Useful Instructional Maneuvers

By Paul Furnee

1. Attitude adjustment

Purpose:

- To acquaint the student with the proper water touchdown attitude of the aircraft.
- To develop the students "pitch feel" for landing.

Maneuver:

Choose a calm (< 3" waves) area of water (if possible) at least three miles in length. Ask the student to fly as close to the water as possible (1 foot) without touching the water. You, as the instructor, manage power such that airspeed and touchdown attitude is correct. If the student contacts the water, ask him to lift off again and continue. You will need to add power appropriately for this.

Criteria:

Student should be able to maintain from one to three feet above the water in calm air without touchdown.

2. Step taxi Speed control

Purpose:

- To demonstrate the proper step taxi speed and the effect of turns vs. straight taxi on power requirement.

Maneuver:

Choose a calm area of water (< 3" waves) with minimum wind if possible. Ask the student to maintain a constant step taxi speed of not more than 35 MPH (LA-4) (30 KTS) while performing a figure eight pattern in the water. The use of a rapidly updating GPS is extremely useful in this maneuver.

Criteria:

Student should be able to make at least two complete figure eights while not exceeding the target WATER SPEED nor dropping 5 kts below the target WATER SPEED. Note: if the wind is more than 3 kts, note the effect of the wind on airspeed vs water speed.

3. Bounce Recovery/Go around - Phase 1

Purpose:

- To demonstrate to the student the negative effect of adding power at high angles of attack and very slow airspeeds.

Maneuver:

At safe altitude (1500' AGL - 2500' AGL) ask the student to decelerate the aircraft at full power, from best climb speed at not more than one knot per second, until you note the first sign of buffet, air separation or stall. Make note of that speed. This is normally done flaps down, but ask the student to perform this both with flaps up and down. During stall investigation, make note of the power off (COMPLETELY OFF) stall speed at the same configuration(s).

Then ask the student to maintain altitude at the exact speed previously determined as the speed of first buffet. From this configuration ask the student to suddenly apply full power and climb at best possible angle, simulating a go around (over an obstacle) from a bad bounce. Determine aircraft response for next phase.

Criteria:

Student should perform this maneuver with minimum possible loss of altitude. This will vary from "0" feet to over 100 feet depending on aircraft.

3. Bounce Recovery/Go around - Phase 2

Purpose:

- To demonstrate the improbability or impossibility of "flying" out of a bad bounce situation in the water.

Maneuver:

Ask the student to execute a full stall water landing, power off. The assumption is made that the student is proficient in full stall landings. When, within five feet of the surface, and at a speed which is BELOW the minimum buffet speed as determined in phase 1, ask the student to "Go Around". This WILL NOT BE POSSIBLE without contacting the water, except with an exceptional aircraft probably equipped with VGs. After demonstrating this, repeat the maneuver, but add only the minimum power to keep the aircraft airborne, if possible. Assuming this is successful, ask the student to GRADUALLY add power to gain airspeed and altitude without contacting the water.

Criteria:

The outcome of this maneuvers varies with each individual aircraft. Under all conditions the student MUST maintain pitch control of the aircraft, in that the nose must NEVER drop below the horizon.

4. Power OFF landing approach

Purpose:

- To demonstrate the drag characteristics of the aircraft and perform "energy management".
- To determine if the student can maneuver the aircraft with reference to the ground.
- To determine if the student can make coordinated descending maneuvers.

Maneuver:

With flaps selected down, and at an altitude of at least 800' AGL (1000' AGL, Land), ask the student to make a power OFF approach to a designated and definable landing area from opposite the point of intended touchdown, using a ground track that is essentially a constant radius 180 degree turn.

Criteria:

The roll out to level flight for landing should occur at between 100' AGL and 200' AGL. The point of touchdown should be within (beyond) 300' of the predesignated point of intended touchdown. The bank angle should vary only as required by varying ground speed from initial roll-in to roll-out. All flight should be coordinated with a maximum of "half ball" slip/skid displacement.

5. Engine failure on takeoff

Purpose:

- To demonstrate the potential altitude loss and possible loss of control resulting from an engine failure on take-off.

Maneuver:

Caution! Never perform this maneuver below 1000' AGL without the full knowledge of both pilots and a full briefing about expected actions. Ask the student to make a maximum performance climb at full power. At an altitude of not less that 700' AGL, suddenly reduce power simulating a complete engine failure. Make certain that there is a suitable and easily reachable landing area well within range. After a one second delay to simulate reaction time, lower nose as required to maintain at least 1.5 Vso if landing area is within 30 degrees of track. If landing area requires a turn of more than 30 degrees, accelerate to 1.87Vso (1.3 x 1.44) before making any turns This will allow safe flight at a 60 degree bank Use energy management procedures to successfully reach landing area.

Criteria:

Student (or Instructor) must lower nose to acquire safe speed as soon as possible. This MAY REQUIRE as much as 45 degrees nose down. All turns MUST be coordinated.

6. Water Loop avoidance

Purpose:

To demonstrate at which point the aircraft becomes longitudinally and pitch unstable on the water, and initiates a "water loop".

Maneuver:

At Minimum step speed (not greater than 5 kts above) initiate a constant velocity step turn. After a defined radius of turn is established, demonstrate how lowering the nose affects the rate of turn and the pitch stability of the aircraft. At some point in the turn, suddenly lower the nose sufficiently so that the aircraft becomes unstable in the turn and starts a water loop. Emphasize that the slow water speed precludes damage since there is not enough energy in the turn to complete the water loop, but that a slight increase in water speed would be very hazardous. The beginning of the "water loop" should be sufficiently vigorous to feel the lateral acceleration.

Criteria:

Speed control is the secret to this maneuver. It should be accomplished at as slow a speed as possible to demonstrate the potential results.

7. Getting on the step

Purpose:

- To demonstrate the steps to successfully get "on the step" without porpoise and at minimum power.

Maneuver:

1. Demonstrate three distinct "motions" to get on the step:
   Nose up to get spray behind windshield. Wet windshield decreases visibility. Note effect of CG.
2. Note effect of adding power gradually to decrease initial nose down pitching.
   Nose down to get as much hull (Buoyancy) as possible in the water. Trim Forward effect.
3. Demonstrate effect of "rocking aircraft" at reduced power to get more hull in the water. Note that successful outcome is assured if each successive "rocking" cycle becomes more severe.
   Nose level (3 degrees up) to prevent porpoise. Move trim aft again.

Criteria:

Student should be able to get on the step without porpoise under normal circumstances.