Solo

Approach to Landing
Part 2 of 4

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In part two, we will examine how simple errors in airspeed, flight path and descent rate making the approach unstable, often resulting in crashes or damage that did not have to occur.

Airspeed errors

In part one, I stated that controlling airspeed is accomplished by adjusting the pitch attitude of the aircraft. Perhaps the most frequent error is the rate at which the pilot implements change to aircraft pitch when the plane is on short final.

Most often, the rate at which the pitch change is implemented is too high, which results in two events. First, the aircraft rate of descent changes from one of descent to momentary climb. Second, airspeed falls off. This results in the aircraft flying at a speed slower than when the correction was first made. The aircraft has just become unstable.

With the slower airspeed, the aircraft now starts a new descent, at a rate faster than before, in part because of the loss of life as well as the negative pitch attitude. No doubt, more than one pilot has made the erroneous decision to add UP elevator in an attempt to hold altitude. The aircraft in now dangerously unstable as this is the initiation sequence of an oscillating stall.

The second most frequent error is the pitch/power combination. Typically, the pilot is flying a flat approach with the angle being nearly parallel to the runway surface. Typically, the pilot gets into trouble when the decision is made to reduce power and glide with the throttle at idle to landing. The power change is made and the aircraft slows. As it slows, the rate at which the aircraft descends increases. The pilot adds UP elevator in an attempt to hold altitude, which results in further slowing, increasing the rate of descent (not what was desired) with the result being a landing short of the runway or stalling the aircraft in the air when there is insufficient altitude for recovery.

Flight path error

The most common flight path error is the failure to align the aircraft to the runway when it is on final approach. Most often this occurs when the pilot turns from base to final early or late. The resulting turn puts the aircraft on a parallel heading with the runway but does not align the aircraft with the end of runway.

Typically, the pilot does not detect the error until on short final when the aircraft is close to passing over the runway threshold. The error may be compounded when the pilot makes a drastic heading change in an attempt to reach the runway or avoid an obstacle. The drastic change at slow speed may slow the aircraft to stall speed.

The second most common error is known as pilot induced oscillations or PIO. PIO is the pilot overcorrecting the aircraft flight path with respect to the runway location. The pilot makes a correction to the flight path and then determines that the aircraft has flown through the intended alignment point on the approach flight path. The pilot then corrects the opposite direction, again flying through the intended alignment point on the approach flight path. The pilot is chasing the plane through the course. A wandering “S” of sorts.

Descent rate errors

Descent rate is controlled by throttle and glide angle. Using the elevator to control descent rate rather than glide angle and throttle is perhaps the single largest contributor to the approach becoming unstable and crashes. The aircraft is descending faster than desired. The pilot adds and holds UP elevator while reducing power. The aircraft momentarily slows in the descent. However, it also looses airspeed potentially initiating the porposing action described in the airspeed errors section or initiating an oscillating stall.

The second most common error is the pilot failing to correctly interpret the aircraft vertical position in relation to the intended landing point. Typically, this occurs in the base to final turn sequence. The pilot focuses on aligning the plane to the runway as well as airspeed. This results in a short landing or over flight of the intended landing point.

In part three, we will examine how to prevent the errors I have identified as well as restore stability to the approach.