**

If the pilot exhibits improper use of the rudder control during flight to this point, demonstrate proper rudder use. Practice turns and climbs with high power and low airspeed with proper use of rudder. This is essential for proper control during a high power low airspeed condition and for proper stall recovery.