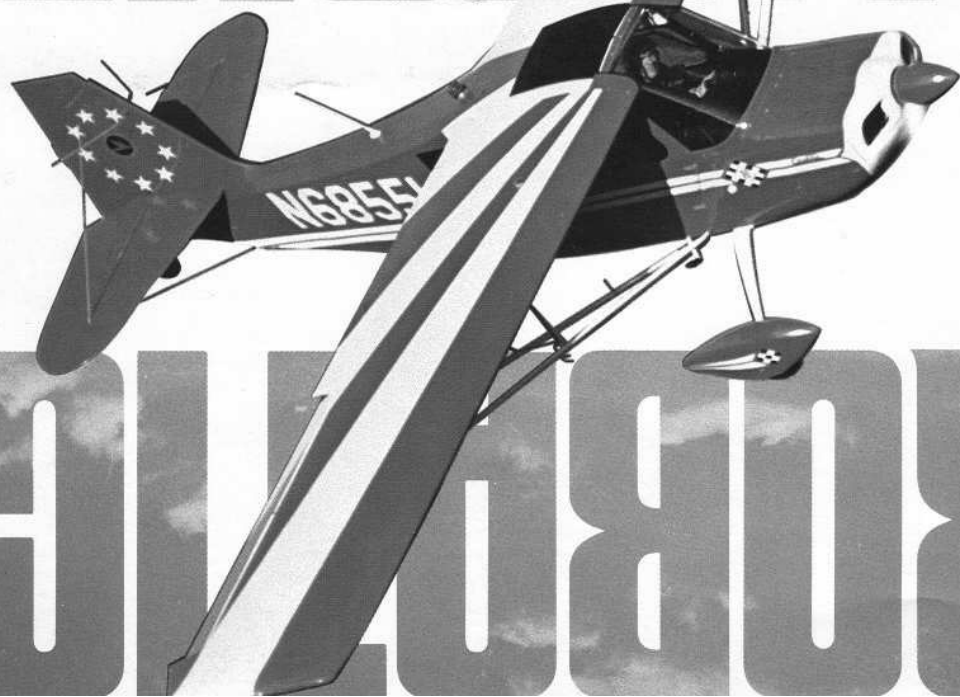


AERORATICS



AERORATICS

the aircraft you need

The first requirement for any aircraft in which you intend to do aerobatics is that it possess certification in the aerobatic category, and that it is stressed for all maneuvers you intend to do.

There are a number of aircraft certified for aerobatics. We recommend the Champion Citabria for primary aerobatics, and the Champion Decathlon for advanced aerobatic training and precision flying. And we have several good reasons.

First of all, Bellanca's Champion line features well ventilated and heated enclosed cabins for year-round, all-climate enjoyment. Champion models also have tandem seating which is the best possible arrangement for aerobatic training. Both the instructor and student sit on the longitudinal axis of the aircraft. This is most important, particularly for learning the slow roll, aileron roll, and snap roll maneuvers.

Both the Citabria and Decathlon are available with inverted systems to prevent the loss of power during maneuvers. The Decathlon comes equipped with a constant speed prop, and is designed and stressed for advanced outside maneuvers (-5 g's), far stronger than even the FAA requirements for aerobatic strength. These extras, combined with the Citabria and Decathlon's powerful 150 h.p. engines, give the aerobatic pilot a high degree of performance and response.

These aircraft are built by Bellanca Aircraft Corporation, a company long famous for quality workmanship — and we think this makes obvious the extreme structural integrity of these aircraft.

In addition, we believe you will enjoy the easy controllability of wide stance spring steel gear and positive tailwheel steering.

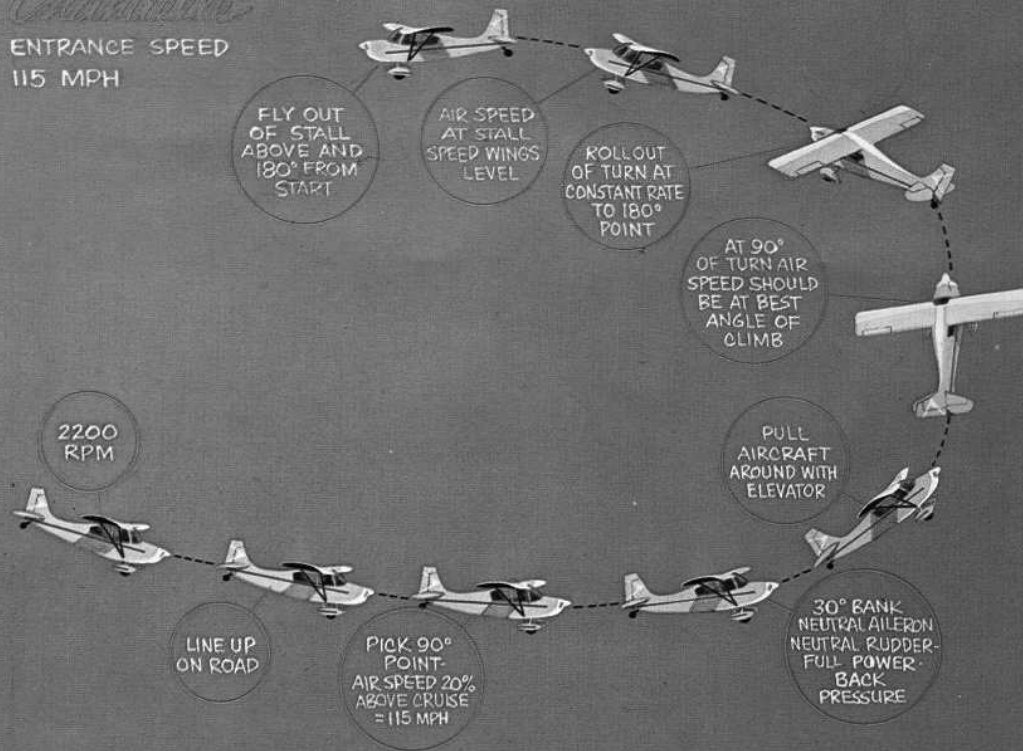
In the following pages, we will describe and depict the primary aerobatic maneuvers used in basic aerobatic courses. Please note that procedures for executing these maneuvers may vary from instructor to instructor and airplane to airplane. In all cases, follow the instructor's guidance in the execution of these maneuvers. Aerobatics is a learned skill. There are a few general rules to be applied. Once the basic aerobatic maneuvers are mastered, however, you will have a great deal of freedom to "do your own thing." This booklet is intended only as a general guide which you may study in preparation for aerobatic training. Entry speeds are based on those for the Citabria aircraft.

Champion Decathlon Specifications and Maneuver Entry Speeds

Number of Seats	2	Range	550 miles	HAMMERHEAD TURN	130 MPH
Engine	Lycoming IO-320	Airfoil Section	nearly symmetrical	LOOP	140 MPH
	E1A-inverted oil system and fuel injection.	modified NACA 1412			(Normal or inverted)
Power	150 hp @ 2700 rpm.	Wing Area	169 sq. ft.	SLOW ROLL	130 MPH
Propeller	Hartzell constant speed	Wing Loading	10.7 lb. per sq. ft.	SNAP ROLL	90 MPH
Gross Weight	1800 lbs.	Power Loading	12 lbs. per hp		(Normal or inverted)
Empty Weight	1225 lbs.	Roll Rate	20° per second	SPIN	SLOW
Useful Load	575 lbs.	Maneuvering Load Factor	+6, -5 G's		DECELERATION
Top Speed	145 mph	Aileron Area	10.34 sq. ft.	IMMELMANN TURN	145 MPH
Cruise Speed	135 mph	Stabilizer Area	12.25 sq. ft.	HORIZONTAL EIGHT	140 MPH
Maneuvering Speed	131 mph	Elevator Area	13.75 sq. ft.	VERTICAL	
V _{ne}	180 mph	Elevator Tab Area83 sq. ft.	ROLL - DOWN	60 MPH
Stall at Gross	53 mph	Vertical Stabilizer Area	7.02 sq. ft.	FOUR-POINT ROLL	130 MPH
Climb at SL	1025 fpm	Rudder Area	6.83 sq. ft.	SQUARE LOOP	160 MPH
Service Ceiling	16,000 ft.	Wing Dihedral	+1 degree	VERTICAL ROLL - UP	175 MPH
Fuel Capacity	40 gal. useable	Wing Incidence	+1.5 degrees		
		Stabilizer Incidence	-1 degree		

Charabelle

ENTRANCE SPEED
115 MPH



chandelle

Entrance Speed: 115 MPH IAS

The chandelle is a maximum performance climbing turn in which the airplane changes direction through 180 degrees.

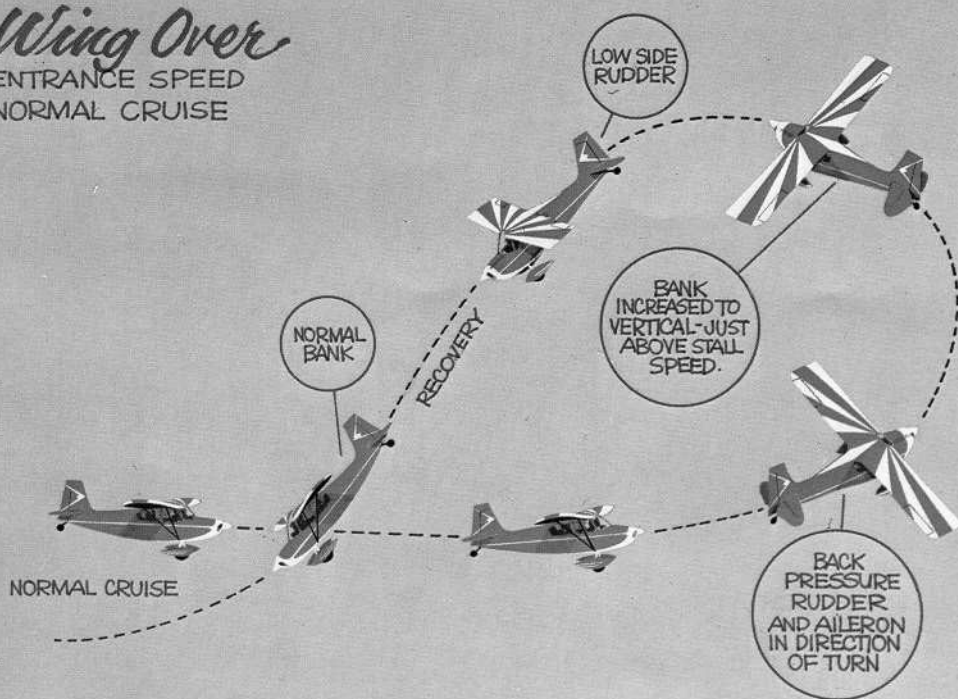
The chandelle is a practice maneuver and develops coordination of controls together with the feel of the plane as it slows down in a steep climbing turn.

Select a ground reference line such as a straight stretch of road and fly parallel to it. Set cruise throttle and nose down if necessary to achieve the desired entry speed. Establish a level bank (not normally exceeding 30 degrees) and gradually apply back pressure, while neutralizing ailerons and rudder. As the pitch attitude is increased, the bank is held constant and power is eased in until at the 90 degree point of the turn, the aircraft is in its maximum climbing attitude and at full power.

At the 90 degree point in the turn, a gradual decrease in bank should begin, with pitch attitude being held constant. Airspeed should be closely monitored so it will not decay too rapidly. At the 180 degree point, the wings should level, with the airspeed just above the stall. The nose should then be gradually lowered for a return to cruising flight.

Wing Over

ENTRANCE SPEED
NORMAL CRUISE



wing-over

Entrance Speed: Normal Cruise

A wing-over is a climbing turn followed by a diving turn. In the advanced form, the climbing turn is continued to the extent that the airplane is in a vertical bank at a speed just a little above the stalling speed.

There has been a considerable amount of confusion as to just what constitutes a wing-over as distinct from half of a "lazy eight", and the "hammerhead turn". The chief point of distinction between the lazy eight and the wing-over is that a wing-over is very steep, both in pitch and bank, and the precision of the maneuver is in its shape, whereas in the lazy eight, the maneuver is fairly shallow and the precision of the maneuver is in control of airspeed, altitude, heading, and coordination. Both of these maneuvers, however, are true turns, in which the ball bank indicator remains centralized.

The distinction between the hammerhead turn and the wing-over is that the hammerhead turn is not a true turn, but consists simply of climbing the ship until the longitudinal axis is approximately vertical, then applying rudder to one side or the other just before the stall occurs along with opposite or outside aileron. This means that the ship falls around the turn and the ball of the Turn and Bank indicator will move off center. In the hammerhead turn, if the rudder is applied too late, a tail slide or "whip stall" may occur . . . a maneuver which is not approved for the airplane structure. The wing-over is performed as follows:

Having selected a ground reference line, preferably a straight road, fly the ship straight and level at cruising speed and approach the line at a right angle. Apply back pressure on the stick as you cross the line, and as the ship begins to climb, apply coordinated rudder and aileron in the direction of the desired turn, increasing the climb and bank simultaneously. The pressure on the controls should be continued until a vertical bank is reached as the ship is at 90 degrees to its original heading and just enough above stalling speed to permit adequate control.

When the ship has reached the position of vertical bank, start the nose down mainly by increased pressure on the rudder pedal on the low side. Maintain the back pressure on the stick until the ship is within about 45 degrees of completing a 180 degree turn. At this time, gradually ease off the backward pressure on the elevator and apply coordinated aileron and rudder as in the recovery from a normal bank or power spiral. When the maneuver is completed the ship is in straight and level flight, once again crossing the road at a right angle, and at the same altitude as the entry.