Solo

Approach to Landing

Part 1 of 4

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- Throttle at idle, plane is on short final moving like a rocket and before you know it, out of runway to land on. Throttle up, go around and try again!
- The plane looked like it was lined up! How did I almost land on the barbed wire fence?
- Most of time I end up touching down in the grass off the approach end of the runway and hope I don't bust a prop or remove the gear!
- I'll be happy to just get it down anywhere! (Yikes!).

One might claim the comments are from a student pilot learning how to land. However, it could be any pilot struggling to stabilize an aircraft that is on final approach to landing. This is a multi-part article where we will examine the benefits and elements of a stable approach, how an approach becomes unstable as well as restoring stability to the approach.

There are three benefits to flying a stabilized approach. First, the touch down point becomes predictable. Second, the pilot may quickly detect deviations from the desired glide path and course. Third, the margin of field and flight safety is increased. A stabilized approach is a foundation for consistent landing performance.

To realize the benefits of a stabilized approach, the pilot must control three key elements. The key elements are airspeed, flight path and descent rate. Changing one will have an impact on the other two as well as the characteristics of the approach.

Airspeed

Controlling airspeed is accomplished by adjusting the pitch attitude of the aircraft. Pitching the aircraft negative (nose down) will result in an increase of airspeed. Similarly, positive pitch (nose up) will result in a reduction of airspeed. The airspeed selected as the approach speed should be one that allows the aircraft to glide with positive aileron control. If the aileron control appears to be mushy, the aircraft pitch attitude is too shallow and needs to be increased. No doubt, a sure sign that the aircraft flying critically close stall speed.

Determining the ideal pitch angle is a simple process of taking the aircraft up to a comfortable altitude, reducing power to an idle or near idle and adjusting the pitch attitude so the aircraft is in a shallow glide. Depending on the airfoil, the pitch attitude may be as shallow as 2-3 degrees or as high as 10-12 degrees. During the glide, evaluate the following:

- Responsiveness of the ailerons.

- Rate of descent remains constant.

Flight path

Most flying sites use the AMA suggested offsets to establish the distance between the runway edge and the pilot stations. The offset puts the pilot at a viewing disadvantage when aligning the aircraft to the runway. If the offset is not compensated for, turns from base to final will occur late or wide, placing the aircraft on the side of runway closest to the pilots.

Often, the pilot recognizes that they are not aligned with the center of the runway when the aircraft is near the end of the runway. The pilot then adjusts the heading, attempting to center the plane on the runway centerline. In practice, the correction was too large resulting in the aircraft positioned on the opposite side of the runway, which results in further corrections. Pilot Induced Oscillations. The amount of the errors becomes visible when the aircraft nears the runway threshold and is not where it is expected to be.

Compensating for the offset requires the pilot to pick a reference point or visual gate or queue that is in alignment with the center of the runway. When no one is flying, walk out to the centerline of the runway and see what topography might offer a visual queue. Each flying site is different and visual queue will be different. Consider placing a single marker or cone on the outer perimeter of the site in alignment with the runway centerline. A pair of cones would serve as an approach gate.

Placing the aircraft in alignment with the runway requires that the aircraft roll to level flight from base to final over top of the reference point or through the approach gate as viewed from the flight station. The flight path is then maintained by flying the aircraft from the reference point to the center of the runway.

Often pilots fail to use all of the tools at their disposal. Changes in the flight path or heading should be accomplished using rudder and aileron as coordinated turns/maneuvers.

Descent rate

Application or reduction of power controls the descent rate. Adding power during the descent will slow the rate at which the plane descends. Similarly, a reduction of power will increase the rate at which the plane descends.

Selecting a descent rate is dependent upon where the turns from downwind to base and base to final are made. If the aircraft is low in the pattern, a slow descent rate must be established to ensure the aircraft is assured of reaching the approach end of the runway.

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.