Unusual Attitudes

The recovery from unusual attitudes is divided into full and limited-panel recoveries. Full-panel recoveries are a requirement of the PPL syllabus, and limited-panel recoveries a CPL requirement.

During full-panel recoveries the AI remains the master instrument. During limited-panel recoveries the indirect information of the performance instruments must be used to assess the aeroplane's attitude and achieve recovery to straight and level flight.

The briefing deals with the recovery of the aeroplane, to straight and level, once an unusual attitude has been identified.

Basically there are two types of unusual attitude, nose-high or nose-low. The most dangerous of the nose-low attitudes is the spiral dive, because it is difficult to identify.

The spiral dive produces positive G, which feels like a dive pull-out when, in fact, the aeroplane is being pulled tighter into the spiral dive.

Unusual attitudes may come about as a result of disorientation, turbulence (which may be quite pronounced in cloud) or a distraction that breaks down the instrument scan.

Inadvertent flight into cloud, full or limited-panel, can be expected to be a very stressful experience. In addition, the effects of stress will affect performance and may result in fixation on one instrument, or on a minor aspect of performance or problem.

Avoid the situation entirely.

Objective

To recognise and recover to straight and level from a nose-high or nose-low unusual attitude.

Considerations

A distraction, fixation or high workload may cause an interruption to the scan. Disorientation may occur as a result of the leans while night flying or in poor visibility.

The first step to recognising an unusual attitude is to maintain faith in the instrument indications. This can be difficult when your body senses are screaming at you that the instruments must be wrong!

The unusual attitude recovery is always carried out to regain straight and level. **Then** a gradual return to the reference altitude and heading is made. No attempt to return directly to the reference should be made, as this may increase disorientation or lead to another unusual attitude.

Recovery from unusual attitudes uses the same change – check – hold – adjust – trim sequence as all flight. However, the initial movements are more pronounced, and trim should not be required.

To regain straight and level, the position of the horizon must be identified. There are several methods of achieving this (refer CFI).

The limited-panel method recommended here is to use the airspeed or the altimeter.

The first action is to check the airspeed, ie, stop it increasing or decreasing, then adjust power to compensate and finally roll wings level.

If the airspeed is increasing apply back pressure and reduce power to fix the airspeed at a value. As the airspeed indicator needle stops moving, the aeroplane is in the level attitude, so now using the stationary altimeter needle, hold that altitude as wings are rolled level and a normal straight and level configuration is regained.

If the airspeed is decreasing apply forward pressure and increase power to fix the airspeed at a value. As the airspeed indicator needle stops moving, the aeroplane is in a level attitude, so now using the stationary altimeter needle, hold that altitude as wings are rolled level and a normal straight and level configuration is regained.

Airmanship

Ensure adequate height for recovery.

Revise systematic instrument scanning to maintain situational awareness.

Revise limiting speeds (V_A, V_{NO}, V_{NE}) and rpm limit.

Aeroplane Management

Smooth but positive throttle movements are required when recovering from unusual attitudes.

Human Factors

The limitations of the human orientation system are considerable, and instrument failure is rare; if disorientation occurs, **trust the instruments**.

Air Exercise

The air exercise covers the recognition and recovery from the nose-high, nose-low and spiral-dive unusual attitudes.

Nose-High

Recognition

Low or decreasing airspeed, increasing altitude, increasing rate of climb, and decreasing engine rpm.

Recovery

Apply full power and simultaneously level the wings (check balance), push forward on the control column until the airspeed/altimeter stops, check, and hold. When normal cruise airspeed has been regained, reduce power to cruise setting and adjust (trim if required).

Nose-Low

Recognition

High or increasing airspeed, decreasing altitude, increasing rate of descent, and increasing rpm.

Recovery

Reduce power (how much depends on rate of airspeed increase) and simultaneously level the wings (check balance), ease out of the dive, and check airspeed. When the altimeter stops, check, set cruise power to regain cruise airspeed, hold and adjust (trim if required).

Spiral-Dive

Recognition

high or increasing airspeed, decreasing altitude, high angle of bank (usually turn coordinator on its stops), high rate of descent, high or increasing G-loads, and increasing rpm.

Recovery

Close the throttle and simultaneously level the wings (check balance), ease out of the dive, and check airspeed. When the altimeter stops, check, set cruise power to regain cruise airspeed, hold and adjust (trim if required). Remember smooth control movements above V_A.

Once straight and level flight has been regained, return to the original references (heading and altitude).

Airborne Sequence

The Exercise

Have the student close their eyes, and place the aeroplane in gentle unusual attitudes to start with, gradually working your way up. This is best spread across a number of lessons, as too many unusual attitudes in one lesson is counter-productive.

Ensure a safe altitude, and avoid extreme attitudes.